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Management of Salmon Stocks in the Copper River, Report to the Alaska Board of Fisheries: December 3-8, 2014, Cordova, Alaska

by

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and

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November 2014

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

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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ABSTRACT

This report presents background information relative to the management of the Copper River commercial, personal use, subsistence, and sport salmon fisheries and summarizes the performance of those fisheries and management actions taken through the 2014 season. Chinook salmon *Oncorhynchus tshawytscha*, sockeye salmon *O. nerka*, and coho salmon *O. kisutch*, are the targeted salmon species within the Copper River fisheries and are fished from mid-May through the end of September. From 2004 to 2013 salmon harvest averaged 1.61 million fish in the Copper River District commercial fishery, 3,526 fish in the Copper River District subsistence fishery, 127,667 fish in the Chitina Subdistrict personal use dip net fishery, 81,745 fish in the Glennallen Subdistrict subsistence fishery, 141 fish in the Batzulnetas subsistence fishery, and 17,652 fish in the upper Copper River sport fisheries. Sockeye salmon account for over 70% of the commercial harvest, over 97% of the personal use and subsistence harvests and 83% of the sport harvest. Inriver run of salmon in 2012, 2013, and 2014 were the 3 highest runs since the sonar was installed at Miles Lake. The Chinook salmon components of these runs were the lowest 3 ever in the Copper River. However, escapement goals for Chinook salmon have been met in 8 of the last 10 years and there are no stocks of concern in the Copper River drainage.

Key words: Copper River, Klutina River, Gulkana River, commercial, personal use, subsistence, sport fishery, Alaska Board of Fisheries, Cordova, management, Chinook salmon *Oncorhynchus tshawytscha*, sockeye salmon *O. nerka*, coho salmon *O. kisutch*, rainbow trout *O. mykiss*, Arctic grayling *Thymallus arcticus*.

INTRODUCTION

This report summarizes the most recent fishing seasons and management actions which occurred in the Copper River commercial, subsistence, personal use, and sport salmon fisheries during those years, in addition to briefly summarizing recent research activities. Harvest and participation data specific to the 2014 subsistence, personal use, and sport fisheries is collected postseason, therefore only data through the 2013 season is presented in this report.

AREA DESCRIPTION

The Copper River drainage and estuary encompasses approximately 24,000 square miles and is Alaska's fifth largest river system (Figure 1). The river drains large portions of Interior Alaska. The drainage includes the communities of Glennallen, Gulkana, Gakona, Chitina, McCarthy, Kenny Lake, Copper Center, Paxson, Mentasta, and Slana. Adjacent to the outlet of the Copper River is the community of Cordova. The state's major highways, together with secondary roads and trails, in conjunction with the Copper River itself, provide relatively good access to most of the area's major fisheries. Principle land managers in the Copper River drainage are the National Park Service (NPS), U.S. Forest Service, Bureau of Land Management, Ahtna Native Corporation, Chitina Native Corporation, Chugach Native Corporation, Eyak Native Corporation, and the Alaska Department of Natural Resources.

HISTORY OF THE COPPER RIVER SUBSISTENCE FISHERIES

From statehood until 1978, the dip net and fish wheel fisheries in the Copper River were classified as "subsistence." In 1978, Alaska passed its first subsistence law. Under this law, the Alaska Board of Fisheries (BOF) adopted the *Copper River Subsistence Salmon Management Plan*. This management plan established seasons, open areas, legal gears, permit requirements, and bag limits for a subsistence salmon fishery in the Copper River. The plan also directed Alaska Department of Fish and Game (ADF&G) to manage the Copper River commercial salmon fishery to assure an adequate escapement for spawning and to provide for subsistence harvest. In 1980, with the passage of the Alaska National Interest Lands Conservation Act, the federal government mandated subsistence hunting and fishing preference for rural residents on

federal public lands. To comply with this requirement and prevent federal involvement in fishery management, the joint Boards of Fisheries and Game adopted a regulation in 1982 stating only residents were eligible to participate in subsistence fishing and hunting and established 8 criteria for identifying fish stocks and game populations with customary and traditional uses. Due to growth in the fishery in the early 1980s, BOF eliminated non-basin residents from the Copper River subsistence fishery based on an analysis of the 8 criteria in 1984. The preclusion of non-basin residents from participating in the Copper River subsistence fisheries prevented many individuals from harvesting fish for their personal use. This led the BOF in 1984 to create a personal use salmon fishery in the Copper River under the *Copper River Personal Use Salmon Management Plan*. The original plan remained relatively unchanged from 1984 through 1996.

Changes in harvest patterns and run timing rendered several aspects of the original plan obsolete. Increased numbers of fish contributing to the later portion of the run by the hatchery on the Gulkana River changed the overall timing of fish available for harvest inriver. In addition, harvests during the early portion of the season had been increasing. These changes made the aspects of the management plan that focused harvest during certain portions of the run contrary to sound management of a mixed stock fishery.

Due to changes in the distribution of fishing effort since the inception of the plan in 1984, a revised management plan was developed during the 1996 BOF meeting. The revised plan distributed the personal use harvest throughout the season based upon the daily projected sonar counts at the Miles Lake sonar. The maximum harvest level was increased from 60,000 to 100,000 salmon, not including any salmon in excess of the inriver goal or salmon taken after August 31. At the February 1998 meeting, the BOF passed a proposal (originally submitted as an agenda change request) that allowed personal use permit holders who have filled their original limit to obtain a supplemental permit for 10 additional fish in weeks when a harvestable surplus of 50,000 salmon or greater will be available in the Chitina Subdistrict.

During its 1999 meeting, the BOF ruled in favor of a positive customary and traditional (C&T) use finding for salmon stocks of the Chitina Subdistrict of the Upper Copper River. As a result of this decision, the Copper River personal use salmon dip net fishery was repealed and a Chitina Subdistrict subsistence fishery was established. The regulations for the Chitina Subdistrict subsistence fishery remained similar to the Copper River personal use salmon dip net fishery regulations with 3 exceptions. These included an adjustment to the annual bag limit, a maximum harvest level of wild stock sockeye salmon *Oncorhynchus nerka*, of 85,000–130,000, and permit holders were no longer required to possess a sport fishing license. Annual bag limits continued to be 30 salmon for a household of 2 or more, and 15 salmon for a household of 1, of which only 1 fish could be a Chinook (king) salmon *Oncorhynchus tshawytscha*. The BOF determined that reducing the bag limit of Chinook salmon from 4 in the personal use fishery to 1 in the subsistence fishery provided for a reasonable opportunity to harvest a Chinook salmon and would also maintain Chinook salmon harvests at historical levels. Based upon recent harvests, the board determined that 100,000–150,000 salmon were necessary for subsistence needs to be met for the Chitina Subdistrict fishery. This number included contributions of hatchery fish, and after this contribution was subtracted, resulted in the 85,000–130,000 wild stock harvest level. As a result of this determination, there were 3 subsistence fisheries in the Upper Copper River District from 2000 to 2002.

At its February 2003 meeting in Cordova, following a determination that new information was available, the BOF reestablished a negative C&T use finding for the salmon stocks of the Chitina

Subdistrict of the Upper Copper River. As a result, the Chitina Subdistrict subsistence fishery was repealed and the Copper River personal use dip net salmon fishery was re-established. The BOF viewed this as a name and allocation priority change only; management of the fishery continued as it had prior to the 1999 ruling, based upon the number of fish passing the Miles Lake sonar. The exception to the 1999 regulations was that the 1 fish per household limit of Chinook salmon remained, as did the harvest allocation of 100,000–150,000 salmon for the Chitina Subdistrict within the district's management plan.

At its December 2005 meeting in Valdez, the BOF reaffirmed its negative C&T use finding for the salmon stocks of the Chitina Subdistrict of the Upper Copper River. In addition, the board increased the amount necessary for subsistence (ANS) for the Glennallen Subdistrict to 61,000-82,500 to account for increasing subsistence harvests. The revised ANS was based on average harvests in 3 subsections of the Glennallen Subdistrict.

The BOF declined to review their 2003 decision at the December 2008 meeting in Cordova, citing no new information to justify reconsideration. Following the 2008 meeting, the Chitina Dipnetter's Association and Alaska Fish and Wildlife Fund sued the board over their 2003 decision. The Alaska Superior Court remanded the case back to the board due to the 2003 board members' inconsistent definition of the "subsistence way of life". In March 2010, the board held a 2 day meeting to consider 2 proposals addressing the court ruling. A proposal defining "subsistence way of life" as "a way of life that is based on consistent, long-term reliance upon the fish and game resources for the basic necessities of life" was adopted. The second proposal sought a positive C&T finding for the Chitina Subdistrict, considering the new definition of "subsistence way of life", and failed.

CURRENT MANAGEMENT TOOLS AND STRATEGIES

RUN TIMING

Several stocks of sockeye salmon with different run timing characteristics migrate through the Copper River's commercial fishery (Figure 2). Most Chinook salmon that migrate through the district spawn in tributaries of the Upper Copper River. Three major stock components of sockeye salmon also return to the Copper River. The most abundant sockeye salmon component, referred to as the Upper Copper River wild stock, has both early and late runs that spawn in Copper River tributaries above Miles Lake. The second component is an enhanced sockeye salmon run that is produced at the Gulkana Hatchery. This enhanced run has a run timing that overlaps the late wild stock component. The Gulkana Hatchery has been producing sockeye salmon since the early 1970s and has produced enhanced runs of up to 1.1 million fish. The third group, referred to as the lower delta stock, spawns in systems below the Chugach Mountains between Eyak Lake and the Katalla River. Finally, there are 2 stocks of coho salmon *O. kisutch*, that return to the management area. A small upriver stock of coho salmon shares a run timing with a much larger stock that returns to streams along the Copper River Delta (CRD) below Miles Lake.

Chinook salmon returning to the Copper River drainage begin passing through the CRD and entering the Copper River in early May. Peak migration into the river is generally from mid-May through mid-June and the run is essentially complete by July 1. Sockeye salmon run timing in the Copper River District begins in mid-May and ends in mid to late August. The early-timed Upper Copper River wild stocks are in the commercial fishing district from mid-May to mid-

June. The late-timed Upper Copper River wild stocks and hatchery stock sockeye salmon enter the commercial fishing district from mid- to late-June and are in the fishery through August. Some components of the Lower CRD wild stock run timing begin in mid-May, but a majority of the delta run is not abundant until mid-June. Coho salmon return to the Copper River District from mid-August through October.

ESCAPEMENT ENUMERATION

Enumerating the number of fish that escape the various fisheries and make it to the spawning grounds is an essential component of managing salmon for sustained yield. In 1992, the ADF&G adopted the *Policy for statewide salmon escapement goals*, which was subsequently put into regulation (5 AAC 39.223) in 2001 that formalized the procedure for establishing escapement goals. Various terms relating to escapement goals were adopted as part of the *Policy for management of sustainable salmon fisheries* (5 AAC 39.222) in 2000. The sockeye salmon stocks in the Upper Copper River are managed to achieve a sustainable escapement goal (SEG) of 360,000–750,000 spawners.

In 2002, an SEG of 24,000 or more spawners was created for Copper River Chinook salmon. The CRD sockeye salmon stock SEG is 55,000–130,000 spawners, and the delta coho salmon SEG is 32,000–67,000. Delta escapements are estimated using aerial surveys.

The 3 methods used to estimate salmon that return to the Copper River District are the DIDSON sonar at Miles Lake, aerial surveys of the Upper Copper River tributaries and Lower CRD streams, and a mark–recapture study to assess Chinook salmon.

Miles Lake Sonar

The Miles Lake sonar project began in 1978 with a single Bendix side scan sonar unit on the south bank of the Copper River. In 1979, an additional unit was placed on the north bank. Beginning in 2003, dual frequency identification sonar (DIDSON) has been used. Sonar units are installed each spring below Miles Lake after shore ice is gone, which generally occurs around May 20.

The inriver salmon goal (which includes the Upper Copper River sockeye salmon SEG, hatchery sockeye salmon brood and surplus, subsistence, personal use, and sport harvest components) measured at the Miles Lake sonar is established annually (Table 1). The sockeye salmon SEG and allocations are fixed in regulation while the hatchery brood stock and hatchery surplus components are determined annually. The sonar operates from mid-May to the end of July. Although Chinook salmon and coho salmon pass the sonar site, they constitute a minor portion of the total count. Species apportionment is currently not possible. Sonar passage information, therefore, includes all salmon species and is primarily used for inseason sockeye salmon management and estimating sockeye salmon run strength. Daily escapement projections, based on average run timing and the projected total salmon run, are compared to actual daily counts to evaluate the salmon run's timing and abundance. Temporal achievement of the inriver goal should ensure adequate escapement for all upriver sockeye salmon components. Sonar is the primary commercial fisheries management tool until mid-June, at which point aerial surveys are used to estimate escapement into the delta systems. The Miles Lake sonar is also the primary management tool for the Chitina Subdistrict personal use fishery through the end of August, as it is used to set the fishery opening duration based on estimated weekly salmon abundance. For the month of September the personal use fishery remains open by regulation.

Bendix sonar counters at Miles Lake were replaced by a new DIDSON acoustical lensing sonar system in 2008. From 2003 through 2007, DIDSON sonar units were deployed in close proximity to Bendix sonar devices with both technologies operating simultaneously. Resultant upriver escapement counts were then compared, with little significant variation observed between the 2 systems. Improvements in the DIDSON system include target tracking, digital capture and archiving of acoustic data, and the ability to conduct real-time data processing and interpretation. DIDSON sonar is also able to distinguish the direction of fish migrations, and identify specific individual targets within complex groups. These features are highly useful for distinguishing directional movement of fish, and for detecting false counts frequently created by glacial ice and debris moving downstream through the ensonified zone at Miles Lake. Additionally, this technology is being aggressively developed for a variety of industries, increasing the likelihood that future improvements in DIDSON technology will provide greater information regarding salmon as they pass the counting station at Miles Lake.

Aerial Surveys

Aerial surveys of delta streams are conducted weekly beginning in mid-June through mid-October. These counts are used in conjunction with inriver counts at the Miles Lake sonar to adjust commercial fishery periods in order to assure adequate escapement of sockeye and coho salmon into the Lower CRD streams. Due to the large number of spawning systems on the Lower CRD, total escapement enumeration cannot be obtained. Instead, an escapement index is estimated from aerial surveys of selected streams. The observed weekly escapement indices are compared to anticipated weekly escapement indices that are averages of past year's (1971–2013) escapement observations. The SEG range for the CRD (55,000–130,000 sockeye salmon) is compared to the combined total of the peak count for each index stream.

Chinook salmon are broadly distributed throughout the Copper River basin, having been observed in approximately 40 tributaries. Aerial surveys have been conducted for 35 of these systems. However, only 9 of these streams were surveyed consistently from 1966 to 2004. In 2005, the number of surveyed spawning streams was reduced to 4 (Gulkana River, East Fork Chistochina River, and Manker and St. Anne Creek in the Klutina River drainage), because data gathered from the Chinook salmon radiotelemetry study indicated only a minor component of the Chinook salmon run actually spawned in the clear water tributaries of the glacial rivers (such as the Tazlina and Tonsina rivers). Assessment of Chinook salmon spawning escapements through aerial surveys of key index areas does not provided an estimate of the total spawning population. The current 4 index streams provide a postseason index of run strength for the major sport fisheries and for Upper Copper River Chinook salmon stocks.

Chinook salmon spawning escapement is estimated by the mark–recapture fish wheel study conducted by the Native Village of Eyak (NVE).

OVERVIEW OF COPPER RIVER SALMON FISHERIES

Salmon fisheries in the Copper River District primarily harvest Chinook, sockeye, and coho salmon. These salmon stocks are harvested in 4 fisheries: (1) a commercial gillnet fishery at the mouth of the Copper River; (2) a subsistence gillnet fishery at the mouth of the Copper River, a subsistence dip net and fish wheel fishery in the Copper River between Chitina and the Slana River confluence, and a subsistence fish wheel, dip net and spear fishery in Tanada Creek and the Copper River near the traditional village site of Batzulnetas; (3) a personal use dip net fishery

in the Copper River near Chitina; and (4) sport fisheries that occur in various tributaries (Table 2). In addition, since 1999 federal subsistence fisheries have occurred in the Glennallen and Chitina subdistricts and in the Batzulnetas area. Prior to 1999, participants in these subsistence fisheries took part in the state fisheries and overall participation has not increased as a result of the federal fisheries. Since 1984, total harvest (state and federal harvests combined since 2002, with all harvest reported on state permits prior to 2002) has ranged: (1) for Chinook salmon from 13,872 in 2013 to over 85,000 salmon in 1998 (Figure 3); (2) for sockeye salmon, from 479,289 in 2009 to slightly more than 3 million in 1997 (Figure 4); and (3) for coho salmon from less than 30,000 in 1997 to nearly 700,000 in 1994.

The total 2012 Copper River sockeye salmon run was 3.29 million fish with 1.87 million (56.7%) commercially harvested and sold, 221,000 (6.70%) harvested by upriver subsistence and personal use fishermen, and an estimated 14,100 (0.50%) by upriver sport fishermen (Table 3). Commercial permit holders retained 7,990 sockeye salmon for home pack (0.24%). Sport fishermen on the Copper River Delta harvested an estimated 1,230 (<0.10%) sockeye salmon. Reported educational permit and subsistence harvest in the Copper River District totaled 4,530 (0.14%). Upriver and Copper River Delta wild sockeye salmon escapement was 1.11 million (33.8%) fish, and 65,300 (1.98%) fish returned to the Gulkana Hatchery sites. Overall, 2.49 million (76.1%) of the sockeye salmon entering the Copper River District originated from upriver wild stock systems, 334,000 (10.2%) from Copper River Delta wild stock systems, and 451,000 (13.8%) came from the Gulkana Hatchery.

The 2012 total Chinook salmon run was 43,800 fish with 11,800 (26.9%) commercially harvested and sold, and 1,100 (2.50%) harvested through educational permits and subsistence permits in the Copper River District, and retained by commercial permit holders as "home pack." A total of 3,080 (7.04%) were harvested by upriver personal use and subsistence users, an estimated 2,850 (6.51%) were harvested by sport fishermen, and the remaining 25,000 (57.1%) represented spawning escapement. This spawning escapement was above the SEG lower bound of 24,000 for Copper River Chinook salmon specified in 5 AAC 24.361(a).

The total 2013 Copper River sockeye salmon run was 3.02 million fish with 1.61 million (53.0%) commercially harvested and sold, 275,000 (9.1%) harvested by upriver subsistence and personal use fishermen, and an estimated 15,300 (0.50%) by upriver sport fishermen (Table 3). Commercial permit holders retained 9,450 sockeye salmon for home pack (0.3%). Sport fishermen on the Copper River Delta harvested an estimated 1,030 (<0.1%) sockeye salmon. Reported educational permit and subsistence harvest in the Copper River District totaled 5,790 (0.2%). Upriver and Copper River Delta wild sockeye salmon escapement was 1.05 million (34.5%) fish, and 72,400 (2.4%) fish returned to the Gulkana Hatchery sites. Overall, 2.23 million (74.2%) of the sockeye salmon originated from upriver wild stock systems, 341,000 (11.4%) from Copper River Delta wild stock systems, and 434,000 (14.4%) came from the Gulkana Hatchery.

The 2013 the total Chinook salmon run was 42,900 fish with 8,830 (20.6%) commercially harvested and sold, 1,470 (2.12%) harvested through educational and subsistence permits in the Copper River District, and 564 (1.99%) retained by commercial permit holders as home pack. The commercial harvest ranks as the third lowest annual harvest since 1960. A total of 3,290 (7.67%) were harvested by upriver personal use and subsistence users, an estimated 285 (0.66%) were harvested by sport fishermen, and the remaining 29,000 (67.7%) represent spawning

escapement. This spawning escapement was above the lower bound SEG of 24,000 for Copper River Chinook salmon specified in 5 AAC 24.361(a).

Analysis of harvest and escapement for Copper River sockeye and Chinook salmon in 2014 is incomplete at this time. The sockeye and Chinook salmon commercial harvest was 2.07 million and 9,630 fish, respectively. The 2014 Miles Lake sonar inriver passage estimate was 1.22 million salmon.

COMMERCIAL FISHERIES

Copper River Management Area includes waters of the Gulf of Alaska between Hook Point and Cape Suckling and is comprised of 2 fishing districts, Copper River District and Bering River District (Figure 5). The seaward boundary of the Copper River Management Area is a line 3 miles due south of a line from Cape Suckling the southernmost tip of Pinnacle Rock on Kayak Island to the tip of Hook Point on Hinchinbrook Island. The inshore boundary line for the Copper River District is from Government Rock to a point 500 yards seaward of the junction of Mountain Slough, Center Slough and Eyak River, then east within a line bounded by coordinates located approximately 2 miles seaward of the grass banks and in Boswell Bay. The inshore boundary line for the northern portion of Bering River District is from Point Hey to a point on the northeast shore of Kanak Island, and from a point on the southeastern most shore of Kanak Island to Okalee Spit by way of 2 offshore coordinates. Waters south of Kayak Island and Oklee Spit are closed to commercial fishing. The inshore boundary lines have remained in effect since the 1964 earthquake when the delta area rose 2 meters. Before the earthquake, the inshore boundary was within 500 yards of the grass banks. After the earthquake, the inshore boundary was moved seaward to protect rivers and sloughs from gillnets closing off the entire channel during low water sets. With the loss of fishing area inside the islands, many fishermen moved outside the islands. This move outside the barrier islands lessened some of the congestion in the inside waters.

Average 10-year commercial harvest from the Copper River District for the years 2004–2013 was 25,071 Chinook, 1,273,887 sockeye, and 240,907 coho salmon (Tables 3, 4, and 5). The 25 year average for the years from 1989 to 2013 was 35,071 Chinook, 1,360,247 sockeye and 272,296 coho salmon. Preliminary 2014 harvest was 9,626 Chinook, 2,067,941 sockeye and 315,245 coho salmon. Annual commercial sockeye salmon harvests in 2012, 2013, and 2014 were the sixth, seventh, and third largest harvests, respectively, since 1960. Chinook salmon commercial harvest over the last 3 years ranked eleventh, third, and fifth lowest, respectively, since 1960. Miles Lake sonar inriver passage counts in 2012, 2013, and 2014 were first, second, and third highest, respectively, since the initiation of the program in 1976.

In addition, commercial fishermen may withhold a portion of their catch as home pack. Any commercially caught finfish not sold must be reported on a fish ticket. From 2001 to 2011 an average of 288 permit holders per year have reported retaining 3 Chinook salmon on average from their commercial harvest (Table 6).

Copper River District is managed using 3 primary tools: 1) escapement enumeration at the Miles Lake sonar site; 2) aerial escapement surveys of lower delta systems, and to a lesser extent 3) weekly anticipated harvest estimates (forecasts) with environmental conditions such as river height taken into account (Figure 6). The anticipated catch is based on the current year midpoint harvest forecast and the 1998–2007 harvest timing. The objective is to have a fishing schedule of 2 evenly-spaced periods per week. Fishing schedules are adjusted inseason to account for

variations in river flow, run timing, run strength, fishing effort, and other factors. In early to mid-August ADF&G's priority switches to coho salmon management.

There are 5 proposals currently before the BOF that concern commercial fisheries in the Copper River and Bering River districts specifically:

Fishing seasons (1 proposal)

- Proposal 44–Prohibit commercial salmon fishing until a salmon is recorded at the Copper River sonar.

Copper River Chinook Salmon Management Plan (2 proposals)

- Proposal 45–Repeal mandatory inside-waters closure.
- Proposal 47–Allow use of dip nets for commercial salmon fishing during emergency order closures of the commercial drift gillnet fishery.

Reporting Requirements (1 proposal)

- Proposal 46–Restrict retention of commercially caught Chinook salmon for a person's own use to not exceed the Chinook salmon sport bag limit in area caught.

Closed waters (1 proposal)

- Proposal 48–Mark district boundaries.

2012 Salmon Fisheries, Season Summary

The 2012 preseason commercial harvest forecast for the Copper River District was 20,000 Chinook, 1.23 million sockeye, and 282,000 coho salmon. Gulkana Hatchery was expected to contribute 335,000 sockeye salmon to the common property fishery (CPF) harvest. The commercial salmon fishing season in the Copper River District began on Thursday, May 17. Due to a poor Chinook salmon forecast, inside waters as described in 5 AAC 24.350(1)(B) were closed for the first 10 fishing periods, 7 fishing periods beyond the regulatory requirement in 5 AAC 24.361(b). Actual Chinook salmon harvest was below inseason harvest projections for 9 of the first 10 periods, prompting ADF&G to maintain the inside waters closure through the majority of the Chinook salmon run based on the likelihood of a smaller than anticipated Chinook salmon run. A total of 510 drift gillnet permits were active in the Copper River District in 2012 out of 536 total permits. Fishing effort in 2012 peaked during the fourth period that began May 28 when 476 permit holders harvested 153,000 sockeye and 1,660 Chinook salmon during a 36 hour opening. Peak Chinook salmon harvest also occurred during this fishing period. Peak sockeye salmon harvest occurred during the Thursday, May 24 fishing period when 254,000 fish were harvested by 391 permit holders. Peak fishing effort and harvest for the coho salmon season was during the 24-hour period that occurred on Monday, August 27 when 172 permit holders delivered 25,900 coho salmon. The total commercial sockeye salmon harvest of 1.87 million fish was more than 1.5 times the previous 10-year (2002–2011) harvest average of 1.23 million sockeye salmon. The overall commercial harvest of 1.87 million sockeye salmon from the Copper River District was the fifth largest commercial harvest in the history of the fishery. The preliminary harvest composition was 1.52 million (81%) wild, 330,000 (17.7%) Gulkana Hatchery, and 19,400 (1%) MBH sockeye salmon. The CPF harvest of 11,800 Chinook salmon was below the previous 10-year (2002–2011) average harvest of 28,000. The overall commercial harvest of Chinook salmon was the tenth lowest since 1960. The coho salmon

commercial harvest of 130,000 fish was below the previous 10-year (2002–2011) average harvest of 278,000 coho salmon. The inriver goal for salmon passing the Miles Lake sonar site was 649,000 to 1.02 million salmon. The 2012 preliminary sonar escapement estimate was 1.29 million salmon. Spawning escapement to Copper River delta systems based on aerial survey indices was 66,900 sockeye salmon, and was within the SEG range of 55,000–130,000 fish. Coho salmon spawning escapement to the Copper River delta based on aerial survey indices was 37,000 and was within the SEG range of 32,000–67,000 fish.

The Bering River District was initially closed to commercial sockeye salmon harvest due to aerial survey escapement estimates from 2007 to 2011 that were below the SEG range of 23,000–35,000 fish. Inseason aerial survey escapement estimates above the anticipated goal for the week ending June 23 led to the opening of the district to sockeye salmon fishing on June 25. The district remained open for the remainder of the season concurrent with the Copper River District fishery. The aerial escapement index of 18,000 sockeye salmon was within the new SEG range of 15,000-33,000 fish. No fishing effort was reported in the district until the beginning of the coho salmon fishery in mid-August. The coho salmon commercial harvest of 46,200 was below the previous 10-year (2002–2011) harvest average of 56,000 coho salmon. Aerial surveys of coho salmon produced an escapement index of 15,600 fish and was within the SEG range of 13,000-33,000 fish.

2013 Salmon Fisheries, Season Summary

The 2013 preseason commercial harvest forecast for the Copper River District was 14,200 Chinook, 1.30 million sockeye, and 240,000 coho salmon. Gulkana Hatchery was expected to contribute 230,000 sockeye salmon to the CPF harvest. The commercial salmon fishing season in the Copper River District began on Thursday, May 16. Due to a poor Chinook salmon forecast, inside waters as described in 5 AAC 24.350(1)(B) were closed for the first 4 fishing periods, 2 fishing periods beyond the regulatory requirement in 5 AAC 24.361(b). A total of 521 drift gillnet permits were active in the Copper River District in 2013 out of 536 total permits. Fishing effort and harvest in 2013 peaked during the third period that began May 27 when 479 permit holders harvested 320,000 sockeye and 2,920 Chinook salmon during a 12-hour opening. The sockeye salmon harvest of 1.61 million fish was more than 1.2 times the previous 10-year (2003–2012) harvest average of 1.3 million sockeye salmon. The overall commercial sockeye salmon harvest from the Copper River District was the seventh largest harvest in the history of the fishery. The preliminary harvest composition was 1.26 million (78%) wild, 318,000 (19.8%) Gulkana Hatchery, and 35,600 (2.2%) MBH sockeye salmon. The CPF harvest of 8,830 Chinook salmon was below the previous 10-year (2003–2012) average harvest of 25,100. The overall commercial harvest of Chinook salmon was the third lowest since 1960. The coho salmon commercial harvest of 229,000 fish was below the previous 10-year (2003–2012) average harvest of 241,000 coho salmon. The inriver goal for salmon passing the Miles Lake sonar site was 695,000 to 1.07 million salmon. The 2013 preliminary sonar escapement estimate was 1.27 million salmon. Spawning escapement to Copper River delta systems based on aerial survey indices was 75,700 sockeye salmon, and was within the SEG range of 55,000-130,000 fish. Coho salmon spawning escapement to the Copper River Delta based on aerial survey indices was 34,700 and was within the SEG range of 32,000–67,000 fish.

The Bering River District was initially closed to commercial sockeye salmon harvest due to the recent trend in poor annual escapement. Inseason aerial survey escapement estimates above the anticipated goal for the week ending June 15 led to the opening of the district to sockeye salmon

fishing on June 13. Starting June 20, as a result of healthy escapement and lack of fishing effort, ADF&G elected to keep the Bering River District open to commercial harvest on a twice-weekly basis until the start of coho salmon season in mid-August. The sockeye salmon commercial harvest of 3,290 was below the previous 10-year (2003–2012) harvest average of 16,800 sockeye salmon. The aerial escapement index of 22,000 sockeye salmon was within the new SEG range of 15,000–33,000 fish. The coho salmon commercial harvest of 47,000 was below the previous 10-year (2003–2012) harvest average of 49,700 coho salmon. Aerial surveys of coho salmon produced an escapement index of 18,800 fish and was within the SEG range of 13,000–33,000 fish.

2014 Salmon Fisheries, Season Summary

The 2014 preseason commercial harvest forecast for the Copper River District was 22,000 Chinook, 1.60 million sockeye, and 280,000 coho salmon. Gulkana Hatchery was expected to contribute 270,000 sockeye salmon to the CPF harvest. The commercial salmon fishing season in the Copper River District began on Thursday, May 15. Due to a poor Chinook salmon forecast, inside waters as described in 5 AAC 24.350(1)(B) were closed for the first 11 fishing periods, 9 fishing periods beyond the regulatory requirement in 5 AAC 24.361(b). A total of 518 drift gillnet permits were active in the Copper River District in 2014 out of 536 total permits. Fishing effort in 2014 peaked during the fourth period (May 26–27) when 501 permit holders harvested 151,000 sockeye and 1,170 Chinook salmon during a 36 hour opening. Peak Chinook salmon harvest occurred during the third period (May 22–23) when 1,370 fish were harvested by 498 permit holders. Peak sockeye salmon harvest occurred during the seventh fishing period (June 5–7) when 250,000 fish were harvested by 449 permit holders. Peak fishing effort and harvest for the coho salmon season was during the 24-hour period that started Monday, August 25 when 261 permit holders delivered 58,700 coho salmon. The sockeye salmon harvest of 2.07 million fish was more than 1.5 times the previous 10-year (2004–2013) harvest average of 1.32 million sockeye salmon. The overall commercial sockeye salmon harvest from the Copper River District was the third largest harvest in the history of the fishery. The preliminary harvest composition was 1.69 million (82%) wild, 377,000 (15%) Gulkana Hatchery, and 73,300 (4%) MBH sockeye salmon. The CPF harvest of 9,630 Chinook salmon was below the previous 10-year (2004–2013) average harvest of 21,200. The overall commercial harvest of Chinook salmon was the fifth lowest since 1960. The coho salmon commercial harvest of 315,000 fish was 38% above the previous 10-year (2004-2013) average harvest of 229,000 coho salmon. The inriver goal for salmon passing the Miles Lake sonar site was 748,000 to 1.14 million salmon. The 2014 preliminary sonar escapement estimate was 1.22 million salmon. Spawning escapement to Copper River delta systems based on aerial survey indices was 66,200 sockeye salmon, and was within the SEG range of 55,000-130,000 fish. Coho salmon spawning escapement to the Copper River Delta based on aerial survey indices was 42,400 and was within the SEG range of 32,000–67,000 fish.

The Bering River District was initially opened to commercial sockeye salmon fishing on June 16. Inseason aerial survey escapement estimates trended below the anticipated inseason goals and the fishery was closed starting June 23. Starting June 30, as a result of healthy escapement and the likelihood of minimal participation in the fishery, ADF&G elected to keep the Bering River District open to commercial harvest on a twice-weekly basis until the start of coho salmon season in mid-August. The reported sockeye salmon commercial harvest of 50 fish was below the previous 10-year (2004–2014) harvest average of 15,300 sockeye salmon. The aerial

escapement index of 14,500 sockeye salmon was 500 fish below the SEG range of 15,000–33,000 fish. The coho salmon commercial harvest of 98,000 was the second largest in the last 15 years and more than double the previous 10-year (2003–2012) harvest average of 48,400 coho salmon. Aerial surveys of coho salmon produced an escapement index of 26,500 fish and was within the SEG range of 13,000–33,000 fish.

GULKANA HATCHERY

Gulkana Hatchery is located on the Gulkana River approximately 6 miles north of Paxson Lake. The hatchery was built in 1973 and was initially operated by ADF&G. In 1992, the hatchery was transferred to Prince William Sound Aquaculture Corporation (PWSAC). The donor stock for the facility was the local wild stock at the hatchery site on the Gulkana River. The Gulkana Hatchery was expanded to 2 facilities in 1986. The 2 facilities combined have produced an average of 20.6 million fry annually over the last 10 years. Gulkana Hatchery produces sockeye salmon for the common property fisheries, which include commercial, personal use, subsistence, and sport fisheries. In addition to the common property harvest, hatchery runs meet brood stock needs and also create an additional surplus of enhanced sockeye salmon at the hatchery and the Crosswind Lake remote release site. Since the run timing of hatchery stocks coincides with that of CRD wild and late upriver wild stocks, the harvest rate in the commercial fishery is determined by the strength of the wild stock escapement. Enhanced runs are therefore harvested at the rate that can be sustained by wild stocks. This is generally expected to be between 50% and 60% for wild stocks. This wild stock priority creates surpluses of enhanced sockeye salmon when hatchery runs are large and wild stocks are weak or less plentiful. These unharvested enhanced runs are designated as the hatchery surplus component of the inriver escapement goal in the *Copper River District Salmon Management Plan*. For planning purposes, ADF&G annually projects the hatchery surplus in the preseason forecast, but the actual surplus will depend upon the actual run strength of the wild and enhanced stocks. Recently, because of increased survivals of sockeye salmon released in Crosswind Lake, the forecasted hatchery surplus has ranged from 11,169 fish in 2004 to 136,036 fish in 2010 (Table 1). In 2014, the forecasted hatchery surplus component was 120,400 sockeye salmon. Gulkana Hatchery stocks are intermixed with other sockeye salmon stocks and with other salmon species to the extent that no targeted harvest can occur within either the commercial or inriver fisheries. Gulkana Hatchery brood stock needs are estimated annually and included in the Copper River inriver escapement goal. From 1986 through 2014, the brood stock escapement component within the inriver goal has been 20,000 sockeye salmon. Adequate fish should be available for brood stock needs at Gulkana Hatchery if the Copper River inriver escapement goal is attained at the Miles Lake sonar.

Until 1997, PWSAC had only harvested sockeye salmon for brood stock and facility operating and capital costs have been met through a 2% fishermen's assessment and through corporate revenues from the sale of Wally Noerenberg Hatchery and Main Bay Hatchery salmon. In an effort to avoid excess fish entering Crosswind Lake, a special harvest area (SHA) has been designated to allow the hatchery operator the opportunity to harvest returning adult surplus to Crosswind Lake for fertilization needs.

The Crosswind Lake SHA consists of the waters of Dog Creek west of approximately 145°52.83' W long, downstream to a weir located at approximately 62°34.70' N lat, 145°53.7' W long. PWSAC is allowed to construct a weir or series of weirs to conduct a cost recovery harvest.

Seines or dip nets may be used to harvest cost recovery fish in the SHA. PWSAC, or its contractor, harvests sockeye salmon during periods established by emergency order (EO). All other species must be allowed free upstream or downstream passage. In order to provide state residents with the opportunity to use excess production from Crosswind Lake, PWSAC, or its contractor, may at their discretion, issue a permit for up to 30 sockeye salmon per household to residents who come to the site and request the fish. Less than 3 household permits per year have been issued and total harvests have been less than 200 fish annually. The average actual sockeye salmon run to Crosswind Lake from 2003 to 2013 is 42,400 fish. The 2013 run to Crosswind Lake was approximately 42,400 fish.

When PWSAC is unable to harvest surplus hatchery sockeye in the SHA, they will, under authority of ADF&G, destroy all sockeye salmon in excess of escapement needs. Destruction of these fish is undesirable; however, allowing them to escape into Crosswind Lake is also of concern to local landowners. At a public meeting conducted by PWSAC during the winter of 1995/96, Crosswind Lake area landowners indicated that the increased escapement into the lake in recent years was unacceptable and that it would create a public nuisance if large numbers of fish continued to be allowed into the lake.

The intent for developing the SHA was to limit the run of surplus enhanced sockeye salmon into Crosswind Lake, provide local economic opportunity and provide state residents with a source of salmon. There is negligible spawning habitat at Crosswind Lake and no natural production escapement goal has been established. This SHA prevents most of the returning sockeye salmon from migrating into the system while providing benefits to both PWSAC and state residents.

ADF&G and PWSAC created a *Basic Management Plan* (BMP) for Gulkana Hatchery that reduced historic release numbers and revised release strategies so that the size of the hatchery's adult returns will be within the ability of ADF&G to manage the mixed stock fishery for sustained yield of wild stocks. The production goal outlined in the BMP is for an annual average run of 300,000 adult sockeye salmon. Determining run strength and correctly managing for the escapements of both CRD and upriver wild sockeye salmon stocks is an ongoing challenge. Recent large hatchery surpluses are the combined result of high survival rates and conservative management to protect Chinook salmon in the commercial fishery. Annual runs over the previous 10 years have averaged 284,000 sockeye salmon and every run since 2010 has exceeded the 300,000 fish goal.

Mass marking of enhanced stocks using strontium chloride began in the spring of 2000 as part of a cooperative effort between ADF&G and PWSAC. The ability to more accurately estimate the enhanced sockeye salmon contributions to the various fisheries in the Copper River will further support ADF&G's efforts to manage for the wild stock priority while efficiently utilizing the enhanced sockeye salmon component of the run. A near-term reduction in Gulkana Hatchery production is considered by ADF&G to be an important step towards addressing the mixed stock management difficulties created by the success of the enhancement program.

PERSONAL USE FISHERY

There is a single personal use salmon fishery in the Upper Copper River that occurs in the Chitina Subdistrict of the Upper Copper River District. There are 9 proposals addressing this personal use fishery before the BOF this cycle:

- Proposal 35–Prohibit the use of monofilament mesh in dip net bag webbing in subsistence and personal use fisheries;
- Proposal 36–In subsistence and personal use fisheries, prohibit removing a Chinook salmon from the water if it is to be released;
- Proposal 37–Require ADF&G to operate a check station to monitor subsistence and personal use harvest and permit compliance in the Chitina and Glennallen subdistricts;
- Proposal 38–Change the opening date for the Chitina Subdistrict personal use salmon fishery to open as early as June 1, but not later than June 11;
- Proposal 39–Change the Chitina Subdistrict personal use annual limit to be based on household size;
- Proposal 40–Require charter operators that transport personal use fishermen to keep a daily logbook;
- Proposal 41–Repeal the portion of the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* that reduces the Chitina Subdistrict personal use allocation if the commercial salmon fishery is closed for 13 or more consecutive days;
- Proposal 42–Reduce the maximum harvest level for the Chitina Subdistrict personal use dip net salmon fishery to 100,000 salmon; and
- Proposal 43–Establish an allocation of 3,000 Chinook salmon to the Chitina Subdistrict personal use dip net fishery.

Only Alaska residents are allowed to participate in personal use salmon fisheries. The mainstem Copper River between the downstream edge of the Chitina-McCarthy bridge and a department marker located about 200 yards upstream of Haley Creek (in Wood Canyon) is open to personal use fishing (Figure 7). Only dip nets may be used to harvest salmon. This fishery is opened by EO. Both a valid Alaska sport fishing license and a permit are required to participate in the personal use fishery. Participants must record their harvest on their permit before leaving the fishing site and return the permit upon completion of fishing for the season. Limits are 15 salmon for a single person and 30 salmon for a household of 2 or more, only 1 of which may be a Chinook salmon. The BOF has mandated that Alaskans may participate in either the state subsistence or the state personal use fishery in the Upper Copper River drainage, but not both.

The BOF has directed ADF&G to manage the commercial salmon fishery to achieve an inriver salmon goal based on availability of salmon inriver (5 AAC 24.360; Table 1), as follows:

Spawning escapement (sockeye salmon)	360,000
Spawning escapement (other salmon)	17,500
Subsistence harvest (salmon)	61,000–82,500
Personal use harvest (salmon)	100,000–150,000
Sport fishery harvest (salmon)	15,000
Hatchery brood stock (sockeye salmon)	Estimated annually
Hatchery surplus (sockeye salmon)	Estimated annually
Total	Announced annually

Hatchery broodstock and hatchery surplus are adjusted annually based on the anticipated run size of wild and hatchery stocks. From 1997 to 1999, maximum harvest level for the personal use

fishery was 100,000 salmon, excluding fish provided in excess of the inriver goal and not including any salmon harvested after August 31. Prior to 1997, the maximum harvest level was 60,000 salmon. In 1998, the BOF adopted a proposal that allows permit holders who have filled their original limit to take 10 additional sockeye salmon during a week when a harvestable surplus of 50,000 salmon or greater is available in the Chitina Subdistrict. This supplemental harvest is exclusive of the maximum harvest level. From 2000 to 2002, as a subsistence fishery, the Chitina Subdistrict had a maximum harvest level of 100,000–150,000 salmon, not including any salmon in excess of the inriver goal or salmon taken after August 31, of which 85,000–130,000 were wild salmon, based upon coded wire tag recoveries from the commercial fishery. This harvest range has remained in place, following the change of the Chitina Subdistrict back to a personal use fishery in 2003.

The personal use dip net fishery is managed under the *Copper River Personal Use Salmon Fishery Management Plan* (5 AAC 77.591). In the Chitina Subdistrict, weekly fishing periods and limits are established by EO and are based on the projected inriver run size. The first opening will occur no sooner than June 7 and on or before June 15, as mandated by the plan. Inriver run strength is estimated by the sonar unit located at Miles Lake. Based upon previous migration studies, a 2-week travel period from the Miles Lake sonar to Wood Canyon is used for management purposes from June through mid-July, and a 3-week travel period for mid-July until the sonar is removed. The management plan requires that harvest be distributed throughout the season, based upon projected sonar counts. The daily breakdown of salmon for the Chitina Subdistrict is determined preseason based upon the projected daily sonar counts. Weekly fishing periods are established from the recent 5 year average catch per hour applied to the weekly harvest allocation. Fishing period adjustments inseason are based upon actual sonar counts, and any salmon above the projected weekly salmon escapement are considered surplus. When an escapement of more or less than the inriver goal of salmon actually pass the sonar counter, the BOF has mandated that ADF&G decrease or increase the fishing time by the corresponding percentage. The preseason and actual fishing schedules for 2012–2014 are shown in Tables 7, 8, 9.

Harvests in the Chitina Subdistrict personal use fishery prior to 2000 were determined weekly from permits, which were to be returned after each fishing trip. Permits were only issued from the ADF&G office in Chitina. Beginning in 2000, Chitina Subdistrict permits were available from department offices in Anchorage, Fairbanks, Glennallen, and Palmer to provide additional service to dipnetters, reduce fishery operating costs, and prevent excessive delays (up to 3 hours) at the Chitina department office for participants to receive permits. This was expanded in 2001 to include over 40 license vendors that issued permits throughout the Southcentral and Interior regions. Expanding the availability of permits has prevented the inseason estimation of weekly harvest and participation since 2000, but this information is not needed for management decisions.

Harvest data have been collected since the fishery was established in 1984. Through 1988, harvests remained relatively stable. From 1988 to 1996 harvests increased and peaked at 154,349 fish in 1997 (Figure 8). From 1998 to 2012 the annual harvest ranged from 86,301 to 146,075 fish. In 2013 the harvest exceeded all previous years, reaching 185,194 fish, which corresponds to the number of salmon passing the Mile Lake sonar that year, the second highest ever estimated. Personal use permits with completed harvest information are required to be

returned to ADF&G by October 15 of each year. As a result, this report contains no Chitina personal use fishery harvest data for 2014.

Sockeye salmon dominate the harvest until the second week in September, when coho salmon become the prominent salmon species harvested. Sockeye salmon harvests typically peak in the second and third week of June with a smaller peak in the second to third week of July. Sockeye salmon comprise 96% of the Chitina Subdistrict harvest on average and have ranged from 30,885 in 1985 to 182,915 in 2013. Fluctuations in annual sockeye salmon harvests reflect changes in run strength and participation in the fishery.

Chinook salmon harvests peak the second week of June and continue in small numbers through August. Chinook salmon comprise about 1.5% of the Chitina Subdistrict harvest. Annual harvests generally increased through 1999 with the largest harvest of 6,723 Chinook salmon occurring in 1998. Chinook salmon annual harvests then declined to approximately 3,000 by 2001, due to the harvest limit reduction to 1 Chinook salmon in 2000. Chinook salmon runs have been below average and the retention of Chinook salmon in the Chitina Subdistrict has been prohibited after 1 to 3 weeks each year since 2009. Coho salmon appear in harvests in late August and dominate the catch by the second week of September. Coho salmon comprise less than 2% of the harvest. Annual coho salmon harvests have fluctuated from a low of 160 in 1997 to a high of 4,870 in 1995. The large harvest in 1995 occurred because the closure of the personal use fishery in August shifted pressure into September when coho salmon are more prevalent. The low coho salmon harvest in 1997 was a result of an EO prohibiting retention of coho salmon due to poor run strength.

From 1984 through 2000, Chitina Subdistrict permits were issued at ADF&G office located in Chitina. During these years over 90% of issued permits were actually fished. Since 2002 an average 62% of issued permits are actually fished. The number of participants in the Chitina Subdistrict personal use fishery increased substantially in 1997 when 9,086 permits were issued. Participation peaked in 1998, with 10,006 permits issued and remained high in 1999 with 9,943 permits issued. Participation declined after 1999 with 6,441–9,970 permits issued annually from 2000 to 2011.

Increased participation appears to coincide with a strong sockeye salmon run and media coverage of the fishery. Dipnetters have learned to watch the Miles Lake sonar counts and effort increases in the fishery when large numbers of salmon are counted past the sonar. Record inriver runs of over 1.2 million salmon in 2012 and 2013 coincided with increased numbers of permits issued (10,108 in 2012 and 10,691 in 2013) in those years. Participation is also influenced by changes in access to the fishery either due to river level fluctuations, landslides affecting access along the Copper River railroad right of way, cooperation of private property owners, and changes in fees associated with the fishery. As an example, there was a sharp increase in the number of permits issued for the Chitina Subdistrict personal use fishery in 2004 (6,560 in 2003 to 8,495 in 2004) (Figure 8). This increased participation coincided with removal of the $25 fee associated with the permit prior to the 2004 season. Recent record runs of sockeye salmon to the Copper River have likely caused increasing interest in the fishery and the increase in the number of permits issued.

The 2012 Chitina Subdistrict personal use fishery opened on June 7 as scheduled (Table 7). Salmon passage by the Miles Lake sonar was 55,199 salmon above the projected level of passage. Due to a surplus greater than 50,000 salmon above the weekly salmon escapement

objective, the first period was also a supplemental period. The fishery opened for the second period by EO for a 168 hour opening on June 11 as scheduled. The second period was also a supplemental period. As of June 7 a total of 9,363 Chinook salmon were harvested in the CRD commercial drift gillnet fishery which was less than half the recent 10-year average of 21,081 Chinook salmon. Copper River Chinook salmon migratory timing and 5-year average harvest rates indicated insufficient numbers of Chinook salmon to sustain a Chinook salmon fishery and still attain a spawning escapement of 24,000 or more Chinook salmon to the Copper River. Beginning with the third period, on June 18, the Chitina Subdistrict was closed to the retention of Chinook salmon for the remainder of the 2012 season. The fishery opened for the third period for sockeye salmon by EO for a 168 hour opening as scheduled and remained open as scheduled in periods 4–6. Salmon numbers past the Miles Lake sonar from June 18 to July 1 were above the projected salmon counts for this period by 77,704 fish allowing a supplemental period during the sixth period. Salmon numbers past the sonar continued to exceed the projected counts by more than 50,000 fish each week for periods 7–10 allowing the fishery to remain open each of these weeks and allow supplemental periods through August 12. The fishery remained open by EO from August 13 to 31 and then was open by regulation through September 30.

The 2013 Chitina Subdistrict personal use fishery opened on June 10, 3 days later than scheduled (Table 8). Salmon passage by the Miles Lake sonar was 53,761 salmon below projected, but was still sufficient enough to allow a full 7 days (168 hours) of fishing time. The fishery opened for the second and third period by EO for 168 hour openings on June 17 and June 24 as scheduled. Due to a surplus greater than 50,000 salmon above the weekly salmon escapement objective, the second and third periods were supplemental periods. As of June 18, low harvest rates in the CRD commercial drift gillnet fishery and low capture rates in the NVE research fish wheels appeared consistent with the low preseason forecast for Copper River Chinook salmon. The preseason forecast, inseason run strength indicators, and generally poor stock performance trend over the previous 4 years indicated a need for precautionary action in the personal use dip net fishery to attain a spawning escapement of 24,000 or more Chinook salmon to the Copper River. Beginning with the third period, on June 24, the Chitina Subdistrict was closed to the retention of Chinook salmon. The fishery opened for the fourth period by EO for 168 hours on July 1 as scheduled. The fishery remained open through periods 5–7 which were all supplemental periods. The fishery was opened to continuous fishing from July 29 to August 31 with the period from July 29 through August 4 also a supplemental period. The fishery remained open by regulation through September 30.

In 2014, the Chitina Subdistrict personal use fishery season was opened by EO on June 7 for a 48 hour fishing period (Table 9). Actual salmon numbers past the Miles Lake sonar during the week of May 19–25 were above projected counts by over 79,000 fish. Due to a surplus greater than 50,000 salmon above the weekly salmon escapement objective, the first period was also a supplemental period. Salmon numbers past the Miles Lake sonar for the weeks of May 26–June 1 and June 2–8 remained above the projected salmon counts by over 50,000 fish, allowing the second (week of June 9) and third (week of June 16) fishing periods to remain at 168 hours and open as supplemental periods. The Chinook salmon run to the Copper River appeared weaker than the preseason forecast of 62,000 Chinook salmon and the run timing earlier than average based on low commercial harvest and catch rates in the research fish wheels. The cumulative commercial harvest, as of June 7, was the fourth lowest cumulative harvest through that date since 1980. Catch rates in the NVE research fish wheels through June 7 were the lowest since 2003. Catch rates of Chinook salmon in the personal use and subsistence fisheries

were below expected levels. A precautionary management approach in the upper Copper River fisheries warranted action in the personal use dip net fishery to attain a spawning escapement of 24,000 or more Chinook salmon to the Copper River. Beginning with the third period, on June 16, the Chitina Subdistrict was closed to the retention of Chinook salmon. The fishery opened for the fourth period by EO for 168 hours on June 23 as scheduled and remained open through the next period. The fishery remained open during the sixth and seventh periods which were both supplemental periods. The fishery was open during the eighth period for 144 hours, an increase of 72 hours over the preseason schedule of 84 hours. Fishing time was increased by 24 hours to a total of 168 hours during the ninth period which, due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, was a supplemental period. The fishery remained open during the tenth period which was also a supplemental period. After the tenth period, the fishery remained open by EO from August 11 to 31 and was then open by regulation through September 30.

SUBSISTENCE SALMON FISHERIES

Subsistence salmon fishing is restricted to 3 areas on the Copper River: 1) the Copper River commercial fishing district; 2) the Upper Copper River District (Glennallen Subdistrict); and, 3) the Batzulnetas area (Figure 9). Of the 3 subsistence areas, the Upper Copper River District has the highest effort and harvest. There are 4 proposals dealing with Upper Copper River District subsistence issues before the BOF this year:

- Proposal 34–Amend the *Copper River Chinook Salmon Management Plan* to provide additional management measures for Chinook salmon in the Glennallen Subdistrict subsistence fishery;
- Proposal 35–Prohibit the use of monofilament mesh in dip net bag webbing in subsistence and personal use fisheries;
- Proposal 36–In subsistence and personal use fisheries, prohibit removing a Chinook salmon from the water if it is to be released; and
- Proposal 37–Require ADF&G to operate a check station to monitor subsistence and personal use harvest and permit compliance in the Chitina and Glennallen subdistricts.

UPPER COPPER RIVER DISTRICT SUBSISTENCE FISHERIES

Under State of Alaska regulations there is a single subsistence salmon fishery in the Upper Copper River District which occurs in the Glennallen Subdistrict. The Glennallen Subdistrict subsistence fishery is managed by ADF&G under the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647). Harvest permits are required for this fishery, which must be returned to ADF&G following the end of the fishing season. Alaskans may participate in either the Glennallen Subdistrict subsistence fishery or the Chitina Subdistrict personal use fishery in the Copper River drainage. The Batzulnetas subsistence salmon fishery occurs upstream of the Upper Copper River District near the traditional Native village site of Batzulnetas at the confluence of Tanada Creek and the Copper River. A household may only receive 1 state Upper Copper River District subsistence salmon fishing permit per year; therefore, a household cannot participate in both the Batzulnetas and Glennallen Subdistrict subsistence fisheries in the same year.

Glennallen Subdistrict Subsistence Fishery

The Glennallen Subdistrict is open June 1 through September 30 for continuous subsistence salmon fishing in all waters of the mainstem Copper River upstream of the Chitina-McCarthy Bridge to the mouth of the Slana River (Figure 9). During the 1996 BOF meeting, the *Copper River District Salmon Fishery Management Plan* was modified and established a harvest range of 60,000–75,000 subsistence salmon to accommodate the variability in harvest levels and allow for increased harvests between board cycles. Prior to 1997, this amount was 35,000 salmon. During the 2005 board meeting, the *Copper River District Salmon Fishery Management Plan* was modified and established a range of 61,000–82,500 subsistence salmon to accommodate the combined ANS in 3 subareas of the Glennallen Subdistrict. An ANS of 25,500–39,000 salmon was set for that portion of the Glennallen Subdistrict from the downstream edge of the Chitina-McCarthy Bridge to the mouth of the Tonsina River; 23,500–31,000 salmon for that portion between the mouth of the Tonsina River to the mouth of the Gakona River; and 12,000–12,500 salmon for that portion upstream of the mouth of the Gakona River to the mouth of the Slana River.

Fish wheels and dip nets are legal gear, only 1 of which may be specified on the permit for the season. Participants are allowed 1 permit per household and the permit identifies the gear type to be used. Permit limits are 30 salmon for a household of 1, 60 salmon for a household of 2, and 10 salmon for each additional person in a household of more than 2 people. Individuals may request additional salmon up to a maximum of 200 salmon and households may request up to 500 salmon. For participants using dip nets, only 5 of the salmon may be Chinook salmon. Upper Copper River District subsistence users must record their harvest and clip both tips of the tail fin from all salmon that are harvested, before leaving the fishing site.

Harvests in the Upper Copper River subsistence fisheries have been estimated since 1965. Prior to 1980 harvest and participation remained relatively stable. The fishery experienced rapid growth from 1980 through 1983, when a peak harvest of about 119,000 salmon were taken (Table 10). Under the subsistence fishery management plan, which established the Chitina Subdistrict personal use fishery, Glennallen Subdistrict harvests decreased substantially in 1984 to about 29,000 salmon. Since 1990, participation in the Glennallen Subdistrict subsistence fishery has gradually increased to 1,936 permits (both state and federal permit numbers are preliminary) issued in 2014 (Table 10). Harvests have also increased since 1990; the 95,810 salmon harvested in 2012 comprised the largest harvest since 1983 (when Chitina and Glennallen Subdistrict harvests were combined;Figure 10). Over 1.2 million salmon have been counted past the Miles Lake sonar annually from 2012 to 2014. A record 1,936 permits were issued for the subsistence fishery in 2014 so harvest in 2014 is expected to be similar to or greater than in 2012 or 2013. State subsistence permits with completed harvest information are required to be returned to ADF&G by October 31 of each year, and require time for processing. As a result, this report contains no harvest data but does contains data related to permits issued in 2014.

Fish wheel permits have traditionally comprised the majority of permits issued for the fishery. However, since 1990, the number of dip net permits has gradually increased (Table 10). The decrease in fish wheel permits in 2002 can be partly attributed to the fact that this was the first year permits were issued by the NPS for the federal subsistence fishery in the Glennallen Subdistrict. The majority of federal permit holders use fish wheels. Since 2002 the number of state fish wheel permits issued ranged between approximately 600 and 700 until 2013 when 531 permits were issued. In 2014 only 503 fish wheel permits were issued. The drop in number of

permits issued for 2013 and 2014 reflects a decrease in the number of fish wheels registered due to significant bank erosion in 2013. In 2014, the Kotsina River shifted its channel, greatly hindering access to one of the primary shorelines used to deploy fish wheels. While the number of fish wheel permits declined, the number of dip net permits issued for the Glennallen Subdistrict steadily increased through 2009 and more rapidly increased from 2009 through 2014 (Table 10). Several factors have driven the increase in subsistence dip net permits, including reduced access in the Chitina Subdistrict due to landslides, larger bag limits especially for Chinook salmon, and decreased access to fish wheels. The vast majority of subsistence dip net permits are fished from boats just above the Chitina-McCarthy Bridge.

In 1999, federal regulations were adopted for Copper River subsistence fishing, but since federal and state regulations were identical, both federal and state subsistence users participated in the fisheries under the state subsistence permit from 1999–2001. In 2001, as a result of Federal Subsistence Board (FSB) actions, federally qualified subsistence users were able to begin fishing on May 15 in the Glennallen Subdistrict, and because federal subsistence limits remained identical to state limits, federal subsistence users still fished under state subsistence permits. In 2002, the FSB established a federal subsistence fishery in the Chitina Subdistrict with a cumulative limit of 200 salmon for a household of 1 and 500 salmon for a household of 2 or more for both the Chitina and Glennallen subdistricts. Federal subsistence users were able to participate in both fisheries, while state subsistence users were required to select either the Chitina Subdistrict or Glennallen Subdistrict in which to participate. The NPS issued separate federal subsistence fishing permits to federal subsistence users beginning in 2002. The number of federal permits issued for the Glennallen Subdistrict increased from 201 (2002) to 262 (2003) and have since stabilized, averaging 271 permits between 2009 and 2013. In 2014, the NPS issued 286 Glennallen Subdistrict subsistence permits.

In 2005, NPS enforced federal regulation 36 CFR 2.3 that allows fishing to be conducted within national park boundaries only with closely attended rod and reel. Part 13 of the regulations allow subsistence uses by rural resident zone community residents within national park boundaries. Enforcement of these regulations prohibited subsistence fishing by non-rural residents in that portion of the Copper River upstream of Indian River (which includes approximately 15 river miles of the Glennallen Subdistrict and the Batzulnetas fishery) and required a federal subsistence fishing permit to use a fish wheel or dip net within the boundaries of Wrangell-St. Elias National Park and Preserve. Only those rural residents that qualified for federal subsistence salmon harvest in the Glennallen Subdistrict were issued permits to fish in this area. As a result, no state subsistence fishing permits have been issued for this portion of the Glennallen Subdistrict since 2004. This action excluded approximately 10 Alaska resident households that were not federally qualified from using fish wheels in this area and required these households to use fish wheels elsewhere in the Glennallen Subdistrict.

Batzulnetas Subsistence Fishery

The Batzulnetas subsistence fishery takes place in a portion of Tanada Creek, with spears and dip nets, and with fish wheels and dip nets one half mile downstream of the mouth of Tanada Creek in the Copper River. The fishery encompasses all waters from the regulatory markers near the mouth of Tanada Creek and approximately one half mile downstream from the mouth and in Tanada Creek between ADF&G regulatory markers identifying the open water of the creek. The fishery may begin after June 1. Fishing periods during the month of June are one 48 hour period

per week. Beginning in July, fishing periods are 84 hours per week until September 1 when the fishery closes.

In 1987, an interim subsistence fishery was provided by emergency regulation at Batzulnetas to settle the United States District Court case of *John vs. Alaska*. The fishery was conducted near the mouth of Tanada Creek. Eight permits were issued in that year to individuals or family groups from Mentasta and Dot Lake, and the fishery was conducted during July and early August. A total harvest of 22 sockeye salmon was reported in 1987.

The BOF reviewed the fishery before the 1988 season and set seasons, eliminated the quota, and provided for additional gear types. Permits were available throughout the season and were to be completed and returned to ADF&G by September 30. No permits were issued for this fishery between 1988 and 1992. However, in 1993 1 permit was issued and 160 sockeye salmon were harvested. In 1994, 5 permits harvested 997 sockeye. In 1995, 4 permits were issued and 16 sockeye were harvested. No permits were issued in 1996. In 1997, 3 permits were issued. One household reported fishing and harvested 176 sockeye salmon. In 1998, 1 permit was issued and a harvest of 386 sockeye salmon was reported. In 1999, 1 permit was issued and a harvest of 55 sockeye salmon was reported. No permit was issued in 2000.

In 1999 and 2000, the United States District Court issued a preliminary injunction against the State of Alaska from enforcing 5 AAC 01.647(i)(5) which established fishing periods through EO authority. The injunction allowed subsistence fishing 7 days per week from June 1 through September 1 or until 1,000 sockeye salmon were taken. No more than 250 sockeye salmon could be taken in any 1 week. Since 2001, permits for this fishery have been issued under the federal subsistence fishery program, and during these years, no state permits have been issued. Action taken by NPS in the spring of 2005 has precluded the issuance of state permits for this fishery since then. Since 2001, 1 federal permit has been issued each year except in 2006, 2007, and 2009 when no permits were issued. From 2010 to 2013, 3 permits were issued each year with 2–3 permits fished. Reported harvests averaged 185 salmon from 2001 to 2004. No sockeye salmon were reported harvested in 2005, 2006, and 2009; 1 sockeye salmon in 2007 and 2008; 106 in 2010; 9 in 2011; 101 in 2012; and 867 in 2013.

COPPER RIVER DISTRICT SUBSISTENCE FISHERIES

Boundary lines for Copper River District subsistence fishing are the same as for the commercial gillnet fishery. Subsistence fishing is allowed from May 15 until September 30. From May 15 until 2 days before the commercial opening of Copper River District, subsistence fishing is allowed 7 days per week. Once the commercial season has commenced, subsistence fishing is allowed only during commercial fishing periods or by EO. Within Copper River District, drift gillnets are the only legal gear and may have a maximum length of 50 fathoms with a maximum mesh size of 6 inches prior to July 15. The BOF has found that, in a year when there is a harvestable surplus that allows for a commercial fishery 3,000–5,000 salmon are reasonably necessary for subsistence. In a year when there is no commercial fishery, the board has found that 19,000–32,000 salmon are reasonably necessary for subsistence (5 AAC 01.616(b)(2)). The legal limit for salmon is 15 for a household of 1, 30 for a household of 2 or more, and 10 salmon for each additional household member; however, the limit for Chinook salmon is no more than 5 per household (5 AAC 01.645(b)). From 2004 to 2013 an average of 233 subsistence permit holders have reported an average harvest of 2 Chinook salmon per year per permit (Table 6).

Currently there are 3 proposals before the BOF that concern subsistence fisheries and home pack of salmon from commercial deliveries in the Copper River District:

- Proposal 1–Establish a weekly 36 hour subsistence fishing period until the 2 days after the closure of the commercial salmon season.
- Proposal 2–Establish subsistence fishing season that opens when commercial fishing opens in May and closes when the commercial fishery closes in September.
- Proposal 3–Establish certain marking requirements for that portion of a commercial drift gillnet that is being used for subsistence fishing.

SPORT FISHERIES

Sport fisheries targeting salmon in the Upper Copper River drainage occur mainly on tributaries of the Copper River (Figure 11). From 2009 to 2013, sport anglers expended an average of 43,606 angler-days in the Upper Copper River drainage. Recreational angler effort was relatively stable until 1991 when it began to increase and peaked in 1995 when 102,951 angler-days were expended. Since 2000, angler effort has declined to levels slightly lower than those observed prior to 1990. The majority of fishing effort is believed to be directed towards salmon in the Gulkana and Klutina rivers.

Sport fisheries for salmon in the Copper River target primarily Chinook and sockeye salmon. The fisheries occur in various tributaries to the Copper River with the largest harvest occurring in the Gulkana and Klutina rivers (Figures 12, 13, 14). The Chinook salmon fishery was traditionally the most important recreational salmon fishery in the Copper River in terms of effort and economic value. However, while Chinook salmon runs have declined and sockeye salmon runs have increased, area sockeye salmon fisheries have gained in economic importance and angling effort, particularly in the Klutina River. Sport harvest and effort has been estimated annually since 1977 by a mail survey. The survey does not separate effort by species, but most effort in the major salmon streams is likely directed at salmon. Sport harvest of Chinook salmon from the Upper Copper River drainage, as reported in the survey, increased through 1996 when the harvest peaked at 9,116 Chinook salmon (Figure 12). Since 1996, sport harvest of Chinook salmon from the Upper Copper River drainage has declined to a low of 289 fish in 2013. Approximately 95% of the estimated sport harvest of Chinook salmon taken from the Upper Copper River drainage comes from the Gulkana and Klutina river drainages.

Since 1970, sport harvest of Chinook salmon over 20 inches in length in upper Copper River drainage sport fisheries has been limited by a bag limit of 1 per day. Beginning in 1989, any Chinook salmon removed from Upper Copper-Upper Susitna Management Area (UCUSMA) waters becomes part of the daily bag limit of the person who hooked the fish. During 1991, sport fishing for Chinook salmon was closed in Fish, Indian, Bernard, Ahtell and Natat creeks, and the Little Tonsina River. This action was taken in an effort to bolster escapements to these small clearwater tributaries, which had shown a decline in Chinook salmon runs. In 1994, an annual bag limit of 5 Chinook salmon was authorized for the Copper River drainage. In 1997, following the 1996 BOF meeting, sport fishing for Chinook salmon was closed in Manker Creek, Klutina Lake and all flowing waters entering Klutina Lake, all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering Tonsina Lake, the Chokosna and Gilahina rivers and all clearwater tributaries of the Gakona River, Tazlina Lake and all flowing waters entering Tazlina Lake except a quarter mile radius around the mouth of Kaina Creek. In addition, the season closure date in the Klutina River, for Chinook salmon, was moved from August 10 to August 1

for the flowing waters downstream of ADF&G markers located at mile 19.2 on the Klutina Lake Road. These measures were taken to protect spawning Chinook salmon. Due to increasing harvests in the 1990s and limited escapement data on Chinook salmon runs, the use of bait was restricted and only unbaited, single hook, artificial lures were permitted on the Tonsina River. With the exception of the Klutina River, the sport Chinook salmon fisheries throughout the Copper River drainage closed to fishing after July 19 to protect spawning Chinook salmon.

During the 1996 BOF meeting 5 AAC 24.361 was adopted. The purpose of this plan was to ensure that escapement of Chinook salmon into the Copper River drainage was provided for at or above historic levels by reducing the harvest potential of the commercial, sport, and personal use fisheries by 5%. This was done through inside statistical area closures in the commercial fishery during statistical weeks 20 and 21, in the personal use fishery through an annual bag limit reduction of Chinook salmon from 5 to 4, and in the sport fishery through a sport fish guiding closure on Tuesdays. In 1999 the BOF amended the plan to direct ADF&G to manage the commercial, personal use, and sport fisheries to achieve a spawning escapement range of 28,000–55,000 Chinook salmon. Additional means were provided for ADF&G to manage these fisheries to achieve this spawning escapement range. The sport fish guiding restriction was replaced with a sport fish annual limit reduction from 5 to 4 Chinook salmon. The portion of the plan directed at the personal use fishery was also removed, following the reclassification of the Chitina Subdistrict personal use fishery to a subsistence fishery. In 2003 the management plan was revised and ADF&G was directed to manage the commercial and sport fisheries to achieve an escapement of 24,000 Chinook salmon or more and the Tonsina River bait restriction was lifted, after ADF&G's radiotelemetry study indicated that the Chinook salmon run was larger than originally believed.

In a 2008 meeting, the BOF adopted proposals to close the Slana River drainage to sport fishing for Chinook salmon and also included Sinona Creek, the Chokosna and Gilahina Rivers, and clear water tributaries of the Gakona River to protect these small discreet stocks from exploitation. Also in 2008, the board altered the Chinook salmon season in the Klutina, Tonsina, and Copper River drainage below the Klutina River to July 1–August 10 with specific earlier closures in the Klutina River above mile 19.2 of the Klutina Lake Road (July 19), and above mile 13 (July 31) and in the Tonsina River above the Alyeska pipeline bridge (July 19) to protect spawning Chinook salmon.

There are 4 proposals addressing the Upper Copper River salmon sport fisheries:

- Proposal 49–Change the sport fish season opening date for Chinook salmon on the Klutina River from July 1 to June 1;
- Proposal 50–Prohibit use of barbed hooks, multiple hooks, and bait when fishing for Chinook salmon in the Upper Copper/Upper Susitna Area;
- Proposal 51–Prohibit use of barbed and multiple hooks for Chinook salmon once an angler has taken a bag limit or annual limit of Chinook salmon;
- Proposal 52–Amend the management plan to prohibit use of barbed and multiple hooks with or without bait if the sport fishery is restricted to catch and release.

GULKANA RIVER CHINOOK SALMON FISHERY

The Gulkana River drainage has historically supported the largest sport fishery for Chinook salmon in the Copper River drainage. Chinook salmon begin entering the Gulkana River in early

June. The sport fishery typically peaks during late June through early July, but limited fishing for Chinook salmon continues until the season closes on July 20. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork, primarily in the reach between the confluence of the West and Middle forks, but also in the Middle Fork and a few tributaries of the West Fork.

The Gulkana River is open to sport fishing for Chinook salmon from January 1 through July 19. The closure is intended to offer protection to spawning fish. The Gulkana River downstream from the Richardson Highway Bridge to the confluence of the Copper River is designated as single-hook, artificial flies only from June 1 to July 31. In all waters upstream of a marker 7.5 miles upstream from the West Fork confluence only unbaited, artificial lures may be used. This regulation is intended to protect rainbow trout stocks.

Sport harvest of Chinook salmon in the Gulkana River peaked in 1993 and has declined since. Sport harvest of Chinook salmon in the Gulkana River averaged 2,010 fish annually from 2003 to 2007, and 1,010 fish annually from 2008 to 2012 (Figure 12). The 1993 harvest of 5,892 Chinook salmon was the largest on record and accounted for 72% of the sport harvest of Chinook salmon in the Copper River drainage. Due to low Chinook salmon run numbers the fishery was restricted to catch and release for the majority of the 2013 season and no Chinook salmon were harvested. Sport fishing effort has declined on the Gulkana River averaging 20,803 angler-days annually from 2003 to 2007, and 14,396 angler-days from 2008 to 2012. The last 3 years have seen the lowest angler effort estimated for the Gulkana River (8,541 angler-days in 2011, 8,117 in 2012, and 6,221 in 2013).

Based on low tower counts and anecdotal reports of poor Chinook salmon harvests in the sport, subsistence, personal use, and commercial fisheries, and poor capture rates in NVE sampling wheels, annual limit reduction, no retention, or closure of the Chinook salmon sport fishery was implemented on the Gulkana River in 2005, 2009, 2010, 2011, 2012, and 2013. These restrictions were implemented to provide additional Chinook salmon for the Gulkana River drainage spawning escapement.

KLUTINA RIVER CHINOOK SALMON FISHERY

The Klutina River supports the second largest sport fishery for Chinook salmon in the UCUSMA. The river has considerable stretches of whitewater and is considered to be very challenging to jet riverboat operators. The fast water of the Klutina River limits the number of resting pools for Chinook salmon; therefore there are less than 2 dozen good fishing sites in the lower portion of the river accessible to most anglers.

Chinook salmon typically begin entering the Klutina River in late June, with the run continuing well into August. The sport fishery typically peaks during the third week of July; however, fishing for Chinook salmon continues until the season closes on August 11. Peak spawning occurs from late July through August. The Chinook salmon season runs from July 1 to July 19 upstream of Mile 19.2 of the Klutina River Road, from July 1 to 31 upstream of Mile 13 of the Klutina Lake Road, and July 1 to August 10 downstream from this point. The upper reaches have shorter seasons to protect spawning fish.

The Klutina River sport fishery for Chinook salmon rapidly increased in popularity during the 1990s. Sport harvest of Chinook salmon from the Klutina River drainage has been estimated using the mail survey since 1983. Based on this survey, harvests remained relatively stable from

1983 to 1990. Despite a 10 day reduction of the Chinook salmon sport fishery season in 1997, Chinook salmon harvest more than doubled from 1990 through 1999 when harvest peaked at 3,489 fish. Harvest greatly decreased in 2000, coincident with a reduction in the annual Chinook salmon bag limit from 5 Chinook salmon to 4 and has remained comparatively low since. Sport harvest of Chinook salmon from the Klutina River drainage averaged 1,461 fish annually from 2003 to 2007, and 823 fish annually from 2008 to 2012 (Figure 12). Due to poor overall Chinook salmon runs to the Copper River drainage, the Klutina River Chinook salmon fishery has opened with a 1 fish annual bag limit in 2009, 2010, 2012, 2013, and 2014. In 2011 the fishery opened with a 2 Chinook salmon annual limit and in 2009 the fishery was further restricted to catch and release from July 21 to August 10. The 2013 sport harvest of Chinook salmon from the Klutina River was 223 fish.

Sport fishing effort on the Klutina River has been increasing over the last several years averaging 11,736 angler-days annually from 2003 to 2007, and 14,564 angler-days from 2008 to 2012. Angler effort for the Klutina River in 2013 was 16,099 angler-days, the second highest ever recorded for this river. Due to the nature of the mail survey, we do not know how much of this effort was directed towards Chinook salmon versus other species. Sport fishery observations, however, suggest that a majority of the effort was directed towards Chinook salmon prior to 2006, after which a substantial amount of effort appeared directed at the large runs of sockeye salmon.

OTHER COPPER RIVER CHINOOK SALMON FISHERIES

Less than 10% of the harvest of Chinook salmon in the UCUSMA occurs in systems other than the Gulkana and Klutina rivers (Figure 12). The majority of this harvest occurs in the Tonsina River. Chinook salmon run timing to the Tonsina River drainage is in late June through August, similar to that of the Klutina River.

Tonsina River Chinook salmon sport fishery harvest increased annually from 1988 to 1995, peaking at 539 in 1995. Following the elimination of bait in 1997, Chinook salmon sport harvests dropped off significantly. With the use of bait allowed in 2003, Chinook salmon harvests gradually increased through 2006 to about 100 Chinook salmon annually. Since 2007, no Chinook salmon have been reported harvested except for 58 fish in 2009.

Regulations allow sport fishing for Chinook salmon in the Tonsina River from July 1 to 19 upstream of the Alyeska pipeline bridge and from July 1 through August 10 downstream of this point. The July 20 closure date allows Chinook salmon to spawn undisturbed. The Little Tonsina River, Bernard Creek, and all flowing waters within a quarter mile radius of their confluence with the Tonsina River are closed to Chinook salmon fishing to protect spawning fish. The daily bag limit for Chinook salmon over 20 inches in this drainage is 1, and is included in the annual limit of 4 for the Copper River drainage.

A limited fishery for Chinook salmon also occurs on Kaina Creek in the Tazlina River drainage. Harvests in this fishery have averaged 35 fish from 1990 to 1998, the peak harvest of 63 Chinook salmon occurred in 1998. No harvests have been reported since 1998. Fishing is only permitted within a quarter mile radius around the mouth of Kaina Creek.

COPPER RIVER SOCKEYE AND COHO SALMON FISHERIES

Sockeye salmon sport harvests in the Copper River have generally increased since 1977. A significant increase in sport harvests occurred from 1996 to 2000 when harvests averaged over 11,000 sockeye salmon, the majority from the Gulkana River (Figure 13). From 2001 to 2005, sockeye salmon harvests declined and averaged about 7,500 sockeye salmon. Copper River sockeye salmon sport harvests substantially increased in 2006. Annual sockeye salmon harvest in the Upper Copper River drainage averaged 14,144 fish from 2008 to 2012 with 87% coming from the Klutina River. In 2013 a total of 26,611 sockeye salmon were harvested with 23,721 of those coming from the Klutina River. This is the largest sport harvest of sockeye salmon since initiation of the Statewide Harvest Survey in 1977 for the Klutina River and Upper Copper River drainage as a whole.

The sport fisheries for coho salmon in the upper Copper River are comparatively very small. Average annual coho harvest from 2008 to 2012 was 41 fish (Figure 14). The estimated harvest in 2013 was zero. The majority of the coho salmon harvest occurs in the Tonsina River drainage.

Bag limits for sockeye and coho salmon are 3 salmon for all drainages in the upper Copper River drainage. The only exception to this is in the West Fork of the Gulkana River upstream of a department marker where the bag limit increases to 6 sockeye salmon from August 1 to December 31. This higher bag limit for sockeye salmon in the West Fork allows for a higher exploitation of Gulkana Hatchery-produced fish.

In 2013 and 2014, passage of salmon at the Miles Lake sonar indicated, inseason, that the upper bound of the Copper River sockeye salmon SEG would be exceeded. In response, the bag and possession limit for sockeye salmon in the Copper River was increased from 3 to 6 per day by EO in late June or early July.

UPPER COPPER RIVER ESCAPEMENT AND RESEARCH

NVE CHINOOK SALMON ESCAPEMENT MONITORING

NVE has conducted a Chinook salmon escapement monitoring study on the Copper River since 2003. The objectives of the study are to estimate the annual, systemwide escapement of Chinook salmon in the Copper River, and to further develop an ongoing, long-term monitoring program to ensure continued involvement of NVE in the active management of Copper River fisheries. The estimates are germane to the number of Chinook salmon passing Baird Canyon (just upriver from Miles Lake and before any inriver fisheries) and were generated using 2 event mark–recapture techniques such that the estimates were within 25% of the actual inriver abundance, 95% of the time.

NVE has successfully overcome many challenges associated with this study, which has proved to be a success. The study has generated unbiased and reasonably precise inriver abundance estimates for 2003–2013 (Table 11), and it is expected that the 2014 results will also satisfy the established objective criteria.

Total Escapement Estimates

Estimates of total Chinook salmon escapement were determined by subtracting the subsistence, personal use, and sport harvests from the inriver abundance estimates. The resulting escapement

estimates were 27,993 in 2011, 27,911 in 2012, and 29,012 in 2013 (Table 4). Total run size was the inriver abundance plus the harvest from the commercial and commercial home pack fisheries, and estimates were 53,889 in 2011, 44,312 in 2012, and 42,880 in 2013. Total exploitation rates for 2011, 2012, and 2013 were 48%, 37%, and 32%, respectively.

GULKANA RIVER CHINOOK SALMON COUNTING TOWER

Since 2002, ADF&G and the Bureau of Land Management have jointly operated a counting tower on the Gulkana River above the West Fork to estimate the escapement of Chinook salmon. Counts at this location do not provide an enumeration of total inriver escapement, but do provide a reliable estimate of escapement to the area upstream of the counting tower. Counts are conducted from late May to mid-August. Personnel conduct counts for 10 minutes of each hour every day. The 10 minute counts are expanded to provide an estimate of passage for each hour.

Annual estimates of Chinook salmon escapement upstream of the counting tower have generally declined from 2002 (6,355 fish) through 2014 (3,490) (Figure 15). The lowest estimate occurred in 2012 (1,730 Chinook salmon). From 2002 to 2013, the average estimate was 3,844 Chinook salmon. This average includes years (2005, 2009–2013) in which management actions were taken to restrict the Gulkana River Chinook salmon fishery. The annual limit for Chinook salmon greater than 20 inches in length was reduced from 4 fish to 1 by EO in the Gulkana River on July 2, 2005, June 15, 2009, and June 21, 2010, June 14, 2014. On June 29, 2009, the Chinook salmon fishery was closed on the Gulkana River. Despite these management actions, escapement these years fell below the overall average tower estimates (Figure 15). The Gulkana River Chinook salmon fishery was restricted to catch and release on June 25, 2011, June 30, 2012, and June 15, 2013. Tower estimates of Chinook salmon in 2011 (3,840) and in 2013 (3,936) were close to or above the long-term average but the 2012 (1,730) estimate was the lowest for the project.

Gulkana River Chinook Salmon Travel Time and Distribution

A 3-year radiotelemetry study on Gulkana River Chinook salmon was initiated in 2013. The objective of the study is to identify travel time and spawning locations of Chinook salmon in the Gulkana River. Results will be used to verify the proportion (70%) of Chinook salmon that spawn upriver of the counting tower, estimated from the drainagewide radiotelemetry study conducted in the early 2000s.

SOCKEYE SALMON RESEARCH

In 2005–2009, a radiotelemetry study was conducted by the NVE to determine spawning distribution, and define migratory timing patterns of sockeye salmon in the Copper River. Spawning distribution of sockeye in the major drainages was highest in the Klutina River in all 5 years and averaged 40.2% of the overall proportion of radiotagged sockeye salmon (Figure 16).

Stock-specific run timing varied among stocks in each of the years 2005–2009, but showed a consistent pattern of upriver stocks, such as the Upper Copper River drainage and Gulkana River stocks, entering first and lower river stocks, such as the Klutina and Tonsina River stocks, entering last (Table 12).

NVE Sockeye Salmon Inriver Abundance Estimate

From 2007 to 2009, NVE conducted a mark–recapture study to estimate abundance of sockeye salmon that passed the Mile Lake sonar and compare that estimate to the sonar count for those

years. The overall objective of the study was to provide an independent confirmation of the sonar counter used to manage the Copper River fisheries. This consisted of marking sockeye salmon collected at the Baird Canyon fish wheel site. Sockeye salmon were marked with yellow spaghetti tags embedded with a PIT tag. The tags were inserted in the fish and scanned at the marking site prior to the fish being released. The recapture site was located below Wood Canyon where sockeye salmon were captured via fish wheels. All captured sockeye were recorded, marked fish had their tags rescanned and the proportion of marked fish was compared to the unmarked portion to estimate the total number of sockeye salmon above Miles Lake.

NVE's mark–recapture inriver abundance estimate of sockeye salmon in the Upper Copper River was 1,259,000 (CV=7.2%) in 2007; 739,883 (S.E. = 32,962) in 2008; and 751,133 (S.E. = 36,623) in 2009. This compares to final sonar counts of 919,600 salmon in 2007; 718,344 salmon in 2008; and 709,749 salmon in 2009 (Table 11).

Gulkana Hatchery Contribution Monitoring

ADF&G and PWSAC continue to monitor the contribution of sockeye salmon produced at the Gulkana River Hatchery to the upper Copper River fisheries. This project has been ongoing in the Chitina Subdistrict personal use dip net fishery since 1984 and was expanded in 2013 to include the Glennallen Subdistrict subsistence fishery. The project began by sampling the fishery for sockeye salmon tagged with coded wire tags and now samples a specific number of sockeye salmon per week from each fishery, removing the otoliths and examining the otoliths for a strontium mark applied by the hatchery prior to out stocking the fry. Hatchery contribution to the personal use fishery averaged 20% over the last 5 years (2008–2012) and 16.4% over the past 10 years (2003–2012).

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TABLES AND FIGURES

Table 1.–Apportionment of the inriver sockeye salmon escapement goal for the Copper River, 2004–2014.

Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sockeye spawning escapement	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	360,000	360,000	360,000
Other salmon spawning escapement	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500
Glennallen subsistence harvest	68,000	68,500	68,500	70,000	75,710	70,365	70,747	72,407	71,000	82,500	82,500
Chitina personal use harvest	120,000	110,000	82,500	82,500	122,825	110,948	108,295	112,950	120,000	133,000	132,500
Sport harvest	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Hatchery brood stock	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Hatchery surplus	11,169	47,859	107,718	44,096	63,570	58,238	136,036	84,524	80,500	100,300	120,400
Minimum inriver goal	431,669	468,859	611,218	549,096	614,605	592,000	668,000	622,000	684,000	728,000	748,000

Table 2.–Average harvest by species and fishery in 5 year increments in the Copper River, 1971–2013.

		Fishery			
Year	Species	Commercial	Chitina Subdistrict	Glennallen Subdistrict	UCUSMA Sport
	Chinook	19,475	ND	1,517	ND
1971–1975	Sockeye	523,982	ND	25,567	ND
	Coho	108,966	ND	165	ND
	Chinook	21,679	ND	2,136	1,556
1976–1980	Sockeye	363,448	ND	24,946	2,244
	Coho	176,756	ND	491	243
	Chinook	40,242	ND	2,391	2,165
1981–1985	Sockeye	821,925	ND	64,458	3,101
	Coho	393,961	ND	279	278
	Chinook	32,995	2,504	635	2,437
1986–1990	Sockeye	881,848	47,182	24,586	4,026
	Coho	232,880	767	197	168
	Chinook	43,412	3,503	1,470	6,131
1991–1995	Sockeye	1,200,005	82,064	49,457	5,592
	Coho	435,695	2,628	320	160
	Chinook	53,868	4,967	2,762	7,596
1996–2000	Sockeye	1,843,276	126,082	67,238	11,758
	Coho	155,587	2,294	586	185
	Chinook	39,759	2,337	3,492	4,649
2001–2005[a]	Sockeye	1,227,960	106,231	72,513	7,527
	Coho	370,102	2,401	689	191
	Chinook	19,899	1,673	3,169	3,185
2006–2010[a]	Sockeye	1,049,198	113,002	72,480	15,379
	Coho	211,257	2,219	379	41
	Chinook	18,407	805	2,698	859
2011–2013[b]	Sockeye	2,023,746	146,986	86,318	19,513
	Coho	120,123	1,303	422	7

Note: ND=No data.

[a] Expanded state harvest data plus federal subsistence reported harvest from 2002 to 2004 and federal subsistence expanded harvest after 2004.

[b] 3-year average.

Table 3.–Total disposition of sockeye salmon runs to the Copper River, 2004–2013.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-year Average
Commercial harvest[a]	1,048,078	1,331,747	1,496,868	1,901,773	320,915	896,668	636,214	2,052,432	1,866,541	1,608,117	1,273,887
Commercial, home pack[a]	525	1,785	1,598	2,023	2,172	6,528	2,023	9,070	7,985	9,448	4,277
Educational [b]	0	42	16	62	29	8	62	23	200	152	44
Subsistence (Cordova, drift gillnet)[b]	1,822	728	4,355	6,148	3,969	1,764	6,148	1,783	4,270	5,639	2,853
Federal subsistence (PWS/Copper River)	0	109	150	36	32	46	36	35	64	102	51
Subsistence (Batzulnetas)[c]	182	0	0	1	1	0	106	9	101	862	56
Subsistence (Glennallen Subdistrict)[d]	55,510	64,213	57,710	65,714	43,157	46,849	70,719	59,622	76,305	73,728	58,681
Federal subsistence (Glennallen Subdistrict)[c]	17,704	21,927	18,346	17,624	14,475	13,668	14,137	15,753	16,487	17,060	16,053
Personal use (Chitina Subdistrict)[d]	107,312	120,013	123,261	125,126	81,359	90,035	138,487	128,052	127,143	180,663	112,158
Federal subsistence (Chitina Subdistrict)[c]	1,215	2,450	1,549	1,028	959	882	2,324	1,933	915	2,252	1,262
Upriver sport harvest	6,464	8,135	14,297	23,009	11,431	13,415	14,743	7,727	23,404	27,407	12,973
Delta sport harvest	952	656	113	1,704	1,225	1,014	1,314	838	764	1,026	918
Upriver spawning escapement[e]	448,639	518,181	580,202	613,130	477,953	469,123	491,300	621,545	970,611	889,143	581,964
Delta spawning escapement[f]	69,385	58,406	98,896	88,285	67,950	68,622	83,285	153,014	133,700	151,410	150,525
Hatchery brood stock/excess[g]	6,618	92,455	97,192	28,648	44,865	43,409	176,123	59,589	65,348	72,369	64,113
Total estimated sockeye salmon run size	1,764,406	2,220,847	2,492,648	2,874,330	1,070,492	1,652,031	1,637,021	3,111,425	3,293,838	3,039,378	2,279,877

[a] Numbers are from fish ticket data, commercial harvests that have been donated are included in commercial harvests.

[b] Data represent reported state permit harvests.

[c] Data are reported harvest from federal permits from 2002 to 2004 and expanded federal harvests from 2005 to 2013.

[d] Data represent expanded state permit harvests.

[e] Wild spawning escapements after 1977 were estimated as the adjusted Miles Lake sonar index minus subsistence, personal use, and sport harvests in addition to the Gulkana Hatchery brood stock and excess brood escapement.

[f] Delta spawning escapement estimated by doubling the peak aerial survey index.

[g] Hatchery brood stock and on site excess data are from Prince William Sound Aquaculture Corporation.

Table 4.–Total disposition of Chinook salmon runs to the Copper River, 2004–2013.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-year Average
Commercial harvest[a]	38,196	34,635	30,281	39,095	11,441	9,457	9,645	18,500	11,764	8,826	25,071
Commercial, home pack[a]	539	760	779	1,016	537	876	906	1,282	853	564	862
Educational [b]	0	92	11	70	47	50	31	6	6	55	31
Subsistence (Cordova, drift gillnet)[b]	1,106	219	779	1,145	470	212	276	212	237	854	541
Subsistence (Batzulnetas)[c]	0	0	0	0	0	0	0	0	0	5	0
Subsistence (Glennallen Subdistrict)[d]	3,346	2,229	2,769	3,276	2,381	2,493	2,099	2,319	2,095	2,148	2,555
Federal subsistence (Glennallen subdistrict)[c]	636	389	460	663	837	543	326	744	415	374	550
Personal use harvests (Chitina Subdistrict)[d]	2,495	2,043	2,663	2,694	1,999	214	700	1,067	567	744	1,635
Federal subsistence (Chitna subdistrict)[c]	7	51	18	28	23	9	18	13	5	18	16
Sport harvest	3,435	4,093	3,425	5,113	3,616	1,355	2,416	1,753	459	285	3,139
Upriver spawning escapement[e]	30,628	21,528	58,454	34,565	32,487	27,786	16,771	27,993	27,911	29,012	31,217
Total estimated Chinook salmon run size	80,405	66,039	99,639	87,675	53,836	42,896	33,090	53,889	44,312	42,885	65,618

[a] Numbers are from fish ticket data, commercial harvests that have been donated are included in commercial harvests.

[b] Data represent reported state permit harvests.

[c] Data are reported harvest from federal permits from 2002 to 2004 and expanded federal harvests from 2005 to 2013.

[d] Data represent expanded state permit harvests.

[e] Spawning escapements were determined by subtracting Glennallen Subdistrict subsistence, Chitina Subdistrict personal use, and Upper Copper River sport harvests from the estimated inriver abundance of Chinook salmon.

Table 5.–Total disposition of coho salmon runs to the Copper River, 2004–2013.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-year Average
Commercial harvest[a]	473,000	263,465	318,285	117,182	202,415	207,776	117,182	127,511	130,261	244,985	240,907
Commercial, home pack[a]	2	119	137	340	423	767	1,026	543	1,037	249	439
Subsistence (Cordova, drift gillnet)[b]	46	15	1	15	53	22	27	34	0	1	25
Federal subsistence (PWS/Copper River)	0	141	100	68	119	185	68	581	392	310	165
Subsistence (Batzulnetas)[c]	0	0	0	0	0	0	0	0	0	0	0
Subsistence (Glennallen Subdistrict)[d]	577	154	212	238	493	228	293	372	335	144	337
Federal subsistence (Glennallen subdistrict)[c]	152	187	28	57	229	34	81	223	173	21	125
Personal use (Chitina Subdistrict)[d]	2,860	1,869	2,715	1,742	2,711	1,712	2,013	1,702	1,385	797	2,124
Federal subsistence (Chitina subdistrict)[c]	18	0	20	41	100	11	30	10	8	8	31
Delta sport harvest	14,213	9,442	5,477	6,656	7,072	13,623	15,405	13,889	15.063	16,967	11,781
Upriver sport harvest	131	72	54	0	56	36	51	21	0	45	76
Upriver spawning escapement	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Delta spawning escapement[e]	199,960	202,164	178,540	107,640	153,784	82,588	112,934	76,290	74,020	69,360	129,189
Total estimated coho salmon run size	685,060	478,363	505,837	237,449	367,975	307,449	337,114	221,570	222,841	331,008	385,220

Note: ND=No data.

[a] Numbers are from fish ticket data, commercial harvests that have been donated are included in commercial harvests.

[b] Data represent reported state permit harvests.

[c] Data are reported harvest from federal permits.

[d] Data represent expanded state permit harvests.

[e] Delta spawning escapement estimated by doubling the peak aerial survey index.

Table 6.–Chinook salmon reported harvest and effort in the Copper River District subsistence drift gillnet fishery, and reported harvest of home pack Chinook salmon from the Copper River commercial drift gillnet fishery, 2004–2013.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-year average
Number of subsistence permits fished	321	121	300	295	248	128	139	123	225	360	233
Number of subsistence Chinook salmon harvested	1,106	260	779	1,145	470	212	276	212	237	854	555
Average number of Chinook salmon harvested per subsistence permit	3.4	2.1	2.6	3.9	1.9	1.7	2.0	1.7	1.1	2.4	2.4
Number of commercial permit holders reporting home pack harvests	174	228	264	280	223	328	333	336	378	331	288
Number of Chinook salmon retained for home pack	539	760	779	1,019	537	876	906	1,282	853	564	812
Average number of Chinook salmon harvested for home pack per permit holder reporting retention	3.1	3.3	2.9	3.6	2.4	2.7	2.7	3.8	2.3	1.7	2.8
Combined lower Copper River subsistence and home pack harvests	1,645	1,020	1,558	2,164	1,007	1,088	1,182	1,494	1,090	1,418	1,367

Table 7.–2012 Chitina Subdistrict fishing schedule.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
10 Jun	1	Thursday, June 07, 12:01 AM–Sunday, June 10, 11:59 PM	96	**Thursday, June 07, 12:01 AM–Sunday, June 10, 11:59 PM**	**96**
17 Jun	2	Monday, June 11, 12:01 AM–Sunday, June 17, 11:59 PM	168	**Monday, June 11, 12:01 AM–Sunday, June 17, 11:59 PM**	**168**
24 Jun	3	Monday, June 18, 12:01 AM–Sunday, June 24, 11:59 PM	168	Monday, June 18, 12:01 AM–Sunday, June 24, 11:59 PM	168
01 Jul	4	Monday, June 25, 12:01 AM–Sunday, July 01, 11:59 PM	168	Monday, June 25, 12:01 AM–Sunday, July 01, 11:59 PM	168
08 Jul	5	Monday, July 02, 12:01 AM–Sunday, July 08, 11:59 PM	168	Monday, July 02, 12:01 AM–Sunday, July 08, 11:59 PM	168
15 Jul	6	Monday, July 09, 12:01 AM–Sunday, July 15, 11:59 PM	168	**Monday, July 09, 12:01 AM–Sunday, July 15, 11:59 PM**	**168**
22 Jul	7	Tuesday, July 17, 12:00 PM–Sunday, July 22, 11:59 PM	132	**Monday, July 16, 12:01 AM–Sunday, July 22, 11:59 PM**	**168**
29 Jul	8	Thursday, July 26, 12:00 PM–Sunday, July 29, 11:59 PM	84	**Monday, July 23, 12:01 AM–Sunday, July 29, 11:59 PM**	**168**
05 Aug	9	Tuesday, July 31, 12:01 AM–Sunday, Aug. 05, 11:59 PM	144	**Monday, July 30, 12:01 AM–Sunday, Aug. 05, 11:59 PM**	**168**
12 Aug	10	Tuesday, Aug. 07, 12:01 AM–Sunday, Aug. 12, 11:59 PM	144	**Monday, Aug. 06, 12:01 AM–Sunday, Aug. 12, 11:59 PM**	**168**
16 Aug	11	continuous	168	continuous	168
23 Aug	12	continuous	168	continuous	168
30 Aug	13	continuous	168	continuous	168

Note: PU = personal use. Hours in bold indicate supplemental periods.

Table 8.–2013 Chitina Subdistrict fishing schedule.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
09 Jun	1	Friday, June 07, 12:01 AM–Sunday, June 09, 11:59 PM	72		0
16 Jun	2	Monday, June 10, 12:01 AM–Sunday, June 16, 11:59 PM	168	Monday, June 10, 12:01 AM–Sunday, June 16, 11:59 PM	168
23 Jun	3	Monday, June 17, 12:01 AM–Sunday, June 23, 11:59 PM	168	**Monday, June 17, 12:01 AM–Sunday, June 23, 11:59 PM**	**168**
30 Jun	4	Monday, June 24, 12:01 AM–Sunday, June 30, 11:59 PM	168	**Monday, June 24, 12:01 AM–Sunday, June 30, 11:59 PM**	**168**
07 Jul	5	Monday, July 01, 12:01 AM–Sunday, July 07, 11:59 PM	168	Monday, July 01, 12:01 AM–Sunday, July 07, 11:59 PM	168
14 Jul	6	Monday, July 08, 12:01 AM–Sunday, July 14, 11:59 PM	168	**Monday, July 08, 12:01 AM–Sunday, July 14, 11:59 PM**	**168**
21 Jul	7	Monday, July 15, 12:00 PM–Sunday, July 21, 11:59 PM	156	**Monday, July 15, 12:01 AM–Sunday, July 21, 11:59 PM**	**168**
28 Jul	8	Thursday, July 25, 8:00 AM–Sunday, July 28, 11:59 PM	88	**Monday, July 22, 12:01 AM–Sunday, July 28, 11:59 PM**	**168**
04 Aug	9	Tuesday, July 30, 12:01 AM–Sunday, Aug. 04, 11:59 PM	144	**Monday, July 29, 12:01 AM–Sunday, Aug. 04, 11:59 PM**	**168**
11 Aug	10	Monday, Aug. 05, 8:00 AM–Sunday, Aug. 11, 11:59 PM	160	Continuous	168
18 Aug	11	Continuous	168	Continuous	168
25 Aug	12	Continuous	168	Continuous	168
31 Aug	13	Continuous	168	Continuous	168

Note: PU = personal use. Hours in bold indicate supplemental periods.

Table 9.–2014 Chitina Subdistrict fishing schedule.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
08 Jun	1	Saturday, June 07, 12:01 AM–Sunday, June 08, 11:59 PM	48	**Saturday, June 07, 12:01 AM–Sunday, June 08, 11:59 PM**	**48**
15 Jun	2	Monday, June 09, 12:01 AM–Sunday, June 15, 11:59 PM	168	**Monday, June 09, 12:01 AM–Sunday, June 15, 11:59 PM**	**168**
22 Jun	3	Monday, June 16, 12:01 AM–Sunday, June 22, 11:59 PM	168	**Monday, June 16, 12:01 AM–Sunday, June 22, 11:59 PM**	**168**
29 Jun	4	Monday, June 23, 12:01 AM–Sunday, June 29, 11:59 PM	168	Monday, June 23, 12:01 AM–Sunday, June 29, 11:59 PM	168
06 Jul	5	Monday, June 30, 12:00 PM–Sunday, July 06, 11:59 PM	156	Monday, June 30, 12:01 AM–Sunday, July 06, 11:59 PM	168
13 Jul	6	Tuesday, July 08, 8:00 PM–Sunday, July 13, 11:59 PM	124	**Monday, July 07, 12:01 AM–Sunday, July 13, 11:59 PM**	**168**
20 Jul	7	Tuesday, July 15, 12:01 AM–Sunday, July 20, 11:59 PM	144	**Monday, July 14, 12:01 AM–Sunday, July 20, 11:59 PM**	**168**
27 Jul	8	Thursday, July 24, 12:00 PM–Sunday, July 27, 11:59 PM	84	Monday, July 21, 12:01 PM–Sunday, July 27, 11:59 PM	156
03 Aug	9	Tuesday, July 29, 12:01 AM–Sunday, Aug. 03, 11:59 PM	144	Monday, July 28, 12:01 AM–Sunday, Aug. 03, 11:59 PM	168
10 Aug	10	Monday, Aug. 04, 12:01 AM–Sunday, Aug. 10, 11:59 PM	168	**Monday, Aug. 04, 12:01 AM–Sunday, Aug. 10, 11:59 PM**	**168**
17 Aug	12	Continuous	168	Continuous	168
24 Aug	13	Continuous	168	Continuous	168
31 Aug	14	Continuous	168	Continuous	

Note: PU = personal use. Hours in bold indicate supplemental periods.

Table 10.–Number of permits issued and salmon harvested in the Glennallen Subdistrict subsistence salmon fishery, 1980–2014 (includes federal subsistence permits and harvest since 2002).

Year	Number permits issued				Estimated salmon harvest[b]
	Total	Dip net	Fish wheel	Federal[a]	
1980[c]	3,203	2,804	399	ND	35,081
1981[c]	4,078	3,555	523	ND	68,746
1982[c]	6,090	5,475	615	ND	110,006
1983[c]	7,541	6,911	630	ND	118,728
1984	562	104	458	ND	28,617
1985	533	ND	ND	ND	31,614
1986	405	39	336	ND	28,423
1987	431	59	372	ND	34,142
1988	409	70	339	ND	30,755
1989	386	78	308	ND	29,308
1990	406	95	311	ND	32,524
1991	711	293	418	ND	41,205
1992	655	151	504	ND	47,095
1993	772	193	579	ND	54,855
1994	970	267	703	ND	70,391
1995	858	191	667	ND	55,323
1996	850	219	631	ND	54,290
1997	1,133	286	847	ND	85,743
1998	1,010	272	738	ND	66,951
1999	1,101	336	765	ND	82,119
2000	1,251	464	787	ND	64,885
2001	1,239	407	832	ND	88,568
2002	1,322	469	652	201	55,058
2003	1,233	399	613	221	64,382
2004	1,218	330	626	262	78,001
2005	1,236	363	598	275	89,123
2006	1,238	338	646	254	79,694
2007	1,455	467	707	281	87,759
2008	1,456	536	650	270	61,725
2009	1,364	469	621	274	64,017
2010	1,590	620	701	269	87,908
2011	1,583	617	689	277	79,518
2012	1,798	867	660	271	96,074
2013	1,613	808	531	274	93,594
2014	1,936	1,147	503	286	ND
2004–2008	1,325	407	645	273	79,260
2009–2013	1,587	676	640	271	84,222

Note: ND=No data.

[a] Federal permits are not limited to a single gear type and allow use of fish wheel, dip net, or rod and reel.

[b] Expanded state harvest data plus federal reported harvest from 2002 to 2004 and federal expanded harvest after 2004.

[c] The Chitina Subdistrict was a subsistence fishery from 1980 to 1983 and data for the Glennallen and Chitina subdistricts were combined for those years.

Table 11.–Estimates of inriver abundance for Chinook and sockeye salmon in the Copper River, 2004–2013.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Chinook (ADF&G)[a]	33,793	ND	ND	ND	ND	ND	ND	ND	ND	ND
Standard error	11,038	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chinook (M-R)[b]	**40,564**	**30,333**	**67,789**	**46,349**	**41,343**	**32,400**	**22,323**	**33,889**	**31,452**	**32,581**
Standard error	4,650	1,529	4,779	3,391	2,166	2,365	2,492	3,329	5,242	4,425
Sockeye (sonar)[c]	**669,514**	**855,125**	**959,706**	**919,600**	**718,344**	**709,749**	**923,811**	**914,231**	**1,294,400**	**1,267,060**
Standard error	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sockeye (M-R)[c]	ND	ND	ND	1,259,00	739,833	ND	ND	ND	ND	ND
Standard error	ND	ND	ND	90,648	32,962	ND	ND	ND	ND	ND

Note: Numbers in bold designate final estimates used for management purposes. ND=No data.

[a] Estimates from ADF&G radiotelemetry mark–recapture project.

[b] Estimates from Native Village of Eyak Petersen mark–recapture project.

[c] Sonar counts represent all salmon passing sonar site without differentiation between species.

Table 12.–Run timing statistics past the tagging site at Baird Canyon for major sockeye salmon spawning stocks in the Copper River, 2005–2008.

	Duration[a]				Mean date of passage[b]			
Stocking group	2005	2006	2007	2008	2005	2006	2007	2008
Lower Copper	46	61	63	44	6 Jul	28 Jun	24 Jun	3 Jul
Chitina	68	63	45	51	30 Jun	13 Jul	19 Jun	13 Jun
Tonsina	56	54	46	23	13 Jul	17 Jul	22 Jul	19 Jul
Klutina	75	60	69	45	13 Jun	20 Jun	16 Jun	15 Jun
Tazlina	52	64	70	43	31 May	11 Jun	5 Jun	5 Jun
Gulkana	73	65	62	58	4 Jul	7 Jul	2 Jul	29 Jun
Upper Copper	51	28	40	54	2 Jun	7 Jun	11 Jun	12 Jun

[a] Duration refers to the average number of days it took radiotagged fish to travel to their upriver destinations following the tagging event near Baird Canyon.

[b] Mean date of passage is germane to the capture site near Baird Canyon.

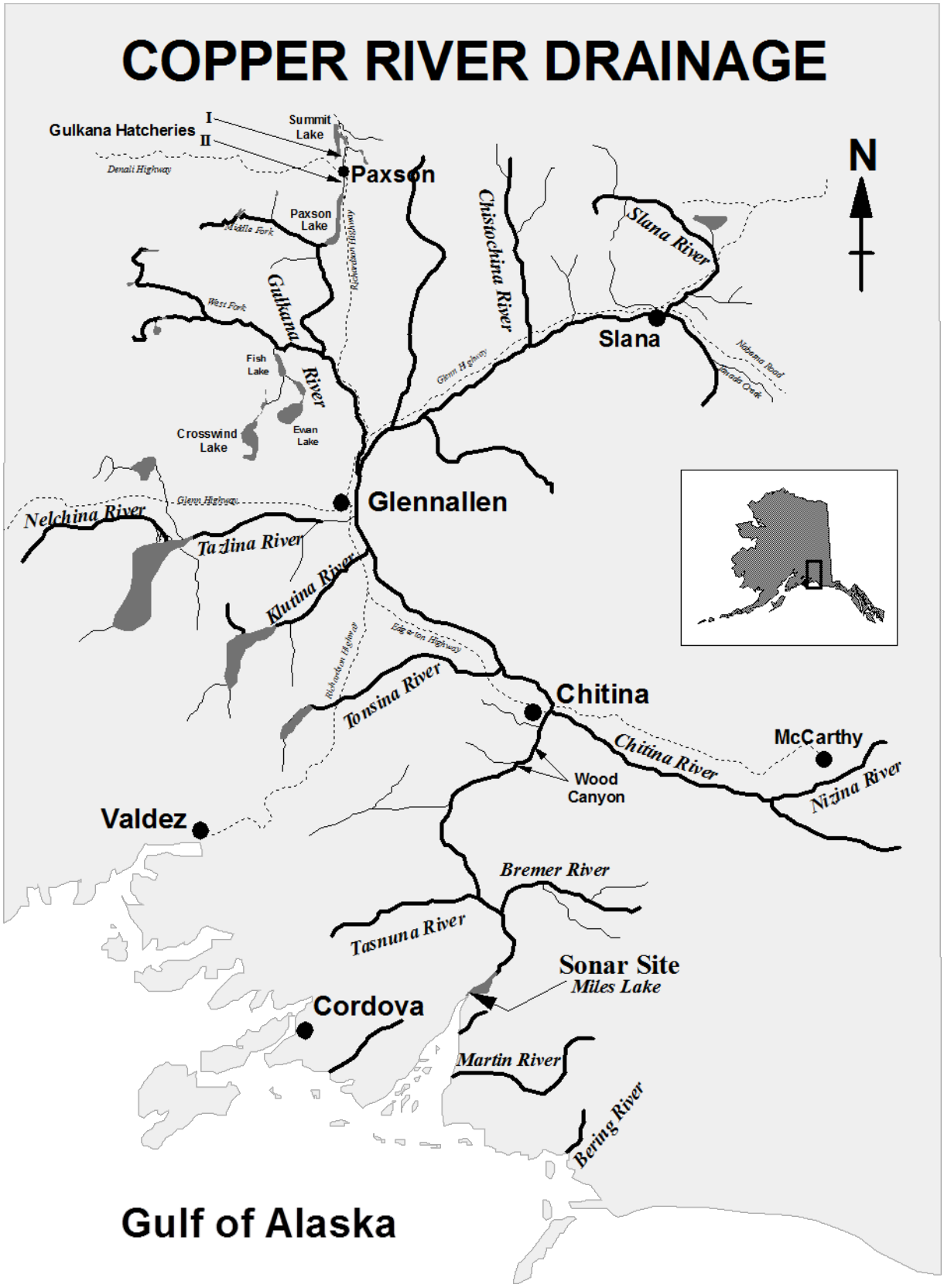


Figure 1.–The Copper River and Copper River Delta area.

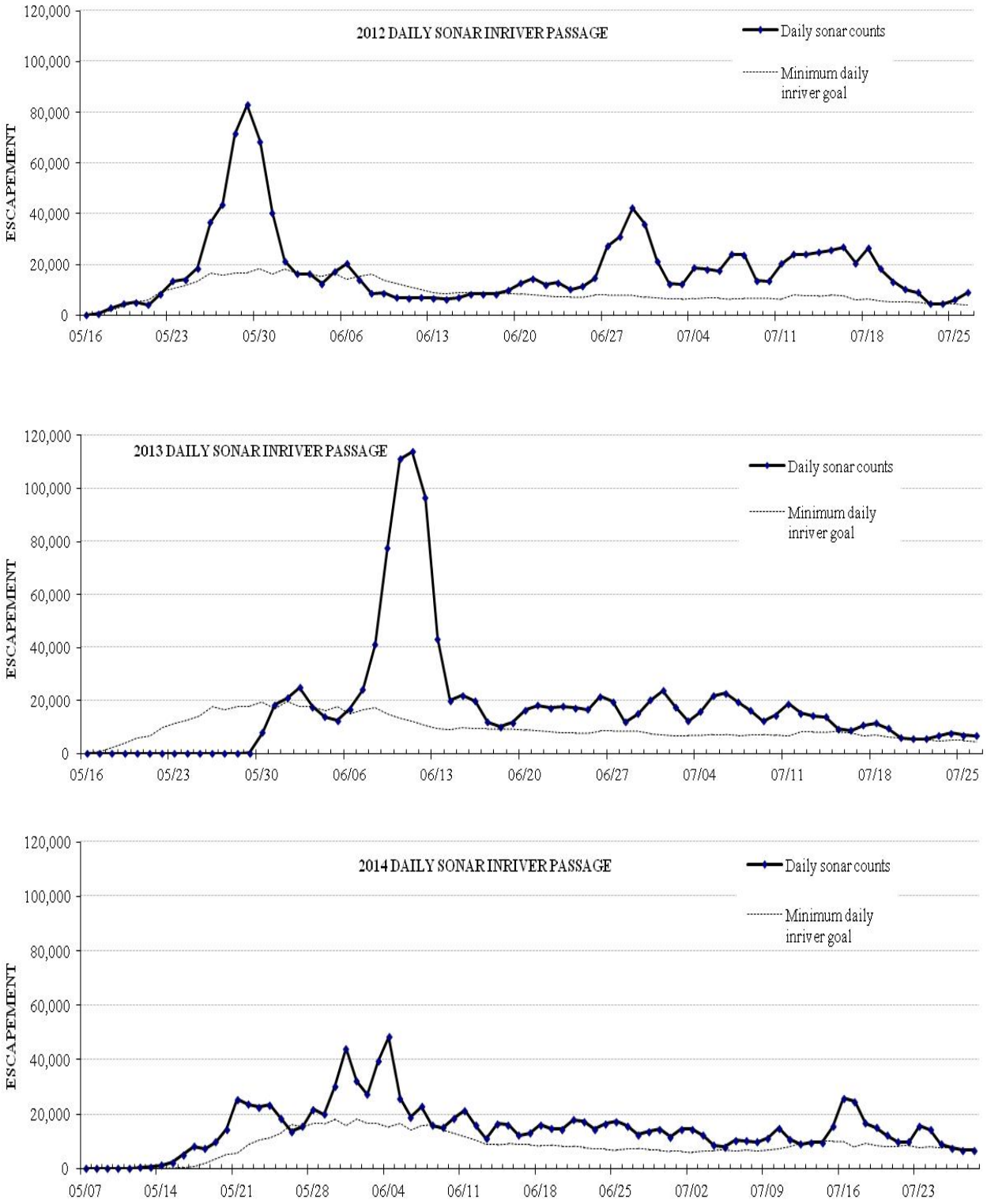
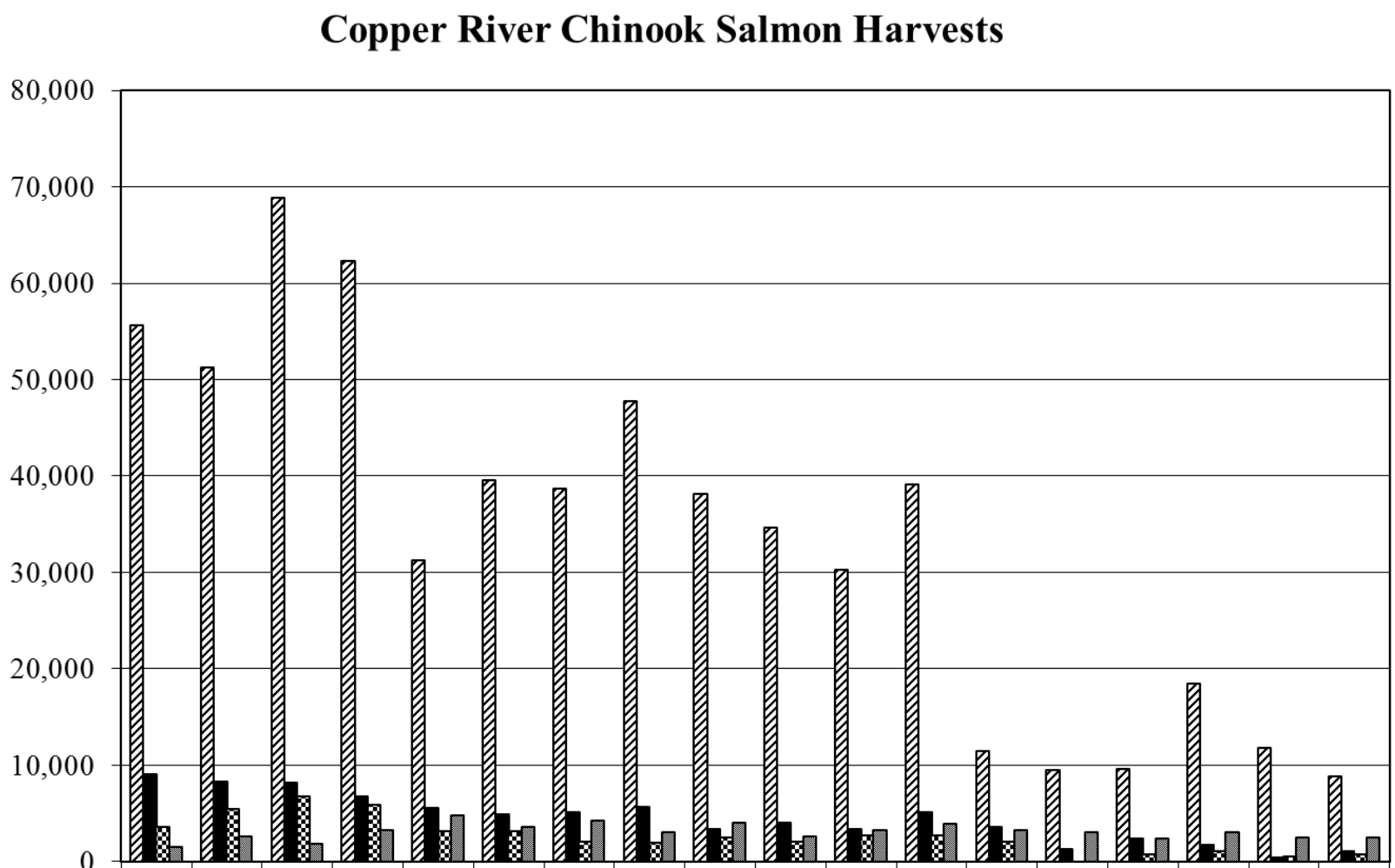
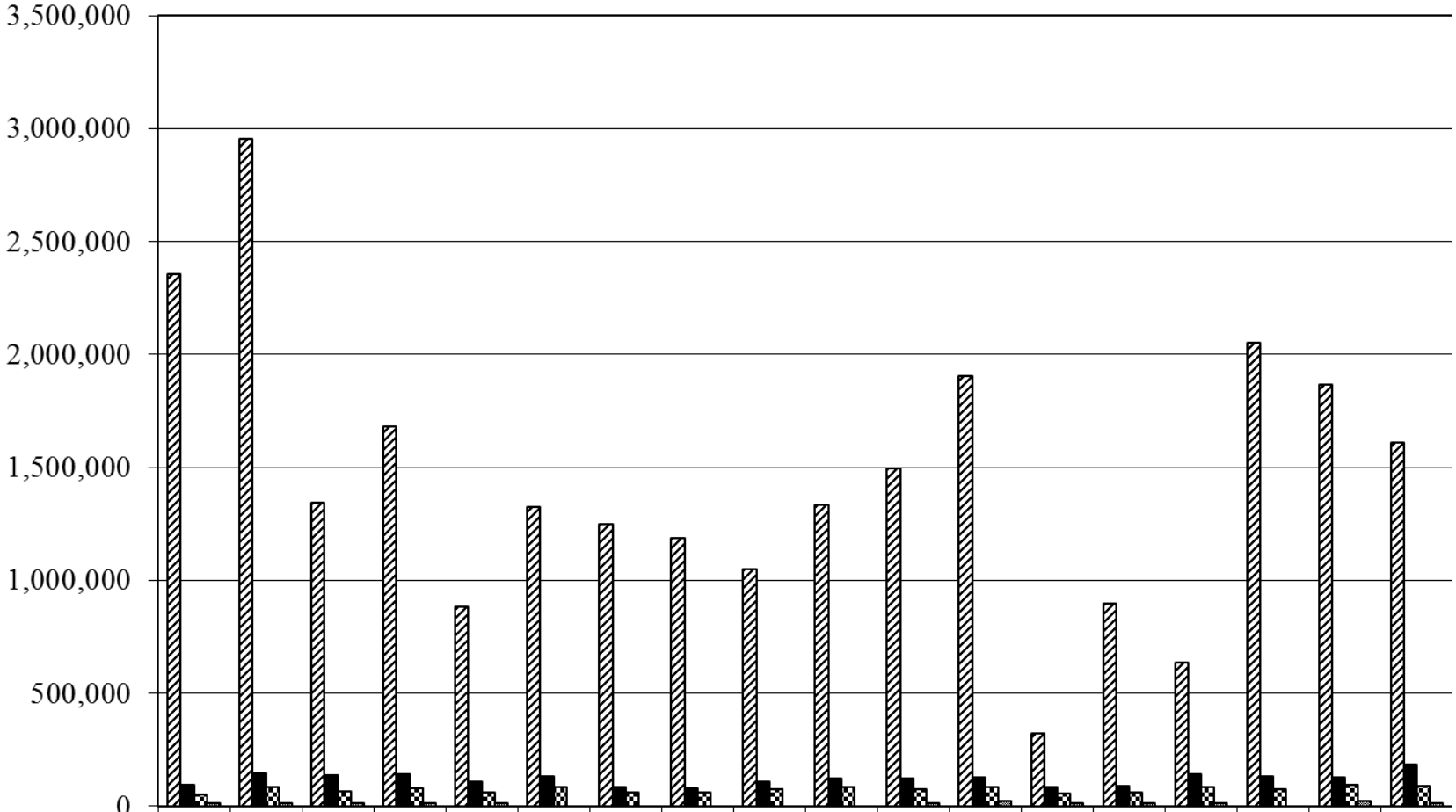


Figure 2.–Anticipated components of the Copper River salmon escapement versus actual escapement past the Miles Lake sonar, 2012–2014.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Commercial	55,646	51,273	68,827	62,337	31,259	39,524	38,734	47,721	38,191	34,624	30,278	39,095	11,437	9,457	9,645	18,500	11,764	8,826
Sport	9,116	8,346	8,245	6,742	5,531	4,904	5,098	5,717	3,435	4,093	3,425	5,123	3,618	1,355	2,409	1,753	459	1,106
Chitina Subdistrict	3,584	5,447	6,723	5,913	3,168	3,113	2,056	1,921	2,502	2,094	2,681	2,722	2,022	223	718	1,080	572	762
Glennallen Subdistrict	1,482	2,583	1,842	3,278	4,856	3,553	4,217	3,092	3,982	2,618	3,229	3,939	3,218	3,042	2,425	3,063	2,510	2,522

Figure 3.–Chinook salmon harvest in the Copper River by fishery, 1996–2013.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Commercial Fishery	2,356,36	2,955,43	1,341,69	1,682,55	880,334	1,323,57	1,248,50	1,188,05	1,048,00	1,331,66	1,496,75	1,901,77	320,815	896,621	636,214	2,052,43	1,866,54	1,608,11
Chitina Subdistrict	95,007	148,727	137,161	141,658	107,856	132,108	86,543	81,513	108,527	122,463	124,810	126,154	82,318	90,917	140,811	129,985	128,058	182,915
Glennallen Subdistrict	52,052	82,807	64,463	77,369	59,497	83,787	58,800	60,623	73,214	86,139	76,058	83,356	57,632	60,882	84,853	75,375	92,792	90,788
Sport Fishery	11,851	12,293	11,184	11,101	12,361	8,169	7,761	7,108	6,464	8,135	14,297	23,028	11,431	13,415	14,743	7,727	23,393	15,288

Figure 4.–Sockeye salmon harvest in the Copper River by fishery, 1996–2013.

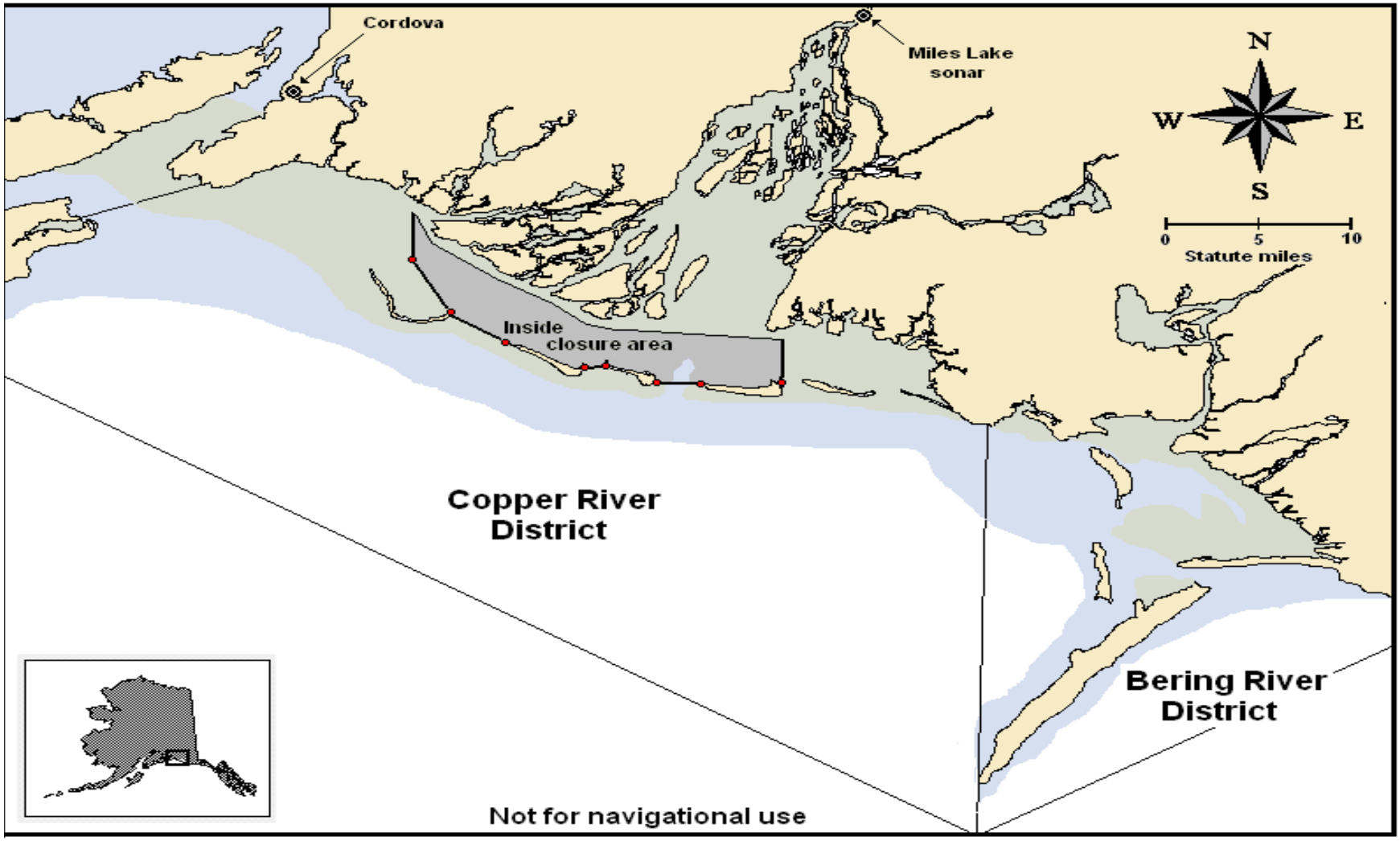


Figure 5.–Map of Copper River and Bering River districts showing inside closure area.

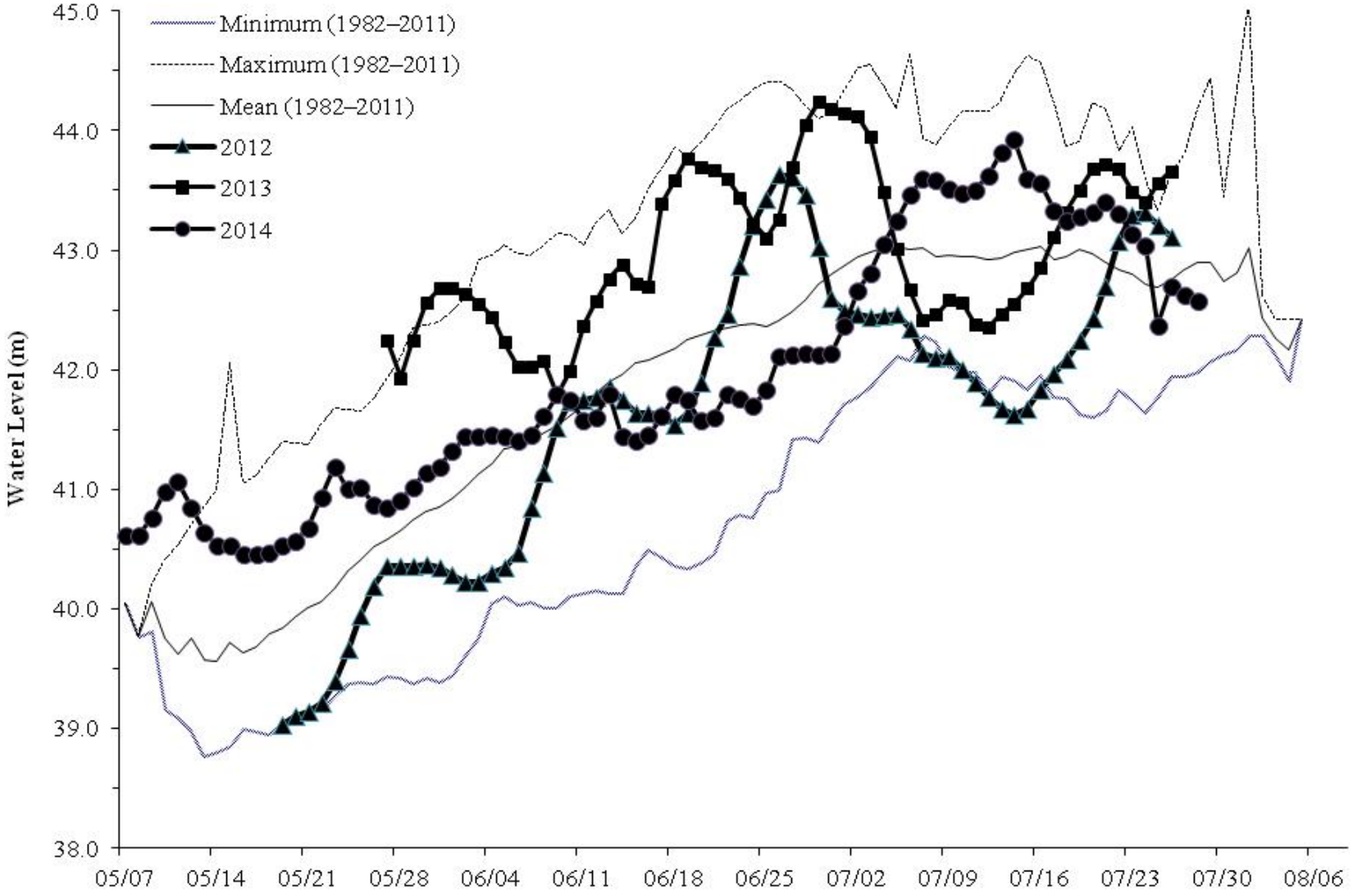


Figure 6.–Measured water level at the Million Dollar Bridge, 2012–2014.

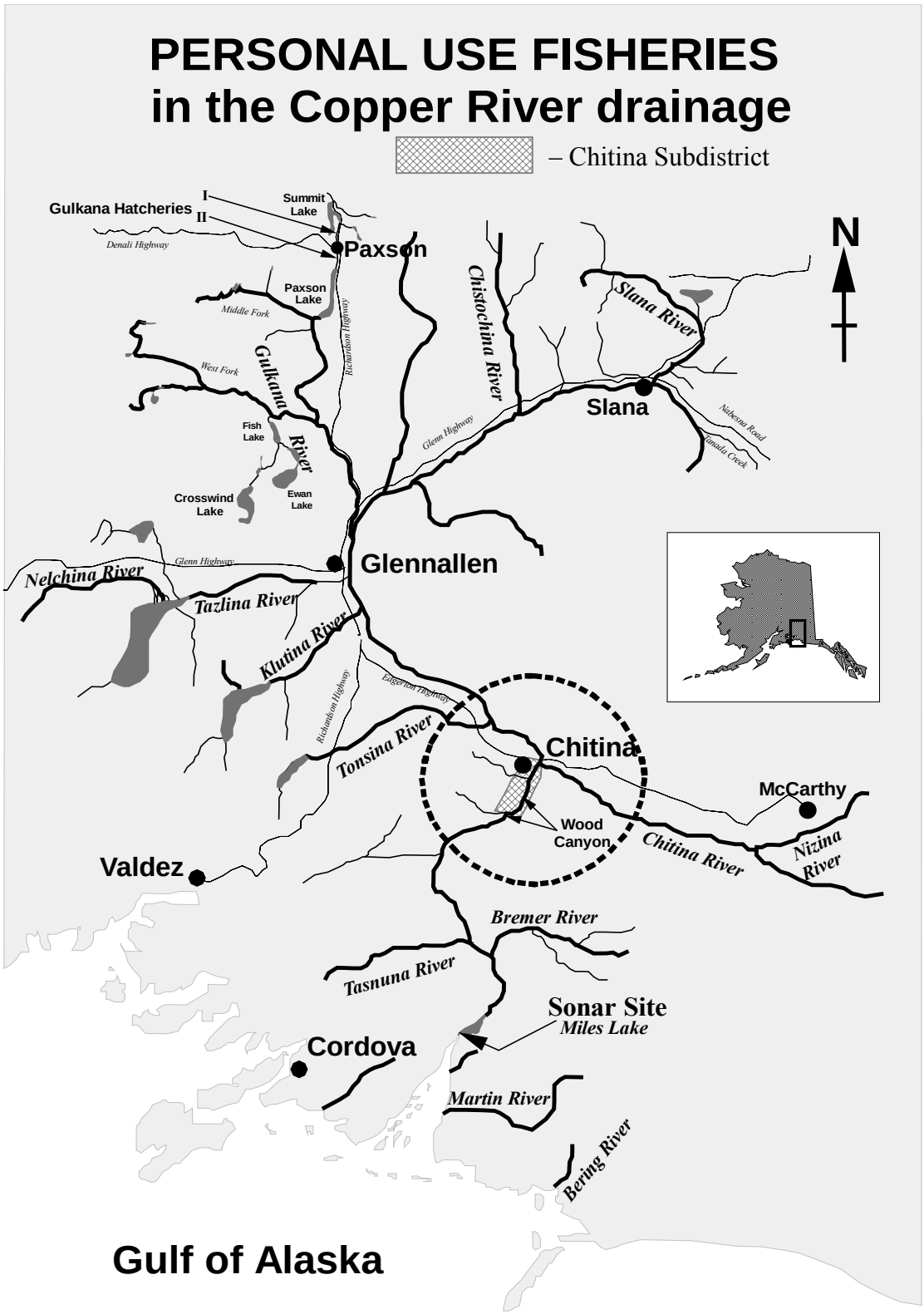


Figure 7.–Map of the personal use salmon fisheries on the Copper River.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sockeye	137,161	141,658	107,856	132,108	86,543	81,513	108,527	122,463	124,810	126,154	82,318	90,917	140,811	129,985	128,058	182,915	154,701
Chinook	6,723	5,913	3,168	3,113	2,056	1,921	2,502	2,094	2,681	2,722	2,022	223	718	1,080	572	762	727
Coho	2,145	2,128	3,657	2,720	1,934	2,603	2,878	1,869	2,735	1,783	2,811	1,723	2,043	1,712	1,393	805	891
Permits Issued	10,006	9,943	8,146	9,458	6,804	6,541	8,265	8,306	8,572	8,474	8,123	8,026	10,062	9,302	10,108	10,691	11,522

Figure 8.–Chitina Subdistrict personal use salmon harvest by species, 1998–2013.

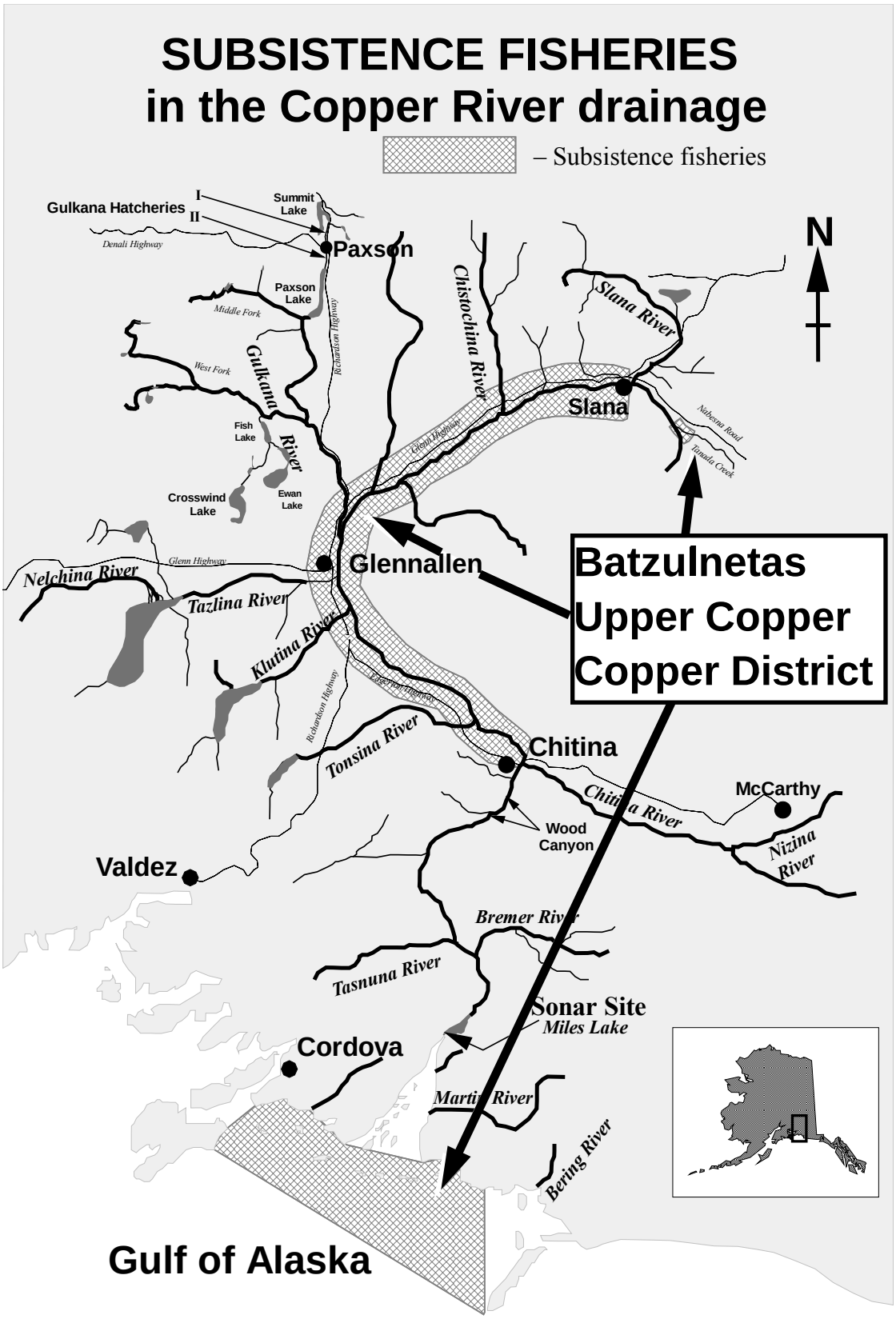
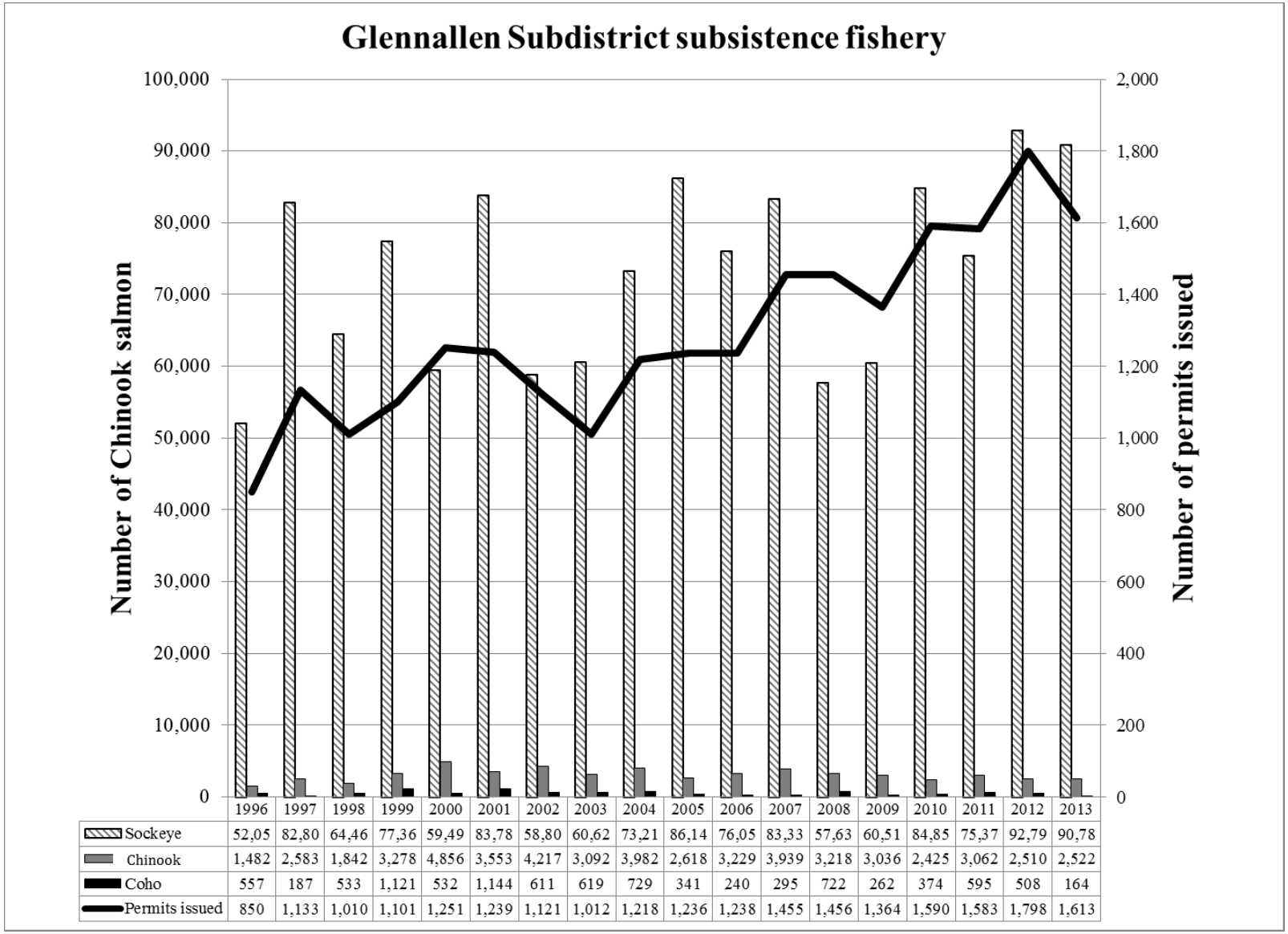


Figure 9.–Map of the subsistence salmon fisheries on the Copper River.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sockeye	52,05	82,80	64,46	77,36	59,49	83,78	58,80	60,62	73,21	86,14	76,05	83,33	57,63	60,51	84,85	75,37	92,79	90,78
Chinook	1,482	2,583	1,842	3,278	4,856	3,553	4,217	3,092	3,982	2,618	3,229	3,939	3,218	3,036	2,425	3,062	2,510	2,522
Coho	557	187	533	1,121	532	1,144	611	619	729	341	240	295	722	262	374	595	508	164
Permits issued	850	1,133	1,010	1,101	1,251	1,239	1,121	1,012	1,218	1,236	1,238	1,455	1,456	1,364	1,590	1,583	1,798	1,613

Figure 10.–Glennallen Subdistrict salmon harvest by species [state estimated and federal reported (2002–2004) and federal estimated (2005–2010) harvest], 1996–2013.

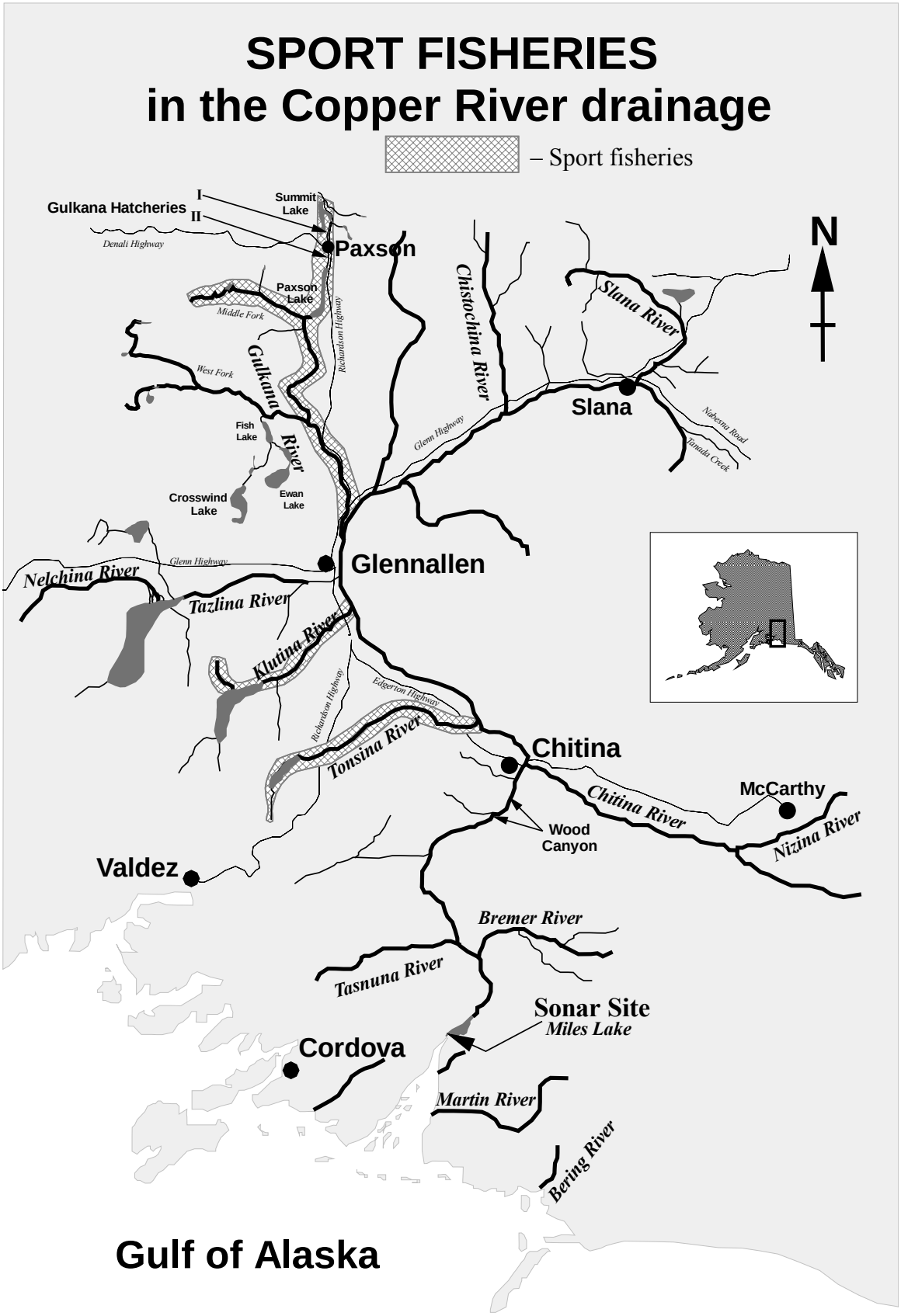
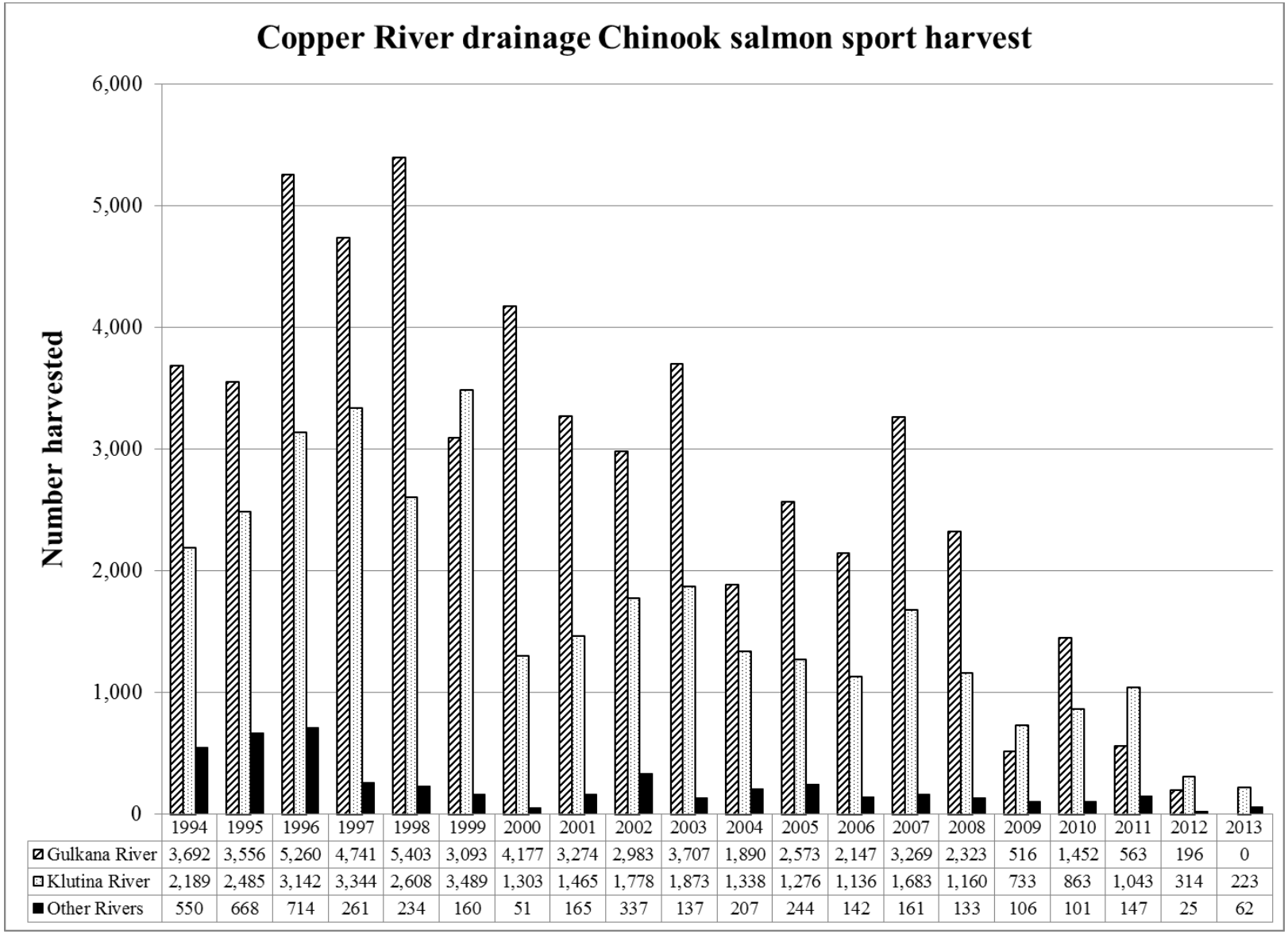
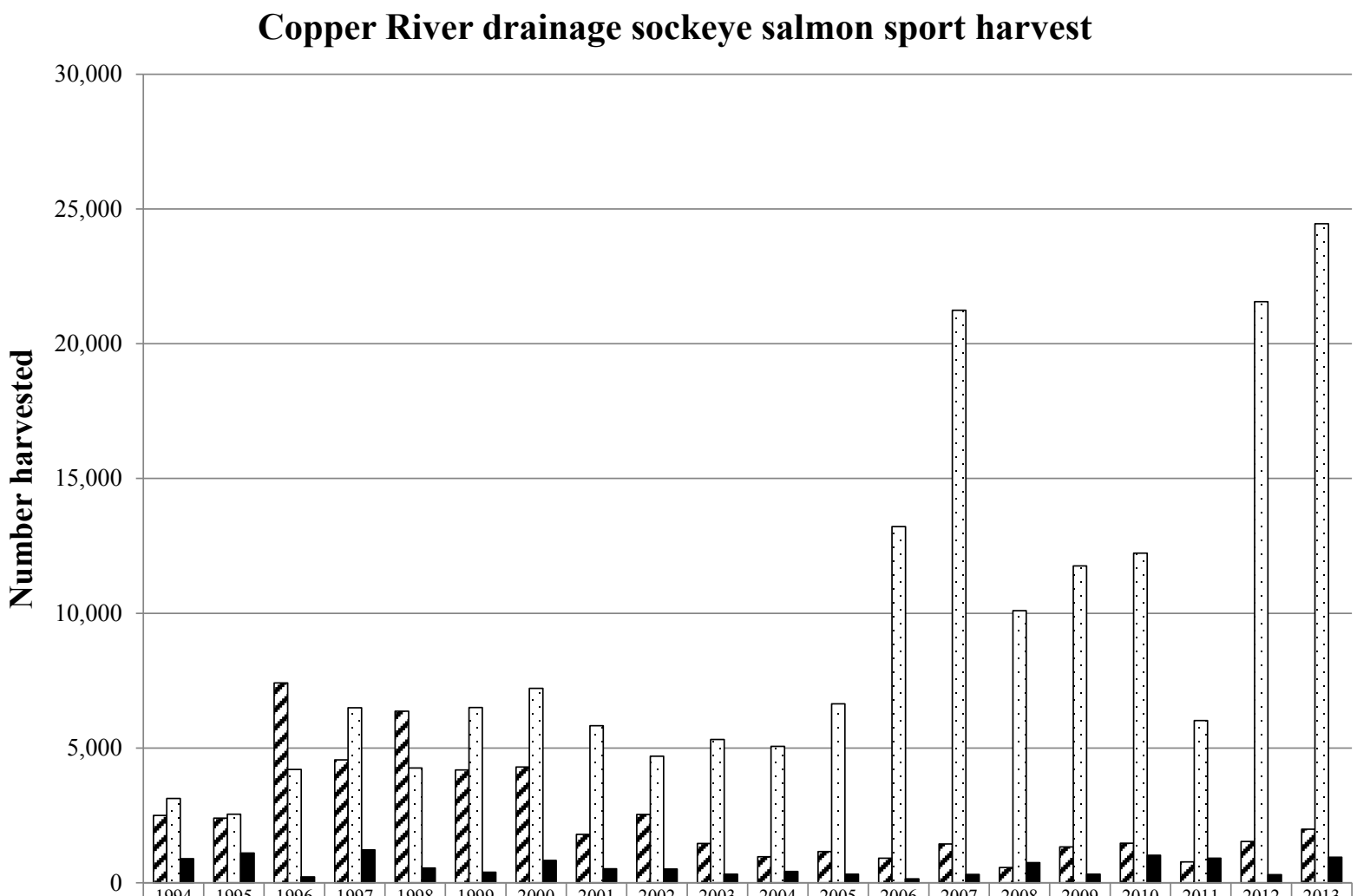


Figure 11.–Map of the sport salmon fisheries on the Copper River.



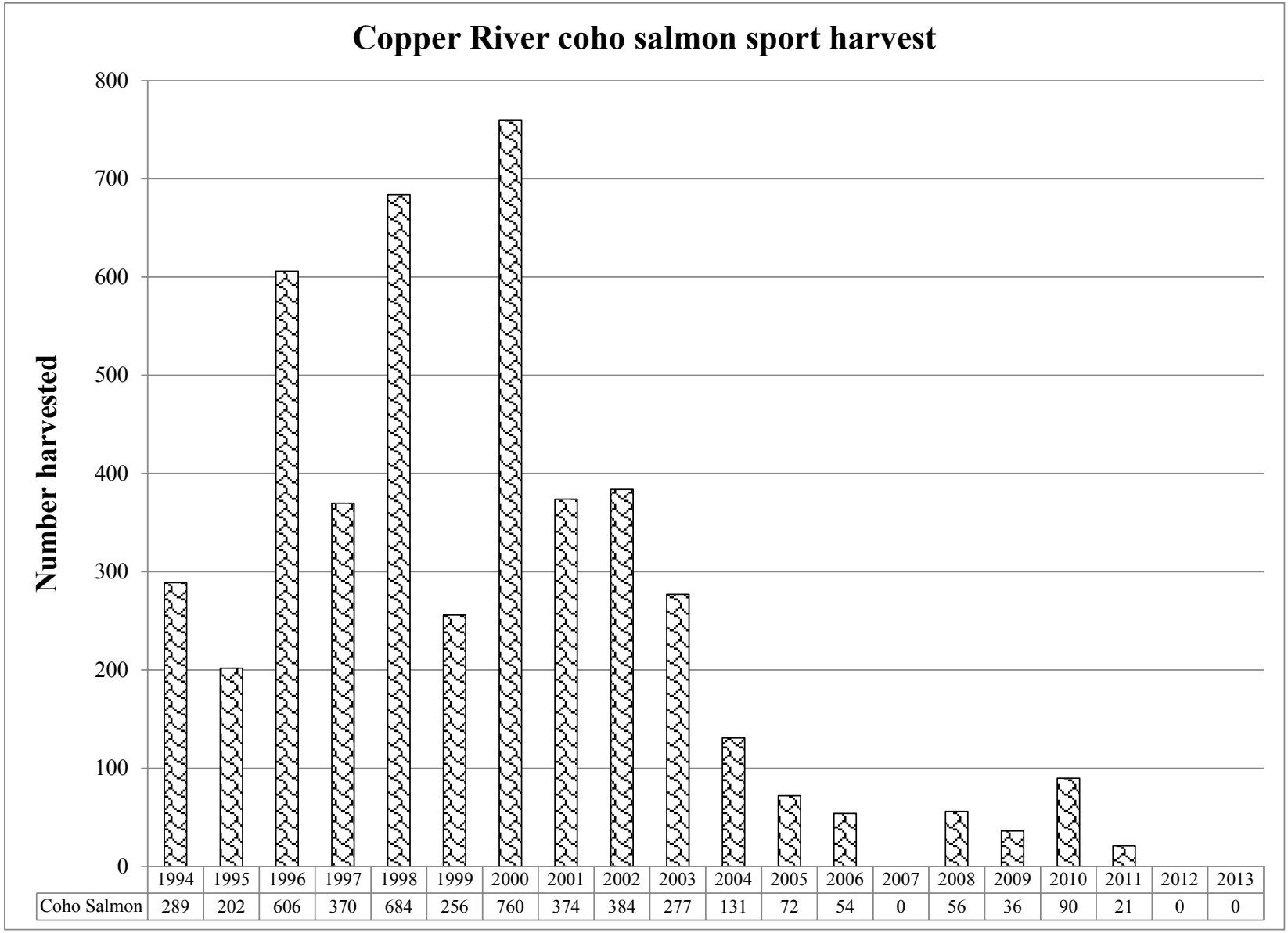
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gulkana River	3,692	3,556	5,260	4,741	5,403	3,093	4,177	3,274	2,983	3,707	1,890	2,573	2,147	3,269	2,323	516	1,452	563	196	0
Klutina River	2,189	2,485	3,142	3,344	2,608	3,489	1,303	1,465	1,778	1,873	1,338	1,276	1,136	1,683	1,160	733	863	1,043	314	223
Other Rivers	550	668	714	261	234	160	51	165	337	137	207	244	142	161	133	106	101	147	25	62

Figure 12.–Copper River Chinook salmon sport harvest, 1994–2013.



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gulkana River	2,503	2,409	7,418	4,566	6,370	4,192	4,307	1,808	2,545	1,465	976	1,169	923	1,452	575	1,335	1,476	785	1,539	1,998
Klutina River	3,137	2,549	4,215	6,501	4,264	6,514	7,219	5,834	4,704	5,321	5,069	6,646	13,222	21,242	10,107	11,759	12,238	6,025	21,564	24,460
Other Rivers	893	1,110	218	1,226	550	395	835	527	512	322	419	320	152	315	749	321	1,029	917	301	949

Figure 13.–Copper River sockeye salmon sport harvest, 1994–2013.



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Coho Salmon	289	202	606	370	684	256	760	374	384	277	131	72	54	0	56	36	90	21	0	0

Figure 14.–Copper River coho salmon sport harvest, 1994–2013.

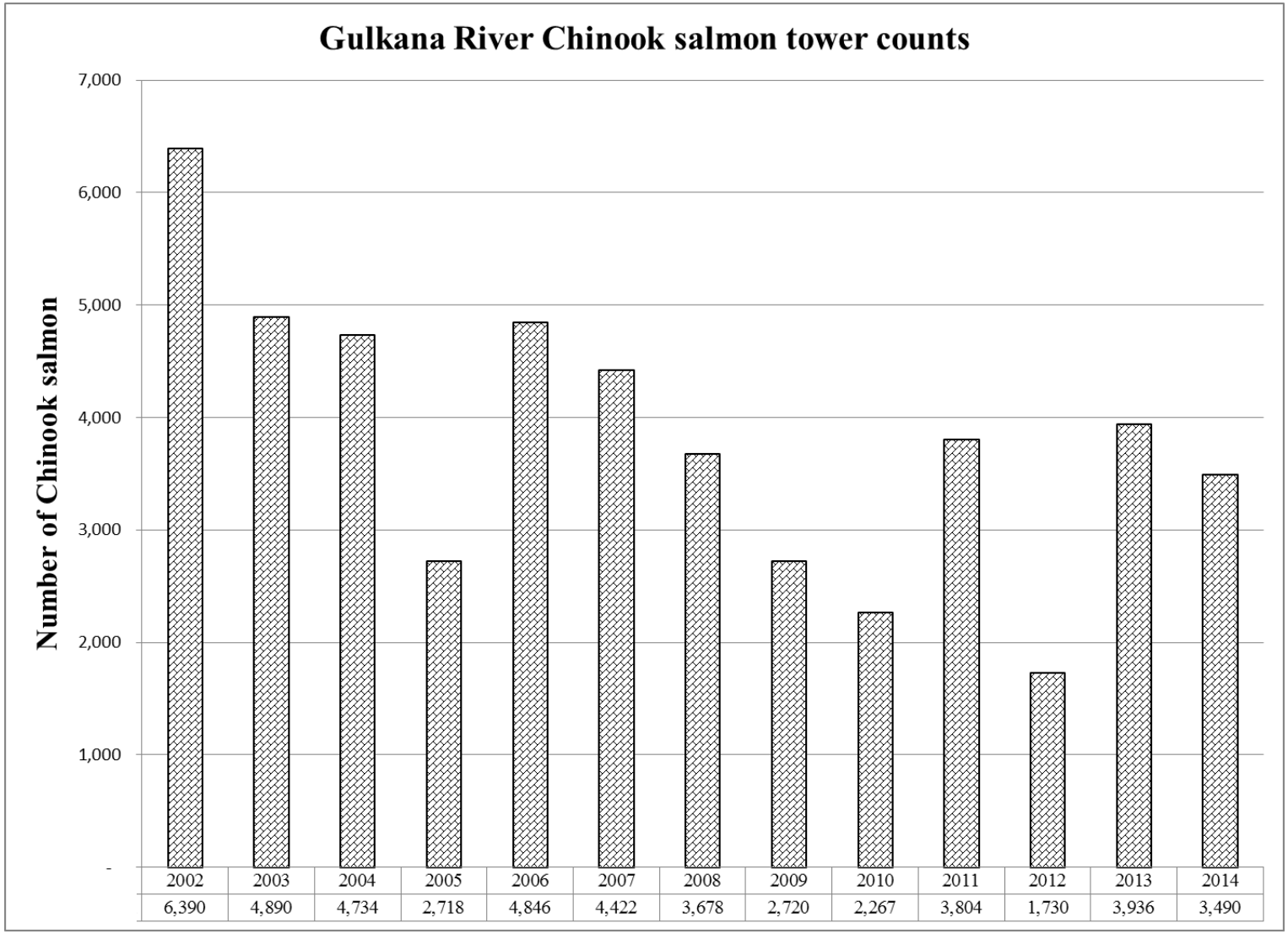


Figure 15.–Expanded cumulative escapement of Chinook salmon past the Gulkana River counting tower, 2002–2014.

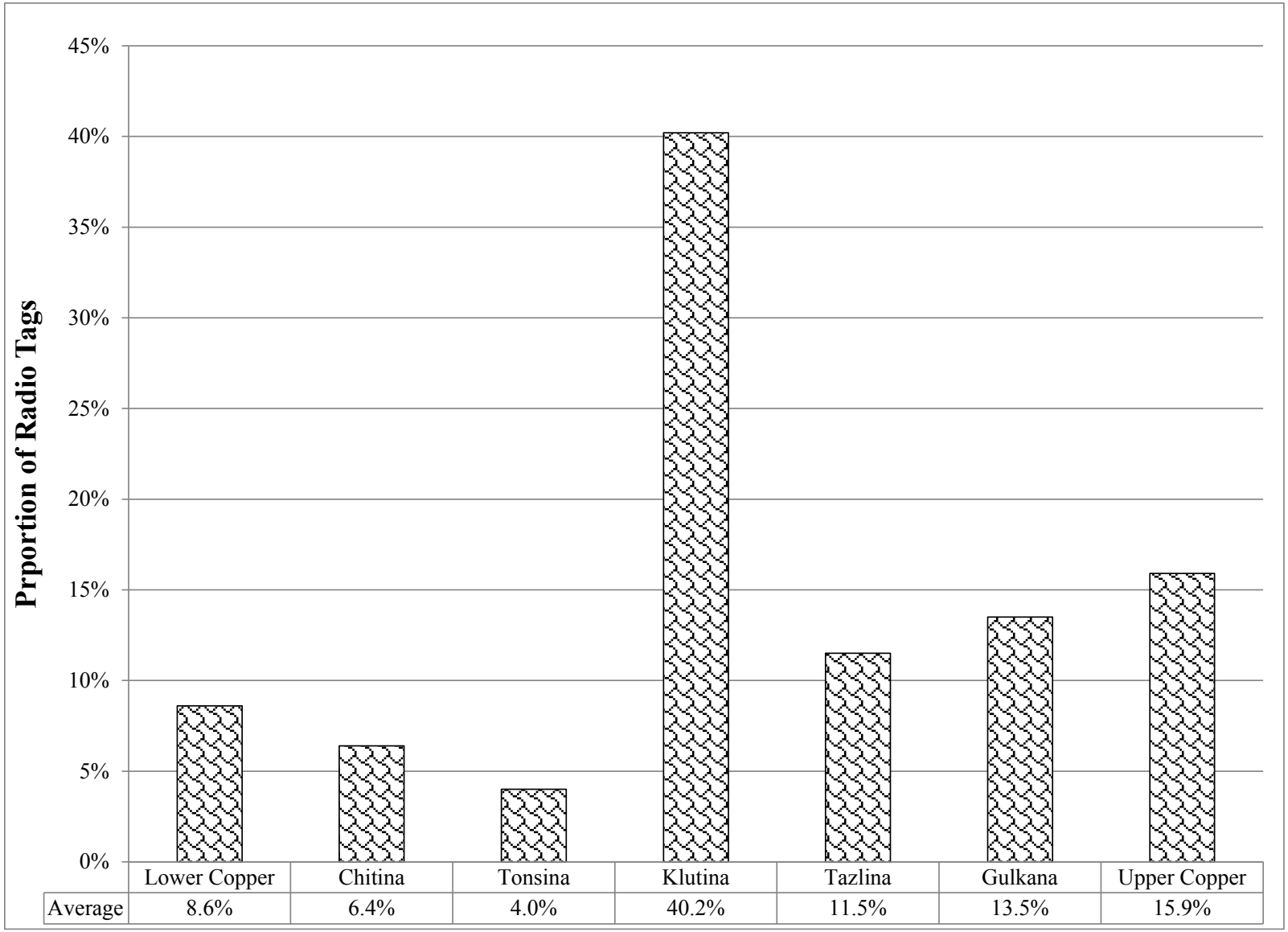


Figure 16.–Average percentage of radiotagged sockeye salmon located within portions of the Copper River drainage, 2005–2009.