Fishery Management Report No. 17-45

Fishery Management Report for the Recreational Fisheries of the Upper Copper/Upper Susitna River Management Area, 2016

by

Mark A. Somerville

November 2017

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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by
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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

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ABSTRACT

Season summaries for subsistence, sport, and personal use fisheries for 2016 and preliminary information for 2017 in the Upper Copper/Upper Susitna Management Area (UCUSMA) are presented. The UCUSMA consists of all waters and drainages of the Copper River upstream of Haley Creek and all waters and drainages of the Susitna River upstream of the Oshetna River. The area's Chinook (king), sockeye, and coho salmon are targeted in sport, personal use, and subsistence fisheries. Other resident and anadromous fishes such as burbot, lake trout, rainbow/steelhead trout, Arctic grayling, and Dolly Varden are targeted in year-round sport fisheries. Whitefish are mainly targeted in subsistence fisheries. Sport fishing effort in 2016 was the lowest in the UCUSMA since 1977. Sport angler effort was estimated at 30,227 angler-days and sport catch was 75,665 fish in 2016. Estimated sport harvest was the lowest ever reported and totaled 16,033 fish with sockeye salmon the primary species targeted, accounting for 47% of the harvest. Total inriver salmon counts at Miles Lake were at record high levels from 2012–2015 exceeding counts of 1.2 million fish. These large returns also influenced harvests in the Chitina Subdistrict personal use and Glennallen Subdistrict subsistence fisheries. Total passage by the Miles Lake sonar in 2016 and 2017 was more average at 801,593 and 723,426 fish respectively. In the Glennallen Subdistrict subsistence fishery a total of 84,764 salmon were harvested in 2016, slightly below the most recent 10-year average. The Chitina Subdistrict personal use fishery harvest totaled 152,831 salmon in 2016, about 10,000 salmon above the most recent 10-year average. Sockeye salmon comprised over 97% of the subsistence and 98% of the personal use harvests. In contrast to recent sockeye salmon returns to the Copper River, king salmon returns have been weak since 2009, with the 2016 return the lowest ever recorded at 29,243 fish and a spawning escapement 12,485 fish.

Key words: Copper River, Susitna River, Gulkana River, Chitina Subdistrict, Glennallen Subdistrict, personal use, subsistence, king salmon, sockeye salmon, burbot, lake trout, Arctic grayling, sport fish, fisheries management

INTRODUCTION

This area management report provides information regarding Upper Copper/Upper Susitna Management Area (UCUSMA) and is one in a series of reports annually updating fisheries management information within Region III. The report is provided for the Alaska Board of Fisheries (BOF), Fish and Game Advisory Committees (ACs), the general public, and other interested parties. It presents fisheries assessment information and management strategies that are developed from that information. In addition, this report includes a description of the fisheries regulatory process, geographic, administrative, and regulatory boundaries, funding sources, and other information concerning Division of Sport Fish management programs within the area.

The goals of the Division of Sport Fish (SF) of the Alaska Department of Fish and Game (ADF&G) are to protect and improve the state's recreational fisheries resources by managing for sustainable yield of wild stocks of sport fish, providing diverse recreational fishing opportunities, and providing information to assist the BOF in optimizing social and economic benefits from recreational fisheries. In order to implement these goals SF has in place a fisheries management process.

A regional review is conducted annually during which the status of important area fisheries is considered and research needs are identified. Fisheries stock assessment projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Biological information gathered from these research projects is combined with effort information and input from user groups to assess the need for and development of fisheries management plans, and to propose regulatory strategies.

Division of Sport Fish management and research activities are funded by ADF&G and Federal Aid in Fisheries Restoration funds. ADF&G funds are derived from the sale of state fishing licenses. Federal aid funds are derived from federal taxes on fishing tackle and equipment established by the Federal Aid in Sport Fish Restoration Act (also referred to as the Dingell–Johnson Act or D–J Act). The D–J funds are provided to states at a match of up to 3-to-1 with the ADF&G funds. Additional funding specified for providing, protecting, and managing access to fish and game is provided through a tax on boat gas and equipment established by the Wallop–Breaux (W–B) Act. Other peripheral funding sources may include contracts with various government agencies and the private sector.

This area management report provides information regarding UCUSMA and its fisheries for 2016, with preliminary information from the 2017 season. This report is organized into 2 primary sections: a management area overview, including a description of UCUSMA and a summary of effort, harvest, and catch for the area; and a section on the significant area fisheries, including specific harvest and catch by species and drainage.

The BOF divides the state into 18 regulatory areas to organize the sport fishing regulatory system by drainage and fishery. These areas (different from regional management areas) are described in Title 5 of the Alaska Administrative Code, Chapters 47-74. The Division of Sport Fish of ADF&G divides the state into 3 administrative regions with boundaries roughly corresponding to groups of the BOF regulatory areas. Region I covers Southeast Alaska (the Southeast Alaska regulatory area). Region II covers portions of Southcentral and Southwest Alaska (including the Prince William Sound, Kenai Peninsula, Kenai River Drainage, Cook Inlet–Resurrection Bay Saltwater, Anchorage Bowl Drainages, Knik Arm Drainages, Susitna River Drainage, West Cook Inlet, Kodiak, Bristol Bay, and the Alaska Peninsula and Aleutian Islands regulatory areas). Region III includes Upper Copper River and Upper Susitna River area and the Arctic–Yukon–Kuskokwim Region (including the North Slope, Northwestern, Yukon River, Tanana River, and Kuskokwim–Goodnews regulatory areas).

Region III is the largest geographic region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 442,500 mi^2 (1,146,000 km^2) of land, some of the state's largest river systems (Yukon, Kuskokwim, Colville, Noatak, Upper Copper and Upper Susitna River drainages), thousands of lakes, thousands of miles of coastline, and streams. Regional coastline boundaries extend from Cape Newenham in the southwest, around all of western, northwestern, and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is very sparsely populated, with the most densely populated center located in the Tanana River Valley. Fairbanks (population about 35,000, Fairbanks North Star Borough population of about 100,000) is the largest community.

For administrative purposes the Division of Sport Fish has divided Region III into 5 fisheries management areas (Figure 1). They are:

1 Northwestern/North Slope Management Area (Norton Sound, Seward Peninsula, Kotzebue Sound, and North Slope drainages);

2 Yukon Management Area (the Yukon River drainage except for the Tanana River drainage);

3 Upper Copper/Upper Susitna Management Area (the Copper River drainage upstream of Canyon Creek and Haley Creek, and the Susitna River drainage above the Oshetna River);

4 Tanana River Management Area (the Tanana River drainage); and

5 Kuskokwim Management Area (the entire Kuskokwim River drainage and Kuskokwim Bay drainages).

Area management biologists for the 5 areas are located in Nome/Fairbanks, Fairbanks, Glennallen, Fairbanks/Delta Junction, and Bethel/Fairbanks, respectively.

ALASKA BOARD OF FISHERIES

The BOF is a 7-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. BOF members are appointed by the governor for 3-year terms and must be confirmed by the legislature.

Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. Proposals to create new or modify existing regulations and management plans are submitted by ADF&G and the public (any individual can submit a proposal to the BOF) for evaluation by the BOF. During its deliberations the BOF receives input and testimony through oral and written reports from ADF&G staff, members of the general public, representatives of local ACs, and special interest groups such as fishermen's associations and clubs. Members of the public provide input concerning regulation changes and allocation through submission of written proposals and testifying directly to the BOF; by participating in local AC meetings; or by becoming members of local ACs.

ADVISORY COMMITTEES

Local ACs have been established throughout the state to assist the boards of Fisheries and Game in assessing fisheries and wildlife issues, and proposed regulation changes. AC meetings allow opportunity for direct public interaction with ADF&G staff attending the meetings to answer questions and provide clarification of proposed regulatory changes regarding resource issues of local and statewide concern. The Boards Support Section within ADF&G's Division of Administrative Services provides administrative and logistical support for the BOF and ACs. During 2013, ADF&G had direct support responsibilities for 84 ACs in the state.

Within the UCUSMA there are 3 ACs: Tok Cutoff/Nabesna Road, Copper Basin, and Paxson committees. In addition, the Copper River/Prince William Sound (Cordova), Fairbanks, Delta Junction, Mat-Su (Palmer/Wasilla), Upper Tanana-Forty Mile (Tok), and Anchorage ACs often comment on proposals concerning UCUSMA fisheries.

RECENT BOARD OF FISHERIES ACTIONS

The BOF meets annually, but deliberates on each individual regulatory area on a 3-year cycle with the next meeting for the UCUSMA occurring in December, 2017 in Valdez. A total of 14 proposals were made for consideration during the 2017 BOF cycle that may affect the UCUSMA. Eight of these proposals address proposed changes to subsistence and personal use salmon fisheries in the Copper River, 1 requests the current sockeye salmon SEG be changed to a higher OEG, and 5 proposals address changes to area sport fish regulations.

The BOF most recently met for the UCUSMA in December 2014, in Cordova. The BOF considered 20 proposals that would change subsistence, personal use, or sport fishing regulations within the Upper Copper River and Upper Susitna River drainages. The BOF voted to support 4 proposals and oppose 14, and took no action on 2 of the proposals.

The BOF adopted one proposal providing the department the emergency order authority to establish a bag limit for Chinook (king) salmon taken with a fish wheel and reduce the bag limit for king salmon taken with either a fish wheel or dip net in the Glennallen Subdistrict subsistence fishery.

A proposal was adopted that changed the annual limit in the Chitina Subdistrict personal use dip net salmon fishery, basing it on family size. The limit was set at 25 salmon for the head of household and 10 salmon for each dependent of the permit holder, except that only one king salmon may be retained per household. The BOF also repealed the supplemental harvest component of the *Copper River Personal Use Dip Net Salmon Fishery Management Plan*.

The BOF adopted two department proposals that were specific to the area sport fisheries. The first aligned the rainbow trout bag and size limits in Bridge Creek with those in Summit Lake (Tebay River drainage). The second updated the list of Upper Copper River and Upper Susitna River drainages area stocked waters in regulation.

During the December 2011 BOF meeting in Valdez, the BOF amended and adopted 1 proposal affecting the freshwater finfish (other than salmon) subsistence fishery in Lake Louise, Susitna, and Tyone lakes. The channels between Lake Louise and Susitna Lake and between Susitna Lake and Tyone Lake were closed to the taking of whitefish *Coregonus* and *Prosopium sp.* with gillnets.

The BOF also adopted a proposal that changed the opening date of the Chitina Subdistrict personal use dip net fishery. The fishery can open on June 7 and must open on or before June 15, previously the fishery could open on June 1 and was required to open on or before June 11. This action, in conjunction with the BOF allowing only one 12-hr fishing period within the inside closure area in the Copper River District commercial fishery during the first 2 weeks of the season, was taken to provide additional salmon to the Upper Copper River subsistence fishery. In another specific proposal affecting this subdistrict, the BOF ruled there was no new information and no errors in previous rulings in the Customary and Traditional (C&T) determination for the Chitina Subdistrict. As a result, the Chitina Subdistrict remains a personal use fishery.

The BOF adopted a proposal that amended the *Copper River King Salmon Management Plan* to include management guidance to ADF&G specific to the Chitina Subdistrict personal use and Glennallen Subdistrict subsistence fisheries. The revised plan gives ADF&G authority to restrict king salmon *Oncorhynchus tshawytscha* harvest for conservation purposes.

A proposal was adopted by the BOF that prohibits the use of bait in Lake Louise, Susitna, Tyone, and Crosswind lakes from April 16–October 31. The bag and possession limit for lake trout *Salvelinus namaycush* in these lakes was changed from 1 fish, 24 inches or greater to 1 fish, no size limit. These actions were taken to reduce hooking mortality and maintain harvests within sustainable levels. Another proposal was amended and adopted for the rainbow trout *O. mykiss* fishery in Summit Lake (Tebay River drainage). The spawning closure (June 1–30) was removed and the size limit was changed from 10 fish, 12 inches or less to 10 fish, of which only 1 may be greater than 18 inches in length.

Finally, the BOF adopted a proposal at the 2011 meeting to add 1 day to the Arctic grayling *Thymallus arcticus* spawning closure from April 1–May 30 to April 1–May 31 in the *Wild Arctic Grayling Management Plan*. This aligned the dates in the plan with the dates in regulation and was the intent when the plan was adopted in 2004. The BOF also adopted a proposal opening

Tolsona Lake to sport fishing for burbot *Lota lota* with a bag and possession limit of 2 fish. Tolsona Lake had been closed to burbot fishing since 1998 and the burbot population had recovered sufficiently to allow harvest.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (EO) authority (5 AAC 75.003) to modify time, area, and bag/possession limit regulations. EOs are implemented to address conservation issues for resident species. EOs are also implemented as a tool for inseason management of salmon fisheries. Inseason management is usually in accordance with a fisheries management plan approved by the BOF. EOs issued under this authority for the UCUSMA during 2015 and 2016 are summarized in Appendix B.

FEDERAL SUBSISTENCE

The Alaska National Interest Lands Conservation Act (ANILCA) established a priority subsistence use of fish and game for federally qualified rural residents on lands and waters for which the federal government asserts jurisdiction. The state of Alaska has also established a priority for subsistence use of fish and game by Alaskan residents (AS 16.05.258) on all lands and waters, but cannot discriminate between rural and urban residents (Alaska State Constitution Article VIII, sections 3 and 15). Because of this difference, the federal government asserted authority to ensure a priority subsistence use of fish and game for rural residents on federal lands and certain adjacent waters. On October 1, 1999, the federal government asserted regulatory authority for assuring the rural priority for subsistence fisheries on federal public lands, which includes nonnavigable waters on public lands. Following the *State of Alaska v. Katie John* decision by the Ninth Circuit Court in 1995, the federal government expanded the definition of public land to include waters for which the federal agencies assert federal reserved water rights. Under current practice, the federal land management agencies adopt regulations to provide for the priority subsistence use by qualified rural residents in non-navigable waters within federal public lands (including Bureau of Land Management (BLM) lands) and in navigable waters adjacent to or within federal conservation system units (generally does not include BLM lands). The state retains all other fish and wildlife management authorities, including management on federal land.

Development of regulations for subsistence fisheries under the federal subsistence program occurs within the established Federal Subsistence Board (FSB) process. The public provides input concerning regulation changes by testifying in Federal Subsistence Regional Advisory Council (RAC) meetings or by becoming council members. Ten RACs have been established throughout Alaska to assist the FSB in determining local subsistence issues and providing recommendations on proposed fishing and hunting regulations on the fish and game populations under consideration. Each RAC meets twice a year, and subsistence users and other members of the public can comment on subsistence issues at these meetings.

Within the UCUSMA, the subsistence fisheries for which the federal government asserts management responsibility include those within and adjacent to the Wrangell-St. Elias National Park and Preserve (including the Copper River mainstem from Haley Creek upstream) and the Gulkana River National Wild River corridor. The UCUSMA fisheries fall under the purview of the Southcentral Regional Advisory Council (SCRAC). The SCRAC's most recent meeting was

held in November 2017 in Homer. At this meeting, no federal fisheries proposals for the Prince William Sound Area were addressed.

REGION III DIVISION OF SPORT FISH RESEARCH AND MANAGEMENT STAFFING

The Region III Division of Sport Fish staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, a regional management biologist, an area biologist for each of the 5 management areas, 1 assistant area management biologist, and 1 stocked-water biologist. Area biologists evaluate fisheries and propose and implement management strategies through plans and regulation in order to meet divisional goals. A critical part of these positions is interaction with the BOF, ACs, and the general public. Stocked-waters biologists plan and implement the regional stocking program for recreational fisheries. The regional management biologist assigned to the Region III office in Fairbanks also administers the regional fishing and boating access program.

The research group consists of a research supervisor, a salmon research supervisor, a resident species supervisor, research biologists, and various field technicians. Research biologists plan and implement fisheries research projects in order to provide information needed by the management group to meet divisional goals. The duties of the management and research biologists augment one another.

STATEWIDE HARVEST SURVEY

Sport fishing effort and harvest of sport fish species in Alaska have been estimated and reported annually since 1977 using a mail survey (e. g., Jennings et al. 2015). The Statewide Harvest Survey (SWHS) is designed to provide estimates of effort, harvest, and catch on a site-by-site basis. It is not designed to provide estimates of effort directed towards a single species. Species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the report. Questionnaires are mailed to a stratified random sample of households containing at least 1 individual with a valid fishing license (resident or non-resident). Information gathered from the survey includes participation (number of anglers and days fished), number of fish caught and number harvested by species and site. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaskan waters, as well as the sport harvest (Mills 1987–1992). Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. Survey results for each year are available the following year; hence, the results for 2016 were available fall 2017. Additionally, creel surveys have been used to verify the mail survey for fisheries of interest, or for fisheries that require more detailed information or inseason management.

The utility of SWHS estimates depends on the number of responses received for a given site (Mills and Howe 1992; Clark 2009). In general, estimates from smaller fisheries with low participation are less precise than those of larger fisheries with high participation. Therefore, the following guidelines were implemented for evaluating survey data:

- Estimates based on fewer than 12 responses should not be used other than to document that sport fishing occurred;
- Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends; and

- Estimates based on 30 or more responses are generally representative of levels of fishing effort, catch, and harvest.

For purposes of reporting and organizing statistics in the SWHS, UCUSMA sites are designated within survey areas M (Susitna River Drainage) and I (Upper Copper River Drainage).

SPORT FISH GUIDE LICENSING AND LOGBOOK PROGRAM

Since 1998, the Division of Sport Fish has operated a program to register and/or license both sport fishing guides and sport fishing guide businesses, and to collect information on sport fishing participation, effort, and harvest by saltwater and freshwater-guided clients (Sigurdsson and Powers 2009). In 1998, the BOF adopted statewide sport fishing guide regulations (5 AAC 75.075) that required all sport fishing guides and businesses to register annually with ADF&G. At this time, the BOF also adopted statewide regulations that required logbooks for saltwater charter vessels. The logbooks collected information on charter activity (location, effort, and harvest) that was necessary for the BOF for allocation and management decisions specific to king salmon (*Oncorhynchus tshawytscha*), rockfish (*Sebastes* spp.), and lingcod (*Ophiodon elongatus*) and for the North Pacific Fishery Management Council (NPFMC) for allocation of Pacific halibut (*Hippoglossus stenolepis*).

In 2004, the Alaska Legislature adopted House Bill 452 that established licensing requirements for sport fishing guide business owners and sport fishing guides on a statewide basis (effective 2005). This legislation also required logbook reporting for all freshwater guiding businesses, in addition to the existing saltwater reporting requirements. The logbook data provides location of fishing effort, level of participation, and number of species kept and released by clients. This information is used for the regulation, development, and management of fisheries and has been published annually since 2009 (data since 2006) in a Fishery Data Series report (Sigurdsson and Powers 2009–2016, Powers and Sigurdsson 2016).

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The UCUSMA consists of all waters and drainages of the Copper River upstream from a line crossing the Copper River between the south bank of the mouth of Haley Creek and the south bank of the mouth of Canyon Creek in Wood Canyon, and all waters and drainages of the Upper Susitna River upstream from the confluence of the Oshetna River (Figure 2). Located within the UCUSMA are the communities of Glennallen, Gulkana, Gakona, Chitina, McCarthy, Kenny Lake, Copper Center, Chistochina, Paxson, Mentasta, and Slana. Three of the state's major highways (Edgerton, Glenn, and Richardson), together with numerous secondary roads and trails, provide access to most of the area's sport fisheries. Float-equipped aircraft are commonly used during the summer to access the area's many remote lake and stream fisheries. Snowmachines are the popular mode of travel to remote fisheries during winter. Principal land managers in the UCUSMA are the National Park Service (Wrangell–St. Elias National Park), BLM (Gulkana Wild River), Ahtna Incorporated, Chitina Native Corporation, and the Alaska Department of Natural Resources.

FISHERY RESOURCES

The UCUSMA offers a unique blend of freshwater fishing opportunities to sport anglers, personal use, and subsistence fishers. Three species of Pacific salmon (king, coho *O. kisutch*, and sockeye *O. nerka*) are available to anglers fishing the Upper Copper River drainage. No anadromous runs of salmon return to the Upper Susitna River drainage, upstream of the Oshetna River. Although at least 1 king salmon stock has been documented above Devils Canyon (located downstream of the Oshetna River and outside the UCUSMA), the canyon presents a velocity barrier that appears to limit upstream migration of other salmon species. Waters upstream of the Oshetna River confluence are closed to salmon fishing (Figure 2).

Popular fisheries occur on the area's resident stocks of Arctic grayling, burbot, Dolly Varden (*Salvelinus malma*), rainbow and steelhead trout, and lake trout. Smaller fisheries occur on resident stocks of whitefish.

There are a total of 25 stocked waters in the UCUSMA stocked with rainbow trout, coho salmon, Arctic grayling, and Arctic char (*S. alpinus)*. The stocked fish are reared at the state-owned Ruth Burnett Hatchery in Fairbanks and the William Jack Hernandez Hatchery in Anchorage. Stocked-lake fisheries provide additional, diversified angling opportunity and reduce harvest pressure on wild fish stocks.

A sockeye salmon hatchery operated by Prince William Sound Aquaculture Corporation (PWSAC) is located in the Upper Gulkana River near the community of Paxson. Egg takes are conducted near the hatchery and incubation and start-up rearing are accomplished at the hatchery. Fry are subsequently released at Crosswind, Paxson, and Summit lakes. The returning adults are harvested in commercial, subsistence, personal use, and sport fisheries.

The BOF has established 1 personal use and 2 subsistence salmon fisheries in the Upper Copper River District. The Division of Sport Fish has the lead management responsibility for these fisheries (as opposed to Division of Commercial Fisheries which manages most of the state subsistence fisheries). From 2011–2015, an average of 231,943 salmon was reported harvested annually in these fisheries (Table 1). Sockeye salmon comprise about 98% of the total harvest.

Returns of salmon to the Copper River also support commercial fisheries in the Copper River District (CRD), located near the mouth of the Copper River. From 2012–2016, an average of 1,690,105 sockeye salmon and 13,130 king salmon were commercially harvested in the Copper River District (Table 2).

ESTABLISHED MANAGEMENT PLANS AND POLICIES

Regulations governing fisheries in the UCUSMA are found in 5 AAC 52.001 through 5 AAC 52.065 (sport fishing), in 5 AAC 77.001 through 5 AAC 77.016, 5 AAC 77.550, 5 AAC 77.570, and 5 AAC 77.591 (personal use fishing), in 5 AAC 01.001 through 5 AAC 01.040 and 5 AAC 01.600 through 5 AAC 01.647 (subsistence fishing), and in 5 AAC 24.360 (Copper River District Salmon Management Plan) and 5 AAC 24.361 (Copper River King Salmon Management Plan).

Fisheries-specific management objectives for the management area have been identified in management plans for Arctic grayling and lake trout. A series of general divisional criteria have been prepared to guide establishment of fishery objectives, and include the following:

1. **Management and protection of existing fish resources**. Divisional activities should strive to manage and protect Alaska's wild fish stock resources for future generations;
2. **Public use and benefits of existing fish resources**. Alaska's fishery resources should be made available for public use and benefit on a sustained yield basis;
3. **Rehabilitation of depressed stocks and damaged habitat**. Division activities should strive to restore and maintain fish stocks and habitat damaged by human activities; and
4. **Enhancement of natural production or creation of new opportunities**. The division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively impact other fisheries.

Some UCUSMA fisheries have been the focus of allocative conflicts. These conflicts have led the BOF to establish several management plans and policies to guide the fisheries in the area. The goal of these plans is to allocate fish resources among users and to provide managers with guidelines to maintain a sustained yield of the fish stocks in the area. The following management plans and policies have been adopted by the BOF for UCUSMA fish stocks:

Copper River District Salmon Management Plan (5 AAC 24.360). This management plan contains spawning escapement goals for sockeye and other salmon, inriver harvest goals for the subsistence, personal use, and sport fisheries in the drainage, and hatchery brood stock and hatchery surplus goals. The goals are met through regulation of the commercial fishery near the mouth of the river, and are measured at the sonar counter at Miles Lake.

Copper River King Salmon Management Plan (5 AAC 24.361). This management plan provides for a minimum sustainable escapement goal for king salmon in the Copper River drainage of 24,000 fish or greater. To ensure this goal, during statistical weeks 20 and 21 (generally, the first 2 weeks of the season) the commissioner may open no more than one 12-hour fishing period within the inside closure area of the Copper River District. The department will manage the sport fishery of the Upper Copper River drainage through an annual limit for king salmon 20 inches or greater in length of 4 fish. The department also has the authority to further restrict the sport fishery to achieve the escapement goals using the following management measures in the following priority order: a) reduction of the annual limit; b) modification of other methods and means not specified in the plan; c) catch-and-release only designation; and d) closure of specific waters to sport fishing for king salmon.

The *Copper River Subsistence Salmon Fisheries Management Plans* (5 AAC 01.647) ensures that adequate escapement of salmon past the Miles Lake sonar in the Lower Copper River and that subsistence needs are met. It also establishes the open area, gear, season, bag and possession limits, and permit requirements for a subsistence fishery near the traditional fishing village of Batzulnetas along a portion of Tanada Creek and its confluence with the Copper River.

The *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591) establishes fishing seasons, open area, gear, bag limits, and seasonal harvest level

for a personal use fishery in the Copper River. The harvest will be distributed throughout the season based on projected daily sonar counts from the Miles Lake sonar counter. Harvest will be adjusted, based on actual sonar counts, through reduction or increase of fishing times by emergency order.

The *Wild Arctic Grayling Management Plan* (5 AAC 52.055) directs ADF&G to manage wild Arctic grayling populations in the UCUSMA for long-term sustained yield through a conservative harvest regime. The plan establishes and defines 3 management approaches under which ADF&G shall manage wild Arctic grayling populations in the UCUSMA: 1) the regional management approach; 2) the conservative management approach; and 3) the special management approach. The plan also outlines guidelines and considerations for ADF&G, public and/or BOF to change or address the management approach for a water body or fish stock.

The *Wild Lake Trout Management Plan* (5 AAC 52.060) directs ADF&G to manage wild lake trout populations in the UCUSMA by employing a conservative harvest regime and by maintaining harvest below the maximum sustained yield level. ADF&G may take 1 or more management actions if there is a conservation or biological concern for the sustainability of the fishery or a stock harvested in that fishery. These actions include reduction of bag and possession limit, reduction of fishing time, allowing only catch-and-release, and modification of methods and means of harvest. The plan also specifies allowable measures to reduce harvest if the harvest level exceeds sustainable yield for a 2-year period. Finally, the plan establishes a process for designating special management waters and means for limiting harvest in these areas to meet the management objectives.

The *Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan* (5 AAC 52.065) directs ADF&G to manage stocked waters in the UCUSMA to provide the public diverse fishing opportunities. The plan establishes and defines 3 management approaches under which ADF&G shall manage stocked waters in the UCUSMA: 1) the regional management approach; 2) the conservative management approach; and, 3) the special management approach. Stocked waters may be reclassified through a proposal from the public, ADF&G, or BOF during the BOF's meeting cycle.

The *Cook Inlet & Copper River Basin Rainbow/Steelhead Trout Management Policy* was adopted by the BOF to provide future BOFs, fisheries managers, and the sport fishing public with: (1) management policies and implementation directives for area rainbow and steelhead trout fisheries; (2) a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management; and, (3) recommended research objectives. This management policy was never adopted as regulation.

MAJOR ISSUES

The major issues associated with UCUSMA sport, personal use, and subsistence fisheries are summarized below:

Copper River King Salmon: King salmon returns have been declining since peaking in the late 1990s. This general decline and actions taken through the *Copper River King Salmon Management Plan* have reduced king salmon harvests in the commercial, personal use, and sport fisheries. The department considers the king salmon resources of

the Copper River fully utilized and while king salmon harvests have declined with the inception of the management plan, the allocation issues between the different user groups remain controversial.

King salmon returns declined sharply, beginning in 2009, averaging an estimated 42,251 fish since 2009. From 1999–2008, the estimated Copper River king salmon total run averaged 80,378 fish. The recent decline in king salmon is a statewide issue, but has required restrictive inseason actions in the Copper River fisheries (sport, personal use, and commercial) to ensure that the spawning escapement goal is achieved.

Copper River Personal Use and Subsistence Salmon Fisheries: Participation and harvests have increased in the personal use and subsistence fisheries of the Chitina and Glennallen subdistricts since the 1960s. Participation in both fisheries is open to all Alaskans and the majority of participants are from outside the Copper River Basin. This influx of people creates issues in the area and many local residents reject these participants as "true" subsistence users. Proposals to the BOF concerning these fisheries often stem from the social issues involved with a large seasonal influx of people rather than a concern for fishery sustainability.

Land Access: Ahtna Incorporated (the regional Alaska Native Corporation) owns a majority of the land along the 3 rivers supporting major fisheries in the Upper Copper River drainage. Ahtna Inc. controls the uplands along the Klutina River between Klutina Lake and the Richardson Highway. The corporation owns the majority of land along the Gulkana River downstream of Sourdough and the Gulkana River National Wild River corridor. Ahtna Inc. or its shareholders also own the majority of land along the Copper River within the Glennallen Subdistrict. Ahtna Inc. initiated an access fee program for corporation uplands adjacent to the Klutina River (1998) and the Gulkana River (1999). The fee program ended years of convenient, free access to these river systems. Access fees angered many of the sport fishing public that traditionally used corporation lands to access these rivers and resulted in some users avoiding these access points. Since that time, the access fee program has become established for all Ahtna Inc. lands and most anglers appear comfortable with paying for some access to fishing and camping areas.

Limited public access has been maintained through lands conveyed to Ahtna Inc. and other Alaska Native organizations by establishment of several public easements. The Klutina Lake Road runs parallel to the north shore of the Klutina River and is a combination of a 17b public easement (managed by the BLM), RS 2477 (managed by the State of Alaska Department of Natural Resources (DNR)), and a Department of Transportation (DOT) ROW and provides free access to Klutina Lake and Klutina River where the river passes within the width of the RS 2477 and DOT ROW. The 17b easement provides access to the Klutina River at approximately Mile 21 of the Klutina Lake Road, downstream of the lake. On the Gulkana River, public access to the river is limited to 4 public 17b easements along the Richardson Highway: Sailors Pit at mile 130.9, Poplar Grove (mile 137), Mile 141 trail, and the Middle Fork trail at mile 169.5. There is also public access via the DOT ROW around the Richardson Highway Bridge and via the BLM Sourdough and Paxson Lake campground boat launches.

Access to the Chitina Subdistrict fishery has long been an issue between dipnetters and the two local Native corporations (Ahtna Inc. and Chitina Native Corporation). From the

early 1990s through 2003 an access fee was associated with the State issued dip net permit. In 2000, DOT conducted a survey of the O'Brien Creek Road from Chitina to Haley Creek and determined that the road ROW provided access to the Copper River from the road for a majority of its distance in the fishery. As a result of the survey, the Alaska Legislature removed the access fee from the permit in 2004. In 2005, Chitina Native Corporation instituted a fee based access permit where the general public can now purchase access across Corporation lands for the day or the season. However, even with the access permit, access to the river and trespass on Corporation lands is still a contentious issue.

Burbot and lake trout fisheries: Unattended set lines were prohibited in all UCUSMA lakes in 1991 to reduce the harvest of burbot, which also reduced the incidental harvest of lake trout. Bait restrictions have been implemented in some lakes to reduce the harvest of lake trout. These bait restrictions have adversely impacted some popular burbot fisheries. In some cases, like Lake Louise, Susitna, Tyone, Crosswind, Paxson, and Summit lakes, regulations have been adjusted for lake trout retention and allow for a limited period when bait is permitted to facilitate a burbot ice fishery while providing protection to the lake trout populations.

Freshwater subsistence fisheries: With low participation, the subsistence whitefish fishery garnered little notice from other user groups. With the increase in subsistence permits following the BOF's positive Customary and Traditional (C&T) designation in 2008 and especially increased activity on popular sport fishing lakes (generally the road accessible fisheries of Lake Louise and Paxson Lake) concern by sport anglers over potential impacts on lake trout and burbot has been elevated and may be a continuing issue into the future.

ACCESS PROGRAMS

The Wallop–Breaux Amendment to the Sport Fish Restoration Act (Dingell–Johnson or D–J) mandates that at least 15% of the federal funds collected from taxes on boat gas and sport fishing equipment be used by the states for the development and maintenance of motorized boating access facilities. A broad range of access facilities can be approved for funding if they are constructed to achieve a state fishery management objective. These facilities can include boat ramps and lifts, docking and marina facilities, breakwaters, fish cleaning stations, rest rooms, and parking areas.

In spite of the large land base in the UCUSMA, access to sport fishing is restricted near most popular fisheries due to private land ownership. In addition, few suitable locations for boat launches exist on the major tributaries and Copper River mainstem. Various small access projects are completed each year in the UCUSMA, which entail validating easements, improving existing trails, and replacing or installing signs for local roadside lakes.

INFORMATION AND EDUCATION

Information regarding regulations, publications, stocking and fishing reports, news releases and EOs for the UCUSMA can be found from the *Fishing* and *Sport* links at the ADF&G website (http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main). In addition, many of these publications, as well as some additional publications regarding fishing opportunities in the UCUSMA, can be found at the area ADF&G office in Glennallen and the regional ADF&G

office in Fairbanks. Information regarding the Gulkana Wild River (BLM) and Wrangell-St. Elias National Park (USNPS) can be obtained from the respective agency offices in Glennallen and Copper Center. The Ahtna Incorporated has its headquarters located in Glennallen and can be visited for information regarding access to corporation-owned lands. The Greater Copper Valley Chamber of Commerce can be a source for commercial operators located in the UCUSMA. A listing of the addresses and contact numbers for these information sources can be found in Appendix A.

There are 3 regional information and education (I&E) staff located in the Fairbanks office. An Information Officer II and a seasonal Fisheries Technician III respond to questions from the public at the office and via phone and e-mail. In addition, I&E staff distribute and update fishery brochures, fishing regulations, the regional webpage, coordinate the Fairbanks Outdoor Show booth, Kid's Fish & Game Fun Day, and the Becoming an Outdoors-Woman (BOW) program. An Education Associate II coordinates the sport fishing component of the Alaska Conservation Camp and works with schools in various communities throughout the region to provide a curriculum in sport fishing and aquatic education.

SPORT FISHING EFFORT, HARVEST, AND CATCH

Effort, harvest, and catch statistics for UCUSMA sport fisheries have been estimated from response to the SWHS since 1977, and reported under the headings of the "Upper Copper River Drainage" (Area I) and the "Susitna River Drainage" (Area M); (Mills 1979, 1980, 1981*a-b*, 1982–1994, Howe et al. 1995–1996, 2001*a-d*, Walker et al. 2003, Jennings et al. 2004, 2006*a-b*, 2007, 2009*a-b*, 2010*a-b*, 2011*a-b*, 2015*;* Romberg et al. *In prep*). Anglers expended a total of 30,227 angler-days of effort in UCUSMA drainages in 2016, which is the lowest level of effort recorded since 1977 (Somerville *In prep*; Table 3). Angler effort in the UCUSMA has generally remained between 40,000 and 60,000 angler-days with the exception of the period from 1992 through 1995 when angler effort averaged nearly 85,000 angler-days and peaked at 102,951 angler-days in 1995 (Somerville *In prep*). Angler effort has also fallen below 40,000 angler-days every year since 2013. The majority of effort in the UCUSMA occurs in the Gulkana and Klutina river drainages, representing approximately 66% of the total area effort in the past decade (Table 3).

Sockeye salmon are the predominant species harvested in the UCUSMA representing 68% (17,047 fish average) of all species harvested from 2011–2015 and 47% (7,538 fish) in 2016 (Table 4). The next most harvested species, from 2011–2015, were Arctic grayling (3,317 fish) and king salmon (969 fish) followed by lake trout, stocked rainbow trout, burbot, Dolly Varden, and whitefish.

Arctic grayling are the predominant species caught in the UCUSMA representing 38% (26,983 fish) of all species caught from 2011–2015 and 59% (44,698 fish) in 2016 (Table 5). The next most caught species from 2011–2015 were sockeye salmon (23,410 fish), and lake trout (5,690 fish) followed by wild rainbow trout, king salmon, stocked rainbow trout, Dolly Varden, burbot, and whitefish.

SECTION II: FISHERIES

This section provides a summary of sport fisheries by species that were considered significant in the UCUSMA in 2016 and 2017. Discussion of each fishery will address: 1) historical perspective; 2) recent fishery performance (stock status); 3) fishery objectives and management;

4) current issues; 5) recent actions by the BOF; and 6) ongoing and recommended management and research activities. Recent fishery performance will focus on data from 2016; however, observations or research data regarding these fisheries in 2017 will be presented when available. A summary of the historical (prior to 2016) sport fishing effort and harvest in the UCUSMA can be found in Somerville (*In prep*).

KING SALMON SPORT FISHERIES

Background and Historic Perspective

The Copper River drainage supports the only anadromous runs of king salmon in the UCUSMA. No anadromous runs of king salmon return to the Upper Susitna River drainage, upstream of the Oshetna River.

King salmon returning to the Copper River drainage pass through the Copper River Delta and enter the Copper River in early May. The peak timing in the Lower Copper River is from mid-May to mid-June, with the return essentially complete by July 1. However, small numbers of king salmon continue to enter the Copper River through August. King salmon make their way to spawning areas in the Upper Copper River tributaries through June and July and spawn mid-July through August. There are no known king salmon spawning streams downstream of Haley Creek.

King salmon are found in at least 40 tributaries distributed throughout the Copper River Basin. Aerial escapement surveys have been conducted in 35 of these systems, with 9 of these systems (Little Tonsina River, Greyling Creek, Mendeltna Creek, Kaina Creek, Indian River, Gulkana River, East Fork Chistochina River, and Manker and St. Anne creeks) surveyed consistently from 1966 (Roberson and Whitmore 1991) through 2004. Unfortunately, aerial index counts have proven to be an unreliable index of overall king salmon escapement in the Copper River drainage. There was a high variability in the proportion of total escapement between years and the majority of the index streams disproportionately represented early run stocks.

A radiotelemetry study conducted by the department from 2002–2004 showed that only 45% of the king salmon returns to the Klutina River and 16% to the Tonsina River spawned in the index streams. The remainder spawned in the glacial mainstem of those rivers (Savereide 2005*a*). The study also indicated that the 9 index streams represented only 26–46% of total escapement in the Copper River drainage. Annual aerial index counts were reduced and have continued on only 4 index streams: Gulkana River, East Fork Chistochina River, and Manker and St. Anne creeks in the Klutina River drainage. These 4 streams provide comparable indices of escapement in these systems from year to year.

The *Copper River King Salmon Management Plan* was adopted by the BOF in 1996 (Appendix B1) and is the primary guide to management of king salmon stocks in the Copper River drainage. Copper River king salmon stocks are harvested in commercial and subsistence gillnet fisheries in the Copper River District near the mouth of the river, a personal use dip net fishery in the Chitina Subdistrict near Chitina, a subsistence dip net and fish wheel fishery in the Glennallen Subdistrict between the Chitina and Slana rivers, and sport fisheries in various tributaries. Because most of these fisheries are comprised of mixed stocks, the contribution to the harvest by each spawning stock cannot be quantified and king salmon productivity assessed using stock specific spawner-recruit relationships (Brady et al. 1991; Roberson and Whitmore 1991). Therefore, Copper River king salmon are managed in aggregate to achieve a drainagewide spawning escapement of 24,000 or more fish.

From 1960–1998 harvest of king salmon gradually increased in the commercial, personal use, subsistence, and sport fisheries of the Copper River drainage (Somerville *In prep*). For example, total king salmon harvest in the Copper River averaged 12,709 salmon with a range of 8,174 to 15,919 salmon from 1960–1964 and from 1994–1998 averaged 73,934 salmon with a range of 60,139 to 87,343 salmon. The increase in harvest may be attributable to a general increase in stock abundance as well as increases in participation and efficiency of the commercial fishery and increased participation in the upriver personal use, subsistence, and sport fisheries. Since 1998, king salmon harvests in all Copper River fisheries have generally declined (Table 6). Declining harvests appear to be the result of declining stock abundance rather than decreased participation or efficiencies in the various fisheries. However, since 2009, implementation of inseason management restrictions in all fisheries, except subsistence, have directly resulted in reduced harvests in these fisheries.

From 1997 to 2008 total king salmon harvest ranged from 21,293–87,343 fish (Table 6). During 2009–2016 the total king salmon harvest averaged 18,583 fish and ranged from 13,868–29,410 fish. The total king salmon harvest in 2016 was 16,758 fish, which is the sixth lowest since 1974 (Evenson and Savereide 1999; Somerville *In prep*). King salmon escapement has averaged 26,463 fish from 2011 through 2015 and met or exceeded the sustainable escapement goal (SEG) for the Copper River in 11 of the last 18 years since the first SEG was established by the BOF in 1999. King salmon escapement was below the SEG in 2016 and was estimated at 12,485 fish, which is the lowest spawning escapement estimate since 1999. Since 2009, implementation of inseason management restrictions in all fisheries except subsistence, as provided in the *Copper River King Salmon Management Plan*, have resulted in reduced harvests and achievement of the SEG in 5 of the last 8 years, falling below the goal in 2010, 2014, and 2016.

King salmon sport fisheries occur in various tributaries of the Copper River. Fisheries on the Gulkana and Klutina rivers account for 87% of the sport caught king salmon in the UCUSMA (Table 9). In 1994, an annual bag limit of 5 king salmon was established for the Upper Copper River drainage in an attempt to stem rising king salmon harvests. Sport harvest of king salmon continued to increase through 1996 when it peaked at 9,116 fish (Somerville *In prep*) and has declined since (Table 7). In 1997, guides were prohibited to operate on Tuesdays during the king salmon season, but this appeared to have little or no effect on guided harvests. In 2000, the annual limit for king salmon in the Upper Copper River drainage was reduced from 5 to 4 and the guide restriction was repealed. From 2011–2015 sport harvest of king salmon in the UCUSMA averaged 969 fish and totaled 327 fish in 2016 (Table 7), the second lowest total harvest since 1977 (Somerville *In prep*). Inseason management actions have restricted the sport harvest of king salmon in the Upper Copper River drainage each year since 2009.

Creel survey data indicate that guided king salmon anglers are more successful than unguided anglers on the Gulkana and Klutina rivers (LaFlamme 1997; Potterville and Webster 1990; Schwanke 2009*a*). Harvest estimates from guide logbooks also indicate a majority of king salmon are harvested by guided anglers (Table 8). Since 2005, ADF&G has required guides to log the harvest and number of fish released per client by trip and fishing site (Sigurdsson and Powers 2009-2013). The number of guides operating on area rivers has increased since the early 1980s. For example, prior to the 1986 season, only one individual specialized in guiding anglers for king salmon on the Gulkana River. By 1989, five guides were operating on the Gulkana River (Potterville and Webster 1990) and from 2007 through 2016, 8–29 guides operated annually on the Gulkana River (H. Sigurdsson, Sport Fish Biologist, ADF&G, Anchorage,

personal communication; Table 8). On the Klutina River 13–28 guides operated there annually since 2007.

To more accurately assess king salmon abundance in the Copper River, research was initiated in 1995 to estimate the timing and contribution of king salmon stocks from its major tributaries. In 1996, a weir was operated on the Gulkana River to enumerate king salmon in tandem with a creel survey to estimate king salmon harvest (LaFlamme 1997). From 1997 to 1999, a coded-wire tagging study was conducted in the Gulkana, Klutina, Tonsina, and East Fork Chistochina rivers. Unfortunately, the methods used for marking wild king salmon fry with coded wire tags proved ineffective to assess returns due to a low tag recovery rate (Sarafin 2000; Brase and Sarafin 2004). Despite the failures in this study, a new effort to assess Copper River King salmon productivity was initiated in 2014, in which king salmon smolt and fry have been coded-wire-tagged. Adult returns will be monitored for tagged fish beginning in 2017.

From 1999–2004, radiotelemetry studies were used to determine king salmon distribution and timing of entry into the spawning streams of the Copper River (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005*a*). Estimates of total escapement were obtained during these studies from a mark-recapture experiment in which king salmon were captured and tagged during the radio-transmitter deployment and then recaptured in the Chitina Subdistrict personal use fishery. In 2002, a separate mark-recapture study was initiated using only fish wheels as the means to capture (for marking) and recapture marked and unmarked king salmon. This continuing study, conducted by the Native Village of Eyak and LGL, Inc., has provided a postseason estimate of annual king salmon escapement to the Copper River since 2003 (Smith et al. 2003; Smith 2004; Smith and van den Broek 2005*a-b*; van den Broek et al. 2007, 2008, 2009, 2010, 2011, 2012; Pelekis and Smith 2013; Whissel et al. 2014, 2015; Piche et al. 2016, 2017).

Gulkana River King Salmon Sport Fishery

Background and Historic Perspective

The Gulkana River drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana. The section of the Gulkana River upstream from Sourdough has been designated as “wild” under the Wild and Scenic Rivers Act of 1968. Access to the river, downstream of Paxson Lake, is limited to seven state and federal trail and site easements, and 1 privately owned and controlled site accessible from the Richardson Highway, which parallels much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the Richardson Highway Bridge. Powerboat operators generally launch at the BLM Sourdough launch and use the river from approximately two miles below Sourdough upstream to several miles above the confluence of the West Fork. Powerboat operators also launch from the Richardson Highway Bridge and fish the 5-mile reach of the river above the bridge. Powerboat operators access the mouth of the Gulkana River, when the river level is sufficiently high, by launching near the Richardson Highway Bridge and boating down the Gulkana River and when water levels are lower by launching in the Gakona River, to the north, and then boating down the Copper River.

The Gulkana River drainage has historically supported the largest sport fishery for harvest (Table 7) and catch (Table 9) of king salmon in the UCUSMA. King salmon begin entering the Gulkana River in early to mid-June. The sport fishery peaks during late June/early July, but

fishing for king salmon continues until the season closes July 20th. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork (Figure 3). King salmon harvest and catch increased in the Gulkana River through the mid-late 1990s and declined after 1998 (Somerville *In prep*). King salmon harvest peaked in 1992 at 5,892 fish and averaged 5,135 fish from 1996–1998. Harvest in 2015, when no inseason restrictions were implemented, was 774 king salmon. Harvest from 2009–2014 averaged 529 king salmon, but inseason action was taken in each of these years to specifically reduce harvest of king salmon in the Gulkana River.

Spawning escapement of king salmon in the Gulkana River, upstream of the West Fork, has been documented since 1966 by aerial index counts (Brady et al. 1991; Roberson and Whitmore 1991; Taube 2006*a*-*b*). A weir was operated on the Gulkana River in 1996 to provide a count of king salmon escapement concurrent with a creel survey conducted that same year (LaFlamme 1997). The estimated total inriver run in 1996 was 13,840 and estimated spawning escapement was 11,684.

In 2002, ADF&G initiated a multi-year project with BLM to estimate the escapement of king salmon in the Gulkana River (Taras and Sarafin 2005; Perry-Plake et al. 2007; Perry-Plake and Antonovich 2009; Perry-Plake and Huang 2011; Savereide 2010, 2011; Maclean 2013; Schwanke *In prep a*). A counting tower site was established approximately two miles upstream of the West Fork confluence to enumerate king salmon migrating upstream. The estimated escapement passing the counting tower generally decreased from a 6,390 king salmon count to a count of 1,730 king salmon in 2012. Counts increased in 2013–2015 to nearly 4,000 king salmon due to inseason restrictions to the Gulkana River sport fishery in 2013 and 2014 and a stronger than expected return in 2015. However, despite closing the river to sport fishing for king salmon in 2016 the Gulkana River spawning escapement was the lowest ever recorded at 1,044 king salmon (Schwanke *In prep a*). From 2002–2004 a radiotelemetry tracking station was installed at the tower site to collect data in conjunction with the Copper River king salmon radiotelemetry project. These data enabled the estimation of the proportion of radiotagged king salmon that entered the Gulkana River and migrated past the tower. The telemetry data indicated that 50–86% of the Gulkana River king salmon return passed the counting tower during these years (Taras and Sarafin 2005; Perry-Plake et al. 2007). A radiotelemetry project specifically tracking king salmon distribution and spawning in the Gulkana River was initiated in 2013 and ran through 2015 (Schwanke *In prep c*). Telemetry data from this project indicated that no more than 50% of the Gulkana River king salmon spawned above the counting tower during these years. The cause of this apparent shift in spawning locations is not clearly identified and could be the result of low water conditions in 2013–2015, a longer term trend due to unidentified environmental factors or may be a result of differences in capture method and tag deployment between the two studies.

A roving creel survey conducted in 1989 (Potterville and Webster 1990) and an on-site survey conducted in 1996 (LaFlamme 1997) showed the majority of effort and harvest of king salmon from the Gulkana River occurs from the Richardson Highway Bridge upstream to the confluence of the West Fork. During both creel surveys few anglers appeared to fish the single-hook, artificial fly only areas downstream of the Richardson Highway Bridge. Although many anglers floated the upper river, the harvest of king salmon appeared minimal in this reach because most king salmon did not arrive to the area until after the July 19 spawning season closure. Anglers that were guided or used bait had higher harvest and catch rates. Shore anglers caught as many

king salmon as boat anglers, but harvested more and expended more time to catch a king salmon. According to both creel surveys, approximately 50% of the harvest occurred on weekends.

Regulations used to manage the Gulkana River king salmon fisheries accommodate concurrent fisheries on other species, provide protection to these other species populations, and provide protection for spawning king salmon while still providing maximum opportunity for the anglers who target king salmon. Twelvemile Creek, the Middle Fork drainage, and all waters of the Gulkana River drainage upstream of the Middle Fork confluence are closed to fishing for king salmon year-round to protect spawning fish (Figure 3). The remainder of the river is open to king salmon fishing from January 1 through July 19. From June 1 through July 19 anglers may use bait, artificial lures, and treble hooks upstream from the Richardson Highway Bridge to an ADF&G marker located 7.5 miles upstream of the West Fork confluence. From June 1 through July 31, anglers are limited to using only single-hook, artificial flies from the Richardson Highway Bridge downstream to an ADF&G marker approximately 500 yards downstream of the confluence with the Copper River. In all waters of the Gulkana River drainage, upstream of a marker 7.5 miles upstream of the West Fork confluence with the mainstem, and in the entire Gulkana River drainage from July 20 to May 31, only unbaited, single-hook artificial lures may be used. This restriction is intended to protect the resident rainbow trout population and the small population of steelhead that return to the Gulkana River.

Recent Fishery Performance

The sport harvest of king salmon in the Gulkana River averaged 396 fish over the last 5 years (2011–2015) and 1,169 fish from 2006–2015 (Table 7). Angler effort on the Gulkana River, which is presumed to be primarily focused toward king salmon, peaked in the 1990s reaching 44,075 angler-days in 1995 (Somerville *In prep*). The 5-year average (2011–2015) of angler effort was 8,668 angler-days. Angler effort in 2016 was the lowest ever recorded for the Gulkana River at 3,120 angler-days and most likely reflects inseason restrictions of the king salmon fishery (Appendix B).

In 2015, no management actions were taken in the Copper River king salmon fisheries. Drainagewide spawning escapement was 26,764 king salmon (Table 6) and passage by the Gulkana River counting tower was estimated at 3,738 king salmon (Schwanke 2016).

On June 18, 2016, retention of king salmon was prohibited in the Gulkana River drainage. The use of bait and treble hooks in the Gulkana River was also prohibited. One week later, on June 25, 2016, all sport fisheries for king salmon in the Upper Copper River were closed. King salmon could no longer be taken or possessed and had to be released immediately. In addition, the use of bait and treble hooks was also prohibited. As a result of these management actions, the 2016 harvest of 293 king salmon from the Gulkana River was the third lowest ever recorded (Table 7). The final escapement estimate for king salmon in the Gulkana River for 2016 was 1,044 fish (Schwanke *In prep a*).

Fishery Objectives and Management

The goal of past and current management of king salmon on the Gulkana River has been to ensure sustained yield, but there is currently no escapement goal specific to the Gulkana River. The *Copper River King Salmon Fishery Management Plan* was developed in 1996 to provide for king salmon escapement at or above average historic levels. To meet this goal, escapement objectives (postseason indices of escapement only) were developed for several river systems

based on the 1977–1995 average aerial index count for those systems. Only years in which the systems were surveyed between July 17 and 31 were used in the average as this was considered the peak spawning period. An aerial escapement index objective of 1,200 king salmon has been used for the Gulkana River. An inseason escapement count target of 4,070 king salmon past the Gulkana River counting tower was developed using an expansion of the aerial survey indices from 2002–2011 to the tower counts for those years (Maclean 2013). This target is not a formal escapement goal, but rather a target to help guide inseason management decisions, which depend on voluntary reports from sport anglers and guides, Copper River subsistence and personal use fishers, aerial index counts, and counting tower reports.

Current Issues and Fishery Outlook

Low king salmon returns have reduced the number of anglers targeting the Gulkana River and reduced conflict between its various users who access the fishery from shore, by raft, or by power boat. At the 1999, 2003, and 2008 BOF meetings, proposals were submitted to limit motor boat use on the Gulkana River. None of these proposals were addressed, as they fell outside the purview of the BOF. However, BLM has authority within the designated wild section of the river to establish a permit system for camping on their lands and thus limit the number of trips per year or number of people per trip. No such permit system has been implemented, but BLM currently issues portable toilets for rafting groups floating the river from Paxson Lake to the Sourdough boat launch.

Public access to the Gulkana River is limited to a few easements and access points, and this lack of access drives the need for people to float long sections of the river or use a power boat to access quality fishing locations. A combination of private and federal campgrounds and a developed public use area on DOT land immediately below the Richardson Highway Bridge provide overnight sites for river users as well as locations for boat and raft launching and retrieval.

Recent trends in total returns of king salmon to the Copper River and other state waters indicate the Gulkana River will experience low returns into at least the near future. Harvest and catch data, as well as tower counts, indicate a declining trend in run strength for Gulkana River king salmon stocks beginning in the late 1990s. Despite these declines, the Gulkana River is expected to remain a popular king salmon fishery. It is anticipated that management actions in low run years will continue to be needed to achieve adequate king salmon escapements, thereby providing sustainable fisheries into the future.

Recent Board of Fisheries Actions

There were 3 proposals before the BOF at the 2011 meeting that addressed the Gulkana River king salmon fishery. One proposal sought to change the king salmon season on the Gulkana River from 7 days per week from January 1–July 19 to 5 days per week from June 10–August 10. This proposal failed. The BOF took no action on proposals that sought to restrict sport fish guides in some undetermined way if the Copper River District commercial drift gillnet fishery was closed for conservation measures, or sought to limit nonresident anglers to shipping only a single daily bag limit of fish from the state and establish a permitting system to ensure compliance.

There were also 3 proposals submitted for the December 2014 BOF meeting in Cordova that could have affected the Gulkana River king salmon sport fishery. All three sought restrictions

for barbless hooks, one limiting all king salmon fisheries in the UCUSMA to unbaited, single-hook, barbless hooks, one limiting king salmon anglers to a single barbless hook after achieving the daily or annual bag limit, and one limiting fisheries, restricted to catch and release, to single, barbless hooks. All three proposals failed.

A proposal to prohibit catch and release sport fishing in the Upper Copper Upper Susitna Management Area has been submitted for the December 2017 BOF meeting in Valdez. If approved this proposal will directly affect the king salmon sport fishery on the Gulkana River.

Current or Recommended Research and Management Activities

The Gulkana River counting tower project is a continuing projects used to assist with inseason management of the Gulkana and Copper River king salmon fisheries. A 3-year radiotelemetry study on king salmon movements and spawning locations within the Gulkana River drainage was conducted from 2013–2015 and provided valuable insight on use and selection of king salmon spawning locations (Schwanke *In prep c*). In 2015, a study designed to estimate productivity of king salmon tributaries was begun with the coded-wire tagging of king salmon fry and smolt in Copper River tributaries and steams such as the Gulkana River. This project is intended to continue for 5–10 years.

Klutina River King Salmon Sport Fishery

Background and Historical Perspective

The semi-glacial Klutina River drops rapidly out of Klutina Lake and enters the Copper River at the community of Copper Center. Access to the river is available from the old and new Richardson Highways and along the Klutina Lake Road (also called the Brenwick-Craig Road), which parallels the river. Shore anglers participate in the fishery adjacent to the Richardson Highway and the Klutina Lake Road. Jet-powered riverboats are used by experienced operators to access the upstream portions of the river. The river has considerable stretches of whitewater and is considered to be very challenging to navigate. Jet boats are launched from private land adjacent to the highway or from a boat launch within the highway ROW along the new Richardson Highway Bridge. Rafters also use the Klutina River and launch from sites located at mile 4, mile 14, and mile 22 of the Klutina Lake Road and exit the river at the new Richardson Highway Bridge. The fast water of the Klutina River limits the number of resting pools for king salmon to less than 2 dozen good fishing sites accessible to most anglers in the lower portion of the river.

The Klutina River supports the second largest sport fishery for king salmon in the UCUSMA. King salmon begin entering the Klutina River in late June, with the run continuing into August. The king salmon sport fishery opens on July 1, peaks during the third week of July, and continues until the season closes on August 11. King salmon spawn from late-July through August in tributary streams of the river and lake and in the mainstem of the river. Most spawning is believed to occur upstream of a point adjacent to mile 19.2 on the Klutina Lake Road. Current open seasons for king salmon and areas closed to sport fishing for king salmon on the Klutina River provide protection to king salmon spawners. On the Klutina River from an ADF&G marker located adjacent to mile 19.2 of the Klutina Lake Road upstream to Klutina Lake, king salmon may be taken only from July 1 through July 19. From mile 19.2 downstream to an ADF&G marker at mile 13.0 of the Klutina Lake Road, king salmon may be taken from July 1 through July 31. From mile 13.0 downstream to the confluence of the Copper River, king salmon

may be taken from July 1 through August 10. The current bag and possession limit for sport caught king salmon ≥20 inches is 1 fish. The Upper Copper River drainage wide annual bag limit of 4 king salmon ≥20 inches per year includes the Klutina River.

Creel surveys were conducted on the Klutina River in 1988 (Roth and Delaney 1989), in 1989 (Potterville and Webster 1990), and 2006 (Schwanke 2009*a*). All 3 surveys indicated that most kings are harvested by anglers accessing the river by boat (80% in 1988, 88% in 1989, and 87% in 2006). The 2006 survey segregated the boat accessed king salmon harvest by anglers accessing with power boats (70%) and rafts (17%) (Schwanke 2009*a*). Furthermore, anglers accessing the fishery via boats operated by commercial guide services were more successful. Nearly 80% of the harvest of king salmon and 90% of the king salmon catch was attributed to guided boat anglers in 1988 (Roth and Delaney 1989). The 1989 creel survey reported that the vast majority of boat anglers that participated in the fishery were guided (Potterville and Webster 1990). In 2006, guided anglers accounted for 90% of the king salmon harvest in June and 79% of the harvest in July (Schwanke 2009*a*).

Aerial index counts have been conducted on two clearwater tributaries (Manker and St. Anne creeks) of the Klutina River since 1966 (Brady et al. 1991, Roberson and Whitmore 1991, Taube 2006*a*-*b*). Radiotelemetry studies conducted on king salmon from 1999–2004 indicated that these two streams accounted for about 45% of the spawning population of the Klutina River system (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005*a*). Additionally, the king salmon returning to Manker and St. Anne creeks primarily represented the early component of the Klutina River king salmon run. The majority of Klutina River king salmon spawn in the mainstem and generally later than those in the clearwater tributaries of the river.

Recent Fishery Performance

Sport harvest of king salmon in the Klutina River peaked in the late 1990s with the highest harvest recorded in 1999 at 3,489 fish (Somerville *In prep*; Table 7). Over the last 5 years (2011–2015), the sport harvest of king salmon in the Klutina River averaged 495 fish and 805 fish from 2006–2015. From 2009–2014, management actions were taken to ensure adequate spawning escapement of king salmon to the Copper River drainage (Appendix B). These management actions reduced the annual limit of king salmon each year from 4 fish to either 2 or 1 fish and additionally restricted the Klutina River king salmon fishery to catch and release and no bait after July 26 in 2009 and after July 27 in 2012.

In 2015, no management actions were taken in the Copper River king salmon fisheries. Drainagewide spawning escapement was 26,764 king salmon (Table 6). A total of 481 king salmon were harvested from the Klutina River that year.

In 2016, management action was taken to restrict all king salmon fisheries in the UCUSMA. On June 25, 2016, all sport fisheries for king salmon in the Upper Copper River were closed. King salmon could no longer be taken or possessed and had to be released immediately. In addition, the use of bait and treble hooks was also prohibited. The 2016 harvest of no king salmon was the lowest harvest ever reported for the Klutina River fishery.

Fishery Objectives and Management

Although no specific fishery objectives have been established for this stock, the underlying goal of fisheries management is to ensure sustained yield. Aerial index counts of the clearwater

tributaries will continue to be used to monitor Klutina River king salmon returns inseason along with anecdotal reports from the subsistence, personal use and sport fisheries; and catch data from the Copper River commercial gillnet fishery and NVE/LGL project fish wheels.

The Klutina River king salmon return is managed as a single stock. Anglers and guides consider the return to be two separate stocks of kings, comprising an early and late run. Radiotelemetry data indicate that early returning fish primarily spawn in Manker and St. Anne creeks and the later returning king salmon primarily spawn in the mainstem Klutina River (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005*a*). However, early and late returning king salmon do spawn in both locations and there is sufficient overlap in entry timing of both tributary and mainstem spawners that no distinct temporal differences between early and late returning king salmon have been identified. Genetic sampling conducted from 2003–2005 had insufficient resolution to determine a significant genetic difference between the tributary and mainstem spawners (Seeb et al. 2009).

Current Issues and Fishery Outlook

Radiotelemetry indicated that 10–12% of the total Copper River drainage king salmon escapement from 2002–2004 spawned in the Klutina River, compared to the 17–27% that spawned in the Gulkana River during the same period (Savereide 2005*a*). Since 2005 the king salmon sport harvest from the Klutina River has averaged 45% of the overall Upper Copper River drainage sport harvest. Overall, king salmon harvest from the Klutina River has declined consistent with the overall decline in king salmon returns to the Copper River since the late 1990s (Table 7). Continued low king salmon runs may make future restrictions to the fishery necessary.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna Native Corporation. The Klutina Lake Road provides access to boat and raft launch sites at 14 mile and 22 mile of the road as well as shore fishing access where the road right-of-way intersects the river. The status of the Klutina Lake Road remains in dispute. The state asserts the road is an RS 2477 route and therefore a 100-foot ROW allowing access to the river, opportunity to park and opportunity to camp within the ROW. Ahtna Native Corp. Asserts the road is a 17b easement managed by the BLM and limits travelers to using the road to access Klutina Lake only with no right to camp, park, or access the Klutina River without payment of an access fee to Ahtna. Until this issue is resolved, the state assumes the road is 100-foot ROW and any use of the land outside of that ROW is subject to permission from and payment of any applicable fees to Ahtna.

Recent Board of Fisheries Actions

There were two proposals before the BOF at the 2011 meeting that indirectly concerned the Klutina River king salmon fishery. One proposal sought to restrict sport fish guides in some undetermined way if the Copper River District commercial drift gillnet fishery was closed for conservation measures. Another proposal sought to limit nonresident anglers to shipping only a single daily bag limit of fish from the state and establish a permitting system to ensure compliance. The BOF took no action on these proposals.

There were also three proposals submitted for the December 2014 BOF meeting in Cordova that could have affected the Klutina River king salmon sport fishery. All three sought restrictions for barbless hooks, one limiting all king salmon fisheries in the UCUSMA to unbaited, single-hook,

barbless hooks, one limiting king salmon anglers to a single barbless hook after achieving the daily or annual bag limit, and one limiting fisheries, restricted to catch and release, to single, barbless hooks. All three proposals failed.

A proposal to prohibit catch and release sport fishing in the Upper Copper Upper Susitna Management Area has been submitted for the December 2017 BOF meeting in Valdez. If approved this proposal will directly affect the king salmon sport fishery on the Klutina River.

Current or Recommended Research and Management Activities

At a minimum, aerial index counts should continue to provide an inseason assessment of the king salmon return in the Klutina River. Management of king salmon in the Klutina River would benefit from another radiotelemetry project, which could provide data on king salmon movements and milling behavior within the Klutina River to ensure current closing dates on the upper river sections are providing the assumed protection to spawning adults. Continued genetic sampling may provide data to determine if the tributary and mainstem spawning groups are distinct stocks or a single related stock. Finally, continuation of the NVE/LGL king salmon stock assessment provides the best inriver abundance estimate of king salmon for the Copper River and is essential to the management of king salmon sport fisheries.

In 2015, a study designed to determine productivity of king salmon tributaries was begun with the coded-wire tagging of king salmon fry and smolt in Copper River tributaries steams, such as the Gulkana River. This is projected is intended to continue for 5–10 years.

Other Copper River Basin King Salmon Sport Fisheries

Background and Historical Perspective

Less than 10% of the harvest of king salmon in the UCUSMA occurs in systems other than the Gulkana and Klutina rivers. The majority of this remaining harvest occurs in the Tonsina River. The semi-glacial Tonsina River flows from Tonsina Lake into the Copper River downstream of the Klutina River confluence (Figure 2). The Tonsina River is crossed by the Richardson Highway, Edgerton Highway, and Alyeska Pipeline bridges. Shore anglers participate in the fishery adjacent to the Edgerton and Richardson highways; some angling is conducted by raft between the Richardson and Edgerton highways; and some angling is conducted by fly-in anglers fishing the Tonsina Lake outlet. Some boat anglers access the Tonsina River to fish the mouth by boating upstream from the Chitina-McCarthy Bridge.

King salmon return to the Tonsina River drainage from late-June through early-August, similar to king salmon in the Klutina River. Spawning occurs in tributaries and mainstem of the Tonsina River from mid-July through August. From 2002–2004 the Tonsina River king salmon run represented approximately 12% of the total Copper River return, a similar percentage as the run in the Klutina River (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005*a*).

The sport harvest of king salmon in the Tonsina River has averaged 23 fish over the last 5 years (2011–2015) and 28 fish over the last 10 years (2006–2015; Table 7). However, angler effort, directed at king salmon, has been observed every year in several locations along the river. In 2013, 2014, and 2015 51, 16, and 50 king salmon were harvested respectively from the Tonsina River.

King salmon spawning escapement to the Tonsina River was documented by aerial index counts of the Little Tonsina River and Grayling Creek from 1966–2004 (Brady et al. 1991; Roberson and Whitmore 1991; Taube 2006*b*). The spawning escapement to these index sites averaged 465 fish from 1977–1986, but the average index count declined to 310 for 1996–2004. Aerial index counts on the Tonsina River tributaries were discontinued after 2004 due to minimal sport fishing effort and harvest and based upon the radiotelemetry study that indicated the majority of spawning occurred in the glacially-occluded mainstem.

Current regulations allow sport fishing for king salmon in the Tonsina River from July 1 through July 19 above the downstream edge of the Alyeska Pipeline access bridge and from July 1 through August 10 downstream of the access bridge. The July 20 closure date for the upper river provides protection for spawning king salmon. Tonsina Lake and all tributaries to the Tonsina River are closed to king salmon fishing. The current bag and possession limit for king salmon ≥20 inches in this drainage is 1 fish, with an annual bag limit of 4 king salmon ≥20 inches for the Copper River drainage.

A limited fishery for king salmon also occurs in the Tazlina River drainage. Traditionally, most effort was focused at the mouth of Kaina Creek, which flows into Tazlina Lake. No king salmon harvest has been reported from the Tazlina River drainage since 1998 (Table 7), but catch was reported sporadically and has averaged 10 king salmon from 2011–2015 (Table 9). The average escapement index for the Tazlina drainage was 576 king salmon from 1977–2004 (65% from Kaina Creek, 35% from Mendeltna Creek). Aerial index counts on Kaina and Mendeltna creeks were discontinued after 2004, due to minimal sport fishing effort and harvest and based upon radiotelemetry studies (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003-2005*a*) that indicated the Tazlina River represented less than 5% of the total Copper River return of king salmon.

Fishery Objectives and Management

No specific fishery objectives have been established for the Tonsina or Tazlina river king salmon stocks. The underlying goal of past and current management is to ensure sustained yield. The aerial index count had been used as a postseason escapement index, but had limited utility to describe overall escapement in these systems.

Current Issues and Fishery Outlook

The overall strong runs of king salmon in the 1990s and good runs through 2007 along with implementation of the *Copper River King Salmon Management Plan* have thus far help prevent the overexploitation of Copper River king salmon stocks. However, if the Copper River experiences below average king salmon runs as seen in recent years, managers may need to continue to take inseason restrictions to ensure continued sustainability of the Copper River king salmon stocks.

Recent Board of Fisheries Actions

There were no proposals before the BOF at their 2011 or 2014 meetings which directly affected the other Copper River Basin king salmon fisheries. A proposal to prohibit catch and release sport fishing in the Upper Copper Upper Susitna Management Area has been submitted for the December 2017 BOF meeting in Valdez. If approved this proposal will directly affect the king salmon sport fishery on all area tributaries.

Current or Recommended Research and Management Activities

Assessment of the genetic structure of Copper River king salmon stocks included sampling from the Tonsina, Tazlina and Klutina drainages (Seeb et al. 2006, 2009; Templin et al. 2011). These drainages appear to have a similar genetic structure that is distinct from the Gulkana and Upper Copper River king salmon stocks. Further genetic sampling and analysis may be helpful in further delineation of king salmon in these three drainages.

Management of the Tonsina River would benefit from continuation of the NVE/LGL king salmon population estimates.

SOCKEYE SALMON SPORT FISHERIES

Background and Historic Perspective

In the UCUSMA, only the Copper River drainage supports wild and enhanced stocks of sockeye salmon. Wild stocks are widely distributed and are present in approximately 125 of the Upper Copper River tributaries, while enhanced stocks are limited to the Gulkana River from production at the Gulkana Hatchery near Paxson. The abundance of salmon migrating into the Copper River has been estimated annually since 1978 by sonar at Miles Lake. Although there is no species apportionment program in place, it is assumed that most of the fish passing the sonar are sockeye salmon. Sonar counts are discontinued prior to the end of the sockeye run by July 31 each year before significant numbers of coho salmon enter the river. With the exception of 1993–1995 the escapement of sockeye salmon to Upper Copper River tributaries has been documented from 1966–2015 by the Division of Commercial Fisheries through aerial index counts to monitor spawner distribution in the drainage (Pirtle 1980; Randall et al. 1981; Brady et al. 1991; Hollowell et al. 2007; Botz et al. 2010–2013; Sheridan et al. 2013, 2014; Wiese et al. 2015; Haught et al. 2017; Russell et al. 2017).

From 2011–2015 sport harvest of sockeye salmon from UCUSMA waters averaged 17,047 fish (Table 10). The sockeye salmon sport harvest in 2016 (7,538 fish) was the lowest since 2004 and was dominated by the Klutina River where 6,406 sockeye were harvested. The primary sport fisheries for sockeye salmon occur in the Klutina and Gulkana rivers, accounting for an average of 97% of the UCUSMA sockeye salmon harvest from 2006–2015.

In addition to harvest in the tributary based recreational fisheries, sockeye salmon stocks of the Upper Copper River drainage are harvested in the Copper River District commercial drift gillnet fishery, the Chitina Subdistrict personal use fishery, and the Glennallen Subdistrict subsistence fishery (Table 11). The management of these fisheries is based on the abundance of all Copper River drainage stocks as counted past the Miles Lake sonar station. Under the *Copper River District Salmon Management Plan* (5 AAC 24.360), the department is directed to manage the commercial fishery to achieve an inriver allocation of 15,000 salmon (all species) for sport fishery harvest, 61,000–82,500 sockeye salmon (wild stocks only) for subsistence harvest, 100,000–150,000 (including hatchery stocks) for personal use harvest, 360,000–750,000 sockeye salmon for spawning escapement, 17,500 for spawning escapement of other salmon, and an amount determined annually for hatchery brood and surplus stocks.

Since 1999, the Klutina River (Figure 2) has consistently supported the largest sockeye salmon sport fishery in the UCUSMA (Table 10). Sockeye salmon begin entering the Klutina River in mid-June and continue through August. The Klutina River accounted for 33–54% of the sockeye

salmon radiotagged in the Copper River from 2005 to 2009 (Wade et al. 2007–2010; Table 12). Spawning activity is known to occur in various locations of the river, lake, and tributaries.

Prior to 1999, the Gulkana River generally supported the largest sockeye salmon sport fishery in the UCUSMA. The sockeye salmon run to the Gulkana River is composed of both wild and hatchery stocks and has accounted for 7–19% of the sockeye salmon radiotagged in the Copper River from 2005–2009 (Wade et al. 2007–2010; Table 12). The Gulkana Hatchery has been producing sockeye salmon since the early 1970s and in the late 1990s produced enhanced returns of up to 800,000 adult salmon (Sharp et al. 2000). A strontium chloride otolith marking program was begun for hatchery fish in 2000. Issues with the strontium marking process caused mortality in marked sockeye salmon fry during brood years 2000 and 2001 significantly reducing adult returns (primarily 2004–2006) from those brood years. Since 2000, hatchery returns have ranged from about 86,000 to 581,000 sockeye salmon (S. Moffitt, Commercial Fisheries Biologist, ADF&G, Cordova, personal communication).

Gulkana River sockeye salmon life history and stock status data is limited beyond basic run timing. Spawning takes place in several upper reach tributaries and lakes. The Gulkana River sockeye salmon return begins in early June and continues into September. The hatchery enhanced return has a run timing that overlaps the late wild stock component. A weir was operated downstream of the West Fork in 1996 (LaFlamme 1997). An estimated 183,461 sockeye salmon passed the weir from June 11 to July 31. The proportion of the total run that this count represented is unknown, as the weir was operated only through a portion of the sockeye salmon run. Except for the period from 1993–1999, escapement of sockeye salmon to the Gulkana River has been documented by aerial index counts since 1966 (Pirtle 1980; Randall et al. 1981; Brady et al. 1991; Hollowell et al. 2007; Botz et al. 2010–2013; Sheridan et al. 2013, 2014; Wiese et al. 2015; Haught et al. 2017; Russell et al. 2017).

Sockeye salmon passage has been recorded at a king salmon counting tower project initiated in 2002 on the mainstem Gulkana River upstream of the West Fork (Taras and Sarafin 2005; Perry-Plake et al. 2007; Perry-Plake and Antonovich 2009; Perry-Plake and Huang 2011; Savereide 2010, 2011; Maclean 2013; Schwanke *In prep a*). These counts are considered minimums as sockeye salmon are still passing the tower site after the tower project ends. From 2002–2015 an estimated 11,400 to 48,024 sockeye salmon (including hatchery fish) passed the tower from May 27 to August 14 each year (Schwanke 2016).

Recent Fishery Performance

Sockeye salmon harvest from the Klutina River has increased dramatically since 2006 and has continued to remain high through 2015 (Table 10). Angler effort on the Klutina River has been primarily targeting sockeye salmon since about 2007. The 5-year average (2011–2015) of angler effort was 14,790 angler-days (Table 3). Angler effort in 2016 was 9,974 angler-days reflecting a run size far below that observed for the past several years. Sockeye salmon harvests from the Klutina River averaged 15,443 fish from 2011–2015 compared to the average harvest from 1996–2005 of 5,629 sockeye salmon (Somerville *In prep*). Sockeye harvest peaked on the Klutina River in 2012 and 2013 with reported harvests of 21,564 and 23,721 fish respectively. Annual aerial surveys of the Klutina River drainage indicate that the high sport harvests of sockeye salmon since 2006 are coincident with historically high aerial survey indices in Mahlo and St. Anne creeks during 2006–2012 (Botz et al. 2010–2013; Sheridan et al. 2013, 2014). Additionally, the highest proportional return of radio tagged sockeye salmon to the Klutina River

occurred in 2006 (44.5) and 2007 (54.2) during a five year study conducted from 2005 through 2009 (Smith et al. 2005 a-b; Wade et al. 2007-2010). Sockeye salmon harvest from the Klutina River was 6,406, which was the lowest harvest since 2004.

Sport harvest of sockeye salmon from the Gulkana River peaked in 1996 with a harvest of 7,418 sockeye salmon (Somerville *In prep*). Returns of hatchery produced sockeye salmon peaked from 1996–2000 with total hatchery runs ranging from 474,000 to 1,119,000 sockeye salmon (Sharp et al. 2000). Sockeye salmon sport harvest declined after 2000 reaching a low of only 533 sockeye harvested from the Gulkana River in 2015. Sockeye salmon harvest rebounded some in 2016 to 853 fish. Sockeye salmon returns in the Gulkana River are currently underutilized by sport anglers primarily due to the late timing of enhanced sockeye salmon and low king salmon returns that have led to overall reduced fishing effort on the river.

Fishery Objectives and Management

Sockeye salmon fisheries in the Copper River are managed to provide for sustained yield, diversity of public fishing opportunities and access, and to achieve public benefits from the fishery that outweigh the costs of associated management and research. Escapement objectives for individual rivers within the Copper River drainage have not been established.

Current levels of sport, personal use, commercial, and subsistence harvests are believed sustainable. The present management guidelines of the commercial, personal use, and subsistence fisheries are also thought to provide sustainability of the Copper River sockeye salmon stocks. If future Miles Lake sonar counts indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

Sport harvest of sockeye salmon is monitored through the SWHS. Harvest of sockeye salmon in the personal use and subsistence fisheries is monitored through a permit and mandatory reporting of harvest in those fisheries.

Current Issues and Fishery Outlook

Issues and conflicts involving the Gulkana and Klutina rivers sockeye salmon fisheries are similar to those previously noted for the king salmon fishery. Prior to 2006, angler effort on the Klutina River was primarily directed toward king salmon, but since 2006 it appears angler effort has been equally or more directed toward sockeye salmon. It appears unlikely that sport angler harvest of sockeye salmon will have any significant impact on the Klutina River stocks.

Sockeye salmon returns to Copper River have been on a general increasing trend since the 1960s (Somerville *In prep*). The peak of this rise was in 2014 with a total return of 3,411,377 sockeye salmon. The 2015 sockeye return was 3,205,039 fish followed by total return of 2,074,971 fish in 2016 (Table 11). The 2017 preliminary estimated return totaled about 1,300,000 sockeye salmon. The long-term upward trend in returns may be starting a natural decline that will affect management of the various fisheries over the next several years.

Recent Board of Fisheries Actions

There were no proposals submitted during the 2011 and 2014 BOF cycles that affected sockeye salmon sport fisheries in the UCUSMA. A proposal submitted for the 2017 BOF meeting in Valdez would increase the current sockeye salmon SEG of 360,000–750,000 to an Optimal

Escapement Goal of 700,000–1,200,000 sockeye salmon. A second proposal would prohibit catch and release in the UCUSMA sport fisheries.

Current or Recommended Research and Management Activities

Sockeye salmon sport fish harvests will continue to be monitored with the SWHS. An aerial index count program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. The present management guidelines for the commercial, personal use, and subsistence fisheries are thought to assure sustainability of the Gulkana and Klutina River sockeye salmon stocks.

Future fisheries research on sockeye salmon should be directed towards a better understanding of sport harvest, effort, and fishing patterns through a creel survey and studies of specific life history components of Klutina and Gulkana river sockeye salmon. Additionally, determining the proportion of hatchery produced sockeye in the Gulkana River sport harvest could be helpful to future management of that fishery.

COPPER RIVER PERSONAL USE AND SUBSISTENCE SALMON FISHERIES

Background and Historical Perspective

A personal use fishery and a subsistence salmon fishery occur in the Upper Copper River District. The personal use fishery occurs in the Chitina Subdistrict between the downstream edge of the Chitina McCarthy Road Bridge and a line approximately 200 yards upstream of Haley Creek (Figure 4). Dip nets are the only allowed gear in this fishery. The subsistence fishery occurs in the Glennallen Subdistrict from the downstream edge of the Chitina McCarthy Road Bridge upstream about 150 miles to the confluence of the Slana River. Dip nets and fish wheels are the allowable gear in the subsistence fishery. Both fisheries are limited to the main stem of the Copper River.

Personal use fisheries differ from sport fisheries in both their objectives and management. Both fisheries provide Alaskans the opportunity to harvest fish for personal consumption (in either fishery fish cannot be sold or bartered), but personal use fisheries are managed to maximize harvest potential whereby sport fisheries are managed to provide diversity of opportunity. Anyone can participate in Alaska's sport fisheries (provided they have a sport fishing license), but only Alaska residents may participate in personal use fisheries. The Division of Sport Fish manages most of the state's freshwater personal use fisheries, while the Division of Commercial Fisheries manages most of the subsistence fisheries and saltwater personal use fisheries. However, the Glennallen Subdistrict subsistence fishery in the Upper Copper River District is managed by the Division of Sport Fish.

Subsistence fisheries are also managed to maximize harvest potential for Alaska residents. Subsistence fish are used for personal consumption, traditional sharing and may also be used for dog food or as bait. Salmon harvested under a subsistence permit may not be sold or bartered under state regulation. Subsistence fisheries are also afforded a priority with regards to fishery management.

Management of the Chitina Subdistrict personal use dip net fishery is guided by the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591), first adopted by the BOF in 1984. The Chitina Subdistrict Personal Use Dip Net Salmon Fishery is opened each year by emergency order between June 7 and June 15. Both a valid Alaska sport fishing license

and a personal use permit are required to participate in the fishery. Users must record their harvest on their permit prior to leaving the fishing site and return the permit when they are done fishing for the season or by October 15. The limits are 25 salmon for the head of household and 10 additional salmon for each additional household member. Only 1 of the total limit of salmon may be a king salmon. The BOF has mandated that a household may not be issued both a Glennallen Subdistrict subsistence salmon fishing permit and a Chitina Subdistrict personal use salmon fishing permit in the same year.

Fishing time in the Chitina Subdistrict personal use dip net fishery is determined weekly based on the abundance of salmon passing the sonar counter at Mile Lake on the Copper River. Based on the proportion of salmon apportioned to the personal use fishery within the annual inriver goal for the Copper River, a proportion of the passage of salmon are also apportioned to the personal use fishery each week. Fishing time is determined by dividing the weekly allotment of fish passage by the catch-per-hour 5-year rolling average. The department assumes a 2-week passage time from the sonar to the Chitina Subdistrict from June 1 through July 15 and a 3-week passage time thereafter.

The BOF adopted the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647) in 1980. This plan directs the department to manage the Copper River commercial fisheries to ensure an adequate escapement reaches the spawning grounds and to provide for subsistence, personal use, and sport fisheries. The season in the Glennallen Subdistrict is open from June 1 through September 30, unless closed by emergency order. Only Alaska residents may participate in this subsistence fishery. A subsistence permit is required to participate in the fishery. Users must select only one gear type (dip net or fish wheel) when getting their permit and must record their harvest on their permit prior to leaving the fishing site and return the permit upon completing fishing for the season or by October 31. The limits are 30 salmon for a household of 1, 60 salmon for a household of 2, and 10 salmon for each additional person in a household of more than 2 people. Individuals may request additional salmon up to a maximum of 200 salmon and households may request up to 500 salmon. For people using dip nets, only 5 of the salmon may be king salmon. A subsistence fishery is also allowed in a portion of Tanada Creek with spears and dip nets and near the traditional Ahtna Native fishing site of Batzulnetas with a fish wheel or dip net.

In 1999, federal management of the Copper River subsistence fisheries was initiated, primarily due to the state not complying with rural preference for subsistence uses as mandated by ANILCA. Under federal management, residents from rurally qualified communities may attain a subsistence permit for either or both the Glennallen Subdistrict and the Chitina Subdistrict. The federal fishery in the Glennallen Subdistrict opens on May 15 and closes September 30. In the Chitina Subdistrict the federal subsistence fishery opens and closes on a weekly basis in alignment with the state personal use fishery. Under federal management, permit holders have an annual 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 permit holders may harvest salmon with a dip net, fish wheel, or rod and reel, or combination of these gear types through the season. From 1999–2001, federally qualified subsistence users fished under state issued permits as the state and federal regulations were essentially identical. In 2002, the National Park Service issued separate federal subsistence fishing permits to federally qualified subsistence users as the two regulations were no longer aligned (Appendices C1 and D1). Although this change did not affect overall subsistence harvest from the Copper River, the number of state permits issued

decreased after 2001 (Table 13), with at least a portion of the federally qualified residents opting for a federal rather than state permit.

Annual harvests from the Upper Copper River District (Glennallen Subdistrict and Chitina Subdistrict) subsistence fishery have been estimated since 1960 (Somerville *In prep*). Participation and harvest in both the Chitina Subdistrict (either as a subsistence fishery or personal use fishery) and the Glennallen Subdistrict has increased steadily since 1960 (Somerville *In prep*). Since 1984 the two subdistricts have been managed separately as a personal use fishery (Chitina Subdistrict) or subsistence fishery (Glennallen Subdistrict).

Harvests in the Chitina Subdistrict state fishery have been estimated since its establishment in 1984 (Somerville *In prep*). Since 1997, harvest has fluctuated from a low 85,496 salmon in 2003 to a high of 226,832 salmon in 2015, but has generally averaged around 135,000 salmon prior to 2013 (Table 14). Harvest fluctuations are generally the result of salmon abundance, changes in access such as landslides, conflicts with local tribal land owners over trespass, or improved road conditions. Changes in river conditions also affect harvest with years of large fluctuations in flow showing some of the lowest harvests.

Prior to 2015, the annual limits in this fishery were a maximum of 15 salmon for a household of 1 and 30 for a household of two or more with a chance to harvest an additional 10 fish if surpluses of more than 50,000 salmon over the weekly projections were available. Starting in 2015, the annual limit changed to 25 salmon for the head of a household and plus 10 salmon for each additional household member. This change in annual limit may increase overall harvest in this fishery or will change how permit holders fish the fishery with little change in overall harvest. In 2015, with the highest ever inriver abundance of salmon, harvest totaled 229,213 salmon (Table 14) or about 29 fish per permit fished. However, total harvest in 2016 with a more average inriver abundance, was 152,831 salmon or about 24 fish per permit fished, which is the same harvest per permit at the old annual limit with similar inriver abundance and personal use fishery participation.

Sockeye are the primary species harvested in the Chitina and Glennallen subdistricts, comprising about 97% of the total harvest in both fisheries (Table 13 and Table 14). King salmon, which comprise about 3.0% of the harvest in each fishery, are generally present in the Glennallen and Chitina Subdistrict fisheries by June 1 and, on average, 80% of the king salmon harvest is taken by July 12 and 95% by July 25 (Roberson and Whitmore 1991; Somerville *In prep*). King salmon run timing and harvest rates have remained similar to these trends through 2016.

Recent Fishery Performance

Total inriver salmon counts at Miles Lake, which are over 97% sockeye salmon, were at record high levels from 2012–2015 with all 4 years exceeding counts of 1.2 million fish (Haught et al. 2017). These large returns have been reflected in the Chitina Subdistrict personal use and Glennallen Subdistrict subsistence harvests in these years. Total harvest in 2015 was the highest ever recorded at 229,213 salmon in the Chitina Subdistrict personal use fishery (Table 14, Appendix C1) and 111,689 salmon in the Glennallen Subdistrict subsistence fishery (Table 13, Appendix D1). Although overall salmon abundance has been high in recent years, the king salmon component of Copper River salmon returns has declined and have been low enough to justify restrictive management in the personal use fishery each year (except for 2015) since 2009. In 2015, river conditions were generally low with few large fluctuations in flow through the season providing excellent conditions for harvest. In 2016, the inriver abundance of salmon

counted past the Miles Lake sonar was 801,593 salmon which was about 500,000 fewer salmon than in 2015 and closer to the long term average of about 780,000 salmon (Russel et al. 2017). Secondly, the Copper River flow varied greatly through the season with several high water events occurring. The result of lower abundance and more difficult fishing conditions led to a large drop in actual participation in both fisheries during 2016.

A total of 11,394 state and 128 federal permits (11,552 total permits) were issued for the Chitina Subdistrict personal use fishery in 2016 (Table 14, Appendix C1) which is the third highest number of permits issued for the Chitina Subdistrict. Of the permits issued, 54% were actually fished in 2016, which is the lowest participation rate ever recorded. Total harvest from the Chitina Subdistrict for 2016 was about 152,831 salmon including the federal harvest (Table 14; Appendix C1), which is the fifth largest harvest since the fishery was established in 1984 (Somerville *In prep*). Total harvest under state permits has averaged 140,935 salmon over the last 10 years (2006–2015) (Table 14) while total harvest under federal permits has averaged 1,675 salmon (Appendix C1). The 2016 harvest under state permits was 151,480 salmon and under federal permits was 1,351 salmon.

A total of 1,769 state and 320 federal permits were issued for the Glennallen Subdistrict in 2016 (Table 13; Appendix D1) which is the highest number of permits ever issued for the Glennallen Subdistrict (Somerville *In prep*). Of the permits issued, 62% were actually fished in 2016, which is the lowest participation rate ever recorded. Total harvest from the Glennallen Subdistrict subsistence fishery for 2016 was 84,265 salmon including the federal harvest (Table 13; Appendix D1), which is below the latest 5-year average (2011–2015) of 96,312 salmon and the 10-year average (2006–2015) of 86,265 salmon. Total harvest under state permits has averaged 67,768 salmon over the last 10 years (2006–2015; Table 13) while total harvest under federal permits has averaged 18,836 salmon (Appendix D1). The 2016 harvest under state permits was 64,617 salmon (Table 13). The 2016 harvest under federal permits was 20,147 salmon (Appendix D1).

The total number of permits issued for the Chitina Subdistrict personal use fishery is estimated at 9,408 state and 134 federally issued permits in 2017. This is a 17% decrease in the number of permits issued in this fishery from 2016 to 2017. Preliminary data based on less than 50% of returned permits and the 5-year average harvest from the federal subsistence fishery indicate that the 2017 harvest in the Chitina Subdistrict personal use fishery will be less than 140,000 fish.

The total number of permits issued for the Glennallen Subdistrict subsistence fishery is estimated at 1,630 state and 332 federally issued permits in 2017. Although the number of total permits decreased overall there was only a 3% decrease in subsistence dip net permits versus a 25% decrease in fish wheel permits from 2016 to 2017. In the Glennallen Subdistrict subsistence fishery preliminary data based on less than 50% of returned state permits and the 5-year average harvest from the federal subsistence fishery indicate the harvest will be less than 70,000 salmon for 2017.

Fishery Objectives and Management

The Glennallen Subdistrict subsistence fishery is managed under the *Copper River Subsistence Salmon Management Plan* (5 AAC 01.647). This plan stipulates management objectives and guidelines, with allocations for each fishery outlined in the *Copper River District Salmon Management Plan* (5 AAC 24.360). In 2005, the BOF amended the amounts necessary for subsistence (ANS) for the Glennallen Subdistrict (5 AAC 01.616). These amounts are

25,500–39,000 salmon for the portion of the subdistrict from the Chitina-McCarthy Bridge upstream to the mouth of the Tonsina River; 23,500–31,000 salmon from the Tonsina River to the mouth of the Gakona River; and 12,000–12,500 salmon from the Gakona River to the mouth of the Slana River (and including the Batzulnetas fishery). The ANS amounts are based on the combined reported state and federal harvest, not the final estimated harvest that expands the reported harvest to account for unreturned permits.

Inseason management of the Chitina Subdistrict personal use dip net salmon fishery is guided by the objectives and guidelines in the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591). The weekly fishing periods and limits established by EO are based on the projected inriver returns. Actual inriver returns are estimated inseason by sonar located at Miles Lake. The harvest is distributed throughout the season, based upon the projected sonar counts. Adjustments are made to the preseason schedule based on the actual sonar counts, by increasing or decreasing fishing time. The maximum harvest level (based on historical harvest levels) for the Chitina Subdistrict is 100,000–150,000 salmon, not including salmon above the inriver goal or salmon harvested after August 31. The fishery is open by regulation through the month of September.

The 2016 Chitina Subdistrict personal use fishery opened, by EO, on June 7. Salmon passage by the Miles Lake sonar was 3,331 salmon below projected, but was still sufficient enough to maintain 144 hours of fishing time (Appendix B1). Strong salmon passage past the Miles Lake sonar allowed the fishery to remain open during the next 6 weekly periods through July 24. However, the king salmon run to the Copper River was weaker than the preseason forecast of 64,000 king salmon with run timing earlier than average. The cumulative commercial harvest, as of June 12, was approximately 10,554 king salmon. This was below the expected level, and was the 7th lowest cumulative harvest through this date since 1980. Based on these data retention of king salmon in the Chitina Subdistrict, personal use dip net fishery was prohibited for the remainder of the season effective June 20. Salmon passage numbers at Miles Lake sonar were above the projected counts during the week of July 4–10, resulting in the dipnet fishery being open for 160 hours during week 8, and were below projected counts during the weeks of July 11 and July 18, resulting in reduced fishing time for weeks 9 and 10. Passage at Miles Lake after the week of July 18th was sufficient to allow for the fishery to be open continuously from August 15th through the end of the season.

In 2017, the Chitina Subdistrict personal use fishery season was opened, by EO, on June 7 for a 120-hour fishing period and continued strong salmon passage past the Miles Lake sonar allowed the fishery to remain open during the next 3 weekly periods through July 2 (Appendix B1). Passage past the Miles Lake sonar through July 30th resulted in some weeks in which fishing time was increased from the preseason schedule, and some weeks in which fishing time was decreased from the preseason schedule, but all weeks had some hours of closure. Passage past Miles Lake after the week of July 31 was sufficient to allow for the fishery to be open continuously from August 21st through the end of the season.

Current Issues and Fishery Outlook

Access to the Glennallen and Chitina Subdistrict fisheries is an ongoing issue. Currently, access is allowed across Chitina Native Corporations (CNC) lands with payment of a daily or annual fee paid directly to CNC. Ahtna and CNC land enforcement officers monitor compliance with the fee based access system.

The Copper River has experienced the four highest ever inriver sockeye salmon passage years from 2012–2015. Participation in the Chitina and Glennallen Subdistrict fisheries has risen quickly with these high passage years. It is anticipated that future sockeye salmon run strength will begin to decline and that inriver salmon passage will remain close to or perhaps below the annual inriver goal. As salmon passage declines, it is anticipated that participation in the fisheries will decline or level off.

Recent Board of Fisheries Actions

A total of eight proposals potentially affecting the Chitina Subdistrict personal use salmon fishery were submitted to the 2011 BOF meeting. In addition to the C&T status proposals, four proposals sought changes in king salmon or sockeye salmon limits in the personal use fishery and all failed. A commercial fishery proposal to further restrict the Copper River District commercial drift gillnet fishery from fishing within the inside closure area during its first two statistical weeks was amended and carried. As a result the Copper River District commercial fishery was limited to a single 12-hr opener in the inside closure area during the first two weeks of the fishery and the Chitina Subdistrict personal use dip net fishery opening dates were delayed from opening as early as June 1 and no later than June 11 to opening no earlier than June 7, but prior to June 15. These changes were made to increase the number of early run sockeye and king salmon into the Glennallen Subdistrict subsistence fishery and increase spawning escapement for these early run timing stocks.

ADF&G submitted a proposal to the BOF for the 2011 meeting that concerned the Glennallen Subdistrict subsistence salmon fishery. This proposal was carried and added language to the *Copper River King Salmon Management Plan* providing guidance and authority to the department to restrict king salmon harvest for conservation in the Chitina Subdistrict personal use and Glennallen Subdistrict subsistence fisheries.

A total of 10 proposals were submitted for consideration during the 2014 BOF cycle for the UCUSMA subsistence and personal use fisheries. The BOF carried a proposal specific to the Glennallen Subdistrict providing EO authority for ADF&G to establish an annual bag limit for king salmon taken by fish wheel, modify the annual limit for king salmon taken by dip net, and to modify methods and means in the subsistence fishery to reduce harvest of king salmon. The BOF also carried a proposal changing the annual limit in the Chitina Subdistrict personal use dip net fishery to 25 plus 10 additional salmon per household member and repealed the supplemental harvest periods. Proposals to prohibit the use of monofilament webbing in dip nets, require that king salmon be kept in the water prior to release, establish a check station in Chitina for harvest reporting in both the Glennallen and Chitina subdistricts, open the Chitina Subdistrict 6 days earlier, repeal the 13 day commercial closure trigger for lowering the maximum allowable harvest in the Chitina Subdistrict, establish a 3,000 fish allocation of king salmon in the Chitina Subdistrict, require charter operators to maintain daily logbooks and record client harvests, and reducing the maximum harvest to 100,000 salmon in the Chitina Subdistrict all failed.

There are nine proposals submitted for consideration at the 2017 BOF meeting in Valdez. Two proposals would affect the Chitina Subdistrict personal use fishery by extending the downstream boundary of the Subdistrict and by removing automatic reduction to the maximum harvest limit when the Copper River District commercial fishery is closed for 13 or more consecutive days. Three proposals would affect the Glennallen Subdistrict subsistence fishery by requiring live boxes to be installed on fish wheels or that the fish wheels be closely attended, prohibit dip

netting from a boat, or requiring an automatic delay of 7 days in the opening of the fishery based on the pre-season king salmon forecast. Two proposals would affect both fisheries by prohibiting the use of monofilament in dip nets and requiring logbooks for transporters or guides in these fisheries. Finally, one proposal would change regulations to automatically open the Batzulnetas Area Subsistence fishery each season rather than require an EO to be issued.

Current or Recommended Research and Management Activities

Daily sampling in the Chitina Subdistrict personal use fishery and Glennallen Subdistrict subsistence fishery is conducted from the opening of the fishery in June through the majority of the sockeye salmon run at the end of August. Otoliths and length of sockeye salmon harvested in the fishery are collected. Otoliths are examined to determine age and for the presence of a strontium chloride mark that was imprinted on hatchery sockeye fry prior to release from the Gulkana River hatchery. The collected data are used to estimate hatchery contribution to the Copper River sockeye salmon run and to determine age and length composition of the Chitina and Glennallen Subdistrict sockeye salmon harvest. Scales and length data are collected from harvested king salmon for use in stock composition models. Sampling technicians provide a department presence in the Chitina area six days per week. They also monitor compliance with fishery regulations, educate subsistence and personal use fishers on the regulations and emergency orders, and note any violations observed.

RESIDENT SPECIES SUBSISTENCE FISHERIES

Background and Historical Perspective

Freshwater subsistence fishing permits have been issued in the UCUSMA since 1960. The majority of permits issued have been for freshwater subsistence fishing with gillnets for whitefish between October 1 and March 31 in several area lakes. At the 2008 meeting, the BOF made a positive C&T determination for the freshwater fishes in the Prince William Sound Area, which includes the entire UCUSMA with an ANS of 25,000–42,000 useable pounds of fish. Prior to 2008 an average of 10 permits were issued each year for netting whitefish from area lakes with a maximum of 18 permits issued in 2007 (Somerville *In prep*). After the formal C&T designation the subsistence whitefish fishery grew in popularity with an average of 21 permits issued in this fishery from 2009–2016 (Table 15) with maximum of 28 permits issued in 2009. Over the last 5 years (2011–2015) an average of 20 freshwater subsistence permits were issued with an average of 14 fished each year. In 2016, 25 permits were issued for fishing in 8 lakes with 14 of those permits fished in 2 of the permitted lakes.

Subsistence gillnet fisheries in the UCUSMA primarily target whitefish and have been managed with this intent. Incidental harvest of other species, such as lake trout, burbot, and Arctic grayling was minimal and retention of these species was permitted. After formal C&T status was established for the freshwater fishes of the UCUSMA in 2008, it became necessary to apply stipulations on the permits to prohibit retention of species other than whitefish and suckers harvested by gillnet as some fishers began targeting other species with this highly efficient gear. Subsistence opportunity for other species such as lake trout, burbot, Arctic grayling and Dolly Varden is provided with other allowable gear types that provide a more directed and sustainable fishery for these species.

Recent Fishery Performance

The average harvest of whitefish from 2011–2015 was 850 fish with an average incidental catch of nontarget species of 20 fish (Table 15). In 2016, a total reported harvest of 664 whitefish were harvested from Paxson Lake and Lake Louise. Although retention of species other than whitefish and suckers is prohibited, incidental take is common with gillnet gear. Incidental take of other species must be recorded and the incidental take released, whether dead or alive, back into the lake. In 2016, there was an incidental take of 14 lake trout, 8 burbot, and 25 other fishes (Table 15).

Fishery Objectives and Management

There are no specific fishery objectives or management plans for resident freshwater subsistence fisheries in the UCUSMA. Resident species are managed to provide for sustained yield. The current low number of participants in the winter gillnet fishery allows for liberal management of the whitefish harvest. However, slower-growing resident species such as lake trout and burbot are managed with bag limits similar to those in the sport fisheries for these species. More efficient gear is permitted for the abundant, high productivity species (whitefish and longnose suckers), while selective harvest gear is permitted for the less abundant, low productivity species (lake trout and burbot).

Current Issues and Fishery Outlook

After formal C&T designation and the public notices to that affect, issues arose in this historic fishery with targeting of lake trout and other highly prized sport fishes with gillnets. There were also issues of trespass, littering, and property damage around the Lake Louise Area. To address these concerns ADF&G developed additional permit stipulations to ensure compliance with the fishery and to ensure sustainability of the various fish populations within targeted waters. These stipulations, plus increased enforcement presence alleviate most of the abuse and the fishery continues with little concern.

Recent Board of Fisheries Actions

A total of 15 proposals were submitted to the 2011 BOF meeting in Valdez specific to the UCUSMA freshwater subsistence fishery. These proposals mainly addressed the whitefish fishery in Lake Louise, Susitna, and Tyone lakes and the harvest of lake trout. The BOF took no action on 6 of these proposals and 8 proposals failed. One proposal was amended and carried resulting in the closure of the channels between Lake Louise and Susitna Lake and between Susitna and Tyone lakes to the use of gillnets.

No proposals concerning freshwater subsistence fisheries were submitted to the BOF for the 2014 and 2017 board cycles.

Current or Recommended Research and Management Activities

Research on resident species populations within the UCUSMA would provide data useful in the management of the freshwater finfish subsistence fishery. Analysis of otoliths from subsistence harvested whitefish in Paxson Lake has shown individuals as old as 20 years (Personal Communication, Tim Sundlov, BLM Fisheries Biologist, Glennallen). A more formal life history study of whitefish in Paxson Lake, Lake Louise, and Susitna and Tyone lakes would be helpful in determining sustainable harvest levels of whitefish from these lakes. However, current subsistence harvest appears to be well within sustainable levels.

WILD ARCTIC GRAYLING SPORT FISHERIES

Background and Historical Perspective

Wild Arctic grayling (does not include Arctic grayling stocked in lakes) were the most harvested fish in the UCUSMA from 1977–1995 (Somerville *In prep*). Harvests declined after 1988 and have been surpassed nearly every year since 1996 by sockeye salmon and by king salmon in 2005 and 2007 (Table 4). The decline in harvest from 1988–1999 most likely resulted from more restrictive regulations that reduced overall bag limits and limited anglers to only one fish 14 inches or larger in the Gulkana River drainage to ensure the sustained yield of the area's wild Arctic grayling stocks (Taube 2002). In 2003, the bag and possession limit in lakes was reduced to 5 wild Arctic grayling. Continued declines in harvest may reflect a general decline in fishing effort area wide since 2000.

Wild Arctic grayling are harvested throughout the UCUSMA. The Susitna River drainage averaged 38% of the total UCUSMA harvest from 2011–2015 (Table 16). The Gulkana River drainage accounted for 26% of the harvest during this period followed by smaller tributary streams and lakes in the Upper Copper River drainage (17%) and the Tazlina River drainage (15%).

Wild Arctic grayling are the most caught species in the UCUSMA (Table 5). As with harvest, catch has declined over the past decade, but wild Arctic grayling catch, on average, contributes nearly 50% to the annual total catch of all species.

Recent Fishery Performance

Harvest of wild Arctic grayling has averaged 3,479 fish over the last 10 years (2006–2015) and 3,141 fish over the last 5 years (2011–2015) (Table 16). Total harvest of wild Arctic grayling in 2016 was 2,916 fish, which is the third lowest harvest ever recorded. Wild Arctic grayling are harvested throughout the UCUSMA. The Susitna River drainage accounted for 41% of the total UCUSMA harvest in 2016, followed by the Gulkana River drainage, which accounted for 35% of the harvest.

Fishery Objectives and Management

Wild Arctic grayling fisheries in the UCUSMA are managed to maintain sustained yield and historic age and size composition and stock abundance while producing satisfactory catch rates for anglers (Roth and Alexandersdottir 1990). Harvest and catch of wild Arctic grayling are monitored by the SWHS.

The *Wild Arctic Grayling Management Plan* (5 AAC 52.055) was adopted in 2004 and designates 3 management approaches: regional, conservative, and special management. Most wild Arctic grayling fisheries in the UCUSMA fall under the regional management approach and are open to fishing all year, with or without bait, and a bag and possession limit of 5 fish with no size limit. Under the conservative management approach the fishery is open from June 1–March 31 and may be limited to unbaited lures and a bag and possession limit of 2 fish. Size limits may or may not be imposed. Four fisheries within the UCUSMA are classified under the conservative management approach; Mendeltna Creek (2 fish ≥12 inches), Moose Lake and Our Creek in the Tazlina drainage (2 fish, no size limit), and the Gulkana River upstream of Paxson Lake (2 fish, only 1 fish ≥ 14 inches, open all year). Under these regulations, the wild Arctic grayling stocks in the UCUSMA are able to support current harvest levels.

The bag limit for wild Arctic grayling in the remainder of the Gulkana River (5 fish, only 1 fish ≥14 inches), which was established in 1986 (Taube 2002), deviates slightly from the 3 management approaches outlined in the *Wild Arctic Grayling Management Plan*. However, previous estimates of abundance indicate that current exploitation rates on the major stock units of wild Arctic grayling in the Gulkana River drainage appear sustainable given current harvest levels. Data from stock assessments also indicate that the restriction limiting anglers to only 1 fish ≥14 inches allowed the population to reach and maintain historic levels (Fish and Roach 1999). A similar assessment was conducted in 2002 on the upper reaches to determine the impacts of the 1996 regulatory change to catch-and-release and provide background information for any future BOF proposals (Wuttig 2007). No stock assessments have been conducted on the Gulkana River since 2002.

Current Issues and Fishery Outlook

Overall, UCUSMA wild Arctic grayling fisheries appear sustainable. The current management strategies and regulatory regimes are within the guidelines of the management plan to manage for long-term sustained yield. As a result, it is anticipated that harvest levels of wild Arctic grayling will remain at sustainable levels.

Recent Board of Fisheries Actions

The BOF carried a proposal that aligned the *Wild Arctic Grayling Management Plan* (5 AAC 52.055) spawning closure dates (April 1–May 30) with those in area regulations (April 1–May 31) during the 2011 meeting in Valdez.

A proposal to increase the bag limit of Arctic grayling in the Gulkana River drainage to 10 fish, only 5 of which may be greater than 14 inches was submitted for the 2014 BOF cycle. The proposal failed.

A proposal to prohibit catch and release fishing in the UCUSMA has been submitted for the 2017 BOF meeting in Valdez. If adopted, this proposal would significantly impact the many Arctic grayling fisheries in the area and probably reduce angler satisfaction in the area, negatively impacting angler effort.

Current or Recommended Research and Management Activities

An objective of the wild Arctic grayling research program was to develop a plan for monitoring the status of wild Arctic grayling stocks in the Gulkana River drainage. This consisted of monitoring of the 3 identified stocks (mainstem, Middle Fork and waters upstream of Paxson Lake) for abundance, age and length composition every 3 to 5 years. Stock assessments were conducted in 1998 (Fish and Roach 1999) and in 2002 (Wuttig 2007). It is recommended that a monitoring program continue, with stock assessment linked to an increase in harvest, to assure the sustained yield of the fishery.

In 2016, Arctic grayling were radio tagged in the Gulkana River (Schwanke *In prep b*). The purpose of the project was to identify winter distribution and spring spawning areas. This project also helped in planning for future population estimate studies. A mark-recapture population estimate for Arctic grayling was conducted in the mainstem Gulkana River, above Sourdough, during the summer of 2017. This study will also profile the size distribution of the population.

LAKE TROUT SPORT FISHERIES

Background and Historical Perspective

The UCUSMA is the only area in Alaska where numerous lake trout fisheries exist along the road system (Figure 5). Lake trout are harvested mainly from lakes within the Tyone River drainage (Lake Louise, Susitna and Tyone lakes) and the Gulkana River drainage (Paxson, Summit, and Crosswind lakes) (Table 17).

Prior to 1987, the bag limit in UCUSMA waters was two lake trout ≥20 inches and 10 lake trout <20 inches. Under these regulations, lake trout harvests from UCUSMA waters averaged about 7,400 fish annually (Somerville *In prep*). However, it was found that 8 of 9 lake trout populations in the Upper Copper River drainage were being harvested above sustainable levels, based on surplus production models developed from lake trout populations in Canada and the Great Lakes (Burr 1987). As a result of these findings, the bag limit for UCUSMA waters was reduced to two fish and a minimum size limit of 18 inches was adopted for Summit and Paxson lakes, Lake Louise, and Susitna and Tyone lakes in the Tyone River drainage in 1987. The minimum size limit was imposed to allow female lake trout to spawn once before reaching harvestable size.

In 1994, the minimum size limit for lake trout was increased from 18 to 24 inches in Lake Louise and Susitna, Tyone, Crosswind, Paxson, and Summit lakes, and the bag and possession limit was reduced from two to one lake trout in Lake Louise and Susitna, Tyone, and Crosswind lakes. The minimum size limit was increased to allow lake trout to reach a size where they could spawn at least once before being recruited to the fishery and to reduce the harvest to a sustainable level in Paxson and Summit lakes. The bag limit reduction was imposed on lakes with lake trout of greater than average length to prevent effort from being concentrated on these size classes.

Following the 24 in minimum size restriction, the number of lake trout released by anglers in Crosswind, Paxson, and Summit lakes and Lake Louise, Susitna and Tyone lakes increased from an average of 60% released prior to the restriction (1990–1993) to an average 80% for all the years following (1994–2005). Although harvest decreased, the overall catch rate did not decrease and in many cases increased so that effective harvest (harvest plus 10% of the catch minus the harvest, to account for hooking mortality of released fish) was still exceeding the sustainable yield levels in the larger UCUSMA lake trout fisheries.

The department initiated a regional review of lake trout regulations and management in 2002 and developed a lake trout management plan that was adopted by the BOF in 2005 (Burr 2006). Based on this review and adoption of the management plan, the minimum size limit for lake trout was removed in Paxson and Summit lakes and the bag limit was set to one per day beginning in 2006. Additionally, the use of bait was prohibited from April 16–October 31. Bait was allowed from November 1–April 15 to provide for the burbot fishery. In 2012, these same regulations were implemented for Lake Louise, Susitna, Tyone, and Crosswind lakes effectively aligning lake trout management in all large lakes with high angler effort and effective harvest rates that consistently met or exceeded sustainable levels. These regulation changes are intended to reduce fishing mortality below the sustainable yield estimates for these lakes.

Recent Fishery Performance

Total harvest of lake trout averaged 876 fish from 2011–2015 (Table 17). Harvests from the Susitna River drainage accounted for 51% and the Gulkana River drainage accounted for 34% of

the annual UCUSMA harvest from 2011–2015. Lake Louise (38%), Paxson (16%), and Susitna (14%) lakes accounted for over half the annual average lake trout harvest in the UCUSMA from 2011–2015. The harvest of 1,443 lake trout from the UCUSMA in 2016 was above the 5-year and 10-year average and was the highest overall harvest since 2010.

Fishery Objectives and Management

Lake trout fisheries in the UCUSMA are managed conservatively following the guidelines in the *Wild Lake Trout Management Plan* (5 AAC 52.060). ADF&G uses restrictive bag and size limits to maintain harvests below sustained yield. Assessment of lake trout stock status is currently based on evaluation of the SWHS harvest and catch (and associated hooking mortality) in relation to the sustained yield estimate. If total mortality exceeds the sustained yield estimate for 2 consecutive years, stock assessment is initiated for that population.

ADF&G uses the Lake Area model (Evans et al. 1991) to develop sustained yield thresholds for lake trout. The Lake Area model involves estimating the level of sustainable harvests for lakes based on an observed lake trout production and lake surface area relationship for northern latitude lakes. The Lake Area model provides an excellent general guideline for sustainable harvests, but is based on a large range of lakes and their observed sustainable yields. Therefore the predicted annual yields are inherently imprecise (Burr 2006). The potential yield given by the Lake Area model is treated as a threshold that should not be exceeded rather than a target level of exploitation.

Current Issues and Fishery Outlook

A reduced bag limit, prohibition of bait during the open water period, and removal of the size limit have reduced effective harvest in Lake Louise, Susitna, Tyone, Crosswind, Paxson, and Summit lakes to sustainable levels (Table 18). However, in some lakes there is a small margin between current harvest and the maximum sustainable harvest. If effort increases it may be necessary to further restrict some of these lake fisheries. Overall, lake trout fisheries in the UCUSMA are within sustainable levels and should remain so into the near future.

Recent Board of Fisheries Action

The BOF considered seven proposals at its 2011 meeting in Valdez that addressed lake trout sport fisheries in the UCUSMA. Two proposals to implement spawning closures failed as did two proposals banning commercial guiding on Lake Louise. Proposals to lengthen the time bait is allowed on Paxson and Summit lakes and impose a maximum size limit for lake trout on Lake Louise and Crosswind Lake also failed. The BOF adopted a proposal submitted by ADF&G to remove the size limit for lake trout and prohibit the use of bait from April 16–October 31 in Lake Louise, Susitna, Tyone, and Crosswind lakes. No proposals concerning area lake trout fisheries were submitted to the BOF for the 2014 board cycle.

A proposal to prohibit catch and release fishing in the UCUSMA has been submitted for the 2017 BOF meeting in Valdez. If adopted, this proposal would impact the many Lake trout fisheries in the area and probably reduce angler satisfaction in the area, negatively impacting overall angler effort.

Current or Recommended Research and Management Activities

Length and weight data were collected from Lake Louise in the fall of 2006 and assessment to estimate abundance was to continue in 2007 and 2008. However, review of the past data

indicated that movement of lake trout between Lake Louise, Susitna, and Tyone lakes may affect any estimate of abundance. Therefore, a more extensive research project must be developed including radiotelemetry to assess movement of lake trout between the 3 lakes prior to starting a mark-recapture study.

Lake trout research in Alaska lakes has provided a length-weight relationship and future sampling can focus on collecting lengths alone. Length data for Susitna Lake and Crosswind Lake needs to be collected to update the Lake Area model yield estimates. If harvest rates approach the estimates of sustainable yield calculated by the Lake Area model for Paxson and Summit lakes, stock abundance and size composition of lake trout should be reassessed.

BURBOT SPORT FISHERIES

Background and Historical Perspective

Burbot fisheries occur primarily during the winter months from November to April using closely attended lines. Many lakes and rivers of the UCUSMA historically contained large populations of burbot (Figure 5) and prior to 1990, these waters supported an average of 56% of the statewide sport harvest of this species (Somerville *In prep*). The largest fishery historically occurred in Lake Louise, Susitna, and Tyone lakes (Table 19). Other fisheries occur in various lakes of the Gulkana River drainage (e.g., Paxson, Summit, and Crosswind lakes), Tazlina River drainage, and smaller remote lakes scattered throughout the UCUSMA.

With rapid growth in the fishery from 1979–1985, burbot stocks in the UCUSMA were in danger of being overexploited (Somerville *In prep*). A research program was initiated in 1986 to evaluate the life history of Interior Alaska burbot and to determine stock status and sustained yields of burbot fisheries in the UCUSMA. Annual results of these studies are summarized in Lafferty et al. (1990-1992), Lafferty and Bernard (1993), Parker et al. (1987-1989), Schwanke and Bernard (2005), Schwanke and Perry-Plake (2007), Schwanke (2009b), Taube et al. (1994, 2000), and Taube and Bernard (1995, 1999, 2001, 2004). Concern over the sustainability of burbot fisheries in the UCUSMA led to adoption of increasingly restrictive regulations and some complete fishery closures, most of which were reopened once stocks recovered (Somerville *In prep*).

More recent studies on burbot abundance have occurred in Crosswind and Tolsona lakes. An abundance survey of the burbot population in Crosswind Lake was conducted in 2006 and 2007 (Schwanke 2009*b*) to provide a basis to compare future estimates of abundance should harvest levels significantly change. The 2006 abundance of burbot (≥18 in [450 mm]) in Crosswind Lake was 3,860 fish (90% CI = 2,262–5,549) and in 2007 it was 3,130 fish (90% CI = 2,170–4,091). Tolsona Lake was closed to burbot fishing by either emergency order or by regulation from 1998 through 2011. Stock assessment on Tolsona Lake occurred on an annual basis from 1986 to 2010 with a goal to open the fishery when the burbot population rebuilt to 1,500 burbot ≥18 in (Taube and Bernard 2001). Based on results from 2009 and 2010 sampling, it appears the burbot population achieved this abundance goal (Schwanke 2014).

Recent Fishery Performance

Total burbot harvest from the UCUSMA averaged 765 fish from 2011–2015 (Table 19). Total harvest of burbot from UCUSMA waters has ranged from 238–1,576 over that same period. The 2016 harvest of 555 burbot is the third lowest ever recorded for the UCUSMA. Observations of

the area fisheries indicate the low burbot harvest most likely reflects a lack of effort in the area, rather than a downturn in abundance.

Fishery Objectives and Management

The burbot fisheries in lakes of the UCUSMA are managed for sustained yield and opportunity to participate. The majority of burbot fisheries in the UCUSMA are monitored for trends in harvests estimated through the SWHS.

Current Issues and Fishery Outlook

Unattended setlines are an efficient method of fishing, but data clearly show burbot populations in UCUSMA lakes cannot sustain use of this method and is therefore prohibited. Prohibition of unattended set lines in 1991 reduced burbot harvest in area lakes. Based on enforcement reports, some anglers still continue to use unattended set lines. ADF&G and AWT educate anglers to fish closely attended lines with clearly visible strike indicators. Prohibition of set lines also reduced mortality of lake trout caught on burbot gear.

Based upon current regulations the harvest of burbot in the UCUSMA should remain stable. Winter weather conditions can dictate ice fishing effort in a given year; mild winter or late winter conditions can result in increased ice fishing effort. Annual fluctuations in harvest appear to be related to angler effort and winter weather conditions rather than a reflection of the abundance of burbot in specific lakes.

Recent Board of Fisheries Actions

The BOF opened Tolsona Lake to burbot fishing at the 2011 meeting in Valdez. The bag and possession limit was set at two burbot. In 2014, the BOF adopted an ADF&G proposal to replace area specific language with regards to burbot fisheries and reference similar language in statewide regulation.

A proposal to prohibit catch and release fishing in the UCUSMA has been submitted for the 2017 BOF meeting in Valdez. If adopted, this proposal would impact the many Burbot fisheries in the area and may reduce angler satisfaction in the area, negatively impacting overall angler effort.

Current or Recommended Research and Management Activities

The burbot stock assessment program in the UCUSMA continues on a limited scale. Baseline data was collected on the Copper River burbot population in 2003 (Schwanke and Bernard 2005). A monitoring program has been proposed for Lake Louise on a 3- to 5-year schedule. Lake Louise burbot populations were sampled in 1999 and again in 2005 to assess the impact of the fishery reopening in 2003 (Taube et al. 2000; Schwanke and Perry-Plake 2007). Catch per unit effort was estimated with baited hoop traps to monitor population trends. There was not a significant decline in burbot catch per unit effort after Lake Louise was reopened. If future harvest levels increase significantly, the Lake Louise population should continue to be monitored.

WILD RAINBOW AND STEELHEAD TROUT SPORT FISHERIES

Background and Historical Perspective

The Upper Copper River drainage is the northernmost extent of the natural range of rainbow and steelhead trout in North America. The area's widely distributed stocks of wild rainbow and steelhead trout display generally low production with little ability to sustain harvests. To assure

that these stocks are not overexploited, a conservative regulation plan was developed and implemented in several Upper Copper River drainages to manage the fisheries targeting these stocks. This plan was guided by the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy* (CISFPT Unpublished).

In 1988, the waters of Lower Hanagita Lake and the Hanagita River from Lower Hanagita Lake to the Tebay River were restricted to catch-and-release for rainbow/steelhead trout. In 1990, the Gulkana River drainage fishery was restricted to catch-and-release. In 2005, the remainder of the Hanagita River drainage (upstream of Lower Hanagita Lake) and the Tebay River downstream of the Hanagita River confluence were included in the area closed to the retention (catch-and-release only) of rainbow/steelhead trout. Regulations restricting waters supporting rainbow/steelhead trout to only unbaited, single-hook, artificial lures were adopted for the flowing waters of Tebay River drainage in 1988, all flowing waters of the Gulkana River drainage above a point on the mainstem Gulkana River 7.5 miles upstream of the confluence of the West Fork in 1990, and for all flowing waters of the UCUSMA in 1999. Spawning closures were established around the identified rainbow/steelhead trout spawning areas on the Middle Fork of the Gulkana River in 1997 and Twelvemile Creek (a tributary of the Gulkana River) in 2003. Additionally, the retention of rainbow or steelhead trout incidentally caught in the Copper River Personal Use Dip Net Salmon Fishery (Chitina Subdistrict) in 1997 was prohibited. Beginning in 2003, rainbow trout or steelhead trout caught by dip net in the subsistence salmon fishery (Glennallen Subdistrict) could not be retained.

Summit Lake and its outlet stream Bridge Creek in the Tebay drainage once constituted a unique rainbow trout fishery within the UCUSMA. Test netting, hook-and-line sampling, and visual surveys from 1982–1985 showed that these waters contained the largest nonanadromous rainbow trout in the Copper River drainage, with individual fish measuring over 32 inches in length and weighing up to 20 pounds (Williams and Potterville 1985). Sampling also indicated that the unique size structure of this population could not sustain high levels of harvest. Special regulations (bag limit of 1 fish ≥32 inches) were established in 1988 for these waters to provide anglers the opportunity to harvest a "trophy trout" while maintaining the overall population structure. However, sampling in late 1990s (Fleming 2000) indicated that only 27% of all rainbow trout sampled (> 3,000 fish) were greater than 12 inches, with a maximum size of 18 inches. As a result, the "trophy trout" regulations were repealed at the 1999 BOF meeting and changed to a bag and possession limit of 10 per day, maximum size limit of 12 inches, and an open season of July 1–May 31. In addition, the department initiated a research study in 2002 to remove a percentage of rainbow trout from Summit Lake on an annual basis to reduce the population density to determine if growth can be promoted (Wuttig *In prep*).

All other waters supporting wild rainbow/steelhead trout stocks are managed under a two fish bag limit of which only one fish may be ≥20 inches. The season is year-round with the exception of the spawning closure (April 15–June 14) on the Middle Fork Gulkana River and Twelvemile Creek.

In 2003, the BOF adopted a statewide *Policy for the Management of Sustainable Wild Trout Fisheries* (5 AAC 75.222). This policy provides guidelines to the BOF and ADF&G for developing regulations and managing wild trout populations.

Recent Fishery Performance

A total of 131 wild rainbow trout were reported harvested from the UCUSMA in 2016, which is the third lowest harvest ever recorded for UCUSMA and less than half of the 2011–2015 average of 296 fish (Table 4). Harvest from the Klutina River accounted for 60% of the 2016 harvest.

The Gulkana River accounts for the majority of rainbow trout caught in the UCUSMA making up 69% of the catch over the past 5 years (2011–2015). The overall catch of 5,532 wild rainbow trout in 2016 was the highest catch since 2008 and was above the recent 5 and 10-year average catches (Table 20).

No steelhead trout have been reported harvested in the UCUSMA since 1999 and no catch reported since 2013. Historic trends in the area's wild rainbow/steelhead fishery are difficult to ascertain, as annual harvest and catch estimates have been small and fluctuate markedly.

Fishery Objectives and Management

The wild rainbow trout and steelhead populations are managed under the guidelines in the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy* and the statewide *Policy for the Management of Sustainable Wild Trout Fisheries*.

Current Issues and Fishery Outlook

Rainbow trout and steelhead trout populations and distribution in the UCUSMA are still not fully understood. Some populations may yet be unidentified and may be reported through the SWHS periodically.

With adoption of more restrictive regulations, particularly in the Gulkana River drainage, harvests of rainbow trout have declined from the historic ranges of 2,000 or more fish (Somerville *In prep*). Wild rainbow and steelhead trout populations should remain at low, but sustainable levels into the foreseeable future. Although rainbow and steelhead trout can be found in the Tonsina, Klutina, and Tazlina drainages, there are no fisheries in the UCUSMA that attract anglers specifically targeting rainbow and steelhead trout other than the Gulkana, Tebay, and Hanagita River drainages and sometimes Kiana Creek (tributary to Tazlina Lake).

Recent Board of Fisheries Actions

At the 2011 meeting, the BOF changed the bag limit for rainbow trout in Summit Lake of the Tebay River drainage from 10 fish ≤12 inches to 10 fish ≤18 inches. The spawning closure in Bridge Creek, the outlet of Summit Lake, was also rescinded at this meeting. These actions were made to encourage sport harvest to try and maintain the large fish component in the Summit Lake rainbow trout population. In 2014, the BOF adopted an ADF&G proposal to simplify and align current regulations for Summit Lake in the Chitina River drainage with its outlet stream Bridge Creek.

A proposal to prohibit catch and release fishing in the UCUSMA has been submitted for the 2017 BOF meeting in Valdez. If adopted, this proposal would impact the wild rainbow trout fisheries in the area, and would require changes to the Gulkana River regulations that only allow a catch and release fishery for rainbow trout.

Ongoing or Recommended Research and Management Activities

The research project, initiated in 2002 to alter the size distribution of rainbow trout in Summit Lake by large-scale removal and relocation of fish, was discontinued in 2013, but fish up to 23

inches (580 mm FL) were captured during the most recent sampling. Data from the project indicate that maximizing sport harvest of rainbow trout, up to an 18 inch length, is the most feasible regulatory means to attempt to maintain the improved size structure of the rainbow trout population in Summit Lake (Wuttig *In prep*). Due to the remote access of this fishery (fly-in only) it is doubtful sport harvest alone will maintain the current size structure.

Stock assessment of the Gulkana River rainbow trout population was initiated in 2004. The abundance of rainbow trout ≥11in (275 mm FL) was 5,238 fish (SE = 689; 95% CI = 3,888–6,588) and for rainbow trout 6–11 in (160–274 mm FL) was 6,850 fish (SE = 1,023; 95% CI = 4,845–8,855) in the river section from Paxson Lake to 2 miles downstream of Sourdough (Schwanke and Taras 2009). Radio tracking 100 rainbow trout in 2009–2010 identified previously undocumented spawning areas in the West Fork Gulkana and Gulkana River Mainstem above the confluence with the West Fork (Schwanke 2015).

A project to determine steelhead trout distribution using radiotelemetry was conducted in the Upper Copper River from 2004–2006. Feasibility work was conducted in September 2004 and the full project was conducted during fall 2005 and 2006 (Savereide 2005*b*, 2005*c*, 2008). Radiotagged fish migrated into the mainstem Chitina (26%), Tazlina (47%), and Gulkana (27%) rivers.

DOLLY VARDEN SPORT FISHERIES

Background and Historical Perspective

Dolly Varden are primarily targeted by sport anglers in the Klutina and Tonsina river drainages. Resident populations are found throughout the Upper Copper River drainage with the exception of the Gulkana River drainage. No juvenile or adult fish have been captured during any of the ADF&G stock assessment projects on the Gulkana River. Dolly Varden have been reported in the SWHS as being caught in the Gulkana River, downstream of the Richardson Highway bridge, but these occurrences are rare. Based upon harvest and catch reports from the SWHS, some Dolly Varden occur in the Upper Susitna River drainage, though due to the barrier at Devils Canyon it is believed these are resident populations.

Sport fisheries in the Klutina and Tonsina river drainages have traditionally accounted for an average of 77–85% of the Dolly Varden harvest in the UCUSMA (Somerville *In prep*). These fisheries occur primarily in the Little Tonsina River and the Upper Klutina River. Harvests of Dolly Varden in the UCUSMA, peaked at 6,001 fish in 1985 (Somerville *In prep*). The bag and possession limit for Dolly Varden has been 10 per day since at least the early 1970s.

Recent Fishery Performance

Sport harvest of Dolly Varden in the UCUSMA varies greatly from year to year. Total harvest of Dolly Varden in the UCUSMA averaged 636 fish from 2011–2015 and ranged from 148–1,036 fish (Table 21). In 2016 the total harvest was 1,483 Dolly Varden in UCUSMA waters, with 55% of them from the Klutina River drainage and 31% from waters of the Upper Copper River drainage above the confluence of the Gulkana and Copper rivers. This was the highest harvest since 2004.

Fishery Objectives and Management

There are currently no specific management objectives for Dolly Varden. The underlying goal of the department has been to assure sustained yield and provide fishing opportunity on fish resources. Harvest and catch of Dolly Varden in the UCUSMA is monitored through the SWHS.

Current Issues and Fishery Outlook

There is a lack of biological and stock data for UCUSMA Dolly Varden populations. It is suspected that both resident and anadromous populations exist within individual systems. However, one study in Klutina Lake to date failed to identify any anadromous individuals (Zimmerman and Schwanke *In prep*).

There have been no indications that the populations of Dolly Varden in the UCUSMA are declining. Declines in harvest appear to reflect a general decline in angler effort. The SWHS does not distinguish effort between individual species. Without a creel survey to assess the proportion of effort directed at individual species, the current effort data is only specific to drainage or system trends. If fishing effort in the UCUSMA as a whole increases, it is anticipated that Dolly Varden harvest may also increase.

Recent Board of Fisheries Action

There were no proposals before the BOF in 2011 or 2014 specific to the Dolly Varden fisheries in the UCUSMA. A proposal to prohibit catch and release fishing in the UCUSMA has been submitted for the 2017 BOF meeting in Valdez. If adopted, this proposal would impact Dolly Varden fisheries in the area.

Ongoing and Recommended Research and Management

There is limited knowledge regarding the Dolly Varden populations in the UCUSMA. Since there is a lack of baseline data on Dolly Varden stocks, future research projects in the UCUSMA that may capture Dolly Varden should record biological data for incorporation into an area database. If creel surveys are conducted on the Klutina or Tonsina rivers for king or sockeye salmon, otoliths should be collected from any Dolly Varden observed and sampled for evidence of strontium deposition levels consistent with anadromous movement. During the 2006 creel survey on the Klutina River, no Dolly Varden were reported harvested and thus no heads or otoliths were collected despite this being an objective of the project (Schwanke and Taras 2009).

In 2012, ADF&G collected 20 Dolly Varden from the Upper Klutina River and outlet of Klutina Lake during late October. Otoliths from all 20 fish were analyzed for strontium signatures (Zimmerman and Schwanke *In prep*). None of the fish were anadromous, but chemical signatures in the otoliths suggested the fish may migrate within the greater Copper River drainage or there may be large variance in strontium isotope concentrations within the Klutina River drainage. Further otolith analyses of Klutina River and other stocks and analysis of water chemistry from those systems will augment these findings.

UPPER COPPER / UPPER SUSITNA MANAGEMENT AREA STOCKED WATERS

Background and Historical Perspective

ADF&G stocks approximately 25 lakes in the UCUSMA providing fishing opportunities for popular fish species in locations where fishing opportunities are limited or didn't exist previously (Table 22). The lake stocking program serves a segment of the public who want to fish, but must

remain on or near the road system. All but 4 of the 25 stocked lakes are road-accessible or within 2 miles of a road and have trail access. This program provides increased fishing opportunities and offers a diversity of species in rural areas where minimal opportunity exists for sport fishing. It also diverts effort from wild populations in areas for which ADF&G has conservation concerns.

ADF&G stocks fingerling size fish (2–3 inches), subcatchable size fish (4–6 inches), and catchable size fish (7–9 inches) in area lakes, of which most are rainbow trout, but other stocked species include Arctic grayling, Arctic char, coho, and king salmon. Most large lakes can produce sufficient numbers of catchable size fish from stockings of fingerling to meet angler demand. Smaller lakes or the more popular large lakes are stocked with subcatchable or catchable size fish because stockings of fingerling cannot provide sufficient numbers of catchables to meet angler demand. In the few UCUSMA stocked lakes that may be prone to winterkill (low dissolved oxygen in late winter months) catchables are stocked to provide an immediate open water and early winter fishery. Due to budget constraints, ADF&G ended its Arctic Graying stocking program in 2016.

Recent Fishery Performance

Effort on stocked waters peaked in the UCUSMA at 7,623 angler-days in 1992 (Somerville *In prep*). In 2016, angler effort on stocked waters was 3,014 angler-days, which is above the most recent 5- and 10-year averages (Table 23).

Anglers harvested 1,547 stocked fish in 2016 and caught 5,453 fish for a catch rate of 1.8 fish per angler-day (Table 23). The average catch per effort for the last 5 years has been 1.8 fish per day fished. The average harvest from 2011–2015 was 947 stocked fish.

Rainbow trout comprised 81% of the harvest and 84% of the catch of stocked fish from 2011–2015 and accounted for 100% of the harvest and 99% of the catch in 2016. Arctic grayling, which were not stocked from 2004–2012, still made up 19% of the stocked lake harvests and 16% of the catch from 2011–2015.

Silver Lake on the McCarthy Road and other stocked lakes in the Chitina area have been the most popular stocked lakes to fish in the UCUSMA since the early 1990s.

Fishery Objectives and Management

The *Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan* (5 AAC 52.065), requires the department to manage stocked waters in the AYK Region to meet public demand for diverse fishing opportunities. Sport fishing effort and harvest are estimated through the Statewide Harvest Survey. All 25 stocked lakes in the UCUSMA are managed under the regional approach, with a bag and possession limit of 10 fish (all stocked species combined), only 1 fish 18 inches or larger.

Current Issues and Fishery Outlook

The outlook for UCUSMA stocked lakes is good, with consistent stocking of catchable rainbow trout, Arctic grayling, and Arctic char, and fingerling coho salmon and Arctic char. Harvest and angler effort have increased on previously popular lakes like Tolsona, Pippin, and Squirrel Creek Pit, which are again being stocked with catchable rainbow trout. Angler success should increase greatly over the next few years, which may lead to increased angler effort in all area lakes.

Recent Board of Fisheries Action

There were no changes to UCUSMA stocked lakes during the 2011 BOF cycle. In 2014, the BOF approved removal of Kathleen, Little Crater, Little Junction, and Van lakes from the stocked waters of the UCUSMA. These lakes were either small with variable or low production, remote with too little effort to justify stocking or have seen almost no fishing effort over the last 10 years. There are no proposals submitted specific to stocked waters for the 2017 BOF cycle.

Current or Recommended Research and Management Activities

Population status of stocked species is assessed by periodic sampling or as a component of research projects. No other research is currently planned for UCUSMA stocked waters.

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TABLES

Table 1.–Reported subsistence and personal use (Glennallen and Chitina Subdistricts) harvest of king, sockeye, and coho salmon in the Copper River, 1997–2016.

	Harvest			
Year	King salmon	Sockeye salmon	Coho salmon	Total
1997	7,798	224,611	334	232,915
1998	8,334	195,567	2,607	206,660
1999	8,680	208,841	3,123	221,007
2000	7,789	161,510	4,051	173,739
2001	6,176	200,421	3,486	210,534
2002	5,766	132,164	2,317	140,602
2003	4,611	129,595	2,840	137,318
2004	5,917	164,231	3,015	173,589
2005	4,220	189,001	1,729	195,400
2006	4,958	173,292	2,144	180,994
2007	6,089	190,384	1,797	198,955
2008	4,655	122,937	3,058	131,107
2009	3,031	137,823	1,691	142,884
2010	2,862	197,443	1,980	202,829
2011	3,834	183,674	2,042	190,332
2012	2,794	193,196	1,561	197,984
2013	2,929	236,101	865	240,565
2014	2,238	226,464	1,171	230,238
2015	3,724	294,450	963	300,596
2016	2,677	197,111	1,092	201,759
Average 2011–2015	3,104	226,777	1,320	231,943
Average 2006–2015	3,711	195,576	1,727	201,648

Note: Starting with 2002 includes federal fishery harvests in the Glennallen and Chitina Subdistricts and Batzulnetas.

Table 2.–Commercial harvests of king and sockeye salmon in the Copper River District, 1998–2017.

Year	King salmon	Sockeye salmon
1998	68,827	1,341,692
1999	62,337	1,682,559
2000	31,259	880,334
2001	39,524	1,323,577
2002	38,734	1,248,503
2003	47,721	1,188,052
2004	38,191	1,048,004
2005	34,624	1,331,664
2006	30,278	1,496,754
2007	39,095	1,901,773
2008	11,437	320,815
2009	9,457	896,469
2010	9,645	635,961
2011	18,500	2,052,432
2012	11,764	1,866,541
2013	8,826	1,608,117
2014	10,207	2,050,007
2015	22,506	1,750,762
2016	12,348	1,175,100
2017	13,100	570,000
Average 2012–2016	13,130	1,690,105
Average 2007–2016	15,379	1,425,798

Source: Botz et al. 2017.

[a] Data for 2017 are preliminary.

Table 3.–Sport fishing effort (angler-days) in the UCUSMA by drainage, 1997–2016.

	Gulkana River drainage			Upper Susitna drainage						Copper River			Other Sites			
Year	Lakes	Streams	Total	Lakes	Streams	Total	Klutina	Tazlina	Tonsina	Upstream of Gulkana	Downstream of Klutina[a]	Stocked lakes	Lakes	Streams	Total	Area total
1997	5,343	23,713	29,056	5,046	949	5,995	11,644	1,489	1,099	457	952	2,160	1,517	1,888	3,405	56,257
1998	4,560	27,349	31,909	5,135	508	5,643	9,408	1,592	1,054	540	795	3,346	1,182	1,237	2,419	56,706
1999	7,933	29,934	37,867	11,120	883	12,003	15,687	1,617	1,230	1,184	388	3,841	1,340	2,462	3,802	77,619
2000	4,825	20,896	25,721	8,899	1,747	10,646	11,125	1,583	1,182	459	780	3,689	1,717	1,292	3,009	58,194
2001	6,188	18,664	24,852	4,829	332	5,161	8,960	902	1,100	781	484	4,396	1,549	694	2,243	48,879
2002	5,910	18,060	23,970	4,991	531	5,522	9,111	751	1,381	675	301	2,377	945	1,580	2,525	46,613
2003	6,682	19,164	25,846	7,934	844	8,778	8,897	773	879	1,947	330	2,858	1,382	449	1,831	52,139
2004	3,257	17,351	20,608	6,037	819	6,856	10,472	241	1,007	1,431	2,608	1,406	1,611	318	1,929	46,558
2005	5,209	15,277	20,486	3,723	755	4,478	10,516	613	593	1,133	539	2,313	721	293	1,014	41,685
2006	2,545	11,910	14,455	4,032	1,111	5,143	12,285	587	716	734	855	2,790	738	804	1,542	39,107
2007	3,297	19,323	22,620	7,681	521	8,202	16,512	593	562	1,180	578	1,974	150	459	609	52,830
2008	4,099	16,794	20,893	7,089	1,383	8,472	12,677	641	653	1,216	1,349	1,453	807	210	1,017	48,371
2009	4,373	13,340	17,713	7,595	1,250	8,845	15,665	802	645	1,653	508	2,254	1,407	3,917	5,324	53,409
2010	2,880	13,834	16,714	9,896	1,424	11,320	16,534	1,540	725	1,726	974	2,049	400	250	650	52,232
2011	2,407	6,134	8,541	4,609	1,423	6,032	9,915	1,366	535	408	1,366	3,117	233	480	713	31,993
2012	2,524	5,593	8,117	6,625	1,163	7,788	18,030	1,067	380	894	628	2,510	721	233	954	40,368
2013	2,658	6,322	8,980	5,240	1,758	6,998	16,357	1,331	898	1,589	1,717	1,163	166	406	571	39,604
2014	2,974	5,509	8,483	5,506	696	6,202	17,298	778	436	331	775	1,380	139	233	372	36,055
2015	2,385	6,840	9,225	3,696	1,271	4,967	12,371	742	737	1,393	692	2,171	121	62	183	32,481
2016	3,048	6,129	9,177	3,120	1,264	4,384	9,974	693	437	1,810	301	3,014	241	196	437	30,227
Average 2011–2015	2,589	6,078	8,668	5,144	1,251	6,395	14,790	1,049	597	923	1,011	2,058	276	293	569	36,060
Average 2006– 2015	3,014	10,559	13,573	6,202	1,194	7,396	14,762	941	629	1,113	932	2,081	488	710	1,199	42,626

[a] Copper River drainage streams and lakes below the confluence with the Klutina River and excluding the Tonsina River drainage.

Table 4.–Number of fish harvested, by species, by sport anglers fishing UCUSMA waters (including stocked waters), 1997–2016.

Year	King salmon	Sockeye salmon	Coho salmon	Rainbow trout (wild)	Rainbow trout (stocked)	Dolly Varden[a]	Lake trout	Arctic grayling[a]	Burbot	Whitefish	Landlocked salmon[a]	Other fish	Total fish
1997	8,346	12,293	370	1,135	1,677	1,092	1,983	9,153	1,358	134	331	56	37,611
1998	8,245	11,184	684	443	4,739	1,589	1,818	8,498	1,485	584	477	0	39,590
1999	6,742	11,101	256	798	3,044	2,390	2,224	9,510	1,861	317	232	0	37,876
2000	5,531	12,361	760	331	2,546	991	1,709	7,111	2,290	451	436	22	34,510
2001	4,904	8,169	374	452	1,964	1,612	1,245	4,923	1,506	1,135	282	207	26,595
2002	5,098	7,761	384	393	2,901	1,388	2,215	9,849	2,224	2,288	282	54	34,837
2003	5,717	7,108	277	1,335	2,426	1,578	1,854	6,596	1,457	422	51	104	28,866
2004	3,435	6,464	131	696	1,615	2,153	2,044	4,177	1,127	885	0	1,629	24,356
2005	4,093	8,135	72	378	1,440	891	2,354	3,899	1,374	1,089	122	16	23,863
2006	3,425	14,297	54	486	1,618	777	737	3,387	575	662	42	111	26,171
2007	5,113	23,009	0	32	573	712	964	2,766	577	124	0	17	33,887
2008	3,616	11,431	56	324	694	396	1,470	4,231	1,234	655	0	18	24,125
2009	1,355	13,415	36	241	1,013	943	1,875	4,480	2,850	569	44	81	26,902
2010	2,416	14,743	90	158	1006	682	1,631	4,723	2,997	759	78	0	29,283
2011	1,753	7,727	21	262	803	231	726	1,849	556	298	10	12	14,248
2012	535	23,404	0	512	936	753	676	4,091	995	107	11	0	32,020
2013	285	26,711	0	129	246	1,036	1,096	3,606	1,576	586	0	21	35,292
2014	931	18,005	89	240	353	148	819	2,264	458	597	0	0	23,904
2015	1,343	9,489	16	339	1,517	1,012	1,062	4,775	238	345	0	0	20,136
2016	327	7,538	0	131	1,547	1,483	1,443	2,916	555	10	83	0	16,033
Average 2011–2015	969	17,047	25	296	771	636	876	3,317	765	387	4	7	25,100
Average 2006–2015	2,077	16,213	36	272	876	669	1,106	3,617	1,206	470	19	26	26,587

[a] Includes fish harvested in stocked waters. Landlocked salmon include stocked king and coho salmon.

Table 5.–Number of fish caught, by species, by sport anglers fishing UCUSMA waters, 1997–2016.

Year	King salmon	Sockeye salmon	Coho salmon[a]	Steelhead trout	Rainbow trout stocked	Rainbow trout wild	Dolly Varden[a]	Lake trout	Arctic Grayling[a]	Burbot	Whitefish	Landlocked salmon[a]	Other fish	Total fish
1997	27,699	26,724	748	81	4,525	16,342	3,439	9,101	71,432	2,646	1,075	1,095	81	164,988
1998	22,312	21,359	2,574	192	11,224	11,059	4,156	8,184	73,014	2,849	1,612	1,708	80	160,323
1999	18,034	20,782	382	276	4,505	10,304	6,993	14,184	68,860	3,173	907	309	58	148,767
2000	18,503	19,348	1,396	334	8,038	10,292	3,332	9,388	53,421	4,316	2,019	800	58	131,245
2001	16,000	15,843	1,246	234	13,204	6,327	6,188	6,913	49,901	2,527	3,069	513	233	122,198
2002	19,497	12,181	471	129	6,870	9,735	4,714	12,197	106,424	3,878	3,756	927	100	180,879
2003	19,400	15,718	585	112	4,777	12,806	3,720	12,425	90,190	2,496	2,338	169	356	165,092
2004	12,664	10,912	478	64	6,624	6,212	5,622	8,212	51,219	1,626	1,420	0	1,637	106,690
2005	9,704	16,093	172	64	4,096	6,858	2,551	11,057	50,760	2,150	2,259	279	32	106,075
2006	10,971	21,778	72	50	4,125	3,790	2,189	4,043	25,524	1,054	1,023	42	111	74,772
2007	12,109	30,875	11	99	1,666	4,253	3,647	6,125	29,815	1,503	273	0	26	90,402
2008	7,827	16,912	57	61	2,819	7,414	1,814	9,140	47,718	1,482	1,605	0	36	96,885
2009	4,231	19,788	36	20	2,563	4,607	3,211	12,843	76,559	3,471	1,076	554	81	129,040
2010	8,213	19,489	114	84	5,044	4,926	1,089	14,082	54,882	5,897	1,994	282	10	116,106
2011	7,025	11,873	21	0	4,498	3,794	1,058	3,846	19,738	1,157	483	10	23	53,526
2012	1,869	30,336	0	0	5,155	4,141	1,712	4,217	30,320	1,853	373	66	0	80,042
2013	1,195	36,246	229	58	1,149	4,826	2,304	8,218	29,991	2,162	691	0	42	87,111
2014	2,248	24,943	129	0	1,931	3,405	493	4,491	26,163	821	2,400	0	0	67,024
2015	4,165	13,654	16	0	2,846	2,313	3,163	7,680	28,702	493	721	0	0	63,753
2016	1,514	8,700	0	0	5,416	5,532	2,420	6,326	44,698	759	217	83	0	75,665
Average 2011–2015	3,300	23,410	79	12	3,116	3,696	1,746	5,690	26,983	1,297	934	15	13	70,291
Average 2006–2015	5,985	22,589	69	37	3,180	4,347	2,068	7,469	36,941	1,989	1,064	95	33	85,866

[a] Includes fish caught in stocked waters. Landlocked salmon includes stocked king and coho salmon.

Table 6.–Summary of king salmon harvests and upriver escapement in the Copper River 1997–2016.

Year	Commercial harvest[a]	Copper River District subsistence harvest	Sport harvest[b]	Glennallen Subdistrict harvest[c]	Chitina Subdistrict harvest[c]	Total harvest	Upriver return estimate	Estimated total return	Upriver escapement	Estimate source
1997	52,516	200	8,346	2,583	5,447	69,092	ND	ND	ND	ND
1998	70,238	295	8,245	1,842	6,723	87,343	ND	ND	ND	ND
1999	63,508	353	6,742	3,278	5,913	79,794	32,090	95,951	16,157	ADF&G
2000	32,018	689	5,531	4,856	3,168	46,262	38,047	70,754	24,492	ADF&G
2001	40,551	826	4,904	3,553	3,113	52,947	39,778	81,155	28,208	ADF&G
2002	39,552	549	5,098	4,217	2,056	51,472	32,873	72,974	21,502	ADF&G
2003	49,031	710	5,717	3,092	1,921	60,471	44,764	94,505	34,034	NVE
2004	38,889	1,106	3,435	3,982	2,502	49,914	40,564	80,559	30,645	NVE
2005	35,764	260	4,093	2,618	2,094	44,829	30,333	66,357	21,528	NVE
2006	31,309	779	3,425	3,229	2,681	41,423	67,789	99,877	58,454	NVE
2007	40,276	1,145	5,113	3,939	2,722	53,205	46,349	87,770	34,565	NVE
2008	12,067	470	3,616	3,218	2,022	21,393	41,343	53,880	32,487	NVE
2009	10,394	212	1,355	3,036	223	15,220	32,401	43,007	27,787	NVE
2010	10,582	276	2,416	2,425	718	16,410	22,323	33,181	16,771	NVE
2011	19,788	212	1,753	3,062	1,080	25,895	33,889	53,889	27,994	NVE
2012	12,623	237	535	2,510	572	16,401	31,452	44,312	27,911	NVE
2013	9,445	854	285	2,522	762	13,868	32,581	42,880	29,012	NVE
2014	11,011	153	931	1,785	733	14,613	24,158	35,322	20,709	NVE
2015	23,701	167	1,343	2,614	1,585	29,410	32,306	56,174	26,764	NVE
2016	13,161	73	327	2,471	726	16,758	16,009	29,243	12,485	NVE
Average 2011–2015	15,314	325	969	2,499	946	20,053	30,877	46,515	26,463	
Average 2006–2015	18,120	451	2,077	2,834	1,310	24,791	36,459	55,029	30,238	

Note: ND = No data; ADF&G = Alaska Department of Fish and Game; NVE = Native Village of Eyak.

[a] Includes commercial personal use, educational, and donated harvests from the Copper River District.

[b] Includes sport harvest from Copper River District and delta and Upper Copper River.

[c] These data are expanded to reflect unreported permits and include reported federal subsistence harvest figures from 2002 to 2004 and expanded federal subsistence harvest beginning with 2005. See Table 2 for reported harvests.

Table 7.–Harvest of king salmon by sport anglers fishing in the UCUSMA by drainage, 1997–2016.

	Gulkana River Drainage							Copper River			
Year	Upper river	Lower river	Unspecified	Total	Klutina River drainage	Tonsina River drainage	Tazlina River drainage	Upstream of Gulkana	Downstream of Klutina	Other waters	Area total
1997	1,872	2,514	355	4,741	3,344	131	28	0	22	80	8,346
1998	885	3,786	732	5,403	2,608	39	63	0	15	117	8,245
1999	845	1,764	484	3,093	3,489	0	0	25	11	124	6,742
2000	1,318	2,304	555	4,177	1,303	0	0	0	10	41	5,531
2001	967	1,793	514	3,274	1,465	11	0	0	32	122	4,904
2002	715	2,125	143	2,983	1,778	230	0	13	0	94	5,098
2003	1,427	2,164	116	3,707	1,873	25	0	0	12	100	5,717
2004	64	1,670	156	1,890	1,338	115	0	0	39	53	3,435
2005	392	2,081	100	2,573	1,276	214	0	0	15	15	4,093
2006	464	1,495	188	2,147	1,136	100	0	0	13	29	3,425
2007	467	2,639	163	3,269	1,683	0	0	0	113	48	5,113
2008	241	2,036	46	2,323	1,160	0	0	0	118	15	3,616
2009	62	454	0	516	733	58	0	0	48	0	1,355
2010	401	1,038	13	1,452	863	0	0	0	101	0	2,416
2011	0	536	27	563	1,043	0	0	0	107	40	1,753
2012	14	106	76	196	314	0	0	0	25	0	535
2013	0	0	0	0	223	51	0	0	0	11	285
2014	16	431	0	447	414	16	0	0	54	0	931
2015	116	658	0	774	481	50	0	20	18	0	1,343
2016	0	225	68	293	0	0	0	0	34	0	327
Average 2011–2015	29	346	21	396	495	23	0	4	41	10	969
Average 2006–2015	178	939	51	1,169	805	28	0	2	60	14	2,077

Table 8.–Harvest summary data for guided anglers in the Upper Copper River drainage, 2007–2016.

Site	Year	Guides	Clients	Trips	King salmon	Sockeye salmon	Coho salmon	Dolly Varden	Arctic grayling	Rainbow trout	Lake trout
Gulkana River drainage [a]	2007	28	1,251	364	754	64	0	0	7	0	10
Gulkana River drainage [a]	2008	29	1,001	284	504	11	0	1	8	0	2
Gulkana River drainage [a]	2009	19	364	109	147	33	0	0	0	0	6
Gulkana River drainage [a]	2010	18	452	139	197	14	0	0	0	0	0
Gulkana River drainage [a]	2011	19	463	144	192	33	0	0	15	0	0
Gulkana River drainage [a]	2012	8	314	86	58	136	0	0	1	0	0
Gulkana River drainage [a]	2013	9	163	50	0	93	0	0	8	0	4
Gulkana River drainage [a]	2014	10	140	43	30	27	0	0	8	0	0
Gulkana River drainage [a]	2015		348	114	196	23	0	0	0	0	0
Gulkana River drainage [a]	2016										
Klutina River drainage [b]	2007	28	1,657	500	904	967	0	161	39	2	2
Klutina River drainage [b]	2008	22	1,571	470	688	266	4	84	21	4	0
Klutina River drainage [b]	2009	28	1,203	359	374	540	5	225	31	3	0
Klutina River drainage [b]	2010	25	1,286	407	563	356	0	184	6	1	0
Klutina River drainage [b]	2011	19	953	307	387	189	0	93	2	3	0
Klutina River drainage [b]	2012	18	979	281	237	757	0	28	22	3	0
Klutina River drainage [b]	2013	23	1,046	298	131	1,635	0	37	0	0	0
Klutina River drainage [b]	2014	13	673	201	163	405	0	61	1	0	0
Klutina River drainage [b]	2015	15	645	196	297	56	0	36	4	1	0
Klutina River drainage [b]	2016										

Note: Harvest data is total harvest and may exceed the harvest reported by area and site in Sigurdsson and Powers 2009–2014, where harvest cannot be reported for sites or drainages with 3 or fewer guides reporting in a given year.

[a] Includes all sections of the Gulkana River, Crosswind Lake, Paxson Lake, and Mud Lake.

[b] Includes Klutina River and Klutina Lake.

Table 9.–Catch of king salmon by sport anglers fishing in the UCUSMA by drainage, 1997–2016.

	Gulkana River				Klutina	Tonsina	Tazlina	Copper River			
Year	Upper river	Lower river	Unspecified	Total	River drainage	River drainage	River drainage	Upstream of Gulkana	Downstream of Klutina	Other waters	Area total
1997	9,658	7,385	1,080	18,123	8,677	395	94	0	22	449	27,760
1998	2,335	11,115	2,003	15,453	5,815	193	101	419	60	283	22,324
1999	3,221	4,876	937	9,034	8,637	0	104	50	22	187	18,034
2000	4,890	7,650	1,379	13,919	4,057	292	0	178	16	41	18,503
2001	2,947	6,417	1,470	10,834	4,922	21	0	53	158	12	16,000
2002	3,346	8,613	357	12,316	5,645	861	0	13	471	191	19,497
2003	4,165	8,898	293	13,356	5,418	290	0	202	25	135	19,426
2004	1,380	5,433	555	7,368	4,135	521	0	404	173	63	12,664
2005	1,670	4,697	217	6,584	2,651	483	0	0	45	15	9,778
2006	1,805	5,664	204	7,673	2,890	367	0	0	13	114	11,057
2007	1,203	7,254	163	8,620	3,025	31	62	16	275	80	12,109
2008	549	5,389	46	5,984	1,670	15	11	0	132	15	7,827
2009	616	1,469	0	2,085	1,888	79	0	15	164	0	4,231
2010	982	3,719	39	4,740	3,240	39	13	0	181	0	8,213
2011	64	2,372	161	2,597	3,476	72	17	0	802	61	7,025
2012	177	495	13	685	1,118	41	0	0	25	0	1,869
2013	0	327	0	327	560	285	0	0	0	23	1,195
2014	34	1,000	0	1,034	955	130	0	0	129	0	2,248
2015	516	2,533	0	3,049	835	210	33	20	18	0	4,165
2016	54	474	509	1,037	367	40	36	34	0	0	1,514
Average 2011–2015	158	1,345	35	1,538	1,389	148	10	4	195	17	3,300
Average 2006–2015	586	3,022	63	3,671	1,966	127	14	5	174	29	5,985

Table 10.–Harvest of sockeye salmon by sport anglers fishing UCUSMA drainages, 1997–2016.

Year	Gulkana River Drainage				Klutina River drainage	Tonsina River drainage	Tazlina River drainage	Copper River		Other waters	Area total
	Upper river	Lower river	Unspecified	Total				Upstream of Gulkana	Downstream of Klutina		
1997	1,585	2,469	512	4,566	6,501	39	0	21	201	965	12,293
1998	1,591	3,460	1,319	6,370	4,264	68	58	0	11	413	11,184
1999	1,349	2,142	701	4,192	6,514	0	30	32	65	268	11,101
2000	1,162	1,194	1,951	4,307	7,219	0	35	141	317	342	12,361
2001	524	852	432	1,808	5,834	0	0	0	193	334	8,169
2002	833	1,680	32	2,545	4,704	96	0	0	13	403	7,761
2003	550	843	72	1,465	5,321	21	0	11	203	87	7,108
2004	177	776	23	976	5,069	142	0	11	0	266	6,464
2005	157	939	73	1,169	6,646	0	0	0	180	140	8,135
2006	230	693	0	923	13,222	0	0	0	130	22	14,297
2007	114	1,306	38	1,458	21,255	25	0	0	290	0	23,028
2008	369	206	0	575	10,107	0	0	0	749	0	11,431
2009	362	886	87	1,335	11,759	0	51	0	270	0	13,415
2010	160	1,316	0	1,476	12,238	156	0	0	708	165	14,743
2011	0	684	101	785	6,025	0	46	0	871	0	7,727
2012	0	1,528	0	1,528	21,564	0	0	0	301	0	23,393
2013	25	1,973	0	1,978	23,721	0	97	0	787	129	26,711
2014	0	586	123	709	17,004	0	0	0	292	0	18,005
2015	31	502	0	533	8,903	0	0	0	53	0	9,489
2016	21	768	64	853	6,406	52	0	0	120	107	7,538
Average 2011–2015	11	1,051	47	1,109	15,443	0	29	0	441	26	17,047
Average 2006–2015	129	965	36	1,131	14,579	18	19	0	435	32	16,213

Table 11.–Summary of sockeye harvests and upriver escapement in the Copper River 1997–2016.

Year	Commercial harvest[a]	CRD subsistence harvest[b]	Sport harvest[c]	Glennallen Subdistrict harvest[d]	Chitina Subdistrict harvest[d]	Total harvest	Upriver return estimate[e]	Estimated total return	Spawning escapement[f]
1997	2,955,431	1,001	13,265	82,807	148,727	3,201,231	1,107,156	4,063,588	797,882
1998	1,343,127	850	13,199	64,463	137,161	1,558,800	820,554	2,341,546	485,541
1999	1,683,892	1,330	13,956	77,369	141,658	1,918,205	818,507	2,708,888	457,589
2000	881,419	4,360	14,550	59,497	107,856	1,067,682	598,790	1,633,508	345,961
2001	1,325,690	3,072	8,467	83,787	132,108	1,553,124	838,427	2,237,918	533,816
2002	1,249,920	3,067	8,559	58,800	86,543	1,406,889	797,390	2,192,176	583,824
2003	1,192,164	1,607	7,739	60,623	81,513	1,343,646	702,327	2,043,029	507,958
2004	1,048,603	1,822	7,416	73,214	108,527	1,239,582	643,539	1,833,686	448,457
2005	1,333,574	939	8,791	86,140	122,463	1,551,907	824,792	2,276,773	516,996
2006	1,498,423	4,505	14,410	76,056	124,810	1,718,204	891,917	2,592,750	580,202
2007	1,903,858	6,184	24,732	83,338	126,154	2,144,266	873,252	2,961,568	613,129
2008	323,096	4,001	12,656	57,632	82,318	479,703	677,001	1,141,223	477,952
2009	902,940	1,810	14,429	60,517	90,917	1,070,613	677,347	1,721,695	469,089
2010	643,086	2,016	16,057	84,856	140,811	886,826	901,488	1,715,714	502,992
2011	2,061,525	1,818	8,565	75,375	129,985	2,277,268	880,342	3,097,537	607,657
2012	1,874,726	4,334	24,618	92,792	128,058	2,124,528	1,239,902	3,253,887	930,210
2013	1,617,717	5,741	27,773	90,788	182,915	1,924,934	1,234,479	3,006,009	860,829
2014	2,062,265	1,751	18,092	98,535	158,879	2,339,522	1,194,260	3,386,773	864,988
2015	1,761,443	1,555	9,901	108,696	225,425	2,107,020	1,313,794	3,209,594	930,061
2016	1,184,901	1,185	7,739	81,839	150,303	1,425,967	785,584	2,074,971	513,563
Average 2011–2015	1,875,535	3,040	17,545	93,237	165,052	2,154,409	1,177,165	3,196,022	843,376
Average 2006–2015	1,464,908	3,372	16,996	82,859	139,027	1,707,161	990,683	2,611,303	686,121

[a] Includes commercial harvest plus homepack, donated and educational harvests.

[b] Includes state and federal subsistence harvests in the Copper River District.

[c] Includes sport harvest in the Copper River Delta and the Upper Copper River upstream of Haley Creek

[d] These data are expanded to reflect unreported state harvest and include reported federal harvest (2002–2004) and expanded federal harvest beginning in 2005.

[e] Prior to 1999 is the Miles Lake sonar count minus the proportion of king salmon in the Glennallen and Chitina subdistrict fisheries. Starting in 1999, this includes the Miles Lake sonar count minus the king salmon mark-recapture point estimate

[f] Upriver return escapement minus upriver sockeye harvests.

Table 12.–Distribution of sockeye salmon in major drainages in the Copper River, 2005–2009.

	Percentage of total Copper River escapement by river system						
Year	Lower Copper River	Chitina River	Tonsina River	Klutina River	Tazlina River	Gulkana River	Upper Copper River
2005	7.4	5.0	4.7	35.1	12.4	7.0	28.4
2006	5.8	8.1	5.5	44.5	11.4	15.6	9.1
2007	9.1	5.4	5.1	54.2	9.8	9.4	7.1
2008	8.2	8.2	1.7	33.7	18.6	19.2	10.3
2009	12.4	5.0	2.7	33.2	5.7	16.4	24.5
Average 2005–2009	6.8	6.3	3.9	40.1	11.6	13.5	15.9

Source: (Smith et al. 2003; Wade et al. 2007; Wade et al. 2009; Wade et al. 2010).

Table 13.–Number of permits issued and expanded salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1997–2016 (does not include federal subsistence fishery permit numbers or harvests).

		Estimated salmon harvest			
Year	Number of permits issued	King	Sockeye	Coho	Total[a]
1997	1,133	2,583	82,807	187	85,743
1998	1,010	1,842	64,463	533	66,951
1999	1,101	3,278	77,369	1,121	82,119
2000	1,251	4,856	59,497	532	64,885
2001	1,239	3,553	83,787	1,144	88,568
2002	1,121	3,653	50,850	530	55,058
2003	1,012	2,538	47,007	467	50,055
2004	956	3,346	55,510	577	59,497
2005	961	2,229	64,213	154	66,615
2006	984	2,769	57,710	212	60,774
2007	1,174	3,276	65,714	238	69,284
2008	1,186	2,381	43,157	493	46,106
2009	1,090	2,493	46,849	228	49,643
2010	1,321	2,099	70,719	293	73,260
2011	1,306	2,319	59,622	372	62,477
2012	1,527	2,095	76,305	335	78,851
2013	1,339	2,148	73,728	143	76,044
2014	1,656	1,365	75,501	233	77,131
2015	1,631	2,212	81,800	77	84,105
2016	1,769	2,075	62,474	45	64,617
Average 2011–2015	1,492	2,028	73,391	232	75,722
Average 2006–2015	1,321	2,316	65,111	262	67,768

[a] Total harvest includes steelhead and other species.

Table 14.–Number of permits issued and expanded salmon harvested during the Chitina Subdistrict personal use salmon fishery in the Copper River, 1997–2016 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of permits issued	Estimated salmon harvest			
		King	Sockeye	Coho	Total[a]
1997	9,086	5,447	148,727	160	154,349
1998	10,006	6,723	137,161	2,145	146,075
1999	9,943	5,913	141,658	2,128	149,733
2000 [b]	8,151	3,168	107,856	3,657	114,884
2001 [b]	9,458	3,113	132,108	2,720	138,425
2002 [b]	6,804	2,023	85,968	1,934	90,242
2003	6,441	1,903	80,796	2,533	85,496
2004	8,156	2,495	107,312	2,860	113,176
2005	8,230	2,043	120,013	1,869	124,403
2006	8,497	2,663	123,261	2,715	129,103
2007	8,377	2,694	125,126	1,742	130,222
2008	8,041	1,999	81,359	2,711	86,476
2009	7,958	214	90,035	1,712	92,228
2010	9,970	700	138,487	2,013	141,565
2011	9,217	1,067	128,052	1,702	131,265
2012	10,016	567	127,143	1,385	129,362
2013	10,592	744	180,663	797	182,904
2014	11,717	719	157,215	1,129	159,392
2015	12,635	1,570	223,080	841	226,832
2016	11,394	711	148,982	1,182	151,480
Average 2011–2015	10,835	933	163,231	1,171	165,951
Average 2006–2015	9,702	1,294	137,442	1,675	140,935

[a] Total expanded, includes unidentified salmon.

[b] From 2000 to 2002 the Chitina Subdistrict was classified a subsistence fishery.

Table 15.–Number of freshwater finfish subsistence permits issued and harvest from UCUSMA waters, 1997–2016.

	Permits				Harvest[a,b]				
Year	Total Issued	Total fished	Water bodies permitted	Water bodies fished	Whitefish	Lake Trout	Burbot	Other	Total
1997	10	5	7	6	1,380	0	0	65	1,445
1998	6	6	4	4	2,032	1	0	7	2,040
1999	9	8	6	5	1,382	1	0	3	1,386
2000	9	8	6	6	1,974	4	0	9	1,987
2001	8	7	5	5	1,670	2	2	36	1,710
2002	12	7	5	3	1,321	4	1	1	1,327
2003	13	7	6	3	1,143	2	8	13	1,166
2004	11	9	5	4	2,125	15	0	25	2,165
2005	17	13	7	5	1,643	13	1	19	1,676
2006	13	10	6	4	1,070	6	3	2	1,081
2007	18	12	5	3	3,094	6	3	6	3,109
2008	16	10	3	2	585	9	2	1	597
2009	28	16	5	3	2,708	28	21	11	2,768
2010	27	19	7	4	2,088	33	13	13	2,147
2011	25	20	5	5	981	17	1	0	999
2012	15	10	2	2	648	8	0	0	656
2013	25	25	19	6	1,259	10	0	18	1,287
2014	19	12	6	3	697	19	0	20	736
2015	15	10	4	4	664	6	1	2	673
2016	25	14	8	2	959	14	8	25	1,006
Average 2011–2015	20	14	5	4	850	12	0	8	870
Average 2006–2015	20	14	5	4	1,379	14	4	7	1,405

[a] Reported harvest is from set gillnets with the following exceptions: 202 whitefish (WF) were harvested with a seine in 2000, 5 WF and 5 burbot (BB) in 2003, 52 WF in 2006 with fyke nets, and 12 WF and 1 BB by spear in 2011.

[b] Retention of species other than whitefish or longnose suckers taken with gillnets was prohibited by permit stipulation beginning in 2011. Species other than whitefish listed as harvested after 2010 were not retained and were released either dead or alive.

Table 16.–Harvest of wild Arctic grayling by sport anglers in the UCUSMA by drainage, 1997–2016.

Year	Gulkana River drainage	Upper Susitna River drainage	Klutina River drainage	Tonsina River drainage	Tazlina River drainage		Copper River drainage		Other lakes and streams	Area total
					Mendeltna Creek	Other lakes and streams	Above Gulkana	Below Klutina		
1997	3,228	1,332	165	82	462	468	475	269	1,785	8,266
1998	2,975	1,797	517	495	579	490	527	150	589	8,119
1999	2,482	1,564	530	368	79	650	1,108	67	798	7,646
2000	2,062	2,181	134	123	245	274	588	0	954	6,561
2001	1,753	686	267	128	70	120	589	29	630	4,272
2002	2,646	928	566	180	23	370	2,598	62	537	7,910
2003	2,132	1,047	575	58	23	312	1,466	0	236	5,849
2004	1,331	819	197	112	65	73	805	124	589	4,115
2005	1,553	380	59	86	0	500	432	96	540	3,646
2006	1,179	998	77	8	46	359	194	137	298	3,296
2007	729	387	138	0	97	130	840	144	19	2,484
2008	1,665	1,431	17	59	190	34	616	42	76	4,130
2009	1,522	1,216	47	35	0	85	462	0	1,078	4,445
2010	2,081	1,850	57	12	107	90	210	89	227	4,723
2011	532	1,195	0	10	0	0	14	28	29	1,808
2012	1,393	1,335	42	0	0	710	243	67	144	3,934
2013	436	1,340	0	0	23	401	1,087	72	0	3,359
2014	501	700	49	0	81	243	220	0	77	1,871
2015	1,299	1,530	92	33	82	963	655	82	0	4,736
2016	1,028	1,209	73	64	32	0	510	0	0	2,916
Average 2011–2015	832	1,220	37	8	37	463	444	50	50	3,141
Average 2006–2015	1,134	1,198	52	16	63	302	454	66	195	3,479

Table 17.–Harvest of lake trout by sport anglers fishing UCUSMA waters by drainage, 1997–2016.

	Gulkana River drainage					Upper Susitna River drainage							
Year	Paxson Lake	Summit Lake	Crosswind Lake	Other lakes and streams	Gulkana total	Lake Louise	Susitna Lake	Other lakes and streams	Upper Susitna total	Klutina River drainage	Tazlina River drainage	Other lakes and streams	Area total
1997	452	158	96	142	848	585	52	100	737	33	23	342	1,983
1998	205	59	238	39	541	625	131	135	891	12	56	318	1,818
1999	342	220	525	68	1,155	430	176	216	822	35	16	196	2,224
2000	228	79	297	27	631	563	131	93	787	18	83	190	1,709
2001	302	74	44	86	506	259	110	118	487	17	0	235	1,245
2002	328	66	299	60	753	458	152	138	748	0	122	592	2,215
2003	399	102	403	104	1,008	393	128	80	601	52	0	193	1,854
2004	46	107	105	30	288	770	30	347	1,147	14	0	595	2,044
2005	50	32	519	71	672	370	429	478	1,277	66	16	323	2,354
2006	61	10	191	32	294	200	148	42	390	0	0	53	737
2007	77	56	97	54	284	340	61	0	401	0	0	279	964
2008	173	67	90	0	330	604	206	85	895	0	0	245	1,470
2009	191	125	295	18	629	493	217	230	940	25	58	223	1,875
2010	268	192	164	0	624	697	73	101	871	0	54	82	1,631
2011	42	37	50	36	165	239	122	62	423	0	75	63	726
2012	149	0	32	0	181	169	66	94	329	16	0	150	676
2013	165	0	300	113	545	239	108	35	382	0	21	148	1,096
2014	155	109	16	11	291	278	120	86	484	0	0	44	819
2015	213	59	56	0	328	297	194	111	602	16	0	116	1,062
2016	200	37	47	203	487	201	0	380	581	21	0	354	1,443
Average 2011–2015	138	41	91	32	302	244	122	78	444	6	19	104	876
Average 2006–2015	146	66	129	26	367	356	132	85	572	6	21	140	1,106

Table 18.–Sustainable yield (Lake Area model) and harvest of lake trout from UCUSMA lakes greater than 500 ha in size.

Lake	Harvest[a]	Road accessible	Sustainable yield	Size[b]
Crosswind	139	No	565	Any Size
Paxson	250	Yes	585	Any Size
Summit	66	Yes	413	Any Size
Tanada	17	No	399	Any Size
Copper	75	No	341	Any Size
Lake Louise	433	Yes	848	Any Size
Susitna	148	Yes	439	Any Size

[a] Average harvest from SWHS 2012–2016 plus 10% mortality factor for released fish.

[b] The length limit in Lake Louise, Susitna, and Crosswind lakes was removed beginning the summer of 2012.

Table 19.–Harvest of burbot by sport anglers fishing in the UCUSMA by drainage, 1997–2016.

	Gulkana River drainage				Upper Susitna River drainage							
Year	Paxson Lake	Crosswind Lake	Other Gulkana waters	Total	Lake Louise	Susitna and Tyone lakes	Other Susitna waters	Total	Tazlina River drainage	Klutina River drainage	Other streams and lakes	Area total
1997	535	174	103	812	0	262	52	314	26	0	206	1,358
1998	535	139	17	691	0	149	118	267	460	0	67	1,485
1999	266	503	13	782	0	670	0	670	117	0	292	1,861
2000	291	539	472	1,302	0	609	0	609	222	0	157	2,290
2001	764	173	122	1,059	0	154	36	190	136	0	121	1,506
2002	401	578	259	1,238	0	437	31	468	128	13	377	2,224
2003	173	470	250	893	32	119	33	184	87	65	228	1,457
2004	20	336	0	356	317	91	10	418	0	0	353	1,127
2005	112	859	94	1,065	25	74	10	109	25	0	175	1,374
2006	0	229	0	229	210	46	64	320	13	13	0	575
2007	0	55	30	85	185	30	0	215	0	0	277	577
2008	40	302	0	342	241	452	17	710	111	0	71	1,234
2009	0	452	0	452	489	237	0	726	69	0	1,603	2,850
2010	166	129	533	828	1,231	147	18	1,396	422	18	333	2,997
2011	61	60	36	157	144	36	48	228	146	0	25	556
2012	33	0	0	33	134	67	104	305	0	63	594	995
2013	35	421	18	474	266	407	0	673	83	0	346	1,576
2014	0	0	0	0	221	237	0	458	0	0	0	458
2015	16	0	0	16	71	0	48	119	39	0	64	238
2016	0	76	0	76	84	90	0	174	129	0	176	555
Average 2011–2015	29	96	11	136	167	149	40	357	54	13	206	765
Average 2006–2015	35	165	62	262	319	166	30	515	88	9	331	1,206

Table 20.–Sport catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, 1997–2016.

	Gulkana River drainage[a]				Klutina	Tazlina	Tonsina	Copper River drainage		Other	
Year	Upper River	Lower River	Gulkana R. other	Total	River drainage	River drainage	River drainage	Upstream of Gulkana	Downstream of Klutina	streams and lakes	Area total
1997	7,816	199	99	8,114	53	125	0	218	3,062	4,770	16,342
1998	3,429	1,317	682	5,428	8	48	25	0	4,993	557	11,059
1999	5,699	1,743	261	7,703	23	108	83	128	553	1,706	10,304
2000	5,354	1,281	194	6,829	267	0	78	0	1,496	1,622	10,292
2001	2,806	961	381	4,148	256	0	36	0	767	1,120	6,327
2002	5,166	2,525	31	7,722	7	0	105	14	349	1,538	9,735
2003	5,496	676	332	6,504	66	48	0	0	0	6,188	12,806
2004	3,995	787	0	4,782	27	26	81	0	535	761	6,212
2005	2,967	1,251	405	4,623	87	21	331	0	374	1,422	6,858
2006	1,361	405	205	1,971	58	741	67	0	488	465	3,790
2007	3,173	652	210	4,035	21	0	0	0	73	124	4,253
2008	4,183	593	624	5,400	38	0	61	0	1,707	208	7,414
2009	3,700	328	0	4,028	172	101	10	0	0	296	4,607
2010	3,044	999	28	4,071	117	113	15	0	422	188	4,926
2011	1,684	622	615	2,921	132	81	33	0	384	243	3,794
2012	1,815	778	44	2,637	518	17	10	0	530	429	4,141
2013	2,837	185	819	3,841	0	65	0	13	0	0	3,919
2014	1,587	110	0	1,697	410	0	0	196	308	794	3,405
2015	1,260	308	0	1,568	33	73	0	0	339	300	2,313
2016	3,261	643	236	4,140	255	86	0	0	1,004	47	5,532
Average 2011–2015	1,836	401	296	2,532	219	172	9	42	370	353	3,696
Average 2006–2015	2,464	498	255	3,217	150	181	20	21	454	305	4,347

[a] The Gulkana River has been closed to the retention of rainbow trout since 1991.

Table 21.–Harvest of wild Dolly Varden by sport anglers fishing UCUSMA waters by drainage, 1997–2016.

Year	Klutina River drainage	Tazlina River drainage	Tonsina River drainage	Copper River drainage		Other streams and lakes	Area total
				Upstream of Gulkana	Downstream of Klutina		
1997	549	0	107	135	44	257	1,092
1998	1,092	16	98	0	16	367	1,589
1999	1,818	22	363	32	45	110	2,390
2000	257	0	498	10	102	77	944
2001	644	54	795	0	11	65	1,569
2002	725	0	369	22	215	57	1,388
2003	1,009	54	0	67	20	0	1,150
2004	886	0	150	120	891	106	2,153
2005	423	0	82	13	0	373	891
2006	219	0	146	0	58	150	573
2007	362	0	99	154	15	82	712
2008	204	0	0	22	59	0	285
2009	620	0	93	33	0	197	943
2010	268	0	29	88	121	132	638
2011	64	0	96	62	9	0	231
2012	602	0	89	0	0	62	753
2013	244	0	460	37	295	0	1,036
2014	148	0	0	0	0	0	148
2015	459	0	143	410	0	0	1,012
2016	812	0	214	457	0	0	1,483
Average 2011–2015	303	0	158	102	61	12	636
Average 2006–2015	319	0	116	81	56	62	633

Note: Dolly Varden are not present in the Gulkana River drainage. Data do not include stocked Arctic char.

Table 22.–Stocking schedule for lakes in the UCUSMA, 2014–2016.

Access	Area Lake	Stocking Frequency[a]	Species	Size	Number stocked 2014	2015	2016
Glenn Hwy	Arizona	Discontinued	Grayling	Catchable	500	0	0
	Buffalo	Annual	Rainbow	Catchable	536	545	538
	DJ	Alternate	Rainbow	Fingerling	1,047	0	804
	Gergie	Alternate	Arctic Char	Fingerling	2,001	0	0
		Alternate	Rainbow	Fingerling	9,005	0	0
	Ryan	Annual	Arctic Char	Catchable	1,001	0	0
		Discontinued	Grayling	Catchable	600	0	0
		Annual	Rainbow	Catchable	591	546	538
	Tex Smith	Annual	Arctic Char	Catchable	1,003	0	0
		Annual	Rainbow	Catchable	1,086	1,161	1,072
	Tolsona	Annual	Rainbow	Catchable	1,498	2,103	2,082
Richardson Hwy	Dick	Annual	Arctic Char	Catchable	0	1,000	0
	Pippin	Discontinued	Grayling	Catchable	2,061	0	0
		Annual	Rainbow	Catchable	4,890	5,462	5,469
	Squirrel Creek	Annual	Rainbow	Catchable	1,350	1,354	1,362
		Discontinued	Grayling	Catchable	500	0	0
Lake Louise Rd	Connor	Discontinued	Grayling	Catchable	500	0	0
	Crater	Alternate	Arctic Char	Fingerling	1,500	0	1,500
		Alternate	Rainbow	Fingerling	0	2,000	0
	Junction	Discontinued	Grayling	Catchable	1,000	0	0
	Old Road	Annual	Rainbow	Catchable	541	767	754
	Peanut	Alternate	Rainbow	Fingerling	0	1,500	0
	Round	Annual	Rainbow	Catchable	601	753	769
Edgerton Hwy	Three Mile	Discontinued	Grayling	Catchable	1,000	0	0
		Annual	Rainbow	Catchable	1,439	1,469	1,431
	Two Mile	Annual	Arctic Char	Catchable	1,001	0	0
		Annual	Rainbow	Catchable	2,020	2,023	1,988
McCarthy Rd	Sculpin	Alternate	Rainbow	Fingerling	10,012	0	8,015
	Silver	Alternate	Rainbow	Fingerling	19,953	0	20,000
	Strelna	Alternate	Rainbow	Fingerling	5,000	0	5,000
		Alternate	Coho	Fingerling	0	0	5,000
Remote	John	Alternate	Arctic Char	Fingerling	2,001	0	2,001
	North Jans	Alternate	Rainbow	Fingerling	0	9,625	0
	South Jans	Alternate	Rainbow	Fingerling	0	7,713	0
		Alternate	Coho	Fingerling	0	5,871	0
	Tolsona Mtn.	Alternate	Rainbow	Fingerling	11,013	0	10,068

[a] With increased availability of catchable sized rainbow trout in 2012, fingerling stockings were discontinued in lakes with low productivity or the potential to winterkill.

[b] Silver Lake was stocked with fingerling rainbow trout out of cycle in 2012 to compensate for lack of outstocked fish from Summit Lake.

Table 23.–Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1997–2016.

		Catch						Harvest				
Year	Days fished (effort)	Rainbow trout	Coho salmon	Arctic grayling	Arctic char	Total	Catch rate (catch / effort)	Rainbow trout	Coho salmon	Arctic grayling	Arctic char	Total
1997	2,160	4,525	444	1,969	0	6,938	3.2	1,677	274	570	0	2,521
1998	3,346	11,224	1039	1,389	0	13,652	4.1	4,739	395	223	0	5,357
1999	3,841	4,505	309	4,694	22	9,530	2.5	3,044	232	1265	0	4,541
2000	3,689	8,038	800	2,954	298	12,090	3.3	2,546	436	521	47	3,560
2001	4,396	13,204	513	3,315	43	17,075	3.9	1,964	282	473	43	2,762
2002	2,377	6,870	0	6,966	179	14,015	5.9	2,901	0	1939	0	4,862
2003	3,374	4,777	0	3,309	495	8,581	2.5	2,426	0	688	428	3,609
2004	1,461	6,624	0	531	0	7,155	4.9	1,615	0	62	0	1,677
2005	2,313	4,096	0	86	0	4,182	1.8	1,440	0	253	0	1,693
2006	2,790	4,125	0	232	357	4,714	1.7	1,618	0	91	204	1,913
2007	1,974	1,666	0	559	0	2,225	1.1	573	0	282	0	855
2008	1,453	2,819	0	275	444	3,538	2.4	694	0	101	111	906
2009	2,254	2,563	0	445	0	3,008	1.3	1013	0	35	0	1048
2010	2,049	5,044	31	208	73	5,356	2.6	1006	31	0	44	1081
2011	3,117	4,498	0	497	0	4,995	1.6	803	0	42	0	845
2012	2,510	5,155	0	610	0	5,765	2.3	936	0	157	0	1,093
2013	1,034	1,149	0	518	0	1,667	1.6	246	0	247	0	493
2014	1,380	1,931	0	1280	0	3,211	2.3	353	0	393	0	746
2015	2,171	2,846	0	122	0	2,968	1.4	1,517	0	39	0	1,556
2016	3,014	5,416	0	37	0	5,453	1.8	1,547	0	0	0	1,547
Average 2011–2015	2,042	3,116	0	605	0	3,721	1.8	771	0	176	0	947
Average 2006–2015	2,073	3,180	3	475	87	3,745	1.8	876	3	139	36	1,054

FIGURES

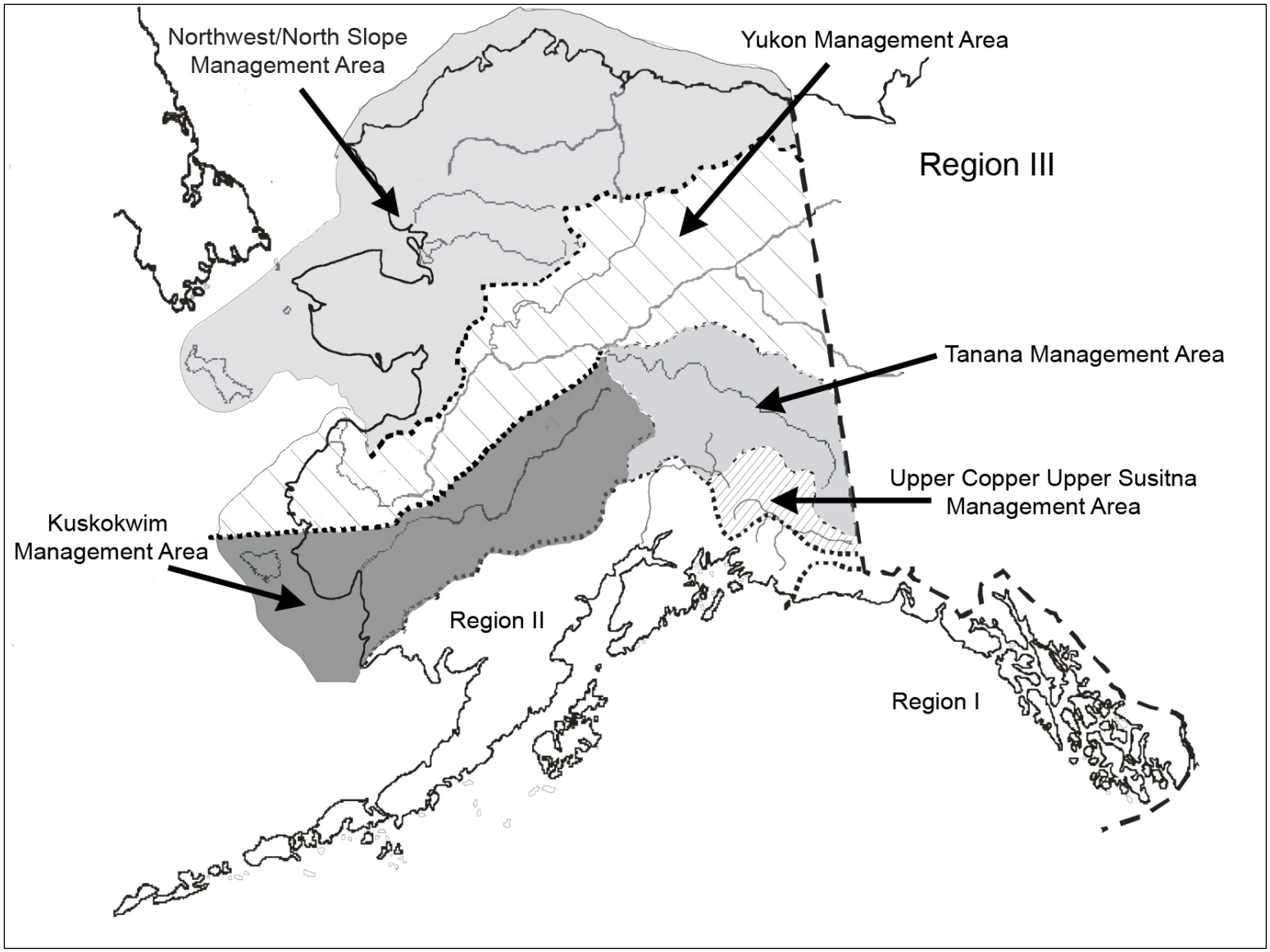

Figure 1.–Map of the sport fish regions in Alaska and the 5 Region III management areas.

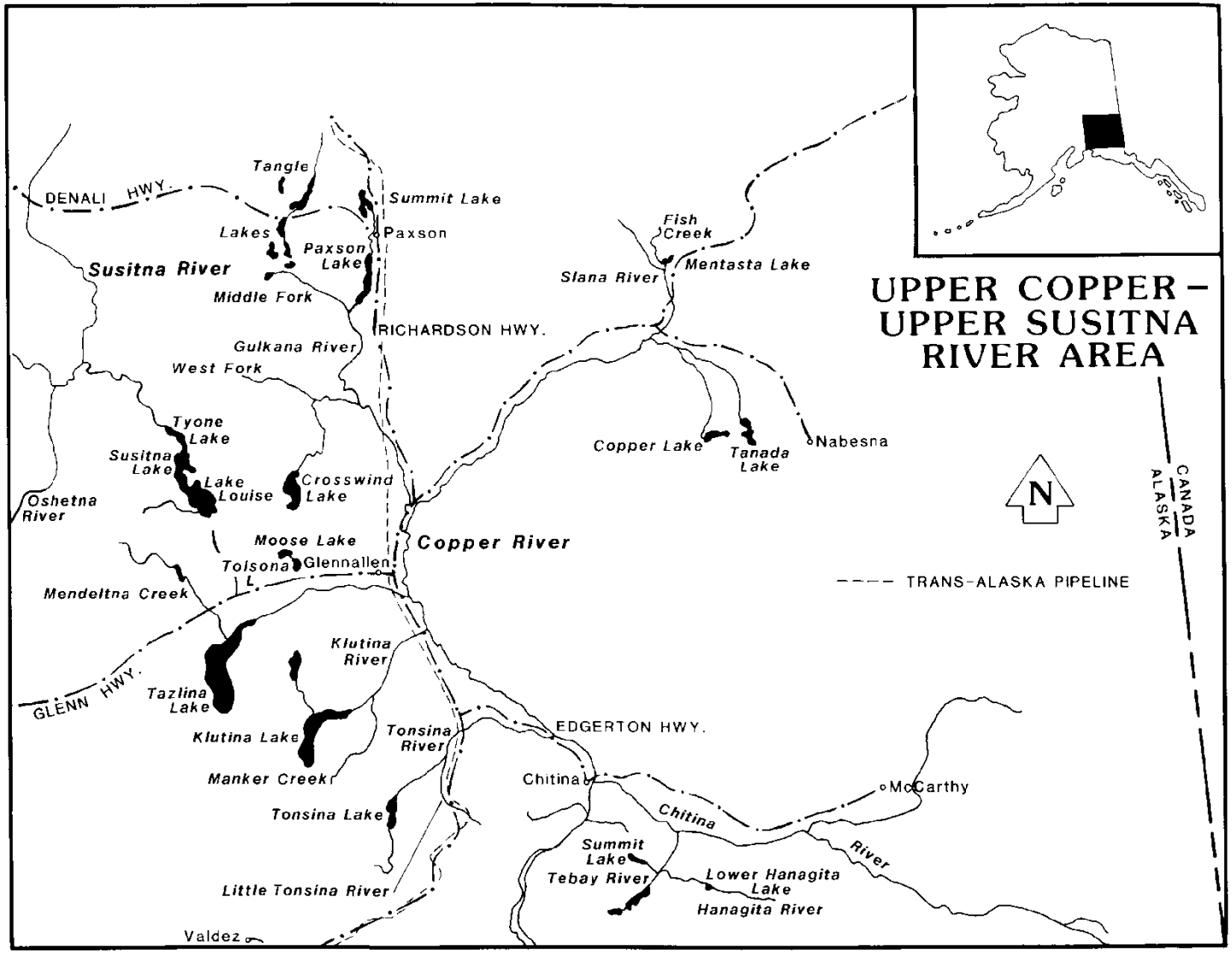

Figure 2.–The Upper Copper/Upper Susitna Management Area (UCUSMA).

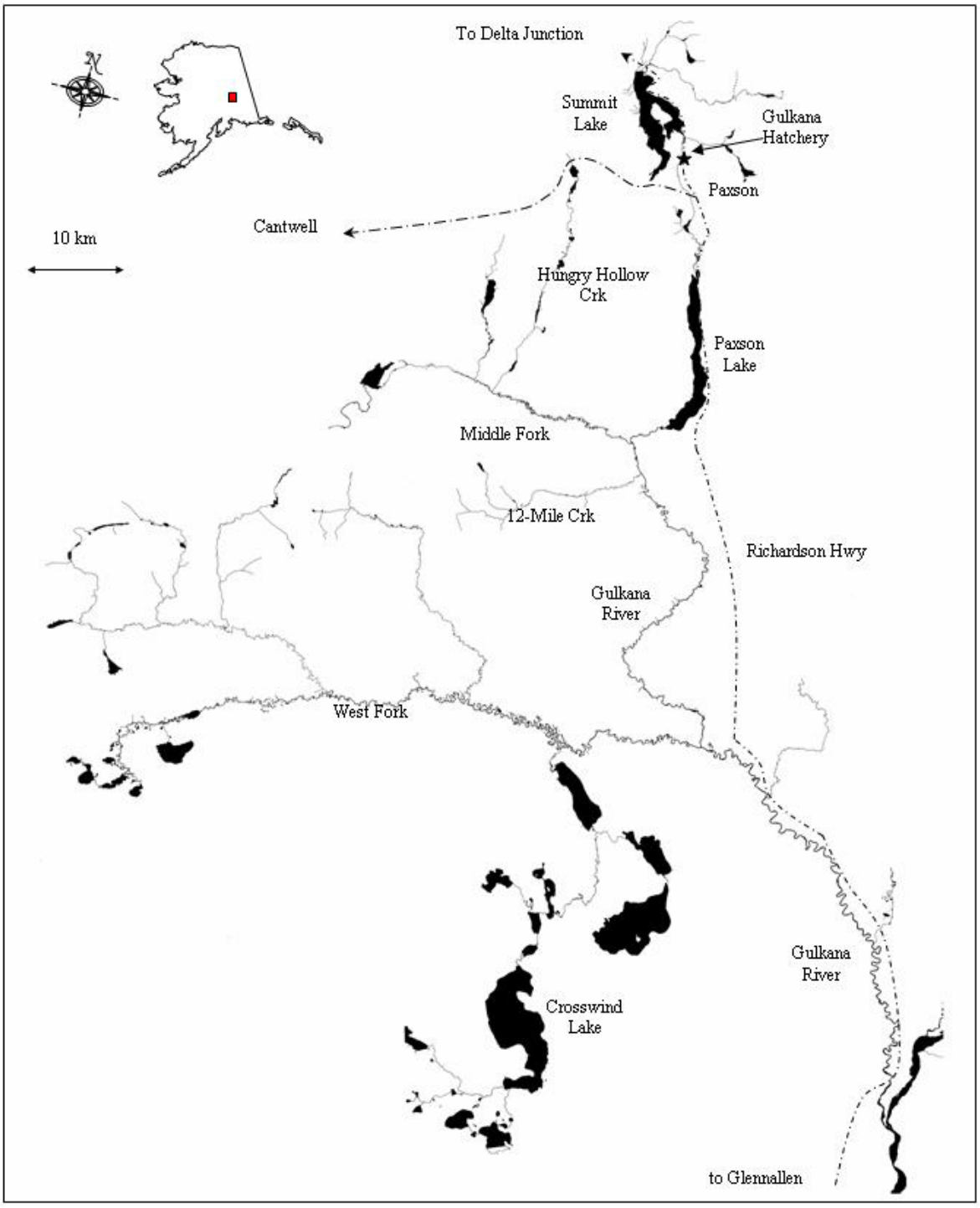

Figure 3.–Gulkana River drainage.

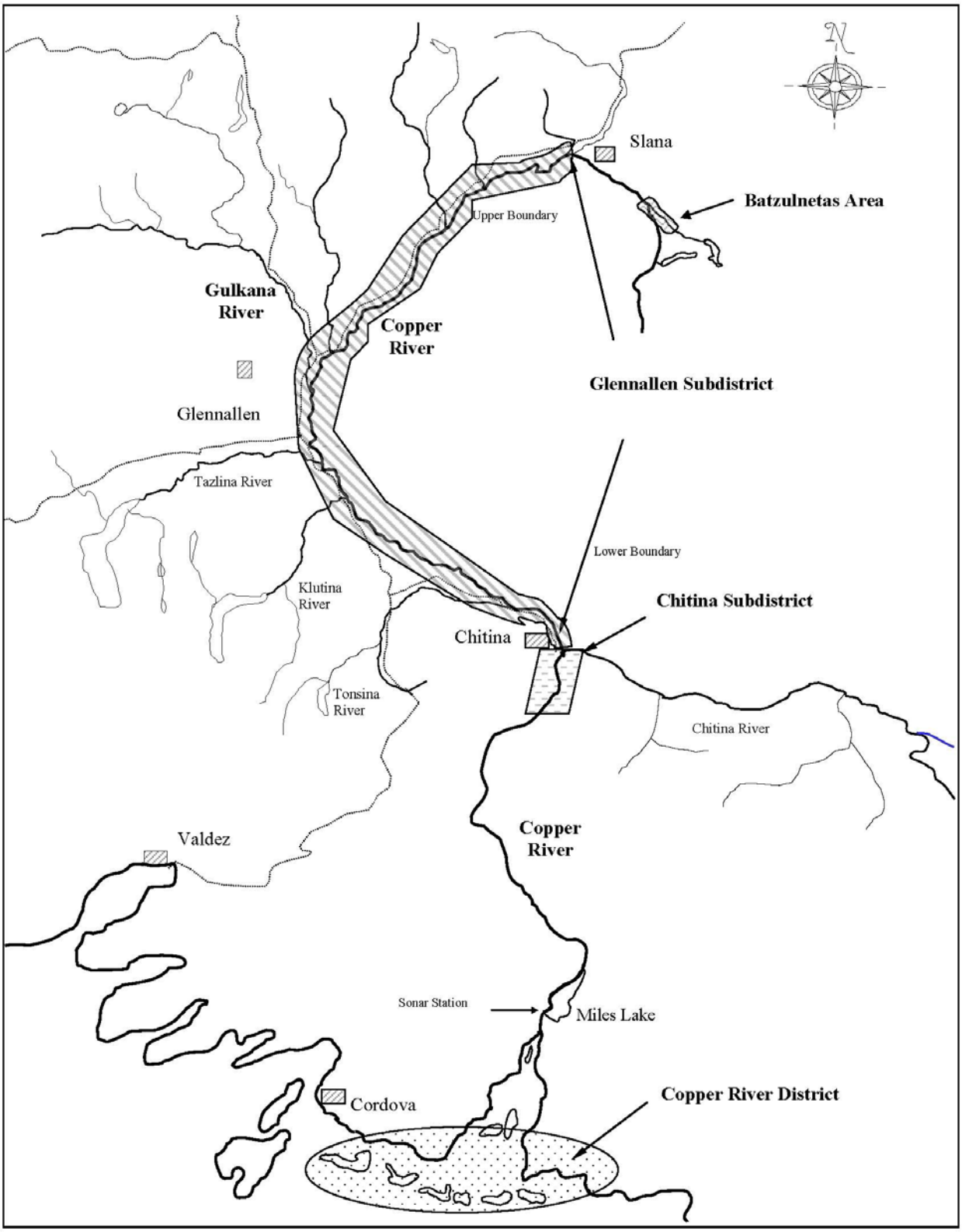

Figure 4.–Upper Copper River fishery subdistricts and areas.

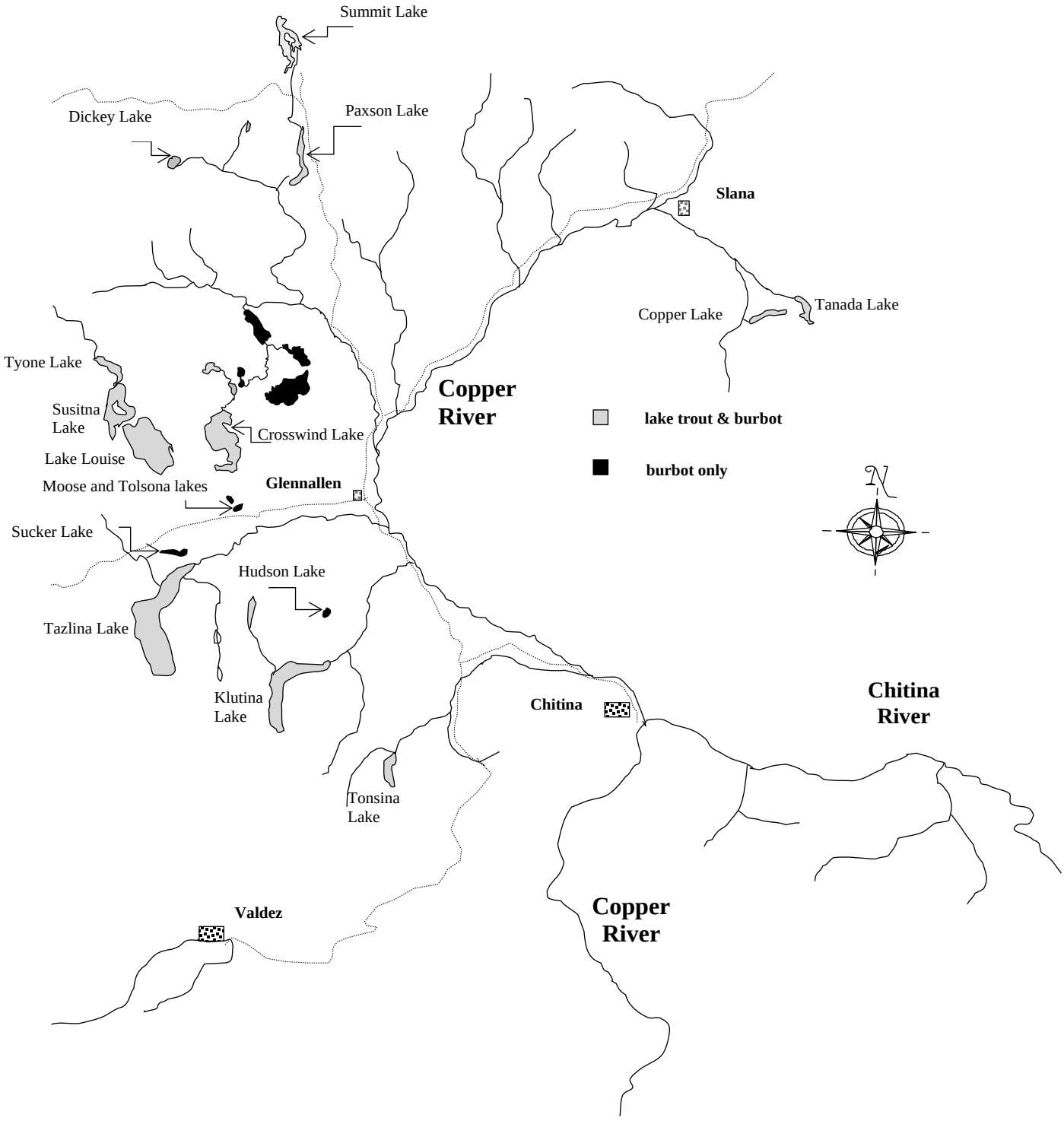

Figure 5.–Lake trout and burbot fisheries in the UCUSMA.

APPENDIX A

Appendix A1.–Listing of the addresses and contact numbers for information sources regarding UCUSMA information.

Organization	Address	Phone	Internet address
Alaska Department of Fish and Game,			http://www.adfg.alaska.gov/index.cfm?adfg=home.main
Glennallen Area office	PO Box 47 Glennallen, AK 99588-0047	(907) 822-3309	
Fairbanks Regional office	1300 College Road Fairbanks, AK 99701-1599	(907) 459-7207	
U.S. Bureau of Land Management	PO Box 147 Glennallen, AK 99588-0147	(907) 822-3217	http://www.blm.gov/alaska
Wrangell-St. Elias National Park & Preserve	PO Box 439 Copper Center, AK 99573	(907) 822-5234	http://www.nps.gov/wrst/index.htm
Ahtna, Inc	PO Box 649 Glennallen, AK 99588-0649	(907) 822-3476	www.ahtna-inc.com
Chitina Native Corporation	PO Box 3 Chitina, AK 99566	(907) 823-2223	http://www.chitinanative.com/corp/default.htm
Greater Copper Valley Chamber of Commerce	PO Box 469 Glennallen, AK 99588-0469	(907) 822-5555	http://www.coppervalleychamber.com

APPENDIX B

Appendix B1.–Emergency orders issued for UCUSMA sport, personal use, and subsistence fisheries during 2015 and 2016.

Year	E. O. Number	Explanation
2015	3-RS-01-15	Establishes a weekly fishing period for the Batzulnetas Area subsistence salmon fishery. The weekly fishing period will be 48 hours in duration from 12:00 noon Friday to 12:00 noon Sunday, beginning Friday, June 5, 2015. Beginning on Friday, July 3, the weekly fishing period will be increased to 84-hours in duration from 12:00 noon Friday to 11:59 P.M. Monday each week through September 1, or until closed by emergency order.
2015	3-RS-01-15	Opens the Chitina Subdistrict for a 24-hour period from 12:01 a.m. Sunday, June 7 until 11:59 p.m. Sunday, June 7. Tentative openings after this period are listed in the schedule below. Additional emergency orders will implement and likely change this schedule based on actual numbers of fish passing the Miles Lake Sonar. After August 31, the fishery will remain open, by regulation, through September 30.
2015	3-RS-02-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 8–June 14, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 8 until 11:59 p.m. Sunday, June 14.
2015	3-RS-03-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 15–June 21, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 15 until 11:59 p.m. Sunday, June 21.
2015	3-RS-04-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 22–June 28, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 22 until 11:59 p.m. Sunday, June 28.
2015	3-RS-01-15	Increases the bag and possession limit in the Copper River drainage for sockeye salmon 16 inches or longer. Beginning at 12:01 a.m., Saturday, June 20, the bag and possession limit for sockeye salmon in the Copper River drainage is six fish.
2015	3-RS-05-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 29–July 5, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 29 until 11:59 p.m. Sunday, July 5.
2015	3-RS-06-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 6–July 12, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 6 until 11:59 p.m. Sunday, July 12.
2015	3-RS-07-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 13–July 19, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 13 until 11:59 p.m. Sunday, July 19.

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Year	E. O. Number	Explanation
2015	3-RS-08-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 20–July 26, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 20 through 11:59 p.m. Sunday, July 26.
2015	3-RS-09-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 27–August 2, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 27 through 11:59 p.m. Sunday, August 2.
2015	3-RS-10-15	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 3–August 31, 2015. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 3 until 11:59 p.m. Monday, August 31.
2016	3-RS-01-16	Establishes a weekly fishing period for the Batzulnetas Area subsistence salmon fishery. The subsistence salmon fishery in the vicinity of the former Native village of Batzulnetas will be open to weekly fishing periods 48 hours in duration from 12:00 noon Friday to 12:00 noon Sunday, beginning Friday, June 3, 2016. Beginning Friday, July 1, weekly fishing periods will increase to 84 hours in duration from 12:00 noon Friday to 11:59 p.m. Monday each week through September 1 or until closed by emergency order.
2016	3-RS-01-16	Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River through August 31, 2016 and amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 6–June 12, 2016. The Chitina Subdistrict of the Upper Copper River District will be open from 12:01 a.m. Tuesday, June 7 through 11:59 p.m. Sunday, June 12.
2016	3-RS-02-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of June 13, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 13 through 11:59 p.m. Sunday, June 19, 2016.
2016	3-KS-06-16	Prohibits the retention of king salmon in all flowing waters of the Copper River upstream of the Klutina River, effective June 18. King salmon may not be retained or possessed and must be released immediately. In addition, the use of bait and treble hooks in these waters is also prohibited.
2016	3-RS-03-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of June 20, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 20 through 11:59 p.m. Sunday, June 26, 2016. In addition, this emergency order closes the Chitina Subdistrict Personal Use Dip Net Salmon Fishery to the retention of king salmon. King salmon incidentally taken may not be retained and must be released immediately and returned to the water unharmed.

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Year	E. O. Number	Explanation
2016	3-KS-07-16	Closes the Upper Copper River drainage upstream of the south bank of Haley Creek to sport fishing for king salmon, effective June 25. King salmon may not be taken or possessed and must be released immediately. In addition, the use of bait in these waters is also prohibited.
2016	3-RS-04-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of June 27, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 27 through 11:59 p.m. Sunday, July 3, 2016.
2016	3-RS-05-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of July 4, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 4 through 11:59 p.m. Sunday, July 10, 2016.
2016	3-RS-06-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of July 11, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 11 through 11:59 p.m. Sunday, July 17, 2016.
2016	3-RS-07-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of July 18, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 18 through 11:59 p.m. Sunday, July 24, 2016.
2016	3-RS-08-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of July 25, 2016. The Chitina Subdistrict will be open from 8:00 a.m. Monday, July 25 through 11:59 p.m. Sunday, July 31, 2016.
2016	3-RS-09-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of August 1, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Wednesday, August 3 through 10:00 p.m. Sunday, August 7, 2016.
2016	3-RS-10-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the week of August 8, 2016. The Chitina Subdistrict will be open from 6:00 p.m. Thursday, August 11 through 11:59 p.m. Sunday, August 14, 2016.
2016	3-RS-11-16	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period from August 15–August 31, 2016. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 15 through 11:59 p.m. Wednesday, August 31, 2016.

APPENDIX C

Appendix C1.–Federal subsistence permits and harvest from the Copper River, Chitina Subdistrict, 2002–2016.

Year	Permits issued	Permits returned	Species harvested				
			King	Sockeye	Coho	Steelhead	Other
2002	122	89	33	575	0	0	0
2003	100	82	18	717	70	0	0
2004	111	83	7	1,215	18	0	0
2005	76	64	51	2,450	0	0	0
2006	75	62	18	1,549	20	0	0
2007	97	86	28	1,028	41	0	0
2008	82	70	23	959	100	0	0
2009	68	62	9	882	11	0	0
2010	92	79	18	2,324	30	0	0
2011	85	68	13	1,933	10	0	0
2012	92	80	5	915	8	8	0
2013	99	85	18	2,252	8	2	10
2014	113	103	14	1,664	69	10	0
2015	111	100	15	2,345	14	7	0
2016	128	95	15	1,321	11	0	4
Average 2011–2015	100	87	13	1,822	22	5	2
Average 2006–2015	91	80	16	1,585	31	3	1

Note: Reported harvest only 2002–2004; expanded harvest (including estimated harvest from non-returned permits) after 2004.

APPENDIX D

Appendix D1.–Federal subsistence permits and harvest from the Copper River, Glennallen Subdistrict, 2002–2016.

Year	Permits issued	Permits returned	Species harvested				
			King	Sockeye	Coho	Steelhead	Other
2002	201	162	564	7,950	81	62	0
2003	221	184	554	13,616	152	5	0
2004	262	206	636	17,704	152	12	0
2005	275	224	389	21,927	187	0	41
2006	254	220	460	18,346	28	15	71
2007	281	238	663	17,624	57	9	122
2008	270	219	837	14,475	229	26	52
2009	274	227	543	13,668	34	19	110
2010	269	236	326	14,137	81	42	62
2011	277	240	743	15,753	223	5	317
2012	271	244	415	16,487	173	42	106
2013	274	236	374	17,060	21	7	88
2014	315	279	420	23,034	29	10	59
2015	325	286	402	26,896	78	7	201
2016	320	246	396	19,365	11	7	368
Average 2011–2015	293	257	471	19,846	105	14	154
Average 2006–2015	281	243	518	17,748	95	18	119

Note: Reported harvest only 2002–2004; expanded harvest (estimates include harvest from non-returned permits) after 2004.