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Norton Sound Subdistrict 1 and Subdistricts 2 and 3 Chum Salmon Stock Status and Action Plans, 2012; a Report to the Alaska Board of Fisheries

by

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and

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December 2012

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ABSTRACT

In response to the guidelines established in the *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222), the Alaska Board of Fisheries (board) classified the Norton Sound Subdistrict 1 (Nome) chum salmon *Oncorhynchus keta* stock as a stock of management concern and Subdistricts 2 (Golovin) and 3 (Elim) as a stock of yield concern at its September 2000 work session. Action plans were developed by the Alaska Department of Fish and Game (department) and acted upon by the board in January 2001. The SSFP directs the department to assess salmon stocks in areas addressed during the board regulatory cycle to identify stocks of concern and, in the case of Subdistricts 1–3 chum salmon, to reassess the stock of concern status. In 2004, the classification for Subdistrict 1 chum salmon as a stock of management concern and for Subdistricts 2 and 3 chum salmon as a stock of yield concern was continued by the board at its January 2004 meeting. A majority of chum salmon escapement goals were achieved in Subdistrict 1 from 2002 to 2006. Hence, in January 2007, the board classified the Subdistrict 1 chum salmon stock as a yield concern, rather than a management concern. In 2010, the department recommended continuation of classification of this stock as a yield concern, which was supported by the board at its January 2010 meeting. Likewise, the Subdistricts 2 and 3 chum salmon stock has been maintained as a yield concern classification. Since 2004, the subdistrictwide escapement goal has been met in Subdistrict 1, except for 2009, when assessed escapement fell 7% short of the lower end of the escapement goal range of 23,000 to 35,000. Escapements within individual rivers of Subdistrict 1 have been variable. Subdistricts 2 and 3 chum salmon runs have been more volatile and have only reached sustainable escapement goals (SEGs) in 2 of the last 5 years. Based on the definitions provided in the SSFP, the department recommends continuing the stock of yield concern classification for Norton Sound Subdistrict 1 and Subdistricts 2 and 3 chum salmon.

Key words: Norton Sound, chum salmon, *Oncorhynchus keta*, stock of concern, commercial, fishing, sustainable salmon fisheries policy, Alaska Board of Fisheries, Alaska.

INTRODUCTION

The *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222, 2001) directs the Alaska Department of Fish and Game (department) to provide the Alaska Board of Fisheries (board) with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation during regular board meetings. This report provides the department's reassessment of two stocks of concern; Norton Sound Subdistrict 1 (Nome) chum salmon and, Subdistricts 2 (Golovin) and 3 (Elim) chum salmon (*Oncorhynchus keta*), which both are classified as a yield concern.

In response to guidelines established in SSFP, the board classified the Norton Sound Subdistrict 1 chum salmon stock as a management concern, and Subdistricts 2 and 3 chum salmon stock as a yield concern at its September 2000 work session. A stock of management concern is defined as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the sustainable escapement goal (SEG), biological escapement goal (BEG), optimal escapement goal (OEG), or other specified management objectives for the fishery" (5 AAC 39.222(f)(21)). The SSFP further goes on to define chronic inability as "the continuing or anticipated inability to meet escapement objectives over a 4 to 5 year period." A stock of yield concern is defined as "a concern arising from a chronic inability, despite use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs; a yield concern is less severe than a management concern" (5 AAC 39.222(f)(42)).

The Subdistrict 1 stock of concern determination was the result of the persistent low chum salmon productivity since the mid-1980s. In Subdistrict 1, commercial and sport fishing for chum salmon were closed, and subsistence salmon management was among the most restrictive in Alaska, with a Tier II chum salmon fishery in effect from 1999 to 2005. A Tier II fishery restricts subsistence fishing to those households that submit an application to fish and receive a

subsistence permit based on a scoring system that determines their household historical dependence on chum salmon. An action plan was subsequently developed by the department (Bue 2000a) and acted upon by the board in January 2001. The classification as a management concern was recommended by the department during the next board cycle (Menard and Bergstrom 2003a) and was continued at the January 2004 board meeting.

In 2007, based on definitions provided in SSFP (5 AAC 39.222(f)(21) and (42)), only the most recent 5-year yield and escapement information (2002–2006) and the historical level of yield or harvestable surpluses were considered. Accordingly, the department recommended a change in status of Subdistrict 1 chum salmon stock from a management concern to a yield concern at the October 2006 board work session. During the preceding 5 years (2002–2006), a majority of chum salmon escapement goals had been achieved in Subdistrict 1 (Menard and Bergstrom 2006a). The board accepted the department's recommendation and the Subdistrict 1 chum salmon stock was reclassified from a management concern to a yield concern at the 2007 board meeting. The classification as a yield concern was recommended at the next board cycle (Menard and Bergstrom 2009a) and was continued at the January 2010 board meeting.

The initial determination as a yield concern for Subdistricts 2 and 3 was based on low harvest levels for the previous 5-year period (1995–1999). An action plan was subsequently developed by the department (Bue 2000b) and acted upon by the board in January 2001. The classification as a yield concern was continued at the 2004, 2007, and 2010 board meetings based on department recommendations (Menard and Bergstrom 2003b, 2006b, 2009b).

At the October 2012 board work session, the department recommended continuation of Norton Sound Subdistrict 1, and Subdistricts 2 and 3 chum salmon as stocks of yield concern. The department recommendation to continue classification of these 2 chum salmon stocks as yield concerns was based on low yields for the recent 5-year period (2008–2012) compared to historical yields in the 1980s. Although available yields in 2010 and 2011 in Subdistricts 1–3 were the best seen since the 1980s, the other 3 years had low available yields and not all escapement goals were achieved.

SUBDISTRICT 1 STOCK ASSESSMENT BACKGROUND

The Norton Sound District is composed of 6 commercial fishing subdistricts (Figure 1). Most subdistricts have several rivers where subsistence fishing occurs, and except for Subdistrict 1 (Nome), there are few restrictions (Menard et al. 2012). In Subdistrict 1, the larger chum salmon runs are typically east of Nome, particularly in the Eldorado and Flambeau rivers (Figure 2).

ESCAPEMENT

In 2001, the department recommended, and then later established, a chum salmon BEG for Subdistrict 1 chum salmon stock of 23,000 to 35,000 chum salmon (Clark 2001a). In January 2001, the board established OEG ranges for chum salmon on 3 rivers in Subdistrict 1: Nome, Snake, and Eldorado rivers. Chum salmon have been counted via towers or weirs on these rivers since 1994, 1995, and 1997, respectively (Table 1). The department also established SEG ranges based on aerial survey information, on 4 other rivers in Subdistrict 1. All board-established OEGs and department-established SEGs were set in conjunction with the overall Subdistrict 1 BEG, and have been used to assess the overall escapement to Subdistrict 1 in relation to the BEG. The Subdistrict 1 BEG was achieved or exceeded from 2005 through 2008, fell short of the goal in 2009, and exceeded it from 2010 through 2012 (Figure 3). Performance of the

Subdistrict 1 BEG has largely mirrored performance of the Eldorado River OEG, because it is usually the single largest contributor to the subdistrictwide escapement (Figures 3 and 6). During the recent 5-year period (2008–2012), the OEG has been achieved or exceeded in 2 of 5 years at Snake (Figure 4) and Nome (Figure 5) rivers, and 4 of 5 years at Eldorado River (Figure 6). Comparing escapements during 2008–2012 to the escapement goals established in 2001 shows there has not been a chronic inability to meet escapement goals (Figures 3–6).

YIELD

Subsistence chum salmon harvests in Subdistrict 1 gradually increased after statehood until the 1990s, when harvests decreased because of low runs and increased subsistence restrictions (Table 2). Participation in Subdistrict 1 subsistence chum salmon fishing was limited beginning in 1999 when Tier II restrictions were initiated. In 2004 and 2005, all Tier II applicants received a permit, but harvests still remained below 1,000 chum salmon (Table 2 and Figure 7). Since 2006, Tier II restrictions have been suspended, allowing all Alaska residents to participate in the subsistence fishery for chum salmon. In recent years, despite improved chum salmon runs and more subsistence harvest opportunities, subsistence harvests remain low compared to pre-1990s harvests. This may reflect changes in species targeted by subsistence fishermen; record pink (*O. gorbuscha*) and coho salmon (*O. kisutch*) runs in the mid-2000s in Subdistrict 1 allowed subsistence permit holders to easily target those species. Subsistence users have been targeting pink salmon since 2004, particularly during the larger runs in even-numbered years when harvests have ranged from 3 to 25 times higher than the following odd-numbered year pink runs (Table 2). Additionally, beginning in 2003, record sockeye salmon (*O. nerka*) runs returning to Pilgrim River in Port Clarence District for several years, resulted in a three- to eightfold increase of permits issued.

In 2012, the department forecast was for the chum salmon run to reach or exceed the escapement goal range. Additionally, beach seining was allowed during all scheduled chum salmon gillnet fishing periods in fresh water in 2012, except one period. Historical subsistence harvests are listed for Subdistrict 1 in Table 2 and for the nearby Pilgrim River in Table 3. An overview of management actions in Subdistrict 1 is listed in Table 4.

In summary, Tier II subsistence fishing was liberalized to Tier I subsistence fishing regulations the past 9 years (2004–2012) and beginning in 2006, there have been no Tier II restrictions in the subsistence fishery throughout the season. Although the recent available yield from 2010 to 2012, based upon the combined Subdistrict 1 escapement, appears to be near historical levels in the 1980s, the surplus is primarily in the eastern portion of the subdistrict as assessed by individual tributary projects (Table 2 and Figures 3–7). Thus overall, the Subdistrict 1 chum salmon stock is showing improvement. However, the available yield in 2008 and 2009, and in the western portion of the subdistrict, as assessed by Nome and Snake rivers, remains below historical levels. The available yield in Subdistrict 1 is higher east of Cape Nome as indicated by escapements observed in Eldorado River.

SUBDISTRICT 1 STOCK OF CONCERN RECOMMENDATION

Given that chum salmon escapement goals for Nome and Snake rivers have been achieved 2 of the past 5 years, and the Eldorado River OEG and Subdistrict 1 BEG were achieved 4 of the past 5 years, there is not a chronic inability to meet escapement goals. Overall, the Subdistrict 1 chum salmon stock is showing improvement. However, the available yield in 2008 and 2009,

and in the western portion of the subdistrict, as assessed by Nome and Snake rivers, remains below historical levels despite use of specific management measures. Based on the definitions provided in the SSFP, 5 AAC 39.222(f)(21) and (42), the department recommends continuing the stock of concern classification of Subdistrict 1 chum salmon stock as a yield concern.

OUTLOOK

The Subdistrict 1 chum salmon run is expected to be below average in 2013 based on parent-year escapements and age composition of escapement samples from 2012. Age-0.3 chum salmon make up the majority of the run to Subdistrict 1 in most years and the lower number of age-0.3 fish present in the 2012 run is a likely indication age-0.4 chum salmon returns will be below average. Likewise based on the limited number of age-0.2 chum salmon in 2012, the age-0.3 returns are expected to be below average to average in 2013. However, the chum salmon run is expected to be sufficient to provide for escapement and subsistence uses, and no Tier II restrictions will be in place.

ALASKA BOARD OF FISHERIES ACTION

In response to the guidelines established in the SSFP, it is anticipated that the board will continue the stock of concern classification of Norton Sound Subdistrict 1 chum salmon stock as a yield concern during its January 2013 regulatory meeting.

SUBDISTRICT 1 ESCAPEMENT GOAL EVALUATION

The department has undertaken a review of escapement goals for several Norton Sound salmon stocks where long-term escapement, catch, and age-composition data exist that enable the development of BEGs or SEGs based on analysis of production, consistent with the escapement goal policy. In January 2001, the board established OEG ranges for chum salmon on 3 rivers in Subdistrict 1: Nome River, Snake River, and Eldorado River. These 3 rivers have weir projects to determine escapement. The department established aerial survey-based SEG ranges on 4 other rivers in Subdistrict 1. Escapement information from all 7 rivers provided an index of escapement for the subdistrict. The department established an aggregate BEG of 23,000 to 35,000 chum salmon for Subdistrict 1 (Clark 2001a). Escapement goals developed in 2000 were reviewed in the 2004 board cycle, utilizing additional data since the escapement goals were established (ADF&G 2004). This evaluation resulted in no numerical changes. However, all of the goals, except for the subdistrictwide goal, were revised to SEGs rather than BEGs, because system specific goals may not provide for maximum sustained yield (MSY) from each individual river. Escapement goals were reviewed in the 2007 board cycle utilizing additional data. This evaluation resulted in no recommended changes (Brannian et al. 2006). Escapement goals were again reviewed in the 2010 board cycle and the 4 rivers with aerial survey-expanded SEGs were eliminated. Due to weather, uncertainty of the relationship of the survey to peak spawning time and availability of aircraft, these counts are unreliable for evaluating goals on these specific systems (Volk et al. 2009). No changes to escapement goals in Subdistrict 1 were recommended by the department after the escapement goal review for the 2013 board meeting cycle.Current and proposed escapement goals for Subdistrict 1 chum salmon are as follows:

Stream (Project Type)	Current Goal		Proposed Goal
Eldorado River (Weir)	6,000–9,200	SEG/OEG	No Change
Nome River (Weir)	2,900–4,300	SEG/OEG	No Change
Snake River (Weir)	1,600–2,500	SEG/OEG	No Change
Subdistrict 1	23,000–35,000	BEG	No Change

SUBDISTRICT 1 MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCKS OF CONCERN AS OUTLINED IN THE POLICY FOR THE MANAGEMENT OF SUSTAINABLE SALMON FISHERIES

NORTON SOUND SUBDISTRICT 1 CHUM SALMON MANAGEMENT PLAN REVIEW/DEVELOPMENT

Current Stock Status

In response to the guidelines established in the SSFP, the department recommended continuation of Norton Sound Subdistrict 1 chum salmon stock as a yield concern at the October 2012 board work session. This recommendation is based on achieving a majority of chum salmon escapement goals during the last 5 years, but the inability, despite the use of specific management measures, to consistently maintain expected yields, or harvestable surpluses, above a stock's escapement needs during the last 5 years. The board, after reviewing stock status information and public input during its January 2013 regulatory meeting, is anticipated to continue the classification of Norton Sound Subdistrict 1 chum salmon stock as a yield concern.

Customary and Traditional Use Finding and the Amount Necessary

The board has made a positive finding for customary and traditional (C&T) use for chum salmon in Subdistrict 1. Amount necessary for subsistence (ANS) uses has been determined to be 3,430–5,716 chum salmon seasonally in Subdistrict 1 and 96,000–160,000 salmon for the Norton Sound-Port Clarence Area.

HABITAT FACTORS ADVERSELY AFFECTING CHUM STOCK

Subdistrict 1 has been subjected to gold mining over a long time-period. While historical mining did cause significant damage, most of the direct physical damage was to tributary streams and/or headwaters. For the most part, prime chum salmon spawning areas were not affected (except for the Nome, Snake, and Solomon rivers). Additionally, there are other habitat issues that have contributed to loss of fish habitat, such as road and narrow gauge railroad construction. A discussion of habitat issues affecting Subdistrict 1 chum salmon production is contained in the Norton Sound/Bering Strait Regional Comprehensive Salmon Plan 1996–2010 (Norton Sound/Bering Strait Regional Planning Team 1996).

The following excerpts from the Comprehensive Plan describe some of the problems:

1. The **Snake River** "was heavily impacted by gold mining activities which played a significant role in damaging salmon spawning and rearing habitats as well as impacting the returns of the different species of salmon. A few Snake River tributaries (predominantly Anvil Creek) are still actively mined today." (page 43)
2. "Prior mining activity on the **Nome River** and its tributaries as well as road construction has adversely impacted salmon populations over the years." (page 44)
3. In the **Solomon River** "early mining activity was substantial; at least 13 dredges were operated on the Solomon River and its' tributaries. Considerable damage was done to some sections of river as a result of these activities. Additionally, road construction has resulted [in] redirection of portions of the river that may require stream channelization work for complete recovery." (page 45)

In addition to existing mining activity, a large-scale mine may open in the future. Explorations have identified a lode deposit on Rock Creek, a tributary of Snake River, and a 1,000-acre pit mine may open, depending on economic conditions. The lode consists of 2 ore structures, the Albion and Tension zones. These 2 zones have distinct geochemical characteristics that may influence long-term environmental effects. An assessment program is under development to evaluate the acid-generating potential of both deposits, as well as their neutralizing potential. Mine site development and reclamation plans will need to consider these factors to ensure that water quality in the Snake River is maintained during and after completion of mining. Electrofishing and minnow trapping have not revealed the recent presence of any fish in Rock Creek, although a few juvenile Dolly Varden have been documented in lower Rock Creek in the past. It is not clear what impact this mining activity may have on Snake River chum salmon. Additionally, there is the possibility of renewed interest in mining adjacent to the Big Hurrah River, a tributary of the Solomon River.

There has been increasing mining activity by floating dredges in the marine waters west of the Snake River mouth. This area is 1 of 2 areas where recreational dredges are allowed. The other recreational area is a mile east of the Snake River mouth and has also seen increased mining activity. The dredge mooring area is designated in the lower Snake River area and over 50 dredges sometime moor there.

The Alaska Department of Transportation and Public Facilities are in the process of building a new road across the Snake River, including construction of new bridge across the lower Snake River. Work began during the summer of 2012, with the contractor blocking half the lower Snake River with a rock roadway to provide support for a crane to place bridge supports into the riverbed.

Projects Needed

1. Solomon River restoration to correct loss of habitat due to historical dredging and material extraction (road construction).
2. Intensive monitoring of existing and future projects to determine whether or not chum salmon and their habitat are being impacted.

Do New Or Expanding Fisheries On This Stock Exist?

There are no new or expanding fisheries on this stock. However, Norton Sound-bound chum salmon may be caught as bycatch in the Bering Sea groundfish fishery. The chum salmon bycatch in this fishery greatly increased from 2003 through 2007, decreased substantially from 2008 through 2010, and increased again in 2011. The North Pacific Fishery Management Council is currently addressing the chum salmon bycatch issue in the Bering Sea trawl fishery.

Subdistrict 1 chum salmon may also be harvested in other salmon fisheries in Western Alaska managed by the department. The Western Alaska Salmon Stock Identification Project (WASSIP) is a comprehensive program to sample commercial and subsistence chum and sockeye salmon fisheries in coastal marine and estuarine areas of western Alaska from 2006 to 2009. Analysis of salmon stocks, through use of genetic techniques has replaced scale pattern analysis, as the tool of choice for examining stock compositions of fisheries in Alaska. WASSIP was designed to investigate stock compositions of chum and sockeye salmon fisheries from Chignik to Kotzebue Sound. The project collected data to examine stock compositions of chum salmon fisheries from 2007 to 2009 and for sockeye salmon fisheries from 2006 to 2008 (3 years

for each species). The data for sockeye salmon were just published and provide insight into the stock compositions of some commercial fisheries in the Kuskokwim Area. The data for chum salmon have not published as of this writing; these data are expected to provide insight about Yukon River fall chum and Kotzebue Sound fish captured in AYK fisheries, but stocks spanning from Bristol Bay to Norton Sound were not differentiated. Results of this project will be available at the January 2013 board meeting.

EXISTING MANAGEMENT PLAN

5 AAC 01.190. Subdistrict 1 of the Norton Sound District chum salmon management plan.

ACTION PLAN DEVELOPMENT

NORTON SOUND SUBDISTRICT 1 CHUM SALMON ACTION PLAN GOAL

Reduce fishing mortality, when necessary, in order to meet spawning escapement goals, to provide for subsistence harvests within the ANS range, and to provide opportunity for other uses when a surplus above escapement needs and subsistence uses is available.

REVIEW OF MANAGEMENT ACTION PLAN

Regulation Changes Adopted in January 2001

In January 2001, after review of the management action plan options addressing this stock of concern, the board adopted the following plan:

> **5 AAC 01.190. Subdistrict 1 of the Norton Sound District Chum Salmon Management Plan.** The purpose of this management plan is to provide the department with conservative management guidelines for the sustained yield of chum salmon stocks in Subdistrict 1 of the Norton Sound District. The department shall manage Subdistrict 1 to achieve optimal escapement goals for chum salmon spawning streams and to restore chum salmon abundance so that a Tier II subsistence fishery will not be necessary. The department shall manage chum salmon as follows:
>
> (1) commercial fishing for chum salmon is closed and will be reopened only after,
>
> (A) the harvestable surplus of chum salmon has met Tier I subsistence needs for 4 consecutive years; and
>
> (B) the department has proposed to the Board of Fisheries and the board has adopted an abundance-based management plan supported by inseason enumerator counts of abundance;
>
> (2) in the subsistence fishery,
>
> (A) subsistence chum salmon fishing will be opened and closed by emergency order (EO) on a stream-by-stream basis, to be determined by the department, when chum salmon stocks are abundant enough to provide for optimal escapement goals and a harvestable surplus;
>
> (B) a subsistence fishing permit under 5 AAC 01.180 is required and will be issued to a household; the permit will identify the body of water to be fished, the annual limit for each salmon species, and the allowable gear;
>
> (C) in Subdistrict 1, pink salmon may be taken only with gillnets that have a mesh size of four and one-half inches or less.

The board repealed existing chum salmon OEG ranges for river systems in Subdistrict 1 of the Norton Sound District in 5 AAC 04.358 and adopted the following optimal escapement goal ranges for chum salmon:

(1) Snake River: 1,600 to 2,500 chum salmon;

(2) Nome River: 2,900 to 4,300 chum salmon; and

(3) Eldorado River: 6,000 to 9,200 chum salmon.

The Cripple and Penny rivers were closed to subsistence salmon fishing.

The board adopted subsistence hook-and-line attached to a rod or pole as a lawful gear for all species in northern Norton Sound and southern Kotzebue Sound. Sport fishing limits and methods and means restrictions were adopted, except when a subsistence fishing permit is required; then, the catch limits specified in the subsistence fishing permit will apply, except when fishing through the ice.

Regulation Changes Adopted in January 2004

In January 2004, after review of the management action plan options addressing this stock of concern (Menard and Bergstrom 2003a), the board adopted the following regulations: subsistence salmon fishermen using hook-and-line attached to a rod or pole were required to obtain subsistence salmon permits, and 5 AAC 01.190(2)(C) was repealed.

Regulation Changes Adopted in January 2007

In January 2007, after review of the management action plan options addressing this stock of concern (Menard and Bergstrom 2006a), the board adopted the following regulations: (1) expanded the subsistence fishing area with a hook-and-line to all areas where sport fishing was allowed, (2) reopened the first 100 yards of the Penny River upstream from the mouth and the first 200 yards of the Cripple River upstream from the mouth to subsistence salmon fishing, except for chum salmon, (3) eliminated subsistence permit catch limits listed in regulation and allowed the department to continue setting catch limits based on expected returns, (4) reduced the subsistence area where nets could be fished in the Nome River, and (5) allowed for an annual cash sale of up to $200 for customary trade of subsistence caught finfish.

Regulation Changes Adopted in January 2010

No regulatory changes were adopted pertaining to Subdistrict 1 chum salmon in 2010.

Management Review

Conservative management strategies employed by the department from 2001 through 2003 were based on the management action plan adopted by the board in January 2001. Subdistrict 1 was closed to all salmon fishing in mid-June and reopened in marine waters to Tier II chum salmon permit holders the third week of June. In 2000–2002, there were regular Tier II fishing periods in marine waters, and some rivers had Tier II fishing periods. In 2003, the Subdistrict 1 escapement goal was not reached and Tier II chum salmon fishing was suspended. In 2004 and 2005, there were regular Tier II subsistence fishing periods in marine waters and some fresh water areas also had Tier II fishing periods. As escapements were met in rivers, Tier I fishing was allowed and chum salmon harvest limits were waived.

The number of successful Tier II permit applicants was 30 in 2001, and 40 in 2002 and 2003. After 2003, the department reviewed the 5 years of fishing history since Tier II went into effect in 1999. Analyses showed that some successful applicants were not picking up permits and some permit holders were not fishing. Also, average harvests were 33 chum salmon per permit, although the limit was 100. Because of limited fishing effort and limited catches, the number of permits issued was increased to 50 in 2004 and 2005 with the possibility of issuing an additional 10 conditional permits. All applicants were successful in 2004 (57) and 2005 (59), with 52 Tier II permits issued in 2004 and 49 issued in 2005. The number of permits issued was less than the number of applicants because some applicants never picked up their permit.

A trend in subsistence harvests was observed in 2004 and 2005 that approximately one-half of Tier II permit holders were harvesting chum salmon. Other permit holders were using Tier II permits as an opportunity to fish for other salmon species, particularly pink salmon, during Tier II openings. In 2006, 2007, and 2008, the department suspended Tier II restrictions after considering that the projection for a strong chum salmon run would provide for ANS and that trends of limited effort targeting chum salmon observed in recent years would continue. Lower chum salmon harvests observed in these years may have been the result of subsistence fishermen harvesting other species; pink, sockeye, and coho salmon when abundant (Figure 8). Although the 2008 chum run was within the BEG range, the harvest was one-fourth previous year and may have been the result of subsistence fishermen targeting a record pink salmon run.

The poor chum salmon run of 2009 in Subdistrict 1 was similar to poor chum salmon runs observed elsewhere in northern Norton Sound. From 2010–2012, Subdistrict 1 chum salmon runs were well above the overall escapement needs, there were no fishing closures, and the department waived subsistence chum salmon catch limits in many locations in Subdistrict 1, and usually allowed beach seining for the majority of the season during the regular freshwater gillnet schedule. Still, the harvest of chum salmon remained below the lower end of the ANS.

ACTION PLAN ALTERNATIVES

No new action plans necessary; continue under current plans.

2013 ALASKA BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING NORTON SOUND SUBDISTRICT 1 CHUM SALMON

Commercial

116 – Create a pink and chum salmon commercial fishery in Subdistrict 1.

117 – Allow for commercial salmon fishery west of Cape Nome.

127 – Increase the amount of gear used by a permit holder from 100 fathoms to 150 or 200 fathoms by EO during a pink salmon directed fishery in Norton Sound District.

Subsistence

122 – Allow gillnet fishing 7 days a week in Subdistrict 1.

123 – Allow beach seining during gillnet fishing periods in Subdistrict 1.

124 – Expand the boundaries of Sinuk River gillnet fishing area.

Sport

129 – Allow sport fishing for chum salmon in Nome Subdistrict.

A research plan for Subdistrict 1 chum salmon stock of concern is provided at the end of this report.

SUBDISTRICTS 2 AND 3 STOCK ASSESSMENT BACKGROUND

In Norton Sound Subdistrict 2, most freshwater subsistence fishing occurs in Niukluk and Fish rivers, and in Subdistrict 3, in Kwiniuk and Tubutulik rivers (Figure 2). Therefore, the Niukluk, Fish, Kwiniuk, and Tubutulik rivers are index rivers to determine salmon run strength for these 2 subdistricts.

ESCAPEMENT

In Subdistrict 2, the department established a lower-bound SEG of 30,000 chum salmon for Niukluk River tower in 2004. In 2010, the department recommended a lower-bound SEG of 23,000 chum salmon for Niukluk River tower (Bernard et al. 2009). The revised Niukluk River escapement goal was achieved in 2010 and 2011. Overall, the Niukluk River escapement goal was achieved in 2 of the last 5 years (Table 6; Figure 9). In 2012, the chum salmon escapement may have fallen short by less than 10% of the goal, but the total chum salmon escapement could not be determined because flooding events prevented total enumeration of the chum salmon run.

In Subdistrict 3, based on escapement counts from Kwiniuk River counting tower project, the OEG of 11,500 to 23,000 chum salmon has been achieved or exceeded in 2 of the 5 recent years (Table 7 and Figure 10). The OEG for Tubutulik River chum salmon is 9,200 to 18,400 chum salmon as assessed via aerial survey. It is difficult to determine if the OEG was achieved in most years because aerial surveys were often incomplete due to poor weather conditions or lack of aircraft. Another difficulty in surveying Tubutulik River, beginning in 2004, was the huge number of pink salmon arriving at the same time as chum salmon in even-numbered years. In 2010, the chum salmon run was estimated to be the best in 25 years and a record escapement was counted at Kwiniuk River tower. The 2006 brood year had phenomenal production, resulting in strong runs in both 2010 and 2011, but the 2012 run was considerably weaker. Overall, chum salmon runs in Subdistrict 3 have been lower in the 1990s and 2000s than in the 1980s, based on Kwiniuk River escapements and reported harvests (Figures 10 and 11).

YIELD

In Subdistricts 2 and 3, chum salmon harvests in the 2000s had been minimal until the 2010 and 2011 fishing seasons. Subsistence chum salmon harvests averaged 1,271 and 2,195 fish in Subdistricts 2 and 3, respectively, from 2008 through 2012. The total subsistence salmon harvest has usually been double in even-numbered years compared to odd-numbered years as fishermen take advantage of the larger runs of pink salmon in even-numbered years (Tables 8 and 9). In most years in middle of the last decade, chum salmon runs have been insufficient to allow for commercial harvests in Subdistricts 2 and 3. However, in 2007, there was a large surplus of chum salmon, but the buyer was only able to purchase fish in Subdistrict 3. In 2008 and 2009, there was not a surplus of chum salmon in either subdistrict, but in 2010 and 2011, chum salmon runs and harvests were the highest in over 20 years. In 2012, commercial chum salmon fishing was limited to 1 fishing period in Subdistrict 2 because of a weaker than expected run. During the last 5 years (2008–2012), the available yield has been less than historical yield in the 1980s (Tables 8 and 9; Figures 11 and 12).

SUBDISTRICT 2 AND 3 STOCK OF CONCERN RECOMMENDATION

Given the continued low yield of chum salmon despite use of specific management measures, the Norton Sound Subdistricts 2 and 3 chum salmon stock continues to meet the criteria for a stock of yield concern. Therefore, based on the definitions provided in the SSFP, 5 AAC 39.222(f)(42), the department recommends continuation of the yield concern classification for the Norton Sound Subdistricts 2 and 3 chum salmon stock.

OUTLOOK

The 2013 chum salmon run in Norton Sound Subdistricts 2 and 3 is expected to be below average based on the age-0.2 and age-0.3 chum salmon samples from the commercial catch, Kwiniuk River escapement in 2012, and parent-year escapements. In most years, age-0.3 chum salmon make up the majority of the run to Subdistricts 2 and 3, and the survival rate from brood year 2009 was estimated to be below average based on the limited number of age-0.2 fish observed in escapement samples. Based on the age-0.3 fish return in 2012, the age-0.4 return is expected to be below average to average.

ALASKA BOARD OF FISHERIES ACTION

In response to guidelines established in the SSFP, the board is anticipated to continue classification of the Norton Sound Subdistricts 2 and 3 chum salmon as a stock of yield concern during its January, 2013 regulatory meeting.

ESCAPEMENT GOAL EVALUATION

The department has undertaken a review of escapement goals for several Norton Sound salmon stocks where sufficient long-term escapement, catch, and age composition data exist that enable the development of BEGs or SEGs, based on analysis of production consistent with the escapement goal policy.

In Subdistrict 2, the department established a lower-bound SEG of >30,000 chum salmon for Niukluk River tower in 2004 (ADF&G 2004). This escapement goal remained unchanged until the 2010 board cycle, when the review team recommended changing to a lower-bound SEG of >23,000 (Volk et al. 2009) based on a risk analysis (Bernard et al. 2009) which indicated escapements exceeding this threshold would result in only a 6.6% estimated risk of a management concern (4 consecutive years of escapements below the threshold), and only a 6.4% estimated risk of experiencing a 75% drop in mean escapement.

In Subdistrict 3, BEGs were established for the Tubutulik and Kwiniuk rivers in 2001: 8,000–16,000 and 10,000–20,000 summer chum salmon, respectively (Clark 2001b). Aerial surveys are used to determine if the Tubutulik River goal is reached. A counting tower project is used to estimate chum salmon escapement in Kwiniuk River. In January 2001, the board established OEG ranges for Tubutulik and Kwiniuk rivers by increasing the department-recommended BEGs by 15%. Escapement goals were reviewed in the 2007 board cycle utilizing additional data since the escapement goals were established. This evaluation resulted in no recommended changes (Brannian et al. 2006). No changes to escapement goals in Subdistricts 2 and 3 were recommended by the department after the escapement goal review for the 2013 board cycle meeting.

Current goals for Subdistricts 2 and 3 chum salmon are as follows:

Stream	Current Goal		Proposed Goal
Niukluk River Counting Tower	>23,000	SEG	No Change
Kwiniuk River Counting Tower	10,000–20,000	BEG	No Change
Kwiniuk River Counting Tower	11,500–23,000	OEG	No Change
Tubutulik River Aerial Survey	8,000–16,000	BEG	No Change
Tubutulik River Aerial Survey	9,200–18,400	OEG	No Change

MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCKS OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY

NORTON SOUND SUBDISTRICTS 2 AND 3 CHUM SALMON MANAGEMENT PLAN REVIEW/DEVELOPMENT

Current Stock Status

In response to guidelines established in the SSFP (5 AAC 39.222), the department recommended continuation of Norton Sound Subdistricts 2 and 3 chum salmon as a stock of yield concern at the October 2012 board work session. The board, after reviewing stock status information and public input during its January 2013 regulatory meeting, is anticipated to continue the classification of Subdistricts 2 and 3 chum salmon as a stock of yield concern. This determination is anticipated to be based on the inability, despite the use of specific management measures, to maintain expected yields or harvestable surpluses above a stock's escapement needs during the last 5 years (2008–2012).

Customary and Traditional Use Finding and the Amount Necessary

The board has made a positive finding for customary and traditional use (C&T) for salmon in the Norton Sound-Port Clarence Area. Amounts reasonably necessary for subsistence (ANS) uses have been determined to be 96,000–160,000 salmon for the Norton Sound-Port Clarence Area.

HABITAT FACTORS ADVERSELY AFFECTING CHUM SALMON STOCKS

Subdistrict 2

The Norton Sound/Bering Strait Regional Comprehensive Salmon Plan 1996–2010 briefly mentions that the population of Council, on Niukluk River, was 10,000 people during the Gold Rush. Damage to fish habitat would have occurred 50 to 100 years ago and is not thought by area staff to be the limiting factor now in chum salmon production. Available spawning habitat appears to be more than adequate for the numbers of fish returning. The extent to which mining reduced the available spawning and rearing habitat is not known. There is occasional small-scale mining activity on Ophir Creek, which is not currently known for chum salmon production. Oral history indicated Ophir Creek used to be predominately a chum salmon producer. Historical dredging left numerous dredge ponds. Beaver activity has intensified morphological changes in the creek. The system now primarily produces coho salmon. The increasing presence of beavers appears to be a common agent of habitat change. There are likely other habitat changes, with very small impacts, that could indicate a trend in changing environment. Casadepaga River has both small-scale mining and significant chum salmon production.

Subdistrict 3

In the late 1990s, there was a perched culvert on Iron Creek for the road linking Moses Point and Elim that was a barrier to fish passage (pink, chum, and coho salmon) at all but high tidal stages. Local residents manually transported spawning stocks around the culvert in some years. The culvert was initially installed by the Bureau of Indian Affairs (BIA) and a retrofit has now provided easier fish passage. Beaver dams are becoming more prevalent on Iron Creek and this stream has been transformed from a chum salmon producer to a coho salmon producer. Many hook-and-line subsistence fishermen report harvesting coho salmon from Iron Creek. Kroeker (2006) reported the effect of beaver activity on Kwiniuk River and Iron Creek.

Projects Needed

In 2012, complete blockage of one of the Kwiniuk River ocean outlets by buildup of sand from current and wave action was believed to shift some salmon to the nearby Tubutulik River.

Do New Or Expanding Fisheries On This Stock Exist?

There are no new or expanding fisheries on this stock. However, Norton Sound-bound chum salmon may be taken as bycatch in the Bering Sea groundfish fishery (Wilmot et al. 1998). The chum salmon bycatch in this fishery greatly increased from 2003 through 2007, decreased substantially from 2008 through 2010, and increased again in 2011. The North Pacific Fishery Management Council is currently addressing the chum salmon bycatch issue in the Bering Sea trawl fishery.

Subdistricts 2 and 3 chum salmon may also be harvested in other salmon fisheries in Western Alaska managed by the department. The Western Alaska Salmon Stock Identification Project (WASSIP) is a comprehensive program to sample commercial and subsistence chum and sockeye salmon fisheries in coastal marine and estuarine areas of western Alaska from 2006 to 2009. Analysis of salmon stocks, through use of genetic techniques has replaced scale pattern analysis, as the tool of choice for examining stock compositions of fisheries in Alaska. WASSIP was designed to investigate stock compositions of chum and sockeye salmon fisheries from Chignik to Kotzebue Sound. The project collected data to examine stock compositions of chum salmon fisheries from 2007 to 2009 and for sockeye salmon fisheries from 2006 to 2008 (3 years for each species). The data for sockeye salmon were just published and provide insight into the stock compositions of some commercial fisheries in the Kuskokwim Area. The data for chum salmon have not published as of this writing; these data are expected to provide insight about Yukon fall chum and Kotzebue fish captured in AYK fisheries, but stocks spanning from Bristol Bay to Norton Sound were not differentiated. Results of this project will be available at the January 2013 board meeting.

EXISTING MANAGEMENT PLAN

5 AAC 04.390. Subdistricts 2 and 3 of the Norton Sound District Salmon Management Plan.

ACTION PLAN DEVELOPMENT

NORTON SOUND SUBDISTRICTS 2 AND 3 CHUM SALMON ACTION PLAN GOAL

Reduce fishing mortality in order to meet spawning escapement goals, to provide for subsistence levels within the ANS range, and to reestablish historical range of harvest levels by other users.

REVIEW OF MANAGEMENT ACTION PLAN

Regulation Changes Adopted in January 2001

In January 2001, after review of the management action plan options addressing this stock of concern, the board adopted the following plan:

5 AAC 04.390. Subdistricts 2 and 3 of the Norton Sound District Salmon Management Plan.

(a) The purpose of this management plan is to provide the department with management guidelines for sustained yield of salmon stocks in Subdistricts 2 and 3 in the Norton Sound District. The department shall manage, to the extent practicable, the commercial, sport, subsistence, and personal use fisheries in Subdistricts 2 and 3 to achieve escapement goals.

(b) The department shall manage salmon fisheries in the Subdistricts 2 and 3 as follows:

(1) in the commercial chum salmon fishery,

(A) the department shall manage the fisheries to achieve the following optimal escapement goals ranges:

i. Kwiniuk River: 11,500–23,000 chum salmon; and

ii. Tubutulik River: 9,200–18,400 chum salmon;

(B) the chum salmon harvest may not exceed 15,000 fish before the departments mid-July run assessment in Subdistrict 2;

(C) the fishery may occur only if the department projects that chum salmon escapement goals will be achieved and the harvestable surplus will more than meet subsistence needs;

(2) in the commercial pink salmon fishery, the fishery may occur only if subsistence needs are expected to be met and chum salmon escapement goals achieved;

(3) in the commercial coho salmon fishery, the fishery may occur only when the chum salmon escapement goals for the Norton Sound District index rivers specified in 5 AAC 04.358 are achieved or when the department determines that further restrictions would have no impact on achieving chum salmon escapement goals;

(4) the commissioner may not place restrictions on subsistence fishing for chum salmon by EO, unless all directed chum salmon commercial fishing has been closed and sport fishing has been appropriately restricted in the subdistrict as provided in 5 AAC 01.180–5 AAC 01.184. (Eff. 6/17/2001, Register 158).

The board adopted subsistence hook-and-line attached to a rod or pole as a lawful gear for all species in northern Norton Sound and southern Kotzebue Sound. Sport fishing bag limits and

methods and means restrictions were adopted, except when a subsistence fishing permit is required; then, the catch limits specified in the subsistence fishing permit will apply, except when fishing through the ice.

Regulation Changes Adopted in January 2004

In January 2004, after review of the management action plan options addressing this stock of concern (Menard and Bergstrom 2003b), the board adopted a regulation requiring subsistence salmon permits in all waters of Subdistricts 2 and 3. No harvest limits were established.

Regulation Changes Adopted in January 2007

In January 2007, after review of the management action plan options addressing this stock of concern (Menard and Bergstrom 2006b), the board (1) eliminated the commercial fishing period schedule of two 48-hour fishing periods per week in Subdistrict 2 and allowed the department to set periods by EO, and (2) eliminated the commercial fishing period schedule in Subdistrict 3 of two 24-hour fishing periods per week and allowed the department to set periods by EO.

Regulation Changes Adopted in January 2010

In January 2010, after review of the management action plan options addressing this stock of concern (Menard and Bergstrom 2009b), the board allowed for a directed pink salmon commercial fishery after July 6 in Subdistrict 3 and July 14 in Subdistrict 2 if there is a harvestable pink salmon surplus and a directed pink salmon commercial fishery would not have a significant impact on escapement goals or subsistence use of chum salmon.

Management Review

Historical management actions in Subdistricts 2 and 3 are listed in Table 9. From 2002 through 2006, there was no commercial fishing in either subdistrict, mainly because of no market interest, but in the case of chum salmon, there were some years of poor runs.

Telemetry studies on the Fish River drainage, from 2002 to 2004, estimated that approximately one-third of the chum salmon went up Niukluk River (Todd 2004; Todd et al. 2005). In 2004 and 2005, the chum salmon run was again poor to both subdistricts, but pink salmon runs in both years were near record to record-setting in relation to historical runs. In 2006, the chum salmon run to Subdistrict 3 rebounded and escapement was good, but in Subdistrict 2, the chum salmon run continued to be poor.

Commercial fishing was allowed in 2007 for chum salmon in Subdistrict 3. In 2008 and 2009, chum salmon runs were too weak in both subdistricts to allow for commercial fishing, but in 2010 and 2011, chum salmon runs were the best in over 20 years. A weaker chum salmon run in 2012 resulted in only 1 chum salmon fishing period in Subdistrict 2. Pink salmon commercial fishing has occurred during even-numbered years since 2008, and commercial fishing for coho salmon has occurred yearly since 2008 in both subdistricts.

Subsistence salmon harvests in the 2000s, in Subdistricts 2 and 3, have usually been double in even-numbered years compared to odd-numbered years as fishermen take advantage of the greater runs of pink salmon in even-numbered years. There had been little interest by buyers to purchase pink salmon in the 2000s, until the last few years.

ACTION PLAN ALTERNATIVES

No new action plans necessary; continue under current plans.

2013 ALASKA BOARD OF FISHERIES REGULATORY PROPOSAL AFFECTING NORTON SOUND SUBDISTRICTS 2 AND 3 CHUM SALMON

Norton Sound - Commercial

127 – Increase the amount of gear used by a permit holder from 100 fathoms to 150 or 200 fathoms by EO during a pink salmon directed fishery in Norton Sound District. This proposal could affect Subdistricts 2 and 3 chum salmon because increasing the amount of gear used during a pink salmon-directed commercial fishery may result in more chum salmon caught during a pink salmon-directed commercial fishery.

RESEARCH PLAN

NORTON SOUND INITIATIVE AND AYK SUSTAINABLE SALMON INITIATIVE

A Norton Sound Research and Restoration Initiative (NSI) Steering Committee was formed that identified and prioritized research needs in response to the low chum salmon run in 1999. Through this initiative, native organizations, private industry, nonprofit organizations, and state and federal agencies came together to form an innovative partnership to cooperatively address salmon research and restoration needs. The NSI projects were operational from 2001 to 2006 and a final report is scheduled to be issued in 2013. Norton Sound Economic Development Corporation (NSEDC), the Community Development Quota (CDQ) group for Norton Sound, has continued to support salmon projects since the NSI funding ended.

NSI funded many projects in Norton Sound, including several projects in Subdistrict 1. Escapement projects on Nome, Snake, and Eldorado rivers received funding to sample chum salmon for age, sex, and length (ASL) data. These data helped managers determine age class return strength, which can improve run projections. Environmental monitoring on stream conditions occur year-round using data loggers on the Nome and Snake rivers. Studies were conducted in Subdistrict 1 to determine outmigration timing of juvenile salmon in the Eldorado-Flambeau drainage and Nome River. Results from 2002 studies showed the majority of chum salmon fry outmigration from the Eldorado-Flambeau River system was in late July (Nemeth et. al. 2003), as opposed to a belief that outmigration occurred mainly in late June.

The Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (AYK SSI) was formed after the NSI and is similar in organization, but encompasses Yukon and Kuskokwim areas, in addition to Norton Sound. The AYK SSI has funded several salmon radiotelemetry and salmon smolt projects in Norton Sound.

The Regional Planning Team (RPT) met in the spring of 2012 after several years of inactivity. The RPT is comprised of 3 department personnel and 3 members appointed by the Northern Bering Sea Regional Aquaculture Association (NoBSRAA). The RPT plans to update the Norton Sound/Bering Strait Regional Comprehensive Salmon Plan, 1996–2010, and review restoration and enhancement plans for Norton Sound.

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TABLES AND FIGURES

Table 1.–Subdistrict 1 chum salmon estimated escapement, 1993–2012.

Year	Solomon River [a]	Bonanza River [a]	Flambeau River [a]	Sinuk River [a]	Eldorado River [b]	Snake River [c]	Nome River [d]	Subdistrict Total [e]
1993	2,525	3,007	6,103	6,052	9,048	2,115	5,925	34,775
1994	1,066	5,178	12,889	4,905	13,202	3,519	2,893	43,652
1995	2,106	11,182	16,474	9,464	18,955	4,395	5,093	67,669
1996	2,141	7,049	13,613	6,658	32,970	2,772	3,339	68,542
1997	2,111	4,140	9,455	9,212	14,302	6,184	5,147	50,551
1998	925	4,552	9,129	6,720	13,808	11,067	1,930	48,131
1999	637	2,304	637	6,370	4,218	484	1,048	15,698
2000	1,294	4,876	3,947	7,198	11,617	1,911	4,056	34,899
2001	1,949	4,745	10,465	10,718	11,635	2,182	2,859	44,553
2002	2,150	3,199	6,804	6,333	10,243	2,776	1,720	33,225
2003	806	1,664	3,380	3,482	3,591	2,201	1,957	17,081
2004	1,436	2,166	7,667	3,197	3,273	2,145	3,903	23,787
2005	1,914	5,534	7,692	4,710	10,426	2,948	5,584	38,808
2006	2,062	708	27,828	4,834	41,985	4,128	5,677	87,222
2007	3,469	8,491	12,006	16,481	21,312	8,147	7,034	76,940
2008	959	3,636	11,618	5,367	6,746	1,244	2,607	32,177
2009	918	6,744	4,075	2,232	4,943	891	1,565	21,368
2010	2,678	3,513	25,009	11,107	42,612	6,973	5,906	97,798
2011	4,529	7,357	15,056	15,028	16,227	4,343	3,582	66,122
2012	1,377	6,002	17,517	10,537	13,393	1,235	2,015	52,076
2008–2012 ave.	2,092	5,450	14,655	8,854	16,784	2,937	3,135	53,908
2003–2012 ave.	2,015	4,582	13,185	7,698	16,451	3,426	3,983	51,338

[a] The Bonanza, Flambeau, Sinuk, and Solomon rivers escapement estimate is obtained by expanding aerial survey counts by calculation from Clark 2001.

[b] The Eldorado River escapement estimate is the same method as in Clark 2001 for 1993–1996. From 1997 to 2002, escapement estimates are from counting tower and from 2003 to 2012, by weir. The 2010 escapement estimate was by aerial expansion because the weir was often not fish-tight due to high water. Escapement goal range was established in 2001 at 6,000–9,200 chum salmon.

[c] The Snake River escapement estimate is the same method as in Clark 2001 for 1993–1994. From 1995 to 2002, escapement estimates are from counting tower and from 2003 to 2012, by weir. Escapement goal range was established in 2001 at 1,600–2,500 chum salmon.

[d] The Nome River escapement estimate is the same method as in Clark 2001 for 1993. From 1994 to 1995, escapement estimates are from counting tower and from 1996 to 2012, by weir. Escapement goal range was established in 2001 at 2,900–4,300 chum salmon.

[e] Subdistrict 1 BEG was established in 2001 at 23,000–35,000 chum salmon.

Table 2.–Commercial and subsistence salmon catch by species in Subdistrict 1, Norton Sound District, 1964–2012.

	SUBDISTRICT 1(NOME)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
1964	5	0	0	1	1,194	1,200	0	0	0	0	0	0	5	0	0	1	1,194	1,200
1965	1	0	0	193	1,941	2,135	0	0	0	780	1,825	2,605	1	0	0	973	3,766	4,740
1966	1	0	32	1	581	615	12	0	0	1,794	1,762	3,568	13	0	32	1,795	2,343	4,183
1967	0	0	0	72	406	478	11	0	0	349	627	987	11	0	0	421	1,033	1,465
1968[a]	0	0	0	50	102	152	7	0	0	6,507	621	7,135	7	0	0	6,557	723	7,287
1969	0	0	63	330	601	994	2	0	0	3,649	508	4,159	2	0	63	3,979	1,109	5,153
1970	0	0	6	55	960	1,021	0	0	35	5,001	458	5,494	0	0	41	5,056	1,418	6,515
1971	11	0	0	14	2,315	2,340	0	0	122	5,457	2,900	8,479	11	0	122	5,471	5,215	10,819
1972	15	0	0	12	2,643	2,670	19	0	52	4,684	315	5,070	34	0	52	4,696	2,958	7,740
1973	0	0	0	321	1,132	1,453	14	0	120	5,108	1,863	7,105	14	0	120	5,429	2,995	8,558
1974	19	0	123	7,722	10,431	18,295	8	0	5	3,818	183	4,014	27	0	128	11,540	10,614	22,309
1975[b]	2	0	319	2,163	8,364	10,848	2	0	97	6,267	2,858	9,224	4	0	416	8,430	11,222	20,072
1976	2	10	26	1,331	7,620	8,989	13	0	189	5,492	1,705	7,399	15	10	215	6,823	9,325	16,388
1977	8	0	58	65	15,998	16,129	35	0	498	2,773	12,192	15,498	43	0	556	2,838	28,190	31,627
1978	19	0	0	22,869	8,782	31,670	35	0	225	13,063	4,295	17,618	54	0	225	35,932	13,077	49,288
1979	9	0	29	5,860	5,391	11,289	11	0	1,120	6,353	3,273	10,757	20	0	1,149	12,213	8,664	22,046
1980	8	0	0	10,007	13,922	23,937	129	0	2,157	22,246	5,983	30,515	137	0	2,157	32,253	19,905	54,452
1981	4	0	508	3,202	18,666	22,380	35	14	1,726	5,584	8,579	15,938	39	14	2,234	8,786	27,245	38,318
1982	20	0	1,183	18,512	13,447	33,162	21	6	1,829	19,202	4,831	25,889	41	6	3,012	37,714	18,278	59,051
1983	23	0	261	308	11,691	12,283	74	53	1,911	8,086	7,091	17,215	97	53	2,172	8,394	18,782	29,498
1984	7	0	820	0	3,744	4,571	83	16	1,795	17,182	4,883	23,959	90	16	2,615	17,182	8,627	28,530
1985	21	0	356	0	6,219	6,596	56	114	1,054	2,117	5,667	9,008	77	114	1,410	2,117	11,886	15,604
1986	6	0	50	0	8,160	8,216	150	107	688	8,720	8,085	17,750	156	107	738	8,720	16,245	25,966
1987	3	0	577	0	5,646	6,226	200	107	1,100	1,251	8,394	11,052	203	107	1,677	1,251	14,040	17,278
1988	2	0	54	182	1,628	1,866	63	133	1,076	2,159	5,952	9,383	65	133	1,130	2,341	7,580	11,249
1989	2	0	0	123	492	617	24	131	469	924	3,399	4,947	26	131	469	1,047	3,891	5,564
1990	0	0	0	0	0	0	58	234	510	2,233	4,246	7,281	58	234	510	2,233	4,246	7,281
1991	0	0	0	0	0	0	83	166	1,279	194	3,715	5,437	83	166	1,279	194	3,715	5,437
1992	1	2	693	185	881	1,762	152	163	1,481	7,351	1,684	10,831	153	165	2,174	7,536	2,565	12,593
1993	0	2	611	0	132	745	52	80	2,070	873	1,766	4,841	52	82	2,681	873	1,898	5,586
1994	0	1	287	0	66	354	23	69	983	6,556	1,673	9,304	23	70	1,270	6,556	1,739	9,658
1995	0	1	369	0	122	492	26	148	1,365	336	3,794	5,669	26	149	1,734	336	3,916	6,161
1996	0	0	9	13	3	25	9	185	828	3,510	2,287	6,819	9	185	837	3,523	2,290	6,844
1997	0	0	0	0	0	0	10	50	325	175	2,696	3,256	10	50	325	175	2,696	3,256
1998	0	0	0	0	0	0	15	14	1,057	4,797	964	6,847	15	14	1,057	4,797	964	6,847
1999[c]	0	0	0	0	0	0	11	85	161	58	337	652	11	85	161	58	337	652

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Table 2.–Page 2 of 2.

	SUBDISTRICT 1(NOME)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
2000	0	0	0	0	0	0	7	26	747	2,657	535	3,972	7	26	747	2,657	535	3,972
2001	0	0	0	0	0	0	2	92	425	113	858	1,490	2	92	425	113	858	1,490
2002	0	0	0	0	0	0	4	79	666	3,161	1,114	5,024	4	79	666	3,161	1,114	5,024
2003	0	0	0	0	0	0	63	76	351	507	565	1,562	63	76	351	507	565	1,562
2004	0	0	0	0	0	0	100	106	1,574	15,047	685	17,512	100	106	1,574	15,047	685	17,512
2005	0	0	0	0	0	0	62	177	1,287	5,075	803	7,404	62	177	1,287	5,075	803	7,404
2006[d]	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	1,149	8,376	2,521	12,229
2008–2012 average	0	0	0	0	0	0	28	97	1,783	5,825	1,640	9,373	28	97	1,783	5,825	1,640	9,373
2003–2012 average	0	0	0	0	0	0	41	130	1,710	5,993	1,408	9,282	41	130	1,710	5,993	1,408	9,282

[a] Beginning in 1968, a subsistence permit was required for Sinuk, Snake, Nome, and Solomon rivers. Previous subsistence harvests were estimated by a limited survey of fishermen.

[b] Beginning in 1975, a subsistence permit was required for the entire subdistrict.

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

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

Table 3.–Subsistence harvest from Pilgrim River and Salmon Lake, 1963–2012.

Year	Number of Permits Issued	King	Sockeye	Coho	Pink	Chum
1963	16	0	3,586	25	865	419
1964	22	17	1,475	227	371	1,049
1965	23	12	1,267	164	222	671
1966	11	5	130	16	84	297
1967	13	7	337	6	5	21
1968	6	3	107	5	7	19
1969	7	0	55	0	10	0
1970	7	0	62	6	25	55
1971	8	7	127	5	14	49
1972	0	0	0	0	0	0
1973	0	0	0	0	0	0
1974	4	0	28	0	0	0
1975	8	0	28	0	0	75
1976	9	3	91	20	236	226
1977	4	0	0	0	0	0
1978	0	0	0	0	0	0
1979	2	0	0	0	6	8
1980	0	0	0	0	0	0
1981	0	0	0	0	0	0
1982	2	0	0	0	0	0
1983	2	0	0	0	6	8
1984	1	0	0	0	0	20
1985	1	0	0	0	0	9
1986	[a]	[a]	[a]	[a]	[a]	[a]
1987	3	0	0	0	0	20
1988	[a]	[a]	[a]	[a]	[a]	[a]
1989	[a]	[a]	[a]	[a]	[a]	[a]
1990	[a]	[a]	[a]	[a]	[a]	[a]
1991	26	8	110	34	25	98
1992	9	0	12	0	1	7
1993	8	0	0	0	0	0
1994	4	0	6	0	0	0
1995	14	4	99	6	0	6
1996	3	0	0	0	0	0
1997	17	0	18	0	2	13
1998	12	1	30	0	3	1
1999	33	28	180	20	0	91
2000	15	2	61	36	22	43
2001	20	3	169	20	0	6
2002	25	18	165	20	4	13
2003	101	56	1,421	67	136	84
2004	223	57	3,546	50	222	53
2005	214	13	4,754	42	176	132
2006	199	26	5,556	22	100	313
2007	201	27	5,306	20	36	218
2008	255	17	3,495	27	526	88
2009	190	7	694	1	35	49
2010	146	6	234	3	219	55
2011	133	1	356	28	10	65
2012	188	6	651	5	27	219
2008–2012 average	182	7	1,086	13	163	95
2003–2012 average	185	22	2,601	27	149	128

[a] Information not available.

Table 4.–Subdistrict 1 (Nome) historical management actions.

1962	Norton Sound District divided into subdistricts to focus management near terminal harvest areas.
1968	Subsistence registration permits required for fishing in the Sinuk, Snake, Nome, and Solomon Rivers with bag limits and standard fishing times for entire subdistrict.
Late 1970s -	Board set commercial guideline harvest range between 5,000 and 15,000 chum salmon.
	Commercial fishing period length reduced by half.
	Subsistence permits required for all Nome area waters beginning in 1975.
1981	Subsistence fishing periods were two 48-hour fishing periods a week.
1984	Salmon management shifted focus from commercial to subsistence.
	Commercial harvest area reduced by half to protect subsistence harvest areas.
	Commercial fishing time greatly reduced to allow for subsistence needs and adequate escapements.
	Sport fish chum and coho salmon bag limits reduced.
	Subsistence season bag limits reduced to 20 chum salmon and 20 coho salmon.
1987	Commercial fishery nearly eliminated by regulations and management, due to low chum and pink salmon stocks
	Sport fish chum and coho salmon bag limits further reduced.
	Use of beach seines as a legal gear type for subsistence harvest in specific waters was disallowed.
1988	Sport fishing for chum salmon closed in the Nome River.
	Subsistence gillnets reduced to 50 feet maximum length in Nome River.
1990	Subsistence fishing closure on Nome River to allow for chum salmon escapement.
1991	Commercial, sport, and subsistence closures of nearly the entire subdistrict due to low chum and pink salmon escapements. Restrictions were lifted once they were no longer effective and other species could be targeted.

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1992	Sport fishing for chum salmon closed by regulation. Subsistence restrictions lifted incrementally as abundant pink salmon returned, while protecting the chum salmon. Beach seines allowed as a legal gear for pink salmon only. Subsistence gillnet gear restricted to 50 feet maximum length for all inland waters of the Nome area by regulation.
1993	Same as 1991.
1994	Commercial fishing closed until August 1 when coho salmon could be targeted. Subsistence restrictions similar to 1992.
1995	Management similar to 1994, except beach seine gear allowed in areas with adequate chum salmon escapements and subsistence fishing time increased for marine waters an additional day to 5 days a week to allow for more flexibility to deal with harsh fishing conditions.
1996	Management similar to 1995, except that beach seine fishing targeted pink salmon and did not allow chum salmon to be retained.
1997	Management similar to 1995, except that no beach seine fishing was allowed.
1998	Initial salmon subsistence closures for all species in all waters, except marine west of Nome Jetty. Incremental relaxing of individual areas to subsistence with gear restrictions to avoid chum salmon. No commercial coho salmon fishery.
1999	Board implements Tier II subsistence chum salmon fishing regulations, which awards limited fishing opportunity to individuals with the longest history and greatest dependence on Subdistrict 1 chum salmon resources, based on the inability of Subdistrict 1 chum salmon stock to fully support all subsistence user's needs. Board reduces subsistence fishing time in marine waters from 5 days to 3 days a week during chum salmon season. Open Tier II-only subsistence chum salmon fishing, issuing 20 permits, and restricting effort to marine waters east of Cape Nome. Close all subsistence chum salmon fishing due to very weak runs. No commercial coho salmon season; close sport and subsistence fishing for coho salmon.

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2000	Open Tier II-only subsistence chum salmon fishing, issuing 10 permits, and restricting effort to marine waters east of Cape Nome.
	Open Tier I beach seining for pink salmon and later, small mesh gillnets to take advantage of strong pink salmon run while protecting chum salmon.
	General subsistence fishing reopened to coho salmon in all usual waters of subdistrict.
2001	Board updates escapement goals for Nome Subdistrict rivers.
	Open Tier II-only subsistence chum salmon fishing in late June, issuing 20 permits, and restricting effort to marine waters east of Cape Nome. Tier II fishing opened in Eldorado, Flambeau, and Bonanza rivers in mid-July. An additional 10 Tier II permits are issued in mid-July.
	Open Tier I subsistence chum salmon in Eldorado and Flambeau rivers after July 18.
	General subsistence fishing reopened in August to coho salmon fishing.
	Subsistence coho salmon fishing time reduced after August 20. Sport coho salmon fishing closed.
	Hook-and-line attached to a rod or pole adopted as legal subsistence gear.
2002	Open Tier II-only subsistence chum salmon fishing in late June, issuing 30 permits, and restricting effort to marine waters east of Cape Nome. An additional 10 Tier II permits are issued in late June.
	Open Tier II fishing in Eldorado and Flambeau rivers after July 4.
	Open Tier I fishing for pink salmon in marine waters second week of July.
	Open Tier I fishing in fresh waters east of Cape Nome in mid-July and then all rivers, except Nome River.
	General subsistence fishing reopened in August to coho salmon fishing.
	Subsistence and sport coho salmon fishing closed for 2 weeks beginning mid-August and then a restricted freshwater schedule in September.
2003	Open Tier II-only subsistence chum salmon fishing in late June, issuing 30 permits, and restricting effort to marine waters east of Cape Nome. An additional 10 Tier II permits issued in early July.
	Close all subsistence fishing in mid-July because of weak chum salmon runs.
	General subsistence fishing reopened in August to coho salmon fishing.
	Subsistence and sport fishing for coho salmon closed in mid-August.

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2004	All applicants for Tier II subsistence chum salmon fishing permits are successful.
	57 applicants (including those applying during 10 day appeal process).
	52 applicants eventually pick up permits and 49 permit holders fish.
	Tier II opens in marine waters east of Cape Nome on June 15.
	Eldorado, Flambeau, and Sinuk freshwater subsistence zones opened in late June
	Hook-and-line Tier I subsistence fishing opens to target record pink salmon run.
	Marine waters west of Cape Nome opened to Tier II gillnets from July 1 to July 3.
	Tier II fishing allowed in all chum salmon subsistence areas the second half of July, except for the Eldorado and Solomon rivers.
	Tier I chum salmon fishing allowed in rivers that had made escapement goals.
	Marine and fresh waters opened on July 26 opened to coho salmon Tier I and Tier II subsistence fishing. Anvil Creek closed to protect spawning salmon.
2005	All applicants for Tier II subsistence chum salmon fishing permits are successful.
	59 applicants (including those applying during the 10 day appeal process).
	49 applicants eventually pick up permits and 44 permit holders fish.
	Tier II opens in marine waters east of Cape Nome on June 15.
	Eldorado, Flambeau, and Sinuk freshwater subsistence zones opened on June 29 to set gillnet fishing for Tier II permit holders.
	Hook-and-line Tier I subsistence fishing opened on June 30.
	In mid-July, Tier II restrictions rescinded.
	In late July, Tier I subsistence chum salmon limits waived.
	Anvil Creek closed to protect spawning coho salmon.
2006	No Tier II restrictions as chum salmon surplus projected to surpass ANS.
	Beginning mid-June, Subdistrict 1 on the regular subsistence schedule for the first time since 1990.
	Opened beach seining during gillnet fishing schedule on July 6 and pink salmon limits waived. Chum salmon limits waived on July 10.
	Coho salmon limits waived on August 19 in marine waters.
	Coho salmon limits waived on September 1 in fresh waters.

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2007	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule in effect. In mid-July, subsistence catch limits for chum and sockeye salmon \waived in Subdistrict 1, except for the Solomon, Cripple, and Penny rivers. Subsistence marine gillnet schedule extended 2 additional days a week. End of July, beach seining allowed for salmon during subsistence net fishing periods.
2008	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule .in effect. Beginning the second week of July, beach seining allowed throughout the month during subsistence net fishing periods and pink salmon limits waived. Sport fishing pink salmon limits were doubled from 10 to 20 fish. Subsistence coho salmon limits doubled in September.
2009	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule in effect In mid-July, subsistence salmon gillnet fishing and chum salmon subsistence fishing closed in subdistrict when projections show chum salmon escapement would fall short of lower end of escapement goal range of 23,000 to 35,000 fish. In mid-July, Pilgrim River, in neighboring Port Clarence District, closed to all salmon net fishing until September because of low sockeye salmon run. First week of August, subsistence salmon gillnet fishing schedule allowed in marine waters to target coho salmon. Second week of August, subsistence gillnet fishing schedule allowed in fresh waters. Fourth week of August, subsistence salmon gillnet fishing and sport fishing for coho salmon closed. A few days later, subsistence coho salmon fishing with hook-and-line closed.
2010	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule in effect. Beginning July 1, beach seining allowed in Eldorado, Flambeau, and Sinuk rivers until coho salmon season in late July.

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	Beginning second week of July, subsistence pink salmon catch salmon limits waived. Subsistence chum salmon limits waived in rivers east of Cape Nome, excluding Solomon River, Sinuk River, and later throughout the subdistrict. In mid-July, Pilgrim River, in neighboring Port Clarence District, closed to all salmon net fishing through the first week of August because of low sockeye salmon run.
2011	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule in effect and beach seining allowed until coho salmon season in late July. During the second week of July, ocean net fishing time was doubled for 2 weeks because of poor weather. Beginning second week of July, subsistence chum salmon catch limits waived east of Cape Nome, except for Solomon River. In mid-July, Pilgrim River, in neighboring Port Clarence District, closed to all salmon net fishing through the first week of August because of low sockeye salmon run. Sockeye salmon escapement goal was reached. Last 5 days of August and first 2 weeks of September, subsistence coho salmon fishing closed.
2012	No Tier II restrictions as chum salmon surplus projected to surpass ANS. Regular subsistence gillnet schedule in effect and beach seining allowed until coho salmon season in late July. Beginning second week of July, subsistence chum salmon catch limits waived east of Cape Nome, except of Solomon River. In mid-July, pink salmon limit waived. Third week of July, Pilgrim River, in neighboring Port Clarence District, closed to all salmon net fishing through the first week of August because of low sockeye salmon run. Sockeye salmon escapement goal was reached. Mid-August, almost all counting projects in Norton Sound inoperable for the remainder of the season due to record rainfall.

Table 5.–Subdistricts 2 and 3 (Golovin and Elim) historical management actions.

1961	Districtwide fishing schedule established as two 48-hour periods per week. Commercial fishing allowed in marine waters only. 100-fathoms maximum length allowable gillnet gear.
1962	Formation of 6 managements (SD).
1969	Beach seines allowed in Subdistrict 2 as commercial gear for pink salmon by EO.
1977	Kwiniuk River escapement goal of 20,000 chum salmon established due to low returns in 1975 and 1976.
1979	Kwiniuk River escapement goal of 25,000 chum salmon established due to low returns in 1975 and 1976 and to rebuild the stock.
1980	Management authority to restrict gillnet mesh size to 4.5-inch maximum allowed the ability to open pink salmon directed commercial fishing periods. Subdistrict 3 commercial fishing period duration reduced in half.
1985	Commercial seasons determined to be opened by EO between June 8 and June 20, and close by regulation on August 31. Subdistrict 3 returned to the standard two 48-hour commercial fishing periods per week schedule. Half of Subdistrict 3 closed to commercial fishing due to low chum salmon returns.
1986	Four commercial fishing periods closed in Subdistrict 3 due to low chum salmon returns.
1987	Five commercial fishing periods in Subdistrict 3 due to low chum salmon returns.
1988	Management authority to restrict gillnet mesh size to 6-inch maximum allowed the ability to direct the commercial fishery toward a target species. Management restricted the Subdistrict 3 to pink salmon gear only and closed commercial fishing periods to protect weak chum salmon return.

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1989	Management reduced period length in Subdistrict 2 and closed Subdistrict 3 during most of the chum salmon run to protect the weak return.
1990	Subdistrict 3 commercial fishery was restricted half the season to pink salmon gear during weak chum salmon run.
1991	Subdistrict 3 commercial fishery was open only 1 period during weak chum salmon run.
1992	Management plan for Subdistrict 2 established a maximum harvest level of 10,000 chum salmon to preserve the stock and allowed directed fisheries on other species only if survey data indicated adequate chum salmon escapements would likely be achieved. The Kwiniuk River escapement goal was reduced to 19,500 chum salmon. Only 1 directed chum salmon commercial period during the anticipated weak chum salmon run.
1993	Management restricted Subdistrict 2 to special pink salmon commercial periods, with limited gear and harvest areas, to avoid high incidental catches of chum salmon. Subdistrict 3 commercial fishery did not open for king salmon or pink salmon due to the chance of potentially harvesting a portion of the depressed chum salmon stocks. Subsistence fishing restrictions were imposed to protect chum salmon on the spawning grounds.
1994	Subdistrict 2 commercial fishery continued to operate under the 10,000 fish chum salmon cap management plan, but no harvest occurred due to no market. Subdistrict 3 had no directed commercial chum fishery and only allow a pink salmon fishery if adequate chum salmon were available; however, there was no market interest.
1995	No change in management plans in either subdistrict, with some chum salmon caught during directed pink salmon and coho salmon fisheries.

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1996	No change in management plans in either subdistrict, with some chum salmon caught during directed pink salmon and coho salmon commercial fisheries.
1997	No change in management plans in either subdistrict, with some chum salmon caught during directed king salmon commercial fishing periods. However, the Subdistrict 2 chum salmon commercial capacity was liberalized to 15,000 fish prior to July 15.
1998	One commercial king salmon commercial period allowed in consideration of incidental catches when chum salmon periods were common. Pink salmon-directed commercial harvest opened continuously, with the buyer scheduling fishing to maximize transport and production. Good coho salmon run attracted limited market.
1999	No commercial periods for any salmon species due to poor returns. -Sport and subsistence coho salmon closures in Subdistrict 2.
2000	Directed pink salmon and coho salmon fisheries land small numbers of chum salmon through use of gear and time restrictions.
2001	New chum salmon escapement goals established for Kwiniuk River (11,500–23,000) and Tubutulik River (9,200–18,400); board establishes Subdistricts 2 and 3 salmon management plan.
2002	Lack of buyer results in no commercial fishing. Sport and subsistence restrictions for coho salmon in Subdistrict 2.
2003	No commercial fishing in either subdistrict because of poor runs. Sport and subsistence restrictions for chum salmon and coho salmon in Subdistrict 2.
2004	Subsistence and sport restrictions on coho salmon. New goal for chum salmon established for Niukluk River tower (SEG >30,000 chums).
2005	Sport restrictions for coho salmon in Subdistrict 2.

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Table 5.–Page 4 of 4.

2006	No restrictions.
2007	For the first time in 6 years, a buyer returns to Subdistrict 3 and chum salmon and coho salmon commercial fishing periods occur.
2008	For the first time in 8 years, a buyer returns to Subdistrict 2 and commercial coho salmon fishing periods occur. After 1 commercial chum salmon period, Subdistrict 3 is closed because inseason projection indicated the chum salmon escapement goal would not be met. Pink salmon and coho salmon commercial periods allowed in Subdistrict 3.
2009	Both Subdistricts 2 and 3 remained closed to commercial chum salmon fishing because projections showed chum salmon escapement goals would not be reached. Kwiniuk River counting tower recorded one of the worst chum salmon escapements on record. Commercial coho salmon catches were good in both subdistricts.
2010	Both Subdistricts 2 and 3 had record commercial coho salmon harvests and the best commercial chum salmon harvests in over 20 years to date. Kwiniuk River counting tower has a record chum salmon escapement.
2011	Both Subdistricts 2 and 3 had the best commercial chum salmon harvests in over 20 years.
2012	Both Subdistricts 2 and 3 have the best commercial pink salmon harvests since 1998. Only 1 commercial chum salmon fishing period in Subdistrict 2 and none in Subdistrict 3. Stormy August weather greatly curtails coho salmon fishing and floods out escapement counting projects in mid-August for the remainder of the year.

Table 6.–Historical salmon escapements at Niukluk River counting tower, 1995–2012.

Year	Operating Period	Chum	Pink	King	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 09	45,588	1,624,438	260	840
1999	June 04 - Sept 04	35,239	20,351	40	4,260
2000	July 04 - Aug 27	29,573	961,603	48	11,382
2001	July 10 - Sept 08	30,662	41,625	30	3,468
2002	June 25 - Sept 10	35,307	645,141	621	7,391
2003	June 25 - Sept 10	20,018	75,855	179	1,282
2004	June 25 - Sept 08	10,770	975,895	141	2,064
2005	June 28 - Sept 09	25,598	270,424	41	2,727
2006	June 26 - Sept 08	29,199	1,371,919	39	11,169
2007	July 01 - Sept 04	50,994	43,617	30	3,498
2008	July 01 - Sept 06	12,078	669,234	33	13,779
2009	July 03 - Sept 02	15,879	24,204	204	6,861
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 16	19,576	249,412	21	1,729
2008-2012 avg.		23,940	278,496	58	6,763

Table 7.–Historical salmon escapements at Kwiniuk River counting tower, 1965–2012.

Year	Operating period	Chum	Pink	King	Coho
1965	June 18–Jul 19	32,861	8,668	19	0
1966	June 19–Jul 28	32,786	10,629	7	0
1967	June 18–Jul 28	26,661	3,587	13	0
1968	June 18–Jul 24	19,976	129,052	27	0
1969	June 26–Jul 26	19,687	56,683	12	0
1970	June 25–Jul 29	66,604	226,831	0	0
1971	June 29–Jul 29	38,679	16,634	0	0
1972	June 28–Jul 27	30,686	62,461	65	0
1973	June 25–Jul 25	28,029	37,070	57	0
1974	June 20–Jul 26	35,161	39,375	62	0
1975	July 04–Jul 26	14,049	55,293	44	0
1976	July 04–Jul 25	8,508	35,226	12	0
1977	June 26 Jul 25	21,798	47,934	0	0
1978	July 04–Jul 22	11,049	70,148	0	0
1979	June 28–Jul 25	12,355	167,492	107	0
1980	June 22–Jul 28	19,374	319,363	177	0
1981	June 19–Aug 02	34,565	566,534	136	0
1982	June 21–Jul 26	44,099	469,674	138	0
1983	June 19–Jul 27	56,907	251,965	267	0
1984	June 19–Jul 25	54,043	736,544	736 [a]	0
1985	June 26–Jul 28	9,013	18,237	955	0
1986	June 19–Jul 26	24,700	241,446	654	0
1987	June 25–Jul 23	16,133	5,566	317	0
1988	June18–Jul 26	13,303	187,907	321	0
1989	June 27–Jul 27	14,529	27,488	248	0
1990	June 21–Jul 25	13,957	416,512	900	0
1991	June 18–Jul 27	19,801	53,499	708	0
1992	June 27–Jul 28	12,077	1,464,716	479	0
1993	June 27–Jul 27	15,824	43,063	600	0
1994	June 23–Aug 09	33,012	2,303,114	625	2,547
1995	June 21–Jul 26	42,500	17,511	498	114
1996	June 20–Jul 25	28,493	907,893	577	461
1997	June 18–Jul 27	20,119	9,535	974	0
1998	June 18–Jul 27	24,247	655,934	303	0
1999	June 25–Jul 28	8,763	607	116	0
2000	June 22–Jul 27	12,879	750,173	144	41
2001	June 27–Sept 15	16,598	8,423	261	9,532
2002	June 17–Sept 11	37,995	1,114,410	778	6,459
2003	June 15–Sept 15	12,123	22,329	744	5,490
2004	June 16–Sept 14	10,362	3,054,684	663	11,240
2005	June 17–Sept 13	12,083	341,048	342	12,950
2006	June 22–Sept 12	39,519	1,347,090	195	22,341
2007	June 21–Sept 10	27,756	54,255	258	9,429
2008	June 23–Sept 07	9,462	1,442,246	237	10,461
2009	June 24–Sept 13	8,739	42,962	444	8,677
2010	June 25–Sept 07	71,388	634,220	135	8,049
2011	June 20–Sept 11	31,604	30,023	57	3,288
2012	June 23–Aug 16	5,577	393,302	54	777
2008–2012 avg.		25,354	508,551	185	6,250

[a] King salmon counts from 1965 to 1984 were not expanded. Counts in 1985 and after were expanded.

Table 8.–Commercial and subsistence salmon catch by species, in Subdistrict 2, Norton Sound District, 1962–2012.

	SUBDISTRICT 2 (GOLOVIN)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
1962	45	11	264	10,276	68,720	79,316	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1963	40	40	0	19,677	49,850	69,607	0	0	118	5,702	9,319	15,139	40	40	118	25,379	59,169	84,746
1964	27	40	3	7,236	58,301	65,607	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1965	0	0	0	0	0	0	2	0	49	1,523	3,847	5,421	2	0	49	1,523	3,847	5,421
1966	17	14	584	4,665	29,791	35,071	4	0	176	1,573	3,520	5,273	21	14	760	6,238	33,311	40,344
1967	10	0	747	5,790	31,193	37,740	3	0	185	2,774	4,803	7,765	13	0	932	8,564	35,996	45,505
1968	12	0	205	18,428	10,011	28,656	4	0	181	4,955	1,744	6,884	16	0	386	23,383	11,755	35,540
1969	28	0	1,224	23,208	20,949	45,409	2	0	190	2,760	2,514	5,466	30	0	1,414	25,968	23,463	50,875
1970	13	0	3	18,721	20,566	39,303	4	0	353	2,046	2,614	5,017	17	0	356	20,767	23,180	44,320
1971	37	0	197	2,735	33,824	36,793	7	0	191	1,544	1,936	3,678	44	0	388	4,279	35,760	40,471
1972	36	0	20	6,562	27,097	33,715	4	0	62	1,735	2,028	3,829	40	0	82	8,297	29,125	37,544
1973	70	0	183	14,145	41,689	56,087	1	0	48	9	74	132	71	0	231	14,154	41,763	56,219
1974	30	0	3	28,340	30,173	58,546	3	0	0	967	205	1,175	33	0	3	29,307	30,378	59,721
1975	17	0	206	10,770	41,761	52,754	0	0	1	2,011	2,025	4,037	17	0	207	12,781	43,786	56,791
1976	12	0	1,311	24,051	30,219	55,593	0	0	0	1,995	1,128	3,123	12	0	1,311	26,046	31,347	58,716
1977	26	0	426	7,928	53,912	62,292	3	0	80	703	2,915	3,701	29	0	506	8,631	56,827	65,993
1978	22	0	94	72,033	41,462	113,611	1	0	0	2,470	1,061	3,532	23	0	94	74,503	42,523	117,143
1979	75	49	1,606	45,948	30,201	77,879	0	0	845	2,546	2,840	6,231	75	49	2,451	48,494	33,041	84,110
1980	36	36	328	10,774	52,609	63,783	12	0	692	10,727	4,057	15,488	48	36	1,020	21,501	56,666	79,271
1981	23	5	13	49,755	58,323	108,119	8	0	1,520	5,158	5,543	12,229	31	5	1,533	54,913	63,866	120,348
1982	78	5	4,281	39,510	51,970	95,844	7	0	1,289	4,752	1,868	7,916	85	5	5,570	44,262	53,838	103,760
1983	52	10	295	17,414	48,283	66,054	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	31	0	2,462	88,588	54,153	145,234	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	193	113	1,196	3,019	55,781	60,302	12	2	430	1,904	9,577	11,925	205	115	1,626	4,923	65,358	72,227
1986	81	8	958	25,425	69,725	96,197	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	166	51	2,203	1,579	44,334	48,333	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	108	921	2,149	31,559	33,348	68,085	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	52	21	0	0	15,993	16,066	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]

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Table 8.–Page 2 of 2.

	SUBDISTRICT 2 (GOLOVIN)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
1991	49	1	0	0	14,839	14,889	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	6	9	2,085	0	1,002	3,102	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	1	4	2	8,480	2,803	11,290	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [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
2008-2012 average	2	3	1,945	7,159	8,358	17,468	120	57	1,644	7,370	1,271	10,461	122	60	3,590	14,529	9,629	27,930
2003-2012 average	1	2	973	3,580	4,179	8,734	135	69	1,281	9,191	1,550	12,227	136	71	2,253	12,771	5,729	20,960

[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 that replaced household surveys. The permit system helped to record harvest by residents living outside the subdistrict.

Table 9.–Commercial and subsistence salmon catch by species, in Subdistrict 3, Norton Sound District, 1962–2012.

	SUBDISTRICT 3 (ELIM)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
1962	27	0	0	11,100	50,683	61,810	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1963	15	0	0	2,549	46,274	48,838	5	0	0	5,808	8,316	14,129	20	0	0	8,357	54,590	62,967
1964	32	3	0	3,372	28,568	31,975	0	0	0	63	348	411	0	0	0	3,435	28,916	32,386
1965	0	0	0	0	0	0	16	0	72	1,325	9,857	11,270	16	0	72	1,325	9,857	11,270
1966	17	0	0	2,745	24,741	27,503	14	0	250	2,511	5,409	8,184	31	0	0	5,256	30,150	35,687
1967	0	0	0	0	0	0	39	0	116	1,322	9,913	11,390	39	0	116	1,322	9,913	11,390
1968	12	0	1	9,012	17,908	26,933	2	0	80	6,135	2,527	8,744	14	0	81	15,147	20,435	35,677
1969	29	0	0	11,807	26,594	38,430	9	0	109	1,790	1,303	3,211	38	0	0	13,597	27,897	41,641
1970	39	0	0	13,052	29,726	42,817	16	0	160	4,661	6,960	11,797	55	0	0	17,713	36,686	54,614
1971	95	0	4	922	43,831	44,852	16	0	271	1,046	2,227	3,560	111	0	275	1,968	46,058	48,412
1972	190	0	11	5,866	30,919	36,986	44	0	108	1,579	2,070	3,801	234	0	119	7,445	32,989	40,787
1973	134	0	0	10,603	31,389	42,126	2	0	0		298	300	136	0	0	10,603	31,687	42,426
1974	198	0	9	12,821	55,276	68,304	3	0	0	2,382	1,723	4,108	201	0	0	15,203	56,999	72,412
1975	16	0	0	4,407	46,699	51,122	2	0	6	1,280	508	1,796	18	0	0	5,687	47,207	52,918
1976	24	0	232	5,072	10,890	16,218	22	0	0	5,016	1,548	6,586	46	0	0	10,088	12,438	22,804
1977	96	0	6	9,443	47,455	57,000	22	0	225	1,145	1,170	2,562	118	0	231	10,588	48,625	59,562
1978	444	0	244	39,694	44,595	84,977	38	0	407	1,995	1,229	3,669	482	0	651	41,689	45,824	88,646
1979	1,035	0	177	40,811	37,123	79,146	16	0	890	6,078	1,195	8,179	1,051	0	1,067	46,889	38,318	87,325
1980	502	0	0	1,435	14,755	16,692	131	0	229	4,232	1,393	5,985	633	0	0	5,667	16,148	22,677
1981	198	0	5	26,417	29,325	55,945	32	0	2,345	6,530	2,819	11,726	230	0	2,350	32,947	32,144	67,671
1982	253	0	318	9,849	40,030	50,450	1	0	1,835	3,785	3,537	9,158	254	0	2,153	13,634	43,567	59,608
1983	254	0	0	17,027	65,776	83,057	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	0	0	5,959	28,035	9,477	43,471	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	816	32	1,803	559	24,466	27,676	67	0	1,389	1,212	947	3,615	883	0	3,192	1,771	25,413	31,291
1986	600	41	5,874	15,795	20,668	42,978	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	907	15	64	568	17,278	18,832	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	663	93	3,974	13,703	18,585	37,018	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	62	0	0	0	167	229	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	202	0	0	501	3,723	4,426	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]

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Table 9.–Page 2 of 2.

	SUBDISTRICT 3 (ELIM)																	
	Commercial						Subsistence						Combined					
Year	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total	King	Sockeye	Coho	Pink	Chum	Total
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	30,443
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
2008-2012 average	4	4	6,941	15,834	10,029	32,812	223	5	1,781	5,712	2,195	9,915	227	8	8,722	21,546	12,224	42,724
2003-2012 average	2	2	4,061	8,082	5,471	17,618	285	8	1,583	4,962	1,754	8,593	287	10	5,644	13,044	7,226	26,209

[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 that replaced household surveys. The permit system helped to record harvest by residents living outside the subdistrict.

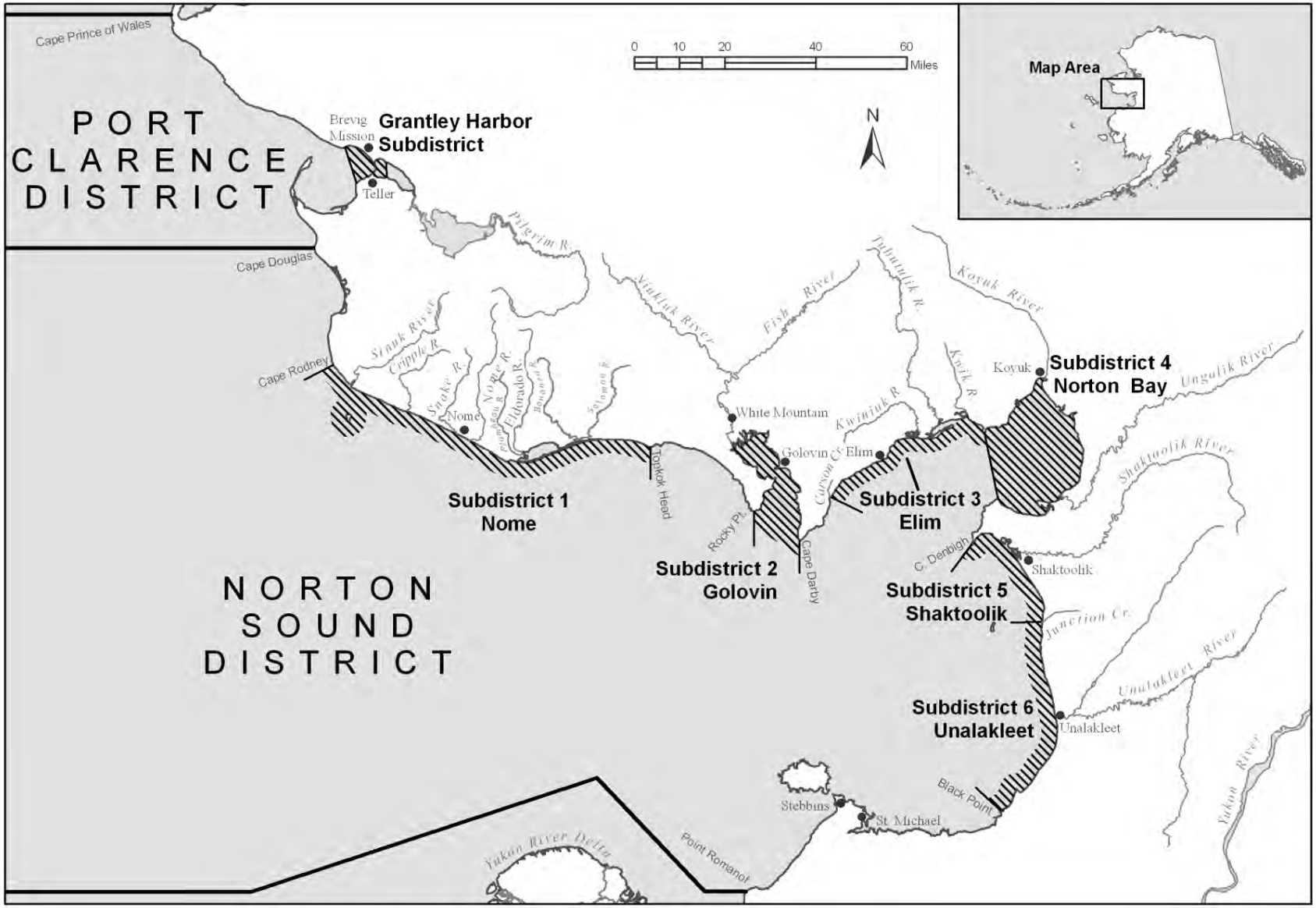


Figure 1.–Norton Sound commercial salmon fishing districts and subdistricts.

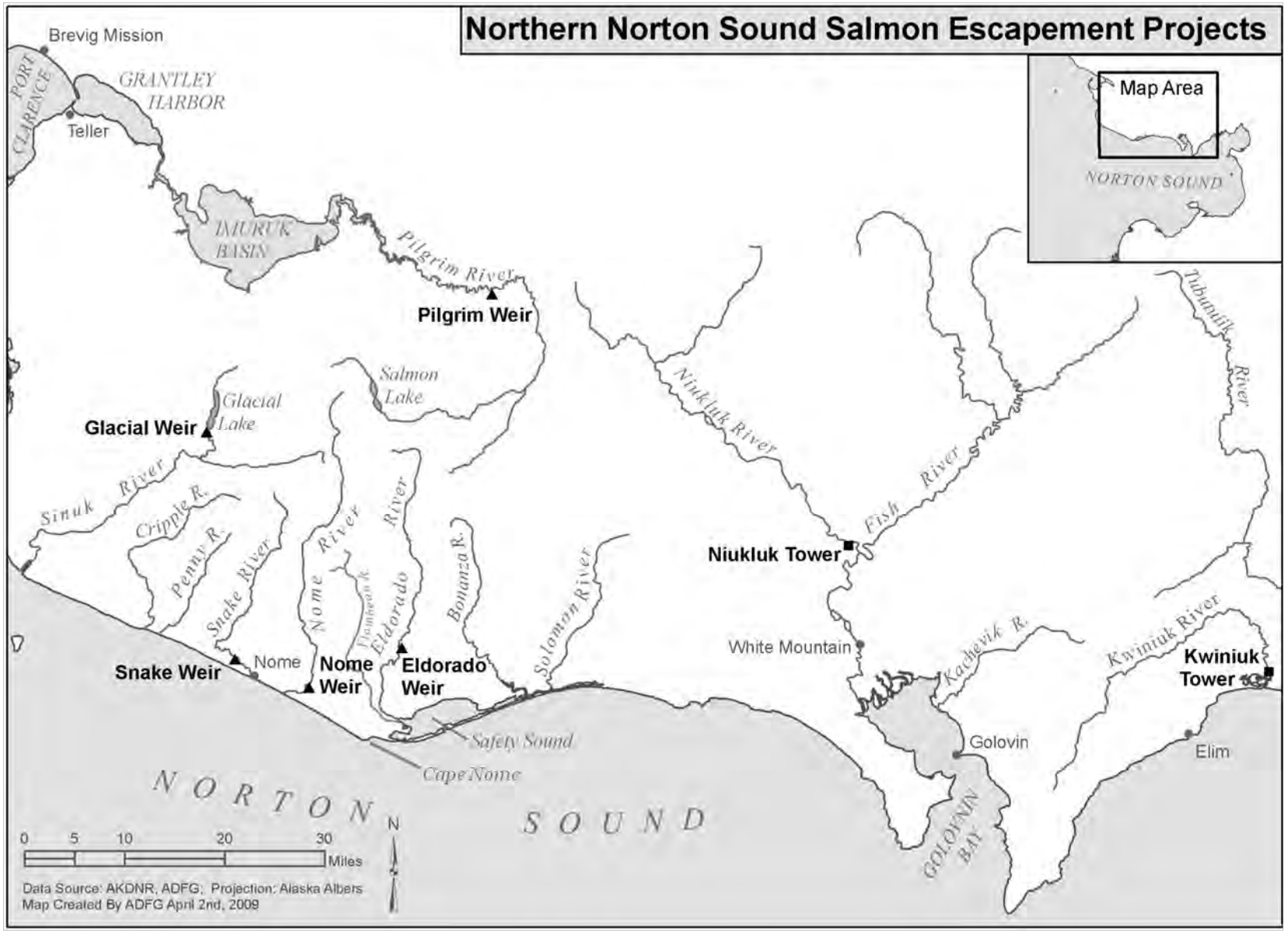


Figure 2.–Northern Norton Sound area rivers.

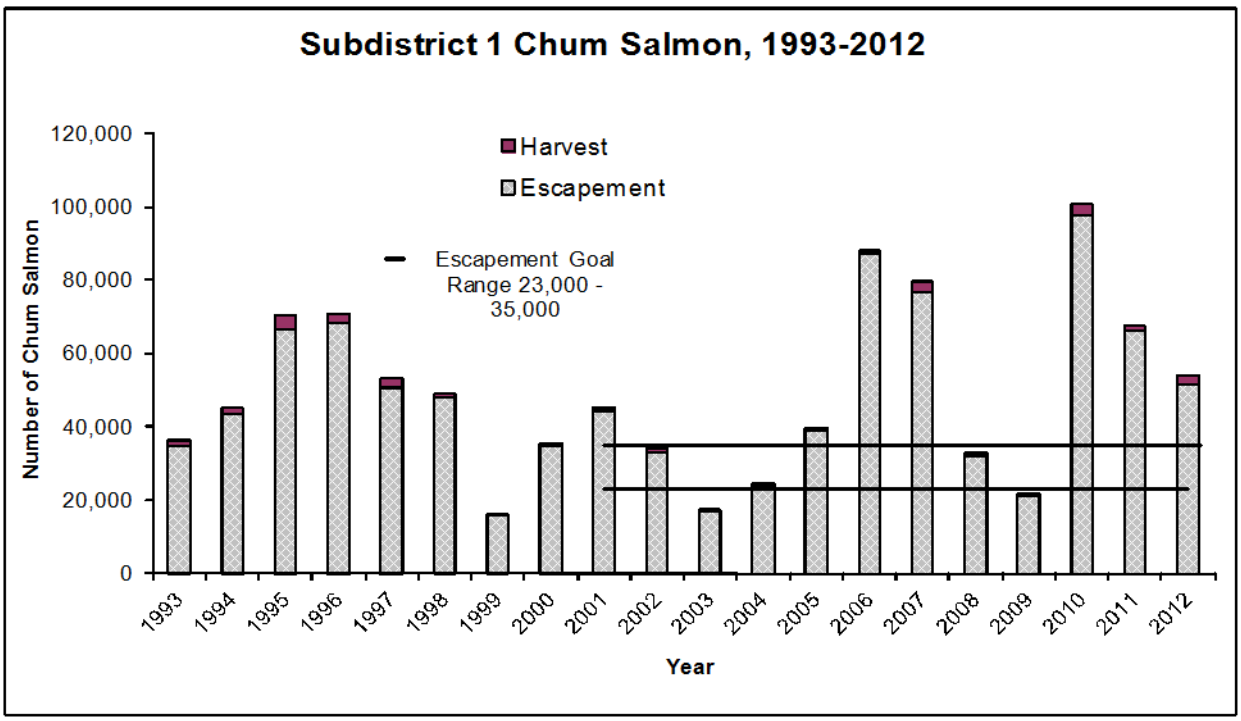


Figure 3.–Subdistrict 1 total chum salmon run by harvest and escapement, 1993–2012.

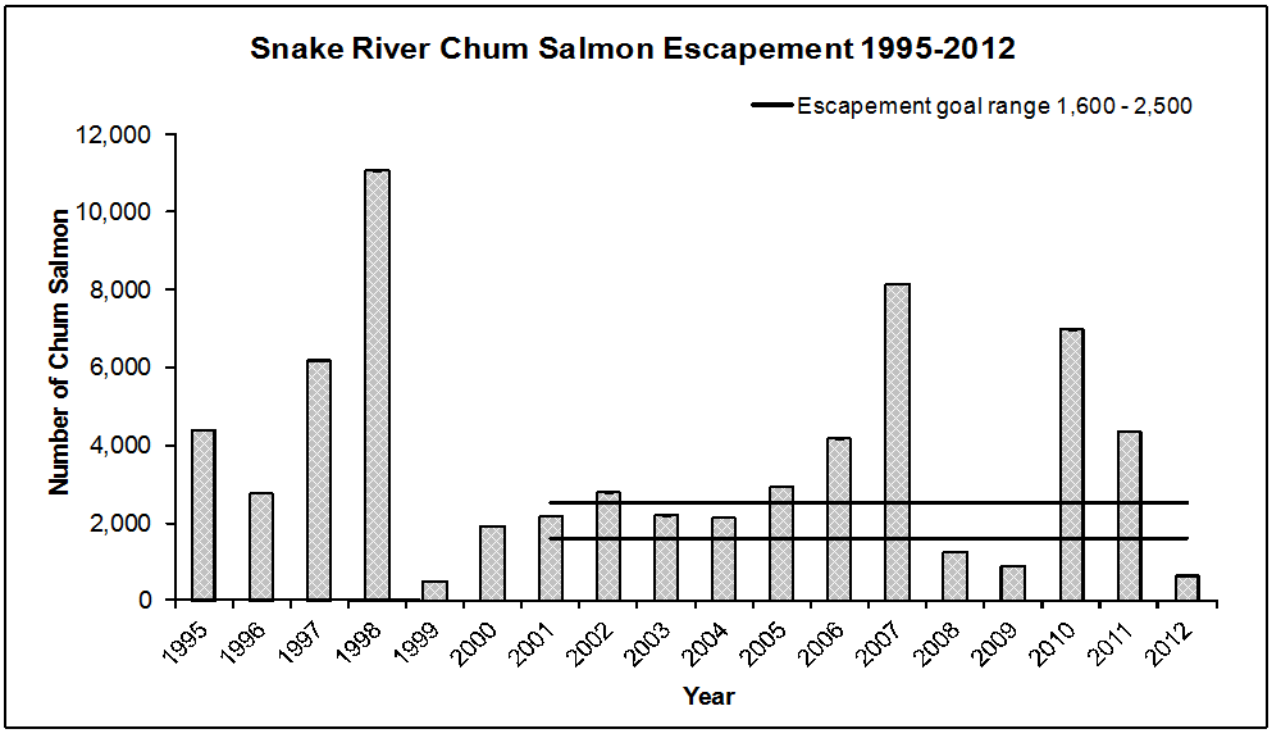


Figure 4.–Snake River chum salmon escapement, 1995–2012.

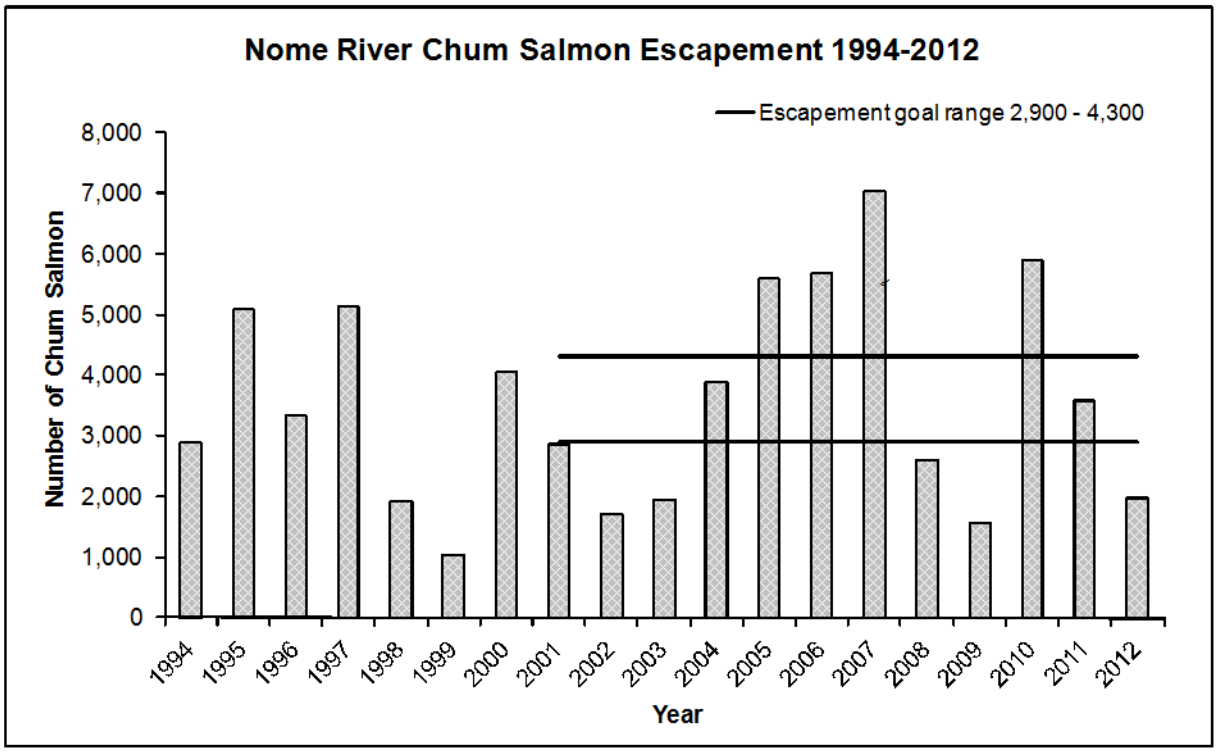


Figure 5.–Nome River chum salmon escapement, 1994–2012.

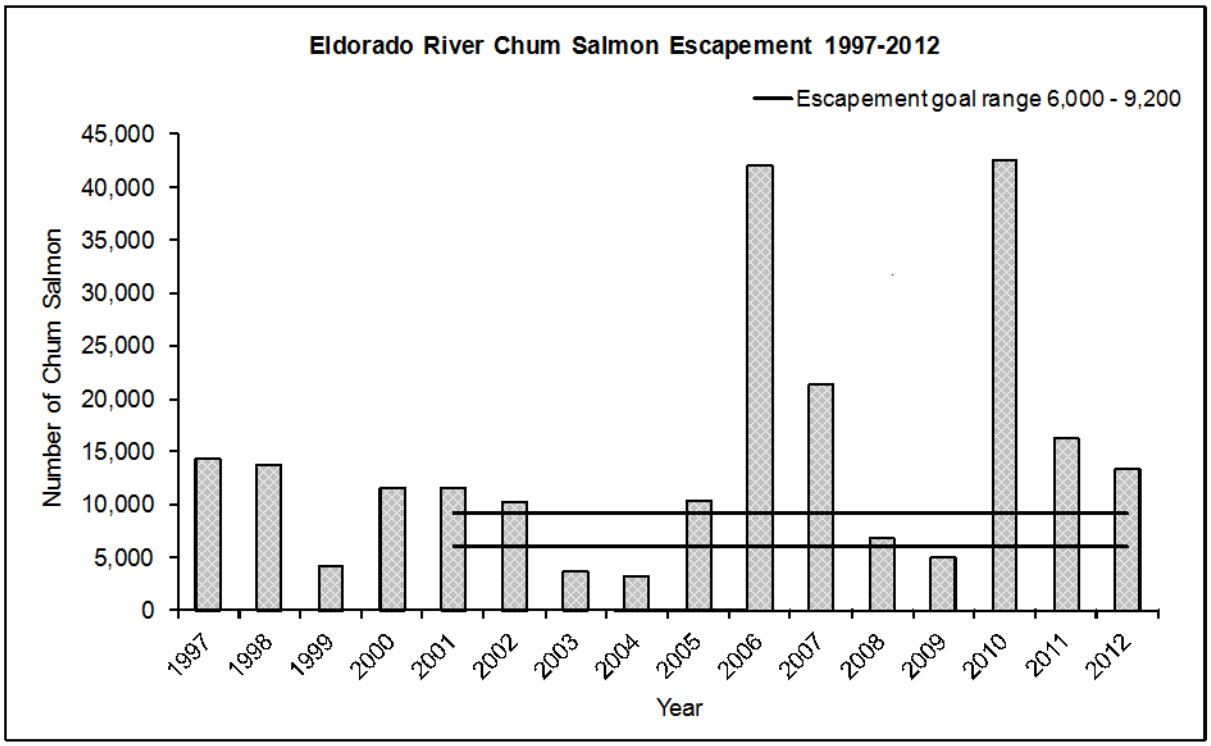
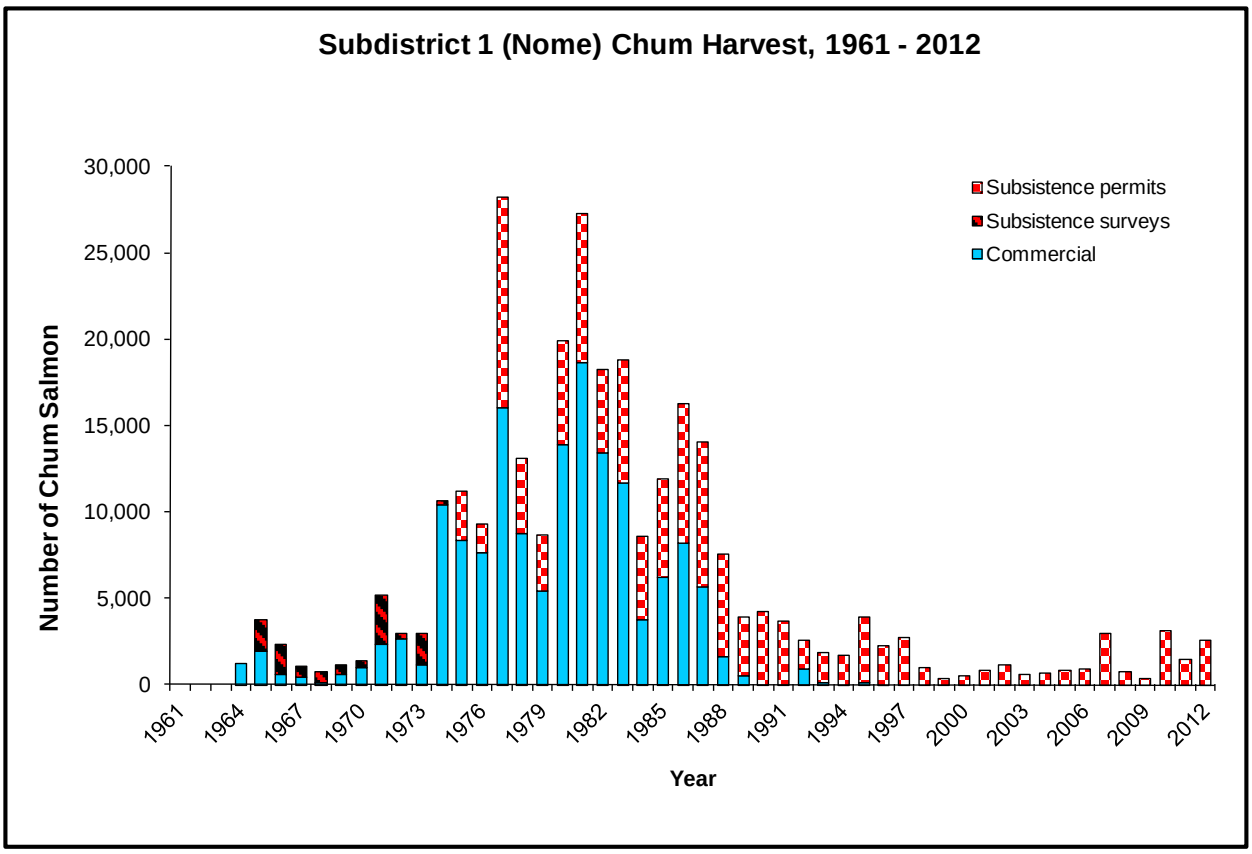


Figure 6.–Eldorado River chum salmon escapement, 1997–2012.



Note: Subsistence harvest data not available for all years and incomplete for other years prior to 1975.

Figure 7.–Subdistrict 1 chum salmon harvest, 1961–2012.

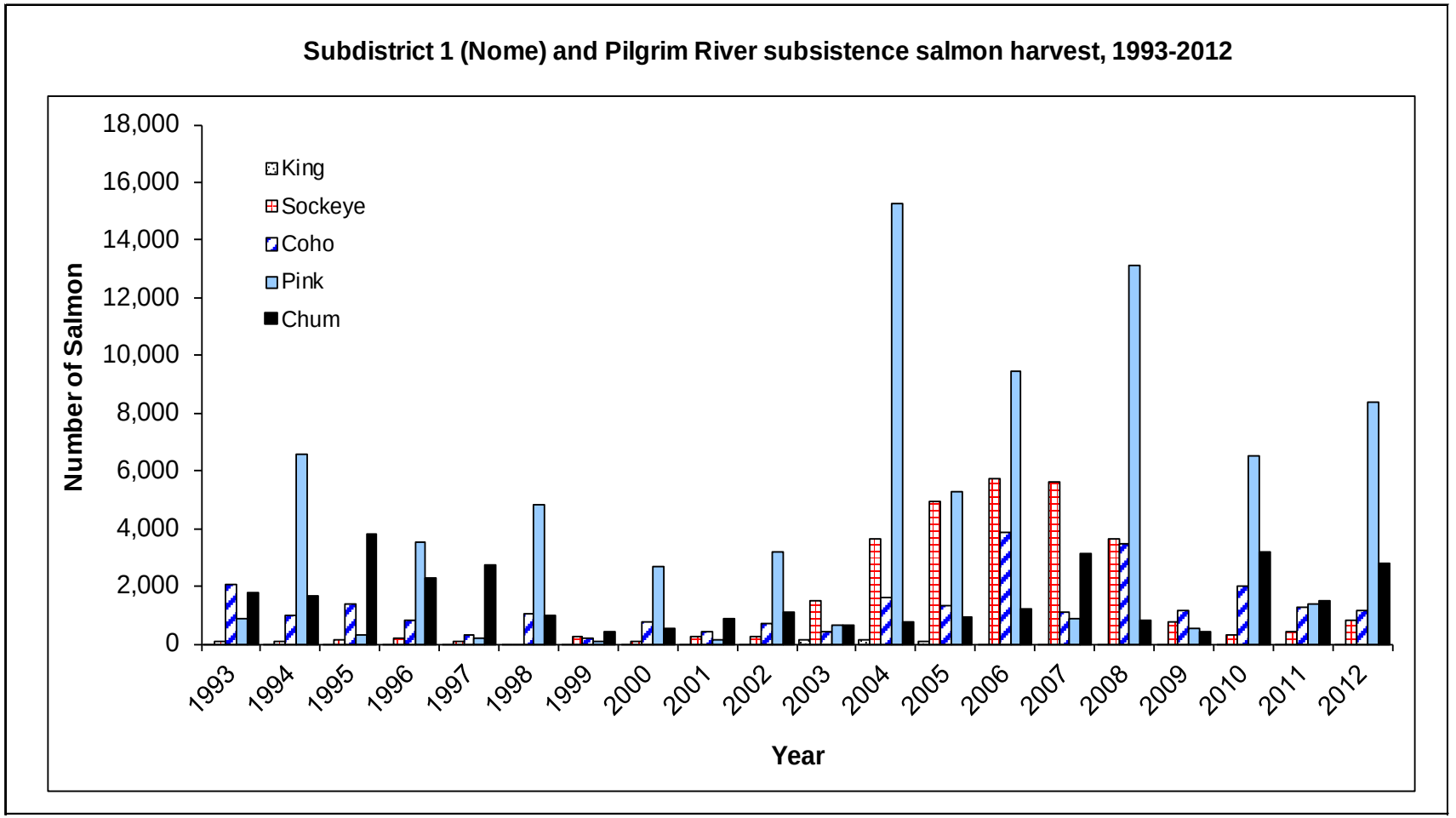


Figure 8.–Subdistrict 1 and Pilgrim River combined subsistence salmon harvest, 1993–2012.

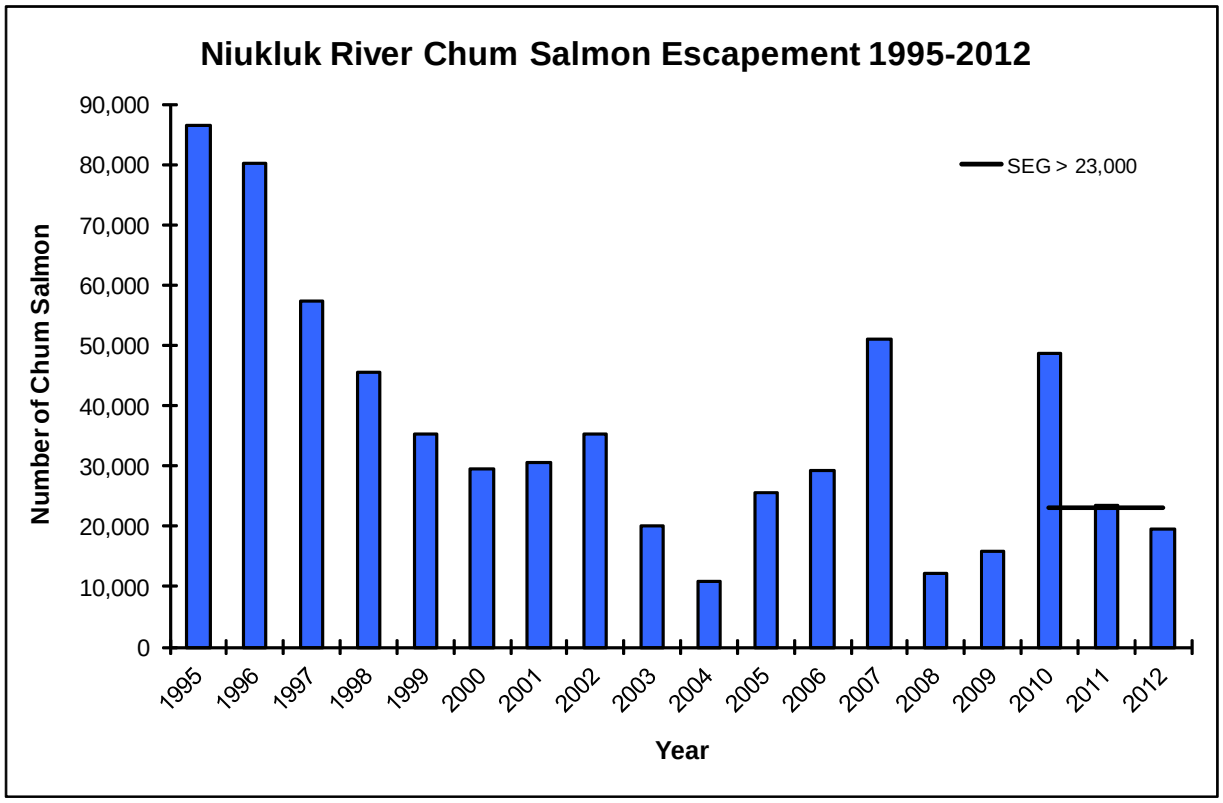


Figure 9.–Niukluk River chum salmon escapement, 1995–2012.

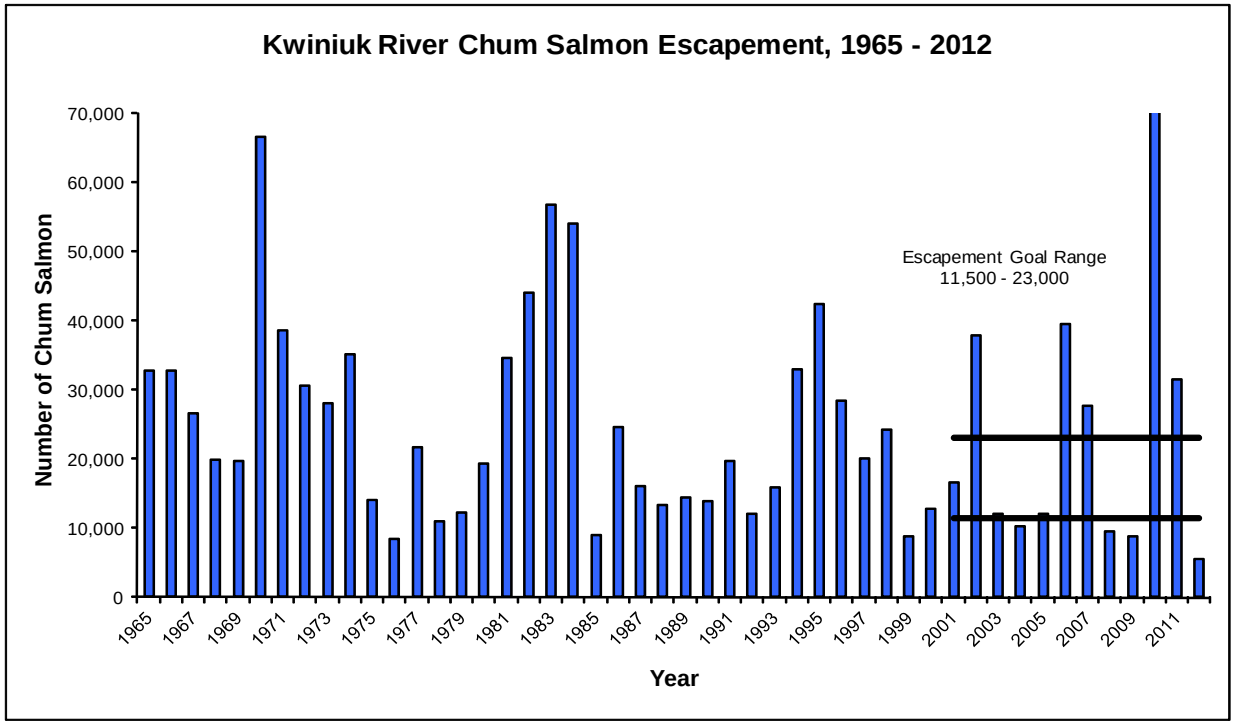
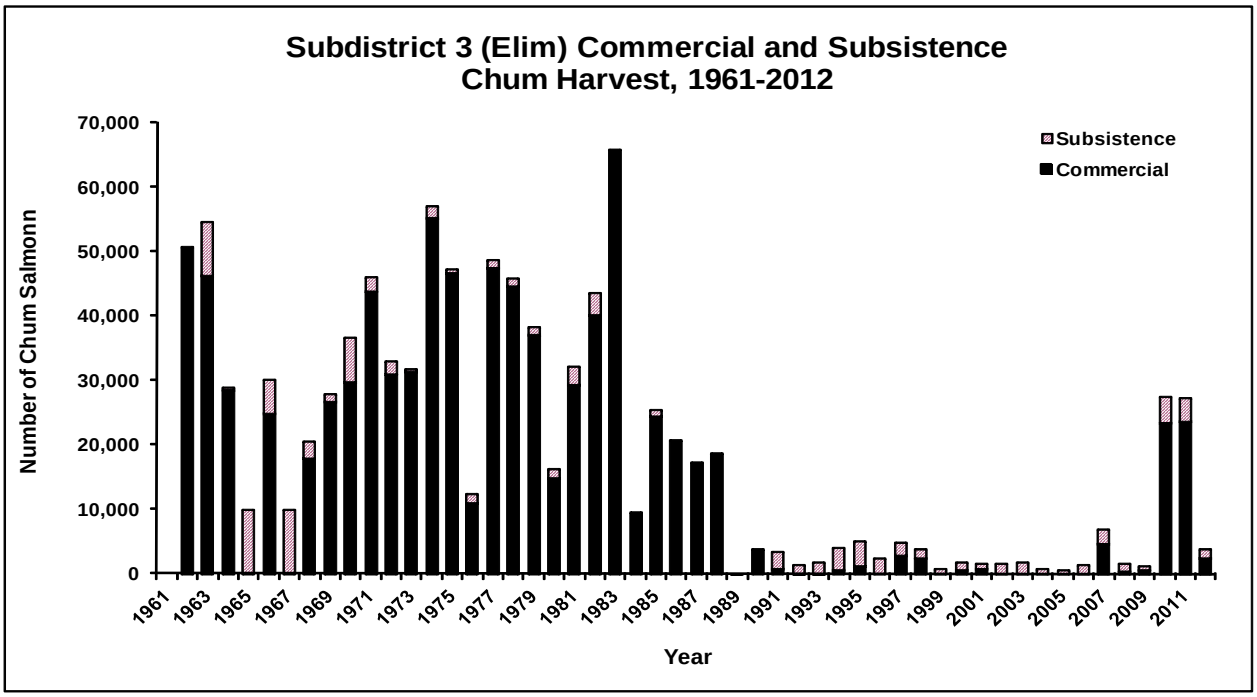
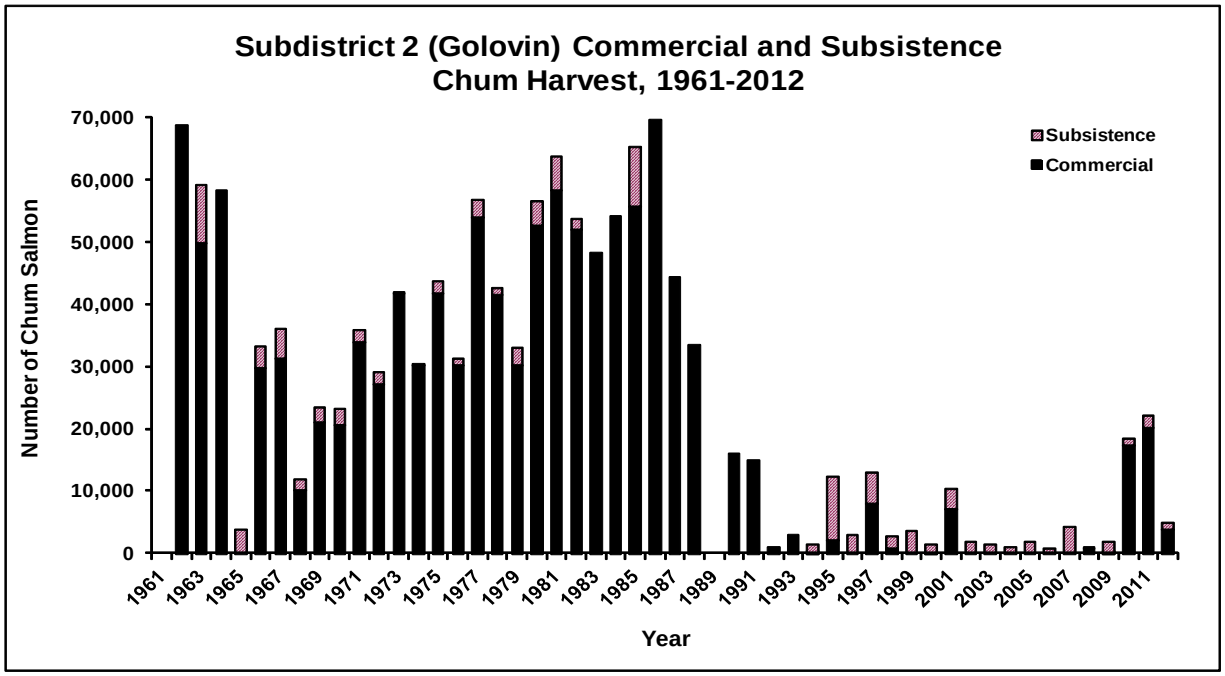


Figure 10.–Kwiniuk River chum salmon escapement, 1965–2012.



Note: Subsistence data not available for all years.

Figure 11.–Subdistrict 3 (Elim) commercial and subsistence chum salmon harvest, 1961–2012.



Note: Subsistence data not available for all years.

Figure 12.–Subdistrict 2 (Golovin) commercial and subsistence chum salmon harvest, 1961–2012.