

**Special Publication No. 09-20**

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**Norton Sound Subdistrict 1 (Nome) Chum Salmon  
Stock Status and Action Plan, 2010; A Report to the  
Alaska Board of Fisheries**

by

**Jim Menard**

and

**Daniel J. Bergstrom**

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December 2009

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.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Measures (fisheries)</b>	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye to fork	MEF
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	mid-eye to tail fork	METF
hectare	ha	at	@	standard length	SL
kilogram	kg	compass directions:		total length	TL
kilometer	km	east	E		
liter	L	north	N	<b>Mathematics, statistics</b>	
meter	m	south	S	<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	west	W	alternate hypothesis	H <sub>A</sub>
millimeter	mm	copyright	©	base of natural logarithm	<i>e</i>
		corporate suffixes:		catch per unit effort	CPUE
<b>Weights and measures (English)</b>		Company	Co.	coefficient of variation	CV
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	common test statistics	(F, t, $\chi^2$ , etc.)
foot	ft	Incorporated	Inc.	confidence interval	CI
gallon	gal	Limited	Ltd.	correlation coefficient (multiple)	R
inch	in	District of Columbia	D.C.	correlation coefficient (simple)	r
mile	mi	et alii (and others)	et al.	covariance	cov
nautical mile	nmi	et cetera (and so forth)	etc.	degree (angular)	°
ounce	oz	exempli gratia	e.g.	degrees of freedom	df
pound	lb	(for example)		expected value	<i>E</i>
quart	qt	Federal Information Code	FIC	greater than	>
yard	yd	id est (that is)	i.e.	greater than or equal to	≥
		latitude or longitude	lat. or long.	harvest per unit effort	HPUE
<b>Time and temperature</b>		monetary symbols		less than	<
day	d	(U.S.)	\$, ¢	less than or equal to	≤
degrees Celsius	°C	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (natural)	ln
degrees Fahrenheit	°F	registered trademark	®	logarithm (base 10)	log
degrees kelvin	K	trademark	™	logarithm (specify base)	log <sub>2</sub> , etc.
hour	h	United States (adjective)	U.S.	minute (angular)	'
minute	min	United States of America (noun)	USA	not significant	NS
second	s	U.S.C.	United States Code	null hypothesis	H <sub>0</sub>
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	percent	%
<b>Physics and chemistry</b>				probability	P
all atomic symbols				probability of a type I error (rejection of the null hypothesis when true)	α
alternating current	AC			probability of a type II error (acceptance of the null hypothesis when false)	β
ampere	A			second (angular)	"
calorie	cal			standard deviation	SD
direct current	DC			standard error	SE
hertz	Hz			variance	
horsepower	hp			population	Var
hydrogen ion activity (negative log of)	pH			sample	var
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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BOARD OF FISHERIES**

by

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## ABSTRACT

In response to guidelines established in the *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222), the Alaska Board of Fisheries (BOF) classified the Norton Sound Subdistrict 1 (Nome) chum salmon *Oncorhynchus keta* stock as a stock of management concern at its September 2000 work session. An action plan was developed by the Alaska Department of Fish and Game (ADF&G) and acted upon by the BOF in January 2001. The SSFP directs ADF&G to assess salmon stocks in areas addressed during the BOF regulatory cycle to identify stocks of concern and, in the case of Subdistrict 1 chum salmon, to reassess the stock of concern status. In 2003, ADF&G recommended continuation of this classification as a stock of management concern, which was supported by the BOF at its January 2004 meeting. A majority of chum salmon escapement goals were achieved in Subdistrict 1 from 2002–2006. Hence, in January 2007, the BOF classified Subdistrict 1 chum salmon stock of yield concern. Since 2004, escapement has been met in Subdistrict 1, except for 2009, when it fell 7% short of the lower end of the escapement goal range of 23,000–35,000. The recent yield remains below historical levels despite use of specific management measures. Based on the definitions provided in the SSFP, ADF&G recommends continuing the stock of concern classification of Subdistrict 1 chum salmon as a stock of yield concern. Furthermore, ADF&G recommends that current fisheries management plans continue through the next BOF cycle.

Key words: Norton Sound, chum salmon, *Oncorhynchus keta*, stock of concern, commercial, fishing, ADF&G, 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 (ADF&G) to provide the Alaska Board of Fisheries (BOF) 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 BOF meetings. This report provides ADF&G's reassessment of the Norton Sound Subdistrict 1 (Nome) chum salmon stock of concern, which is classified as a yield concern.

In response to guidelines established in SSFP (5 AAC 39.222(f)(21)), the BOF classified Subdistrict 1 chum salmon *Oncorhynchus keta* stock as a management 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 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”. The stock of concern determination was a result of persistent low chum salmon productivity since the mid 1980s. Commercial and sport fishing for chum salmon are closed in the Subdistrict 1 and subsistence salmon management is among the most restrictive in Alaska with a Tier II chum salmon fishery in effect from 1999–2005. 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 ADF&G (Bue 2000) and acted upon by the BOF in January 2001. The classification as a management concern was continued at the January 2004 BOF 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, ADF&G recommended a change in status

of the Subdistrict 1 chum salmon stock from a management concern to a yield concern at the October 2006 BOF work session. The SSFP (5 AAC 39.222(f)(42)) defines a yield concern as “a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock’s escapement needs”. During the preceding 5 years (2002–2006) a majority of chum salmon escapement goals had been achieved in Subdistrict 1. The BOF accepted ADF&G’s recommendation and the Subdistrict 1 chum salmon stock was reclassified from a management concern to a yield concern at its 2007 meeting.

ADF&G recommended continuation of Norton Sound Subdistrict 1 chum salmon as a stock of yield concern at the October 2009 BOF work session. During the most recent 5 years (2005–2009), a majority of chum salmon escapement goals had been achieved in Subdistrict 1. Since the 2006 fishing season, Subdistrict 1 has reverted back to Tier I subsistence fishing regulations because projected runs of chum salmon exceeded the amount necessary for subsistence (ANS). Tier I regulations allow all Alaska residents to fish during subsistence fishing periods. However, ADF&G’s recommendation to continue classification of this stock as a yield concern was based on low yields for the recent 5-year period (2005–2009) compared to historical yields in the 1980s.

## **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, there are few restrictions (Soong et al. 2008). 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, ADF&G recommended, and then later established, a chum salmon BEG for Subdistrict 1 chum salmon stock of 23,000–35,000 chum salmon (Clark 2001). In January 2001, the BOF established OEG ranges for chum salmon on 3 rivers in Subdistrict 1: Nome, Snake, and Eldorado rivers, in order to index the districtwide BEG. Chum salmon have been counted via towers or weirs on these rivers since 1994, 1995, and 1997, respectively (Table 1). ADF&G also established SEG ranges, based on aerial survey information, on 4 other rivers in Subdistrict 1. All BOF-established OEGs and ADF&G 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 2005–2008 and fell short of the goal in 2009 (Figure 3). During this same time period (2005–2009), the OEG has been achieved or exceeded for 3 of 5 years (2005–2009) at Snake (Figure 4) and Nome (Figure 5) rivers, and 4 of 5 years at Eldorado River (Figure 6). Comparing escapements during 2005–2009 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 last decade, when harvests decreased on chum salmon because of low runs and increasing subsistence restrictions (Table 2). However, even with fishing closures, escapements did not increase in the late 1990s and early 2000s in response to less fishing pressure (Figures 3–6). In recent years, as chum salmon runs have started increasing, subsistence harvests remain low. In



2004 and 2005 all Tier II applicants received a permit, but harvests still remained below 1,000 chum salmon (Figures 3 and 7). Since 2006, Tier II restrictions have been suspended, allowing all Alaska residents to participate in the subsistence fishery for chum salmon. However, subsistence harvests of chum salmon continue to be low in the later 2000s and may be the result of record pink *O. gorbuscha* and coho salmon *O. kisutch* runs in Subdistrict 1 in recent years allowing subsistence permit holders to target those species. Additionally, beginning in 2003, record sockeye salmon *O. nerka* runs have been returning to Pilgrim River in Port Clarence District, resulting in a nearly tenfold increase of permits issued since 2002.

In 2009, ADF&G forecast was for the chum salmon run to reach the lower end of the escapement goal range, but by mid-July the chum salmon run in Subdistrict 1 was projected to fall short of the escapement goal, and subsistence salmon gillnetting and subsistence chum salmon fishing was subsequently closed. Subsistence fishing for coho salmon was also closed the end of the third week of August and the worst sockeye salmon run, since the Pilgrim River weir counting project was initiated in 2003, resulted in all subsistence gillnetting being closed on the Pilgrim River (Tables 3 and 4).

In summary, Tier II subsistence fishing was liberalized to Tier I subsistence fishing regulations the past 6 years (2004–2009) and beginning in 2006 there have been no Tier II restrictions in the subsistence fishery (Table 4). In the last 5 years, a majority of escapement goals were achieved, except for 2009. However, during the most recent 5–year period (2005–2009), the average total chum salmon harvest and available yield, continues to be below the historical yield (combined subsistence and commercial harvests) of the 1980s and early 1990s (Table 2 and Figure 7).

## **STOCK OF CONCERN RECOMMENDATION**

The recent yield remains well below historical levels during the 1980s despite use of specific management measures. Based on the definitions provided in the *Policy for the Management of Sustainable Salmon Fisheries*, 5 AAC 39.222(f)(21) and (42), ADF&G recommends continuing the stock of concern classification of Subdistrict 1 chum salmon as a stock of yield concern.

## **OUTLOOK**

The Subdistrict 1 chum salmon run is expected to be average to above average in 2010 based on parent year escapements that included a record number of age-0.2 chum salmon samples from Subdistrict 1 escapement projects. Age-0.3 chum salmon make up the majority of the run to Subdistrict 1 in most years and the numerous age-0.2 fish in 2009 is an indication of good survival for the 2006 brood year. The 2010 chum salmon run is expected to be sufficient to provide for escapement and subsistence uses.

## **ALASKA BOARD OF FISHERIES ACTION**

In response to the guidelines established in the SSFP, it is anticipated that the Alaska Board of Fisheries will continue classification of Norton Sound Subdistrict 1 chum salmon as a stock of yield concern during the January 2010 regulatory meeting.

## ESCAPEMENT GOAL EVALUATION

ADF&G 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 BOF established OEG ranges for chum salmon on 3 rivers in Subdistrict 1: Nome River, Snake River, and Eldorado River. These OEG ranges are the same as ADF&G-established SEG ranges. These 3 rivers have weir projects. ADF&G established aerial-survey based SEG ranges on 4 other rivers in Subdistrict 1. Escapement information from all 7 rivers provides an index of escapement for Subdistrict 1. ADF&G established an aggregate BEG of 23,000–35,000 chum salmon for Subdistrict 1 (Clark 2001). Escapement goals developed in 2000 were reviewed in the 2004 BOF 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 recommended and later adopted by ADF&G to be classified as 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 BOF cycle utilizing additional data. This evaluation resulted in no recommended changes (Brannian et al. 2006). Escapement goals were again reviewed in preparation for the 2010 BOF cycle and the 4 rivers with aerial survey expanded goals were proposed to be 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. *In prep*)

List of current and proposed escapement goals for Subdistrict 1 chum salmon stocks:

Stream (Project Type)	Current Goal		Proposed Goal
Sinuk River (aerial expanded)	4,000-6,200	SEG	Eliminate
Snake River (weir)	1,600-2,500	SEG and OEG	No Change
Nome River (weir)	2,900-4,300	SEG and OEG	No Change
Eldorado (weir)	6,000-9,200	SEG and OEG	No Change
Flambeau River (aerial expanded)	4,100-6,300	SEG	Eliminate
Bonanza River (aerial expanded)	2,300-3,400	SEG	Eliminate
Solomon River (aerial expanded)	1,100-1,600	SEG	Eliminate
Subdistrict 1	23,000-35,000	BEG	No Change

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

### NORTON SOUND SUBDISTRICT 1 (NOME) CHUM SALMON MANAGEMENT PLAN REVIEW/DEVELOPMENT

#### Current Stock Status

In response to the guidelines established in the SSFP, ADF&G recommended continuation of Norton Sound Subdistrict 1 chum salmon as a stock of yield concern at the October 2009 BOF work session. The majority of chum salmon escapement goals were achieved during the last

5 years; however, the inability, despite the use of specific management measures, to consistently maintain expected yields, or harvestable surpluses, above the stock's escapement needs during the last 5 years, is the basis for recommending continuation as a stock of yield concern. The BOF, after reviewing stock status information and public input during the January 2010 regulatory meeting, is anticipated to continue the classification of Norton Sound Subdistrict 1 chum salmon as a stock of yield concern.

### **Customary and Traditional Use Finding and the Amount Necessary**

The BOF has made a positive finding for Customary and Traditional Use for chum salmon in Subdistrict 1. Amount necessary for subsistence (ANS) 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 SALMON 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 new 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 in 2011, 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 affects. 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.

The Alaska Department of Transportation and Public Facilities is looking at the possibility of extending the runways at the Nome Airport and a possible need to move the outlet of Snake River approximately one mile to the west. The project to move Snake River is in planning stages with no established timetable as of yet.

### **Projects Needed**

1. Survey of the loss of chum salmon spawning and rearing habitat due to mining and instream gravel extraction (historic practice) in rivers with previous extensive mining. New channel development in the Snake River will require surveys of loss of habitat.
2. Solomon River restoration to correct loss of habitat due to historical dredging and material extraction (road construction).
3. Intensive monitoring of existing and future projects to determine whether or not chum salmon and their habitat are being, or will be, affected.

### **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 are likely caught as bycatch in the Bering Sea groundfish fishery (Wilmot et al. 1998). The chum salmon bycatch in this fishery greatly increased from 2003–2007, but has decreased greatly in the last 2 years.

### **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 (NOME) 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 BOF 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 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 4.5 inches or less.

The BOF repealed escapement goal ranges in 5 AAC 04.358. Chum salmon optimal escapement goal ranges for river systems in Subdistrict 1 of the Norton Sound District, currently in regulation and adopted the following optimal escapement goal ranges for chum salmon in Subdistrict 1:

- (1). Snake River: 1,600 to 2,500 chum salmon
- (2). Nome River: 2,900 to 4,300 chum salmon
- (3). Eldorado River: 6,000 to 9,200 chum salmon

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

The BOF 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 2003), the BOF 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 2006), the BOF 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 ADF&G 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.

## **Management Review**

Conservative management strategies employed by ADF&G from 2001–2003 were based on the management action plan adopted by the BOF 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 2003, the Subdistrict 1 escapement goal was not reached and Tier II chum salmon fishing was suspended. In the years 2000–2002, there were regular Tier II fishing periods in marine waters and some rivers had Tier II fishing periods. 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, ADF&G reviewed 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, as some applicants never picked up their permits.

A trend in subsistence harvests was observed in 2004 and 2005; approximately one-half of Tier II permit holders were harvesting chum salmon. Other permit holders were using the Tier II permits as an opportunity to fish for other salmon species, particularly pink salmon, during Tier II openings. In 2006, ADF&G suspended Tier II restrictions after considering the projection for a strong chum salmon run would easily exceed the ANS and that trends of limited effort targeting chum salmon observed in recent years would continue. For the first time since 1990, Subdistrict 1 did not close to salmon fishing in mid June, but went to the subsistence fishing schedule in regulation. At the start of the season almost all salmon limits in marine waters and rivers were doubled from previous years, and were later waived for pink (July 6), chum (July 10), sockeye (July 14), and coho salmon (August 19 in marine waters and September 1 in rivers). Although there was much more opportunity to subsistence fish in 2006 and the chum salmon run was the best in nearly 2 decades, chum salmon catches were still 20% below those in 2002 (Table 2 and Figure 3). The lower chum salmon harvests may have been the result of subsistence fishermen harvesting other species (Figure 8). In 2006, subsistence harvests of coho salmon were record breaking and pink salmon subsistence harvests were second highest in 20 years. Since 2004, the 4 highest subsistence salmon harvests in over 10 years were from 2004–2006 and 2008. Likewise, the 4 highest subsistence salmon harvests in 20 years, if the Pilgrim River catch is included with the Subdistrict 1 catch, were from 2004–2006 and 2008 (Tables 2–3 and Figure 8).

In 2007, ADF&G again suspended Tier II restrictions because ANS was projected to be reached. A strong run resulted in subsistence limits being waived for chum salmon in the marine waters and most of the rivers in Subdistrict 1. The odd-numbered year run of pink salmon was average and allowed for fishermen to target chum salmon more easily without the worry of pink salmon plugging their nets, as had been the case in 2004–2006. The harvest of 2,938 chum salmon was

the highest since 1995, but still below the lower end of ANS of 3,430. The poor run of 2009 in Subdistrict 1 for chum salmon was similar to poorer chum salmon runs observed elsewhere in northern Norton Sound, but the poor run of coho salmon was unusual in Subdistrict 1 compared to the excellent coho salmon runs observed in other Norton Sound subdistricts.

## **ACTION PLAN ALTERNATIVES**

No new action plans necessary; continue under current plans.

# **2010 ALASKA BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING NORTON SOUND SUBDISTRICT 1 (NOME) CHUM SALMON**

### Subsistence

71 – Allow beach seining of salmon in Nome Subdistrict during scheduled subsistence net openings.

### Sport

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

Currently, beach seining is allowed by emergency order to harvest a more abundant species such as pink salmon, and if another species such as chum salmon is in low abundance, it may be required to release that species. Presently, sport fish for chum salmon is closed in Subdistrict 1.

## **RESEARCH PLAN**

### **NORTON SOUND INITIATIVE AND AYK SUSTAINABLE SALMON INITIATIVE**

A Norton Sound Initiative (NSI), funded by the Norton Sound Salmon Research and Restoration fund, (NSSR&R) formed a Steering Committee that identified and prioritizing research needs in response to the low chum salmon run in 1999. Through this initiative, native organizations, private industry, non-profit organizations, 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 2001–2006 and a final report is scheduled to be issued in 2010. Norton Sound Economic Development Corporation (NSEDC), the community development quota (CDQ) group for Norton Sound, has continued to support salmon projects since NSSR&R funding ended. 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.

NSSR&R fund was used for several projects in Subdistrict 1. The 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 that can improve run projections. Environmental monitoring of stream conditions occurred year-round through data loggers on the Nome and Snake rivers. Studies were conducted in Subdistrict 1 to determine the 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.

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## **TABLES AND FIGURES**

Table 1.–Subdistrict 1 (Nome) chum salmon estimated escapement, 1993–2009.

Year	Solomon River <sup>a</sup>	Bonanza River <sup>a</sup>	Flambeau River <sup>a</sup>	Sinuk River <sup>a</sup>	Eldorado River <sup>b</sup>	Snake River <sup>c</sup>	Nome River <sup>d</sup>	Subdistrict Total
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	7,084	76,990
2008 <sup>e</sup>	1,000	1,000	11,618	1,000	6,746	1,244	2,607	25,215
2009	918	6,744	4,075	2,232	4,943	891	1,565	21,368
2005-2009 avg.	1,873	4,495	12,644	5,851	17,082	3,472	4,503	49,921
2000-2009 avg.	1,700	3,913	9,548	6,019	12,577	2,857	3,701	40,315

<sup>a</sup> The Bonanza, Flambeau, Sinuk, and Solomon rivers escapement estimate is obtained by expanding aerial survey counts and expanding by calculation from Clark, J. H. 2001.

<sup>b</sup> The Eldorado River escapement estimate is the same method as in Clark, J. H. 2001 for 1993–1996. From 1997–2002 escapement estimates are from counting tower and from 2003–2009 by weir.

<sup>c</sup> The Snake River escapement estimate is the same method as in Clark, J. H. 2001 for 1993–1994. From 1995–2002 escapement estimates are from counting tower and from 2003–2009 by weir.

<sup>d</sup> The Nome River escapement estimate is the same method as in Clark, J. H. 2001 for 1993. From 1994–1995 escapement estimates are from counting tower and from 1996–2009 by weir.

<sup>e</sup> A huge pink salmon run prevented surveyors from estimating chum salmon in the Solomon, Bonanza, and Sinuk rivers; escapement was conservatively listed at 1,000 chum salmon for each river, but based on historical data was likely higher.

Table 2.—Commercial and subsistence salmon catch by species, by year in Subdistrict 1 (Nome), Norton Sound District, 1964–2009.

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

Year	SUBDISTRICT 1 (Nome)																	
	Commercial							Subsistence <sup>a</sup>					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	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	0	0	0	0	0	0	24	159	3,808	9,329	940	14,260	24	159	3,808	9,329	940	14,260
2007	0	0	0	0	0	0	18	297	1,103	850	2,938	5,206	18	297	1,103	850	2,938	5,206
2008	0	0	0	0	0	0	39	127	3,423	12,592	739	16,920	39	127	3,423	12,592	739	16,920
2009	0	0	0	0	0	0	32	58	1,127	471	383	2,071	32	58	1,127	471	383	2,071
5-year avg. <sup>d</sup>	0	0	0	0	0	0	35	164	2,150	5,663	1,161	9,172	35	164	2,150	5,663	1,161	9,172
10-year avg. <sup>e</sup>	0	0	0	0	0	0	35	120	1,451	4,980	956	7,542	35	120	1,451	4,980	956	7,542

<sup>a</sup> Subsistence harvest data are incomplete prior to 1975. From 1975–2009, a permit was required to subsistence fish and harvest numbers are from permits returned.

<sup>b</sup> Beginning in 1999, Tier II chum salmon fishing restrictions limited the number of permit holders that could fish for chum salmon.

<sup>c</sup> Beginning in 2006, Tier II chum salmon fishing restrictions have been suspended.

<sup>d</sup> This average includes the years 2005–2009.

<sup>e</sup> This average includes the years 2000–2009.

Table 3.–Subsistence salmon harvest from Pilgrim River and Salmon Lake, 1963–2009.

Year	Number of Permits Issued	Chinook	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					
1973	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					
1979	2	0	0	0	6	8
1980	0					
1981	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					
1987	3	0	0	0	0	20
1988	a					
1989	a					
1990	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
5-year average <sup>b</sup>	212	18	3,961	22	175	160
10-year average <sup>c</sup>	144	23	2,517	31	126	100

<sup>a</sup> Information not available.

<sup>b</sup> This average includes the years 2005–2009.

<sup>c</sup> This average includes the years 2000–2009.

Table 4.-Subdistrict 1 (Nome) historical salmon management actions.

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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-	The Alaska Board of Fisheries 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.
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 and 20 coho salmon.
1987	-Commercial fishery nearly eliminated by current regulations and management due to low chum and pink salmon stocks -Sport fish chum and coho salmon bag limits further reduced. -Subsistence disallowed beach seines as a legal gear type in specific waters.
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 became no longer effective and other species could be targeted.
1992	Similar to 1991 except that subsistence restrictions were lifted incrementally as the abundant pink salmon returned, while protecting the chum salmon stocks. Beach seines were allowed as a legal gear type for pinks only. -Subsistence gillnet gear was restricted to 50 feet maximum length for all inland waters of the Nome area by regulation.
1993	Same as 1991.

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Table 4.-Page 2 of 4.

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1994	Commercial fishing closed until August 1 when coho salmon could be targeted. Sport harvest of chum salmon closed for entire season. Subsistence restrictions were similar to 1992.
1995	Management similar to 1994, except: sport fishing for chum salmon became closed by regulation; beach seine gear was allowed in areas with adequate chum salmon escapements; and subsistence fishing time increased in marine waters to allow for more flexibility to deal with more 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	<ul style="list-style-type: none"><li>-Initial all salmon subsistence closure for all waters, except marine waters west of Nome Jetty.</li><li>-Incremental relaxing of individual areas to subsistence with gear restrictions to avoid chum salmon.</li><li>-No commercial coho salmon season.</li></ul>
1999	<p>BOF implements Tier II subsistence chum salmon fishing regulations which awards limited fishing opportunity to individuals with the longest history and greatest dependence on the Nome chum salmon resource, based on the inability of the Nome chum salmon stock to fully support all subsistence users' needs.</p> <ul style="list-style-type: none"><li>-Open Tier II only subsistence chum salmon fishing, issuing 20 permits and restricting effort to marine waters east of Cape Nome.</li><li>-Close all subsistence chum salmon fishing due to very weak runs.</li><li>-No commercial coho salmon season; close sport and subsistence fishing for coho salmon.</li><li>-Open Tier II only subsistence chum salmon fishing, issuing 10 permits and restricting effort to marine waters east of Cape Nome.</li><li>-Open Tier I beach seining for pink salmon and later, small mesh gillnets to take advantage of the strong pink salmon run while protecting chum salmon.</li><li>-General subsistence fishing reopened to coho salmon in all usual waters of the subdistrict.</li></ul>
2000	<ul style="list-style-type: none"><li>-Open Tier II only subsistence chum salmon fishing, issuing 10 permits and restricting effort to marine waters east of Cape Nome.</li><li>-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.</li><li>-General subsistence fishing reopened to coho salmon in all usual waters of subdistrict.</li></ul>
2001	<ul style="list-style-type: none"><li>-BOF updates escapement goals for Subdistrict 1 rivers.</li><li>-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.</li></ul>

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	<ul style="list-style-type: none"><li>-Open Tier I subsistence chum salmon in Eldorado-Flambeau Rivers after July 18.</li><li>-General subsistence fishing reopened in August to coho salmon fishing.</li><li>-Subsistence coho salmon fishing time reduced after August 20. Sport coho salmon fishing closed.</li><li>-Hook and line attached to a rod or pole adopted as legal subsistence gear.</li></ul>
2002	<ul style="list-style-type: none"><li>-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.</li><li>-Open Tier II fishing in Eldorado and Flambeau rivers after July 4.</li><li>-Open Tier I fishing for pink salmon in marine waters second week of July.</li><li>-Open Tier I fishing open in fresh waters east of Cape Nome in mid-July and then all rivers, except Nome.</li><li>-General subsistence fishing reopened in August to coho salmon fishing.</li><li>-Subsistence and sport coho salmon fishing closed for 2 weeks beginning mid August and then a restricted fresh water schedule in September.</li></ul>
2003	<ul style="list-style-type: none"><li>-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 early July.</li><li>-Close all subsistence fishing in mid July because of weak chum salmon runs.</li><li>-General subsistence fishing reopened in August to coho salmon fishing.</li><li>-Subsistence and sport fishing for coho salmon closed in mid August.</li></ul>
2004	<ul style="list-style-type: none"><li>-All applicants for Tier II subsistence chum salmon fishing permits are successful.</li><li>-57 applicants (including those applying during 10 day appeal process).</li><li>-52 applicants eventually pick up permits and 49 permit holders fish.</li><li>-Tier II opens in marine waters east of Cape Nome on June 15.</li><li>-Eldorado, Flambeau, and Sinuk freshwater subsistence zones opened in late June</li><li>-Hook and line Tier I subsistence fishing opens to target record pink salmon run.</li><li>-Marine waters west of Cape Nome opened to Tier II gillnets from July 1 to July 3.</li><li>-Tier II fishing was allowed in all chum salmon subsistence areas the second half of July, except for the Eldorado and Solomon rivers.</li><li>-Tier I chum salmon fishing was allowed in rivers that had made the escapement goal.</li><li>-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.</li></ul>
2005	<ul style="list-style-type: none"><li>-All applicants for Tier II subsistence chum salmon fishing permits are successful.</li><li>-59 applicants (including those applying during the 10 day appeal process).</li><li>-49 applicants eventually pick up permits and 44 permit holders fish.</li><li>-Tier II opens in marine waters east of Cape Nome on June 15.</li><li>-Eldorado, Flambeau, and Sinuk freshwater subsistence zones opened on June 29 to set gillnet fishing for Tier II permit holders.</li></ul>

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- 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 were 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 is 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 were waived on July 10.
  - Coho salmon limits were waived on August 19 in the marine waters.
  - Coho salmon limits were waived on September 1 in fresh waters.
- 2007
- No Tier II restrictions as chum salmon surplus projected to surpass ANS.
  - The regular subsistence gillnet schedule is 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 is allowed for salmon during subsistence net fishing periods.
- 2008
- No Tier II restrictions as chum salmon surplus projected to surpass ANS.
  - The regular subsistence gillnet schedule is in effect.
  - Beginning the second week of July, beach seining is allowed throughout the month during subsistence net fishing periods and pink salmon limits are waived. Sport fishing pink salmon limits are doubled from 10 to 20 fish.
  - Subsistence coho salmon limits are doubled in September.
- 2009
- No Tier II restrictions as chum salmon surplus projected to surpass ANS.
  - The regular subsistence gillnet schedule is in effect
  - In mid July, subsistence salmon gillnet fishing and chum salmon subsistence fishing closed in subdistrict when projections show chum salmon escapement will fall short of lower end of escapement goal range of 23,000–35,000 chum salmon.
  - In mid July, Pilgrim River, in neighboring Port Clarence District, is closed to all salmon net fishing 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, the subsistence gillnet fishing schedule allowed in the 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.
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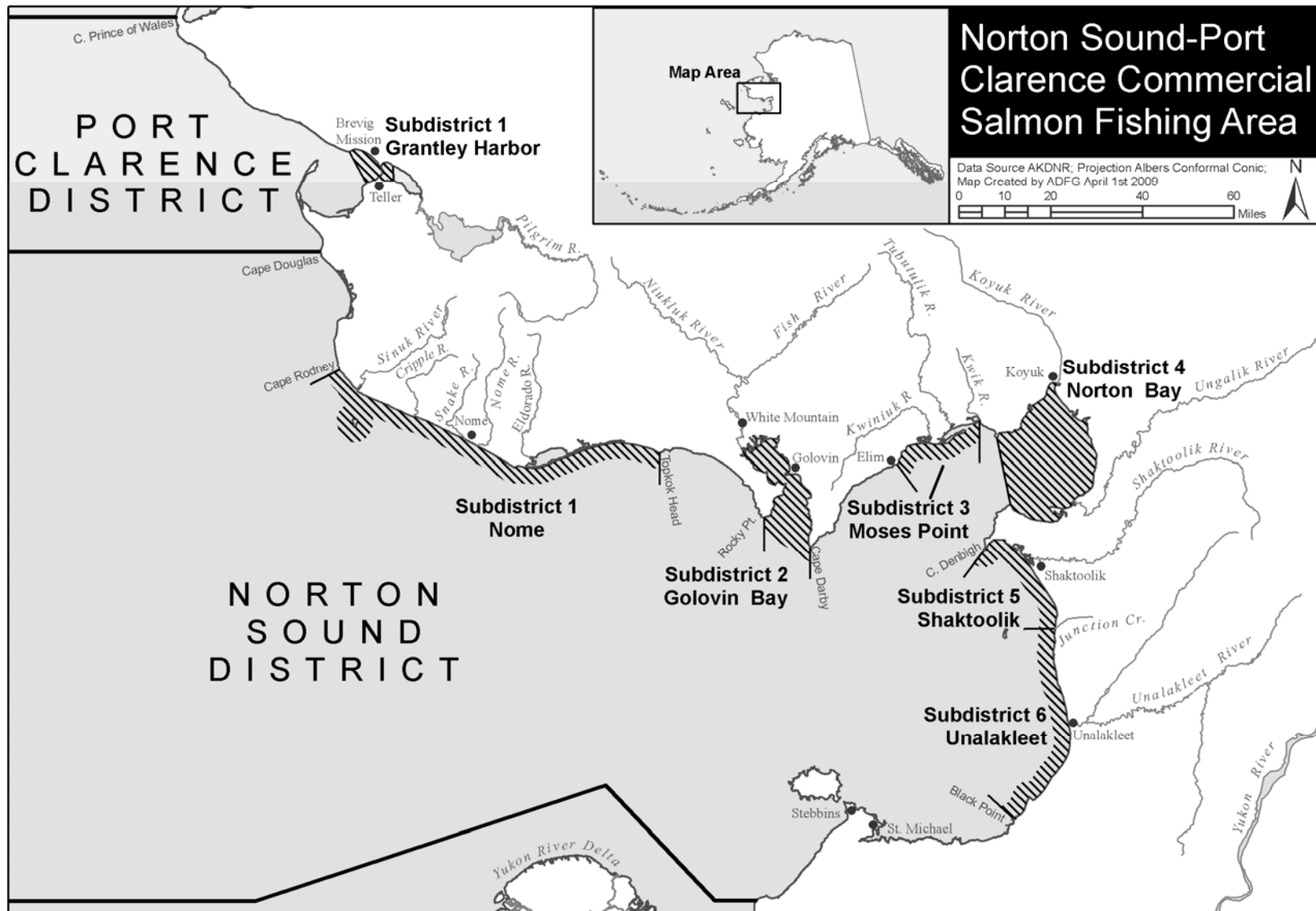


Figure 1.—Norton Sound commercial salmon fishing districts and subdistricts.

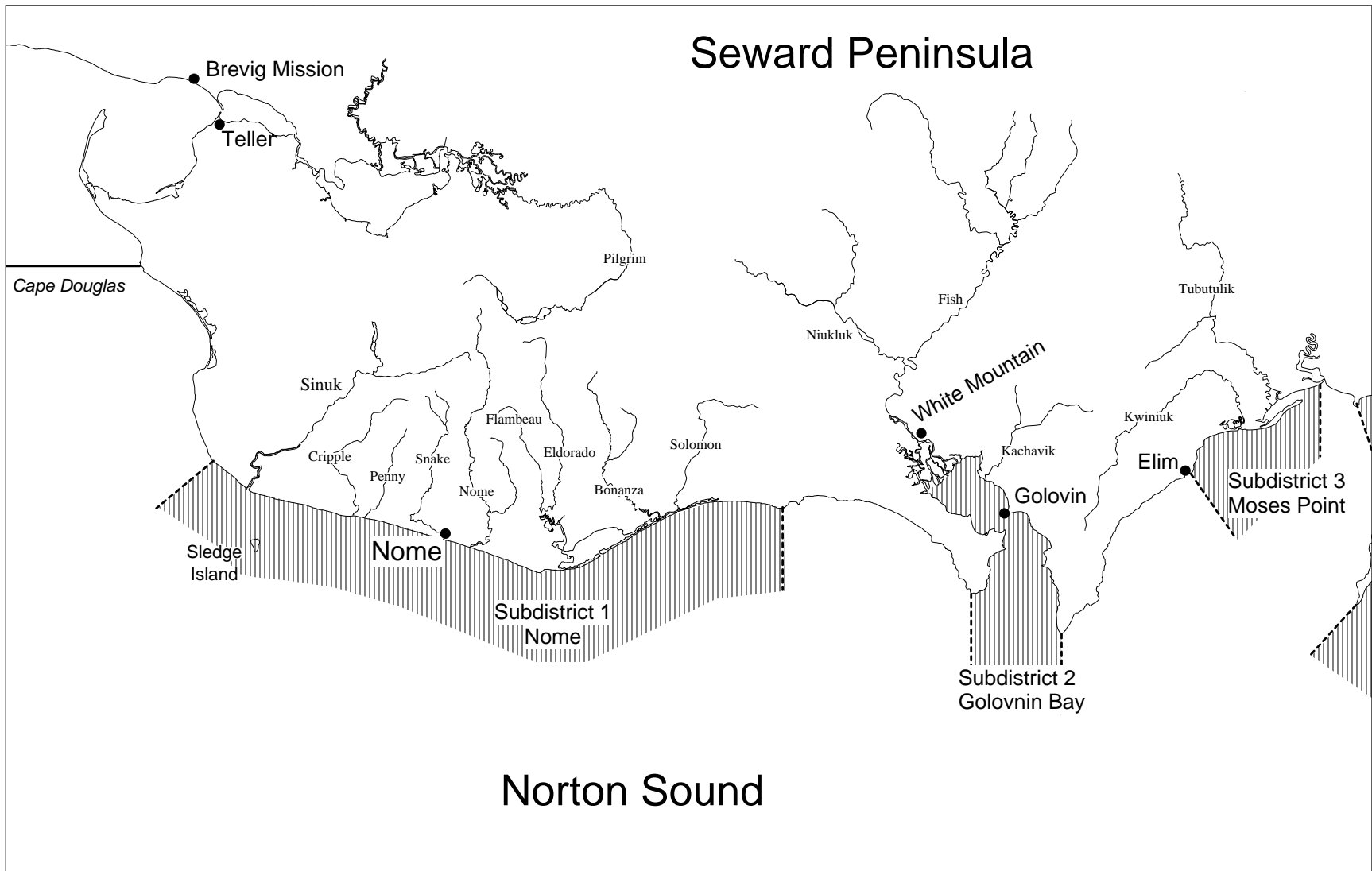


Figure 2.—Northern Norton Sound area rivers.

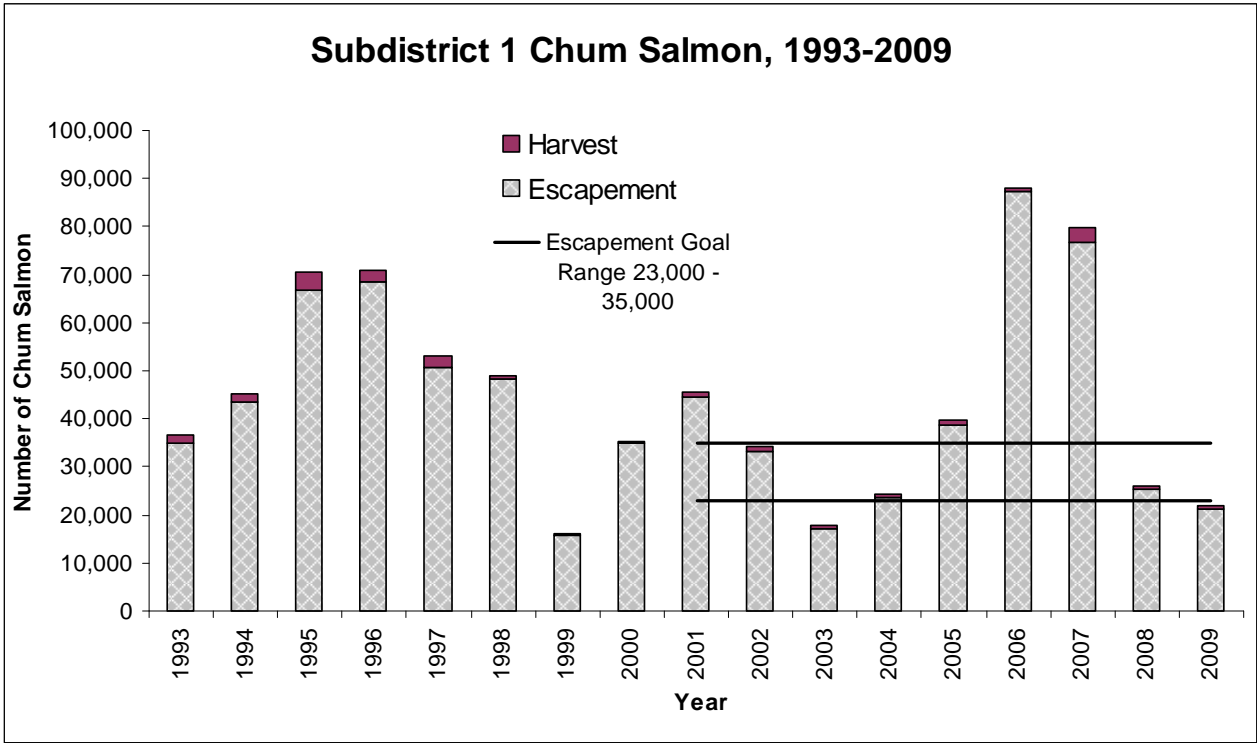


Figure 3.—Subdistrict 1 (Nome) total chum salmon run by harvest and escapement, with escapement compared to the BEG, 1993–2009.

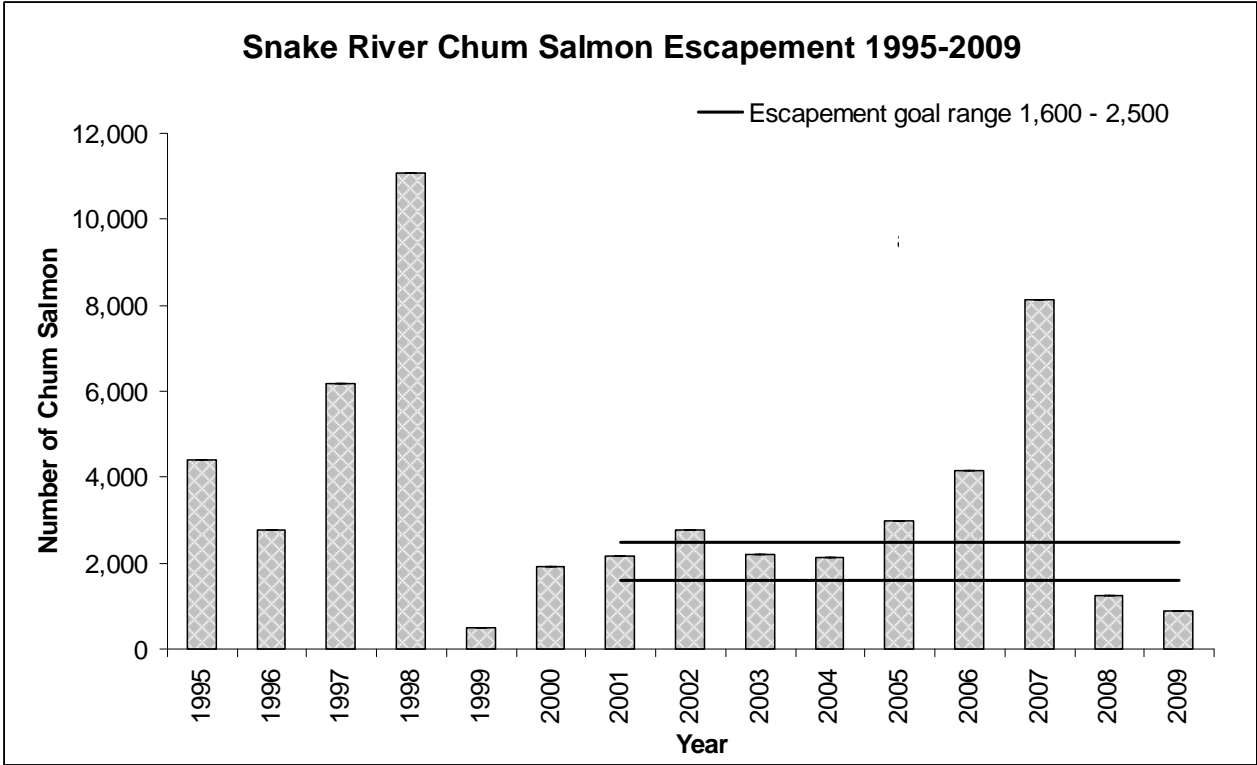


Figure 4.—Snake River chum salmon escapement, 1995–2009.

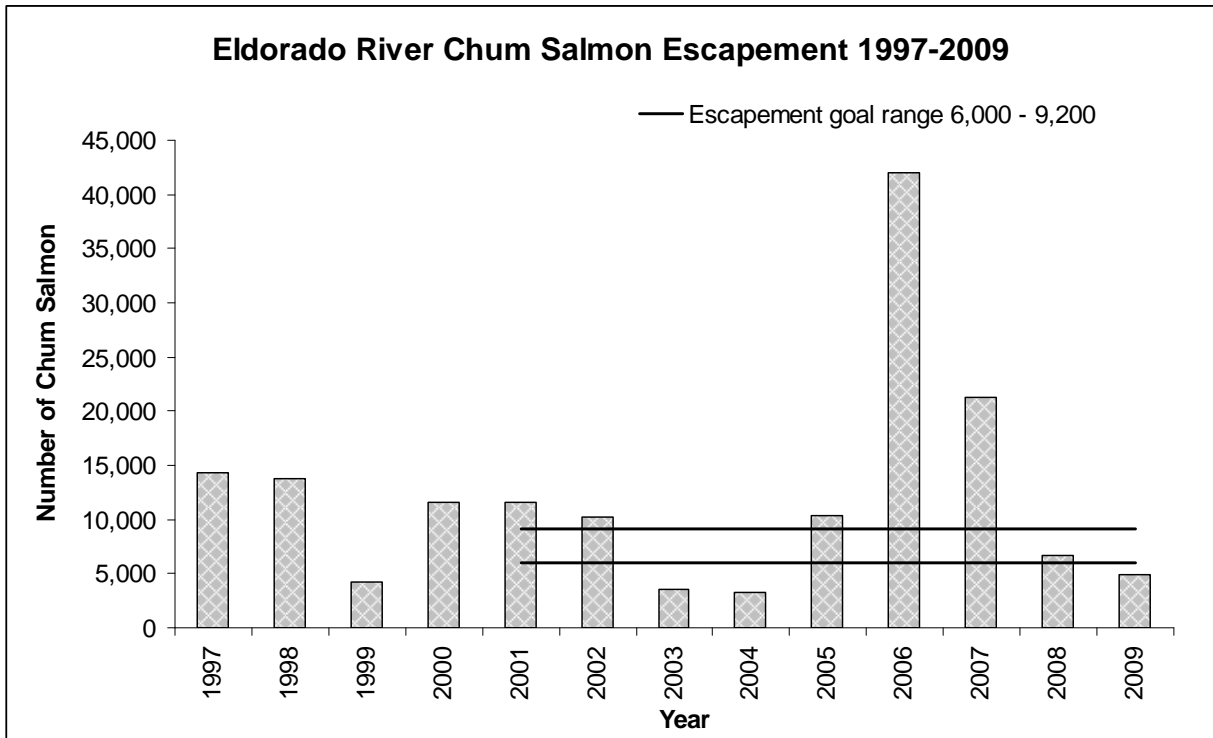


Figure 5.—Eldorado River chum salmon escapement, 1997–2009.

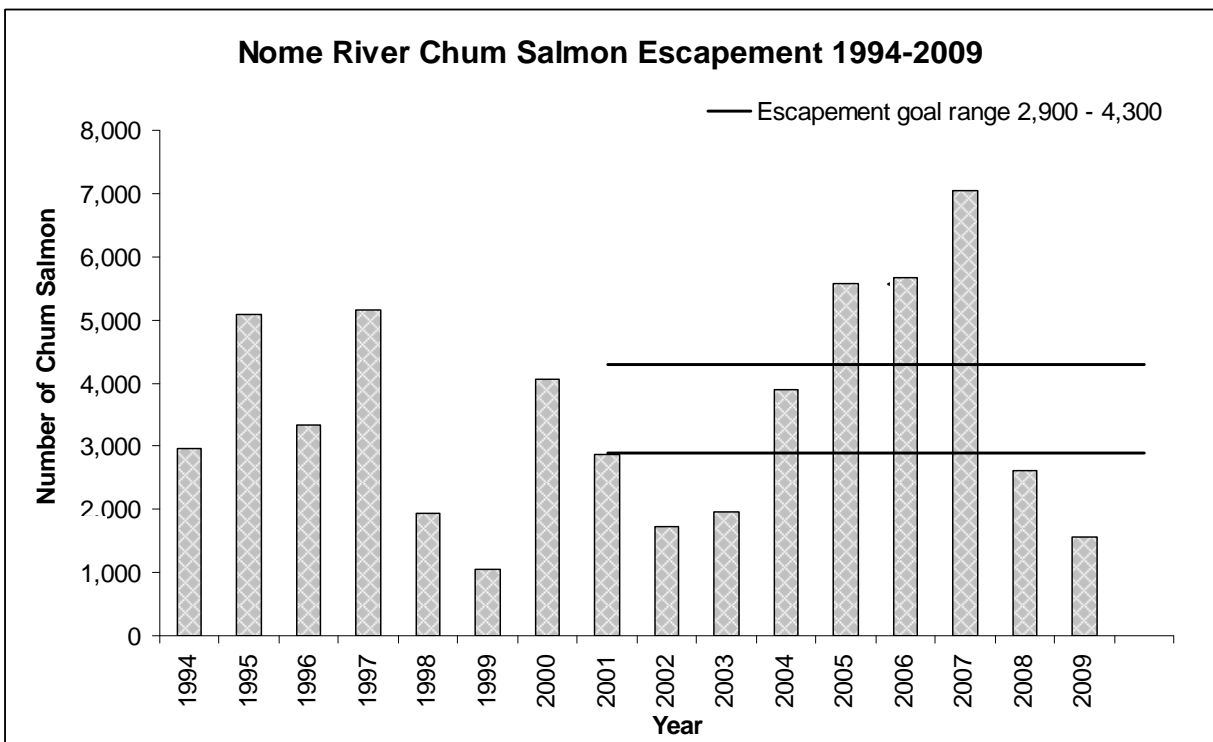
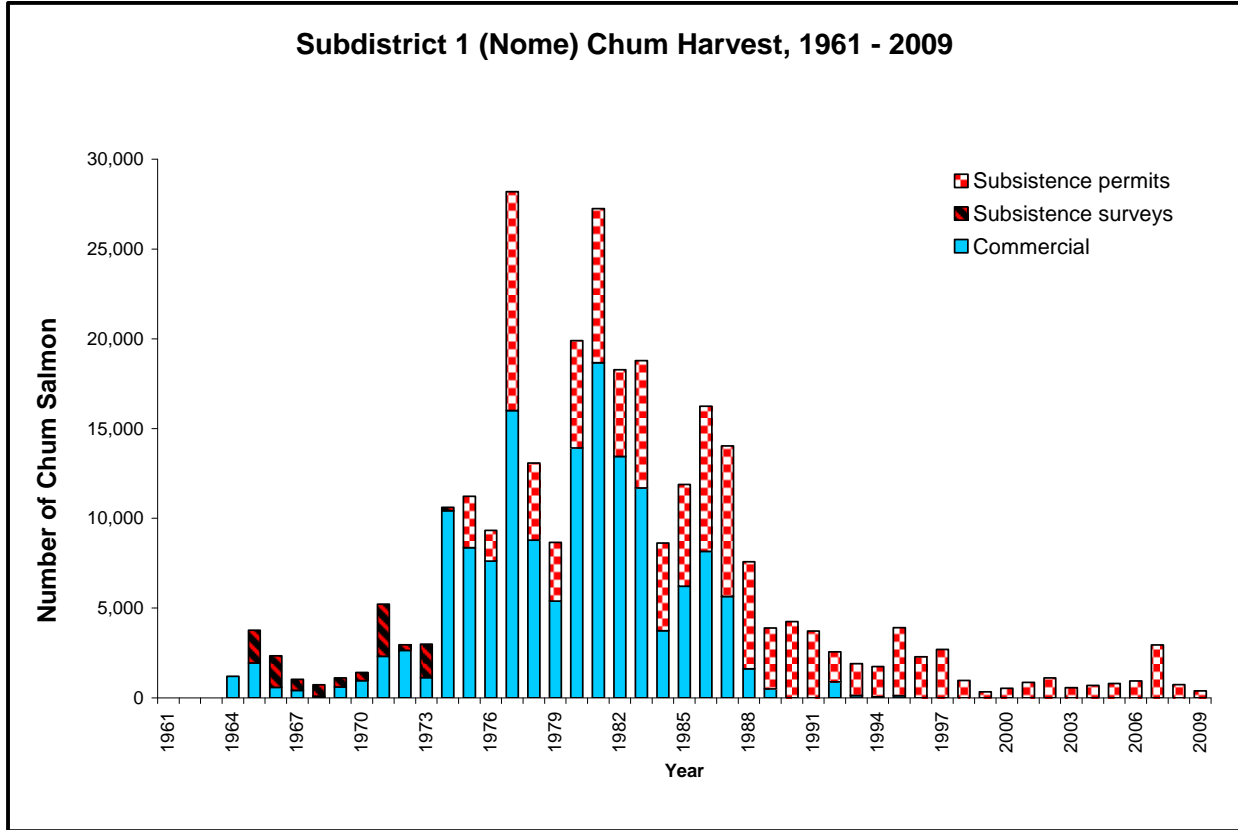


Figure 6.—Nome River chum salmon escapement, 1994–2009.



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

Figure 7.—Subdistrict 1 (Nome) chum salmon harvest, 1961–2009.

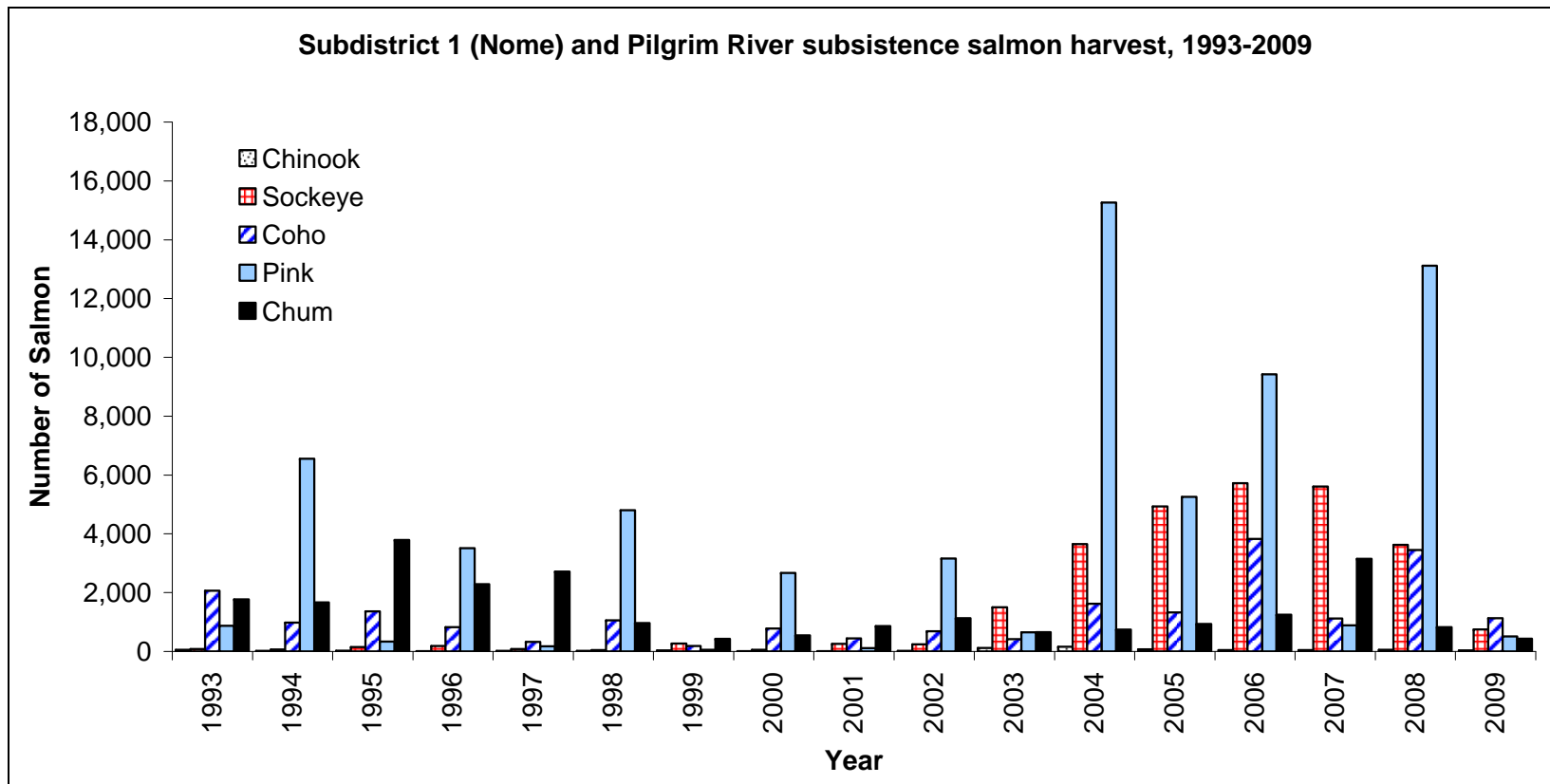


Figure 8.—Subdistrict 1 (Nome) and Pilgrim River combined subsistence salmon harvests, 1993–2009.