Fishery Management Report No. 11-38

Fishery Management Report for the Recreational Fisheries of the Upper Copper/Upper Susitna River Management Area, 2009

by

Mark A. Somerville

June 2011

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 al.ii (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)

Measures (fisheries)

fork length	FL
mideye to fork	MEF
mideye to tail fork	METF
standard length	SL
total length	TL

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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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.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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ABSTRACT

Sport fisheries season summaries for 2009 and preliminary information for 2010 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 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 angler effort was 53,409 angler-days in 2009. Total sport catch in 2009 was 125,497 fish, continuing a four year trend in increasing area sport fish catch. Sport harvest totaled 25,855 fish in 2009 with sockeye salmon accounting for 52% of the harvest. In the Glennallen Subdistrict state subsistence fishery a total of 49,643 salmon were harvested in 2009 amounting to the second lowest harvest per permit ever recorded in this fishery. Sockeye salmon represented over 94% of the subsistence harvest. The Chitina Subdistrict personal use fishery state harvest totaled 92,228 salmon in 2009. Overall, the UCUSMA fish stocks are healthy and harvests appear sustainable, but significant challenges exist to maintain sustainable stocks in the face of decreasing returns or increased effort on specific lakes and flowing waters.

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

EXECUTIVE SUMMARY

This document provides a wide array of information specific to the recreational angling opportunities and personal use and subsistence fisheries that exist within the Upper Copper/Upper Susitna Management Area. Information specific to the recreational, personal use and subsistence fisheries within the Upper Copper/Upper Susitna Management Area during 2009 and including preliminary data from 2010 are presented along with a brief history of these fisheries and past Alaska Board of Fisheries decisions that have affected them.

INTRODUCTION

This report provides information for the 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 the management strategies that are developed from that information. In addition, this report includes a description of the fisheries regulatory process, the 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 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 the division 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 the states at a match of up to three-to-one 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 the UCUSMA and its fisheries for 2009, with preliminary information from the 2010 season. This report is organized into two primary sections: a management area overview including a description of the 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 eighteen 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 three 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 the Upper Copper River and Upper Susitna River area and the Arctic-Yukon-Kuskokwim Region (including the North Slope, Northwestern, Yukon River, Tanana River, 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 1,146,000 km^2 (442,500 mi^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 99,000) is the largest community.

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

- Northwestern/North Slope Management Area (Norton Sound, Seward Peninsula, Kotzebue Sound, and North Slope drainages);
- Yukon Management Area (the Yukon River drainage except for the Tanana River drainage);
- 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);

- Tanana River Management Area (the Tanana River drainage); and,
- Kuskokwim Management Area (the entire Kuskokwim River drainage and Kuskokwim Bay drainages).

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

ALASKA BOARD OF FISHERIES

The BOF is a seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. Board members are appointed by the governor for three-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. The public provides its 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 members are nominated from the local public and voted on by all present during an AC meeting. Most active committees in urban areas meet in the fall and winter on a monthly basis. Rural committees generally have only one fall and one spring meeting due to funding constraints. AC meetings allow opportunity for direct public interaction with ADF&G staff attending the meetings that answer questions and provide clarification concerning proposed regulatory changes regarding resource issues of local and statewide concerns. The Boards Support Section within the ADF&G's Division of Administrative Services provides administrative and logistical support for the BOF and ACs. During 2009, ADF&G had direct support responsibilities for 81 ACs in the state.

Within the UCUSMA there are three 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. The BOF may also consider proposals affecting the UCUSMA during the statewide finfish meeting or during meetings for other areas by accepting Agenda Change Requests for consideration of a proposal outside of the 3-year cycle. In March 2010, the BOF held a two-day meeting in conjunction with the statewide finfish meeting to consider two proposals addressing a court ruling that remanded, back to the BOF, the case against the BOF 2003 negative Customary and Traditional (C&T) finding for the Chitina Subdistrict. A proposal defining subsistence way

of life as "a way of life that is based on consistent, long-term reliance upon the fish and game resources for the basic necessities of life", was adopted. The second proposal sought a positive C&T finding for the Chitina Subdistrict, considering the new definition of "subsistence way of life", and failed.

The last regular cycle meeting for the UCUSMA occurred in December 2008 in Cordova. At that meeting, the board adopted 12 of 33 proposals specific to Upper Copper River subsistence, personal use and UCUSMA sport fisheries.

Two housekeeping proposals were adopted affecting regulations concerning the Glennallen Subdistrict subsistence fishery. The BOF adopted proposals that moved regulatory language found in 5 AAC 01.630(e)(6) (Subsistence fishing permits) to 5 AAC 01.620 (Lawful gear and gear specifications) and moved regulatory language found in 5 AAC 01.630(e)(9) to 5 AAC 01.645(a). A third housekeeping proposal was adopted by the BOF removing 5 AAC 24.360(c) which was created in 2000 when the Chitina Subdistrict fishery was classified a subsistence fishery and should have been removed when the Chitina fishery was reclassified as a personal use fishery in 2003. None of these actions affected management of the Glennallen Subdistrict subsistence or Chitina Subdistrict personal use fishery.

Two proposals affecting the freshwater finfish (other than salmon) subsistence fishery were adopted. The first opened Crosswind Lake to subsistence fishing. The second resulted in a positive Customary and Traditional (C&T) determination for freshwater finfish, other than salmon, in the Prince William Sound Area. As a result of the positive C&T determination, the BOF adopted an Amount Necessary for Subsistence (ANS) of 25,000–42,000 usable pounds of non-salmon fish for the Prince William Sound Area and expanded the boundaries of the Prince William Sound Area to include the Upper Susitna River drainage upstream of the Oshetna River.

Four proposals concerning sport fishing of salmon in the UCUSMA were adopted by the board. As a result, the following changes occurred: 1) sport fishing for king salmon was closed on the Lakina River, Slana River drainage, and Sinona Creek; 2) current king salmon closures on Indian Creek, the clearwater tributaries of the Gakona River, Manker Creek (Klutina River drainage), and Gilahina River in the Chitina River drainage were expanded to include the waters within a ¼ mile radius of their confluences with the Copper, Klutina, or Chitina rivers. The rationale for additional king salmon closures in the UCUSMA was to protect smaller discrete stocks of king salmon from potential overexploitation; and, 3) removal from the water of any salmon that is not retained was prohibited in the Copper River drainage. Any salmon removed from the water must be retained and becomes a part of the angler's bag and possession limit.

The BOF amended and adopted a fourth proposal to modify the open season for king salmon sport fishing on the Klutina, Tonsina and Copper rivers. Concern for the early component of Klutina River king salmon return led to a later opening of July 1 for the king salmon season which partially offset any anticipated increased harvest from an extension of the season from July 31 to August 10 on the Klutina and Tonsina rivers. The open season for king salmon fishing in the Copper River drainage downstream of the upstream bank of the Klutina River and upstream of the south bank of Haley Creek was set for July 1 through August 10 for consistency with the Klutina and Tonsina river seasons. Intermediate closure dates on the Klutina River are July 19 upstream of 19.2 mile of the Klutina Lake Road and July 31 upstream of 13.0 mile of the Klutina Lake Road, and on the Tonsina River is July 19 upstream of the downstream edge of the Alyeska Pipeline access bridge.

The BOF adopted three housekeeping proposals concerning resident species in the UCUSMA. These updated the list of stocked waters in the UCUSMA, removed outdated regulations for rainbow/steelhead trout on Tolsona Lake, and repealed the Lake Burbot Management plan which had become redundant since the components of the plan had been incorporated into the area regulations.

At its December 2005 meeting in Valdez, the BOF addressed 35 proposals (including one Board generated proposal) specific to Copper River subsistence and personal use fisheries and UCUSMA sport fisheries (Somerville 2008). Major changes to the fisheries regulations at this meeting for the Glennallen Subdistrict involved requiring fish wheels be checked every 10 hours, and amending the ANS for the Glennallen Subdistrict. Commercial openings in the Copper River District were limited to only a single opener allowed inside of the barrier islands during each of the first two statistical weeks. Major changes in the UCUSMA sport fisheries included: 1) closure of the Susitna River upstream of Devil's Canyon to salmon fishing; 2) rainbow trout/steelhead bag and possession limits for the Tyone River drainage were aligned with the *Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Plan*; and, 3) catch-and-release rainbow trout/steelhead regulations were established for the entire Hanagita River drainage. Moose Lake, Our Creek, and the Gulkana River drainage upstream of Paxson Lake were placed under the conservative management category in the *Wild Arctic Grayling Management Plan* with bag and possession limits for Arctic grayling in Moose Lake and Our Creek set at two fish, no size limit, and an open season of June 1–March 31; and the bag and possession limit in the Gulkana River drainage upstream of Paxson Lake at two fish, of which only one may be 14 inches or greater in length. Finally the BOF allowed bait in the entire Tonsina River drainage downstream of Tonsina Lake.

Actions taken during BOF meetings prior to December 2005 specific to the UCUSMA are summarized in Taube 2006a-b.

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 deal with conservation issues not adequately controlled by existing regulations. Once implemented, an EO is in effect until the situation is resolved or the BOF can formally take up the issue. EOs are also used as a tool for inseason management of 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 2008 and 2009 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 non-navigable waters on public lands. Following the "Katie John" decision by the 9th 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.

The development of regulations for subsistence fisheries under the federal subsistence program occurs within the established Federal Subsistence Board (FSB) process. The public provides its 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 October 2009 in Cooper Landing. 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, an area biologist for each of the five management areas, one or more assistant area management biologists, and two stocked water biologists. 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 (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995-1996, 2001a-d, Walker et al. 2003, Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, *In prep*). 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. Two types of questionnaires are mailed to a stratified random sample of households containing at least one 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. 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 not available until the following year; hence, the results for 2009 were not available until fall 2010. Additionally, creel surveys have been selectively 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). 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:

1. Estimates based on fewer than 12 responses should not be used other than to document that sport fishing occurred;
2. Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends; and,
3. 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) which required all sport fishing guides and businesses to register annually with the 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 2008 in a Fishery Data Series report (Sigurdsson and Powers 2009, 2010).

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The Upper Copper River/Upper Susitna River Management Area 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), Bureau of Land Management (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 *Oncorhynchus tshawytscha*, 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 one 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 salmon. 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 (*Thymallus arcticus*), burbot (*Lota lota*), Dolly Varden (*Salvelinus malma*), rainbow and steelhead trout (*O. mykiss*), and lake trout (*Salvelinus namaycush*). Smaller fisheries occur on resident stocks of whitefish (*Coregonus* and *Prosopium sp*).

A total of 29 lakes in the UCUSMA are stocked with rainbow trout, coho salmon, and Arctic char (*S. alpinus)*. The stocked fish are reared at state-owned hatcheries on Joint Base Elmendorf-Richardson in Anchorage. The stocked-lake fisheries provide additional and 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 one personal use and two 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 2005 - 2009, an average of 169,868 salmon was reported harvested annually in these fisheries (Table 1). Sockeye salmon comprise about 95% 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 2005–2009, an average of 1,188,338 sockeye salmon and 24,893 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 77.025, 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).

A series of general divisional criteria have been prepared to guide establishment of fishery objectives, and include:

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 man's 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, 2009). 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, 2006). 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 fishing period per statistical week 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 four 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.

Copper River Subsistence Salmon Fisheries Management Plans (5 AAC 01.647, 2009). This management plan 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.

Copper River Personal Use Dip Net Salmon Fishery Management Plan (5 AAC 77.591, 2003). This management plan 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 permit limit may be increased during weeks of harvestable surplus determined from actual sonar counts.

Wild Arctic Grayling Management Plan (5 AAC 52.055, 2006). This management plan directs the department to manage wild Arctic grayling populations in the UCUSMA for long-term sustained yield through a conservative harvest regime. The plan establishes and defines three management approaches under which the department 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 the department, public and/or Board to change or address the management approach for a water body or fish stock.

Wild Lake Trout Management Plan (5 AAC 52.060, 2006). This management plan directs the department 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. The department may take one 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 two 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.

Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan (5 AAC 52.065, 2008). This management plan directs the department to manage stocked waters in the UCUSMA to provide the public diverse fishing opportunities. The plan establishes and defines three management approaches under which the department 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, department or board during the board's meeting cycle.

Cook Inlet & Copper River Basin Rainbow/Steelhead Trout Management Policy. This management policy was adopted by the BOF to provide future boards, 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: From 1995–1999 commercial, subsistence, personal use, and sport harvests of king salmon increased, which raised concerns regarding sustainability of the Copper River king salmon stocks. From 1999 – 2002, Upper Copper River king salmon escapement was estimated through a department radiotelemetry research study. This information, in addition to harvest and age data, resulted in a modification to the *Copper River King Salmon Management Plan* (CRKSMP) spawning escapement range of 28,000–55,000 king salmon to a minimum sustainable escapement goal (SEG) of 24,000 king salmon. Since 2003, king salmon escapement has been estimated through a fish wheel mark-recapture study conducted by the Native Village of Eyak and LGL, Inc.

As a result of the actions taken through the CRKSMP, king salmon harvests have declined 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.

Copper River Personal Use and Subsistence Salmon Fisheries: The Chitina Subdistrict dip net salmon fishery has been controversial since its inception. Its designation as a personal use fishery with no allocative priority or as a subsistence fishery with an allocative priority was reversed at two consecutive BOF meetings. The last change in the status of this fishery occurred in 2003 when the BOF reversed its 1999 decision (classifying it a subsistence fishery) and made a negative C&T determination (reclassifying it a personal use fishery) for the Chitina Subdistrict. The BOF declined to review their 2003 decision at the 2005 and 2008 meetings citing no new information to justify reconsideration. Following the 2008 meeting, the Chitina Dipnetter's Association and Alaska Fish and Wildlife Fund sued the BOF over their 2003 decision. In March 2010 the Alaska Superior Court remanded the case back to the BOF due to the 2003 BOF members' inconsistent definition of the "subsistence way of life". In March 2010 the BOF determined a definition for "subsistence way of life" and then reconsidered and upheld the negative C&T determination for the Chitina Subdistrict.

Land Access: Ahtna Incorporated (the regional Alaska Native Corporation) owns a majority of the land along the three 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 Athna

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 Bureau of Land Management (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 four 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 Paxson Lake campground boat launch.

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. This action was opposed by Ahtna Inc. and Chitina Native Corporation who remained concerned over trespass and vandalism allegedly caused by dipnetters. In July 2004, Chitina Native Corporation blocked access to the Copper River at O'Brien Creek, a primary river access point and boat launching area for charter operators and private boats, forcing these boat operators to launch approximately 3 miles upstream at the Chitina-McCarthy Bridge. This also reduced the parking and camping area used by many of the fishery participants. The state did not dispute the blocked access, as the survey indicated that this land was outside of the ROW, but has tried to negotiate access at this point with the corporations. 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.

User Conflicts: Since 1991 there has been a significant increase in the use of powerboats above the Richardson Highway on the Gulkana and Klutina rivers. Increased use by float and powerboat operators on these rivers has intensified conflicts between users. Float and powerboat operators can anchor and fish prime king salmon holes from their boats or drop passengers off to fish from the bank on the Gulkana or Klutina rivers. Shore anglers are limited to the few holes with public access and feel further limited when a boat angler also fishes those holes. Additionally, use of these rivers by non-fishing recreationalists seeking a quality or just fun float experience has added to river use and conflicts. The Bureau of Land Management (BLM) updated the management plan for the Wild portion of the Gulkana River upstream of Sourdough in 2006 to address impacts from increased recreational use of the river (BLM 2006).

Burbot and lake trout fisheries: The lakes of the UCUSMA have historically supported some of the largest sport fisheries for burbot and lake trout in Alaska. Stock assessment work indicated that many burbot and lake trout stocks were depressed due to overfishing in the early 1980s. Based on these and other findings, the BOF adopted management plans for burbot (1989) and

lake trout (2006) stocks in UCUSMA lakes. Under these management plans, the board adopted more conservative regulations for UCUSMA burbot and lake trout fisheries which have allowed some previously overfished stocks to recover enough to permit sustainable 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 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: At the 2008 BOF meeting a positive C&T determination was made for the freshwater fishes in the Prince William Sound Area which includes the entire UCUSMA. Freshwater subsistence permits were issued in the UCUSMA since 1960, but the positive C&T determination formalized this practice. The majority of permits issued for freshwater subsistence fishing are for gillnetting whitefish between October 1 and March 31. From 1964 through 2004, the maximum number of permits issued for subsistence fishing in any year was 13. In 2009, 28 permits were issued for fishing whitefish with a gillnet. With low participation, the subsistence whitefish fishery garnered little notice from other user groups. With the increase in subsistence permits and especially increases 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 three 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 and reported under the headings of the "Upper Copper River Drainage" (Area I) and the "Susitna River Drainage" (Area M) (Mills 1979-1980, 1981a-b, 1982–1994, Howe et al. 1995-1996, 2001a-d, Walker et al. 2003, Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, *In prep*). Estimated angler effort in the UCUSMA averaged 1.9% of the overall statewide effort and 23.8% of the Region III effort from 2004 to 2008 and was 2.4% of the overall statewide effort and 27.5% of the Region III effort in 2009 (Table 3).

Anglers expended a total of 53,409 angler-days of effort in UCUSMA drainages in 2009, which was above both the recent 5- and 10-year averages (Table 4). 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 peaked at 102,951 angler-days in 1995. The majority of effort in the UCUSMA occurs in the Gulkana and Klutina river drainages, representing approximately 69% of the total area effort in the past decade.

Sockeye salmon are the predominant species harvested in the UCUSMA representing 48% (12,671 fish) of all species harvested from 2004-2008 and 52% (13,381 fish) in 2009 (Table 5). King salmon, Arctic grayling, rainbow trout, and lake trout were the next predominant species harvested from 2004–2008. This order changed in 2009 as Arctic grayling, burbot, lake trout, and king salmon followed sockeye salmon in harvest popularity. This shift was likely a result of restrictions placed on the king salmon fishery in 2009 and a continued reduction in numbers of stocked rainbow trout in area lakes.

Arctic grayling are the predominant species caught in the UCUSMA representing 43% (41,007 fish) of all species caught from 2004-2008 and 61% (76,114 fish) in 2009 (Table 6). Sockeye salmon, king salmon, rainbow trout, and lake trout were the next predominant species caught from 2004–2008. This order shifted slightly in 2009 as sockeye salmon, lake trout, rainbow trout, and king salmon followed Arctic grayling in numbers of fish caught. With the exception of king salmon and rainbow trout, catches of the most popular species increased in 2009 compared to the recent 5-year average.

SECTION II: FISHERIES

This section discusses the major sport fisheries in the UCUSMA. Discussion of each fishery will center on harvest and catch data presented in the 2009 SWHS (Jennings et al. *In prep*). Survey results for 2010 will not be available until the fall of 2011. However, observations or research data regarding these fisheries in 2010 will be presented when available. A summary of the historical (prior to 1990) sport harvest of fish in the UCUSMA by species can be found in Somerville (2008) and data from 1990 to 2009 are presented in Table 5 for harvest and Table 6 for catch.

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 nine of these systems (Little Tonsina River, Greyling Creek, Mendeltna Creek, Kaina Creek, Indian River, Gulkana River, East Fork Chistochina, 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 is high variability in the proportion of total escapement between years and the majority of the index streams disproportionately represent early run stocks.

A radiotelemetry study conducted by the department from 2002 to 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 2005a). The study also indicated that the nine 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 four index streams: Gulkana River, East Fork Chistochina, and Manker and St. Anne Creeks in the Klutina River drainage. These four streams provide comparable indices that can compare escapement in these systems from year to year and an inseason index of run strength.

The *Copper River King Salmon Management Plan* 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. Since 1990, the total harvest of king salmon in these fisheries has ranged from 14,000 to over 87,000 fish (Table 7). In 1982 the commercial harvest of king salmon in the Copper River District nearly doubled over the historic (1969–1981)

average of 19,961 to 47,362 salmon (Somerville 2008). By 1991 the resource was showing signs of stress evidenced by a trend of below average escapements to some systems (Roberson and Whitmore 1991). 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 cannot be assessed using stock specific spawner-recruit relationships (Brady et al. 1991; Roberson and Whitmore 1991). However, overall returns and harvest of king salmon continued to increase and remained high through 1999. From 1999 to 2008 total king salmon runs ranged from 53,838–99,639 fish (Table 7) and averaged 77,528 fish over the last 5 years (2004–2008). King salmon escapement has ranged from 16,294 to 58,454 from 1999 to 2008 and averaged 35,535 fish from 2004 to 2008.

From 2003 to 2007, total harvest of king salmon from the Copper River averaged 60,237 fish. In 2008, king salmon harvests were significantly below this average at 21,351 fish. In 2009, total harvest of king salmon was one of the lowest ever recorded at 14,777 fish, with a total estimated return of 42,564 fish. Preliminary data from the 2010 season indicate the total harvest of king salmon from the Copper River was slightly more than in 2009, but total run strength was insufficient to achieve the overall Copper River SEG of 24,000 or more king salmon.

King salmon sport fisheries occur in various tributaries of the Copper River. Fisheries on the Gulkana and Klutina rivers account for 95% of the sport caught king salmon in the UCUSMA (Table 8). In 1994 an annual bag limit of five king salmon was established for the Upper Copper River drainage in an attempt to stem rising king salmon harvests. Harvest of king salmon continued to increase through 1996 (Table 8). Sport harvest of king salmon declined from 1997 through 2004. From 2004–2008 sport harvest of king salmon in the UCUSMA has averaged 3,938 fish. Angler effort and king salmon harvests remained high on the Klutina River after establishment of the annual king salmon limit in 1994. Reducing the king salmon season by 10 days on the Klutina River in 1997 also failed to reduce either effort or harvest which was considered above sustainable levels. In 2000, the Upper Copper River drainage annual bag limit for king salmon was reduced from 5 to 4. Effort (which is mainly driven by the king salmon fishery on the Klutina River) and harvest on the Klutina River began declining after the reduced annual limit was imposed.

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, marking wild king salmon smolt with coded wire tags proved an ineffective method to assess returns due to a low tag recovery rate (Sarafin 2000; Brase and Sarafin 2004).

From 1999 to 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, 2005a). 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 post-season estimate of annual king

salmon escapement to the Copper River since 2003 (Smith et al. 2003; Smith 2004; Smith and van den Broek 2005a-b; van den Broek et al. 2008, 2009a-c).

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 2009a). Since 2005, ADF&G has required guides to log the harvest and number of fish released per client by trip and fishing site. From 2006 through 2009, 19–29 guides have operated annually on the Gulkana River (Sigurdsson personal communication.) (Table 9). These guides made between 109 and 364 trips each year and reported harvesting 147 to 754 king salmon. The majority of trips were logged between the Richardson Highway Bridge and the confluence of the West Fork. Prior to the 1986 season, only one individual specialized in guiding anglers for king salmon on the Gulkana River. In 1989, five guides were operating on the Gulkana River (Potterville and Webster 1990). Commercial guides operating above the Sourdough landing and within the Wild River Corridor are required to register with the Bureau of Land Management (BLM). Fourteen guides registered with the BLM to operate on Upper Gulkana River (Wild River Corridor) in 2007 (Denton Hamby, BLM, Glennallen, personal communication). On the Klutina River, 22–28 guides logged 359 to 500 trips from 2006 through 2009 and reported harvesting 374 to 904 king salmon in those years (Sigurdsson and Powers 2009, 2010, personal communication.) (Table 9) Only seven guides reported operating on the Tonsina River in 2006, harvesting 18 king salmon.; No guides reported operating on the Tonsina River in 2007–2009.

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 Federal 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 one 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 five-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 8) and catch (Table 10) 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).

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 2006a-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 11,399.

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 *In prep*; Savereide 2010, *In prepb*). A counting tower site was established approximately two miles upstream of the West Fork confluence to enumerate king salmon migrating upstream. From 2002 to 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). The estimated escapement passing the counting tower has generally decreased each year since 2002 and has ranged from 6,390 in 2002 to 2,267 in 2010 . The final estimated king salmon escapement in 2009 was 2,720 fish and 2,267 fish in 2010 (Perry-Plake and Huang *In prep*; Savereide *In prepb*). A long-term goal of this project is to establish a king salmon SEG for the Gulkana River.

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. Potterville and Webster (1990) reported that in 1989 sport anglers on the Gulkana River caught 2,398 king salmon. Sixty-one percent (1,461 fish) of the catch was estimated to be harvested. This estimate verified the accuracy of the SWHS by closely matching that year's estimate of 1,630 king salmon harvested in this fishery. LaFlamme (1997) reported a catch 4,920 of king salmon in 1996, with 50% of the catch harvested. These estimates were not consistent with the 1996 SWHS estimates of 17,815 king salmon caught and 5,260 harvested most likely due to bias created by surveying too few access points.

During the creel surveys conducted in 1989 and 1996 few anglers appeared to fish the single-hook, artificial fly only area. 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 the 1989 and 1996 creel surveys, approximately 50% of the harvest occurred on weekends.

Regulations used to manage the Gulkana River king salmon fisheries are somewhat complex to accommodate concurrent fisheries on other species, to provide protection to these other species populations, and to provide protection for spawning king salmon while still providing maximum opportunity for the wide variety of anglers who target king salmon. Twelve-mile 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

King salmon sport harvests in the Gulkana River increased and peaked in the 1990s with harvest exceeding 5,000 king salmon in several years through 1998. After 1998, king salmon harvests began to decline. Escapement data from the Gulkana River counting tower also indicate a declining trend in king salmon escapement counts from 2002 through 2010 (Savereide *In prepb*). The sport harvest of king salmon in the Gulkana River averaged 2,442 fish over the last five years (2004–2008) and 2,944 fish from 1999 to 2008 (Table 8). Angler effort on the Gulkana River, which is presumed to be primarily focused toward king salmon, also rose and peaked in the 1990s reaching 44,075 angler-days in 1995 (Table 4). As with the sport harvest of king salmon, angler effort has declined since the 1990s to a five year average (2004–2008) of 19,812 angler-days. In 2009, angler effort was 17,713 angler-days which is the second lowest since 1980 and probably reflects king salmon fishery restrictions.

In 2009, management actions were taken to ensure adequate spawning escapement in light of a weak king salmon run (Appendix B). On June 15, the annual limit for king salmon 20 inches or more in length was reduced from four to two fish, of which only one king salmon could be retained from any individual tributary or the mainstem Copper River. On June 29, the Gulkana River king salmon fishery was closed by EO. As a result of these management actions, the 2009 harvest of 516 king salmon from the Gulkana River was below the recent five-year average (Table 8).

In 2010, management action was again taken to restrict the king salmon fishery in the Gulkana River. Due to low harvest of king salmon in the CRD commercial fishery and low capture rates in the Native Village of Eyak and LGL Alaska Research Associates (NVE/LGL) sampling fish wheels that were similar to, but slightly above those observed in 2009, the annual bag limit for king salmon 20 inches or greater in length was reduced by EO from four to two, with only one fish allowed from any Upper Copper River tributary and mainstem Copper River, effective June 21. No further management action was taken in 2010 due to tower counts that initially indicated that an average to slightly below average spawning escapement would be achieved. However, the final escapement estimate for king salmon in the Gulkana River for 2010 was 2,267 (Savereide *In prepb*), the lowest number recorded since the project was established in 2002.

Fishery Objectives and Management

The underlying goal of past and current management of king salmon on the Gulkana River has been to ensure sustained yield, but there is currently no spawning 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 (post-season 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. The aerial escapement index objective for the Gulkana

River was set at 1,200 king salmon. From 1996 to 2007 the Gulkana River aerial escapement index has averaged 1,449 king salmon. Poor visibility prevented an aerial index count of the Gulkana River in 2008. In 2009 the survey was flown after July 31 with an index count 701 king salmon. The survey was flown on July 30 in 2010 with an index count of 728 king salmon.

Inseason management depends on voluntary reports from sport anglers and guides, permit returns from Copper River subsistence and personal use fishers, aerial index counts, and counting tower reports.

Current Issues and Fishery Outlook

Increased use by floaters and powerboat operators on the Gulkana River has intensified conflicts between these user groups and has instigated health concerns by local residents who use the Gulkana River as a source of drinking water. There are currently no restrictions on the number of rafts or for operating motorized boats for the purposes of floating the river, fishing or transporting anglers on the Gulkana River. 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 yet 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 holes. 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. However, these sites do little to increase overall access to the river.

The Gulkana River retains a high popularity with king salmon anglers and this is expected to continue. Harvest and catch data as well as tower counts indicate a declining trend in return strength for Gulkana River king salmon stocks beginning in the late-1990s. Recent trends in overall returns of king salmon to the Copper River and other state waters indicate that declining returns may continue on the Gulkana River into at least the near future. Recent data from aerial index counts, SWHS harvest and catch and angler effort, and tower counts indicate that current or increased effort may lead to overharvest of the Gulkana River king salmon stocks. Natural factors such as river level and turbidity can provide a significant buffer to overharvest, but it is anticipated that management actions will be needed to ensure adequate king salmon escapements that will provide for sustainable fisheries into the future.

Fishing effort for king salmon on the Gulkana River is influenced by water level and clarity, publicity regarding inseason run strength, and management actions on other roadside king salmon fisheries (such as the Kenai and Deshka rivers). Declines in effort may continue, but effort should be anticipated to increase simply due to population increases within Anchorage and Fairbanks.

Recent Board of Fisheries Actions

There was one proposal before the BOF at their 2008 meeting which concerned the Gulkana River king salmon fishery. Proposal 113 sought to close the Klutina and Gulkana Rivers to power boats for two days each week. No action was taken on this proposal.

Current or Recommended Research and Management Activities

Managers depend on aerial index counts to assess the escapement of king salmon. However, these index counts are only post-season indicators of relative spawning abundance and greatly depend on favorable weather conditions and surveyor consistency for useful counts. The purpose of the Gulkana River counting tower project is to provide data from which to develop a spawning escapement goal (SEG).. The counting tower has already proven to be effective for in-season management and should be maintained as a future management tool. Aerial index counts have also proven valuable as a tool to base management decisions on and until a SEG is established should be continued.

Genetic analysis of king salmon stocks in the Copper River drainage was conducted from 2003 to 2005 (Seeb et al. 2006). The study identified three broad groups of king salmon populations that were genetically similar (Seeb et al. 2009). The three groups included an Upper Copper River, a Gulkana River drainage, and a Lower Copper River glacial lake populations and the Chitina River drainage grouping. Mixed stock samples collected from the Copper River District commercial gillnet fishery in 2005 consistently showed the proportion of the Upper Copper River stocks in the fishery were highest in the early season, followed by populations from the Gulkana River and Lower Copper River groups (Seeb et al. 2009). It is hoped by some upriver anglers that continued advances in genetic sampling and processing will lead to a method for in-season management adjustments based on genetic stock identification in commercial harvests. However, Seeb et al. (2009) cautions that while only a small percentage of king salmon harvested in the commercial gillnet fishery are from out-of-basin stocks, use of current genetic data for genetic stock identification on the Copper River commercial gillnet fishery harvests is not recommended prior to inclusion of populations from the western Gulf of Alaska.

The NVE/LGL king salmon estimation project has been a valuable tool in the management of Upper Copper River king salmon fisheries. This project should continue to ensure the overall king salmon escapement goal for the Copper River drainage is consistently achieved. A radiotelemetry study, conducted from 2002 to 2004, provided data on the distribution of king salmon in the Upper Copper River drainage (Savereide 2005a). Another radiotelemetry study should be conducted in the future to augment the three years of distribution data and reconcile a difference between the genetic distribution data and radiotelemetry distribution data concerning the Chitina River drainage (Seeb et al. 2009; Savereide 2005a). A new radiotelemetry study on king salmon may also provide more detailed information on king salmon movements and spawning locations within the Gulkana River drainage to verify current assumptions with regard to location of the Gulkana counting tower and provide information for use in any future land use or river crossing decisions.

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 jet riverboat operators. 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 4 mile, 14 mile and 22 mile 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 two 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 (since 2009), 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. During the 1989 BOF meeting, spawning season closures were established in the UCUSMA to allow king salmon to spawn undisturbed. 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 19.2 mile downstream to a ADF&G marker at 13.0 mile of the Klutina Lake Road, king salmon may be taken from July 1 through July 31. From 13.0 mile 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 one fish. The Upper Copper River drainage-wide annual bag limit of four king salmon per year includes the Klutina River.

Creel surveys were conducted on the Klutina River in 1988 (Roth and Delaney 1989), 1989 (Potterville and Webster 1990), and 2006 (Schwanke 2009a). All three 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 2009a). 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 boat anglers accounted for 88% of the estimated total catch and 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 2009a).

Creel surveys have been used to assess the validity of harvest and catch data generated by the SWHS. The estimated harvest of 450 king salmon in the 1988 creel survey was similar to the 483 king salmon harvest estimated in the mail survey for 1988 (Roth and Delaney 1989). In the 1989 creel survey, the estimated king salmon harvest (1,031 fish) was again similar to that reported in the mail survey for 1989 (652 fish; Potterville and Webster 1990). The 2006 SWHS estimated a total king salmon harvest from the Klutina River of 1,136 fish, which was similar to 2006 creel survey estimate of 993 (95% CI of 791 – 1,195) king salmon (Schwanke 2009a). However, the SWHS estimated the king salmon catch much higher (2,890 king salmon) than did the 2006 creel survey which estimated total king salmon catch at 1,777 (95% CI of 1,345 – 2,209).

Aerial index count indices have been conducted on two clear water tributaries (Manker and St. Anne creeks) of the Klutina River since 1966 (Brady et al. 1991, Roberson and Whitmore 1991, Taube 2006a-b). Radiotelemetry studies conducted on king salmon from 1999 to 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, 2005a). 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 clear water tributaries of the river. The aerial indices are also used as an inseason management tool in conjunction with sport fish angler reports, commercial harvest data from the Copper River District gillnet fishery, NVE/LGL project capture rates, and personal use/subsistence harvest estimates to assess the king salmon run to ensure the drainage-wide Copper River escapement goal is achieved.

Recent Fishery Performance

Fishing effort (Table 4), harvest (Table 8) and catch (Table 10) of king salmon in the Klutina River increased during the 1990s peaking in 1999 (15,687 angler-days, harvest of 3,489 fish and catch of 8,637 fish). Starting in 2000, the annual king salmon bag limit was reduced from five to four fish ≥ 20 inches and coincided with a dramatic decrease in angler effort and king salmon harvest and catch in the Klutina River, which is the only major king salmon fishery in the UCUSMA open after July 20th. The harvest of king salmon from the Klutina River has ranged from 1,136 to 1,873 fish between 2000 and 2008. In 2009, management actions were taken to ensure adequate spawning escapement in light of a weak king salmon return (Appendix B). On June 15, the annual limit for king salmon 20 inches or more in length was reduced from four to two fish with only one king salmon retained from any individual tributary or the mainstem Copper River. On July 27, an EO was issued that prohibited the retention of king salmon from the Klutina River and all waters of the Upper Copper River drainage, downstream of the upstream bank of the Klutina River. This EO also prohibited the use of bait in these waters. As a result of these management actions the 2009 harvest of king salmon from the Klutina River was 733 fish (Table 8) with a catch of 1,888 fish (Table 10), well below the recent five-year (2004–2008) average harvest of 1,319 fish and catch of 2,874 fish. Fishing effort in 2009 was the third highest ever recorded for the Klutina River at 15,665 angler-days, indicating that angler effort is being driven by the sockeye fishery rather than the king salmon fishery in recent years (Table 4).

In 2010, management action was again taken to restrict the king salmon fishery in the UCUSMA. Due to low harvest of king salmon in the CRD commercial fishery and low capture rates in the NVE/LGL sampling fish wheels that were similar to but slightly above those observed in 2009, the annual bag limit for king salmon 20 inches or greater in length was reduced by EO from four to two king salmon, with only one king salmon allowed from any Upper Copper River tributary and the mainstem Copper River, effective June 21. No other actions were taken in 2010 that were specific to the Klutina River.

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. Continued aerial index counts of the clearwater tributaries will 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, however, consider the return to be two separate stocks of kings, one early and one late.

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, 2005a). 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 spawning king salmon into the Klutina River that no distinct temporal differences between early and late returning king salmon has been identified. Genetic sampling conducted from 2003 to 2005 did not have sufficient 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 king salmon escapement from 2002 to 2004 spawned in the Klutina River, compared to the 17%–27% that spawned in the Gulkana River during the same period (Savereide 2005a). Since 1995 the king salmon sport harvest from the Klutina River has comprised 30%–40% of the overall Upper Copper River drainage sport harvest. While harvest levels rose from 2000 through 2003, they have since declined (Table 8). The recent downward trend in Klutina River king salmon harvest and a similar decline in king salmon harvest on the Gulkana River may be an indication of declining king salmon runs to these two rivers. Strong sockeye salmon runs since 2006 have increased popularity of the Klutina River leading to historically high angler effort in 2007 through 2009 (Table 4). Although the increased angler effort appears to be primarily directed toward sockeye salmon, the increased numbers of anglers may create carry-over effort directed toward king salmon.. Greater angler effort directed toward king salmon may increase exploitation rates on the Klutina River king salmon above a level generated normally by those angler specifically coming to the fishery to target king salmon. This situation may increase the risk of overharvest during years of low production and high angler effort. Continued low escapements may make future restrictions to the fishery necessary.

In 2008 the BOF approved changes to the king salmon season on the Klutina and the Upper Copper River drainage downstream of the upstream bank of the Klutina River. The overall season dates were changed from January 1 through July 31 to July 1 through August 10. This change reduces fishing pressure on the early component of the Klutina River king salmon return, but increases it on the latter component of the return. The overall effects of this change are unknown, but since the return peaks in the latter half of July through August and no other king salmon fisheries are open in August overall harvest of kings from the Klutina River may increase.

The relatively high number of powerboats and rafts on the swift Klutina River creates a safety hazard to users. Many sections of the river are not wide enough to allow two boats to pass and result in conflicts between the two user groups. Members of the Klutina River Association (members include guides, charter operators and businesses on the river) have voiced their opposition to improved access which may increase the number of inexperienced boaters operating on the river, citing safety concerns. However, the general public and ADF&G support improved public access to the river.

The number of people exploiting the Klutina River fisheries creates a difficult enforcement issue. Many guides and sport anglers continue to report abuse of the bag and annual limits by shore-based anglers fishing between the Richardson Highway Bridge and the mouth of the Klutina

River. Enforcement of upriver fisheries is complicated by poor road access and the challenges of navigating a boat on the river.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna Native Corporation. Ahtna allows access across its lands along the Klutina Lake Road with the purchase of access passes. If fees increase without increased access this may result in conflicts between fishery users and the corporation or increased congestion in areas of the Klutina River that are not corporation lands.

Recent Board of Fisheries Actions

Two proposals were brought before the BOF at the 2008 meeting specific to the Klutina River king salmon fishery. One proposal sought to extend the king salmon season on the Klutina River by 10 days to August 10 (see summary below). Another sought to close the Klutina and Gulkana Rivers to power boats for two days each week and was not addressed by the BOF.

The BOF addressed three proposals concerning the king salmon seasons on the Klutina and Tonsina rivers, and Copper River mainstem as a single proposal. One proposal sought to extend the king salmon season on the Copper River downstream of the Klutina River from July 19 to August 10. A second proposal sought to extend the king salmon season on the Klutina River by 10 days to August 10. The third proposal sought to extend the king salmon season on the Tonsina River from July 19 to August 10. The amended proposal adopted by the BOF changed the king salmon open season in the Klutina River and the Copper River drainage downstream of the upstream bank of the Klutina River from January 1 through July 19 (July 31 for the Klutina River) to July 1 through August 10. Additionally, on the Klutina River the season closing dates were reduced for the section of river above mile 19.2 of the Klutina Lake Road (July 19) and the section from mile 19.2 downstream to mile 13.0 (July 31) to protect spawning king salmon. Klutina River guides opposed the amended proposal arguing that they lost more fishing time in June than they gained in August. However, these same guides testified that they were extremely concerned about the health of the "early run". Based on radiotelemetry data on king salmon run timing in the Klutina River, extending the season from July 31 to August 10 would allow fishing opportunity on an additional 21% of the return, while the July 1st opening date would protect approximately 20% of the front portion of the return. This action shifted harvest from the early portion of the run to larger later portion of the run.

Current or Recommended Research and Management Activities

Aerial index counts should continue which will 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 of 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 population estimation provides the best in-river abundance estimate of king salmon for the Copper River and is essential to the management of king salmon sport fisheries.

Management of the Klutina River king salmon stock may benefit from a system to count or estimate the king salmon run to the river and development of a SEG specific to the Klutina River drainage. However, current technology does not appear to be able to provide reliable and

accurate species apportionment between sockeye salmon and king salmon, as these two species run timings overlap. Secondly, king salmon on the Copper River are managed to achieve a drainage-wide escapement goal and therefore management decisions, with regard to king salmon stocks with later run timing like in the Klutina River, may require restricting the Klutina River king salmon fishery and exceeding a SEG in favor of achieving the overall Copper River king salmon escapement goal.

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, the Edgerton Highway, and the 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. Boat anglers access the Tonsina River to fish the mouth by boating upstream from the Chitina-McCarthy Bridge.

King salmon run in the Tonsina River drainage from late-June through early-August, similar to the king salmon return in the Klutina River. Spawning occurs in tributaries and mainstem of the Tonsina River from mid-July through August.

In 2009, drainage-wide Copper River management actions were taken to ensure adequate spawning escapement in light of a poor king salmon run (Appendix B). On June 15, the annual limit for king salmon 20 inches or more in length was reduced from four to two fish, with only one king salmon retained from any individual tributary or the mainstem Copper River. On July 27, the retention of king salmon was prohibited from the Klutina River and all waters of the Upper Copper River drainage, downstream of the upstream bank of the Klutina River, by EO (Appendix B). This EO also prohibited the use of bait in these waters. In 2009, the SWHS estimated a harvest of 58 king salmon from the Tonsina River (Table 8). The sport harvest of king salmon in the Tonsina River has averaged 86 fish over the last five years (2004–2008) and 70 fish over the last 10 years (1999–2008) (Table 8). Creel surveys have not been conducted on the Tonsina River due to low fishing effort and king salmon harvest within this drainage.

From 1999 to 2004, a radiotelemetry study of king salmon in the Copper River drainage provided annual estimates of total upriver escapement, as well as migratory timing through the Chitina Subdistrict personal use fishery, timing into the spawning tributaries, and distribution and proportion of king salmon in spawning tributaries (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005a). 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.

The king salmon spawning escapement to the Tonsina River was documented by aerial index counts of the Little Tonsina River and Greyling Creek from 1966–2004 (Brady et al. 1991; Roberson and Whitmore 1991). 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 which indicated that the majority of spawning occurred in the glacially-occluded mainstem and in the upper river.

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 19 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 over 20 inches in this drainage is one fish, with an annual bag limit of four king salmon over 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. Effort dramatically dropped after 1999 with no catch reported until 2007 and 2008 and no harvest reported after 1998. The average escapement index for the Tazlina drainage was 576 king salmon from 1977 to 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 2003-2005a) 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 stocks. The underlying goal of past and current management is to ensure sustained yield. The aerial index count had been used as a post-season escapement index, but had limited utility to describe overall escapement in these systems.

In 2010, management action was again taken to restrict the king salmon fishery in the UCUSMA. Due to low harvest of king salmon in the CRD commercial fishery and low capture rates in the NVE/LGL sampling fish wheels that were similar to but slightly above those observed in 2009, the annual bag limit for king salmon 20 inches or greater in length was reduced by EO from four to two king salmon with only one king salmon allowed from any Upper Copper River tributary and the mainstem Copper River, effective June 21. No other actions were taken in 2010, specific to any tributary of the Copper River.

Current Issues and Fishery Outlook

The Tonsina River king salmon run is currently underutilized due to limited access and challenging conditions for power boaters and rafters. 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 prevented 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

The BOF considered six proposals and adopted three during their 2008 meeting that concerned the king salmon fisheries in waters other than those of the Klutina and Gulkana Rivers. The BOF adopted proposals which closed the Lakina River, Sinona Creek, and the Slana River drainage to sport fishing for king salmon, extended the waters closed to sport fishing for king

salmon in Ahtell, Indian, and Manker Creeks, the clearwater tributaries of the Gakona River, and the Gilahina River, and extended the king salmon season on the Upper Copper River drainage, below the Klutina River confluence, by 22 days to August 10 (see discussion on the Klutina River king salmon sport fishery).

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). 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.

A project designed to measure potential salmon juvenile rearing habitat was initiated on Greyling Creek entering Tonsina Lake and Upper Tonsina River in 2006 (Stillwater Sciences 2007). This study collected biological and fish distribution data as part of a project to model potential salmon habitat within the Tonsina River drainage. Continued habitat and genetic assessments should be supported.

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. From 1966 to 1993, the escapement of sockeye salmon to the Copper River tributaries was documented by the Division of Commercial Fisheries through aerial index counts to monitor spawner distribution in the drainage (Brady et al. 1991). This aerial index count program was discontinued in 1993. A reduced aerial index count program, which targeted high priority index sites, was reinstated in 2000 (Hollowell et al. 2007).

From 2004 to 2008 sport harvest of sockeye salmon from UCUSMA waters averaged 12,671 fish (Table 11). The sockeye salmon sport harvest in 2009 (13,381 fish) was a slight increase over 2008 and was dominated by the Klutina River where 11,759 sockeye were harvested in 2009. The primary sport fisheries for sockeye occur in the Gulkana and Klutina rivers, accounting for an average of 96% of the UCUSMA sockeye harvest from 1999 to 2008.

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 12). 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, 300,000 sockeye salmon for spawning escapement, and an amount determined annually for hatchery brood and surplus stocks.

Since 1999, the Klutina River (Figure 2) has supported the largest sockeye salmon sport fishery in the UCUSMA (Table 11). Sockeye salmon begin returning to the Klutina River in mid-June and continue through August. Beyond basic run timing, the life history and stock status information for Klutina River sockeye salmon is very limited. Spawning activity is known to occur in various locations of the river, lake, and tributaries.

Prior to 1999, the Gulkana River historically supported the largest sockeye salmon recreational fisheries in the UCUSMA. The sockeye salmon run to the Gulkana River is composed of both wild and hatchery stocks. 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). Since 2000, hatchery returns have ranged from about 88,000 to 475,000 sockeye salmon (S. Moffit, 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 (Brady et al. 1991, Hollowell et al. 2007)

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 and Antonovich 2009; Perry-Plake et al. 2007; Perry-Plake and Huang *In prep*; Savereide 2010, *In prepa-b*). These counts are considered minimums as sockeye salmon are still entering the system after the tower project ends. Between 2002 and 2008, an estimated 9,294 to 34,428 sockeye salmon (including hatchery fish) passed the tower from May 27 to August 14 each year.

A radiotelemetry project was begun by NVE in 2005 to study the spawning distribution and run timing of Copper River sockeye salmon (Smith et al. 2006; Wade et al. 2007-2009, *In prep*). From 2005 to 2009, an average of 12.8% of the radiotagged sockeye were detected in the Gulkana River drainage and 41.9% were detected in the Klutina River drainage annually (Table 13).

Recent Fishery Performance

Sockeye harvest from the Klutina River increased dramatically over all previous years in 2006 and has continued to remain high (Table 11). Sockeye harvests from the Klutina River averaged 14,861 fish from 2006–2008 compared to the average harvest from 1996 to 2005 of 5,629 sockeye salmon and the previous high harvest of 7,219 sockeye salmon in 2000. The 2009 harvest of 11,759 sockeye salmon was the third highest sockeye harvest recorded in the Klutina River.

Sport harvest of sockeye salmon from the Gulkana River peaked in 1996 with a harvest of 7,418 sockeye salmon (Table 11). Returns of hatchery produced sockeye also peaked from 1996 to 2000 with total runs of about 474,000 to 1,119,000 sockeye salmon. Sockeye harvest declined after 2000 reaching a low of only 575 sockeye harvested from the Gulkana River in 2008. In

2009, sport anglers harvested 1,301 sockeye salmon in the Gulkana River. Harvest declines since 1999 likely reflect high water conditions and poor Gulkana Hatchery returns.

Fishery Objectives and Management

Sockeye salmon fisheries in the Copper River are managed to ensure a sustained yield; that a diversity of public fishing opportunities and access are maintained; 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 thought to be 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 recording of harvest in those fisheries.

Current Issues and Fishery Outlook

It is anticipated that sport angler effort on the Gulkana River, which is primarily directed toward king salmon, will continue to fluctuate with the strength of the king salmon run. Sport harvest of sockeye salmon in the Gulkana River will probably fluctuate with angler effort and with the strength of the hatchery run.

Prior to 2006, angler effort on the Klutina River was primarily directed toward king salmon as well, but since 2006 it appears angler effort has been equally or more directed toward sockeye salmon. The Klutina River accounted for 33%–54% of the sockeye salmon radiotagged in the Copper River from 2005 to 2009 (Wade et al. *In prep*). It appears unlikely that sport angler harvest of sockeye salmon will have any significant impact on the Klutina River stocks. Even at its highest level in 2007, the sport harvest of sockeye salmon comprised less than 10% of the probable total return to the Klutina River.

Issues and conflicts involving the Gulkana and Klutina river sockeye salmon fisheries are similar to those previously noted for the king salmon fishery.

Recent Board of Fisheries Actions

Four proposals were submitted to the BOF in 2008 that concerned the Copper River sockeye salmon fishery, of which only one was adopted. The BOF adopted a proposal which prohibited removal from the water any salmon which was intended for release.

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 of the commercial, personal use, and subsistence fisheries are thought to provide sustainability of the Gulkana River sockeye salmon stocks.

Current or Recommended Research and Management Activities

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.

Future fisheries research on Klutina River sockeye salmon should be directed towards a better understanding of sport harvest, effort, and fishing patterns, in addition to specific life history of Klutina River sockeye salmon.

COPPER RIVER PERSONAL USE AND SUBSISTENCE SALMON FISHERIES

Background and Historical Perspective

There is a long history of salmon harvest in the Copper River drainage. Ahtna natives took salmon, mostly king and sockeye, with funnel traps and spears in clearwater tributaries. Haley Creek was the site of one of many traditional fishing camps along the Copper River. By 1920, fish wheels had replaced dip nets as the primary means of capturing salmon in the mainstem Copper River, but weirs and funnel traps were used in clearwater tributaries until the 1940s. The use of dip nets to capture salmon in the Copper River began to increase in the 1940s and 1950s as more residents from outside the Copper River Basin communities participated in the Copper River fisheries.

Historically, the taking of salmon for consumption as food or use as bait in the Copper River drainage has been governed under subsistence regulations. Since 1960, participants in the Copper River subsistence fisheries have been required to have a subsistence fishing permit and record all salmon harvested in the Copper River by species, location, and date. In 1977, due to growth in the subsistence fishery, the BOF created the Chitina and Glennallen subdistricts. At this time, due to the potential "fishing power" from the large number of participants in the Chitina Subdistrict, fishing time for fish wheels was allowed only four days a week; dip nets were allowed seven days a week. In 1978, Alaska passed its first subsistence law. This legislation recognized the "customary and traditional use" of fish and game harvest in Alaska and gave this harvest a priority over other harvests. The BOF adopted the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647) in 1980. Under this plan, subsistence fishers were given one of four classes of permits depending upon their locality to the fishery, income, age, and past use. During times of low escapement, Copper River Basin residents received priority over non-basin residents. The current version of this management plan establishes seasons, open areas, legal gears, permit requirements, and bag limits for a subsistence salmon fishery in the Copper River. The plan also directs ADF&G to manage the Copper River commercial salmon fishery to ensure adequate spawning escapement and that upriver subsistence needs are met.

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established a priority subsistence use of fish and game for federally-qualified 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. To comply with ANILCA the Joint Boards of Fisheries and Game adopted a regulation in 1982 stating that only "rural" residents had "customary and traditional use" of fish and game and established eight criteria for identifying "customary and traditional uses." This

regulation excluded many individuals from participating in Copper River subsistence fisheries, thereby precluding them from harvesting fish for their personal use. This led the BOF to establish personal use fisheries in 1982 (5 AAC 77.001). These fisheries were created to provide Alaskans who became ineligible to harvest fish under new subsistence regulations the opportunity to harvest fish for consumption as food or use as bait. Personal use fisheries, like commercial and sport fisheries, were not given a "priority" in terms of allocation as with subsistence fisheries. In 1989, the McDowell decision reversed the "rural preference' and once again allowed all Alaskan residents to participate in subsistence fisheries under state regulations.

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.

In 1984, based on analyses of the eight-point criteria found in 5 AAC 99.010, the BOF created a personal use salmon fishery in the Copper River drainage under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.590). At its December 1999 meeting, the BOF ruled in favor of a positive customary and traditional (C&T) determination for the Chitina Subdistrict and this fishery became a subsistence fishery (5 AAC 01.647(k)). Along with classifying the Chitina Subdistrict as a subsistence use area, the annual limit of king salmon was reduced from four to one fish. In February 2003, the BOF reversed its positive C&T determination for the Chitina Subdistrict and reinstated the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591). The BOF viewed this as a name and allocation priority change only. Management of the fishery continued as it had prior to the 1999 ruling, based upon the number of fish passing the Miles Lake sonar. The king salmon annual limit for the fishery was left at one fish.

Harvests in the Copper River subsistence and personal use fisheries are dominated by sockeye salmon, followed by king and coho salmon (Table 1). Both subsistence and personal use salmon fisheries in the Copper River drainage have undergone changes since their inception. Currently, all Alaskans are eligible to participate in the subsistence fishery based on the McDowell decision in 1989. The Glennallen Subdistrict Subsistence Salmon fishery occurs upstream of the Chitina-McCarthy Bridge to Slana and can be prosecuted with fish wheels or dip nets (Figure 4). The season is open from June 1 through September 30, unless closed by emergency order. Only Alaska residents may participate in this subsistence fishery. A free subsistence permit is required to participate in the fishery. Users must record their harvest on their permit prior to leaving the fishing site and return the permit upon completing fishing for the season. The limits are 30 salmon for a household of one, 60 salmon for a household of two, and 10 salmon for each additional person in a household of more than two 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 five of the salmon may be king salmon. A subsistence fishery is also allowed in a portion of Tanada Creek, near the traditional Ahtna Native fishing site of Batzulnetas, with spears and dip nets.

The Chitina Subdistrict Personal Use Dip Net Salmon Fishery is opened each year by emergency order between May 31 and June 12. The mainstem Copper River between the downstream edge of the Chitina-McCarthy Bridge and a department marker located about 200 yards upstream of Haley Creek (in Wood Canyon) is open to personal use fishing (Figure 4). Both a valid Alaska sport fishing license and a free personal use permit are required to participate in the fishery. From 1991 to 1999, a fee of $10 was attached to the permit and from 2000 to 2003, the permit fee was $25. A portion of this fee was paid to Ahtna and Chitina Native Corporations for access across their lands. 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 October 15. The limits are 15 salmon for a single person and 30 salmon for a household of two or more, only one of which may be a king salmon. Only dip nets may be used to harvest salmon in this fishery. 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.

The BOF has authorized the department to manage the commercial salmon fishery to provide the following inriver goals for salmon escapement as measured at the Miles Lake Sonar (5 AAC 24.360(b)):

Spawning escapement (sockeye salmon)	300,000
Spawning escapement (other salmon)	17,500
Glennallen Subdistrict Subsistence harvest (salmon)	61,000 – 82,500
Chitina Subdistrict Personal Use harvest (salmon)	100,000–150,000
Sport fishery harvest (salmon)	15,000
Hatchery brood stock (sockeye salmon)	Estimated annually
Hatchery surplus (sockeye salmon)	Estimated annually
TOTAL	Announced annually

Hatchery brood stock and hatchery surplus are adjusted annually based on the anticipated return of wild and hatchery stocks. Prior to 1997, maximum harvest for the Chitina Subdistrict was 60,000 salmon, with 25% of fish in excess of the inriver goal allocated to the personal use fishery. From 1997 to 1999, maximum harvest for the Chitina Subdistrict was 100,000 salmon, excluding fish in excess of the inriver goal and not including any salmon harvested after August 31. In 1998, the BOF adopted a proposal that allows permit holders, who have filled their original limit, to take 10 additional sockeye salmon in weeks when a harvestable surplus of 50,000 salmon or greater will be available in the Chitina Subdistrict. This supplemental harvest is exclusive of the maximum harvest level. A supplemental harvest period has occurred at least once during the season in 11 of the 13 years since this provision was adopted (no supplemental periods occurred in 2003 or 2009). From 2000 to 2002, as a subsistence fishery, the Chitina Subdistrict had a harvest range of 100,000–150,000 salmon, of which 85,000–130,000 were wild salmon. This target harvest range remained in place, following the change of the Chitina Subdistrict back to a personal use fishery in 2003.

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. At that time, the federal system adopted the state regulations and as federal and state regulations were identical, both federal and state subsistence users participated in the fisheries

under the state subsistence permit. In 2001, federally qualified subsistence users were able to begin fishing on May 15 in the Glennallen Subdistrict. Federal subsistence limits remained identical to state limits so federal subsistence users still fished under state subsistence permits. In 2002, the FSB established a federal subsistence fishery in the Chitina Subdistrict with an annual cumulative limit of 200 salmon for a household of one and 500 salmon for a household of two or more for both the Chitina and Glennallen subdistricts. Federal subsistence users are able to participate in both fisheries, while state subsistence users must select either the Chitina Subdistrict or Glennallen Subdistrict in which to participate. As a result, the National Park Service issued separate federal subsistence fishing permits to federally qualified subsistence users beginning in 2002 (Appendix C; Appendix D). Although this change did not affect overall subsistence harvest from the Copper River, the number of state permits issued decreased after 2001 (Table 14), with at least a portion of the federally qualified residents opting for a federal rather than state permit.

Annual harvests from the Glennallen Subdistrict subsistence fishery have been estimated since 1965. The fishery experienced rapid growth from 1980 through 1983, when a peak harvest of about 119,000 salmon were taken (Somerville 2008). Under the subsistence fishery management plan, harvests decreased substantially in 1984 to about 29,000 salmon. Subsistence harvests gradually increased from 1984 through 2001 and held between 60,000 and 86,000 fish annually through 2009 including that portion of the harvest taken through federal subsistence permits (Table 14). The preliminary harvest for 2010 was 86,574 salmon from the Glennallen Subdistrict including reported federal harvest.

Harvests in the Chitina Subdistrict fishery have been estimated since its establishment in 1984. From 1984 through 1988, harvests remained relatively stable, averaging about 47,000 salmon annually (Somerville 2008). After 1988, harvests in the personal use fishery generally increased through 1999. The harvest from the Chitina Subdistrict fishery declined from 1999 through 2003 to levels similar to the early 1990s (Table 15). From 2003 to 2007 the harvest steadily increased again before dropping off to 2003 levels in 2008 and 2009. Overall harvest from the Chitina Subdistrict fishery generally tracks closely with the number of permits issued in respective years (Table 15). The preliminary harvest for 2010 was 143,675 salmon from the Chitina Subdistrict including reported federal harvest.

Sockeye are the primary species harvested in the Glennallen Subdistrict, while king salmon comprise less than 5% and coho salmon less than 1% of the annual harvest (Table 14). King salmon were traditionally present in the Glennallen and Chitina Subdistrict fisheries by June 1 and, on average, 80% of the king salmon harvest was taken by July 12 and 95% by July 25 (Roberson and Whitmore 1991). King salmon run timing and harvest rates have remained similar to these trends through 2009.

Recent Fishery Performance

A total of 1,090 state and 277 federal permits (1,367 total permits) were issued for the Glennallen Subdistrict in 2009 (Table 14; Appendix D). In 2010 a total of 1,584 permits were issued (1,321 state and 263 federal) which is the highest number of permits issued for the Glennallen Subdistrict since 1983. The total permits issued (state and federal) have increased steadily since 1991 in the Glennallen Subdistrict.

Since the issuance of permits by the federal government, total harvest under state permits has ranged from 46,106 to 69,284 salmon from 2002–2008 (Table 14). The 2009 harvest under state

permits was 49,643 salmon and the harvest for 2010 was 73,260. Data are not yet available for federal harvests in 2010.

A total of 7,958 state permits were issued for the Chitina Subdistrict personal use fishery in 2009 (Table 15). Total harvest in 2009 was 92,228 salmon (all species) under state permits. In 2010 9,970 state permits were issued with an estimated harvest of 141,565 salmon .

Fishery Objectives and Management

The Glennallen Subdistrict subsistence fishery is managed under the *Copper River Subsistence Salmon Management Plan* (5 AAC 01.647, 2004). 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, 2006). 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 which 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, 2003). The weekly fishing periods and limits established by EO are based on the projected inriver returns. Actual inriver returns are estimated in season 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. When the department determines that a weekly harvestable surplus of 50,000 salmon or more will be present in the Chitina Subdistrict, a supplemental permit for 10 additional fish is available to a permit applicant that has already met their annual limit. 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 for the month of September.

In 2009, the Chitina Subdistrict personal use fishery season was opened by emergency order on June 1 for a 156-hour fishing period (Appendix B). Actual salmon numbers past the Miles Lake sonar during the week of May 18–24 were above projected counts by over 17,000 fish. This justified increasing the preseason schedule by eight hours for the first fishing period. Salmon numbers past the Miles Lake sonar from May 25 to May 31 remained above the projected salmon counts for this period by 9,509 fish, allowing the second fishing period (June 8–14) to remain at 168 hours. As of May 28 a total of 5,445 king salmon of a projected 17,553 king salmon were harvested in the CRD commercial drift gillnet fishery. Copper River king salmon migratory timing and five year average harvest rates indicated insufficient numbers of king salmon to sustain a king salmon fishery and still attain a spawning escapement of $\geq$ 24,000 king salmon to the Copper River. Beginning with the second period opening, on June 8, the Chitina Subdistrict was closed to the retention of king salmon for the remainder of the 2009 season.

The third period from June 15–21 was reduced from the preseason schedule of 168 to 150 hours. Actual salmon numbers past the Miles Lake sonar during the week of June 1–7 were below projected counts by over 47,000 fish. Salmon passage by Miles Lake sonar was 9,905 salmon below the

projected counts for the week of June 8–14. However, passage was sufficient to maintain the 168 hours of fishing time during the fourth period. The fifth period also remained at the preseason schedule of 168 hours with a surplus of 39,689 salmon past the Miles Lake sonar during the week of Jun 15–21.

Fishing time was increased from the preseason schedule during periods six through eight. Salmon passage by the Miles Lake sonar was 9,171 salmon above projection from June 22–28, 17,577 salmon above projection for June 22 through July 5, and 25,983 salmon above projection for June 29 through July 5. Fishing time was extended by 22, 46, and 60 hours for fishing periods six, seven, and eight respectively.

The ninth period remained at the preseason schedule of 168 hours with a surplus of 13,194 salmon past the Miles Lake sonar during the week of July 6–12. The fishery was opened to continuous fishing from August 3–31 based on a surplus of over 35,000 salmon past the Miles Lake sonar from July 20–26 and the previous five-year average harvest. The sonar counter was removed on August 2. The fishery remained open September 1–30 by regulation.

The 2010 Chitina Subdistrict personal use fishery opened on June 5, two days later than scheduled. Salmon passage by the Miles Lake sonar was 25,063 salmon below projected warranting a reduction in fishing time from 90 to 16 hours for the first week of the fishery. (Appendix B). The fishery opened for the second period by emergency order for a 168-hour opening on June 7 as scheduled and remained open for periods three, four, and five. As of June 10 a total of 7,813 king salmon of a projected 15,502 king salmon were harvested in the CRD commercial drift gillnet fishery. Copper River king salmon migratory timing and five-year average harvest rates indicated insufficient numbers of king salmon to sustain a king salmon fishery and still attain a spawning escapement of 24,000 or more king salmon to the Copper River. Beginning with the fourth period, on June 21, the Chitina Subdistrict was closed to the retention of king salmon for the remainder of the 2010 season.

Salmon numbers past the Miles Lake sonar from June 21–27 were below the projected salmon counts for this period by 4,346 fish and resulted in a reduction of 14 hours from the 148-hour preseason schedule for the sixth fishing period. Salmon numbers past the sonar from June 21 to July 4 were above the projected salmon counts by 15,103 fish, justifying an increase of 39 hours over the preseason projection of 112 hours during the seventh period. Fishing hours were also increased for the eighth period by 60 hours from a preseason schedule of 108 hours to 168 hours based on a surplus of 34,552 salmon past the Miles Lake sonar during the week of June 28 through July 4. The fishery remained open during the ninth and tenth periods. Due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the ninth and tenth periods were also supplemental periods. The fishery was open to continuous fishing from August 9 to 31 and remained open by regulation through September 30th.

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. Enforcement efforts by Ahtna and CNC to gain compliance with the fee based access were increased in 2007 and initially created conflicts between Ahtna and subsistence and personal use fishers. Eventually, dipnetters and some subsistence users complied with the requirements of Ahtna and CNC. In 2008, Ahtna and CNC continued their land use enforcement, but maintained a less intrusive presence and compliance from the various fishery users increased. This compliance appeared to continue during the 2009 and 2010 seasons.

Two key designations are needed to alleviate disparate opinions of land ownership and access to fisheries in the Glennallen and Chitina subdistricts fishery. These are the navigability of the Kotsina River and what constitutes state lands below Ordinary High Water (OHW). In 2008, the Alaska Department of Natural Resources (DNR) surveyed the OHW line for the Copper River upstream of the Chitina-McCarthy Bridge and began pursuing a navigability determination for the Kotsina River. This determination is being opposed by AHTNA Inc.

During the 2009 and 2010 seasons, Chitina Native Corporation continued operating a fee station at O'Brien Creek to provide access to the river and camping areas in the Chitina Subdistrict outside the DOT ROW and the OHW at O'Brien Creek. Voluntary participation in the fee based access increased over that observed in 2007.

The Glennallen Subdistrict subsistence fishery continues to be popular and the number of permits issued has gradually increased over the last 20 years (Table 14). The ANS designations established in 2006 increased the overall allocation for subsistence harvest from 75,000 salmon to 82,500 salmon. The popularity of the Copper River subsistence fisheries is unlikely to diminish under current management guidelines. If decreasing returns or additional regulations restrict the Chitina Subdistrict personal use fishery, a portion of those using this fishery may shift to the subsistence fishery. Increased pressure in the subsistence fishery will exacerbate access conflicts and conflicts between rural and non-rural users of the fishery.

Recent Board of Fisheries Actions

The status of the Chitina Subdistrict as a subsistence or personal use fishery continues to be a primary issue in that fishery. There was some resentment among the Native community towards urban participants in the Chitina Subdistrict regarding the subsistence determination granted to the fishery in 1999. The repeal of the 1999 subsistence determination at the 2003 BOF meeting was not well received by the urban-based Chitina Dipnetters Association and the Alaska Outdoor Council. They felt dipnetters should have priority over the commercial fishery. This priority was provided under the subsistence classification. The BOF upheld the personal use classification for the Chitina Subdistrict at its 2005 meeting by finding no new evidence or error in their 2003 decision to warrant review of the 2003 negative C&T determination.

Seven proposals were submitted to the 2008 BOF meeting that concern the Chitina Subdistrict personal use salmon fishery, none of which were adopted. Proposal 1 requested the BOF to reconsider the Customary and Traditional Use determination for the Chitina Subdistrict. No action was taken on this proposal with the BOF citing no new information or error in their 2003 decision to warrant reconsideration. Nine proposals were submitted to the BOF for the 2008 meeting that concerned the Glennallen Subdistrict subsistence salmon fishery. Only two housekeeping proposals were adopted, moving regulatory language from one subsection to another for clarity.

In March 2010, the BOF held a special two-day meeting at the end of the statewide finfish meeting to consider two proposals addressing a court ruling that remanded, back to the BOF, the case against the BOF 2003 negative Customary and Traditional (C&T) finding for the Chitina Subdistrict. A proposal defining subsistence way of life as "a way of life that is based on consistent, long-term reliance upon the fish and game resources for the basic necessities of life," was adopted. The second proposal sought a positive C&T finding for the Chitina Subdistrict, considering the new definition of "subsistence way of life". This proposal failed.

Current or Recommended Research and Management Activities

Daily sampling of the Chitina Subdistrict personal use fishery occurs annually from the opening of the fishery in June through the majority of the sockeye salmon run ending at the end of August. Length and age data of sockeye harvested in the fishery are collected. Otoliths from a portion of the sampled sockeye salmon are removed to be examined for the presence of a strontium mark that was imprinted on 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 sockeye Chitina Subdistrict harvest. In time, this monitoring may allow managers to direct fishing effort towards hatchery stocks, while protecting wild fish.

From 2005–2009, ADF&G assisted the Native Village of Eyak and LGL, Inc., in conducting a radiotelemetry study to estimate sockeye salmon distribution throughout the Upper Copper River drainage and the return timing of the major Copper River stocks. During the five-year study the Upper Copper River and Tazlina stocks had the earliest mean run timing, followed by the Klutina, then the Chitina and Lower Copper River (stocks downstream of Haley Creek), Gulkana and finally the Tonsina River stocks (Wade et al. 2007; 2008; 2009; *In prep*). The Klutina River accounted for over a third of the sockeye spawners annually, followed by 12%-14% of the spawners going into each of the Tazlina River, Gulkana River, and the Upper Copper River.

The Native Village of Eyak continues to conduct a mark-recapture study on king salmon to estimate total inriver abundance past the Miles Lake Sonar and conducted a similar study on sockeye salmon in 2007 through 2009. The sockeye salmon mark-recapture study was specifically designed to act as an independent validation of the Miles Lake sonar passage estimates and was discontinued following 2009 after determining the sonar counts appeared accurate (van den Broek 2008; 2009a-b).

ARCTIC GRAYLING SPORT FISHERIES

Background and Historical Perspective

Arctic grayling were the most heavily harvested fish in the UCUSMA from 1977 through 1995 (Somerville 2008). 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 16). The decline in harvest from 1988 through 1999 most likely resulted from more restrictive regulations adopted to ensure the sustained yield of the area's Arctic grayling stocks (Taube 2002). Continued declines may reflect a general decline in fishing effort areawide since 2000. In 2003, the bag and possession limit in lakes was reduced to five Arctic grayling.

Total harvest of Arctic grayling in 2009 was 4,445 fish which is above the five-year (2004–2008) average of 3,534 fish, but slightly less than the 10-year (1999–2008) average of 4,991 fish (Table 16).

The Gulkana River drainage supports the highest sport harvest of wild Arctic grayling in the UCUSMA (Table 16). From 2004 to 2008 the harvest from the Gulkana River drainage averaged 37% of the total wild Arctic grayling sport harvest in the UCUSMA. Other UCUSMA drainages that have supported significant Arctic grayling fisheries include the Upper Susitna River drainage (23%), the Tazlina River drainage (8%), and the Klutina drainage (3%).

Gulkana River Arctic Grayling Sport Fishery

Background and Historical Perspective

A peak harvest of 20,408 Arctic grayling in the Gulkana River drainage in 1985 accounted for 62% of the total harvest in the UCUSMA (Mills 1986). This harvest raised concern that Arctic grayling stocks in the drainage were in danger of overharvest. Arctic grayling stocks in several Interior Alaska streams were depressed when subjected to similar harvest rates. Research data also indicated that the maximum size of Arctic grayling observed in the Gulkana River drainage was decreasing as the result of anglers targeting larger fish (Williams and Potterville 1983). Regulations were adopted in 1988 that reduced the bag and possession limit to five fish and restricted anglers to only one Arctic grayling ≥ 14 inches.

A research program was initiated by the Division of Sport Fish in 1986 to assess the status of the various Arctic grayling stocks of the Gulkana River drainage (Bosch 1995). Objectives of the research program were to: 1) determine stock structure, growth, annual abundance, survival, and recruitment; 2) estimate sustainable yields under a variety of management scenarios; and, 3) develop future monitoring strategies.

During the 1996 meeting the BOF passed a proposal submitted by ADF&G to establish a catch-and-release grayling fishery in the Upper Gulkana River drainage (upstream of Paxson Lake). The intent of this regulation was to protect a small population of large sized Arctic grayling (> 18 in) in the Gunn and Fish Creek drainages. The Upper Gulkana River above Paxson Lake is easily accessible from the Richardson Highway by foot and ATV. Bosch (1995) determined that the Upper Gulkana River Arctic grayling population was independent from the Middle Fork and mainstem populations, and though the population was small, the fish were large. There was dissatisfaction with the BOF action in 1996 on the Upper Gulkana River. Anglers, who had fished the Upper Gulkana River prior to 1996 and harvested Arctic grayling, still desired to do so. At the 2005 BOF meeting, a proposal was adopted that modified the regulation for the Upper Gulkana River to a bag and possession limit of two fish of which only one fish could be ≥ 14 inches.

Previous estimates of abundance indicate that current exploitation rates on the major stock units of Arctic grayling in the Gulkana River drainage appear sustainable given current harvest levels. Data from stock assessment also indicate that the restriction limiting anglers to only one Arctic grayling ≥ 14 inches is allowing the population to reach and maintain historic levels (Fish and Roach 1999). No stock assessments have been conducted on the Gulkana River since 2002.

Recent Fishery Performance

Harvest of Arctic grayling has generally declined since 1990 and may reflect the similar decline in overall fishing effort in the Gulkana River drainage. Annual harvests have ranged between about 730 to 2,100 Arctic grayling since 2003. The 2009 harvest of 1,522 Arctic grayling from the Gulkana River drainage was above the 2004–2008 average of 1,291 Arctic grayling (Table 17).

Fishery Objectives and Management

Arctic grayling fisheries in the Gulkana River drainage 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 Arctic grayling are monitored by the SWHS.

The *Wild Arctic Grayling Management Plan* (5 AAC 52.055) was adopted in 2004 and designates three management approaches: regional, conservative, and special management. Most 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 five fish with no size limit. Under the conservative management approach the fishery is open from June 1–March 31, may be limited to unbaited lures, and a bag and possession limit of two fish. Size limits may or may not be imposed. Four fisheries within the UCUSMA are classified under the conservative management approach; Mendeltna Creek, Moose Lake, and Our Creek in the Tazlina drainage, and the Gulkana River upstream of Paxson Lake. Under these regulations, the Arctic grayling stocks in the UCUSMA are able to support current harvest levels.

Current Issues and Fishery Outlook

Overall, Gulkana River drainage Arctic grayling stocks appear healthy. The current management strategy and regulatory regime is within the guidelines of the management plan to manage for long-term sustained yield. As a result, it is anticipated that harvest levels of Arctic grayling will remain at current levels.

Data collected through the statewide mail survey suggest that many anglers fishing Arctic grayling in the Gulkana River drainage are practicing catch-and-release. Anglers retained an average of 1,753 Arctic grayling from an annual average catch of 37,788 fish over the past ten years (1999–2008). Assuming a 10% release mortality rate, the level of total fishing mortality appears sustainable given current harvest and abundance levels.

Recent Board of Fisheries Actions

In 2004, the *Wild Arctic Grayling Management Plan* (5 AAC 52.055) was adopted by the BOF. In 2005, the BOF adopted a proposal to allow a harvest of two Arctic grayling per day with only one ≥14 inches in the waters of the Upper Gulkana River upstream of Paxson Lake that had previously been catch-and-release. There were no proposals directed at Arctic grayling fisheries in the UCUSMA during the 2008 BOF meeting.

Current or Recommended Research and Management Activities

An objective of the Arctic grayling research program was to develop a plan for monitoring the status of Arctic grayling stocks in the Gulkana River drainage. This consisted of monitoring of the three identified stocks (mainstem, Middle Fork and waters upstream of Paxson Lake) for abundance, age and length composition every three to five years. Stock assessment was conducted in the mainstem in 1998, to determine age and length composition (Fish and Roach 1999). A similar assessment was conducted in 2002 on the upper reaches to determine the impacts of the 1996 regulatory change and provide background information for any future BOF proposals (Wuttig 2007). It is recommended that a monitoring program continue, with stock assessment linked to an increase in harvest level, to assure the sustained yield of the fishery.

Other UCUSMA Arctic Grayling Sport Fisheries

Background and Historical Perspective

Mendeltna Creek is a small stream, west of Glennallen, in the Tazlina River drainage and drains into Tazlina Lake. Main access points are at the Glenn Highway wayside and a single lane gravel road (Oil Well Road) off Lake Louise Road. Due to its easy access and location along the Glenn Highway, Mendeltna Creek sustained substantial fishing pressure. Harvests increased

significantly between 1992 and 1993, from 255 to 867 Arctic grayling, peaked in 1995 at 1,041, and remained above 460 fish through 1998 (Table 16). There was little baseline data on the Arctic grayling population in Mendeltna Creek prior to 1998.

Fishery Objectives and Management

Management of the Arctic grayling population in Mendeltna Creek has been limited to evaluation of the SWHS. Arctic grayling populations can sustain exploitation rates of approximately 10%. Stock assessment conducted on Mendeltna Creek in 1998 resulted in an abundance estimate of 845 fish ≥ 200 mm (eight inches), with few fish greater than 12 inches (Fish 1999; Scanlon and Fish 2000). At the 1998 population level, only 80 Arctic grayling, greater than 200 mm in length, could be harvested annually. Based upon examination of the SWHS statistics, bag limit reductions alone would not reduce the harvest sufficiently to ensure a sustainable yield.

The department submitted a proposal for the 1999 BOF meeting to reduce the bag limit to two fish ≥12 inches. The open season was set from June 1 to March 31, to offer protection to the larger spawning Arctic grayling. The board adopted this proposal and the regulation went into effect for the 2000 season. Harvest declined significantly in 2001 to 70 fish and has ranged from 0 to 190 fish since (Table 16). The five year (2004–2008) average harvest of Arctic grayling from Mendeltna Creek was 80 fish. In 2009, no Arctic grayling were harvested from Mendeltna Creek.

Recent Board of Fisheries Actions

There have been no proposals before the BOF concerning Mendeltna Creek since 1999.

Current or Recommended Research and Management Activities

Many of the roadside-accessible streams are located in the Tazlina River drainage. Arctic grayling are known to migrate great distances between winter habitats, spring spawning sites, and summer feeding areas that can be in entirely different drainages. Tagging or telemetry studies could provide information regarding timing of Arctic grayling through the fisheries, spawning and rearing streams and distributions throughout the drainage.

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 Susitna River drainage (Lake Louise, and Susitna and Tyone lakes) and the Gulkana River drainage (Paxson, Summit, and Crosswind lakes) (Table 17). Harvests from the Susitna River drainage averaged 56% and the Gulkana River drainage accounted for 25% of the annual UCUSMA harvest from 2004 to 2008. Lake Louise (31%), Crosswind Lake (14%), and Susitna Lake (12%) accounted for over half the annual average lake trout harvest in the UCUSMA from 2004 to 2008.

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 (Somerville 2008). However, it was found that eight of nine 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 and the Tyone River drainage in 1987. The minimum size limit was imposed to allow female lake trout to spawn once before reaching harvestable size.

A research program was initiated in 1990 to evaluate the status of lake trout fisheries in the UCUSMA. The goal of the research program was to determine appropriate management strategies that assured the sustained yield of lake trout in UCUSMA lakes. The study was conducted primarily in Paxson Lake and Lake Louise. Annual results of the research projects are summarized in Szarzi (1992, 1993), Szarzi and Bernard (1994, 1995, 1997). Stock assessment was discontinued in 1995 for Paxson Lake and Lake Louise, but assessment in Paxson Lake was again conducted from 2002 to 2004 (Scanlon 2004; Wuttig 2010).

In 1994, the minimum size limit for lake trout was increased from 18 to 24 inches in the Tyone River drainage, Crosswind, Paxson and Summit lakes; the bag limit was reduced from two to one lake trout in the Tyone River drainage and Crosswind Lake. The minimum size limit was increased to better protect female lake trout spawning for the first time in the Tyone River drainage and Crosswind Lake, 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" minimum size restriction, the number of lake trout released by anglers in Crosswind, Paxson, and Summit lakes and the Tyone River drainage lakes (Lake Louise, Susitna and Tyone lakes) increased from an average of 63% released prior to the restriction (1990–1993) to an average 80% for all the years following (1994–2005) (Table 18). Concerns arose that harvest and hooking mortality of released fish combined was 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 which was adopted by the BOF in 2005 (Burr 2006). A separate proposal was adopted that removed the minimum size limit for lake trout in Paxson Lake and Summit Lake, but reduced the bag limit to one per day. This action was intended to reduce fishing mortality below the sustainable yield estimates for these lakes. Additionally, bait was allowed from November 1 through April 15 to provide for a more effective burbot fishery.

Recent Fishery Performance

Lake trout harvest from the UCUSMA peaked in 1985 at 8,686 fish (Somerville 2008). Total harvest of lake trout declined from 1985 to 1997 and remained between 1,198 to 2,623 lake trout annually from 1997 through 2005 (Table 17). In 2006 harvest dropped to its lowest level (737 lake trout) since reporting began in 1977 (Table 17). Harvest has been increasing since and was 1,875 lake trout in 2009. Harvest increased in all systems from 2008 to 2009 with the exception of Lake Louise and all exceeded the 2004–2008 average except for harvest reported from "Other sites".

Fishery Objectives and Management

Lake trout are slow to mature and a have low reproductive potential. Overexploitation can result in population declines that take decades to recover. As a result of the low reproductive potential and late age-at-maturity, impacts of regulatory actions may not be observed for 8–10 years after a regulation is in place.

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-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.

Because estimates of the average weight of lake trout from most lakes in the UCUSMA are unavailable, the sustainable harvest of lake trout has been estimated based on the probable range of lake trout weights (1.0 to 4.0 kg) depending on the area of the lake. Based on Evans et al. (1991) and these assumed weights, lakes in the UCUSMA which are less than 500 ha appear capable of sustaining harvests of 147 to 231 lake trout annually. Lakes, larger than 500 ha, appear capable of sustaining annual harvests of 320 to 585 lake trout. Estimates of sustained yield for the larger lake trout fisheries in the UCUSMA are found in Table 19.

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 two consecutive years, stock assessment is initiated for that population.

Current Issues and Fishery Outlook

Under the current regulations, it is anticipated that overall harvests of lake trout in the UCUSMA will remain stable. Harvests declined with the 1994 regulation changes. The overall average harvest for the last 10 years (1999–2008) is 73% less than the average harvest for the years 1984–1993. This trend is matched in the Lake Louise and Susitna Lake fisheries. Average harvest from Paxson and Summit lakes dropped 82%–87%, perhaps reflecting the bait restriction on those lakes. Crosswind Lake had a noticeably lesser drop in harvest with the average harvest for the last ten years only dropping 26% from the average for 1984–1993. The effect of the 1994 regulation changes on Crosswind Lake may have been dampened by improved access, increased private land ownership and recreational cabin construction that occurred between the two comparison periods.

Hooking mortality must be considered when determining whether harvests are approaching sustained yield. Effective harvest of lake trout (harvest plus 10% of the catch minus the harvest) in Lake Louise has exceeded the sustainable yield predicted by the Lake Area model in eight of the last ten years (1999–2008) and again in 2009. Additionally, some lake trout have been harvested as incidental take in gillnets targeting whitefish in the subsistence whitefish fishery on that lake. Increased development around Lake Louise may increase harvest of lake trout beyond sustainable levels. Management measures to ensure sustainable lake trout production may conflict with concurrent burbot fisheries. Anglers who wished to harvest burbot with bait in Paxson and Summit lakes expressed their dissatisfaction with the no bait, single-hook artificial lure regulations. This led to compromise regulations which now allow bait to be used in Paxson and Summit lakes during the winter burbot fishery.

Recent Board of Fisheries Action

The BOF adopted a *Wild Lake Trout Management Plan* at its 2005 meeting. This plan sets bag and possession limits and management strategies to provide guidance to ADF&G and the board

and public for addressing future proposals. A second proposal was adopted that allowed the use of bait in Paxson and Summit lakes from November 1 to April 15, and reduced the bag and possession limit of lake trout from two fish ≥ 24 inches to one fish any size, to align those regulations with the management plan guidelines. The seasonal use of bait allows the burbot fishery to continue with minimal restriction and without adversely impacting the lake trout population.

Two proposals were adopted by the BOF during the 2008 meeting that concerned lake trout fisheries within the UCUSMA. One proposal requested the board to consider a Customary and Traditional (C&T) Use determination for freshwater resident fish species in the UCUSMA. In the case of a C&T for the UCUSMA, the 2008 positive C&T determination validated a subsistence fishery for resident fishes (primarily whitefish) that had been in place since the 1960s. A second proposal sought to open Crosswind Lake to subsistence fishing. Crosswind Lake had been closed to subsistence fishing, but this was inconsistent with the state's subsistence laws. Opening the lake to subsistence fishing is not expected to impact the popular sport fisheries for lake trout and burbot on that lake. However, sport anglers may voice concern and opposition to use of gillnets due to a perceived impact from incidental harvest of lake trout and burbot in subsistence nets set for whitefish..

Current or Recommended Research and Management Activities

Stock assessment occurred at Paxson Lake in fall 2002–2004 and spring 2003 and 2004 to collect length and weight data and conduct a mark-recapture study to estimate abundance (Scanlon 2004; Wuttig 2010). Length and weight data provided specific information for Paxson Lake in application with the Lake Area model and in conjunction with the estimates of abundance resulted in the regulatory change.

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 three 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. Current regulations for Susitna and Crosswind lakes and Lake Louise need to be assessed, as harvests have exceeded sustained yield estimates in some years over the past ten years. These lakes are the highest priority for lake trout studies in the UCUSMA.

Stock abundance and size composition of Paxson and Summit Lake lake trout should be reassessed to monitor any changes due to implementation of new regulations changes in 2006.

BURBOT SPORT FISHERIES

Background and Historical Perspective

Burbot fisheries occur primarily during the winter months from November to April using closely attended set or hand jig 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 2008). The largest historical

fishery occurred in Lake Louise and Susitna and Tyone lakes (Table 20). 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 through 1985, burbot stocks in the UCUSMA were in danger of being overexploited. 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 (2005a,2005b), 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 also led to adoption of increasingly restrictive regulations.

Prior to 1979, there were no bag limits or gear restrictions governing the harvest of burbot in the UCUSMA. From 1979–1986 UCUSMA sport anglers were restricted to a bag limit of 15 burbot and could fish multiple hand lines and unattended setlines with no more than a total of 15 hooks plus two hand-held jig hooks. Under these regulations, the sport harvest of burbot peaked at 19,355 fish in 1985. In 1987, bag limits and the number of hooks an angler could fish in area lakes were reduced to five and in several road accessible lakes like Lake Louise, the bag limits were further reduced to two fish and anglers were restricted to using only two hooks. Anglers were still permitted to use unattended setlines. In 1989, under the guidance of the newly adopted *Lake Burbot Management Plan* emergency regulations were enacted that closed the burbot fisheries in Hudson Lake and Lake Louise and eliminated setlines in all lakes of the Tyone River drainage, given that anglers had begun to seek out previously unexploited lakes in the Tyone River drainage in response to restrictions and closures placed on other area lakes (Lafferty and Vincent-Lang 1991). In adopting the *Lake Burbot Management Plan*, the BOF stated its desire to maintain the bag and possession limits for burbot at two or more fish for road accessible lakes and five or more fish for remote lakes, as it was considered unreasonable by board members to participate in these fisheries at lower bag limits. In 1991, the BOF adopted a department proposal that eliminated *unattended* set lines from all burbot fisheries in the UCUSMA and closed Lake Louise and Hudson Lake by regulation. In 2008 the BOF repealed the *Lake Burbot Management Plan* since the provisions within it were incorporated into area regulations.

Hudson Lake was opened by emergency order in 1993, with a bag limit of two burbot. During the December 1996 BOF meeting, the board adopted proposals to reopen Hudson Lake by regulation to a two fish bag limit and allow limited use of unattended setlines in the Copper River. In 2003, the BOF adopted a proposal reopening Lake Louise to a limited burbot fishery with a 1 fish bag limit. Stock assessment work conducted from 1986–1996 and again in 1999, in Lake Louise, demonstrated the burbot population had stabilized at below historic abundance levels (Taube et al. 2000). It was theorized that a portion of the niche formally occupied by burbot had become occupied by lake trout and that the carrying capacity for burbot was reduced. The 12-year closure of the burbot fishery had not resulted in increased abundance.

During the 2003 meeting the BOF closed Tolsona Lake to burbot harvest by regulation. Tolsona Lake had been closed by emergency order since 1998. Sampling in 1997 indicated a drastic decline in abundance between 1996 and 1997. Poor summer survival in 1990 and 1991, and poor annual survival in 1992, 1994, 1995, was attributed to environmental conditions and not a result of overfishing. Stock assessment on Tolsona Lake has continued on an annual basis since

1996 and the fishery will reopen when the population rebuilds to 1,500 burbot > 18 inches (Taube and Bernard 2001).

Recent Fishery Performance

With the adoption of more conservative regulations in 1987, harvests of burbot from UCUSMA waters decreased (Somerville 2008). Total burbot harvest from the UCUSMA has averaged 1,423 fish from 1999 to 2008. Burbot harvest in 2006 and 2007 were the lowest ever recorded at 575 and 577 fish, respectively. Total harvest increased in 2008 to 1,234 burbot and in 2009 increased again to 2,850 (Table 20). Crosswind Lake supports the highest average harvest of burbot from any single water body in the UCUSMA at 404 fish from 1999–2008 and 356 fish for the past five years (2004–2008). The reported burbot harvest from Crosswind Lake was exceptionally low (55 fish) in 2007. Otherwise, harvest ranged from 139 to 859 burbot from Crosswind Lake between 1998 and 2008 (Table 20). An abundance survey of the burbot population in Crosswind Lake was conducted in 2006 and 2007 (Schwanke 2009b) to provide a basis to compare future estimates of abundance should harvest levels significantly change. The 2006 abundance of fully recruited (≥ 450mm) burbot 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).

Reductions in harvest have allowed some previously overexploited burbot stocks to recover to levels at which sustainable fisheries can occur. Larger lakes which were severely overexploited (e.g., Lake Louise) in the early to mid-1980s remain depressed. Stocks in larger lakes take longer to recover from overexploitation than do smaller and moderately-sized lakes. In Lake Louise, historically the largest burbot fishery in Alaska, the abundance of burbot remains low. The number of mature burbot in this lake appeared to have leveled off at 4,000 fish (Taube et al. 2000). However, the current level of burbot abundance may be increasing based on trends found in harvest data. Since re-opening in 2003, annual harvests have fluctuated, but appear to be generally increasing to the 2009 harvest of 489 burbot.

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. Several lakes of concern are sampled on a yearly or three to five year rotation. These lakes currently include Tolsona Lake, Lake Louise and Crosswind Lake. Assessment includes estimation of abundance, catch per unit effort (CPUE), and length composition.

Current Issues and Fishery Outlook

Unattended setlines are a convenient method of fishing, but data clearly show burbot populations cannot sustain use of this method in UCUSMA lakes and is therefore prohibited. Prohibition of unattended set lines led to reduced angler effort directed toward burbot in area lakes. Based on enforcement reports, some anglers unfortunately still continue to use unattended set lines. ADF&G and AWT educate and encourage anglers on fishing closely attended setlines with clearly visible strike indicators.

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. There is increasing recreational

snowmachine activity in the UCUSMA each year and undoubtedly some snowmachiners may include ice fishing in their trips.

ADF&G has been conducting an annual abundance estimate for burbot in Tolsona Lake since 1986. Due to a dramatic decline in the abundance of burbot, Tolsona Lake was closed by EO to burbot fishing in 1998 and by regulation in 2003. It is currently the only lake in UCUSMA closed to burbot fishing. The burbot fishery remains closed until two consecutive abundance estimates equal or exceed 1,500 burbot ≥450 mm TL (Taube and Bernard 2001). Based on results from 2009 and 2010 sampling seasons it appears the burbot population will achieve this abundance goal prior to the 2011 BOF cycle (C. Schwanke, Sport Fish Biologist, ADF&G, Glennallen, personal communication).

Recent Board of Fisheries Actions

In addition to the 2003 closing of Tolsona Lake and reopening of Lake Louise to burbot fishing, the BOF permitted the use of setlines on the Copper River mainstem and the lower portions of its tributaries, with the exception of the Gulkana River, which remains closed to setlines to protect steelhead trout. The upper boundaries to which setlines are permitted are the Richardson Highway bridges to the west and the Tok Cutoff (Glenn Highway) bridges to the north. The BOF also increased the bag and possession limit for burbot from two to five fish per day in this area. The total number of hooks used may not exceed five and gear must comply with that specified for burbot in the general sport fishing regulations.

The BOF repealed the *Lake Burbot Management Plan* at the 2008 meeting. A specific regulatory management plan for burbot is no longer needed. The provisions of the plan to allow time and area reductions and to prohibit the use of set lines are now incorporated into the background area regulations (5 AAC 52.022) and emergency order authority (5 AAC 75.003). During the 2008 meeting, the board adopted two other proposals that could affect burbot populations in the UCUSMA. One created a positive C&T determination for freshwater resident fish species in the UCUSMA. The second opened Crosswind Lake to subsistence fishing.

Current or Recommended Research and Management Activities

The burbot stock assessment program in the UCUSMA continues on a limited scale. A monitoring program has been proposed for Lake Louise on a three to five 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. The Tolsona Lake population should continue to be sampled for abundance and length composition on a yearly basis, as well as for water quality. Baseline data was collected on the Copper River burbot population in 2003 (Schwanke and Bernard 2005b). If future harvest levels increase significantly, this population should continue to be monitored. ADF&G staff should also continue to try to educate the angling public and seek their input in managing these important ice fisheries.

WILD RAINBOW AND STEELHEAD TROUT SPORT FISHERIES

Background and Historical Perspective

The UCUSMA 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 UCUSMA 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 a catch-and-release fishery 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 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 finally in 1999, for all flowing waters of the UCUSMA. 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 taken in the Copper River Personal Use Fishery was prohibited in 1997.

Summit Lake and its outlet stream Bridge Creek in the Tebay drainage, constitute 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, Lafferty and Vincent-Lang 1991). Sampling also indicated that the unique size structure of this population was fragile. 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 1990's (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 in. 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 through 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 and possession limit of which only one fish may be ≥20 inches. The season is year-round with the exception of the Middle Fork Gulkana River and Twelvemile Creek spawning closure and Our Creek (tributary to Moose Lake), which is closed from April 1 through May 31 to protect spawning Arctic grayling.

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 board and department for developing regulations and managing wild trout populations.

Recent Fishery Performance

A total of 241 wild rainbow trout were reported harvested from the UCUSMA in 2009, which is below the 2004–2008 average of 383 fish. The overall catch of 4,607 wild rainbow trout in 2009

was also below the 2004–2008 average of 5,705 fish (Table 21). The overall catch of wild rainbow trout in the UCUSMA achieved its lowest level since 1990 at 3,790 wild rainbow trout in 2006. Over the last five years (2004–2008) the Gulkana River drainage has accounted for 73% of the wild rainbow catch in the UCUSMA.

No steelhead trout have been reported harvested since 1999. The catch of steelhead trout in the UCUSMA declined from a high of 334 fish in 2000 to just 20 steelhead trout in 2009. The Gulkana River drainage accounted for 90% of the steelhead catch in the UCUSMA from 2004–2008. 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

The rainbow trout and steelhead trout populations and distribution are still not fully understood in the UCUSMA. Some populations may yet be unidentified and further investigation is needed to assess all the current spawning areas used by these fish.

With adoption of more restrictive regulations, particularly in the Gulkana River drainage, harvests of rainbow and steelhead trout have declined from the historic average. Since 1999 the catch of wild rainbow trout has ranged from a low of 3,790 to a high of 12,806 with no particular trend (Table 21).

Recent Board of Fisheries Actions

At the 2005 meeting the BOF adopted two proposals specific to rainbow trout/steelhead. The first reduced the bag and possession limit for rainbow trout/steelhead in Lake Louise, Susitna, Tyone lakes and the Tyone River drainage to two fish, of which only one may be over 20 inches. This aligned the regulations on those lakes with the background regulations recommended by the *Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*. The second proposal established catch-and-release regulations in the entire Hanagita River drainage. Previously, a harvest of two fish, one ≥20 inches was allowed upstream of Lower Hanagita Lake. This action was taken to protect the relatively small population of steelhead that spawns above Lower Hanagita Lake.

There were no proposals before the BOF in 2008 that affected wild rainbow or steelhead trout in the UCUSMA.

Ongoing or Recommended Research and Management Activities

Stock assessment of the Gulkana River rainbow trout population was initiated in 2004. The project objective was to estimate abundance of rainbow trout from Paxson Lake to two miles downstream of Sourdough. Feasibility work was conducted in August and September of 2004 and a mark-recapture study was conducted in 2005 (Schwanke and Taras 2009). From river mile 80 to river mile 32 the abundance of rainbow trout ≥275 mm FL was 5,238 fish (SE=689; 95% CI = 3,888-6,588) and for rainbow trout 160-274 mm FL was 6,850 fish (SE = 1,023; 95% CI = 4,845-8,855). A steelhead trout distribution study was initiated in 2004. The project objective was to determine steelhead distribution in the Upper Copper River using radiotelemetry. Feasibility work was conducted in September in 2004 and the full project was conducted in fall

2005 and 2006 (Savereide 2005b, c, *In prepa*). Radio tagged fish migrated into the mainstem Chitina (26%), Tazlina (47%) and Gulkana(27%) rivers.

DOLLY VARDEN SPORT FISHERIES

Background and Historical Perspective

Dolly Varden is a popular sport fish species in the UCUSMA, particularly among local residents fishing in the Klutina and Tonsina river drainages. Resident and anadromous populations are found throughout the Upper Copper River drainage. Dolly Varden are likely not present in the Gulkana River drainage; no juvenile or adult fish have been captured during any of the department stock assessment projects on the 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. Dolly Varden are found in the Copper River tributaries upstream of the Gulkana River, in the Chitina River drainage, and in drainages downstream of the Gulkana River. Based upon harvest and catch reports from the SWHS, a minor harvest occurs in the Upper Susitna River drainage, though due to the barrier at Devils Canyon it is believed these are resident populations.

There is limited knowledge regarding the Dolly Varden populations in the UCUSMA. There have been only two projects directed towards this species. A University of Alaska Fairbanks graduate study was conducted on the Tiekel and Little Tonsina rivers in 1985 and 1986 (Gregory 1988). This study documented the biological characteristics of Tiekel River Dolly Varden and compared these to the characteristics of a sample of Little Tonsina River Dolly Varden. A second graduate study collected aquatic habitat data on the Tiekel River and identified habitat important to Dolly Varden (Martin 1988).

There are directed sport fisheries in the Klutina and Tonsina river drainages for Dolly Varden. These occur primarily in the Little Tonsina River and the Upper Klutina River near the outlet of the lake, generally before the king salmon fishery begins in late June and after the king salmon fishery closes. Harvests of Dolly Varden, in the UCUSMA, peaked at 6,001 fish in 1985 (Somerville 2008). Harvests from the Klutina and Tonsina river drainages accounted for an average of 57% of Dolly Varden harvested in the UCUSMA over the last five years (2004–2008). The bag limit for Dolly Varden has been at 10 per day since at least the early 1970s.

Recent Fishery Performance

Total harvest of Dolly Varden in 2009 was 943 fish, which is slightly above the 2004–2008 average of 923 Dolly Varden (Table 22). The harvest of Dolly Varden ranged from about 1,000–3,000 between 1990 and 2004. Since 2005, harvests of Dolly Varden have ranged from 396 to 943 fish.

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 not known whether both resident and anadromous populations exist within individual systems. It is assumed, based upon the large observed size (two pounds or more) of Dolly Varden harvested

from the Klutina and Tonsina river drainages, that these fish are anadromous Dolly Varden. In addition, there is very little data, aside from the SWHS, auxiliary data from the CWT king salmon project, and lake and stream evaluation data from the 1960s and 1970s regarding distribution of Dolly Varden in the UCUSMA. Based on harvest and catch data from the SWHS, there is a significant fishery for Dolly Varden in the UCUSMA and a need for data concerning these exploited stocks.

With little biological or stock assessment data on the Dolly Varden stocks of the UCUSMA, it is uncertain whether the observed decline in harvests is a result of stock decline or reduced fishing effort. The SWHS does not distinguish effort between individual species, but in the Klutina River sport fisheries, it is assumed that most effort is directed at king salmon. 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 will also increase.

Recent Board of Fisheries Action

As a result of biological concern regarding the Tonsina River king salmon stock, the use of bait was restricted and only unbaited, single-hook, artificial lures were permitted following the 1996 BOF meeting. At the March 1999 BOF meeting, the bait restriction was modified to allow bait to be used with a hook gap of 3/8 inch or less. This regulatory modification was made to permit fisheries for Dolly Varden and Arctic grayling in the Tonsina River using traditional gear to harvest these species, while still reducing the harvest of king salmon. This restriction was repealed at the 2003 and 2005 BOF meetings when bait was permitted in the entire Tonsina River drainage downstream of Tonsina Lake.

There were no proposals before the BOF in 2008 that affected Dolly Varden in the UCUSMA.

Ongoing and Recommended Research and Management

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 and sampled for evidence of strontium deposition levels consistent with anadromous movement from any Dolly Varden that may be sampled. This will determine if the fish are anadromous or resident. Creel surveys will also provide data on fishing effort directed toward Dolly Varden. However, 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).

UPPER COPPER / UPPER SUSITNA MANAGEMENT AREA STOCKED WATERS

Background and Historical Perspective

The Alaska Department of Fish and Game stocks approximately 29 lakes in the UCUSMA to provide fishing opportunities for popular game species in locations where fishing opportunities were limited or didn't exist (Table 23). The lake stocking program serves a segment of the public who want to fish, but must remain on or near the road system. This program provides increased fishing opportunities and offers a diversity of species in rural areas where minimal or no opportunities exist for sport fishing. It also diverts effort from wild populations in areas for which the department has conservation concerns. Stocked lakes vary in size from 1.5 to 500 acres.

ADF&G stocks fingerling size fish (2–4 inches), subcatchable size fish (4-6 inches) and catchable size fish (6–12 inches) in area lakes, of which most are rainbow trout but other stocked species have included 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.

Recent Fishery Performance

Angler effort on stocked waters averaged 1,998 angler-days fished over the last five years (2004–2008) and 2,767 angler-days fished over the last ten years (1999–2008) (Table 24). This level of effort has produced an average catch of 4,363 stocked fish and an average harvest of 1,409 fish over the last five years. The average catch per effort for the last five years has been 2.4 fish per day fished. The total effort on stocked lakes has generally decreased from the early 1990s through 2008 (Table 24). Decreasing fishing effort reflects an overall decline in fishing effort in the UCUSMA. In 2009, effort increased to 2,254 angler-days.

Rainbow trout comprised 97% of the harvest and 85% of the catch from stocked waters in 2009. Rainbow trout also dominated the stocked lakes harvest and catch from 2004 to 2008, comprising 84% of the harvest and 89% of the catch. Arctic grayling and Arctic char comprise the remaining harvest and catch.

Several lakes in the UCUSMA were stocked with Arctic grayling prior to 2004 (Table 25). These stocked lakes still provide opportunity for sport anglers and accounted for 4% of the average harvest of all Arctic graying in the UCUSMA from 2004–2008 and 1% of the harvest in 2009. The bag and possession limit in stocked lakes remained at 10 fish , only one of which may be > 18 inches, of all stocked species combined.

Stocking strategy in Region III has changed over the past 20 years. In the 1990s the majority of fish were stocked as fry and fingerling, since 1999 there has been a shift to stocking catchable or subcatchable size fish. There were several reasons for this shift, poor survival of fingerlings due to predation by larger fish (subcatchables have better survival); catchables provide a fishery in lakes that may winterkill, or in low productivity lakes in which fish may not grow. In general, fingerlings are stocked in remote lakes with good survival and catchables are stocked in road-accessible lakes and lakes with poor survival to the next year. Since fish are stocked at various sizes, and the smaller stocking products are stocked at higher levels due to lower survival rates to catchable size, comparison of previous stocking levels to current levels is done by biomass. Rainbow trout are the predominant stocked species making up 96% of the catchable/subcatchable sized fish biomass and 94% of the fingerling sized fish biomass stocked from 2004–2008 (Table 25).

Of all the stocked lakes in the UCUSMA, Silver Lake has been the most popular. Over the last five years (2004–2008) Silver Lake has accounted for over 41% of the harvest from area stocked lakes. When added with the harvests from Two and Three Mile lakes in Chitina on the Edgerton Highway and Sculpin and Strelna lakes on the McCarthy Road they accounted for over 60% of the harvest from UCUSMA stocked lakes from 2004–2008. In 2009 Silver Lake accounted for 31% of the harvest of rainbow trout from UCUSMA stocked waters (Jennings et al. 2010b).

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.

Current Issues and Fishery Outlook

The DNA of the causative agent for whirling disease in rainbow trout and the freshwater carrier organism were identified in the ADF&G Elmendorf Hatchery catchable size rainbow trout in 2007. Although the disease has not been confirmed, all stocking of catchable rainbow trout was discontinued in UCUSMA to protect endemic rainbow trout populations in the area. Therefore, only fingerling rainbow trout will be stocked until completion of the Ruth Burnett Hatchery in Fairbanks.

All the fish used in the state's recreational stocking program come from the Ft. Richardson and Elmendorf hatcheries. These facilities were constructed in 1958 and 1976 respectively and relied on warm water from nearby electrical generating facilities. In the late 1990s this source of warm water was lost and production of large stockable fish was cut by more than half. This loss of warm water and the age of these facilities severely curtailed stocking levels in the UCUSMA as well as the rest of the state. In 2003, ADF&G began a study to restore a trophy rainbow trout fishery in Summit Lake in the Chitina River drainage. To achieve this goal substantial numbers of the stunted population of rainbow trout had to be removed from the lake. These Summit Lake rainbow trout were outplanted mainly to Silver Lake on the Chitina-McCarthy Road.

Recent Board of Fisheries Action

During the January 2004 AYK Board of Fisheries meeting the board adopted a *Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan* (5 AAC 52.065). The plan created three Management Categories: Regional Management, Conservative Management, and Special Management Approach. All stocked lakes in the UCUSMA are categorized under the Regional Management Approach. The regulations for each management category are applied region-wide, and changed the general regulations for stocked waters in some areas. The primary change in the UCUSMA stocked waters was from a bag limit of 10 fish per species to a bag limit of 10 fish all species combined under the Regional Management Approach.

During the March 2008 BOF meeting a proposal was adopted that amended the *Stocked Waters Management Plan* to provide ADF&G with EO authority to reduce bag limits, allow catch-and-release only, or alter methods and means in stocked waters during times of low hatchery production. Reduced hatchery production may require such alterations to provide a diverse opportunity for anglers targeting stock waters.

Two proposals were adopted at the December 2008 BOF meeting that concerned stocked waters in the UCUSMA. The first proposal updated the stocked waters list for the UCUSMA by adding Kathleen Lake and Tolsona Lake and removing Town Lake. The second proposal repealed the special harvest regulations for rainbow trout in Tolsona Lake. Tolsona Lake rainbow trout are now managed under the stock waters regulations.

Current or Recommended Research and Management Activities

Population status of stocked species may be assessed by periodic on-site sampling or as a component of research projects in stocked waters. 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) harvests of king, sockeye, and coho salmon in the Copper River, 1991–2010.

Year	King Harvest	Sockeye Harvest	Coho Harvest	Total
1991	5,164	111,788	3,477	120,528
1992	4,705	127,670	1,817	134,288
1993	4,037	138,211	1,428	143,791
1994	5,423	153,049	1,958	160,561
1995	6,326	125,364	5,547	137,301
1996	4,881	141,337	3,817	150,354
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[a]	5,766	132,164	2,317	140,602
2003[a]	4,611	129,595	2,840	137,318
2004[a]	5,917	164,231	3,015	173,589
2005[a]	4,220	189,001	1,729	195,400
2006[a]	4,958	173,292	2,144	180,994
2007[a]	6,089	190,384	1,797	198,955
2008[a]	4,655	122,937	3,058	131,107
2009[a]	3,031	137,823	1,691	142,884
2010[b]	2,138	144,775	1,686	148,995
2005–2009 average	4,591	162,687	2,084	169,868
2000–2009 average	5,321	160,136	2,613	168,512

[a] Includes federal fishery harvests in the Glennallen and Chitina Subdistricts, and Batzulnetas.

[b] Data are preliminary and do not include 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, 1991–2010.

Year	King Harvest	Sockeye Harvest
1991	34,787	1,206,811
1992	39,810	970,938
1993	29,727	1,398,234
1994	47,061	1,152,220
1995	65,675	1,271,822
1996	55,646	2,356,365
1997	51,273	2,955,431
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	9,029	890,682
2010[a]	9,654	635,968
2005–2009 average	24,893	1,188,338
2000–2009 average	31,989	1,163,016

[a] Data for 2010 are preliminary.

Table 3.–Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1990–2009.

	Effort (angler-days)			% Effort by UCUSMA	
Year	UCUSMA	Region III	Statewide	Region III	Statewide
1990	50,791	296,420	2,455,468	17.1%	2.1%
1991	64,207	284,129	2,476,588	22.6%	2.6%
1992	72,052	253,904	2,564,754	28.4%	2.8%
1993	77,870	298,842	2,559,408	26.1%	3.0%
1994	85,520	295,507	2,719,911	28.9%	3.1%
1995	102,951	373,092	2,787,670	27.6%	3.7%
1996	64,407	265,573	2,006,528	24.3%	3.2%
1997	56,257	295,113	2,079,514	19.1%	2.7%
1998	56,706	227,841	1,856,976	24.9%	3.1%
1999	77,619	304,522	2,499,152	25.5%	3.1%
2000	58,194	241,574	2,627,805	24.1%	2.2%
2001	48,879	194,138	2,261,941	25.2%	2.2%
2002	46,613	220,276	2,259,091	21.2%	2.1%
2003	52,139	206,705	2,219,398	25.2%	2.3%
2004	46,558	217,041	2,473,961	21.5%	1.9%
2005	41,685	183,535	2,463,929	22.7%	1.7%
2006	39,107	175,274	2,297,961	22.3%	1.7%
2007	52,830	204,032	2,543,674	25.9%	2.1%
2008	48,371	183,084	2,315,601	26.4%	2.1%
2009	53,409	194,019	2,216,445	27.5%	2.4%
2004–2008 Average	45,710	192,593	2,419,025	23.8%	1.9%
1999–2008 Average	51,200	213,018	2,396,251	24.0%	2.1%

Table 4.–Sport fishing effort (angler-days) in the UCUSMA by drainage, 1990–2009.

	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
1990	7,172	19,112	26,284	8,334	860	9,194	5,556	2,082	498	1,197	537	2,599	1,804	1,040	2,844	50,791
1991	9,047	21,285	30,332	8,342	1,325	9,667	12,145	2,295	2,072	989	313	4,693	663	1,038	1,701	64,207
1992	8,816	26,039	34,855	10,594	1,408	12,002	6,398	3,486	2,240	540	1,255	7,484	1,759	2,033	3,792	72,052
1993	8,302	27,543	35,845	14,384	2,451	16,835	8,177	3,112	2,901	1,322	728	4,760	2,205	1,985	4,190	77,870
1994	9,121	25,581	34,702	16,686	1,888	18,574	10,624	3,837	2,254	1,611	1,778	5,561	3,231	3,348	6,579	85,520
1995	10,660	33,415	44,075	17,080	3,658	20,738	14,496	4,034	3,912	2,276	1,373	5,441	3,482	3,124	6,606	102,951
1996	6,298	25,727	32,025	8,749	1,110	9,859	10,699	1,775	1,514	815	695	3,759	1,475	1,791	3,266	64,407
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
Average 2004–2008	3,681	16,131	19,812	5,712	918	6,630	12,492	535	706	1,139	1,186	1,987	805	417	1,222	45,710
Average 1999–2008	4,995	18,737	23,732	6,634	893	7,526	11,624	830	930	1,074	821	2,710	1,096	856	1,952	51,200

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

Table 5.–Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters (including stocked waters), 1990–2009.

Year	King Salmon	Sockeye Salmon	Coho Salmon	Steelhead Trout	Rainbow Trout[a]	Dolly Varden[a]	Lake Trout	Arctic Grayling[a]	Burbot	Whitefish	Landlocked Salmon[a]	Other Fish	Total Fish
1990	2,302	3,569	17	34	4,298	3,159	5,503	14,710	1,836	1,784	17	0	37,229
1991	4,884	5,511	138	114	6,950	2,140	4,864	14,004	793	707	111	47	40,263
1992	4,412	4,560	492	8	9,484	1,997	4,251	12,748	1,495	1,150	433	11	41,041
1993	8,217	5,288	305	0	7,245	3,173	4,569	13,356	1,694	815	56	9	44,727
1994	6,431	6,533	289	7	5,808	1,598	4,058	15,233	2,869	1,149	134	128	44,237
1995	6,709	6,068	202	10	4,671	1,695	2,934	15,093	995	898	42	30	39,347
1996	9,116	11,851	606	0	5,076	2,575	2,632	11,260	981	384	751	0	45,232
1997	8,346	12,293	370	0	2,812	1,092	1,923	9,153	1,358	134	331	56	37,868
1998	8,245	11,184	684	0	5,182	1,589	1,723	8,498	1,485	584	477	0	39,651
1999	6,742	11,101	256	8	3,842	2,390	2,135	9,510	1,861	317	232	0	38,394
2000	5,531	12,361	760	0	2,877	991	1,700	7,111	2,290	451	436	22	34,530
2001	4,904	8,169	374	0	2,416	1,612	1,185	4,923	1,506	1,135	282	207	26,713
2002	5,098	7,761	384	0	3,294	1,388	2,067	9,849	2,224	2,288	282	54	34,689
2003	5,717	7,108	277	0	3,761	1,578	1,831	6,596	1,457	422	51	104	28,902
2004	3,435	6,464	131	0	2,311	2,153	1,938	4,177	1,127	885	0	1,629	24,250
2005	4,093	8,135	72	0	1,818	891	2,354	3,969	1,374	1,089	122	16	23,933
2006	3,425	14,297	54	0	2,104	777	737	3,478	575	662	42	111	26,262
2007	5,123	23,028	0	0	605	712	924	3,048	577	124	0	17	34,158
2008	3,616	11,431	56	0	1,018	396	1,389	4,332	1,234	655	0	18	24,145
2009	1,355	13,381	36	0	241	943	1,875	4,480	2,850	569	44	81	25,855
Average 2004–2008	3,938	12,671	63	0	1,571	986	1,468	3,801	977	683	33	358	26,550
Average 1999–2008	4,768	10,986	236	1	2,405	1,289	1,626	5,699	1,423	803	145	218	29,598

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

Table 6.–Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1990–2009.

Year	King Salmon	Sockeye Salmon	Coho Salmon	Steelhead Trout	Rainbow Trout[a]	Dolly Varden[a]	Lake Trout	Arctic Grayling[a]	Burbot	Whitefish	Landlocked Salmon[a]	Other Fish	Total Fish
1990	6,057	8,474	51	136	12,312	5,707	15,335	82,831	2,872	2,276	51	0	136,102
1991	10,091	10,243	467	140	14,842	8,863	10,444	57,134	946	1,566	389	47	115,172
1992	12,340	9,344	677	39	27,412	6,243	12,886	63,049	2,222	4,074	670	22	138,978
1993	21,767	10,813	410	102	23,300	7,903	17,728	84,257	2,471	2,670	145	53	171,619
1994	11,272	11,700	913	332	25,187	5,992	13,368	84,357	4,064	3,368	550	660	161,763
1995	14,178	10,383	363	51	16,979	3,129	10,937	71,189	2,375	1,826	109	70	131,589
1996	27,195	25,265	1,195	170	19,935	4,595	11,209	83,611	1,639	3,017	1,244	6	179,081
1997	27,760	26,724	748	81	20,867	3,439	9,101	71,432	2,646	1,075	1,095	81	165,049
1998	22,324	21,359	2,574	192	22,283	4,156	8,184	73,014	2,849	1,612	1,708	80	160,335
1999	18,034	20,782	382	276	14,809	6,993	14,184	68,860	3,173	907	309	58	148,767
2000	18,503	19,348	1,396	334	18,330	3,332	9,388	53,421	4,316	2,019	800	58	131,245
2001	16,000	15,843	1,246	234	19,531	6,188	6,913	49,901	2,527	3,069	513	233	122,198
2002	19,497	12,181	471	129	16,605	4,714	12,197	106,424	3,878	3,756	927	100	180,879
2003	19,426	15,718	585	112	17,583	3,720	12,425	90,190	2,496	2,338	169	356	165,118
2004	12,664	10,912	478	64	12,836	5,622	8,212	51,219	1,626	1,420	0	1,637	106,690
2005	9,778	16,093	172	64	10,954	2,551	11,057	50,760	2,150	2,259	279	32	106,149
2006	11,057	21,778	72	50	7,915	2,189	4,043	25,524	1,054	1,023	42	111	74,858
2007	12,109	30,875	11	99	5,919	3,647	6,010	29,815	1,503	273	0	26	90,287
2008	7,827	16,912	57	61	10,230	1,814	8,793	47,719	1,482	1,605	0	36	96,536
2009	4,231	19,788	36	20	4,607	3,211	12,308	76,114	3,471	1,076	554	81	125,497
Average 2004–2008	10,687	19,314	158	68	9,571	3,165	7,623	41,007	1,563	1,316	64	368	94,904
Average 1999–2008	14,490	18,044	487	142	13,472	4,077	9,322	57,383	2,421	1,867	304	265	122,273

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

Table 7.–Summary of king salmon harvests and upriver escapement in the Copper River 1990–2009.

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
1990	21,702	60	2,302	647	2,708	27,419	ND	ND	ND	ND
1991	34,787	136	4,884	1,328	4,056	45,191	ND	ND	ND	ND
1992	39,810	142	4,412	1,449	3,405	49,218	ND	ND	ND	ND
1993	29,727	120	8,217	1,434	2,846	42,344	ND	ND	ND	ND
1994	47,812	164	6,431	1,989	3,743	60,139	ND	ND	ND	ND
1995	67,363	154	6,709	1,892	4,707	80,825	ND	ND	ND	ND
1996	57,815	276	9,116	1,482	3,584	72,273	ND	ND	ND	ND
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	63,452	353	6,742	3,278	5,913	79,738	32,090	95,895	16,294	ADF&G
2000	32,005	689	5,531	4,856	3,168	46,249	38,047	70,741	24,492	ADF&G
2001	40,459	826	4,904	3,553	3,113	52,855	39,778	81,063	28,208	ADF&G
2002	39,536	549	5,098	4,217	2,056	51,456	32,873	72,958	21,502	ADF&G
2003	48,797	710	5,717	3,092	1,921	60,237	44,764	94,271	34,034	NVE
2004	38,735	1,106	3,435	3,982	2,502	49,760	40,564	80,405	30,645	NVE
2005	35,487	260	4,093	2,618	2,094	44,552	30,333	66,080	21,528	NVE
2006	31,071	779	3,425	3,229	2,681	41,185	67,789	99,639	58,454	NVE
2007	40,184	1,145	5,123	3,939	2,722	53,113	46,349	87,678	34,565	NVE
2008	12,025	470	3,616	3,218	2,022	21,351	41,343	53,838	32,485	NVE
2009	9,951	212	1,355	3,036	223	14,777	32,401	42,564	29,142	NVE
Average 2004–2008	31,500	752	3,938	3,397	2,404	41,992	45,276	77,528	35,535	
Average 1999–2008	38,175	689	4,768	3,598	2,819	50,050	41,393	80,257	30,221	

[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 8.–Harvest of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1990–2009.

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		
1990	239	525	863	1,627	583	23	17	17	0	35	2,302
1991	483	1,321	1,187	2,991	1,709	89	32	0	25	38	4,884
1992	416	1,395	1,260	3,071	1,075	152	8	18	55	33	4,412
1993	694	1,894	3,304	5,892	1,989	172	0	47	64	53	8,217
1994	1,352	2,071	279	3,702	2,189	349	105	16	20	50	6,431
1995	984	2,250	322	3,556	2,485	539	0	0	0	129	6,709
1996	1,165	3,362	733	5,260	3,142	331	64	0	64	255	9,116
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	2,643	165	3,275	1,687	0	0	0	113	48	5,123
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
Average 2004–2008	326	1,985	131	2,442	1,319	86	0	0	60	32	3,938
Average 1998–2007	690	2,008	247	2,944	1,651	70	0	4	36	64	4,768

Table 9.–Harvest Summary data for guided anglers in the Upper Copper River drainage, 2006–2009.[a]

Site	Year	Guides	Clients	Trips	King salmon	Sockeye salmon	Coho salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Lake Trout
Gulkana River drainage[b]	2006	27	874	240	478	68	0	0	0	3	0
Gulkana River drainage[b]	2007	28	1,251	364	754	64	0	0	7	0	10
Gulkana River drainage[b]	2008	29	1,001	284	504	11	0	1	8	0	2
Gulkana River drainage[b]	2009	19	364	109	147	33	0	0	0	0	6
Klutina River drainage[c]	2006	22	1,614	476	842	913	0	154	45	0	0
Klutina River drainage[c]	2007	28	1,657	500	904	967	0	161	39	2	2
Klutina River drainage[c]	2008	22	1,571	470	688	266	4	84	21	4	0
Klutina River drainage[c]	2009	28	1,203	359	374	540	5	225	31	3	0
Tonsina River drainage[d]	2006	7	51	13	18	0	0	0	0	0	0
Tonsina River drainage[d]	2007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tonsina River drainage[d]	2008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tonsina River drainage[d]	2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

[a] Harvest data is total harvest and may exceed the harvest reported by area and site in Sigurdsson and Powers 2009 and 2010 since harvest cannot be reported for sites or drainages with 3 or fewer guides reporting in a given year.

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

[c] Includes Klutina River and Klutina Lake.

[d] Includes Tonsina River and Tonsina Lake.

Table 10.–Catch of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1990–2009.

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		
1990	2,728	1,055	ND	3,783	1,493	35	146	17	0	583	6,057
1991	3,956	2,731	ND	6,687	3,036	146	134	0	25	63	10,091
1992	4,635	3,419	ND	8,054	3,822	222	8	18	160	56	12,340
1993	10,592	4,994	ND	15,586	4,934	614	0	283	176	174	21,767
1994	3,038	3,407	83	6,528	3,807	698	144	16	29	50	11,272
1995	2,963	4,839	46	7,848	5,081	1,102	0	0	9	138	14,178
1996	3,472	11,836	2,507	17,815	7,407	832	74	0	246	821	27,195
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
Average 2004–2008	1,321	5,687	237	7,246	2,874	283	15	84	128	57	10,687
Average 1999–2008	2,518	6,489	562	9,569	4,305	288	18	92	133	85	14,490

Table 11.–Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, 1990–2009.

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		
1990	681	552	1,464	2,697	802	40	0	0	30	0	3,569
1991	779	599	988	2,366	2,435	200	60	0	240	210	5,511
1992	805	255	1,068	2,128	1,356	99	0	90	649	238	4,560
1993	784	547	1,714	3,045	1,369	188	9	403	0	274	5,288
1994	1,055	884	564	2,503	3,137	66	95	37	93	602	6,533
1995	978	920	511	2,409	2,549	105	0	115	284	606	6,068
1996	1,828	4,673	917	7,418	4,215	42	25	0	17	134	11,851
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	328	886	87	1,301	11,759	0	51	0	270	0	13,381
Average 2004–2008	209	784	27	1,020	11,260	33	0	2	270	86	12,671
Average 1999–2008	547	1,063	332	1,942	8,589	28	7	20	214	186	10,986

Table 12.–Summary of sockeye harvests and upriver escapement in the Copper River 1990–2009.

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]
1990	844,778	469	3,569	31,765	66,432	947,013	552,923	1,398,170	395,726
1991	1,206,811	830	6,317	39,599	77,590	1,331,147	537,789	1,745,407	351,666
1992	970,938	785	6,138	45,232	86,724	1,109,817	572,361	1,544,084	351,845
1993	1,398,234	428	6,609	53,252	93,472	1,551,995	801,181	2,199,843	613,309
1994	1,153,167	474	9,599	68,278	94,024	1,325,542	682,319	1,835,013	472,748
1995	1,271,822	692	6,658	52,516	79,006	1,410,694	547,565	1,820,079	379,329
1996	2,356,365	969	14,086	52,052	95,007	2,518,479	852,125	3,209,459	569,212
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	818,861	2,708,888	450,246
2000	881,419	4,360	14,550	59,497	107,856	1,067,682	549,450	1,633,508	294,351
2001	1,325,690	3,072	8,467	83,787	132,108	1,553,124	793,791	2,264,981	494,045
2002	1,249,920	3,067	8,559	58,800	86,543	1,406,889	786,921	2,192,176	571,248
2003	1,192,164	1,607	7,739	60,623	81,513	1,343,646	655,779	1,996,481	461,347
2004	1,048,603	1,822	7,416	73,214	108,527	1,239,582	628,950	1,819,097	433,945
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	873,251	2,968,405	613,128
2008	323,096	4,001	12,242	57,632	82,318	479,289	677,001	1,140,809	481,120
2009	897,153	1,810	13,381	60,517	90,917	1,063,778	676,929	1,714,476	468,705
Average 2004–2008	1,221,511	3,490	13,518	75,276	112,854	1,426,650	779,182	2,159,567	525,078
Average 1999–2008	1,244,064	3,089	12,086	71,646	111,395	1,442,279	750,071	2,159,387	489,663

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, is the Miles Lake sonar count minus the king salmon mark-recapture point estimate

f Upriver return escapement minus upriver sockeye harvests.

Table 13.–Distribution of sockeye salmon in major drainages in the Copper River, 2005–2009.

Year	River System						
	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 2005–2008	7.6	6.7	4.3	41.9	13.0	12.8	13.7

Source: (Smith et al. 2006; Wade et al. 2007; Wade et al. 2009; Wade et al. *in prep*)

Table 14.–Number of permits issued and expanded salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1991–2010 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of Permits Issued	Estimated Salmon Harvest			
		King	Sockeye	Coho	Total[a]
1991	711	1,328	39,599	232	41,205
1992	655	1,449	45,232	350	47,095
1993	772	1,434	53,252	77	54,855
1994	970	1,989	68,278	60	70,391
1995	858	1,892	52,516	882	55,323
1996	850	1,482	52,052	557	54,290
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
Average 2005–2009	1,079	2,630	55,529	265	58,484
Average 2000–2009	1,097	3,109	57,429	458	61,049

[a] Total harvest includes steelhead and other species.

Table 15.–Number of permits issued and expanded salmon harvested during the Chitina Subdistrict personal use salmon fishery in the Copper River, 1991–2010 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of Permits Issued	Estimated Salmon Harvest			
		King	Sockeye	Coho	Total[a]
1991	6,222	4,056	77,590	3,354	85,058
1992	6,385	3,405	86,724	1,517	91,682
1993	7,914	2,846	93,472	1,416	97,767
1994	7,061	3,743	94,024	1,981	99,823
1995	6,760	4,707	79,006	4,870	88,617
1996	7,198	3,584	95,007	3,381	102,108
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	9,308	700	138,487	2,013	141,565
Average 2005–2009	8,221	1,923	107,959	2,150	112,486
Average 2000–2009	8,011	2,232	105,383	2,445	110,466

[a] Total expanded includes unidentified salmon.

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

Table 16.–Harvest of wild Arctic grayling by recreational anglers in the UCUSMA by drainage, 1990–2009.

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		
1990	5,383	3,193	544	289	170	578	1,478	136	1,477	13,248
1991	6,936	1,978	1,092	296	102	717	795	45	591	12,552
1992	4,021	2,044	346	781	255	445	413	15	1,422	9,742
1993	4,071	2,746	681	814	867	481	935	336	821	11,752
1994	4,253	3,662	363	363	906	984	884	123	1,796	13,334
1995	4,159	3,982	285	261	1,041	1,171	953	166	1,661	13,679
1996	3,263	2,949	183	192	570	849	608	194	1,279	10,087
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
2004–2008[a]	1,291	803	98	53	80	219	577	109	304	3,534
1999–2008[a]	1,753	1,042	256	112	84	282	924	70	468	4,991

[a] Average for years listed.

Table 17.–Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, 1990–2009.

	Gulkana River Drainage					Upper Susitna River Drainage							
Year	Paxson Lake	Summit Lake	Crosswind Lake	Other Lakes & Streams	Gulkana Total	Lake Louise	Susitna Lake	Other Lakes & Streams	Upper Susitna Total	Klutina Drainage	Tazlina Drainage	Other Sites	Area Total
1990	2139	968	306	170	3,583	1,036	187	119	1,342	68	51	782	5,826
1991	1248	981	463	98	2,790	1,332	308	196	1,836	84	42	579	5,331
1992	1118	524	378	240	2,260	1,033	324	348	1,705	39	62	678	4,744
1993	778	344	311	276	1,709	1,316	669	375	2,360	28	0	774	4,871
1994	262	353	429	110	1,154	1,463	426	477	2,366	74	15	913	4,522
1995	507	224	94	90	915	946	200	419	1,565	71	0	1,215	3,766
1996	297	120	339	336	1,092	662	381	306	1,349	22	11	774	3,248
1997	452	158	96	142	848	585	52	100	737	33	23	982	2,623
1998	205	59	238	39	541	625	131	135	891	12	56	468	1,968
1999	342	220	525	68	1,155	430	176	216	822	35	16	572	2,600
2000	228	79	297	27	631	563	131	93	787	18	83	265	1,784
2001	302	74	44	86	506	259	110	118	487	17	0	188	1,198
2002	328	66	299	60	753	458	152	138	748	0	122	669	2,292
2003	399	102	403	104	1,008	393	128	80	601	52	0	325	1,986
2004	46	107	105	30	288	770	30	347	1,147	14	0	489	1,938
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	239	924
2008	173	67	90	0	330	604	206	85	895	0	0	164	1,389
2009	191	125	295	18	629	493	217	230	940	25	58	223	1,875
Average 2004–2008	81	54	200	37	374	457	175	190	822	16	3	254	1,468
Average 1999–2008	201	81	257	53	592	439	157	160	756	20	24	235	1,626

Table 18.–Percent of lake trout released in lakes with 24" minimum size limit, 1990–2009.

Year	Paxson [a]	Summit [a]	Crosswind	Louise	Susitna	Average of all lakes
1990	52	61	77	65	82	67
1991	39	47	60	37	59	48
1992	53	54	73	67	68	63
1993	68	79	76	81	67	74
1994	79	65	79	71	67	72
1995	71	81	90	66	76	77
1996	85	84	72	78	82	80
1997	78	77	79	80	89	81
1998	88	85	85	75	66	80
1999	89	67	80	91	82	82
2000	89	77	67	82	86	80
2001	84	88	93	83	87	87
2002	91	82	69	85	79	81
2003	88	84	72	88	69	80
2004	75	62	88	81	96	80
2005	96	95	77	86	56	82
2006	79	92	60	86	81	80
2007	88	59	92	85	88	82
2008	82	94	93	67	85	84
2009	72	86	89	86	76	82
Average 1990–1993	53	60	72	63	69	63
Average 1994–2005	84	79	79	81	78	80
Average 2006–2009	80	83	84	81	83	82

Note: The 24" minimum size limit went into effect prior to the 1994 fishing season.

[a] Beginning in 2006, the bag limit for lake trout in Paxson and Summit Lakes became one lake trout of any size and bait was allowed from November 1 through April 15.

Table 19.–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
Crosswind	397	No	361	> 24 inch
Paxson	189	Yes	585	Any size
Summit	119	Yes	413	Any size
Tanada	10	No	399	Any size
Copper	36	No	341	Any size
Lake Louise	637	Yes	540	> 24 inch
Susitna	304	Yes	321	> 24 inch

[a] Average harvest from SWHS 2005–2009 + 10% mortality factor for released fish

Table 20.–Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, 1990–2009.

	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 Sites	Area Total
1990	221	340	17	578	255	323	0	578	408	0	272	1,836
1991	45	271	54	370	0	45	54	99	189	0	135	793
1992	127	152	152	431	0	533	8	541	347	0	151	1,470
1993	32	225	0	257	0	172	0	172	107	0	1,158	1,694
1994	21	317	291	629	0	766	145	911	238	0	1,091	2,869
1995	69	271	7	347	0	137	46	183	126	0	339	995
1996	65	86	48	199	0	163	49	212	138	0	432	981
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
Average 2004–2008	34	356	25	415	196	139	20	354	30	3	175	977
Average 1999–2008	207	404	124	735	101	268	20	389	84	9	205	1,423

Table 21.–Sport catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, 1990–2009.

Year	Gulkana River Drainage[a]				Klutina River Drainage	Tazlina River Drainage	Tonsina River Drainage	Copper River Drainage		Other Sites	Area Total
	Upper River	Lower River	Gulkana R. Other	Total				Upstream of Gulkana	Downstream of Klutina		
1990	2,344	51	0	2,395	34	645	17	509	153	2,768	6,521
1991	1,256	14	0	1,270	246	792	41	342	109	1,106	3,906
1992	1,496	166	0	1,662	103	253	293	0	1,908	2,581	6,800
1993	2,468	305	0	2,773	958	99	98	79	663	1,954	6,624
1994	3,088	149	143	3,380	95	207	290	161	3,454	4,926	12,513
1995	3,397	495	66	3,958	37	0	234	0	1,233	1,247	6,709
1996	5,140	1,371	183	6,694	42	10	26	0	1,584	2,389	10,745
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
Average 2004–2008	3,136	738	289	4,162	46	158	108	0	635	596	5,705
Average 1999–2008	4,020	1,087	264	5,372	85	94	84	14	634	1,515	7,799

[a] In 1991, the Gulkana River was closed to the harvest of rainbow trout.

Table 22.–Harvest of wild Dolly Varden by sport anglers fishing UCUSMA waters by drainage, 1990–2009.

Year	Klutina River Drainage	Tazlina River Drainage	Tonsina River Drainage	Copper River Drainage		Other Sites	Area Total
				Upstream of Gulkana	Downstream of Klutina		
1990	2,156	476	459	0	0	34	3,125
1991	1,448	0	179	26	154	90	1,897
1992	1,294	57	630	0	0	16	1,997
1993	1,818	26	689	106	0	534	3,173
1994	1,250	11	216	56	9	56	1,598
1995	712	44	500	66	48	325	1,695
1996	838	0	462	1,043	24	208	2,575
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
Average 2004–2008	419	0	95	62	205	142	923
Average 1999–2008	655	13	250	44	142	102	1,206

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

Table 23.–Stocking schedule for lakes in the UCUSMA.

Area (Access) Lake	Lake Size (Acres)	Species	Stocking Years	Year Last Stocked	Number Stocked [a]
		Glenn Highway			
Arizona Lake	25	Grayling	Alternate	2003	800 F
Buffalo Lake	4	Rainbow	Annual	2009	1,000 F
DJ Lake	4	Rainbow	Alternate	2010	400 F
Gergie Lake	60	Rainbow	Alternate	2010	11,964 F
		Coho	Annual	2008	300 F
Little Junction Lake	5	Grayling	Alternate	2000	200 C
Ryan Lake	45	Rainbow	Annual	2009	1,000 F
Tex Smith Lake	15	Rainbow	Annual	2009	3,000 F
Tolsona Lake	320	Rainbow	Alternate	2008	30,231 F
		Richardson Highway			
Dick Lake	40	Arctic Char	Alternate	2010	2,952 S
Pippin Lake	160	Rainbow	Annual	2009	8,000 F
		Coho	As Needed	2010	1,254 F
Squirrel Creek Pit	5	Grayling	Annual	2001	800 C
		Rainbow	Annual	2006	420 C
		Lake Louise Road			
Connor Lake	18	Grayling	Alternate	2003	775 F
Crater Lake	16	Rainbow	Alternate	2010	3,200 F
Junction Lake	18	Grayling	Alternate	2003	793 F
Little Crater Lake	2	Rainbow	Alternate	2010	400 F
Old Road Lake	1.5	Rainbow	Annual	2009	1,000 F
Peanut Lake	12	Rainbow	Alternate	2010	600 F
Round Lake	2	Rainbow	Annual	2009	1,000 F
		Edgerton Highway			
Three Mile Lake	20	Rainbow	Alternate	2009	4,000 F
Two Mile Lake	17	Rainbow	Alternate	2009	4,000 F
		McCarthy Road			
Sculpin Lake	190	Rainbow	Annual	2009	10,000 F
Silver Lake [b]	500	Rainbow	Annual	2010	7,571 S/C
Strelna Lake	290	Coho	Annual	2010	10,528 F
		Rainbow	Alternate	2009	5,000 F
Van Lake	280	Rainbow	Alternate	2005	14,000 F
		Remote Lakes			
John Lake	160	Rainbow	Alternate	2008	7,100 F
Kathleen Lake		Rainbow	Alternate	2010	2,800 F
North Jans Lake	58	Rainbow	Alternate	2010	11,496 F
South Jans Lake	100	Coho	Annual	2010	19,603 F
		Rainbow	Alternate	2010	10,141 F
Tolsona Mt. Lake	75	Rainbow	Alternate	2010	10,078 F

[a] F = fingerling, C = catchable, and S = subcatchable

[b] Silver Lake has been stock with fish transferred from Summit Lake in the Chitina River drainage since 2003

Table 24.–Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1990–2009.

		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
1990	2,665	5,791	51	2,531	68	8,441	3.2	2,548	17	935	34	3,534
1991	4,812	10,936	347	1,920	243	13,446	2.8	6,240	69	726	243	7,278
1992	7,623	20,612	508	3,998	0	25,118	3.3	8,280	379	1,623	0	10,282
1993	4,782	16,676	56	3,760	0	20,492	4.3	6,327	56	852	0	7,235
1994	5,561	12,674	496	4,055	45	17,270	3.1	4,209	80	1,167	0	5,456
1995	5,441	10,270	109	4,189	0	14,568	2.7	4,252	42	804	0	5,098
1996	3,759	9,190	693	6,230	0	16,113	4.3	4,000	414	726	0	5,140
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	1,039	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	1,265	0	4,541
2000	3,689	8,038	800	2,954	298	12,090	3.3	2,546	436	521	57	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	1,939	22	4,862
2003	3,374	4,777	0	3,309	495	8,581	2.5	2,426	0	688	495	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	1,013	0	35	0	1,048
Average 2004–2008	1,998	3,866	0	337	160	4,363	2.4	1,188	0	158	63	1,409
Average 1999–2008	2,767	5,672	162	2,292	184	8,311	3.0	1,882	95	568	83	2,638

Table 25.–Stocking summary by species in biomass (kg) for lakes in the UCUSMA 1990–2009.

	Stocked catchables and subcatchables					Stocked fry and fingerling					
Year	Rainbow trout	King Salmon	Arctic grayling	Arctic char	Total	Rainbow trout	Coho Salmon	Arctic grayling	Arctic char	Total	Grand Biomass Total
1990	315	0	0	0	315	390	200	219	0	809	1,124
1991	330	0	0	0	330	161	27	107	0	434	764
1992	378	2,122	0	0	2,500	523	119	86	0	858	3,358
1993	292	1,472	0	0	1,764	187	19	65	11	517	2,281
1994	308	0	0	0	308	204	274	67	276	932	1,240
1995	50	0	0	0	50	833	219	10	40	1,102	1,152
1996	523	0	0	0	523	652	196	38	60	947	1,470
1997	1,407	0	0	0	1,407	285	316	0	0	601	2,008
1998	678	0	0	105	783	25	237	0	0	262	1,045
1999	653	0	54	0	707	352	224	0	0	577	1,284
2000	630	0	703	312	1,644	0	241	0	0	241	1,885
2001	1,559	0	325	0	1,884	276	0	0	0	276	2,160
2002	1,132	0	0	0	1,132	0	122	0	16	139	1,271
2003	1,483	0	0	337	1,820	63	0	2	0	64	1,884
2004	2,048	0	0	0	2,048	77	39	0	0	116	2,164
2005	1,683	0	0	286	1,969	20	0	0	0	20	1,989
2006	672	0	0	0	672	56	0	0	0	56	728
2007	735	0	0	12	747	139	0	0	0	139	886
2008	1,263	0	0	0	1,263	317	0	0	0	317	1,580
2009	1,424	0	0	0	1,424	61	0	0	11	72	1,813
Average 2004–2008	1,280	0	0	60	1,340	122	8	0	0	130	1,469
Average 1999–2008	1,186	0	108	95	1,389	130	63	0	2	195	1,583

FIGURES

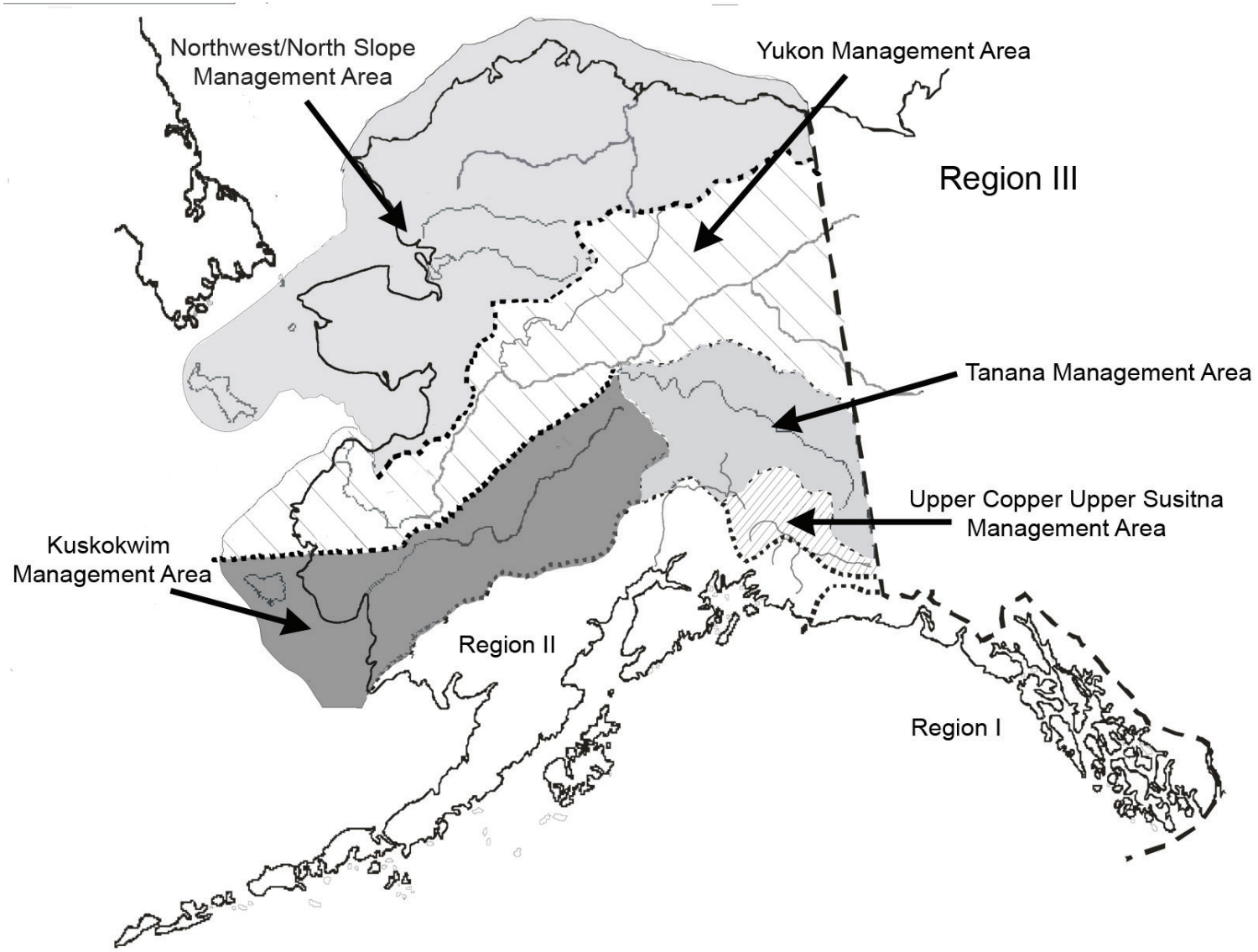

Figure 1.–Map of the sport fish regions in Alaska and the five Region III management areas.

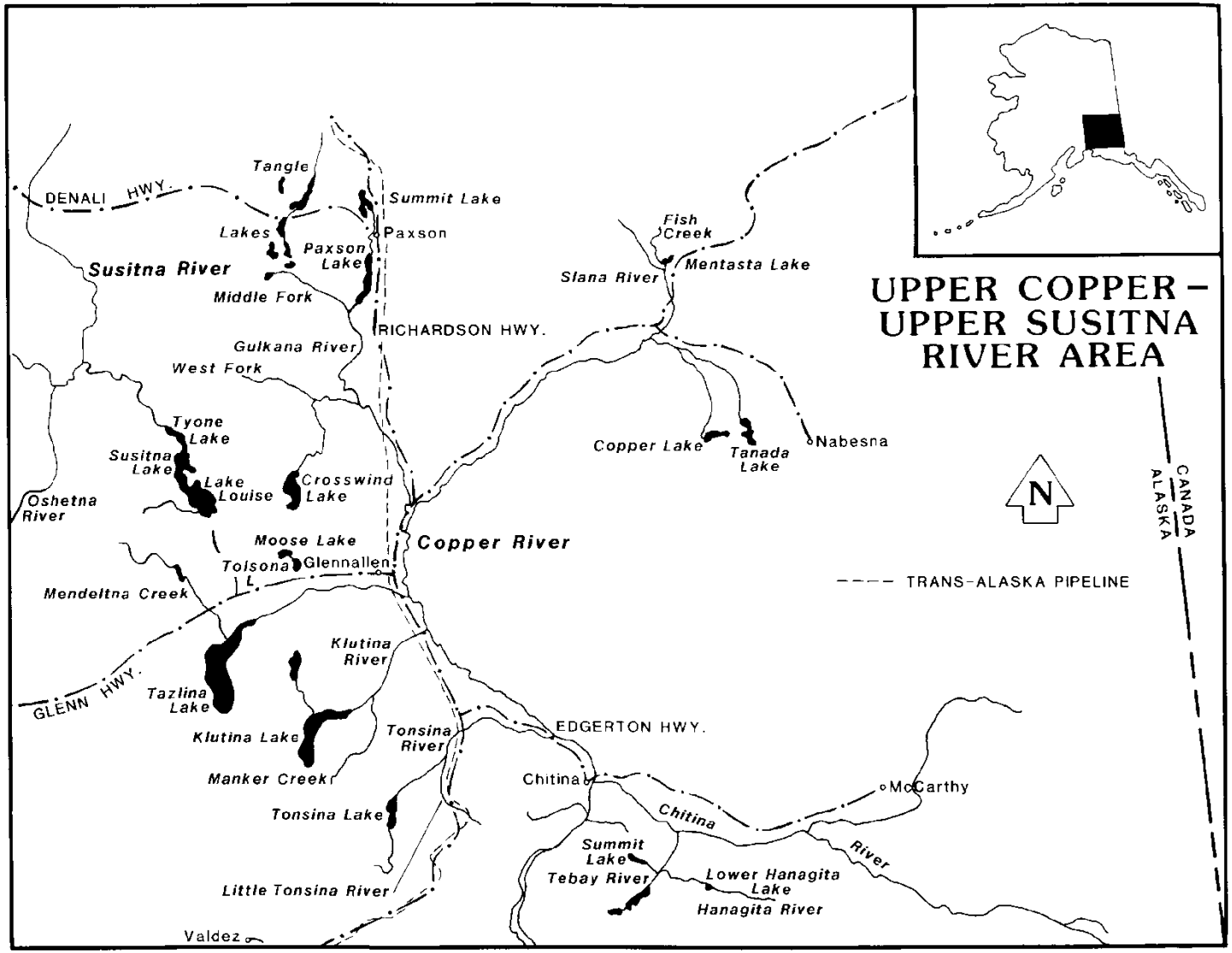

Figure 2.–The Upper Copper/Upper Susitna Management Area (UCUSMA).

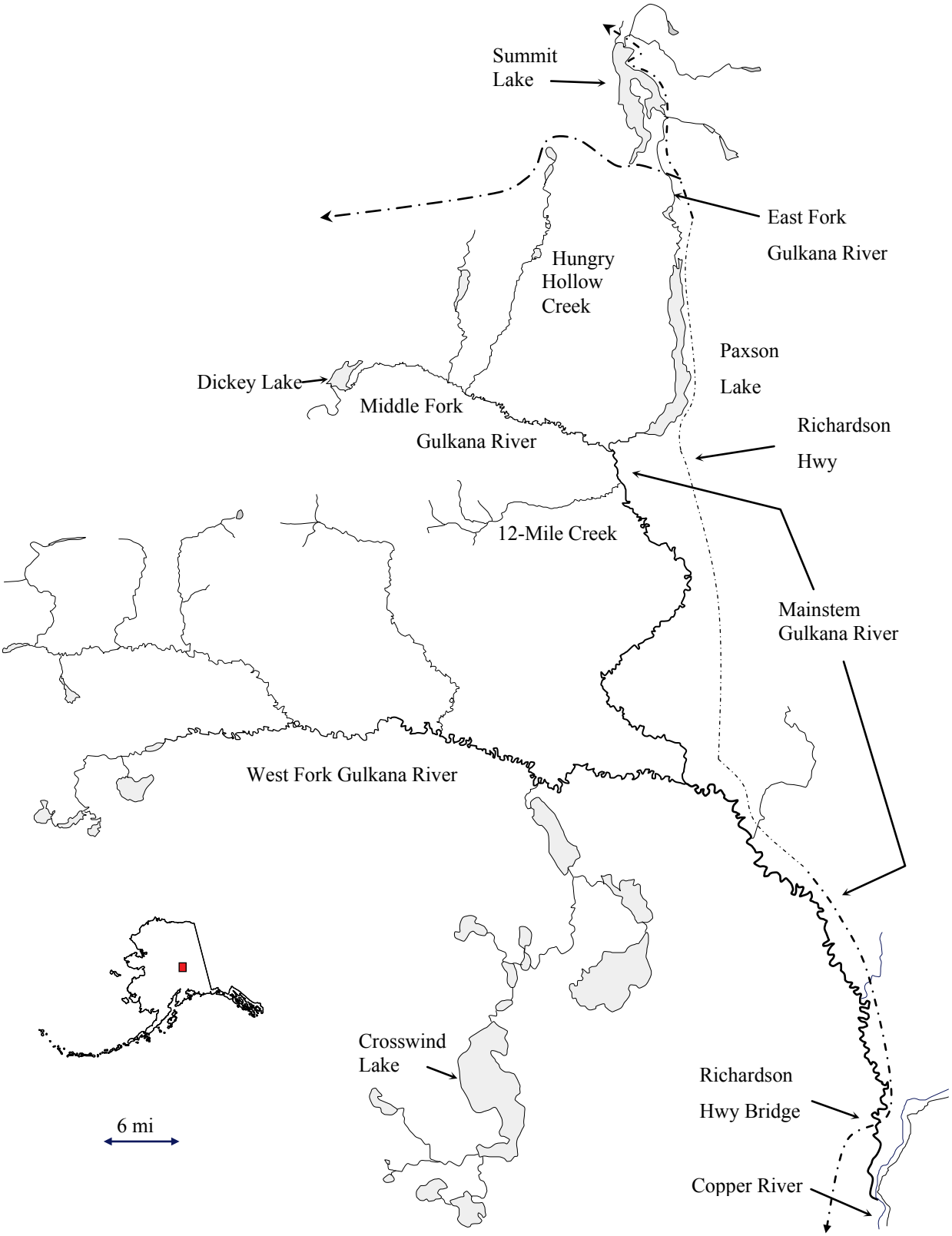

Figure 3.–Gulkana River drainage.

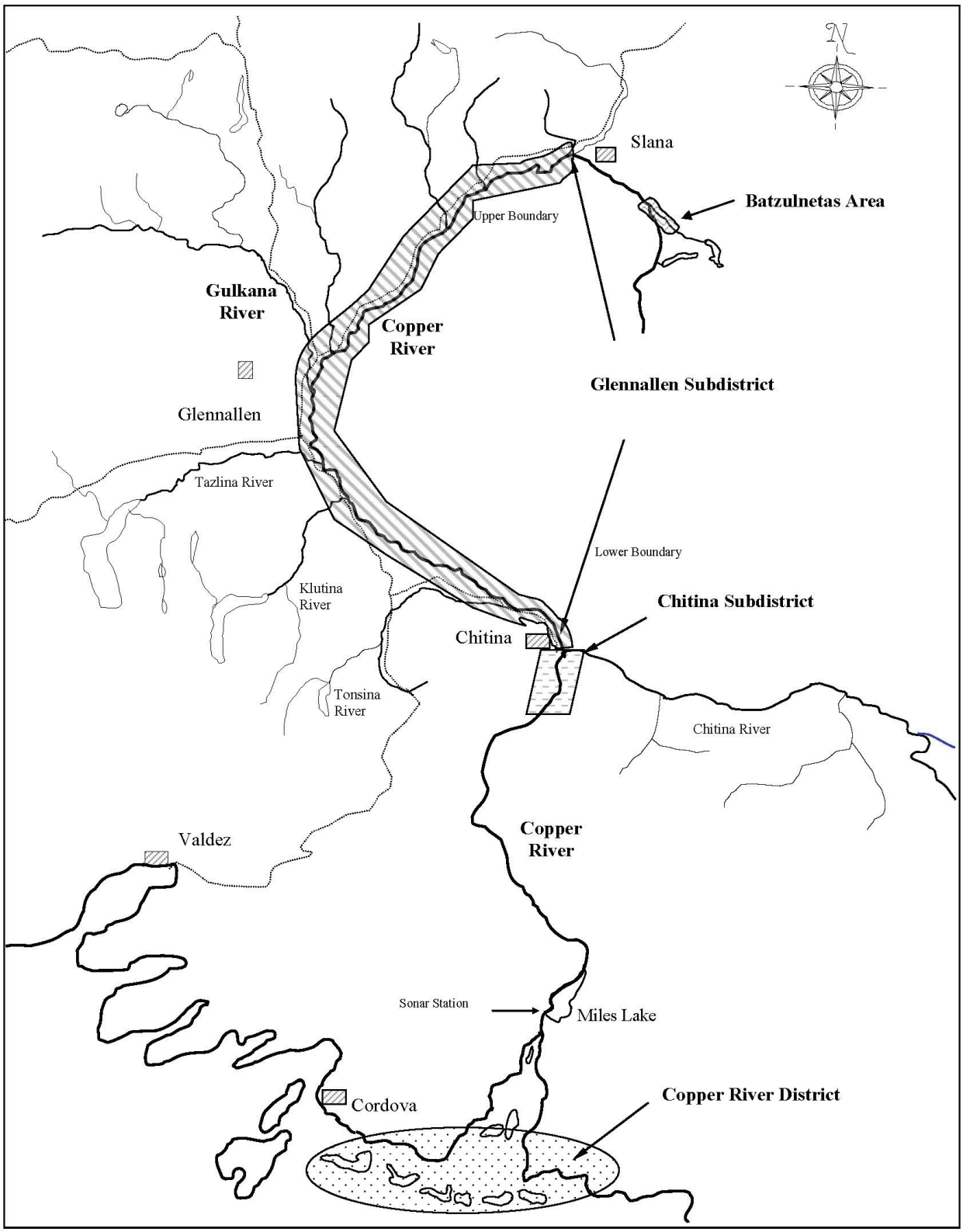

Figure 4.–Upper Copper River fishery subdistricts and areas.

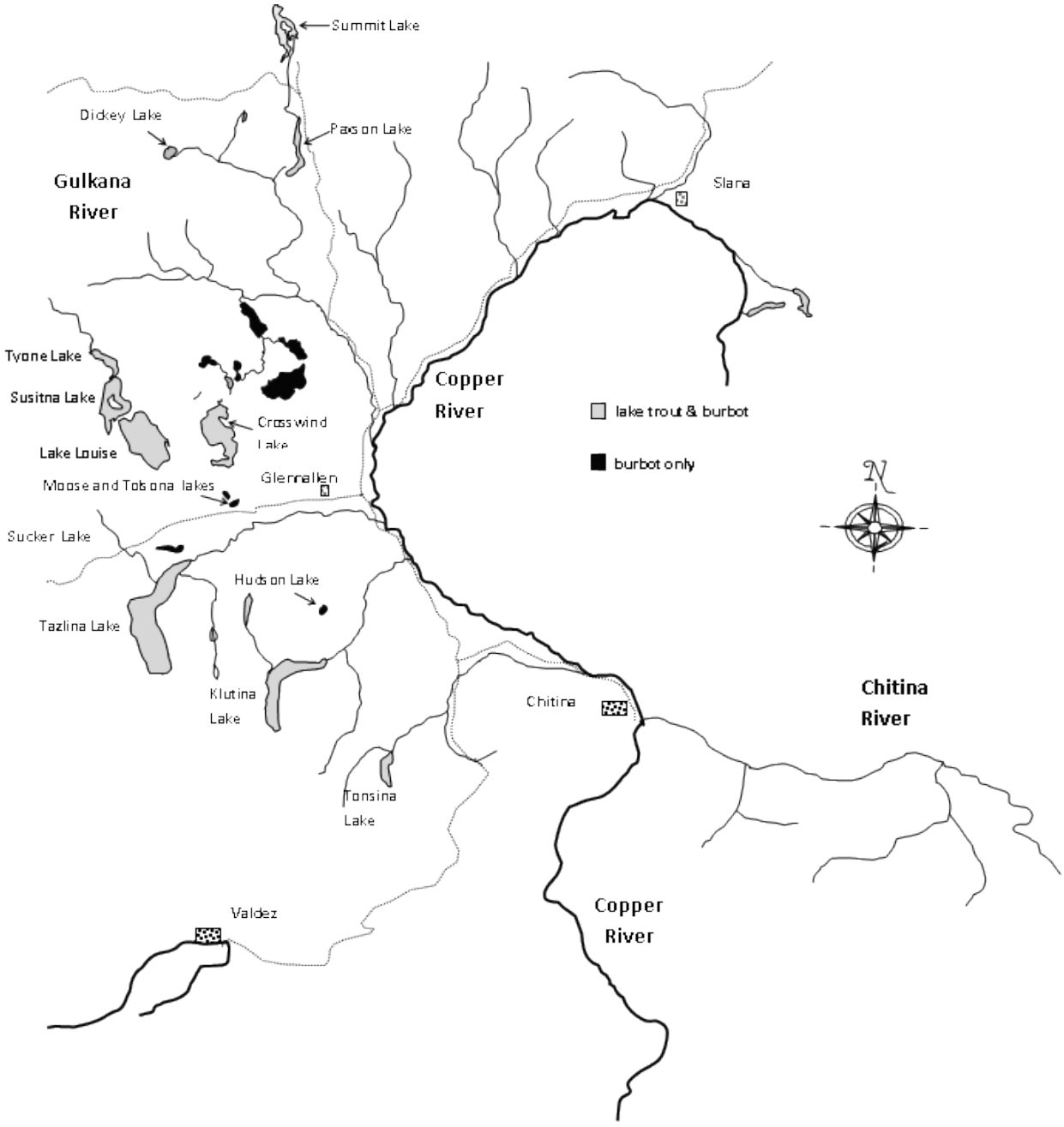

Figure 5.–Major lake trout and burbot fisheries in the UCUSMA.

APPENDIX A

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

Organization	Address	Phone	Internet address
Alaska Department of Fish and Game,			www.adfg.alaska.gov
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	www.glennallen.ak.blm.gov
Wrangell-St. Elias National Park & Preserve	PO Box 439 Copper Center, AK 99573	(907) 822-5234	www.nps.gov/wrst
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	www.chitinanative.com
Greater Copper Valley Chamber of Commerce	PO Box 469 Glennallen, AK 99588-0469	(907) 822-5555	www.traveltoalaska.com

APPENDIX B

Appendix B.–Emergency orders issued for UCUSMA sport, personal use, and subsistence fisheries during 2009 and 2010.

Year	E. O. Number	Explanation
2009	3-RS-01-09	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, 2009. Beginning on Sunday, 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.
2009	3-RS-01-09	Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River through August 31, 2009. The Chitina Subdistrict will open for a 156-hour period from 12:01 p.m. Monday, June 1 until 11:59 p.m. Sunday June 7.
2009	3-RS-02-09	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. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 8 until 11:59 p.m. Sunday June 14. In addition, this emergency order closes the Chitina Subdistrict Personal Use Dip Net Salmon Fishery to the retention of king salmon for the remainder of the 2009 season.
2009	3-RS-03-09	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, 2009. The Chitina Subdistrict will be open from 6:00 p.m. Monday, June 15 until 11:59 p.m. Sunday, June 21.
2009	3-RS-04-09	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, 2009. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 22 until 11:59 p.m. Sunday, June 28.
2009	3-RS-05-09	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, 2009. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 29 until 11:59 p.m. Sunday, July 5.
2009	3-RS-06-09	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, 2009. The Chitina Subdistrict will be open from 6:00 p.m. Monday, July 6 until 11:59 p.m. Sunday, July 12.

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Year	E. O. Number	Explanation
2009	3-RS-07-09	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, 2009. The Chitina Subdistrict will be open from 6:00 p.m. Monday, July 13 until 11:59 p.m. Sunday, July 19.
2009	3-RS-08-09	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, 2009. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 20 until 11:59 p.m. Sunday, July 26.
2009	3-RS-09-09	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, 2009. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 27 until 11:59 p.m. Sunday, August 2.
2009	3-RS-10-09	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, 2009. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 3 until 11:59 p.m. Monday, August 31.
2009	3-KS-02-09	Reduces the annual limit for king salmon 20 inches or more in length in the Upper Copper River drainage from four to two fish. In addition, no more than one king salmon of the two fish annual limit may be retained from any individual tributary or the mainstem of the Copper River after June 15, 2009.
2009	3-KS-03-09	Closes the Gulkana River drainage to fishing for king salmon effective 12:01 a.m. Monday June 29, 2009. This closure extends to the ADF&G marker located approximately 500 yards downstream of the confluence between the Gulkana River and the Copper River. The use of bait and treble hooks in these waters is also prohibited.
2009	3-KS-05-09	Prohibits retention of king salmon from the Klutina River and all waters of the Upper Copper River drainage downstream of the upstream bank of the Klutina River effective 12:01 a.m. Monday July 27, 2009. The use of bait in these waters is also prohibited.

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Year	E. O. Number	Explanation
2010	3-RS-01-10	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 4, 2010. Beginning on Friday, July 2, 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.
2010	3-RS-01-10	Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River District through August 31, 2010. The Chitina Subdistrict will remain closed through 12:59 p.m. Saturday, June 5. The Chitina Subdistrict will be open for a 29-hour period from 1:00 p.m. Saturday, June 5 through 6:00 p.m. Sunday, June 6.
2010	3-RS-02-10	Rescinds Emergency Order No. 3-RS-01-10 and Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River District through August 31, 2010. The Chitina Subdistrict will remain closed through 7:59 a.m. Saturday, June 5. The Chitina Subdistrict will be open for a 16-hour period from 8:00 a.m. Saturday, June 5 through 11:59 p.m. Saturday, June 5
2010	3-RS-03-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 7–June 13, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 7 until 11:59 p.m. Sunday, June 13.
2010	3-RS-04-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 14–June 20, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 14 until 11:59 p.m. Sunday, June 20.
2010	3-RS-05-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 21–June 27, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 21 until 11:59 p.m. Sunday, June 27. In addition, this emergency order closes the Chitina Subdistrict Personal Use Dip Net Salmon Fishery to the retention of king salmon for the remainder of the 2010 season.

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Year	E. O. Number	Explanation
2010	3-RS-06-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 28–July 4, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 28 until 11:59 p.m. Sunday, July 4.
2010	3-RS-07-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 5–July 11, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 5 until 11:59 p.m. Sunday, July 11.
2010	3-RS-08-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 12–July 18, 2008. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 12 until 11:59 p.m. Sunday, July 18.
2010	3-RS-09-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 19–July 25, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 19 until 11:59 p.m. Sunday, July 25.
2010	3-RS-10-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 26–August 1, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Wednesday, July 26 until 11:59 p.m. Sunday, August 1. In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be valid for the personal use dip net salmon fishery in the Chitina Subdistrict of the Copper River.
2010	3-RS-11-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 2–August 8, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 2 until 11:59 p.m. Sunday, August 8. In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be valid for the personal use dip net salmon fishery in the Chitina Subdistrict of the Copper River.

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Year	E. O. Number	Explanation
2010	3-RS-12-10	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 9–August 31, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 9 until 11:59 p.m. Tuesday, August 31.
2010	3-KS-01-10	Reduces the annual limit for king salmon 20 inches or more in length in the Upper Copper River drainage from four to two fish. In addition, no more than one king salmon of the two fish annual limit may be retained from any individual tributary or the mainstem of the Copper River after June 20, 2010.

APPENDIX C

Appendix C.–Federal subsistence permits and harvest[a] from the Copper River, Chitina Subdistrict, 2002–2010

Year	Permits Issued	Permits Returned	King	Sockeye	Coho	Steelhead	Other
2002	122	89	33	575	0	0	
2003	100	82	18	689	70	0	
2004	109	83	7	1,215	18	0	
2005	76	64	51	2,450	0	0	
2006	75	64	18	1,549	20	0	
2007	98	87	28	1,028	41	0	
2008	82	70	23	959	100	0	
2009	68	62	9	882	11	0	
2010	92	76	17	2,061	31	1	0

[a] Reported harvest only 2002–2004 and 2010; Expanded (estimates harvest from non-returned permits) harvest 2005–2009

APPENDIX D

Appendix D.–Federal subsistence permits and harvest[a] from the Copper River, Glennallen Subdistrict, 2002–2010.

Year	Permits Issued	Permits Returned	King	Sockeye	Coho	Steelhead	Other
2002	201	162	564	7,950	81	62	
2003	221	184	554	13,616	152	5	
2004	262	206	636	17,789	152	12	
2005	267	229	389	21,927	187	0	41
2006	254	222	460	18,346	28	15	71
2007	281	237	663	17,624	57	9	122
2008	270	219	837	14,475	229	26	52
2009	277	227	543	13,668	34	19	110
2010	263	233	300	12,849	64	39	62

[a] Reported harvest only 2002–2004 and 2010; Expanded (estimates harvest from non-returned permits) harvest 2005–2009.