Fishery Management Report No. 17-15

2015 Annual Management Report
Norton Sound, Port Clarence, and Arctic, Kotzebue Areas

by

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April 2017

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

FISHERY MANAGEMENT REPORT NO. 17-15

2015 ANNUAL MANAGEMENT REPORT NORTON SOUND, PORT CLARENCE, AND ARCTIC, KOTZEBUE AREAS

by
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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.

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ABSTRACT

This report provides information about the 2015 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: 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*, subsistence, commercial fishery, management, escapement, Norton Sound, Port Clarence, Kotzebue Sound, Arctic, Annual Management Report (AMR), Fishery Management Report (FMR)

INTRODUCTION

This report summarizes the 2015 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, and 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 1–13 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.

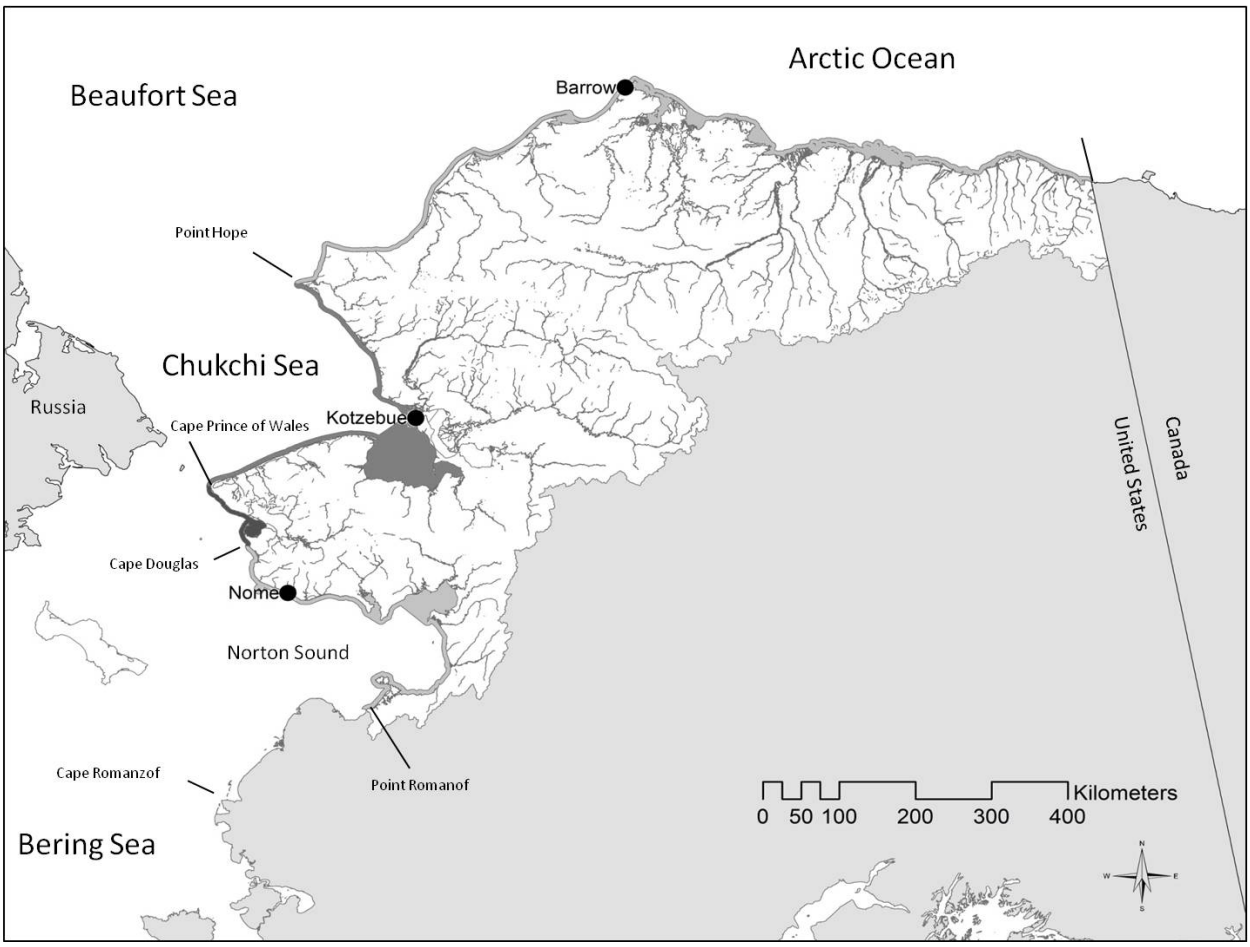

Figure 1.–Norton Sound, Port Clarence, Kotzebue Sound, and Arctic management districts.

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 (among 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 information and genetic samples for salmon.

SPORT SALMON FISHERY

Sport salmon harvests occur throughout all areas of Norton Sound (Appendices A14–A17). 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 2015 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 2015, 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 2015 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).

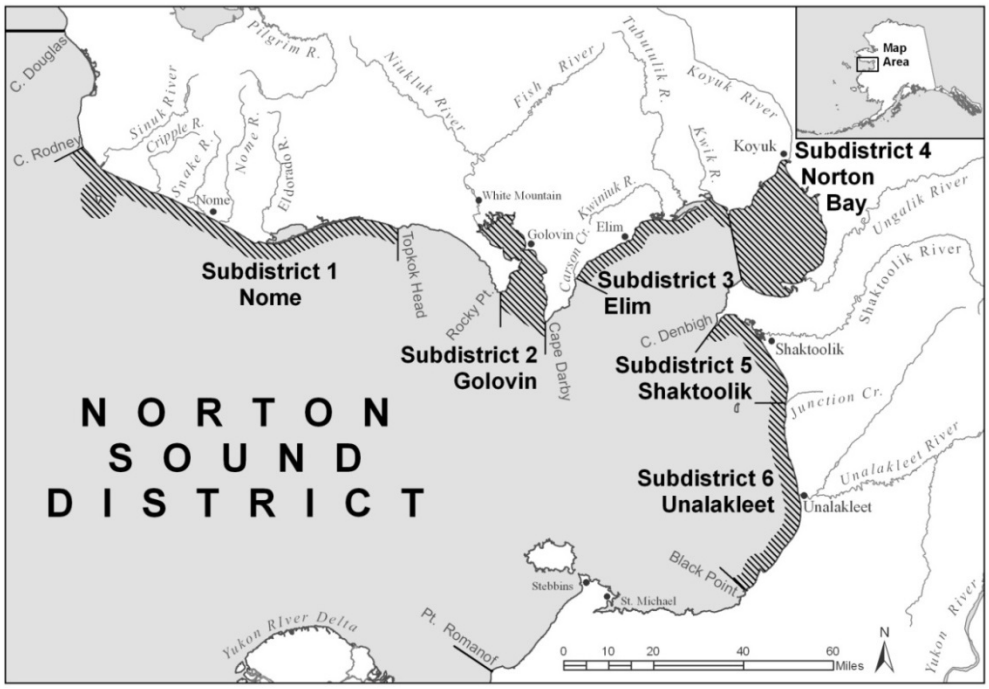

Figure 2.–Norton Sound commercial salmon fishing subdistricts.

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 beginning in 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 of 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 trade 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 2015.

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 in stretched mesh. In Unalakleet and Shaktoolik Subdistricts, 8.25 in 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 2015, 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 and although they had dropped from the record levels seen in Norton Sound in the mid-2000s the 2015 catch was a record. 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 began to drop 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. However, salmon runs have improved greatly with record runs of pink and coho salmon in the mid-2000s and the best chum salmon runs in recent years 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 northern Norton Sound. Over the last 10 years in Norton Sound Subdistricts 1–6 (2005–2014), the average subsistence harvest was 65,518 salmon, with the majority being pink salmon (Appendix A14). 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 the last 5 years 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 (2013–2015), due to ADF&G's increased efforts

to remind residents about the permit requirement when selling subsistence-caught finfish, an average of 17 customary trade permits were issued per year in Norton Sound District. Total annual sales have never exceeded $2,000 (Appendix A34).

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 (SEG). 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.

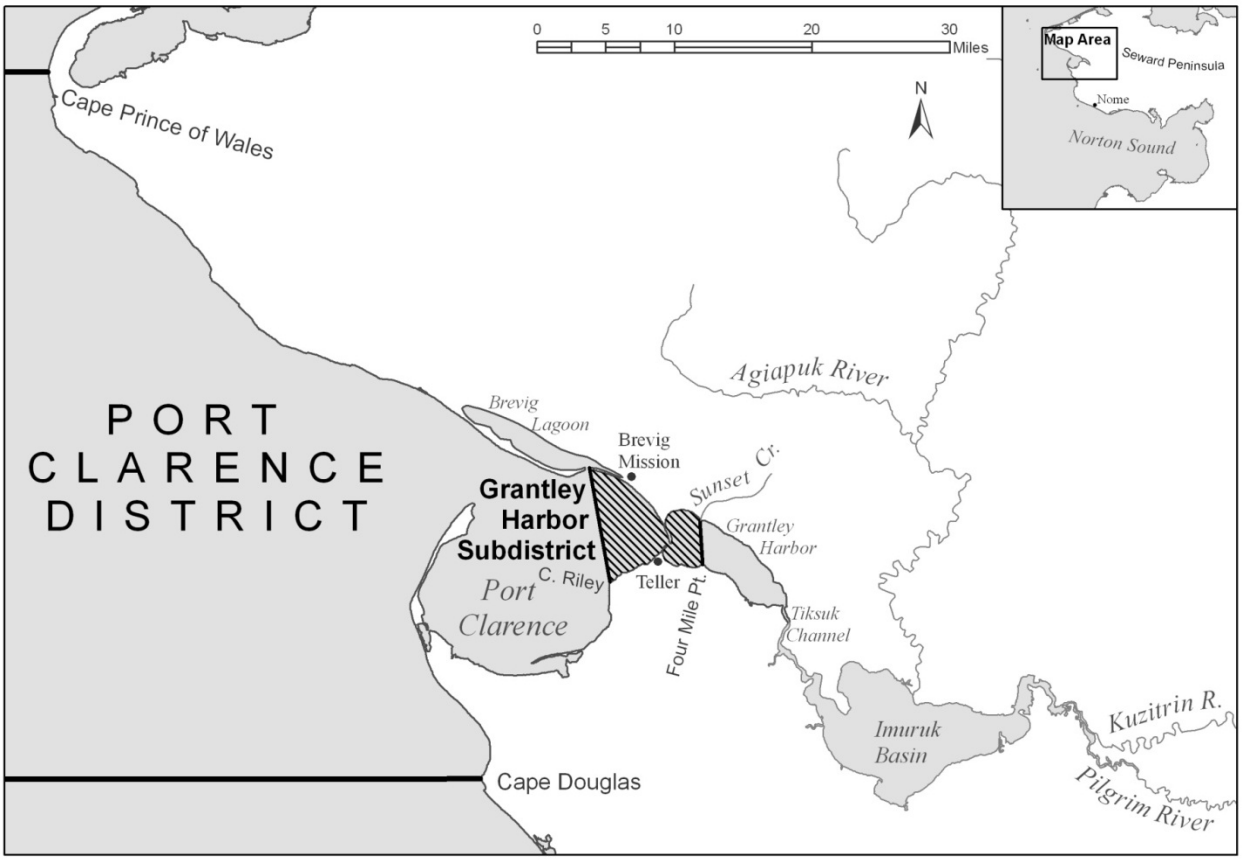

Figure 3.–Port Clarence District.

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 had not been achieved through 2014. Last year a surge of sockeye during the second half of July resulted in an escapement of just over 36,000 fish past the Pilgrim River weir and the possibility of commercial fishery, but there was no buyer interest.

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 9 customary trade permits were issued. Total annual sales have never exceeded $2,000 (Appendix A34).

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 7 years, there continues to be record fishing effort at Pilgrim River.

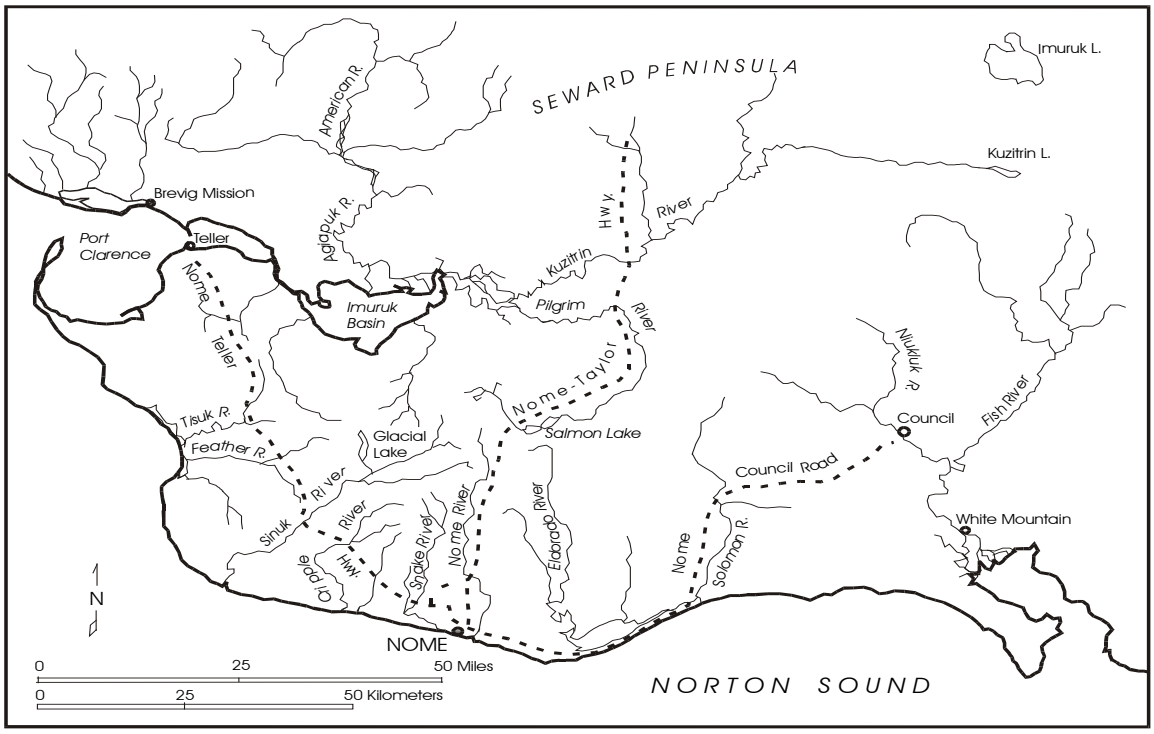

Figure 4.–Seward Peninsula with road-accessible waters.

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.

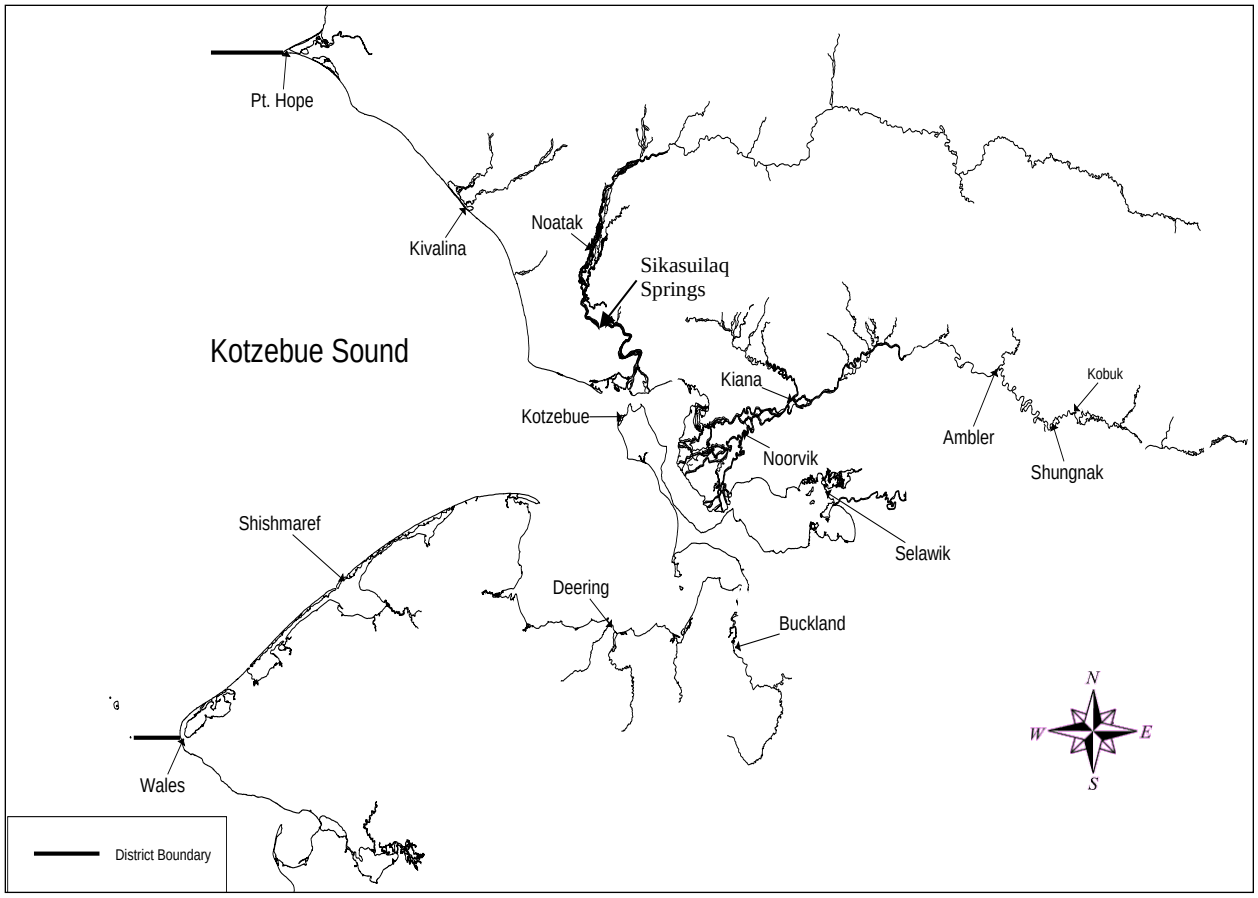

Figure 5.–Kotzebue District, villages and subsistence fishing area.

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.

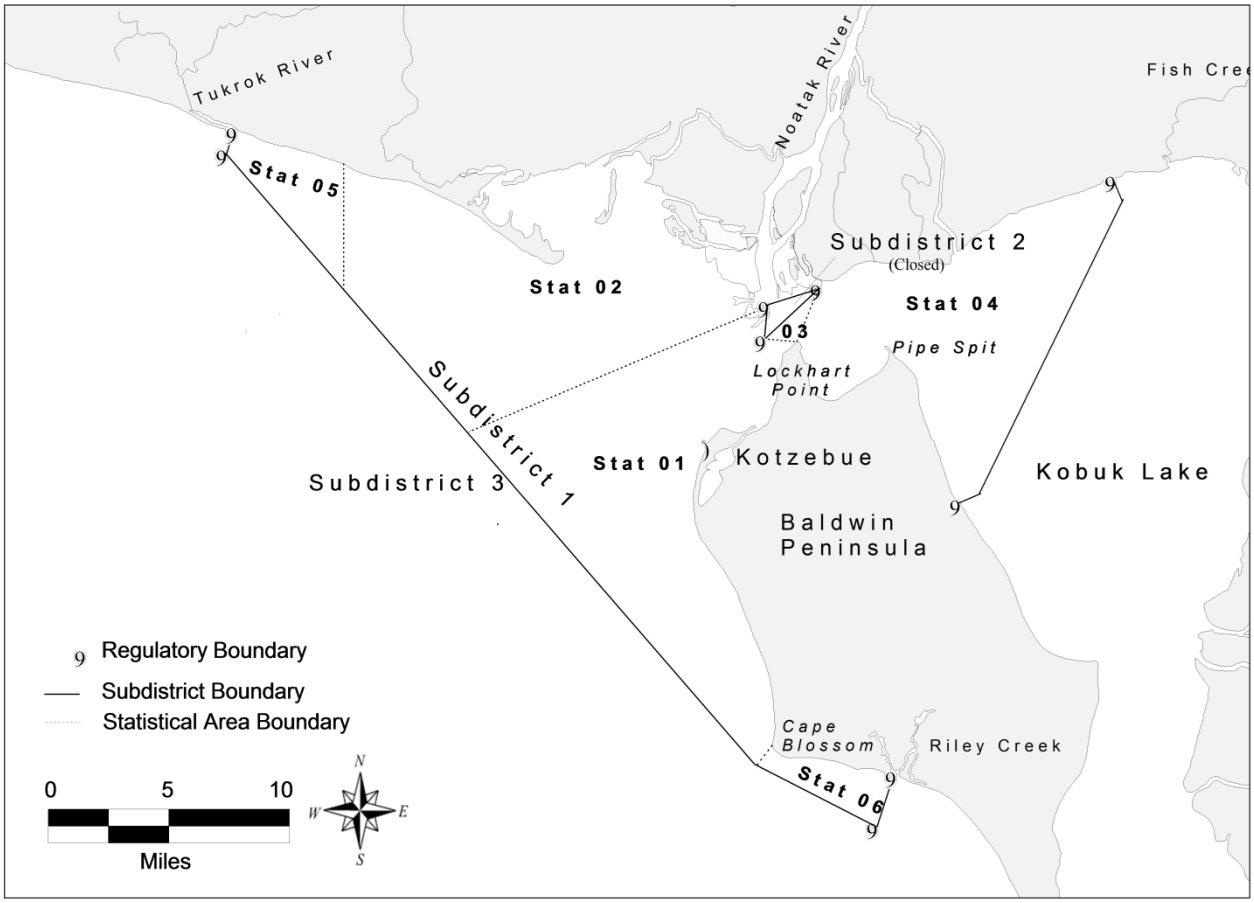

Figure 6.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

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 (Menard et al. 2015b). However, only 1 major buyer returned in 2015 (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. The town of Kotzebue, which had not been surveyed since 2001, was surveyed in 2015, but results are not yet available.

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.

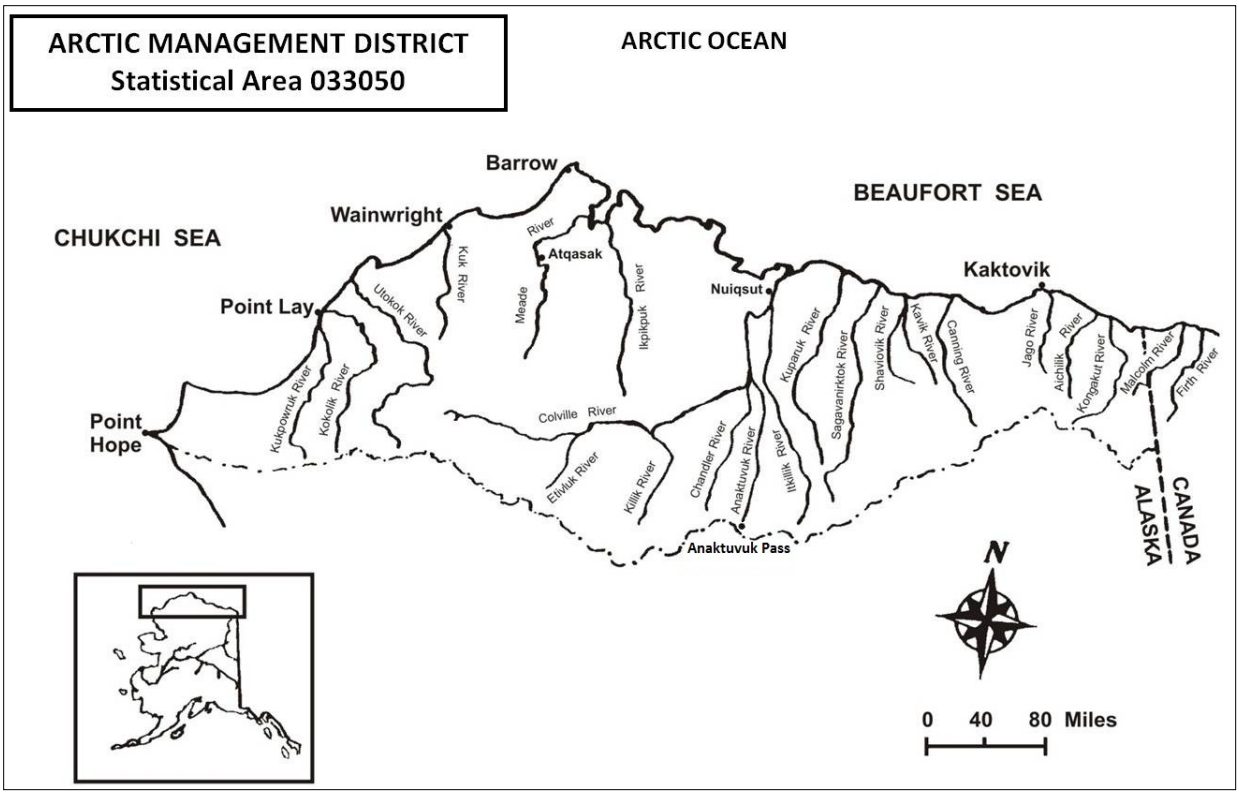

Figure 7.–Arctic management district.

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.

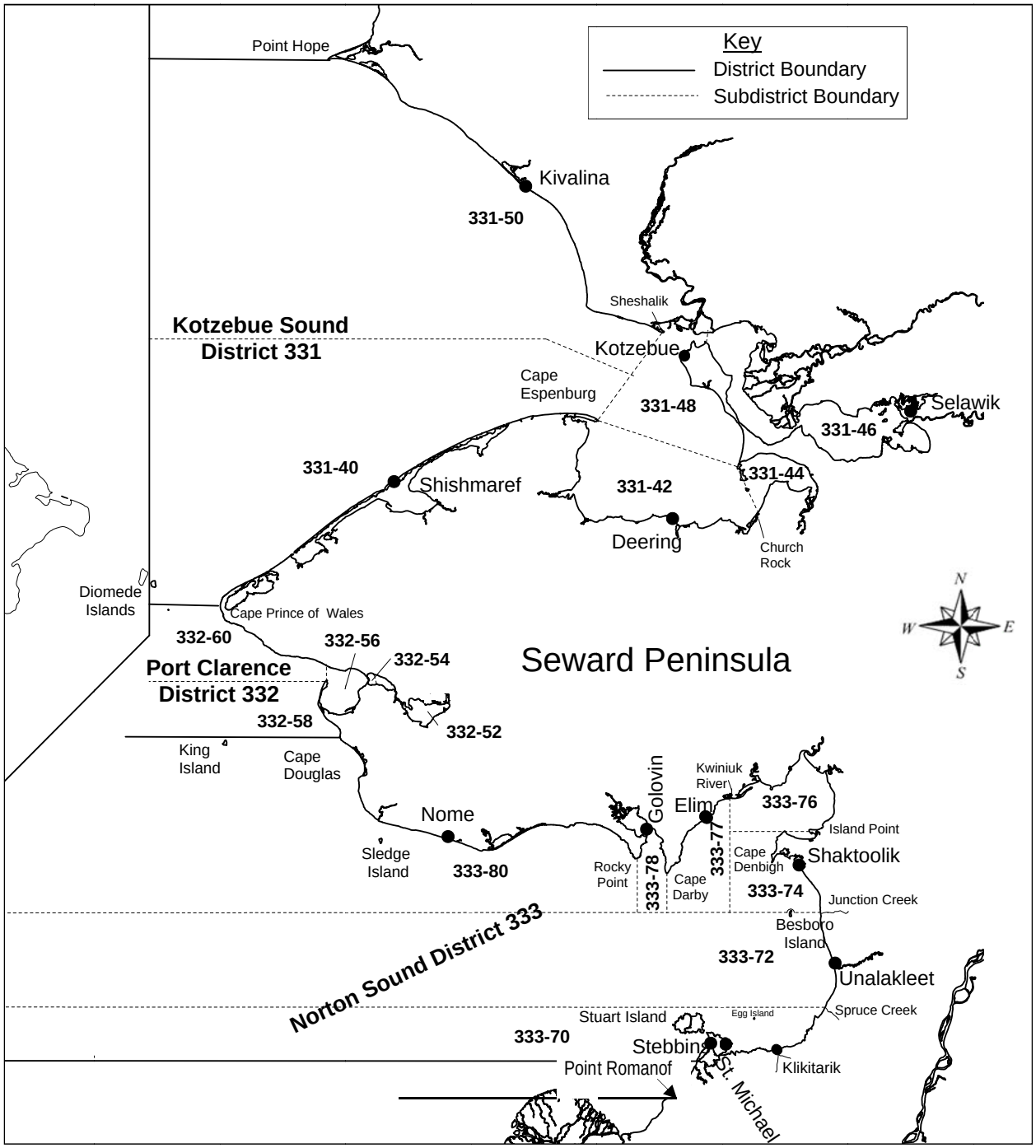

Figure 8.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

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. 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 19 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 3 out of the last 5 years. In 2012, 2014, and 2015, there was no sac roe fishery either due to ocean ice blocking tenders or preventing deliveries, or lack of market interest. One bright spot was the high recovery of over 13% roe in 2010 and 2011, but the last year that a sac roe fishery occurred, in 2013, less than 500 tons of sac roe herring was harvested.

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 (GHL) may not exceed 30 metric tons. The herring pound spawn-on-kelp GHL 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

From 1976 to late 1990s, abundance of legal (over 4.75 inch carapace width) red king crab *Paralithodes camtschaticus* biomass in Norton Sound has been estimated based on standardized results from triennial trawl surveys and sporadic summer pot surveys, which indicated periods of weak and strong recruitment (Menard et al. 2013 and Appendix E9). Results from the latest trawl survey, which occurred in 2104, showed that male red king crab abundances were the highest since 1976 (Soong and Hamazaki 2015). Abundance of prerecruits was three to seven times higher than those for 2011 survey. However, the increases were mainly due to high catches at 1 station which also resulted in high biomass estimates and uncertainties.

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 E9 and E23–E24), historical winter and summer pot studies, and winter and summer fisheries (Appendices E16–E22), 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. Trawl survey estimates prior to 1996 were revised and standardized in 2013 (NPFMC 2013).

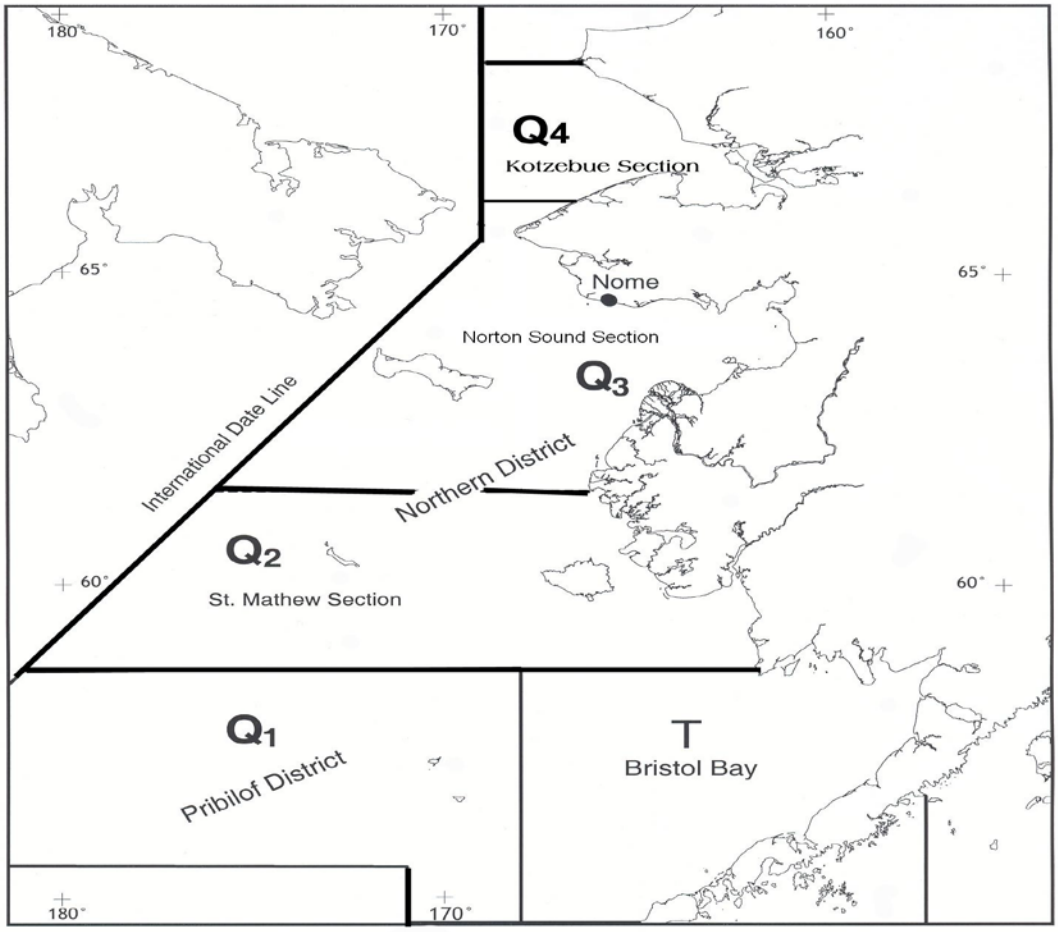

Figure 9.–King crab fishing districts and sections of Statistical Area Q.

The following estimates are based on the model's results from spring of 2015 with the latest data from the 2014 trawl survey, the 2014 summer fishery, and the 2011–2012 winter study. In 2010, legal biomass estimate for the summer crab fishery was 5.08 million lb, an increase of 10% from the 4.60 million lb estimated for 2009. The legal population estimate increased again, to 5.16 million lb in 2011, but decreased the following 3 years: to 4.81 million lb in 2012, 4.26 million lb in 2013, and 4.15 million lb in 2014. From 2014 to 2015, the estimate increased by 6% to 4.38 million lb (NPFMC 2015).

No winter study has taken place after the 2011–2012 season, because ADF&G did an expanded spring and summer tagging study in 2012–2015. 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 E13 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 E14).

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 E12).

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 E12).

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 E12. 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 where 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.

COMMERCIAL FISHERY OVERVIEW – WINTER

A winter commercial through-the-ice fishery has existed in Norton Sound since 1978. Until recent years, all harvest occurred within 10 miles of Nome, with an area closed to commercial fishing that is roughly 1 mile west to 3 miles east of town and extending 3 miles offshore (Appendix E15). The harvest is generally divided between local residents who buy crab directly from the fishermen, the seafood plant (NSSP) in Nome, and other non-local markets such as Anchorage.

By regulation, season dates were initially from January 1 to April 30, but in its March 1985 meeting, the BOF set the new season dates from November 15 to May 15 (Appendix E4). In March of 2015, a proposal adopted by the BOF set new season dates with the start date to be established by emergency order on or after January 15 and the regulatory closure to occur on April 30, unless extended by emergency order. This action was initiated in an effort to reduce pot loss and potential ghost fishing by lost pots as the shore fast ice is relatively more stable and solid from mid-January to April.

Both this proposal and a second one seeking to set a winter commercial guideline harvest level (GHL) were adopted unanimously by the BOF in response to the dramatic increases in winter fishing effort that occurred in recent years due to much higher exvessel prices. During the years 1978–2011, an average of 9 permit holders fished commercially in winter. Since 2012, winter fishery participation tripled, to an average of 27 permit holders. From 1978–2011, the average harvest was roughly 7,000 pounds, but from 2012 to 2014, the average harvest increased more than 5-fold, to over 40,000 pounds. Average exvessel price for winter red king crab from 2012–2014 was $6.71/lb, more than twice the average price of $3.25/lb during the previous 5 year period (Appendix E4). Part of the reason for the increase in prices was due to expansion of live king crab markets overseas, particularly in South Korea; since 2012, crab have been sold live to Korea by 2 catcher-processors based in Nome.

Prior to 2010, all of the crabbers were based out of Nome. Starting with the 2009–2010 winter season, crabbers in other Norton Sound villages started participating in the winter commercial crab fishery. In 2012, both Shaktoolik and Unalakleet crabbers sold roughly a third each of the total harvest, while Nome crabbers only accounted for a quarter of the harvest sold. Since then, ice conditions in eastern Norton Sound have not been conducive to winter crab fishing; consequently, Nome crabbers harvested over 90% of the total commercial winter harvest the last 2 years. All crab harvested by crabbers based outside of Nome is shipped live and sold to NSSP in Nome.

For 2015, no winter commercial harvest limit was set, but beginning in 2016, harvest allocation for the winter commercial fishery will be 8% of the total commercial GHL.

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 E7). 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

[1] Statewide electronic fish ticket database [Internet]. 1985-present. 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."

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).

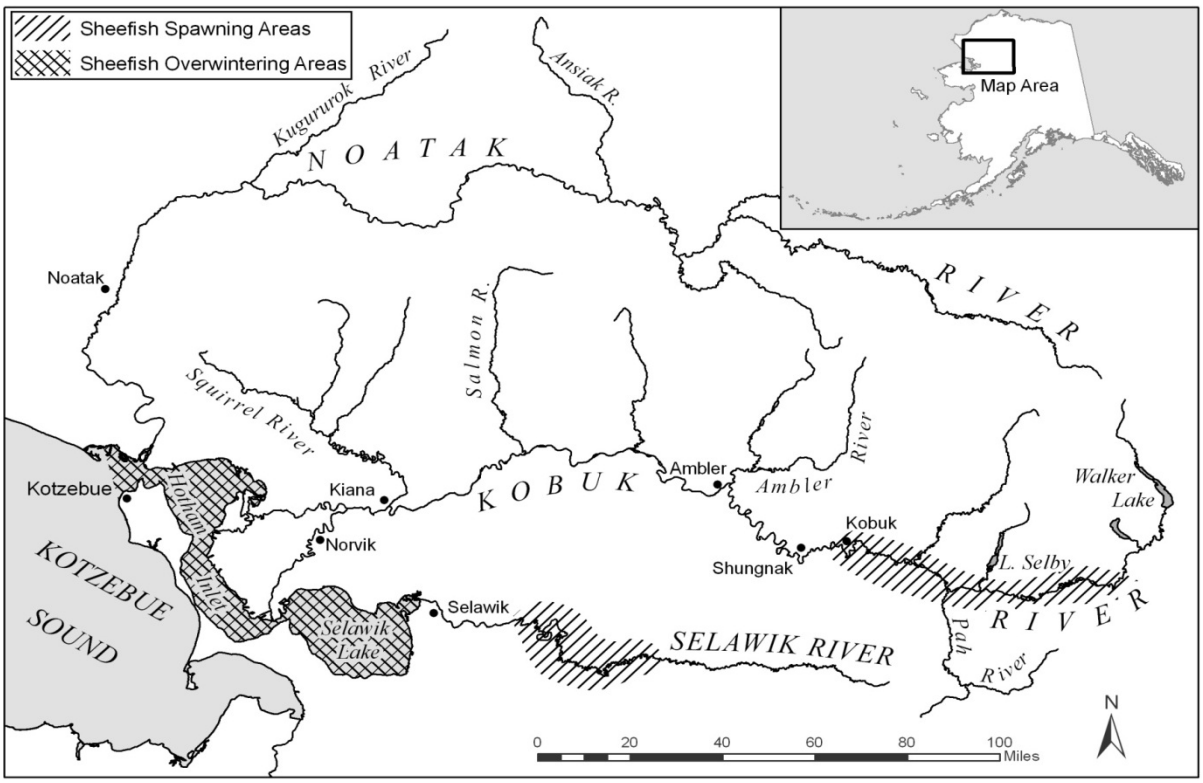

Figure 10.–Kotzebue and Kobuk River Valley villages and their spatial relationship with sheefish spawning and overwintering areas.

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 2015, there were comprehensive subsistence surveys for fish and wildlife harvests of 6–9 Kotzebue area villages. For the last 2 years that information is available, 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 Hotham 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 25 years (Appendix F1). Since 2004, there have been no reported commercial sheefish catches except in 2005, 2012, and 2015. In all 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 under 500 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 2015, a comprehensive survey of fish and wildlife harvests was done in 6–9 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 usually beginning 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 2,300 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.

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 4 year comprehensive subsistence fish and wildlife harvest survey in 6–9 Kotzebue area villages.

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).

Sport Fishery

No harvest data are collected in Norton Sound, Port Clarence, or Kotzebue Districts for whitefish.

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 600 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 almost half that of Dolly Varden (Appendix F3).

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. Sightings of capelin nearshore of Nome are incidentally reported to ADF&G by Nome residents or observed by ADF&G employees. 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.

SECTION 2: SALMON FISHERIES

2015 NORTON SOUND SALMON FISHERY

2015 Norton Sound Fisheries Outlook

The 2015 outlook was for a commercial harvest level of 70,000 to 100,000 chum salmon, 25,000 to 75,000 pink salmon, and 60,000 to 90,000 coho salmon. Salmon outlooks and harvest projections for the 2015 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 2015 by subdistrict is listed in Table 1.

For the third 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, 2012 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

Improving Chinook salmon runs occurred throughout Norton Sound in 2015, but still required inseason restrictions and early closures to southern Norton Sound subsistence fisheries. The pink salmon run was slightly above average, the chum salmon run was above average, and the coho salmon run was well above average. Although there was no directed sockeye salmon commercial fishing and the Pilgrim River sockeye salmon run was the best since the mid-2000s, a commercial fishery could have occurred if there was buyer interest.

The 2015 Norton Sound District commercial salmon fishery came in within the forecast range for pink salmon, but well above the forecast range for chum and coho salmon. Norton Sound commercial salmon harvest was 1,288 Chinook; 62,888 pink; 147,497 chum; 153,929 coho; and 4,119 sockeye salmon (Table 1), and included 508 Chinook, 721 pink, 147 chum, 85 coho, and 466

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

Record coho salmon harvests accounted for 70% of the $1,940,408 paid to 128 permit holders in 2015 (Appendices A2 and A3). The 2015 exvessel value ranks highest on record and represents the fifth year since 2010 in which exvessel value exceeded 1 million dollars (Appendix A3).

Subdistrict 6 (Unalakleet) accounted for nearly two-thirds of the coho salmon harvest (Table 1). Subdistrict 4 (Norton Bay) had a record harvest of 9,468 coho salmon.

The commercial chum salmon harvest was best in over 30 years and was the fifth year in the past 6 years that the harvest exceeded 100,000 fish. This was the third year in a row commercial chum salmon fishing occurred in Subdistrict 1 (Nome). Nearly 60% of the commercial chum harvest came from southern Norton Sound subdistricts (4–6).

Commercial pink salmon harvest in 2015 of 62,167 pink salmon was the best odd-numbered year harvest since 1995. 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 participating in the commercial fishery this year was above average and tied with last year which was the highest number of participants since 1993 (Appendix A2). The previous 5-year average in Norton Sound was 123 permits fished, and the previous 10-year average was 96 permits fished. The increased fishing effort in the salmon fishery since 2010 is largely the result of stronger chum salmon runs and continued strong runs of coho salmon, improved market interest, and good dock prices for salmon, particularly coho salmon. However, in 2015 the price per pound of coho salmon did drop nearly 27%, but the record catch of coho salmon resulted in the exvessel value percentage wise by species being slightly higher than last year. Dock prices per pound for Norton Sound salmon in 2015 were $2.25, $0.14, $0.50, $0.60, and $1.10 for Chinook, pink, chum, sockeye, and coho salmon, respectively (Appendix A4). Average commercial weights by species were 13.7 lb for Chinook salmon, 3.5 lb for pink salmon, 6.9 lb for chum salmon, and 8.0 lb for chum salmon (Appendix A5).

Only 1 salmon buyer operated in Norton Sound during the 2015 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 2015 the return rate was 100% for the fifth year in a row (Table 2).

In southern Norton Sound, in 2015, postseason household surveys were conducted in Koyuk, Shaktoolik, Stebbins, St. Michael, and Unalakleet, and attempts were made to contact 100% of the households. Catch information for all these villages are in Appendices A9–A13.

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 2015, an average chum salmon run was forecasted for Subdistrict 1 and the subdistrict was not closed to salmon fishing in mid-June for the tenth 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 2015 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 2015 there were 6 customary trade permits issued in Norton Sound District and 8 permits issued in Port Clarence District. Cash sales of almost $1,300 were recorded in 2015 for both Norton Sound and Port Clarence Districts combined (Appendix A34).

Season Summary by Subdistrict

Nome–Norton Sound Subdistrict 1

In Subdistrict 1, 2015 chum salmon run abundance was projected to achieve the subdistrict-wide 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 2015. 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 2015. 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 6 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 6 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 5 years (Appendix A22–A23 and A26). Although chum salmon runs are greater east of Cape Nome (Appendix A32), for pink salmon the run strength is much greater west of Cape Nome (Appendix A33). 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 odd-year goal of 3,200 pink salmon was easily exceeded in 2015 (Appendix A26).

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 2015 there were a record 531 subsistence salmon permits issued for the Nome Subdistrict, surpassing the previous record of 494 permits issued during the 2010 season. All 531 permits issued were returned (Table 2).

Reported subsistence harvest was 21 Chinook, 3,967 chum, 3,180 pink, 1,790 coho, and 1,081 sockeye salmon (Appendix A6). The chum salmon harvest was the second highest since 1990. The pink salmon harvest was the second highest odd-numbered year harvest in over 30 years. The coho salmon harvest was average, but the sockeye salmon harvest was a record.

Commercial chum salmon fishing occurred for the third year in a row after being closed for over 2 decades. Four permit holders participated in the commercial fishery compared to only 1 permit holder last year. The commercial harvest including personal use was 4 Chinook; 4,861 chum; 509 pink; 13 coho; and 244 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 to 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 A25). Consequently, ADF&G has implemented a conservative approach with respect to determining when commercial fishing may occur. In 2014 a new counting tower project was initiated by NSEDC on the Fish River. High water in 2014 resulted in salmon passage being undercounted, but in 2015 low water enabled the tower crew to more accurately count salmon passage. 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 and counts at the Fish River confirmed a large chum salmon escapement. Therefore, commercial

chum salmon fishing was opened late June in Subdistrict 2 for 48 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 throughout July. Fishing continued through August with two 48-hour fishing periods and the 2015 coho salmon harvest was the fifth highest on record, and Fish River tower count of over 14,000 coho salmon indicated the a very good escapement.

The commercial catch in Golovin Subdistrict for 2015 including personal use was 73 Chinook; 1,214 sockeye; 2,996 coho; 1,596 pink; and 20,525 chum salmon caught by 12 permit holders (Table 5). The number of permit holders participating in the fishery was the highest since 1988.

This was the twelfth year that subsistence salmon permits were required and 187 permits were issued for Golovin Subdistrict in 2015. Reported harvest was 147 Chinook, 71 sockeye, 1,091 coho, 4,443 pink, and 2,250 chum salmon (Appendix A7). The number of salmon reported harvested (8,002) ranked fifth lowest in the 2000s mainly because of the low harvest of pink salmon.

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 A24). The first opening was a 48 hour chum salmon directed fishing period beginning on June 25. A second opening was a 48 hour fishing period and then fishing time was reduced to a 24 hour opening to reduce the incidental catch of Chinook salmon. Fishing then returned to two 48-hour fishing periods for the remainder of the season.

The commercial catch in Elim Subdistrict including personal use was 533 Chinook; 1,535 sockeye; 14,155 coho; 2,787 pink; and 30,116 chum salmon caught by 26 permit holders (Table 6). The 2015 coho salmon harvest was the second highest on record only trailing last year's catch of 15,938 coho salmon (Appendix A8).

There were 59 subsistence salmon permits issued for Elim Subdistrict in 2015. The number of salmon reported harvested (4,911) was 40% below the recent 5-year and 10-year averages although the 2015 salmon run was above average. Some residents reported being busy with commercial fishing and as a result not as much effort was being devoted to subsistence salmon fishing. Estimated subsistence harvests by species were 198 Chinook; 154 sockeye; 1,158 coho salmon; 1,828 pink salmon; and 1,573 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 catch (9,562) of coho salmon and a near record catch of 9,468 coho salmon in 2015 (Table 7).

In 2015, the first chum salmon fishing period was 48 hours, which began on July 19. Good catches resulted in two 48-hour fishing periods per week for the rest of July for chum salmon and later two 48-hour fishing periods per week for August for coho salmon.

Cumulative commercial catch by species for Norton Bay Subdistrict including personal use was 245 Chinook; 335 sockeye; 9,468 coho; 8,297 pink; and 23,568 chum salmon (Appendix A9). The final escapement estimate at Inglutalik River tower was 1,543 Chinook; 8,247 coho; 1,041,693 pink; and 82,156 chum salmon (Appendix A29). All escapement estimates were a minimum estimate because high water destroyed the camp and operations were terminated after July 12.

This was the eighth 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 72 households that were successfully contacted out of a possible 76 in 2015. 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 254 Chinook, 53 sockeye, 952 coho, 1,602 pink, and 3,451 chum salmon were reported as subsistence harvest in Norton Bay Subdistrict in 2015 (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 15 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 2015 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. 2015a). 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. 2015a).

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. Severe restrictions on fishing time had the intended consequence that the Chinook salmon escapement dramatically improved and reaching the North River counting tower escapement goal range (1,200–2,600) with 2,328 Chinook salmon counted. Likewise in 2015 subsistence fishing was closed early in the season (June 8) and there were only 1 gillnet opening of 24 hours or 30 hours with 6 inch stretch mesh size or less per week in marine waters for the remainder of June. The first week of July subsistence fishing time was increased to 2 openings of 24 hours and 48 hours with 6 inch stretch mesh size or less gillnets and on July 9, subsistence fishing was expanded to 7 days a week in marine waters. Periodically during July subsistence beach seining in fresh waters was allowed with nets restricted to 4.5 inch or less stretch mesh and the requirement that all king salmon be returned to the water immediately (Appendix G9). 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 2015, subsistence Chinook salmon harvests in Subdistrict 5 might have been affected by the reduced fishing time with 168 fish harvested, the third lowest recorded since 1994 (Appendix A10). However, in Subdistrict 6, the 961 Chinook salmon harvested in the subsistence fishery were higher than the previous 4 years (Appendix A11).

Commercial fishing began on July 1 with two 24-hour chum salmon fishing periods the first week and during the second week there was a 48 hour and a 72 hour fishing period. In mid-July the chum salmon commercial fishing schedule was set at two 48-hour periods per week. In August the coho salmon commercial fishing schedule was also two 48-hour fishing periods per week. There was one 24-hour extension to a fishing period in both subdistricts in mid-August

because of the strong coho salmon run. In September there was 1 combined fishing period of 96 hours in length.

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 (27,503) ranked third highest and the Subdistrict 6 chum salmon harvest (40,924) ranked the second highest out of the last 23 years of commercial harvests, respectively. In Subdistrict 5, the coho salmon harvest ranked fourth highest on record with 25,637 fish (Appendix A10) and Unalakleet had a record harvest of 101,659 fish (Appendix A11).

Escapement

Table 3 and Appendix A18 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2015. Appendices A22–A31 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, Fish, 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 good during July and August of 2015.

Chinook Salmon

Chinook salmon escapement was similar to 2014 with a much greater improvement in Subdistrict 2 as noted in the Fish River tower count and the aerial survey of Fish River and Boston Creek. For the second year in a row the Kwiniuk River tower count exceeded the lower end of the SEG range of 300–550 fish with 318 Chinook salmon counted (Appendix A24). Also, for the second year in a row the North River tower count exceeded the lower end of the SEG range of 1,200–2,600 fish with 1,950 Chinook salmon counted (Appendix A30). Final escapement at the Unalakleet River weir was 2,789 Chinook salmon, which was the highest count in the 6 year project history (Appendix A31).

Chum Salmon

Chum salmon escapement goals were achieved in 7 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.

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 92,030, which was 163% above the upper bound of the subdistrict-wide BEG range of 23,000–35,000 chum salmon (Table 3; Appendix A21). Subdistrict 1 escapements of chum salmon have exceeded the upper bound of the escapement goal range in 10 of the last 15 years of

the established goal. As in previous years, more than half (56%) 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 25,560 chum salmon or 28% of the subdistrict-wide escapement (Appendix A32).

Escapement at Kwiniuk River tower was 37,831 chum salmon which was slightly below last year's escapement of 39,789 chum salmon, but a great improvement from the record low counts of 2012 and 2013 when less than 6,000 chum salmon were counted each year (Appendix A24). The neighboring Tubutulik River has an OEG range of 9,200–18,400 fish, and an aerial survey count in late July was 9,835 chum salmon. To the west in Subdistrict 2, the Fish River tower count was 144,491 chum salmon (Table 3).

In southern Norton Sound the Inglutalik River tower count of 82,156 chum salmon was a record (Appendix A29), and the North River tower count of 23,100 chum salmon was also a record (Appendix A30).

In Port Clarence District, chum salmon runs were well above average in 2015. Escapement of chum salmon to the Pilgrim River was 41,121 fish, which ranked fourth highest out of 13 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 9,432 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 7,151 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. The Fish River tower count was 14,729 coho salmon (Table 3) and previous radiotelemetry studies (Bell et al. 2011) showed that at least one-third of the coho salmon would have entered Niukluk River.

Both the Snake (1,638) and Nome (2,418) rivers' weir projects had counts near the median for coho salmon (Appendices A23 and A26).

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 most ground-based escapement projects in 2015. 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 2015 (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 prior 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 A28).

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 A28). 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 A28). 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 2015 sockeye run was the best run since the record runs of the mid-2000s with 9,257 sockeye salmon counted at Glacial Lake weir and 36,052 sockeye salmon counted at Pilgrim River weir.

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 2015. In addition, Nome ADF&G Division of Commercial Fisheries has 7 deputized staff with the ability to issue citations. The subsistence fishery had no official patrol, but random checks were conducted by 2 ADF&G personnel.

2016 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for the 2016 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 show improvement, and slightly better than 2015 run, but no commercial fishing targeting Chinook salmon is 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 above 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 2016, northern Norton Sound chum salmon runs are expected to be above 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 commercial fishery for chum salmon is expected 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 120,000 and 160,000 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 above average for an even-numbered year, and dependent on buyer interest the harvest could be 250,000–750,000 fish. No subsistence fishing restrictions for pink salmon are expected.

The coho salmon run in 2016 is expected to be above average based on recent 5 year trends in abundance and ocean conditions, as well as parent-year escapements and freshwater rearing conditions for the 2012 brood year. Considering these factors collectively, the commercial harvest is expected to range from 130,000 to 170,000 coho salmon. Coho salmon subsistence fishing restrictions are not expected.

2015 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

No commercial salmon fishing occurred in 2015. ADF&G had projected that the sockeye salmon run for Pilgrim River in 2015 would not reach the inriver goal of 30,000 sockeye salmon that is necessary for a commercial fishery to occur. However, the run came in much stronger than expected after mid-July, but there was no buyer interest in having commercial fishing.

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 2015 a record 377 permits were issued, surpassing the previous record in 2013 when 265 permits were issued. Pilgrim River estimated subsistence harvests by species were 13 Chinook salmon, 37 coho salmon, 167 chum salmon, 10,706 sockeye salmon, and 38 pink salmon (Table 2). The sockeye salmon harvest was a record and nearly doubled the previous record of 5,556 sockeye salmon harvested in 2006.

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 and in 2014 there were 260 permits issued (permit data on file with ADF&G, Division of Commercial Fisheries; Nome). 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 over 50 years, 2015 was the twelfth 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 171 permits, similar to 170 permits issued last year (Menard et al. 2015b).

In 2015 there were 8 customary trade permits issued in Port Clarence District. Cash sales of $1,255 were recorded in 2015 for both Norton Sound and Port Clarence Districts combined (Appendix A34).

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 and this year. An aerial survey in 2015 of Salmon Lake and Grand Central River estimated 3,030 sockeye salmon in Salmon Lake and 7,500 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 5 years, but still in 3 of those 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 2015, one AWT officer patrolled Pilgrim River in Port Clarence District.

2016 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 last year's run and parent-year escapement, ADF&G expects that the inriver goal of 30,000 sockeye salmon for Pilgrim River will be met. However, no commercial fishing is expected in 2016 because of a lack of a buyer.

2015 Kotzebue Sound Salmon Fishery

Commercial Fishery Season Summary

The commercial salmon fishery opened on July 12 and closed after August 31. However, the major buyer last purchased salmon on August 21 and a smaller buyer bought purchased fish during the final fishing period on August 23.

The 2015 harvest was the third highest in over 25 years and would have easily finished in the top 10 harvests all-time, but because of capacity concerns Copper River Seafoods (CRS), the major buyer, restricted daily deliveries for most of the season to 1,500 pounds per permit holder.

Throughout the season, except for the last opening on August 23, fishing periods started at 10 a.m. The first 2 openings on July 12 and 13 were 12 hour fishing periods and CRS requested ADF&G reduce the next openings to 8 hour fishing periods. Buying was then suspended for 3 days, but the following week the fishery was open for 6 consecutive days for 8 hour fishing periods. During the first 5 fishing periods of the second week of the fishery CRS placed a 3,000 pound limit on daily deliveries by permit holders and beginning July 24 the limit was reduced to 1,500 pounds daily per permit holder for the remainder of the season. Furthermore, on July 24, CRS requested that fishing periods be reduced to 6 hours daily for the remainder of the season. During the last week of July there were 4 fishing periods and during the next 3 weeks in August there were 5 fishing periods each week.

No fish processing occurred in Kotzebue and fish were flown out in the round, except for the last opening on August 23 when Maniilaq required fishermen to gill and gut their catch.

CRS required permit holders to sign up if they intended to fish the following fishing period and dependent on effort CRS would notify ADF&G if they did not intend to purchase fish for the following opening.

There were 105 permit holders that sold chum salmon in 2015. This year's participation by permit holders was the highest number since 1994 when 109 permit holders sold fish (Appendix C1). The highest fishing effort occurred on August 11 when 72 permit holders fished. This was the greatest number of permit holders to participate during 1 fishing period since 1994. One difference was that period length in 1994 was 36 hours.

The commercial harvest figure of 305,383 chum salmon was the twelfth highest in the 54 year history of the fishery. There were 8 chum salmon kept for personal use that were not included in the commercial harvest total. Additionally, 5 Chinook salmon, 6 sockeye salmon, 13 pink salmon, 6 coho salmon, 54 Dolly Varden, and 30 sheefish were reported in the catch, but kept for personal use. Likely, additional fish kept for personal use were not reported on fish tickets.

A total of 2,626,607 pounds of chum salmon (average weight 8.6 lb) was sold at an average of $0.33 per pound (Appendix C2). A total of 37,458 pounds of chum salmon was purchased that was gilled and gutted and this total included 2,029 pounds of roe from the August 23 fishing period. This year's average price was a drop of nearly 40% from last year's price of $0.54 per pound. The total exvessel value was $867,583 and although less than a third of last year's exvessel value it was still the fourth highest in over 20 years (Appendix C3).

Age, sex and length composition (ASL) was taken from commercial catch samples, but was not used to manage the fishery. The majority of the chum salmon each year are usually 4- and 5-year-old fish. In 2015, commercial catch samples were 5% age-0.2 fish, 34% age-0.3 fish, 59% age-0.4 fish and 2% age-0.5 fish. The age composition was similar to 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 2015, when

comprehensive subsistence fish and wildlife harvest data were collected from 6 to 9 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). Survey results for 2014 and 2015 were not yet available at this time (Nikki Braem, Subsistence Resource Specialist, ADF&G, Fairbanks; personal communication).

Escapement

Primary fishery management objectives are to provide adequate chum salmon escapement throughout the duration of the commercial fishery to ensure sustainability of the fishery and to provide for subsistence priority. A test fishery conducted on the Kobuk River provides the only inseason escapement index of the Kotzebue Sound District.

This year's test fish chum salmon CPUE cumulative index at the ADF&G test fish project on Kobuk River near Kiana was 2,535 and was the fourth highest in the 23 year project history (Table 11).

Kobuk River test fishery catch samples were 3% age-0.2 fish, 39% age-0.3 fish, 54% age-0.4 fish, and 4% age-0.5 fish. The age composition was similar to previous years.

No aerial surveys were conducted in 2015.

There was a small die-off of approximately 100 fish comprised of chum salmon and sheefish prior to spawning reported near Shungnak on the Kobuk River in July. Last year a much larger die-off occurred and low dissolved oxygen in the water was suspected to again be the cause because of hot July temperatures.

Testing at the Fish & Game fish pathology lab in Anchorage in 2014 showed the presence of algae in fish gills indicating a possible algae bloom during the warm and sunny weather that year. An algae bloom would have contributed to suspected low dissolved oxygen resulting in fish deaths. Other fish besides salmon were reported in the die-off. However, no contaminants were observed during pathology tests.

Although no tests were conducted in 2015 the test fish crew in Kiana reported similar hot July temperatures and sluggish fish in the test net during this time.

Enforcement

Two AWT officers patrolled the Kotzebue Sound District 2015 commercial salmon fishery.

2016 Kotzebue Salmon Outlook

The outlook for the 2016 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 2015. During the 2016 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

2015 NORTON SOUND PACIFIC HERRING FISHERY

Sac Roe

A commercial fishery directed on sac roe did not occur for the second consecutive season in 2015. Unlike the 2014 season, when pack ice prevented tender vessels from reaching Norton Sound, the lack of a sac roe fishery in 2015 was due to a lack of market interest.

Historical information for the Norton Sound commercial sac roe fishery can be found in Appendix D2 and Menard et al. 2013. Current and 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

A small directed herring bait fishery occurred in 2015. The Norton Sound commercial bait herring fishery was opened by emergency order on May 18 and Norton Sound Seafood Products purchased 73 short tons of herring from May 23 to May 25 with 10 permit holders making deliveries (Appendix D2).

Commercial Fishery Management

ADF&G projection for the 2015 herring spawning biomass for Norton Sound was 51,582 tons. At 20% exploitation rate, the guideline harvest level (GHL) for the Norton Sound District fishery was 10,316 tons with 9,996 tons allocated to the sac roe fishery.

Budget reductions have resulted in no ADF&G field crew deployed for Cape Denbigh during the 2015 season and no test fishing operations being conducted from Unalakleet. No commercial samples were taken.

Catch Reporting and Enforcement

No AWT officers were on Norton Sound herring grounds during the 2015 fishery because there was no sac roe fishery.

Biomass Determination

There were no Norton Sound herring aerial surveys conducted this season by NSEDC or ADF&G biologists. Due to budget restrictions, there will no longer be aerial surveys or ASL sampling conducted by ADF&G in future.

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

Abundance

The ADF&G length-based population model estimated harvestable legal (over 4.75 inch carapace width) male crab biomass for the 2015 summer commercial crab fishery at 4.38 million lb (1.51 million crab). This estimate was based on the model's results from spring of 2015 that included the latest data from the 2014 summer fishery and the 2014 trawl survey, which had associated high uncertainty (Appendix E9) leading to correspondingly high biomass estimate uncertainty. By BOF regulation, a harvest rate of up to 15% is allowed when the legal male biomass exceeds 3.0 million pounds. Additionally, the North Pacific Fishery Management Council had set an allowable biological catch (ABC) of 577,000 pounds for 2015, which included the winter harvest of 98,750 pounds as well as estimated winter and summer subsistence harvests. Considering the high level of biomass estimate uncertainty, sizeable winter commercial harvest, and size of the ABC, ADF&G applied a precautionary summer commercial harvest rate of 9% to the legal male population. A 9% harvest rate equated to a summer guideline harvest level (GHL) of 394,600 pounds of crab. The CDQ allocation (7.5%) was 29,595 pounds and the open access fishery allocation was 365,005 pounds.

Summer Open Access Commercial Fishery

The 2015 summer open access commercial crab fishery was opened by emergency order at 12:00 noon, June 29 in the Norton Sound Section, with a GHL of 394,600 pounds of crab. Two companies, Norton Sound Seafood Products (NSSP) and Aquatech, were registered to buy crab, and 6 fishermen registered to sell crab dockside as catcher-seller or catcher-processor (but only 3 made any sales). NSSP operated a seafood processing plant in Nome and 2 tenders in eastern Norton Sound. Crab were sold to NSSP, to Aquatech in Anchorage, to a live market in Korea, and to local residents.

The first open access delivery was made on July 1 and final delivery was made July 25, the day after the fishery was closed by emergency order at 12:00 noon, for a season length of 26 days (Table 11), compared to 40 days in 2014. 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 2015 season, the harvest rate was excellent from the start and, with no major storms, continued to be superb throughout the 4 week period of the season (Appendix E3), making it the shortest season since the Norton Sound registration area was designated a super-exclusive area in 1994, which effectively changed the character of the fishery from a large vessel to a small vessel fishery. The daily CPUE never dropped below 13 crab per pot and went as high as 27 crab per pot (Table 12). By the third week of July, the projected trend line showed that the open access quota would be reached in less than a week; therefore, since the weather forecast remained positive and no drop in harvest rate was expected, a closure was announced for July 24, which gave the fishermen

72 hours' notice. Because of sudden weather change and consequent safety concerns, the usual requirement to have all pot doors open and bait containers removed by the closure date and time was waived. Fishermen could get to their pots once they felt safe to do so, but all crab retrieved after the closure date and time had to be returned to the water.

The open access harvest from fish ticket reports was 133,531 red king crab or 371,520 pounds (102% of the open-access quota; Table 12). Of this total, 4,892 pounds were reported as deadloss, and 2,107 pounds reported as personal use. Out of the 37 vessels and 40 permit holders that registered to fish, 36 vessels and 36 permit holders actually fished, making 231 landings, and average weight for commercially caught crab was 2.8 pounds, slightly lighter than last year (Appendix E1). Including CDQ, number of pots registered was 1,480, and there were 8,356 pot pulls, for a season CPUE of 17 crab per pot, compared to 13 crab in 2014. In 2015, the total harvest rate tracked similarly to 2011 once the fishery got under way (Appendix E3). The average price paid (including CDQ catch) was $5.40 per pound, the third highest amount ever paid (Appendix E1). The exvessel value of the fishery (including CDQ) was $2.130 million, the third highest fishery value ever.

CDQ Fishery

Same as in the last 4 years, the CDQ fishery opened concurrently with the open access fishery in 2015. The initial CDQ delivery was made on July 2 and the last delivery was made July 17. Total harvest was 29,595 pounds, which was 100% of the CDQ allocation (Table 12). In 2015, as in the previous 8 years, YDFDA transferred their quota to NSEDC. Six permit-holders registered to fish the CDQ fishery and, unlike last year, by the time the open access fishery closure was announced on July 21, the entire CDQ allocation had been harvested.

In 2015, there were a total of 20 CDQ landings and 717 pots lifts. Average price paid to fishermen was $5.40 per pound, for an exvessel value of $159,170 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 13), 10 of which were the same as in 2014. Unlike last year, the top harvest (34%) and most effort (30%) came from statistical areas 636401 and 626401, respectively, both of which are south of Golovin Bay in eastern Norton Sound, followed by statistical areas 656401 and 646401, south of Nome, which yielded 17% and 15%, respectively, of the total harvest. These 4 statistical areas are all directly south of the closed boundary line (Appendix E12). Unlike past years, harvest was concentrated in these 4 main areas; the remaining 7 statistical areas all had 2% or less of the total harvest (Appendix E13). The catch from statistical areas east of 164°W longitude made up 62% of the harvest, the largest percentage since 2008 (Appendix E14).

Carapace length (CL) measurements and shell age were collected from 4,173 commercially-caught crab during the open access and CDQ fisheries (Appendix E22). Since the summer of 2002, NSEDC has operated a seafood processing plant in Nome. In 2015, 100% of sampling data was collected from this plant as crabbers offloaded their catch. Carapace age was classified as new (2–12 months old) or old (over 13 months old). Male new-shell crab made up 90% of the total legal crab sampled, and old-shell crab made up 10%, less than half 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 58% of the legal crab

sampled and postrecruit crab made up 42%, the smallest percentage in the last 25 years (Appendix E2). Overall mean carapace length of legal male crab was 115 mm. For comparison of historical length composition of Norton Sound red king crab summer commercial harvests from 1990 to 2014, see Appendices E16–E21.

Enforcement

No AWT trooper made dockside checks during the 2015 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 2015.

Winter Commercial Fishery

The winter commercial season opened November 15, 2014, and 49 fishermen registered. Two land-based processors (NSSP in Nome and Aquatech in Anchorage) and 1 catcher-processor registered to buy crab, and 8 fishermen applied for a catcher-seller permit to sell crab dockside (but only 3 made sales). Based on fish tickets submitted, the first landing was made January 18 and last landing was made on April 30. Although the regulatory closure date of April 30 was not scheduled to go into effect until 2016, ADF&G issued an emergency order in 2015 closing the season on April 30, due to the high rate of reported pot loss and expected early spring break-up. With the record number of 44 fishermen that fished, the harvest rate for the 2015 season started off slower than the previous record season of 2013, but picked up in mid-February once the ice stabilized, and ended the season with the catch far surpassing that of 2013 (Appendix E5). A total of 664 landings was made, with an overall CPUE of 6 crab/pot, and average weight of 2.4 lb/crab (Appendix E4). Price of crab averaged $6.57/lb, lower than the record high of $6.94/lb in 2014, but total exvessel value of the fishery was $617,434, which was 64% higher than 2014. A record total of 98,750 lb (41,046 crab) were harvested, with percentages of crab sold (and CPUE) each month as follows: January <1% (4), February 16% (5), March 47% (6), and April 36% (6). Total amount of crab harvested was almost times more than 2014 and over 5 times the average harvest from 2005 to 2014. As an indicator of near-shore ice instability, commercial fishermen reported losing 104 out of 606 pots (17%) during the 2014–2015 winter season (Appendix E11). Nome crabbers reported fishing from 20 miles west to 40 miles east of Nome, excluding the area closed to commercial fishing. Similar to last year, the majority of fishermen (28) and harvest (92%) came from the Nome area, with the remaining fishermen and harvest coming from Elim, Golovin, Shaktoolik, St. Michael/Stebbins, and Unalakleet areas. Similar to the last 2 years, the ice was unstable in most of eastern Norton Sound and none of the harvest from these villages exceeded 4% of the total harvest.

In 2015, NSSP and Aquatech combined purchased roughly half of the total harvest; the lone catcher-processor also purchased roughly half of the total harvest; while the 3 catcher-sellers together accounted for less than 1% of the total harvest sold (fish ticket data on file with ADF&G, Division of Commercial Fisheries; Nome).

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 E6 and E7). For the 2014–15 winter crab season, 154 of the 155 permits issued were returned, and the 108 permit holders that actually fished reported retaining 7,660 crab, more than double what was retained in 2014. The number caught, which included crab thrown back to the ocean, was 9,849 crab, about

88% of the average catch from the previous 10 years. Residents of Elim, Golovin, St. Michael, Stebbins, Unalakleet, and White Mountain had a combined harvest of 1,542 crab, which was 20% of the total harvest. Out of at least 207 pots reported fishing, 16 (8%) were reportedly lost during the season due to moving ice (Appendix E11). Percentages of subsistence crab harvested each month are as follows: January 3%, February 23%, March 36%, April 27%, and May 4% (7% was unknown). Similar to 2014, almost 100% of the crab were caught with pots in 2015 (Permit data on file with ADF&G, Division of Commercial Fisheries; Nome).

During the 2015 Norton Sound summer subsistence crab season, 31 permits were issued, 30 were returned, and the 14 fishermen that actually fished reported harvesting a total of 2,862 crab. 84% of the harvest came from the Nome area, 12% from the Unalakleet area, and the remaining 4% from St Michael area. Crab kept per fisherman averaged 204 crab for summer 2015 (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

Red king crab biomass estimates from the triennial Norton Sound trawl surveys are an integral part of the data used in the length-based population model to project the summer king crab legal biomass and appropriate GHL for the summer commercial king crab fishery. The next trawl survey is scheduled to 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 2012–2015. 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 E10. 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.

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 2015. No permit holders fished in the Kotzebue section in 2015.

SECTION 5: MISCELLANEOUS SPECIES

INCONNU (SHEEFISH)

Commercial Fishery

In Kotzebue Sound District, for the winter of 2014–2015, two fishermen reported selling inconnu, commonly known as sheefish (Appendix F1). However, catch information is confidential since there were less than 3 fishermen. Sheefish are not commonly found in either Norton Sound or Port Clarence Districts.

Subsistence and Sport Fishery

From 2012 to 2015, there were comprehensive subsistence surveys for fish and wildlife harvests of 6–9 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. Survey results are not yet available for 2014 and 2015.

Sport fish harvest reports for Kotzebue Sound District in 2015 indicate a harvest of 1,191 sheefish, almost 5 times that of 2014 (Appendix F3). Sheefish sport harvests in the last 10 years have averaged less than 500 fish annually.

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 2015, test fishing on Kobuk River resulted in 98 sheefish caught in 204 drifts, for a cumulative CPUE of 102, the second lowest CPUE out of the 18 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 2015 commercial salmon fishery, Kotzebue District reported 62 Dolly Varden caught but not sold, which is one-tenth the amount in 2014 when 620 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 6–9 Kotzebue area villages by the Division of Subsistence from 2012 to 2015. In 2013, surveyed Noatak

households reported harvesting 6,223 Dolly Varden (Appendix F5). Survey results are not yet available for 2014 and 2015.

Sport fish harvest was 412 Dolly Varden in Norton Sound and 221 Dolly Varden in Kotzebue/Chukchi Sea areas in 2015 (Appendix F3). Overall, Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged almost 2,300 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 2015, a survey on the Wulik River counted a total of 72,895 Dolly Varden (Appendix F7).

WHITEFISH

Commercial Fishery

There was no reported commercial catch of whitefish for the 2014–2015 season in Norton Sound District (Appendix F9).

Subsistence 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 6–9 Kotzebue area villages from 2012 to 2015. In 2013, survey data showed that 113,158 whitefish were harvested for 8 villages in Kotzebue District (Appendix F8). Survey results are not yet available for 2014 and 2015. Harvest numbers are considered minimal and are not comparable year to year.

SAFFRON COD

Commercial Fishery

During the 2014–2015 season, 16 permit holders harvested 12,973 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 2015, Norton Sound household subsistence surveys were conducted; however, subsistence harvest information of tomcod was not collected.

CAPELIN

Subsistence

In 2015, spawning capelin was observed by Nome residents June 3–5 and again on June 28. No other information on capelin harvest is available.

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TABLES

Table 1.–Norton Sound commercial salmon harvest summary by subdistrict, 2015.

		Subdistricts						
		1	2	3	4	5	6	Total
Number of fishermen [a]		4	12	26	16	23	56	128
Chinook	Number	3	67	479	231	0	0	780
	Weight (lb)	44	944	6,705	3,011	0	0	10,704
Sockeye	Number	57	1,197	1,438	321	1	639	3,653
	Weight (lb)	477	8,766	10,067	2,205	4	4,123	25,642
Coho	Number	13	2,996	14,095	9,468	25,632	101,640	153,844
	Weight (lb)	85	23,503	115,666	75,154	204,998	807,069	1,226,475
Pink	Number	506	1,446	2,323	8,208	15,156	34,528	62,167
	Weight (lb)	1,683	5,090	7,657	27,696	55,181	118,245	215,552
Chum	Number	4,861	20,525	29,974	23,565	27,503	40,922	147,350
	Weight (lb)	30,723	147,810	210,900	162,905	188,388	277,761	1,018,487
Total	Number	5,440	26,231	48,309	41,793	68,292	177,729	367,794
	Weight (lb)	33,012	186,113	350,995	270,971	448,571	1,207,198	2,496,860

Note: An additional 508 Chinook, 394 sockeye, 85 coho, 721 pink, and 147 chum salmon were retained for personal use. Average commercial weights by species were 13.7 lb for Chinook, 7.0 lb for sockeye salmon, 8.0 lb for coho salmon, 3.5 lb for pink salmon, and 6.9 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, 2015.

	Permits fished [a]	Number of salmon harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	42	16	421	419	882	2,306	4,044
Bonanza River	30	0	7	372	302	391	1,072
Cripple Creek	4	0	0	2	12	0	14
Eldorado River- above weir	1	0	0	0	20	0	20
Eldorado River- below weir	8	0	0	88	19	352	459
Flambeau River	1	0	0	0	5	10	15
Safety Sound	3	0	12	50	31	307	400
Nome River- above weir	10	0	2	18	31	11	62
Nome River- below weir	162	2	7	349	1,405	327	2,090
Penny River	10	0	1	18	0	0	19
Sinuk River	55	1	604	36	41	59	741
Snake River - above weir	1	0	0	0	0	0	0
Snake River - below weir	62	2	18	247	167	118	552
Solomon River - above weir	8	0	5	15	11	10	41
Solomon River - below weir	37	0	0	174	254	76	504
Other Rivers & Creeks	2	0	4	2	0	0	6
Nome Subdistrict total [b]	314	21	1,081	1,790	3,180	3,967	10,039
Cape Woolley [c]	2	0	0	0	0	2	2
Marine Waters	13	64	48	102	643	108	965
Kachavik River	13	0	5	164	2,017	297	2,483
McKinley River	6	0	0	73	50	0	123
Chinik Creek	3	0	0	2	40	0	42
Fish River - above tower	28	44	0	275	1,280	923	2,522
Fish River - below tower	36	31	16	351	240	714	1,352
Niukluk River	24	8	2	124	173	208	515
Other Rivers & Creeks	1	0	0	0	0	0	0
Golovin Subdistrict total [d]	101	147	71	1,091	4,443	2,250	8,002
Marine Waters	13	81	139	330	833	1,000	2,383
Kwiniuk River - above tower	8	3	0	69	665	149	886
Kwiniuk River - below tower	26	52	7	702	316	301	1,378
Next Creek	1	0	0	4	0	0	4
Tubutulik River	14	62	8	53	14	123	260
Iron Creek	0	0	0	0	0	0	0
Elim Subdistrict total [e]	40	198	154	1,158	1,828	1,573	4,911
Port Clarence - marine waters	71	44	2,463	464	2,782	3,285	9,038
Tuksuk Channel	12	7	663	30	108	706	1,514
Imuruk Basin	1	0	11	0	38	2	51
Agiapuk River	1	0	0	11	2	61	74
Kuzitrin River	5	0	0	0	0	0	0
Kougaruk River	2	0	29	8	14	10	61
Pilgrim River- above weir	130	6	4,425	29	36	132	4,628
Pilgrim River- below weir	161	7	6,281	8	2	35	6,333
Port Clarence District total [f g]	361	64	13,872	550	2,982	4,231	21,699
Total	818	430	15,178	4,589	12,433	12,023	44,653

[a] There were 6 locations where subsistence permits were issued in 2015 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 531 Nome Subdistrict permits issued were returned.

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

[d] All 187 Golovin Subdistrict permits issued were returned.

[e] All 59 Elim Subdistrict permits issued were returned.

[f] All 377 Pilgrim River permits issued were returned. All 171 Port Clarence District permits issued were returned.

[g] One Salmon Lake permit was issued and returned with no fishing attempted.

Table 3.–Salmon counts of rivers and associated salmon escapement goal ranges (SEG, BEG or OEG), Norton Sound and Port Clarence, 2015.

	Chinook salmon				Chum salmon				
Stream	Weir/ tower count	Escapement goal range	Aerial survey count [a]	Escapement goal range	Weir/ tower count	Escapement goal range	Aerial survey count [a]	Aerial survey expansion	Escapement goal range
Salmon L.									
Grand Central R.									
Agiapuk R.									
American R.									
Pilgrim R.	99				41,121				
Glacial L.									
Sinuk R.			1				17,615	29,643	
Cripple R.							792		
Penny R.							125		
Anvil Creek									
Dry Creek									
Snake R.	7				4,241	1,600 - 2,500 [b]			
Nome R.	23				6,111	2,900 - 4,300 [b]			
Flambeau R.							4,455	12,011	
Eldorado R.	25				25,560	6,000 - 9,200 [b]			
Bonanza R.			2				5,150	13,212	
Solomon R.	5				1,128				
Nome Subdistrict						**23,000 - 35,000** [c]		**92,030**	
Fish R.	2,299		150	**Combined**	144,690		710		
Boston Cr.			519	**100 - 250**			4,550		
Niukluk R.						23,000			
Ophir Cr.									
Kwiniuk R.	318	300 - 550			37,831	11,500 - 23,000 [d]			
Tubutulik R.			874			9,200 - 18,400 [e]	9,835		
Ungalik R.									
Inglutalik R	1,543		721		82,156		30,210		
Pikmiktalik R									
Shaktoolik R.			581	400 - 800					
Unalakleet R.	2,789			**Combined**	97,885				**Combined**
Old Woman R.				**550 - 1,100**					**2,400 - 4,800**
North R.	1,950			1,200-2,600	23,100				

-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.					3,030	**Combined**			
Grand Central R.					7,500	**4,000 - 8,000**			
Agiapuk R.									
American R.									
Pilgrim R.	296			36,052			2,807		
Glacial L.				9,257	1,819	800 - 1,600			
Sinuk R.		1,280							57,050
Cripple R.		308			3				15,581
Penny R.		83							2,640
Anvil Creek									
Dry Creek									
Snake R.	1,638			56			16,321		
Nome R.	2,418			96			75,603	3,200	
Flambeau R.		509							400
Eldorado R. [b]	1	356		0			1,483		
Bonanza R.		997							10,500
Solomon R.	46	309		3			18,764		
Fish R.	14,729			0			218,525		8,100
Boston Cr.									2,500
Niukluk R.									
Ophir Cr.									
Kwiniuk R.	7,151		650-1,300	27			67,295	8,400	
Tubutulik R.									16,495
Ungalik R.									
Inglutalik R	8,247			23			1,041,693		150,700
Pikmiktalik R									
Shaktoolik R.		100							12,965
Unalakleet R.	40,964			996			1,616,042		
Old Woman R.									
North R.	9,432		550-1,100	0			465,681	25,000	

-continued-

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. The OEG and BEG do not include Cripple and Penny rivers.

[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 Nome, Subdistrict 1, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	7/08–7/09	24	2	3	773	90	0	0
2	Chum	7/11–7/13	48	4	0	2,107	223	40	0
3	Chum	7/15–7/17	48	2	0	204	60	9	0
4	Chum	7/18–7/20	48	0	0	0	0	0	0
5	Chum	7/22–7/24	48	1	0	1,268	132	36	1
6	Chum	7/25–7/27	48	1	0	509	48	44	12
Totals			264	4	3	4,861	553	129	13

Note: An additional 1 Chinook, 3 pink, and 115 sockeye salmon were retained for personal use in 2015.

Table 5.–Commercial salmon set gillnet catches from Golovin, Subdistrict 2, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	6/25–6/27	48	12	29	5,108	3	33	0
2	Chum	6/29–7/01	48	11	13	4,487	16	33	0
3	Chum	7/03–7/05	48	11	7	3,707	111	113	0
4	Chum	7/07–7/09	48	9	10	1,739	137	106	0
5	Chum	7/11–7/13	48	11	3	2,049	392	506	1
6	Chum	7/15–7/17	48	8	0	811	358	213	2
7	Chum	7/18–7/20	48	10	1	1,327	393	120	10
8	Chum	7/22–7/24	48	6	0	501	36	29	52
9	Chum	7/25–7/27	48	7	1	321	0	23	168
10	Chum	7/29–7/31	48	5	2	120	0	12	163
11	Coho	8/01–8/03	48	7	0	157	0	3	365
12	Coho	8/05–8/07	48	5	0	89	0	4	398
13	Coho	8/08–8/10	48	5	0	34	0	1	220
14	Coho	8/12–8/14	48	6	1	43	0	0	531
15	Coho	8/15–8/17	48	7	0	19	0	1	413
16	Coho	8/19–8/21	48	5	0	10	0	0	555
17	Coho	8/22–8/24	48	5	0	3	0	0	102
18	Coho	8/26–8/28	48	3	0	0	0	0	16
Totals			864	12	67	20,525	1,446	1,197	2,996

Note: An additional 6 Chinook, 150 pink, and 17 sockeye salmon were retained for personal use in 2015.

Table 6.–Commercial salmon set gillnet catches from Elim, Subdistrict 3, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	6/25–6/27	48	17	188	6,849	4	2	0
2	Chum	6/29–7/01	48	18	98	5,831	16	8	0
3	Chum	7/04–7/05	24	21	63	3,801	71	65	0
4	Chum	7/07–7/09	48	21	34	3,510	165	246	0
5	Chum	7/11–7/13	48	22	10	3,477	712	320	0
6	Chum	7/15–7/17	48	18	11	2,033	678	221	5
7	Chum	7/18–7/20	48	8	6	925	283	110	18
8	Chum	7/22–7/24	48	16	7	1,177	394	168	159
9	Chum	7/25–7/27	48	17	5	462	0	106	528
10	Chum	7/29–7/31	48	15	1	268	0	40	585
11	Coho	8/01–8/03	48	8	23	215	0	21	984
12	Coho	8/05–8/07	48	18	1	281	0	14	1,544
13	Coho	8/08–8/10	48	19	4	274	0	17	1,318
14	Coho	8/12–8/14	48	13	2	188	0	19	1,339
15	Coho	8/15–8/17	48	14	8	280	0	22	1,576
16	Coho	8/19–8/21	48	14	7	188	0	16	1,784
17	Coho	8/22–8/24	48	15	2	89	0	15	952
18	Coho	8/26–8/28	48	13	7	34	0	16	1,280
19	Coho	8/29–8/31	48	16	2	92	0	11	2,023
Totals			888	26	479	29,974	2,323	1,438	14,095

Note: An additional 54 Chinook, 142 chum, 464 pink, 97 sockeye, and 60 coho salmon were retained for personal use in 2015.

Table 7.–Commercial salmon set gillnet catches from Norton Bay, Subdistrict 4, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	6/25–6/27	48	8	85	3,166	47	0	0
2	Chum	6/29–7/01	48	10	61	5,915	406	1	0
3	Chum	7/03–7/05	48	11	28	4,658	535	0	0
4	Chum	7/07–7/09	48	11	29	3,151	951	109	0
5	Chum	7/11–7/13	48	11	5	2,016	2,360	75	0
6	Chum	7/15–7/17	48	11	6	912	1,272	68	12
7	Chum	7/18–7/20	48	7	3	1,414	1,325	8	45
8	Chum	7/22–7/24	48	12	4	1,043	1,312	30	269
9	Chum	7/25–7/27	48	11	2	347	0	8	438
10	Chum	7/29–7/31	48	11	2	269	0	4	699
11	Coho	8/01–8/03	48	1	0	8	0	1	34
12	Coho	8/05–8/07	48	7	0	143	0	1	1,301
13	Coho	8/08–8/10	48	4	0	123	0	0	1,246
14	Coho	8/12–8/14	48	9	3	137	0	9	2,185
15	Coho	8/15–8/17	48	9	1	111	0	3	1,411
16	Coho	8/19–8/21	48	10	2	115	0	4	1,131
17	Coho	8/22–8/24	48	6	0	37	0	0	651
19	Coho	8/29–8/31	48	1	0	0	0	0	46
Totals			864	16	231	23,565	8,208	321	9,468

Note: An additional 14 Chinook, 3 chum, 89 pink, 14 sockeye, and 1 coho salmon were retained for personal use in 2015.

Table 8.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	7/01–7/02	24	6	0	3,296	41	0	0
2	Chum	7/06–7/07	24	20	0	2,936	928	0	0
3	Chum	7/08–7/10	48	22	0	7,912	4,131	0	0
4	Chum	7/11–7/14	72	21	0	7,543	4,312	1	4
5	Chum	7/15–7/17	48	12	0	2,204	2,654	0	61
6	Chum	7/19–7/21	48	11	0	789	2,747	0	146
7	Chum	7/22–7/24	48	7	0	200	343	0	96
8	Chum	7/26–7/28	48	16	0	889	0	0	1,557
9	Chum	7/29–7/31	48	17	0	671	0	0	3,975
10	Coho	8/02–8/04	48	17	0	320	0	0	2,713
11	Coho	8/05–8/07	48	20	0	295	0	0	4,276
12	Coho	8/09–8/11	48	15	0	105	0	0	2,112
13	Coho	8/12–8/15	72	18	0	102	0	0	3,321
14	Coho	8/16–8/18	48	20	0	169	0	0	4,507
15	Coho	8/19–8/21	48	14	0	54	0	0	1,698
16	Coho	8/23–8/25	48	3	0	1	0	0	307
17	Coho	8/26–8/28	48	1	0	0	0	0	20
18	Coho	8/30–9/01	48	4	0	6	0	0	473
19	Coho	9/02–9/04	48	3	0	11	0	0	366
Totals			912	23	0	27,503	15,156	1	25,632

Note: An additional 49 Chinook, 52 sockeye, and 5 coho salmon were retained for personal use in 2015.

Table 9.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2015.

Period	Target species	Dates fished	Length (hours)	Permits fished	Chinook harvest	Chum harvest	Pink harvest	Sockeye harvest	Coho harvest
1	Chum	7/01–7/02	24	31	0	2,868	268	6	0
2	Chum	7/06–7/07	24	24	0	4,977	4,158	41	0
3	Chum	7/08–7/10	48	31	0	8,267	10,114	97	5
4	Chum	7/11–7/14	72	28	0	7,440	7,188	136	66
5	Chum	7/15–7/17	48	29	0	3,434	6,848	69	186
6	Chum	7/19–7/21	48	22	0	2,553	3,677	84	674
7	Chum	7/22–7/24	48	21	0	1,530	1,886	12	1,802
8	Chum	7/26–7/28	48	41	0	2,786	389	37	7,776
9	Chum	7/29–7/31	48	43	0	2,037	0	43	9,826
10	Coho	8/02–8/04	48	39	0	1,759	0	38	6,829
11	Coho	8/05–8/07	48	43	0	1,059	0	2	16,316
12	Coho	8/09–8/11	48	31	0	546	0	1	7,713
13	Coho	8/12–8/15	72	43	0	685	0	10	18,000
14	Coho	8/16–8/18	48	46	0	455	0	4	10,322
15	Coho	8/19–8/21	48	41	0	285	0	23	12,511
16	Coho	8/23–8/25	48	25	0	65	0	8	2,409
17	Coho	8/26–8/28	48	9	0	13	0	4	1,215
18	Coho	8/30–9/01	48	18	0	59	0	4	2,553
19	Coho	9/02–9/06	96	20	0	104	0	20	3,437
Totals			960	56	0	40,922	34,528	639	101,640

Note: An additional 384 Chinook, 2 chum, 15 pink, 99 sockeye, and 19 coho salmon were retained for personal use in 2015.

Table 10.–Kotzebue District commercial chum salmon catch and average weight by date, 2015.

Date	Number of fishermen	Catch	Pounds	Average weight
7/12	37	8,741	75,483	8.6
7/13	35	11,379	98,894	8.7
7/14	37	9,293	84,131	9.1
7/15	39	12,262	109,254	8.9
7/19	56	12,258	105,191	8.6
7/20	53	9,016	80,165	8.9
7/21	48	9,456	85,162	9.0
7/22	49	9,505	85,962	9.0
7/23	57	14,342	130,758	9.1
7/24	42	8,776	77,425	8.8
7/27	56	8,597	77,309	9.0
7/28	62	9,597	85,115	8.9
7/30	71	12,053	108,292	9.0
7/31	71	12,789	112,841	8.8
8/02	68	11,440	98,730	8.6
8/03	70	10,345	88,760	8.6
8/04	63	10,526	91,601	8.7
8/05	49	9,809	86,193	8.8
8/07	63	11,372	98,062	8.6
8/09	48	7,899	65,092	8.2
8/10	61	11,585	98,331	8.5
8/11	72	13,251	110,764	8.4
8/12	60	9,442	78,001	8.3
8/14	61	10,950	88,896	8.1
8/16	58	11,459	95,561	8.3
8/17	55	9,726	80,315	8.3
8/18	43	8,008	64,229	8.0
8/20	52	8,554	67,070	7.8
8/21	40	7,855	62,196	7.9
8/23 [a]	36	5,098	36,824 [b]	7.2
Total	105	305,383	2,626,607	8.6 [c]

Note: Also harvested during the 2015 commercial fishery and kept for personal use were 5 Chinook, 8 chum, 6 sockeye, 13 pink, and 6 coho salmon, and 54 Dolly Varden, and 30 sheefish.

[a] Gilled and gutted.

[b] Includes 2,029 pounds of roe.

[c] Excludes August 23 period.

Table 11.–Historical chum salmon catch for Kobuk River drift test fishery, 1993–2015.

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
2015	7/17–8/25	204	2,535	8/05

[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 12.–Daily catch for the open access and CDQ summer commercial king crab harvests, Norton Sound Section, Eastern Bering Sea, June 29–July 24, 2015.

Date [a]	Landings	Number of crabs	Crab harvested (lb)	Cumulative total (lb)	Number pots pulled	Average weight (lb)	CPUE
			Open access				
07/01	1	380	1,073	1,073	27	2.8	14
07/02	5	1,373	3,677	4,750	82	2.7	17
07/03	9	4,029	11,294	16,044	276	2.8	15
07/04	14	7,529	20,777	36,821	351	2.8	21
07/05	4	1,855	4,796	41,617	80	2.6	23
07/06	10	5,259	14,392	56,009	349	2.7	15
07/07	8	3,980	10,986	66,995	267	2.8	15
07/08	13	10,659	29,137	96,132	504	2.7	21
07/09	9	5,444	15,106	111,238	340	2.8	16
07/10	5	2,292	6,321	117,559	178	2.8	13
07/11	18	11,824	32,836	150,395	677	2.8	17
07/12	9	4,891	13,415	163,810	315	2.7	16
07/13	5	2,734	7,778	171,588	189	2.8	14
07/14	5	3,951	11,088	182,676	197	2.8	20
07/15	16	10,131	28,288	210,964	568	2.8	18
07/16	9	6,110	16,926	227,890	308	2.8	20
07/17	7	4,398	12,378	240,268	240	2.8	18
07/18	3	2,162	6,055	246,323	80	2.8	27
07/19	3	3,089	8,698	255,021	119	2.8	26
07/20	22	13,315	37,183	292,204	775	2.8	17
07/21	12	8,223	23,618	315,822	440	2.9	19
07/22	26	11,062	31,117	346,939	794	2.8	14
07/23	6	1,996	5,318	352,257	142	2.7	14
07/24	7	3,088	8,680	360,937	194	2.8	16
07/25	5	3,757	10,583	371,520	147	2.8	26
Total	231	133,531	371,520	371,520	7,639	2.8	17
			CDQ				
07/02	2	880	2,330	2,330	50	2.6	18
07/04	1	721	1,929	4,259	40	2.7	18
07/06	1	718	2,042	6,301	40	2.8	18
07/07	2	603	1,817	8,118	80	3.0	8
07/09	1	1,017	2,796	10,914	38	2.7	27
07/10	3	1,133	3,231	14,145	120	2.9	9
07/11	1	850	2,363	16,508	40	2.8	21
07/12	1	432	1,149	17,657	39	2.7	11
07/13	2	1,249	3,519	21,176	80	2.8	16
07/15	2	1,607	4,271	25,447	76	2.7	21
07/16	1	415	1,178	26,625	40	2.8	10
07/17	3	1,069	2,970	29,595	74	2.8	14
Total	20	10,694	29,595	29,595	717	2.8	15

Source: Fish ticket data.

[a] The open access fishery closed by emergency order July 24, and last deliveries were made July 25. The CDQ (community development quota) fishery closed July 24, and the last delivery was made July 17.

Table 13.–Summer commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2015.

Statistical area	Number crab [a]	Crab harvested (lb)	Number of pots pulled	CPUE	Average weight (lb)
616331	1,180	3,410	133	9	2.89
616401	660	1,929	40	17	2.92
626401	37,264	103,881	2,522	15	2.79
636330	900	2,680	40	23	2.98
636401	49,319	137,285	1,952	25	2.78
646330	669	1,812	30	22	2.71
646401	21,233	58,929	1,137	19	2.78
656330	1,698	4,828	97	18	2.84
656401	25,370	69,355	1,827	14	2.73
666401	3,242	9,308	338	10	2.87
666402	2,690	7,699	240	11	2.86
Total	144,225	401,115	8,356	17	2.78

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

[a] Includes 10,694 crab (29,595 lb) from the CDQ (community development quota) fishery.

APPENDIX A: NORTON SOUND FISHERIES

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1990–2015.

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	289	519	112,756	182,406	107,745	403,715
2015	1,288	4,119	153,929	62,888	147,497	369,721
Avg 2010–14	192	274	64,922	86,988	103,505	255,882
Avg 2005–14	132	158	87,443	53,160	61,323	202,215

Note: Harvest numbers may include some 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.

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1990–2015.

	Subdistrict						District
Year	1	2	3	4	5	6	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
2015	4	12	26	16	23	56	128
Avg 2010–14	1	14	25	15	27	60	123
Avg 2005–14	0	8	17	8	23	52	96

[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, 1990–2015.

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
2015	10,704	1,226,475	215,552	1,018,487	0	1,940,408

[a] Information not available.

Appendix A4.–Estimated mean prices paid to commercial salmon fishermen in dollars, Norton Sound District, 1990–2015.

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
2015	2.25	1.10	0.14	0.50	0.60
Avg 2010–14	2.42	1.60	0.29	0.59	1.05

[a] None sold.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1990–2015.

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
2015	13.7	8.0	3.5	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, 1990–2015.

	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
2015	4	244	13	509	4,861	5,631	21	1,081	1,790	3,180	3,967	10,039	25	1,325	1,803	3,689	8,828	15,670
5-year avg [d]	3	7	39	1,169	1,456	2,674	30	182	1,842	4,708	2,796	9,558	30	184	1,849	4,942	3,088	10,092
10-year avg [e]	3	7	39	1,169	1,456	2,674	32	174	2,002	5,187	1,974	9,369	33	174	2,006	5,304	2,120	9,636

Note: Commercial harvest numbers may include some 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] Less than 3 permit holders fished, so information is confidential.

[d] 2010–2014.

[e] 2005–2014.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1990–2015.

	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
2015 [c]	73	1,214	2,996	1,596	20,525	26,404	147	71	1,091	4,443	2,250	8,002	220	1,285	4,087	6,039	22,775	34,406
5-year avg. [d]	8	13	3,307	8,433	11,550	23,311	60	53	1,438	6,785	1,857	10,193	68	65	4,746	15,218	13,407	33,504
10-year avg. [e]	4	6	1,924	4,486	5,846	12,267	110	77	1,453	7,798	1,812	11,250	114	83	3,378	12,285	7,658	23,518

Note: Commercial harvest numbers may include some 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] 2010–2014.

[e] 2005–2014.

Appendix A8.–Commercial and subsistence salmon catch by species, by year in Elim Subdistrict, Norton Sound District, 1990–2015.

	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
2015 [c]	533	1,535	14,155	2,787	30,116	49,126	198	154	1,158	1,828	1,573	4,911	731	1,689	15,313	4,615	31,689	54,037
5-year avg. [d]	25	42	8,626	18,741	13,641	41,075	123	13	1,598	5,022	2,478	9,234	147	54	10,225	23,763	16,119	50,309
10-year avg. [e]	13	21	6,322	10,993	7,367	24,716	209	10	1,731	4,497	1,847	8,293	222	31	8,053	15,489	9,215	33,010

Note: Commercial harvest numbers may include some 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] 2010–2014.

[e] 2005–2014.

Appendix A9.–Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1990–2015.

	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	163	1	1,219	2,321	4,431	8,135	234	23	10,781	30,714	17,867	59,619
2015	245	335	9,469	8,297	23,568	41,914	254	53	952	1,602	3,451	6,312	499	388	10,421	9,899	27,019	48,226
5-year avg. [c]	19	12	5,173	16,420	14,288	35,911	194	5	673	2,106	3,543	6,521	165	126	5,963	19,006	18,215	41,344

Note: Commercial harvest numbers may include some 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] 2010–2014.

Appendix A10.–Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1990–2015.

	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	158	82	1,159	3,961	682	6,042	174	129	20,912	37,098	30,137	88,450
2015	49	53	25,637	15,156	27,503	68,398	168	211	2,080	4,975	482	7,916	217	264	27,717	20,131	27,985	76,314
5-year avg. [c]	19	42	12,341	11,411	27,747	51,560	214	83	1,519	4,201	894	6,910	233	124	13,861	15,612	28,641	58,471
10-year avg. [d]	17	27	19,849	7,042	16,591	43,526	361	54	1,657	5,162	606	7,840	378	81	21,506	12,204	17,197	51,366

Note: Commercial harvest numbers may include some 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] 2010–2014.

[d] 2005–2014.

Appendix A11.–Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1990–2015.

	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	442	146	7,232	12,707	3,476	24,003	512	378	70,540	96,019	35,789	203,238
2015	384	738	101,659	34,543	40,924	178,248	961	248	5,673	7,544	2,381	16,807	1,345	986	107,332	42,087	43,305	195,055
5-year avg. [c]	121	165	35,466	31,749	35,988	103,489	716	209	4,835	8,900	3,411	18,071	838	374	40,300	40,649	39,398	121,560
10-year avg. [d]	88	97	56,525	22,133	23,993	102,836	1,327	266	6,220	13,099	3,000	23,911	1,415	363	62,744	35,232	26,993	126,747

Note: Commercial harvest numbers may include some 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] 2010–2014.

[d] 2005–2014.

Appendix A12.–Subsistence salmon catch by species and year for St. Michael and Stebbins in Norton Sound District, 1994–2015.

Year	Chinook	Chum	Pink	Sockeye	Coho	Total
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	323	2,202	683	0	460	3,668
2015	475	4,634	237	33	762	6,141

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

Appendix A13.–Subsistence salmon catch by species and year for Stebbins in Norton Sound District, 1994–2015.

Year	Chinook	Chum	Pink	Sockeye	Coho	Total
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	209	5,104	1,124	0	1,492	7,929
2015	299	2,798	359	4	2,122	5,582

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

Appendix A14.–Commercial, subsistence, and sport salmon catch by species, by year for Subdistricts 1–6 in Norton Sound District, 1990–2015.

	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	1,106	763	16,180	37,595	16,233	71,877	0	0	3,358	4,603	511	8,472
2015	1,288	4,119	153,929	62,935	147,497	369,768	1,709	1,789	12,478	23,019	13,964	52,959	0	271	3,720	1,381	331	5,703
5-year avg. [b]	192	274	64,922	86,988	103,505	255,882	1,336	544	11,905	31,722	14,979	60,487	24	22	5,096	2,582	649	8,374
10-year avg. [c]	132	158	87,443	53,160	61,323	202,215	2,182	582	13,596	37,497	11,662	65,518	177	21	6,447	2,821	448	9,913

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

[a] Not all subdistricts were surveyed.

[b] 2010–2014.

[c] 2005–2014.

Appendix A15.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2015.

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	0	1,432	377	352	2,161
2015	0	2,602	78	222	2,902
Avg 2010–2014	23	2,856	197	437	3,513
Avg 2005–2014	169	3,847	177	683	4,875

Appendix A16.–Sport salmon harvest by species, by year for the Fish/Niukluk rivers, 1990–2015.

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	0	883	71	25	979
2015	0	302	0	39	341
Avg 2010–2014	0	1,008	35	154	1,197
Avg 2005–2014	7	1,010	42	199	1,258

Appendix A17.–Sport salmon harvest by species, by year for the Nome River, 1990–2015.

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	0	458	52	2,162	2,672
2015	0	243	39	474	756
Avg 2010–2014	3	333	38	1,106	1,480
Avg 2005–2014	1	825	19	1,268	2,114

Appendix A18.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1990–2015.

	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.			
2015	1 [b]	17,615 [b]	57,050 [b]	1,280 [b]	No survey occurred.			

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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.			
2015	0 [b]	4,455 [b]	400 [b]	509 [b]	ND	ND	ND	356

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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
2015	150 [b]	710 [b]	8,100 [b]	ND	519 [b]	4,550 [b]	2,500 [b]	ND

Year [a]	Niukluk River				Year [a]	Niukluk River			
	Chinook	Chum	Pink	Coho		Chinook	Chum	Pink	Coho
1990	15	6,200	115,250	170	2003	55	2,315	272	146
1991	42	10,700	37,410	1,783 [d]	2004	15	173	277,900	828
1992	ND	7,770	803,200	812	2005	6	3,225	154,000	ND
1993	15	19,910	2,840	2,104	2006	ND	ND	ND	737 [e]
1994	7	16,470	1,294,100	274	2007	ND	ND	ND	ND
1995	48	25,358	200	2,136	2008	ND	ND	ND	1,715
1996	25	9,732 [c]	153,150	2,047	2009	No survey occurred.			
1997	131	16,550	ND	983	2010	No survey occurred.			
1998	51	2,556	205,110	593	2011	4 [b]	9,735 [b]	375 [b]	838 [b]
1999	ND	640	ND	619	2012	ND	ND	ND	928 [b]
2000	ND	ND	ND	3,812	2013	68 [b]	17,203 [b]	9,700 [b]	2,279 [b]
2001	6	2,448	2,856	809	2014	ND	ND	ND	2,342 [b]
2002	ND	ND	ND	1,122	2015	No survey occurred.			

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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 [f]
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
2015	874 [b]	9,835 [b]	16,495 [b]	ND	No survey occurred.			

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] Includes counts from Casadepaga and Ophir Creeks.

[e] Includes counts from Ophir Creek.

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

Appendix A19.–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 2015.

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	3,932,201	49,737	1,252
2009	41,812	275,833	39,234	3,052
2010	191,626	1,484,282	31,173	1,481
2011	102,235	206,127	13,001	933
2012 [c]	51,796	1,013,565	6,011	1,056
2013 [d]	50,529	73,928	16,897	621
2014 [d]	90,287	735,843	23,769	3,920
2015 [d]	96,843	626,383	20,640	2,323

Note: Starting with 2008, some numbers might have changed compared to previous FMRs due to interpolation methods in calculating escapement counts being standardized in 2015.

[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 A20.–Total escapement (4–6 rivers) and catch (commercial, subsistence, and sport fish) for chum, pink, coho, and Chinook salmon for Norton Sound District, 1995–2015.

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	4,069,508	198,406	4,380
2009	85,297	320,631	147,837	6,795
2010	325,688	1,560,810	110,991	3,802
2011	227,485	231,000	84,038	2,538
2012	127,176	1,265,834	57,739	2,488
2013	187,009	102,117	91,638	1,633
2014	214,776	960,447	156,063	5,315
2015	258,635	713,718	190,767	5,320

Note: Starting with 2008, some numbers might have changed compared to previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[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.

Appendix A21.–Nome Subdistrict chum salmon estimated escapement, 1999–2015.

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
2015	Nome		6,111				
	Snake		4,241				
	Eldorado		25,560				
	Flambeau		12,011				
	Solomon[e]		1,128				
	Sinuk		29,643				
	Bonanza		13,212				
			91,906				

[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 A22.–Historical escapement of salmon and Dolly Varden at Eldorado River counting tower, 1997–2002 and weir, 2003–2015.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1997	June 29–Aug 19	98	14,302	1,022	194	n/a	n/a
1998	June 29–Aug 12	8	13,808	137,283	21	n/a	n/a
1999	July 10–Sept 01	28	4,218	977	510	n/a	n/a
2000	June 29–Aug 25	33	11,617	55,992	192	n/a	n/a
2001	July 08–Sept 13	50	11,635	488	1,509	n/a	n/a
2002	June 24–Sept 10	26	10,215	119,098	540	10	377
2003	June 21–Sept 08	29	3,591	173	115	0	60
2004	June 22–Sept 09	25	3,277	60,866	1,151	57	0
2005	June 23–Sept 02	32	10,369	12,356	689	10	23
2006	June 26–Aug 03	41	42,105	222,348	55	1	65
2007	June 26–Aug 06	14	21,312	833	2	22	60
2008	June 27–July 31	36	6,746	244,641	38	3	14
2009	July 02–Aug 03	31	4,943	1,119	2	0	72
2010 [a]	June 30–July 24	23	42,612	48,136	2	8	72
2011	June 30–Aug 03	3	16,273	507	1	0	2
2012	July 04–Aug 15	0	13,348	59,318	1	0	30
2013	July 01–Aug 06	9	26,131	1,029	15	0	2
2014	June 23–July 27	18	27,054	46,746	0	0	4
2015	June 23–July 30	25	25,560	1,483	1	0	37

Notes: ND is no data. Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[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 A23.–Historical escapement of salmon and Dolly Varden at Snake River counting tower 1995–2002 and weir 2003–2015.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1995	July 01–Aug 18	0	4,393	917	856	0	n/a
1996	July 03–Aug 22	5	2,772	44,558	1,638	0	n/a
1997	July 07–Aug 18	12	6,184	6,742	1,157	0	n/a
1998	July 01–Aug 11	0	11,067	219,679	178	0	n/a
1999	July 01–Aug 14	20	484	116	90	0	n/a
2000	June 29–Aug 25	28	1,911	4,723	406	0	n/a
2001	July 08–Sept 05	33	2,182	1,295	1,335	0	n/a
2002	June 28–Sept 16	9	2,776	4,103	851 [a]	8	149
2003	June 26–Sept 11	50	2,201	2,856	489	84	111
2004	June 23–Sept 03	17	2,146	126,917	474	22	290
2005	June 27–Sept 11	31	2,967	13,813	2,948	275	28
2006	July 01–Sept 11	32	4,160	74,028	4,776	302	614
2007	July 01–Sept 14	61	8,147	4,634	1,781	1,354	121
2008	July 06–Sept 06	13	1,244	145,761	5,206	143	452
2009	July 08–Aug 30 [b]	6	891	769	50	2	14
2010	July 03–Sept 11	43	6,973	51,099	2,243	124	198
2011	July 08–Sept 11	1	4,352	7,090	343	14	5
2012	July 06–Aug 15 [c]	1	978	8,601	22	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
2015	July 04–Sept 14 [d]	7	4,241	16,321	1,638	56	67

Notes: ND is no data. Starting with 2008, some numbers might have changed compared to previous FMRs due to interpolation methods being standardized in 2015.

[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.

[d] Weir was knocked out August 25–29. Counts were interpolated during this period.

Appendix A24.–Historical salmon escapement at Kwiniuk River counting tower, 1990–2015.

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	42,963	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 11	5,631	13,212	15	3,940
2014	June 15–Sept 08	39,789	326,558	429	14,713
2015	June 15–Sept 03 [a]	37,831	67,295	318	7,151

Note: Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[a] Unable to count August 26 due to murky water. Counts for pink and coho salmon were interpolated.

Appendix A25.–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

Notes: The Niukluk River counting tower project was discontinued after 2012. Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

Appendix A26.–Historical salmon escapement at Nome River counting tower, 1993–1995, and weir, 1996–2015.

Year	Operating Period	Chum	Pink	Chinook	Coho	Sockeye
1993	July 25–Aug 28	1,859	13,036	63	4,349	
1994	June 24–Aug 15	2,893	142,604	54	726	
1995	June 22–Sept 06	5,093	13,893	5	1,650	
1996	June 26–July 23	3,339	95,681 [a]	5	66	
1997	June 27–Aug 27	5,147	8,035	22	321	
1998	July 01–Aug 11	1,930	359,469	70	96	
1999	July 02–Aug 25	1,048	2,033	3	417	6
2000	June 29–Aug 25	4,056	41,673	25	698	19
2001	July 08–Sept 11	2,859	3,138	7	2,418	55
2002	June 29–Sept 11	1,720	35,057	7	3,418	29
2003	July 05–Sept 10	1,957	11,402	12	548	47
2004	June 25–Sept 12	3,903	1,051,146	51	2,283	114
2005	June 27–Sept 11	5,584	285,759	69	5,848	381
2006	July 02–Sept 07	5,677	578,555	43	8,308	188
2007	July 03–Sept 16	7,034	24,395	13	2,437	534
2008	July 02–Sept 17	2,607	1,186,554	28	4,605	90
2009	July 01–Sept 20	1,565	16,490	10	1,370	103
2010	June 30–Sept 16	5,877	165,934	9	4,114	43
2011	July 01–Sept 12	3,578	14,384	12	1,831	22
2012	July 04–Aug 15	2,028	151,791	6	237	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
2015	July 01–Sept 20 [b]	6,111	75,603	23	2,418	96

Notes: ND is no data. Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

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

[b] Counts during the period 8/25–8/29 were estimated via linear interpolation due to high water events rendering weir inoperable.

Appendix A27.–Salmon escapement at Solomon River weir, 2013–2015.

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
2015	June 26–Aug 24	1,128	18,764	5	46	3

Note: The Solomon River weir was initiated in 2013.

Appendix A28.–Historical sockeye salmon escapement at Glacial Lake weir, 2000–2015.

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
2015 [e]	June 24–July 12			9,257

[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 A29.–Historical salmon escapement at Inglutalik River counting tower, 2011–2015.

Year	Operating Period	Chum	Pink	Chinook	Coho
2011	June 24–Aug 14	62,897	475,167	1,469	862
2012	June 23–Aug 23	33,123	90,349	1,159	1,431
2013 [a]	June 21–Aug 11	51,099	201,438	3,411	4,488
2014	June 20–July12	62,153	61,752	1,676	978
2015	June 23–Aug 21	82,156	1,041,693	1,543	8,247

Notes: The Inglutalik River tower was initiated in 2013. Some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[a] Due to speciation problems, the Chinook and coho salmon counts are likely inaccurate.

Appendix A30.–Historical salmon escapement at North River counting tower, 1996–2015.

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	241,798	905	15,648
2009	June 19–Sept 11	9,795	190,289	2,357	22,274
2010	June 19–Sept 07	16,215	150,688	1,256	7,723
2011	June 17–Sept 08	21,396	138,542	841	4,975
2012	June 21–Aug 19	9,120	137,012	972	3,258
2013	July 01–Aug 05	11,201	48,097	580	9,115
2014	June 14–Sept 01	13,872	246,075	3,454	4,995
2015	June 14–Aug 25	23,100	465,681	1,950	9,432

Note: Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

Appendix A31.–Historical salmon escapement at Unalakleet River weir, 2010–2015.

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	104,050	354,361	1,030	10,231	181
2012	June 24–Aug 15	70,859	674,250	823	17,548	237
2013	June 20–Aug 22	106,715	143,250	667	25,550	217
2014 [a]	June 28–Aug 27	55,341	1,194,708	1,126	44,524	206
2015	June 18–Aug 15	97,885	1,616,042	2,789	40,964	996

Notes: The Unalakleet River weir was initiated in 2010. Some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[a] Weir was flooded out July 21–25.

Appendix A32.–Chum salmon escapement by river, Nome Subdistrict, 1993–2015.

	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	q	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	5,877	25,009	42,612	3,513	2,678	97,769
2011	15,028	4,352	3,578	15,056	16,273	7,357	4,529	66,173
2012	10,537	978	2,028	17,517	13,348	6,002	1,377	51,787
2013	31,691	2,755	4,811	27,928	26,131	13,437	1,377	108,130
2014	19,136	3,983	5,589	21,462	27,054	18,508	1,502	97,234
2015	29,643	4,241	6,111	12,011	25,560	13,212	1,128	91,906
Total	231,075	82,391	90,331	282,765	383,252	141,204	41,059	1,252,077

Note: Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[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 (2003–2015). 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 (1996–2015). 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 (2003–2015). Escapement goal range is 6,000–9,200 chum salmon.

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

Appendix A33.–Pink salmon escapement by year and river, Nome Subdistrict, 1993–2015.

	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	165,934	4,797	48,136	106,000	21,804	566,370
2011	21,100	7,090	14,384	58	507	11,050	5,580	59,769
2012	506,500	8,601	151,791	2,657	59,318	54,700	15,000	798,567
2013	143,921	1,333	10,257	ND	1,029	800	2,733	160,073
2014	115,000	20,067	96,397	25,000	46,746	71,000	20,616	394,826
2015	57,050	16,321	75,603	400	1,483	10,500	18,764	180,121
Total	5,482,140	819,282	4,383,286	119,365	1,118,768	1,218,976	527,928	13,669,745

Notes: ND is no data. Starting with 2008, some numbers might have changed compared previous reports because interpolation methods in calculating escapement counts were standardized in 2015.

[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 (2003–2015).

[c] Nome River escapements are estimated by tower counts (1993–1995) and weir counts (1996–2015). 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 (2003–2015).

Appendix A34.–Number of customary trade permits issued, Norton Sound District and Port Clarence District, 2007–2015.

	Norton Sound District									Port Clarence District			Total	
Year	Nome	White Mountain	Golovin	Elim	Koyuk	Shaktoolik	Unalakleet	St. Michael	Stebbins	Teller	Brevig Mission	Wales	(both districts)	Value
2007	3	0	0	2	0	0	0	0	0	0	0	0	5	$200.00
2008	3	0	0	0	0	0	0	0	0	1	0	0	4	$0.00
2009	1	0	0	0	0	0	1	0	0	1	0	0	3	$100.00
2010	1	0	0	0	0	0	0	0	0	0	0	0	1	Confidential
2011	0	0	0	0	0	0	0	1	0	0	0	0	1	Confidential
2012	2	0	0	0	0	0	0	0	0	0	0	0	2	Confidential
2013	4	0	4	1	0	0	0	0	0	3	6	0	18	$1,790.00
2014	6	1	1	0	0	0	1	0	0	0	11	0	20	$1,885.00
2015	4	1	1	0	0	0	0	0	0	0	8	0	14	$1,255.00

APPENDIX B: PORT CLARENCE FISHERIES

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1990–2015.

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
2015	3,030	7,500	10,530

[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 (2003–2015).

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 [c]	June 25–Sept 01	133	25,008	92,641	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 [d]	June 26–Aug 18	65	25,733	46,201	95	7,090	65
2013 [c]	June 27–Sept 08	37	47,557	1,060	890	12,428	27
2014 [c]	June 25–Aug 27	48	25,634	4,197	425	9,719	66
2015 [c]	July 02–Aug 25	99	41,121	2,807	296	36,052	76

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.

[c] Some numbers have changed compared to previous reports because of postseason updating.

[d] Some numbers have changed compared to previous reports because interpolation methods were standardized in 2015.

Appendix B3.–Estimated number of subsistence fishing families and harvest in Port Clarence District, 1994–2015.

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
2015	[c]	549	[d]	64	13,872	550	2,982	4,231	21,699

[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, 1997–2015.

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
2015	21	NSEDC

APPENDIX C: KOTZEBUE FISHERIES

Appendix C1.–Kotzebue District chum salmon catch statistics, 1990–2015.

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
2015	305,383	2,626,607	0	105	2,908
Avg 1995–2014	181,166	1,474,458	394	57	3,152

[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, 1990–2015.

	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 [b]	8.0	0.15	1.00	[a]	0.20
1999 [b]	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	[a]	[a]	[a]
2003	8.6	0.12	[a]	[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]
2015	8.6	0.33	[a]	[a]	[a]

[a] Did not purchase.

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

Appendix C3.–Kotzebue District commercial fishery dollar value estimates, 1990–2015.

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
2015	$825,500	105	$7,862
Avg 1995–2014	$435,021	57	$6,476

[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 (1990–2015) and subsistence salmon catches (1990–2004 and 2012–2015).

	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.		
2015	305,383	38	305,421			Information is not yet available.		
Average 2005–2014	245,701	271	245,972	Average 1997–2013	44,610	413	111	178,818

[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 2012–2015.

Year	Village					Kobuk River Villages	Noatak Village	Village					District Total
	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]	
2015	Information is not yet available.								[a]	[a]			

Note: No subsistence surveys were conducted from 2005 to 2011. Kotzebue area villages were surveyed by the Division of Subsistence in 2014 and 2015, 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 2012–2015.

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]
2015	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, 1990–2015.

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]		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, 2010–2013, and 2015.

[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.

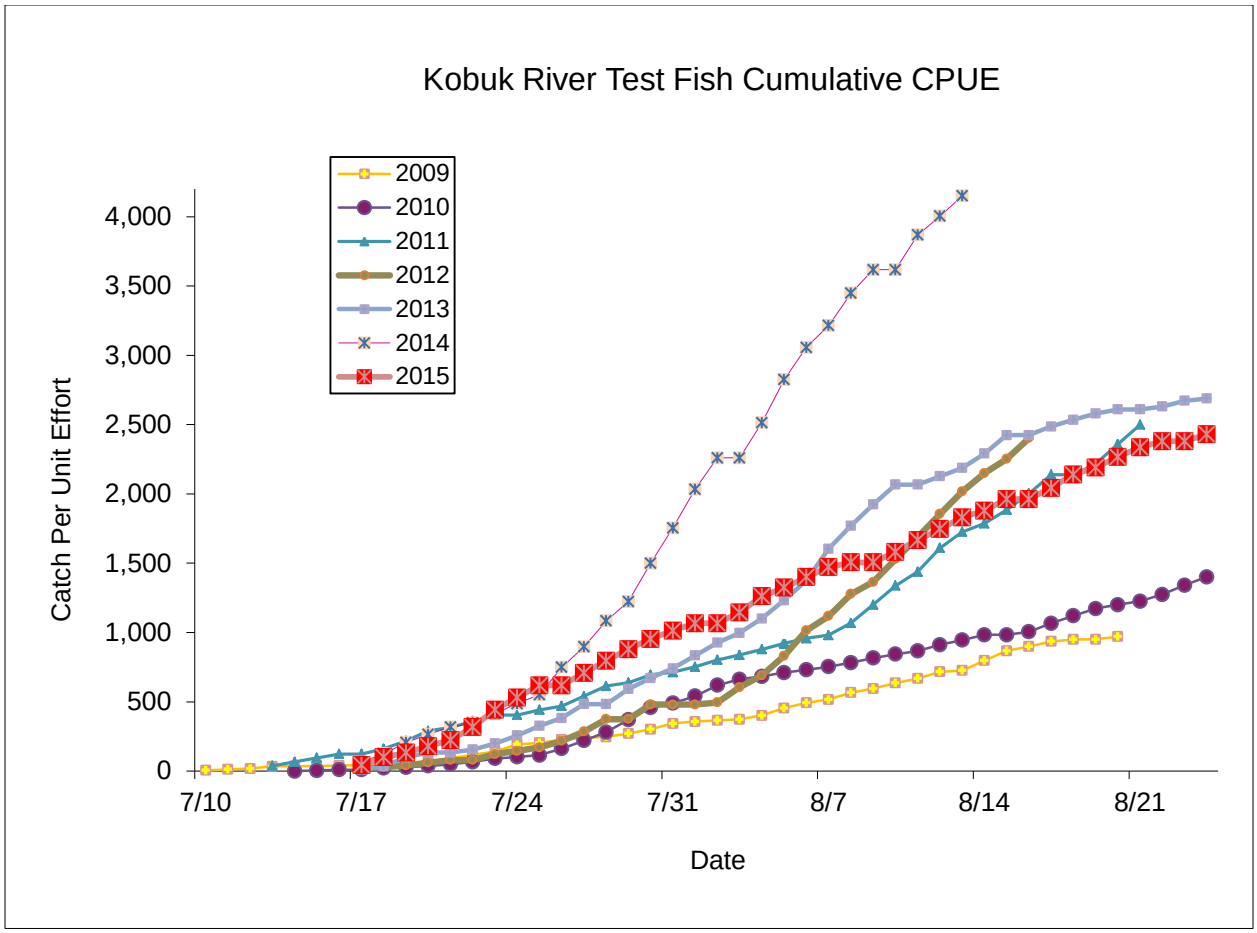
[b] Poor survey conditions or incomplete, early, or late survey.

[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), 2009–2015.

APPENDIX D: HERRING FISHERIES

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishermen, 1990–2015.

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
2015 [b]	0	73	73	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, 2014, and 2015.

[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, 1990–2015.

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
2015 [a]	51,582	73	0	0	0	11	0.04	1	[a]	5/25	5/23–05/26

[a] No or very limited fishery due to late sea ice breakup in 1992, 2012, and 2014, and no sac roe fishery in 2004, 2007–2009, and 2015 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, 1990–2015.

	Subdistricts								
Year [a]	1	2	3	4	5	6	7	Totals	
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	
2015	0	73	0	0	0	0	0	73	

[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).

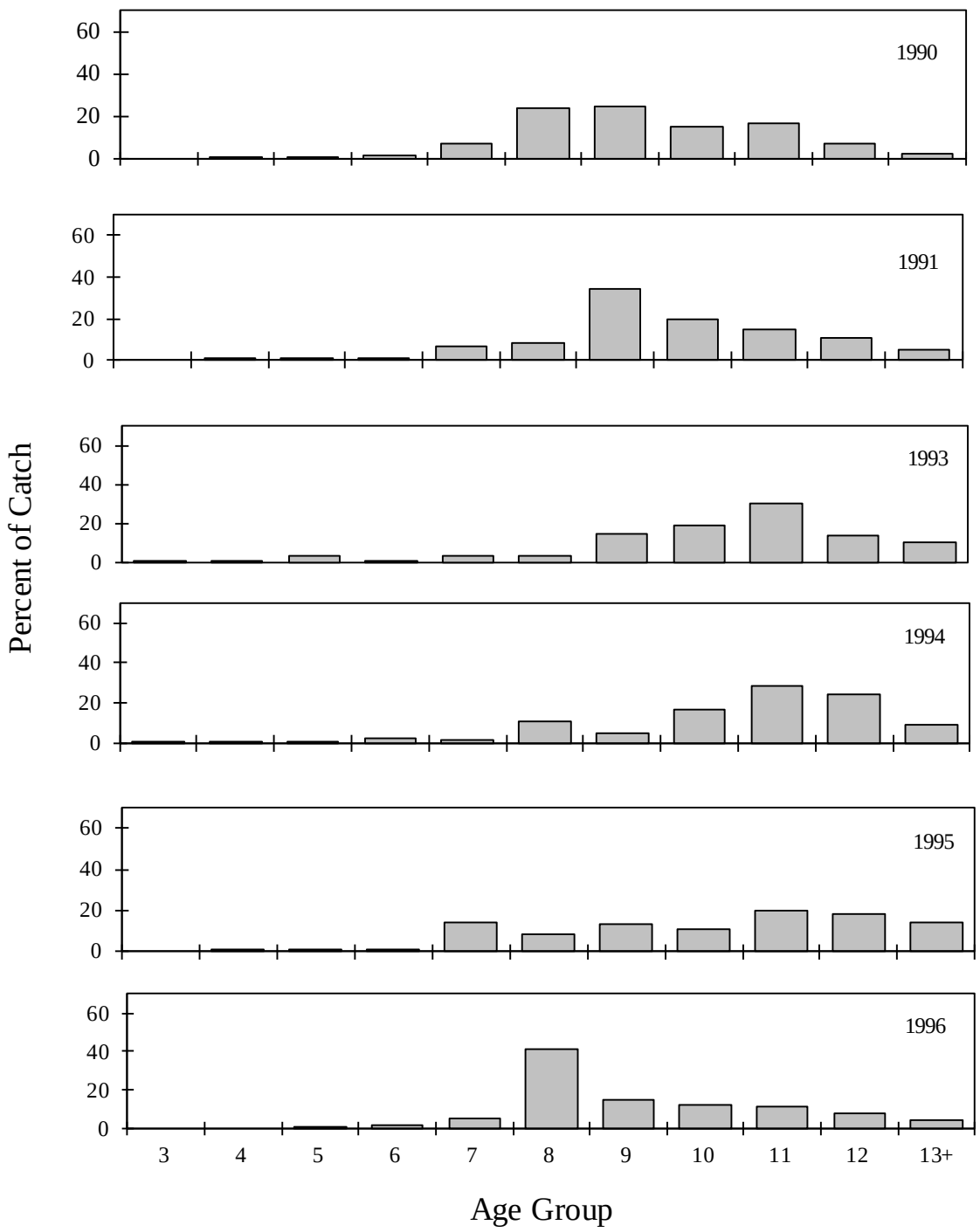
[h] Does not include an estimated 5 st of wastage.

[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.

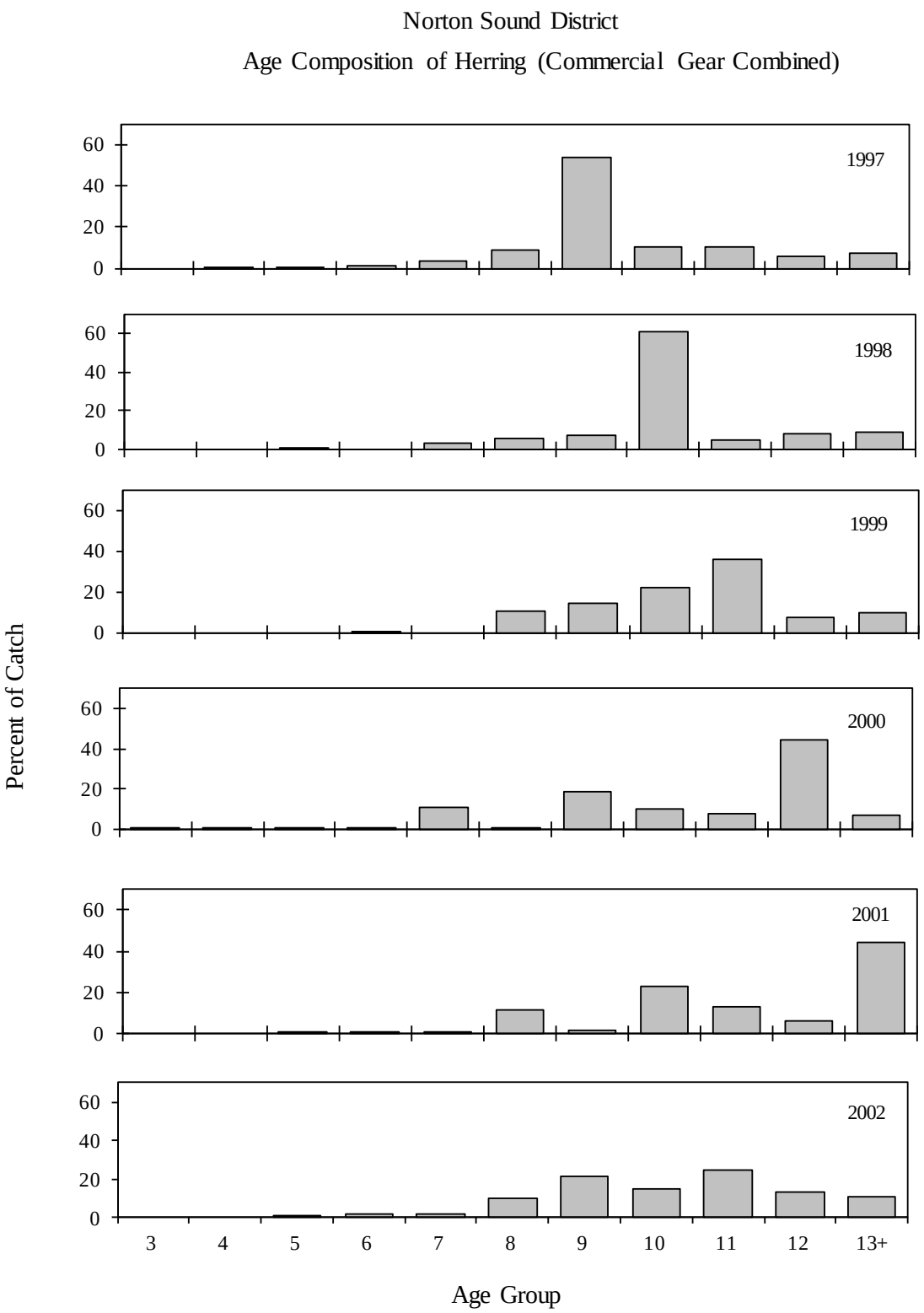
Appendix D4.–Port Clarence District commercial herring fishery, 1986–1996.

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



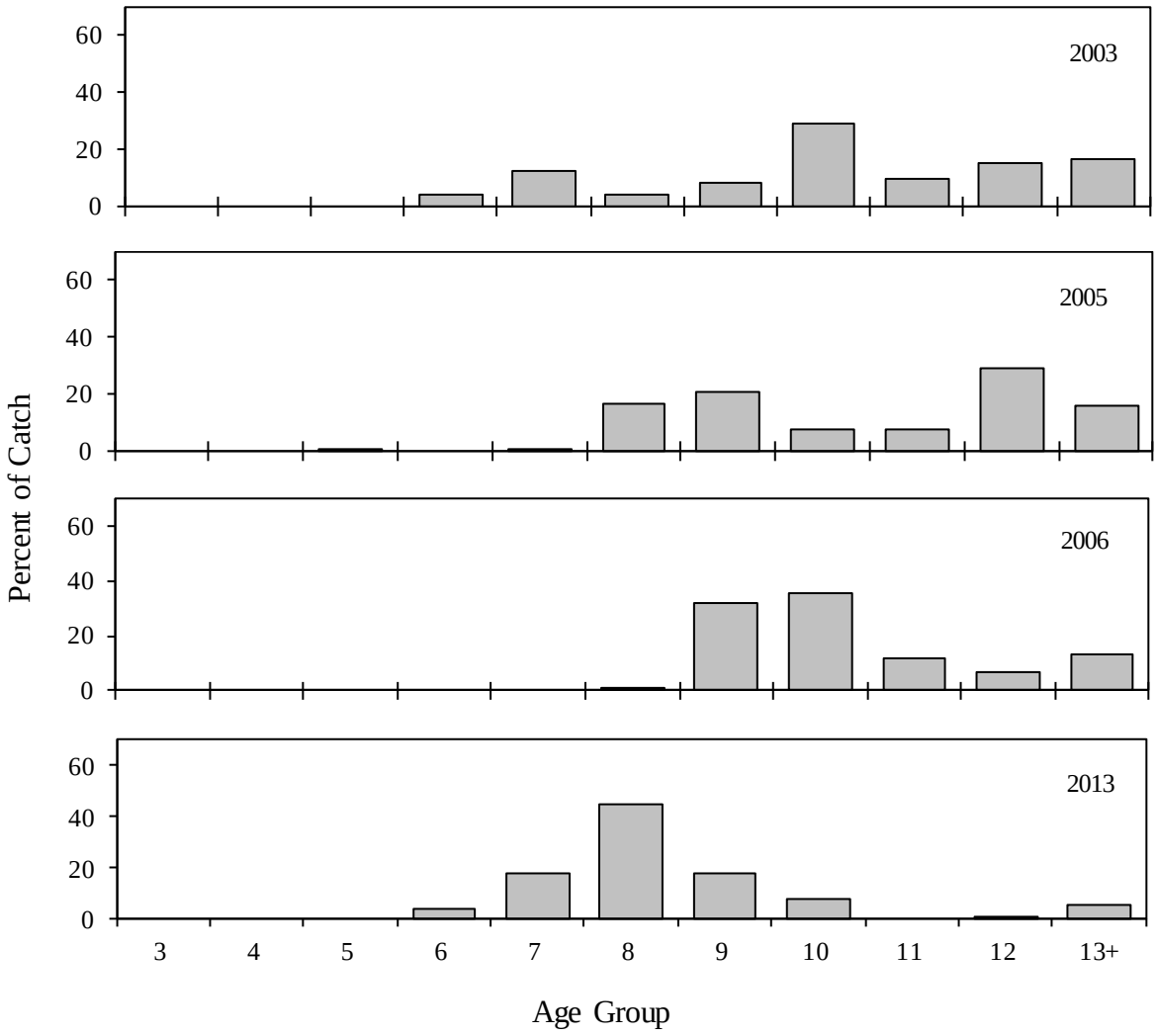
Appendix D5.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1990–1996.

Note: No commercial fishing occurred in 1992.



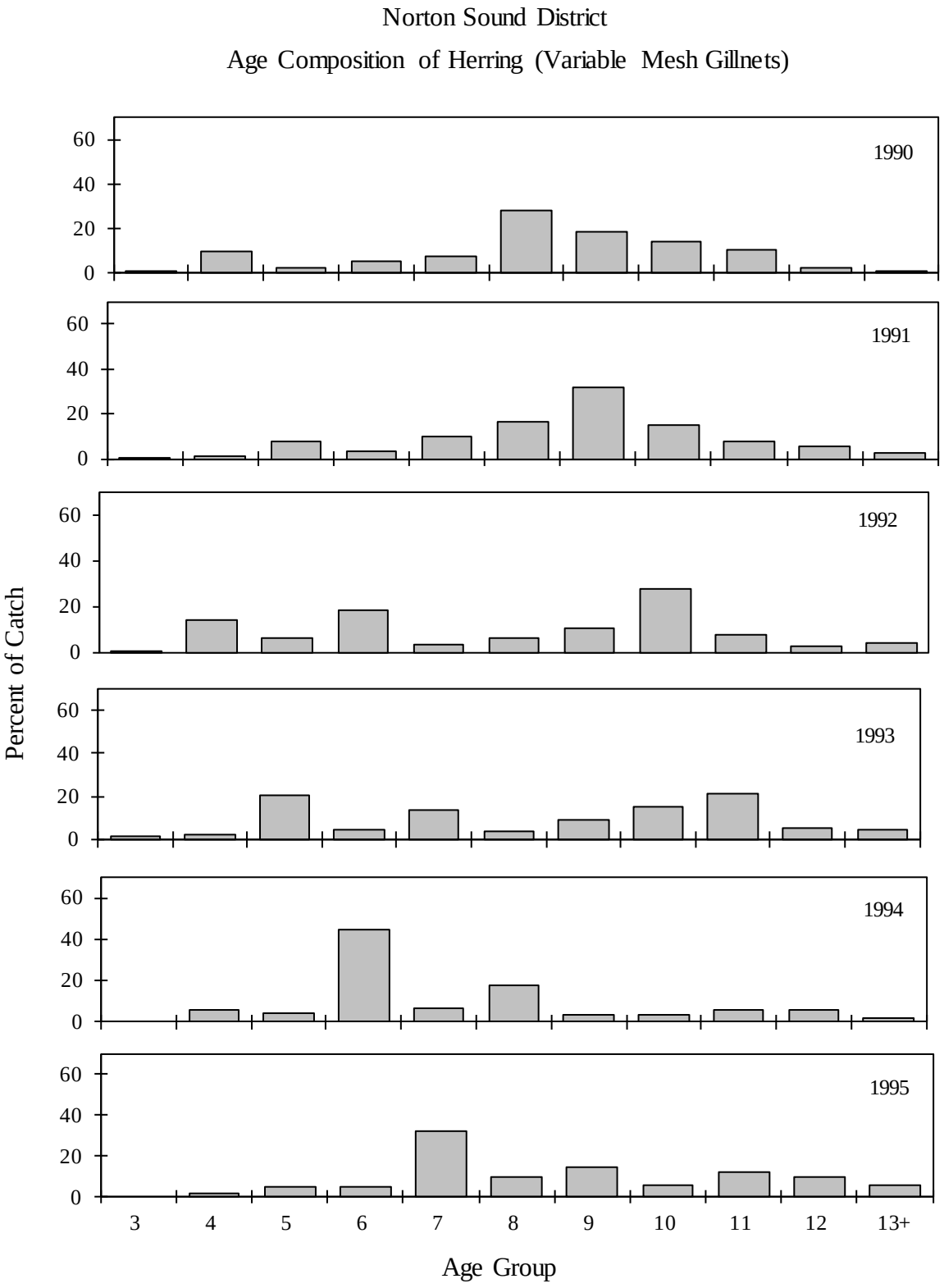
Appendix D6.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1997–2002.

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

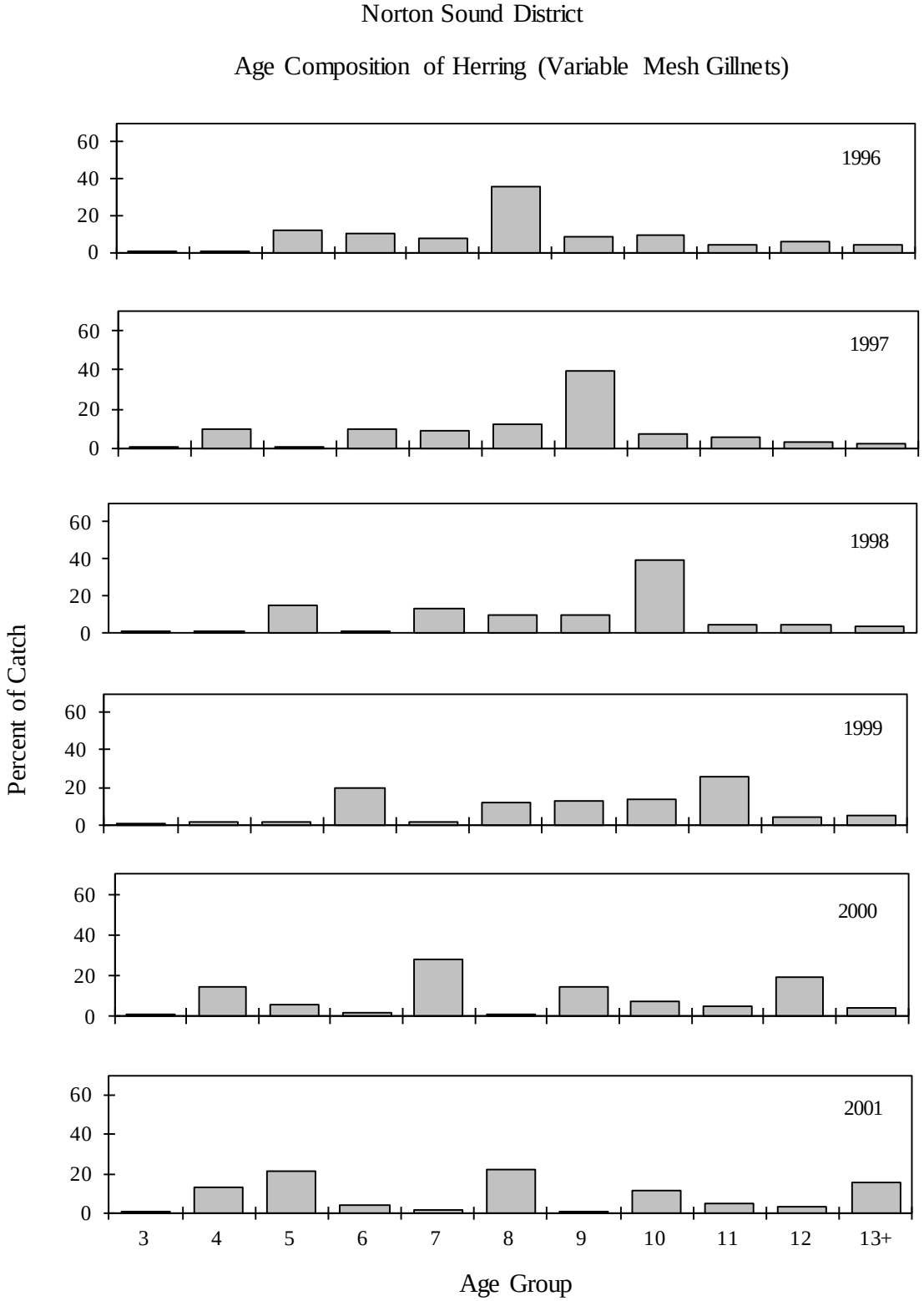


Appendix D7.–Norton Sound herring age class composition by percentage of commercial catch, gillnet only, 2003–2006 and 2013–2015.

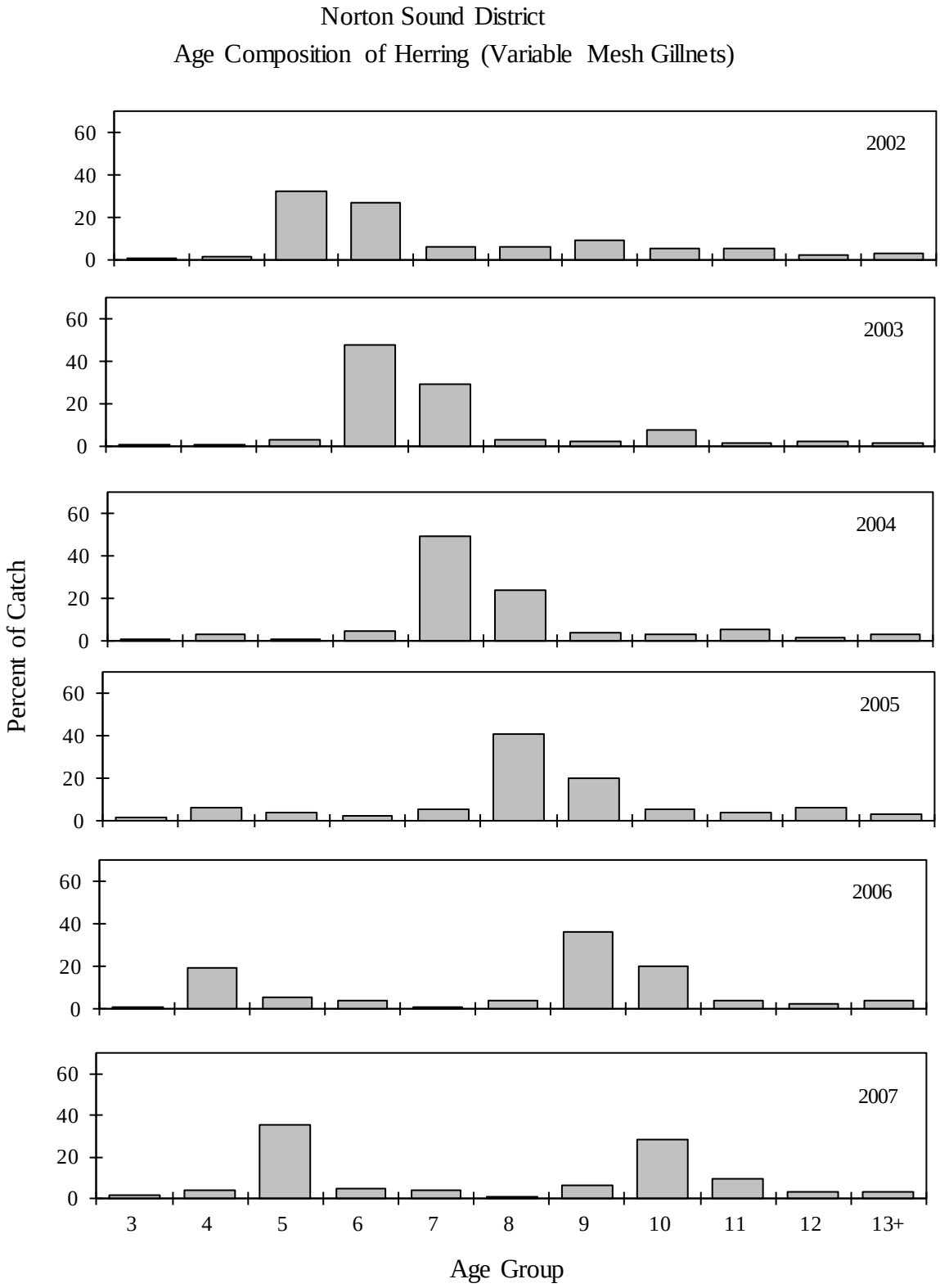
Note: No fishery in 2004. No commercial samples were available 2007–2012, 2014, and 2015.



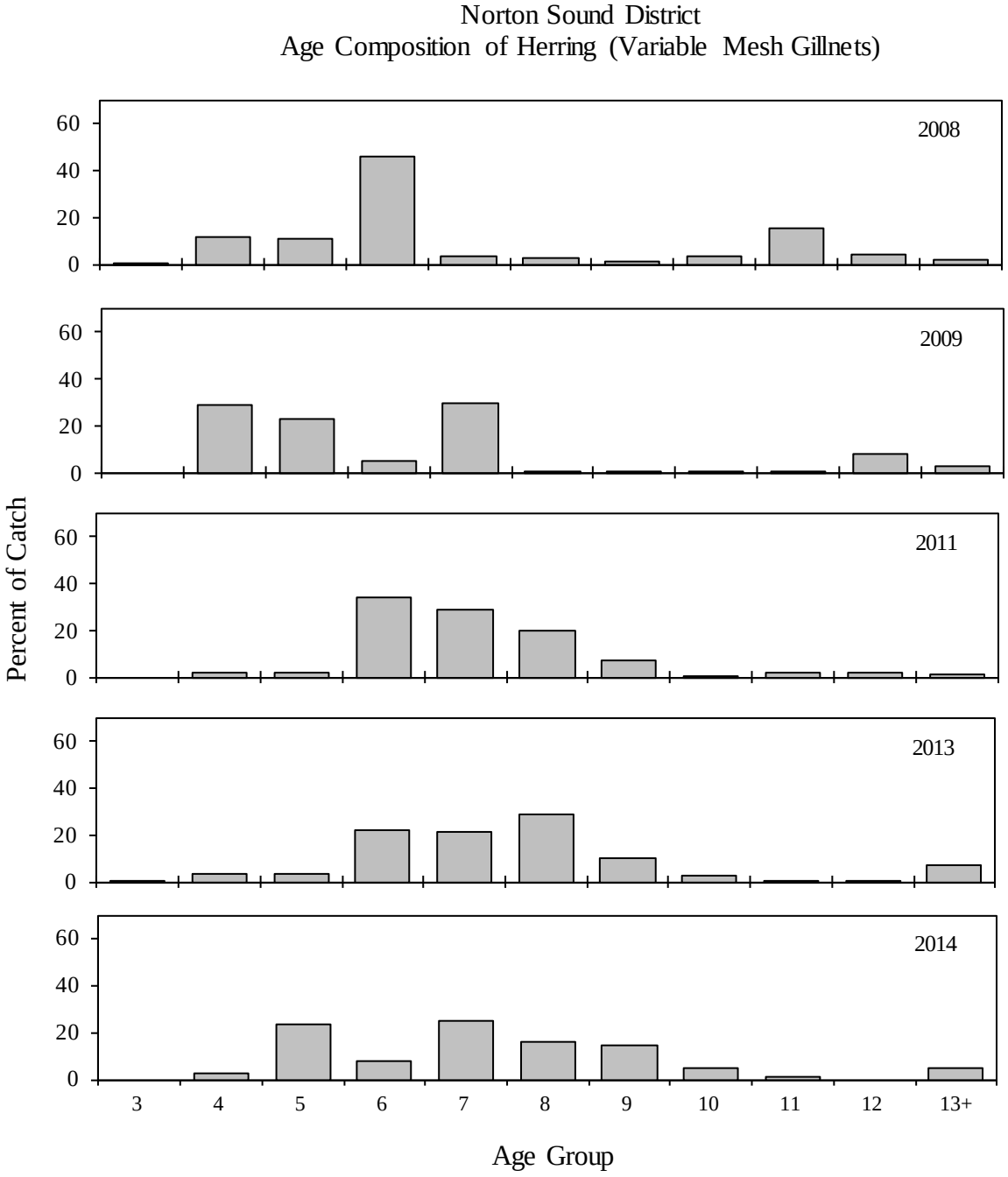
Appendix D8.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1990–1995.



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, 2008–2015.

Note: Herring age class composition by percentage of total catch for 2010, 2012, and 2015 are not available.

APPENDIX E: KING CRAB FISHERIES

Appendix E1.–Historical summer commercial red king crab fishery catch statistics and economic performance, Norton Sound Section, Eastern Bering Sea, 1990–2015.

Year	Guideline Harvest Level (lb) [b]	Commercial Harvest (lb) [a,b] Open Access	CDQ	Total Number of Vessels	Permits	Landings	Total Number of Pots Registered	Pulls	Avg Weight (lb)	Total Exvessel Price/lb	Total Fishery Value (millions $)	Season Length Days	Dates Open Access	Dates CDQ
1990	0.20	0.19		4	4	[c]	1,388	3,172	3.1	[c]	[c]	4	8/01–8/05	[d]
1991	0.34						No Summer Fishery							
1992	0.34	0.07		27	27	[c]	2,635	5,746	3.0	1.75	0.130	2	8/01–8/03	[d]
1993	0.34	0.33		14	20	208	560	7,063	2.9	1.28	0.430	52	7/01–8/28 [e]	[d]
1994	0.34	0.32		34	52	407	1,360	11,729	3.0	2.02	0.646	31	7/01–7/31	[d]
1995	0.34	0.32		48	81	665	1,900	18,782	3.0	2.87	0.926	67	7/01–9/05	[d]
1996	0.34	0.22		41	50	264	1,640	10,453	3.0	2.29	0.519	57	7/01–9/03 [f]	[d]
1997	0.08	0.09		13	15	100	520	2,982	2.8	1.98	0.184	44	7/01–8/13 [g]	[d]
1998	0.08	0.03	0.00	8	11	50	360	1,639	2.8	1.47	0.041	65	7/01–9/03 [h]	[d]
1999	0.08	0.02	0.00	10	9	53	360	1,630	2.7	3.08	0.073	66	7/01–9/04 [i]	[d]
2000	0.33	0.29	0.01	15	22	201	560	6,345	2.7	2.32	0.715	91	7/01–8/29	9/01–9/29
2001	0.30	0.28	0.00	30	37	319	1,200	11,918	2.9	2.34	0.674	97	7/01–9/01	9/01–9/09
2002	0.24	0.24	0.01	32	49	201	1,120	6,491	3.0	2.81	0.729	77	7/01–8/06	6/15–28; 8/9–9/3
2003	0.25	0.25	0.01	25	43	236	960	8,494	2.8	3.09	0.823	68	7/01–8/13	6/15–28; 8/15–24
2004	0.35	0.31	0.03	26	39	227	1,120	8,066	2.8	3.12	1.063	51	7/01–8/08	6/15–6/28
2005	0.37	0.37	0.03	31	42	255	1,320	8,867	2.9	3.14	1.264	73	7/01–8/15	6/15–28; 8/17–27
2006	0.45	0.42	0.03	28	40	249	1,120	8,867	3.0	2.26	1.021	68	7/01–8/22	6/15–6/28
2007	0.32	0.29	0.02	38	30	251	1,200	9,118	2.8	2.49	0.750	52	7/01–8/17	6/15–6/28
2008	0.41	0.36	0.03	23	30	248	920	8,721	2.8	3.20	1.231	73	6/23–8/18	8/17–9/03
2009	0.38	0.37	0.03	22	27	359	920	11,934	2.8	3.17	1.225	98	6/15–9/20 [j]	6/15–7/28 [j]
2010	0.40	0.39	0.03	23	32	286	1,040	9,698	2.8	3.73	1.528	58	7/01–8/24	6/28–7/16

-continued-

Appendix E1.–Page 2 of 2.

Year	Guideline Harvest Level (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	Avg Weight (lb)	Total Exvessel Price/lb	Total Fishery Value (millions $)	Season Length Days	Season Length Dates Open Access	Season Length Dates CDQ
2011	0.36	0.37	0.03	24	25	173	1,040	6,808	2.8	5.23	2.016	33	6/28–7/30	6/28–7/08
2012	0.47	0.44	0.03	40	29	312	1,200	10,041	2.9	5.41	2.556	72	6/29–8/11	6/29–9/08
2013	0.50	0.37	0.02	37	33	460	1,420	15,058	3.0	5.63	2.165	74	7/03–9/14	7/03–9/14 [g]
2014	0.38	0.36	0.03	52	33	309	1,560	10,127	3.0	5.12	1.960	52	6/25–8/02	6/25–8/15
2015	0.39	0.37	0.03	42	36	251	1,480	8,356	2.8	5.40	2.130	26	6/29–7/24	6/29–7/24 [j]

[a] Deadloss included in total.

[b] Millions of pounds.

[c] Information not available.

[d] Fishing actually began July 8.

[e] Fishing began July 9 due to fishermen strike.

[f] First delivery was made July 10.

[g] First delivery was made July 16.

[h] The season was extended 24 hours due to bad weather.

[i] NSSP stopped buying crab from June 29 to July 6 due to poor meatfill.

[j] Final delivery was made July 17.

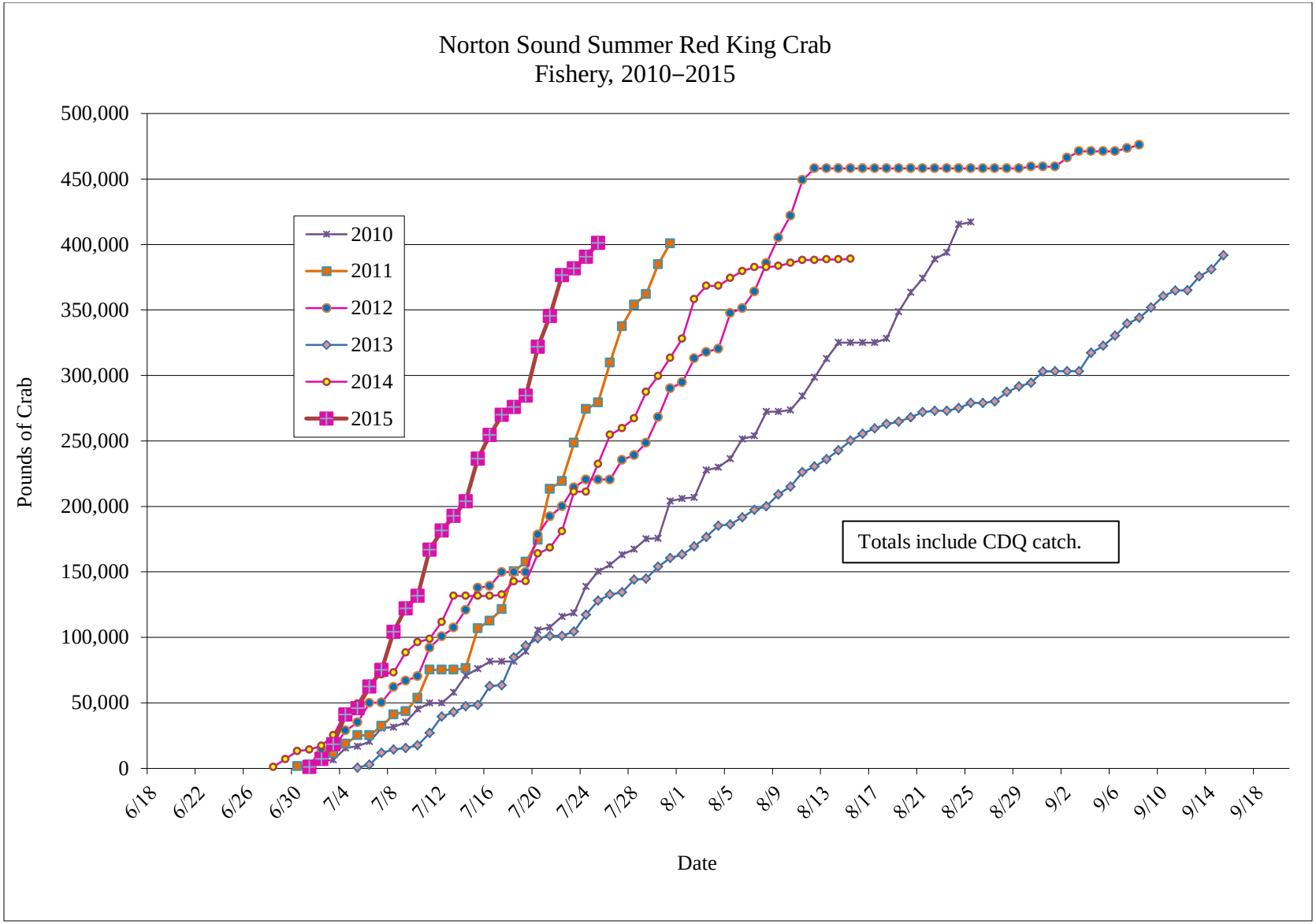
Appendix E2.–Average length and percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Eastern Bering Sea, 1990–2015.

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
2015	115	58	42

[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 E3.–Current and historical cumulative catch for the Norton Sound summer commercial crab fishery, 2010–2015.

Appendix E4.–Historical winter commercial red king crab fishery catch statistics and economic performance, Norton Sound Section, Eastern Bering Sea, 1990–2015.

Year	Commercial Harvest (lb) [a]	Permits Fished	Landings	Pot Pulls	CPUE	Average Weight (lb)	Exvessel Price/lb	Fishery Value ($)	Season Dates [b]
1990	9,792	12	199	257	14	2.8	1.59	557	11/15–5/15
1991	10,064	11	187	609	6	2.7	[c]	[c]	11/15–5/15
1992	21,177	13	287	1,823	4	2.8	3.60	76,283	11/15–5/15
1993	4,926	8	66	[c]	[c]	2.8	[c]	[c]	11/15–5/15
1994	17,214	25	183	1,018	6	3.0	3.01	51,709	11/15–5/15
1995	21,813	42	345	3,302	2	2.9	3.09	66,190	11/15–5/15
1996	5,064	9	68	292	7	2.5	3.16	14,838	11/15–5/15
1997	[d]	2	[d]	[d]	[d]	[d]	2.81	[d]	11/15–5/15
1998	2,349	5	31	749	1	2.4	3.57	8,168	11/15–5/15
1999	7,041	5	61	425	6	2.6	3.69	24,777	11/15–5/15
2000	7,894	10	90	1,230	2	2.6	3.72	29,300	11/15–5/15
2001	2,943	3	21	534	2	2.7	3.60	10,582	11/15–5/15
2002	6,860	11	68	1,247	2	2.7	3.53	22,682	11/15–5/15
2003	16,827	13	128	1,960	3	2.5	3.52	57,577	11/15–5/15
2004 [e]	1,293	2	16	397	1	2.5	3.95	5,110	11/15–5/15
2005	5,619	4	51	1,076	2	2.7	4.52	25,054	11/15–5/15
2006	[d]	1	[d]	[d]	[d]	[d]	3.98	[d]	11/15–5/15
2007	8,023	8	106	926	4	2.4	3.06	24,464	11/15–5/15
2008	14,676	9	129	1,008	6	2.5	3.03	43,664	11/15–5/15
2009	12,348	7	130	1,282	4	2.5	3.01	32,649	11/15–5/15
2010	12,028	10	184	1,848	3	2.5	3.54	41,265	11/15–5/15
2011	8,669	5	129	1,747	2	2.6	3.59	30,776	11/15–5/15
2012	24,142	35	319	1,668	5	2.6	6.47	150,569	11/15–5/15
2013	62,179	26	495	6,093	4	2.8	6.73	402,256	11/15–5/15
2014	34,587	21	323	4,037	4	2.3	6.94	234,291	11/15–5/15
2015	98,750	44	664	7,314	6	2.4	6.57	617,434	11/15–4/30
Average 2010–14	28,321	19	290	3,079	4	2.6	5.45	171,831	
Average 2005–14	18,249	13	187	1,969	5	2.6	4.49	98,574	

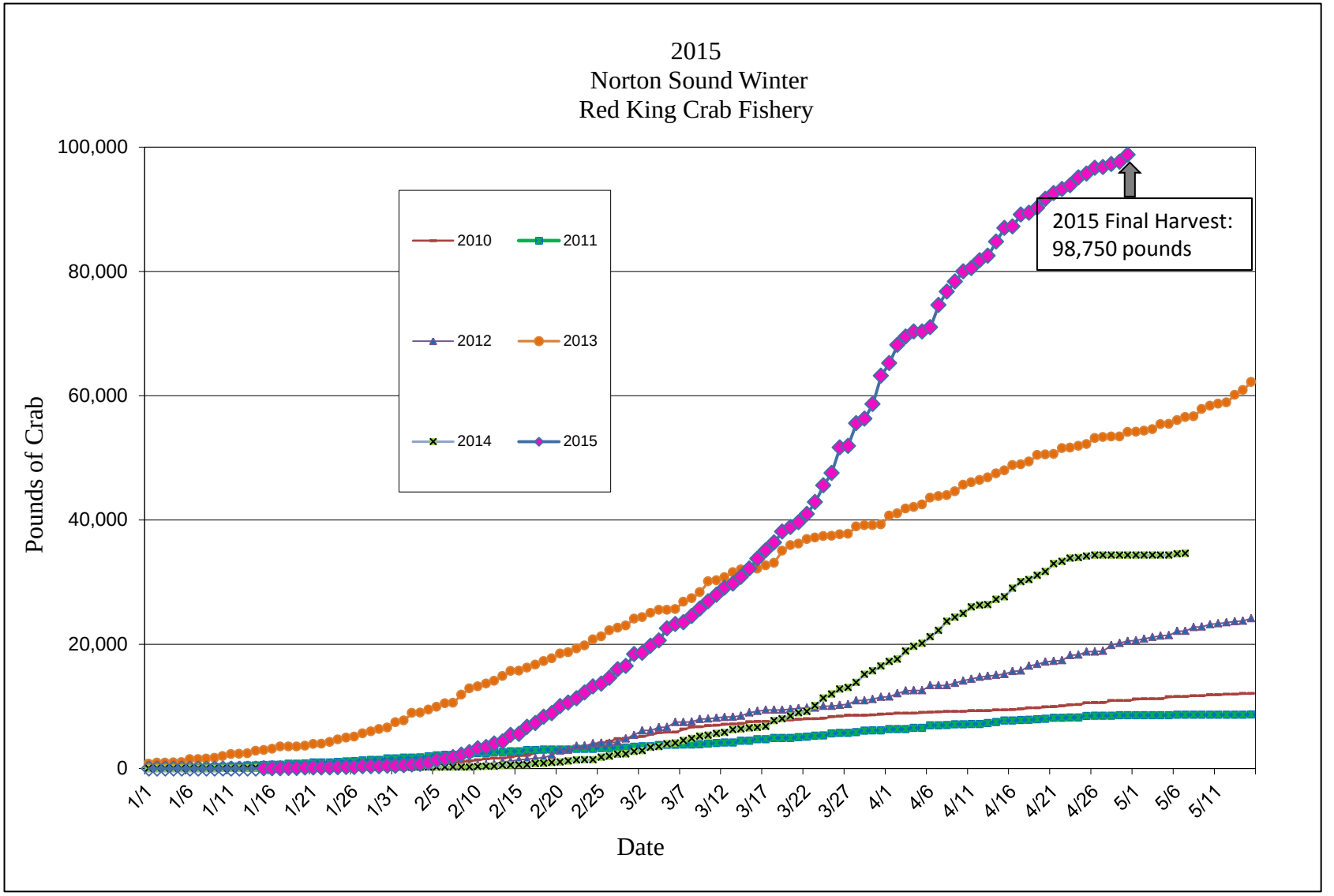
[a] Deadloss included in total.

[b] Prior to 2015, season dates were from November 15 of the previous year to May 15 of the current year. In 2015, season dates were from November 15, 2014 to April 30, 2015.

[c] Information is not available.

[d] Information is confidential because less than 3 permit holders delivered.

[e] Confidentiality was waived by the fishermen.



Appendix E5.–Current and historical catch performance for the Norton Sound winter commercial crab fishery, 2010–2015.

Appendix E6.–Summer subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 2004–2015.

Year [a]	Permits Issued	Permits Returned	Permits Fished	Crab Caught [b]	Crab Harvested [c]	Multiplier [d]	Pounds Harvested [d]	Average Number Kept/ Permits Fished
2004	38	18	5	996	350	2.3	805	70
2005	14	12	4	753	304	2.4	727	76
2006	6	4	3	67	62	2.5	155	21
2007	19	19	5	1,425	1,008	2.3	2,318	202
2008	30	30	14	1,816	1,176	2.3	2,705	84
2009	20	20	13	1,874	653	2.3	1,502	50
2010	27	27	15	1,086	660	2.3	1,518	44
2011	43	42	27	4,026	2,658	2.3	6,193	98
2012	45	44	13	1,346	912	2.4	2,189	70
2013	47	46	26	3,102	1,865	2.5	4,663	72
2014	40	40	25	2,185	1,210	2.5	3,025	48
2015	31	28	12	5,649	2,734	2.3	6,234	228
Average 2010–14	40	40	21	2,349	1,461	2.4	3,517	66
Average 2005–14	29	28	15	1,768	1,051	2.4	2,499	76

Note: There were no recorded summer subsistence harvests prior to 2004.

[a] The summer subsistence fishery is open June through November.

[b] The number of crab actually caught; some may have been released.

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

[d] Multiplier is the average weight of crab from the commercial fishery of the same year minus 0.5 pound. Pounds harvested are derived by multiplying the total number of harvested crab by the multiplier.

Appendix E7.–Winter subsistence red king crab harvest statistics, Norton Sound, Eastern Bering Sea, 1990–2015.

Winter [a]	Permits Issued	Permits Returned	Permits Fished	Crab Caught [b]	Crab Harvested [c]	Multiplier [d]	Pounds Harvested [d]	Average Number Kept/ Permits Fished
1989–90	136	118	107	16,635	12,152	2.3	27,464	114
1990–91	119	104	79	9,295	7,366	2.2	15,911	93
1991–92	158	105	105	15,051	11,736	2.3	27,345	112
1992–93	88	79	37	1,193	1,097	2.3	2,479	30
1993–94	118	95	71	4,894	4,113	2.5	10,241	58
1994–95	166	131	97	7,777	5,426	2.4	12,968	56
1995–96	84	44	35	2,936	1,679	2.0	3,408	48
1996–97	38	22	13	1,617	745	2.0	1,512	57
1997–98	94	73	64	20,327	8,622	1.9	16,296	135
1998–99	95	80	71	10,651	7,533	2.1	15,744	106
1999–00	98	64	52	9,816	5,723	2.1	11,961	110
2000–01	50	27	12	366	256	2.2	558	21
2001–02	114	101	67	8,805	3,669	2.2	7,888	55
2002–03	107	73	64	9,052	4,140	2.0	8,114	65
2003–04	96	77	41	1,775	1,181	2.0	2,338	29
2004–05 [e]	170	102	60	6,496	3,973	2.2	8,542	66
2005–06	98	97	67	2,083	1,239	2.4	2,974	18
2006–07	129	127	116	21,444	10,690	1.9	20,525	92
2007–08	139	137	108	18,621	9,485	2.0	19,255	88
2008–09	105	105	70	6,971	4,752	2.0	9,456	68
2009–10	125	123	85	9,004	7,044	2.0	14,018	83
2010–11	148	148	95	9,183	6,640	2.1	13,811	70
2011–12	204	204	138	11,341	7,371	2.1	15,774	53
2012–13	149	148	104	21,752	7,662	2.3	17,240	74
2013–14	103	103	75	5,421	3,252	1.8	5,886	43
2014–15	155	153	107	9,840	7,651	1.9	14,613	72
Average 2010–14	146	145	99	11,340	6,394	2.1	13,346	65
Average 2005–14	137	129	92	11,232	6,211	2.1	12,748	66

[a] The winter subsistence fishery is open December through May.

[b] The number of crab actually caught; some may have been released.

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

[d] Multiplier is the average weight of crab from the commercial fishery of the same year minus 0.5 pound. Pounds harvested are derived by multiplying the total number of harvested crab by the multiplier.

[e] Permits were only given out of the Nome ADF&G office, except during the 2004–2005 season, when permits were given out in Elim, Golovin, Shaktoolik, and White Mountain.

Appendix E8.–Summer and winter, commercial and subsistence red king crab harvests in pounds, Norton Sound, Eastern Bering Sea, 1990–2015.

	Commercial					Subsistence				
Year	Summer Harvest	Winter Harvest	Winter/ Total Harvest (%)	Total Harvest	Guideline Harvest Level	Summer Harvest [a]	Winter Harvest [a]	Winter/ Total Harvest (%)	Total Harvest	Combined Total Harvest [b]
1990	192,831	9,792	5	202,623	200,000	[c]	27,464	100	27,464	230,087
1991	[d]	10,064	100	10,064	[d]	[c]	15,911	100	15,911	25,975
1992	74,029	21,177	22	95,206	340,000	[c]	27,345	100	27,345	122,551
1993	335,790	4,926	1	340,716	340,000	[c]	2,479	100	2,479	343,195
1994	327,858	17,214	5	345,072	340,000	[c]	10,241	100	10,241	355,313
1995	322,676	21,813	6	344,489	340,000	[c]	12,968	100	12,968	357,457
1996	224,231	5,064	2	229,295	340,000	[c]	3,408	100	3,408	232,703
1997	92,988	[e]	[e]	92,988	80,000	[c]	1,512	100	1,512	94,500 [f]
1998	29,684	2,349	7	32,033	80,000	[c]	16,296	100	16,296	48,329
1999	23,553	7,041	23	30,594	80,000	[c]	15,744	100	15,744	46,338
2000	312,524	7,894	2	320,418	336,000	[c]	11,961	100	11,961	332,379
2001	288,199	2,943	1	291,142	303,000	[c]	558	100	558	291,700
2002	259,601	6,860	3	266,461	248,000	[c]	7,888	100	7,888	274,349
2003	267,207	16,827	6	284,034	253,000	[c]	8,114	100	8,114	292,148
2004	340,746	1,293	0	342,039	326,500	805	2,338	74	3,143	345,182
2005	400,804	5,619	1	406,423	370,000	727	8,542	92	9,269	415,692
2006	451,748	[e]	[e]	451,748	454,000	155	2,974	95	3,129	454,877 [f]
2007	312,875	8,023	3	320,898	315,000	2,318	20,525	90	22,843	343,741
2008	395,135	14,676	4	409,811	412,000	2,705	19,255	88	21,959	431,770
2009	397,587	12,348	3	409,935	375,000	1,502	9,456	86	10,958	420,893
2010	417,304	12,028	3	429,332	400,000	1,518	14,018	90	15,536	444,868
2011	400,840	8,669	2	409,509	358,000	6,193	13,811	69	20,004	429,513
2012	475,990	24,142	5	500,132	465,450	2,189	15,774	88	17,963	518,095
2013	391,863	62,179	14	454,042	495,600	4,663	17,240	79	21,902	475,944
2014	389,008	34,587	8	423,595	382,800	3,025	5,886	66	8,911	432,506
2015	401,115	98,750	20	499,865	394,600		14,613	100	14,613	514,478
Average 2010–14	415,001	28,321	6	443,322	420,370	3,517	13,346	78	16,863	460,185
Average 2005–14	403,315	20,252	5	421,543	402,785	2,499	12,748	84	15,247	436,790

[a] Harvest in pounds is derived by multiplying number of crab by 0.5 pound less than the average weight from the respective commercial fishery.

[b] Combined total harvest is from summer and winter, commercial and subsistence red king crab harvests.

[c] There were no recorded summer subsistence harvests prior to 2004.

[d] There was no summer commercial fishery, therefore no GHL was set.

[e] Information is confidential.

[f] Does not contain winter commercial harvest because it is confidential information.

Appendix E9.–The results of the population assessment trawl surveys conducted for red king crab in Norton Sound since 1990.

Year	Date	Research Agency	Population Abundance Estimates [a] (number of crab) Pre-2 Males [b]	Pre-1 Males [b]	Legal Males [c]	Legal Male Biomass (millions of lb) [d]	Standard Error (number of crab) Pre-2 Males [b]	Pre-1 Males [b]	Legal Males [c]
1991	8/22–08/30	NMFS	386,338	408,241	1,545,558	4,636,674	297,059	157,018	450,814
1996	9/07–09/18	ADF&G	395,888	277,595	528,431	1,585,293	243,594	78,712	157,909
1999	7/28–08/07	ADF&G	96,295	582,799	1,542,589	4,627,767	56,017	165,689	318,731
2002	7/27–08/06	ADF&G	393,689	482,815	740,450	2,221,350	85,797	81,271	81,271
2006	7/25–08/08	ADF&G	937,083	571,890	718,379	2,155,137	551,144	153,272	105,487
2008	7/24–08/11	ADF&G	795,777	689,843	811,727	2,435,181	187,516	120,153	152,145
2011	7/18–08/15	ADF&G	431,153	311,550	1,310,634	3,931,902	151,713	87,866	123,310
2014	7/18–07/30	ADF&G	1,547,538	2,110,274	1,747,720	5,243,160	643,563	1,474,574	912,399

[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.

[d] Legal male biomass is estimated by multiplying the population abundance estimate of legal males by an average weight of 3.0 pounds.

Appendix E10.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, 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 inch carapace width (CW). Legal crab are male king crab greater than or equal to 4.75 inch CW.

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

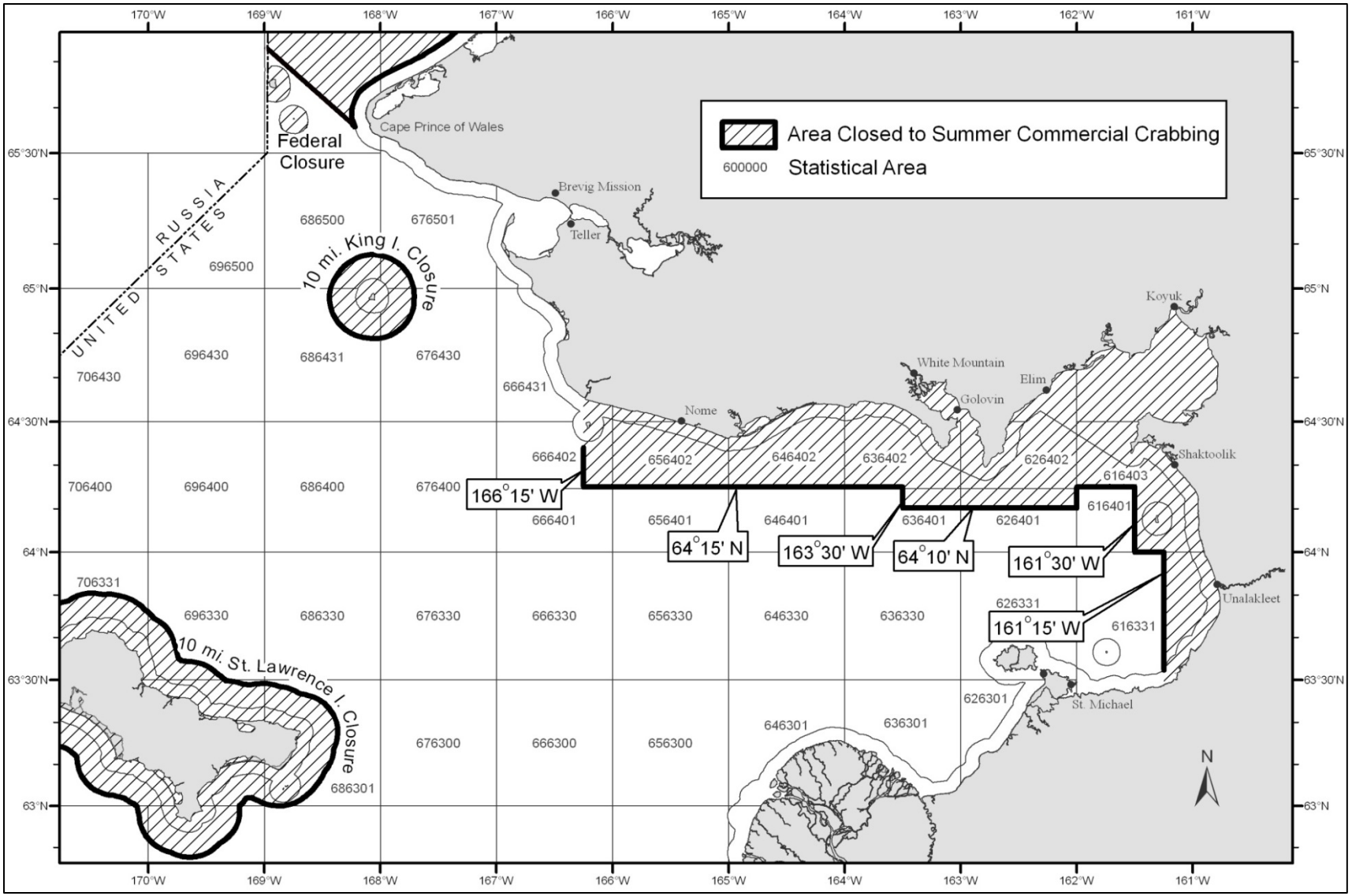
[c] Includes prerecruit 3.

Appendix E11.–Reported number of crab pots lost during the commercial and subsistence winter crab fisheries, and ADF&G studies/surveys, 2006–2015.

Year	Commercial [a]	Subsistence	ADF&G Winter Study & Spring/Fall Tagging Studies [b]	Total
2005–06	ND	50	6	56
2006–07	ND	132	7	139
2007–08	ND	6	4	10
2008–09	ND	8	2	10
2009–10	30	23	2	55
2010–11	3	8	0	11
2011–12	64	19	4	87
2012–13	23	4	3	30
2013–14	105	16	1	122
2014–15	104	16	0	120

[a] Prior to the 2009–10 season, lost pots were not tracked for the winter commercial fishery.

[b] The 2011–12 winter season was the last time the winter study took place. The spring/fall tagging studies took place 2012–2015.



Appendix E12.–Closed waters area in effect for the Norton Sound summer commercial crab fishery.

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

Appendix E13.–Historical commercial summer harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1990–2015 (catch in pounds).

Statistical Area	1990	1992	1993	1994	1995	1996 [a]	1997	1998	1999
616331	0	0	0	48	0	0	0	0	633
616401	0	0	0	0	35	0	0	0	0
626331	0	0	0	0	0	61	0	0	0
626401	0	0	0	0	18,971	45,045	18,066	8,065	508
626402	0	0	0	0	0	0	0	0	0
636330	0	0	0	0	0	4,560	3,838	2,449	0
636401	0	1,159	1,373	3,340	24,329	70,677	59,206	10,771	14,201
636402	0	0	0	1,754	3,466	0	0	0	0
646301	0	0	0	0	4,628	13,888	0	0	0
646330	0	0	0	0	1,493	2,894	314	0	3,021
646401	0	0	1,963	37,510	105,045	22,834	1,052	3,194	221
646402	0	0	730	139,661	66,821	0	0	0	0
656300	0	0	0	0	0	0	0	0	0
656330	0	4,814	265	0	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	0	0	193,079	110,289	44,000	0	0	0	0
666230	0	0	0	0	0	0	0	0	0
666300	0	0	0	0	0	25,519	0	0	0
666330	27,185	4,305	31,758	0	730	0	0	0	0
666401	162,263	10,632	746	396	0	3,001	1,816	0	930
666402	0	0	535	1,221	0	0	0	0	0
666431	0	0	0	0	1,124	0	0	0	0
676300	0	0	0	0	0	546	0	0	0
676330	0	0	0	0	0	0	0	0	0
676400	3,212	0	0	0	0	9,775	0	0	0
676430	0	0	0	0	0	0	0	0	0
676501	0	0	0	0	0	0	0	0	0
686330	0	0	0	0	0	0	0	0	0
686431	0	0	0	0	0	0	0	0	0
Total	192,831	74,029	335,790	328,905	322,676	224,231	92,988	29,684	23,553
(tons)	96	37	168	164	161	112	46	15	12

Appendix E13.–Page 2 of 3.

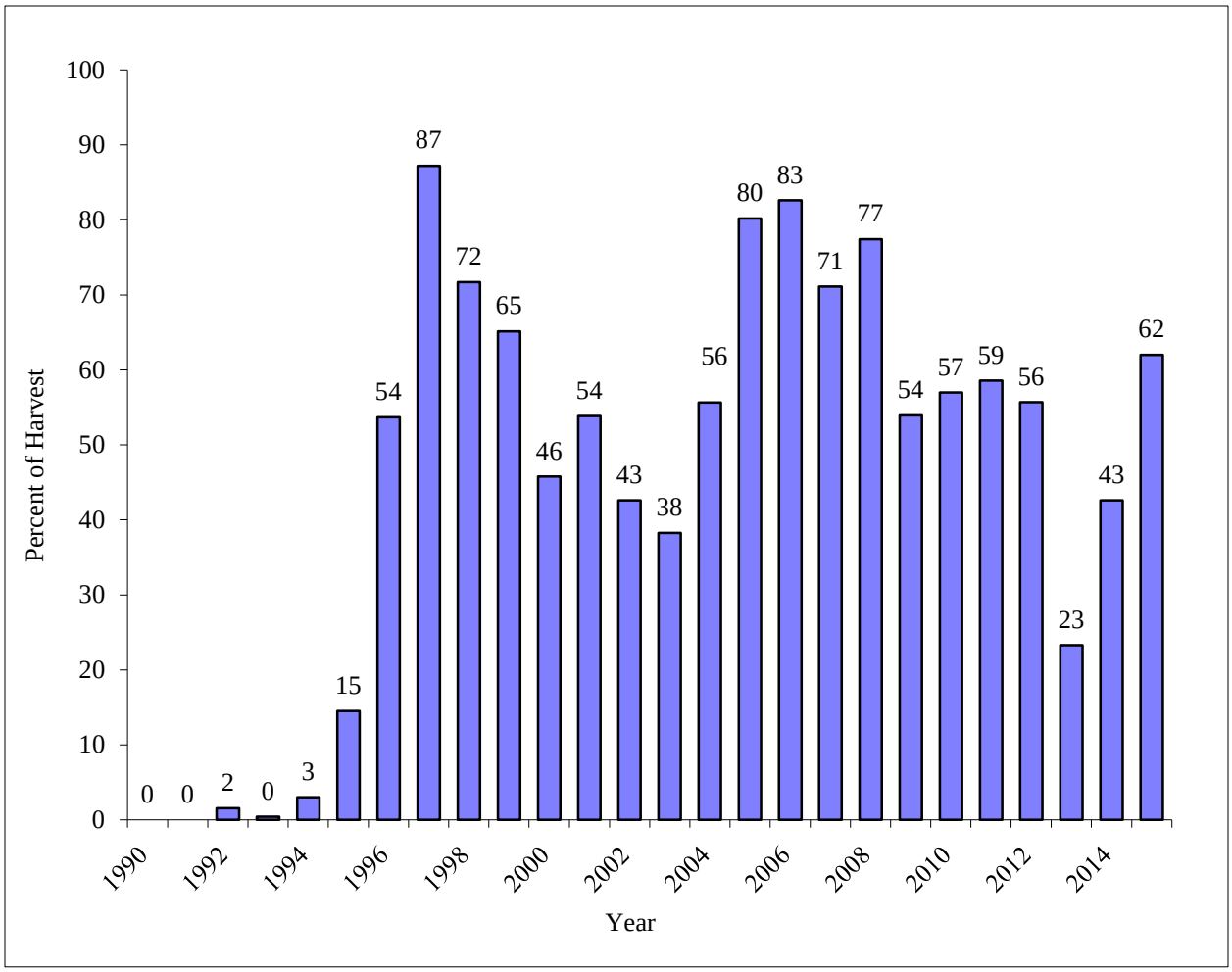
Statistical Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
616331	4,557	0	3,506	646	0	0	2,357	0	5,658	888
616401	0	0	0	0	0	0	0	231	416	6,170
626331	0	0	2,455	0	0	0	1,415	27,018	3,235	3,047
626401	4,689	61,620	53,722	15,899	23,113	94,130	118,202	61,704	96,327	103,043
626402	0	0	0	1,352	0	0	0	0	0	0
636330	0	2,253	0	0	0	126	26,680	10,253	2,350	5,026
636401	130,463	91,343	50,906	83,949	166,489	227,204	224,531	123,092	197,948	96,279
636402	0	0	0	0	0	0	0	0	0	0
646301	0	0	0	0	0	0	0	0	0	0
646330	0	1,868	1,955	0	2,226	4,097	2,629	5,290	1,505	933
646401	0	4,287	0	3,952	1,964	149	1,660	0	18,728	46,264
646402	0	0	0	0	0	0	0	0	0	0
656300	0	0	0	14	932	0	284	1,909	0	0
656330	1,990	20,869	12,374	21,176	46,288	47,411	17,752	4,911	0	10,617
656401	95,979	55,158	63,038	40,566	21,579	9,405	28,434	70,065	68,968	107,557
656402	0	0	0	1,441	0	380	807	2,254	0	0
666230	0	0	0	0	0	0	1,721	0	0	0
666300	0	0	0	0	0	0	18,245	0	0	0
666330	5,839	7,030	1,332	1,296	12,359	142	5,041	511	0	1,514
666401	69,007	43,771	35,970	83,998	42,452	727	600	2,498	0	10,021
666402	0	0	30,070	12,873	23,344	16,025	1,050	2,959	0	6,228
666431	0	0	4,274	45	0	0	0	0	0	0
676300	0	0	0	0	0	0	0	0	0	0
676330	0	0	0	0	0	0	0	0	0	0
676400	0	0	0	0	0	0	0	180	0	0
676430	0	0	0	0	0	0	0	0	0	0
676501	0	0	0	0	0	1,008	0	0	0	0
686330	0	0	0	0	0	0	0	0	0	0
686431	0	0	0	0	0	0	340	0	0	0
Total	312,524	288,199	259,602	267,207	340,746	400,804	451,748	312,875	395,135	397,587
(tons)	156	144	130	134	170	200	226	156	198	199

-continued-

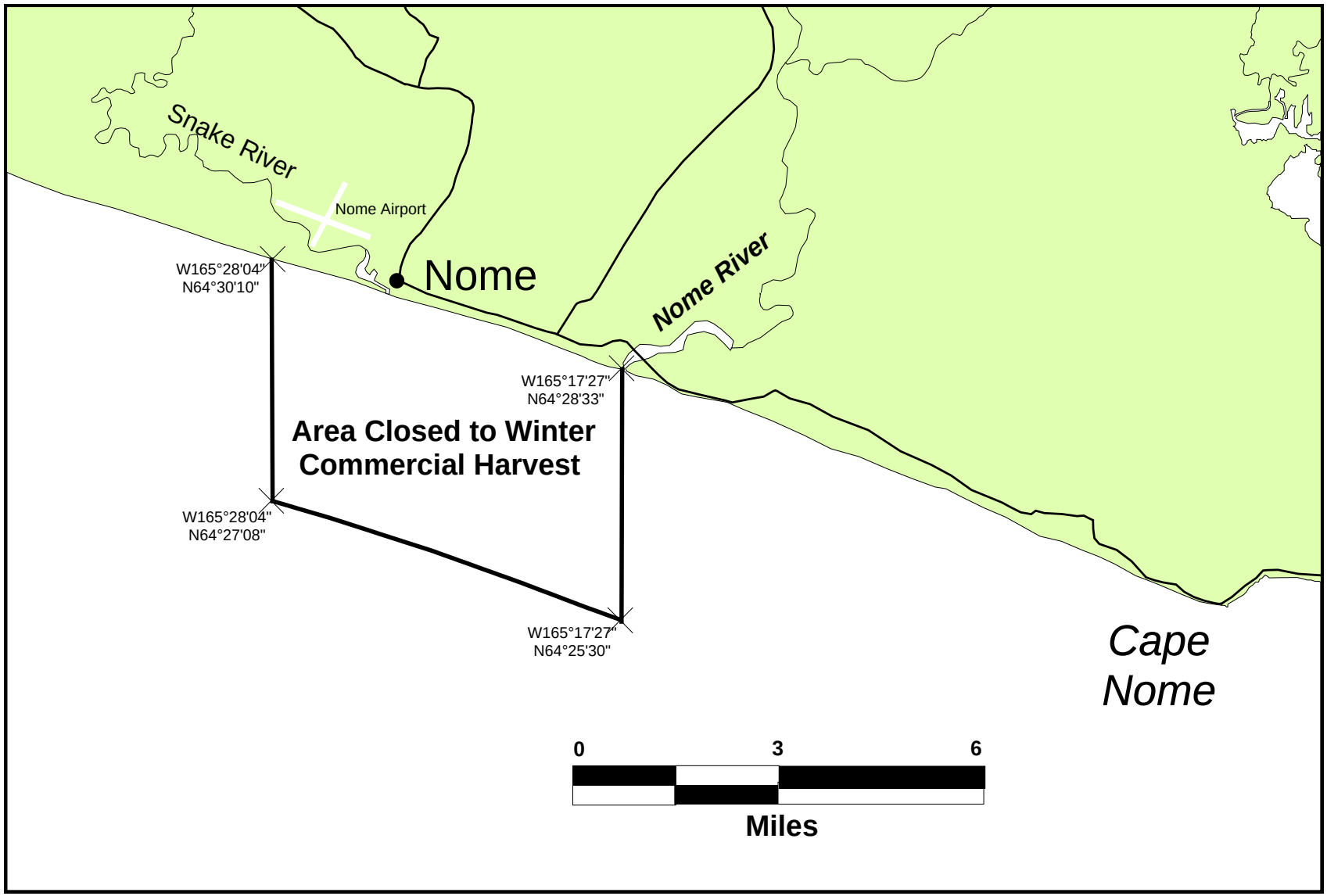
Statistical Area	2010	2011	2012	2013	2014	2015	Total
616331	0	0	0	0	4,923	3,410	26,625
616401	0	0	0	7,729	4,692	1,929	21,202
626331	0	2,489	0	686	0	0	40,406
626401	52,054	85,271	115,524	36,802	69,936	103,881	1,186,572
626402	0	0	0	0	0	0	1,352
636330	2,584	0	1,454	12,035	7,565	2,680	83,853
636401	182,040	146,973	148,183	34,027	78,572	137,285	2,304,339
636402	0	0	0	0	0	0	5,220
646301	0	0	0	0	0	0	18,516
646330	1,205	0	1,204	4,195	5,390	1,812	42,031
646401	77,437	83,099	98,811	59,737	36,409	58,929	663,245
646402	0	0	0	5,271	0	0	212,483
656300	0	0	0	0	0	0	3,139
656330	17,660	1,546	8,168	8,515	0	4,828	274,413
656401	82,747	77,149	85,920	147,569	122,631	69,355	1,389,610
656402	0	0	0	37,743	0	0	389,993
666230	0	0	0	0	0	0	1,721
666300	0	0	0	0	0	0	43,764
666330	0	2,042	1,000	0	0	0	102,084
666401	0	0	15,726	33,469	38,099	9,308	565,430
666402	1,577	2,271	0	1,419	18,968	7,699	126,238
666431	0	0	0	2,669	1,825	0	9,937
676300	0	0	0	0	0	0	546
676330	0	0	0	0	0	0	0
676400	0	0	0	0	0	0	13,167
676430	0	0	0	0	0	0	0
676501	0	0	0	0	0	0	1,008
686330	0	0	0	0	0	0	0
686431	0	0	0	0	0	0	340
Total	417,304	400,840	475,990	391,863	389,008	401,115	7,527,234
(tons)	209	200	238	196	195	201	3,764

Note: No commercial fishery occurred in 1991.

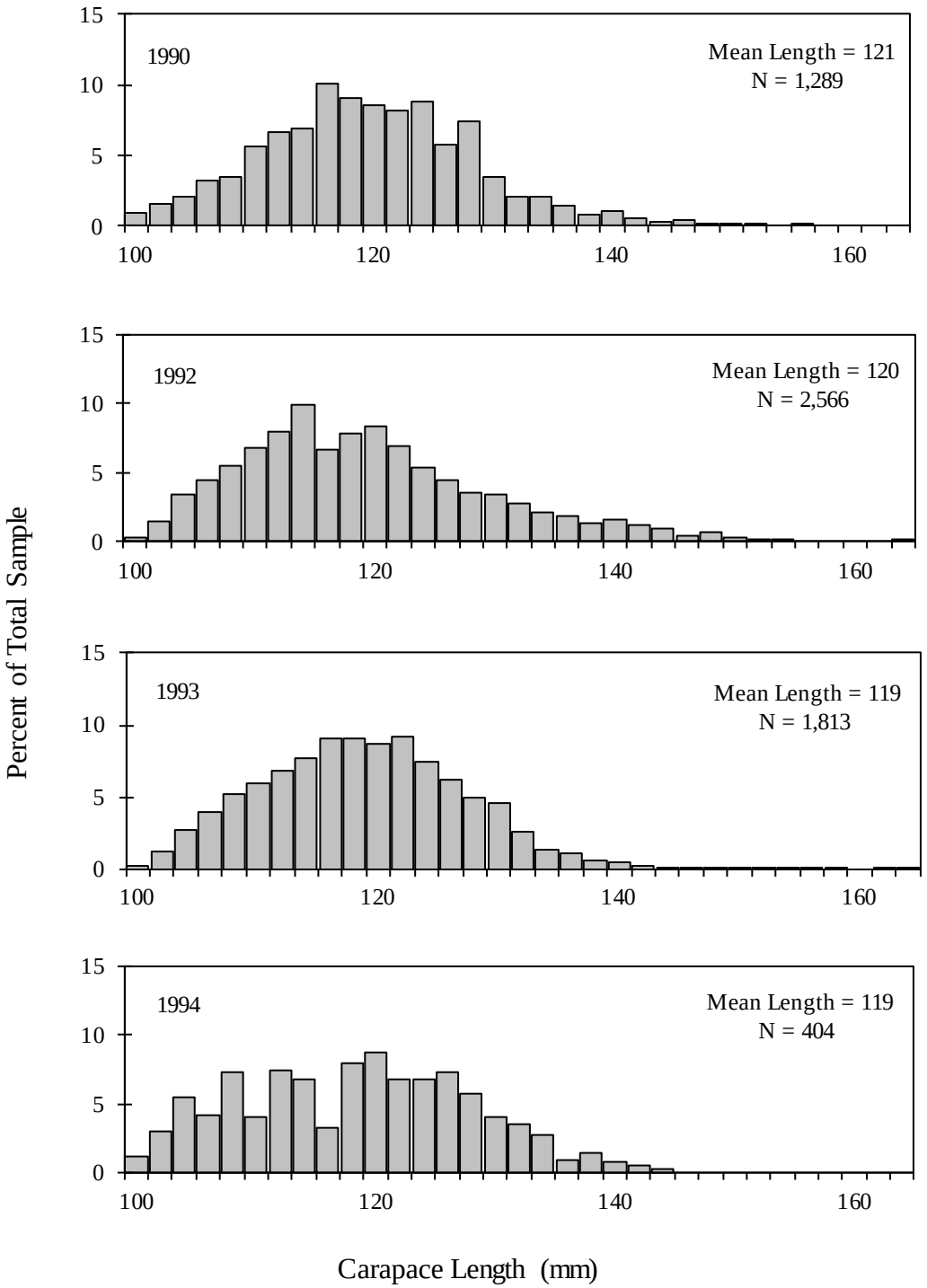
[a] Does not include approximately 2,490 lb not reported on fish tickets.



Appendix E14.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164° W longitude, 1990–2015.

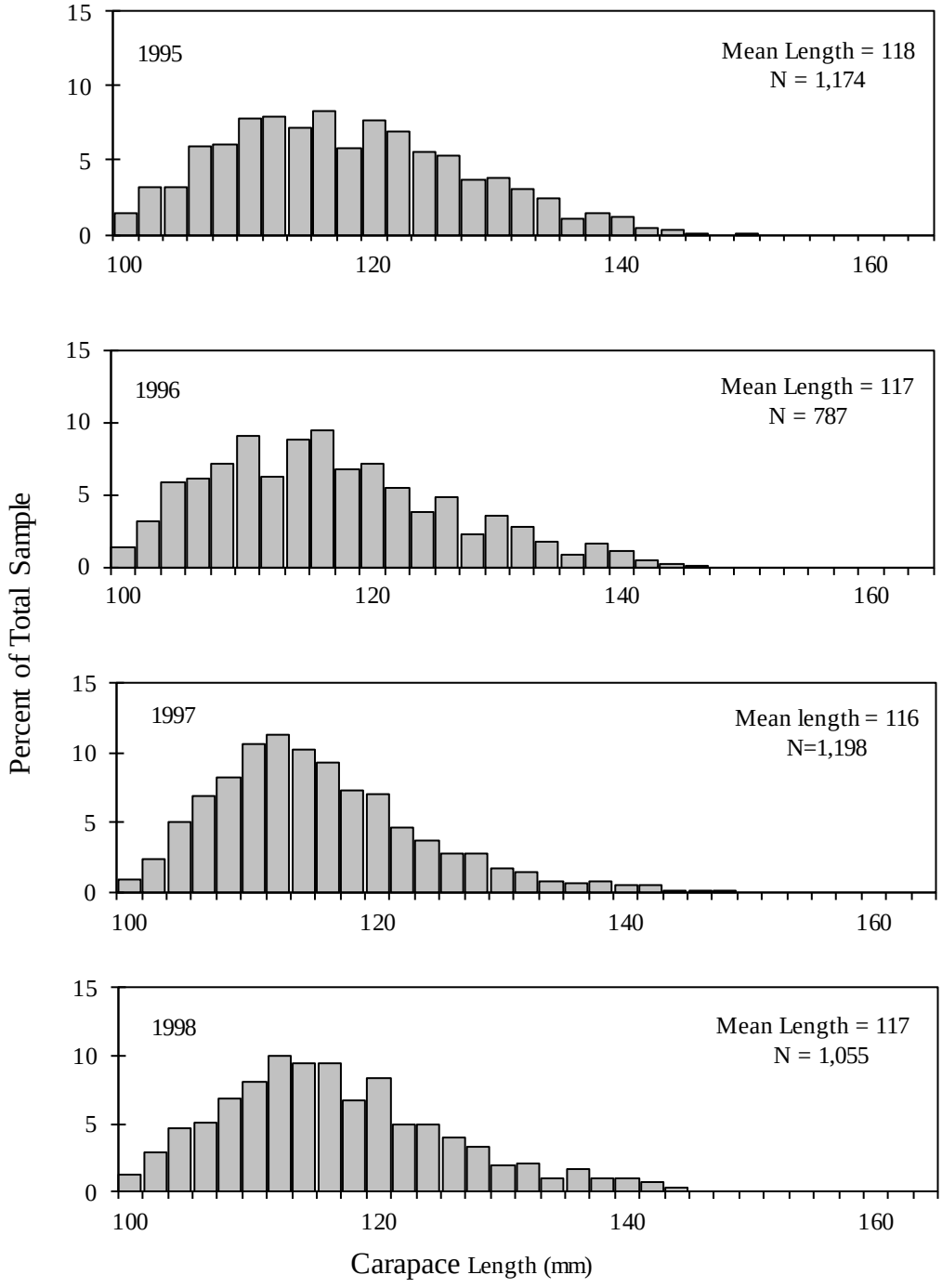


Appendix E15.–Closed waters area in effect for the Norton Sound winter commercial crab fishery.

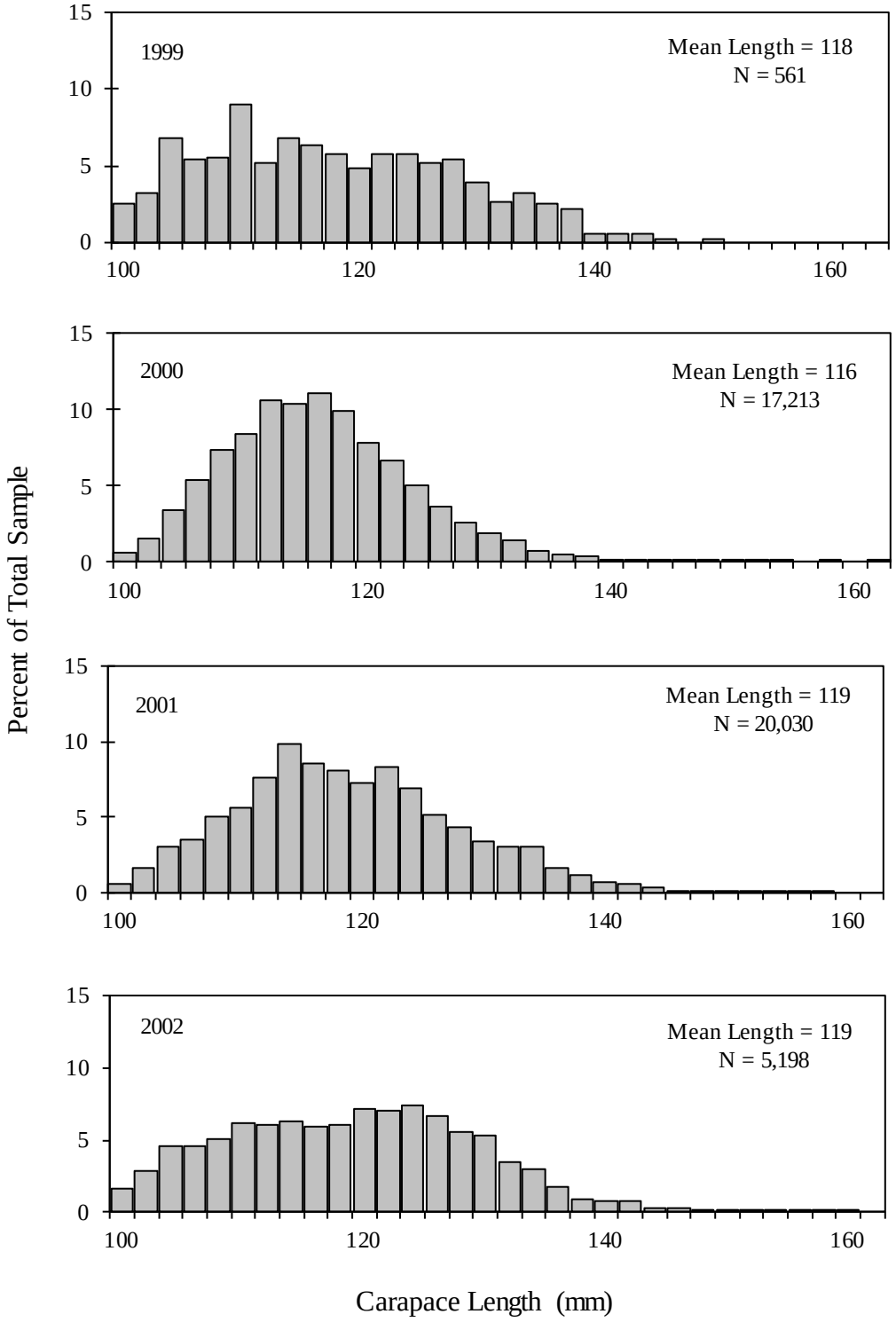


Appendix E16.–Length composition of Norton Sound red king crab summer commercial harvests, 1990–1994.

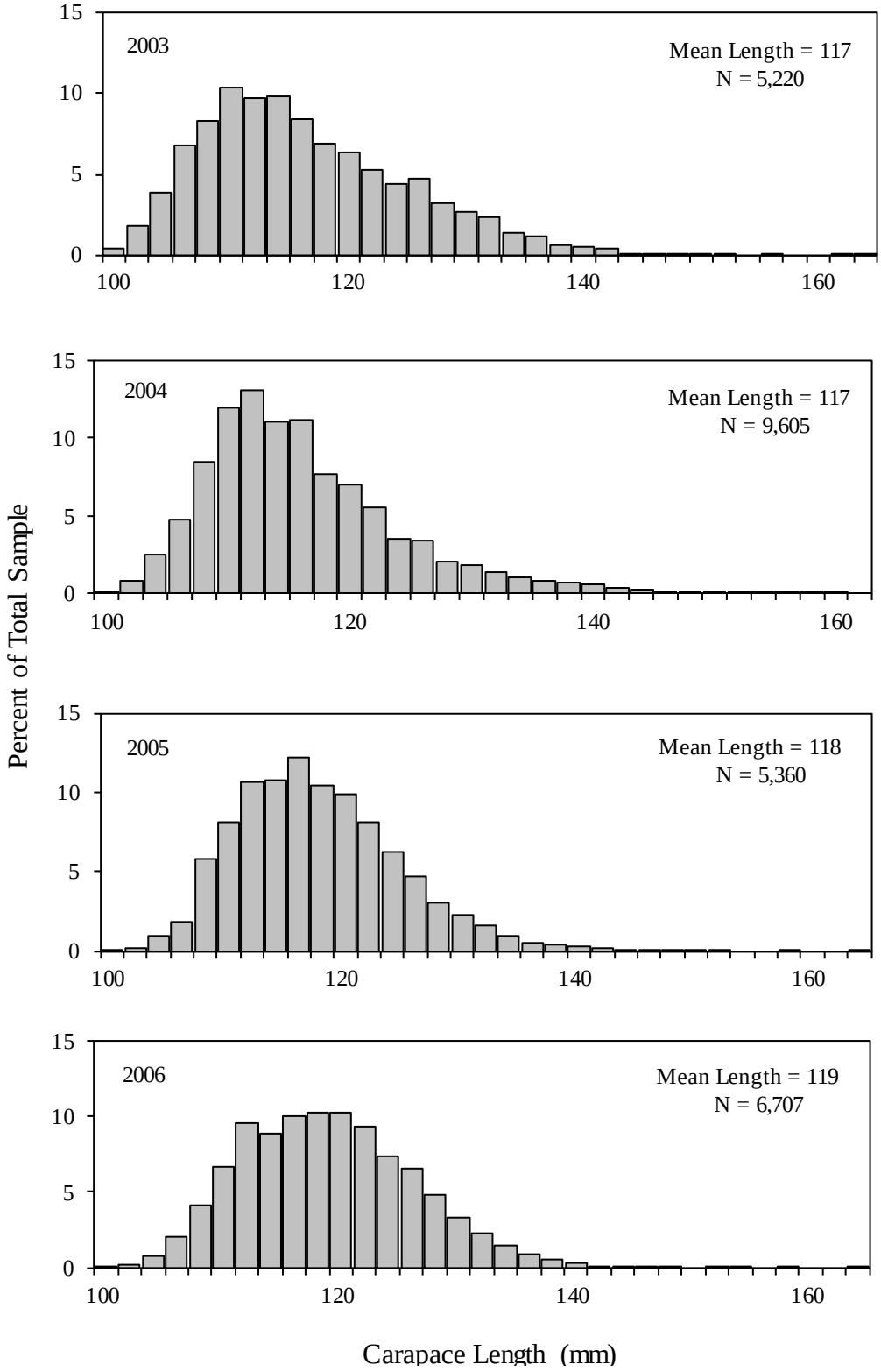
Note: No fishery in 1991.



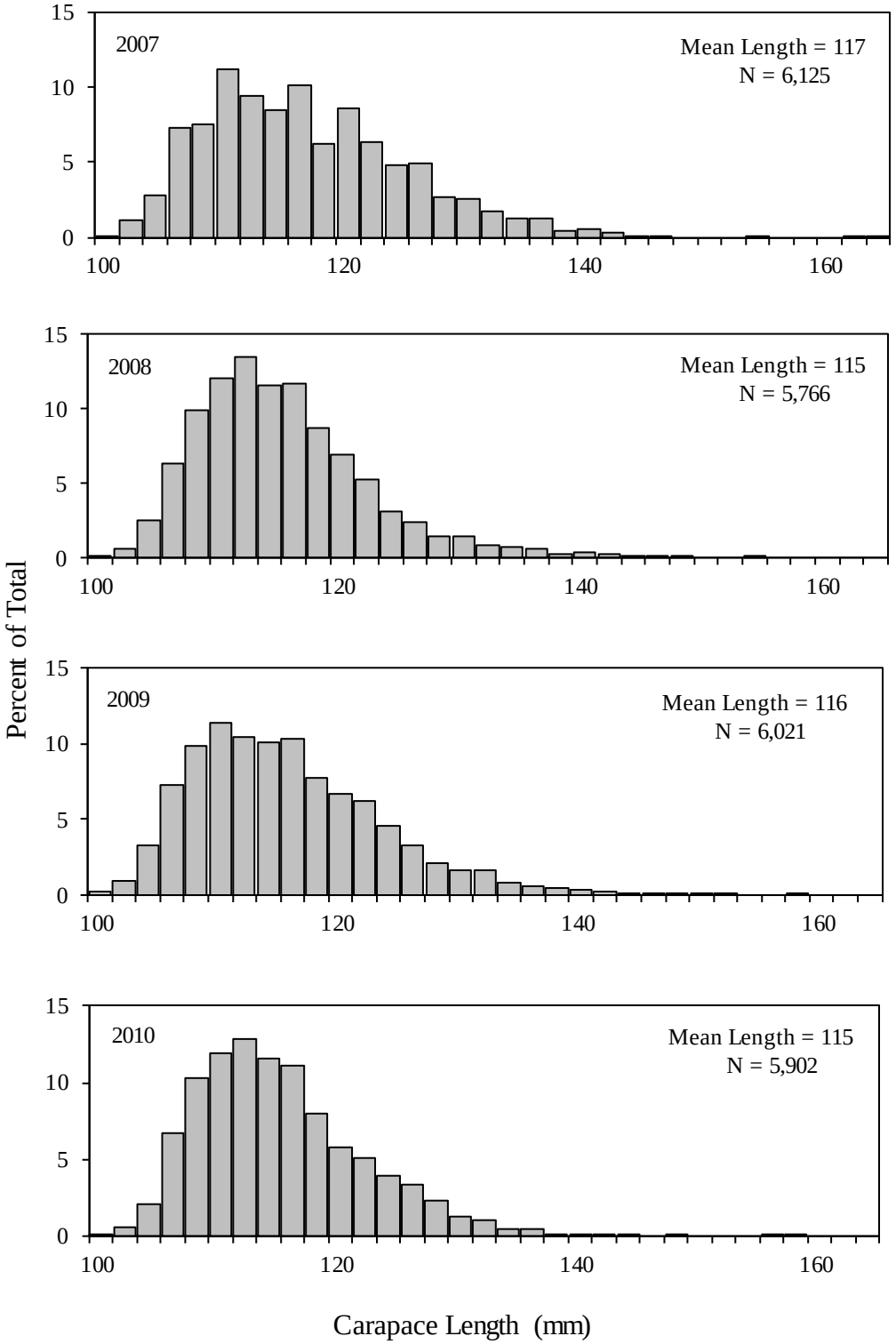
Appendix E17.–Length composition of Norton Sound red king crab summer commercial harvests, 1995–1998.



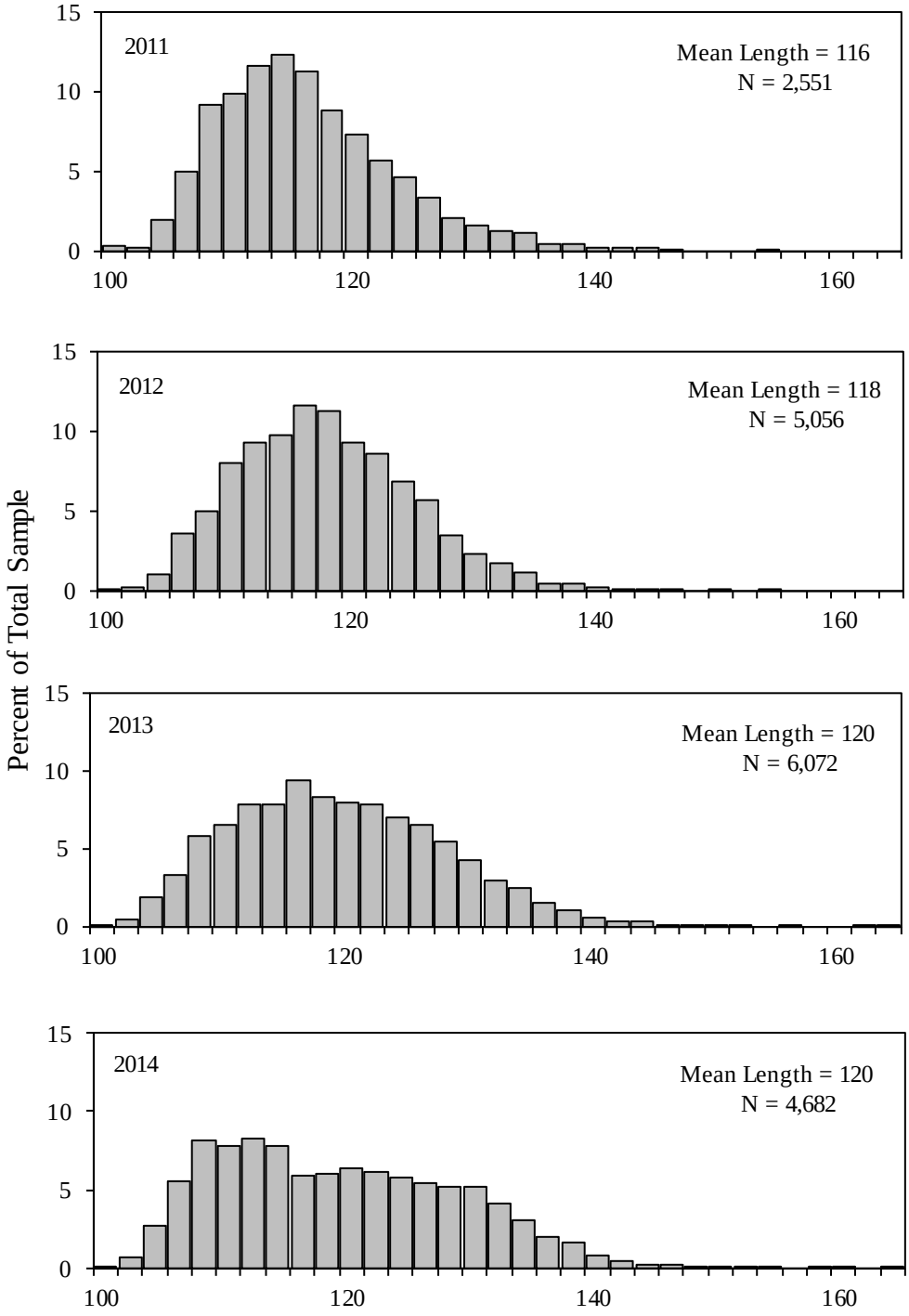
Appendix E18.–Length composition of Norton Sound red king crab summer commercial harvests, 1999–2002.



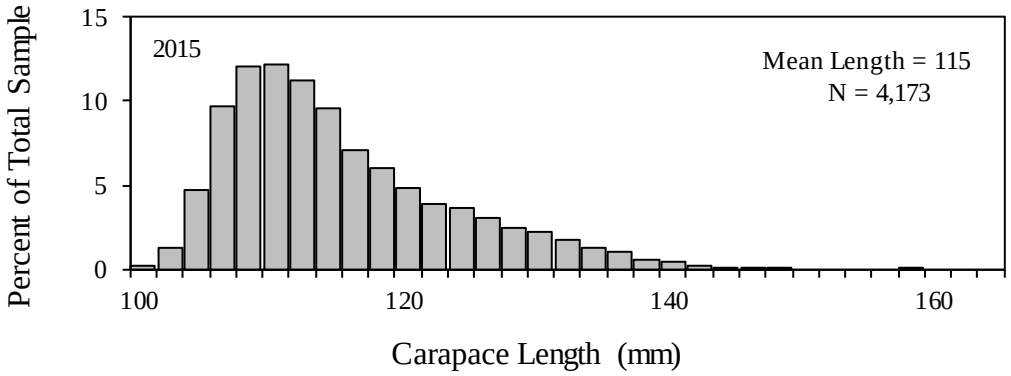
Appendix E19.–Length composition of Norton Sound red king crab summer commercial harvests, 2003–2006.



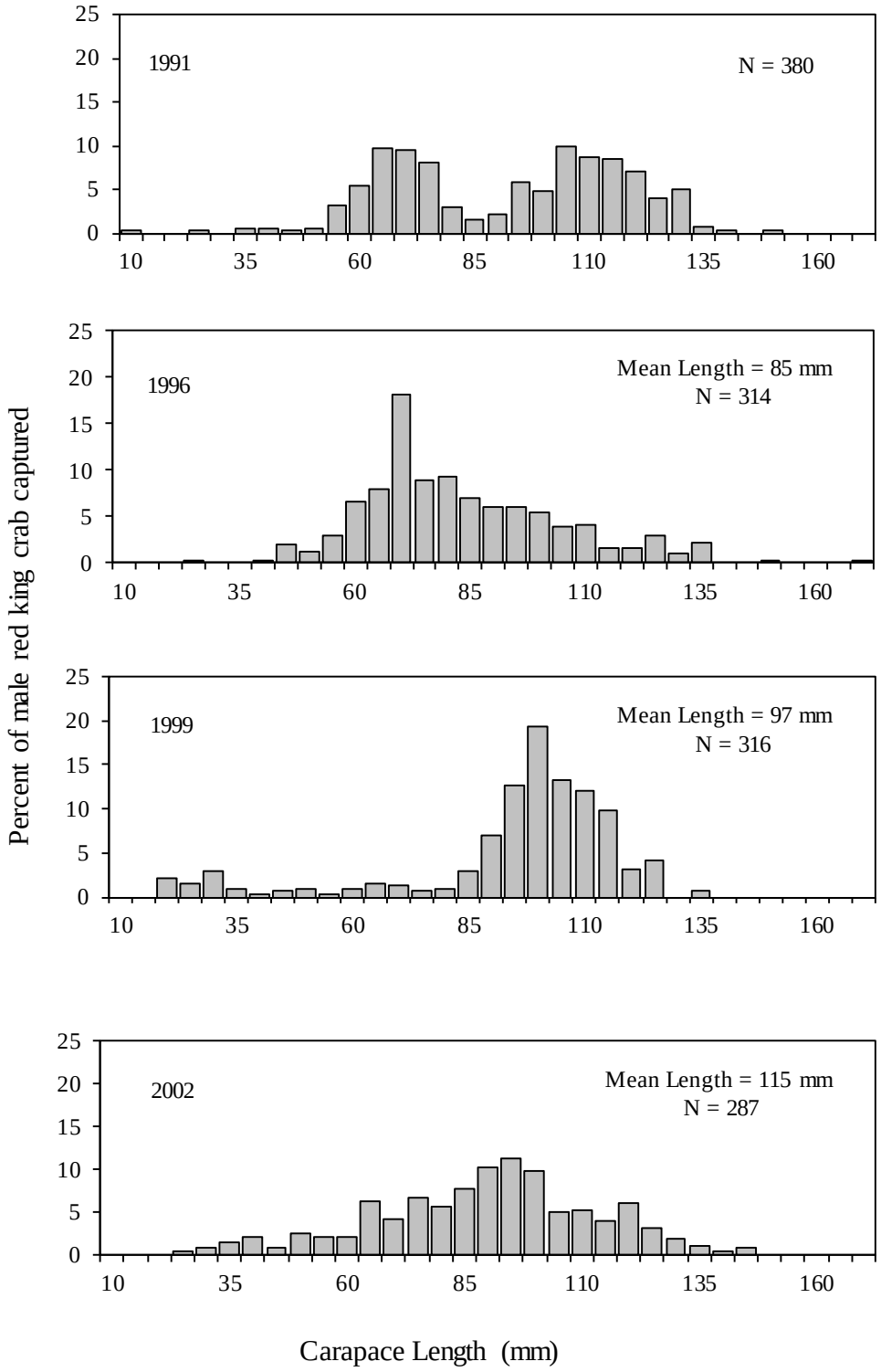
Appendix E20.–Length composition of Norton Sound red king crab summer commercial harvests, 2007–2010.



Appendix E21.–Length composition of Norton Sound red king crab summer commercial harvests, 2011–2014.

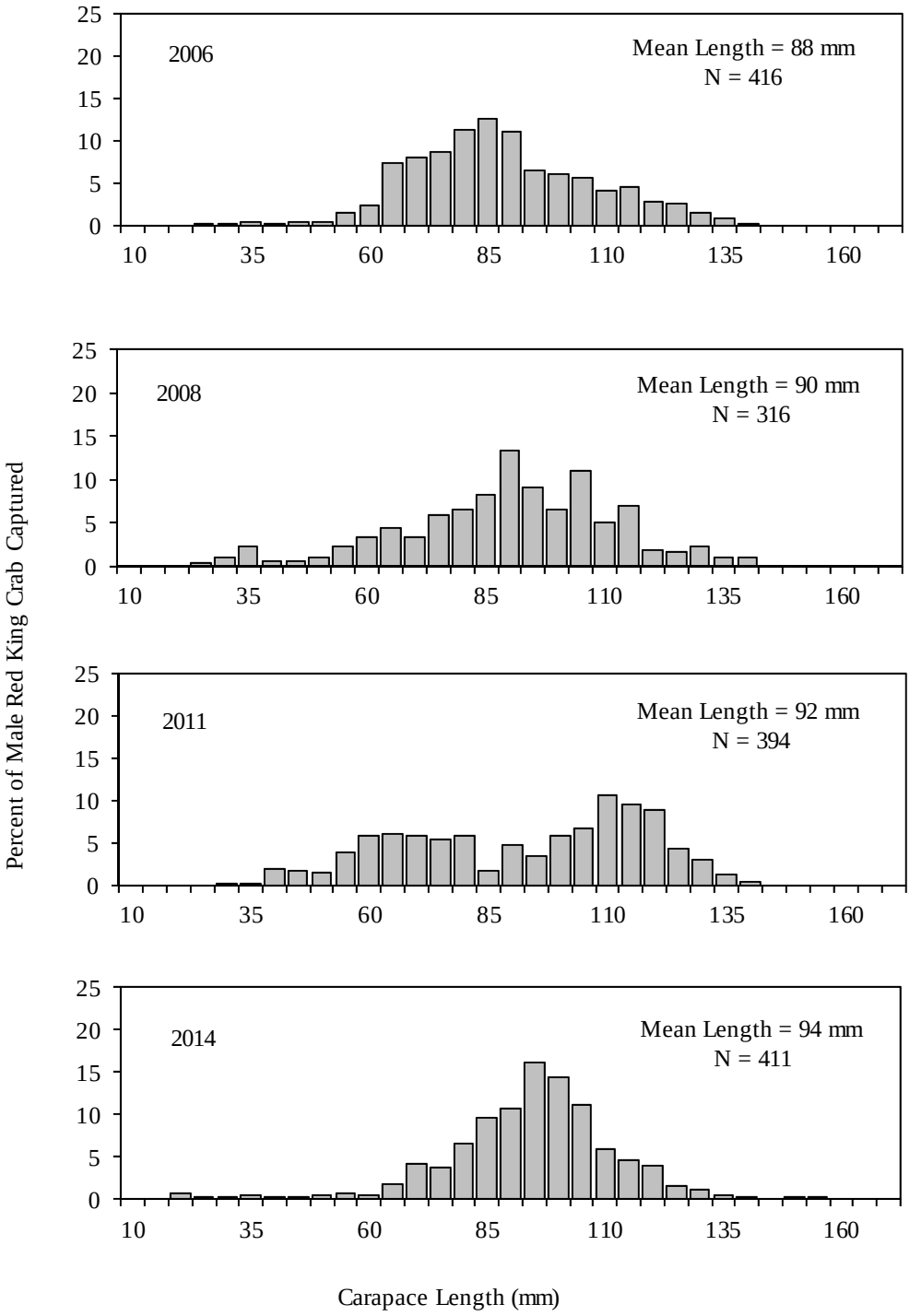


Appendix E22.–Length composition of Norton Sound red king crab summer commercial harvest, 2015.



Appendix E23.–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 E24.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G in 2006, 2008, 2011, and 2014.

APPENDIX F: MISCELLANEOUS FISHERIES

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1990–2015.

Year [b]	Number of Fishermen	Number of Fish	Pounds [a] Total	Pounds [a] Average	Price per Pound ($)	Estimated Value ($)
1990	6	687	5,617	8.2	[c]	[c]
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
1999–2000 [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	[c]	Confidential Information			1.09	[f]
2006–2011 [e]						
2012	1	Confidential Information			[c]	[f]
2013–2014 [e]						
2015	2	Confidential Information			1.02	[f]

[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 3 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 2012–2015.

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.		
2015 [f]	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.

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

Appendix F3.–Non-salmon sport fish harvests in Norton Sound and Kotzebue/Chukchi Sea, 1990–2015.

	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	154	0	216	237	244
2015	412	154	221	664	1,191
Average					
2010–2014	1,493	530	686	456	309
2005–2014	2,276	613	1,118	488	483

Appendix F4.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1990–2015.

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
2015	0	62	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, 1991–2015.

	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.		
2015	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, 1990–2015.

	Location									
Year	Marine Water	Nome	Pilgrim	Unalakleet	Fish-Niukluk	Sinuk	Snake	Solomon	Other Streams	Total
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	0	0	0	40	0	20	0	15	79	154
2015	0	97	0	120	0	195	0	0	0	412
Average										
2010–'14	0	59	2	848	329	29	9	8	210	1,493
2005–'14	11	273	2	1,064	415	112	68	67	264	2,276

Note: Data are not available for all years.

Appendix F7.–Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1990–2015.

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]
2015	[d]	72,895	[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 2012–2015.

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	183
2014	Information is not yet available.			
2015 [f]	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.

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

Appendix F9.–Norton Sound District winter commercial whitefish harvest statistics, 2007–2015.

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	0.40	859
2012–2013	2	105	0.50	53
2013–2014 [c]	1	4,726	0.50	2,288
2014–2015 [b]				

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

[b] No reported sales.

[c] Total pounds include personal use.

Appendix F10.–Norton Sound District winter commercial saffron cod harvest statistics, 1994–1995 and 2010–2015.

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	27	19,050	0.50	9,525
2014–2015	16	12,973	0.50	6,487

[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 2015

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, 2015.

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 9 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 5 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 1 mile upstream of the VOR site.

b) Description: To determine daily and seasonal timing and magnitude of salmon escapement. Compare aerial survey totals with weir counts in order to improve survey accuracy. Collect age and sex data through escapement sampling of weir trap. ADF&G project with additional funding from NSEDC.

North River Tower

a) Location: North River, approximately 2 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 6 miles downstream of Pilgrim River bridge at mile 65 of the Kougarok Road / Nome–Taylor Highway.

b) Description: Determine daily and seasonal timing and magnitude of the salmon escapements. 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 5 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.

Chum Salmon Acoustic Tagging Project

a) Location: Chum salmon were tagged in the marine waters of Norton Sound Subdistrict 1 within 2,000 meters of shore. Acoustic receivers were placed in 7 curtain arrays spaced throughout the subdistrict and perpendicular to shore. Acoustic receivers were also placed in each of the large chum-rearing streams within Subdistrict 1.

b) Description: Track movement of tagged chum salmon within marine waters of Norton Sound Subdistrict 1 and attempt to identify tagged chum salmon to their river of origin within the subdistrict. A cooperative project between ADF&G and NSEDC.

Kobuk River Test Fish

a) Location: Lower Kobuk River, approximately 2 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 2 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. Operated by NSEDC.

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.

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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.

Summer King Crab Tagging Study

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

b) Description: Investigate movement, size composition, potential critical habitat, and handling of red king crab in Norton Sound. Cooperative project between ADF&G and NSEDC.

Appendix G3.–Norton Sound and Kotzebue Sound processors, 2015.

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
Maniilaq Services, Inc. dba Arctic Circle Wild Salmon	1700 Seventh Avenue Suite 2100 Seattle, WA 98101	Buy and Fly	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, 2015.

NORTON SOUND 2015 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, 2015.

NORTON SOUND 2015 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, 2015.

NORTON SOUND 2015 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, 2015.

NORTON SOUND 2015 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, 2015.

NORTON SOUND 2015 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 <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)		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?

Appendix G9.–Emergency Orders issued during 2015.

RED KING CRAB

Emergency Order: 3-C-Z-01-15 Effective Date: May 1, 2015

EXPLANATION: This emergency order closes the winter commercial red king crab season effective 12:00 midnight, Thursday evening, April 30. All pot gear must be removed from the ice.

JUSTIFICATION: The department's decision to close the fishery early to reduce pot losses is consistent with the intent of proposal 270 which was recently adopted by the Alaska Board of Fisheries at their March meeting. Proposal 270 established new season dates for the winter commercial crab season with a new regulatory closure date of April 30, unless extended by emergency order. Proposal 270 also clarified the department's emergency order authority to close the season early if necessary in order to minimize adverse impacts to the crab resource. Over 100 winter commercial pots were lost during the 2014 winter season as a result of more pot gear being fished during spring ice retreat and intensive fishing effort being carried out on less stable ice expanses farther offshore. These same patterns of fishing behavior have been repeated this season and the amount of gear and participants have also increased. An estimated 700 commercial pots have reportedly been fished this season and initial reports suggest pot losses may have already exceeded 2014 estimates. Therefore, considering the high rate of pot loss and expected early spring break-up, this early closure is warranted. Closing the commercial fishery down before the peak of spring ice retreat will minimize pot losses and the potential for increased fishing mortality of crab and other organisms due to ghost fishing by lost pot gear.

Emergency Order: 3-C-Z-02-15 Effective Date: June 29, 2015

EXPLANATION: This emergency order opens both the CDQ fishery and the commercial open access crab fishery in Norton Sound from 12:00 noon Monday, June 29 until 12:00 noon Thursday, September 3, or when closed by subsequent emergency order when the GHL is reached.

JUSTIFICATION: By regulation the open access king crab fishery can open anytime on or after June 15 by emergency order. Currently 2 land-based processor-buyers are registered and both buyers are ready to purchase open access crab. The GHL for the 2015 Norton Sound open access fishery is 365,005 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 29,595 pounds. The CDQ group has notified the department they are ready to harvest crab.

Emergency Order: 3-C-Z-03-15 Effective Date: July 24, 2015

EXPLANATION: This emergency order closes the commercial crab fishery in Norton Sound, and all pots must be removed from the water by Saturday, August 1, 2015.

JUSTIFICATION: The guideline harvest level (GHL) for the 2015 Norton Sound crab fishery is 394,600 pounds. Through the morning of July 21, there were approximately 332,000 pounds reported harvested. There are currently at least 36 vessels fishing and the GHL is expected to be reached by 12:00 pm Friday, July 24.

HERRING

Emergency Order: 3-H-Z-1-15 Effective Date: May 18, 2015

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet fishing for bait herring beginning 5:00 p.m. Monday, May 18, 2015 until Wednesday, July 1, 20154, unless superseded by another emergency order.

JUSTIFICATION: NSEDC has established a bait quota of approximately 70 tons of bait herring this season. Processing and buying operations will be limited to Norton Sound Seafood Products processing plant in Unalakleet. The run of herring in Norton Sound is expected to occur earlier than expected this season. On May 19, NSEDC biologists flew aerial surveys in southern Norton Sound to ascertain ice conditions and attempt to locate any herring. No herring were observed.

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Leaving the fishery open continuously allows the buyer to direct the bulk of the fishing fleet to areas where harvest efficiency can be maximized. To commercial fish for bait herring, permit holders must have a valid 2015 bait or sac roe herring permit. Crew members must have a 2015 crew member license or current year state of Alaska commercial fishery permit. For example, a 2015 Norton Sound king crab or salmon permit can substitute as a crewmember license if one intends to crew on a herring vessel. Permit holders should be in contact with Norton Sound Seafood Products once the fishery is underway to ensure there is a market for their catch. Any herring not purchased by the buyer must be retained for personal or subsistence uses.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-15 Effective Date: July 12, 2015

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

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season. 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. One buyer has notified the department that they would like to begin purchasing fish on Sunday July 12. The second buyer notified the department that they might be able to purchase fish on Sunday. This 12 hour opening will serve as a test of earlier run strength.

Emergency Order: 3-S-X-02-15 Effective Date: July 13, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District daily for 12 hours from the hours of 10 a.m. until 10 p.m. Monday, July 13 through Friday, July 17.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season. Airline schedules will affect some buyer's ability to ship fish out. One buyer purchased fish during the July 12 opening and plans to continue to buy fish through this week. The first opener had similar catches to previous opening day periods though the first period was 2 days later this year. The second buyer notified the department that they might be able to purchase fish by Tuesday. The first week of fishing will allow the department to test early run strength5

Emergency Order: 3-S-X-03-15 Effective Date: July 14, 2015

EXPLANATION: This emergency order supersedes emergency order 3-S-X-02-15 and reduces fishing time from 12 hours daily to 8 hours daily. The new fishing hours are from the hours of 10 a.m. until 6 p.m. Tuesday, July 14 through Friday, July 17.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season. However, only 1 buyer is buying at this time and the other buyer has notified the department they may not be ready to buy until next week. The lone buyer has requested the department shorten the fishing periods because of the large volumes of fish.

Emergency Order: 3-S-X-04-15 Effective Date: July 15, 2015

EXPLANATION: This emergency order closes commercial 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 an area to be closed by emergency order, it is warranted to close fishing in waters off the end of the runway as a public safety measure.

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Emergency Order: 3-S-X-05-15 Effective Date: July 16, 2015

EXPLANATION: This emergency order supersedes emergency order 3-S-X-02-15 and cancels the scheduled fishing period on Thursday, July 16.

JUSTIFICATION: The sole buyer has requested that the scheduled commercial fishing period on Thursday, July 16 be cancelled because the buyer has capacity concerns. Because there is not a buyer for Thursday's fishing period the department is cancelling the fishing period.

Emergency Order: 3-S-X-06-15 Effective Date: July 17, 2015

EXPLANATION: This emergency order supersedes emergency order 3-S-X-02-15 and cancels the scheduled fishing period on Friday, July 17.

JUSTIFICATION: The sole buyer has requested that the scheduled commercial fishing period on Friday, July 17 be cancelled because the buyer has capacity concerns. Because there is not a buyer for Friday's fishing period the department is cancelling the fishing period.

Emergency Order: 3-S-X-07-15 Effective Date: July 19, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from the hours of 10 a.m. until 6 p.m. Sunday, July 19.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but during the first week of commercial fishing only 1 buyer has been operational. The second buyer notified the department that they may be able to purchase fish during the second week of fishing. Because of capacity concerns the sole buyer has notified the department that they will not be able to purchase salmon for previous scheduled daily openings on July 16 and July 17 and therefore those fishing periods have been cancelled. Having an 8-hour fishing period after several days with no commercial fishing should not jeopardize subsistence fishing or escapement.

Emergency Order: 3-S-X-08-15 Effective Date: July 20, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from the hours of 10 a.m. until 6 p.m. Monday, July 20.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. Today's fishing period was the first fishing period in 4 days because of capacity concerns with the lone buyer and fishermen have been placed on limits of 3,000 pounds. Today's preliminary catch figures were approximately 12,000 chum salmon by 40 permit holders. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-09-15 Effective Date: July 21, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours from the hours of 10 a.m. until 6 p.m. Tuesday, July 21.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits of 3,000 pounds. Today's preliminary catch figures were approximately 9,000 chum salmon. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-10-15 Effective Date: July 22, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 8 hours daily from the hours of 10 a.m. until 6 p.m. from Wednesday, July 22 through Friday, July 24.

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JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits of 3,000 pounds. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-11-15 Effective Date: July 27, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Monday, July 27.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits of 3,000 pounds and there has been no fishing for 2 days. The Kobuk River test fish project has a chum salmon catch index greater than last year's record index for the first week of fishing. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-12-15 Effective Date: July 28, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Tuesday, July 28.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The Kobuk River test fish project has a chum salmon catch index greater than last year's record index for the first week of fishing. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-13-15 Effective Date: July 30, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Thursday, July 30.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits and has not been buying daily because of capacity issues. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-14-15 Effective Date: July 31, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Friday, July 31.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The Kobuk River test catch ranks fifth highest in the 23-year project history. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-15-15 Effective Date: Effective Date: August 2, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Sunday, August 2.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits and has been taking a day break from fishing after 2 days of fishing. The Kobuk River test fish project has had catches well above average this

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year. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-16-15 Effective Date: August 3, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Monday, August 3.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits and has been taking a 1 day break from fishing after 2 days of fishing during the past week. The Kobuk River test fish project has had catches well above average this year. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-17-15 Effective Date: August 4, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours from the hours of 10 a.m. until 4 p.m. Tuesday, August 4.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The cumulative catch is 170,000 and only half of last year's catch of 338,000 chum salmon. However, the Kobuk River test fish project has had catches well above average this year and ranks third highest for early August in cumulative catch. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-18-15 Effective Date: August 5, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours daily from the hours of 10 a.m. until 4 p.m. Wednesday, August 5 through Friday, August 7.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The cumulative catch is 181,000 and only half of last year's catch of 355,000 chum salmon. However, the Kobuk River test fish project has had catches well above average this year and ranks third highest overall in the 23-year project history. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-19-15 Effective Date: August 9, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours daily from the hours of 10 a.m. until 4 p.m. Sunday, August 9 through Monday, August 10.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits of 1,500 pounds daily. The cumulative catch is 202,000 chum salmon and less than half of last year's catch of 417,000 chum salmon for August 7. However, the Kobuk River test fish project has had catches well above average this year and ranks third highest overall in the 23-year project history. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-20-15 Effective Date: August 11, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours daily from the hours of 10 a.m. until 4 p.m. Tuesday, August 11 through Friday, August 14.

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JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The cumulative catch is 210,000 and only half of last year's catch of 432,000 chum salmon through August 9. However, the Kobuk River test fish project has had catches well above average this year and ranks fifth highest overall in the 23-year project history. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-21-15 Effective Date: August 16, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 6 hours daily from the hours of 10 a.m. until 4 p.m. Sunday, August 16 through Friday, August 21.

JUSTIFICATION: Two commercial salmon buyers have registered to purchase Kotzebue chum salmon this season, but only 1 has been able to buy. The lone buyer has put fishermen on catch limits. The cumulative catch is 255,000 and less than half of last year's catch of 532,000 chum salmon through August 14. However, the Kobuk River test fish project has had catches well above average this year and ranks sixth highest overall in the 23-year project history. Continuing with short duration openings, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-22-15 Effective Date: August 23, 2015

EXPLANATION: This emergency order opens commercial salmon fishing in the Kotzebue District for 4 hours from the hours of 4 p.m. until 8 p.m. Sunday, August 23.

JUSTIFICATION: The major buyer in the fishery has completed operations for the season and the second buyer has requested a short duration fishing opening to buy limited quantities of salmon. The Kobuk River test fish project has had catches well above average this year and ranks fifth highest overall in the 23-year project history. Having a short duration opening, with restricted limits in place by the buyer, should not jeopardize escapement or subsistence opportunity.

Emergency Order: 3-S-X-01S-15 Effective Date: July 15, 2015

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-01-15 Effective Date: June 8, 2015

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 8 through June 30, 2015.

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.

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Emergency Order: 3-S-Z-02-15 Effective Date: June 8, 2015

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 8 through June 30, 2015. The Koyuk River remains open to subsistence salmon fishing and is not affected by this action.

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. Like other areas of western Alaska, an early but weak run of king salmon is expected for Norton Bay Subdistrict with only a small amount of harvestable surplus expected. Severe conservation measures are therefore needed to conserve Ungalik and Inglutalik River king salmon for escapement needs and provide for future returns. There will be 48-hour subsistence openings beginning the week of Monday, June 15 to provide for some subsistence opportunity. 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-03-15 Effective Date: June 8, 2015

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 8 through June 30, 2015. 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 5 consecutive years. Escapement of king salmon as indexed by the North River tower escapement goal has fallen short of the SEG range of 1,200–2,600 king salmon in 3 out of the previous 8 seasons despite implementation of severe restrictions and closures. Restrictions taken during the 2014 season were effective at ensuring escapement needs were achieved. If restrictions are as effective as last season, run sizes of king salmon in 2015 should be sufficient to meet escapement needs in the Shaktoolik and Unalakleet rivers in addition to providing a very limited amount of harvestable surpluses for some subsistence use of king salmon. 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 will begin as early as the week of June 29 by providing two 36-hour beach seine and 4.5-inch mesh gillnet openings 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 or rescinded earlier to provide additional subsistence fishing time without jeopardizing king salmon escapement needs.

Emergency Order: 3-S-Z-04-15 Effective Date: June 15, 2015

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 2015 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.

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Emergency Order: 3-S-Z-05-15 Effective Date: June 15, 2015

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-02-15 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 two 48-hour periods from 6:00 p.m. Monday, June 15 to 6:00 p.m. Wednesday, June 17, and from 6:00 p.m. Thursday, June 18 to 6:00 p.m. Saturday, June 20.

JUSTIFICATION: As planned, 48-hour subsistence openings will begin in mid-June to allow some subsistence harvest opportunities for salmon. Windows between periods should have the desired effect of increasing escapements of Chinook salmon in the Ungalik and Inglutalik river drainages. These openings have been scheduled to provide for an orderly subsistence fishery and may or may not coincide with good drying and fishing weather and increasing abundance of salmon in Norton Bay. This action does not affect the marine closure from Point Dexter west to the southern tip of Cape Denbigh. This area will remained closed to subsistence salmon fishing until further notice.

Emergency Order: 3-S-Z-06-15 Effective Date: June 15, 2015

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-3-15 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 24 hours from 6:00 p.m. Monday, June 15 to 6:00 p.m. Tuesday, June 16.

JUSTIFICATION: As planned, marine subsistence openings will begin this week to allow opportunities to target more plentiful chum salmon. This opening has been scheduled to coincide with good drying weather and acceptable marine surf conditions, as well as increasing abundance of salmon in southern Norton Sound coastal areas. Although some king will be caught during this opening, incidental catch levels during this 24-hour opening are not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower are expected to be fully operational by late next week.

Emergency Order: 3-S-Z-07-15 Effective Date: June 22, 2015

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-3-15 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 4:00 p.m. Monday, June 22 to 10:00 p.m. Tuesday, June 23.

JUSTIFICATION: As planned, marine subsistence fishing opportunity will be increased this week to allow opportunities to target more plentiful chum salmon in the Subdistricts 5 and 6 coastal waters. This opening has been scheduled to coincide with good drying weather and acceptable marine surf conditions, as well as increasing abundance of salmon in southern Norton Sound coastal areas. Although some king will be caught during this opening, incidental catch levels during this 30-hour opening are not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower are fully operational with the North River counting tower enumerating 24 king salmon to date. Unalakleet River weir is expected to observe king salmon passage in the coming days.

Emergency Order: 3-S-Z-08-15 Effective Date: June 22, 2015

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-02-15 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 two 48-hour periods from 6:00 p.m. Monday, June 22 to 6:00 p.m. Wednesday, June 24, and from 6:00 p.m. Thursday, June 25 to 6:00 p.m. Saturday, June 27.

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JUSTIFICATION: As planned, 48-hour subsistence openings will continue throughout the remainder of June to allow some subsistence harvest opportunities for salmon. Windows between periods should have the desired effect of increasing escapements of Chinook salmon in the Ungalik and Inglutalik river drainages. These openings have been scheduled to provide for an orderly subsistence fishery and may or may not coincide with good drying and fishing weather and increasing abundance of salmon in Norton Bay. This action does not affect the marine closure from Point Dexter west to the southern tip of Cape Denbigh. This area will remained closed to subsistence salmon fishing until further notice.

Emergency Order: 3-S-Z-09-15 Effective Date: June 25, 2015

EXPLANATION: This emergency order opens Subdistricts 2 and 3 of the Norton Sound Subdistrict, the Golovin and Elim Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Thursday, June 25 to 6:00 p.m. Saturday, June 27. 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: This index opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 2–3. Chum salmon escapement to Subdistricts 2 and 3 is being indexed by the Kwiniuk River counting tower east of Elim and the Fish River counting tower upstream of the village of White Mountain. Based on early run timing projection models, chum salmon escapement to the Kwiniuk River is anticipated to easily exceed the upper end of the tower-based escapement goal range of 11,500–23,000 fish. Additionally, over 7,000 chum salmon have been enumerated at the Fish River tower through June 24 which is tracking well ahead of the 1,263 chum salmon enumerated by June 24 in 2014. Therefore, it is unlikely that chum salmon directed openings will jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 2–3.

Emergency Order: 3-S-Z-10-15 Effective Date: June 25, 2015

EXPLANATION: This emergency order opens Subdistrict 4 of the Norton Sound Subdistrict, the Norton Bay Subdistrict, to commercial salmon fishing for 48 hours from 6:00 p.m. Thursday, June 25 to 6:00 p.m. Saturday, June 27. 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: This index opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistrict 4. Chum salmon escapement to Subdistrict 4 is being indexed by the Inglutalik River counting tower south of Koyuk. Initial subsistence catch reports indicate that users have not had difficulty meeting subsistence needs for chum salmon during directed marine and freshwater subsistence openings. Subsistence and escapement needs of chum salmon should not be jeopardized based on good initial subsistence catches and anticipated low levels of commercial effort during the first few periods. Additionally, commercial CPUE statistics will provide managers with an early comparative catch statistic to gauge early chum salmon run strength.

Emergency Order: 3-S-Z-11-15 Effective Date: June 26, 2015

EXPLANATION: This emergency order amends Emergency Order 3-S-Z-3-15 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 24 hours from 6:00 p.m. Friday, June 26 to 6:00 p.m. Saturday, June 27.

JUSTIFICATION: As planned, marine subsistence fishing opportunity will be increased this week to allow opportunities to target more plentiful chum salmon in the Subdistricts 5 and 6 coastal waters. This opening has been scheduled to coincide with good drying weather and acceptable marine surf conditions, as well as increasing abundance of salmon in southern Norton Sound coastal areas. Although some king will be caught during this opening, incidental catch levels during the last 30-hour opening were low and anticipated catches from this opening should not jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower are fully operational with the North River counting tower enumerating 18 king salmon to date. Unalakleet River weir king salmon passage is 5 king salmon and should increase in the coming days.

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Emergency Order: 3-S-Z-12-15 Effective Date: June 25, 2015

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 48 hours from 6:00 p.m. Monday, June 29 to 6:00 p.m. Wednesday, July 1. 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. Catches during the most recent 48-hour opening ranged from below average in Golovin to near average in Elim to well above average in Norton Bay. Chum salmon escapement to Subdistricts 2 and 3 is being indexed by the Kwiniuk River counting tower east of Elim and the Fish River counting tower upstream of the village of White Mountain. Considering that June 28 is only the average 10% point in the Kwiniuk River chum salmon run, escapement of chum salmon should easily exceed the upper end of the tower-based escapement goal range of 11,500–23,000 fish. Additionally, over 10,000 chum salmon have been enumerated at the Fish River tower through June 28 which is 125% above last year's cumulative passage for this date. June 28 is the historical 5% point of the chum salmon run to the Niukluk River tributary. Therefore, it is unlikely that chum salmon directed openings will jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 2–4.

Emergency Order: 3-S-Z-13-15 Effective Date: July 1, 2015

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 and set gillnets with a mesh size of 4.5 inches or less for two 36-hour periods from 12:00 noon Wednesday, July 1 to 12:00 midnight Thursday evening, July 2 and from 12:00 noon Friday, July 3 to 12:00 midnight, Saturday evening, July 4. 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 opportunities for salmon other than Chinook salmon will begin in July and marine subsistence fishing time will be increased in Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts. 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 ½ inches or less and that king salmon incidentally captured in seines be immediately released alive and unharmed. Additionally, gillnets with a mesh size of 4 ½ inches have shown to have a low incidental harvest rate of Chinook salmon. These measures should limit and/or prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, these openings are not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-14-15 Effective Date: July 1, 2015

EXPLANATION: This emergency order closes and immediately 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 for 24 hours from 6:00 p.m. Wednesday, July 1 to 6:00 p.m. Thursday, July 2, and for 48 hours from 6:00 p.m. Friday, July 3 to 6:00 p.m. Sunday, July 5.

JUSTIFICATION: As planned, marine subsistence fishing opportunity will be increased this week as the bulk of the Chinook salmon run is expected have entered the lower reaches of the Shaktoolik and Unalakleet River drainages. These periods will allow additional opportunity to target more plentiful chum salmon in the Subdistricts 5 and 6 coastal waters. This opening has been scheduled to coincide with acceptable marine surf conditions, as well as increasing abundance of salmon in southern Norton Sound coastal areas. Although some Chinook salmon will be caught during these openings, incidental catch levels are not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower have been fully operational for nearly 2 weeks now with 37 and 108 Chinook salmon counted at the Unalakleet and North Rivers, respectively. Water levels have been extremely low in the Unalakleet River drainage but cumulative passage of Chinook salmon is still ahead of passage for this date observed last year when escapement goals were achieved.

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Emergency Order: 3-S-Z-15-15 Effective Date: July 1, 2015

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. Wednesday, July 1 to 6:00 p.m. Thursday, July 2. 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 2,200, 216, and 3,547 fish, respectively. The aerial survey SEG range of 2,400–4,800 chum salmon for the Unalakleet River is projected to easily be achieved. 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-16-15 Effective Date: July 3, 2015

EXPLANATION: This emergency order reopens Subdistricts 2 and 4 of the Norton Sound Subdistrict, the Golovin and Norton Bay Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Friday, July 3 to 6:00 p.m. Sunday, July 5. Permit holders in Subdistricts 2 and 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 opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 2–4. Catches during the most recent 48-hour opening were near average in Golovin and well above average in Norton Bay. Chum salmon escapement to Subdistricts 2 and 3 is being indexed by the Kwiniuk River counting tower east of Elim and the Fish River counting tower upstream of the village of White Mountain. Escapement of chum salmon should easily exceed the upper end of the tower-based escapement goal range of 11,500–23,000 fish. Additionally, over 20,000 chum salmon have been enumerated at the Fish River tower through July 1. Escapement of chum salmon at the Inglutalik River in Norton Bay is over 2,000 fish. Catches have been well above average and the low escapements could be due to very low water levels in Norton Bay river drainages. The department will continue to monitor chum salmon escapements in Norton Bay. These chum salmon directed openings should not jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 2 and 4.

Emergency Order: 3-S-Z-17-15 Effective Date: July 4, 2015

EXPLANATION: This emergency order reopens Subdistrict 3 of the Norton Sound Subdistrict, the Elim Subdistrict, to commercial salmon fishing for 24 hours from 6:00 p.m. Saturday, July 4 to 6:00 p.m. Sunday, July 5. Permit holders in Subdistrict 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: This opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistrict3. Catches of chum salmon from the most recent 48-hour commercial period were 11%above long-term average late June harvest levels in the Elim Subdistrict. The incidental harvest of Chinook salmon is already double the harvest reported in the Elim Subdistrict in 2014 and escapements of Chinook salmon at the Kwiniuk River tower have lagged due to very low water levels. To reduce the harvest rate and increase escapements of Chinook salmon in the Elim Subdistrict, the department will delay the start and shorten the duration of the next period. This escapement window and shorter period should allow the bulk of remaining Chinook salmon milling in nearshore areas to enter the lower reaches of the Tubutulik and Kwiniuk rivers for spawning escapement. Therefore, it is unlikely that this chum salmon directed opening will jeopardize escapement needs or subsistence uses of chum salmon in Subdistrict 3.

Emergency Order: 3-S-Z-18-15 Effective Date: July 6, 2015

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 24 hours from 6:00 p.m. Monday, July 6 to 6:00 p.m. Tuesday, July 7. 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. Both chum and Chinook salmon counts have improved significantly over the last 2 days and projections based on early and normal run timing models suggest escapement goals in the Unalakleet River drainage will be achieved for the second consecutive season. 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 5,079, 2,994, and 17,231 fish, respectively. The aerial survey SEG range of 2,400–4,800 chum salmon for the Unalakleet River will be easily achieved. This chum salmon directed opening will not jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 5 and 6.

Emergency Order: 3-S-Z-19-15 Effective Date: July 7, 2015

EXPLANATION: This emergency order closes and immediately reopens all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with beach seines and set gillnets with a mesh size of 4.5 inches or less for two 36-hour periods from 12:00 noon Tuesday, July 7 to 12:00 midnight Wednesday evening, July 8 and from 12:00 noon Friday, July 10 to 12:00 midnight, Saturday evening, July 11. 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: These subsistence fishing opportunities will allow subsistence users to target plentiful chum and pink salmon. Regulation requires that beach seines used in Subdistricts 5 and 6 have a mesh size of 4 ½ inches or less and that king salmon incidentally captured in seines be immediately released alive and unharmed. Additionally, gillnets with a mesh size of 4 ½ inches have shown to have a low incidental harvest rate of Chinook salmon. These measures should limit and/or prevent inadvertent mortality of king salmon while still allowing harvest opportunity of more plentiful species. Therefore, these openings are not expected to jeopardize king salmon escapement needs for the Shaktoolik and Unalakleet River drainages.

Emergency Order: 3-S-Z-20-15 Effective Date: July 7, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for 48 hours from 6:00 p.m. Tuesday, July 7 to 6:00 p.m. Thursday, July 9. 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 catch and escapement indices improved this weekend in Norton Sound. Nearly 40,000 chum salmon have been harvested through July 4 and the harvest is on track to exceed the upper limit of the pre-season forecast of 80,000–110,000 chum salmon. The Kwiniuk River tower has already enumerated over 16,000 chum salmon and the NSEDC-operated Fish River tower has counted nearly 27,000 chum salmon. Kwiniuk River tower chum salmon escapement will easily exceed the upper bound of the escapement goal range and Fish River escapement of chum salmon is projected to easily provide for escapement and inriver subsistence uses. Norton Bay chum salmon escapement counts should be considered incomplete due to tidal events preventing some salmon from being enumerated. However, catch statistics from Norton Bay indicate average to above average chum salmon abundance based on historical catch statistics. With chum salmon escapement and subsistence needs projected to be met and Chinook salmon incidental catches declining, commercial chum salmon fishing is warranted to utilize harvestable surpluses in Subdistricts 2–4. These chum salmon directed openings should not jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 2–4.

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Emergency Order: 3-S-Z-21-15 Effective Date: July 8, 2015

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 one 24-hour period from 12:00 p.m. Wednesday, July 8 to 12:00 p.m. Thursday, July 9. 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 indices of chum salmon in the eastern half of the Nome Subdistrict indicate escapement goals will be easily achieved. Additionally, harvestable surpluses will be sufficient to provide for inriver subsistence uses and some commercial utilization. Nearly 4,400 chum salmon have passed the Eldorado River weir, and projected escapement is anticipated to range between 14,000–26,000 chum salmon which is well above the sustainable escapement goal range of 6,000–9,200 chum salmon. This will be the 6th consecutive season in which the upper end of the escapement goal range has been exceeded.

Emergency Order: 3-S-Z-22-15 Effective Date: July 8, 2015

EXPLANATION: This emergency order closes and immediately 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 for 48 hours from 6:00 p.m. Wednesday, July 8 to 6:00 p.m. Thursday, July 10.

JUSTIFICATION: Escapement counts of Chinook salmon have improved over that past few days and projected escapement is expected to fall within the North River tower-based SEG range 1,200–2,600 Chinook salmon. Additionally, rapidly declining incidental harvests of Chinook salmon indicate the bulk of the Chinook salmon run has entered the lower reaches of the Shaktoolik and Unalakleet River drainages. This opening has been scheduled to coincide with commercial fishing times. The Unalakleet River weir and North River tower have been fully operational for nearly 3 weeks with 1,000 and 714 Chinook salmon counted at the Unalakleet and North Rivers, respectively. An estimated 420 Chinook salmon have also been counted at the Shaktoolik River counting tower.

Emergency Order: 3-S-Z-23-15 Effective Date: July 8, 2015

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. Wednesday, July 8 to 6:00 p.m. Friday, 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: This opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 5 and 6. Both chum and Chinook salmon counts have improved significantly over the last 2 days and projections based on early and normal run timing models suggest escapement goals in the Unalakleet River drainage will be achieved for the second consecutive season. 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.

Emergency Order: 3-S-Z-24-15 Effective Date: July 9, 2015

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 24 hours a day, 7 days a week until midnight, Sunday evening July 19.

JUSTIFICATION: Escapement counts of Chinook salmon have improved over that past few days and projected escapement is expected to fall within the North River tower-based SEG range 1,200–2,600 Chinook salmon. Additionally, rapidly declining incidental harvests of Chinook salmon indicate the bulk of the Chinook salmon run has entered the lower reaches of the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower have been fully operational for nearly 3 weeks with 1,000 and 714 Chinook salmon counted at the Unalakleet and North Rivers, respectively. An estimated 429 Chinook salmon have also been counted at the

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Shaktoolik River counting tower. Allowing subsistence fishing 24 hours a day from July 9–19 with restricted mesh will allow subsistence users to utilize chum salmon harvestable surpluses.

Emergency Order: 3-S-Z-25-15 Effective Date: July 14, 2015

EXPLANATION: This emergency order closes and immediately reopens all fresh waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to a subsistence salmon fishing schedule with beach seines and set gillnets with a mesh size of 4.5 inches from July 14–25. There will be two 36-hour periods per week from 12:00 noon Tuesdays to 12:00 midnight Wednesdays, and from 12:00 midnight Fridays to 12:00 midnight Saturdays. 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: Escapement counts of Chinook salmon have improved in recent days and projected escapement is expected to fall within the North River tower-based SEG range 1,200–2,600 Chinook salmon. Additionally, rapidly declining incidental harvests of Chinook salmon indicate the bulk of the Chinook salmon run has entered the lower reaches of the Shaktoolik and Unalakleet River drainages. The Unalakleet River weir and North River tower have been fully operational for nearly 3 weeks with 1,200 and 770 Chinook salmon counted at the Unalakleet and North Rivers, respectively. An estimated 465 Chinook salmon have also been counted at the Shaktoolik River counting tower. Setting a freshwater schedule allowing beach seines and 4.5 inch gillnets will provide for an orderly subsistence fishery to let subsistence users target chum and pink salmon harvest surpluses while the weather is still conducive to drying fish. Chinook salmon captured in beach seine gear must be released immediately alive back into water unharmed.

Emergency Order: 3-S-Z-26-15 Effective Date: July 11, 2015

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. Saturday, July 11 to 6:00 p.m. Tuesday, 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: This opening will enable commercial users to utilize harvestable surpluses of chum salmon in Subdistricts 5 and 6. Escapement goals of Chinook salmon are projected to be achieved and chum salmon escapement goals have been met. Additionally, this extended period will not jeopardize subsistence uses of chum salmon in Subdistricts 5 and 6. Because of the severe restrictions taken on subsistence fisheries in June and early July, Chinook salmon incidentally harvested in the Subdistricts 5 and 6 commercial fishery cannot be sold this season 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-27-15 Effective Date: July 11, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to a commercial salmon fishing schedule of two 48-hour periods per week for the remainder of July. Periods will be from 6:00 p.m. Saturdays to 6:00 p.m. Mondays, and from 6:00 p.m. Wednesdays to 6:00 p.m. Fridays. 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 catch and escapement indices improved this weekend in Norton Sound. Nearly 65,000 chum salmon have been harvested through July 9 and the harvest is on track to exceed the upper limit of the pre-season forecast of 80,000–110,000 chum salmon. The Kwiniuk River tower has already enumerated over 25,000 chum salmon and the NSEDC-operated Fish River tower has counted nearly 80,000 chum salmon. Kwiniuk River tower chum salmon escapement has exceeded the upper bound of the escapement goal range and Fish River escapement of chum salmon is projected to easily provide for escapement and inriver subsistence uses. Norton Bay chum salmon escapement counts should be considered incomplete due to tidal events preventing some salmon from being enumerated. However, escapements of chum salmon have improved dramatically over the last few days and

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nearly 18,000 chum salmon have been counted to date. Additionally, catch statistics from Norton Bay have been well above average based on historical catch information. With chum salmon escapement needs met and Chinook salmon incidental catches declining, continued commercial chum salmon fishing is warranted to utilize harvestable surpluses in Subdistricts 2–4. This chum salmon commercial fishing schedule will provide for an orderly fishery and will not jeopardize escapement needs or subsistence uses of chum salmon in Subdistricts 2–4.

Emergency Order: 3-S-Z-28-15 Effective Date: July 15, 2015

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing schedule for the remainder of July. Periods during this schedule will be from 6:00 p.m. Wednesdays to 6:00 p.m. Fridays and from 6:00 p.m. Sundays to 6:00 p.m. Tuesdays. 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 commercial chum salmon fishing schedule will provide for an orderly fishery for the remainder of the chum salmon season. Escapement goals of Chinook salmon are projected to be achieved and chum salmon escapement goals have already been met. Additionally, this schedule will not jeopardize subsistence uses of chum salmon in Subdistricts 5 and 6. Because of the severe restrictions taken on subsistence fisheries in June and early July, Chinook salmon incidentally harvested in the Subdistricts 5 and 6 commercial fishery cannot be sold this season 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. The Unalakleet River weir and North River tower have been fully operational for nearly 3 weeks with 1,200 and 770 Chinook salmon counted at the Unalakleet and North Rivers, respectively. An estimated 465 Chinook salmon have also been counted at the Shaktoolik River counting tower.

Emergency Order: 3-S-Z-29-15 Effective Date: July 11, 2015

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 48 hours period from 12:00 p.m. Saturday, July 11 to 12:00 p.m. Monday, 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: Escapement indices of chum salmon in the eastern half of the Nome Subdistrict indicate escapement goals will be easily achieved. Additionally, harvestable surpluses will be sufficient to provide for inriver subsistence uses and some commercial utilization. Over 7,000 chum salmon have passed the Eldorado River weir and the weir-based escapement goal range has been achieved. Projected escapement is anticipated to range between 15,500–26,000 chum salmon, which will easily provide for subsistence uses of chum salmon in eastern half of the Nome Subdistrict as well as provide for commercial utilization of remaining surpluses.

Emergency Order: 3-S-Z-30-15 Effective Date: July 13, 2015

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 12,000 chum salmon and has exceeded the escapement goal range of 6,000 to 9,200 chum salmon. Historically, mid-July is average midpoint of the chum salmon run at Eldorado River weir. At Snake River, 1,300 chum salmon have passed the weir (escapement goal range is 1,600 to 2,500 chum salmon). At Nome River, 600 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.

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Emergency Order: 3-S-Z-31-15 Effective Date: July 15, 2015

EXPLANATION: This emergency order reopens the marine waters from the Cape Nome jetty eastward to Topkok Head in Subdistrict 1 of the Norton Sound Subdistrict, to a commercial fishing schedule of two 48-hour periods per week from 12:00 p.m. Wednesday, July 15 to 12:00 p.m. Friday, July 31. Periods will be from 12:00 p.m. Wednesdays to 12:00 p.m. Fridays and from 12:00 p.m. Saturdays to 12:00 p.m. Mondays. 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 indices of chum salmon throughout the Nome Subdistrict indicate escapement goal ranges will be easily achieved. Additionally, harvestable surpluses will be sufficient to provide for inriver subsistence uses and some commercial utilization. Escapement counts in Subdistrict 1 escapement projects are 661, 1,467, and 13,500 chum salmon at the Nome, Snake, and Eldorado River weirs, respectively. The Nome River weir count is below average for this date but an estimated 800 chum salmon were observed below the weir via aerial survey this weekend and chum salmon passage should improve in the coming days. The lower end of the sustainable escapement goal range of 1,600–2,500 chum salmon has nearly been achieved and escapement is projected to range between 4,600–9,800 chum salmon. Eldorado River passage is already over the upper end of the SEG range of 6,000–9,200 chum salmon and projected escapement ranges from 23,000–34,000 chum salmon. Harvestable surpluses of chum salmon are available for commercial utilization east of Cape Nome and surpluses are well above what is needed to easily provide for subsistence uses of chum salmon. The Nome Subdistrict-wide escapement goal range of 23,000–35,000 chum salmon has been exceeded for the 6th consecutive season and this commercial schedule allowing two 48-hour periods weekly will allow opportunity to harvest surplus fish.

Emergency Order: 3-S-Z-32-15 Effective Date: July 15, 2015

EXPLANATION: This emergency order raises the sockeye salmon subsistence catch limit to 50 fish at Pilgrim River.

JUSTIFICATION: The Pilgrim River weir count for sockeye salmon is 8,613 fish through July 14. This year's sockeye salmon run is already the best since 2008 and run timing projections give a final count of between 15,000 and 20,000 fish. Raising the limit to 50 sockeye salmon should not jeopardize the escapement goal of 4,000 to 8,000 sockeye salmon observed by aerial survey in Salmon Lake.

Emergency Order: 3-S-Z-33-15 Effective Date: July 15, 2015

EXPLANATION: This emergency order waives chum salmon subsistence catch limits for the Nome and Snake Rivers in the Nome Subdistrict.

JUSTIFICATION: Over 1,600 chum salmon have been enumerated at the Snake River weir and the escapement goal has been achieved. Over 1,500 chum salmon have also been counted at the Nome River weir and projected escapement ranges from 3,300–4,600 chum salmon which is above the SEG range of 2,900–4,300. Additionally, area biologists conducted boat and aerial surveys of the lower reaches of the Snake and Nome Rivers and several thousand chum and pink salmon were observed under fair viewing conditions. Schools of salmon were comprised of roughly 50% chum salmon. Considering this is the first quarter point passage date for chum salmon runs to the Nome and Snake rivers, escapement goal ranges will easily be exceeded this season and there are surpluses available for increased subsistence harvests. Accordingly, the department is waiving subsistence catch limits for chum salmon for the Sinuk, Nome, and Snake rivers effectively immediately to provide opportunity to utilize harvestable surpluses.

Emergency Order: 3-S-Z-34-15 Effective Date: July 16, 2015

EXPLANATION: This emergency order amends emergency order 3-S-Z-31-15 by opening the western half of the Nome Subdistrict, from the Cape Nome jetty westward to Cape Rodney, to a commercial salmon fishing schedule of two 48-hour periods per week for the remainder of July. Periods for the entire Nome Subdistrict are from 12:00 p.m. Wednesday, July 15 to 12:00 p.m. Friday, July 31. Periods will be from 12:00 p.m. Wednesdays to 12:00 p.m.

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Fridays and from 12:00 p.m. Saturdays to 12:00 p.m. Mondays. 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 indices of chum salmon throughout the Nome Subdistrict indicate escapement goal ranges at all ground-based escapement projects will be easily achieved. Additionally, harvestable surpluses will be more than sufficient to provide for inriver subsistence uses and increased commercial opportunities. Harvestable surpluses of chum salmon are available for commercial utilization and surpluses are well above what is needed to easily provide for subsistence uses of chum salmon. The Nome Subdistrict-wide escapement goal range of 23,000–35,000 chum salmon has been exceeded for the 6th consecutive season and this commercial schedule allowing two 48-hour periods weekly will allow opportunity to harvest surplus fish.

Emergency Order: 3-S-Z-35-15 Effective Date: July 17, 2015

EXPLANATION: This emergency order waives the sockeye salmon subsistence catch limit at Pilgrim River.

JUSTIFICATION: The Pilgrim River weir count for sockeye salmon is 12,398 fish through July 16. This year's sockeye salmon run is already the best since 2008 and run timing projections give a final count of over 20,000 fish. The escapement goal range of 4,000 to 8,000 sockeye salmon observed by aerial survey in Salmon Lake is ensured of being reached and waiving the catch limit will lessen the number of sockeye salmon exceeding the high end of the range.

Emergency Order: 3-S-Z-36-15 Effective Date: July 26, 2015

EXPLANATION: This emergency order sets the 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: This emergency order extends the subsistence catch limits that are listed for coho salmon on the back of the subsistence fishing permits. Coho salmon are beginning to enter local rivers and the coho salmon runs are much smaller in size than other salmon runs, except for king salmon. Catch limits are needed until there is adequate escapement to ensure continued health of the runs.

Emergency Order: 3-S-Z-37-15 Effective Date: August 1, 2015

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 1, the Nome Subdistrict, to commercial salmon fishing for one 48-hour period from 12:00 p.m. Saturday, August 1 to 12:00 p.m. Monday, August 3. 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: Chum salmon escapement goals throughout the Nome Subdistrict have been easily exceeded for the third consecutive season. Harvestable surpluses of chum salmon are available for commercial utilization in the Nome Subdistrict and incidental catches of coho salmon in the directed chum salmon fishery continue to be low for the last week of July. Considering the minimal effort and low catch rates of coho salmon, this commercial opening should not jeopardize escapement or subsistence needs of coho salmon.

Emergency Order: 3-S-Z-38-15 Effective Date: August 1, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to a commercial salmon fishing for two 48-hour periods from 6:00 p.m. Saturday August 1 to 6:00 p.m. Monday August 3, and from 6:00 p.m. Wednesday August 5 to 6:00 p.m. Friday 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: Cumulative passage of coho salmon at the Fish, Kwiniuk, and Inglutalik River towers is 1,050, 297, and 6,400 coho salmon, respectively. The Fish River count is similar to last year's July 31 count of 1,115 coho

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salmon. Kwiniuk River tower passage is about ½ the cumulative count last season but projected escapement ranges between 3,000–6,000 coho salmon. This level of escapement is more than sufficient to meet the aerial survey SEG range of 650–1,300 coho salmon and provide for inriver subsistence use of coho salmon. Passage of coho salmon at the Inglutalik River that drains into Norton Bay is the highest ever since the project began in 2011. Following these periods, the department will evaluate catch statistics and ground-based escapement data to determine if additional commercial fishing is warranted. These index openings directed at coho salmon will provide indices of coho salmon abundance and should not jeopardize escapement needs or subsistence uses of coho salmon in Subdistricts 2–4.

Emergency Order: 3-S-Z-39-15 Effective Date: August 2, 2015

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. Sunday, August 2 to 6:00 p.m. Tuesday, August 4 and from 6:00 p.m. Wednesday, August 5 to 6:00 p.m. Friday, August 7. 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: These openings will enable commercial users to utilize harvestable surpluses of coho salmon in Subdistricts 5 and 6. Commercial catch statistics for Subdistrict 5 are above average for late July and near record setting for late July in the Unalakleet Subdistrict. Additionally, escapement counts of coho salmon at the Shaktoolik and North River towers indicate escapement needs and inriver subsistence uses of coho salmon will be easily achieved. The Unalakleet River weir has counted over 10,000 coho salmon through July 31 which is more than double the previous high cumulative passage observed for this date. These periods should not jeopardize subsistence uses of coho salmon in Subdistricts 5 and 6 and will provide additional opportunities for commercial harvest of coho salmon. Fishing time may be increased next week if strong coho salmon catches persist.

Emergency Order: 3-S-Z-40-15 Effective Date: August 8, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to a commercial salmon fishing for two 48-hour periods from 6:00 p.m. Saturday August 8 to 6:00 p.m. Monday August 10, and from 6:00 p.m. Wednesday August 12 to 6:00 p.m. Friday August 14. 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: Coho salmon runs as indexed by commercial catch statistics are tracking only slightly behind last season in Norton Sound Subdistricts 2–4 which had near record to record coho salmon harvests. Additionally, projections of Niukluk River and Kwiniuk River coho salmon escapements based on Fish River and Kwiniuk River tower passage estimates have improved over the past week. Current passage estimates at these projects indicate inriver abundance of coho salmon will be more than sufficient to achieve escapement goals and provide reasonable subsistence harvest opportunity. The Niukluk River tower-based goal of 2,400–7,200 coho salmon would be achieved based on Fish River tower passage and radiotelemetry abundance estimates. Additionally, the Kwiniuk River aerial survey-based SEG range of 650–1,300 coho salmon is projected to be easily achieved. Therefore, these openings directed at coho salmon should not jeopardize escapement needs or subsistence uses of coho salmon in Subdistricts 2–4.

Emergency Order: 3-S-Z-41-15 Effective Date: August 9, 2015

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. Sunday, August 9 to 6:00 p.m. Tuesday, August 11 and from 6:00 p.m. Wednesday, August 12 to 6:00 p.m. Friday, 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: Silver salmon counts at the Unalakleet River weir continue to be strong for early August with over 18,000 silvers counted through August 6. Additionally, projections of escapement to the North River based on

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1,950 silvers counted through August 6 range between 4,700–6,700 silvers. This range of projected escapements will be sufficient to exceed the North River aerial survey-based SEG range of 550–1,100 silver salmon and provide for subsistence and sport harvest of silver salmon.

Emergency Order: 3-S-Z-42-15 Effective Date: August 14, 2015

EXPLANATION: This emergency order supersedes Emergency Order 3-S-Z-41-15 and extends fishing time in Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik and Unalakleet Subdistricts by 24 hours until 6:00 p.m. Saturday, August 15. 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 extension is warranted to utilize surpluses of coho salmon for commercial purposes. Tower and weir-based escapement information suggests subsistence uses of coho salmon will not be jeopardized due to additional commercial fishing time. Drainagewide escapement projections based on current weir and tower count estimates, and previous radiotelemetry studies show the coho salmon run will range between 60,000–85,000 coho salmon. Therefore, this extension is being granted at the request of the buyer to make up for lost fishing opportunities that resulted from recent hazardous surf conditions.

Emergency Order: 3-S-Z-43-15 Effective Date: August 15, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Saturday August 15 to 6:00 p.m. Monday August 17, and from 6:00 p.m. Wednesday August 19 to 6:00 p.m. Friday August 21. 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: Coho salmon runs as indexed by commercial catch statistics are on track to be the second best harvests on record for Norton Sound Subdistricts 2–4. Current passage at the Fish River counting tower project is at 6,600 silvers. Radiotelemetry studies showed 1/3 of the Fish River escapement spawn in the Niukluk River and historical Niukluk River run timing suggests the projected escapement will approach the midpoint of the former Niukluk River tower-based escapement goal range of 2,400–7,200 coho salmon. Projected escapement at the Kwiniuk River tower east of Elim is expected to range between 4,500–8,500 coho salmon based on current tower counts. The Kwiniuk River aerial survey-based SEG range of 650–1,300 coho salmon is projected to be easily achieved. Levels of inriver abundance in major salmon-producing river drainages from Subdistricts 2–4 will be more than sufficient to achieve escapement goals and provide for subsistence needs.

Emergency Order: 3-S-Z-44-15 Effective Date: August 16, 2015

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. Sunday, August 16 to 6:00 p.m. Tuesday, August 18 and from 6:00 p.m. Wednesday, August 19 to 6:00 p.m. Friday, August 21. 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: Coho salmon counts at the Unalakleet River weir continue to be the best in the project's 6-year history through mid-August. Over 38,000 coho salmon have been counted through August 14. Additionally, projections of escapement to the North River tributary based on 3,300 coho salmon counted through August 13 range between 7,000–9,000 fish. Previous radiotelemetry investigations showed that 8–14% of the Unalakleet River coho salmon run spawns in the North River tributary. Cumulative North River tower passage currently represents 8% of the aggregate weir and tower count estimate of coho salmon escapement. Based on this proportion, the range of projected drainagewide escapements for this season is 88,000–112,000 coho salmon. Such levels of inriver abundance are more than what is necessary to easily meet escapement needs and provide for subsistence uses of coho salmon in the Unalakleet River drainage. The sportfish bag limit was also recently increased from 4 per day to 10 per day to provide additional harvest opportunities for Unalakleet residents.

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Emergency Order: 3-S-Z-45-15 Effective Date: August 20, 2015

EXPLANATION: This emergency order opens the northeastern half of Salmon Lake to subsistence salmon fishing.

JUSTIFICATION: The Pilgrim River weir count for sockeye salmon is over 35,000 sockeye salmon and an aerial survey last month had over 10,000 sockeye salmon in Salmon Lake, exceeding the aerial survey escapement goal range of 4,000 to 8,000 sockeye salmon. Allowing subsistence fishing in the northeastern half of lake where the number of spawning sockeye salmon is less than the southwestern half should not affect overall spawning success of this year's run.

Emergency Order: 3-S-Z-46-15 Effective Date: August 22, 2015

EXPLANATION: This emergency order reopens Subdistricts 2, 3, and 4 of the Norton Sound District, the Golovin, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for three 48-hour periods from 6:00 p.m. Saturday August 22 to 6:00 p.m. Monday August 24, and from 6:00 p.m. Wednesday August 26 to 6:00 p.m. Friday August 28, and from 6:00 p.m. Saturday, August 29 to 6:00 p.m. Monday, August 31. 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: Coho salmon harvests are on pace to be the second best on record in Elim, 3rd best in Golovin, and record setting in Norton Bay. Current passage at the Fish River counting tower project is at 12,000 coho salmon. Radiotelemetry studies showed 1/3 of the Fish River coho salmon escapement spawns in the Niukluk River. Historical Niukluk River run timing and radiotelemetry findings suggests the projected escapement will approach the midpoint (~4,800 silvers) of the former Niukluk River tower-based escapement goal range of 2,400–7,200 coho salmon. Projected escapement at the Kwiniuk River tower east of Elim is expected to range between 7,000–9,000 coho salmon based on current tower counts. The Kwiniuk River aerial survey-based SEG range of 650–1,300 coho salmon is projected to be easily achieved and levels of inriver abundance in major salmon-producing river drainages from Subdistricts 2–4 will be more than sufficient to achieve escapement goals and provide for subsistence needs.

Emergency Order: 3-S-Z-47-15 Effective Date: August 16, 2015

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 for the remainder of the season. Periods will be from 6:00 p.m. Sundays to 6:00 p.m. Tuesdays and from 6:00 p.m. Wednesdays to 6:00 p.m. Fridays. The season closes by regulation on Sunday, September 6. 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: Drainagewide escapement projections of coho salmon based on North River tower counts and radiotelemetry studies range between 100,000–122,000 coho salmon. This level of inriver abundance easily provides for escapement needs and has led to an increase in daily bag and possession limits in the sport fishery. This commercial fishing schedule will therefore not jeopardize escapement needs or subsistence uses of coho salmon this season. The final period could be extended into Sunday if the buyer chooses to purchase fish over the weekend.

Emergency Order: 3-S-Z-48-15 Effective Date: September 4, 2015

EXPLANATION: This emergency order supersedes Emergency Order 3-S-Z-47-15 by extending the September 2nd period by an additional 48 hours for Norton Sound Subdistrict 6, the Unalakleet Subdistrict. The September 2nd period in the Unalakleet Subdistrict will now be 96 hours and will conclude at 6:00 p.m. Sunday, September 6. Permit holders in Subdistrict 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: Over 100,000 silver salmon have been harvested in the Unalakleet Subdistrict alone this season. At the request of the salmon buyer and fishermen, the department is extending the current period in the Unalakleet Subdistrict by an additional 48 hours effective immediately. Additional fishing time is warranted in the Unalakleet

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Subdistrict based on above average abundance of silver salmon in the Unalakleet River drainage and continued buyer interest. Subsistence needs will not be negatively impacted by this extension.

NORTON SOUND SALMON – SPORT FISH

Emergency Order: 3-KS-03-15 Effective Date: June 8, 2015

EXPLANATION: This emergency order closes all waters from Black Point to Point Romanof to sport fishing for king salmon, effective 12:01 a.m. Monday, June 8, 2015. This closure includes marine waters as well as fresh waters including, but not limited to, the Koyuk, Ungalik, Inglutalik, Shaktoolik, Unalakleet, and Golsovia river drainages.

All king salmon caught unintentionally, in the waters described above, 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 rivers of southern Northern Sound will be poor. 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 (2005–2014). King salmon stocks throughout western Alaska are experiencing a period of low productivity and, since 2010 below average run strength, and since 2006 in the Unalakleet River drainage.

The Department does not have escapement goals for king salmon in the Koyuk, Ungalik, Inglutalik, Shaktoolik, or Golsovia rivers, but there is no indication that king salmon runs in southern Norton Sound are going to be better than those in other western Alaska drainages such as the Yukon and Kuskokwim river drainages, both of which have already been closed to sport fishing for king salmon by emergency order. Subsistence fishing closures for king salmon will be implemented in southern Norton Sound waters beginning June 8th. The Department will continue to evaluate inseason run strength and take appropriate management actions to ensure that escapement requirements are met.

Emergency Order: 3-KS-04-15 Effective Date: June 8, 2015

EXPLANATION: This emergency order rescinds Emergency Order 3-KS-03-15 issued on May 21, 2015 and extends the area closed to sport fishing for king salmon. All waters from Bald Head to Point Romanof are closed to sport fishing for king salmon, effective 12:01 a.m. Monday, June 8, 2015. This closure includes marine waters as well as fresh waters including, but not limited to, the Koyuk, Ungalik, Inglutalik, Shaktoolik, Unalakleet, and Golsovia river drainages.

All king salmon caught unintentionally, in the waters described above, 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 rivers of southern Northern Sound will be poor. 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 (2005–2014). King salmon stocks throughout western Alaska are experiencing a period of low productivity and, since 2010 below average run strength, and since 2006 in the Unalakleet River drainage.

The Department does not have escapement goals for king salmon in the Koyuk, Ungalik, Inglutalik, Shaktoolik, or Golsovia rivers, but there is no indication that king salmon runs in southern Norton Sound are going to be better than those in other western Alaska drainages such as the Yukon and Kuskokwim river drainages, both of which have already been closed to sport fishing for king salmon by emergency order. Subsistence fishing closures for king salmon will be implemented in southern Norton Sound waters beginning June 8th. The Department will continue to evaluate inseason run strength and take appropriate management actions to ensure that escapement requirements are met.

Emergency Order: 3-SS-01-15 Effective Date: August 12, 2015

EXPLANATION: This emergency order increases the bag and possession limit for coho salmon to ten (10) fish in

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all waters of the Unalakleet River drainage. Beginning Wednesday, August 12, the bag and possession limit for salmon, other than king salmon, is 10 fish, of which only 4 fish in combination may be chum and sockeye salmon.

JUSTIFICATION: The cumulative count of coho salmon at the counting tower on the North River, a tributary of the Unalakleet River, is well above the recent 5-year average. Projections of escapement to the North River based on 2,830 coho salmon counted through August 10 range between 4,300–8,300 coho salmon. This range of projected escapements will be sufficient to exceed the North River aerial survey-based sustainable escapement goal (SEG) range of 550–1,100 coho salmon. In addition, cumulative escapement counts of coho salmon at the Unalakleet River floating weir are almost twice the previous high for this date since the project began operation in 2010. As of August 10th, 27,128 coho salmon had passed the weir. This is well above the average of 11,048 coho salmon by this date. Due to the high escapement of coho salmon in the Unalakleet River drainage and projections to exceed the upper bound of the SEG at the North River tower, an increase in the bag and possession limit for coho salmon from 4 to 10 fish is warranted. It is anticipated that the additional harvest associated with the increased bag limit will not reduce the escapement below the SEG.

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 1 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.