Fishery Management Report No. 15-39

2014 Annual Management Report Norton Sound–Port Clarence Area and Arctic–Kotzebue Area

by

Jim Menard

Joyce Soong

Scott Kent

Lauri Harlan

and

Justin Leon

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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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2014 ANNUAL MANAGEMENT REPORT NORTON SOUND–PORT CLARENCE AREA AND ARCTIC–KOTZEBUE AREA

by
Jim Menard, Joyce Soong, Scott Kent, Lauri Harlan, and Justin Leon
Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

Jim Menard, Joyce Soong, Scott Kent, Lauri Harlan, and Justin Leon
Alaska Department of Fish and Game, Division of Commercial Fisheries,
P.O. Box 1148, Nome, AK 99762, USA

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ABSTRACT

This report provides information about the 2014 commercial and subsistence fisheries of Norton Sound–Port Clarence and Arctic–Kotzebue management areas of the Arctic–Yukon–Kuskokwim Region of the Alaska Department of Fish and Game, Division of Commercial Fisheries. The management areas consist of all waters from Point Romanof north of the Yukon River and west of 141 degrees W longitude and those waters draining into the Bering Sea north of Yukon River; the Chukchi Sea, Beaufort Sea and Arctic Ocean. 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, Arctic, 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*, Annual Management Report (AMR), Fishery Management Report (FMR).

INTRODUCTION

This report summarizes the 2014 season and historical information concerning management of the commercial and subsistence fisheries of Norton Sound–Port Clarence, Arctic–Kotzebue management areas of the Arctic–Yukon–Kuskokwim (AYK) Region. Data from select management and research projects are included in this report. A more complete documentation of project results is presented in separate reports. Most of the historical harvest and escapement information in this report goes back to 1990. For information prior to 1990 see Menard et al. 2013.

Data presented in this report supersede information found in previous management reports. An attempt has been made to correct errors present in earlier reports. Previously unreported data were included and are 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 2 categories to facilitate use of this report: 1) Tables 1–12 present annual data, and 2) Appendices generally present historical comparisons. Not all appendices are cited in the text, and those that are cited are not necessarily cited in order.

SECTION 1: MANAGEMENT AREA OVERVIEWS

BOUNDARIES

Norton Sound–Port Clarence Area and Arctic–Kotzebue Area include all waters from Point Romanof in southern Norton Sound and St. Lawrence Island and west of 141 degrees W longitude, to the U.S.–Canada border (Figure 1). This area encompasses over 100,000 mi² and has a coastline exceeding that of California, Oregon, and Washington combined. For crab management the southern boundary is Cape Romanzof.

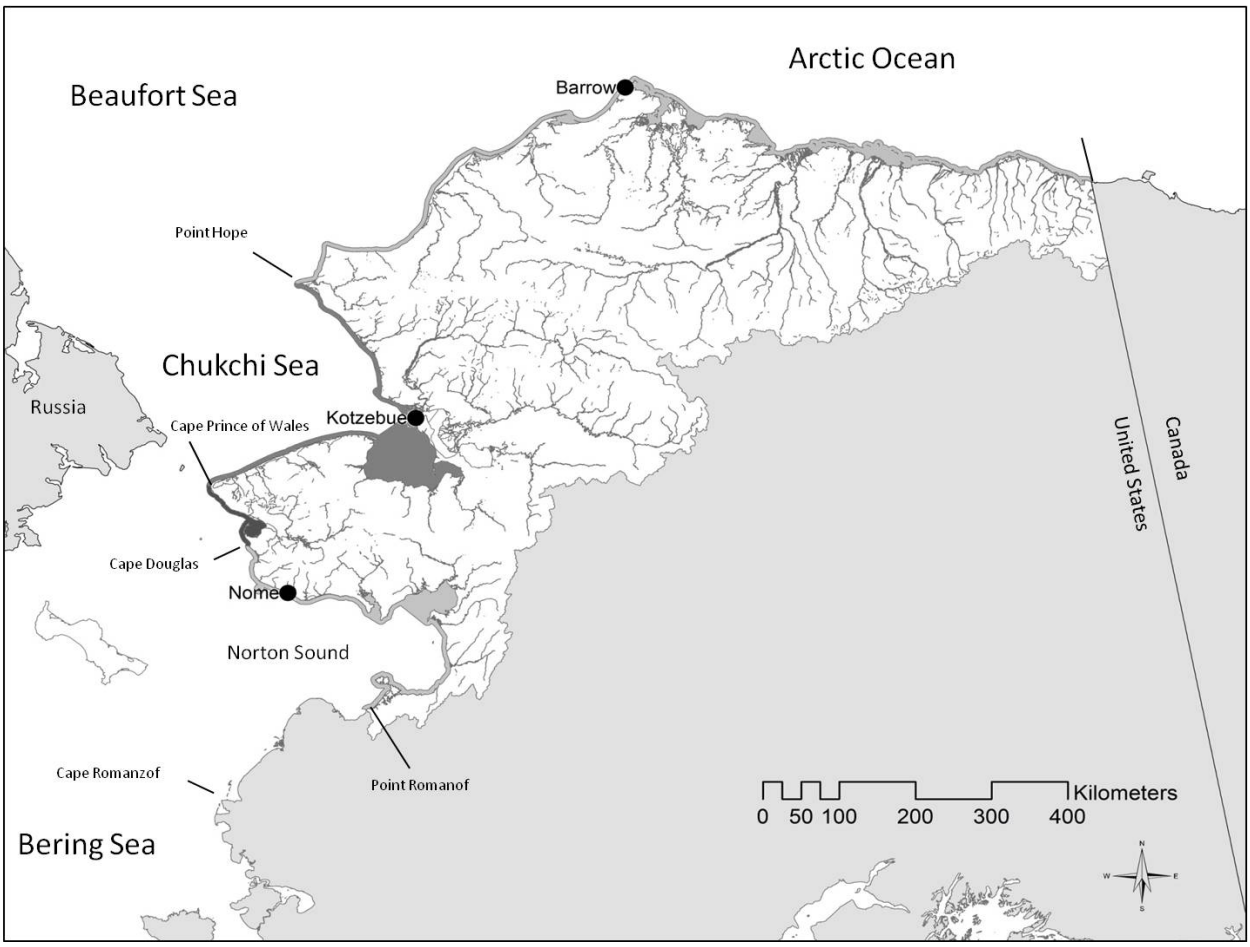

Figure 1.–Norton Sound, Port Clarence, Kotzebue Sound, and Arctic management districts.

SALMON OVERVIEW

There are 5 species of Pacific salmon 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, but 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. Small numbers of chum, pink, sockeye, and Chinook salmon have been reported by subsistence fishermen along the Arctic coast.

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 Norton Sound, Port Clarence, and Kotzebue Districts. 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 Alaska Natives (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.

There is no commercial salmon fishery in the Arctic District.

SUBSISTENCE SALMON FISHERY

There are approximately 23,000 people in the area, the majority of whom are Alaska Natives residing in more than 40 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 livelihoods.

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 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 fewer

household surveys because subsistence harvests for those communities are now reported through subsistence permits.

Also, in 2004, the Division of Commercial Fisheries began doing subsistence salmon household surveys annually in Shaktoolik and Unalakleet (and in Koyuk starting in 2008) and in other southern Norton Sound villages periodically. Surveyors attempt to contact all households. ADF&G staff members use 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.

Prior to the fishing season, ADF&G personnel usually make at least 1 visit to each village to issue subsistence salmon fishing permits. Fishermen 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, by phone or letter, all permit holders who did not return their household permit. Also, trips to villages are made postseason by ADF&G personnel to collect permits and discuss the fishing season.

In 2008, a cooperative project (between ADF&G Divisions of Commercial Fisheries, Habitat, and Subsistence; and North Slope Borough Department of Wildlife Management and Planning) was initiated and is ongoing to assess Pacific salmon resources in the Arctic District. Components of the project include 1) documenting subsistence salmon fishing patterns such as species targeted, fishing gear and methods, harvest timing, local salmon abundance and run timing, historical knowledge, and observations of spawning locations; 2) conducting aerial surveys to document adult salmon distribution in river systems and determine which rivers could be used as index areas for future monitoring; and 3) acquiring age, sex, and length samples and genetic samples for salmon.

SPORT SALMON FISHERY

Sport salmon harvests occur throughout all areas of Norton Sound (Appendices A13–A16). However, in northern Norton Sound from Bald Head near Elim to southern Kotzebue Sound at Cape Espenberg, a fishing pole is legal subsistence gear, and catches are often reported as subsistence harvests. More detailed description of sport fish harvest is reported in the fishery management report for sport fisheries in the Northwest/North Slope management area (Scanlon 2015).

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 2014 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, Port Clarence, and Kotzebue Sound. Biologists from regional staff provided additional assistance. In 2014, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians at some projects. There are 5 cooperative projects staffed by NSEDC and 2 projects jointly operated by NSEDC and ADF&G in Norton Sound that supplemented salmon escapement monitoring activities of 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 insufficient comparative catch and return information and difficulties in obtaining accurate escapement data. Management difficulties are compounded by the need to provide not only for adequate escapements but also for the needs of several different user groups. Alaska law requires subsistence users to receive priority over other users 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 2014 are listed in Appendix G9. 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 1 major salmon-producing stream (Figure 2).

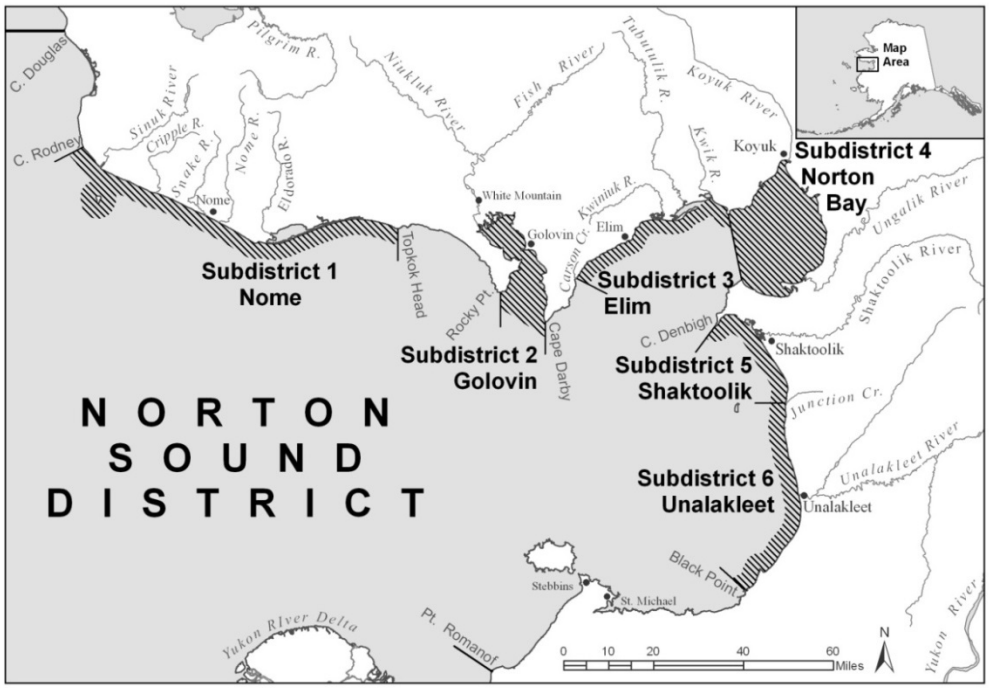

Figure 2.–Norton Sound commercial salmon fishing subdistricts.

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 had 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 catch per unit effort (CPUE). Nome Subdistrict is managed intensively for subsistence use: Tier II chum salmon subsistence permits, registration permits, closed waters, fishing-period length restrictions, gear limits, 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 precontact 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 composed of 1 or 2 families and set up camps near the mouths of streams. Harvest levels of fish on any 1 stream were relatively small because of low concentrations of people who caught only what their families and 1 or 2 dogs needed through the winter (Thomas 1982).

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

Mining affected fish populations significantly. Nearly every stream on the Seward Peninsula has had some sort of mining operation, ranging from simple gold panning or sluice boxes to hydraulic giants or 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 consisted of 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; the rest they bartered or sold to mining camps, roadhouses, and trading posts or stores. For example, the Haycock mining camp on the Koyuk River bought about 2 tons of dried fish each year. Roadhouses were located at Golovin, Walla Walla, Moses Point, Isaac’s Point, Ungalik, Robertvale, Foothills (south of Shaktoolik), Egavik, and other locations. Dried fish was bought in units of bundles (50 dried fish tied together) at a typical price of $0.10 per lb from the fishermen. One elder in the area thought fishermen retained more fish 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. However, 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 per lb and then sell them for $0.10 per lb 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 provides a list of commercial processors and buyers that operated in Norton Sound and Kotzebue Sound in 2014.

The commercial salmon fishing season usually opens by emergency order between June 8 and July 1 but depends on run timing within each subdistrict. The season closes by regulation on August 31 in Subdistricts 1, 2, and 3, and on September 7 in Subdistricts 4, 5, and 6, but processors often terminated their operations before regulatory closure dates in the past. However, during recent years Norton Sound Seafood Products (NSSP) has remained operational until the regulatory fishing season closure. Commercial fishing periods are set by emergency order. No commercial salmon fishing periods occurred in the Nome Subdistrict 1997–2012 because of regulatory restrictions on chum salmon, lack of buyer interest, or weak runs. Beginning in 2013, limited commercial fishing has occurred for chum and pink salmon (Appendix A6).

Commercial fishing gear is restricted to gillnets. A maximum aggregate length of 100 fathoms is allowed for each fisherman and there are no depth restrictions. However, mesh size is often restricted in an attempt to direct harvest toward a specific species of salmon. Fishing periods restricted to 6.0 in and smaller mesh gillnets are used to target chum and coho salmon. Most gillnets fished are approximately 5.875-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 in mesh or less to be used. These special small-mesh periods are an attempt to target pink salmon while reducing harvest of 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 fishing 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 interannual aerial

survey comparisons. Counting towers and weirs are a more consistent and accurate method of obtaining escapement information and have been utilized on several river systems in Norton Sound. In 2014, there were 3 counting towers and 7 weirs in operation. One sonar project was operated on the Shaktoolik River in combination with a counting tower, but the project was still in development and was not used for inseason management.

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 except as incidentally caught fish when there are other salmon directed fisheries. Coho salmon catches have remained fairly stable in recent years, 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 to the best catches since the 1980s. 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 Golovin and Elim Subdistricts have targeted chum salmon in June and most of July, pink salmon in June and July during even-numbered years, 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. However, continued 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 had occurred in Nome and Norton Bay Subdistricts since the early 1980s. Nome Subdistrict had very depressed chum salmon stocks that, until the mid-2000s, required closure or severe restrictions of the subsistence fishery. Although salmon runs have improved greatly with record runs of pink and coho salmon in recent years and the best chum salmon runs since the 1980s, Nome Subdistrict had been unable to attract a buyer for pink and coho salmon until recently and was closed to commercial chum salmon fishing by regulation until 2013. The Norton Bay Subdistrict often has healthy stocks, but it had been unable to attract markets willing to operate in this remote area until recently. Since 2008, improving market conditions resulted in NSSP bringing more tenders to the subdistrict, and commercial salmon fishing has resumed in Norton Bay.

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 (2004–2013), the average subsistence harvest was 67,730 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 are included for those years.

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 by village in Appendices G4–G8.

In 2004, ADF&G's subsistence salmon harvest assessment program changed substantially when household surveys were discontinued in most communities because the household subsistence permit system was expanded from Nome Subdistrict 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. Permits issued at the Nome office, and by ADF&G personnel in the field, identify gear restrictions, bag limits, subsistence zones (for Subdistrict 1, 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 1 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 catch limits.

In Subdistrict 1 (Nome), low salmon stock levels combined with a large concentration of users has required subsistence fishing permits since 1975. 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 the subsistence permit program, all subsistence salmon catches from Norton Sound Subdistrict 1 have been determined from returned permits since 1975. 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 that 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, and since 2010, all subsistence salmon permits issued have been returned or households have reported catches in person, by telephone, or by email.

Norton Bay, Shaktoolik, and Unalakleet Subdistricts have continued to be surveyed postseason by household interviews. Additionally, daily surveys of Unalakleet River and ocean subsistence fishermen were conducted annually after fishing periods during the Chinook salmon run from 1985–2012. Although total harvests by subsistence fishermen were not documented inseason, effort and catch information were used to judge timing and magnitude of the Chinook salmon run. These surveys were discontinued in 2012 because major reductions in subsistence fishing time and gear restrictions limited the utility of the data inseason. The directed Chinook salmon commercial fishery has not occurred since 2005 and can only be opened once it becomes apparent subsistence needs will be met and escapement goals will be achieved as indexed by North River counting tower and Unalakleet River mainstem weir counts.

Beginning in 2007, regulations allowed for cash sales of up to $200 worth of subsistence-taken finfish per household, per year, in the Norton Sound–Port Clarence Area, and starting in 2013 the amount allowed was raised to $500. From 2007 to 2012, 5 or fewer customary trade finfish permits were issued per year, but more recently, due to ADF&G's increased efforts to remind

residents about the permit requirement when selling subsistence-caught finfish, an average of 9 customary trade permits were issued per year in Norton Sound District. Total annual sales have never exceeded $2,000 (Appendix A33).

HISTORICAL REGULATORY ACTIONS IN NORTON SOUND SUBDISTRICTS

Nome Subdistrict (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 Nome Subdistrict 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 that the fishery may have intercepted nonlocal stocks. A 1978–1979 Norton Sound stock separation study (Gaudet and Schaefer 1982) showed that some 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 the Nome Subdistrict 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 committee 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 in the subsistence fishery. Beach seine use in specific waters in the subsistence fishery was also eliminated.

Beginning in 1991, no subsistence 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 affected the use of beach seines for subsistence fishing 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.

In 1999, the BOF concluded that 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. Under Tier II, permits are dispensed to individuals prioritized by fishing history and dependence and are based on projected harvestable surplus. As a result, ADF&G allowed 20 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 returned. If the run was assessed to be strong, then the subsistence fishery would open to all Alaska 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*. Chum salmon in Nome Subdistrict were determined to be a stock of management concern, and chum salmon in Golovin and Elim Subdistricts 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. The new OEGs are in actual number of fish and based on allocative factors considered by the BOF and ADF&G escapement goal analyses (Clark 2001). Except for Kwiniuk and Tubutulik rivers, which factors in additional chum salmon needed to provide for in river subsistence use, the OEGs are the same as ADF&G established sustainable escapement goals. BOF established OEGs, by subdistrict, are as follows:

Nome Subdistrict (Subdistrict 1)

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

Elim Subdistrict (Subdistrict 3)

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

A chum salmon management plan for Nome Subdistrict (Subdistrict 1) and a salmon management plan for Golovin and Elim Subdistricts (Subdistricts 2 and 3) were adopted by 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 in or less by emergency order when necessary to conserve chum salmon in Subdistricts 1, 2, and 3. Also, 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 boundary between Subdistricts 3 and 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, hook and line became legal subsistence gear. Although hook and line can be used for subsistence fishing, sport fish methods and means requirements still apply to harvesting of fish (for example, no snagging of fish is allowed). 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, 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 salmon subsistence permit requirement for the Norton Sound 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.

Improving chum salmon runs in Nome Subdistrict resulted in Tier II chum salmon fishery restrictions being suspended beginning in 2006. A permit is still required for subsistence salmon fishing, but there is no longer a Tier II fishery that restricts participation in subsistence fishing. In 2007, the BOF upgraded Nome Subdistrict from a management concern to a yield concern. The yield concern status was reaffirmed for Golovin and Elim Subdistricts, and all 3 subdistricts continue to be stocks of yield concern by BOF designation at 2010 and 2013 BOF regulatory meetings. In addition, the BOF allowed commercial chum salmon fishing beginning in 2013 in Nome Subdistrict and liberalized subsistence fishing restrictions during chum salmon season. Specifically, this included expanding subsistence fishing time in the marine waters east of Cape Nome to 7 days a week and allowing the use of beach seines during the scheduled freshwater gillnet periods throughout the Nome Subdistrict.

Regulatory actions were also undertaken in other subdistricts. Subdistricts 5 and 6 Chinook salmon were designated a stock of yield concern in 2004, and BOF continued this designation in 2007, 2010, and 2013. 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 ADF&G 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, ADF&G is directed to close the Chinook salmon fishery.

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 gracilis*, whitefish, and herring *Clupea pallasii* are the major subsistence species.

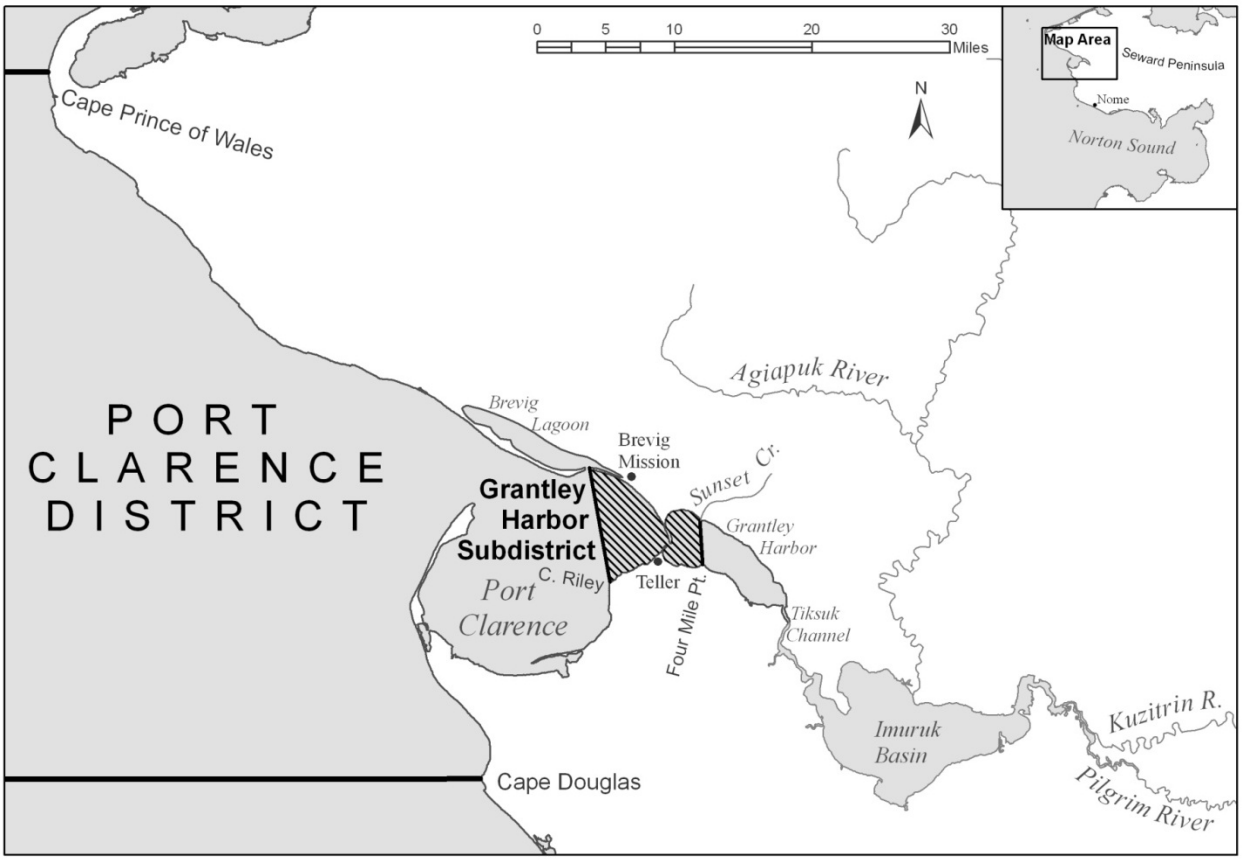

Figure 3.–Port Clarence District.

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

COMMERCIAL FISHERY OVERVIEW

In contrast to Norton Sound District, commercial fishing has been limited in Port Clarence District. In 1966, a commercial salmon fishery was established in the Grantley Harbor/Tuksuk Channel area of the Port Clarence District, but the fishery that year yielded less than 2,300 combined chum, pink, and sockeye salmon (Menard et al. 2013). It was closed later that same season, due to small salmon runs and concerns from local residents about impacts to area subsistence salmon fisheries, and had remained closed until relatively recently. In the mid-2000s, there were large increases in sockeye salmon runs as well as positive results from an ADF&G test fishery in 2006. Consequently, in 2007, the BOF reestablished by regulation a Port Clarence

District commercial salmon fishery. The BOF also established an inriver run goal of at least 30,000 sockeye salmon as a trigger point to allow a commercial fishery. The 2007 fishery harvest was 1,152 sockeye salmon, and 3,183 chum salmon, whereas the 2008 fishery harvest was 89 sockeye salmon, 256 chum salmon, and 910 pink salmon (Menard et al. 2010). 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 has remained closed since 2009 because the inriver run goal of 30,000 sockeye salmon has not been achieved in the last 6 years.

SUBSISTENCE FISHERY OVERVIEW

Salmon Lake, which empties into the Pilgrim River in the Port Clarence District, along with Glacial Lake in the northwestern portion of the Nome Subdistrict, supports the northernmost sockeye salmon populations of significant size in North America. Subsistence harvests of sockeye salmon in the Sinuk River, which drains Glacial Lake, have historically been low due to difficulties navigating this shallow, boulder-laden river. In contrast, sockeye salmon harvests in the Pilgrim River are much higher because it is more easily traveled and several beach seining and set gillnet fishing locations are accessible via the Kougarok Road (Nome–Taylor Highway) emanating from Nome. 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.

Beginning in 2007, regulations allowed for cash sales of up to $200 worth of subsistence-taken finfish per household, per year, in the Norton Sound–Port Clarence Area, and starting in 2013 the amount allowed was raised to $500. From 2007 to 2012, one or zero customary trade finfish permits were issued in Port Clarence District, but more recently, due to ADF&G's increased efforts to remind residents about the permit requirement when selling subsistence-caught finfish, an average of 10 customary trade permits were issued. Total annual sales have never exceeded $2,000 (Appendix A33).

Village subsistence surveys were conducted annually by the Division of Commercial Fisheries until 1983 (Menard et al. 2013). 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 subsistence salmon permit program in 2004, subsistence salmon harvests for residents of Teller and Brevig Mission have been determined from reported totals on permits.

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, 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 (Figure 4), there has been increased fishing effort from Nome area residents due to increased fishing restrictions in Nome Subdistrict beginning in the 1990s, and more so in the mid-2000s when there were record runs of sockeye salmon to Salmon Lake. Since then, even though numerous fishing restrictions have been eliminated in Nome Subdistrict and subsistence fishing closures have occurred on Pilgrim River in 5 of the last 6 years, there continues to be record fishing effort at Pilgrim River.

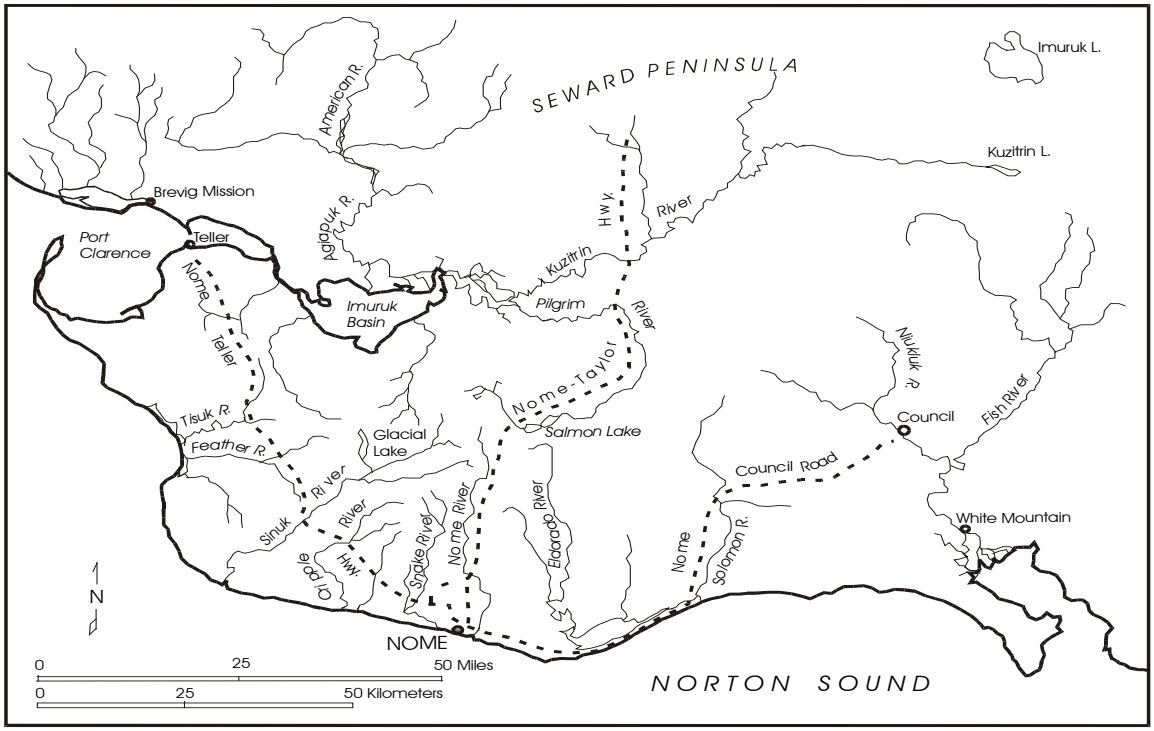

Figure 4.–Seward Peninsula with road-accessible waters.

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 whether 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 at a reduced amount from the earlier years (Appendix B4).

KOTZEBUE SALMON OVERVIEW

DISTRICT BOUNDARIES

Kotzebue 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 major subsistence species.

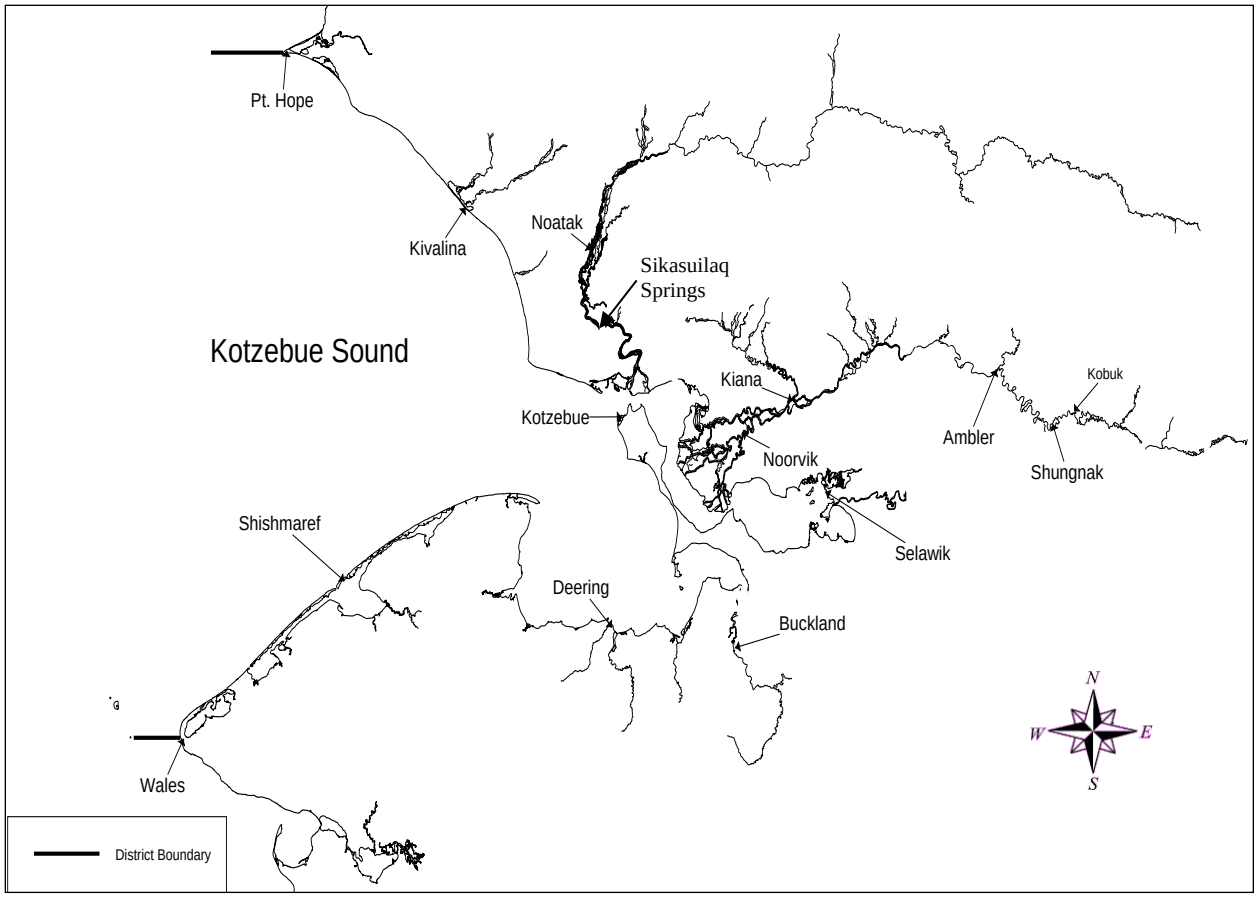

Figure 5.–Kotzebue District, villages and subsistence fishing area.

COMMERCIAL FISHERY OVERVIEW

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

The commercial fishery under state management opened in 1962. Salmon harvests consist primarily of chum salmon, although limited amounts of Dolly Varden; sheefish; whitefish; and Chinook, sockeye, pink, and coho salmon are harvested during the fishery.

In the Kotzebue fishery, gear is limited to setnets with an aggregate of no more than 150 fathoms per permit holder. Fishermen generally operate with an end on or near shore and with all 3 shackles connected. Fishermen also set in deeper channels in the mudflats farther out from shore. Most gear used in the district is 5.875 in or 6.0 in stretch mesh gillnet.

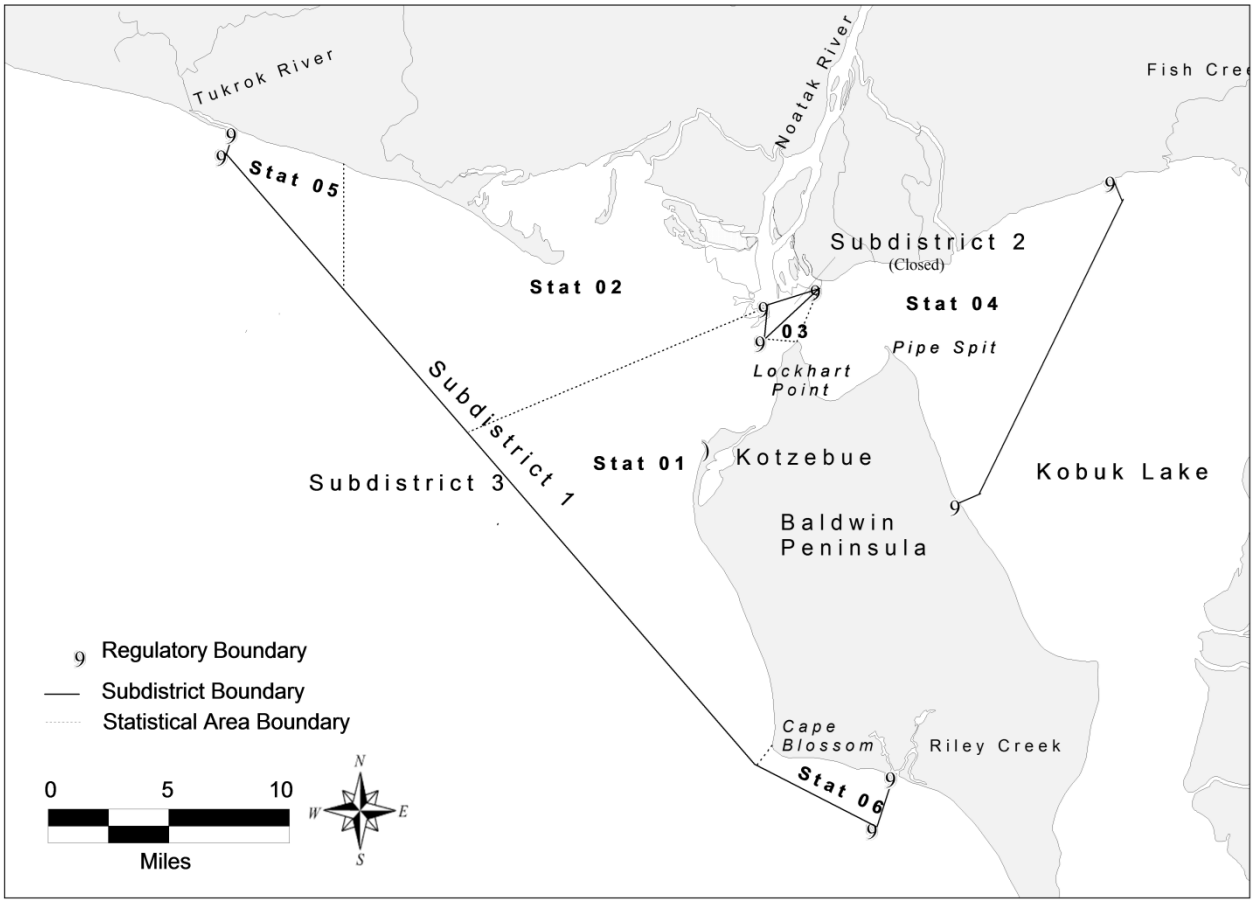

Figure 6.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

The earliest documented sales of salmon in Kotzebue District were in 1909 when Lockhart's store purchased 21,906 lb of salmon from local residents and resold it at $0.05/lb. Of those sales, 21,366 lb were sold to gold miners on the Kobuk River drainage and 540 lb 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 the present. The current fishery became fully developed in the mid-1970s. 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 limited buyer capacity have caused harvests to fall short of their potential. The fishery bottomed out in 2002 and 2003 when no major buyer came to Kotzebue and began to slowly rebound in 2004 when 1 major buyer returned and slowly increased their capacity over a decade. This buyer remained the only major buyer for 10 years, but in 2014 two additional major buyers purchased fish (Appendix G3).

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 unknown.

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, whereas others move seasonally to fish camps where they stay for several days to several weeks. The predominant species in the district is chum salmon, although small numbers of other salmon species are present.

Historical subsistence surveys for the Kotzebue area have been less complete than for Norton Sound and Port Clarence Districts. However, expanded documented surveys from 1995–2001 resulted in an estimated total subsistence salmon harvest for the Kotzebue Sound area to be 74,151 annually (Appendix C4). During these years, ADF&G Division of Subsistence (DOS) conducted annual household subsistence salmon surveys in select Kotzebue District communities, including surveying the town of Kotzebue using mail-in postcards. Due to budget constraints these surveys were discontinued in 2005 but were restarted in 2012, when comprehensive subsistence fish harvest data were again collected from Kotzebue area villages by DOS. However, the town of Kotzebue has not been surveyed since 2001.

ARCTIC SALMON OVERVIEW

DISTRICT BOUNDARIES

The Arctic District includes all waters of Alaska north of the latitude of the westernmost tip of Point Hope and west of 141 degrees W longitude, including those waters draining into the Chukchi Sea, Beaufort Sea, and Arctic Ocean (Figure 7).

SUBSISTENCE FISHERY OVERVIEW

There are no commercial salmon fisheries in the Arctic District. Small numbers of chum, pink, and Chinook salmon have been reported by subsistence fishermen along the Arctic coast, with pink salmon being the most numerous and then chum salmon (Craig George, North Slope Borough, senior wildlife biologist, personal communication). Salmon are caught in gillnets as an incidental species when subsistence fishermen are targeting other non-salmon finfish. In October 2012, a fisherman caught 2 sockeye salmon in Ikroavik Lake, approximately 5 miles south of Barrow, subsistence fishing with gillnets under the ice targeting least cisco *Coregonus sardinella* (Geoff Carroll, ADF&G, Barrow; personal communication). There are no reliable reports of coho salmon being caught.

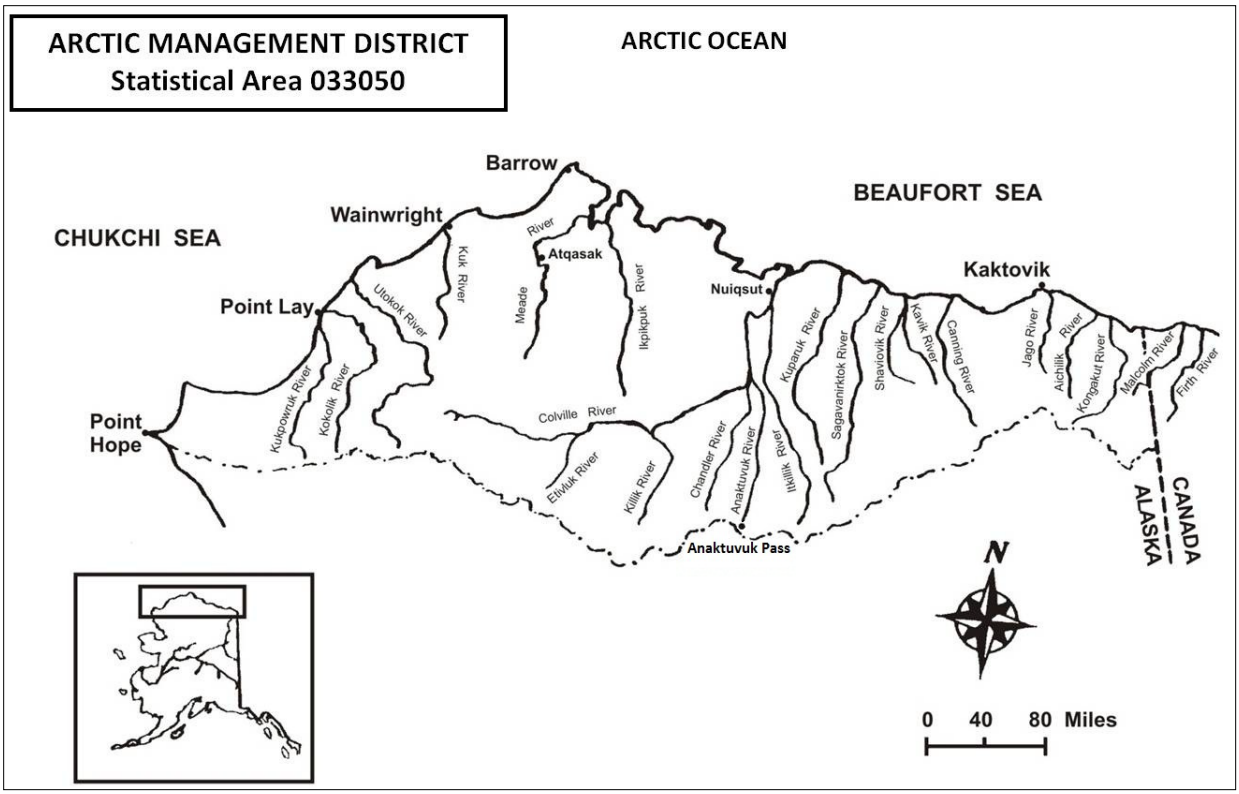

Figure 7.–Arctic management district.

PACIFIC HERRING OVERVIEW

DISTRICT BOUNDARIES

Pacific herring *Clupea pallasii* are present in Norton Sound, Port Clarence, Kotzebue Sound, and Arctic Districts. Norton Sound Herring District consists of all state waters between the latitude of the westernmost tip of Cape Douglas and the latitude of Point Romanof (Figure 8). 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. The Arctic District does not have herring district boundaries in regulation.

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. Although subsistence herring catches have been reported in the Arctic District near Barrow, there is no information available on spawning areas.

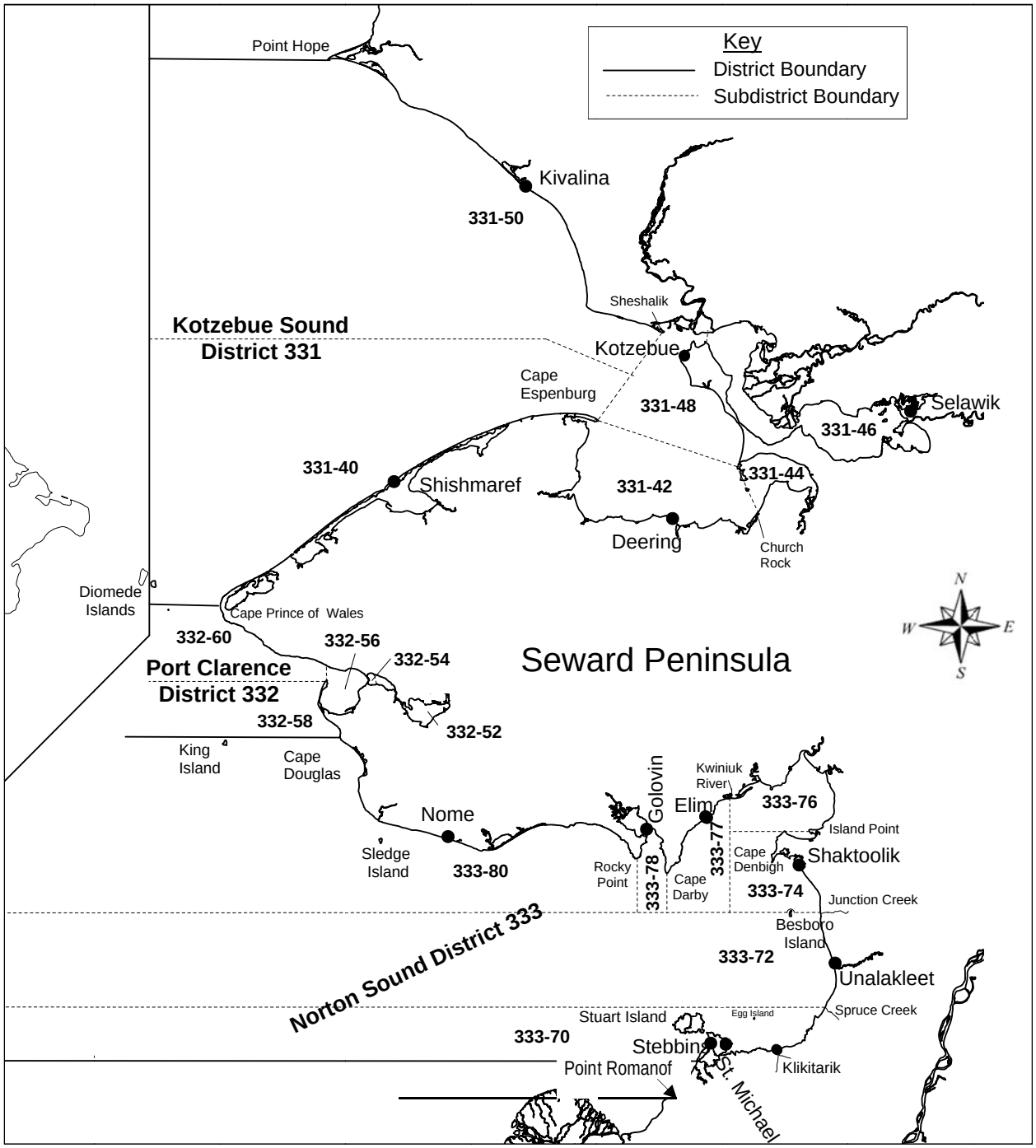

Figure 8.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

NORTON SOUND PACIFIC HERRING OVERVIEW

COMMERCIAL FISHERY OVERVIEW

Sac Roe

The earliest American commercial effort on Bering Sea herring apparently took place in the early part of the 1900s near Golovin in Norton Sound (Menard et al. 2013). 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 (Menard et al. 2013). 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 that 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 (Menard et al. 2013). 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 projections as published by the 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 has existed 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 sac roe gillnet harvest was 3,759 tons and had the highest level of fishing effort on record (Menard et al. 2013). This effort was more than twice the average from 1980 through 1986, yet Norton Sound area residents accounted for only about a third of both the effort and 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.

No harvest occurred in 1992 due to very late ice breakup, but both gillnet and beach seine fisheries continued with a total of more than 200 participating fishermen until 1998. The 1995 gillnet harvest of 6,033 tons was the largest on record, and the 1993 beach seine harvest of 742 tons was the largest harvest on record by this gear type. Combined dollar value for both the beach seine and gillnet fisheries peaked in 1996 at $4.5 million (Appendix D2).

Since 1997, poor market conditions have been the primary influence on the level of commercial harvest. There has been no harvest by beach seine since 2000. Number of fishermen has

decreased from 122 in 1999 to an average of 23 for the past 5 years. From 1999 to present, the number of buyers has steadily declined, from 4 to 1, with no buyers present in 2004. Even when there was a buyer, sometimes only bait was purchased, as happened in 2007–2009. One bright spot was the high recovery of over 13% roe in 2010 and 2011. In 2012 there was no sac roe fishery due to late ice breakup and in 2013, less than 500 tons of sac roe herring was harvested. In 2014, only 1 ton of bait was harvested because ice prevented tenders from reaching Norton Sound. Also, Unalakleet was often iced in, which prevented deliveries to the plant.

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 periods ranged from less than 1 ton (1977) to approximately 47 tons (1981). During the 1984 season, 1 ton of *Macrocystis* kelp imported into Norton Sound resulted in a harvest of approximately 3 tons of product (Menard et al. 2013). 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.

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 D2).

Food and Bait Fishery

Early records indicate about 3,200 tons of “fall herring” were processed in Norton Sound from 1916 to 1941 (Menard et al. 2013). 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 (Menard et al. 2013). 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 reported food and bait herring harvest estimates were initially harvested as sac roe but bought and processed as food and bait, so they were 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 based upon the *Bering Sea Herring Fishery Management Plan* (5 AAC 27.060) 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 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 (Menard et al. 2013). This strategy prevented harvest efforts from concentrating in 1 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. Figured heavily in this strategy is the belief that ripe females approach the beach at that time to spawn. 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.

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 herring spawn-on-kelp for subsistence use.

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 that 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 D4).

Regulations allow spawn-on-kelp fisheries in Port Clarence and Kotzebue Districts. 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 (3 m) in shallow bays, inlets, and lagoons.	Intertidal and shallow subtidal spawning along exposed rocky headlands.
Zosteria sp. primary spawning substrate.	*Fucus* sp. primary spawning substrate.
More euryhaline.	Less euryhaline.
Overwinter in shallow bays; water is warmed by river discharge under ice cover.	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 Districts. These data do not preclude possibility of more southern stocks utilizing this region, such as stocks that 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 that are warmed by river discharge under the ice (Barton 1978). Size difference may be explained by warmer water temperatures from river discharge. Water temperatures and feeding conditions in deep ocean waters are probably more favorable for growth than those in herring winter habitats along the Seward Peninsula, where apparently they have become adapted to Arctic conditions (Barton 1978).

Aerial surveys are difficult in Port Clarence District because of organic coloring of waters of Imuruk Basin, Tuksuk Channel, Grantley Harbor, and, to a lesser extent, Port Clarence. Presence of other species of fish caught in test commercial gear sets indicate the need for verifying species composition of any biomass sighted. A further complicating factor within Port Clarence is spring ice conditions. Port Clarence is a sheltered body of water that 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. Herring have been observed in Imuruk Basin in the fall, and seals have also been observed by aerial observation when returning through the area from salmon surveys.

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 9).

Abundance

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 (Appendices E2 and E13–E14), historical winter and summer pot studies, and winter and summer fisheries (Appendices E15–E20), the model is used to project abundance estimates of legal male crab 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. It should be noted that estimates prior to 1996 are currently under review as survey extrapolation methodologies changed after that point, and previous biomass estimates may be revised and incorporated into the model as a result of this assessment.

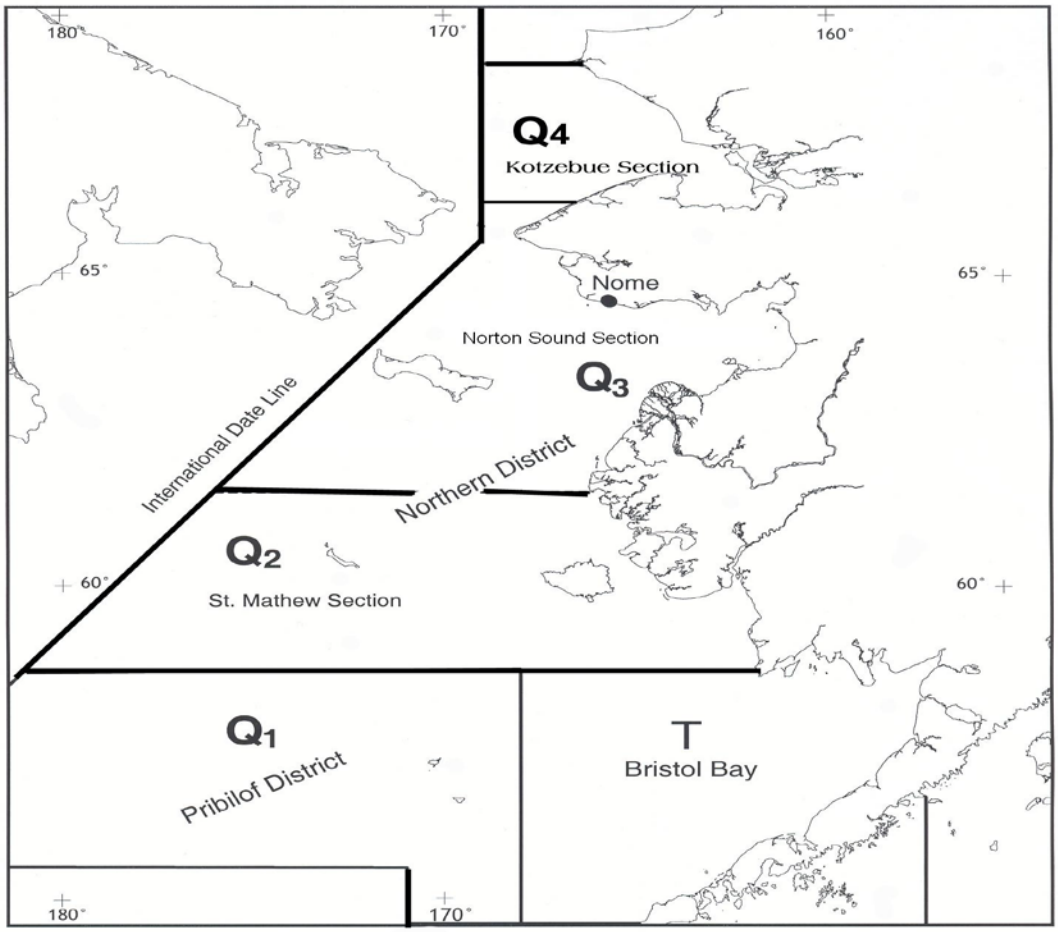

Figure 9.–King crab fishing districts and sections of Statistical Area Q.

The following estimates are based on the model's results from spring of 2014 with the latest data from the 2011 trawl survey, the 2013 summer fishery, and the 2011–2012 winter study. In 2009, legal biomass estimate for the summer crab fishery was 3.97 million lb, an increase of 7% from the 3.70 million lb estimated for 2008. The legal population estimate increased for the following 2 years: to 4.42 million lb in 2010 and 4.54 million lb in 2011. From 2011 to 2014, the legal abundance estimate decreased, to 4.23 million lb in 2012, 3.61 million lb in 2013, and 3.23 million lb in 2014 (NPFMC 2014).

No winter study has taken place after the 2011–2012 season, because ADF&G did an expanded spring and summer tagging study in 2012–2014. Results from the summer tagging project will be compared with previous winter tagging projects for possible future incorporation into the model estimates.

COMMERCIAL FISHERY OVERVIEW

The last year that a large-vessel summer commercial crab fishery existed in Norton Sound Section was in 1990. No summer commercial fishery occurred in 1991 because of ADF&G 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 since 1990. Historical information before 1990 can be found in the 2012 Annual Management Report (Menard et al. 2013). 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, but no CDQ 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 E12).

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 lb. A summer commercial season may only open if the legal crab biomass is estimated to be at least 1.5 million lb, and if the legal biomass falls in the range of 1.5 to 2.5 million lb the harvest rate will be no more than 5% so the stock may rebuild. If legal biomass is 2.5 million lb or more, the harvest rate will be no more than 10%. In March of 2012, this regulation was modified by the BOF so that the new threshold level of abundance of legal male red king crab biomass was set at 1.25 million lb. If the estimated legal crab biomass falls within the range of 1.25 to 2.0 million lb, the harvest rate will be no more than 7% of legal male abundance. From 2.0 to 3.0 million lb, the harvest rate will be no more than 13%. If the estimated legal biomass is more than 3.0 million lb, the harvest rate will be no more than 15%. Improved abundance estimates and the current management strategy will greatly reduce the risks of over fishing the stock.

Since 1981, in order to protect crab utilized by the inshore subsistence fishery from commercial harvest, an area delineated by a line approximately 10 to 15 miles off the shores of southern Seward Peninsula from Port Clarence to St Michael has been closed to the summer commercial fishery. This closure line has been adjusted over the years to its current position adopted by the BOF in 2002 (Appendix E11).

To reduce handling mortality of sublegal and smaller female crab, 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 in located within 1 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 in stretched mesh. Also starting with the 2008 season, even though the minimum legal size of red king crab is 4.75 in in carapace width (CW), the local seafood plant did not always buy crab less than 5.0 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 Fishery Management Council closed the Bering Strait 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 E11).

CDQ Fishery

NSEDC and Yukon Delta Fisheries Development Association (YDFDA) divide the CDQ allocation. Only fishermen designated by these 2 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 E11. 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, Norton Sound Seafood Products (NSSP), began operating in Nome in summer 2002, greatly improving the ability of Nome ADF&G staff to sample crab brought to the Nome dock. Crab were either sampled at NSSP or at the small boat harbor where non-resident fishermen or catcher-processors not selling to NSSP 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.

Catch information for king crab before 1990 can be found in the 2012 Annual Management Report (Menard et al. 2013). Since 1990, the winter subsistence crab fishery harvest has ranged from a low of 256 crabs during the 2000–2001 season to a high of 12,152 crabs during the 1989–1990 season (Appendix E5). Lack of success in the winter crab fishery during some 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, as well as 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 85 fishermen averaged 80 crab each.

ST. LAWRENCE ISLAND AND KOTZEBUE KING CRAB OVERVIEW

District Boundaries

Formerly, St. Lawrence Island Section was located 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 degrees N latitude and west of 168 degrees W longitude (Figure 9). The former St. Lawrence Island Section north of 66 degrees 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 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 crab, and indicated that using standard Norton Sound crab gear would only access a nursery site for gravid blue king crab. When more suitable gear becomes available, further surveys will be necessary to determine the feasibility of a summer fishery. At the March 2008 BOF meeting, legal size requirement for blue king crab was changed from 5.5 to 5.0 in. Preliminary data indicate that blue king crab size at maturity is very similar to Norton Sound red king crab.

In summer of 2006, 2008, and 2011, trawl surveys in the northern Bering Sea were 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. The 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. 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. The 2008 and 2011 trawl work was focused on looking at the distribution of blue and red king crab in the area between Port Clarence and King Island. More survey work is necessary to generate an abundance estimate and to better understand the distribution of blue king crab. The 2006, 2008, and 2011 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

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. Since 1990, commercial catches in the former St. Lawrence Island Section have only been reported for 4 years. In 1992, 53 lb of blue king crab were landed. In

1995, 7,913 lb of blue king crab were delivered from 3 landings (Bue et al. 1997). In 2005, 316 lb of red king crab were harvested in the Kotzebue area, and in 2006, 340 lb were harvested[1].

Fishermen from 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, Kotzebue, and Arctic 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 10).

[1] Statewide electronic fish ticket database [Internet]. 1985- . Juneau, AK: Alaska Department of Fish and Game, Division of Commercial Fisheries. [URL not available as some information is confidential]. Hereafter referenced as "fish ticket database."

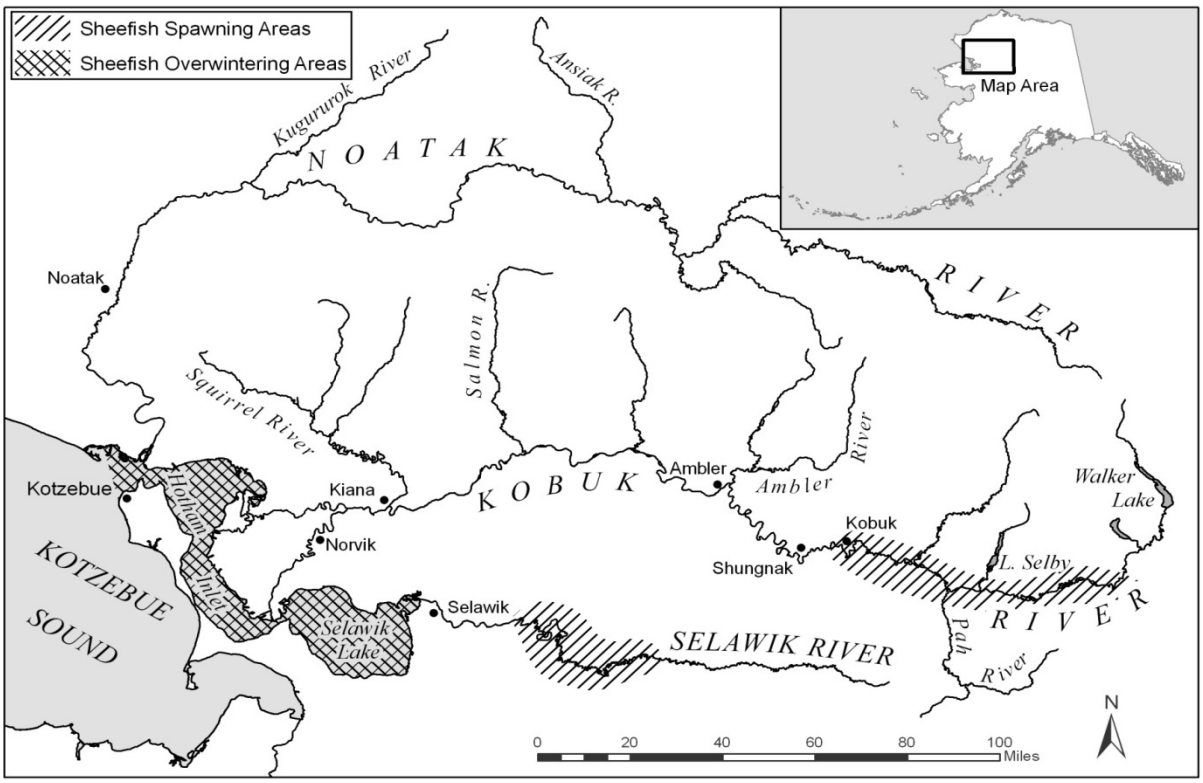

Figure 10.–Kotzebue and Kobuk River Valley villages and their spatial relationship with sheefish spawning and overwintering areas.

Spawning and overwintering migration behavior of sheefish makes them available for harvest by various fisheries throughout their life cycle, yet increases their vulnerability to overharvest. Although sheefish 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 increase 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 sheefish stocks were overharvested by commercial and subsistence fisheries in Kotzebue District. Consequently, an annual area commercial harvest quota of 25,000 lb was instituted, but subsistence is given priority and has remained unrestricted.

Subsistence Fishery

Sheefish have long been utilized for subsistence purposes throughout Kotzebue basin, especially in Kotzebue, Selawik, and the villages along the Kobuk River. These harvests may include winter, summer, and fall catches. As a result of budget constraints, the Division of Subsistence did not survey the villages in Kotzebue District for subsistence sheefish harvests from 2005 to 2011. 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 sheefish harvest information was not always collected for the town of Kotzebue, where a sizable ice fishery occurs for sheefish in late winter and spring. From 2012 to 2014, there were comprehensive subsistence surveys for fish and wildlife harvests of 6–8 Kotzebue area villages. For the last 2 years, estimated annual combined harvest of sheefish from these villages has been well over 10,000 fish (Appendix F2).

Summer and fall subsistence fishing for sheefish 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 sheefish 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; catch information is gathered with the use of subsistence household surveys, if conducted.

In 1987, BOF adopted a regulation limiting size of gillnets used to take sheefish for subsistence to be not more than 50 fathoms in aggregate length or 12 meshes in depth, nor have a mesh size larger than 7.0 in (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 sheefish harvest.

Commercial Fishery

Most commercial fishing effort occurs through the ice in Hatham Inlet, near Kotzebue, using gillnets from 5.5 in to 7.0 in stretched mesh. Recorded commercial catches are relatively small, but undocumented catches may be significant. Therefore, harvest totals should be considered minimum estimates. Lack of markets outside northwestern Alaska greatly limits commercial activity; however, most individuals participating in the winter commercial fishery also fish for subsistence purposes. Sheefish incidentally caught in the commercial salmon fisheries are sold in years when there is a market, but only in small amounts. Reported harvest and effort in the commercial fishery have declined in the last 15 years. Since 1998, harvest has not exceeded 1,250 lb, compared to the highest harvest of 8,224 lb in the last 24 years (Appendix F1). Since 2004, there have been no reported commercial sheefish catches except in 2005 and 2012. In both of those seasons, there were fewer than 3 permit holders fishing, making their catch information confidential.

Sport Fishery

Kotzebue District sheefish are considered by many to be among the pinnacle of Alaska freshwater sport fishing due to their large size. 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, the 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). Sheefish sport harvests in the last 10 years have averaged just over 600 annually (Appendix F3).

Historical Escapement

Historically, aerial surveys were conducted on key sheefish 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 sheefish being observed. During these surveys, species identification has been a problem. Surveys were not conducted from 1984 through 1990 because of high and/or 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 sheefish in Kotzebue District, but some local residents were concerned that the sheefish stocks were declining.

Because of these concerns, a cooperative tagging project on sheefish 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 sheefish 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 sheefish 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 sheefish were tagged in Upper Kobuk River. Spawning population estimates of sheefish in Upper Kobuk River were 32,273 in 1995, 43,036 in 1996, and 26,800 in 1997. Sheefish spawn upstream of the village of Kobuk; the 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, Kotzebue, and Arctic Districts. Although taxonomists have 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. They 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 outmigrating 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 and Arctic areas. In some communities, they outrank salmon and whitefish in importance to subsistence; however, most fishermen 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 making up 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. Most Dolly Varden harvests take place before or just after freeze-up. Fishermen from Noatak usually fish before freeze-up, but residents of Kobuk River villages of Shungnak and Noorvik fish for Dolly Varden throughout the winter. Since 1991, subsistence catch of Dolly Varden in Noatak has ranged from almost 3,000 to over 11,000 fish (Appendix F5). However, these harvests should be considered minimal figures because of survey timing. Except for 2007, no Dolly Varden harvest surveys have been conducted of Kivalina residents during the last 24 years. From 2012 to 2014, a comprehensive survey of fish and wildlife harvests was done in 6–8 Kotzebue area villages by the Division of Subsistence.

In Arctic District, fishery harvest studies by ADF&G's Division of Subsistence noted that annual community catches of Dolly Varden in Kaktovik (Pedersen and Linn 2005) and Anaktuvuk Pass (Pedersen and Hugo 2005) produced annual catches of "char" (a mix of Arctic char and Dolly Varden).

Commercial Fishery

Dolly Varden generally appear in commercial catches during the last 3 weeks of August and are taken as a nontarget 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 in Kotzebue Sound, 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. During the 2011–2012 season,

3 fishermen caught and sold 1,057 lb of Dolly Varden to the fish plant in Nome as bait. This was the first recorded sale of Dolly Varden in Norton Sound in recent history.

Sport Fishery

Drainages of Kotzebue Sound and the Chukchi Sea are known for the large size of anadromous Dolly Varden, but 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.

Sport fishing effort has been consistently low, which is probably due to the remote location and difficult access of fishing sites (Scanlon 2009). Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged almost 2,700 annually but averaged less than 1,200 in the Kotzebue/Chukchi Sea areas (Appendix F3).

Historical Escapement

Since 1990, aerial survey counts of overwintering Dolly Varden on the Wulik River has ranged from 144,138 fish in 1993 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 2000, however, only Wulik River has been surveyed.

WHITEFISH

Although sheefish 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 the 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, Kotzebue, and Arctic districts and can also be found at various times of year in inshore marine waters. Several whitefish species spawn 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 delineates 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 1 local Nome fisherman, who waived confidentiality, sold 3,723 lb of whitefish. No further whitefish harvests occurred until the 2010–2011 season, and since then as much as 4,726 lb of whitefish have been commercially harvested in 1 season (Appendix F9).

In the Arctic District, a commercial fishery for freshwater finfish has existed in the Colville River delta (located approximately 60 miles west of Prudhoe Bay) since 1964 (Menard et al. 2013). Historically, commercial fishing generally took place during late June and July for broad and humpback whitefish and October through early December for Arctic and least cisco. However, since 1990 commercial fishing effort has predominantly occurred in October and November for Arctic and least cisco. Set gillnets are used as capture gear, and fishing during fall months occurs under the ice. All fish were harvested with the intent to sell commercially and are reported daily on a catch form. However, not all fish reported on permits for this area were sold. Those fish not commercially sold were retained and used for subsistence purposes. No commercial harvest has been reported since 2007 from the Coville River (Appendix H1).

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 because fishermen do not count fish individually, but by "tubs," "bags," "strings," or 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 District than in many areas of the state (Georgette and Shiedt 2005). Average subsistence harvests of whitefish estimated for the village of Noatak and the 5 Kobuk River villages combined from 1997 to 2004 was almost 54,000 fish (Appendix F8). Harvest numbers are considered minimal and are not comparable year to year. Since 2004, subsistence harvest surveys have not been conducted in the Kotzebue District until 2012, when the Division of Subsistence conducted a 3-year comprehensive subsistence fish and wildlife harvest survey in 6–8 Kotzebue area villages.

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 Arctic–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 and Arctic–Kotzebue areas has ever occurred, but during the 1980s, a limited commercial fishery occurred in Norton Sound (Menard et al. 2013). According to local fishermen, these fish were used for dog food, crab bait, and human consumption. In the mid-1990s, NSEDC established markets for several fish species not commercially utilized in the past. The need for crab bait was the primary factor in initiating the saffron cod fishery near Unalakleet. A total of 1,402 lb of saffron cod were sold during the 1993–1994 season. The NSEDC market was not available the following winter and was probably a factor in the reduced harvest of 52 lb (Appendix F10).

No commercial harvest was reported from 1995 through 2008. Since the fall of 2009, total annual tomcod harvest has ranged from 1,748 lb to almost 34,000 lb (Appendix F10), all sold to Norton Sound Seafood Products (NSSP) in Nome for use as crab bait. NSSP would only buy tomcod that were caught through the ice by jigging gear.

Miscellaneous Finfish Species

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

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 Arctic–Kotzebue areas, but they are relatively small. Average annual sport fish harvests for Arctic grayling in the last 5 years were under 800 fish in both Norton Sound and Kotzebue Districts. In Norton Sound, average Arctic grayling sport fish harvests for the last 10 years are roughly a fourth of that of Dolly Varden, but in Kotzebue District, average Arctic grayling sport fish harvests for the last 10 years is over half that of Dolly Varden (Appendix F3).

SECTION 2: SALMON FISHERIES

2014 NORTON SOUND SALMON FISHERY

2014 Norton Sound Fisheries Outlook

The 2014 outlook was for a commercial harvest level of 80,000 to 110,000 chum salmon, 250,000 to 500,000 pink salmon, and 60,000 to 90,000 coho salmon. Salmon outlooks and harvest projections for the 2014 season were based on qualitative assessments of parent-year escapements and age composition, subjective determinations of freshwater overwintering and ocean survival conditions, and, in the case of the commercial fishery, anticipated market interest and processing capacity. Commercial salmon harvest for Norton Sound in 2014 by subdistrict is listed in Table 1.

For the second year in a row commercial fishing for chum salmon was expected to occur in Nome Subdistrict after being closed for over 2 decades. Commercial periods for chum salmon were not expected to exceed 24 hours in length.

As in previous years, the bulk of commercial salmon harvests were expected to come from southern Norton Sound (Subdistricts 4–6). The relatively large southern Norton Sound watersheds (e.g., Inglutalik, Ungalik, Shaktoolik, and Unalakleet rivers) generally support larger runs of salmon. This fact, coupled with stable, healthy salmon runs (except Chinook salmon) and more liberal fisheries management plans, allows for more commercial harvest opportunity in the southern Norton Sound subdistricts. In contrast, salmon runs, particularly chum salmon runs, have been more unstable in the smaller drainages to the north in Subdistricts 2 (Golovin) and 3 (Elim) since the early 2000s. Subdistricts 2 and 3 chum salmon runs have either been very strong, providing large surpluses available for commercial use (e.g., in 2006, 2007, 2010, and 2011); or very weak, with runs often below levels needed to achieve escapement goals, such as in 2004, 2005, 2008, 2009, and 2013. The extent and frequency of commercial chum and pink salmon periods in Subdistricts 2 and 3 is also largely predicated on the Subdistricts 2 and 3 management plan, which directs ADF&G to ensure that chum salmon escapement goals and subsistence needs are achieved.

Commercial Fishery Season Summary

Weak Chinook salmon runs occurred throughout Norton Sound in 2014, requiring inseason restrictions and early closures to southern Norton Sound subsistence fisheries. The pink salmon run was slightly below average, the chum salmon run was average, and the coho salmon run was well above average. No directed sockeye salmon commercial fishing occurred and the Pilgrim River required a closure to the subsistence fishery for 2 weeks in order to reach the sockeye salmon escapement goal at Salmon Lake.

The 2014 Norton Sound District commercial salmon fishery came in below the forecast range for pink salmon, but within the forecast range for chum salmon and well above the forecast range for coho salmon. Norton Sound commercial salmon harvest was 289 Chinook, 182,406 pink, 107,745 chum, 112,756 coho, and 519 sockeye salmon (Table 1), and included 205 Chinook, 773 pink, 71

chum, 199 coho, and 200 sockeye salmon kept for personal use. The buyer was not able to buy Chinook salmon in Subdistricts 5 and 6, per emergency order.

Large coho salmon harvests combined with high prices paid for that species accounted for 68% of the $1,915,749 paid to 128 permit holders in 2014 (Appendices A2 and A3). The 2014 exvessel value ranks highest on record and represents the fourth year since 2010 in which exvessel value exceeded 1 million dollars (Appendix A3).

Commercial coho salmon harvest in 2014 was the fourth highest on record. Subdistrict 6 (Unalakleet) accounted for over half of the harvest. Subdistrict 3 (Elim) had a record harvest of 15,938 coho salmon and exceeded the previous record by over 56%.

The commercial chum salmon harvest was fourth best in over 25 years and was the fourth year in the past 5 years that the harvest exceeded 100,000 fish. The chum salmon run was stronger than the last 2 years in Subdistricts 2 (Golovin) and 3 (Elim) when chum salmon commercial fishing was closed for most of the season, and for the second year in a row commercial chum salmon fishing occurred in Subdistrict 1 (Nome). As usual, over 70% of the commercial chum harvest came from southern Norton Sound subdistricts (4–6).

Commercial pink salmon harvest in 2014 was slightly below the 2012 harvest of 205,498 fish, but was still the second best in the 2000s. Good runs of both chum and coho salmon limited the number of directed pink salmon openings, and overall there was less interest by fishermen for participating in pink salmon fishing likely because of the lower price compared to other species.

The number of permit holders (128) participating in the commercial fishery this year was above average and was the highest number of participants since 1993 (Appendix A2). The previous 5-year average in Norton Sound was 115 permits fished, and the previous 10-year average was 87 permits fished. The increased fishing effort in the salmon fishery since 2010 is largely the result of stronger chum salmon runs, improved market interest, and higher dock prices for salmon, particularly coho salmon. Dock prices per pound for Norton Sound salmon in 2014 were $2.00, $0.29, $0.60, $0.63, and $1.60 for Chinook, pink, chum, sockeye, and coho salmon, respectively (Appendix A4). Average commercial weights by species were 12.8 lb for Chinook salmon, 3.1 lb for pink salmon, 6.9 lb for chum salmon, 6.8 lb for sockeye salmon and 7.2 lb for chum salmon (Appendix A5).

Only 1 salmon buyer operated in Norton Sound during the 2014 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. Subdistrict 1 catch was delivered to the Nome plant by the permit holders.

Subsistence Fishery Season Summary

Subsistence salmon fishermen in Port Clarence District, Cape Woolley Subdistrict, and Subdistricts 1–3 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. Return rates for these permits have been close to 100% in most years, and in 2014 the return rate was 100% for the fourth year in a row (Table 2).

In southern Norton Sound, in 2014, postseason household surveys were conducted in Koyuk, Shaktoolik, and Unalakleet, and attempts were made to contact 100% of the households. Catch

information for Subdistricts 4–6 are in Appendices A9–A11. The villages of Stebbins and St. Michael were also surveyed in 2014, with survey results in Appendix A12.

In Norton Sound District, there are limits on subsistence salmon harvests only in Subdistrict 1 (Nome), where salmon limits have been in place since 1985. Also, hook and line subsistence fishermen must follow sport fish bag limits except in the Subdistrict 1 subsistence zones, where they can catch the subsistence limit. In 2014, an average chum salmon run was forecasted for Subdistrict 1 and the subdistrict was not closed to salmon fishing in mid-June for the ninth year in a row. From 1991 through 2005, Subdistrict 1 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 in 2014 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, and starting in 2013 the amount allowed was raised to $500. In 2014 there were 9 customary trade permits issued in Norton Sound District. Cash sales of almost $2,000 were recorded in 2014 for both Norton Sound and Port Clarence Districts combined (Appendix A33).

Season Summary by Subdistrict

Nome–Norton Sound Subdistrict 1

In Subdistrict 1, 2014 chum salmon run abundance was projected to achieve the subdistrict-wide biological escapement goal (BEG) range of 23,000–35,000 chum salmon and amounts necessary for subsistence (ANS) range of 3,430–5,716 chum salmon. As such, a Tier II fishery was not implemented in 2014. There has not been a Tier II fishery implemented since 2005, and Tier II subsistence fishing restrictions were rescinded early during the 2004 and 2005 seasons.

Regulation changes starting in 2013 allowed for subsistence gillnet fishing 7 days a week in marine waters in the eastern half of Subdistrict 1, and beach seining was allowed in all subsistence locations during the chum salmon run when gillnet fishing was open. Excellent marine subsistence catches of chum salmon were reported in late June and early July in eastern Subdistrict 1. Aerial surveys were conducted in mid-July of the eastern Nome Subdistrict drainages (Flambeau and Bonanza rivers) and Sinuk River in the western Nome Subdistrict. Several thousand chum salmon were observed on these surveys in the lower reaches of these drainages. The Eldorado River, Nome River, and Snake River weir counts exceeded the chum salmon escapement goal ranges in 2014. Consequently, chum salmon subsistence gillnet fishing proceeded on the standard freshwater schedule, and the marine schedule for western Subdistrict 1 was extended from 3 days a week to 5 days a week.

The Subdistrict 1 BEG of 23,000–35,000 chum salmon has been exceeded for the last 5 years. However, achievement of the goal is often a result of better and more productive chum salmon runs east of Cape Nome disproportionately contributing to the BEG. The chum salmon escapement goal range for the Eldorado River, which is east of Cape Nome, is double the combined escapement goal range of the Nome and Snake rivers, both of which are west of Cape Nome, highlighting the disparity in river productivity within the subdistrict. In the last 5 years, the Eldorado River has exceeded the chum salmon escapement goal range every year, and the

Nome and Snake rivers have exceeded their escapement goal ranges in 4 years (Appendix A21–A22 and A25). Although chum salmon runs are greater east of Cape Nome (Appendix A31), for pink salmon the run strength is much greater west of Cape Nome (Appendix A32). Both the Nome and Sinuk rivers have much larger runs of pink salmon, particularly in even-numbered years, compared to rivers east of Cape Nome. Nome River has the only pink salmon escapement goal in Subdistrict 1, and the even-year goal of 13,000 pink salmon was easily exceeded in 2014 (Appendix A25).

No coho salmon escapement goals have been established in Subdistrict 1, but the escapement in Nome and Snake rivers was in midrange compared to 10 previous years of sufficient escapement estimates with no large-scale flooding events.

In 2014 there were 490 subsistence salmon permits issued for the Nome Subdistrict, slightly below the record 494 permits issued during the 2010 season. All 490 permits issued were returned (Table 2).

Reported subsistence harvest was 31 Chinook, 3,844 chum, 6,648 pink, 3,042 coho, and 405 sockeye salmon (Appendix A6). The chum salmon harvest was the second highest since 1990 and the coho salmon harvest was the fourth highest. The pink salmon harvest was comparable to most even-numbered years in the last 20 years.

Commercial chum salmon fishing occurred for the second year in a row after being closed for over 2 decades. Three permit holders participated in the commercial fishery compared to only 1 permit holder last year. The commercial harvest was 3 Chinook, 1,456 chum, 1,169 pink, 39 coho, and 7 sockeye salmon (Appendix A6).

Golovin–Norton Sound Subdistrict 2

The Subdistrict 2 regulatory salmon management plan 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 mid-July, the chum salmon run can be assessed and fishing time adjusted accordingly. The counting tower project on the Niukluk River had been used to evaluate escapement in the Golovin Subdistrict from 1995–2012, but the project was discontinued in 2013. The Niukluk River is a tributary of Fish River, a major salmon-producing river in the Golovin Subdistrict. 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).

There was no commercial chum salmon fishing in Golovin Subdistrict from 2002 to 2007, largely because escapements, in most of those years, had fallen short of the lower bound SEG of greater than 30,000 fish for the Niukluk River (Appendix A24). Consequently, ADF&G has implemented a conservative approach with respect to determining when commercial fishing may occur. In 2014 a new counting tower was operated by NSEDC on the Fish River. Initially only 1 tower could be installed because of high water, and a panel to assist with observations was only able to be placed near the tower. Although chum salmon passage at the tower was obviously being undercounted, there were early indicators of 2014 chum salmon abundance to Golovin Subdistrict based on reports of very good subsistence catches. Additionally, ADF&G has previously used observations of the chum salmon run in the adjacent Subdistrict 3 counting tower at Kwiniuk River. During the 18-year period when the counting tower at both the Niukluk and Kwiniuk rivers were operational, ADF&G observed that in 16 of those years, when the Kwiniuk River

counting tower reached or did not reach its chum salmon escapement goal, then Niukluk River counting tower was in agreement in reaching or not reaching its goal. Because of passage of large numbers of chum salmon at the Kwiniuk River tower indicating that the escapement goal range there would easily be exceeded, ADF&G expected that this would also be the case in the Fish River drainage. Therefore, commercial chum salmon fishing was opened late June in Subdistrict 2 for 24 hours. The commercial catch index in Subdistrict 2 was above the historical average and with continued improvements in the Fish River counts, ADF&G allowed commercial chum salmon fishing to increase to two 48-hour fishing periods per week and then opened up fishing continuously for 1 week after mid-July to allow the buyer to direct fishing when a tender was available to purchase fish. One additional 54 hour fishing period was allowed in late July and then ADF&G switched to coho salmon management, allowing two 48-hour fishing periods per week for the remainder of the season. The coho salmon harvest was the fourth highest on record, and aerial surveys of Niukluk River and Ophir Creek confirmed that the combined aerial survey goal (950–1,900 coho salmon) used in the early 2000s had been exceeded.

The commercial catch in Golovin Subdistrict for 2014 including personal use was 28 Chinook, 47 sockeye, 4,156 coho, 7,888 pink, and 13,560 chum salmon caught by 18 permit holders (Table 4). The number of permit holders participating in the fishery was the highest since 1988.

This was the eleventh year that subsistence salmon permits were required and 170 permits were issued for Golovin Subdistrict in 2014. Reported harvest was 36 Chinook, 91 sockeye, 1,720 coho, 7,363 pink, and 1,719 chum salmon (Appendix A7). The number of salmon reported harvested (10,929) ranked eighth highest in the 2000s.

Elim–Norton Sound Subdistrict 3

The Subdistrict 3 management plan directs ADF&G to project that chum salmon escapement goals will be reached and ensure that harvestable surpluses will be in excess of subsistence needs before directed chum or pink salmon commercial fishing is allowed. Further, in times of low chum salmon abundance, directed pink salmon commercial fishing may not occur before July 7 in the subdistrict. By this date, historical data indicate that the bulk of the chum salmon run is in river, and commercial pink salmon fishing would be expected to have little impact on chum salmon escapement or subsistence needs.

Early indicators of chum salmon abundance to Elim Subdistrict were that the chum salmon run would easily reach the chum salmon escapement range at Kwiniuk River tower. The tower-based OEG range of 11,500–23,000 chum salmon was easily exceeded with a final chum salmon count of nearly 40,000 fish (Appendix A23). The first opening was a 24 hour chum salmon directed fishing period beginning on June 25. The second opening was a 24 hour pink salmon opening with mesh size restricted to 4.5 inches or less starting on June 28. By June 29 the lower end of OEG range had been reached at Kwiniuk River tower and the buyer was interested in chum salmon as opposed to pink salmon, and two 48-hour fishing periods per week with mesh size restricted to 6 inches or less were allowed. In mid-July fishing was opened continuously for 1 week to allow the buyer to direct fishing when a tender was available to purchase fish. One additional 54 hour fishing period was allowed in late July and then ADF&G switched to coho salmon management, allowing two 48-hour fishing periods per week for the remainder of the season.

The commercial catch in Elim Subdistrict including personal use was 101 Chinook, 164 sockeye, 15,938 coho, 28,507 pink, and 17,525 chum salmon caught by 29 permit holders (Table 5). The 2014 coho salmon harvest was a record and was over 50% above the previous record of 10,180 coho salmon caught in 2010 (Appendix A8).

There were 66 subsistence salmon permits issued for Elim Subdistrict in 2014. The number of salmon reported harvested (8,798) was near the recent 5-year and 10-year averages. Estimated subsistence harvests by species were 276 Chinook, 38 sockeye, 1,808 coho salmon, 4,595 pink salmon, and 2,081 chum salmon (Appendix A8).

Norton Bay–Norton Sound Subdistrict 4

Historically, Norton Bay Subdistrict has had difficulty attracting a buyer due to its remoteness and its reputation for watermarked fish. Until recently, Norton Bay Subdistrict has typically been managed based on Shaktoolik and Unalakleet Subdistricts' salmon run assessments due to a lack of ground-based escapement projects in Norton Bay. However, in 2011, an enumeration tower project was initiated by NSEDC on the Inglutalik River to provide an index of salmon escapement to Norton Bay. Currently, the Inglutalik River escapement counts are considered ancillary to comparative catch statistics for inseason management until a longer time series of escapement data becomes established.

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 probably due to concurrent fisheries prosecuted in the Elim and Shaktoolik Subdistricts (permit data on file with ADF&G, Division of Commercial Fisheries; Nome).

In 2011 effort nearly doubled to 12 permit holders, and in 2012 there were 18 permit holders fishing in Norton Bay Subdistrict and a record 49,970 pink salmon were harvested. In 2013 there was a record catch of 36,021 chum salmon by 18 permit holders. In 2014 there were 20 permit holders and a record coho catch of 9,562 coho salmon (Table 6).

In 2014, the first pink salmon fishing period was 36 hours, which began on June 19, and the next opening was on June 25 for 24 hours targeting chum salmon followed by a 24-hour pink salmon opening beginning on June 28. During pink salmon openings the gillnet mesh size was restricted to 4 ½ inches or less and during chum salmon openings mesh size was restricted to 6 inches or less. No chum salmon catch was recorded during the first pink salmon opening because the tender operator mistakenly thought chum salmon could not be bought because the pink salmon directed fishing opening had a size restriction of 4 ½ inches or less. The CPUE for pink salmon for the first opening and chum salmon for the second opening were similar to historical CPUE for those dates. The buyer requested 1 more pink salmon opening and beginning June 30 chum salmon openings were set at two 48-hour fishing periods per week. In mid-July fishing was opened continuously for 1 week to allow the buyer to direct fishing when a tender was available to purchase fish. One additional 54-hour fishing period was allowed in late July and then ADF&G switched to coho salmon management, allowing two 48-hour fishing periods per week for the remainder of the season.

Cumulative commercial catch by species for Norton Bay Subdistrict including personal use was 71 Chinook, 22 sockeye, 9,562 coho, 28,393 pink, and 13,436 chum salmon (Appendix A9). The final escapement estimate at Inglutalik River tower was 1,567 Chinook, 978 coho, 61,725 pink, and 61,025 chum salmon (Appendix A28). All escapement estimates were a minimum estimate because high water destroyed the camp and operations were terminated after July 12.

This was the seventh 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 77 in 2014. Results from these households were expanded to estimate harvests by species, gear type, and location (e.g., Inglutalik River, Ungalik River, Koyuk River, Mukluktulik River, and marine waters) for those households not surveyed. An estimated 154 Chinook, 1 sockeye, 1,201 coho, 2,205 pink, and 4,323 chum salmon were reported as subsistence harvest in Norton Bay Subdistrict in 2014 and both the coho and chum salmon harvests were the highest out of the last 7 years (Appendix A9).

Shaktoolik and Unalakleet–Norton Sound Subdistricts 5 and 6

Both Subdistricts 5 and 6, which share a common boundary, consistently attract commercial markets due to larger volumes of fish and better transportation services. Management actions typically encompass both subdistricts because salmon tend to intermingle, and harvest in 1 subdistrict affects the movement of fish in the adjacent subdistrict. Results from ADF&G's test net in Unalakleet River (Kent 2010), North River tower counts, and subsistence fishermen interviews in Unalakleet had been used to set early fishing periods in both subdistricts. However, the test net project was discontinued in 2013. This year ADF&G used the North River tower counts to assess run strength along with commercial and subsistence catches and, later in the run, counts from the Unalakleet River weir, which is much farther upstream. 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, 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.

In Subdistricts 5 and 6, directed commercial Chinook salmon fishing has only occurred in 2 of the previous 14 years, and in only 1 year since 2001. Restrictive action was taken in the subsistence and sport fisheries from 2003 to 2004 and from 2006 to 2014. As forecasted, a weak run of Chinook salmon to Shaktoolik and Unalakleet Subdistricts in 2014 precluded commercial fisheries directed on Chinook salmon but also led to a significant amount of foregone chum salmon harvest surplus. As a consequence of the poor Chinook salmon run, directed chum salmon fishing was delayed until July 1 based upon the Shaktoolik and Unalakleet Subdistricts management plan.

Estimated 2013 Chinook salmon escapements from the Unalakleet River mainstem and its major tributary, North River, were 767 and 564 fish, respectively, and were the lowest ever recorded (Menard et al. 2015). Subsistence Chinook salmon harvests in Subdistricts 5 and 6 were the lowest recorded since survey methods were standardized in 1994, with 136 and 468 fish, respectively (Menard et al. 2015).

Therefore in 2014 the season started with an unprecedented closure to subsistence salmon fishing to ensure that the Chinook salmon run would meet escapement goals. ADF&G had fishermen's

meetings in Shaktoolik and Unalakleet prior to the fishing season to inform residents of the upcoming subsistence closure to all subsistence salmon fishing from north of Wood Point near St. Michael, to Bald Head near Elim, including the Golsovia, Shaktoolik, Unalakleet, Egavik, Ungalik and Inglutalik rivers. In addition, sport fishing for Chinook salmon was closed in the same area and farther north to the Golovin Subdistrict. The subsistence closure began on June 9. In the marine waters of Subdistricts 5 and 6, 3 subsistence fishing periods were allowed, with mesh size restricted to 6 inches or less. Two openings were 30 hours in length and 1 was 48 hours in length (Appendix G9). Also, 2 openings for subsistence fishing were allowed with mesh size restricted to 4.5 inches or less to target pink salmon in the marine waters of Subdistricts 5 and 6. Beginning July 7, subsistence fishing was allowed 7 days a week with mesh size restricted to 6 inches or less in all waters.

Once again subsistence Chinook salmon harvests were greatly affected by the reduced fishing time with 189 fish harvested in Subdistrict 5, the second lowest recorded since 1994 (Appendix A10). In Subdistrict 6, the 345 Chinook salmon harvested in the subsistence fishery were lower than the previous record low in 2013 (Appendix A 11).

Commercial fishing began on July 1 with a 24-hour pink salmon fishing period in both subdistricts followed by a 48-hour chum salmon fishing period beginning on July 3, and then another 24-hour pink salmon fishing period beginning on July 6. Incidental catches of Chinook salmon were minimal and following another 24 hour chum salmon fishing period beginning on July 8, additional chum salmon fishing periods ranged from 48 hours to 168 hours until early August when ADF&G switched to coho salmon management. Throughout the season fishing periods allowed in Subdistricts 5 and 6 were the same.

The first coho salmon fishing period was 48 hours beginning on August 8 followed by a 72-hour fishing period beginning on August 11. Beginning on August 15 and until the end of the season on September 7, there were two 48-hour coho salmon fishing periods per week.

Despite the late start to commercial fishing in Subdistricts 5 and 6, the chum and coho salmon commercial harvests were well above average. The Subdistrict 5 chum salmon harvest (29,455) ranked second highest and the Subdistrict 6 chum salmon harvest (32,313) ranked the third highest out of the last 20 years of commercial harvests, respectively. In both Subdistricts 5 and 6, the coho salmon harvest ranked fifth highest out of the last 20 years of commercial harvests with 19,753 fish and 63,308 fish, respectively (Appendices A10 and A11).

Escapement

Table 3 and Appendix A17 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2014. Appendices A21–A30 present passage numbers for Chinook, chum, coho, pink, and sockeye salmon at various enumeration projects in Norton Sound. Aerial survey assessments are indices and relative to historical escapement sizes.

Escapement projects in Norton Sound include counting towers on North, Inglutalik, and Kwiniuk rivers; sonar/tower on Shaktoolik River; and weirs on Unalakleet, Snake, Nome, Solomon, Eldorado, and Pilgrim rivers, and in Glacial Creek, which flows from Glacial Lake into Sinuk River.

Escapement project operations were a result of multiple collaborators, including ADF&G, NSEDC, BLM, and Unalakleet IRA. All projects supplied important daily information to ADF&G

that was very useful for management of local salmon resources and will become more important the longer they operate. Funding sources for projects come from USFWS Office of Subsistence Management, NSEDC, and ADF&G.

Aerial survey assessment conditions were fair to poor during July and August of 2014; as a result, very few aerial surveys were flown.

Chinook Salmon

Chinook salmon escapement was much improved from 2013 and restrictions to fishing time in southern Norton Sound likely helped get more fish to the spawning grounds. For the first time since 2009 the Kwiniuk River tower count in 2014 exceeded the lower end of the SEG range of 300–550 fish with 429 Chinook salmon counted (Appendix A23). Also, for the first time since 2010 the North River tower count exceeded the lower end of the SEG range of 1,200–2,600 fish with 2,328 Chinook salmon counted (Appendix A29). Final escapement at the Unalakleet River weir was 1,048 Chinook salmon, which was the second highest count in the 5 year project history even though this was a minimal count due to flooding and a breach in the weir (Appendix A30).

Chum Salmon

Chum salmon escapement goals were achieved in 6 of 8 established Norton Sound chum salmon runs. The former Niukluk River tower-based goal could not be determined because the project is no longer operational, but that goal was likely reached. Tubutulik River's escapement goal was not evaluated because the aerial survey was not conducted during the peak spawning stage.

Subdistrict 1 chum salmon escapement was slightly less than last year, but in both 2013 and 2014 were the largest in over 20 years. Estimated subdistrict-wide escapement of chum salmon was 97,234, which was 178% above the upper bound of the subdistrict-wide biological escapement goal (BEG) range of 23,000–35,000 chum salmon (Table 3; Appendix A20). Subdistrict 1 escapements of chum salmon have exceeded the upper bound of the escapement goal range in 9 of the last 14 years of the established goal. As in previous years, the majority (70%) of the chum salmon escapement occurred in rivers east of Cape Nome, and Eldorado River had the largest estimated escapement for an individual river system, contributing 27,054 chum salmon or 28% of the subdistrict-wide escapement (Appendix A31).

Escapement at Kwiniuk River tower was 39,789 chum salmon, a great improvement from the record low counts of 2012 and 2013 when less than 6,000 chum salmon were counted each year (Appendix A23). The neighboring Tubutulik River has an OEG range of 9,200–18,400 fish, but no aerial survey was flown in 2014. To the west in Subdistrict 2, the Fish River tower count was 48,100 chum salmon, but this was a minimal count because counting was made difficult and limited by high water (Table 3).

In southern Norton Sound the Inglutalik River tower count of 61,025 chum salmon was similar to the highest counts in project history although the project was cut short due to flooding (Appendix A28), and the North River tower count of 11,706 chum salmon was the fourth year out of 5 years that the count exceeded 10,000 fish, compared to only 2 times previous to 2010 (Appendix A29).

In Port Clarence District, chum salmon runs were slightly above average in 2014. Escapement of chum salmon to the Pilgrim River was 25,647 fish, which ranked fifth out of 12 years at the Pilgrim River floating weir project (Appendix B2).

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. 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 recently 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.

There are only 2 coho salmon escapement goals in Norton Sound, and both are aerial survey goals. The North River goal of 550–1,100 was probably achieved although an aerial survey was not flown, but the tower count was 4,380 fish (Table 3). The Kwiniuk River goal of 650–1,300 was probably achieved because, although no survey was flown, the final tower count was 14,713 fish (Table 3).

The previous aerial survey goal for Niukluk River and Ophir Creek was 950–1,900 coho salmon, but it was eliminated with a Niukluk River tower goal of 2,400–7,200 coho salmon. A combined aerial survey count of 2,479 coho salmon of Niukluk River and Ophir Creek indicates that both former escapement goals would have been reached (Table 3).

Both the Snake (1,424) and Nome (2,637) rivers' weir projects had counts near the median for coho salmon (Appendices A22 and A25).

Pink Salmon

For over 25 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 abundance than odd-numbered years. Pink salmon escapement estimates were successfully obtained from all ground-based escapement projects in 2014. There are 3 pink salmon escapement goals in Norton Sound: Nome River (13,000), Kwiniuk River (8,400), and North River (25,000). In almost all years the goals were reached, and the goals were likewise reached in 2014 (Table 3).

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 any significance of sockeye salmon in North America. 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 a record count of 11,135 sockeye salmon occurred in 2005 (Appendix A27).

In 2008, sockeye salmon escapement dropped off at both Glacial Lake and Salmon Lake, and in 2009 sockeye salmon counts were record lows at both Glacial Lake weir and Pilgrim River weir. The Glacial Lake weir is operated at Glacial Creek near the outlet of the lake and about 1 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 (Appendix A27). The 2009 Salmon Lake sockeye salmon run was also the lowest since Pilgrim River weir began operations in 2003, with 953 sockeye salmon counted through the weir (Appendix B2).

Sockeye salmon escapements in these 2 systems increased in 2010, although not by much. Sockeye salmon escapement in 2010 at Glacial Lake was 1,047 fish, tying 2002 for the third lowest count since the project began in 2000 (Appendix A27). Pilgrim River weir sockeye salmon escapement in 2010 was 1,654 fish, which was the second lowest on record (Appendix B2).

Improving sockeye salmon runs started occurring at both Glacial and Salmon Lakes in 2011 and by 2013 an estimated 2,544 sockeye salmon were enumerated at Glacial Lake weir, and 12,428 sockeye salmon were enumerated at the Pilgrim River weir (Appendices A28 and B2). The 2013 Glacial Lake weir count was a 55% increase from the 1,636 sockeye salmon counted in 2012. Similarly, the 2013 Pilgrim weir count represents a 75% increase from the 2012 weir count of 7,085 sockeye salmon (Appendix B2). An August 13 aerial survey count of 6,971 sockeye salmon was greater than the 5,830 and 5,144 sockeye salmon observed during the 2011 and 2012 aerial surveys, respectively. In 2014 the Pilgrim River was closed to subsistence fishing for 2 weeks when sockeye salmon counts lagged, but did reopen in early August and the season signified the fourth consecutive season in which the Grand Central River/Salmon Lake aerial survey SEG range of 4,000–8,000 was achieved.

At Glacial Lake a total of 2,330 sockeye salmon was also observed making 2014 the second season in a row since 2010 that the Glacial Lake aerial survey SEG range (800–1600 sockeye salmon) has been evaluated and achieved.

Enforcement

Fishing regulations are primarily enforced by the Department of Public Safety, Alaska Wildlife Troopers (AWT). One AWT officer provided enforcement for the Norton Sound–Port Clarence Area in 2014. In addition, Nome ADF&G Division of Commercial Fisheries has 7 deputized staff with the ability to issue citations, of which 2 worked the commercial salmon fishery in Shaktoolik and Unalakleet Subdistricts. The subsistence fishery had no official patrol, but random checks were conducted by 2 ADF&G personnel.

2015 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for the 2015 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 very weak and similar to the 2014 run, with no commercial fishing targeting Chinook salmon expected. Additional preemptive subsistence restrictions are also likely for southern Norton Sound in order to conserve Chinook salmon to reach escapement goals. These restrictions include preemptive closures or reductions in fishing time in marine waters, inriver closures to gillnets with a mesh size greater than 4.5 in, and 6 in or less mesh size restrictions in marine waters. However, beach seining subsistence opportunity will be provided early in the run to allow the take of other, more plentiful species like pink and chum salmon.

Chum salmon runs are expected to be average in southern Norton Sound Subdistricts (Norton Bay, Shaktoolik, and Unalakleet) based on the recent 5-year trend of average to above-average chum salmon abundance in southern Norton Sound and sibling relationship analyses. As a result, directed chum salmon fishing is anticipated to commence as early as the fourth week of June in Norton Bay Subdistrict but no earlier than July 1 in Shaktoolik and Unalakleet Subdistricts

because of Chinook salmon conservation concerns. In 2015, northern Norton Sound chum salmon runs are expected to be average. Chum salmon abundance is anticipated to be sufficient to reach escapement goals and provide for a chum salmon commercial harvest in Subdistricts 2 (Golovin) and 3 (Elim). A limited commercial fishery for chum salmon is possible in Nome Subdistrict dependent on a sufficient chum salmon run to obtain escapement goals throughout the subdistrict. Overall projected commercial harvest of chum salmon in Norton Sound is expected to range between 70,000–100,000 fish with an increased contribution to this harvest expected for Norton Bay Subdistrict due to improvements in tendering capacity, a good forecast, and a flexible management plan.

ADF&G expects the pink salmon run to be average for an odd-numbered year, and dependent on buyer interest the harvest could be 25,000–75,000 fish. No subsistence fishing restrictions for pink salmon are expected.

The coho salmon run in 2015 is expected to be average based on recent 5-year trends in abundance and ocean conditions, as well as parent-year escapements and freshwater rearing conditions for the 2011 brood year. Considering these factors collectively, the commercial harvest is expected to range from 60,000 to 90,000 coho salmon. Coho salmon subsistence fishing restrictions are not expected.

2014 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

No commercial salmon fishing was allowed in 2014. ADF&G had projected, and later confirmed by counts from the Pilgrim River weir, that the sockeye salmon run for Pilgrim River in 2014 would not reach the inriver goal of 30,000 sockeye salmon that is necessary for a commercial fishery to occur.

Subsistence Fishery Season Summary

Subsistence fishing permits have been required for Pilgrim River since 1964, and beginning in 2003 the number of permits issued has greatly increased with the record sockeye salmon runs in the mid-2000s. In 2013 a record 265 permits were issued, surpassing the previous record in 2008 when 255 permits were issued (Menard et al. 2012) and in 2014 there were 260 permits issued (Table 2) with Pilgrim River estimated subsistence harvests by species of 30 coho salmon, 42 chum salmon, 2,134 sockeye salmon, and 130 pink salmon (Table 2). A 2 week subsistence fishing closure occurred in late July and early August when projections showed escapement to be lagging and a late surge of salmon allowed the fishery to reopen.

The size of the Pilgrim River sockeye salmon run greatly affects the number of issued subsistence permits. The first year of the great runs of sockeye salmon (2003), there were 100 permits issued. In 2004, there were 223 permits issued (permit data on file with ADF&G, Division of Commercial Fisheries; Nome) and in 2014 there 260 permits issued (Table 2). 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 (Appendix B2).

Although permits have been required in the Pilgrim River drainage for 50 years, 2014 was the eleventh 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 170 permits, compared to 162 permits issued last year.

In 2014 there were 11 customary trade permits issued in Port Clarence District. Cash sales of almost $2,000 were recorded in 2014 for both Norton Sound and Port Clarence Districts combined (Appendix A33).

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 shown an increasing trend of sockeye salmon returns to Salmon Lake since 1990 (Appendix B1). However, the sockeye salmon run crashed beginning in 2009, and ADF&G has had to have subsistence fishing restrictions on Pilgrim River in every year except 2013. An aerial survey in 2014 of Salmon Lake and Grand Central River estimated 4,535 sockeye salmon in Salmon Lake and 768 sockeye salmon in Grand Central River, a tributary to Salmon Lake. The combined aerial survey escapement goal for Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 3).

Salmon Lake had an average sockeye salmon spawning escapement of roughly 12,500 fish in the 5 years previous to 2003. But from 2003 to 2007, sockeye salmon escapements greatly increased, and average weir count for the 5 year period was almost 56,000 sockeye salmon (Appendix B2). Salmon Lake aerial survey escapement goal has been reached the last 4 years, but still in 3 of the last 4 years subsistence closures were required in Pilgrim River. Counts at the Pilgrim River weir have improved at least four-fold since the crash of the 2009 and 2010 sockeye runs.

Enforcement

In 2014, one AWT officer patrolled Pilgrim River in Port Clarence District.

2015 PORT CLARENCE SALMON OUTLOOK

The guideline harvest range (GHR) set by BOF for the Port Clarence commercial sockeye salmon fishery allows for a harvest of up to 10,000 sockeye salmon. Based on recent history, ADF&G expects that the inriver goal of 30,000 sockeye salmon for Pilgrim River will not be met; therefore, no commercial fishing is expected in 2015. In addition, based on escapement and age data, the sockeye salmon run is expected to drop, and subsistence fishing restrictions may occur during the second week of July or later, if necessary. Chum and pink salmon are expected to have sufficient runs allowing for subsistence fishing.

ADF&G will compare the 2015 run with sockeye salmon escapement counts at the weir from the last few years and determine whether any subsistence fishing restrictions are needed.

2014 KOTZEBUE SOUND SALMON FISHERY

Commercial Fishery Season Summary

One of the largest chum salmon runs in history resulted in the second-largest chum salmon harvest even though commercial fishing time was often limited because of insufficient cargo space on airplanes to get the catch out to processing facilities. The commercial salmon fishery opened on July 10 and closed after August 31. However, declining catches the last week of August resulted in buyers terminating operations after the August 28 fishing period.

During the first week of the fishery, commercial fishing periods ranged from 8 to 12 hours a day starting in the afternoon with no fishing on Saturday because of insufficient plane availability. There were 3 major buyers in 2014, the first time since 2001 that there was more than 1 buyer. No fish processing occurred in Kotzebue and fish were flown out in the round. If there was a large harvest during a particular day then fishing often did not occur the following day so the buyers had enough time to work with cargo companies to get the fish shipped out in a timely manner to processing facilities.

During the second week of the fishery, periods were 8 hours in length and beginning the last week of July some fishing periods were reduced to 6 hours. The harvest during an 8 hour period on July 28 of 65,014 chum salmon was nearly one-quarter of the entire harvest for the month of July. The July 28 fishing period had record CPUE and had the greatest fishing period catch since a 48-hour fishing period in 1988. Fishing resumed on July 30 with periods reduced to 5 hours. On August 4, periods were reduced to 4 hours through August 10. On August 11 fishing time was increased to 5 hours, but another large harvest resulted in periods being reduced to 3 to 4 hours until August 21. A large contributing factor to shorter fishing periods starting after August 11 was due to closures of the Kotzebue airport for maintenance that prevented sufficient plane capacity for longer fishing periods. From August 21–28 there were daily fishing periods ranging from 5 to 9 hours, except for the normal Saturday closure. By August 27 the catch had dropped to one-seventh of what was caught at the start of the week and fishing effort had dropped by nearly two-thirds. The last 2 buyers that remained announced that they would close after August 28.

There were 94 permit holders who sold chum salmon in 2014 (Appendix C1). This year's participation by permit holders was the highest number since 1994 when 109 permit holders sold fish. The highest fishing effort occurred on July 28 and August 4 when 68 permit holders fished.

The overall chum salmon run to Kotzebue Sound in 2014 was estimated to be one of the greatest on record based on commercial harvest rates, subsistence fishermen remarking that it was one of the best years ever for chum salmon fishing, the greatest Kobuk River test fish index in the 22 year project history (Table 10), and record setting aerial surveys (Appendix C7).

The commercial harvest of 636,187 chum salmon was the highest in the last 25 years (Appendix C1). There were 65 chum salmon kept for personal use that were included in the commercial harvest total. Additionally, 20 Chinook salmon, 17 sockeye salmon, 405 pink salmon, 33 coho salmon, 620 Dolly Varden, 296 sheefish, and 30 whitefish (Table 9) were reported caught and kept for personal use. However, there were likely some additional fish kept for personal use that did not get reported on fish tickets.

A total of 5,330,144 pounds of chum salmon (average weight 8.4 lb) were sold at an average of $0.54 per pound (Appendices C1 and C2). The total exvessel value was $2,879,016, with an average value for each participating permit holder of $30,628. The total exvessel value was nearly 10 times that of the average from the last 20 years (Appendix C3).

Age, sex, and length (ASL) composition was taken from commercial catch samples but was not used to manage the fishery. The majority of the chum salmon each year are usually 4- and 5-year-old fish. In 2014, commercial catch samples were 70% age-0.3 fish, 27% age-0.4 fish and 3% age-0.5 fish. Historical comparisons showed the catch samples falling within the range of previous years (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

Subsistence Fishery Season Summary

Subsistence household salmon surveys were regularly conducted in Kotzebue District from 1990 to 2004 by the Division of Subsistence (DOS), and again from 2012 to 2014, when comprehensive subsistence fish and wildlife harvest data were collected from 6–8 Kotzebue area villages by DOS. In 2012 and 2013, total subsistence chum salmon reported caught was 26,693 salmon and 42,249 salmon, respectively, both more than in 2003 and 2004, the last 2 years that the same 6 villages were surveyed (Appendices C4 and C5). Subsistence chum harvest per household averaged 66 salmon in 2012 and 85 salmon in 2013 for Kobuk River villages (Appendix C6). Information for 2014 was not yet available at this time (Nikki Braem, Subsistence Resource Specialist, ADF&G, Fairbanks; personal communication).

Escapement

This year's test fishing chum salmon CPUE cumulative index at ADF&G test fish project on Kobuk River near Kiana was 4,150 and was a record index at the Kobuk River test fish project (Table 10). The Kobuk River test net catch samples were 1% age-0.2 fish, 73% age-0.3 fish, 20% age-0.4 fish and 6% age-0.5 fish (age data on file with ADF&G, Division of Commercial Fisheries; Nome). Historical comparisons show the catch samples falling within the range of previous years. Record aerial survey counts of chum salmon occurred on the upper Kobuk River system and Noatak River system index areas in 2014 (Appendix C7).

There was a noticeable die-off of chum salmon prior to spawning in the Kobuk River and low dissolved oxygen in the water was suspected. Testing at the Fish and Game pathology lab in Anchorage showed the presence of algae in fish gills indicating a possible algae bloom during the warm and sunny weather this year that may have contributed to suspected low dissolved oxygen which resulted in fish deaths. Other fish besides salmon were reported in the die-off, but no contaminants were observed during pathology tests.

Enforcement

One AWT officer patrolled the Kotzebue Sound District 2014 commercial salmon fishery.

2015 Kotzebue Salmon Outlook

The outlook for the 2015 season is based on the parent-year returns and returning age classes observed in the commercial catch samples and in the test fishing catch samples from the Kobuk River in 2014. During the 2015 season, the 4-year-old component of the run is expected to be average based on the 3-year-old return. The 5-year-old component of the run is expected to be above average based on the 4-year-old return this past season. The 3-year-old and 6-year-old age classes are much smaller components of the run and are expected to be average (age data on file with ADF&G, Division of Commercial Fisheries; Nome). The commercial harvest is expected to fall within the range of 300,000 to 500,000 chum salmon.

SECTION 3: PACIFIC HERRING FISHERIES

2014 NORTON SOUND PACIFIC HERRING FISHERY

Sac Roe

There was no herring sac roe fishery due to a lack of markets. Historical information for the Norton Sound commercial sac roe fishery can be found in Appendix D2 and Menard et al. 2013. Other historical fisheries information is presented in Appendices D1 and D3.

Spawn-on-Kelp

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

Bait Fishery

One ton of herring was delivered to the Unalakleet plant and bought as bait.

Commercial Fishery Management

ADF&G projection for the 2014 herring spawning biomass for Norton Sound was 52,138 tons. At 20% exploitation rate, the guideline harvest level (GHL) for the Norton Sound District fishery was 10,428 tons with 10,108 tons allocated to the sac roe fishery. No market was available for sac roe herring, but NSEDC did attempt to have a bait fishery. However, ice conditions prevented tenders from being able to reach Norton Sound in time for the fishery and only 1 ton of herring was delivered to the Unalakleet plant (Appendix D2).

Due to ice conditions, the ADF&G field crew was not able to deploy for Cape Denbigh during the 2014 season; therefore, test fishing operations were conducted from Unalakleet. From May 26 to 29, the test fishery crew sampled 222 herring using variable-mesh gillnet in the area between Klikitarik and Black Point, and between Unalakleet and Egavik (data on file with ADF&G, Division of Commercial Fisheries; Nome). As a result of very limited commercial fishing, no commercial samples were taken.

Catch Reporting and Enforcement

No AWT officers were on Norton Sound herring grounds during the 2014 fishery because there was no sac roe fishery and ice conditions limited the bait fishery to a catch of 1 ton.

Biomass Determination

There were no Norton Sound herring aerial surveys conducted this season by NSEDC or ADF&G biologists because of ice conditions that made surveying and accurately estimating herring biomass impossible.

2015 NORTON SOUND PACIFIC HERRING OUTLOOK

The 2015 projected biomass for Norton Sound District is 51,582 tons. A 20% exploitation rate would result in a GHL of 10,316 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 9,996 tons for sac roe harvest. The beach seine harvest is allocated 10% of the sac roe projected harvest, or 1,000 tons. The 2015 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. However, no buyer for sac roe is expected in 2015, but there may be a limited bait fishery. ADF&G does not expect to test fish for herring in 2015 and no commercial sampling is anticipated. One or two aerial surveys are expected to be flown to estimate biomass if weather conditions allow.

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

Abundance

The ADF&G length-based population model estimated harvestable legal male crab biomass for the 2014 summer commercial crab fishery at 3.19 million lb (1.15 million crab). This estimate was based on the model's results from spring of 2014 that included the latest data from the 2011 trawl survey (Appendix 1), the 2013 summer fishery, and the 2011–12 winter study (NPFMC 2014). Based on the BOF regulation that an exploitation rate is not to exceed 15% when the legal male biomass exceeds 3.0 million pounds, in 2014 ADF&G allowed an exploitation rate of 12% on the legal population (over 4.75 in carapace width), which equated to a guideline harvest level (GHL) of 382,800 pounds of crab. The CDQ allocation (7.5%) was 28,710 pounds and the open access fishery allocation was 354,090 pounds.

Summer Open Access Commercial Fishery

The 2014 summer open access commercial crab fishery was opened by emergency order at 12:00 noon, June 25 in the Norton Sound Section, with a GHL of 382,800 pounds of crab. Two companies, Norton Sound Seafood Products (NSSP) and Aquatech, were registered to buy crab, and 5 fishermen registered to sell crab dockside as catcher–seller or catcher–processor. NSSP operated a seafood processing plant in Nome and 2 tenders in eastern Norton Sound. A fisherman based in Unalakleet shipped live crab via airplane to Aquatech in Anchorage. The majority of crab was delivered to NSSP, while the catcher–sellers sold crab directly to local residents as well as to NSSP. The 2 catcher–processors sold to a live market in Korea and to NSSP.

The first open access delivery was made on June 28 and final delivery was made August 3, the day after the open access portion of the fishery was closed by emergency order at 12:00 noon, for an open access season length of 40 days, compared to 74 days in 2013 (Table 11). This year as in past years, the season start was based on when the crab processors were ready to purchase crab. Once the open access season was under way, both land-based buyers purchased crab continuously with no reports of poor crab meat fill.

For the first 3 weeks of the 2014 season, the harvest rate was similar to that of the past 4 summers (Appendix E9), but after a 4 day storm in mid-July during which no crabbing occurred, the harvest rate for the fleet increased and CPUE averaged 20 crab per pot during the third week of July (Table 11). The CPUE then dropped to an average of 13 crab per pot, but the fleet harvest rate continued to be excellent because additional fishermen started fishing. By the end of July, the projected trend line showed that the open access quota would be reached in the first week of August; therefore, since the weather forecast remained positive and no drop in harvest rate was expected, a closure was announced for August 2, which gave fishermen 72 hours' notice.

The open access harvest from fish ticket reports was 120,385 red king crab or 360,860 pounds (102% of the open-access quota; Table 11). Of this total, 2,365 pounds were reported as deadloss, and 3,187 pounds reported as personal use. Out of the 39 vessels and 43 permit holders that

registered to fish, 33 vessels and 35 permit holders actually fished, making 281 landings, and average weight for commercially caught crab was 3.0 pounds, same as last year. Including CDQ, number of pots registered was 1,560, and there were 10,127 pot pulls, for a season CPUE of 13 crab, compared to 9 crab in 2013. In 2014, the total harvest rate tracked very closely to 2012. Out of the last 6 years, only 2011 showed a higher harvest rate (Appendix E9). Average price paid (including CDQ catch) was $5.12 per pound, the fourth highest amount ever paid (Appendix E3). Exvessel value of the fishery (including CDQ) was $1.960 million, the fourth highest fishery value since 1994 when Norton Sound was designated a superexclusive area, which effectively changed the character of the fishery from a large vessel to a small vessel fishery (Appendix E10).

CDQ Fishery

For the fifth time in the last 6 years, the CDQ fishery opened concurrently with the open access fishery in 2014. The initial CDQ delivery was made on June 29 and the last delivery was made August 15. Total harvest was 28,148 pounds and was 98% of the CDQ allocation of 28,710 pounds (Table 11). In 2014, as in the previous 7 years, YDFDA transferred their quota to NSEDC. Unlike last year, but similar to the years previous to 2013, NSEDC fishermen harvested at least 96% of their entire allocation. Only 2 permit-holders initially registered to fish the CDQ fishery and had harvested approximately 6,300 pounds (22% of the CDQ quota) by the time the open access fishery closure was announced on July 30. By August 1, an additional 16 fishermen had registered, but 1 registrant later decided not to fish. Due to the high catch rate exhibited in the open access fishery, NSEDC implemented harvest restrictions on their CDQ fishermen in order to not exceed the quota. The 17 fishermen were each given one-seventeenth of the remaining quota (minus a buffer), and the remainder of the quota left after 1 round of fishing was given out by lottery to any interested and registered CDQ permit holder. NSEDC originally set the delivery deadline for August 8, but later extended it until most of the quota had been caught.

In 2014, there was a total of 28 CDQ landings and 854 pots lifts. Average price paid to fishermen was $5.00 per pound, for an exvessel value of $139,740 for the CDQ fishery. This was the fourteenth year a CDQ harvest occurred since the CDQ fishery was implemented in 1998.

Harvest Areas and Commercial Catch Sampling

Fish ticket reports document 11 statistical areas were fished in the open access and CDQ fisheries (Table 12), compared to 14 areas in 2013. Same as last year, the top harvest (32%) and most effort (30%) came from statistical area 656401, south of Nome, followed by statistical areas 636401 and 626401 in eastern Norton Sound, both of which yielded 18–20% of the total harvest. Along with 2 other higher producing areas, statistical areas 666401 (10%) and 646401 (9%), these statistical areas are all directly south of the closed boundary line (Appendix E11). The catch from statistical areas east of 164°W longitude made up 43% of the harvest, almost twice of the 23% last year (Appendices E1 and E12).

Carapace length (CL) measurements and shell age were collected from 4,682 commercially-caught crab during the open access and CDQ fisheries. Carapace age was classified as new (2–12 months old) or old (over 13 months old). Male new-shell crab made up 78% of the total legal crab sampled, and old-shell crab made up 22%, almost three times as much as last year. Recruit crab are new-shell legal crab <116 mm CL. Postrecruit crab are legal new-shell male crab $\geq$116 mm CL and all legal old-shell males. Recruit crab made up 35% of the legal crab sampled and postrecruit crab made up 65%, similar to last year (Appendix E4). Overall mean carapace length of legal male crab was 120 mm. For comparison of historical length composition

of Norton Sound red king crab summer commercial harvests from 1990 to 2013, see Appendices E15–E20.

Since the summer of 2002, NSEDC has operated a seafood processing plant in Nome. In 2014, as in past years, the majority of sampling data was collected from this plant as fishermen offloaded their catch. Additional sampling data were collected from 1 of the 2 catcher-processors when offloading at the dock prior to shipment to Anchorage.

Enforcement

No AWT trooper made dockside checks during the 2014 summer crab fishery; however, an ADF&G staff member who worked the king crab fishery was deputized to cite violations if necessary. No violations were cited in 2014.

Winter Commercial Fishery

The winter commercial season opened November 15, 2013, and 31 fishermen registered. Two land-based processors (NSSP in Nome and Aquatech in Anchorage) and 2 land-based floating-processors registered to buy crab, and 8 fishermen applied for a catcher-seller permit to sell crab dockside. Based on fish tickets submitted, the first landing was made January 13, 2013. From then until the last landing on May 6, the 21 fishermen that fished made a total of 323 landings, with an overall CPUE of 4, and average weight of 2.31 lb/crab. Price of crab averaged $6.94/lb, slightly higher than the $6.73/lb in 2013, and total exvessel value of the fishery was $234,291. A total of 14,986 crab (34,587 lb) were harvested, with percentages of crab sold (and CPUE) each month as follows: January 1% (2), February 6% (3), March 41% (4), April 52% (4), and May 1% (3). Total number of crab harvested was 34% less than 2013 but over 3 times the average harvest from 1990 to 2013 (Appendix E5). As an indicator of near-shore ice instability, commercial fishermen reported losing 105 out of 429 pots (24%) during the 2013–2014 winter season. Pots were fished from 12 miles east to 18 miles west of Nome, excluding the area closed to commercial fishing from 3.5 miles east to 2.0 miles west of Nome. Similar to last year, the majority of fishermen (17) and harvest (99%) came from the Nome area, with the remaining fishermen and harvest coming from Shaktoolik and St. Michael/Stebbins areas. Same as last year, ice was unstable in most of eastern Norton Sound; therefore, no fishermen from Unalakleet even registered to fish the winter commercial crab fishery.

The harvest is generally divided between local residents who buy crab directly from the fishermen, the seafood plant (NSSP) in Nome, and other nonlocal markets such as Anchorage. Similar to last year, over half of the harvest in 2014 was purchased by the 2 catcher–processors and sold to Korea (fish ticket data on file with ADF&G, Division of Commercial Fisheries; Nome). NSSP and Aquatech combined purchased a third of the total harvest, and the 4 catcher–sellers accounted for the remaining harvest. Most fishermen consider winter 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). For the 2013–14 winter crab season, all of the 103 permits issued were returned, and the 75 permit holders that actually fished reported retaining 3,252 crab, less than half of what was retained in 2013. The number caught, which included crab thrown back to the ocean, was 5,421 crabs, just

over half of the average catch from 1990 to 2013. Residents of Elim, Savoonga, St. Michael, Unalakleet, and White Mountain had a combined harvest of 272 crab, which was 8% of the total harvest. Out of at least 136 pots reported fishing, 14 (10%) were reportedly lost during the season due to moving ice (Appendix E7). Percentages of subsistence crab harvested each month are as follows: February 7%, March 44%, April 47%, and May 2%. Like 2013, more than 99% of the crab were caught with pots in 2014 (Permit data on file with ADF&G, Division of Commercial Fisheries; Nome).

During the 2014 Norton Sound summer subsistence crab season, 40 permits were issued, all were returned, and the 25 fishermen that actually fished reported harvesting a total of 1,210 crab. Two-thirds of the harvest came from the Unalakleet area, almost a third from the Nome area, and the remaining 3% from Brevig Mission area. Crab kept per fisherman averaged 48 crab for summer 2014 (Appendix E6).

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 crab daily, and they must be of legal size (4.75 in 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 nonresident sport fishermen caught 918 crab and kept 106, for an average harvest of 18 crab per fisherman (permit data on file with ADF&G, Division of Commercial Fisheries; Nome).

Future Resource Investigations

The triennial Norton Sound Trawl Survey took place in the summer of 2014[2], but results are not yet published. Red king crab biomass estimates from the trawl survey are an integral part of the data used in the length-based population model to project the summer king crab legal biomass (during years when no trawl survey occurs) and appropriate GHL for the summer commercial king crab fishery. The next trawl survey will take place in 2017.

During the 2014 trawl survey, hemolymph samples were drawn from 98 male red king crab greater than 71 mm in length and frozen until samples are processed at a later date. Samples will be analyzed for ecdysteroid hormone levels and will be used to determine what, if any, relationship there is between hormone levels and molting phases. The results could be useful in monitoring molt timing in red king crab so that appropriate management actions could be taken to avoid fishing on molting crab.

A winter pot study that had been conducted annually in nearshore waters of Nome since the early 1980s was replaced with a much larger tagging project in the summer and fall of 2012–2014. Results of the winter project have been used in the length-based model to project the summer legal biomass and appropriate GHL for the upcoming summer commercial crab fishery. Size composition by year from the winter king crab project is shown in Appendix E8. Results from the summer tagging project will be compared with previous winter tagging projects and may be incorporated into the model once a longer time series of data become established.

[2] Soong, J., and T. Hamazaki. 2015. Analysis of red king crab data from the 2014 Alaska Department of Fish and Game trawl survey of Norton Sound. Alaska Department of Fish and Game, Fishery Data Series No. 15-40, Anchorage.

ST. LAWRENCE ISLAND CRAB FISHERY

Commercial Fishery

In 2006, the BOF split the St. Lawrence Island section between north and south of 66° N latitude. In the northern section, now known as the Kotzebue section, the commercial season was from noon June 15 through August 1. The southern section was merged with Norton Sound section. This change was initiated by Norton Sound area fishermen to expand fishing opportunity to an area with little commercial utilization since 1995. No harvest was reported from this new area in 2014. No permit holders fished in the Kotzebue section in 2014.

SECTION 5: MISCELLANEOUS SPECIES

INCONNU (SHEEFISH)

Commercial Fishery

Although inconnu, commonly known as sheefish, may have been harvested and sold in the winter of 2013–2014, no fish tickets were submitted to ADF&G. In Kotzebue Sound District, no fishermen reported selling sheefish (Appendix F1). Sheefish are not commonly found in either Norton Sound or Port Clarence Districts.

Subsistence and Sport Fishery

From 2012 to 2014, there were comprehensive subsistence surveys for fish and wildlife harvests of 6–8 Kotzebue area villages conducted by the Division of Subsistence. In 2013, surveyed households in 5 Kobuk River villages, Buckland, Noatak, and Selawik reported harvesting 22,109 sheefish, more than any other year since 1990 (Appendix F2). However, because survey effort was limited during many years, harvest numbers should be considered minimal and are not comparable year to year. Information is not yet available for 2014.

Sport fish harvest reports indicate a harvest of 218 sheefish in Kotzebue Sound District in 2013. Information is not yet available for 2014. Sheefish sport harvests in the last 10 years have averaged just over 600 fish 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 2014, test fishing on Kobuk River resulted in 295 sheefish caught in 160 drifts, for a cumulative CPUE of 370. The CPUE ranked 10th out of 17 years sheefish catches were recorded (data on file with ADF&G, Division of Commercial Fisheries; Nome).

DOLLY VARDEN

Commercial Fishery

Dolly Varden *Salvelinus malma* are occasionally incidentally caught in commercial salmon fisheries in Norton Sound and Kotzebue Districts. During the 2014 commercial salmon fishery, Kotzebue District reported 620 Dolly Varden caught but not sold, more than twice the amount in 2013 when 302 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 Arctic communities. A comprehensive survey of fish and wildlife harvests was done in 6–8 Kotzebue area villages by the Division of Subsistence from 2012 to 2014. In 2013, surveyed Noatak

households reported harvesting 6,223 Dolly Varden (Appendix F5). Information is not yet available for 2014.

Sport fish harvest was 1,184 Dolly Varden in Norton Sound and 1,074 Dolly Varden in Kotzebue/Chukchi Sea areas in 2013 (Appendix F3). Information is not yet available for 2014. Overall, Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged almost 2,700 annually, with most fish harvested out of the Unalakleet River (Appendix F6).

Escapement

Dolly Varden escapement is determined from aerial surveys conducted by ADF&G Sport Fish Division in the Kotzebue area, and weir or tower counts in Norton Sound. In 2014, a survey on the Wulik River counted a total of 64,351 Dolly Varden (Appendix F7).

WHITEFISH

Commercial Fishery

Commercial whitefish harvest information for the 2013–2014 season was 4,726 pounds harvested by 1 fisherman, who waived confidentiality, in Norton Sound District (Appendix F9).

Subsistence and Sport Fishery

Subsistence harvest data for whitefish were not recorded for Norton Sound, Port Clarence or Arctic Districts, but a comprehensive survey of fish and wildlife subsistence harvests by the Division of Subsistence was conducted in 6–8 Kotzebue area villages from 2012 to 2014. In 2013, survey data showed that 113,158 whitefish were harvested for 8 villages in Kotzebue District (Appendix F8). Information is not yet available for 2014. 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 Districts for whitefish.

SAFFRON COD

Commercial Fishery

During the 2013–2014 season, 24 permit holders harvested 18,322 lb of saffron cod *Eleginus gracilis*, commonly known as tomcod, in Norton Sound and sold them to a commercial buyer at $0.50/lb for use as bait (Appendix F10).

Subsistence

In Norton Sound areas tomcod are primarily fished by “jigging” through the ice. Because no subsistence permit is required and a sport fish license is not needed for Alaska residents in northern Norton Sound from Cape Prince of Wales to Bald Head, harvests of tomcod are not reported or documented. In 2014, Norton Sound household subsistence surveys were conducted; however, subsistence harvest information of tomcod was not collected.

CAPELIN

Commercial Fishery

No reported commercial fishery has occurred for capelin *Mallotus villosus*, although there are substantial stocks in northern Norton Sound (Pahlke 1985).

Subsistence

Because no subsistence permit for capelin is required, accurate harvests of capelin are not reported or documented. In 2013, one of the latest capelin spawning events observed on Nome beaches occurred on July 19, compared to mid-June in most years when capelin are observed spawning on Nome beaches. In 2014, capelin were observed spawning on June 16. Many residents harvest capelin with various gear types, such as nets, buckets, plastic bags, and shovels. No other information on capelin harvest is available.

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TABLES

Table 1.–Norton Sound commercial salmon harvest summary by subdistrict, 2014.

		Subdistricts						
		1	2	3	4	5	6	Total
Number of fishermen [a]		3	18	29	20	24	63	128
Chinook	Number	0	22	46	16	0	0	84
	Weight (lb)	0	264	452	363	0	0	1,079
Sockeye	Number	2	8	129	11	25	144	319
	Weight (lb)	10	51	888	70	178	957	2,154
Coho	Number	33	4,135	15,810	9,560	19,749	63,270	112,557
	Weight (lb)	228	29,895	117,756	67,704	144,678	455,133	815,394
Pink	Number	1169	7,887	28,074	28,291	33,066	83,146	181,633
	Weight (lb)	3849	24,696	83,954	98,694	109,589	244,564	565,346
Chum	Number	1455	13,560	17,491	13,427	29,455	32,286	107,674
	Weight (lb)	9,055	93,869	109,798	92,089	208,646	234,009	747,466
Total	Number	2,659	25,612	61,550	51,305	82,295	178,846	402,267
	Weight (lb)	13,142	148,775	312,848	258,920	463,091	934,663	2,131,439

Note: An additional 205 Chinook, 200 sockeye, 199 coho, 773 pink, and 71 chum salmon were retained for personal use. Average commercial weights by species were 12.85 lb for Chinook, 6.75 lb for sockeye salmon, 7.24 lb for coho salmon, 3.11 lb for pink salmon, and 6.94 lb for chum salmon.

[a] Number of fishermen is a unique number of permit holders that fished in each subdistrict. Some permit holders fished in more than 1 subdistrict.

Table 2.–Subsistence salmon harvest for northern Norton Sound, 2014.

	Permits fished [a]	Number of salmon harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	59	28	270	1,131	1,945	2,529	5,903
Bonanza River	27	0	0	223	603	289	1,115
Cripple Creek	22	0	0	76	86	3	165
Eldorado River- above weir	1	0	0	0	13	16	29
Eldorado River- below weir	9	0	0	59	129	179	367
Flambeau River	2	0	0	1	13	7	21
Safety Sound	6	0	13	3	245	257	518
Nome River- above weir	3	0	0	5	7	0	12
Nome River- below weir	221	0	20	533	2,562	320	3,435
Penny River	18	0	0	49	70	7	126
Sinuk River	36	1	96	60	305	55	517
Snake River - above weir	3	0	0	0	5	1	6
Snake River - below weir	77	2	3	660	595	170	1,430
Solomon River - above weir	6	0	0	13	4	4	21
Solomon River - below weir	27	0	3	229	66	7	305
Nome Subdistrict Total [b]	352	31	405	3,042	6,648	3,844	13,970
Cape Woolley [c]	5	0	3	6	36	5	50
Marine Waters	14	26	72	173	398	416	1,085
Kachavik River	12	0	0	256	2,122	231	2,609
McKinley River	4	0	0	56	0	0	56
Chinik Creek	6	0	0	39	9	9	57
Fish River - above tower	27	1	5	516	2,596	375	3,493
Fish River - below tower	36	9	10	420	1,867	565	2,871
Niukluk River	21	0	4	260	371	123	758
Golovin Subdistrict Total [d]	95	36	91	1,720	7,363	1,719	10,929
Marine Waters	16	184	27	883	1,844	1,195	4,133
Kwiniuk River - above tower	8	1	5	48	613	162	829
Kwiniuk River - below tower	41	38	1	710	1,594	560	2,903
Next Creek	2	0	0	15	0	0	15
Tubutulik River	14	53	5	113	294	155	620
Iron Creek	10	0	0	39	250	9	298
Elim Subdistrict Total [e]	53	276	38	1,808	4,595	2,081	8,798
Port Clarence - Marine Waters	88	19	1,631	489	4,678	4,385	11,202
Tuksuk Channel	8	2	204	45	232	569	1,052
Imuruk Basin	0	0	0	0	0	0	0
Agiapuk River	3	0	0	0	0	89	89
Kuzitrin River	4	0	0	0	0	0	0
Salmon Lake	0	0	0	0	0	0	0
Pilgrim River- above weir	51	0	541	24	113	29	707
Pilgrim River- below weir	97	0	1,593	6	17	13	1,629
Port Clarence District Total [f]	247	21	3,969	564	5,040	5,085	14,679
Total	752	364	4,506	7,140	23,682	12,734	48,426

[a] There were 6 locations where subsistence permits were issued in 2014 for northern Norton Sound: 1-Nome Subdistrict; 2-Cape Woolley; 3-Golovin Subdistrict; 4-Elim Subdistrict; 5-Pilgrim River; and 6-Port Clarence District. Except for Pilgrim River and Salmon Lake, each permit is valid for both marine and fresh waters. Permits fished include those permit holders who fished but reported no harvest.

[b] All 490 Nome Subdistrict permits issued were returned.

[c] All 18 Cape Woolley permits issued were returned.

[d] All 170 Golovin Subdistrict permits issued were returned.

[e] All 66 Elim Subdistrict permits issued were returned.

[f] All 260 Pilgrim River permits issued were returned. No Salmon Lake permits were issued. All 170 Port Clarence District permits issued were returned.

Table 3.–Salmon counts of rivers and associated salmon escapement goal ranges (SEG, BEG or OEG), Norton Sound and Port Clarence, 2014.

	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.			0				0		
Grand Central R.			0				0		
Agiapuk R.									
American R.									
Pilgrim R.	48				25,647				
Glacial L.	0				0				
Sinuk R.			0				9,050	19,136	
Cripple R.								596	
Penny R.					26				
Anvil Creek									
Dry Creek									
Snake R.	11				3,983	1,600–2,500 [b]			
Nome R.	8				5,589	2,900–4,300 [b]			
Flambeau R.							10,776	21,462	
Eldorado R.	18				27,054	6,000–9,200 [b]			
Bonanza R.			7				8,602	18,508	
Solomon R.	0		1		1,502		444		
Nome Subdistrict						23,000–35,000 [c]		97,234	
Fish R.	954			Combined	48,100				
Boston Cr.				100–250					
Niukluk R.						23,000			
Ophir Cr.									
Kwiniuk R.	429	300–550			39,789	11,500–23,000 [d]			
Tubutulik R.						9,200–18,400 [e]			
Ungalik R.									
Inglutalik R	1,567				61,025				
Pikmiktalik R									
Shaktoolik R.				400–800					
Unalakleet R.	1,048			Combined	54,501				Combined
Old Woman R.				550–1,100					2,400–4,800
North R.	2,328			1,200-2,600	11,706				

-continued-

Table 3.–Page 2 of 3.

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.					4,535	Combined			0
Grand Central R.					768	4,000–8,000			0
Agiapuk R.									
American R.									
Pilgrim R.	425			9,719			4,197		
Glacial L.	0			4,211	2,330	800–1,600	0		
Sinuk R.		1,275							115,000
Cripple R.									26,000
Penny R.							1,350		
Anvil Creek									
Dry Creek									
Snake R.	1,424			86			20,067		
Nome R.	2,637			34			96,397	13,000	
Flambeau R.									25,000
Eldorado R. [b]	0			0			46,746		
Bonanza R.		6,250			0				71,000
Solomon R.	79			0			20,691		11,300
Fish R.	16,929			21			222,777		
Boston Cr.									
Niukluk R.		2,342							
Ophir Cr.		137							
Kwiniuk R.	14,713		650-1,300	21			326,558	8,400	
Tubutulik R.									
Ungalik R.									
Inglutalik R	978			0			61,725		
Pikmiktalik R									
Shaktoolik R.									
Unalakleet R.	44,108			203			1,180,130		
Old Woman R.									
North R.	4,380		550-1,100	6			143,838	25,000	

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Note: Data not available for all streams. Sustainable escapement goal (SEG), biological escapement goal (BEG), and optimal escapement goal (OEG) are listed.

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

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

[c] BOF established OEG is the same range as the BEG and is based on a combination of weir counts and expanded aerial survey counts.

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

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

Table 4.–Commercial salmon set gillnet catches from Golovin, Subdistrict 2, Norton Sound, 2014.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	6/25–6/26	24	7	0	1,778	114	0	0
2	Pink	6/28–6/29	24	4	0	532	2,368	0	0
3	Chum	6/30–7/02	48	7	9	3,769	436	0	0
4	Chum	7/04–7/06	48	6	3	2,008	568	0	0
5	Chum	7/08–7/10	48	7	3	2,699	1,987	0	0
6	Chum	7/12–7/14	48	5	2	933	781	5	0
7	Chum	7/17–7/24	168	8	4	1,547	1,556	1	155
8	Chum	7/26–7/28	54	7	0	168	56	0	163
9	Coho	7/31–8/02	48	7	0	73	21	1	431
10	Coho	8/05–8/07	48	8	0	20	0	0	447
11	Coho	8/09–8/11	48	7	1	7	0	0	628
12	Coho	8/12–8/14	48	6	0	5	0	0	574
13	Coho	8/15–8/17	48	5	0	1	0	0	525
14	Coho	8/19–8/21	48	7	0	1	0	0	711
15	Coho	8/22–8/24	48	12	0	19	0	1	364
16	Coho	8/26–8/28	48	2	0	0	0	0	119
17	Coho	8/29–8/31	48	1	0	0	0	0	18
Totals			894	18	22	13,560	7,887	8	4,135

Note: An additional 6 Chinook, 1 pink, 39 sockeye, and 21 coho salmon were retained for personal use in 2014.

Table 5.–Commercial salmon set gillnet catches from Elim, Subdistrict 3, Norton Sound, 2014.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	6/25–6/26	24	14	0	2,859	2,318	0	0
2	Pink	6/28–6/29	24	7	0	1,327	4,885	1	0
3	Chum	6/30–7/02	48	18	35	5,259	5,841	6	0
4	Chum	7/04–7/06	48	17	2	2,971	2,854	5	0
5	Chum	7/08–7/10	48	13	1	1,657	2,451	45	1
6	Chum	7/12–7/14	48	6	1	328	1,288	3	0
7	Chum	7/17–7/24	168	18	2	2,022	7,399	17	283
8	Chum	7/26–7/28	54	17	1	460	892	4	643
9	Coho	7/31–8/02	48	14	0	158	142	7	1,674
10	Coho	8/05–8/07	48	17	0	66	1	4	2,133
11	Coho	8/09–8/11	48	17	0	53	0	2	2,550
12	Coho	8/12–8/14	48	18	1	62	0	3	1,865
13	Coho	8/15–8/17	48	17	1	43	3	6	1,627
14	Coho	8/19–8/21	48	14	1	71	0	7	2,090
15	Coho	8/22–8/24	48	15	0	57	0	5	1,045
16	Coho	8/26–8/28	48	10	0	47	0	8	1,036
17	Coho	8/29–8/31	48	15	1	51	0	6	863
Totals			894	29	46	17,491	28,074	129	15,810

Note: An additional 55 Chinook, 34 chum, 433 pink, 35 sockeye, and 128 coho salmon were retained for personal use in 2014.

Table 6.–Commercial salmon set gillnet catches from Norton Bay, Subdistrict 4, Norton Sound, 2014.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Pink	6/19–6/22	36	4	0	0	442	0	0
2	Chum	6/25–6/26	24	10	0	2,671	3,840	0	0
3	Pink	6/28–6/29	24	2	0	514	1,834	0	0
4	Chum	6/30–7/02	48	5	7	2,147	3,191	0	0
5	Chum	7/04–7/06	48	8	4	2,068	2,607	0	0
6	Chum	7/08–7/10	48	8	2	1,553	2,750	9	0
7	Chum	7/12–7/14	48	4	0	264	1,597	0	0
8	Chum	7/17–7/24	168	8	0	394	2,655	0	10
9	Chum	7/26–7/28	54	10	2	1,859	8,904	0	665
10	Coho	7/31–8/02	48	13	0	842	470	0	1,464
11	Coho	8/05–8/07	48	10	0	141	0	1	547
12	Coho	8/09–8/11	48	12	1	236	0	1	1,966
13	Coho	8/12–8/14	48	10	0	202	1	0	1,485
14	Coho	8/15–8/17	48	9	0	228	0	0	1,284
15	Coho	8/19–8/21	48	7	0	188	0	0	1,077
16	Coho	8/22–8/24	48	9	0	85	0	0	859
17	Coho	8/26–8/28	48	5	0	35	0	0	203
18	Coho	8/29–8/31	48			No fishing			
19	Coho	9/02–9/04	48			No fishing			
20	Coho	9/05–9/07	48			No fishing			
Totals			1,026	20	16	13,427	28,291	11	9,560

Note: An additional 55 Chinook, 9 chum, 102 pink, 11 sockeye, and 2 coho salmon were retained for personal use in 2014.

Table 7.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2014.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Pink	7/01–7/02	24	9	0	814	11,289	1	0
2	Chum	7/03–7/05	48	15	0	7,409	9,295	0	0
3	Pink	7/06–7/07	24	4	0	64	1,114	0	0
4	Chum	7/08–7/09	24	20	0	7,271	5,677	0	278
5	Chum	7/11–7/14	72	1	0	103	23	0	0
6	Chum	7/17–7/24	168	17	0	6,747	4,716	23	427
7	Chum	7/25–7/28	72	18	0	2,977	841	1	789
8	Chum	7/29–7/31	48	16	0	840	64	0	751
9	Chum	8/01–8/03	48	19	0	1,157	46	0	3,272
10	Coho	8/05–8/07	48	20	0	658	0	0	3,117
11	Coho	8/08–8/10	48	20	0	570	0	0	2,561
12	Coho	8/11–8/14	72	20	0	371	0	0	2,017
13	Coho	8/15–8/17	48	18	0	206	0	0	1,086
14	Coho	8/19–8/21	48	17	0	96	0	0	2,425
15	Coho	8/22–8/24	48	19	0	42	1	0	722
16	Coho	8/26–8/28	48	9	0	36	0	0	1,025
17	Coho	8/29–8/31	48	6	0	14	0	0	549
18	Coho	9/02–9/04	48	6	0	1	0	0	236
19	Coho	9/05–9/07	48	5	0	79	0	0	494
Totals			1,032	24	0	29,455	33,066	25	19,749

Note: An additional 16 Chinook, 71 pink, 22 sockeye, and 4 coho salmon were retained for personal use in 2014.

Table 8.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2014.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Pink	7/01–7/02	24	15	0	366	22,954	0	0
2	Chum	7/03–7/05	48	26	0	4,503	21,941	7	0
3	Pink	7/06–7/07	24	11	0	230	6,094	0	0
4	Chum	7/08–7/09	24	32	0	5,903	16,738	13	8
5	Chum	7/11–7/14	72	35	0	6,003	9,540	14	47
6	Chum	7/17–7/24	168	30	0	7,161	4,133	40	1,735
7	Chum	7/25–7/28	72	27	0	1,386	1,004	5	1,654
8	Chum	7/29–7/31	48	34	0	1,598	414	4	5,034
9	Chum	8/01–8/03	48	38	0	1,607	289	1	8,011
10	Coho	8/05–8/07	48	41	0	566	39	5	4,158
11	Coho	8/08–8/10	48	45	0	558	0	22	5,499
12	Coho	8/11–8/14	72	47	0	825	0	16	8,434
13	Coho	8/15–8/17	48	48	0	472	0	7	4,485
14	Coho	8/19–8/21	48	46	0	526	0	1	10,467
15	Coho	8/22–8/24	48	44	0	182	0	2	3,047
16	Coho	8/26–8/28	48	42	0	226	0	5	5,830
17	Coho	8/29–8/31	48	26	0	92	0	2	2,625
18	Coho	9/02–9/04	48	29	0	62	0	0	1,343
19	Coho	9/05–9/07	48	10	0	20	0	0	893
Totals			1,032	63	0	32,286	83,146	144	63,270

Note: An additional 70 Chinook, 27 chum, 166 pink, 88 sockeye, and 38 coho salmon were retained for personal use in 2014.

Table 9.–Kotzebue District commercial chum salmon catch and average weight by date, 2014.

Date	Number of fishermen	Catch	Pounds	Average weight
7/10	28	6,553	55,469	8.5
7/11	37	7,835	66,005	8.4
7/13	36	14377	121,685	8.5
7/14	43	9,399	80,743	8.6
7/15	50	9,617	83,153	8.6
7/17	53	14042	116,273	8.3
7/18	58	14,024	119,839	8.5
7/20	53	13,223	112,252	8.5
7/21	58	25,850	213,058	8.2
7/22	44	8,502	77,493	9.1
7/24	54	21,235	180,124	8.5
7/25	47	8554	69,672	8.1
7/27	63	28,005	237,477	8.5
7/28	68	65,014	541,195	8.3
7/30	63	18552	156,424	8.4
7/31	60	17,942	150,284	8.4
8/1	55	22,091	185,726	8.4
8/3	57	32,921	277,199	8.4
8/4	68	17,557	151,562	8.6
8/5	65	20,541	176,293	8.6
8/6	64	21,399	182,032	8.5
8/7	61	19,764	167,542	8.5
8/8	34	15,390	129,399	8.4
8/10	45	23,226	193,359	8.3
8/11	64	33,461	280,144	8.4
8/12	66	29,491	242,336	8.2
8/14	54	14,035	115,125	8.2
8/15	54	13,025	109,987	8.4
8/17	55	14,276	117,211	8.2
8/18	55	16,241	132,463	8.2
8/19	45	6,506	53,378	8.2
8/20	48	8,080	65,366	8.1
8/21	52	10,645	87,104	8.2
8/22	44	7,637	62,578	8.2
8/24	46	11,187	90,717	8.1
8/25	42	10,283	84,320	8.2
8/26	24	3,372	26,853	8.0
8/27	18	1,639	13,131	8.0
8/28	7	631	5,173	8.2
Total	94	636,122	5,330,144	8.4

Note: Also harvested during the 2014 commercial fishery and kept for personal use were 20 Chinook, 65 chum, 17 sockeye, 405 pink, and 33 coho salmon, and 620 Dolly Varden, 296 sheefish, and 30 whitefish.

Table 10.–Historical chum salmon catch for Kobuk River drift test fishery, 1993–2014.

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
2011	7/13–8/21	220	2,499	8/10
2012	7/17–8/16	151	2,398	8/08
2013	7/17–8/25	208	2,698	8/06
2014	7/17–8/13	152	4,150	8/02

[a] Cumulative catch per unit of effort (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 11.–Daily catch for the open access and CDQ summer commercial king crab harvests, Norton Sound Section, Eastern Bering Sea, June 28–August 15, 2014.

Date [a]	Landings	Number of crab	Crab harvested (lb)	Cumulative total (lb)	Number pots pulled	Average weight (lb)	CPUE
OPEN ACCESS							
06/28	1	358	1,006	1,006	40	2.8	9
06/29	8	1,950	5,648	6,654	238	2.9	8
06/30	5	2,092	6,094	12,748	198	2.9	11
07/01	2	379	1,073	13,821	41	2.8	9
07/02	4	1,158	3,004	16,825	135	2.6	9
07/03	7	2,598	7,341	24,166	180	2.8	14
07/04	13	5,951	17,373	41,539	463	2.9	13
07/05	8	2,104	6,098	47,637	229	2.9	9
07/06	11	4,935	14,767	62,404	436	3.0	11
07/07	5	2,395	7,286	69,690	196	3.0	12
07/08	1	457	1,406	71,096	27	3.1	17
07/09	15	4,967	14,686	85,782	496	3.0	10
07/10	6	2,599	7,814	93,596	195	3.0	13
07/11	3	904	2,516	96,112	58	2.8	16
07/12	12	4,423	12,895	109,007	413	2.9	11
07/13	18	6,103	18,620	127,627	588	3.1	10
07/17	3	347	965	128,592	91	2.8	4
07/18	8	2,756	8,458	137,050	212	3.1	13
07/19	1	28	82	137,132	19	2.9	1
07/20	10	7,110	21,184	158,316	317	3.0	22
07/21	2	1,487	4,476	162,792	79	3.0	19
07/22	9	4,152	12,590	175,382	236	3.0	18
07/23	16	9,598	29,554	204,936	498	3.1	19
07/25	21	6,970	21,171	226,107	679	3.0	10
07/26	10	7,315	22,286	248,393	364	3.0	20
07/27	2	1,664	5,012	253,405	80	3.0	21
07/28	7	2,456	7,430	260,835	199	3.0	12
07/29	14	6,809	20,211	281,046	456	3.0	15
07/30	9	4,063	12,248	293,294	352	3.0	12
07/31	12	4,618	13,820	307,114	380	3.0	12
08/01	11	4,834	14,680	321,794	370	3.0	13
08/02	22	9,813	30,086	351,880	785	3.1	13
08/03	5	2,992	8,980	360,860	223	3.0	13
Total	281	120,385	360,860	360,860	9,273	3.0	13

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Table 11.–Page 2 of 2.

Date [a]	Landings	Number crab	Crab harvested (lb)	Cumulative total (lb)	Number pots pulled	Average weight (lb)	CPUE
			CDQ				
06/29	1	135	382	382	20	2.8	7
07/03	1	211	638	1,020	40	3.0	5
07/04	1	220	590	1,610	40	2.7	6
07/06	1	151	410	2,020	40	2.7	4
07/09	1	236	665	2,685	40	2.8	6
07/13	1	448	1,301	3,986	60	2.9	7
07/18	1	550	1,677	5,663	40	3.0	14
07/23	1	231	649	6,312	40	2.8	6
08/03	1	364	1,235	7,547	20	3.4	18
08/05	8	1,687	5,956	13,503	255	3.5	7
08/06	4	1,824	5,343	18,846	104	2.9	18
08/07	2	986	2,957	21,803	60	3.0	16
08/09	1	313	980	22,783	20	3.1	16
08/10	1	842	2,319	25,102	15	2.8	56
08/11	1	798	2,239	27,341	20	2.8	40
08/13	1	152	455	27,796	10	3.0	15
08/15	1	124	352	28,148	30	2.8	4
Total	28	9,272	28,148	28,148	854	3.0	11

Source: Fish ticket data.

[a] The open access fishery closed by emergency order August 2, and last deliveries were made August 3. The CDQ (community development quota) fishery closed August 15, and the last delivery was made August 15.

Table 12.–Summer commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2014.

Statistical area	Number crab [a]	Crab harvested (lb)	Number of pots pulled	CPUE	Average weight (lb)
616331	1,763	4,923	243	7	2.79
616401	1,624	4,692	170	10	2.89
626401	23,006	69,936	2,059	11	3.04
636330	2,568	7,565	266	10	2.95
636401	25,675	78,572	1,976	13	3.06
646330	1,803	5,390	94	19	2.99
646401	12,460	36,409	1,062	12	2.92
656401	40,905	122,631	3,007	14	3.00
666401	12,784	38,099	826	15	2.98
666402	6,316	18,968	344	18	3.00
666431	753	1,825	80	9	2.42
Total	129,657	389,008	10,127	13	3.00

Note: Data for summer fishery only. CPUE is catch per unit of effort.

[a] Includes 9,272 crab (28,148 lb) from the CDQ (community development quota) fishery.

APPENDIX A: NORTON SOUND FISHERIES

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1990–2014.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1990	8,895	434	56,712	501	65,123	131,665
1991	6,068	203	63,647	0	86,871	156,789
1992	4,541	296	105,418	6,284	83,394	199,933
1993	8,972	279	43,283	157,574	53,562	263,670
1994	5,285	80	102,140	982,389	18,290	1,108,184
1995	8,860	128	47,862	81,644	42,898	181,392
1996	4,984	1	68,206	487,441	10,609	571,241
1997	12,573	161	32,284	20	34,103	79,141
1998	7,429	7	29,623	588,013	16,324	641,396
1999	2,508	0	12,662	0	7,881	23,051
2000	752	14	44,409	166,548	6,150	217,873
2001	213	44	19,492	0	11,100	30,849
2002	5	1	1,759	0	600	2,365
2003	12	21	17,060	0	3,560	20,653
2004[a]	22	47	42,016	0	6,296	48,381
2005	151	12	85,523	0	3,983	89,669
2006	20	3	130,808	0	10,042	140,873
2007	19	2	126,136	3,769	22,431	152,357
2008	83	60	120,309	75,525	25,124	221,101
2009[a]	84	126	87,041	17,364	34,122	138,737
2010	140	103	62,079	31,557	117,743	211,622
2011	185	369	58,917	7,141	110,555	177,167
2012[a]	197	134	37,056	205,498	62,772	305,657
2013[a]	151	247	53,802	8,338	118,709	181,247
2014[b]	289	519	112,756	182,406	107,745	403,715
Avg 2009–13	151	196	59,779	53,980	88,780	202,886
Avg 2004–13	105	110	80,369	34,919	51,178	166,681

Note: Harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] All Chinook salmon caught were retained for personal use and not sold.

[b] Of the 289 Chinook salmon caught there were 205 retained for personal use and not sold.

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1990–2014.

Year	SUBDISTRICT 1	2	3	4	5	6	District total [a]
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
2011	0	13	32	12	30	65	123
2012	0	14	24	18	21	55	123
2013	1	14	21	18	24	57	124
2014	3	18	29	20	24	63	128
Avg 2009–13	0	11	23	12	26	57	115
Avg 2004–13	0	6	14	6	21	48	87

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

Appendix A3.–Round weight and value of commercially caught salmon by species, Norton Sound District, 1990–2014.

Year	Pounds caught (round wt. in lb)				Salmon roe (lb)	Value of catch ($)
	Chinook	Coho	Pink	Chum		
1990	168,745	426,902	[a]	482,060	75	474,064
1991	107,541	469,495	[a]	597,272	221	413,479
1992	57,571	820,406	18,230	595,345	2,641	448,395
1993	151,504	287,702	406,820	347,072	2,608	368,723
1994	98,492	766,050	2,185,066	122,540	0	863,060
1995	174,771	356,190	198,121	290,445	0	356,164
1996	95,794	573,372	1,196,115	84,349	0	340,347
1997	225,136	235,517	50	253,006	880	363,908
1998	127,831	232,705	1,330,624	106,687	0	358,982
1999	48,421	88,037	0	57,656	0	76,860
2000	11,240	307,565	369,800	40,298	0	149,907
2001	3,803	152,293	0	79,558	0	56,921
2002	50	12,972	0	4,555	0	2,941
2003	136	139,775	0	23,687	0	64,473
2004	0	302,379	0	42,385	0	122,506
2005	2,511	659,278	0	28,071	0	296,154
2006	167	869,427	0	68,500	0	389,707
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
2011	1,659	438,481	19,768	774,906	0	1,269,730
2012	0	245,078	492,372	425,233	0	758,908
2013	0	410,791	24,201	823,453	0	1,183,236
2014	1,079	815,394	565,346	747,466	0	1,915,749

[a] Information not available.

Appendix A4.–Estimated mean prices paid to commercial salmon fishermen in dollars, Norton Sound District, 1990–2014.

Year	Chinook	Coho	Pink	Chum	Sockeye
1990	1.01	0.50	(0.75 for roe)	0.23	[a]
1991	0.87	0.36 (3.00 for roe)	[a]	0.27 (3.00 for roe)	[a]
1992	0.66	0.33 (1.50 for roe)	0.16	0.22	[a]
1993	0.72	0.22 (1.76 for roe)	0.15	0.24	0.40
1994	1.02	0.52	0.15	0.29	[a]
1995	0.66	0.43	0.18	0.18	[a]
1996	0.54	0.28	0.10	0.08	[a]
1997	1.00	0.47	0.06	0.11	[a]
1998	0.74	0.29	0.14	0.09	[a]
1999	0.82	0.35	[a]	0.11	[a]
2000	1.30	0.30	0.10	0.15	[a]
2001	1.00	0.25	[a]	0.19	0.37
2002	0.39	0.20	[a]	0.07	[a]
2003	0.64	0.44	[a]	0.14	0.45
2004	[a]	0.39	[a]	0.14	[a]
2005	1.22	0.44	[a]	0.15	0.45
2006	1.49	0.44	[a]	0.14	[a]
2007	0.55	0.53	0.14	0.24	0.55
2008	0.73	0.77	0.23	0.34	0.56
2009	[a]	0.93	0.18	0.33	0.34
2010	2.25	1.47	0.32	0.62	0.63
2011	3.01	1.70	0.25	0.68	1.04
2012	[a]	1.47	0.36	0.52	1.45
2013	[a]	1.77	0.22	0.55	1.49
2014	2.00	1.60	0.29	0.60	0.63
Avg 2009–13	1.32	1.84	0.33	0.68	1.24

[a] None sold.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1990–2014.

Year	Mean round weight in pounds [a]			
	Chinook	Coho	Pink	Chum
1990	19.0	7.5	NA	7.4
1991	17.7	7.4	[c]	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 [b]	14.4	7.6	2.8	6.8
2011 [b]	11.4	7.3	2.8	7.0
2012	[c]	6.6	2.4	6.8
2013	[c]	7.6	2.9	6.9
2014 [b]	12.8	7.2	3.1	6.9

[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, 1990–2014.

	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
1990	0	0	0	0	0	0	58	234	510	2,233	4,246	7,281	58	234	510	2,233	4,246	7,281
1991	0	0	0	0	0	0	83	166	1,279	194	3,715	5,437	83	166	1,279	194	3,715	5,437
1992	1	2	693	185	881	1,762	152	163	1,481	7,351	1,684	10,831	153	165	2,174	7,536	2,565	12,593
1993	0	2	611	0	132	745	52	80	2,070	873	1,766	4,841	52	82	2,681	873	1,898	5,586
1994	0	1	287	0	66	354	23	69	983	6,556	1,673	9,304	23	70	1,270	6,556	1,739	9,658
1995	0	1	369	0	122	492	26	148	1,365	336	3,794	5,669	26	149	1,734	336	3,916	6,161
1996	0	0	9	13	3	25	9	185	828	3,510	2,287	6,819	9	185	837	3,523	2,290	6,844
1997	0	0	0	0	0	0	10	50	325	175	2,696	3,256	10	50	325	175	2,696	3,256
1998	0	0	0	0	0	0	15	14	1,057	4,797	964	6,847	15	14	1,057	4,797	964	6,847
1999 [a]	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 [b]	0	0	0	0	0	0	24	159	3,865	9,329	890	14,267	24	159	3,865	9,329	890	14,267
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	6,281	3,124	11,504
2011	0	0	0	0	0	0	19	47	1,229	1,389	1,428	4,112	19	47	1,229	1,389	1,428	4,112
2012	0	0	0	0	0	0	11	171	1,150	8,376	2,521	12,229	11	171	1,150	8,376	2,521	12,229
2013	[c]	[c]	[c]	[c]	[c]	[c]	48	211	1,804	805	3,065	5,973	[c]	[c]	[c]	[c]	[c]	[c]
2014	3	7	39	1,169	1,456	2,674	31	405	3,042	6,648	3,844	13,970	34	412	3,081	7,817	5,300	16,644
5-year avg [d]	0	0	0	0	0	0	30	114	1,460	3,476	2,105	7,184	30	114	1,460	3,476	2,105	7,184
10-year avg [e]	0	0	0	0	0	0	39	144	1,855	6,027	1,658	9,723	39	144	1,855	6,027	1,658	9,723

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Beginning in 1999, Tier II chum salmon fishing restrictions limited the number of permit holders that could fish for chum salmon.

[b] Beginning in 2006, Tier II chum salmon fishing restrictions were suspended.

[c] Confidential.

[d] 2009–2013.

[e] 2004–2013.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1990–2014.

	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
1990	52	21	9	9	15,993	16,066	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	49	1	0	0	14,839	14,889	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	6	9	2,085	0	1,002	3,102	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	1	4	2	8,480	2,803	11,290	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	0	0	3,424	0	111	3,535	253	168	733	8,410	1,337	10,901	253	168	4,157	8,410	1,448	14,436
1995 [b]	0	0	1,616	4,296	1,987	7,899	165	34	1,649	7,818	10,373	20,039	165	34	3,265	12,114	12,360	27,938
1996 [b]	0	0	638	0	0	638	86	134	3,014	17,399	2,867	23,500	86	134	3,652	17,399	2,867	24,138
1997 [b]	19	2	102	20	8,003	8,146	138	427	555	4,570	4,891	10,581	157	429	657	4,590	12,894	18,727
1998 [b]	1	0	3	106,761	723	107,488	184	37	1,292	13,340	1,893	16,746	185	37	1,295	120,101	2,616	124,234
1999 [b]	0	0	0	0	0	0	60	48	1,234	469	3,656	5,467	60	48	1,234	469	3,656	5,467
2000 [b]	0	0	1,645	17,408	164	19,217	169	18	2,335	10,906	1,155	14,583	169	18	3,980	28,314	1,319	33,800
2001 [b]	0	43	30	0	7,094	7,167	89	72	880	1,665	3,291	5,997	89	115	910	1,665	10,385	13,164
2002 [b]	0	0	0	0	0	0	69	66	1,640	14,430	1,882	18,087	69	66	1,640	14,430	1,882	18,087
2003 [b]	0	0	0	0	0	0	166	28	309	5,012	1,477	6,992	166	28	309	5,012	1,477	6,992
2004 [c]	0	0	0	0	0	0	164	6	654	19,936	880	21,640	164	6	654	19,936	880	21,640
2005 [c]	0	0	0	0	0	0	96	15	686	11,467	1,852	14,116	96	15	686	11,467	1,852	14,116
2006 [c]	0	0	0	0	0	0	136	38	1,760	14,670	722	17,326	136	38	1,760	14,670	722	17,326
2007 [c]	0	0	0	0	0	0	188	321	1,179	3,980	4,217	9,885	188	321	1,179	3,980	4,217	9,885
2008 [c]	0	0	256	2,699	623	3,578	146	95	2,337	10,155	350	13,083	146	95	2,593	12,854	973	16,661
2009 [c]	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 [c]	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
2011 [c]	7	0	859	3	20,075	20,944	99	74	1,345	5,652	2,122	9,292	106	74	2,204	5,655	22,197	30,236
2012 [c]	2	14	573	31,055	3,791	35,435	57	52	1,143	7,635	1,056	9,943	59	66	1,716	38,690	4,847	45,378
2013 [c]	0	0	5,362	1,180	3,113	9,655	47	15	964	3,655	3,256	7,937	47	15	6,326	4,835	6,369	17,592
2014 [c]	28	47	4,156	7,888	13,560	25,679	36	91	1,720	7,363	1,719	10,929	64	138	5,876	15,251	15,279	36,608
5-year avg. [d]	2	3	2,966	6,855	8,856	18,683	100	41	1,370	6,070	1,852	9,433	102	44	4,336	12,925	10,708	28,116
10-year avg. [e]	1	2	1,509	3,698	4,490	9,699	123	68	1,347	9,056	1,728	12,321	124	70	2,855	12,753	6,218	22,021

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence household surveys. Previous surveys often were partial surveys and did not capture later season harvests like coho salmon.

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

[d] 2009–2013.

[e] 2004–2013.

Appendix A8.–Commercial and subsistence salmon catch by species, by year in Elim Subdistrict, Norton Sound District, 1990–2014.

	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
1990	202	0	0	501	3,723	4,426	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991 [b]	161	0	0	0	804	965	312	0	2,153	3,555	2,660	8,680	473	0	2,153	3,555	3,464	9,645
1992 [b]	0	0	3,531	0	6	3,537	100	0	1,281	6,152	1,260	8,793	100	0	4,812	6,152	1,266	12,330
1993 [b]	3	0	4,065	0	167	4,235	368	0	1,217	1,726	1,635	4,946	371	0	5,282	1,726	1,802	9,181
1994 [b]	0	0	5,345	0	414	5,759	322	104	1,180	9,345	3,476	14,427	322	104	6,525	9,345	3,890	20,186
1995 [b]	4	44	3,742	2,962	1,171	7,923	284	17	1,353	2,046	3,774	7,474	288	61	5,095	5,008	4,945	15,397
1996 [b]	0	0	1,915	68,609	0	70,524	417	52	1,720	9,442	2,319	13,950	417	52	3,635	78,051	2,319	84,474
1997 [b]	844	0	1,409	0	2,683	4,936	619	50	1,213	1,314	2,064	5,260	1,463	50	2,622	1,314	4,747	10,196
1998 [b]	105	0	1,462	145,669	2,311	149,547	414	49	1,831	6,891	1,376	10,561	519	49	3,293	152,560	3,687	160,108
1999 [b]	0	0	0	0	0	0	424	13	975	1,564	744	3,720	424	13	975	1,564	744	3,720
2000 [b]	10	0	5,182	46,369	535	52,096	248	46	1,429	5,983	1,173	8,879	258	46	6,611	52,352	1,708	60,975
2001 [b]	7	0	1,696	0	681	2,384	427	70	1,352	1,390	898	4,137	434	70	3,048	1,390	1,579	6,521
2002 [b]	0	0	0	0	0	0	565	14	1,801	8,345	1,451	12,176	565	14	1,801	8,345	1,451	12,176
2003 [b]	0	0	0	0	0	0	660	39	1,143	2,524	1,687	6,053	660	39	1,143	2,524	1,687	6,053
2004 [c]	0	0	0	0	0	0	412	0	704	7,858	683	9,657	412	0	704	7,858	683	9,657
2005 [c]	0	0	0	0	0	0	225	9	1,011	3,721	598	5,564	225	9	1,011	3,721	598	5,564
2006 [c]	0	0	0	0	0	0	179	13	1,769	5,216	1,267	8,444	179	13	1,769	5,216	1,267	8,444
2007 [c]	1	0	5,908	1,648	4,567	12,124	260	0	2,295	1,742	2,334	6,631	261	0	8,203	3,390	6,901	18,755
2008 [c]	5	0	4,602	14,536	304	19,447	269	0	1,804	7,655	1,284	11,012	274	0	6,406	22,191	1,588	30,459
2009 [c]	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 [c]	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
2011 [c]	4	12	8,336	165	23,531	32,048	160	3	1,688	704	3,671	6,226	164	15	10,024	869	27,202	38,274
2012 [c]	3	1	2,003	52,775	2,262	57,044	42	0	1,302	10,848	1,494	13,686	45	1	3,305	63,623	3,756	70,730
2013 [c]	6	27	6,675	601	1,434	8,743	39	15	1,515	1,134	1,218	3,921	45	42	8,190	1,735	2,652	12,664
2014 [c]	101	164	15,938	28,507	17,525	62,235	276	38	1,808	4,595	2,081	8,798	377	202	17,746	33,102	19,606	71,033
5-year avg. [d]	4	9	7,355	13,047	10,255	30,671	177	8	1,724	4,408	2,182	8,497	181	17	9,079	17,454	12,437	39,168
10-year avg. [e]	3	5	4,729	8,142	5,615	18,493	223	6	1,620	4,823	1,707	8,379	226	11	6,349	12,965	7,322	26,872

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence household surveys. Previous surveys often were partial surveys and did not capture later season harvests like coho salmon.

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

[d] 2009–2013.

[e] 2004–2013.

Appendix A9.–Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1990–2014.

	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
1990	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	27	0	0	0	1,787	1,814	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	267	0	0	290	1,378	1,935	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	0	0	0	0	0	0	308	1	370	6,049	4,581	11,309	308	1	370	6,049	4,581	11,309
1995 [b]	0	0	0	0	0	0	475	46	985	3,514	5,828	10,848	475	46	985	3,514	5,828	10,848
1996 [b]	0	0	0	0	0	0	295	3	676	3,929	4,161	9,064	295	3	676	3,929	4,161	9,064
1997 [b]	194	0	0	0	531	725	656	54	322	1,795	4,040	6,867	850	54	322	1,795	4,571	7,592
1998 [b]	0	0	0	0	0	0	684	0	388	2,009	6,192	9,273	684	0	388	2,009	6,192	9,273
1999 [b]	0	0	0	0	0	0	327	0	167	1,943	4,153	6,590	327	0	167	1,943	4,153	6,590
2000 [b]	0	0	0	0	0	0	397	2	267	2,255	4,714	7,635	397	2	267	2,255	4,714	7,635
2001 [b]	0	0	0	0	0	0	460	14	276	5,203	4,445	10,398	460	14	276	5,203	4,445	10,398
2002 [b]	0	0	0	0	0	0	557	0	509	6,049	3,971	11,086	557	0	509	6,049	3,971	11,086
2003 [b]	0	0	0	0	0	0	373	46	510	4,184	3,397	8,510	373	46	510	4,184	3,397	8,510
2004	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2005	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2006	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2007	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2008	7	0	600	1,232	507	2,346	187	2	1,084	4,489	3,330	9,092	194	2	1,684	5,721	3,837	11,438
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
2011	5	9	4,836	652	7,558	13,060	239	1	549	1,132	3,529	5,450	6	558	5,968	4,181	13,008	13,066
2012	10	16	4,378	49,970	8,417	62,791	103	0	310	2,623	2,721	5,757	113	16	4,688	52,593	11,138	68,548
2013	8	4	5,485	487	36,021	42,005	123	2	826	1,341	3,853	6,145	131	6	6,311	1,828	39,874	48,150
2014	71	22	9,562	28,393	13,436	51,484	154	1	1,201	2,205	4,323	7,884	225	23	10,763	30,598	17,759	59,368
5-year avg. [c]	6	9	4,505	13,566	14,963	33,049	266	7	759	2,680	4,117	7,828	213	153	5,410	16,845	19,560	39,516

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence household surveys. Previous surveys often were partial surveys that did not capture later season harvests like coho salmon.

[c] 2009–2013.

Appendix A10.–Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1990–2014.

	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
1990	2,644	49	4,695	0	21,748	29,136	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	1,324	55	11,614	0	31,619	44,612	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	1,098	56	14,660	0	27,867	43,681	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	2,756	20	11,130	106,743	20,864	141,513	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	885	8	22,065	502,231	5,411	530,600	1,175	1	2,777	9,133	1,221	14,307	2,060	9	24,842	511,364	6,632	544,907
1995 [b]	1,239	5	10,856	37,377	14,775	64,252	1,303	72	2,682	7,176	2,534	15,885	2,542	77	13,538	44,553	17,309	80,137
1996 [b]	1,340	1	13,444	304,982	3,237	323,004	1,114	31	3,615	8,370	4,425	17,555	2,454	32	17,059	313,352	7,662	340,559
1997 [b]	2,449	0	4,694	0	5,747	12,890	1,146	62	2,761	5,779	1,612	11,360	3,595	62	7,455	5,779	7,359	24,250
1998 [b]	910	0	3,624	236,171	7,080	247,785	982	92	1,872	6,270	1,034	10,250	1,892	92	5,496	242,441	8,114	258,035
1999 [b]	581	0	2,398	0	2,181	5,160	818	183	1,556	5,092	467	8,116	1,399	183	3,954	5,092	2,648	13,276
2000 [b]	160	3	7,779	85,493	2,751	96,186	440	20	2,799	5,432	2,412	11,103	600	23	10,578	90,925	5,163	107,289
2001 [b]	90	0	2,664	0	1,813	4,567	936	143	2,090	10,172	1,553	14,894	1,026	143	4,754	10,172	3,366	19,461
2002 [b]	1	0	680	0	261	942	1,230	4	2,169	8,769	800	12,972	1,231	4	2,849	8,769	1,061	13,914
2003 [b]	2	0	4,031	0	485	4,518	881	50	2,941	12,332	587	16,791	883	50	6,972	12,332	1,072	21,309
2004	0	0	12,734	0	1,372	14,106	943	12	1,994	7,291	139	10,379	943	12	14,728	7,291	1,511	24,485
2005	50	0	21,818	0	791	22,659	807	0	1,913	12,075	202	14,997	857	0	23,731	12,075	993	37,656
2006	8	0	32,472	0	3,321	35,801	382	36	1,968	4,817	351	7,554	390	36	34,440	4,817	3,672	43,355
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
2011	45	69	15,368	29	25,388	40,899	235	100	1,241	2,681	490	4,747	280	169	16,609	2,710	25,878	45,646
2012	25	29	7,828	19,253	20,141	47,276	214	9	1,110	4,609	634	6,576	239	38	8,938	23,862	20,775	53,852
2013	6	45	6,890	14	23,268	30,223	136	108	2,146	3,346	983	6,719	142	153	9,036	3,360	24,251	36,942
2014	16	47	19,753	33,137	29,455	82,408	189	72	1,025	3,593	625	5,504	205	119	20,778	36,730	30,080	87,912
5-year avg. [c]	17	39	11,003	5,813	24,044	40,917	266	78	1,716	4,629	832	7,520	283	117	12,719	10,441	24,876	48,437
10-year avg. [d]	15	22	19,148	3,728	13,782	36,696	440	47	1,740	5,495	552	8,274	455	69	20,888	9,224	14,334	44,969

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence household surveys. Previous surveys often were partial surveys that did not capture later season harvests like coho salmon.

[c] 2009–2013.

[d] 2004–2013.

Appendix A11.–Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1990–2014.

	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
1990	5,998	358	52,015	0	23,659	82,030	2,476	[a]	[a]	[a]	[a]	[a]	8,474	[a]	[a]	[a]	[a]	[a]
1991	4,534	147	52,033	0	39,609	96,323	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	3,409	229	84,449	6,284	52,547	146,918	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	5,944	251	26,290	42,061	28,156	102,702	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	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 [b]	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 [b]	3,644	0	52,200	113,837	7,369	177,050	3,023	181	11,187	18,026	4,227	36,644	6,667	181	63,387	131,863	11,596	213,694
1997 [b]	9,067	159	26,079	0	17,139	52,444	4,191	196	6,746	10,600	1,603	23,336	13,258	355	32,825	10,600	18,742	75,780
1998 [b]	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 [b]	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 [b]	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 [b]	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 [b]	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 [b]	10	21	13,029	0	3,075	16,135	2,585	297	6,192	21,779	1,785	32,638	2,595	318	19,221	21,779	4,860	48,773
2004	22	47	29,282	0	4,924	34,275	2,829	417	6,653	22,755	2,154	34,808	2,851	464	35,935	22,755	7,078	69,083
2005	101	12	63,705	0	3,192	67,010	2,193	656	7,886	25,447	2,660	38,842	2,294	668	71,591	25,447	5,852	105,852
2006	12	3	98,336	0	6,721	105,072	2,537	326	9,905	22,547	2,712	38,027	2,549	329	108,241	22,547	9,433	143,099
2007	13	2	88,418	2,121	11,788	102,342	1,666	292	5,859	11,674	2,057	21,547	1,678	294	94,277	13,795	13,845	123,889
2008	65	36	77,227	48,839	17,648	143,815	1,402	137	7,452	15,116	2,805	26,912	1,467	173	84,679	63,955	20,453	170,727
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
2011	124	279	29,518	6,292	34,003	70,216	607	189	2,486	5,608	3,316	12,206	731	468	32,004	11,900	37,319	82,422
2012	157	74	22,274	52,445	28,161	103,111	808	192	4,558	9,460	3,973	18,991	965	266	26,832	61,905	32,134	122,102
2013	131	171	29,390	6,056	54,873	90,621	468	221	6,117	7,724	3,129	17,659	599	392	35,507	13,780	58,002	108,280
2014	70	232	63,308	83,312	32,313	179,235	345	114	5,642	9,914	2,712	18,727	415	346	68,950	93,226	35,025	197,962
5-year avg. [c]	123	137	34,850	17,412	33,654	86,176	1,006	220	4,773	8,700	3,257	17,956	1,130	357	39,623	26,112	36,911	104,133
10-year avg. [d]	83	78	53,122	13,802	21,255	88,340	1,566	293	6,162	14,104	2,867	24,992	1,649	371	59,284	27,906	24,122	113,331

Note: Commercial harvest numbers may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence household surveys. Previous surveys often were partial surveys that did not capture later season harvests like coho salmon.

[c] 2009–2013.

[d] 2004–2013.

Appendix A12.–Subsistence salmon catch by species and year for St. Michael and Stebbins in Norton Sound District, 1994–2014.

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.					
2011	Subsistence surveys were not conducted.					
2012	80	2,172	457	20	911	3,640
2013	Subsistence surveys were not conducted.					
2014	328	2,175	700	0	448	3,651
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.					
2011	Subsistence surveys were not conducted.					
2012	109	3,456	3,659	0	1,256	8,480
2013	Subsistence surveys were not conducted.					
2014	149	3,696	883	0	1,116	5,844

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, 1990–2014.

	SUBDISTRICTS 1–6																	
	Commercial						Subsistence						Sport fish					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1991 [a]	6,068	203	63,647	0	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	5,367	908	17,867	37,515	31,761	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	6,760	839	11,922	24,233	16,906	60,660	1,106	30	4,393	1,458	278	7,265
1998	7,429	7	29,623	588,013	16,324	641,396	6,345	393	13,929	46,961	14,497	82,125	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	11,100	30,849	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	21	17,060	0	3,560	20,653	4,728	536	11,446	46,338	9,498	72,546	239	572	3,039	2,222	292	6,364
2004 [a]	22	47	42,016	0	6,296	48,381	4,448	541	11,579	72,887	4,541	93,996	535	404	5,806	8,309	498	15,552
2005 [a]	151	12	85,523	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]	20	3	130,808	0	10,042	140,873	3,258	572	19,267	56,579	5,942	85,618	427	22	11,427	5,317	344	17,537
2007 [a]	19	2	126,136	3,769	22,431	152,357	2,647	938	11,879	20,954	12,011	48,428	147	15	6,179	1,331	96	7,768
2008	83	60	120,309	75,525	25,124	221,101	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
2011	185	369	58,917	7,141	110,555	177,167	1,359	414	8,538	17,166	14,556	42,033	61	58	3,582	566	139	4,406
2012	197	134	37,056	205,498	62,772	305,657	1,235	424	9,573	43,551	12,399	67,182	0	28	5,099	3,220	209	8,556
2013	151	247	53,802	8,338	118,709	181,247	861	572	13,372	18,045	15,504	48,354	0	23	7,567	1,806	2,267	11,663
2014	289	519	112,756	182,406	107,745	403,715	1,031	721	14,438	34,318	15,304	65,812	Sport fish harvest is not yet available.					
5-year avg. [b]	151	196	59,779	53,980	88,780	202,886	1,791	466	11,649	29,426	13,521	56,853	80	22	5,758	1,926	630	8,415
10-year avg. [c]	105	110	80,369	34,919	51,178	166,681	2,516	560	13,136	41,026	10,492	67,730	230	61	6,692	3,192	447	10,621

Note: Commercial harvest may include a small number of salmon reported on fish tickets that were retained for personal use and not commercially sold.

[a] Not all subdistricts were surveyed.

[b] 2009–2013.

[c] 2004–2013.

Appendix A14.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2014.

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
2011	54	2,493	77	391	3,015
2012	0	3,283	118	20	3,421
2013	0	4,068	354	886	5,308
2014		Sport fish harvest is not yet available.			
Avg 2009–2013	70	3,589	174	484	4,316
Avg 2004–2013	204	4,056	144	848	5,252

Appendix A15.–Sport salmon harvest by species, by year for the Fish/Niukluk rivers, 1990–2014.

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
2011	0	700	29	10	739
2012	0	1,163	74	636	1,873
2013	0	1,227	0	0	1,227
2014		Sport fish harvest is not yet available.			
Avg 2009–2013	6	1,020	35	154	1,215
Avg 2004–2013	9	951	79	231	1,270

Appendix A16.–Sport salmon harvest by species, by year for the Nome River, 1990–2014.

Year	Chinook	Coho	Chum	Pink	Total
1990	39	407	122	2,651	3,219
1991	22	417	241	356	1,036
1992	16	713	0	4,397	5,126
1993	93	602	0	723	1,418
1994	0	326	0	4,103	4,429
1995	0	143	0	230	373
1996	0	598	0	3,280	3,878
1997	10	295	0	83	388
1998	0	189	0	1,985	2,174
1999	0	219	0	0	219
2000	0	342	0	578	920
2001	0	297	0	0	297
2002	0	217	0	312	529
2003	0	68	0	12	80
2004	0	270	0	3,369	3,639
2005	0	1,001	0	1,193	2,194
2006	0	2,768	0	2,422	5,190
2007	0	797	0	402	1,199
2008	0	1,793	0	2,954	4,747
2009	0	229	0	178	407
2010	13	602	0	1,716	2,331
2011	0	68	0	85	153
2012	0	259	0	1,264	1,523
2013	0	279	139	302	720
2014	Sport fish harvest is not yet available.				
Avg 2009–2013	3	287	28	709	1,027
Avg 2004–2013	1	807	14	1,389	2,210

Appendix A17.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1990–2014.

	Sinuk River				Nome River			
Year [a]	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1990	ND	95	29,040	161	ND	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	ND	3,110	1,250	290	ND	1,865	182	517
1996	5	1,815	74,100	367	1	799	34,520	723
1997	ND	2,975	1,200	57	4	956	65	544
1998	ND	630	372,850	322	3	335	179,680	515
1999	ND	1,697	180	217	ND	375	345	620
2000	ND	10	12,608	912	ND	658	6,380	1,032
2001	ND	3,746	115 [b]	750	ND	946 [b]	790 [b]	1,307 [b]
2002	ND	1,682	28,487	1,290 [b]	ND	127 [b]	295 [b]	1,796
2003	ND	677	9,885	190	8	337	2,841	604
2004	ND	100 [b]	1,267,100 [b]	2,085	ND	3 [b]	707,350 [b]	1,687
2005	ND	1,072 [b]	211,000 [b]	2,045	2 [b]	2,082 [b]	212,000 [b]	3,541
2006	0 [b]	1115 [b]	515,000 [b]	2,147	0 [b]	394 [b]	441,550 [b]	3,650
2007	3 [b]	7,210 [b]	6,810 [b]	668	4 [b]	1,449 [b]	3,378 [b]	1,442
2008	ND	ND	1,496,000 [b]	1,633	ND	106 [b]	528,000 [b]	2,051
2009	0 [b]	344 [b]	6,730 [b]	508 [b]	ND	ND	ND	877 [b]
2010	0 [b]	3,955 [b]	168,600 [b]	5,507 [b]	0 [b]	2,998 [b]	98,272 [b]	0 [b]
2011	0 [b]	6,265 [b]	21,100 [b]	479 [b]	0 [b]	1,317 [b]	9,575 [b]	870 [b]
2012	0 [b]	3,650 [b]	506,500 [b]	ND	No survey occurred.			
2013	0 [b]	19,500 [b]	23,000 [b]	1,054 [b]	No survey occurred.			
2014	0 [b]	9,050 [b]	115,000 [b]	1,275 [b]	No survey occurred.			

-continued-

Year [a]	Flambeau River				Eldorado River			
	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1990	ND	905	ND	96	17	884	2,050	44
1991	ND	2,828	7,180	ND	76	5,755	1,590	98
1992	ND	55	ND	42	2	4,887	6,615	113
1993	ND	819	640	11	38	2,895	120	111
1994	ND	3,612	4	213	ND	5,140	53,890	242
1995	ND	1,876	1,102	186	4	9,025	50	247
1996	ND	647	355	71	21	20,710	40,100	254
1997	ND	2,250 [b]	200 [b]	751	40	5,967	10	37
1998	ND	2,828	7,180	ND	ND	3,000	123,950	71
1999	ND	55	ND	42	2	1,741	6	45
2000	ND	819	640	11	2	3,383	16,080	24
2001	ND	3,612	4	213	2	4,450	8	232
2002	ND	1,876	1,102	186	8	139	58,700	463
2003	ND	647	355	71	12	1,257	821	71
2004	ND	2,250 [b]	200 [b]	751	ND	109 [b]	52,000 [b]	755
2005	ND	2,261 [b]	100 [b]	154	2 [b]	5,445 [b]	2,050 [b]	376
2006	0 [b]	16,000 [b]	8,800 [b]	ND	0 [b]	2,355 [b]	156,500 [b]	523
2007	1 [b]	4,452 [b]	0 [b]	38	2 [b]	6,315 [b]	318 [b]	34
2008	0 [b]	4,235 [b]	106,200 [b]	918	No survey occurred.			
2009	0 [b]	860 [b]	1,598 [b]	627 [b]	14 [b]	1,069 [b]	210 [b]	301 [b]
2010	0 [b]	13,600 [b]	36,000 [b]	ND	0 [b]	30,600 [b]	84,582 [b]	ND
2011	0 [b]	5,283 [b]	1,810 [b]	292 [b]	0 [b]	9,225 [b]	260 [b]	120 [b]
2012	0 [b]	7,911 [b]	ND	ND	No survey occurred.			
2013	0 [b]	16,088 [b]	ND	ND	4 [b]	16,859 [b]	52 [b]	ND
2014	0 [b]	10,776 [b]	25,000 [b]	ND	No survey occurred.			

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Year [a]	Fish River				Boston Creek			
	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1990		No survey occurred.			112	1,455	8,440	ND
1991	58	10,470	51,190	ND	152	2,560	3,210	ND
1992	4	390	1,387,000	ND	68	1,540	50,850	ND
1993	48	12,695	13,440	ND	227	4,563	1,930	ND
1994	55	16,500	910,000	ND	95	4,270	355,600	ND
1995	40	13,433	780	1,829	78	4,221	ND	230
1996	189	5,840 [c]	684,780	ND	ND	3,505 [c]	35,980	ND
1997	110	19,515	800	465	452	4,545	ND	ND
1998	96	28,010	663,050	ND	255	1,570	175,330	ND
1999	ND	50	20	821	ND	ND	ND	319
2000	ND	ND	ND	805	ND	ND	ND	414
2001	8	3,220	1,744	1,055	33	3,533	1,038	155
2003	95	3,200	1,014	ND	145	750	701	ND
2004	19	621	404,930	90	93	55	135,000	140
2005	0	6,875	319,170	ND	46	1,675	5,850	ND
2010			No survey occurred.		29 [b]	3,010 [b]	5,110 [b]	73 [b]
2013	15 [b]	2,550 [b]	ND	ND	19 [b]	16,100 [b]	ND	ND

Year [a]	Niukluk River				Kwiniuk River			
	Chinook	Chum	Pink	Coho	Chinook [d]	Chum [d]	Pink [d]	Coho [d]
1990	15	6,200	115,250	170	744	13,735	416,511	746 [e]
1991	42	10,700	37,410	1,783 [f]	587	18,802	53,499	809 [e]
1992	ND	7,770	803,200	812	479	12,077	1,464,717	532 [e]
1993	15	19,910	2,840	2,104	565	15,823	43,065	1,238 [e]
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 [e]
1996	25	9,732 [c]	153,150	2,047	567	27,256	907,894	1,410 [e]
1997	131	16,550	ND	983	972	20,118	9,536	610 [e]
1998	51	2,556	205,110	593	296	24,248	655,933	610 [e]
1999	ND	640	ND	619	115	8,763	608	223 [e]
2000	ND	ND	ND	3,812	144	12,878	750,173	541 [e]
2001	6	2,448	2,856	809	258	16,598	8,423	9,532
2002	ND	ND	ND	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	ND	342	12,083	341,048	12,950
2006	ND	ND	ND	737 [g]	195	39,519	1,347,090	22,341
2007	ND	ND	ND	ND	258	27,756	54,225	9,429
2008	ND	ND	ND	1,715	237	9,483	1,444,213	10,461
2009		No survey occurred.			444	8,739	42,960	9,036
2010		No survey occurred.			135	71,388	634,220	8,049
2011	4 [b]	9,735 [b]	375 [b]	838 [b]	57	31,604	30,023	3,288
2012	ND	ND	ND	928 [b]	54	5,577	393,302	777
2013	68 [b]	17,203 [b]	9,700 [b]	2,279 [b]	15	5,631	13,212	3,940
2014	ND	ND	ND	2,342 [b]	429	38,789	326,558	14,713

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Appendix A17.–Page 4 of 4.

Year [a]	Tubutulik River				North River			
	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1990	397	4,350	186,400	ND	255	1,345	25,685	ND
1991	661	7,085	26,870	ND	656	2,435	119,140	2,510
1992	260	2,595	138,600	ND	329	ND	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	ND	106	270 [c]	125,500	917
1997	1,946	3,105	16,890	ND	1,605	9,045	17,870	ND
1998	894	10,180	1,124,800	ND	591	50	153,150	233
1999	No survey occurred.				18	1,480	3,790	533
2001	77	863	ND	ND	367	330	ND	ND
2002	42	180	182,000	ND	122	217	4,590	800
2003	50	1,352	60	292	131	222	11,010	ND
2004	321	1,117	391,000	779	189	283	264,000	1,386
2005	78	1,336	48,203	ND	156	310	381,150	1,963
2007	823	7,045	32,250	4,552	554	295	50,100	2,349
2008	ND	ND	ND	4,197	ND	ND	ND	2,774
2009	627	3,161	12,695	ND	438	3,263	189,939	2,830
2010	122	16,097	16,520	50	124	1,627	1,480	200
2011	141 [b]	14,127 [b]	3,875 [b]	1,606	433	9,785	20,920	898
2012	ND	ND	ND	2,889 [b]	No survey occurred.			
2013	2	4,532	700	ND	339	2,425	5,025	867

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

[a] Represents "high count" for season.

[b] Helicopter survey.

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

[d] Total counts obtained from counting tower.

[e] Aerial survey, not tower count.

[f] Includes counts from Casadepaga and Ophir Creeks.

[g] Includes counts from Ophir Creek.

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

Appendix A18.–Total Norton Sound escapement index for chum, pink, coho, and Chinook salmon from weir and tower projects at Kwiniuk, Niukluk, Nome, and Snake rivers (starting 1995), North River (starting 1996), and Eldorado River (starting 1997) to 2014.

Year	Chum	Pink	Coho [a]	Chinook
1995	138,318	49,409	7,333	626
1996 [b]	124,571	2,535,593	16,175	2,027
1997	109,961	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	708,669	37,112	2,324
2008	41,660	3,930,689	49,737	1,250
2009	41,800	275,835	39,236	3,050
2010	262,382	2,323,131	36,440	2,502
2011	208,031	555,149	21,912	2,066
2012 [c]	121,585	1,666,828	23,769	1,885
2013 [d]	163,789	216,720	42,182	1,372
2014 [d]	142,622	1,813,916	67,262	3,842

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

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

[c] Most projects were only operational for a short duration during coho season because of high water.

[d] Starting in 2013, there was no longer a counting tower at Niukluk.

Appendix A19.–Total escapement (4-6 rivers) and catch (commercial, subsistence, and sport fish) for chum, pink, coho, and Chinook salmon for Norton Sound District, 1995–2014.

Year [a, b]	Chum	Pink	Coho	Chinook
1995	213,371	169,496	76,768	15,291
1996 [c]	156,128	3,089,682	112,710	12,617
1997 [d]	161,248	189,439	60,033	25,989
1998 [d]	129,669	3,712,761	52,489	17,105
1999	76,493	95,302	40,546	9,315
2000	85,243	2,091,074	84,983	6,655
2001	97,223	109,878	66,232	6,926
2002	108,444	2,300,537	39,368	8,524
2003	63,099	441,387	45,306	7,445
2004	51,829	6,513,682	87,800	7,027
2005	78,719	2,652,592	146,616	5,280
2006	142,373	5,825,726	217,986	4,961
2007	157,932	734,723	181,306	5,137
2008	75,834	4,067,996	198,406	4,378
2009	85,285	320,632	147,839	6,793
2010	325,633	1,566,755	110,876	3,802
2011	224,511	216,116	82,531	2,560
2012	126,296	1,247,014	57,731	2,510
2013 [e]	186,316	100,684	91,357	1,617
2014 [e]	211,170	850,330	150,348	4,114

[a] Kwiniuk, Niukluk, Nome, and Snake rivers (starting 1995), North River (starting 1996), and Eldorado River (starting 1997). Does not include Niukluk River after 2012.

[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 Gambell.

[e] Sport fish data are not yet available for 2014.

Appendix A20.–Nome Subdistrict chum salmon estimated escapement, 1999–2014.

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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Year	Rivers	Aerial survey counts	Estimated escapement [a]	Year	Rivers	Aerial survey counts	Estimated escapement [a]
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
2011	Nome		3,582	2012	Nome		2,015
	Snake		4,343		Snake		1,235
	Eldorado		16,227		Eldorado		13,393
	Flambeau	6,283	15,056		Flambeau	7,911	17,517
	Solomon	1,010	4,529		Solomon	165	1,377
	Sinuk	6,265	15,028		Sinuk	3,650	10,537
	Bonanza	2,113	7,357		Bonanza	1,550	6,002
			66,122				52,076
2013	Nome		4,811	2014	Nome		5,589
	Snake		2,755		Snake		3,983
	Eldorado		26,121		Eldorado		27,054
	Flambeau	16,088	27,928		Flambeau	10,776	21,462
	Solomon [e]		1,377		Solomon [e]		1,502
	Sinuk	19,500	31,691		Sinuk	9,050	19,136
	Bonanza	5,284	13,437		Bonanza	8,602	18,508
			108,120				97,234

[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.

[e] Solomon escapement was a weir count beginning in 2013.

Appendix A21.–Historical escapement of salmon and Dolly Varden at Eldorado River counting tower, 1997–2002 and weir, 2003–2014.

Year	Operating period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1997	June 29–Aug 19	98	14,302	1,022	194	ND	ND
1998	June 29–Aug 12	8	13,808	137,283	21	ND	ND
1999	July 10–Sept 01	28	4,218	977	510	ND	ND
2000	June 29–Aug 25	33	11,617	55,992	192	ND	ND
2001	July 08–Sept 13	50	11,635	488	1,509	ND	ND
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
2011	June 30–Aug 03	3	16,227	489	1	0	2
2012	July 04–Aug 15	0	13,393	59,952	1	0	30
2013	July 01–Aug 06	9	26,121	1,025	15	0	2
2014	June 23–July 27	18	27,054	46,746	0	0	4

Note: ND is no data.

[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 escapement of salmon and Dolly Varden at Snake River counting tower 1995–2002 and weir 2003–2014.

Year	Operating period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1995	July 01–Aug 18	0	4,393	917	856	0	ND
1996	July 03–Aug 22	5	2,772	44,558	1,638	0	ND
1997	July 07–Aug 18	12	6,184	6,742	1,157	0	ND
1998	July 01–Aug 11	0	11,067	219,679	178	0	ND
1999	July 01–Aug 14	20	484	116	90	0	ND
2000	June 29–Aug 25	28	1,911	4,723	406	0	ND
2001	July 08–Sept 05	33	2,182	1,295	1,335	0	ND
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
2011	July 08–Sept 11	1	4,343	7,011	343	14	5
2012	July 06–Aug 15 [c]	1	1,235	5,954	14	3	3
2013	July 19–Sept 10	8	2,755	1,333	1,203	163	1
2014	July 05–Sept 10	11	3,983	20,067	1,424	86	62

Note: ND is no data.

[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.

[c] Weir was knocked out for 13 days in late July and early August. An interpolation was made for chum salmon.

Appendix A23.–Historical salmon escapement at Kwiniuk River counting tower, 1990–2014.

Year	Operating period	Chum	Pink	Chinook	Coho
1990	June 21–July 25	13,957	416,512	900	0
1991	June 18–July 27	19,801	53,499	708	0
1992	June 27–July 28	12,077	1,464,716	479	0
1993	June 27–July 27	15,824	43,063	600	0
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	0
1998	June 18–July 27	24,247	655,934	303	0
1999	June 25–July 28	8,763	607	116	0
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	9,483	1,444,213	237	10,461
2009	June 24–Sept 13	8,739	42,962	444	8,677
2010	June 25–Sept 07	71,388	634,220	135	8,049
2011	June 20–Sept 11	31,604	30,023	57	3,288
2012	June 23–Aug 16	5,577	393,302	54	777
2013	June 24–Sept 16	5,631	13,212	15	3,940
2014	June 15–Sept 08	39,789	326,558	429	14,713

Appendix A24.–Historical salmon escapement at Niukluk River counting tower, 1995–2012.

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
2011	June 28–Sept 06	23,607	15,425	18	2,405
2012	July 04–Aug 17	19,576	249,212	21	1,729

Note: The Niukluk River counting tower project was discontinued after 2012.

Appendix A25.–Historical salmon escapement at Nome River counting tower, 1993–1995, and weir, 1996–2014.

Year	Operating period	Chum	Pink	Chinook	Coho	Sockeye
1993	July 25–Aug 28	1,859	13,036	63	4,349	ND
1994	June 24–Aug 15	2,893	142,604	54	726	ND
1995	June 22–Sept 06	5,093	13,893	5	1,650	ND
1996	June 26–July 23	3,339	95,681 [a]	5	66	ND
1997	June 27–Aug 27	5,147	8,035	22	321	ND
1998	July 01–Aug 11	1,930	359,469	70	96	ND
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
2011	July 01–Sept 12	3,582	14,403	12	1,833	22
2012	July 04–Aug 15	2,015	149,119	6	224	48
2013	July 05–Sept 16	4,811	10,257	9	2,624	38
2014	July 05–Sept 11	5,589	96,397	8	2,637	34

Note: ND is no data.

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

Appendix A26.–Salmon escapement at Solomon River weir, 2013–2014.

Year	Operating period	Chum	Pink	Chinook	Coho	Sockeye
2013	July 05–Aug 26	1,377	2,733	0	178	3
2014	July 02–Aug 20	1,502	20,691	0	79	0

Note: The Solomon River weir was initiated in 2013.

Appendix A27.–Historical sockeye salmon escapement at Glacial Lake weir, 2000–2014.

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
2011	June 28–July 26	4		1,697
2012 [c]	July 01–Aug 09	25	165	1,636
2013 [d]	June 20–Aug 12	35	2	2,544
2014 [e]	June 30–Aug 07			4,211

[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.

[c] A video project was tested during 2012 and was in operation 11 days (July 31 to August 9) after human occupation of the weir site. Included in totals are 34 sockeye, 12 pink, and 10 chum salmon that were counted by camera during that time.

[d] A video project was in operation from July 14 to August 12.

[e] A video project was in operation for the entire duration.

Appendix A28.–Historical salmon escapement at Inglutalik River counting tower, 2011–2014.

Year	Operating period	Chum	Pink	Chinook	Coho
2011	June 24–Aug 14	64,892	494,099	1,467	870
2012	June 23–Aug 23	32,832	90,349	1,134	1,431
2013	June 21–Aug 11	61,259	268,537	860	5,904
2014	June 20–July12	61,025	61,725	1,567	978

Note: Due to speciation problems in 2013, the Chinook and coho salmon counts are probably inaccurate.

Appendix A29.–Historical salmon escapement at North River counting tower, 1996–2014.

Year	Operating period	Chum	Pink	Chinook	Coho
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	580,935	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
2011	June 17–Sept 08	19,898	123,892	864	3,624
2012	June 21–Aug 19	9,120	137,006	996	3,258
2013	July 01–Aug 05	10,518	46,668	564	8,834
2014	June 14–Sept 01	11,706	143,838	2,328	4,380

Appendix A30.–Historical salmon escapement at Unalakleet River weir, 2010–2014.

Year	Operating period	Chum	Pink	Chinook	Coho	Sockeye
2010	June 22–July 31	70,811	832,904	1,021	5,382	130
2011	June 17–Aug 07	108,770	363,906	1,111	10,418	190
2012	June 24–Aug 15	70,669	672,083	807	17,766	245
2013	June 20–Aug 22	113,953	144,225	767	25,566	243
2014[a]	June 28–Aug 27	54,501	1,180,310	1,048	44,108	203

[a] Weir was flooded out July 21–25.

Appendix A31.–Chum salmon escapement by river, Nome Subdistrict, 1993–2014.

	Rivers west of Cape Nome			Rivers east of Cape Nome				
Year	Sinuk [a]	Snake [b]	Nome [c]	Flambeau [a]	Eldorado [d]	Bonanza [a]	Solomon [a]	Total [e]
1993	6,052	2,115	5,925	6,103	9,048	3,007	2,525	34,775
1994	4,905	3,519	2,893	12,889	13,202	5,178	1,066	43,652
1995	9,464	4,395	5,093	16,474	18,955	11,182	2,106	67,669
1996	6,658	2,772	3,339	13,613	32,970	7,049	2,141	68,542
1997	9,212	6,184	5,147	9,455	14,302	4,140	2,111	50,551
1998	6,720	11,067	1,930	9,129	13,808	4,552	925	48,131
1999	6,370	484	1,048	637	4,218	2,304	637	15,698
2000	7,198	1,911	4,056	3,947	11,617	4,876	1,294	34,899
2001	10,718	2,182	2,859	10,465	11,635	4,745	1,949	44,553
2002	6,333	2,776	1,720	6,804	10,243	3,199	2,150	33,225
2003	3,482	2,201	1,957	3,380	3,591	1,664	806	17,081
2004	3,197	2,145	3,903	7,667	3,273	2,166	1,436	23,787
2005	4,710	2,948	5,584	7,692	10,426	5,534	1,914	38,808
2006	4,834	4,128	5,677	27,828	41,985	708	2,062	87,222
2007	16,481	8,147	7,034	12,006	21,312	8,491	3,469	76,940
2008	5,367	1,244	2,607	11,618	6,746	3,636	959	32,177
2009	2,232	891	1,565	4,075	4,943	6,744	918	21,368
2010	11,107	6,973	5,906	25,009	42,612	3,513	2,678	97,798
2011	15,028	4,343	3,582	15,056	16,227	7,357	4,529	66,122
2012	10,537	1,235	2,015	17,517	13,393	6,002	1,377	52,076
2013	31,691	2,755	4,811	27,928	26,121	13,437	1,377	108,120
2014	19,136	3,983	5,589	21,462	27,054	18,508	1,502	97,234
Total	201,432	78,398	84,240	270,754	357,681	127,992	39,931	1,160,428

[a] Sinuk, Flambeau, Bonanza, and Solomon rivers' escapements are estimated by aerial survey, but beginning in 2013, Solomon River escapement was a weir count.

[b] Snake River escapements are estimated by aerial survey (1993–1994), tower counts (1995–2002), and weir counts (2003–2014). Escapement goal range is 1,600–2,500 chum salmon.

[c] Nome River escapements are estimated by aerial survey expansion (1993), tower counts (1994–1995), and weir counts (1996–2014). Escapement goal range is 2,900–4,300 chum salmon.

[d] Eldorado River escapements are estimated by aerial survey (1993–1996), tower counts (1997–2002), and weir counts (2003–2014). Escapement goal range is 6,000–9,200 chum salmon.

[e] Subdistrict 1 BEG is 23,000–35,000 chum salmon.

Appendix A32.–Pink salmon escapement by year and river, Nome Subdistrict, 1993–2014.

	Rivers west of Cape Nome			Rivers east of Cape Nome				
Year	Sinuk [a]	Snake [b]	Nome [c]	Flambeau [a]	Eldorado [d]	Bonanza [a]	Solomon [a]	Total
1993	5,120		13,036	5,584	120	ND	ND	23,860
1994	492,100	63,860	142,604	19,202	53,890	20	ND	771,676
1995	1,250	917	13,893	8,086	4,243	619	350	29,358
1996	74,400	44,558	95,681	17,182	46,100	40,510	15,230	333,661
1997	1,200	6,742	8,035	2,117	1,022	ND	80	19,196
1998	342,100	219,679	359,469	8,720	137,283	167,130	45,175	1,279,556
1999	180	116	2,033	1,251	977	245	90	4,892
2000	12,175	4,723	41,673	2,159	55,992	12,410	2,899	132,031
2001	115	1,295	3,138	924	488	221	ND	6,181
2002	28,487	4,103	35,057	2,233	119,098	17,095	9,170	215,243
2003	9,907	2,856	11,402	194	173	1,540	157	26,229
2004	1,267,100	126,917	1,051,146	7,351	60,866	185,000	109,000	2,807,380
2005	211,285	13,813	285,759	873	12,356	55,000	11,100	590,186
2006	515,000	74,028	578,555	6,556	222,348	268,500	165,215	1,830,202
2007	6,810	4,634	24,395	336	833	1,360	2,400	40,768
2008	1,496,000	145,761	1,186,554	3,510	244,641	212,000	81,000	3,369,466
2009	6,740	769	16,490	175	1,119	3,276	1,565	30,134
2010	168,600	51,099	171,760	4,797	48,136	106,000	21,804	572,196
2011	21,100	7,011	14,403	58	489	11,050	5,580	59,691
2012	506,500	5,954	149,119	2,657	59,318	54,700	15,000	793,248
2013	143,921	1,333	10,257	ND	1,025	800	2,733	160,069
2014	115,000	20,067	96,397	25,000	46,746	71,000	20,691	394,901
Total	5,425,090	800,235	4,214,459	118,965	1,117,263	1,208,476	509,239	13,095,223

Note: ND is no data.

[a] Sinuk, Flambeau, Bonanza, and Solomon rivers' escapements are estimated by aerial survey, but beginning in 2013, Solomon River escapement was a weir count.

[b] Snake River escapements are estimated by aerial survey (1993–1994), tower counts (1995–2002), and weir counts (2003–2014).

[c] Nome River escapements are estimated by tower counts (1993–1995) and weir counts (1996–2014). Escapement goal range is 13,000 pink salmon in even-numbered years and 3,200 pink salmon in odd-numbered years.

[d] Eldorado River escapements are estimated by aerial survey (1993–1996), tower counts (1997–2002), and weir counts (2003–2014).

Appendix A33.–Number of customary trade permits issued, Norton Sound District and Port Clarence District, 2007–2014.

	Norton Sound District									Port Clarence District			
Year	Nome	White Mountain	Golovin	Elim	Koyuk	Shaktoolik	Unalakleet	St. Michael	Stebbins	Teller	Brevig Mission	Wales	Value
2007	3	0	0	2	0	0	0	0	0	0	0	0	$200.00
2008	3	0	0	0	0	0	0	0	0	1	0	0	$0.00
2009	1	0	0	0	0	0	1	0	0	1	0	0	$100.00
2010	1	0	0	0	0	0	0	0	0	0	0	0	Confidential
2011	0	0	0	0	0	0	0	1	0	0	0	0	Confidential
2012	2	0	0	0	0	0	0	0	0	0	0	0	Confidential
2013	4	0	4	1	0	0	0	0	0	3	6	0	$1,790.00
2014	6	1	1	0	0	0	1	0	0	0	11	0	$1,885.00

APPENDIX B: PORT CLARENCE FISHERIES

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1990–2014.

Year	Salmon Lake	Grand Central River	Total
1990	2,834	926	3,760
1991	3,790	1,570	5,360
1992	1,500	[a]	1,500
1993	2,885	216	3,092
1994	3,740	1,230	4,970
1995	5,433	628 [b]	6,061
1996	6,610	770	7,380
1997	8,760	1,520	10,280
1998	5,210	1,977	7,187
1999	31,720	1,780	33,500
2000	12,772	[a]	12,772
2001	9,400	155	9,555
2002	3,520	71	3,591
2003	19,275	1,015	20,290
2004	23,005	2,855	25,860
2005	41,500	740	42,240
2006	39,400	2,380	41,780
2007	14,920	5,692	20,612
2008	9,420	2,252	11,672
2009	136	50	186
2010	73	711	784
2011	4,604	540	5,144
2012	4,730	1,100	5,830
2013	5,820	1,151	6,971
2014	4,535	768	5,303

[a] No survey occurred.

[b] Early count.

Appendix B2.–Historical escapement of salmon and Dolly Varden at Pilgrim River counting tower (1997–2002) and weir (2003–2014).

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]	ND
1998	Did not operate						
1999	July 13–Aug 06	6	2,617	35,577	104	4,650	ND
2000	July 05–Aug 18	72	861	374	21	12,141	ND
2001	Did not operate						
2002	July 04–Aug 04	150	5,590	3,882	246	3,888	ND
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
2011	June 28–Sept 01	44	41,740	3,364	269	8,449	229
2012	June 26–Aug 18	64	25,521	46,135	95	7,085	65
2013	June 27–Sept 08	47	47,557	1,060	890	12,428	27
2014	June 25–Aug 27	48	25,647	4,197	425	9,719	66

Note: ND is no data.

[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.–Estimated number of subsistence fishing families and harvest in Port Clarence District, 1994–2014.

Year	Number of fishing families interviewed	Chinook	Sockeye	Coho	Pink	Chum	Total
1994 [a]	127	203	2,220	1,892	4,309	2,294	10,918
1995 [a]	122	76	4,481	1,739	3,293	6,011	15,600
1996 [a]	117	194	2,634	1,258	2,236	4,707	11,029
1997 [a]	126	158	3,177	829	755	2,099	7,018
1998 [a]	138	289	1,696	1,759	7,815	2,621	14,180
1999 [a]	155	89	2,392	1,030	786	1,936	6,233
2000 [a]	134	72	2,851	935	1,387	1,275	6,520
2001 [a]	160	84	3,692	1,299	1,183	1,910	8,168
2002 [a]	159	133	3,732	2,194	3,394	2,699	12,152
2003 [a,b]	204	177	4,495	1,434	4,113	2,430	12,649
2004 [c]	376 [d]	278	8,688	1,131	5,918	2,505	18,520
2005 [c]	335[d]	152	8,492	726	6,615	2,479	18,464
2006 [c]	345[d]	102	9,940	1,061	4,939	4,353	20,395
2007 [c]	363[d]	85	9,484	705	1,468	4,454	16,196
2008 [c]	408[d]	125	5,069	512	7,527	2,449	15,682
2009 [c]	326[d]	40	1,643	804	1,882	3,060	7,429
2010 [c]	290[d]	63	824	596	5,202	5,232	11,917
2011 [c]	270[d]	57	1,611	393	2,610	4,338	9,008
2012 [c]	335[d]	44	1,422	703	5,200	7,802	15,171
2013 [c]	431[d]	38	5,243	651	1,788	6,588	14,308
2014 [c]	430[d]	21	3,969	564	5,040	5,085	14,679

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

[b] Includes harvest reported from 59 Pilgrim River permits. In total, 101 permits were issued and 79 were returned.

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

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

Appendix B4.–Application of 20-05-00 liquid blend of phosphorous and nitrogen fertilizer to Salmon Lake, 1997–2014.

Year	Fertilizer (tons)	Organization
1997	40	NSEDC/ADF&G/BLM
1998	40	NSEDC/ADF&G/BLM
1999	40	NSEDC/ADF&G/BLM
2000	40	NSEDC/ADF&G/BLM
2001	40	NSEDC/ADF&G/BLM
2002	0	
2003	0	
2004	27	NSEDC/ADF&G
2005	0	
2006	0	
2007	16	NSEDC
2008	8	NSEDC
2009	28	NSEDC
2010	19	NSEDC
2011	11	NSEDC
2012	10	NSEDC
2013	10	NSEDC
2014	20	NSEDC

APPENDIX C: KOTZEBUE FISHERIES

Appendix C1.–Kotzebue District chum salmon catch statistics, 1990–2014.

Year	Chum salmon		Other [a]	Number of fishermen	Season catch per fisherman
	Number of fish	Pounds			
1990	163,263	1,453,040	538	153	1,067
1991	239,923	1,951,041	714	142	1,690
1992	289,184	2,397,302	2,714	149	1,941
1993 [b]	73,071	613,968	1,507	114	641
1994 [c]	153,452	1,166,494	73	109	1,408
1995	290,730	2,329,898	93	92	3,160
1996 [d]	82,110	657,224	1,204	55	1,493
1997	142,720	1,141,741	649	68	2,099
1998	55,907	447,256	2,971	45	1,242
1999	138,605	1,108,898	87	60	2,310
2000	159,802	1,370,637	106	64	2,497
2001	211,672	1,847,361	64	66	3,207
2002	8,390	74,341	0	3	2,797
2003	25,423	218,091	0	4	6,356
2004	51,038	419,059	1,450	43	1,187
2005	75,971	621,573	1,258	41	1,853
2006	137,961	1,040,023	0	42	3,285
2007	147,087	1,209,842	0	46	3,198
2008	190,550	1,541,922	0	48	3,970
2009	187,562	1,505,734	0	62	3,025
2010	270,343	2,160,264	0	67	4,035
2011	264,225	2,158,365	0	89	2,970
2012	227,965	1,751,473	0	83	2,747
2013	319,062	2,555,304	0	66	4,834
2014	636,187	5,330,144	0	94	6,768
Avg 1990–2013	162,751	1,322,535		71	2,625

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

[b] Includes 11,160 pounds from the Sikusuilaq Springs Hatchery terminal fishery.

[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.

Appendix C2.–Kotzebue District mean prices paid per pound in dollars to salmon fishermen by species, 1990–2014.

	Chum salmon				
Year	Average weight	Average price	Chinook salmon	Inconnu	Dolly Varden
1990	8.9	0.31	2.00	[a]	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	[a]	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	[a]	0.20
1998 [a]	8.0	0.15	1.00	[a]	0.20
1999 [a]	8.0	0.16	1.00	[a]	0.20
2000	8.6	0.18	1.00	[a]	0.20
2001	8.7	0.17	1.00	[a]	[a]
2002	8.9	0.10	0.00	[a]	[a]
2003	8.6	0.12	0.00	[a]	0.50
2004	8.2	0.15	0.72	[a]	0.26
2005	8.2	0.20	0.50	[a]	0.30
2006	7.5	0.22	[a]	[a]	[a]
2007	8.2	0.20	[a]	[a]	[a]
2008	8.1	0.25	[a]	[a]	[a]
2009	8.0	0.25	[a]	[a]	[a]
2010	8.0	0.40	[a]	[a]	[a]
2011	8.2	0.40	[a]	[a]	[a]
2012	7.7	0.32	[a]	[a]	[a]
2013	8.0	0.27	[a]	[a]	[a]
2014	8.4	0.54	[a]	[a]	[a]

[a] Information is not available.

Appendix C3.–Kotzebue District commercial fishery dollar value estimates, 1990–2014.

Year	Gross value of catch to fishermen [a]	Number of fishermen	Average value per fisherman
1990	$438,044	153	$2,863
1991	$437,948	142	$3,084
1992	$533,731	149	$3,582
1993 [b]	$235,061	114	$2,062
1994	$233,512	109	$2,142
1995	$316,031	92	$3,435
1996	$56,310	55	$1,024
1997	$187,978	68	$2,764
1998	$70,587	45	$1,569
1999	$179,781	60	$2,996
2000	$246,786	64	$3,856
2001	$322,650	66	$4,889
2002	$7,572	3	$2,524
2003	$26,377	4	$6,594
2004	$64,420	43	$1,498
2005	$124,820	41	$3,044
2006	$229,086	42	$5,454
2007	$243,149	46	$5,286
2008	$385,270	48	$8,026
2009	$376,554	62	$6,073
2010	$860,125	67	$12,838
2011	$867,085	89	$9,743
2012	$567,664	83	$6,839
2013	$689,163	66	$10,442
2014	$2,879,016	94	$30,628
Avg 1994–2013	$302,746	58	$6,270

[a] Values represent chum salmon value and incidental species such as char, whitefish, and other salmon.

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

Appendix C4.–Kotzebue District commercial (1990–2014) and subsistence salmon catches (1990–2004 and 2012–2014).

	Commercial catch			Subsistence catch [a]			
Year	Chum	Other [b]	Total	Chum	Number of fishermen interviewed	Average catch per fisherman	Total documented catch
1990	163,263	32	163,295	8,268	[c]	[c]	163,295
1991	239,923	44	239,967	14,740	[c]	[c]	239,967
1992	289,184	204	289,388	14,303	[c]	[c]	289,388
1993	73,071 [d]	131	131	15,430	[c]	[c]	131
1994	153,452 [e]	3	3	36,226 [f]	375	97	36,229
1995	290,730	5	290,735	102,881	593	173	393,616
1996	82,110 [g]	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
2001	211,672	6	211,678	49,232	408	121	260,910
2002	8,390	0	8,390	16,880 [f,h]	191	88	25,270
2003	25,423	0	25,423	19,201 [f]	446	43	44,624
2004	51,038	116	51,154	24,637 [f]	440	63	75,791
2005	75,971	7	75,978	Subsistence surveys were not conducted.			
2006	137,961	17	137,978	Subsistence surveys were not conducted.			
2007	147,087	20	147,107	Subsistence surveys were not conducted.			
2008	190,550	742	191,292	Subsistence surveys were not conducted.			
2009	187,562	106	187,668	Subsistence surveys were not conducted.			
2010	270,343	583	270,926	Subsistence surveys were not conducted.			
2011	264,321	166	264,487	Subsistence surveys were not conducted.			
2012	227,965	476	228,441	26,693 [f]	360	74	255,134
2013	319,062	114	319,176	42,249 [f]	386	109	361,425
2014	636,187	475	636,662	Information is not yet available.			
Avg 2004–2013	187,186	235	187,421	Avg. 1996–2012 50,359	434	117	152,649

[a] Villages surveyed are Ambler, Kiana, Kobuk, Noatak, Noorvik, and Shungnak.

[b] Includes Chinook, coho, pink, and sockeye salmon that were not sold but retained for personal use.

[c] Information not available.

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

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

[f] Does not include the town of Kotzebue.

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

[h] Only 2 of 6 villages surveyed.

Appendix C5.–Kotzebue District subsistence chum salmon catches by village, 1990–2004 and 2012–2014.

	Village					Kobuk River Villages	Noatak Village	Village					District Total
Year	Noorvik	Kiana	Ambler	Shungnak	Kobuk			Kotzebue	Deering	Kivalina	Buckland	Shishmaref	
1990	4,353	[a]	[a]	[a]	[a]	4,353	3,915	[a]	[a]	[a]	[a]	[a]	8,268
1991	6,855	[a]	[a]	4,248	[a]	11,103	3,637	[a]	[a]	[a]	[a]	[a]	14,740
1992	8,370	[a]	[a]	3,890	[a]	12,260	2,043	[a]	[a]	[a]	[a]	[a]	14,303
1993	8,430	[a]	[a]	3,730	[a]	12,160	3,270	[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]	36,226
1995	15,485	5,985	8,558	5,880	2,959	38,867	6,359	50,708	[a]	[a]	[a]	6,947	102,881
1996	13,611	5,935	9,062	8,649	1,819	39,076	10,091	50,573	[a]	[a]	[a]	[a]	99,740
1997	14,323	3,064	2,713	5,513	629	26,242	5,309	26,355	[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]	48,980
1999	17,843	3,788	590	3,868	1,869	27,958	1,616	64,768	[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]	65,975
2001	16,540	5,500	[a]	4,310	2,843	29,193	2,326	17,713	[a]	[a]	[a]	[a]	49,232
2002	13,943	[b]	[b]	[b]	[b]	[b]	2,937	[b]	[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]	19,201
2004	6,025	3,896	3,446	4,186	3,087	20,640	3,997	[a]	[a]	[a]	[a]	[a]	24,637
2012	9,584	2,442	1,621	2,595	2,637	18,879	7,814	[a]	[a]	[a]	[a]	[a]	26,693
2013	19,972	2,969	4,320	7,257	2,076	36,594	5,655	[a]	[a]	[a]	3,104	[a]	45,353
2014	Information is not yet available.							[a]	[a]	[a]	[a]	[a]	

Note: No subsistence surveys were conducted from 2005 to 2011. Kotzebue area villages were surveyed by the Division of Subsistence in 2014, but data are not yet available.

[a] Not surveyed.

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

Appendix C6.–Kotzebue District average subsistence chum salmon harvest per household by village, 1990–2004 and 2012–2014.

Year	Kotzebue	Noatak	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Deering
1990	[a]	135	198	[a]	[a]	[a]	[a]	[a]
1991	[a]	145	311	[a]	[a]	283	[a]	[a]
1992	[a]	89	310	[a]	[a]	243	[a]	[a]
1993	[a]	136	312	[a]	[a]	196	[a]	[a]
1994	[a]	90	133	32	99	154	260	92
1995	71	69	123	59	110	111	110	[a]
1996	73	115	117	58	111	154	76	[a]
1997	41	71	125	35	39	117	28	[a]
1998	35	27	79	34	30	84	41	[a]
1999	78	18	151	42	8	76	81	[a]
2000	48	72	93	33	72	64	11	[a]
2001	23	24	152	62	[a]	94	109	[a]
2002	[a]	29	121	[a]	[a]	[a]	[a]	[a]
2003	[a]	21	58	32	26	57	43	[a]
2004	[a]	50	56	46	56	75	111	[a]
2012	[a]	94	115	38	31	56	88	[a]
2013	[a]	45	151	32	63	112	67	[a]
2014	[a]	Information is not yet available.						[a]

Note: No subsistence surveys were conducted from 2005 to 2011.

[a] Not surveyed.

Appendix C7.–Kotzebue District chum salmon aerial survey counts, 1990–2014.

Stream [a]	1990 [b]	1991 [b]	1992 [b]	1993	1994 [c]	1995	1996	1997	1998	1999
Noatak Drainage										
Noatak River below Kelly River	23,345 [b]	82,750	34,335	25,415		147,260	306,900 [c]	[c]	[b]	
Eli River	3,000	2,940	701	4,795		7,860	30,040 [c]	[c]	[b]	
Kelly River and Lake	325 [d]	654	726	9		8,384	1,427	2,792	2,631	
Noatak River System Total	26,670	86,344	35,762	30,219		163,504	338,367		[b]	84,085
Kobuk Drainage										
Kobuk to Pah River	4,610	9,840	1,030	3,896		12,190	20,700	2,248 [b]	[b]	
Pah River to just below Selby River	305	2,780	3,820	1,535		4,537	4,600	404 [b]	[b]	
Selby River mouth & slough	420	1,040	1,500	1,800		1,250	4,100	662 [b]	[b]	
Selby River	7,505	1,460	868	824		3,364	14,950	853 [b]	730	
Selby River mouth to Beaver Creek		5,250	3,845	929		10,898	15,480	2,582 [b]		
Beaver Creek mouth	2,515							914 [b]	[b]	
Above Beaver Creek		4,155	740	3,174		3,486	14,940	850 [b]	[b]	
Upper Kobuk River Total	15,355	24,525	11,803	12,158		35,725	74,770	8,513 [b]	[b]	27,340
Squirrel River	5,500	4,606	2,765	4,463		10,605	10,740	4,779 [b]	[b]	13,513
Salmon River	6,335	5,845	1,345	13,880		13,988	23,790	1,181 [b]	[b]	4,989
Tutuksuk River	2,275	744	1,162	1,196		3,901	21,805	163 [b]	[b]	2,906
Kobuk River System Total	29,465	35,720	17,075	31,697		64,219	131,105	14,636	[b]	48,748

-continued-

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Stream [a]	2001	2002	2003	2004	2006	2008	2009	2014	Goals [e]
Noatak Drainage									
Noatak River below Kelly River		700	34,575	49,541	36,125 [b]	257,695	67,265	414,235	
Eli River				2,917	1,285 [b]	13,052	2,607	32,174	
Kelly River & Lake		1,116	1,566	2,987	2,375 [b]	1,865	3,986	37,530	
Noatak River System Total			36,141	55,445	39,785 [b]	272,612	73,858	483,939	42,000–91,000
Kobuk Drainage									
Kobuk to Pah River	2,790		5,501	7,493	8,525 [b]	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				2,113	
Selby River			427	3,760	500 [b]	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]			63,540 [f]	
Upper Kobuk River Total	13,420	3,447	11,602	23,199	48,750 [b]	43,347	45,155	65,653	9,700–21,000
Squirrel River			[b]						4,900–10,500
Salmon River			[b]						3,300–7,200
Tutuksuk River			[b]						1,400–3,000
Kobuk River System Total	13,420	3,447	11,602	23,199	48,750 [b]	43,347	45,155	65,653	19,600–39,200

Notes: The figures in these tables have been corrected and supersede figures in previous reports. No surveys were flown in 2000, 2005, 2007, and 2010–2013.

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

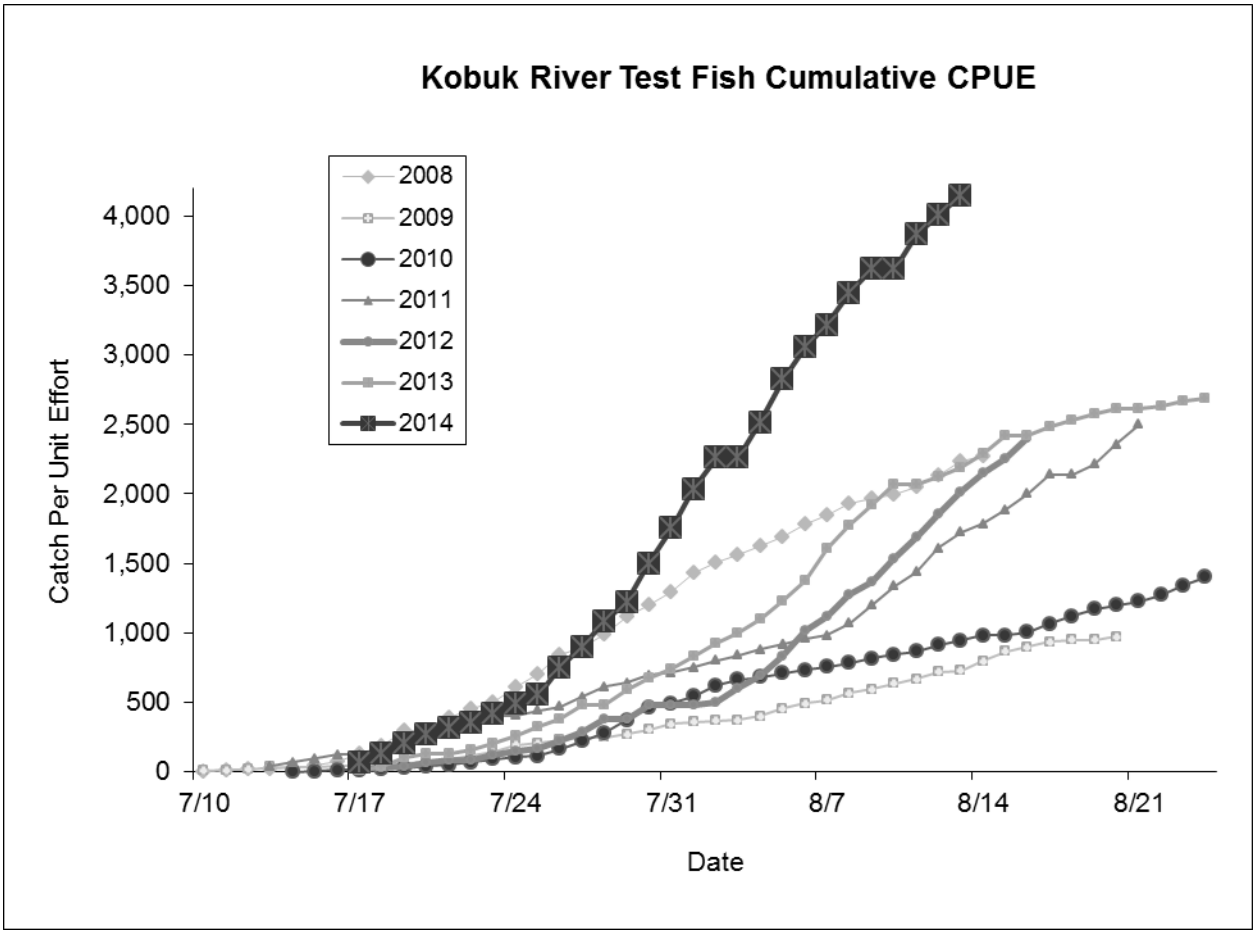
[b] Poor survey conditions or incomplete, early, or late survey.

[c] Unacceptable survey conditions.

[d] Surveyed well before peak of migration.

[e] Aerial survey goals were revised in 2007.

[f] Unclear where these fish were observed.



Appendix C8.–Kobuk River chum salmon drift test fish cumulative catch per unit effort (CPUE), 2008–2014.

APPENDIX D: HERRING FISHERIES

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishermen, 1990–2014.

Year [a]	Sac roe herring	Food or bait herring	Total herring	Spawn on kelp
1990	5,253	1,026	6,279	0
1991	5,465	207	5,672	0
1992 [b]	0	0	0	0
1993	4,713	321	5,034	0
1994	958	2	960	0
1995	6,647	116	6,763	0
1996 [c]	6,061	109	6,220	0
1997 [d]	3,709	262	3,976	0
1998	2,623	8	2,631	9.04 [e]
1999	2,693 [f]	53	2,751	3.74
2000	4,487 [g]	0	4,487	2.25
2001	2,245	0	2,245	2.20
2002	1,059	64	1,123	0
2003	1,587	21	1,608	0.88
2004 [b]	0	11	11	0
2005	1,951	0	1,951	0
2006	646	25	671	0.57
2007 [b]	0	33	33	0.14
2008 [b]	0	91	91	0.18
2009 [b]	0	28	28	0
2010	623	65	688	0
2011	739	67	806	0
2012 [b]	0	7	7	0
2013	490	2	492	0
2014 [b]	0	1	1	0

[a] From 1990 to present, the fishery has occurred in southeastern Norton Sound.

[b] No commercial fishery took place in 1992, and no sac roe fishery took place in 2004, 2007–2009, 2012, and 2014.

[c] Total includes an estimated 50 short tons (st) of wastage.

[d] Total includes an estimated 5 st of wastage and approximately 1,000 lb taken as bait.

[e] Includes 2,100 lb of wild kelp and 16,083 lb of *Macrocystis* kelp.

[f] Includes an estimated 5 st of wastage.

[g] Includes an estimated 15 st of wastage.

Appendix D2.–Commercial herring fishery summary information, Norton Sound District, 1990–2014.

Year	Estimated biomass (tons)	Catch gillnet (tons)	Beach seine (tons)	Wild kelp (tons)	*Macrocystis* kelp (lb)	Number of fishermen	Dollar value (millions)	Number of buyers	Average roe %	Peak catch day	Fishery duration
1990	39,384	6,032	347	0	0	365	3.60	8	8.8	5/29	5/28–05/30
1991	42,854	5,150	522	0	0	279	2.40	8	9.3	5/25	5/23–05/25
1992	57,974	0 [a]	0 [a]	0	0	[a]	0.00	[a]	[a]	6/20 [b]	[a]
1993	46,549	4,291	742	0	0	264	1.50	5	9.9	5/25	5/24–06/05
1994	31,088	921	40	0	0	215	0.30	6	10.3	6/8	6/05–06/09
1995	37,779	6,033	614	0	0	215	4.20	6	10.4	5/24	5/23–05/30
1996	26,596	5,581	589	0	0	287	4.50	10	10.6	5/25	5/24–05/25
1997	47,748	3,459	513	0	0	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	0	7,482	122	0.61	4	10.5	6/17	6/13–06/22
2000	32,680	4,390	81	0	4,500	97	0.89	4	9.5	6/11	6/07–06/15
2001	26,305	2,245	0	0	4,400	76	0.35	3	12.3	6/12	6/12–06/16
2002	27,068	1,123	0	0	0	46	0.16	2	10.6	5/24	5/22–06/03
2003	32,918	1,608	0	0	1,750	32	0.22	2	10.5	5/18	5/16–05/25
2004 [a]	34,180	11 [c]	0	0	0	4	0.00	0	[a]	5/24 [b]	[c]
2005	43,013	1,951	0	0	0	56	0.32	1	11.4	6/04	6/03–06/10
2006	38,833 [d]	671[e]	0	0.57	0	41	0.14	1	10.2	6/09	6/08–06/11
2007 [a]	38,415 [d]	33	0	0.14	0	7	0.02	1	[a]	6/09	6/09–06/15
2008 [a]	37,401[d]	91	0	0	0	14	0.18	1	[a]	6/11	6/10–06/24
2009 [a]	36,917[d]	28	0	0	0	6	0.02	1	[a]	6/12	6/12–06/15
2010	42,889[d]	688	0	0	0	30	0.19	1	13.5	6/17	6/11–06/19
2011	53,786	807	0	0	0	35	0.27	1	14.8	6/04	6/01–06/10
2012 [a]	52,949[d]	7	0	0	0	8	0.01	1	[a]	6/25	6/16–06/25
2013	58,594[d]	492	0	0	0	40	0.15	1	13.2	6/15	6/14–06/20
2014 [a]	52,138	1	0	0	0	1	confidential	1	[a]	6/04	6/04–06/07

[a] No or very limited fishery due to late sea ice breakup in 1992, 2012, and 2014, 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 1 or 2 days prior to peak catch. The 2004 catch was by king crab permit holders for bait.

[c] All fish caught were kept as bait; none were sold.

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

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

Appendix D3.–Norton Sound commercial herring harvest (tons) by subdistrict, by year, 1990–2014.

	Subdistricts							
Year [a]	1	2	3	4	5	6	7	Total
1990	4,498	950	931	0	0	0	0	6,379 [b]
1991	0	880	4,792	0	0	0	0	5,672 [c]
1992 [d]	0	0	0	0	0	0	0	0
1993	2,288	587	1,881	0	278	0	0	5,034 [e]
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 [f]
1997	2,046	62	1,864	0	0	0	1 [g]	3,976 [h]
1998	1,543	0	1,081	0	0	0	0	2,624
1999	285	323	2,050	0	0	0	8	2,746 [i]
2000 [j]	2,623	81	1,767	0	0	0	0	4,471
2001 [j]	898	0	1,347	0	0	0	0	2,245
2002 [j]	373	0	750	0	0	0	0	1,123
2003 [j]	283	0	1,325	0	0	0	0	1,608
2004	0	0	0	0	0	0	11	11
2005 [j]	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
2011	600	84	123	0	0	0	0	807
2012	6	0	0	0	0	0	1	7
2013	107	84	302	0	0	0	0	492
2014	0	1	0	0	0	0	0	1

[a] Includes herring taken for sac roe and bait.

[b] Does not include an estimated wastage of 60 short tons (st) in abandoned gillnets.

[c] Does not include an estimated wastage of 125 st in abandoned gillnets.

[d] No commercial fishery in 1992.

[e] Does not include an estimated wastage of 45 st in abandoned beach seine sets.

[f] Does not include an estimated 50 st of wastage.

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

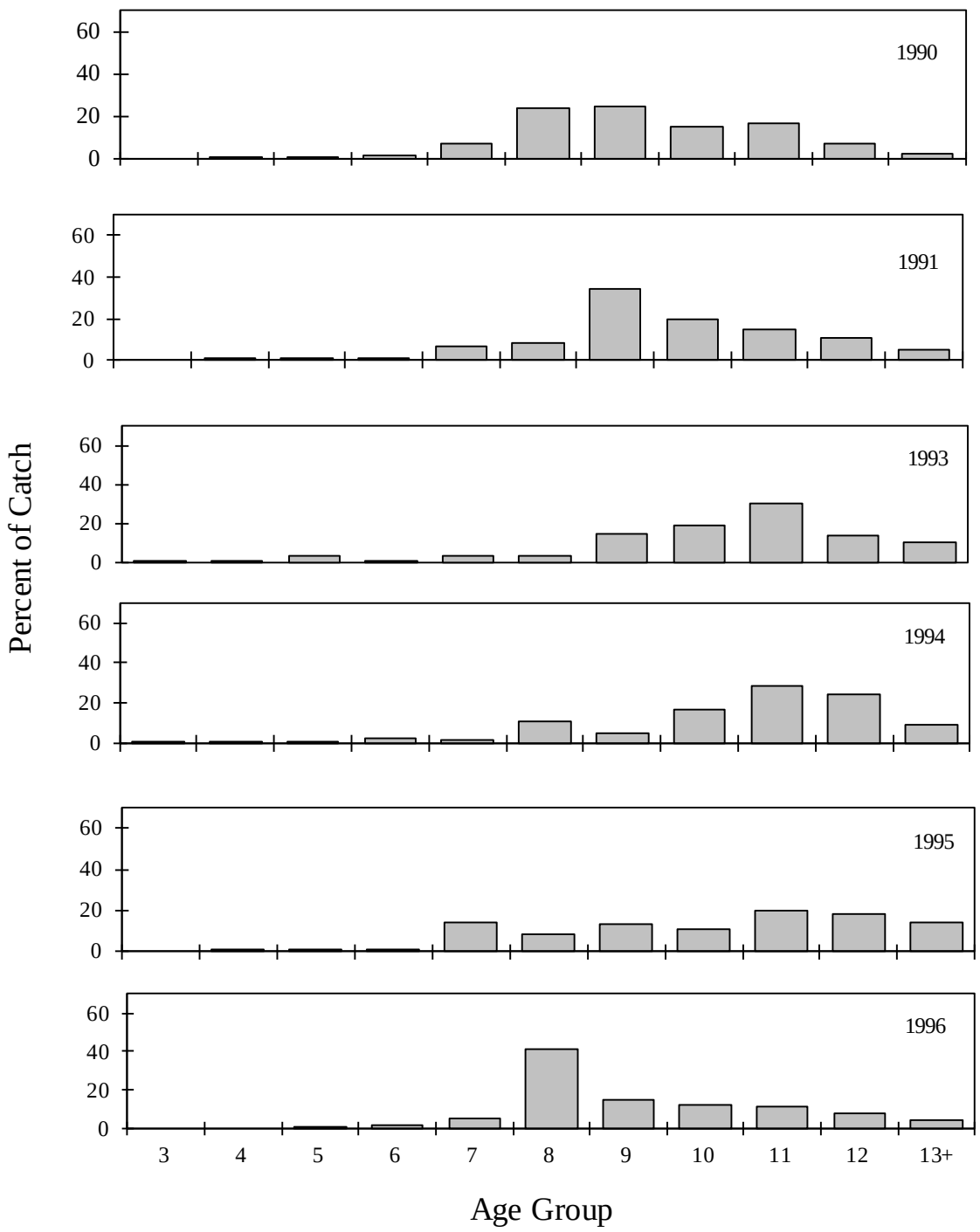
[h] Does not include an estimated 5 st of wastage.

[i] 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.

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

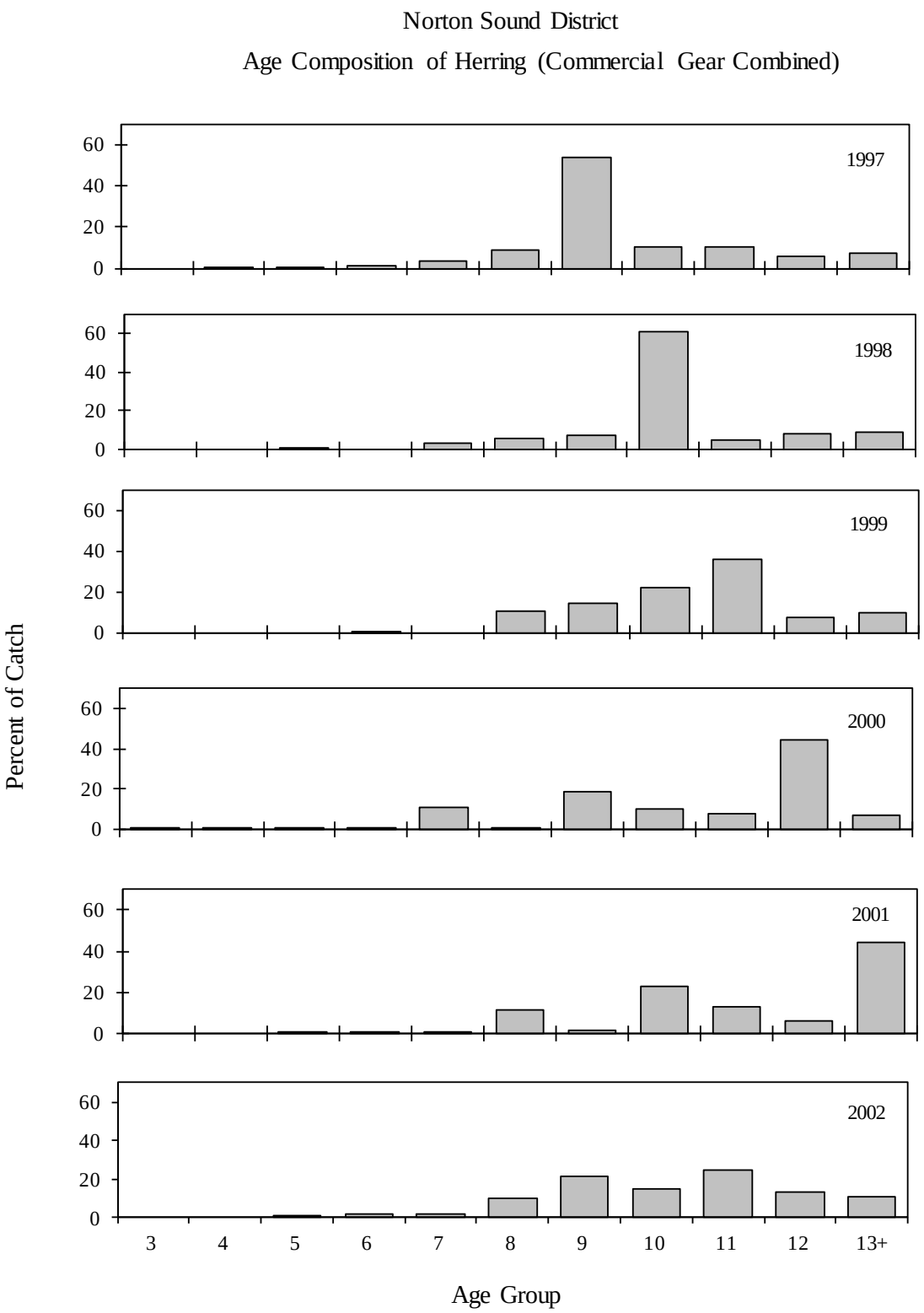
Appendix D4.–Port Clarence District commercial herring fishery, 1986–1996.

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



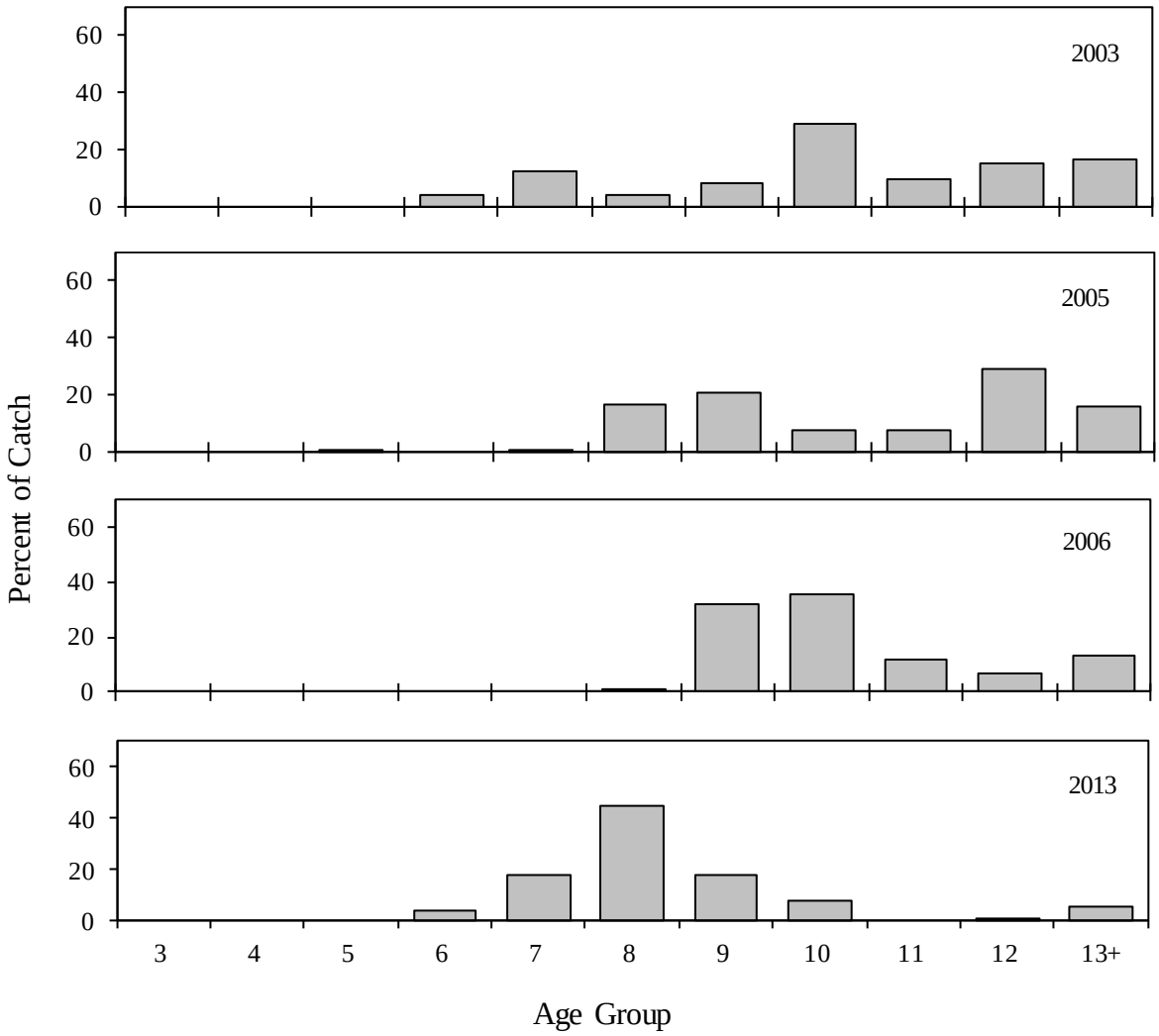
Appendix D5.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1990–1996.

Note: No commercial fishing occurred in 1992.



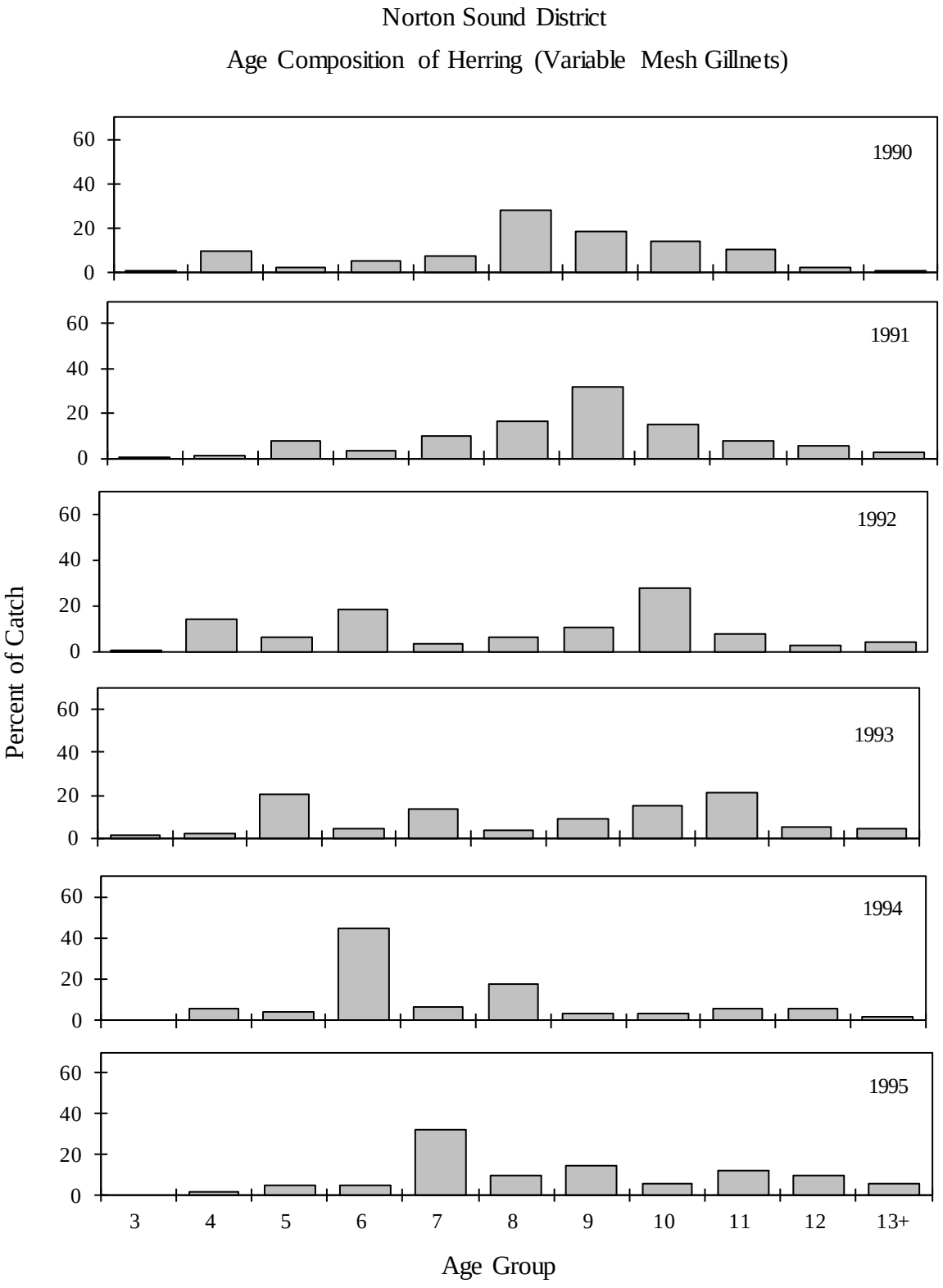
Appendix D6.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1997–2002.

Note: No commercial catch from beach seine gear in 1998 and 1999, and since 2000.

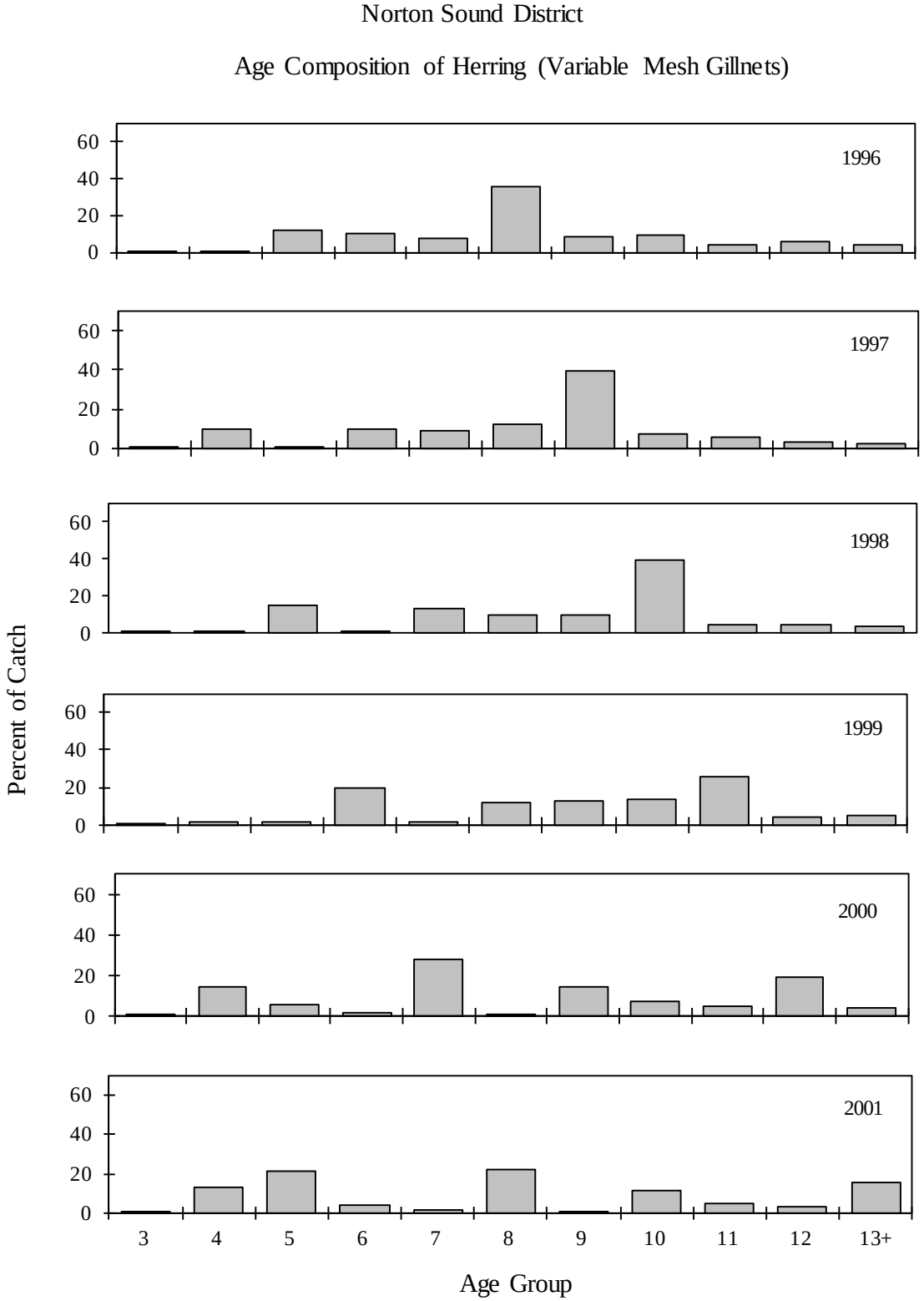


Appendix D7.–Norton Sound herring age class composition by percentage of commercial catch, gillnet only, 2003–2006 and 2013–2014.

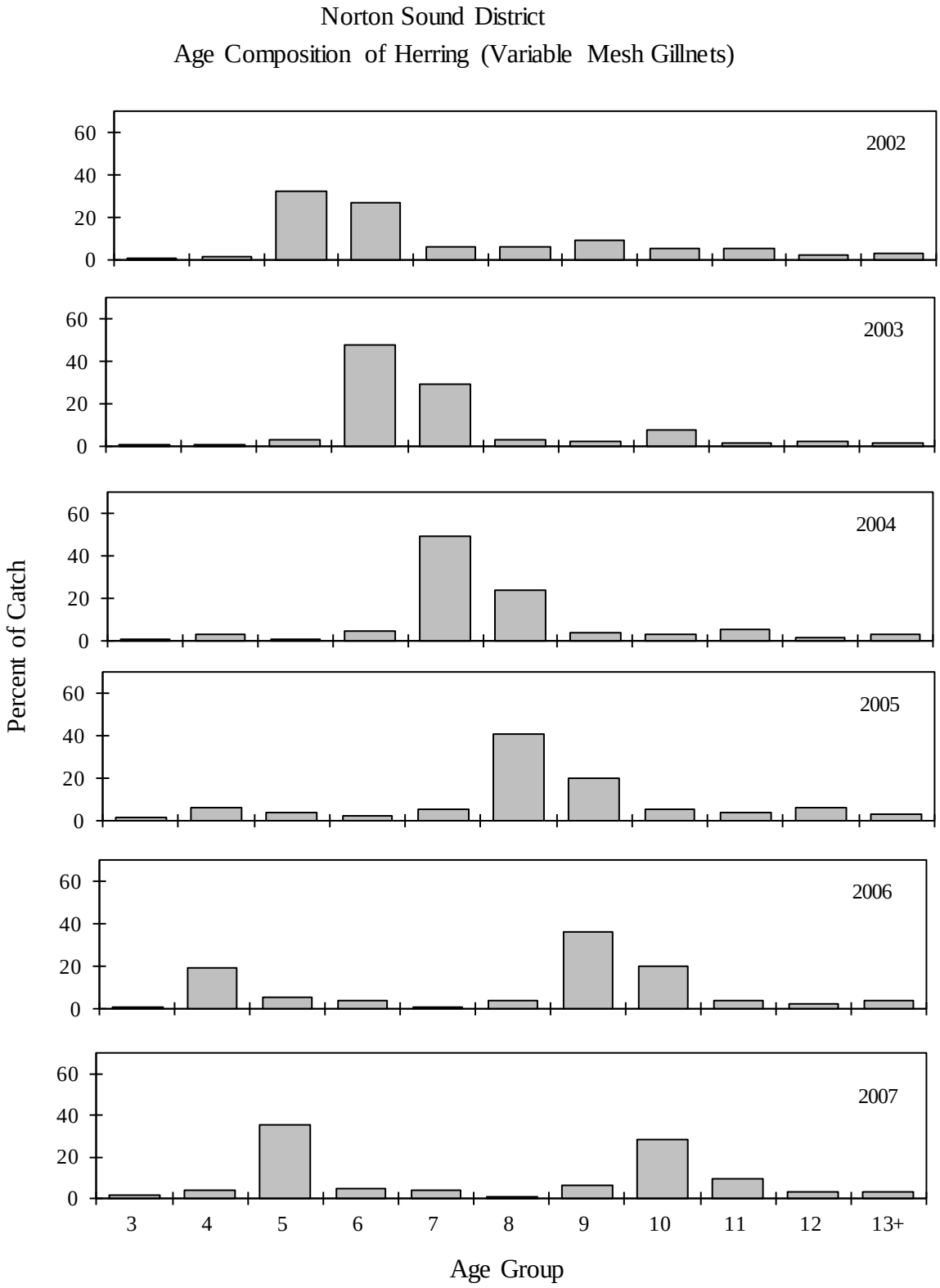
Note: No fishery in 2004. No commercial samples were available 2007–2012 and 2014.



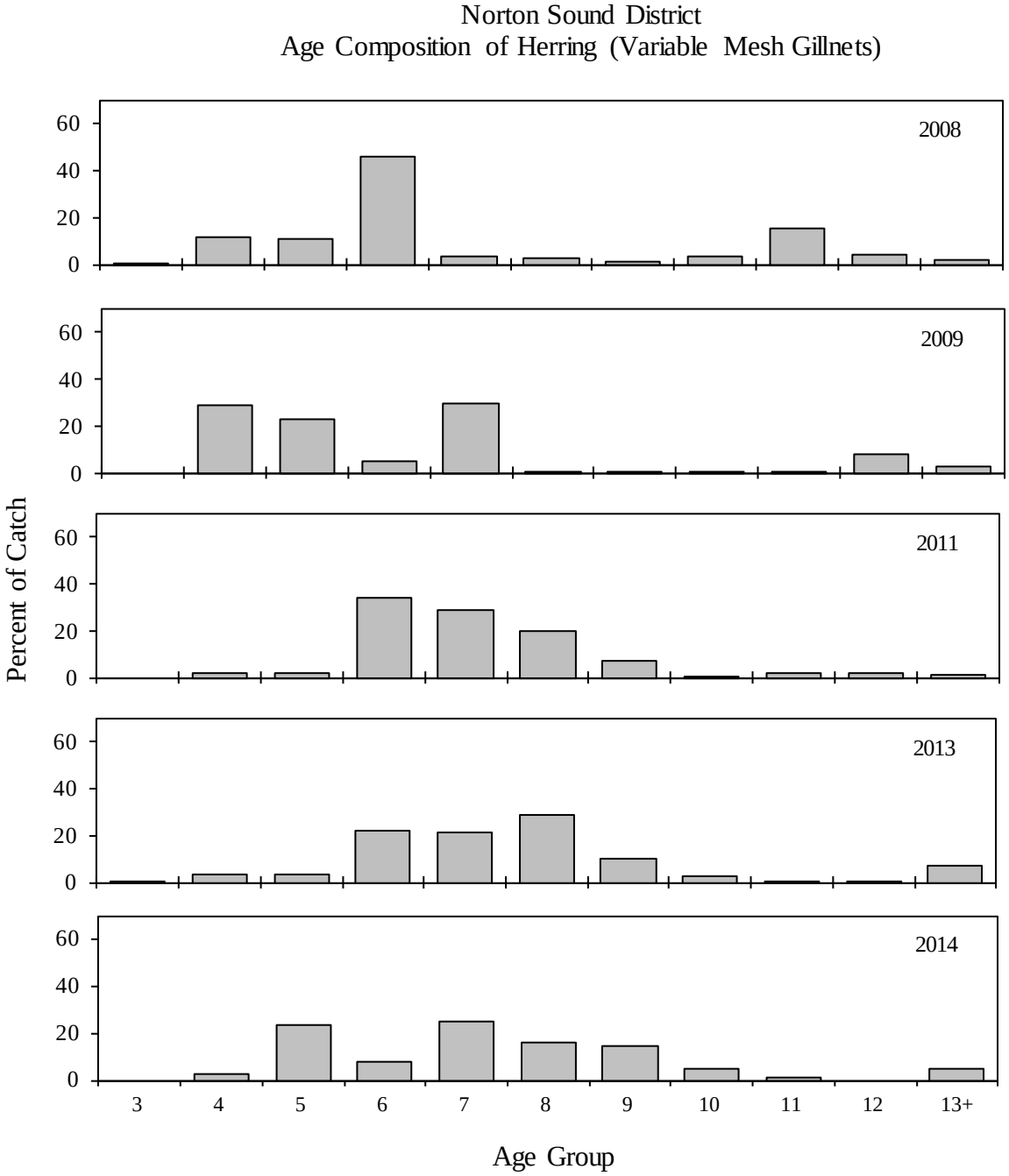
Appendix D8.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1990–1995.



Appendix D9.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1996–2001.



Appendix D10.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 2002–2007.



Appendix D11.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 2008–2014.

Note: Herring age class composition by percentage of total catch for 2010 and 2012 are not available.

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, 1990–2014 (catch in pounds).

Statistical Area	1990	1992	1993	1994	1995	1996 [a]	1997	1998	1999
616331				48					633
616401					35				
626331						61			
626401					18,971	45,045	18,066	8,065	508
626402									
636330						4,560	3,838	2,449	
636401		1,159	1,373	3,340	24,329	70,677	59,206	10,771	14,201
636402				1,754	3,466				
646301					4,628	13,888			
646330					1,493	2,894	314		3,021
646401			1,963	37,510	105,045	22,834	1,052	3,194	221
646402			730	139,661	66,821				
656300									
656330		4,814	265		19,745	15,446	4,661	4,078	1,300
656401	171	53,119	105,341	34,686	32,289	9,985	4,035	1,127	2,739
656402			193,079	110,289	44,000				
666230									
666300						25,519			
666330	27,185	4,305	31,758		730				
666401	162,263	10,632	746	396		3,001	1,816		930
666402			535	1,221					
666431					1,124				
676300						546			
676330									
676400	3,212					9,775			
676430									
676501									
686330									
686431									
Total (tons)	96	37	168	164	161	112	46	15	12

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Appendix E1.–Page 2 of 3.

Statistical Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
616331	4,557		3,506	646			2357		5,658	888
616401								231	416	6,170
626331			2,455				1415	27,018	3,235	3,047
626401	4,689	61,620	53,722	15,899	23,113	94,130	118202	61,704	96,327	103,043
626402				1,352						
636330		2,253				126	26680	10,253	2,350	5,026
636401	130,463	91,343	50,906	83,949	166,489	227,204	224531	123,092	197,948	96,279
636402										
646301										
646330		1,868	1,955		2,226	4,097	2629	5,290	1,505	933
646401		4,287		3,952	1,964	149	1660		18,728	46,264
646402										
656300				14	932		284	1,909		
656330	1,990	20,869	12,374	21,176	46,288	47,411	17752	4,911		10,617
656401	95,979	55,158	63,038	40,566	21,579	9,405	28434	70,065	68,968	107,557
656402				1,441		380	807	2,254		
666230							1721			
666300							18245			
666330	5,839	7,030	1,332	1,296	12,359	142	5041	511		1,514
666401	69,007	43,771	35,970	83,998	42,452	727	600	2,498		10,021
666402			30,070	12,873	23,344	16,025	1050	2,959		6,228
666431			4,274	45						
676300										
676330										
676400								180		
676430										
676501						1,008				
686330										
686431							340			
Total (tons)	156	144	130	134	170	200	226	156	198	199

-continued-

Statistical Area	2010	2011	2012	2013	2014	Total
616331					4,923	23,216
616401				7,729	4,692	19,273
626331		2,489		686		40,406
626401	52,054	85,271	115,524	36,802	69,936	1,082,691
626402						1,352
636330	2,584		1,454	12,035	7,565	81,173
636401	182,040	146,973	148,183	34,027	78,572	2,167,054
636402						5,220
646301						18,516
646330	1,205		1,204	4,195	5,390	40,219
646401	77,437	83,099	98,811	59,737	36,409	604,316
646402				5,271		212,483
656300						3,139
656330	17,660	1,546	8,168	8,515		269,586
656401	82,747	77,149	85,920	147,569	122,631	1,320,255
656402				37,743		389,993
666230						1,721
666300						43,764
666330		2,042	1,000			102,084
666401			15,726	33,469	38,099	556,122
666402	1,577	2,271		1,419	18,968	118,539
666431				2,669	1,825	9,937
676300						546
676330						0
676400						13,167
676430						0
676501						1,008
686330						0
686431						340
Total (tons)	209	200	238	196	195	7,126,119 3,563

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

[a] Does not include approximately 2,490 lb not reported on fish tickets.

Appendix E2.–The results of the population assessment surveys conducted for red king crab in Norton Sound since 1990.

Year	Date	Research Agency	Population abundance estimates (Number of crab [a]) Pre-2 Males [b]	Pre-1 Males [b]	Legal Males [c]	Legal Male Biomass (millions of pounds)
1991	8/22–08/30	NMFS	386,338	408,241	1,545,558	4,636,674
1996	9/07–09/18	ADF&G	395,888	277,595	528,431	1,585,293
1999	7/28–08/07	ADF&G	96,295	582,799	1,542,589	4,627,767
2002	7/27–08/06	ADF&G	393,689	482,815	740,450	2,221,350
2006	7/25–08/08	ADF&G	937,083	571,890	718,379	2,155,137
2008	7/24–08/11	ADF&G	795,777	689,843	811,727	2,435,181
2011	7/18–08/15	ADF&G	431,153	311,550	1,310,634	3,931,902
2014	7/18–07/30	ADF&G	1,547,538	2,110,274	1,747,720	5,243,160

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). All historical abundances were updated based on newly recovered data.

[b] Pre-2 male crab were defined as 76–89 mm in carapace length (CL), and pre-1 male crab were defined as sublegal crab ≥90 mm in CL.

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

Appendix E3.–Historical summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1990–2014.

	Guideline Harvest Level	Legal Male Population est.		Commercial Harvest (lb) [a,b]		Total Number			Total Number of Pots		Total Exvessel	Total Fishery Value	Season Length	
Year	(lb) [b]	Number (millions)	lb [b]	Open Access	CDQ	Vessels	Permits	Landings	Registered	Pulls	Price/lb	(millions $)	Days	Dates
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 [d]
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 [e]
1997	0.08			0.09		13	15	100	520	2,982	1.98	0.184	44	7/01–8/13 [f]
1998	0.08			0.03	0.00	8	11	50	360	1,639	1.47	0.041	65	7/01–9/03 [g]
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 [h]
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 [i]
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 [j]
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 [k]
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 [l]
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 [m]
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 [n]
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 [m]
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 [m]
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 [o]
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 [p]
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 [q]

-continued-

Year	Guideline Harvest Level (lb) [b]	Legal Male Population Est. Number (millions)	Legal Male Population Est. lb [b]	Commercial Harvest (lb) [a,b] Open Access	Commercial Harvest (lb) [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
2011	0.36	1.5	4.0	0.37	0.03	24	25	173	1,040	6,808	5.23	2.016	33	6/28–7/30 [r]
2012	0.47	1.4	3.7	0.44	0.03	40	29	312	1,200	10,041	5.41	2.556	72	6/29–9/08 [s]
2013	0.50	1.6	4.1	0.37	0.02	37	33	460	1,420	15,058	5.63	2.165	74	7/03–9/14 [t]
2014	0.38	1.2	3.2	0.36	0.03	52	33	309	1,560	10,127	5.12	1.960	52	6/25-8/15 [u]

[a] Deadloss included in total.
[b] Millions of pounds.
[c] Information not available.
[d] Fishing actually began 7/8.
[e] Fishing began 7/9 due to fishermen strike.
[f] First delivery was made 7/10.
[g] First delivery was made 7/16.
[h] The season was extended 24 hours due to bad weather.
[i] Open access fishery (OA) closed 8/29. CDQ fishery (CDQ) opened 9/1–9/29.
[j] OA closed 9/1. CDQ opened 9/1–9/9.
[k] OA was 7/1–8/6. CDQ opened 6/15–6/28 and 8/9–9/3.
[l] OA was 7/1–8/13. CDQ opened 6/15–6/28 and 8/15–8/24.
[m] CDQ opened 6/15–6/28. OA opened 7/1 to the end date.
[n] OA was 7/1–8/15. CDQ opened 6/15–6/28 and 8/17–8/27.
[o] OA opened 6/23–8/18. CDQ opened 8/17–9/3.
[p] CDQ opened 6/15–7/28. OA opened 6/15 to the end date.
[q] CDQ opened 6/28–7/16. OA opened 7/1 to the end date.
[r] CDQ opened 6/28–7/8. OA opened 6/28 to the end date.
[s] CDQ opened 6/29 to the end date. OA opened 6/29–8/11.
[t] CDQ and OA opened and closed at the same time.
[u] CDQ opened 6/25 to the end date. OA opened 6/25–8/2.

Appendix E4.–Average length and percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Eastern Bering Sea, 1990–2014.

Year	Average Length (mm)	Recruits [a]	Postrecruits [b]
1990	121	21	79
1991 [c]			
1992	120	28	72
1993	119	31	69
1994	119	20	80
1995	118	36	64
1996	117	30	70
1997	116	49	51
1998	117	32	68
1999	118	42	58
2000	116	41	60
2001	119	33	67
2002	120	33	67
2003	117	48	52
2004	117	49	51
2005	118	36	64
2006	119	25	75
2007	117	45	55
2008	115	45	55
2009	116	43	57
2010	115	49	51
2011	116	43	57
2012	118	33	67
2013	120	32	68
2014	120	35	65

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

[b] Postrecruits = all other male king crab of legal size.

[c] No summer commercial fishery.

Appendix E5.–Winter commercial and subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 1990–2014.

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
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	1,999	1995–96	84	44	35	2,936	1,679	48
1997	2	[e]	1996–97	38	22	13	1,617	745	57
1998	5	984	1997–98	94	73	64	20,327	8,622	135
1999	5	2,714	1998–99	95	80	71	10,651	7,533	106
2000	10	3,045	1999–00	98	64	52	9,816	5,723	107
2001	3	1,098	2000–01	50	27	12	366	256	21
2002	11	2,591	2001–02	114	101	67	8,805	3,669	55
2003	13	6,853	2002–03	107	73	64	9,052	4,140	65
2004 [f]	2	522	2003–04	96	77	41	1,775	1,181	29
2005	4	2,121	2004–05 [g]	170	102	60	6,496	3,973	66
2006	1	[e]	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
2011	9	3,365	2010–11	148	148	95	9,183	6,640	70
2012	35	9,157	2011–12	204	204	138	11,341	7,371	53
2013	26	22,639	2012–13	149	148	104	21,752	7,662	74
2014	21	14,986	2013–14	103	103	75	5,421	3,252	43
Avg 1990–2013	12	4,817	Avg 1990–2013	118	99	73	9,462	5,596	71

[a] 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 released.

[d] The number of crab harvested is the number of crab retained.

[e] Confidential under AS 16.05.815.

[f] Confidentiality was waived by the fishermen.

[g] 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, 2004–2014.

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
2011	43	42	27	4,026	2,658	98
2012	45	44	13	1,346	912	70
2013	47	46	26	3,102	1,865	72
2014	40	40	25	2,185	1,210	48
Avg. 2009–2013	36	36	19	2,287	1,350	67

Appendix E7.–Number of crab pots lost during the subsistence and commercial winter crab fisheries, and ADF&G winter studies, 2006–2014.

Year	Subsistence [a]	Commercial	ADF&G winter study & spring/fall tagging studies [b]	Total
2005–06	50	ND	6	56
2006–07	132	ND	7	139
2007–08	6	ND	4	10
2008–09	8	ND	2	10
2009–10	23	30	2	55
2010–11	8	3	0	11
2011–12	19	64	4	87
2012–13	4	23	3	30
2013–14	18	105	1	124

[a] Starting with the 2013–2014 season, subsistence pots lost during the summer fishery were also tracked.

[b] The 2011–12 winter season was the last time the winter study took place. The spring/fall tagging studies took place 2012–2014.

Appendix E8.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Eastern Bering Sea, 1990–2012.

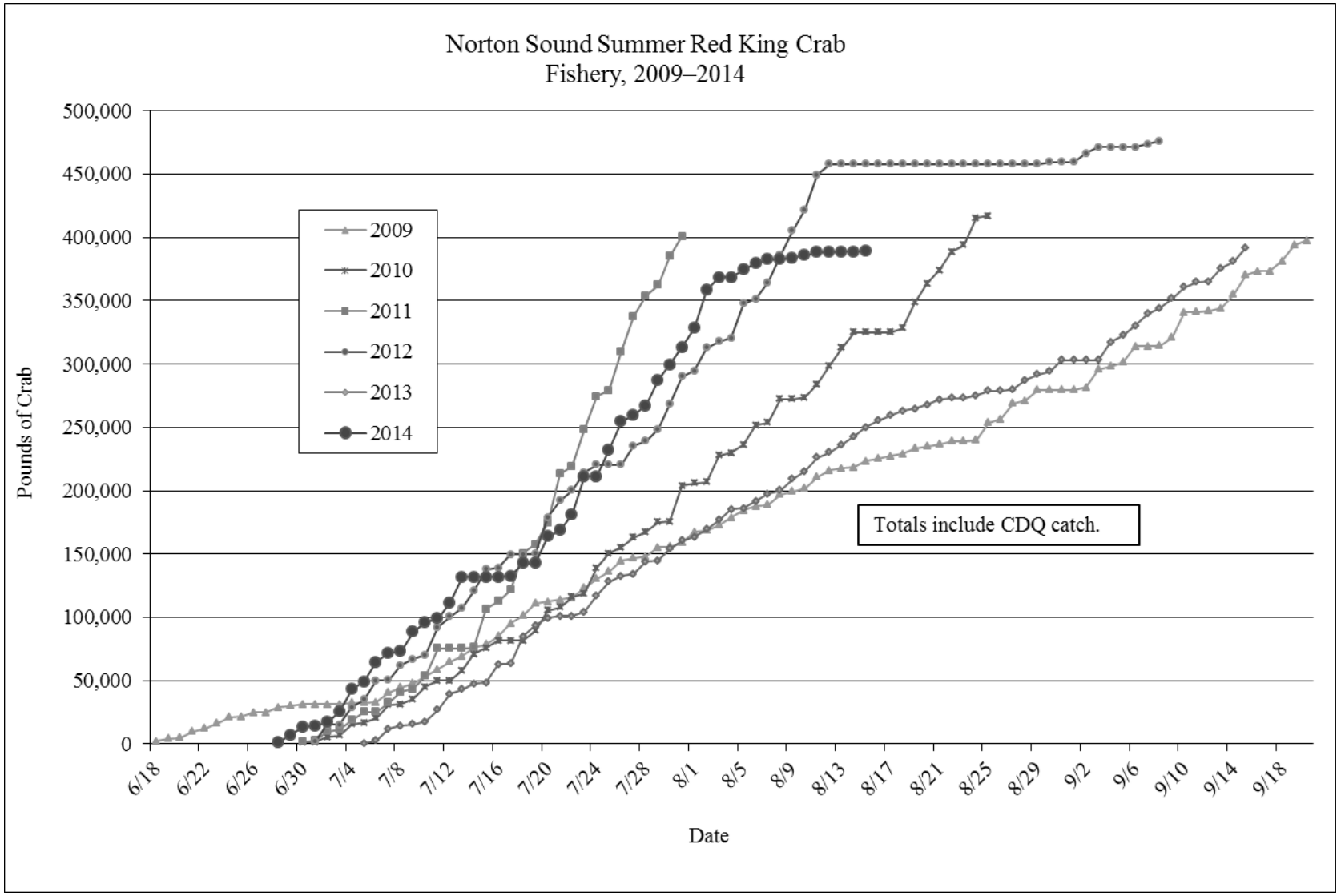
	Undersized [a]			Legal [a]		
Year	Prerecruit 2	Prerecruit 1	Total	Recruits	Post recruits	Total
1990	16	33	49	25	26	51
1991	5	30	36	34	31	65
1992	[b]	[b]	[b]	[b]	[b]	[b]
1993	3	9	12	17	71	88
1994	[b]	[b]	[b]	[b]	[b]	[b]
1995	10	11	23 [c]	32	45	77
1996	22	33	64 [c]	10	26	36
1997	32	21	64 [c]	14	22	36
1998	36	44	82 [c]	9	9	18
1999	7	42	50 [c]	39	11	50
2000	16	20	37 [c]	39	25	64
2001	23	16	39 [c]	14	48	61
2002	43	26	79 [c]	9	12	21
2003	20	42	66 [c]	20	14	34
2004	9	40	50 [c]	37	13	50
2005	16	24	41 [c]	25	34	59
2006	29	33	63 [c]	16	22	38
2007	16	53	78 [c]	11	11	22
2008	36	31	71 [c]	18	12	30
2009	11	42	54 [c]	24	22	46
2010	10	32	43 [c]	30	27	57
2011	15	26	44 [c]	23	33	56
2012	25	29	57 [c]	14	29	43

Note: No winter study has occurred since 2012.

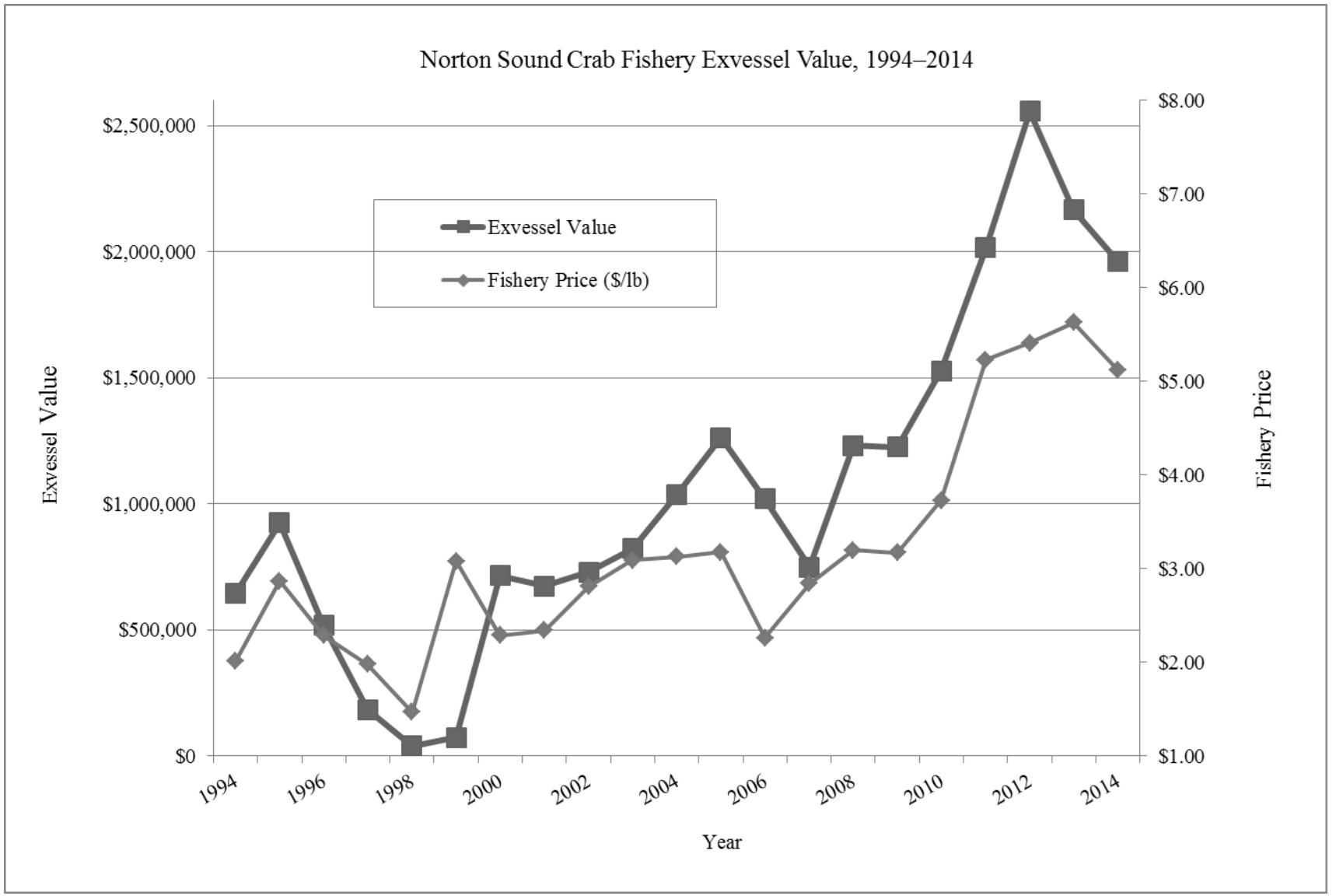
[a] Undersized crab are male crab less than 4.75 in carapace width (CW). Legal crab are male king crab greater than or equal to 4.75 in CW.

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

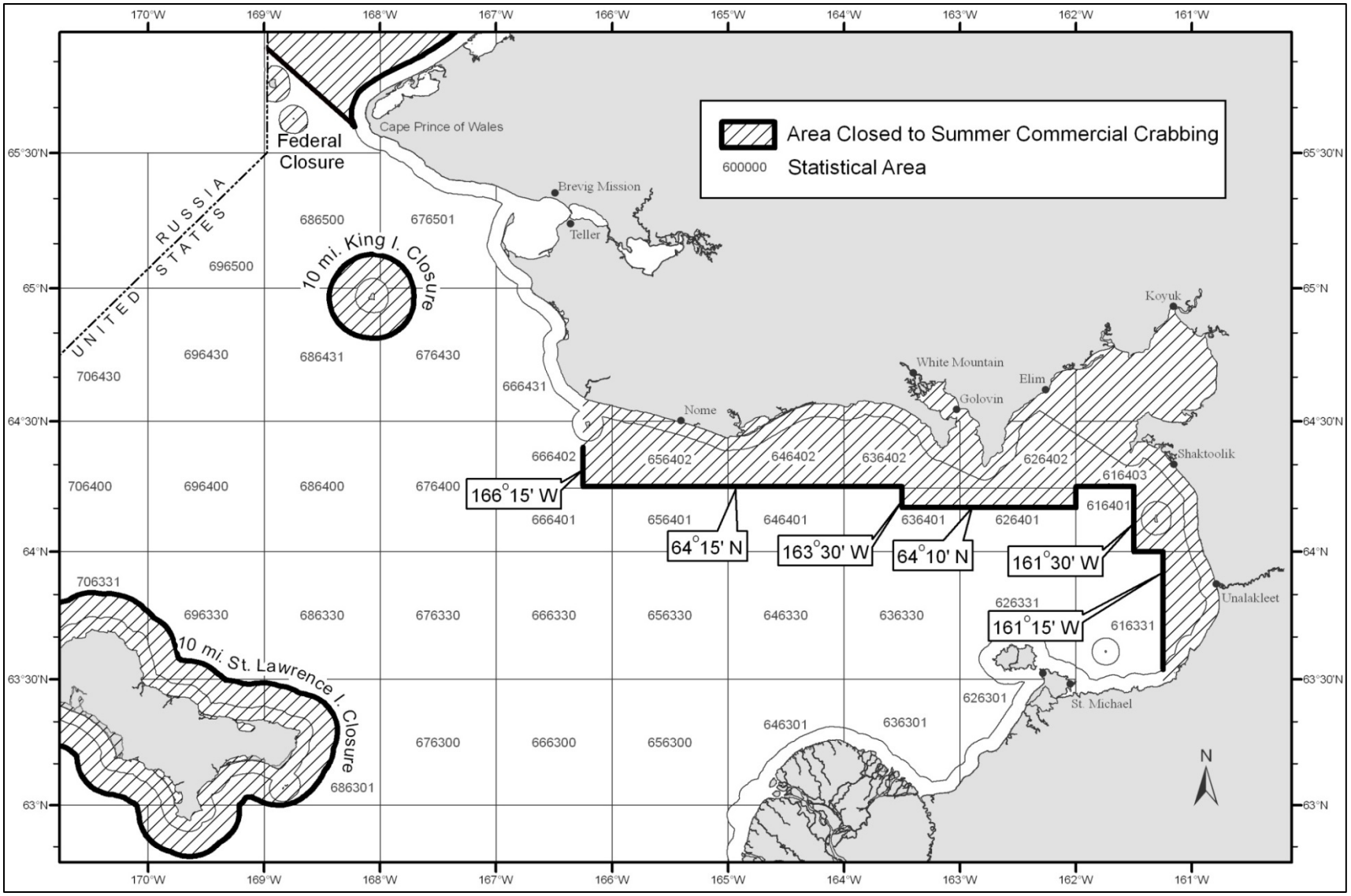
[c] Includes prerecruit 3.



Appendix E9.–Current and historical cumulative catch for the Norton Sound summer commercial crab fishery, 2009–2014.

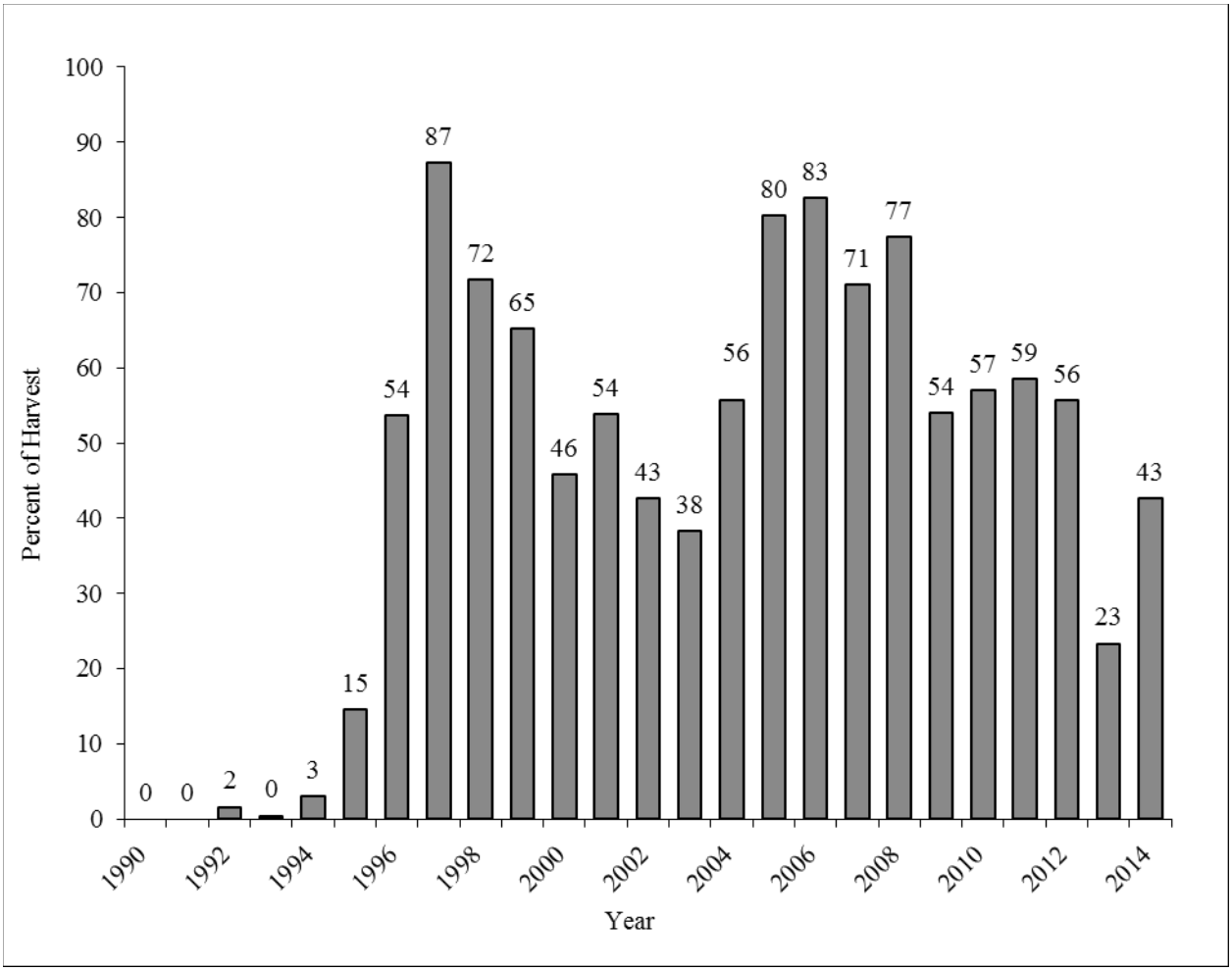


Appendix E10.–Norton Sound crab exvessel value and fishery price per pound, 1994–2014.

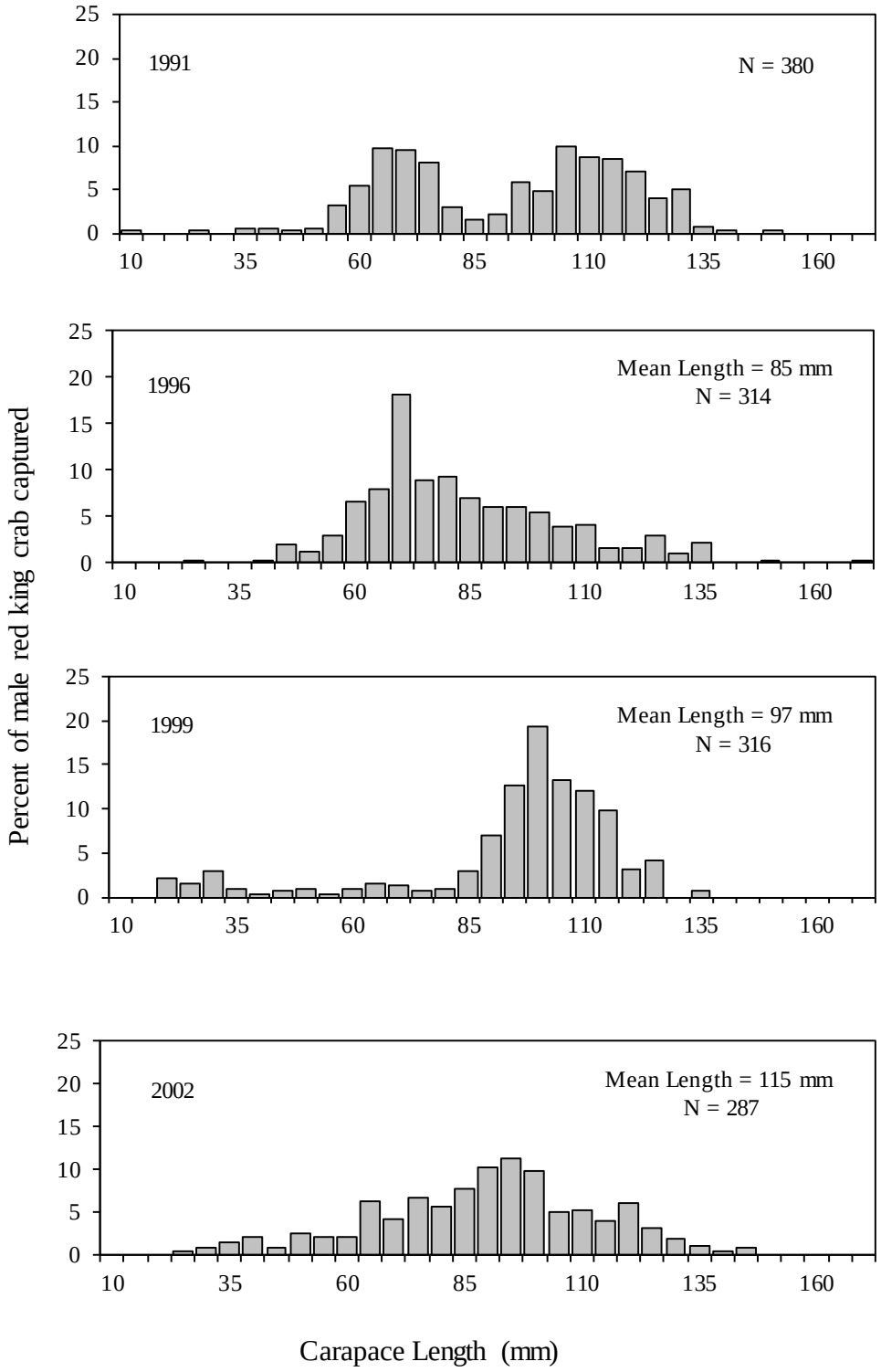


Appendix E11.–Closed water regulations in effect for the Norton Sound summer commercial crab fishery.

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

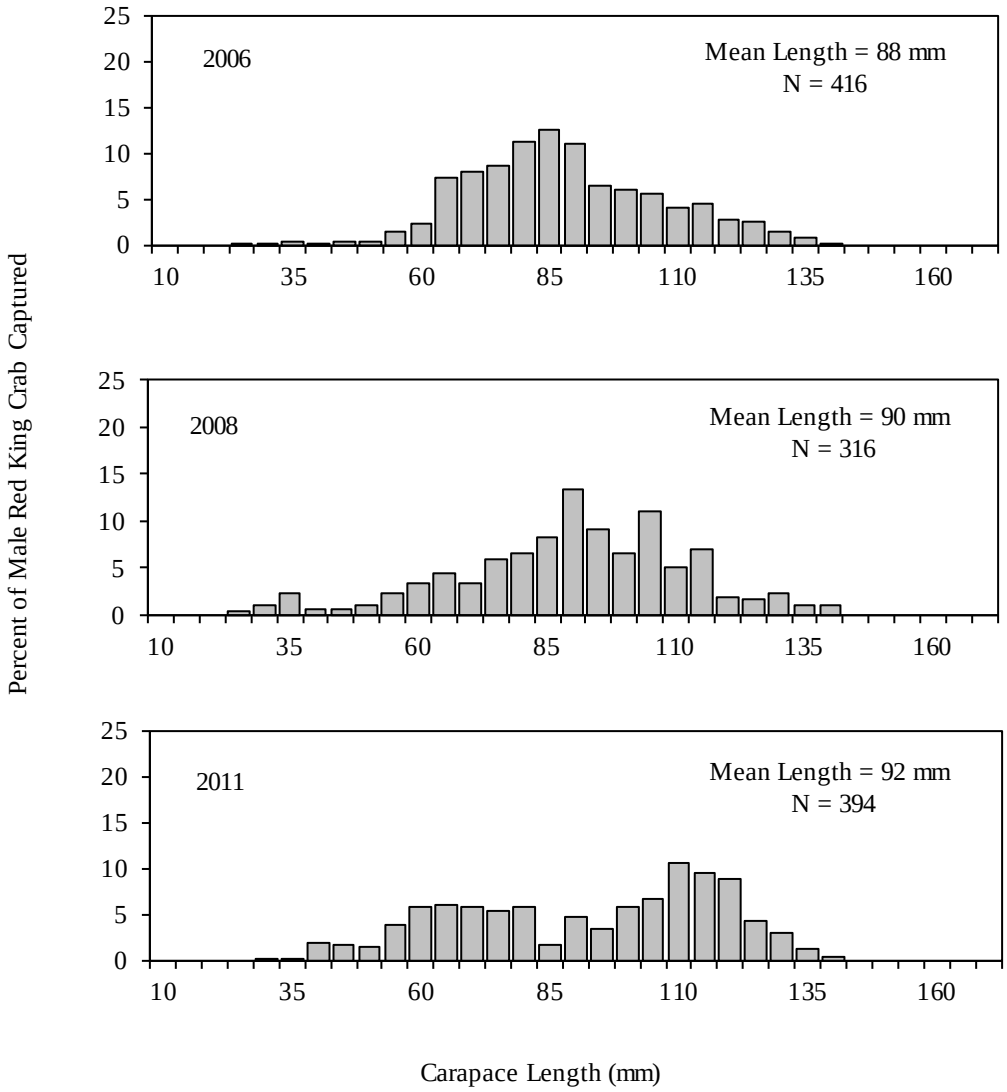


Appendix E12.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164° W longitude, 1990–2014.

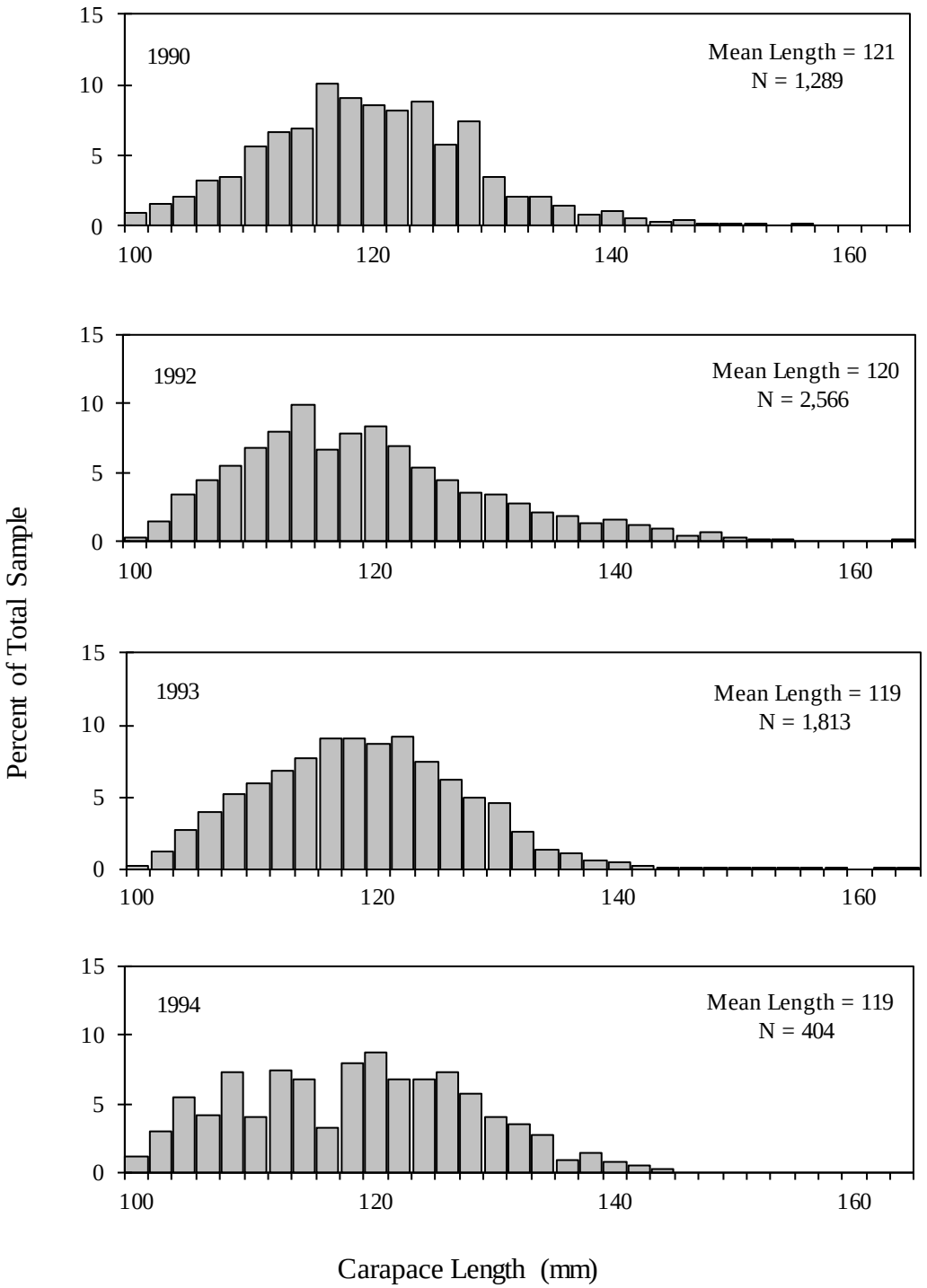


Appendix E13.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service in 1991, and by ADF&G in 1996, 1999, and 2002.

Note: Mean length information is not available for 1991.

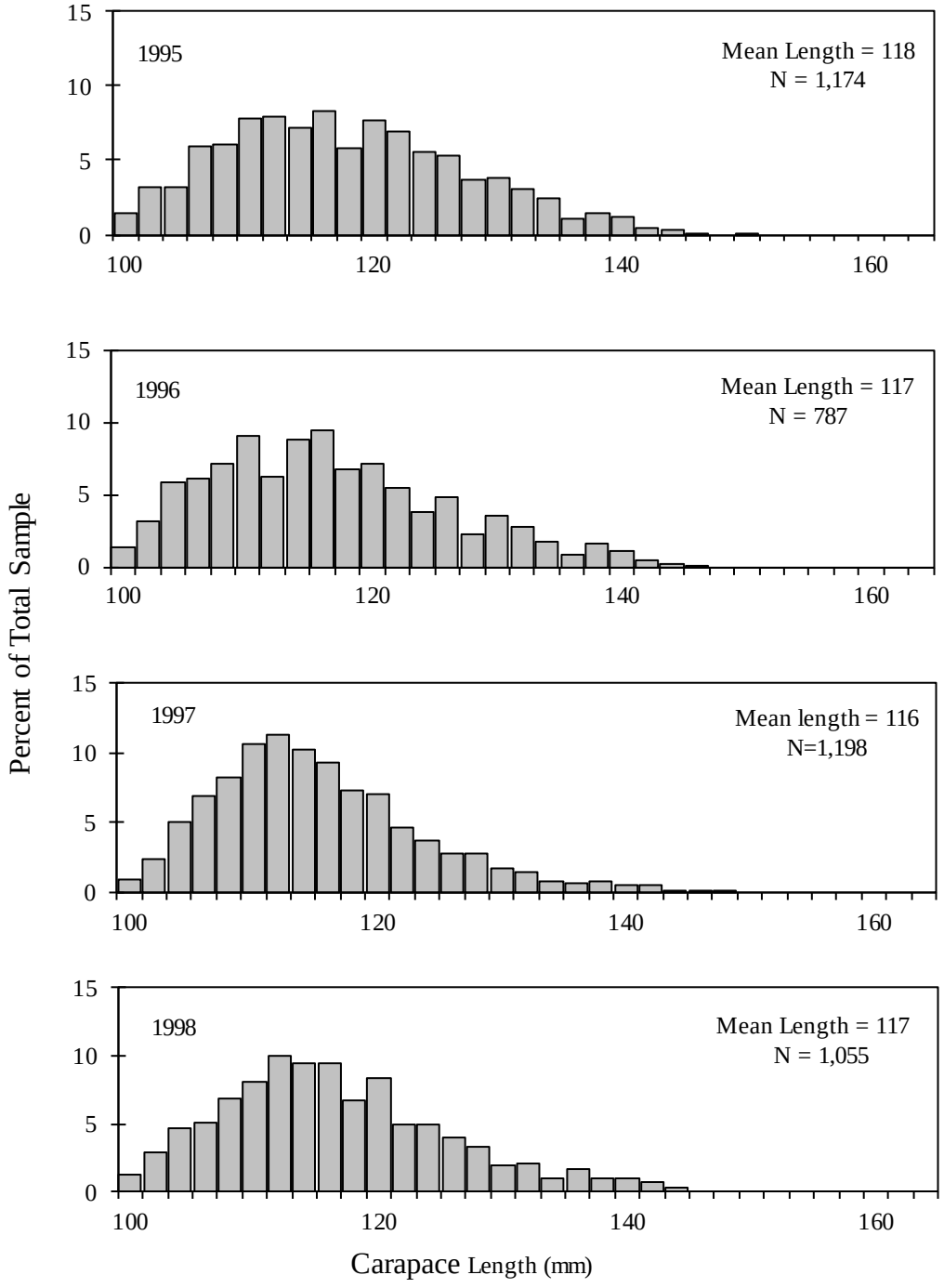


Appendix E14.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G in 2006, 2008, and 2011.

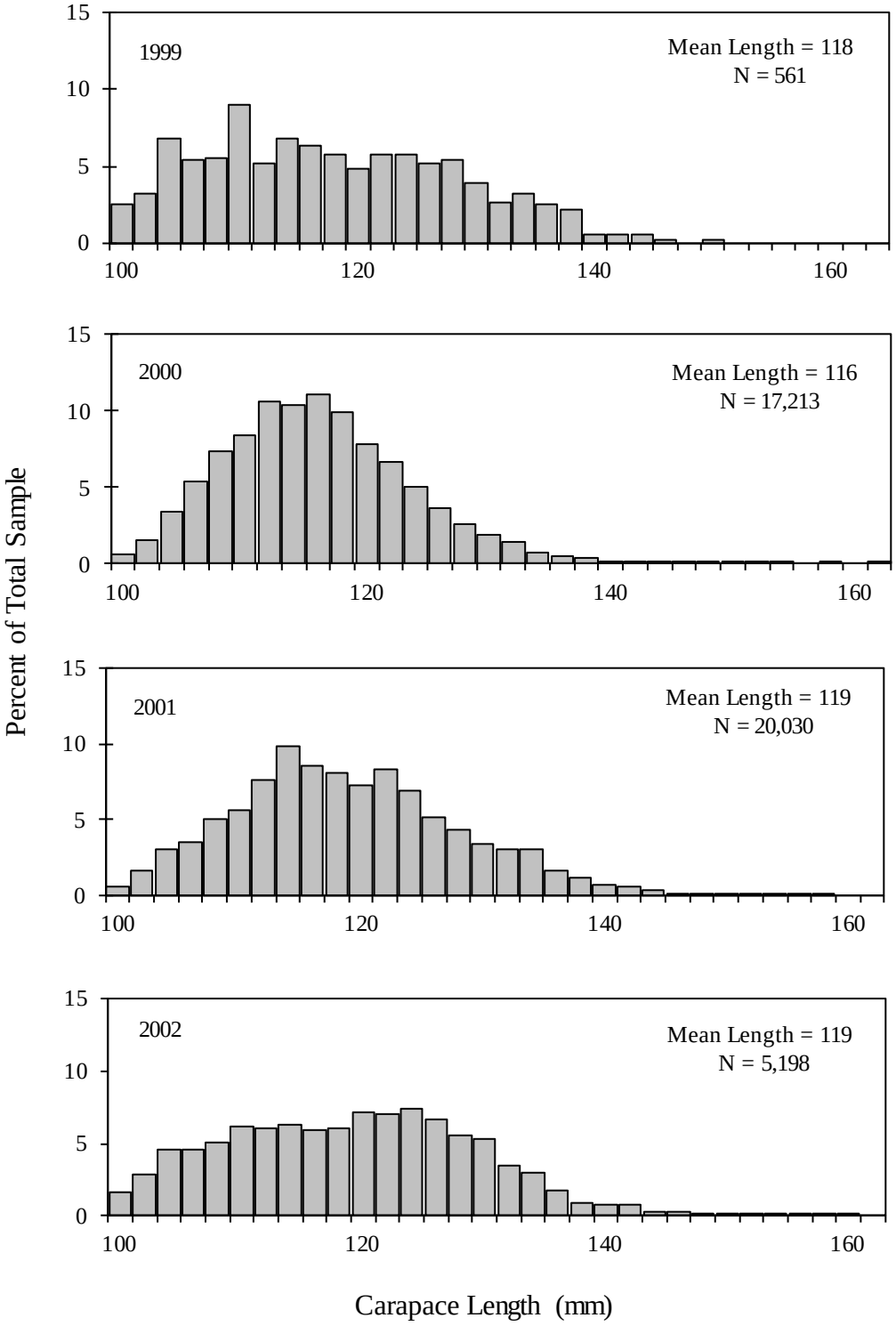


Appendix E15.–Length composition of Norton Sound red king crab summer commercial harvests, 1990–1994.

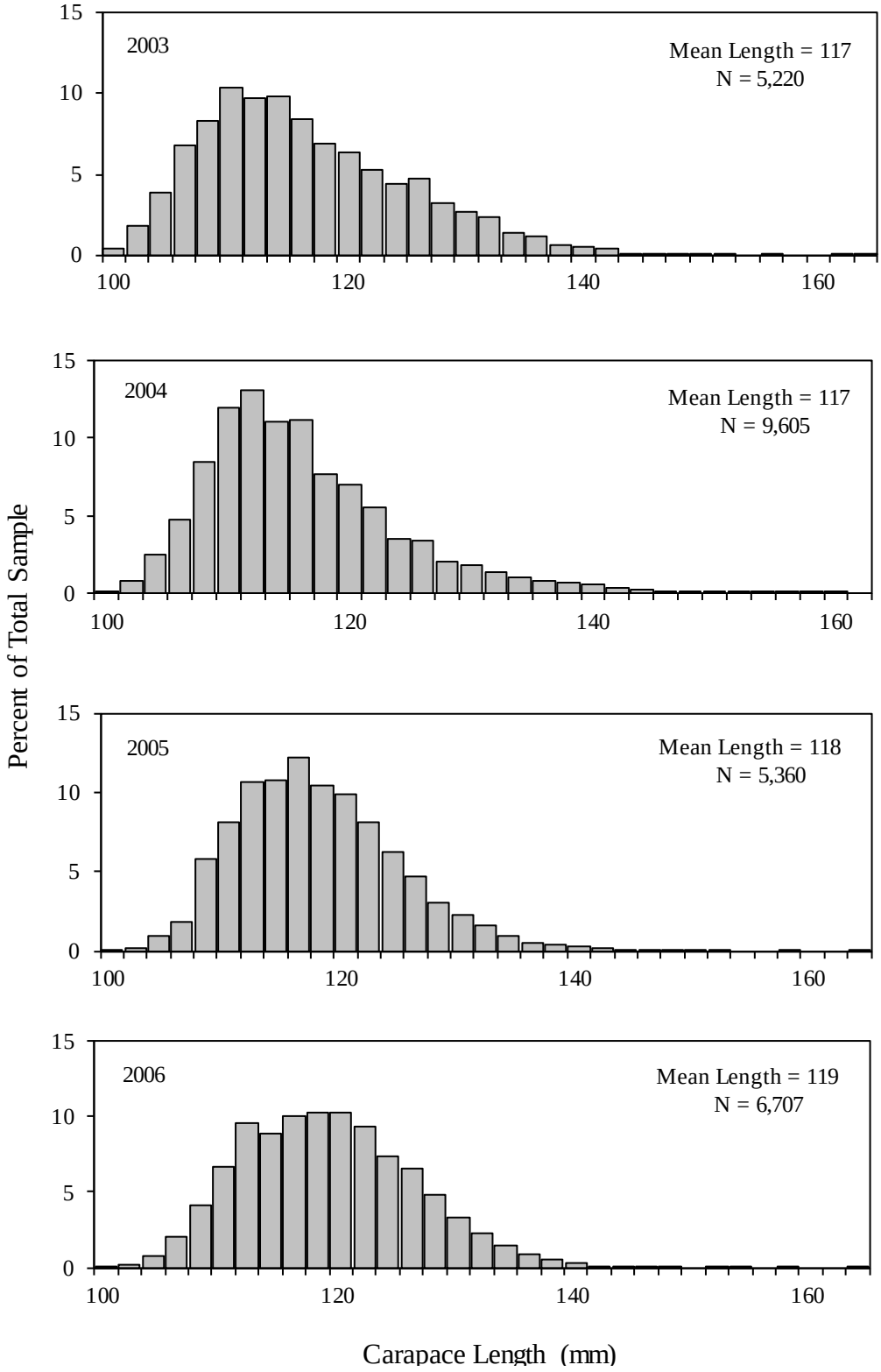
Note: No fishery in 1991.



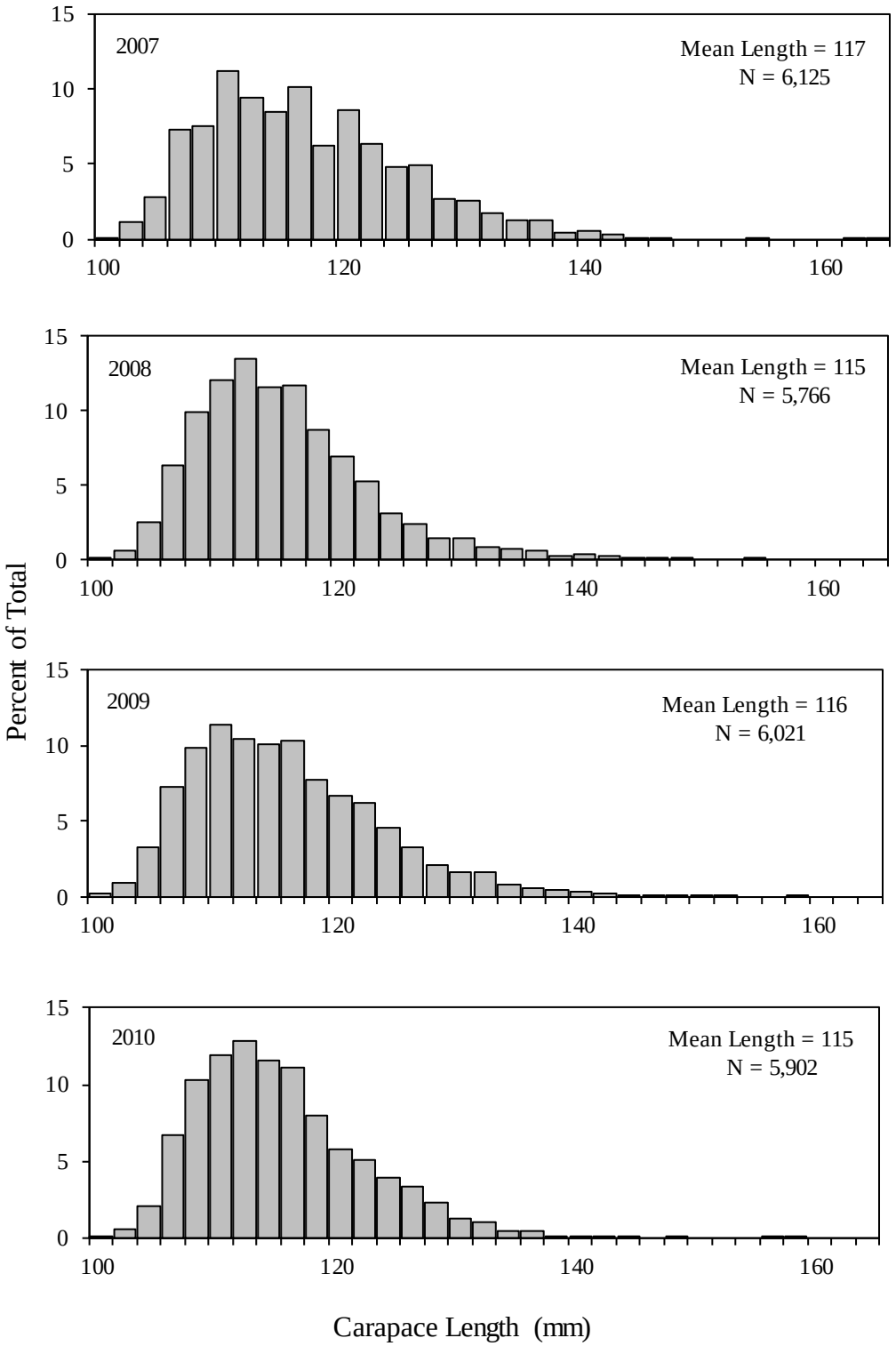
Appendix E16.–Length composition of Norton Sound red king crab summer commercial harvests, 1995–1998.



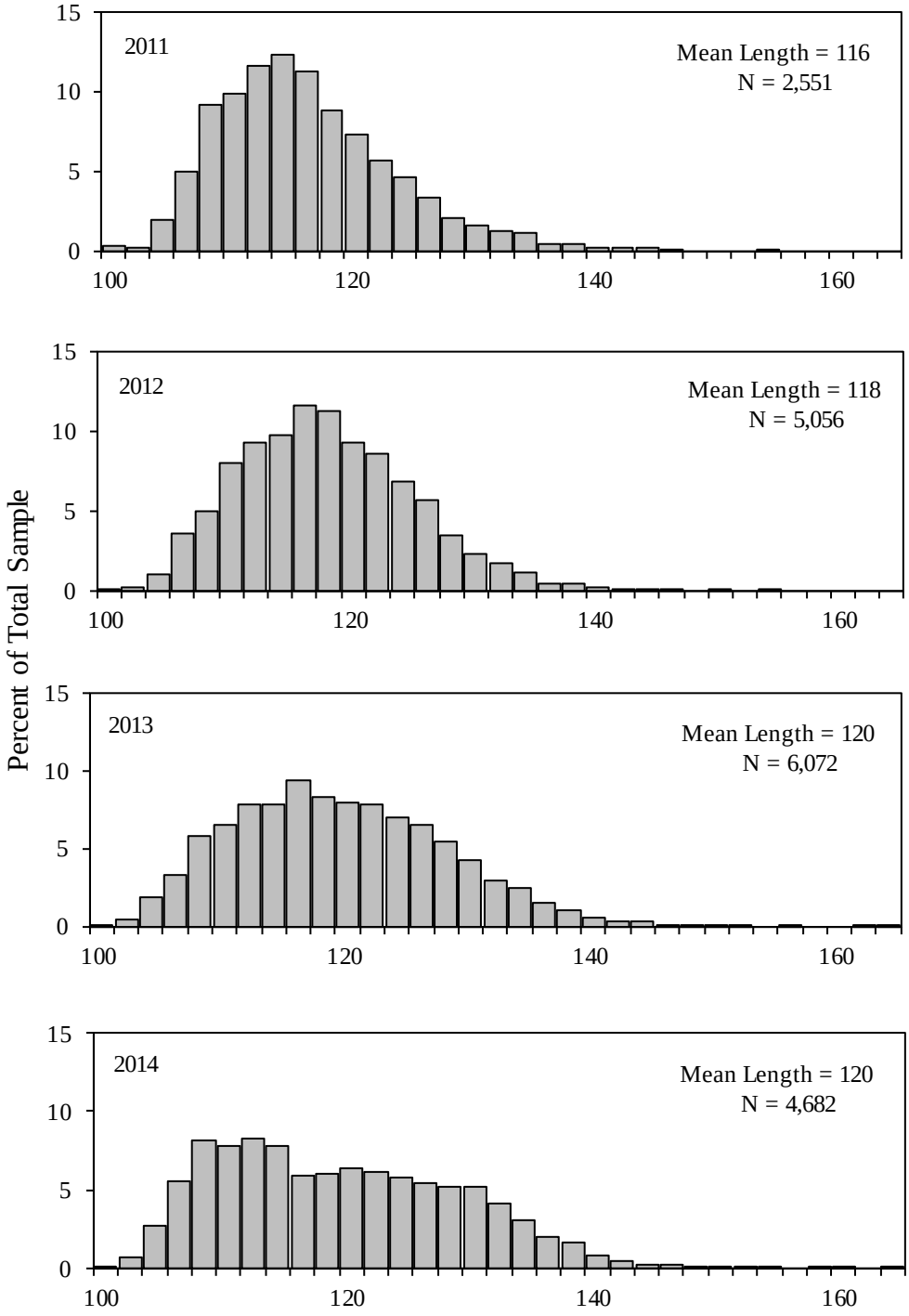
Appendix E17.–Length composition of Norton Sound red king crab summer commercial harvests, 1999–2002.



Appendix E18.–Length composition of Norton Sound red king crab summer commercial harvests, 2003–2006.



Appendix E19.–Length composition of Norton Sound red king crab summer commercial harvests, 2007–2010.



Appendix E20.–Length composition of Norton Sound red king crab summer commercial harvests, 2011–2014.

APPENDIX F: MISCELLANEOUS FISHERIES

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1990–2014.

Year [b]	Number of fishermen	Number of fish	Pounds [a] Total	Pounds [a] Average	Price per pound ($)	Estimated value ($)
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 [f]	All information confidential					
2006–2011 [e]						
2012 [f]	All information confidential					
2013 [e]						
2014 [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 is not always reported. Estimates were based on average weight from reported sales that documented the number of fish.

[e] No reported commercial catches.

[f] Less than 4 fishermen; 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, 1991–2004 and 2012–2014.

Year [a]	Number of households interviewed	Reported harvest	Average catch per household
1991	40	2,180	55
1992	43	2,821	66
1993	46	2,441	53
1994	171	3,181	19
1995 [b]	314	9,465	30
1996 [b]	389	6,953	18
1997 [b]	338	9,805	25
1998 [b]	435	5,350	14
1999 [b]	191	8,256	19
2000 [b]	237	7,446	17
2001 [b]	363	3,838	9
2002	101	3,882	38
2003	488	7,823 [c]	0
2004 [d]	440	10,163	23
2012 [d]	360	11,693	32
2013 [d,e]	618	22,109	36
2014 [d]	Information is not yet available.		

Note: Subsistence surveys were not conducted from 2005 to 2011. Kotzebue area villages were surveyed by the Division of Subsistence in 2014, but data are not yet available.

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

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

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

[e] Villages surveyed were Ambler, Buckland, Kiana, Kobuk, Noatak, Noorvik, Shungnak, and Selawik.

Appendix F3.–Non-salmon sport fish harvests in Norton Sound and Kotzebue/Chukchi Sea, 1990–2014.

	Norton Sound		Kotzebue / Chukchi Sea		
Year	Dolly Varden	Arctic Grayling	Dolly Varden	Arctic Grayling	Inconnu/ Sheefish
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	2,617	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	3,373	1,185	1,406	445	957
2010	1,835	232	493	366	595
2011	4,041	1,398	865	486	385
2012	252	520	781	626	104
2013	1,184	500	1,074	563	218
2014	Information is not yet available.				
Average 2009–2013	2,137	767	924	497	452
2004–2013	2,693	695	1,225	663	622

Appendix F4.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1990–2014.

Year	Number of fish sold	Estimated total catch [a]	Pounds sold	Average weight [b]	Average price
1990	604	[c]	4,219	7.0	0.25
1991	6,136	[c]	40,747	6.6	0.18
1992	1,977	[c]	11,951	6.0	0.10
1993	76	[c]	540	7.1	0.10
1994	149	[c]	767	5.1	0.17
1995	2,090	[c]	13,195	6.3	0.20
1996	188	[c]	1,153	6.1	0.25
1997	3,320	[c]	23,203	7.0	0.20
1998	349	[c]	2,640	7.6	0.20
1999	1,502	[c]	11,352	7.6	0.20
2000	7	[c]	44	6.3	0.20
2001	0	[c]	0	[d]	0.00
2002	0	30	0	[d]	0.00
2003	20	176	160	8.0	0.50
2004	124	[c]	846	6.8	0.26
2005	181	[c]	1,158	6.4	0.30
2006	0	278	0	[d]	0.00
2007	0	960	0	[d]	0.00
2008	0	1,629	0	[d]	0.00
2009	0	960	0	[d]	0.00
2010	0	1,323	0	[d]	0.00
2011	0	400	0	[d]	0.00
2012	0	300	0	[d]	0.00
2013	0	302	0	[d]	0.00
2014	0	620	0	[d]	0.00

[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] No estimates were made of Dolly Varden caught but not sold.

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

Appendix F5.–Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1991–2014.

	Kivalina		Noatak [b,c]
Year [a]	Number	Pounds	Number
1991			4,814
1992			4,395
1993			4,275
1995			5,762
1996			5,031
1997			4,763
1998			3,872
2000			3,315
2001			2,702
2002			3,242
2003			6,386
2004			11,697
2007	20,527	67,739	10,234
2012			6,437
2013			6,223
2014	Information is not yet available.		

Note: Data are not available for all years.

[a] Subsistence surveys were not conducted in 1994, 1999, 2005–2006, and 2008–2011. The Division of Subsistence did a comprehensive survey of Noatak fish and wildlife harvests from 2012 to 2014, but data are not yet available for 2014.

[b] No data are available on poundage.

[c] Based on ADF&G, Division of Subsistence, household surveys in Noatak.

Appendix F6.–Dolly Varden sport fish harvests in Norton Sound, by river, 1990–2014.

Year	Location									Total
	Marine water	Nome	Pilgrim	Unalakleet	Fish-Niukluk	Sinuk	Snake	Solomon	Other Streams	
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	1,147	5,907
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	2,071	346	81	186	265	4,467
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	253	0	2,794	108	50	50	0	118	3,373
2010	0	165	0	1,411	12	117	0	24	106	1,835
2011	0	0	11	2,219	1,631	0	10	0	170	4,041
2012	0	111	0	88	0	9	33	0	11	252
2013	0	17	0	483	0	0	0	0	684	1,184
2014	Information is not yet available.									
Average										
2009–2013	0	109	2	1,399	350	35	19	5	218	2,137
2004–2013	18	296	2	1,419	427	114	68	71	278	2,693

Note: Data are not available for all years.

Appendix F7.–Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1990–2014.

Year [a]	Noatak River spawner survey [b]	Overwintering	
		Wulik River [c]	Kivalina River [c]
1990	7,261	[d]	[d]
1991	9,605	126,985	35,275
1992	[d]	135,135	[e]
1993	9,560	144,138	16,534
1994	[d]	66,752	[d]
1995	6,500	128,705	28,870
1996	12,184	61,005	[d]
1997	[d]	95,412	[d]
1998	[d]	104,043	[d]
1999	9,059 [f]	70,704	[d]
2000	[d]	[d]	[d]
2001	[d]	92,614	[d]
2002	[d]	44,257	[d]
2003	[d]	1,500 [g]	[d]
2004	[d]	101,806	[d]
2005	[d]	120,848	[d]
2006	[d]	108,352	[d]
2007	[d]	99,311	[d]
2008	[d]	71,493	[d]
2009	[d]	63,977	[d]
2010	[d]	36,866	[d]
2011	[d]	64,499	[d]
2012	[d]	21,084	[d]
2013	[d]	23,312 [h]	[d]
2014	[d]	64,351	[d]

[a] Counts are considered minimal because 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.

[d] Not surveyed.

[e] Poor weather hampered or prevented survey.

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

[g] Spawning survey conducted very early (August 20, 2003).

[h] Counting conditions were poor due to presence of river ice.

Appendix F8.–Subsistence whitefish catch and effort in the Kotzebue District, 1991–1993, 1997–2004, and 2012–2014.

Year [a]	Number of households interviewed	Number of whitefish harvested	Average catch per household
1991 [b]	63	16,015	254
1992 [b]	66	17,485	265
1993 [b]	70	19,060	272
1997	413 [c]	84,851	205
1998	435 [c]	39,754	91
1999	191 [c]	56,326	295
2000	237 [c]	70,097	296
2001	363 [c]	30,976	85
2002	101 [d]	25,607	254
2003	446	73,242	164
2004	440 [c]	50,501	115
2012	360 [c]	41,229	115
2013	618 [e]	113,158	192
2014	Information is not yet available.		

Note: Subsistence surveys were not conducted from 1994 to 1996 and from 2005 to 2011.

[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] Subsistence interviews from Noatak, Noorvik, and Shungnak villages only.

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

[d] Subsistence harvest information is from Noatak and Noorvik only.

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

Appendix F9.–Norton Sound District winter commercial whitefish harvest statistics, 2007–2014.

Year [a]	Number of fishermen	Total pounds	Price per pound ($)	Estimated value ($)
2006–2007	1	3,723	0.44	2,635
2007–2008 [b]				
2008–2009 [b]				
2009–2010 [b]				
2010–2011	1	2,009	0.50	1,005
2011–2012	1	2,148	0.50	859
2012–2013	2	105	0.50	53
2013–2014	1	4,726	0.50	2,363

[a] Season was from September 15 to June 15. Confidentiality was waived by fishermen.

[b] No reported sales.

Appendix F10.–Norton Sound District winter commercial saffron cod harvest statistics, 1994–1995 and 2010–2014.

Year [a]	Number of fishermen	Total pounds	Price per pound ($)	Estimated value ($)
1993–1994	[b]	1,402	[b]	[b]
1994–1995	[b]	52	0.50	26
2009–2010 [c]	1	1,748	0.30	524
2010–2011	5	8,031	0.50	4,016
2011–2012	9	3,780	0.47	1,772
2012–2013	25	33,939	0.50	16,970
2013–2014	24	18,322	0.50	9,161

[a] Season was from September 15 to June 15.

[b] Information is not available.

[c] Confidentiality was waived by the fisherman.

APPENDIX G: OVERVIEW OF 2014

Appendix G1.–List of common and scientific names of finfish species of the Norton Sound, Port Clarence, Kotzebue, and Arctic Districts.

Common Name	Scientific Name
Arctic lamprey	*Lampetra camtschatica*
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, Kotzebue, and Arctic Districts, 2014.

HERRING

Herring Test Fishing

a) Location: Norton Sound ocean waters, with base camp in Unalakleet.

b) Description: Determine age class composition through test fishing with variable mesh gillnets. Alaska Department of Fish and Game (ADF&G) project.

SALMON

Eldorado River Weir

a) Location: Eldorado River, approximately 15 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. Collect age, sex, and length data from chum salmon from weir trap. Cooperative project operated by NSEDC with assistance from ADF&G.

Fish River Tower

a) Location: Fish River, approximately nine miles upstream of White Mountain.

b) Description: Determine daily and seasonal timing and magnitude of salmon escapement. NSEDC project with assistance from ADF&G.

Glacial Lake Weir and Video Enumeration Project

a) Location: At outlet of Glacial Lake.

b) Description: Determine daily and seasonal timing and magnitude of sockeye salmon escapement. Weir is cooperative project operated by ADF&G with assistance from NSEDC. Video project is operated by ADF&G.

Inglutalik River Tower

a) Location: Inglutalik River, approximately 18 miles upstream from the mouth at Norton Bay.

b) Description: Determine daily and seasonal timing and magnitude of Chinook, chum, pink, and coho salmon escapements. Collect age, sex, and length data from Chinook, chum, and coho salmon from beach seine. Cooperative project operated by NSEDC with assistance from ADF&G.

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 from beach seining. ADF&G project with additional funding from NSEDC.

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. 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.

Pilgrim River Weir

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

b) Description: Determine daily and seasonal timing and magnitude of the salmon escapements. Collect age, sex, and length data from weir trap. Cooperative project operated by NSEDC with assistance from ADF&G.

-continued-

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.

Solomon River Weir

a) Location: Solomon River, at approximately mile 35.5 on the Nome-Council road.

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

Unalakleet River Weir

a) Location: Unalakleet River, approximately 15 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.

Kobuk River Test Fish

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

b) Description: 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.

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: 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 ADF&G.

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

CRAB

King Crab Blood Study

a) Location: Ocean waters of Norton Sound.

b) Description: Take blood samples from crab during late winter and summer crab commercial seasons, trawl survey and fall pot survey. Lab tests for hormone levels to determine molting timing.

Offshore Summer King Crab Study

a) Location: Tagging conducted along transects 5 and 10 miles from shore from Cape Nome to Elim; observers were placed on commercial fishing vessels throughout the open fishing area of Norton Sound.

b) Description: Investigate movement, size composition, potential essential habitat, and handling of red king crab in eastern Norton Sound. Cooperative project between ADF&G and NSEDC with funding provided by North Pacific Research Board.

Norton Sound Red King Crab Trawl Survey (conducted in 2014)

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.

Appendix G3.–Norton Sound and Kotzebue Sound processors, 2014.

Company	Address	Type of Processing	District
Aqua Tech	P.O. Box 10119 Anchorage, AK 99510	Fresh Crab	Norton Sound
Norton Sound Seafood Products	Nome, AK 99762 and Unalakleet, AK 99684	Frozen/Fresh Salmon Herring Roe Frozen/Fresh King Crab	Norton Sound
Great Pacific Seafoods	650 South Orcas Street Seattle, WA 98108	Buy and Fly Frozen/Fresh Salmon	Kotzebue Sound
Maniilaq Services, Inc. dba Arctic Coast Wild Salmon	1700 Seventh Avenue Suite 2100 Seattle, WA 98101	Buy and Fly Frozen/Fresh Salmon	Kotzebue Sound
Copper River Seafoods	1118 East Fifth Avenue Anchorage, AK 99501	Buy and Fly Frozen/Fresh Salmon	Kotzebue Sound

Appendix G4.–Saint Michael subsistence salmon harvest survey form, 2014.

NORTON SOUND 2014 SUBSISTENCE SALMON HARVEST SURVEY **Community ID# 325**

Alaska Department of Fish and Game **Household ID#**_____

Community: SAINT MICHAEL

Survey Date: **Household Size:** _____

Interviewer: **(If new household) PO Box:**_____

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

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

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

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

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

	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)			OF TOTAL HARVEST How many salmon were caught	
SPECIES	**SUBSISTENCE GILL NET or SEINE** (Number of fish)	**ROD & REEL** (Number of fish)	**KEPT FROM Commercial Fishing** (Number of fish)	In the Pikmiktalik River (Number of fish)	In Marine W. adjacent to Pikmik. R. (Number of fish)
CHUM SALMON Dog					
CHINOOK SALMON King					
PINK SALMON Humpy					
SOCKEYE SALMON Red					
COHO SALMON Silver					

4. Comments or Suggestions?

Appendix G5.–Stebbins subsistence salmon harvest survey form, 2014.

NORTON SOUND 2014 SUBSISTENCE SALMON HARVEST SURVEY

Community ID# 327

Alaska Department of Fish and Game-

Household ID#_____

Community: STEBBINS

Survey Date: _____ **Household Size:** _____

Interviewer: _____ **(If new household) PO Box:**_____

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

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

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

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

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

	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)			**OF TOTAL HARVEST How many salmon were caught**	
SPECIES	**SUBSISTENCE GILL NET or SEINE** (Number of fish)	**ROD & REEL** (Number of fish)	**KEPT FROM Commercial Fishing** (Number of fish)	In the Pikmiktalik River (Number of fish)	In Marine W. adjacent to Pikmik. R. (Number of fish)
CHUM SALMON Dog					
CHINOOK SALMON King					
PINK SALMON Humpy					
SOCKEYE SALMON Red					
COHO SALMON Silver					

4. Comments or Suggestions?

Appendix G6.–Unalakleet Subdistrict subsistence salmon harvest survey form, 2014.

NORTON SOUND 2014 SUBSISTENCE SALMON HARVEST SURVEY **Community ID# 357**

Alaska Department of Fish and Game **Household ID#_____**

Community: UNALAKLEET

Survey Date: **Household Size: _____**

Interviewer: **(If new household) PO Box:_____**

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

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

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

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

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

SPECIES	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)		NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY LOCATION)		
	SUBSISTENCE GILL NET or SEINE (Number of fish)	ROD & REEL (Number of fish)	MARINE WATERS	UNALAKLEET RIVER	NORTH RIVER
CHUM SALMON Dog					
CHINOOK SALMON King					
PINK SALMON Humpy					
SOCKEYE SALMON Red					
COHO SALMON Silver					

4. Comments or Suggestions?

Appendix G7.–Shaktoolik Subdistrict subsistence salmon harvest survey form, 2014.

NORTON SOUND 2014 SUBSISTENCE SALMON HARVEST SURVEY **Community ID# 307**

Alaska Department of Fish and Game- **Household ID#**_____

Community: SHAKTOOLIK

Survey Date: _____ **Household Size:** _____

Interviewer: _____ **(If new household) PO Box:**_____

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

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

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

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

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

SPECIES	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)		NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY LOCATION)	
	SUBSISTENCE GILL NET or SEINE (Number of fish)	ROD & REEL (Number of fish)	MARINE WATERS	SHAKTOOLIK RIVER
CHUM SALMON Dog				
CHINOOK SALMON King				
PINK SALMON Humpy				
SOCKEYE SALMON Red				
COHO SALMON Silver				

4. Comments or Suggestions?

Appendix G8.–Norton Bay Subdistrict subsistence salmon harvest survey form, 2014.

NORTON SOUND 2014 SUBSISTENCE SALMON HARVEST SURVEY **Community ID# 204**

Alaska Department of Fish and Game- **Household ID#**_____

Community: KOYUK

Survey Date: **Household Size:** _____

Interviewer: **(If new household) PO Box:**_____

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

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

2. Does your household usually subsistence fish for salmon? ☐ YES ☐ NO

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

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

	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)		NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY LOCATION)			
SPECIES	SUBSISTENCE GILL NET or SEINE (Number of fish)	ROD & REEL (Number of fish)	MARINE WATERS	KOYUK RIVER	INGLUTALIK RIVER	UNGALIK RIVER
CHUM Dog						
CHINOOK King						
PINK Humpy						
SOCKEYE Red						
COHO Silver						

4. Comments or Suggestions?

RED KING CRAB

Emergency Order: 3-C-Z-01-14 Effective Date: June 25, 2014

EXPLANATION: This emergency order opens both the CDQ fishery and the commercial open access crab fishery in Norton Sound from 12:00 noon Wednesday, June 25 until 12:00 noon Wednesday, September 3, or when the CDQ and 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 GHL for the 2014 Norton Sound open access fishery is 354,090 pounds. By regulation the CDQ crab fishery can open anytime the CDQ group is ready to harvest the crab. The CDQ crab can only be harvested by permit holders approved by Norton Sound Economic Development Corporation and the quota is 28,710 pounds. The CDQ group has notified the department they are ready to harvest crab.

Emergency Order: 3-C-Z-02-14 Effective Date: August 2, 2014

EXPLANATION: This emergency order closes the commercial open access crab fishery in Norton Sound. Permit holders (excluding fishermen registered for the CDQ fishery) must have pots unbaited and secured open by 12:00 noon, Saturday, August 2 and removed from the water by Saturday, August 9, 2014.

JUSTIFICATION: The guideline harvest level for the 2014 Norton Sound open access crab fishery is 354,090 pounds. Through the morning of July 30, there were approximately 280,000 pounds reported harvested. There are currently at least 33 vessels fishing and the guideline harvest level is expected to be reached by 12:00 noon Saturday, August 2.

HERRING

Emergency Order: 3-H-Z-1-14 Effective Date: May 19, 2014

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet fishing for sac roe herring beginning 12:00 p.m. Monday, May 19, 2014 until Tuesday, July 1, 2014, unless superseded by another emergency order.

JUSTIFICATION: NSEDC has established a market quota of 200–550 tons of bait herring this season. Processing and tender vessels are not scheduled to arrive in Norton Sound until May 24. Until then, buying operations will be limited to Norton Sound Seafood Products processing plant in Unalakleet. The run of herring in Norton Sound is occurring about a week earlier than expected this season. On May 15, ADF&G biologists observed approximately 2,000 tons of herring from Klikitarik Point to Tolstoi Point. This morning, pilots also observed herring spawn near Klikitarik Point. Leaving the fishery open continuously allows the buyer to direct the bulk of the fishing fleet to areas where harvest efficiency can be maximized. Any herring not purchased by the buyer must be retained for personal or subsistence uses.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-14 Effective Date: July 10, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 10 hours from 12 p.m. until 10 p.m. Thursday, July 10.

JUSTIFICATION: Four commercial salmon buyers have registered to purchase Kotzebue chum salmon this season. The buyers have limited quantities of ice and airline schedules will affect some buyer's ability to ship fish out. Regulation allows the season to be open from July 10 through August 31. Buyers have notified the department that they would like to begin purchasing fish on the afternoon of July 10. This 10 hour opening will serve as a test of earlier run strength.

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Emergency Order: 3-S-X-02-14 Effective Date: July 11, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from 3 p.m. until 11 p.m. Friday, July 11.

JUSTIFICATION: Yesterday's catch from a 10 hour fishing period was the best chum salmon harvest and highest number of participating permit holders for opening day since the 1990s. The buyers have reported that there is sufficient capacity for additional fishing time. Historically the Kotzebue District has been open to commercial salmon fishing up to 48 hours per week in July. Continuing with short duration openings should not jeopardize subsistence fishing time or escapement.

Emergency Order: 3-S-X-03-14 Effective Date: July 13, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from 4 p.m. until midnight Sunday, July 13.

JUSTIFICATION: Catch from the first commercial salmon fishing period on Thursday was the best chum salmon harvest and highest number of participating permit holders for opening day since the 1990s. Another fishing period is occurring today and at mid-period the catch is similar to last night. Continuing with short duration openings should not jeopardize subsistence fishing opportunity or escapement.

Emergency Order: 3-S-X-04-14 Effective Date: July 14, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from 4 p.m. until midnight Monday, July 14 and for 12 hours from the hours of 12 p.m. until midnight Tuesday, July 15.

JUSTIFICATION: Catch from the first commercial salmon fishing periods last week was the best chum salmon harvest and highest number of participating permit holders for the first two fishing periods since the 1990s. Another fishing period is occurring today and at mid-period the catch is reported to be very good. Historically in the Kotzebue District commercial fishery up to 48 hours of commercial fishing time per week has been allowed during the month of July. Continuing with short duration openings should not jeopardize subsistence fishing opportunity or escapement.

Emergency Order: 3-S-X-05-14 Effective Date: July 17, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for three fishing periods of 8 hours each from 4 p.m. until midnight on Thursday July 17, Friday July 18 and Sunday July 20.

JUSTIFICATION: Catch from the first week of commercial salmon fishing was the best chum salmon harvest and highest number of participating permit holders since the 1990s. The ADF&G crew will begin test fishing on the Kobuk River in Kiana to monitor escapement. If the chum salmon catch index shows sufficient escapement then commercial fishing will continue with only one or two day closures to provide for subsistence opportunity and escapement.

Emergency Order: 3-S-X-06-14 Effective Date: July 21, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for three fishing periods of 8 hours each from 4 p.m. until midnight on Monday July 21, Tuesday July 22 and Thursday July 24.

JUSTIFICATION: The first week and half of commercial salmon fishing has had the best chum salmon harvest and highest number of participating permit holders since the 1990s. The department test fish chum salmon catch index

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on Kobuk River in Kiana ranks sixth best in 22 years, but is starting to drop and is likely showing the effect of the commercial fishing effort. If the chum salmon catch index shows sufficient escapement then commercial fishing will continue with only one or two day closures to provide for subsistence opportunity and escapement.

Emergency Order: 3-S-X-07-14 Effective Date: July 25, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for three fishing periods from 6 p.m. until midnight on Friday July 25 and from 6 p.m. until midnight on Sunday July 27 and from 4 p.m. until midnight Monday July 28.

JUSTIFICATION: The first two weeks of commercial salmon fishing has had the best chum salmon harvest and highest number of participating permit holders since the 1990s. The department test fish chum salmon catch index on Kobuk River in Kiana ranks sixth best in 22 years, but is starting to drop during the past week and is likely showing the effect of the commercial fishing effort. If the chum salmon catch index shows sufficient escapement then commercial fishing will continue with one or two day closures to provide for subsistence opportunity and escapement.

Emergency Order: 3-S-X-08-14 Effective Date: July 30, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one fishing period from 7 p.m. until 12 midnight on Wednesday July 30.

JUSTIFICATION: The first two weeks of commercial salmon fishing has had the best chum salmon harvest and highest number of participating permit holders since the 1990s. The department test fish chum salmon catch index on Kobuk River in Kiana ranks third best in 22 years. Commercial fishing is likely to continue with one or two day closures each week to provide for subsistence opportunity and escapement.

Emergency Order: 3-S-X-09-14 Effective Date: July 31, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one fishing period from 6 p.m. until 11 p.m. on Thursday July 31.

JUSTIFICATION: The first three weeks of commercial salmon fishing has had the best chum salmon harvest and highest number of participating permit holders since the 1990s. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in 22 years. Commercial fishing is likely to continue with one or two day closures each week to provide for subsistence opportunity and escapement.

Emergency Order: 3-S-X-10-14 Effective Date: August 1, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for two 5-hour fishing periods from 6 p.m. until 11 p.m. on Friday August 1 and from 6 p.m. until 11 p.m. on Sunday August 3.

JUSTIFICATION: The first three weeks of commercial salmon fishing has had the best chum salmon harvest and highest number of participating permit holders since the 1990s. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and the last two days the test fish catch had the highest one-day chum salmon catches in project history. The Noatak River chum salmon run should be entering the Kotzebue District in greater numbers in August and the department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-11-14 Effective Date: August 4, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for two 4-hour fishing periods from 6 p.m. until 10 p.m. on Monday August 4 and Tuesday August 5.

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JUSTIFICATION: The chum salmon harvest in the Kotzebue District is on track to be the best in nearly 30 years. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and the last several days the test fish catch had the highest one-day chum salmon catches in project history. The Noatak River chum salmon run should be entering the Kotzebue District in greater numbers in August and the department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-12-14 Effective Date: August 6, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for two 4-hour fishing periods from 6 p.m. until 10 p.m. on Wednesday August 6 and Thursday August 7.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District is on track to be the best in nearly 30 years. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and has continued with high catches after the average historical peak. The Noatak River chum salmon run should be entering the Kotzebue District in greater numbers in August and the department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-13-14 Effective Date: August 8, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 4-hour fishing period from 6 p.m. until 10 p.m. on Friday August 8.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 400,000 chum salmon for the first time since 1985. The cumulative catch is now 416,000 chum salmon and ranks sixth all time. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and has continued with high catches after the average historical peak with the greatest one day catch index on August 5. The Noatak River chum salmon run is expected to enter the Kotzebue District in greater numbers in August and subsistence fishermen have reported good catches in Noatak. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-14-14 Effective Date: August 10, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 4-hour fishing period from 5 p.m. until 9 p.m. on Sunday August 10.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 431,000 chum salmon for the first time since 1985. The cumulative catch now ranks fifth greatest in the 53-year commercial salmon fishery history. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and has continued with record high catches the past week. The Noatak River chum salmon run is expected to enter the Kotzebue District in greater numbers in August and subsistence fishermen have reported good catches in Noatak. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-15-14 Effective Date: August 11, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 5-hour fishing period from 5 p.m. until 10 p.m. on Monday August 11.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 453,000 chum salmon for the first time since 1985. The cumulative catch now ranks fifth greatest all-time. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and had record high catches last week. This week Noatak River chum salmon run should be the majority of the catch in Kotzebue District.

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Subsistence fishermen have reported good catches in Noatak. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-16-14 Effective Date: August 12, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 4-hour fishing period from 5 p.m. until 9 p.m. on Tuesday August 12.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 485,000 chum salmon for the first time since 1985. The cumulative catch now ranks fifth greatest all-time. The department test fish chum salmon catch index on Kobuk River in Kiana ranks the highest in the 22-year project history and had record high catches last week. This week Noatak River chum salmon run should be the majority of the catch in Kotzebue District. Subsistence fishermen have reported good catches in Noatak. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-17-14 Effective Date: August 13, 2014

EXPLANATION: This emergency order closes subsistence fishing in the ocean area adjacent to the end of the main runway nearest the ocean at the Kotzebue airport.

JUSTIFICATION: The main runway at the Kotzebue airport extends nearly to the ocean and concern has arisen over fishing effort creating a safety hazard by attracting birds that may be struck by airplanes while landing or taking off from Kotzebue airport. Consistent with AS 16.05.060, emergency orders, when circumstances require closing an area by emergency order: it is warranted to close fishing in waters off the end of the runway as a public safety measure.

Emergency Order: 3-S-X-18-14 Effective Date: August 14, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 3-hour fishing period from 6 p.m. until 9 p.m. on Thursday August 14.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 515,000 chum salmon for the first time since 1985. The cumulative catch now ranks fifth greatest all-time and after the upcoming fishing period with likely be fourth greatest. The chum catch index at the department test fishing project on Kobuk River in Kiana had record high catches this year. Also, on the Noatak River subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-19-14 Effective Date: August 15, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 3-hour fishing period from 6 p.m. until 9 p.m. on Friday August 15

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 529,000 chum salmon for the first time since 1981. The cumulative catch now ranks fourth greatest all-time. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-20-14 Effective Date: August 17, 2014

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EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 3-hour fishing period from 6 p.m. until 9 p.m. on Sunday August 17.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 542,000 chum salmon and ranks fourth greatest all-time. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-21-14 Effective Date: August 18, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 4-hour fishing period from 6 p.m. until 10 p.m. on Monday August 18.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 556,000 chum salmon and ranks fourth greatest all-time. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-22-14 Effective Date: August 19, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 3-hour fishing period from 6 p.m. until 9 p.m. on Tuesday August 19.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 573,000 chum salmon and ranks third greatest all-time. The commercial catch is on track to surpass 600,000 chum salmon later this week for the first time since 1981. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-23-14 Effective Date: August 20, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 3-hour fishing period from 6 p.m. until 9 p.m. on Wednesday August 20.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 579,000 chum salmon and ranks third greatest all-time. The commercial catch is on track to surpass 600,000 chum salmon later this week for the first time since 1981. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-24-14 Effective Date: August 21, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 5-hour fishing period from 5 p.m. until 10 p.m. on Thursday August 21.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 588,000 chum salmon and ranks third greatest all-time. The commercial catch is on track to surpass 600,000 chum salmon later this week for the first time since 1981. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen have reported good catches of chum salmon. The department will continue to allow commercial fishing

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with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-25-14 Effective Date: August 22, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 5-hour fishing period from 5 p.m. until 10 p.m. on Friday August 22.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 598,000 chum salmon. This season's commercial catch will surpass 600,000 chum salmon for only the third time in the 53-year history of the fishery. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen continue to report good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-26-14 Effective Date: August 24, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 8-hour fishing period from 2 p.m. until 10 p.m. on Sunday August 24.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 606,000 chum salmon. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen continue to report good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-27-14 Effective Date: August 25, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 9-hour fishing period from 1 p.m. until 10 p.m. on Monday August 25.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 617,000 chum salmon. Catches are starting to slow as the season winds down. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen continue to report good catches of chum salmon. The department will continue to allow commercial fishing with one or two day closures to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-28-14 Effective Date: August 26, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for two 8-hour fishing periods from 2 p.m. until 10 p.m. on Tuesday, August 26 and Wednesday, August 27.

JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 627,000 chum salmon. Catches are starting to slow as the season winds down and one buyer has now pulled out leaving two buyers remaining. Test fishing is now complete for the season at the department test fishing project on Kobuk River in Kiana and this year's chum salmon catch index was a record. Also, on the Noatak River, subsistence fishermen continue to report good catches of chum salmon. A department biologist reported chum salmon jumping all over during a 35 mile boat trip along the Noatak River this past weekend. The department will continue to allow commercial fishing with a one closure to allow for subsistence opportunity and escapement.

Emergency Order: 3-S-X-29-14 Effective Date: August 28, 2014

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for one 8-hour fishing period from 2 p.m. until 10 p.m. on Thursday, August 28.

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JUSTIFICATION: The chum salmon harvest in the Kotzebue District has surpassed 632,000 chum salmon and is the second greatest in history. Catches are starting to slow as the season winds down and one buyer has now pulled out leaving two buyers remaining who have notified the department they will begin shut down procedures and no longer purchase salmon after the upcoming fishing period. By regulation the season closes after August 31, so this expected last commercial fishing period should not jeopardize subsistence fishing opportunity or escapement.

Emergency Order: 3-S-X-01S-14 Effective Date: August 13, 2014

EXPLANATION: This emergency order closes subsistence fishing in the ocean area adjacent to the end of the main runway nearest the ocean at the Kotzebue airport.

JUSTIFICATION: The main runway at the Kotzebue airport extends nearly to the ocean and concern has arisen over fishing effort creating a safety hazard by attracting birds that may be struck by airplanes while landing or taking off from Kotzebue airport. Consistent with AS 16.05.060, emergency orders, when circumstances require closing an area by emergency order: it is warranted to close fishing in waters off the end of the runway as a public safety measure.

NORTON SOUND SALMON

Emergency Order: 3-S-Z-01-14 Effective Date: June 9, 2014

EXPLANATION: This emergency order prohibits the retention of king salmon when subsistence fishing using hook and line gear in all fresh and marine waters of Subdistricts 2 and 3 from Monday, June 9 through Friday, August 15, 2014.

JUSTIFICATION: Like other areas of western Alaska, an early but very poor run of king salmon is expected for Norton Sound this season with no harvestable surpluses of king salmon expected. Hook and line subsistence fishing will continue to remain open for other more numerous salmon species. Any king salmon incidentally caught while attempting to target other species with hook and line gear may not be removed from the water and must be immediately released alive.

Emergency Order: 3-S-Z-02-14 Effective Date: June 9, 2014

EXPLANATION: This emergency order closes subsistence salmon fishing with set gillnets in all marine waters from Black Point south of Unalakleet to Wood Point, east of St. Michael from June 9 through June 30, 2014.

JUSTIFICATION: Southern Norton Sound king salmon runs are expected to exhibit early run timing this season but are also expected to show very weak run strength. Severe measures are needed to conserve king salmon that are bound for southern Norton Sound drainages in order to increase spawning escapements of these stocks. Closing the coastal areas from Black Point to Wood Point to subsistence salmon fishing for the month of June is necessary to reduce subsistence harvests of king salmon in order to meet escapement needs.

Emergency Order: 3-S-Z-03-14 Effective Date: June 9, 2014

EXPLANATION: This emergency order closes subsistence salmon fishing in all marine waters of Subdistrict 4 (Norton Bay), and all marine waters from the tip of Point Dexter to the westernmost tip of Cape Denbigh, and all freshwaters of the Inglutalik and Ungalik River drainages in the Norton Sound District, from June 9 through June 30, 2014. The Koyuk River remains open to subsistence salmon fishing.

JUSTIFICATION: Subdistrict 4 (Norton Bay Subdistrict) king salmon runs may constitute the northernmost coastal king salmon populations of significant size in Alaska supporting longstanding subsistence fisheries in Inglutalik River. However, Norton Bay Subdistrict subsistence harvests of king salmon have been at record low levels for three consecutive seasons. Like other areas of western Alaska, an early but very poor run of king salmon is expected for Norton Bay Subdistrict with no harvestable surpluses expected. Severe conservation measures are therefore needed to conserve Ungalik and Inglutalik River king salmon for escapement needs and provide for future returns to support

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subsistence fisheries. It is expected that 48-hour subsistence openings will begin the week of Monday, June 16 to allow opportunities to target more plentiful chum and pink salmon. Inglutalik River tower counts and aerial surveys will be flown to determine if additional subsistence fishing time can be provided without jeopardizing king salmon escapement needs.

Emergency Order: 3-S-Z-04-14 Effective Date: June 9, 2014

EXPLANATION: This emergency order closes subsistence salmon fishing in all marine and freshwaters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts from June 9 through June 30, 2014. Freshwater areas affected by this action include the Golsovia, Egavik, Shaktoolik, and Unalakleet Rivers.

JUSTIFICATION: Shaktoolik and Unalakleet Subdistrict king salmon runs have supported subsistence fisheries since well before statehood, and commercial fisheries since statehood. However, commercial fisheries directed at king salmon have been closed since 2005 and subsistence harvests have been at record low levels for four consecutive years. Escapement of king salmon as indexed by the North River tower escapement goal has fallen short of the lower end of the goal in three out of the previous seven seasons despite implementation of severe restrictions and closures. In 2013, the estimated total run would not have been sufficient to meet escapement goals in the Unalakleet River drainage. An early but similarly poor run of king salmon is also forecasted for Subdistricts 5 and 6 this season. With no harvestable surpluses of king salmon expected, it is imperative to conserve virtually all king salmon returning to these waters to increase spawning escapement and provide for future returns. 24-hour marine subsistence openings with gillnets with a mesh size of 6 inches or less will begin the week of Monday, June 16 to utilize chum salmon for subsistence needs. Freshwater opportunities may begin as early as the week of June 23 by providing one 36-hour beach seine opening per week to allow opportunities to target more plentiful chum and pink salmon. North River tower counts and Unalakleet River weir counts will be evaluated in season to determine if subsistence restrictions can be relaxed to provide additional subsistence fishing time without jeopardizing king salmon escapement needs.

Emergency Order: 3-S-Z-05-14 Effective Date: June 15, 2014

EXPLANATION: This emergency order sets the subsistence salmon gillnet fishing schedule for Subdistrict 1 of the Norton Sound District and catch limits from Cape Rodney to Rocky Point, and Pilgrim and Kuzitrin rivers in the Port Clarence District and all waters draining into the Bering Sea from Cape Prince of Wales to Rocky Point. The subsistence salmon gillnet schedule will be from 6:00 p.m. Wednesday until 6:00 p.m. Saturday in Subdistrict 1 marine waters west of Cape Nome and the catch limits for all locations are listed on the permits.

JUSTIFICATION: The department forecast for 2014 is that the chum salmon run will exceed the ANS and Tier II restrictions will not be required in Subdistrict 1. The subsistence salmon set gillnet fishing schedule in Subdistrict 1 marine waters west of Cape Nome allows up to 72 hours of fishing time and is established by emergency order. Catch limits are in effect for the various fresh water subsistence areas in Subdistrict 1 and Port Clarence District. All catch limits are listed on the permits. Department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon escapement. The weirs on the Nome, Snake, Eldorado, Solomon and Pilgrim rivers will also count salmon escapements. If a river has adequate escapement then catch limits will be relaxed in that location.

Emergency Order: 3-S-Z-06-14 Effective Date: June 18, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-4-14 by reopening all marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts,, from Cape Denbigh to Black Point, to subsistence salmon fishing with gillnets with a mesh size of 6 inches or less for 30 hours from 6:00 p.m. Wednesday, June 18 to 12:00 a.m. Friday, June 20.

JUSTIFICATION: As planned, brief marine subsistence openings will begin this week to allow opportunities to target more plentiful chum and pink salmon. This opening has been scheduled to coincide with good drying and fishing weather and increasing abundance of salmon in southern Norton Sound coastal areas and major salmon

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producing drainages. Current local weather forecasts are conducive to drying fish and this brief opening is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-07-14 Effective Date: June 19, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-03-14 by reopening all marine waters of Norton Sound Subdistrict 4, the Norton Bay Subdistrict, from Bald Head to Point Dexter, and all flowing waters of the Inglutalik and Ungalik River drainages to subsistence salmon fishing with gillnets and beach seines for 48 hours from 10:00 a.m. Thursday, June 19 to 10:00 a.m. Saturday, June 21.

JUSTIFICATION: As planned, 48-hour subsistence openings will begin the week to allow opportunities to target more plentiful chum and pink salmon. This opening has been scheduled to coincide with good drying and fishing weather and increasing abundance of salmon in southern Norton Sound coastal areas and major salmon producing drainages. Current local weather forecasts are conducive to drying fish and this brief opening is not expected to jeopardize king salmon escapement needs.

Emergency Order: 3-S-Z-08-14 Effective Date: June 19, 2014

EXPLANATION: This emergency order opens Subdistrict 4 of the Norton Sound Subdistrict, the Norton Bay Subdistrict, to commercial salmon fishing for 36 hours from 12:00 p.m. Thursday, June 19 to 12:00 a.m. Saturday, June 21. Permit holders in Subdistrict 4 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than four and one-half inches.

JUSTIFICATION: This index opening will provide opportunity to gauge early run strength of the pink salmon run to Norton Bay and utilize projected commercial harvest surpluses of pink salmon. There are early indications that a strong but early run of pink salmon is building in Norton Sound. Chinook salmon incidentally harvested during this opening will not be purchased by the buyer and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery.

Emergency Order: 3-S-Z-09-14 Effective Date: June 25, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-03-14 by reopening all marine waters of Norton Sound Subdistrict 4, the Norton Bay Subdistrict, from Bald Head to Point Dexter, and all flowing waters of the Inglutalik and Ungalik River drainages to subsistence salmon fishing with gillnets and beach seines for 48 hours from 12:00 p.m. Wednesday, June 25 to 12:00 p.m. Friday, June 27.

JUSTIFICATION: This is the second 48-hour subsistence fishing opening to allow opportunities to target more plentiful chum and pink salmon. To the extent practical, this opening has been scheduled to coincide with good drying and fishing weather. Current local weather forecasts are conducive to drying fish and this opening should not jeopardize king salmon escapement needs.

Emergency Order: 3-S-Z-10-14 Effective Date: June 25, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-4-14 by reopening all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with beach seines for 30 hours from 6:00 p.m. Wednesday, June 25 to 12:00 a.m. Friday, June 27. By regulation beach seines in Subdistricts 5 and 6 are restricted to a mesh size of 4.5 inches or less and all king salmon incidentally captured in beach seines must be immediately released alive and unharmed.

JUSTIFICATION: As planned, freshwater subsistence openings using beach seines will begin this week to allow opportunities to target more plentiful chum and pink salmon. This opening has been scheduled to coincide with good drying weather and increasing abundance of pink and chum salmon in major salmon producing drainages of southern Norton Sound. Current local weather forecasts are conducive to drying fish. Regulation requires that beach seines used in Subdistricts 5 and 6 have a mesh size of 4.5 inches or less and that king salmon incidentally captured

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in seines be immediately released alive and unharmed. These measures should prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, allowing this beach seine opening is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-11-14 Effective Date: June 25, 2014

EXPLANATION: This emergency order opens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m. Wednesday, June 25 to 6:00 p.m. Thursday, June 26. Permit holders in Subdistricts 2–4 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: This index opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 2–4. Pink salmon directed openings may also occur in these subdistricts contingent upon incidental harvest rates of pink salmon during this chum salmon directed opening. Chinook salmon incidentally harvested during this opening will not be purchased by the buyer and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery.

Emergency Order: 3-S-Z-12-14 Effective Date: June 27, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-4-14 by reopening all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with beach seines for 24 hours from 6:00 p.m. Saturday, June 28 to 6:00 p.m. Sunday, June 29. By regulation, beach seines in Subdistricts 5 and 6 are restricted to a mesh size of 4.5 inches or less and all king salmon incidentally captured in beach seines must be immediately released alive and unharmed.

JUSTIFICATION: This freshwater subsistence openings using beach seines is being permitted this weekend to allow opportunity to target chum and pink salmon. This opening has been scheduled to coincide with good drying weather and increasing abundance of pink and chum salmon in major salmon producing drainages of southern Norton Sound. Current local weather forecasts are conducive to drying fish. Regulation requires that beach seines used in Subdistricts 5 and 6 have a mesh size of 4.5 inches or less and that king salmon incidentally captured in seines be immediately released alive and unharmed. These measures should prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, allowing this beach seine opening is not expected to jeopardize king salmon escapement needs in Subdistricts 5 and 6 river drainages.

Emergency Order: 3-S-Z-13-14 Effective Date: June 28, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m. Saturday, June 28 to 6:00 p.m. Sunday, June 29. Permit holders in Subdistricts 2–4 are limited to 150 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 4 and one-half inches in length.

JUSTIFICATION: This index opening will enable commercial users to utilize harvestable surpluses of pink salmon in Subdistricts 2–4. This pink salmon directed opening is being established as a result of strong incidental harvests of pink salmon in chum salmon gear during the most recent chum salmon opening. Chinook salmon incidentally harvested during this opening will not be purchased by the buyer and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery. Pink salmon run abundance throughout Norton Sound is anticipated to easily provide for escapement, subsistence and commercial harvest needs this season. Therefore, this period should not jeopardize escapement needs or subsistence uses of pink salmon in Subdistricts 2–4.

Emergency Order: 3-S-Z-14-14 Effective Date: June 30, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the

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Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Monday, June 30 to 6:00 p.m. Wednesday, July 2, and from 6:00 p.m. Friday, July 4 to 6:00 p.m. Sunday, July 6. For these periods, permit holders in Subdistricts 2–4 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 runs to Norton Sound are exhibiting strong early run strength for late June. Over 11,000 chum salmon have been harvested in Subdistricts 2–4 thus far this season. Escapement needs of chum salmon to Subdistricts 2 and 3 will be easily achieved as indexed by the 12,000 chum salmon enumerated at the Kwiniuk River counting tower. Based on early run timing projection models, chum salmon escapement is anticipated to exceed the upper end of the tower-based escapement goal range of 11,500–23,000 fish. Additionally, the 7,700 chum salmon counted thus far at the Inglutalik River in the nearby Norton Bay Subdistrict is well above previous years when chum salmon escapement ranged from 33,000–65,000 chum salmon. Directed chum salmon fishing periods are warranted in these three subdistricts because there are harvestable surpluses available for commercial use in excess of what is needed to provide for subsistence uses and escapement needs.

Emergency Order: 3-S-Z-15-14 Effective Date: July 1, 2014

EXPLANATION: This emergency order reopens all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with beach seines for two 36-hour periods from 12:00 noon Tuesday, July 1 to 12 midnight Wednesday evening, July 3 and from 12:00 noon Friday, July 4 to 12:00 midnight, Saturday evening, July 5. By regulation beach seines in Subdistricts 5 and 6 are restricted to a mesh size of 4.5 inches or less and all king salmon incidentally captured in beach seines must be immediately released alive and unharmed.

JUSTIFICATION: As planned, subsistence fishing restrictions will be incrementally relaxed beginning July 1. These beach seine openings have been scheduled to take advantage of increasing abundance of pink and chum salmon in major salmon producing drainages of southern Norton Sound. Local weather forecasts through the Fourth of July weekend are conducive to drying fish. Regulation requires that beach seines used in Subdistricts 5 and 6 have a mesh size of 4.5 inches or less and that king salmon incidentally captured in seines be immediately released alive and unharmed. These measures should prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, allowing these seine openings is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-16-14 Effective Date: July 1, 2014

EXPLANATION: This emergency order reopens all marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, from Cape Denbigh to Black Point, to subsistence salmon fishing with gillnets with a mesh size of 4.5 inches or less for 24 hours from 6:00 p.m. Tuesday, July 1 to 6:00 p.m. Wednesday, July 2.

JUSTIFICATION: As planned, marine subsistence fishing opportunities will be increased beginning July 1. The bulk of southern Norton Sound Chinook salmon runs are in the lower reaches of major river drainages and harvestable surpluses of pink salmon are available for subsistence and commercial uses. Current local weather forecasts for the Fourth of July weekend are conducive to drying fish. Given that the bulk of Chinook salmon runs are in river and that incidental catches of Chinook salmon should remain low in 4.5 inch mesh, this opening is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-17-14 Effective Date: July 1, 2014

EXPLANATION: This emergency order opens Subdistricts 5 and 6 of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m. Tuesday, July 1 to 6:00 p.m. Wednesday, July 2. Permit holders in Subdistricts 5 and 6 are limited to 150 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than four and one-half inches.

JUSTIFICATION: This opening will provide opportunity to utilize pink salmon harvestable surpluses in the

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Shaktoolik and Unalakleet Subdistricts for commercial harvest surpluses of pink salmon. There are indications that a strong, but early run of pink salmon is building in Norton Sound. Escapement counts at southern Norton Sound projects are 4,541, 1,272, and 18,027 pink salmon through June 29 at the Shaktoolik tower, North River tower, and Unalakleet River weir project, respectively. Available assessment data indicates that escapement goals of pink salmon will be easily achieved and subsistence uses of pink salmon will not be jeopardized by commercial fishing for pink salmon. Chinook salmon incidentally harvested during this opening may not be purchased by the buyer and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery.

Emergency Order: 3-S-Z-18-14 Effective Date: July 2, 2014

EXPLANATION: This emergency order opens the marine waters from the Cape Nome jetty eastward to Topkok Head in Subdistrict 1 of the Norton Sound Subdistrict, the Nome Subdistrict, for two 24-hour periods from 6:00 p.m. Wednesday, July 2 to 6:00 p.m. Thursday, July 3 and from 6:00 p.m. Saturday, July 5 to 6:00 p.m. Sunday, July 6. Permit holders in Subdistrict 1 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 Escapement of chum salmon east of Cape Nome is assessed using counts from the Eldorado River weir operated by Norton Sound Economic Development Corporation. Through June 29, escapement of chum salmon is 1,604 fish, the highest on record for this date. Projections of chum salmon escapement based on early run timing models indicate the upper end of escapement goal range of 6,000–9,200 chum salmon will be exceeded for the 5th consecutive season.

Emergency Order: 3-S-Z-19-14 Effective Date: July 3, 2014

EXPLANATION: This emergency order reopens all marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, from Cape Denbigh to Black Point, to subsistence salmon fishing with gillnets with a mesh size of 6 inches or less for 48 hours from 6:00 p.m. Thursday, July 3 to 6:00 p.m. Saturday, July 5.

JUSTIFICATION: The bulk of southern Norton Sound Chinook salmon runs are in the lower reaches of major river drainages and harvestable surpluses of chum salmon are available for subsistence uses. Current local weather forecasts for the Fourth of July weekend are conducive to drying fish. Given that the bulk of Chinook salmon runs are inriver, the incidental harvest of Chinook salmon should be low during this subsistence opening. It should not jeopardize Chinook salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-20-14 Effective Date: July 6, 2014

EXPLANATION: This emergency order reopens all marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, from Cape Denbigh to Black Point, to subsistence salmon fishing with gillnets with a mesh size of 4.5 inches or less for 24 hours from 6:00 p.m. Sunday, July 6 to 6:00 p.m. Monday, July 7.

JUSTIFICATION: As planned, marine subsistence fishing opportunities will be increased beginning July 1. The bulk of southern Norton Sound Chinook salmon runs are in the lower reaches of major river drainages and harvestable surpluses of pink salmon are available for subsistence and commercial uses. Current local weather forecasts for the Fourth of July weekend are conducive to drying fish. Given that the bulk of Chinook salmon runs are in river and that incidental catches of Chinook salmon should remain low in 4.5 inch mesh, this opening is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-21-14 Effective Date: July 3, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Thursday, July 3

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to 6:00 p.m. Saturday, July 5. Permit holders in Subdistricts 5 and 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: This index opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 5 and 6. Chinook salmon incidentally harvested during this opening cannot be sold and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery. Chum salmon escapement to Subdistricts 5 and 6 is being indexed by the Shaktoolik River tower, North River tower, and Unalakleet River weir. Counts of chum salmon for each project are 4,451, 150, and 680 fish, respectively. The aerial survey SEG range of 2,400–4,800 chum salmon for the Unalakleet River is projected to easily be achieved. Additionally, the Unalakleet River and North River counts should be considered minimums because they were not fish tight before salmon began to show up at the sites. This chum salmon directed opening should not jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-22-14 Effective Date: July 6, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6 of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m. Sunday, July 6 to 6:00 p.m. Monday, July 7. Permit holders in Subdistricts 5 and 6 are limited to 150 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than four and one-half inches.

JUSTIFICATION: This opening will provide opportunity to utilize pink salmon harvestable surpluses in the Shaktoolik and Unalakleet Subdistricts for commercial harvest surpluses of pink salmon. There are indications that a strong, but early run of pink salmon is building in Norton Sound. Escapement counts at southern Norton Sound projects are 4,541, 1,272, and 18,027 pink salmon through June 29 at the Shaktoolik tower, North River tower, and Unalakleet River weir project, respectively. Available assessment data indicates that escapement goals of pink salmon will be easily achieved and subsistence uses of pink salmon will not be jeopardized by commercial fishing for pink salmon. Chinook salmon incidentally harvested during this opening may not be purchased by the buyer and must be retained for subsistence purposes. Chinook salmon incidental harvests must also be recorded in the personal use section of the fish ticket at the time of delivery.

Emergency Order: 3-S-Z-23-14 Effective Date: July 7, 2014

EXPLANATION: This emergency order waives the subsistence salmon catch limits for chum salmon and pink salmon that are listed on the Nome Subdistrict subsistence salmon permit for the following locations: Safety Sound and Bonanza Channel, and Eldorado, Flambeau and Bonanza rivers.

JUSTIFICATION: The Eldorado River weir is used as an index for escapement in eastern Nome Subdistrict. The escapement goal range at Eldorado River is 6,000 to 9,200 chum salmon. The average historical first quarter point of chum salmon passage at the weir is July 10, and the count through July 5, is 5,942 chum salmon. Run projections show that this year will be the fifth consecutive year that the upper end of the escapement goal range will be exceeded. Pink salmon escapement goals have not been established in eastern Nome Subdistrict rivers, but escapement goals have already been exceeded in rivers in the two adjacent subdistricts to the east well before the average historical midpoint date. The Eldorado, Flambeau and Bonanza rivers drain into Safety Sound and are not accessible by road, further protecting the salmon runs from overharvest.

Emergency Order: 3-S-Z-24-14 Effective Date: July 7, 2014

EXPLANATION: This emergency order adds 48-hours to the subsistence salmon gillnet fishing schedule for Subdistrict 1 west of Cape Nome The subsistence salmon gillnet schedule will change from 6 p.m. Wednesday to 6 p.m. Saturday to the expanded schedule from 6 p.m. Monday until 6 p.m. Saturday in Subdistrict 1 marine waters west of Cape Nome.

JUSTIFICATION: The Nome Subdistrict escapement range goal of 23,000-35,000 chum salmon will easily be exceeded this year. At the Eldorado River, escapement is 8,000 chum salmon and is projected to exceed the

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escapement goal range of 6,000 to 9,200 chum salmon in the next day. Historically, mid-July is average midpoint of the chum salmon run at Eldorado River weir. At Snake River, 300 chum salmon have passed the weir (escapement goal range is 1,600 to 2,500 chum salmon). At Nome River, 800 chum salmon have passed the weir (escapement goal range is 2,900 to 4,300 chum salmon). Mid-July is average first-quarter point of the chum salmon run at both Snake and Nome weirs. Nome and Snake rivers are the index rivers for escapement west of Cape Nome and with both projected to reach escapement goal ranges the department is expanding to a 5-day a week subsistence set gillnet fishing schedule west of Cape Nome.

Emergency Order: 3-S-Z-25-14 Effective Date: July 7, 2014

EXPLANATION: This emergency order supersedes Emergency Order 3-S-Z-20-14 by reopening all marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, from Cape Denbigh to Black Point, to subsistence salmon fishing with gillnets with a mesh size of 6 inches or less 24 hours a day, 7 days a week for the remainder of July.

JUSTIFICATION: Chum and pink salmon passage estimates at southern Norton Sound escapement projects are well above average for early July. Additionally, it appears that the severe conservation measures taken this summer have led to much improved escapement of Chinook salmon from recent years. Chinook salmon counts at the Shaktoolik tower, North River tower, and Unalakleet River weir are 1,300, 894, and 229 fish, respectively. Current projections at the North River tower indicate the escapement goal range of 1,200–2,600 Chinook salmon will be achieved for the first time since 2010. The Unalakleet River weir count is also the best for July 5 since the project began in 2010. Marine subsistence fishing time is therefore being increased to allow for utilization of other species with large surpluses.

Emergency Order: 3-S-Z-26-14 Effective Date: July 7, 2014

EXPLANATION: This emergency order reopens all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with beach seines 24 hours a day 7 days week from 12:00 midnight Sunday evening, July 6 to 12:00 midnight Thursday evening, July 31. By regulation beach seines in Subdistricts 5 and 6 are restricted to a mesh size of 4.5 inches or less and all king salmon incidentally captured in beach seines must be immediately released alive and unharmed.

JUSTIFICATION: Chum and pink salmon passage estimates at southern Norton Sound escapement projects are well above average for early July. Escapement goals of chum and pink salmon to the Unalakleet River drainage have already been achieved. Additionally, it appears that the severe conservation measures taken this summer have led to much improved escapement of Chinook salmon from recent years. Chinook salmon counts at the Shaktoolik tower, North River tower, and Unalakleet River weir are 1,300, 894, and 229 fish, respectively. Current projections at the North River tower indicate the escapement goal range of 1,200–2,600 Chinook salmon will be achieved for the first time since 2010. The Unalakleet River weir count is also the best for July 5 since the project began in 2010. Subsistence fishing time with beach seines is being increased because Chinook salmon escapement needs are projected to be achieved and to allow for utilization of large pink and chum salmon harvestable surpluses. Regulation requires that beach seines used in Subdistricts 5 and 6 have a mesh size of 4.5 inches or less and that king salmon incidentally captured in seines be immediately released alive and unharmed. These measures should prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, allowing these seine openings is not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-27-14 Effective Date: July 8, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Tuesday, July 8 to 6:00 p.m. Thursday, July 10, and from 6:00 p.m. Saturday, July 12 to 6:00 p.m. Monday, July 14. For these periods, permit holders in Subdistricts 2–4 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

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JUSTIFICATION: Chum salmon escapement at the Kwiniuk River tower east of Elim has exceeded the upper end of the tower-based escapement goal range of 11,500–23,000 fish. Additionally, the 66,000 chum salmon counted thus far at the Inglutalik River in the nearby Norton Bay Subdistrict is the highest ever through July. Directed chum salmon fishing periods are warranted in these three subdistricts because there are harvestable surpluses available for commercial use in excess of what is needed to provide for subsistence uses and escapement needs.

Emergency Order: 3-S-Z-28-14 Effective Date: July 8, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m. Tuesday, July 8 to 6:00 p.m. Wednesday, July 9. Permit holders in Subdistricts 5 and 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: Subdistricts 5 and 6 is only opening for one 24-hour period from 6:00 p.m. Tuesday, July 8 to 6:00 p.m. Wednesday, July 9 because of concerns from the buyer that incidental harvests of pink salmon will result in capacity concerns. However, if the incidental harvest of pink salmon declines during this chum salmon opening, the buyer will request the department to extend this period. An announcement will be made tomorrow morning as to whether there will be an extension. The Unalakleet River weir count sits at 25,600 chum salmon through July 7, the highest since the project began in 2010. At the Shaktoolik River tower operated by NSEDC a total of 1,779 Chinook, 31,217 chum, and 280,698 pink salmon have been enumerated to date.

Emergency Order: 3-S-Z-29-14 Effective Date: July 9, 2014

EXPLANATION: This emergency order reopens the marine waters from the mouth of the Nome River eastward to Topkok Head in Subdistrict 1 of the Norton Sound Subdistrict, the Nome Subdistrict, for two 24-hour periods from 6:00 p.m. Wednesday, July 9 to 6:00 p.m. Thursday, July 10 and from 6:00 p.m. Saturday, July 12 to 6:00 p.m. Sunday, July 13. Permit holders in Subdistrict 1 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: The Nome Subdistrict escapement goal range of 23,000–35,000 chum salmon is projected to be easily exceeded for the fifth consecutive year. Chum salmon escapement needs east of Cape Nome have already been achieved as indexed by the Eldorado River weir, and the 1,100 chum salmon counted at the Nome River weir through July 7 is new record for this date. Additional commercial fishing time is warranted to utilize these harvestable surpluses.

Emergency Order: 3-S-Z-30-14 Effective Date: July 9, 2014

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-28-14 by extending fishing time for additional 24 hours in Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts. Commercial fishing is now open from 6:00 p.m. Tuesday, July 8 to 6:00 p.m. Thursday, July 10. Permit holders in Subdistricts 5 and 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: Large harvestable surpluses of chum salmon are available in Subdistricts 5 and 6. Additionally, incidental harvest of pink salmon is beginning to decline to levels that will not cause processing capacity concerns. As a result, the buyer has requested the department to extend this period. The Unalakleet River weir count sits at 26,000 chum salmon through July 8, the highest since the project began in 2010, and the count at the Shaktoolik River tower operated by NSEDC 32,000 chum salmon have been enumerated to date. Given the high inriver abundance of chum salmon, this extension in fishing time for this period should not jeopardize subsistence uses of chum salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-31-14 Effective Date: July 11, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6 of the Norton Sound Subdistrict, the

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Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 72 hours from 6:00 p.m. Friday, July 11 to 6:00 p.m. Monday, July 14. Permit holders in Subdistricts 5 and 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: Large harvestable surpluses of chum salmon are available in Subdistricts 5 and 6. Additionally, incidental harvest of pink salmon is beginning to decline to levels that will not cause processing capacity concerns. As a result, the buyer has requested the department begin to provide longer fishing periods to utilize chum salmon harvestable surpluses. The Unalakleet River weir count sits at 26,000 chum salmon through July 8, the highest since the project began in 2010, and the count at the Shaktoolik River tower operated by NSEDC 32,000 chum salmon have been enumerated to date. Given the high inriver abundance of chum salmon, continued commercial fishing should not jeopardize subsistence uses of chum salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-32-14 Effective Date: July 14, 2014

EXPLANATION: This emergency order waives the subsistence salmon catch limits for pink salmon that are listed on the Nome Subdistrict subsistence salmon permit and waives the subsistence salmon catch limits for chum salmon that are listed on the Nome Subdistrict subsistence salmon permit, except for the Solomon, Penny and Cripple rivers.

JUSTIFICATION: The Eldorado River weir is used as an index for escapement in eastern Nome Subdistrict. The escapement goal range at Eldorado River is 6,000 to 9,200 chum salmon. The average historical midpoint of chum salmon passage at the weir is mid-July and over 16,000 chum salmon have passed the weir. In western Nome Subdistrict the Nome River escapement goal range is 2,900 to 4,300 chum salmon and the Snake River escapement goal range is 1,600 to 2,500 chum salmon. The average historical first quarter point of chum passage at the weirs is mid-July and over 2,000 chum salmon have passed Nome River weir and over 1,300 chum salmon have passed Snake River weir. The even-numbered year pink salmon escapement goal at Nome River weir is 13,000 fish and mid-July is the average historical midpoint of pink salmon passage and over 17,000 pink salmon are now passed the weir. By regulation the Penny and Cripple rivers are closed to chum salmon subsistence salmon fishing and the Solomon River has a much smaller chum salmon run compared to eastern Nome Subdistrict rivers and the catch limit of 40 chum salmon remains in effect.

Emergency Order: 3-S-Z-33-14 Effective Date: July 14, 2014

EXPLANATION: This emergency order closes the Pilgrim River and its tributaries, and lower Kuzitrin River, from 300 yards upstream of the Pilgrim River confluence to the Kuzitrin River mouth, to the use of nets and seines for all species of fish.

JUSTIFICATION: Sockeye salmon escapement past the Pilgrim River weir is nearing the average historical midpoint of the run and as of July 12, 2,530 sockeye salmon have passed weir. Although the average historical midpoint at the weir is July 18, last year it was July 12, and escapement projections show that the escapement goal at Salmon Lake will not be met at current passage rates. The escapement goal at Salmon Lake is 4,000 to 8,000 sockeye salmon observed by aerial survey. At this time all gillnetting and seining must be closed in the Pilgrim River drainage and the lower Kuzitrin River.

Emergency Order: 3-S-Z-34-14 Effective Date: July 17, 2014

EXPLANATION: This emergency order reopens Subdistricts 2–6 of the Norton Sound Subdistrict, the Golovin, Elim, Norton Bay, Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for one week from 6:00 p.m. Thursday, July 17 to 6:00 p.m. Thursday, July 24. Commercial 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: Chum salmon escapement needs have been achieved throughout the Norton Sound District and there is additional harvestable surplus available for commercial utilization. Norton Sound Subdistricts 2–6 are being opened for a week continuously, but the salmon buyer will be setting fishing schedules within this time period based on weather, tendering logistics, and processing capacity.

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Emergency Order: 3-S-Z-35-14 Effective Date: July 19, 2014

EXPLANATION: This emergency order reopens all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, except for all flowing waters of the Unalakleet River upstream of the confluence with the Chiroskey River to subsistence salmon fishing with set gillnets 24 hours a day, 7 days a week effective 12:00 noon Saturday, July 19. However, this emergency order limits subsistence salmon fishing to set gillnets with a stretched mesh size no larger than 6 inches. On August 1, set gillnets of any mesh size may be used in freshwater areas of Subdistricts 5 and 6, 24 hours a day, seven days a week.

JUSTIFICATION: Normally, subsistence fishing for salmon would be allowed with unrestricted mesh size in freshwater areas at this time of year. However, there is uncertainty concerning whether escapement needs were met in the mainstem of the drainage based on the Unalakleet River weir count of 1,044 Chinook salmon and the run being exceptionally early. The weir was not fish tight until 6/28/2014 and some Chinook salmon passage on the front end of the run was unmonitored. However, the magnitude of the unmonitored passage is unknown and aerial surveys will need to be flown next week to evaluate the aerial survey escapement goal range of 550–1,100 Chinook. Regardless, this year's run is very weak and warrants additional restrictions to protect Chinook salmon that will contribute to the spawning escapement and provide future returns. Opening up freshwater areas to restricted mesh gillnets will allow subsistence users to target more plentiful chum and pink salmon for subsistence purposes and begin to harvest early run coho salmon.

Emergency Order: 3-S-Z-36-14 Effective Date: July 24, 2014

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 1 of the Norton Sound Subdistrict, the Nome Subdistrict, for one 48-hour period from 6:00 p.m. Thursday, July 24 to 6:00 p.m. Saturday, July 26. Permit holders in Subdistrict 1 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: Additional commercial fishing time is warranted to utilize remaining chum salmon harvestable surpluses. The Nome Subdistrict-wide escapement goal range of 23,000–35,000 chum salmon has been exceeded for the fifth consecutive year. The preliminary estimate of chum salmon escapement in the Nome Subdistrict is in excess of 86,000 fish and is projected to approach 90,000 fish. Additionally, weir-based escapement goal ranges at the Nome, Snake, and Eldorado Rivers have been exceeded or are projected to be exceeded. This commercial opening will not jeopardize subsistence uses of chum salmon in the Nome Subdistrict.

Emergency Order: 3-S-Z-37-14 Effective Date: July 26, 2014

EXPLANATION: This emergency order sets the subsistence salmon catch limits from Cape Rodney to Rocky Point, and Pilgrim and Kuzitrin rivers in the Port Clarence District and all waters draining into the Bering Sea from Cape Prince of Wales to Rocky Point.

JUSTIFICATION: All catch limits are listed on the subsistence salmon permits and were established previously with Emergency Order No. 3-S-Z-05-14. That emergency order expires at midnight on the evening of July 25 when the department shifts to coho salmon management. The chum and pink salmon catch limits were waived by previous emergency orders.

Emergency Order: 3-S-Z-38-14 Effective Date: July 25, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for 72 hours from 6:00 p.m. Friday, July 25 to 6:00 p.m. Monday, July 28. Permit holders in Subdistricts 5 and 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: The Unalakleet River weir count sits at 30,000 chum salmon but has been inoperable since mid-July due to high water levels. The last count at the Shaktoolik River counting tower was in excess of 38,000 fish. Unmonitored passage has mostly likely been significant and the actual escapements are probably much higher in

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both river drainages. Considering the high inriver abundance of chum salmon, continued commercial fishing will not jeopardize subsistence uses of chum salmon in Subdistricts 5 and 6. Additionally, this period will provide an early index of coho salmon run strength to eastern Norton Sound.

Emergency Order: 3-S-Z-39-14 Effective Date: July 26, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 54 hours from 12:00 noon Saturday, July 26 to 6:00 p.m. Monday, July 28. Permit holders in Subdistricts 2–4 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: Directed chum salmon fishing periods are warranted in these three subdistricts because there are harvestable surpluses available for commercial use in excess of what is needed to provide for subsistence uses and escapement needs. Escapement goals have been achieved and subsistence uses of chum salmon will not be jeopardized. This period should also provide an early index of coho salmon run strength.

Emergency Order: 3-S-Z-40-14 Effective Date: July 29, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Tuesday, July 29 to 6:00 p.m. Thursday, July 31 and from 6:00 p.m. August 1 to 6:00 p.m. August 3. Permit holders in Subdistricts 5 and 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: Chum salmon harvest surpluses remain for commercial use. However, catches or coho salmon have been slowly increasing and these next two periods should serve as index openings to gauge early coho salmon run strength until passage increases at ground-based escapement projects.

Emergency Order: 3-S-Z-41-14 Effective Date: July 30, 2014

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 1 of the Norton Sound Subdistrict, the Nome Subdistrict, for one 48-hour period from 6:00 p.m. Wednesday, July 30 to 6:00 p.m. Friday, August 1. Permit holders in Subdistrict 1 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: Escapement goals of chum salmon have been exceeded throughout the Nome Subdistrict and additional surplus is available from the tail end of the chum salmon run. This commercial opening will allow some additional harvest of chum salmon without jeopardizing coho salmon escapement needs or subsistence uses in the Nome Subdistrict. Incidental catches of coho salmon are expected to be small based on recent catch reports from commercial and subsistence users in the marine waters.

Emergency Order: 3-S-Z-42-14 Effective Date: July 31, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Thursday, July 31 to 6:00 p.m. Saturday, August 2. Permit holders in Subdistricts 2–4 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: 14 years of complete coho salmon counts. Additionally, prior years with escapement of 360 or more cohos through July 27 have had escapements ranging from 9,500–22,000 cohos. Current tower counts indicate the projected level of inriver abundance will easily provide for escapement needs and subsistence uses of coho salmon in the Elim Subdistrict. This index opening will enable the department to gauge early run strength of coho salmon and should not jeopardize subsistence uses of chum salmon.

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Emergency Order: 3-S-Z-43-14 Effective Date: August 2, 2014

EXPLANATION: This emergency order reopens the Pilgrim River and its tributaries, and lower Kuzitrin River, from 300 yards upstream of the Pilgrim River confluence to the Kuzitrin River mouth, to the use of nets and seines for all species of fish.

JUSTIFICATION: Sockeye salmon escapement past the Pilgrim River weir has improved the last several days with over 1,000 fish passing the weir. The cumulative passage at the weir is 7,400 sockeye salmon. Enough sockeye salmon should reach Salmon Lake by Saturday to achieve the escapement goal range at the lake of 4,000 to 8,000 sockeye salmon.

Emergency Order: 3-S-Z-44-14 Effective Date: August 5, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Tuesday, August 5 to 6:00 p.m. Thursday, August 7. Permit holders in Subdistricts 2–4 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: The Kwiniuk River tower is used to assess salmon escapement in Subdistricts 2 and 3. Comparative catch statistics are used to manage the Norton Bay commercial fishery in season. Projections of Kwiniuk River escapement based on cumulative passage estimates through August 3 range from 5,500–9,000 cohos. This level of escapement indicates that inriver abundance will be sufficient to provide for escapement needs and subsistence uses of coho salmon in the Elim Subdistrict. This index opening will enable the department to continue monitoring coho salmon run strength and allow commercial utilization of harvestable surpluses, and should not jeopardize subsistence uses of chum salmon. The coho salmon harvest in Norton Bay during the most recent opening was well above average for early August. Given the limited fishing power in Norton Bay, sufficient numbers of coho salmon are most likely reaching the Koyuk, Inglutalik, and Ungalik Rivers to contribute to escapement and subsistence needs.

Emergency Order: 3-S-Z-45-14 Effective Date: August 5, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Tuesday, August 5 to 6:00 p.m. Thursday, August 7 and from 6:00 p.m. August 8 to 6:00 p.m. Sunday, August 10. Permit holders in Subdistricts 5 and 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: Catches of coho salmon in Subdistricts 5 and 6 surged during the last opening. CPUE in both subdistricts was more than double the historical average for the first week of August. Escapements are lagging at the North River tower but a 1,500 cohos migrated past the Unalakleet River weir yesterday. The department will evaluate escapements this coming week to determine if a commercial fishing schedule can be set next week for Subdistricts 5 and 6.

Emergency Order: 3-S-Z-46-14 Effective Date: August 9, 2014

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound Subdistrict, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Saturday, August 9 to 6:00 p.m. Monday, August 11. Permit holders in Subdistricts 2–4 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: The Kwiniuk River tower is the primary tool to assess coho salmon escapement in Subdistricts 2 and 3. Comparative catch statistics are used to manage the Norton Bay commercial fishery in season. Projections of Kwiniuk River escapement based on cumulative passage estimates through August 8 range from 9,000–12,500 cohos. This level of escapement indicates that inriver abundance will easily provide for escapement needs and subsistence uses of coho salmon in the Elim Subdistrict. Additionally, the Fish River counting tower estimate of

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4,700 cohos suggests that Niukluk River escapement of coho salmon will approach the upper end of the SEG Range of 2,400–7,200 fish. Therefore, this opening will allow commercial utilization of harvestable surpluses but should not jeopardize subsistence uses of coho salmon in Subdistricts 2 and 3. The coho salmon harvest in Norton Bay during the most recent opening was above average for early August. Given the limited fishing power in Norton Bay, sufficient numbers of coho salmon are most likely reaching the Koyuk, Inglutalik, and Ungalik Rivers to contribute to escapement and subsistence needs.

Emergency Order: 3-S-Z-47-14 Effective Date: August 11, 2014

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 72-hour period from 6:00 p.m. Monday, August 11 to 6:00 p.m. Thursday, August 14. Permit holders in Subdistricts 5 and 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: Nearly 17,000 coho salmon have been enumerated at ground-based escapement projects through August 10. The Unalakleet River weir passage of 15,680 cohos is 50% above the last year's count of 10,471 cohos for August 10. Drainagewide escapement is projected to exceed 40,000 coho salmon which is sufficient to provide for escapement and inriver subsistence needs. This extended period will provide opportunity to maximize commercial harvests of coho salmon at the peak of the commercial fishery and should not jeopardize subsistence uses of coho salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-48-14 Effective Date: August 12, 2014

EXPLANATION: This emergency order reopens Subdistricts 2 and 3 of the Norton Sound Subdistrict, the Golovin and Elim Subdistricts, to a commercial fishing schedule of two 48-hour periods per week effective 6:00 p.m. Tuesday, August 12 for the remainder of the season. Periods will be from 6:00 p.m. Tuesdays to 6:00 p.m. Thursdays and from 6:00 p.m. Fridays to 6:00 p.m. Sundays. Permit holders in Subdistricts 2–3 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: The Kwiniuk River tower is the primary tool to assess coho salmon escapement in Subdistricts 2 and 3. The Elim Subdistrict commercial harvest stands at 6,500 coho salmon, a record for August 10. Golovin Subdistrict catches of coho salmon have been average for this date. Thus far there have been nearly 4,900 coho salmon enumerated at the Kwiniuk River counting tower east of Elim. This is the highest count through August 10 since the record breaking year of 2006 when 22,000 coho salmon were enumerated. Early to normal run timing projections of Kwiniuk River coho salmon escapement range from 11,000–14,000 cohos based on tower counts. The current Fish River count of 6,600 coho salmon would place the current Niukluk River escapement estimate at 2,200 cohos and the projected Niukluk River escapement is 8,700 cohos based on normal run timing models. The projected level of Niukluk River escapement is in excess of the upper end of the previously-used Niukluk River tower escapement goal range of 2,400–7,200 cohos. The department will be flying aerial surveys of the Niukluk and lower Fish River drainages this week to assess the relationship of Niukluk River escapement to Fish River tower counts. Projected levels of inriver abundance are above which is necessary to provide for escapement goals and inriver subsistence uses of coho salmon. This commercial schedule should therefore, not jeopardize subsistence needs.

Emergency Order: 3-S-Z-49-14 Effective Date: August 12, 2014

EXPLANATION: This emergency order reopens Subdistrict 4 of the Norton Sound Subdistrict, the Norton Bay Subdistrict, to a commercial fishing schedule of two 48-hour periods per week effective 6:00 p.m. Tuesday, August 12 for the remainder of the season. Periods will be from 6:00 p.m. Tuesdays to 6:00 p.m. Thursdays and from 6:00 p.m. Fridays to 6:00 p.m. Sundays. Permit holders in Subdistrict 4 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: Although there is no ground-based escapement information available for Subdistrict 4, the Norton Bay Subdistrict, catches of coho salmon for the ongoing period are well above average for mid-August. The

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cumulative harvest is on pace to be the second or third highest harvest of coho salmon on record. Considering the low level of commercial fishing effort in Norton Bay, sufficient numbers of coho salmon should reach the Inglutalik, Koyuk, and Ungalik rivers to contribute to escapement and inriver subsistence needs.

Emergency Order: 3-S-Z-50-14 Effective Date: August 15, 2014

EXPLANATION: This emergency order reopens Subdistricts 5 and 6 of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to a commercial fishing schedule of two 48-hour periods per week effective 6:00 p.m. Friday, August 15 for the remainder of the season. Periods will be from 6:00 p.m. Tuesdays to 6:00 p.m. Thursdays and from 6:00 p.m. Fridays to 6:00 p.m. Sundays. Permit holders in Subdistricts 5 and 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: Nearly 17,000 coho salmon have been enumerated at ground-based escapement projects through August 10. The Unalakleet River weir passage of 15,680 cohos is 50% above the last year's count of 10,471 cohos for August 10. Drainagewide escapement is projected to exceed 40,000 coho salmon which is sufficient to provide for escapement and inriver subsistence needs. This commercial fishing schedule will provide for an orderly fishery while still allowing windows of escapement for coho salmon to reach subsistence fishing areas and spawning reaches of the Shaktoolik and Unalakleet River drainages. This commercial schedule should not jeopardize subsistence uses of coho salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-51-14 Effective Date: August 16, 2014

EXPLANATION: This emergency order sets the subsistence salmon catch limits from Cape Rodney to Rocky Point and all waters draining into the Bering Sea between those two points.

JUSTIFICATION: All catch limits are listed on the subsistence salmon permits and were established previously with Emergency Order No. 3-S-Z-37-14. That emergency order expires at midnight on the evening of August 15 when the department expands fishing time by regulation during coho salmon management. The chum and pink salmon catch limits were waived by previous emergency orders.

Emergency Order: 3-S-Z-52-14 Effective Date: September 1, 2014

EXPLANATION: This emergency order sets the subsistence salmon catch limits from Cape Rodney to Rocky Point and all waters draining into the Bering Sea between those two points.

JUSTIFICATION: All catch limits are listed on the subsistence salmon permits and were established previously with Emergency Order No. 3-S-Z-51-14. That emergency order expires at midnight on the evening of August 31 when the department expands fishing time by regulation beginning in September. The chum and pink salmon catch limits were waived by previous emergency orders.

NORTON SOUND SALMON – SPORT FISH

Emergency Order: 3-KS-04-14 Effective Date: May 30, 2014

EXPLANATION: This emergency order prohibits the targeting of king salmon while sport fishing in the Unalakleet and Shaktoolik river drainages and prohibits the use of bait in these drainages. Any king salmon caught incidentally while fishing for other species may not be removed from the water and must be released immediately.

JUSTIFICATION: Preseason projections indicate that king salmon runs into the Unalakleet and Shaktoolik rivers will be poor; the projected king salmon escapement is below the lower end of the escapement goal range. The king salmon Biological Escapement Goal (BEG) at the North River counting tower on the Unalakleet River is 1,200–2,600 fish, and has been met just 3 times in the previous 10 years (2004–2013). According to the Subdistricts 5 and 6 of the Norton Sound District and the Unalakleet River King Salmon Management Plan (5 AAC 04.395), if the projected king salmon escapement is below the lower end of the escapement goal range, all fishing for king salmon will be closed. The Department does not have a stock assessment project in the Shaktoolik River, but the king salmon run generally cycles in accordance with Unalakleet River stocks. The elimination of sport harvests of king

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salmon in the Unalakleet and Shaktoolik rivers will provide protection for returning fish. The prohibition of bait is intended to minimize mortality of king salmon incidentally caught while sport fishing for other species.

Emergency Order: 3-KS-05-14 Effective Date: June 2, 2014

EXPLANATION: This emergency order prohibits the targeting of king salmon while sport fishing in all waters from Black Point to Point Romanof and from Rocky Point to Cape Denbigh. Any king salmon caught incidentally while fishing for other species may not be removed from the water and must be released immediately.

JUSTIFICATION: Preseason projections indicate that king salmon runs into Norton Sound rivers will be poor. The king salmon Sustainable Escapement Goal (SEG) for the Kwiniuk River and Fish River/Boston Creek are 300–550 fish and 100 fish, respectively. The goal for the Kwiniuk River has been met just 3 times in the previous 10 years (2004–2013), while the Boston Creek goal has been met once out of 3 years during which counts were obtained; in most years from 2004–2013 conditions did not allow an aerial survey of Boston Creek to be completed. The Department does not have king salmon stock assessment projects in other Norton Sound tributaries, but there is no indication that king salmon runs in Norton Sound are going to be better than those in other western Alaska drainages such as the Unalakleet, Yukon, and Kuskokwim drainages, all of which have already been closed to sport fishing for king salmon by emergency order.

APPENDIX H: ARCTIC FISHERIES

Appendix H1.–Commercial freshwater finfish harvest and sales, Colville River, Arctic Area, 1990–2007.

	Number of fish harvested intended for commercial sale [a]					Estimated commercial sales based on fish tickets	
Year	Broad whitefish	Humpback whitefish	Least Cisco (herring)	Arctic Cisco ("kaktok)	Total harvest	Arctic Cisco	Whitefish species [b]
1990	0	5,694	21,003	19,374	46,071	12,571 [c]	14,249 [c]
1991	0	1,240	5,697	13,805	20,742	1,970 [d]	3,307 [d]
1992	126	5,209	6,962	20,939	33,236	[e]	10,200 [f]
1993	20	5,339	6,037	31,310	42,706	11,291 [d]	6,170 [d]
1994	ND	6,056 [g]	10,176	8,958	25,190	7,434 [d]	4,121 [d]
1995	ND	33,794 [h]	ND	ND	33,794	13,921	6,000
1996	ND	6,425 [g]	7,796	21,817	36,038	9,076	4,127
1997	ND	1,721 [g]	10,754	9,403	21,878	9,403	4,760
1998	ND	4,881 [g]	9,936	7,019	21,836	5,648	7,105
1999	ND	6,875 [g]	7,430	8,832	23,137	7,095	6,170
2000	ND	3,706 [g]	5,758	2,619	12,083	2,809	6,569
2001	ND	6,078 [g]	2,839	1,740	10,657	1,779	7,306
2002	ND	4,183 [g]	5,503	3,935	13,621	899	4,093
2003	ND	6,463 [g]	4,777	5,627	16,867	0	1,292
2004	ND	1,145 [g]	3,061	3,061	7,267	2,412 [f]	476
2005	ND	490 [g]	2,870	9,343	12,703	2,975 [f]	2,170
2006	ND	1,188 [g]	4,995	3,293	9,476	1,482 [f]	3,655
2007	ND	462 [g]	2,265	390	3,117	[e]	[e]
2002-2006 Average	ND	2,694	4,241	5,052	11,987	1,554	2,337

Note: ND is no data.

[a] Reported on daily catch form returned to ADF&G. Catch reports were returned to the department following the fishing season. All fish reported on the catch report were harvested with the intent to sell.

[b] Whitefish species include mostly humpback whitefish and least cisco, with occasional broad whitefish.

[c] Commercial harvest estimate based on one fish ticket average weights of 0.89 lb (900 Arctic cisco at 800 lb) and 0.61 lb (1,400 whitefish species at 850 lb).

[d] Estimated commercial harvest sales based on 1995 to 2001 average weight of 0.92 lb for Arctic cisco and 0.89 lb for whitefish species (humpback and broad whitefish, and least cisco).

[e] No information is available from fish tickets indicating that harvested fish were sold commercially.

[f] Mixed commercial harvest of mostly Arctic cisco along with humpback whitefish, broad whitefish, and least cisco. Estimated commercial harvest sales based on 1995 to 2001 combined average of $1.07/lb. for whitefish species and Arctic cisco.

[g] Humpback whitefish harvest includes undetermined amounts of broad whitefish.

[h] Humpback whitefish harvest includes undetermined amounts of broad whitefish, least cisco, and Arctic cisco.