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**Management of Salmon Stocks in the Copper River,
2018–2020: A Report to the Alaska Board of Fisheries**

by

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and

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October 2021

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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

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ABSTRACT

This report discusses the management of Copper River commercial, personal use, subsistence, and sport salmon fisheries and summarizes the performance of those fisheries and management actions taken through the 2020 season. Chinook salmon *Oncorhynchus tshawytscha* (colloquially known as king salmon), 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 2010 to 2019, salmon harvest averaged 1.62 million fish in the Copper River District commercial fishery, 3,718 fish in the Copper River District subsistence fishery, 153,706 fish in the Chitina Subdistrict personal use dip net fishery, 85,923 fish in the Glennallen Subdistrict subsistence fishery, 213 fish in the Batzulnetas subsistence fishery, and 14,029 fish in the Upper Copper River sport fisheries. Sockeye salmon account for over 70% of commercial harvest, over 98% of personal use harvest, 96% of subsistence harvest, and 91% of sport harvest. The inriver passage of salmon estimated at the Miles Lake sonar station in 2020 was the lowest and in 2018 was the sixth-lowest in the last 30 years. The 2020 Chinook salmon run was the second-lowest in the last 15 years, and the 2018 and 2019 runs were above the 2005–2019 average of 55,200 fish. The Upper Copper River sockeye salmon escapement goal has been met in 10 out of the last 10 years; the Copper River Delta sockeye salmon escapement goal has been met in 9 out of the last 10 years; the Copper River Delta coho salmon escapement goal has been met in 10 out of the last 10 years; the escapement goal for Chinook salmon has been met in 6 of the last 10 years. There are no stocks of concern in the Copper River drainage and across the Copper River Delta.

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

INTRODUCTION

This report provides background information and summarizes the most recent fishing seasons and management actions in the Copper River commercial, subsistence, personal use, and sport salmon fisheries, and briefly summarizes recent research activities.

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 Glennallen, Gulkana, Gakona, Chistochina, Chitina, McCarthy, Kenny Lake, Copper Center, Paxson, Mentasta, and Slana. Adjacent to the outlet of the Copper River is the community of Cordova. Alaska's major highways, together with secondary roads and trails, in conjunction with the Copper River itself, provide relatively good access to most of the major fisheries in the area. Principal 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.

The Alaska Department of Fish and Game (ADF&G) salmon management of the Copper River watershed and delta complex is shared between the Divisions of Commercial Fisheries and Sport Fish. The Copper River and Bering River Districts' commercial and subsistence fisheries are administered by the Division of Commercial Fisheries. Chitina Subdistrict personal use, Glennallen Subdistrict subsistence, and Upper Copper River sport fisheries are administered by the Division of Sport Fish.

MANAGEMENT PLAN BACKGROUND

Copper River District Salmon Management Plan

During the 1980 BOF meeting, the *Copper River District Salmon Management Plan* (5 AAC 24.360) was adopted. The original intent of the management plan was to allow limited Chinook salmon *Oncorhynchus tshawytscha*¹ harvest in years of sockeye salmon *O. nerka* conservation. At the 1996 BOF meeting, the plan was rewritten as an umbrella management plan for Copper River salmon fisheries. The intent of the plan was to direct ADF&G to manage the Copper River District commercial salmon fishery to achieve 1) annual sockeye salmon and “other salmon” escapement goals and 2) an annual inriver goal for salmon. The initial sockeye salmon escapement goal was a biological escapement goal (BEG) of 300,000 fish.

Currently, sockeye salmon stocks in the Upper Copper River are managed to achieve a sustainable escapement goal (SEG) of 360,000–750,000 fish. The inriver goal is measured at the Miles Lake sonar and is established annually. The components of the inriver goal are the SEG lower bound, spawning escapement of other salmon, sockeye salmon brood and surplus for the Gulkana hatchery (GH), and subsistence, personal use, and sport harvests (Table 1). The sockeye salmon SEG and other salmon targets and apportionments for personal use, subsistence, and sport fisheries in the inriver goal are fixed by regulation. However, the hatchery brood stock and surplus components are determined annually.

Copper River Chinook (King) Salmon Management Plan

There is 1 proposal currently before the BOF that concerns Chinook salmon escapement goals for the Copper River:

- Proposal 44—Establish an optimum escapement goal (OEG) of 24,000–40,000 Chinook salmon for the Copper River. The current escapement goal is an SEG of 24,000 or more Chinook salmon.

The *Copper River King Salmon Management Plan* (CRKSMP; 5 AAC 24.361) was adopted during the 1996 BOF meeting. The original purpose of this plan was to ensure that the 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 by allowing inside statistical area closures (effectively closing off most waters in the middle of the district inside the barrier islands; Figure 2) in the commercial fishery during statistical weeks 20 and 21 (14-day period with an annual start date as early as May 10 and end date as late as May 30), reducing the annual bag limit of Chinook salmon from 5 to 4 in the personal use fishery, and through a sport fish guiding closure on Tuesdays in the sport fishery.

In 1999, the BOF amended the plan. Commercial, personal use, and sport fisheries were managed to achieve a spawning escapement range of 28,000–55,000 Chinook salmon, sport fish annual limit was reduced from 5 to 4 Chinook salmon, and personal use language was removed because the Chitina Subdistrict personal use fishery was changed to a subsistence fishery. In 2003, the management plan was again revised, and the SEG was updated to 24,000 Chinook salmon or more. In 2006, the management plan was revised to direct the commissioner to open no more than 1

¹ The colloquial name *king salmon* appears as quoted material in this report (italicized); otherwise, the common name *Chinook salmon* is used.

fishing period per week during statistical weeks 20 and 21 within the inside closure area of the Copper River District.

In 2011, the management plan was revised to restrict the commercial fishery to a single 12-hour period within the inside closure area during the combined statistical weeks 20 and 21. In addition, the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591) was revised to delay the potential range of opening dates for the Chitina Subdistrict personal use dip net fishery from June 1–June 7 to June 7–June 15. Language was also added to the CRKSMP to provide management guidance for the Chitina Subdistrict personal use fishery and the Glennallen Subdistrict subsistence fishery if the commissioner determined that additional conservation measures were necessary to achieve the escapement goal.

The CRKSMP was last revised in 2014 to provide additional management authority within the Glennallen Subdistrict subsistence salmon fishery to (in order of priority) 1) establish a bag limit for Chinook salmon taken by fish wheel, 2) reduce bag limits for Chinook salmon taken by fish wheel and dip net, 3) prohibit retention of Chinook salmon taken by fish wheel and dip net, and 4) modify methods and means if additional measures are necessary to achieve the escapement goal.

STOCK ASSESSMENT INFORMATION

Run Timing and Distribution

Chinook salmon returning to the Copper River begin passing through the Copper River District and enter the Copper River in early May, headed for spawning locations in tributaries of the Upper Copper River. Run timing patterns vary among major spawning stocks, but the general run timing pattern is upriver stocks migrating up the river earlier than downriver stocks (Savereide 2005). Most of the Chinook salmon run (~85% on average) enters the river from mid-May through mid-June, and run entry into the river is essentially complete by July 1. Chinook salmon harvest timing in the commercial fishery, on average, is 50% complete by the end of May and 90% complete by mid-June.

More than 100 stocks of sockeye salmon with varied run timing characteristics migrate through the Bering River and Copper River District commercial fisheries (Figure 2). Sockeye salmon run timing in the Bering River District begins in early June and continues through mid-July, and in the Copper River District begins in mid-May and ends in mid- to late August. Three major sockeye salmon stock groupings return to the Copper River and Copper River Delta (CRD): Copper River wild stocks, GH stock, and CRD stocks. The most abundant sockeye salmon component, referred to as the Copper River wild stocks, is bimodal (e.g., 2019 Copper River daily inriver passage graph; Figure 3), and dominant early and late run components spawn in Copper River tributaries above Miles Lake. The early-timed Copper River wild stocks are in the commercial fishing district starting in mid-May, peak in late May/early June, and decline into mid-June. The late-timed Copper River wild stocks and hatchery stock sockeye salmon first enter the commercial fishing district from early to mid-June, peak in late June/early July, and decline in the fishery through August. This harvest timing in the commercial fishery is roughly 1 to 2 weeks travel time in advance of tagging work done to establish sockeye salmon run timing characteristics. The second component is an enhanced sockeye salmon run that is produced at the GH. This enhanced run has a run timing that overlaps with the late-timed Copper River (Table 2) and CRD wild stock components. The GH has been producing sockeye salmon since the early 1970s and has produced enhanced runs of up to 1.1 million fish but has recently had weak returns with 4 small runs of less than 70,000 fish occurring in the last 5 years.

In 2005–2008, a radiotelemetry study was conducted by the Native Village of Eyak (NVE) to determine spawning distribution and define migratory timing patterns of sockeye salmon in the Copper River. The spawning abundance of sockeye salmon in the major drainages was highest in the Klutina River in all 5 years and averaged 40% of the overall proportion of radiotagged sockeye salmon (Figure 4). Stock-specific run timing varied among stocks in each of the years 2005–2008 but showed a consistent pattern of upriver stocks entering first (e.g., Upper Copper River drainage and Gulkana River stocks) and lower river stocks entering last (e.g., Klutina and Tonsina River stocks; Table 2; Wade et al. 2009).

The third group, referred to as the CRD stocks, spawns in delta systems below the Chugach Mountains between Eyak Lake and the Katalla River (Figure 2). Some components of the CRD stock group have run timing that begins in mid-May, but most of the CRD run is not abundant until mid-June and continuing through late July. Much of the CRD sockeye salmon run overlaps the GH sockeye salmon run. The commercial fishery is actively managed to ensure wild stocks are not overexploited while harvesting the potentially dominant hatchery component. Escapement timing and distribution are assessed through weekly aerial surveys.

Finally, there are 2 stocks of coho salmon *O. kisutch* that return to the management area. A small upriver stock of Copper River coho salmon shares a run timing with a much larger stock that returns to streams along the CRD. Coho salmon return to the Copper River District from mid-August through October.

Escapement Enumeration

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

Miles Lake Sonar

The Miles Lake sonar project is the primary management tool for the Copper River and operates from mid-May to the end of July. Sonar passage includes all salmon species and is primarily used for inseason sockeye salmon management and estimating sockeye salmon run strength. Although Chinook salmon and coho salmon pass the sonar site, they constitute a minor portion of the total count. A species apportionment pilot project with the goal of differentiating larger-sized Chinook salmon from a mix of smaller-sized Chinook and sockeye salmon has been conducted using Adaptive Resolution Imaging Sonar (ARIS) technology since 2017. This project is slated to continue in 2021. Daily salmon escapement projections, based on average run timing and the estimated preseason total salmon run, are compared to actual daily counts to project run timing and abundance inseason. 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 the primary management tool for the Chitina Subdistrict personal use fishery because the weekly sonar counts are used to set the fishing schedules for the following week (i.e., hours open per week) through mid-August. For the month of September, the personal use fishery remains open by regulation.

Aerial Surveys

Aerial surveys of CRD/Bering River District streams (Figure 5) are conducted weekly from mid-June through mid-October. These surveys are used in conjunction with inriver counts at the Miles

Lake sonar to adjust commercial fishery periods to assure adequate escapement of sockeye and coho salmon into the CRD/Bering River District streams. Due to a large number of spawning systems in the CRD and Bering River District, 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 historical weekly escapement indices, which were calculated using 1971–2016 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 and have 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 Creeks in the Klutina River drainage) because data gathered from the Chinook salmon radiotelemetry study indicated only a minor component of the Chinook salmon run 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 provide 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 Upper Copper River Chinook salmon stocks.

Chinook Salmon Inriver Abundance Assessment

Chinook salmon spawning escapement has been estimated in part by the mark–recapture fish wheel study conducted by the NVE since 2003. The objectives of the study are to estimate the annual drainagewide inriver passage of Chinook salmon in the Copper River and to further develop an ongoing, long-term monitoring program to ensure the continued involvement of NVE in the active management of Copper River fisheries. This program provides an estimate of the number of Chinook salmon greater than 500 mm (measured snout to tail fork) passing Baird Canyon located just upriver from Miles Lake and before any inriver fisheries. The inriver abundance estimate is generated using 2-event mark–recapture techniques such that the estimates are within 25% of the actual inriver abundance, 95% of the time (Piche et al. 2016).

NVE has overcome many challenges associated with this study: targeting Chinook salmon in years of high sockeye salmon abundance, rapid changes in water level that affect sampling efficiency, and equipment malfunction or failure in a remote field location. The project has successfully provided a defensible estimate every year and has generated inriver abundance estimates for 2003–2020 (Table 3 and Piche et al. 2016).

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 33,644 in 2017, 42,678 in 2018, 35,080 in 2019, and 22,054 in 2020 (Table 4 and Botz et al. 2021).

Gulkana River 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 fish escapement to the area upstream of the counting tower. Counts are conducted from

late May to mid-August for 10 minutes of each hour every day. The 10-minute counts are expanded to provide an estimate of passage for each hour. Based on the 2002–2004 drainagewide radiotelemetry study on Chinook salmon distribution and run timing in the Copper River drainage, it was estimated that 70% of all Gulkana River Chinook salmon spawned above the counting tower (Savereide 2005). A 2013–2016 radiotelemetry study conducted on Gulkana River Chinook salmon indicated that 50% of Chinook salmon spawned upstream of the counting tower during those years (Schwanke and Tyers 2019). A second ongoing drainagewide radiotelemetry study conducted in 2019 and 2020 has indicated approximately 70% passage by the counting tower (C. J. Schwanke, Sport Fisheries Biologist, ADF&G; 2020, personal communication). Water levels in the Gulkana River during the various radiotelemetry years appear to influence upriver spawning extent.

Gulkana River tower estimates loosely track overall Copper River Chinook salmon run entry. Annual estimates of Chinook salmon escapement upstream of the counting tower generally declined from 2002 through 2017. The lowest estimate occurred in 2016 (1,044 Chinook salmon). Passage by the tower reached its highest level in 2019 (8,352 Chinook salmon). The 2020 tower count was the fourth lowest (2,418 Chinook salmon) since the project began in 2002 (Figure 6).

Gulkana Hatchery Contribution Monitoring

ADF&G and Prince William Sound Aquaculture Corporation (PWSAC) use otolith marks to monitor the contribution of sockeye salmon produced at the Gulkana River Hatchery to the Copper River fisheries. Fry are marked with strontium chloride while rearing at the hatchery; the otoliths retain this mark even after fish are released from the hatchery and mature at sea. Each week, a specific number of adult sockeye salmon harvested in the commercial fishery are sampled for contribution estimates. Otoliths are removed from these fish, and a scanning electron microscope was used to detect the strontium mark from the hatchery; the proportion with this mark is then used as the hatchery proportion of the commercial harvest for that period.

This contribution assessment has been conducted in some form since 1984. It was begun in the Chitina Subdistrict personal use dip net fishery in 1984, expanded from 2013 to 2015, and expanded again in 2019 to include the Glennallen Subdistrict subsistence fishery. Contributions were originally estimated using coded wire tags placed in juveniles but switched to otoliths in 2004. The hatchery's contribution to the personal use fishery has averaged 18%. Hatchery contributions to the Glennallen Subdistrict subsistence fishery varied widely from 2013–2015 and 2019–2020. Additional years of monitoring are needed to better define the GH contribution to the subsistence fishery.

OVERVIEW OF COPPER RIVER SALMON FISHERIES

Salmon fisheries in the Copper River primarily harvest sockeye, Chinook, 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 (Figure 1). In addition, since 1999, federal subsistence fisheries have occurred in the Glennallen and Chitina Subdistricts and the Batzulnetas area. Prior to 1999, participants in these subsistence fisheries took part in the state fisheries, and overall participation has not increased because of the federal fisheries. Since 1984,

total harvest from the 4 primary fisheries² (including federal subsistence harvest) has ranged as follows: (1) for Chinook salmon, from 10,500³ in 2020 (Figure 7) to over 87,300 in 1998; (2) for sockeye salmon, from 187,600 in 2018 (Figure 8) to 3.20 million in 1997; and (3) for coho salmon from less than 23,600 in 1997 to nearly 684,000 in 1994.

COMMERCIAL FISHERIES

The adjoining Copper River and Bering River Districts include the waters of the Gulf of Alaska between Hook Point and Cape Suckling (Figure 5).

The Copper River District is managed using 3 primary tools: 1) fish counts 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 considered (Figures 3, 9, and 10). The anticipated catch is based on the current year midpoint harvest forecast and the 1998–2007 harvest timing. The management objective is to have a fishing schedule of 2 evenly spaced periods per week starting on the first Monday or Thursday after May 15. Fishing schedules are adjusted inseason to account for variations in river flow, run timing, run strength, fishing effort, and other factors. On August 15, ADF&G’s management priority switches to coho salmon management. The Bering River District is generally managed concurrently with the Copper River District when Bering River District sockeye and coho salmon escapement aerial surveys indicate that commercial fishing is warranted.

The Copper River District’s commercial Chinook and sockeye salmon harvest has varied widely around the annual average over the last decade relative to the long-term average (1996–2020; Botz et al. 2021). Chinook salmon commercial harvest during 2010–2019 averaged approximately half of the long-term average (25 years) of 31,300 fish; the annual harvest ranged from 6,105 in 2020 to 22,500 fish in 2015 (Table 4 and Figure 7). Historically, small Chinook salmon runs in 2010, 2014, 2016, and 2020 resulted in commercial catches that all ranked as the lowest 10 years since statehood. In contrast to Chinook salmon, the 2010–2019 average sockeye salmon commercial harvest remained at a level nearly on par with the 25-year average of 1.38 million fish. However, an increased degree of annual swings in harvest, ranging from 46,500 to 2.05 million sockeye salmon over the past 10 years, has made adapting to annual variability in the harvest more challenging for fishery participants (Morella et al. 2021). Annual commercial sockeye salmon harvests in 2018 and 2020 (Figure 8 and Table 5) were the third and fifth smallest harvests, respectively, since 1889 and are central to a recent push for emergency disaster declaration funding in the gillnet fishery.

The coho salmon commercial harvest has also varied widely over the last 25 years, ranging from 18,700 to 543,000 fish (Morella et al. 2021), but during the last 10 years has acted as a stabilizing force during years of poor sockeye and Chinook salmon harvest (Table 6). During the 2018 and 2020 seasons, when the Chinook and sockeye salmon harvest values were near all-time lows, coho salmon harvest, in concert with above-average grounds prices, provided an infusion of funds into the local economy of \$6.1 and \$2.7 million, respectively (Botz et al. 2021).

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 2010 through 2019, an average of 338 permit holders per year reported retaining an average of 780 Chinook and 8,370 sockeye, or

² Does not include Copper River District subsistence and educational harvest and Copper River Delta federal subsistence harvest.

³ Includes an assumption for sport harvest that has not yet been estimated.

2 Chinook and 25 sockeye salmon per permit, from commercial harvests. Home pack of Chinook and sockeye salmon fluctuated near the 2010–2019 average, and during seasons of larger runs fishermen retained more fish from their commercial harvest. During seasons with weak returns, such as 2018, home pack retention declined. Due to a poor Copper River sockeye salmon run in 2018, the commercial fishery was closed for 41 days, and Chinook and sockeye salmon home pack harvest dropped 80% to 90% below average (Tables 4, 5, and 7). The 2020 commercial home pack harvest was 225 Chinook and 1,455 sockeye salmon (Botz et al. 2021), showing that under a weak run and conservative management scenario, like 2018, home pack harvest will be severely reduced. Low salmon abundance increased the likelihood that fish would be sold to meet financial needs instead of being kept for home pack, and historically low fishing time during these 2 years further reduced the number of opportunities to keep home pack.

SEASON SUMMARIES

There is 1 proposal currently before the BOF that concerns commercial fisheries in the Copper River and Bering River Districts:

- Proposal 18– Repeal mandatory inside-waters closure from the *Copper River King Salmon Management Plan*.

2018

The 2018 commercial fishery was notable because of a historically low sockeye salmon run, extensive fishery closures that resulted in foregone Chinook salmon harvest, and an above-average coho salmon run that substantially increased exvessel value for the fishery. Preseason plans based on the forecast of 13,000 Chinook, 942,000 sockeye, and 226,000 coho salmon in the commercial harvest⁴ required significant recalibration to adapt management to the actual runs. Due to the weak sockeye salmon harvest and inriver passage, the fishery was only open 96 hours during the sockeye run, which was the lowest number of hours fished since record-keeping began in 2013 (2013–2017 average was 791 hours). In keeping with the poor Chinook salmon forecast, closed waters described in 5 AAC 24.350(1)(B) were expanded to include inside waters east of Kokinhenik Bar, essentially closing most waters inside barrier islands east of Copper Sands (Figure 2). These closures were maintained through May 28 and affected the first 3 fishing periods prior to the extended fishery closure. Sockeye salmon harvest was below the expected harvest for the 3 commercial fishing periods that occurred prior to the month-long fishery closure, but Chinook salmon harvest in the commercial fishery was above the expected harvest for these 3 commercial fishing periods. Without the management actions in place for sockeye salmon conservation and based on early-season Chinook salmon abundance indices, inside waters would probably have been open during any fishing period after May 28, and Chinook salmon harvest would have been closer to average (Russell et al. 2021).

The commercial sockeye salmon harvest from the Copper River District was the second-lowest harvest in the last 100 years; Chinook harvest was the lowest in 60 years, and coho salmon harvest ranked fourth highest in the last 10 years, nearly 100,000 fish above the average. The commercial harvest of 7,700 Chinook salmon (Table 4) was 40% below the 2008–2017 average of 12,900 fish (Russell et al. 2021). The Copper River commercial sockeye salmon harvest of 48,100 fish (Table 5) was 95% below the projected harvest of 942,000 fish and 96% below the 2008–2017

⁴ Advisory Announcement issued on April 10, 2018 <http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/900844226.pdf>

average of 1.29 million sockeye salmon. The harvest composition of sockeye salmon commercially harvested and sold was 40,300 (87%) wild and 6,200 (13%) GH sockeye salmon (Russell et al. 2021). The coho salmon commercial harvest of 306,500 fish (Table 6) was 34% above the 2008–2017 average harvest of 226,000 coho salmon. A total of 484 of 536 total drift gillnet permits were active in the Copper River District in 2018. Fishing effort and harvest in the Copper River District peaked during the third fishing period on May 28 when 431 permits were fished and accounted for approximately 3,100 Chinook and 21,100 sockeye salmon harvested. Peak fishing effort for the coho salmon season occurred on August 30 when 288 permit holders delivered 28,300 coho salmon. Peak coho harvest occurred over 3 periods between August 20 through August 28, when an average of 261 permit holders delivered an average of 47,600 coho salmon in each of these periods (Russell et al. 2021).

The inriver goal for salmon passing the Miles Lake sonar site was 644,000–1.03 million salmon. The 2018 sonar passage estimate was 701,600 salmon (Table 3 and Figure 9), approximately 300,000 salmon less than the 2008–2017 average Russel et al. 2021). The Chinook salmon escapement estimate was 42,700 fish (Table 5), which was well above the 2008–2017 average of 25,500 fish and more than 17,000 fish above the 24,000 Chinook salmon SEG lower bound. The Copper River sockeye salmon spawning escapement estimate was 478,800 fish (Table 5), approximately 28% below 2008–2017 average 664,200 and nearly double the sockeye salmon SEG lower bound of 360,000 fish (Russell et al. 2021).

The results of CRD spawning escapement surveys indicated a weak sockeye salmon run and an above-average coho salmon run. The peak index counts within the CRD systems based on aerial surveys were 58,500 sockeye salmon (Table 5) and were within the SEG range of 55,000–130,000 fish. With the extensive closures in the commercial fishery, this level of sockeye salmon escapement provided clear confirmation that maintaining a conservative management approach throughout the sockeye salmon fishery was warranted. The coho salmon peak index counts within the CRD based on aerial surveys was 53,800 fish (Table 6) and was within the SEG range of 32,000–67,000 fish. This level of escapement, above the middle of the escapement goal range, was achieved while allowing strong commercial harvest and effort and a regular fishing schedule.

In 2018, a directed fishery on sockeye salmon in the Bering River District was not possible, but the coho salmon run ended up supporting a regular and robust fishery. The Bering River District is managed concurrently with the Copper River District fishery whenever possible. To reduce enforcement concerns associated with the line fishery on the eastern edge of the Copper River District, the western edge of the Bering River District was opened concurrently with the start of Copper River District periods beginning May 17. The remainder of Bering River District was anticipated to be closed to commercial sockeye salmon harvest until escapement levels were close to or within the anticipated weekly escapement index due to the ongoing trend in annual (2006–2017) aerial survey escapement estimates being below or near the lower end of the escapement goal. Throughout the season, only 1 weekly sockeye salmon aerial survey index count was within the target range. The aerial escapement index of 13,300 sockeye salmon was below the SEG range of 15,000–33,000 fish. The Bering River District coho salmon commercial harvest of 119,900 was the second-largest since 1995 and well above the 2008–2017 average. Aerial surveys of Bering River District coho salmon stocks produced an escapement index of 26,500 fish, which was within the SEG range of 13,000–33,000 fish (Russell et al. 2021). Like the Copper River District, the strong coho salmon escapement and harvest speak to an opportunity well met with

appropriate management action and determination on the part of the fishing fleet to make up for limited fishing opportunities early in the season.

2019

The 2019 commercial fishery was notable for above-average Chinook salmon and average sockeye salmon runs that promoted regular fishing opportunity and a coho salmon run affected by poor survival, both before and after the fishery. The 2019 commercial harvest forecast for the Copper River District was 25,000 Chinook and 756,000 sockeye salmon⁵ and laid a prudent groundwork for a May–July season that was remarkable for its relative orderliness. Fishing periods were regular and at times extended in duration, harvest remained within anticipated ranges, inriver abundance indices continually supported achieving the inriver goal, and CRD aerial surveys implied early on that peak counts were probably within the escapement goal range (Morella et al. 2021).

Due to the low Chinook salmon forecast, closed waters described in 5 AAC 24.350(1)(B) were in effect during the first 7 fishing periods. By regulation, no more than one 12-hour fishing period can occur within the inside closure area of the Copper River District described in 5AAC 24.350(1)(B) during statistical weeks 20 and 21 (the first 2 weeks of the season); however, a more conservative management approach was taken due to the Chinook salmon forecast and inseason abundance indices. Closed waters were also expanded to include inside waters east of Kokinhenik Bar, closing most waters inside barrier islands east of Copper Sands, during the sixth and seventh fishing periods. The reduction in channelized shallow water fishing area was intended to reduce Chinook salmon harvest potential while allowing for a more aggressive sockeye salmon fishery in outside waters. These closures were maintained through June 9 for all or a portion of these first 7 fishing periods.

The commercial harvest of 19,100 Chinook salmon (Table 4) was 54% above the 2009–2018 average of 12,500 fish; the sockeye salmon harvest of 1.28 million fish (Table 5) was 60% above the projected 756,000 and 1% above the 2009–2018 average of 1.27 million sockeye salmon. The harvest composition was 1.21 million (94%) wild, 39,900 (3%) GH, and 33,300 (3%) Main Bay Hatchery (MBH) sockeye salmon (Morella et al. 2021). The small contribution of MBH sockeye salmon transiting through the Copper River District to western PWS was like previous years of comparable MBH runs (~1.0 million fish), but with a similarly small contribution percentage to GH, it illustrates the degree to which the runs to GH have declined in recent years. The 2019 GH total run of 65,400 sockeye salmon was 78% below the 300,000 fish hatchery program goal. A total of 490 of 536 drift gillnet permits were active in the Copper River District in 2019. Fishing efforts peaked during the third fishing period that began May 23, when 441 permits were fished, although harvest did not peak until the sixth period (36 hours, June 3–4) with 135,000 sockeye salmon (Morella et al. 2021).

The inriver goal for salmon passing the Miles Lake sonar site was 618,000–1.01 million salmon. The 2019 sonar passage estimate was 1.04 million salmon (Table 3 and Figure 3). The Chinook salmon escapement estimate was 35,600 fish (Table 4) and well above the 2009–2018 average of 26,600 fish and more than 11,000 fish above the 24,000 Chinook salmon SEG lower bound. The Copper River sockeye salmon spawning escapement estimate was 719,500 fish (Table 5), approximately 8% above the 2009–2018 average of 664,000 and nearly double the sockeye salmon SEG lower bound of 360,000 fish. The peak index counts within CRD systems based on aerial

⁵ Advisory Announcement issued on April 15, 2019 <http://www.adfg.alaska.gov/static/applications/DCFnewsrelease/1026468392.pdf>

surveys were 61,825 sockeye salmon (Table 6) and were within the SEG range of 55,000–130,000 fish (Morella et al. 2021).

The coho salmon commercial harvest of 78,300 fish (Table 6) was below the 2009–2018 average harvest of 235,000 coho salmon. The season started in mid-August on a conservative note due to a poor harvest performance in advance of the fishery. After 3 weekly fishing periods, the season was put on hold, pending improvements in escapement indices, and never reopened. Drought conditions in advance of the fishery lowered the water table and increased water temperatures across the CRD, and continued well into escapement timing. This translated to fish holding in the fishing district and in lower portions of drainages late into run timing. Infrequent precipitation events caused water levels to rise for short periods of time and resulted in multiple stranding events. Once weather patterns shifted, and more frequent rain events elevated and sustained the water table, the extended fishing closure through September and into October began to show results in terms of improving escapement indices. By the end of October, the coho salmon spawning escapement goal for the CRD was achieved with 37,000 fish in peak index counts (Table 6), 5,000 fish over the lower end of the goal (Morella et al. 2021).

To reduce enforcement concerns associated with boats fishing over the eastern boundary line of the Copper River District, a small western section of the Bering River District was opened concurrently with Copper River District fishing periods between May 16 and June 11. Historically, this enforcement issue was most noticeable when salmon run entry into the district was from the east and concentrated near the Martin Islands on the Copper River District boundary. These islands and the associated reef extend approximately 1.5 miles from the mainland shore and cause salmon to aggregate while moving around this promontory, creating an incentive to fish illegally in front of gear legally set on the line and increase harvest potential. Moving the line into the Bering River District resulted in less concentrated fish movement at the line and therefore less incentive to fish illegally.

Between June 12 and June 30, the Bering River District was closed to commercial fishing due to an increase in run timing overlap with Bering Lake sockeye salmon. Bering Lake escapement, with minimal fishing effort over the last 10 years, has indicated minimal salmon surplus above escapement needs. The first aerial survey of the Bering River District was flown during the week ending June 15. Only 310 sockeye salmon were observed during this survey. With a weekly escapement target range of 3,250–7,150 sockeye salmon, the continued closure of the district to commercial fishing was warranted. The next survey was flown during the week ending June 29 and resulted in an escapement count of 13,400 fish, which was near the upper end of the weekly escapement index range of 6,090–13,400 sockeye salmon (Morella et al. 2021).

Because the escapement count was near the upper range of the escapement index, the fishery was opened in the entirety of the district, concurrent with the Copper River District, starting July 1. By the end of the sockeye salmon season, the aerial escapement index of 17,600 sockeye salmon was within the SEG range of 15,000–33,000 fish. Total sockeye salmon harvest in the district was 21,000 fish, most of which occurred early in the season when the western portion of the district was open to target Copper River District-bound fish (Morella et al. 2021).

The coho salmon fishery in the Bering River District followed the schedule implemented in the Copper River District. Harvest and effort tracked a similar pattern to aerial survey observations but peaked about 4 to 6 weeks before the highest escapement observation. The Bering River District experienced low fishing pressure during the 2019 season, and the fishery remained closed

for the season after September 3 due to low harvest early in the season and continued low escapement indices. A total of 76 permits fished during the season, and peak coho salmon fishing effort of 15 permits fished during the 24-hour period began August 26, when the peak harvest of 4,570 coho salmon occurred. Harvest and effort declined to 5 permits fished and 1,980 coho salmon harvested during the final fishing period of the season on September 2. Aerial surveys of coho salmon produced an escapement index of 9,590 fish, which was below the SEG range of 13,000–33,000 fish (Morella et al. 2021). These survey results were affected by the drought and a Jökulhlaup event originating from Berg Lake in the upper reaches of the Bering River drainage complex. Glacial floodwaters obscured survey index reaches in this drainage complex for weeks, coinciding with what would normally be the timing for peak counts.

2020

The 2020 commercial fishery was noteworthy for historically low Chinook and sockeye salmon runs to the Copper River that necessitated conservative management, resulting in low commercial catch and escapement near or below escapement goals for these 2 species. A near-average coho salmon run that substantially increased exvessel value for the fishery highlighted the importance of this late-season fishing opportunity. Like 2018, fishing time was heavily curtailed in response to a weak sockeye salmon run, but in contrast to 2018, the Chinook salmon run was also weak. This provided a 2-pronged justification for keeping the fishery on a conservative footing via extended and expanded inside closures, short-duration fishing periods, and no more than 1 fishing period every 1 or 2 weeks for most of the season (Botz et al. 2021).

The 2020 commercial harvest forecast for the Copper River District at 771,000 sockeye salmon⁶ was below the 2010–2019 average harvest (Table 4), and the common property (all fishery) Chinook salmon harvest forecast estimate of 36,000 fish⁷ was above the 2010–2019 average harvest (Table 5). Due to the above-average Chinook salmon forecast, closed waters described in 5 AAC 24.350(1)(B) were only anticipated to be utilized during statistical weeks 20 (May 10–May 16) and 21 (May 17–May 23). Chinook salmon harvest was near the semi-weekly anticipated harvest point estimate on the second fishing period (May 18). Sockeye salmon harvest remained well below anticipated harvest levels for the first 2 fishing periods and signified that a shift to a conservative fishing schedule of once a week or less was in order. Due to reduced overall exploitation potential for Chinook salmon, inside waters were open during the third fishing period, May 25. Poor Chinook salmon harvest during the third fishing period resulted in the inside closures being implemented again with an expansion of the closure area to include inside waters east of Kokinhenik Bar, essentially closing most waters inside barrier islands east of Copper Sands (between Egg Island and Pete Dahl channels; Figure 2). These expanded closures were maintained into the first week of July, accounting for any remaining Chinook salmon run overlap. Sockeye salmon harvest was below semi-weekly harvest projections during all commercial fishing periods (Botz et al. 2021).

From the May 18 fishing period until the start of the coho salmon fishery on August 17, the commercial fishery was prosecuted on a schedule of 1 period a week or less, amounting to a total of 84 hours fished for the entirety of the Chinook and sockeye salmon season (2015–2019 average was 515 hours). A total of 465 drift gillnet permits were active in the Copper River District in 2020, a continuation of the steady decline in effort seen over the last 3 years. Fishing effort in 2020

⁶ Advisory Announcement issued on April 15, 2020 <http://www.adfg.alaska.gov/static/applications/dfnewsrelease/1146516292.pdf>

⁷ Advisory Announcement issued on April 15, 2020 <http://www.adfg.alaska.gov/static/applications/dfnewsrelease/1146516292.pdf>

peaked on May 25 with 434 permits fished during a 12-hour opening. Peak Chinook salmon harvest occurred on May 18 when 1,880 Chinook salmon were harvested during a 12-hour fishing period (Botz et al. 2021). The commercial harvest of 6,100 Chinook salmon (Figure 7) was 57% below the 2010–2019 average harvest of 14,200 (Table 4). Peak sockeye salmon harvest occurred on May 25, when 34,700 sockeye salmon were harvested during a 12-hour fishing period (Botz et al. 2021). The Copper River sockeye salmon commercial harvest of 103,700 (Figure 8) fish was 93% less than the 2010–2019 harvest average of 1.31 million sockeye salmon (Table 5). The number of wild sockeye salmon in the Copper River District commercial harvest was 88,400, or 85% of the total sockeye salmon catch. The GH contribution to the sockeye salmon commercial harvest was 10,100, or 10% of the Copper River District harvest. Main Bay Hatchery contributed 5,500 fish or 5% of the Copper River District harvest (Botz et al. 2021).

Chinook and sockeye salmon inriver passage targets and escapement levels were consistently low in 2020. The sonar estimate was 530,313 salmon and was below the 661,000–1,050,000 inriver goal range (Table 3 and Figure 10). The estimate of inriver Chinook salmon abundance indicated that spawning escapement was 22,100 fish and was below the lower bound SEG of 24,000 fish. The Copper River sockeye salmon escapement estimate (calculated by subtracting out the estimate of Chinook salmon inriver abundance and inriver sockeye salmon harvest from the Miles Lake sonar estimate) was 365,000 fish and near the lower bound of the SEG, 360,000 fish. Spawning escapement to CRD systems based on aerial survey indices was 55,620 sockeye salmon and was just within the SEG range of 55,000–130,000 fish (Botz et al. 2021).

The Copper River District season total coho salmon commercial harvest of 170,100 fish (Botz et al. 2021) was below the 2010–2019 average harvest of 223,000 coho salmon (Table 6). The coho salmon fishery provided 50% of the Copper River District exvessel value in 2020. The average grounds price of \$1.40 per pound and an average fish weight of 8.42 pounds per fish equaled a total exvessel value of just over \$2.0 million for this fishery. The Chinook and sockeye salmon fishery also had an exvessel value of just over \$2.0 million (Botz et al. 2021). However, in an average year, like 2019, this fishery can be worth close to \$24.0 million (Morella et al. 2021). Peak fishing effort during the coho salmon season occurred during the 24-hour fishing period that started Monday, August 24, when 262 permit holders harvested 43,040 coho salmon. Peak coho salmon harvest occurred during the fishing period on the following Monday when 44,900 fish were harvested. CRD coho salmon spawning escapement of 36,425 fish was near the lower end of the SEG range of 32,000–67,000 fish (Botz et al. 2021).

Bering River District sockeye and coho salmon fisheries in 2020 were prosecuted in a similar manner to 2018 and 2019 fisheries. Inseason aerial survey escapement estimates trended near or below the anticipated inseason weekly index, and the fishery remained closed or restricted to the western edge of the district throughout the sockeye salmon season. No sockeye salmon commercial harvest was reported prior to August 15, during the sockeye salmon season (Botz et al. 2021), and the 2010–2019 harvest average was 4,100 fish. The aerial escapement index of 15,685 sockeye salmon was within the SEG range of 15,000–33,000 fish. The coho salmon commercial harvest of 65,100 fish was on par with the 2010–2019 harvest average of 63,000 fish (Botz et al. 2021). Commercial fishing effort in the Bering River District coho salmon fisheries was high due to productive fishing in the adjoining eastern portion of the Copper River District. Bering River District coho salmon spawning escapement of 25,825 was within the SEG range of 13,000–33,000 fish (Botz et al. 2021).

GULKANA HATCHERY

The GH 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 PWSAC. The donor stock for the facility was the local wild stock at the hatchery site on the Gulkana River. The GH was expanded to 2 facilities in 1986. The 2 facilities combined have produced an average of 21.6 million fry annually over the last 10 years. The GH 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 broodstock needs and create an additional surplus of enhanced sockeye salmon at the hatchery and the Crosswind Lake remote release site. Because 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* (5 AAC 24.360).

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 the increased survival of sockeye salmon released in Crosswind Lake, the forecasted hatchery surplus has ranged from 9,400 fish in 2019 to 136,036 fish in 2010 (Table 1). The GH stocks are intermixed with other sockeye salmon stocks and other salmon species to the extent that no targeted harvest can occur within either the commercial or inriver fisheries. The GH broodstock needs are estimated annually and included in the Copper River inriver goal. From 1986 through 2019, the broodstock escapement component within the inriver goal has been 20,000 sockeye salmon. Sockeye salmon surplus to broodstock needs is required to ensure that the broodstock escapement objectives are realized. This surplus varies from year to year based on the magnitude of the hatchery run forecast and is added into the inriver goal. Adequate fish should be available for broodstock needs at GH if the Copper River inriver goal is attained at the Miles Lake sonar. Starting in 2020, due to broodstock shortfalls in recent years at GH with standard hatchery surplus assumptions, the inriver broodstock surplus assumption was adjusted upward to increase the likelihood of meeting broodstock escapement needs.

ADF&G and PWSAC created a *Basic Management Plan* (BMP) for GH 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 hatchery shortfalls have highlighted the difficulty in managing hatchery broodstock needs. The GH is at the upper extent of the river drainage, and sockeye salmon returning to the hatchery must pass through 4 fisheries and navigate hundreds of river miles before reaching hatchery release sites. Under a weak hatchery run scenario, the predominant wild stocks in the fisheries tend to support the harvest of available surplus and prevent conservation actions that would be needed to specifically manage for the hatchery run. Annual runs from 2015–2019 and 2010–2019 averaged less than 300,000 sockeye salmon (range of 65,100–580,900; Botz et al. 2021).

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 supports ADF&G's efforts to manage the wild stock priority while efficiently utilizing the enhanced sockeye salmon component of the run.

PERSONAL USE FISHERY OVERVIEW

There is only 1 personal use salmon fishery in the Upper Copper River. This occurs in the Chitina Subdistrict of the Upper Copper River District. The Chitina Subdistrict was classified as a personal use fishery in 1984 and is managed under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591; Somerville 2017). Only Alaska residents may participate in the Copper River personal use salmon fishery. The subdistrict consists of the mainstem Copper River between the downstream edge of the Chitina-McCarthy Bridge and an ADF&G marker located about 200 yards upstream of Haley Creek in Wood Canyon (Figure 11).

From 1984 to 1990, dip nets were the primary legal gear in the Chitina Subdistrict personal use fishery, but fish wheels were also allowed in a small section of the subdistrict. Since 1991, only dip nets have been allowed in the Chitina Subdistrict. Dip nets are fished from shore or from a boat. Based on anecdotal reports, boats have been used for accessing and dipnetting in the Chitina Subdistrict since the 1960s and have increased in use with the construction of the Chitina-McCarthy Bridge in 1971 and improvements to the Copper River Railroad Right-of-Way. ADF&G required permit holders to report fishing from a boat or shore beginning in 2001. During 2014–2018, an average of 19% of all permits fished in the Chitina Subdistrict fished from boats, and those permits accounted for 24% of total sockeye salmon and 27% of total Chinook salmon harvest. In addition to personal boats, permit holders can charter drop-off services from transporters (there are 2 such operators) to fish sites accessible primarily or exclusively by boat. Permit holders may also charter boat operators who take them out for a specified number of hours of dipnetting from the boat.

The personal use fishery is opened weekly by emergency order (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 report online upon completion of fishing for the season. The BOF has mandated that Alaskans may participate in either the state subsistence or state personal use fishery in the Upper Copper River drainage, but not both. Some rural residents of the Copper River Basin that are federally qualified may choose to have a combination of federal and ADF&G permits to access both subdistricts.

There are 11 proposals currently before the BOF that concern personal use fisheries in the Copper River drainage:

- Proposal 6 – Require inseason reporting of subsistence, sport fish, and personal use harvest and effort.
- Proposal 8 – Prohibit dipnetting near tributary mouths of the Upper Copper River District.
- Proposal 10 – Prohibit dipnetting from a boat in the Upper Copper River District.
- Proposal 11 – Prohibit dipnetting from a moving boat in a portion of the Chitina Subdistrict.
- Proposal 12 – Prohibit dipnetting from a boat when within 50 feet of a person dipnetting from shore in the Chitina Subdistrict.

- Proposal 15 – Prohibit the use of monofilament or gillnet mesh in dip nets prior to August 15.
- Proposal 16 – Prohibit the use of depth or fish finders on boats in the Upper Copper River District.
- Proposal 18 – Extend the lower boundary of the Chitina Subdistrict downstream one-half mile.
- Proposal 19 – Reduce the maximum harvest level in the Chitina Subdistrict personal use fishery when the Copper River commercial fishery harvest is 50% below the 10-year average on June 1.
- Proposal 20 – Amend the annual limit for salmon in the Chitina Subdistrict.
- Proposal 21 – Amend the opening date of the Chitina Subdistrict personal use fishery from June 7 to June 1.

Prior to 1997, the annual limit for a personal use salmon fishing permit was 15 salmon for a household of 1 person and 30 salmon for a household of 2 or more persons, of which no more than 5 may be Chinook salmon. In 1998, the BOF passed a proposal that allowed permit holders, who had filled their original limit, to take 10 additional sockeye salmon under a supplemental permit in weeks when a harvestable surplus of 50,000 salmon or greater was available in the Chitina Subdistrict. In addition, the BOF added language to the *Copper River District Salmon Management Plan* (5 AAC 24.360) that required the maximum harvest level for the Chitina Subdistrict to be reduced to 50,000 salmon if the Copper River District commercial salmon fishery was closed for 13 or more consecutive days. In 2000, when the BOF made a positive customary and traditional (C&T) determination for the Chitina Subdistrict, making it a subsistence fishery rather than personal use, it reduced the Chinook salmon component of the annual limit to 1 Chinook salmon and retained this 1 fish limit when they reversed the C&T determination prior to the 2003 season. In 2015, the BOF changed the total annual limit for each personal use salmon fishing permit to 25 salmon for the head of household and 10 salmon for each dependent of the permit holder, except that only 1 Chinook salmon may be retained per household. The BOF also removed the supplemental permits for additional sockeye salmon during weeks of surplus salmon passage. In 2017, the BOF removed the requirement to reduce the maximum harvest level for the Chitina Subdistrict to 50,000 salmon if the Copper River District commercial salmon fishery was closed for 13 or more consecutive days.

Prior to 1997, the maximum harvest for the personal use fishery was 60,000 salmon, as established in the *Copper River District Salmon Management Plan* (5 AAC 24.360), and this amount is included as part of the inriver goal ADF&G is mandated to manage the commercial fishery for each season. From 1997 to 1999, the maximum harvest level for the personal use fishery was increased to 100,000 salmon, excluding fish in excess of the inriver goal and not including any salmon harvested after August 31. 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. This harvest range has remained in place following the change of the Chitina Subdistrict back to a personal use fishery in 2003.

Each year, a tentative fishing schedule is established by EO and is based on the preseason apportionment of salmon to the fishery within the inriver goal. The management plan requires that the harvest be distributed throughout the season, based upon the projected sonar counts. Weekly fishing periods are determined using the projected weekly sonar passage and applying the 5-year average catch per hour to the weekly harvest apportionment. The first opening can occur no sooner than June 7 and must occur before June 15. Inriver salmon passage 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 the end of August. Weekly fishing periods are adjusted inseason, by EO, based upon actual sonar counts. When the weekly sonar passage falls below the projected passage, fishing time is reduced. When weekly sonar passage exceeds the projected passage, fishing time is increased, with a maximum of 168 hours per week (Tables 8–10).

Prior to 2000, personal use permits were only issued from the ADF&G office in Chitina, and harvest in the Chitina Subdistrict personal use fishery was estimated weekly from permits that were returned after each fishing trip. Beginning in 2000, permits were available from ADF&G offices in Anchorage, Fairbanks, Glennallen, and Palmer to provide additional service to the dipnetting public, reduce fishery operating costs, and prevent excessive delays (up to 3 hours) at the Chitina ADF&G 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. Beginning in 2016, Chitina Subdistrict permits could also be obtained online, and harvest could be reported online or by mailing in the harvest report prior to October 15. Beginning in 2020, permits were only available online, and households were required to report their harvest online by October 15. Expanding the availability of permits has prevented the inseason estimation of weekly harvest and participation since 2000. However, because the fishery is managed using the abundance of salmon passing the Miles Lake sonar and over 30 years of daily effort and harvest data are available, the lack of inseason harvest data has not adversely influenced inseason management decisions.

Harvest data have been collected since the fishery was established in 1984. Harvest in the Chitina Subdistrict personal use dip net fishery was relatively stable from 2000 through 2012 (Figure 12). Over this period, harvest ranged from a low of 86,301 salmon in 2003 to a high of 143,937 salmon in 2010 and averaged about 117,000 salmon. Annual fluctuations in the harvest result from changes in participation, the abundance of fish, and river flow conditions. There was a marked increase in harvest from 2013 to 2015 and again in 2019, for an average of 189,000 salmon for these 4 years (Figure 12). These high harvest years occurred when sonar passage was at historical highs and was near or exceeded a million salmon. 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. Conversely, dipnetters may choose not to fish when the passage is low.

Sockeye salmon account for 97% of the Chitina Subdistrict harvest on average (Figure 12) and dominate the harvest until the second week in September. Sockeye salmon harvests typically peak in the second and third week of June with a smaller GH-generated peak in the second to third week of August. Chinook salmon make up about 1.3% of the Chitina Subdistrict harvest, peaking during the first 3 weeks of June and continuing in small numbers through August. Chinook salmon annual harvests declined from an average of about 5,000 fish prior to 2000 to approximately 2,500 fish from 2000 through 2008, due to the bag limit reduction to 1 Chinook salmon in 2000. Since 2009, Chinook salmon returns have been below average, and the retention of Chinook salmon in the Chitina Subdistrict has been prohibited during part of the personal use season in all years since, except for 2015, 2018, and 2019. The average Chinook salmon harvest in the personal use fishery has been 1,130 fish since 2009. Coho salmon account for about 1.4% of the Chitina Subdistrict harvest; they begin to appear in the fishery in August and dominate the catch by the second week of September. Coho salmon harvests have averaged about 2,000 fish since 1997 and have ranged from 723 to 3,657 fish annually.

Annual harvest fluctuates directly with the number of permits issued each year and inriver fish passage numbers (Figure 12). Increased participation usually reflects strong sockeye salmon returns and media coverage of the fishery. In other words, strong returns generate a higher effort and higher harvests. 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, and the level of conflict with private property owners. Since 1984, the number of permits issued for the Chitina Subdistrict personal use fishery has averaged 7,802 permits and ranged from 4,031 permits in 1986 to 12,635 permits in 2015. Over the last 10 years, the fishery has averaged 9,797 issued permits and ranged from 4,982 in 2018 to 12,635 in 2015.

SEASON SUMMARIES

2018

The 2018 Copper River sockeye salmon return was one of the weakest on record, especially during the early weeks of the return, and sonar passage quickly fell behind preseason projections. As a result, the Chitina Subdistrict personal use fishery opened by EO on June 9, 2 days later than the preseason scheduled date of June 7 (Table 8). The opening during the second week was also reduced from the preseason schedule. The commercial fishery was closed after the third period on May 28 and remained closed through mid-August. Although daily sonar passage improved with the commercial closure, it remained well below projected, and cumulative passage was 30% below expected on June 24. Although enough fish were passing the sonar to justify fishing time in the Chitina Subdistrict according to the management plan, it was unclear whether the Copper River sockeye salmon lower-bound escapement goal could be met. Therefore, the Chitina Subdistrict was closed under general EO authority for the third through fifth weeks. The latter portion of the sockeye return was stronger but highly variable and was sufficient to allow limited fishing time for 42–168 hours each week from July 12 through August 31.

2019

The 2019 sockeye and Chinook salmon inriver passage were strong throughout 2019, and no restrictive management actions were required. The Chitina Subdistrict personal use fishery was opened, by EO, on June 7 (Table 9) and remained open for the rest of the season. Sonar passage was 11,531–90,714 salmon above weekly preseason projections throughout the season.

2020

In 2020, sockeye and Chinook salmon runs were both weak and required restrictive action to achieve the lower bound escapement goals for each species. The Chitina Subdistrict personal use fishery season was opened by EO on June 7 (Table 10). Although the sonar counts remained 1,330–49,151 fish below the weekly expected passage and cumulative sonar passage indicated the lower-bound sockeye salmon goal may not be achieved, some fishing opportunity was allowed each week through the eighth week of the season. In all these weeks, except for weeks 4 and 5, fishing time was restricted under general EO authority beyond what the *Chitina Subdistrict Personal Use Dip Net Fishery Management Plan* (5 AAC 77.591) would normally allow. Unlike in 2018, the later portion of the return was extremely weak and required the complete closure of the Chitina Subdistrict in August. Retention of Chinook salmon in this fishery was closed effective June 22.

SUBSISTENCE SALMON FISHERIES

Subsistence fishing is restricted to 3 areas: 1) the Copper River District; 2) the Upper Copper River District (Glennallen Subdistrict); and 3) the Batzulnetas area (Figure 13). Of the 3 subsistence areas, the Upper Copper River District has the highest effort and harvest. The U.S. Fish and Wildlife Service also manages subsistence fisheries in the Copper River drainage through the U.S. Forest Service Chugach National Forest (Copper River District) and the National Park Service–Wrangell-St. Elias National Park and Preserve (WRST-NPS; Chitina and Glennallen Subdistricts and Batzulnetas area).

UPPER COPPER RIVER DISTRICT SUBSISTENCE FISHERIES

Under State of Alaska regulations, there are 2 subsistence fisheries in the Upper Copper River District. The Glennallen Subdistrict subsistence fishery is managed by ADF&G under the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647). All Alaskans are eligible to participate in this subsistence fishery based on the McDowell decision in 1989. 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, but not both. There is a second subsistence fishery upstream of the Upper Copper River District which occurs near the traditional Native village site of Batzulnetas at the confluence of Tanada Creek and the Copper River. A household can only receive 1 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 under state regulations.

There are 11 proposals currently before the BOF that concern subsistence fisheries in the Upper Copper River drainage:

- Proposal 6 – Require inseason reporting of subsistence, sport fish, and personal use harvest and effort.
- Proposal 7 – Prohibit guiding in subsistence finfish fisheries.
- Proposal 8 – Prohibit dipnetting near tributary mouths of the Upper Copper River District.
- Proposal 9 – Prohibit dipnetting from a boat in the Glennallen Subdistrict.
- Proposal 10 – Prohibit dipnetting from a boat in the Upper Copper River District.
- Proposal 11 – Prohibit dipnetting from a moving boat in a portion of the Chitina Subdistrict
- Proposal 13 – Prohibit dipnetting from a boat within 75 feet of an operating fish wheel in the Glennallen Subdistrict.
- Proposal 14 – Prohibit the use of monofilament or gillnet mesh in dip nets.
- Proposal 15 – Prohibit the use of monofilament or gillnet mesh in dip nets prior to August 15.
- Proposal 16 – Prohibit the use of depth or fish finders on boats in the Upper Copper River District.
- Proposal 17 – Establish specific permit and bag limits when dipnetting from a boat in the Glennallen Subdistrict.

Glennallen Subdistrict Subsistence Fishery

The Glennallen Subdistrict of the Upper Copper River District opens June 1 through September 30 for continuous subsistence fishing in all waters of the mainstem Copper River upstream of the Chitina-McCarthy Bridge to the mouth of the Slana River (Figure 13). During the 2005 BOF

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 amounts reasonably necessary for subsistence (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. The ANS amounts were developed from the 3 high years of reported harvest amounts from each subarea between 2000 and 2004 (Somerville 2017).

Fish wheels and dip nets are the traditional and currently legal gear in the Glennallen Subdistrict, only 1 of which may be specified on the permit for the season. Fish wheels have always been allowed in the Glennallen Subdistrict, and dip nets have been allowed in all years except 1979–1983. Dip nets are fished from shore or a boat. Based on anecdotal reports, boats have been used for accessing the Upper Copper River and dip netting since the 1960s and increased in use with the construction of the Chitina-McCarthy Bridge in 1971 and improvements to the Copper River Railroad Right-of-Way. In 2010, the number of subsistence dip net permits in this fishery began to increase while the number of fish wheel permits began to decrease (Table 11). Dip net permits exceeded fish wheel permits starting in 2012. The increase in dip net versus fish wheel permits reflects some shift in households that fished the Chitina Subdistrict personal use fishery to the subsistence fishery as well as displacement of households from traditionally fished fish wheels just above the Chitina-McCarthy Bridge but also reflected an increase of households newly entering the Copper River fisheries and choosing to fish in this subdistrict versus the Chitina Subdistrict. There are more options for subsistence permit holders to access the fishery by dipnetting, especially from a boat, versus from shore or building and locating a fish wheel or gaining permission to participate on an existing fish wheel. Additionally, charters are available, offering drop-off services for shore-based dipnetting or dipnetting from the chartered boat. Although the total number of permits issued in this fishery has increased by 30%, the overall harvest in this fishery has remained about the same or even slightly decreased since before 2010.

Participants are allowed 1 permit per household, and the permit identifies the gear type to be used. The limit is 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. Glennallen Subdistrict 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. Harvest reports must be returned to ADF&G by October 31 each year.

Harvests in the Upper Copper River subsistence fisheries have been estimated since 1965. Through 2011, the total harvest in the Glennallen Subdistrict subsistence fishery was less than 90,000 fish annually (Table 11 and Figure 14). However, due to multiple years of record-high inriver entry of sockeye salmon to the Copper River, total harvest significantly increased from 2012 to 2015, peaking at 111,689 salmon in 2015. Sockeye salmon harvests have since declined, and the total harvest in 2020 was about 46,000 fish. Sockeye salmon are the primary species harvested in this fishery for an average of 96% of the harvest over the 2010–2019 average (Figure 14).

In 1999, federal regulations were adopted for Copper River subsistence fishing, but because federal and state regulations were identical, both federal and state subsistence users participated in the

fisheries under the state subsistence permit in 1999–2001. In 2001, because 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, but state subsistence users must 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. Harvest under federal permits accounts for about 23% of the overall subsistence harvest each year.

In 2005, the WRST-NPS enforced NPS 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 NPS regulations do allow subsistence uses by residents of the federally determined rural resident zone within national park boundaries. Enforcement of these regulations prohibited subsistence fishing by nonrural 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 WRST-NPS. As a result, no state subsistence fishing permits have been issued for this portion of the Glennallen Subdistrict since 2004. Only those rural residents that qualified for federal subsistence salmon harvest in the Glennallen Subdistrict were issued permits to fish in this area. This action excluded approximately 10 Alaska resident households, which 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

A second state subsistence fishery is also allowed in a portion of Tanada Creek, near the traditional Native fishing site of Batzulnetas, 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 Batzulnetas 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 the 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.

There are no proposals affecting the Batzulnetas area subsistence fishery.

No state permits have been issued for the Batzulnetas fishery since 2000. No state permits were requested from 2001 to 2004, and since 2005 none have been issued due to WRST-NPS enforcement of NPS regulation 36 CFR 2.3. The relatively small harvest in this fishery fluctuates widely from year to year depending on effort (usually fewer than 4 permits), water levels, and abundance of fish. Since 2001, harvest under federal permits has averaged 144 sockeye salmon with a maximum of 867 sockeye salmon in 2013 and harvests ranging from 0 to 468 sockeye salmon from 2015 to 2019 (D. Sarafin, Fisheries Biologist, Wrangell-St. Elias National Park and Preserve, National Park Service, Copper Center AK; unpublished data, 2021). Federal harvest reports are due by December 31 each year. As a result, this report contains no Batzulnetas area subsistence fishery harvest data for 2020.

CORDOVA AREA SUBSISTENCE FISHERIES

Boundary lines for subsistence fishing at the mouth of the Copper River are the same as for the commercial gillnet fishery. This is the primary salmon subsistence fishery for Cordova area residents with minor participation of people from outside the area. 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 during commercial fishing periods, by EO, and on Saturdays. Within the 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 BOF has found that 19,000–32,000 salmon are reasonably necessary for subsistence (5 AAC 01.616(b)(2)). This 2-tier ANS signifies that the commercial fishery plays an important role in meeting subsistence needs. Salmon removed from commercial catch as home pack is often used for subsistence purposes and supplement Copper River District subsistence catches. Without an annual commercial fishery, the ANS jumps over 6-fold in the subsistence fishery to ensure more harvest opportunity is provided in this fishery. 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 2010 to 2019, an average of 210 subsistence permit holders that reported fishing harvested an average of 2 Chinook salmon per year per permit (Table 7). The number of subsistence permits fished in the Copper River District has increased in the last 3 years since subsistence fishing periods on Saturdays have been implemented. The 2018 through 2020 seasons were the highest levels of participation in the last 10 years (Botz et al. 2021).

Currently, there is 1 proposal before the BOF that concerns subsistence fisheries in the Copper River District:

- Proposal 66 – Amend household harvest limits for subsistence caught salmon.

SPORT FISHERIES

Sport fisheries targeting salmon in the Upper Copper River drainage occur mainly on tributaries of the Copper River (Figure 15). Sport harvest and effort have been estimated annually since 1977 by a mail survey. The survey does not separate effort by species, but most effort in the major tributaries are probably directed at salmon. From 2015 to 2019, sport anglers annually expended an average of 23,351 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 76,772 angler-days were expended (Somerville 2017). Since 2000, angler effort in the Upper Copper River drainage declined to a low of 25,244 angler-days in 2018. The majority of salmon fishing effort is directed towards salmon in the Gulkana, Klutina, and Tonsina Rivers.

There are 2 proposals currently before the BOF that concern salmon sport fisheries in the Copper River drainage:

- Proposal 30 – Extend single-hook, artificial fly regulations in the Gulkana River to include the area under the Richardson Highway Bridge.
- Proposal 31 – Increase the possession limit for sockeye salmon in the Upper Copper River.

Sport fisheries for salmon in the Copper River primarily target Chinook and sockeye salmon. The fisheries occur in various tributaries to the Copper River, and the largest harvest occurs in the Gulkana and Klutina Rivers (Figures 16–18). The Chinook salmon fishery was traditionally the most important recreational salmon fishery in the Copper River in terms of effort and economic value. However, when Chinook salmon returns declined after 2008, sockeye salmon returns increased during 2010–2015, and area sockeye salmon fisheries gained in economic importance and angling effort, particularly in the Klutina River increased. Sport harvest of Chinook salmon from the Upper Copper River drainage increased through 1996 when the harvest peaked at 9,116 Chinook salmon (Somerville 2017). Since 1996, the sport harvest of Chinook salmon from the Upper Copper River drainage has declined 74% to an average of 1,122 Chinook salmon from 2014 to 2018 (Somerville 2017). Sport fishery restrictions such as reduced annual limits, no retention, and full closures have contributed to these low Chinook salmon harvest rates since 2009. 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 the Upper Copper River drainage sport fisheries has been increasingly regulated and restricted to ensure sustainable escapements (Somerville 2017). Regulations imposing bag and annual limits have been implemented, and the annual limit was reduced from 5 to 4 Chinook salmon. Various tributaries of the Copper River and streams and lakes in the drainage have been closed over the years by regulation to either bolster escapements of stocks that showed declines or to protect discrete stocks from overexploitation. Currently, all these waters are closed to sport fishing for Chinook salmon: Fish, Indian, Bernard, Ahtell, and Natat Creeks, and the Little Tonsina River; 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; 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; the Slana River drainage; and Sinona Creek. In addition to these closed waters, the Gulkana River below the Richardson Highway Bridge is restricted to single-hook, artificial flies, and the gap between point and shank three-quarter inches or less from June 1 through July 31. Finally, in 2008, the BOF 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 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.

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, and 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.

The Gulkana River is open to sport fishing for Chinook salmon from January 1 through July 19. The closure is intended to protect spawning fish (spawning begins in mid-July and continues through late August). The Gulkana River downstream of 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 downstream of a marker 7.5 miles upstream from the West Fork confluence

to the Richardson Highway Bridge, methods and means are liberalized to allow bait and treble hooks during the Chinook salmon season.

The 1993 harvest of 5,892 Chinook salmon was the largest on record from the Gulkana River and accounted for 72% of the sport harvest of Chinook salmon in the Copper River drainage that year (Somerville 2017). Sport harvest of Chinook salmon in the Gulkana River peaked during the late 1990s, and annual harvests often exceeded 4,000 fish. Harvests have declined since those days and have been below 1,500 fish since 2008 (Figure 16). Due to low Chinook salmon run numbers, the Gulkana River sport fishery has been restricted through reduced annual limits, catch-and-release fishing only, or complete closure each year from 2009 through 2020 except in 2015, 2018, and 2019 when there were no restrictions on this sport fishery. As a result of these restrictions, sport fishing effort declined from over 30,000 angler-days per year in the late 1990s to a low of 8,013 angler-days in 2018. Sport harvest of Chinook salmon in the Gulkana River averaged 544 fish from 2014 to 2018 (Figure 16).

KLUTINA RIVER CHINOOK SALMON FISHERY

The Klutina River supports the second-largest sport fishery for Chinook salmon in the Upper Copper-Upper Susitna Management Area. The fast water of the Klutina River limits the number of resting pools for Chinook salmon; therefore, there are fewer 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, and the run continues 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 is open 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.

Like the Gulkana River, the sport harvest of Chinook salmon in the Klutina River peaked during the late 1990s at 3,489 fish in 1999 (Somerville 2017). From 2000 through 2008, harvests ranged from approximately 1,100–1,800 Chinook salmon but have remained under 1,000 fish since (Figure 16). Due to poor overall Chinook salmon runs to the Copper River drainage, the Klutina River sport fishery has been restricted through reductions in the annual limit, catch-and-release fishing only, and complete closure from 2009 through 2020, except for 2015, 2018, and 2019 when no restrictions were implemented on the Klutina River fishery. From 2014 to 2018, Chinook salmon harvest from the Klutina River has averaged 469 fish.

Although the Statewide Harvest Survey does not differentiate angler effort between species, effort on specific river systems is often driven by a single species. On the tributary fisheries of the Copper River, effort directed at Chinook salmon has traditionally driven overall effort on those systems. However, sockeye salmon returns to the Klutina River increased greatly in the late 2000s, and Chinook salmon runs declined. As a result, angler effort on the Klutina River has not shown the same trends as on the Gulkana River and even increased by about 70% above the average effort to over 17,000 angler-days in 2014 despite restrictions in the Chinook salmon fishery. Sport fishing effort on the Klutina River currently averages 10,876 angler-days (2014–2018).

OTHER COPPER RIVER CHINOOK SALMON FISHERIES

Less than 5% of the harvest of Chinook salmon in the Upper Copper-Upper Susitna Management Area occurs in systems other than the Gulkana and Klutina Rivers (Figure 16). Most of this harvest occurs in the Tonsina River. Chinook salmon run timing to the Tonsina River drainage is from late June through August, similar to the Klutina River.

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 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. The harvest of Chinook salmon from the Tonsina River has not exceeded 230 fish since 1998 and has averaged only 53 fish from 2014 to 2018 (Figure 16).

COPPER RIVER SOCKEYE AND COHO SALMON FISHERIES

Sockeye salmon sport harvests in the Copper River have generally increased since 1977 (Somerville 2017). A significant increase in sport harvests occurred during the late 1990s, coinciding with increased angler effort during the years of Chinook salmon abundance in the Gulkana and Klutina Rivers. From 2001 to 2005, sockeye salmon harvests declined and averaged about 7,500 sockeye salmon. Sockeye salmon harvest numbers doubled in 2006 due to strong returns to the Klutina River and continued to increase, peaking at 26,611 fish in 2013 and remained high through 2014 (Figure 17). Sockeye salmon harvest has since declined to an average of 9,671 over the last 5 years. Sockeye salmon harvest from the Klutina River has accounted for about 80% of the area sockeye salmon harvest from 2014 to 2018.

The sport fisheries for coho salmon in the Upper Copper River are very small compared with other area fisheries and coho salmon fisheries elsewhere in the state. The average annual coho salmon harvest from 2014 to 2018 was 113 fish (Figure 18). 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 an ADF&G 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 higher exploitation of GH-produced fish. However, due to the late timing of this run and the relative remoteness of the West Fork, few anglers take advantage of these more liberal bag limits.

In 2012, 2013, 2014, and 2015 inseason passage of salmon at the Miles Lake sonar indicated 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 in 2013, 2014, and 2015 from 3 to 6 per day by EO in late June or early July.

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TABLES AND FIGURES

Table 1.—Apportionment of the inriver goal for the Copper River, 2010–2020.

Category	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sockeye spawning escapement	300,000	300,000	360,000	360,000	360,000	360,000	360,000	360,000	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	70,747	72,407	71,000	82,500	82,500	82,500	82,500	77,900	77,000	70,400	70,100
Chitina personal use harvest	108,295	112,950	120,000	133,000	132,500	150,000	150,000	130,300	130,500	125,600	133,200
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	136,036	84,524	80,500	100,300	120,400	114,000	66,550	69,000	24,300	9,400	45,200
Minimum inriver goal	668,000	622,000	684,000	728,000	748,000	759,000	712,000	690,000	644,000	618,000	661,000

Table 2.—Run timing statistics past the tagging site at Baird Canyon for major sockeye salmon spawning stocks in the Copper River, 2005–2008.

Stocking group	Travel time (days) ^a				Mean date of passage ^b			
	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 measured at the capture site near Baird Canyon.

Table 3.—Estimates of inriver abundance for Chinook and sockeye salmon in the Copper River, 2007–2020.

Year	Chinook (mark–recapture) ^a	Standard error	Sonar count ^b	Sockeye (mark–recapture) ^a	Standard error
2007	46,349	3,391	919,600	1,259,00	90,648
2008	41,343	2,166	718,344	739,833	32,962
2009	32,400	2,365	709,749	ND	ND
2010	22,323	2,492	923,811	ND	ND
2011	33,889	3,329	914,231	ND	ND
2012	31,452	5,242	1,294,400	ND	ND
2013	32,581	4,425	1,267,060	ND	ND
2014	24,158	2,100	1,218,418	ND	ND
2015	32,306	3,977	1,346,100	ND	ND
2016	16,009	1,193	801,593	ND	ND
2017	40,725	4,187	723,426	ND	ND
2018	52,524	4,034	701,577	ND	ND
2019	43,714	3,143	1,039,354	ND	ND
2020	26,293	2,863	530,313	ND	ND

Note: ND = No data.

^a Estimates from Native Village of Eyak Petersen mark–recapture project.

^b Sonar counts represented all salmon passing sonar site without differentiation between species.

Table 4.—Total estimated Chinook salmon runs to the Copper River by end user or destination, 2010–2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	10-year Average (2010–2019)
Commercial harvest ^a	9,645	18,500	11,764	8,826	10,207	22,506	12,348	13,834	7,618	19,148	13,440
Commercial, home pack ^a	906	1,282	853	564	768	1,145	727	744	85	742	782
Educational ^b	31	6	6	55	36	50	86	50	40	31	39
Subsistence (Copper River District – drift gillnet) ^b	276	212	237	854	153	167	73	778	1,356	808	491
Subsistence (Batzulnetas – dip net, fish wheel, or spear) ^c	0	0	0	5	0	0	0	2	0	0	1
Subsistence (Glennallen Subdistrict – dip net, fish wheel or spear) ^d	2,099	2,319	2,095	2,148	1,365	2,212	2,075	2,906	4,531	3,429	2,518
Federal subsistence (Glennallen Subdistrict – dip net, fish wheel, or spear) ^c	342	799	403	372	439	416	446	468	2,662	946	729
Personal use harvests (Chitina Subdistrict – dip net) ^d	700	1,067	567	744	719	1,570	711	1,961	1,273	2,611	1,192
Federal subsistence (Chitina Subdistrict – dip net) ^c	20	15	6	19	15	14	20	15	100	83	31
Sport harvest	2,409	1,753	459	285	931	1,343	327	1,731	1,320	1,565	1,168
Upriver spawning escapement ^e	16,753	27,936	27,922	29,013	20,689	26,751	12,430	33,644	42,678	35,080	27,337
Total estimated Chinook salmon run size	33,181	53,889	44,312	42,885	35,322	56,174	29,243	56,133	61,663	64,443	47,729

^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 2019.

^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 estimated sockeye salmon runs to the Copper River and Copper River Delta by end user or destination, 2010–2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	10-year Average (2010–2019)
Commercial harvest ^a	636,214	2,052,432	1,866,541	1,608,117	2,050,007	1,750,762	1,175,100	586,079	46,524	1,283,736	1,305,551
Commercial, home pack ^a	7,064	9,070	7,985	9,448	12,072	10,590	9,598	8,289	1,545	8,016	8,368
Commercial, donated ^a	0	0	0	0	0	0	0	0	0	0	0
Educational drift gillnet permit ^a	61	23	200	152	186	91	203	217	6	18	116
Subsistence (Copper River District – drift gillnet) ^b	1,980	1,783	4,270	5,639	1,675	1,403	1,075	2,448	5,189	6,163	3,163
Federal subsistence (PWS/Chugach Nat'l Forest– dip net, spear, rod, and reel) ^b	36	35	64	102	76	152	234	127	96	70	99
Subsistence (Batzulnetas – dip net, fish wheel, or spear) ^b	106	9	101	862	146	0	0	254	468	209	216
Subsistence (Glennallen Subdistrict – dip net, fish wheel, or spear) ^c	70,719	59,622	76,305	73,728	75,501	81,800	62,474	41,570	39,359	60,257	64,134
Federal subsistence (Glennallen Subdistrict– dip net, fish wheel, or spear) ^d	12,849	14,163	14,461	17,789	23,889	26,753	19,181	18,415	16,736	17,718	18,195
Personal use reported (Chitina Subdistrict – dip net) ^c	138,487	128,052	127,143	180,663	157,215	223,080	148,982	132,694	77,051	171,203	148,457
Federal subsistence (Chitina Subdistrict – dip net) ^d	2,061	1,766	1,332	2,199	1,636	2,404	1,925	1,828	3,430	4,479	2,306
Upriver sport harvest ^e	14,743	7,727	23,404	26,611	18,005	9,489	7,555	9,589	2,943	6,696	12,676
Delta sport harvest ^e	1,342	838	764	386	87	130	246	200	58	168	422
Upriver spawning escapement ^f	502,403	607,142	953,502	860,258	864,131	930,145	513,126	461,268	478,760	719,526	689,026
Delta spawning escapement ^g	167,810	153,014	133,700	151,410	128,410	132,390	103,100	113,900	116,940	123,650	132,360
Hatchery broodstock/excess	157,980	59,589	65,348	72,369	53,737	40,123	32,341	17,083	30,306	15,552	54,443
Total estimated sockeye salmon run size	1,713,855	3,095,265	3,275,120	3,009,733	3,386,773	3,209,312	2,075,140	1,393,961	819,411	2,417,461	2,439,531

^a Numbers are from fish ticket data.

^b Data are reported harvest from returned state and federal subsistence permits.

^c Data are expanded harvest from returned state and federal subsistence permits.

^d Data are reported harvest (2002–2004) and expanded harvest (2005–2019) from returned state and federal subsistence permits.

^e Upriver and Copper River Delta sport harvest data are from statewide sport fish harvest surveys.

^f Beginning in 1999, sockeye salmon spawning escapement was based on the total number of fish past the Miles Lake sonar minus the Chinook salmon inriver midpoint abundance estimate, upriver subsistence, personal use, sport, hatchery broodstock, and onsite hatchery surplus.

^g Delta spawning escapement estimated by doubling the peak aerial survey index.

Table 6.—Total estimated coho salmon runs to the Copper River and Copper River Delta by end user or destination, 2010–2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	10-year Average (2010-2019)
Commercial harvest ^a	210,621	127,511	130,261	244,985	315,776	136,981	367,630	306,287	303,957	78,292	222,230
Commercial, home pack ^a	1,026	543	1,037	249	1,146	1,423	1,353	1,945	2,581	855	1,216
Subsistence (Copper River District – drift gillnet) ^b	27	34	0	1	0	10	2	43	195	330	64
Federal subsistence (PWS/Chugach Nat'l Forest – dip net, spear, rod, and reel) ^c	68	581	392	310	630	878	555	514	255	480	466
Subsistence (Batzulnetas – dip net, fish wheel, or spear) ^c	NA	NA	0	0	0	0	0	0	0	0	0
Subsistence (Glennallen Subdistrict – dip net, fish wheel, or spear) ^d	293	372	335	144	233	77	45	68	151	204	192
Federal subsistence (Glennallen Subdistrict – dip net, fish wheel, or spear) ^c	64	53	78	27	25	14	11	1	0	0	27
Personal use (Chitina Subdistrict – dip net) ^d	2,013	1,702	1,385	797	1,129	841	1,182	715	1,436	1,064	1,226
Federal subsistence (Chitina Subdistrict – dip net) ^c	33	8	8	9	72	15	41	9	31	22	25
Delta sport harvest	15,752	14,283	15,230	17,053	16,137	24,515	13,094	9,559	11,730	11,461	14,881
Upriver sport harvest	114	21	0	0	89	0	0	23	387	137	77
Upriver spawning escapement	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Delta spawning escapement ^e	82,154	76,290	74,020	69,360	86,020	83,330	152,400	87,520	107,600	74,040	89,273
Total estimated coho salmon run size	312,165	221,398	222,746	332,935	421,257	248,084	536,313	406,684	428,323	166,885	329,679

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 7.—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, 2010–2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	10-year Average (2010–2019)
Number of subsistence permits fished	139	113	204	321	101	97	77	265	437	347	210
Number of subsistence Chinook salmon harvested	276	212	237	854	153	167	73	778	1,356	808	491
Average number of Chinook salmon harvested per subsistence permit	2.0	1.7	1.1	2.4	1.5	1.7	0.9	2.9	3.1	2.3	2.3
Number of commercial permit holders reporting home pack harvests	333	336	378	331	386	359	340	363	216	340	338
Number of Chinook salmon retained for home pack	906	1,282	853	564	768	1,145	727	744	85	742	782
Average number of home pack Chinook salmon harvested per permit holder	2.7	3.8	2.3	1.7	2.0	3.2	2.1	2.0	0.4	2.2	2
Combined lower Copper River subsistence and home pack harvests	1,182	1,494	1,090	1,418	921	1,312	800	1,522	1,441	1,550	1,273

Table 8.–Chitina Subdistrict fishing schedule, 2018.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
June 10	1	Thursday, June 07, 8:00 AM - Sunday, June 10, 11:59 PM	88	Saturday, June 09, 12:00 PM - Sunday, June 10, 12:00 PM	24
June 17	2	Monday, June 11, 12:01 AM - Sunday, June 17, 11:59 PM	168	Thursday, June 14, 12:01 AM - Sunday, June 17, 11:59 PM	96
June 24	3	Monday, June 18, 12:01 AM - Sunday, June 24, 11:59 PM	168	Closed	0
July 1	4	Monday, June 25, 12:01 AM - Sunday, July 01, 11:59 PM	168	Closed	0
July 8	5	Monday, July 02, 12:01 AM - Wednesday, July 04, 6:00 PM	66	Closed	0
July 8	5	Friday, July 06, 12:00 PM - Sunday, July 08, 11:59 PM	60	Closed	0
July 15	6	Tuesday, July 10, 12:01 AM - Sunday, July 15, 11:59 PM	144	Thursday, July 12, 12:01 PM - Sunday, July 15, 11:59 PM	84
July 22	7	Wednesday, July 18, 12:01 AM - Sunday, July 22, 11:59 PM	120	Thursday, July 19, 6:00 AM - Sunday, July 22, 6:00 PM	84
July 29	8	Wednesday, July 25, 6:00 PM - Sunday, July 29, 11:59 PM	102	Thursday, July 26, 6:00 AM - Sunday, July 29, 11:59 PM	90
August 5	9	Wednesday, August 01, 6:00 PM - Sunday, August 05, 11:59 PM	102	Monday, July 30, 12:01 AM - Sunday, August 05, 11:59 PM	168
August 12	10	Monday, August 06, 6:00 PM - Sunday, August 12, 11:59 PM	150	Monday, August 06, 12:01 AM - Sunday, August 12, 11:59 PM	168
August 19	11	Monday, August 13, 12:01 AM - Sunday, August 19, 11:59 PM	168	Thursday, August 16, 6:00 AM - Sunday, August 19, 6:00 PM	84
August 26	12	Continuous	168	Thursday, August 23, 6:00 AM - Sunday, August 26, 6:00 PM	84
August 30	13	Continuous	96	Thursday, August 30, 6:00 AM - Friday, August 31, 11:59 PM	42

Table 9.–Chitina Subdistrict fishing schedule, 2019.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
June 9	1	Friday, June 07, 6:00 PM - Sunday, June 09, 11:59 PM	54	Friday, June 07, 12:01 AM - Sunday, June 09, 11:59 PM	72
June 16	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
June 23	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
June 30	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
July 7	5	Wednesday, July 03, 6:00 AM - Sunday, July 07, 11:59 PM	114	Monday, July 01, 12:01 AM - Sunday, July 07, 11:59 PM	168
July 14	6	Monday, July 08, 6:00 PM - Sunday, July 14, 11:59 PM	150	Monday, July 08, 12:01 AM - Sunday, July 14, 11:59 PM	168
July 21	7	Friday, July 19, 6:00 AM - Sunday, July 21, 11:59 PM	66	Monday, July 15, 12:01 AM - Sunday, July 21, 11:59 PM	168
July 28	8	Friday, July 26, 12:00 PM - Sunday, July 28, 11:59 PM	60	Monday, July 22, 12:01 AM - Sunday, July 28, 11:59 PM	168
August 4	9	Friday, August 02, 6:00 PM - Sunday, August 04, 11:59 PM	54	Monday, July 29, 12:01 AM - Sunday, August 04, 11:59 PM	168
August 11	10	Monday, August 05, 6:00 AM - Sunday, August 11, 11:59 PM	162	Monday, August 05, 12:01 AM - Sunday, August 11, 11:59 PM	168
August 18	11	Continuous	168	Monday, August 12, 12:01 AM - Sunday, August 18, 11:59 PM	168
August 25	12	Continuous	168	Monday, August 19, 12:01 AM - Sunday, August 25, 11:59 PM	168
September 1	13	Continuous	168	Monday, August 26, 12:01 AM - Saturday, August 31, 11:59 PM	144

Table 10.–Chitina Subdistrict fishing schedule, 2020.

Week ending	PU week	Preseason opening schedule	Hours	Actual opening schedule	Hours
June 7	1	Sunday, June 07, 12:01 AM - Sunday, June 07, 11:59 PM	24	Sunday, June 07, 12:01 AM - Sunday, June 07, 11:59 PM	24
June 14	2	Monday, June 08, 12:01 AM - Sunday, June 14, 11:59 PM	168	Thursday, June 11, 12:00 PM - Sunday, June 14, 11:59 PM	84
June 21	3	Monday, June 15, 12:01 AM - Sunday, June 21, 11:59 PM	168	Monday, June 15, 12:01 AM - Monday, June 15, 11:59 PM	24
June 21	3	–		Thursday, June 18, 12:01 AM - Sunday, June 21, 11:59 PM	96
June 28	4	Monday, June 22, 12:01 AM - Monday, June 22, 11:59 PM	24	Monday, June 22, 12:01 AM - Monday, June 22, 11:59 PM	24
June 28	4	Wednesday, June 24, 6:00 AM - Sunday, June 28, 11:59 PM	114	Wednesday, June 24, 6:00 AM - Sunday, June 28, 11:59 PM	114
July 5	5	Monday, June 29, 12:01 AM - Monday, June 29, 11:59 PM	24	Monday, June 29, 12:01 AM - Sunday, July 05, 11:59 PM	168
July 5	5	Tuesday, June 30, 6:00 PM - Sunday, July 05, 11:59 PM	126	–	
July 12	6	Monday, July 06, 12:01 AM - Monday, July 06, 11:59 PM	24	Thursday, July 09, 12:01 PM - Sunday, July 12, 11:59 PM	84
July 12	6	Thursday, July 09, 6:00 AM - Sunday, July 12, 11:59 PM	90	–	
July 19	7	Monday, July 13, 12:01 AM - Monday, July 13, 11:59 PM	24	Thursday, July 16, 12:01 PM - Sunday, July 19, 11:59 PM	84
July 19	7	Wednesday, July 15, 6:00 AM - Sunday, July 19, 11:59 PM	114	–	
July 26	8	Thursday, July 23, 12:00 PM - Sunday, July 26, 11:59 PM	84	Friday, July 24, 12:01 AM - Sunday, July 26, 11:59 PM	72
August 2	9	Monday, July 27, 12:01 AM - Monday, July 27, 11:59 PM	24	Closed	0
August 2	9	Thursday, July 30, 6:00 PM - Sunday, August 02, 11:59 PM	78	Closed	0
August 9	10	Thursday, August 06, 6:00 AM - Sunday, August 09, 11:59 PM	90	Closed	0
August 16	11	Monday, August 10, 12:01 AM - Monday, August 10, 11:59 PM	24	Closed	0
August 16	11	Thursday, August 13, 6:00 PM - Sunday, August 16, 11:59 PM	78	Closed	0
August 23	12	Friday, August 21, 6:00 PM - Sunday, August 23, 11:59 PM	54	Closed	0
August 31	13	Wednesday, August 26, 12:00 PM - Monday, August 31, 11:59 PM	132	Closed	0

Table 11.—Number of permits issued and salmon harvested in the Glennallen Subdistrict subsistence salmon fishery, including federal subsistence permits and harvest, 2003–2020.

Year	Number permits issued			Estimated salmon harvest ^b	
	Total	Dip net	Fish wheel		
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	1,971	1,148	508	315	100,683
2015	1,956	1,128	503	325	111,689
2016	2,089	1,300	469	320	84,764
2017	1,964	1,264	368	332	60,085
2018	1,994	1,312	347	335	63,994
2019	2,056	1,354	359	343	80,990
2020 ^c	2,041	1,290	375	376	54,333
Average 2015–2019	2,012	1,272	409	331	96,312
Average 2010–2019	1,862	1,042	514	306	86,265

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 ADF&G harvest data plus federal reported harvest from 2002 to 2004 and federal expanded harvest after 2004.

^c Data for 2020 may be preliminary.

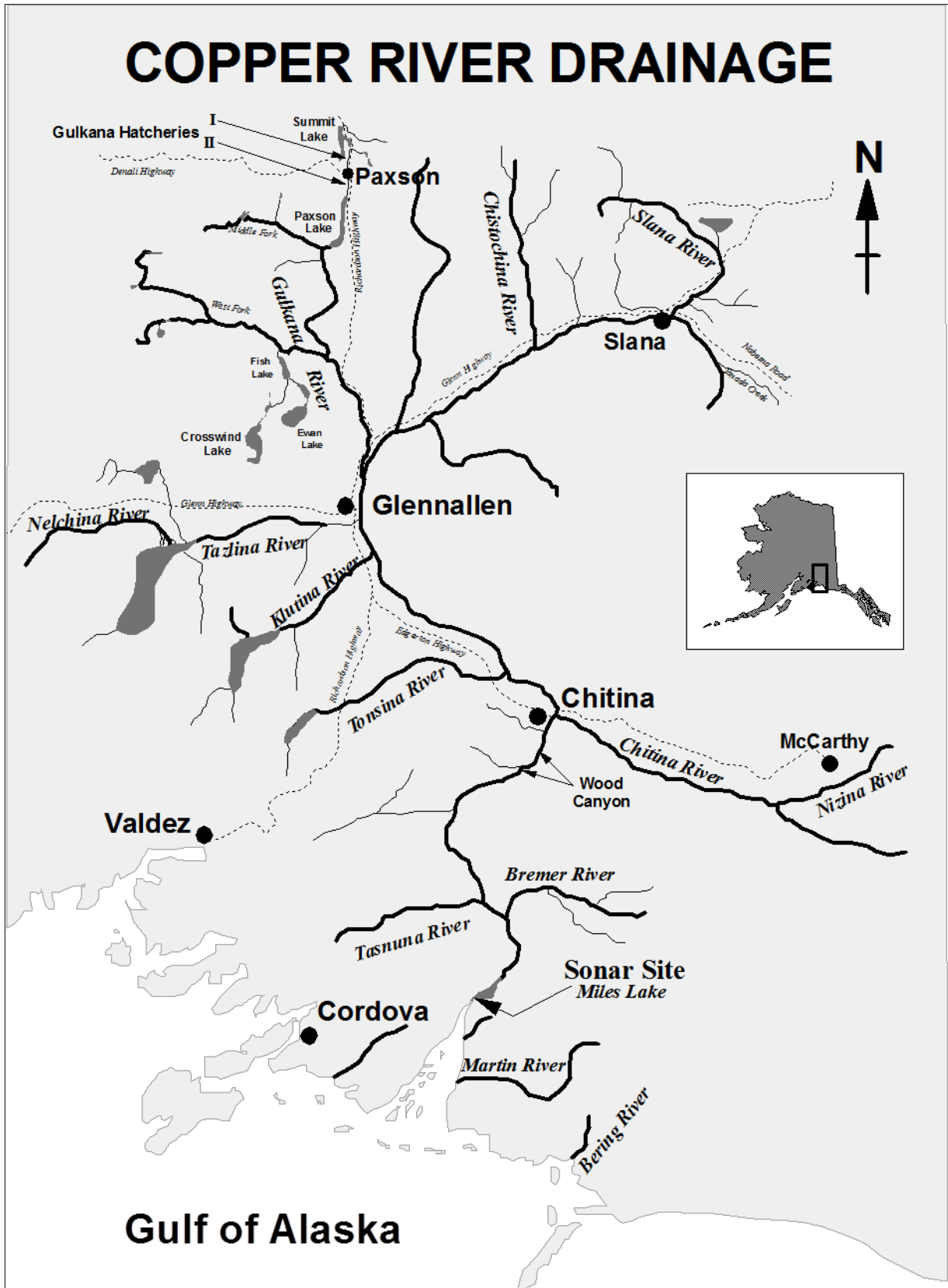


Figure 1.—The Copper River drainage.

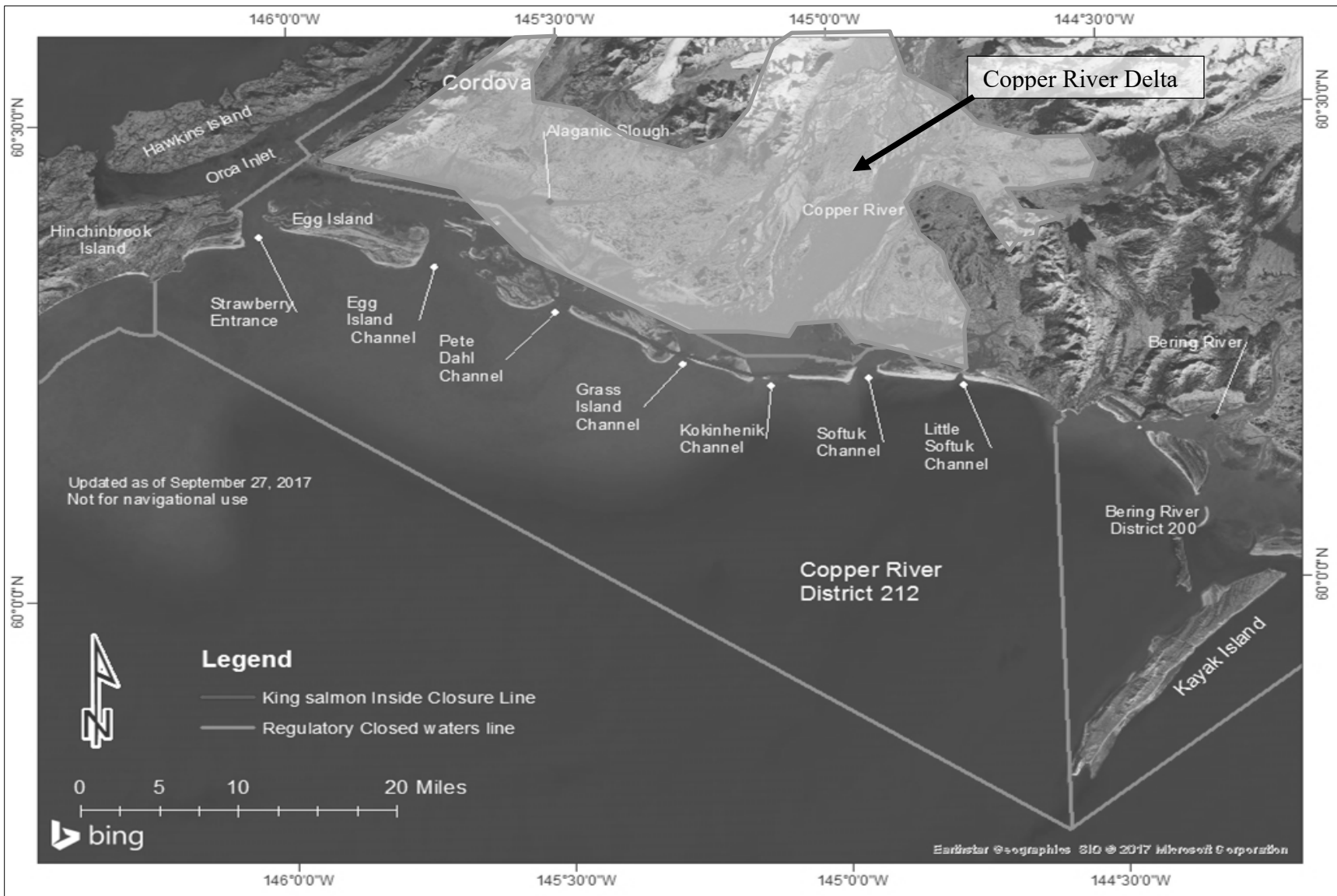


Figure 2.—Map of Copper River and Bering River Districts showing inside closure area and Copper River Delta.

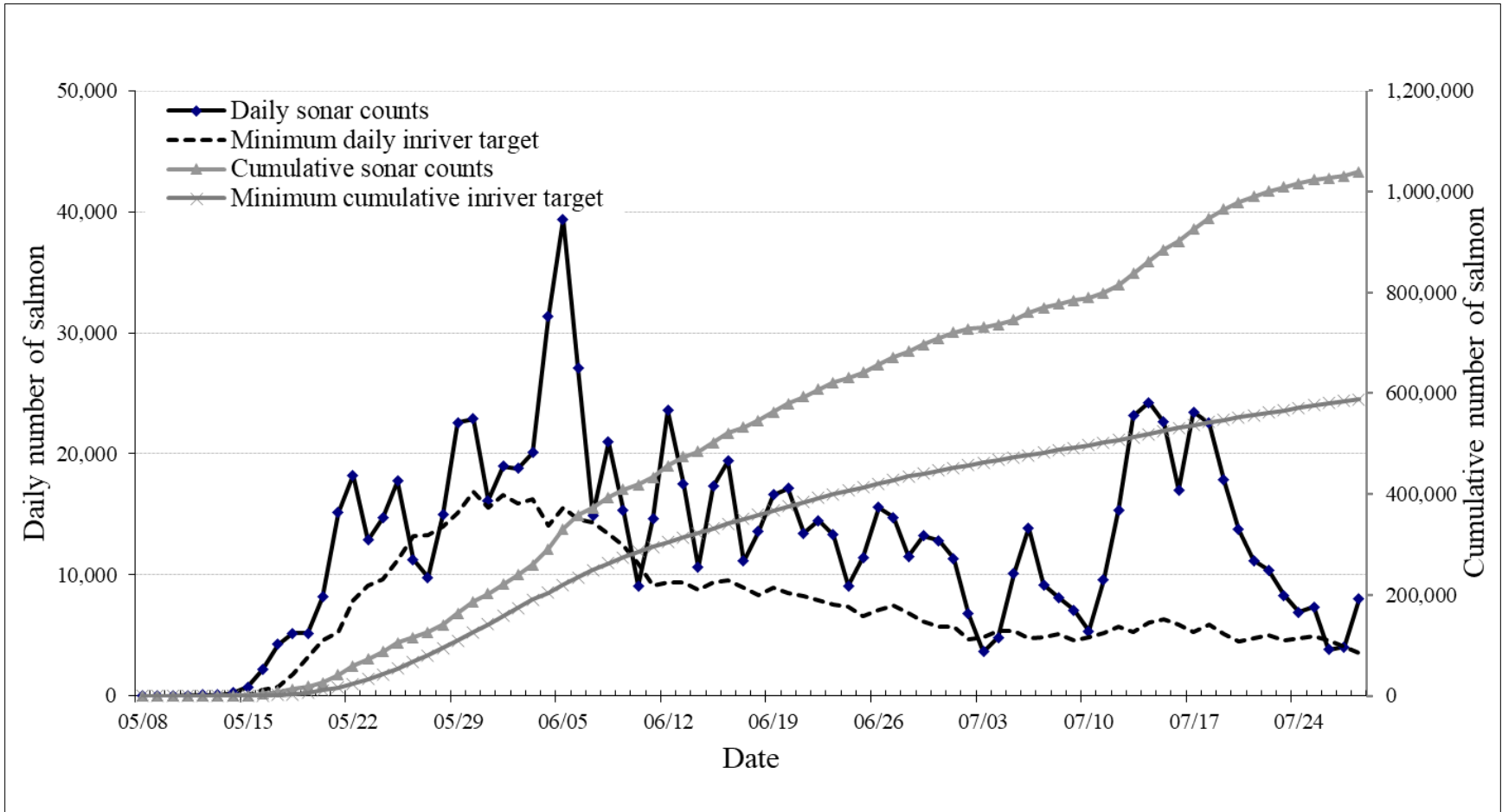


Figure 3.—Daily and cumulative Copper River inriver passage compared to inriver target at the Miles Lake sonar, 2019.

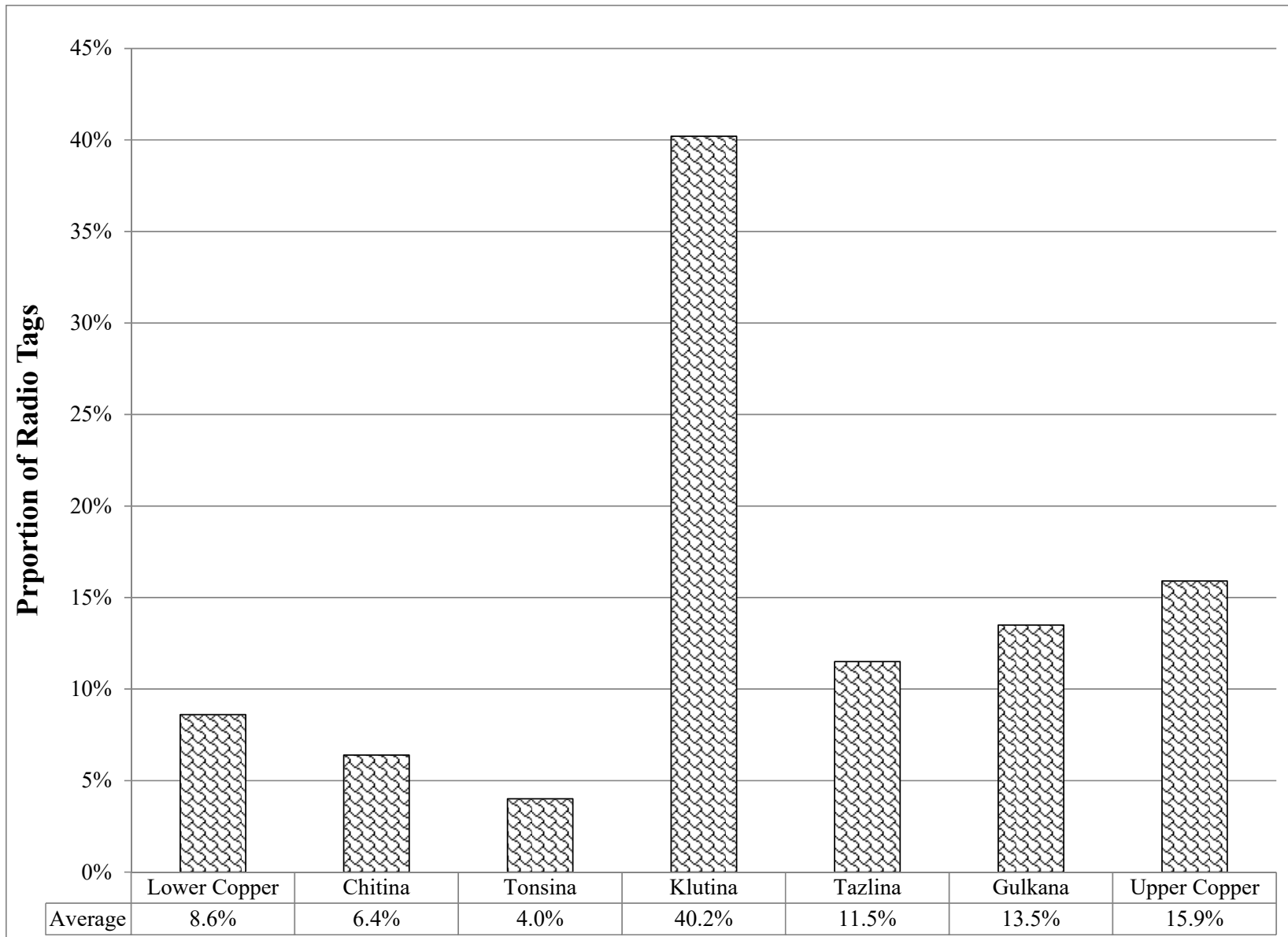


Figure 4.—Average percentage of radiotagged sockeye salmon located within portions of the Copper River drainage, 2005–2008.

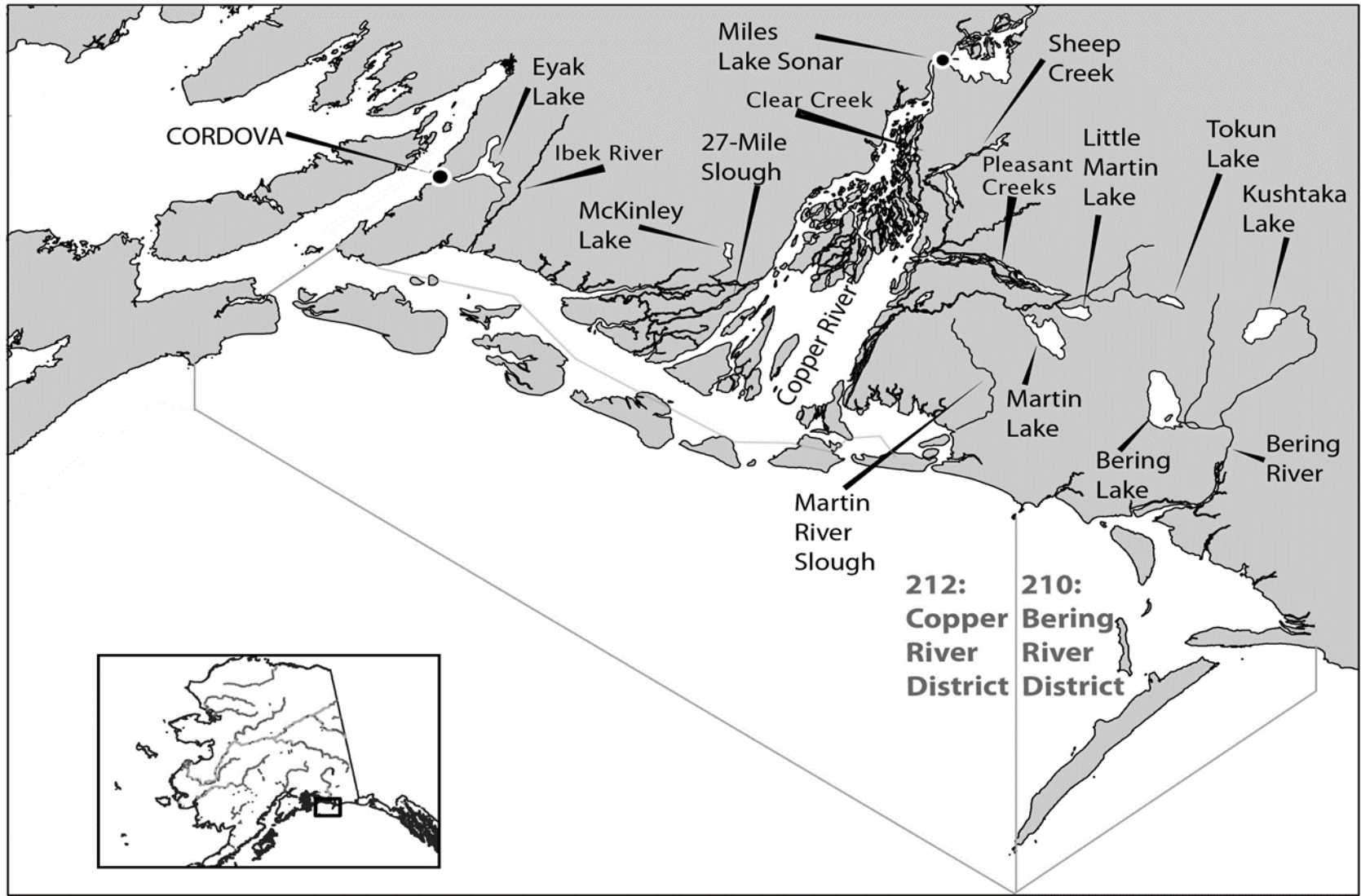


Figure 5.—Map of Copper River Delta and Bering River District sockeye and coho salmon aerial survey locations.

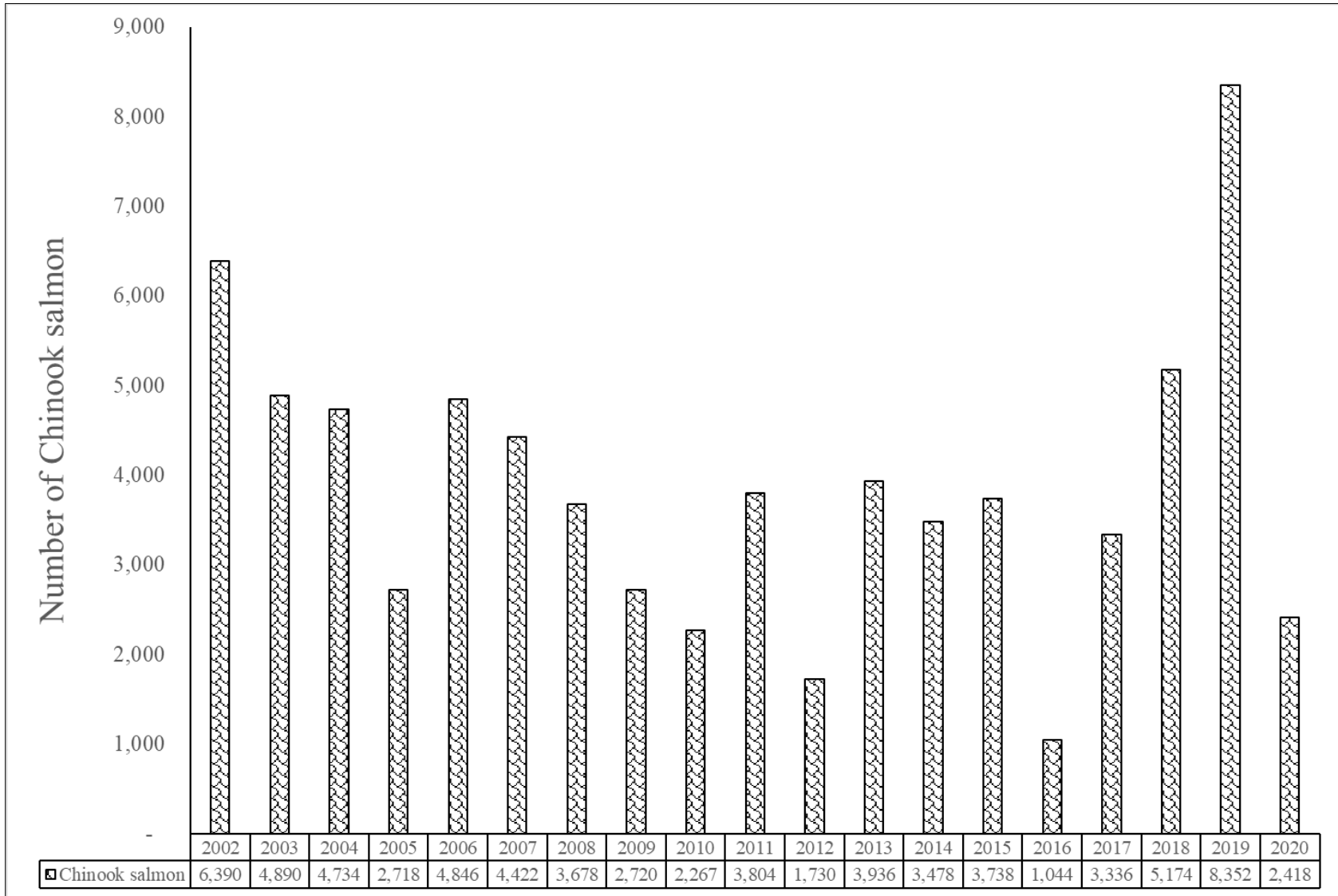


Figure 6.—Expanded cumulative escapement of Chinook salmon past the Gulkana River counting tower, 2002–2020.

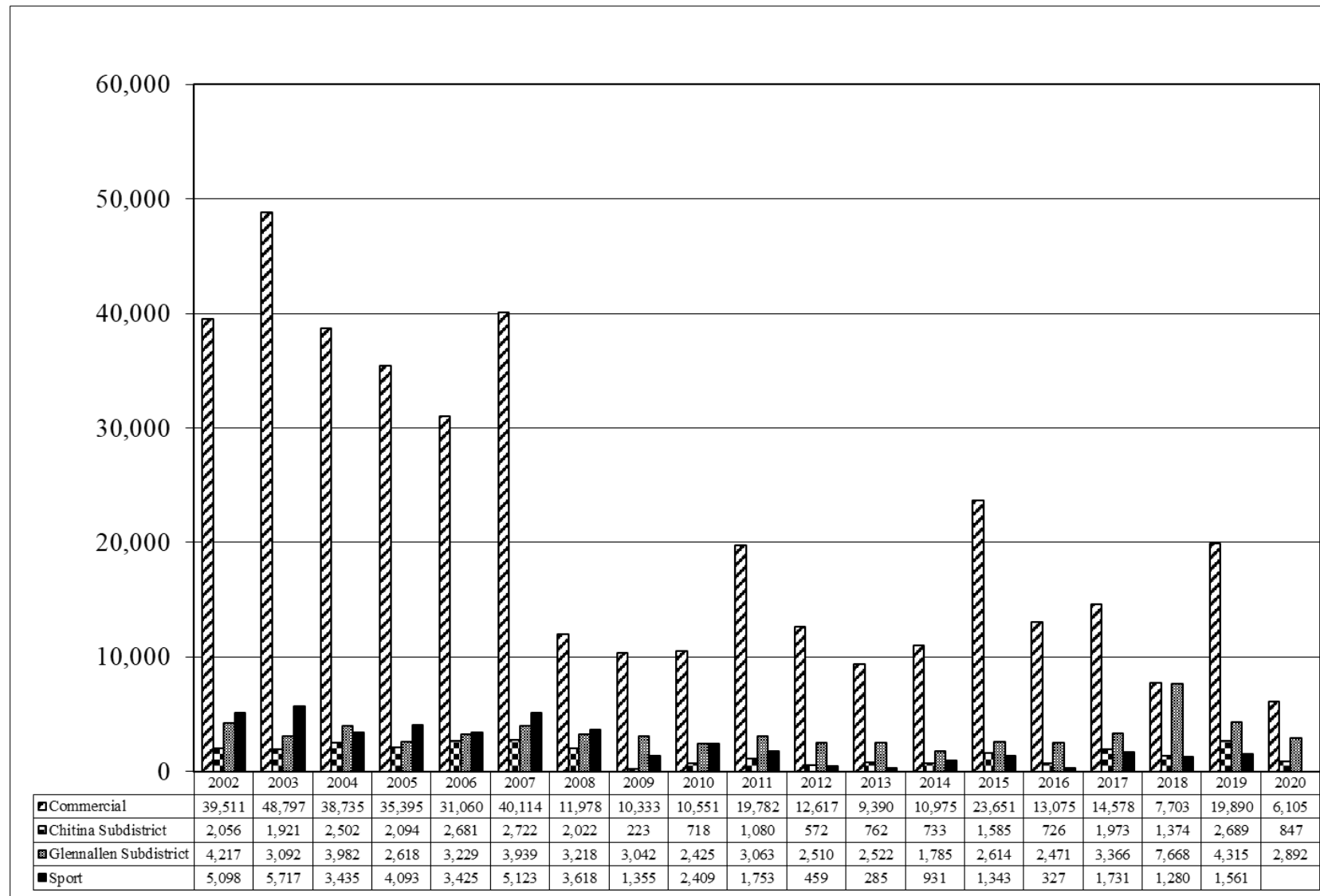


Figure 7.—Chinook salmon harvest in the Copper River by fishery, 2002–2020.

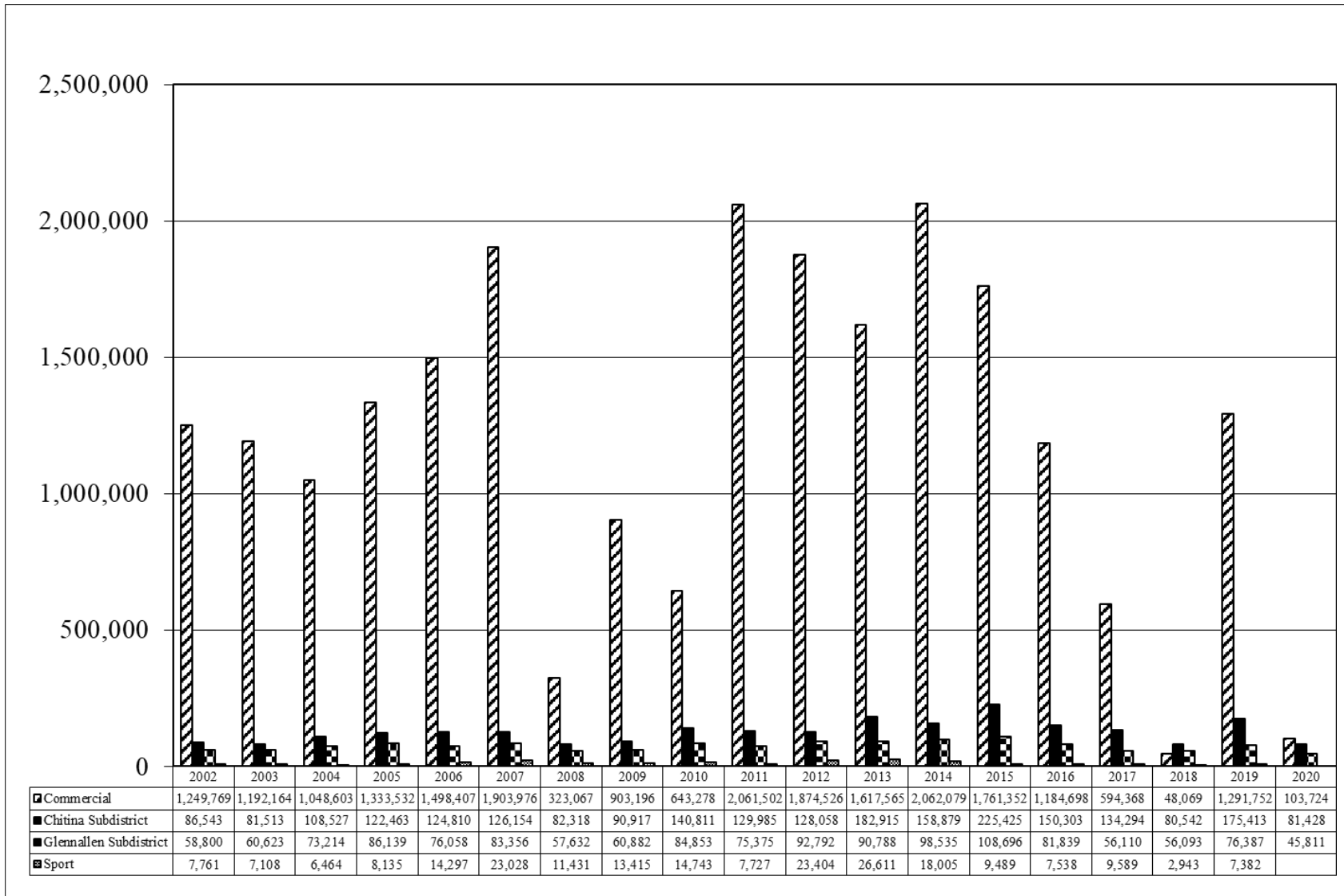


Figure 8.—Sockeye salmon harvest in the Copper River by fishery, 2002–2020.

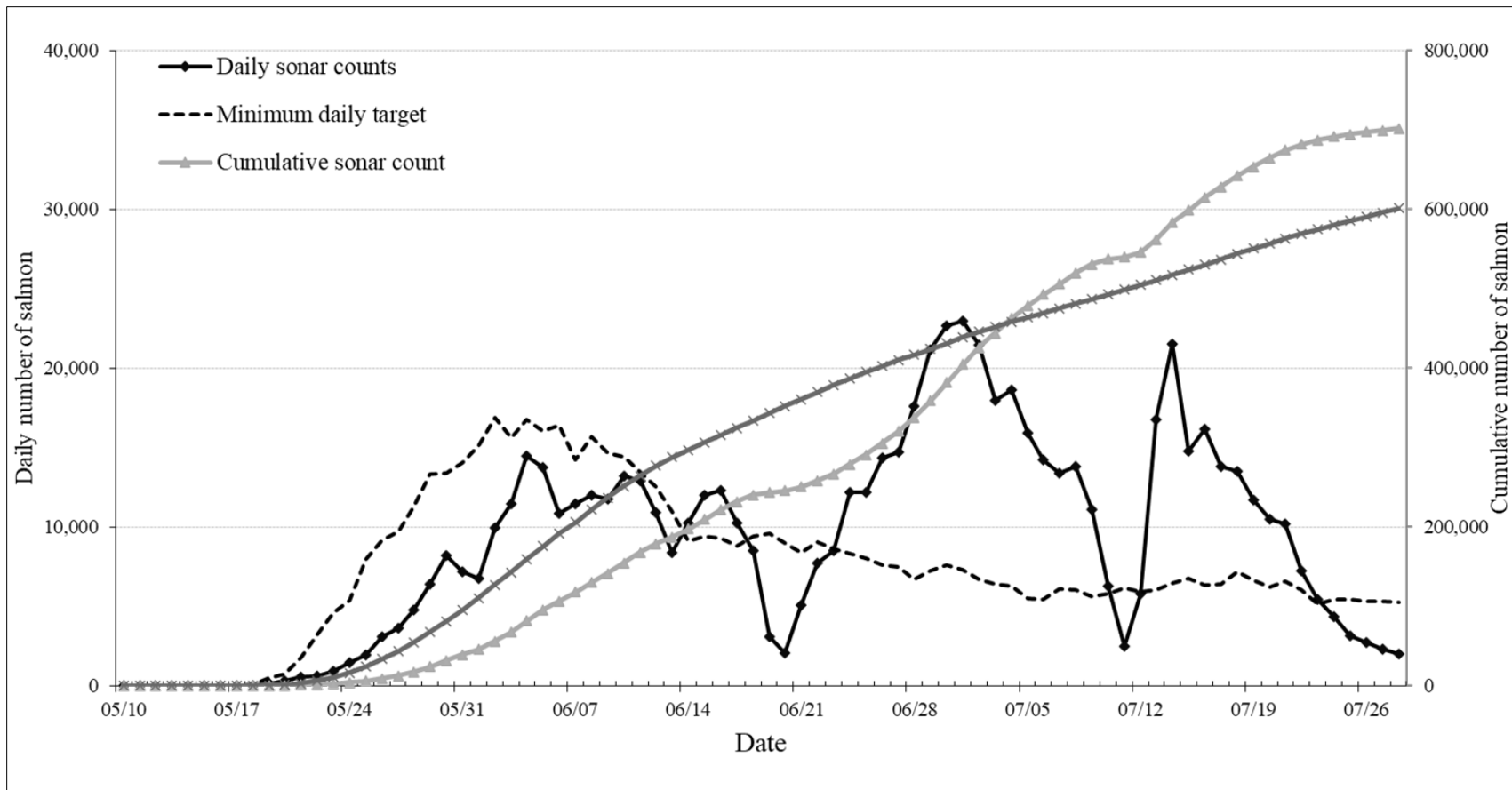


Figure 9.—Daily and cumulative Copper River inriver passage compared to inriver target at the Miles Lake sonar, 2018.

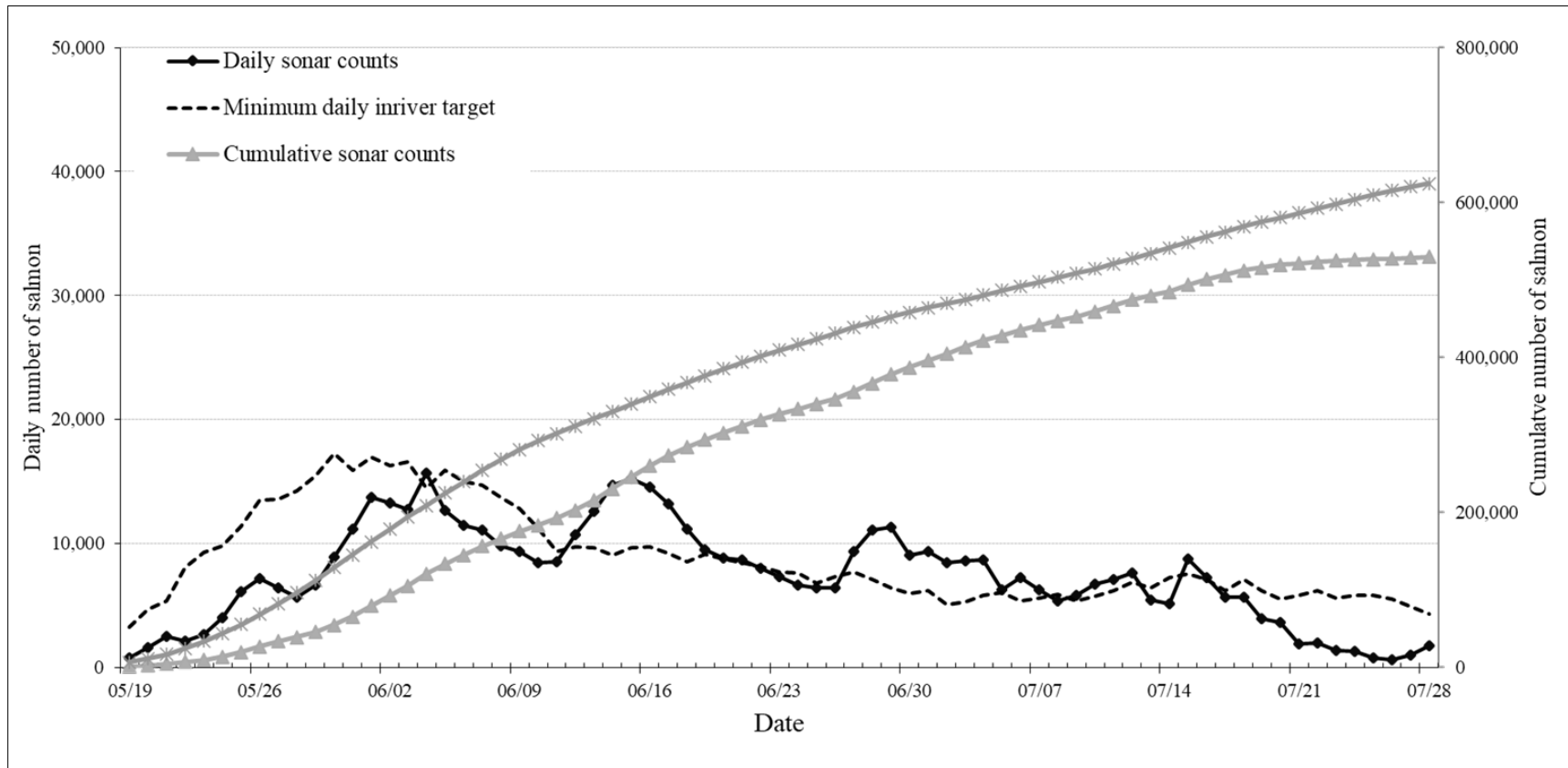


Figure 10.—Daily and cumulative Copper River inriver passage compared to inriver target at the Miles Lake sonar, 2020.

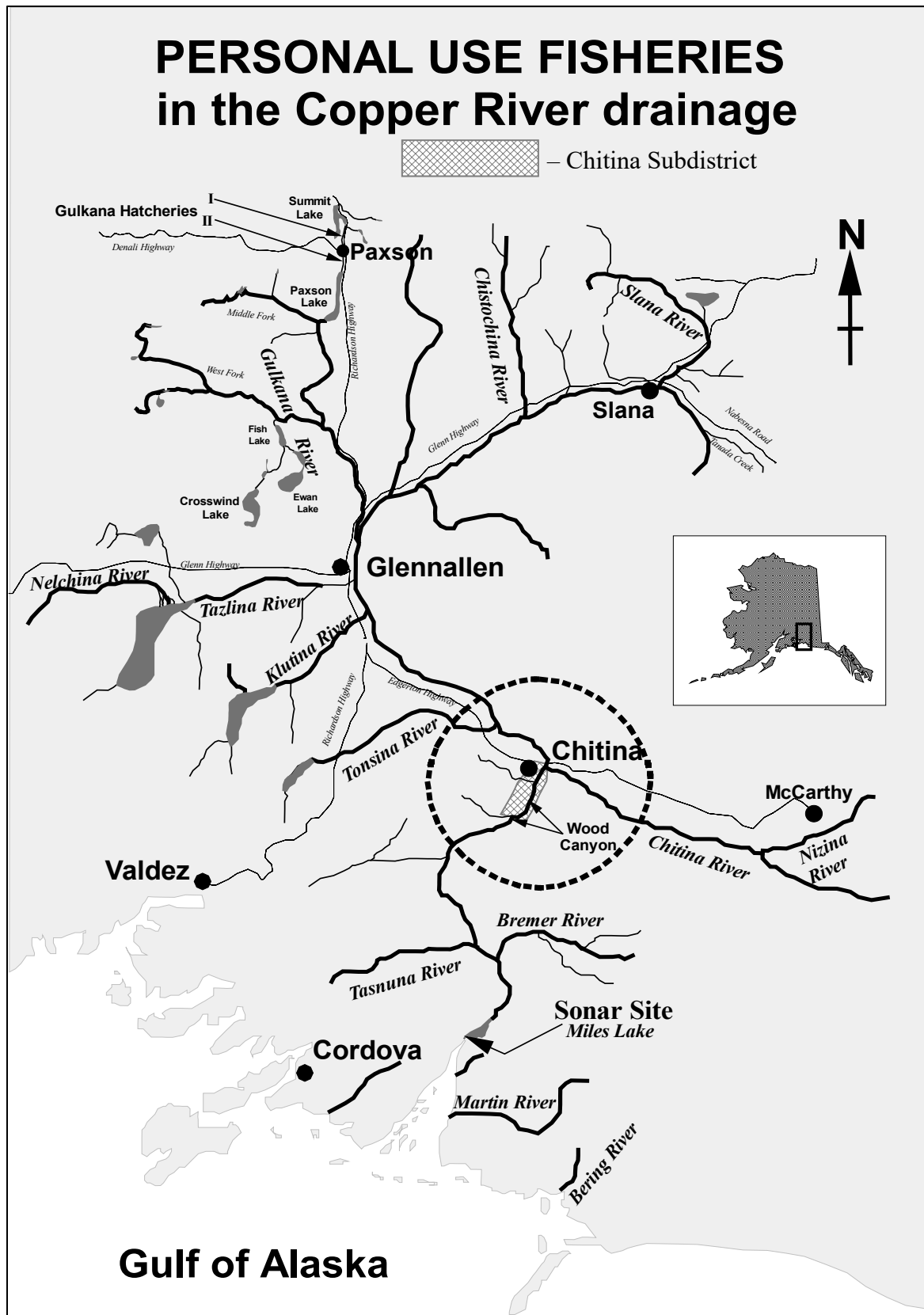


Figure 11.—Map of the personal use salmon fisheries on the Copper River.

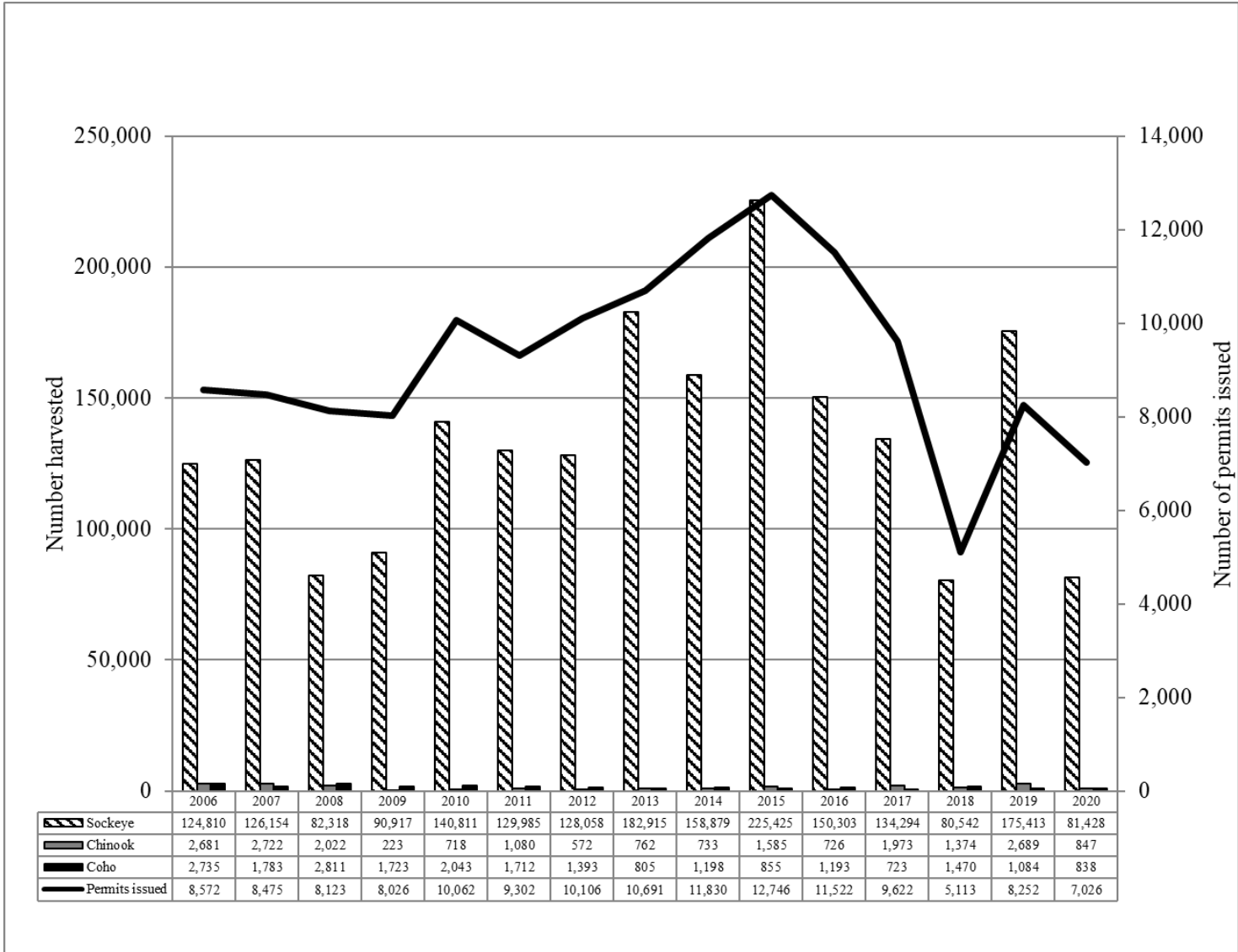


Figure 12.—Chitina Subdistrict personal use salmon harvest by species, 2006–2020.

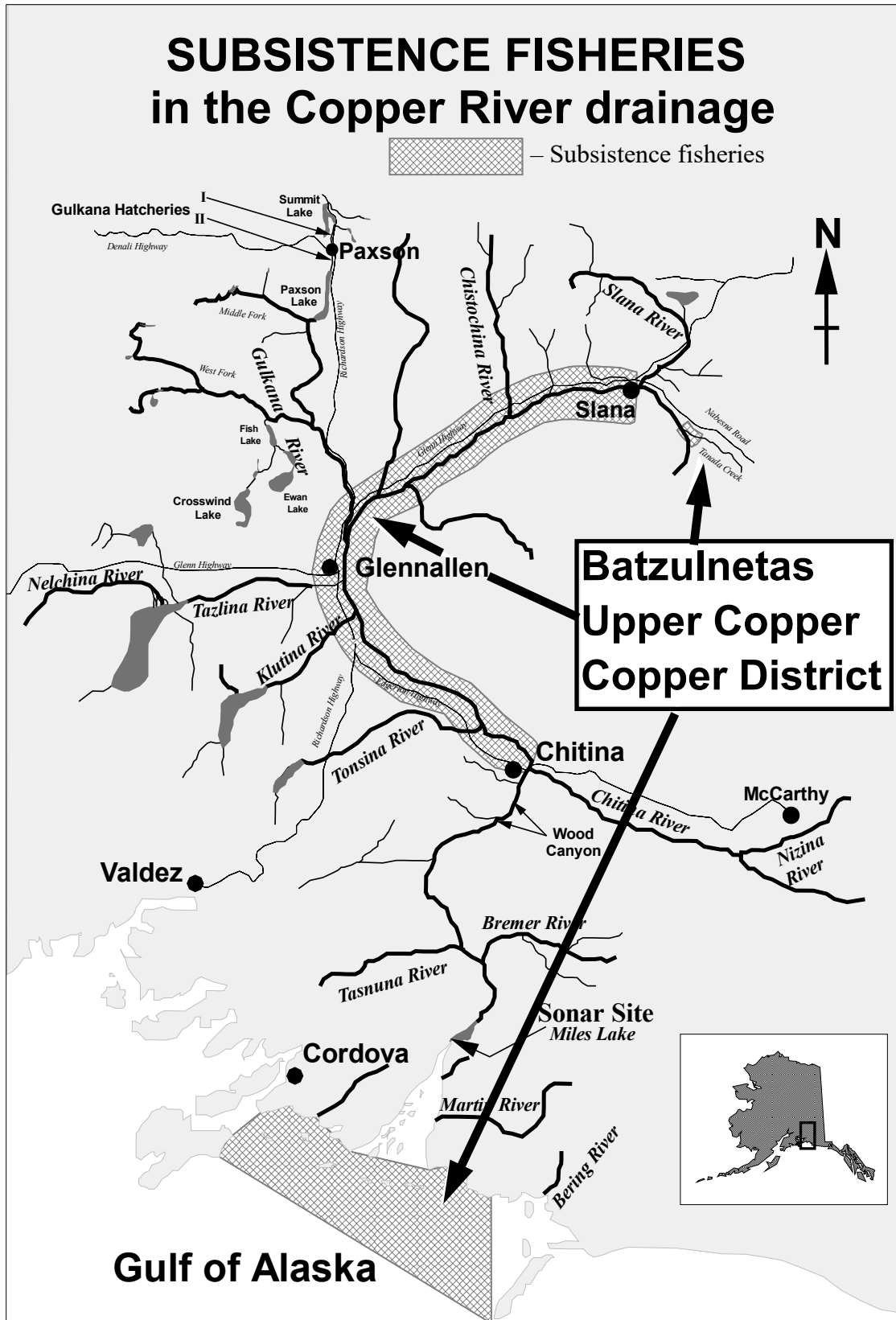


Figure 13.—Map of the subsistence salmon fisheries on the Copper River.

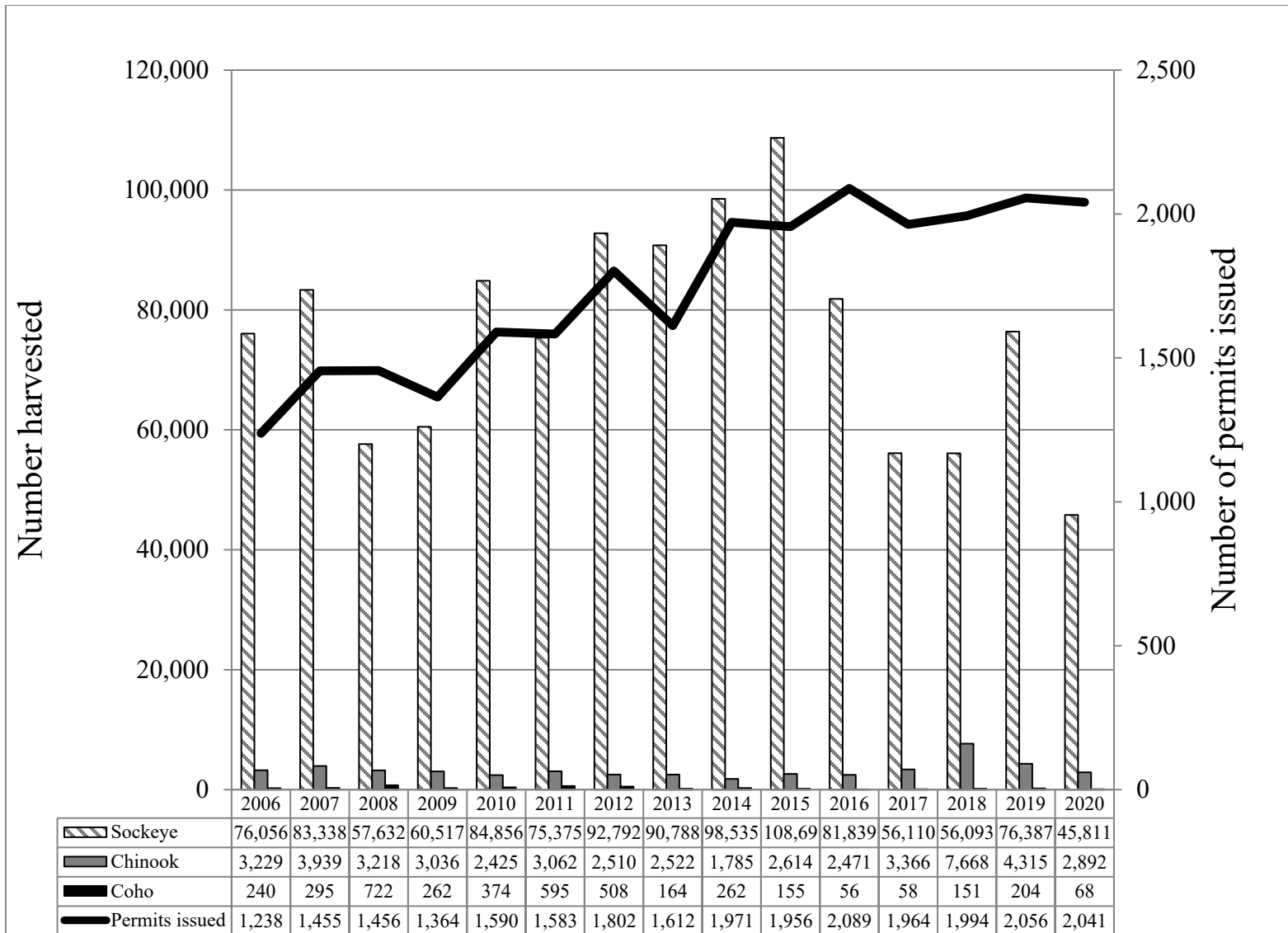


Figure 14.—Glennallen Subdistrict salmon harvest by species, 2006–2020.

Note: ADF&G estimated and federal reported harvest for 2002–2004; federal estimated harvest for 2005–2019. Chinook are colloquially known as king salmon.

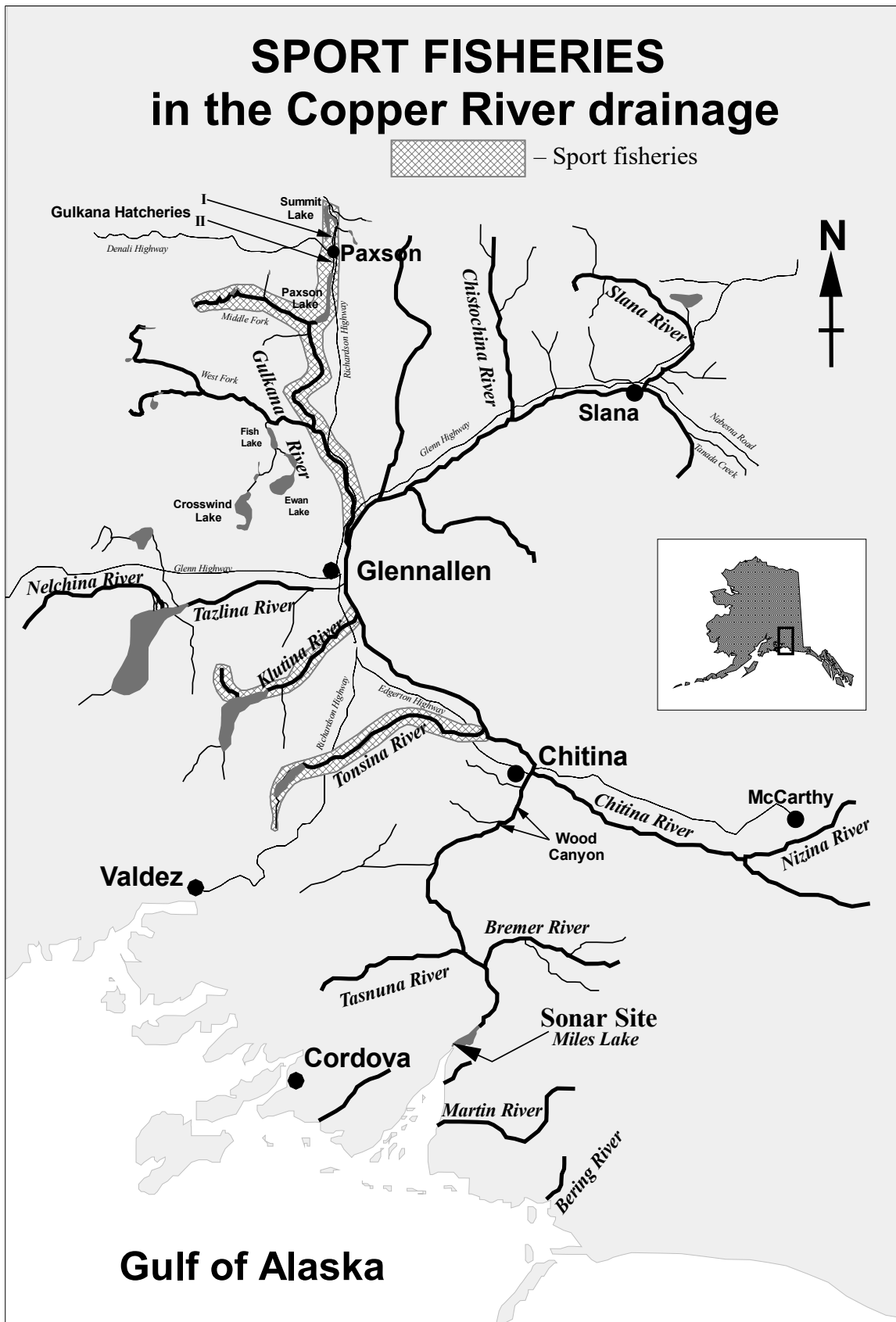


Figure 15.—Map of the sport salmon fisheries on the Copper River.

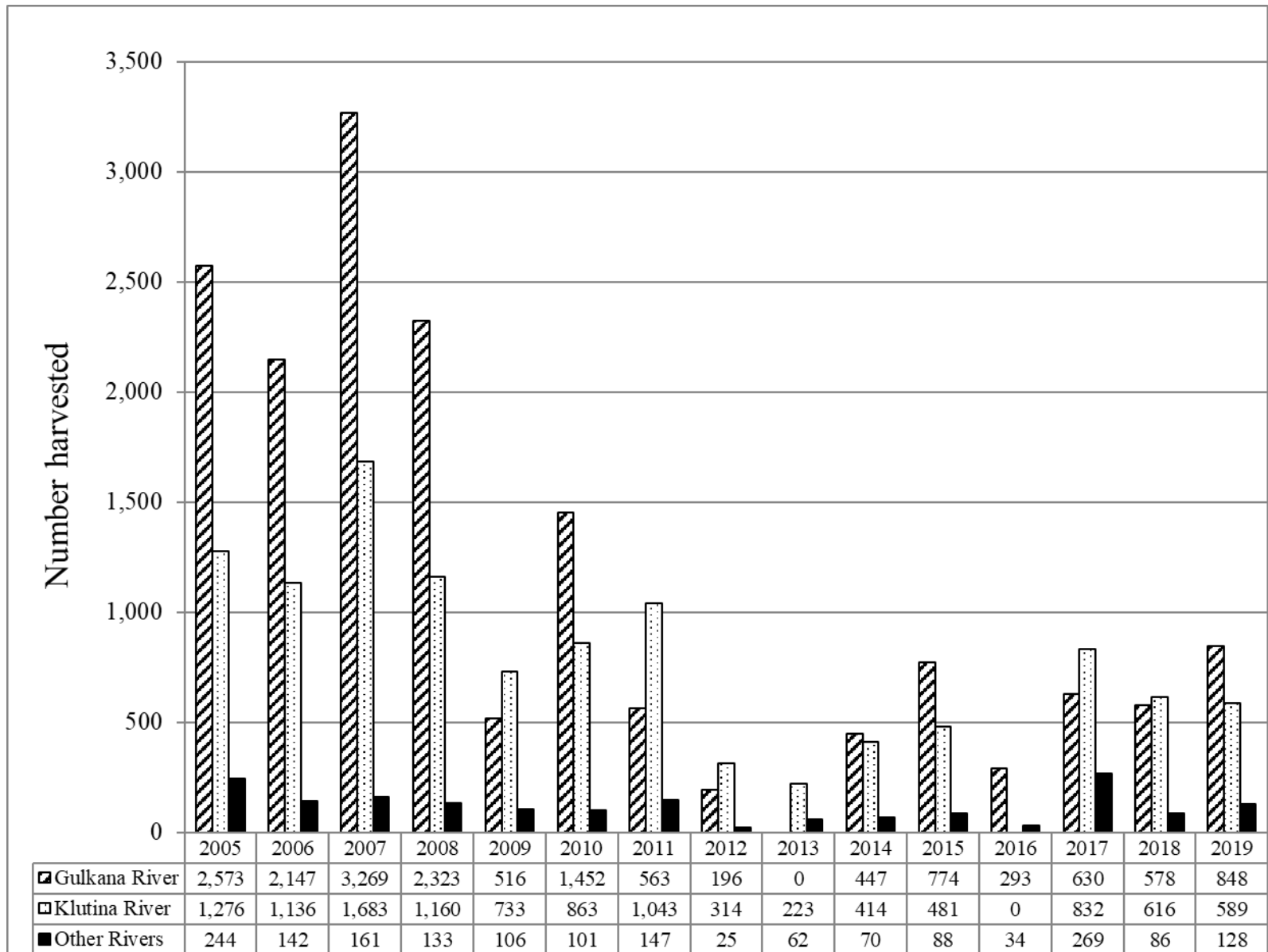


Figure 16.–Copper River Chinook salmon sport harvest, 2005–2019.

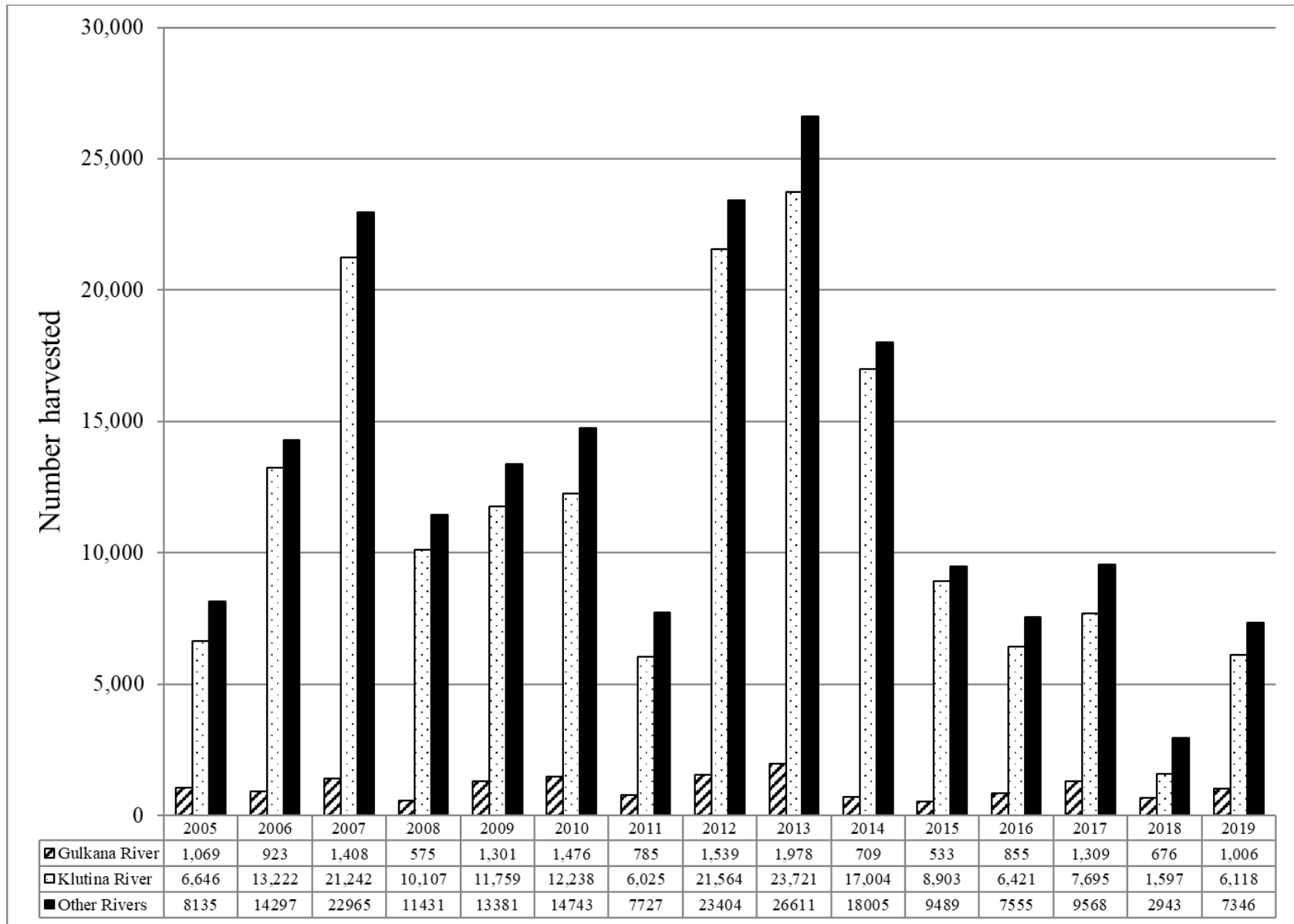


Figure 17.—Copper River sockeye salmon sport harvest, 2005–2019.

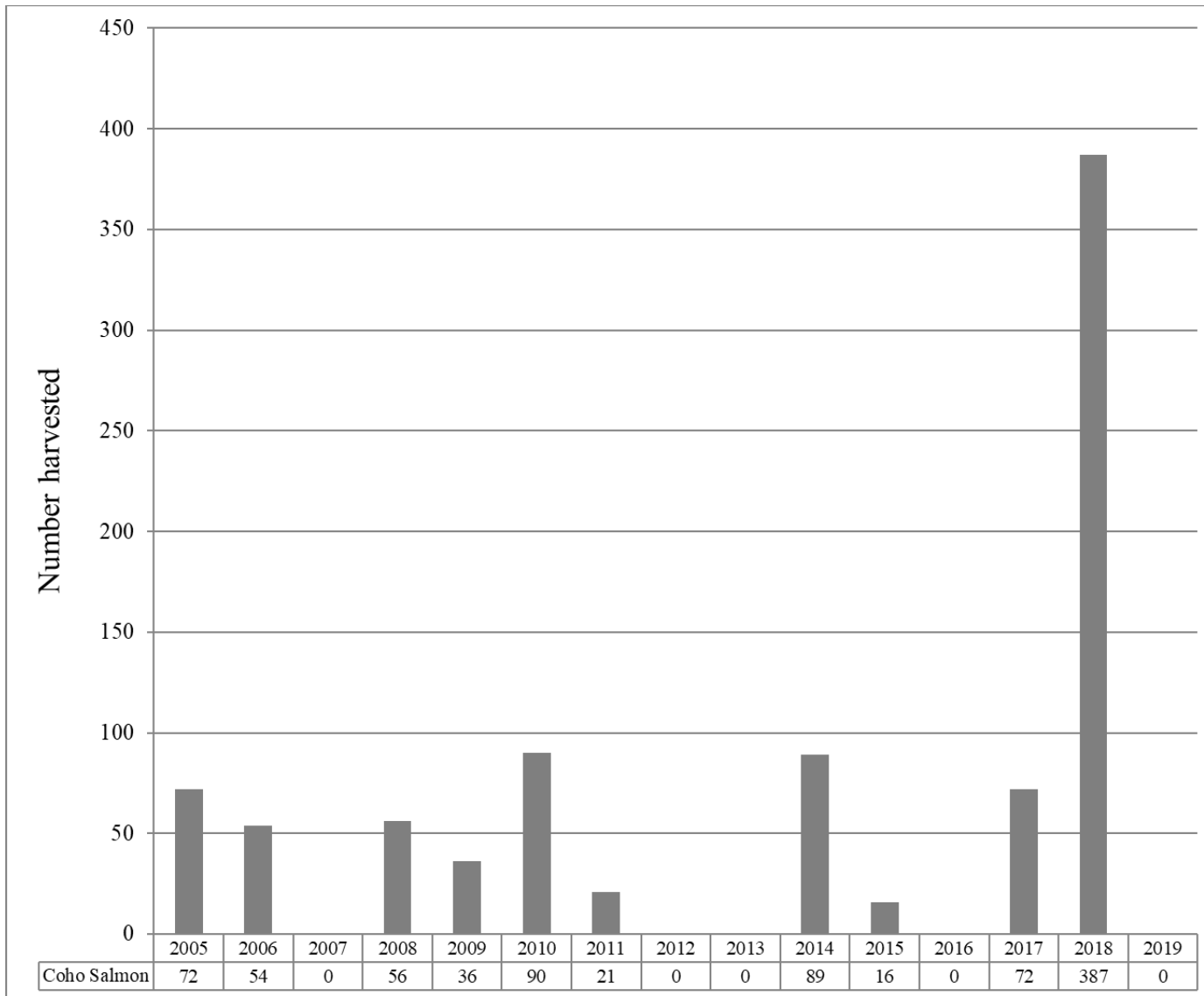


Figure 18.—Upper Copper River coho salmon sport harvest, 2005–2019.