

Fishery Management Report No. 11-55

**Fishery Management Report for the Recreational and
Subsistence Fisheries of the Upper Copper/Upper
Susitna River Management Area, 2010**

by

Mark A. Somerville

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

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FISHERIES OF THE UPPER COPPER/UPPER SUSITNA RIVER
MANAGEMENT AREA, 2010**

by

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ABSTRACT

Sport, personal use, and subsistence fisheries season summaries for 2010 and preliminary information for 2011 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 40,912 angler-days in 2010. Total sport catch in 2010 was 116,106 fish, with Arctic grayling making up 54,882 fish of this total. Sport harvest totaled 29,398 fish in 2010, with sockeye salmon accounting for 50% of the harvest. In the Glennallen Subdistrict state subsistence fishery a total of 73,260 salmon were harvested in 2010 which is the highest harvest since 2001. Sockeye salmon represented over 96% of the subsistence harvest. The Chitina Subdistrict personal use fishery state harvest totaled 141,565 salmon in 2010. 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, Klutina 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 proposals that the Alaska Board of Fisheries (board) will address at the December 2–7, 2011 meeting is contained within this report. As a means to assist board members in acquiring information in a timely manner, Appendix C has been constructed (page 81). This table guides the reader to specific information contained within the text, tables, and graphic format that, may be useful in evaluating regulatory proposals. Information specific to the recreational, personal use and subsistence fisheries within the Upper Copper/Upper Susitna Management Area during 2010 and including preliminary data from 2011 are presented along with a brief history of these fisheries and past board decisions that have affected them.

INTRODUCTION

This area management report provides information regarding the Upper Copper/Upper Susitna Management Area (UCUSMA) and its fisheries for 2010, with preliminary information from the 2011 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.

ADVISORY COMMITTEES

Local Advisory Committees (ACs) have been established throughout the state to assist the Boards of Fisheries and Game in assessing fisheries and wildlife issues and proposed regulation changes. AC meetings allow opportunity for direct public interaction with ADF&G staff attending the meetings that answer questions and provide clarification concerning proposed regulatory changes regarding resource issues of local and statewide concerns. The Board Support Section within ADF&G's Division of Administrative Services provides administrative

and logistical support for the board 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.

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 board 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 board. EOs issued under this authority for the UCUSMA during 2009 and 2010 are summarized in Appendix A.

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 Ninth Circuit Court in 1995, the federal government expanded the definition of public land to include waters for which the federal agencies assert federal reserved water rights. Under current practice, the federal land management agencies adopt regulations to provide for priority subsistence use by qualified rural residents in nonnavigable waters within federal public lands (including Bureau of Land Management (BLM) lands) and in navigable waters adjacent to or within federal conservation system units (generally does not include BLM lands). The state retains all other fish and wildlife management authorities, including management on federal land.

Development of regulations for subsistence fisheries under the federal subsistence program occurs within the established Federal Subsistence Board (FSB) process. The public provides 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 2011 in Cantwell. At this meeting, no federal fisheries proposals for the Prince William Sound (PWS) Area were addressed.

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. 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 1 individual with a valid fishing license (resident or nonresident). 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 2010 were not available until fall 2011. 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 board 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 board 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 board 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, 2011).

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The UCUSMA consists of all waters and drainages of the Copper River upstream from a line crossing the Copper River between the south bank of the mouth of Haley Creek and the south bank of the mouth of Canyon Creek in Wood Canyon, and all waters and drainages of the Upper Susitna River upstream from the confluence of the Oshetna River (Figure 1). 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 (NPS; Wrangell-St. Elias National Park); BLM (Gulkana Wild River); Ahtna, Incorporated; Chitina Native Corporation (CNC); 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 1 king salmon stock has been documented above Devil's 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 1).

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 board has established 1 personal use and 2 subsistence salmon fisheries in the Upper Copper River District. The Division of Sport Fish has lead management responsibility for these fisheries (Division of Commercial Fisheries 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, located near the mouth of the Copper River. From 2006–2010, an average of 1,049,248 sockeye salmon and 19,899 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*).

Some UCUSMA fisheries have been the focus of allocative conflicts. These conflicts have led the board 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 board for UCUSMA fish stocks:

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

Copper River King Salmon Management Plan (5 AAC 24.361). This management plan provides for a minimum sustainable escapement goal (SEG) 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 1 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 of 4 fish, 20 inches or greater in length. 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). This management plan ensures 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). 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 EO. 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). 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 3 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). 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 1 or more management actions if there is a conservation or biological concern for the sustainability of the fishery or a stock harvested in that fishery. These actions include reduction of bag and possession limit, reduction of fishing time, allowing only catch-and-release, and modification of methods and means of harvest. The plan also specifies allowable measures to reduce harvest if the harvest level exceeds sustainable yield for a 2-year period. Finally, the plan establishes a process for designating special management waters and means for limiting harvest in these areas to meet the management objectives.

Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan (5 AAC 52.065). 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 3 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 and Copper River Basin Rainbow/Steelhead Trout Management Policy. This management policy was adopted by the board 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 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 (NVE) and LGL Alaska Research Associates, Inc (LGL).

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 2 consecutive board meetings. The last change in the status of this fishery occurred in 2003 when the board 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 board declined to review its 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 board over its 2003 decision. In March 2010, the Alaska Superior Court remanded the case back to the board due to the 2003 board members’ inconsistent definition of the “subsistence way of life”. In March 2010, the board 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 3 rivers supporting major fisheries in the Upper Copper River drainage. Ahtna, Inc. controls the uplands along the Klutina River between Klutina Lake and the Richardson Highway. The corporation owns the majority of land along the Gulkana River downstream of Sourdough and the Gulkana River National Wild River corridor. Ahtna, Inc., or its shareholders, also own the majority of land along the Copper River within the Glennallen Subdistrict. Ahtna, Inc. initiated an access fee program for corporation uplands adjacent to the Klutina River (1998) and the Gulkana River (1999). The fee program ended years of free access to these river systems. Access fees 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 BLM), RS 2477 (managed by the Alaska Department of Natural Resources(DNR)), and a Department of Transportation (DOT) right of way (ROW) that provides free access to Klutina Lake and Klutina River where the river passes within the width of the RS 2477 and DOT ROW. The 17b easement provides access to the Klutina River at approximately Mile 21 of the Klutina Lake Road, downstream of the lake. On the Gulkana River, public access to the river is limited to 4 public 17b easements along the Richardson Highway: Sailors Pit at mile 130.9, Poplar Grove (mile 137), Mile 141 trail, and the Middle Fork trail at mile 169.5. There is also public access via the DOT ROW around the Richardson Highway Bridge and via the BLM Paxson Lake campground boat launch.

Access to the Chitina Subdistrict fishery has long been an issue between dipnetters and the 2 local Native corporations (Ahtna, Inc. and CNC). 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 CNC, who remained concerned over trespass and vandalism caused by dipnetters. In July 2004, CNC 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, requiring 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, since 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, CNC 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.

Other 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 nonfishing recreationalists seeking a quality, or just fun, float experience has added to river use and conflicts. The 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 board 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 board meeting, a positive C&T determination was made for the freshwater fishes in the PWS Area which includes the entire UCUSMA. Freshwater subsistence permits have been 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 this subsistence fishery 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 states for 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, restrooms, 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 is located on 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 (NPS) can be obtained from the respective agency offices in Glennallen and Copper Center. 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.

There are 3 regional information and education (I&E) staff located in the Fairbanks office. An Information Officer II and a seasonal Fisheries Technician III respond to questions from the public at the office and via phone and e-mail. In addition, I&E staff distribute and update fishery brochures, fishing regulations, the regional webpage, coordinate the Fairbanks Outdoor Show

booth, Kid's Fish & Game Fun Day, and the Becoming an Outdoors Woman (BOW) program. An Education Associate II coordinates the sport fishing component of the Alaska Conservation Camp and works with schools in various communities throughout the region to provide a curriculum in sport fishing and aquatic education.

SPORT FISHING EFFORT, HARVEST, AND CATCH

Effort, harvest, and catch statistics for UCUSMA sport fisheries have been estimated from response to the SWHS 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, 2011, *In prep*). Estimated angler effort in the UCUSMA averaged 1.7% of the overall statewide effort, 21.3% of the Region III effort from 2005 to 2009, and was 2.0% of the overall statewide effort and 22.1% of the Region III effort in 2010 (Table 3).

Anglers expended a total of 52,210 angler-days of effort in UCUSMA drainages in 2010, 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, except for 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 68% of the total area effort in the past decade.

Sockeye salmon are the predominant species harvested in the UCUSMA, representing 52% (14,061 fish) of all species harvested from 2005–2009 and 50% (14,743 fish) in 2010 (Table 5). Arctic grayling were the next most popular species harvested after sockeye salmon through 2004. From 2005–2007 king salmon held the second highest harvest, but was again surpassed by Arctic grayling in 2008.

Arctic grayling are the predominant species caught in the UCUSMA, representing 46% (46,075 fish) of all species caught from 2005–2009 and 47% (54,882 fish) in 2010 (Table 6). In most years through 2004, king salmon were the second most caught species in the UCUSMA, followed by rainbow trout or sockeye salmon. Beginning 2005, sockeye salmon took over the number 2 spot followed by rainbow trout and king salmon.

SECTION II: FISHERIES

This section discusses the major fisheries in the UCUSMA. Discussion of each sport fishery will center on harvest and catch data presented in the 2010 SWHS (Jennings et al. *In prep*). Survey results for 2011 will not be available until the fall of 2012. Observations or research data regarding these fisheries in 2011 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 2010 are presented in Table 5 for harvest and Table 6 for catch. Personal use and subsistence participation harvest data is estimated from permits required and issued for those fisheries.

KING SALMON SPORT FISHERIES

Background and Historical Perspective

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

King salmon are found in at least 40 tributaries distributed throughout the Copper River Basin. Aerial escapement surveys have been conducted in 35 of these systems, with 9 (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. 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 estimated that only 45% of the king salmon returns to the Klutina River, and 18% 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 9 index streams represented only 34%–46% of total escapement in the Copper River drainage. Annual aerial index counts were reduced and have continued on only 4 index streams: Gulkana River, East Fork Chistochina, and Manker and St. Anne Creeks in the Klutina River drainage. These 4 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 harvest 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 runs and harvest of king salmon continued to increase and remained high through 1999. From 1999 to 2010 total king salmon runs ranged from 33,053–99,639 fish (Table 7) and averaged 69,960 fish over the last 5 years (2005–2009). King salmon escapement has ranged from 16,294 to 58,454 from 1999 to 2010 and averaged 34,964 fish from 2005 to 2009.

From 2005 to 2009, total harvest of king salmon from the Copper River averaged 34,996 fish. Since 2004, total king salmon harvests have steadily declined, with the 2009 total harvest of 14,777 king salmon the lowest since 1980. In 2010, total king salmon harvest increased slightly to 16,419 fish, but the overall run was only 33,053 king salmon and was insufficient to achieve the 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 limit of 5 king salmon was established for the Upper Copper River drainage in an attempt to stem rising king salmon harvests. Harvests of king salmon continued to increase through 1998 (Table 8). In general, sport harvest of king salmon has declined from 1999 through 2009. From 2005–2009, sport harvest of king salmon in the UCUSMA has averaged 3,522 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 sport harvest (LaFlamme 1997). From 1997 to 1999, a coded-wire-tagging study was conducted in the Gulkana, Klutina, Tonsina, and East Fork Chistochina rivers. 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 NVE and LGL, has provided a postseason estimate of annual king salmon escapement to the Copper River since 2003 (Smith et al. 2003; Smith 2004; Smith and van den Broek 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 (D. Sigurdsson, Sport Fish biologist, ADF&G, Anchorage, personal communication.) (Table 9). These guides made between 109 and 364 trips each year with 364 to 1,251 clients 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. In 2010, 18 guides made 139 trips with 452 clients and harvested 197 king salmon in the Gulkana River. Prior to the 1986 season, only 1 individual specialized in guiding anglers for king salmon on the Gulkana River. In 1989, 5 guides were operating on the Gulkana River (Potterville and Webster 1990). On the Klutina River, 22–28 guides logged 359 to 500 trips with 1,203–1,657 clients from 2006 through 2009 and reported harvesting 374 to 904 king salmon in those years (Sigurdsson and Powers 2009, 2010, personal communication.) (Table 9) In 2010, 25

guides made 407 trips with 1,286 clients and harvested 563 king salmon in the Klutina River (Sigurdsson and Powers 2011). Only 7 guides reported operating on the Tonsina River in 2006, harvesting 18 king salmon. No guides reported operating on the Tonsina River in 2007–2010.

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 7 state and federal trail and site easements, and 1 privately-owned and controlled site accessible from the Richardson Highway, which parallels much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the Richardson Highway Bridge. Powerboat operators generally launch at the BLM Sourdough launch and use the river from approximately 2 miles below Sourdough upstream to several miles above the confluence of the West Fork. Powerboat operators also launch from the Richardson Highway Bridge and fish the 5-mile reach of the river above the bridge. Powerboat operators access the mouth of the Gulkana River, when the river level is sufficiently high, by launching near the Richardson Highway Bridge and boating down the Gulkana River, and when water levels are lower, by launching in the Gakona River, to the north, and then boating down the Copper River.

The Gulkana River drainage has historically supported the largest sport fishery for harvest (Table 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 20. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork (Figure 2).

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.

A counting tower to estimate king salmon escapement has been operated on the Gulkana River since 2002 (Taras and Sarafin 2005; Perry-Plake et al. 2007; Perry-Plake and Antonovich 2009, Savereide 2010). 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 2011; Savereide *In prep*). Management action restricting the Gulkana king salmon fishery to catch and release only, allowed escapement to increase in 2011 to 3,804 king salmon (Maclean and Huang *In prep*). A long-term goal of this project is to establish a king salmon SEG for the Gulkana River.

Current regulations for the Gulkana River king salmon sport fisheries are somewhat complex. The regulations are designed to accommodate concurrent fisheries on other species, provide protection to these other species populations, and provide protection for spawning king salmon. While

complex, the regulations still attempt to provide 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 2). The remainder of the river is open to king salmon fishing from January 1 through July 19. From June 1 through July 19, anglers may use bait, artificial lures, and treble hooks upstream from the Richardson Highway Bridge to an ADF&G marker located 7.5 miles upstream of the West Fork confluence. From June 1 through July 31, anglers are limited to using only single-hook, artificial flies from the Richardson Highway Bridge downstream to an ADF&G marker approximately 500 yards downstream of the confluence with the Copper River. In all waters of the Gulkana River drainage, upstream of a marker 7.5 miles upstream of the West Fork confluence with the mainstem, and in the entire Gulkana River drainage from July 20 to May 31, only unbaited, single-hook artificial lures may be used. This restriction is intended to protect the resident rainbow trout population and the small population of steelhead that return to the Gulkana River.

Recent Fishery Performance

The sport harvest of king salmon in the Gulkana River averaged 2,167 fish over the last 5 years (2005–2009) and 2,687 fish from 2000 to 2009 (Table 8). Angler effort on the Gulkana River, which is presumed to be focused on 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 5-year average (2005–2009) of 19,233 angler-days. In 2010, angler effort was 16,714 angler-days which is the second lowest since 1980, and likely reflects the king salmon fishery restrictions taken in that year.

In 2009, 2010, and 2011 management actions were taken on the Gulkana River king salmon fishery to ensure adequate spawning escapement in consideration of weak king salmon runs. On June 15, 2009, the annual limit for king salmon 20 inches or more in length was reduced from 4 to 2 fish, of which only 1 king salmon could be retained from any individual tributary or the mainstem Copper River. On June 29, 2009, the Gulkana River king salmon fishery was closed by EO.

In 2010, due to low harvest of king salmon in the Copper River District commercial fishery and low capture rates in the NVE and LGL fish wheels that were similar to those observed in 2009, the annual limit for king salmon 20 inches or greater in length was reduced by EO from 4 to 2, with 1 one fish allowed from any Upper Copper River tributary and mainstem Copper River, effective June 21, 2010 (Appendix A). No further management action was taken in 2010 due to tower counts that initially indicated an average to slightly below average spawning escapement. However, the final escapement estimate for king salmon in the Gulkana River for 2010 was 2,267 (Savereide *In prep*), the lowest number recorded since the project was established in 2002.

On June 25, 2011, the annual limit for king salmon 20 inches or greater in length was reduced by EO from 4 to 2, with only 1 fish allowed from any Upper Copper River tributary and mainstem Copper River (Appendix A). In addition, retention of king salmon was prohibited in all flowing waters of the Copper River Drainage upstream of the Klutina River (including the Gulkana, Tazlina, and Chistochina rivers) resulting in a catch-and-release fishery with the use of bait and treble hooks prohibited. These actions were taken in response to a below average commercial harvest, less than expected counts in NVE/LGL fish wheels, and lower than expected counts at the Gulkana River king salmon counting tower.

Fishery Objectives and Management

The underlying goal of management of king salmon on the Gulkana River is to ensure sustained yield. To meet this goal, escapement objectives (postseason indices of escapement only) were developed for several river systems based on the 1977–1995 average aerial index count for those systems. Only years in which the systems were surveyed between July 17 and 31 were used in the average as this was considered the peak spawning period. 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 averaged 1,449 king salmon. Aerial surveys were flown on July 30 in 2010, with an index count of 728 king salmon, and on July 22, 2011, with an index count of 513 king salmon. As of July 22, 2011 2,604 king salmon had been counted past the tower. An additional 1,200 king salmon were counted past the tower following the aerial survey.

Current Issues and Fishery Outlook

Increased use by raft 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 board meetings, proposals were submitted to limit motor boat use on the Gulkana River. None of these proposals were addressed, because they fell outside the purview of the board. However, BLM has authority within the designated wild section of the river to establish a permit system for camping on its 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 sites. A combination of private and federal campgrounds and a developed public use area on Alaska Department of Transportation (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.

Recent Board of Fisheries Actions

There was 1 proposal before the board at its 2008 meeting which concerned the Gulkana River king salmon fishery. Proposal 113 sought to close the Klutina and Gulkana Rivers to power boats for 2 days each week. No action was taken on this proposal.

There are 2 proposals before the board for the 2011 meeting specific to the Gulkana River king salmon sport fishery.

- #126 - Change the Gulkana River king salmon season from January 1 through July 19, 7 days per week, to June 10 through August 10, 5 days per week.
- #127 - Restrict commercial sport fish guiding when the commercial drift gillnet fishery is closed for conservation measures.

Current or Recommended Research and Management Activities

Managers depend on aerial index counts to assess escapement of king salmon. However, these index counts are only postseason indicators of relative spawning abundance and greatly depend

on favorable weather conditions and surveyor consistency for useful counts. The counting tower has already proven to be effective for inseason management and should be maintained as a future management tool. Aerial index counts have also proven valuable as a tool for management decisions and 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 3 broad groups of king salmon populations that were genetically similar (Seeb et al. 2009). The 3 groups included Upper Copper River, Gulkana River drainage, and 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. 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 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 distribution of king salmon in the Upper Copper River drainage (Savereide 2005a). Another radiotelemetry study should be conducted in the future to augment the 3 years of distribution data and reconcile a difference between the genetic distribution data and radiotelemetry distribution data concerning the Chitina River drainage. 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 river upstream of the Richardson Highway and downstream to the Copper River confluence. 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. Current open seasons and areas are designed to allow king salmon to spawn undisturbed. 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 less than 20 inches is 1 fish. The Upper Copper River drainagewide annual limit of 4 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 3 surveys indicated that most king salmon 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%). 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. 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. In 2006, guided anglers accounted for 90% of the king salmon harvest in June and 79% of the harvest in July.

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. 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). 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. 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 2 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 2 streams accounted for about 45% of the spawning population of the Klutina River system. Additionally, 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. 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 reports, to assess the king salmon run to ensure the drainagewide 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 limit was reduced from 5 to 4 fish less than 20 inches, and coincided with a decrease in angler effort and king salmon harvest and catch in the Klutina River. About this time, Ahtna, Inc. began enforcing trespass issues along the Klutina Lake Road; this may explain the decrease in harvest. The harvest of king salmon from the Klutina River has ranged from 1,136 to 1,873 fish between 2000 and 2008.

In 2009, 2010, and 2011 management actions were taken to ensure adequate spawning escapement in light of weak king salmon runs to the Copper River drainage (Appendix A). On June 15, 2009, the annual limit for king salmon 20 inches or more in length was reduced from 4 to 2 fish, with only 1 king salmon retained from any individual tributary or the mainstem Copper River. On July 27, 2009, an EO was issued that prohibited 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, resulting in a catch-and-release fishery with use of bait prohibited. Due to low harvest of king salmon in the Copper River District commercial fishery and low capture rates in the NVE/LGL fish wheels, the annual limit for king salmon 20 inches or greater was reduced by EO from 4 to 2 king salmon, with only 1 king salmon allowed from any Upper Copper River tributary and the mainstem Copper River in both 2010 (June 21) and 2011 (June 25). No other actions were taken in 2010 or 2011 that were specific to the Klutina River.

As a result of restrictive management actions the 2009 and 2010 harvest of king salmon from the Klutina River was 733 and 863 fish, respectively (Table 8), below the 2005–2009 average harvest of 1,198 fish. The 2005–2009 average angler effort on the Klutina River was 13,531 angler-days (Table 4) and average catch was 2,425 king salmon (Table 10). Angler effort in 2009 and 2010 were near the historical high at 15,665 and 16,512 angler-days, respectively. However, the catch of king salmon was below average in 2009 at 1,888 fish and was above average in 2010 at 3,240 fish (Table 10).

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 runs inseason, along with anecdotal reports from the subsistence, personal use and sport fisheries, catch data from the Copper River commercial gillnet fishery, and NVE/LGL project fish wheels.

The Klutina River king salmon run is managed as a single stock. Anglers and guides, however, consider the return to be 2 separate stocks of kings, 1 early and 1 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. 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 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 1991, the king salmon sport harvest from the Klutina River has comprised 30%–50% of the overall Upper Copper River drainage sport harvest, and from 1991 through 2009 has averaged 35% of the 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 2 rivers, with the most recent declines in 2009–2011 due to restrictive management actions in those years. Strong sockeye salmon runs since 2006 have increased popularity of the Klutina River leading to historically high angler effort in 2007 through 2010 (Table 4).

In 2008, the board 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 by delaying the opening date, but increases it on the latter component of the return by extending the closing date. The overall effects of this change will not be known until several seasons with the new season dates have occurred.

The presence of powerboats and rafts on the swift Klutina River may pose a safety hazard to users. Many sections of the river are not wide enough to allow 2 watercraft to pass and result in conflicts between the 2 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, based on a previous meeting regarding river access, the general public and ADF&G support improved public access to the river.

Many guides and sport anglers continue to report violations of bag and annual limits by shore-based anglers fishing between the Richardson Highway Bridge and the mouth of the Klutina River. Reports of anglers harvesting more than 1 bag limit are difficult to enforce because anglers need to be observed with 2 limits in their possession during the same day.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna, Inc., who 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 board at its 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 2 days each week and was not addressed by the board as it was outside the board's authority.

The board addressed 3 proposals concerning king salmon seasons on the Klutina and Tonsina rivers, and Copper River mainstem as a single proposal. The amended proposal adopted by the

board 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 run, while the July 1st opening date would protect approximately 20% of the front portion of the run. This action shifted harvest from the early portion of the run to larger later portion of the run.

There is 1 proposal before the board for the 2011 meeting specific to the Klutina River king salmon sport fishery.

- #127 - Restrict commercial sport fish guiding when the commercial drift gillnet fishery is closed for conservation measures.

Current or Recommended Research and Management Activities

Aerial surveys provide an inseason assessment of the king salmon run in the Klutina River and should be continued. Management of king salmon in the Klutina River would benefit from another radiotelemetry project to 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. Genetic sampling to determine if tributary and mainstem spawning groups are distinct stocks or a single related stock would be useful. Continuation of the NVE/LGL king salmon population estimation provides the best inriver abundance estimate of king salmon for the Copper River and is essential to management of king salmon sport fisheries.

Inseason management of the Klutina River king salmon stock may benefit from a system to count or estimate the king salmon run to the river. However, current technology does not provide a reliable and accurate species apportionment between sockeye salmon and king salmon, since these 2 species run timings overlap.

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 1). 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, with some angling conducted by raft between the Richardson and Edgerton highways, and some 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. The sport harvest of king salmon in the Tonsina River has averaged 74 fish over the last 5 years (2005–2009) and 75 fish over the last 10 years (Table 8). In 2010, the SWHS estimated a harvest of zero king salmon from the Tonsina River. Creel surveys have not been conducted on the Tonsina River due to low fishing effort and king salmon harvest within this drainage.

Based on the king salmon radiotelemetry study, 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.

Current regulations allow sport fishing for king salmon in the Tonsina River from July 1 through July 19 upstream of the downstream edge of the Alyeska Pipeline access bridge to Tonsina Lake, 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 limit for king salmon over 20 inches in this drainage is 1 fish, with an annual limit of 4 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 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 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 postseason escapement index, but had limited utility to describe overall escapement in these systems.

Current Issues and Fishery Outlook

Sport fish effort directed at the Tonsina River king salmon run remains low 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 Copper River king salmon stocks.

Recent Board of Fisheries Actions

The board considered 6 proposals and adopted 3 during its 2008 meeting that concerned the king salmon fisheries in waters other than those of the Klutina and Gulkana Rivers. The board 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).

There is 1 proposal before the board for the 2011 meeting that would impact the king salmon sport fisheries of the Copper River drainage, other than the Gulkana and Klutina rivers.

- #127 - Restrict commercial sport fish guiding when the commercial drift gillnet fishery is closed for conservation measures.

Current or Recommended Research and Management Activities

Assessment of the genetic structure of Copper River king salmon stocks included sampling from the Tonsina, Tazlina, Klutina, and Chitina drainages (Seeb et al. 2006, 2009). These drainages appear to have a similar genetic structure that is distinct from Gulkana and Upper Copper River king salmon stocks.

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.

SOCKEYE SALMON SPORT FISHERIES

Background and Historical 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 by sonar since 1978 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, 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 2005 to 2009, sport harvest of sockeye salmon from UCUSMA waters averaged 14,061 fish (Table 11). The sockeye salmon sport harvest in 2010 (14,743 fish) was an increase over

2008 and 2009, and was dominated by the Klutina River where 12,238 sockeye were harvested in 2010. 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 2000 to 2009.

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). 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 1) 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 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 runs 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 are 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 total run is unknown, because 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 the king salmon counting tower project initiated in 2002 on the mainstem Gulkana River upstream of the West Fork. These counts are considered minimums because sockeye salmon are still entering the system after the tower project ends. Between 2002 and 2010, tower counts ranged from 9,294 to 34,428 sockeye salmon (including hatchery fish) from May 27 to August 14 each year. In 2011, a total of 38,048 sockeye salmon were counted past the tower between June 4 and August 8 (Maclean and Huang *In prep*)

A radiotelemetry project was begun by NVE in 2005 to study 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 over all previous years in 2006 and has remained high (Table 11). Sockeye harvests from the Klutina River averaged 13,716 fish from 2006–2010 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 2010 harvest of 12,238 sockeye salmon was the third highest sockeye harvest recorded for 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 and in 2010 harvested 1,476 sockeye salmon. Harvest declines since 1999 likely reflect lower Gulkana Hatchery returns and reduced overall angler effort on the river.

Fishery Objectives and Management

Sockeye salmon sport 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.

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 provide sustainability of the Copper River sockeye salmon stocks. Sport harvest of sockeye salmon is monitored through the SWHS.

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 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, but since 2006, it appears angler effort has been increasingly directed toward sockeye salmon. Since the Klutina River accounted for 33%–54% of the sockeye salmon radiotagged in the Copper River from 2005 to 2009, it is 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.

Recent Board of Fisheries Actions

Only one of the four proposals submitted to the board in 2008 that concerned the Copper River sockeye salmon fishery was adopted. The board adopted a proposal which prohibited removal from the water any salmon which was intended to be released.

There are no proposals before the board for the 2011 meeting specific to the sockeye salmon sport fisheries of the Copper River Drainage.

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 to index distribution on priority spawning areas of

the drainage. The present management guidelines of the commercial, personal use, and subsistence fisheries provide sustainability of the Gulkana River sockeye salmon stocks.

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 1 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 board 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 4 days a week; dip nets were allowed 7 days a week. In 1978, Alaska passed its first subsistence law. This legislation recognized the "customary and traditional use" of fish and game harvests in Alaska and gave this harvest a priority over other harvests. The board adopted the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647) in 1980. Under this plan, subsistence fishers were given 1 of 4 classes of permits depending upon their proximity to the fishery, income, age, and past use. During times of low escapement, Copper River Basin residents received priority over nonbasin residents. The current version of this management plan establishes seasons, open areas, legal gears, permit requirements, and annual 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 uses 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 for subsistence uses 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 (C&T) uses" of fish and game and established eight criteria for identifying C&T 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 board

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 had 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 both fisheries 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 he or she has 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 8-point criteria found in 5 AAC 99.010, the board 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 board made a positive C&T finding 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 4 to 1 fish. In February 2003, the board 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 board 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 1 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 3). The season is open from June 1 through September 30, unless closed by EO. 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 1, 60 salmon for a household of 2, and 10 salmon for each additional person in a household of more than 2 people. Individuals may request additional salmon up to a maximum of 200 salmon and households may request up to 500 salmon. For people using dip nets, only 5 of the salmon may be king salmon. A subsistence fishery is also allowed in a portion of Tanada Creek, 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 EO 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 3). 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, Inc. and CNC 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 2 or more, only 1 of which may be a king salmon. Only dip nets may be used to harvest salmon in this fishery. The 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 board 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 broodstock 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 board 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 1 and 500 salmon for a household of 2 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 or Glennallen Subdistrict in which to participate. As a result, the NPS issued separate federal subsistence fishing permits to federally-qualified subsistence users beginning in 2002 (Appendix B). 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 46,000 and 73,000 fish annually through 2010 (Table 14). The preliminary (based on 52% of issued permits) harvest for 2011 was 65,217 salmon from the Glennallen Subdistrict, excluding 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 1997 and remained high through 1999. Since 1999, the harvest from the Chitina Subdistrict fishery has fluctuated from a low of 85,496 salmon in 2003 to a high of 141,565 salmon in 2010 (Table 15). Overall harvest from the Chitina Subdistrict fishery generally tracks closely with the number of permits issued (Table 15). Participation in the Chitina Subdistrict fishery fluctuates with salmon run strength, changes in access, and river water levels.

Sockeye salmon 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 1,321 state and 270 federal permits (1,591 total permits) were issued for the Glennallen Subdistrict in 2010, which is the highest number of permits issued for the Glennallen Subdistrict since 1983 (Table 14; Appendix B). In 2011, a total of 1,580 permits were issued (1,306 state and 274 federal). The total permits issued (state and federal) have increased steadily since 1991 in the Glennallen Subdistrict.

Since issuance of permits by the federal government, total harvest under state permits has ranged from 46,106 to 73,260 salmon from 2002–2010 (Table 14). The 2010 harvest, under state permits, was 73,260 salmon and the preliminary harvest (based on 52% of issued permits) for 2011 was 65,217 salmon.

A total of 9,308 state permits were issued for the Chitina Subdistrict personal use fishery in 2010 (Table 15). Total harvest in 2010 was 141,565 salmon (all species) under state permits. There are no preliminary data available for 2011 for this fishery.

Fishery Objectives and Management

The Glennallen Subdistrict subsistence fishery is managed under the *Copper River Subsistence Salmon Management Plan* (5 AAC 01.647). This plan stipulates management objectives and guidelines, with allocations for each fishery outlined in the *Copper River District Salmon Management Plan* (5 AAC 24.360). In 2005, the board 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 (including the Batzulnetas fishery). The 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 inseason by sonar located at Miles Lake. The harvest is distributed throughout the season, based upon 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 permit applicants who have 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.

The 2010 Chitina Subdistrict personal use fishery opened on June 5, 2 days later than the preseason schedule. Salmon passage at the Miles Lake sonar was 25,063 salmon below projected from May 17–23, warranting a reduction in fishing time from 90 to 16 hours during the first fishing period (Appendix A). The second period was a 168-hour opening on June 7, and due to Miles Lake sonar passage at or above projected counts, the fishery remained open continuously for periods 3, 4, and 5. As of June 10, a total of 7,813 king salmon of a projected 15,502 king salmon were harvested in the Copper River District commercial drift gillnet fishery and inriver assessment projects were also observing below average king salmon numbers, indicating a weak king salmon run. Migratory timing and 5-year average harvest rates indicated insufficient numbers of king salmon to sustain a fishery and still attain the SEG 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 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 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 time was 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 30.

In 2011, the Chitina Subdistrict personal use fishery opened on June 4 (Appendix A). Actual salmon numbers past the Miles Lake sonar during the week of May 16–22 were below projected counts by 12,713 fish. This resulted in reducing the preseason schedule by 33 hours for the first fishing period. Actual salmon numbers past the Miles Lake sonar during the week of May 23–29 were above projected counts by over 128,000 fish, allowing the second fishing period to open for the preseason schedule of 168 hours. Due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the second period was also a supplemental period. Salmon numbers past the sonar from May 30 to June 5 were below the projected salmon counts for this period by 10,754 fish, but based upon historic harvest and participation levels, the third fishing period (June 9–15) remained at 168 hours. Based upon historical harvest and participation levels, the fishery remained open continuously during the fourth through the seventh periods although actual sonar counts were at or below projected sonar counts from June 6 to 26. As of June 23, a total of about 18,000 king salmon were harvested in the Copper River District commercial drift gillnet fishery, 11,000 fish below the 10-year average. Secondly, the Gulkana River king salmon counting tower counts were about 66% of average for this date and cumulative counts at the NVE sampling wheels were the second lowest on record. Migratory timing and 5-year average harvest rates indicated insufficient numbers of king salmon to sustain a fishery and still attain the SEG of 24,000 or more king salmon to the Copper River. Beginning with the fifth period, on June 27, the Chitina Subdistrict was closed to retention of king salmon for the remainder of the 2010 season. Salmon numbers past the Miles Lake sonar from June 20–July 3 were above the projected salmon counts for this period and resulted in an increase of 26 hours from the 125-hour preseason schedule for the seventh fishing period and 39 hours from the 96-hour preseason schedule for the eighth fishing period. Salmon numbers past the Miles Lake sonar from July 4–24 exceeded the preseason projections in each of the 3 weeks by 72,538, 73,506, and 66,354 salmon, respectively. Therefore, the fishery remained open continuously, and due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the ninth through eleventh periods were also supplemental periods. The sonar counter was removed on July 30. The fishery remained open through August 31 based on projected sonar counts, and remained open through September 30 by regulation.

Current Issues and Fishery Outlook

Access to the Glennallen and Chitina Subdistrict fisheries is an ongoing issue. Currently, access is allowed across CNC's lands with payment of a daily or annual fee paid directly to CNC. Enforcement efforts by Ahtna, Inc. and CNC to gain compliance with the fee-based access were increased in 2007 and initially created conflicts between Ahtna, Inc. enforcement officers and subsistence and personal use participants. Eventually, dipnetters and some subsistence users complied with the requirements of Ahtna, Inc. and CNC. In 2008, Ahtna, Inc. 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. In 2011, Ahtna, Inc. reported issuing the most trespass permits ever, presumably for accessing area fisheries (Kathryn Martin, Vice President Ahtna Land and Resources Department, personal communication)

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 2010 and 2011 seasons, CNC 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 nonrural 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. Based on public testimony at previous board meetings, there was some resentment among the Ahtna Native community because urban participants in the Chitina Subdistrict were considered equal to the rural participants in the Glennallen and Chitina subdistricts based on the subsistence determination granted to the fishery in 1999. Repeal of the 1999 subsistence determination at the 2003 board meeting was not well received by the urban-based Chitina Dipnetters Association and the Alaska Outdoor Council. These groups believed dipnetters should have priority over the commercial fishery. This priority was provided under the subsistence classification. The board upheld the personal use classification for the Chitina Subdistrict at its 2005 meeting because there was no new evidence or error in their 2003 decision to warrant review of the negative C&T determination.

Seven proposals were submitted to the 2008 board meeting that concerned the Chitina Subdistrict personal use salmon fishery, none of which were adopted. Proposal 1 requested the board to reconsider the C&T use determination for the Chitina Subdistrict. No action was taken on this proposal, with the board citing no new information or error in its 2003 decision to warrant reconsideration. Nine proposals were submitted to the board for the 2008 meeting that concerned the Glennallen Subdistrict subsistence salmon fishery. Only 2 housekeeping proposals were adopted, moving regulatory language from 1 subsection to another for clarity.

In March 2010, the board held a special 2-day meeting to consider 2 proposals addressing a court ruling that remanded, back to the board, the case against the board 2003 negative 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.

There are 8 proposals before the board for the 2011 meeting specific to the Chitina Subdistrict personal use fishery.

- #54 and #55 - Seek a positive C&T determination for the Chitina Subdistrict.
- #56 - Amend the *Copper River King Salmon Management Plan* to include language specific to the management of the Chitina Subdistrict personal use fishery.
- #72 - Rescind the reduction of the maximum harvest level in the Chitina Subdistrict personal use dipnet fishery when the commercial fishery is closed for 13 or more consecutive days.
- #73 - Increase the annual limit of king salmon in the Chitina Subdistrict personal use fishery.
- #74 - Require that retention of king salmon be allowed within the Chitina Subdistrict personal use dipnet fishery if retention of king salmon is allowed in the sport or commercial fishery.
- #75 - Increase the personal limit of sockeye in the Chitina Subdistrict personal use dipnet fishery when retention of king salmon is prohibited.
- #76 - Delay the opening of the Chitina Subdistrict personal use dipnet fishery until June 15.

There is 1 proposal before the board for the 2011 meeting specific to the Glennallen Subdistrict subsistence fishery.

- #56 - Amend the *Copper River King Salmon Management Plan* to include language specific to the management of the Glennallen Subdistrict subsistence fishery.

Current or Recommended Research and Management Activities

Daily sampling of the Chitina Subdistrict personal use fishery harvest occurs annually from the opening of the fishery in June through the majority of the sockeye salmon run, which concludes at the end of August. Length and age data of sockeye salmon 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 NVE 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 5-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 NVE 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).

RESIDENT SPECIES SUBSISTENCE FISHERIES

Background and Historical Perspective

Freshwater subsistence fishing permits have been issued in the UCUSMA since 1960. The majority of permits issued for freshwater subsistence fishing have been for gillnetting whitefish between October 1 and March 31 in several area lakes. At its 2008 meeting, the board made a positive C&T determination for freshwater fishes in the PWS Area which includes the entire UCUSMA. From 1990–2000, the maximum number of permits issued for subsistence fishing in any year was 10 in 1992 and 1997, and a maximum harvest of 2,964 fish in 1995 (Table 16). During this period, an average of 8 permits were issued annually, with a harvest of 1,586 fish. From 2001–2010 the maximum number of permits issued was 28 in 2009 and a maximum harvest of 3,109 fish in 2007. During this period, an average of 16 permits were issued annually with a harvest of 1,775 fish.

Recent Fishery Performance

The average harvest of whitefish from 2005–2009 was 1,820 fish, with an average incidental catch of nontarget species of 26 fish (Table 16). In 2010, 27 permits were issued for fishing whitefish with a gillnet. A total of 19 of these permits were actually fished, with a total reported harvest of 2,088 whitefish, 33 lake trout, 13 burbot, and 13 other fishes from a total of 4 lakes.

Fishery Objectives and Management

There are no specific fishery objectives or management plans for resident freshwater subsistence fisheries in the UCUSMA. Resident species are managed to ensure a sustained yield. The current low number of participants in the winter gillnet fishery allows for liberal management of the whitefish harvest. However, slower-growing resident species, such as lake trout and burbot, are managed with bag limits similar to those in the sport fisheries for these species. The difference is in the allowable methods and means of harvest which are generally more efficient in the subsistence fishery.

Current Issues and Fishery Outlook

With low participation, the subsistence whitefish fishery garnered little notice from other user groups for several decades. 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), sport anglers have taken notice of these fisheries and the incidental harvest of popular sport species, such as lake trout. As the subsistence whitefish fishery has gained popularity, the department has had to develop additional permit stipulations to ensure sustainability of the various fish populations within targeted waters.

Recent Board of Fisheries Actions

At its 2008 meeting in Cordova, the board made a positive C&T determination for freshwater resident fish species in the PWS Area and adjusted the boundaries of that area to include the entire UCUSMA. Prior to the boundary change, the waters of the Upper Susitna drainage were part of the Cook Inlet Area for subsistence management. The board established an ANS of 25,000–42,000 usable pounds of fish in this fishery. The board also adopted a proposal that opened Crosswind Lake to subsistence fishing. Crosswind Lake had been closed to subsistence fishing since the 1960s.

There are 15 proposals before the board for the 2011 meeting specific to the resident species subsistence fishery.

- #57–60 - Prohibit use of all net gear as a legal method to harvest fish in Lake Louise, Susitna Lake, and Tyone Lake subsistence freshwater finfish fisheries.
- #61–62 - Prohibit use of all net gear as a legal method to harvest whitefish or lake trout in Lake Louise, Susitna Lake, and Tyone Lake.
- #63–65 - Prohibit use of all net gear as a legal method to harvest whitefish in Lake Louise, Susitna Lake, and Tyone Lake.
- #66 - Prohibit retention of nontarget species, require 24-hour notice prior to subsistence net fishing, prohibit subsistence net fishing during the open-water period, and require subsistence nets to be moved if more than 4 lake trout are caught.
- #67 - Require 24-hour notice prior to subsistence net fishing, limit the subsistence season for whitefish to November 10–March 31, and permit only 5% of the harvest in the whitefish fishery to be nontarget species (bycatch).
- #68–69 - Establish areas closed to subsistence gillnet fishing in the Lake Louise, Susitna Lake, and Tyone Lake.
- #70 - Limit the amount of subsistence whitefish that can be harvested from Lake Louise, Susitna Lake, and Tyone Lake, and prohibit lake trout bycatch.
- #71 - Establish a spawning closure for lake trout in Lake Louise, Susitna Lake, and Tyone Lake that prohibits subsistence and sport fishing for lake trout from September 1–October 15.

Current or Recommended Research and Management Activities

The harvest of fishes in the freshwater finfish subsistence fishery is monitored through a permit system where permit holders log their harvests on a daily basis and return their harvest reports at the end of the permit period. There are no research projects recommended specific to this fishery; however, research on resident species populations within the UCUSMA should consider the potential impact of subsistence harvests in their study design and conclusions.

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 4). Lake trout are harvested primarily from lakes within the Susitna River drainage (Lake Louise and Susitna Lake) and the Gulkana River drainage (Paxson, Summit, and Crosswind lakes) (Table 17). Harvests from the Susitna River drainage accounted for 52% and the Gulkana River drainage accounted for 31% of the annual UCUSMA harvest from 2005 to 2009. Lake Louise (29%), Crosswind Lake (16%), and Susitna Lake (14%) accounted for over half the annual average lake trout harvest in the UCUSMA from 2005 to 2009.

Prior to 1987, the bag limit in UCUSMA waters was 2 lake trout \geq 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 8 of 9 lake trout populations in the Upper Copper River drainage were being harvested above sustainable levels, based on surplus production models developed from lake trout populations in Canada and the Great Lakes (Burr 1987). As a result of these findings, the bag limit for UCUSMA waters was reduced to 2 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), and 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, as well as in Crosswind, Paxson, and Summit lakes; the bag limit was reduced from 2 to 1 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 Lake, and Tyone Lake) increased from an average of 63% released prior to the restriction (1990–1993) to an average of 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 that was adopted by the board 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 1 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 the winter burbot fishery. From 2006–2010, anglers have released an average of 81% and 84% of their lake trout in Paxson and Summit lakes, respectively (Table 18).

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 1993. Increase of the minimum size limit to 24" appeared to reduce harvest in the Tyone River drainage lakes, and to a lesser degree, in Crosswind, Paxson, and Summit lakes (Table 17). Total harvest of lake trout from UCUSMA waters has averaged 1,480 fish from 2005–2009. In 2010, a total of 1,631 lake trout were harvested from UCUSMA waters with 43% of the harvest coming from Lake Louise and 38% from all Gulkana River drainage lakes combined.

Fishery Objectives and Management

Lake trout are slow to mature and 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 or as a trigger for assessment.

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 hectares (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, methods and means restrictions, or reductions in fishing time to maintain harvests below sustained yield. Assessment of lake trout stock status is currently based on evaluation of the SWHS harvest and catch (and associated hooking mortality) in relation to the sustained yield estimate. If total mortality exceeds the sustained yield estimate for 2 consecutive years, stock assessment is initiated for that population.

Current Issues and Fishery Outlook

Under 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 (2000–2009) 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 to a range of 82%–87%, most likely attributable to the bait restriction on those lakes. Crosswind Lake had a noticeably lesser drop in harvest, with the average harvest for the last 10 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 in the last decade.

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 8 of the last 10 years (2000–2009) and again in 2010. 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 board 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 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 2 fish \geq 24 inches to 1 fish any size, to align those regulations with the management plan guidelines. 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 board during its 2008 meeting that concerned lake trout fisheries within the UCUSMA. The first resulted in a positive C&T use determination for freshwater resident fish species in the UCUSMA. This essentially validated a subsistence fishery for resident fishes (primarily whitefish) that had been in place since the 1960s. The second proposal opened Crosswind Lake to subsistence fishing. Crosswind Lake had been closed to subsistence fishing since the 1960s. This action was not expected to impact the popular sport fisheries for lake trout and burbot on that lake.

There are 7 proposals before the board for the 2011 meeting specific to the UCUSMA lake trout sport fishery.

#129 - Modify lake trout regulations in 4 area lakes.

#130 - Establish a maximum size limit for lake trout in Lake Louise and Crosswind Lake.

#71 - Establish a spawning closure for lake trout in Lake Louise, Susitna Lake, and Tyone Lake that prohibits subsistence and sport fishing for lake trout from September 1–October 15.

#132 - Close Paxson and Summit lakes to lake trout fishing September 1–October 1.

#133 - Allow use of bait October 1–July 31 in Paxson and Summit lakes.

#134–135 - Restrict guided sport fishery on Lake Louise, Susitna Lake, and Tyone Lake.

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 of the Lake Area model and, in conjunction with the estimates of abundance, led the department to submit a proposal to the board to remove the 24-inch minimum size limit.

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

Lake trout research in Alaska lakes has provided a length-weight relationship and future sampling can focus on collecting lengths alone. Length data for Susitna and Crosswind lakes need to be collected to update the Lake Area model yield estimates. These lakes are the highest priority for lake trout studies in the UCUSMA. Stock abundance and size composition of Paxson

and Summit lakes 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 lines. Many lakes and rivers of the UCUSMA historically contained large populations of burbot (Figure 4) 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.

Prior to 1979, there were no bag limits or gear restrictions governing 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 set lines, with no more than a total of 15 hooks, plus 2 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 5; and in several road-accessible lakes like Lake Louise, the bag limits were further reduced to 2 fish and anglers were restricted to using only 2 hooks. Anglers were still permitted to use unattended set lines. In 1989, under the guidance of the newly-adopted *Lake Burbot Management Plan*, emergency regulations were enacted that closed burbot fisheries in Hudson Lake and Lake Louise, and eliminated set lines in all lakes of the Tyone River drainage. 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 board stated its desire to maintain bag and possession limits for burbot at 2 or more fish for road-accessible lakes and 5 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 board 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 board repealed the *Lake Burbot Management Plan* since the provisions within it were incorporated into area regulations.

Hudson Lake was opened by EO in 1993, with a bag limit of 2 burbot. During its December 1996 board meeting, the board adopted proposals to reopen Hudson Lake by regulation to a 2-fish bag limit and allow limited use of unattended set lines in the Copper River. In 2003, the board 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 historical 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 its 2003 meeting the board closed Tolsona Lake to burbot harvest by regulation. Tolsona Lake had been closed by EO 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 (Taube and Bernard 2001). 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. Based on results from 2009 and 2010 sampling, it appears the burbot population has achieved this abundance goal (C. Schwanke, Sport Fish Biologist, ADF&G, Glennallen, personal communication).

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 averaged 1,521 fish from 2000 to 2009. Burbot harvest in 2006 and 2007 were the lowest ever recorded at 575 and 577 fish, respectively. Total harvest has steadily increased since 2008 to 2,997 burbot in 2010 (Table 20). Crosswind Lake supported the highest average harvest of burbot from any single water body in the UCUSMA at 379 fish from 2005–2009. However, burbot harvests from Lake Louise exceeded those from Crosswind Lake during 2009 and 2010 (Table 20). Stock assessment was conducted in Crosswind Lake 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 ($\geq 450\text{mm}$) 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 recent trends in harvest data. Annual harvests in Lake Louise have fluctuated, but appear to be increasing with the 2010 harvest of 1,231, the highest since 2003.

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. Lakes with harvest concerns are sampled when necessary, dependent on available funding. Recently, these lakes have included 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 set lines are an efficient method for burbot fishing, but data clearly show burbot populations cannot sustain use of this method in UCUSMA lakes; it 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 Alaska Wildlife Troopers educate and encourage anglers on fishing closely attended lines with clearly-visible strike indicators.

Recent Board of Fisheries Actions

In addition to the 2003 closing of Tolsona Lake and reopening of Lake Louise to burbot fishing, the board permitted use of set lines on the Copper River mainstem and the lower portions of its tributaries, with the exception of the Gulkana River, which remains closed to set lines to protect steelhead trout. The upper boundaries to which set lines are permitted are the Richardson Highway bridges to the west and the Tok Cutoff (Glenn Highway) bridges to the north. The board also increased the bag and possession limit for burbot from 2 to 5 fish per day in this area. The total number of hooks used may not exceed 5, and gear must comply with that specified for burbot in the general sport fishing regulations.

The board repealed the *Lake Burbot Management Plan* at its 2008 meeting. A specific regulatory management plan for burbot was 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 EO authority (5 AAC 75.003).

There is 1 proposal before the board for the 2011 meeting specific to the UCUSMA burbot sport fishery.

- #138 - Open Tolsona Lake to sport fishing for burbot.

Current or Recommended Research and Management Activities

The burbot stock assessment program in the UCUSMA continues on a limited scale. 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. Abundance sampling of Tolsona Lake burbot will discontinue once the burbot fishery on that lake is reopened. ADF&G staff should continue to educate the angling public on burbot biology and the rationale behind prohibiting set lines and other regulations concerning burbot, and seek their input in managing these important fisheries.

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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, 1990–2010^a.

Year	King Harvest	Sockeye Harvest	Coho Harvest	Total
1990	3,221	94,001	1,544	98,940
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	5,766	132,164	2,317	140,602
2003	4,611	129,595	2,840	137,318
2004	5,917	164,231	3,015	173,589
2005	4,220	189,001	1,729	195,400
2006	4,958	173,292	2,144	180,994
2007	6,089	190,384	1,797	198,955
2008	4,655	122,937	3,058	131,107
2009	3,031	137,823	1,691	142,884
2010	2,862	197,443	1,980	202,829
Average 2005–2009	4,591	162,687	2,084	169,868
Average 2000–2009	5,321	160,136	2,613	168,512

^a Includes federal subsistence fishery harvests in the Glennallen and Chitina subdistricts, and Batzulnetas after 2001.

Table 2.–Commercial harvests of king and sockeye salmon in the Copper River District, 1990–2011.

Year	King Harvest	Sockeye Harvest
1990	21,702	844,778
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	9,654	636,214
2011 ^a	18,407	2,023,763
Average 2006–2010	19,899	1,049,248
Average 2001–2010	29,829	1,138,604

^a Data for 2011 are preliminary.

Table 3.—Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1990–2010.

Year	Effort (angler-days)			% Effort by UCUSMA	
	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	52,051	206,705	2,219,398	25.2%	2.3%
2004	39,702	217,041	2,473,961	18.3%	1.6%
2005	37,188	183,535	2,463,929	20.3%	1.5%
2006	33,964	175,274	2,297,961	19.4%	1.5%
2007	44,628	204,032	2,543,674	21.9%	1.8%
2008	39,899	183,084	2,315,601	21.8%	1.7%
2009	44,564	194,019	2,216,445	23.0%	2.0%
2010	40,912	184,824	2,000,167	22.1%	2.0%
Average 2005–2009	40,049	187,989	2,367,522	21.3%	1.7%
Average 2000–2009	44,568	201,968	2,367,981	22.0%	1.9%

Table 4.–Sport fishing effort (angler-days) in the UCUSMA by drainage, 1990–2010.

Year	Gulkana River Drainage			Upper Susitna Drainage			Copper River					Other Sites			Area Total ^b	
	Lakes	Streams	Total	Lakes	Streams	Total	Klutina	Tazlina	Tonsina	Upstream of Gulkana	Downstream of Klutina ^a	Stocked Lakes	Lakes	Streams		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
2010	2,880	13,834	16,714	9,896	1,424	11,320	16,512	1,540	725	1,726	974	2,049	400	250	650	52,210
Average 2005–2009	3,905	15,329	19,233	6,024	1,004	7,028	13,531	647	634	1,183	766	2,157	765	1,137	1,901	47,080
Average 2000–2009	4,639	17,078	21,716	6,281	929	7,210	11,622	749	872	1,121	833	2,551	1,103	1,002	2,104	48,779

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

^b Area total is greater than published amount for UCUSMA since 2003 due to inclusion of all drainages with at least 1 respondent to the SWHS.

Table 5.—Number of fish harvested, by species, by sport anglers fishing UCUSMA waters (including stocked waters), 1990–2010.

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	4,884	5,511	138	114	6,950	2,140	4,878	14,004	793	707	111	47	40,277
1992	4,412	4,560	492	8	9,484	1,997	4,274	12,748	1,495	1,150	433	11	41,064
1993	8,217	5,288	305	0	7,245	3,173	4,714	13,356	1,694	815	56	9	44,872
1994	6,431	6,533	289	7	5,808	1,598	4,352	15,233	2,869	1,149	134	128	44,531
1995	6,709	6,068	202	10	4,671	1,695	3,098	15,093	995	898	42	30	39,511
1996	9,116	11,851	606	0	5,076	2,575	2,713	11,260	981	384	751	0	45,313
1997	8,346	12,293	370	0	2,812	1,092	1,983	9,153	1,358	134	331	56	37,928
1998	8,245	11,184	684	0	5,182	1,589	1,818	8,498	1,485	584	477	0	39,746
1999	6,742	11,101	256	8	3,842	2,390	2,224	9,510	1,861	317	232	0	38,483
2000	5,531	12,361	760	0	2,877	991	1,709	7,111	2,290	451	436	22	34,539
2001	4,904	8,169	374	0	2,416	1,612	1,245	4,923	1,506	1,135	282	207	26,773
2002	5,098	7,761	384	0	3,294	1,388	2,215	9,849	2,224	2,288	282	54	34,837
2003	5,717	7,108	277	0	3,761	1,578	1,854	6,596	1,457	422	51	104	28,925
2004	3,435	6,464	131	0	2,311	2,153	2,044	4,177	1,127	885	0	1,629	24,356
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	964	3,048	577	124	0	17	34,198
2008	3,616	11,431	56	0	1,018	396	1,470	4,332	1,234	655	0	18	24,226
2009	1,355	13,415	36	0	1,254	943	1,875	4,515	2,850	569	44	81	26,937
2010	2,409	14,743	90	0	1,164	682	1,631	4,845	2,997	759	78	0	29,398
Average 2005–2009	3,522	14,061	44	0	1,360	744	1,480	3,868	1,322	620	42	49	27,111
Average 2000–2009	4,230	11,217	214	0	2,146	1,144	1,647	5,200	1,521	828	126	226	28,499

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

Table 6.—Number of fish caught, by species, by sport anglers fishing UCUSMA waters, 1990–2010.

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	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	6,125	29,815	1,503	273	0	26	90,402
2008	7,827	16,912	57	61	10,233	1,814	9,140	47,718	1,482	1,605	0	36	96,885
2009	4,231	19,788	36	20	7,170	3,211	12,843	76,559	3,471	1,076	554	81	129,040
2010	8,213	19,489	114	84	9,970	1,089	14,082	54,882	5,897	1,994	282	10	116,106
Average 2005–2009	9,000	21,089	70	59	8,438	2,682	8,642	46,075	1,932	1,247	175	57	99,467
Average 2000–2009	13,109	17,945	452	117	12,708	3,699	9,234	58,153	2,450	1,884	328	267	120,346

^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, 1990–2011.

Year	Copper River District			Glennallen Subdistrict Harvest ^c	Chitina Subdistrict Harvest ^c	Total Harvest	Upriver Return Estimate	Estimated Total Return	Upriver Escapement	Estimate Source
	Commercial Harvest ^a	Subsistence Harvest	Sport Harvest ^b							
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	ND	ND	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	2,574	2,065	44,479	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	32,487	NVE
2009	9,951	212	1,355	3,036	223	14,777	32,401	42,564	27,787	NVE
2010	10,591	276	2,409	2,425	718	16,419	22,186	33,053	16,634	NVE
2011	18,407	ND	ND	2,562	ND	20,969	ND	18,407	ND	NVE
Average 2005–2009	25,744	573	3,522	3,208	1,948	34,996	43,643	69,960	34,964	
Average 2000–2009	32,825	675	4,230	3,574	2,250	43,554	41,424	74,924	31,370	

^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. 2011 data are preliminary based on 52% of state issued permits and do not include federal subsistence data.

Table 8.–Harvest of king salmon by sport anglers fishing in the UCUSMA by drainage, 1990–2010.

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
2010	400	1,032	13	1,445	863	0	0	0	101	0	2,409
Average 2005–2009	325	1,742	100	2,167	1,198	74	0	0	61	21	3,522
Average 2000–2009	612	1,877	198	2,687	1,375	75	0	1	40	52	4,230

Table 9.—Harvest Summary data for guided sport anglers in the Upper Copper River drainage, 2006–2010.^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
Gulkana River drainage ^b	2010	18	452	139	197	14	0	0	0	0	0
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
Klutina River drainage ^c	2010	25	1,286	407	563	356	0	184	6	1	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
Tonsina River drainage ^d	2010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper River mainstem	2006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper River mainstem	2007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper River mainstem	2008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper River mainstem	2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper River mainstem	2010	6	107	29	82	21	1	0	0	0	0

^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 sport anglers fishing in the UCUSMA by drainage, 1990–2010.

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	0	3,783	1,493	35	146	17	0	583	6,057
1991	3,956	2,731	0	6,687	3,036	146	134	0	25	63	10,091
1992	4,635	3,419	0	8,054	3,822	222	8	18	160	56	12,340
1993	10,592	4,994	0	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
2010	982	3,719	39	4,740	3,240	39	13	0	181	0	8,213
Average 2005–2009	1,169	4,895	126	6,189	2,425	195	15	6	126	45	9,000
Average 2000–2009	2,257	6,148	468	8,874	3,630	296	7	88	147	67	13,109

Table 11.—Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, 1990–2010.

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	362	886	87	1,335	11,759	0	51	0	270	0	13,415
2010	160	1,316	0	1,476	12,238	156	0	0	708	165	14,743
Average 2005–2009	246	806	40	1,092	12,598	5	10	0	324	32	14,061
Average 2000–2009	448	938	271	1,656	9,114	28	9	16	235	159	11,217

Table 12.–Summary of sockeye harvests and upriver escapement in the Copper River, 1990–2011.

Year	Commercial Harvest ^a	Copper R. District 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	84,186	121,278	1,548,768	824,792	2,276,773	516,996
2006	1,498,423	4,505	14,410	74,421	124,640	1,716,399	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	14,429	60,517	90,917	1,064,826	676,929	1,715,490	468,671
2010	643,339	2,016	14,743	84,856	140,811	885,765	901,824	1,714,989	485,185
2011	2,023,763	ND	ND	61,955	ND	2,085,718	ND	ND	ND
Average 2006-2010	1,053,174	3,703	16,111	72,153	112,968	1,258,109	804,184	2,026,489	525,661
Average 2000 -2010	1,141,582	2,902	12,153	72,137	109,481	1,338,255	771,116	2,068,195	510,589

^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. 2011 data are preliminary based on 52% of state permits issued and do not include federal subsistence data.

^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 (percentage of radiotagged fish) 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, 1990–2011 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of Permits Issued	Estimated Salmon Harvest			
		King	Sockeye	Coho	Total ^a
1990	406	647	31,765	92	32,524
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
2011 ^b	1,306	2,562	61,955	440	65,217
Average 2006–2010	1,151	2,604	56,830	293	59,813
Average 2001–2010	1,104	2,834	58,552	434	61,886

^a Total harvest includes steelhead and other species.

^b Data are preliminary based on 52% of permits issued.

Table 15.—Number of permits issued and expanded salmon harvested during the Chitina Subdistrict personal use salmon fishery in the Copper River, 1990–2010 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of Permits Issued	Estimated Salmon Harvest			
		King	Sockeye	Coho	Total ^a
1990	5,689	2,708	66,432	1,511	70,812
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.–Number of freshwater finfish subsistence permits issued and harvest from UCUSMA waters, 1990–2010.

Year	Permits				Harvest ^a				
	Total Issued	Total Fished	Water bodies permitted	Water bodies fished	Whitefish	Lake trout	Burbot	Other	Total
1990	7	4	7	4	849	5	4	12	870
1991	9	5	5	4	1,115	4	1	4	1,124
1992	10	6	6	5	998	2	0	1	1,001
1993	7	4	6	4	876	3	2	11	892
1994	5	5	5	5	1,565	0	0	0	1,565
1995	6	6	5	5	2,964	2	5	5	2,976
1996	8	6	6	5	2,104	0	3	47	2,154
1997	10	5	7	6	1,380	0	0	65	1,445
1998	6	6	4	4	2,032	1	0	7	2,040
1999	9	8	6	5	1,382	1	0	3	1,386
2000	9	8	6	6	1,974	4	0	9	1,987
2001	8	7	5	5	1,670	2	2	36	1,710
2002	12	7	5	3	1,321	4	1	1	1,327
2003	13	7	6	3	1,143	2	8	13	1,166
2004	11	9	5	4	2,125	15	0	25	2,165
2005	17	13	7	5	1,643	13	1	19	1,676
2006	13	10	6	4	1,070	6	3	2	1,081
2007	18	12	5	3	3,094	6	3	6	3,109
2008	16	10	3	2	585	9	2	1	597
2009	28	16	5	3	2,708	28	21	11	2,768
2010	27	19	7	4	2,088	33	13	13	2,147
Average 2005–2009	18	12	5	3	1,820	12	6	8	1,846
Average 2000–2009	15	10	5	4	1,733	9	4	12	1,759

^a Reported harvest is from set gillnets with the following exceptions: 202 whitefish (WF) were harvested with a seine in 2000, 5 WF and 5 burbot in 2003, and 52 WF in 2006 with a fyke net.

Table 17.–Harvest of lake trout by sport anglers fishing UCUSMA waters by drainage, 1990–2010.

Year	Gulkana River Drainage					Upper Susitna River Drainage							
	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	2,139	968	306	170	3,583	1,036	187	119	1,342	68	51	561	5,503
1991	1,248	981	463	98	2,790	1,332	308	196	1,836	84	42	579	5,331
1992	1,118	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
2010	268	192	164	0	624	697	73	101	871	0	54	82	1,631
Average 2005–2009	110	58	238	35	442	401	212	167	781	18	15	225	1,480
Average 2000–2009	186	72	234	48	540	445	161	161	767	19	28	293	1,647

Table 18.–Percent of lake trout released in lakes with 24” minimum size limit, 1990–2010.

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
2010	86	87	89	89	89	88
Average 1990–1993	53	60	71	63	69	63
Average 1994–2005	84	79	79	80	78	80
Average 2006–2010	81	84	85	83	84	83

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 1e 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	294	No	361	> 24 inch
Paxson	228	Yes	585	Any size
Summit	156	Yes	413	Any size
Tanada	34	No	399	Any size
Copper	44	No	341	Any size
Lake Louise	732	Yes	540	> 24 inch
Susitna	212	Yes	321	> 24 inch

^a Average harvest from SWHS 2006–2010 + 10% mortality factor for released fish

Table 20.—Harvest of burbot caught by sport anglers fishing in the UCUSMA by drainage, 1990–2010.

Year	Gulkana River Drainage				Upper Susitna River Drainage							
	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
2010	166	129	533	828	1,231	147	18	1,396	422	18	333	2,997
Average 2005–2009	30	379	25	435	230	168	18	416	44	3	425	1,322
Average 2000–2009	180	399	123	702	150	225	20	395	79	9	336	1,521

FIGURES

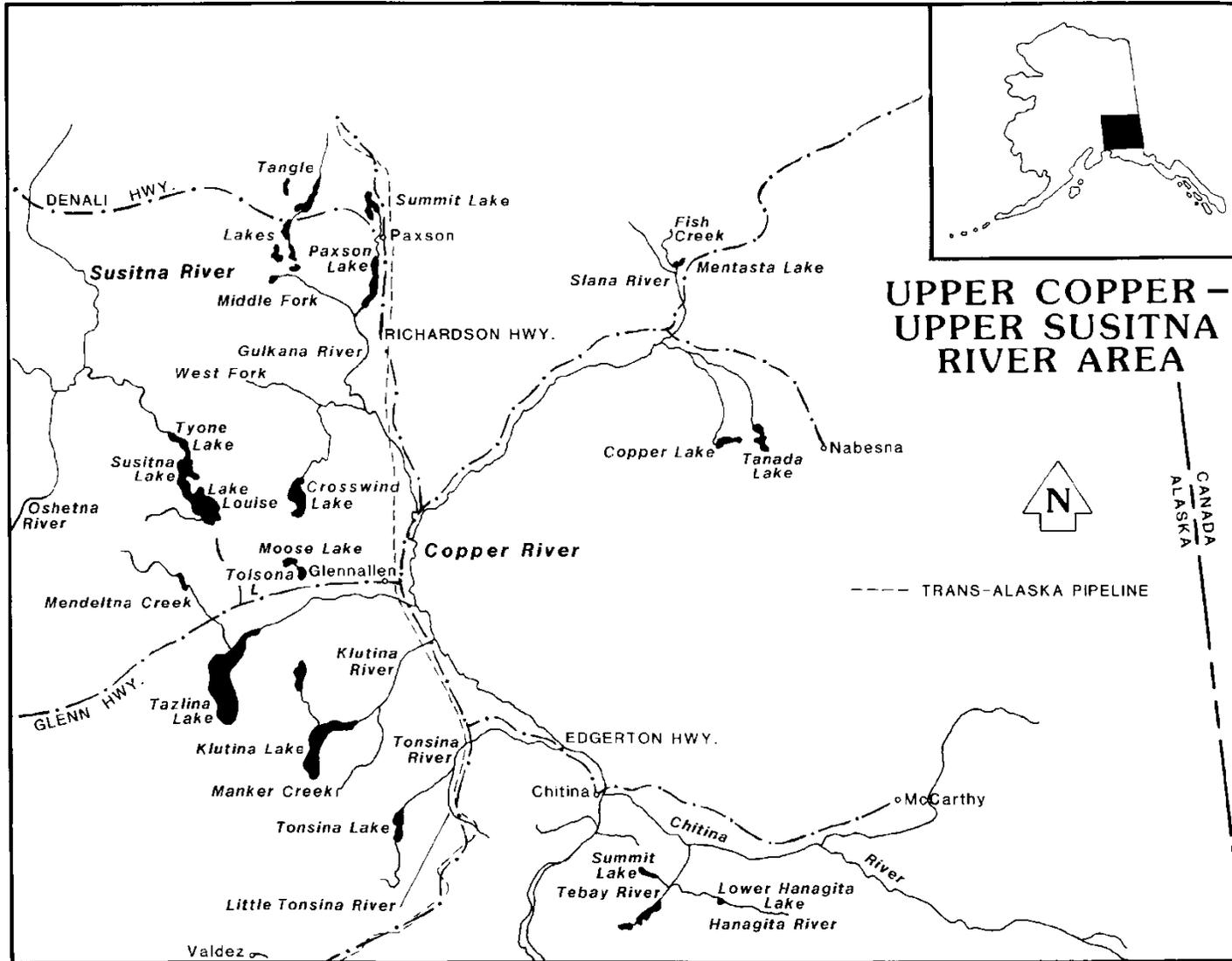


Figure 1.—The Upper Copper/Upper Susitna Management Area (UCUSMA).

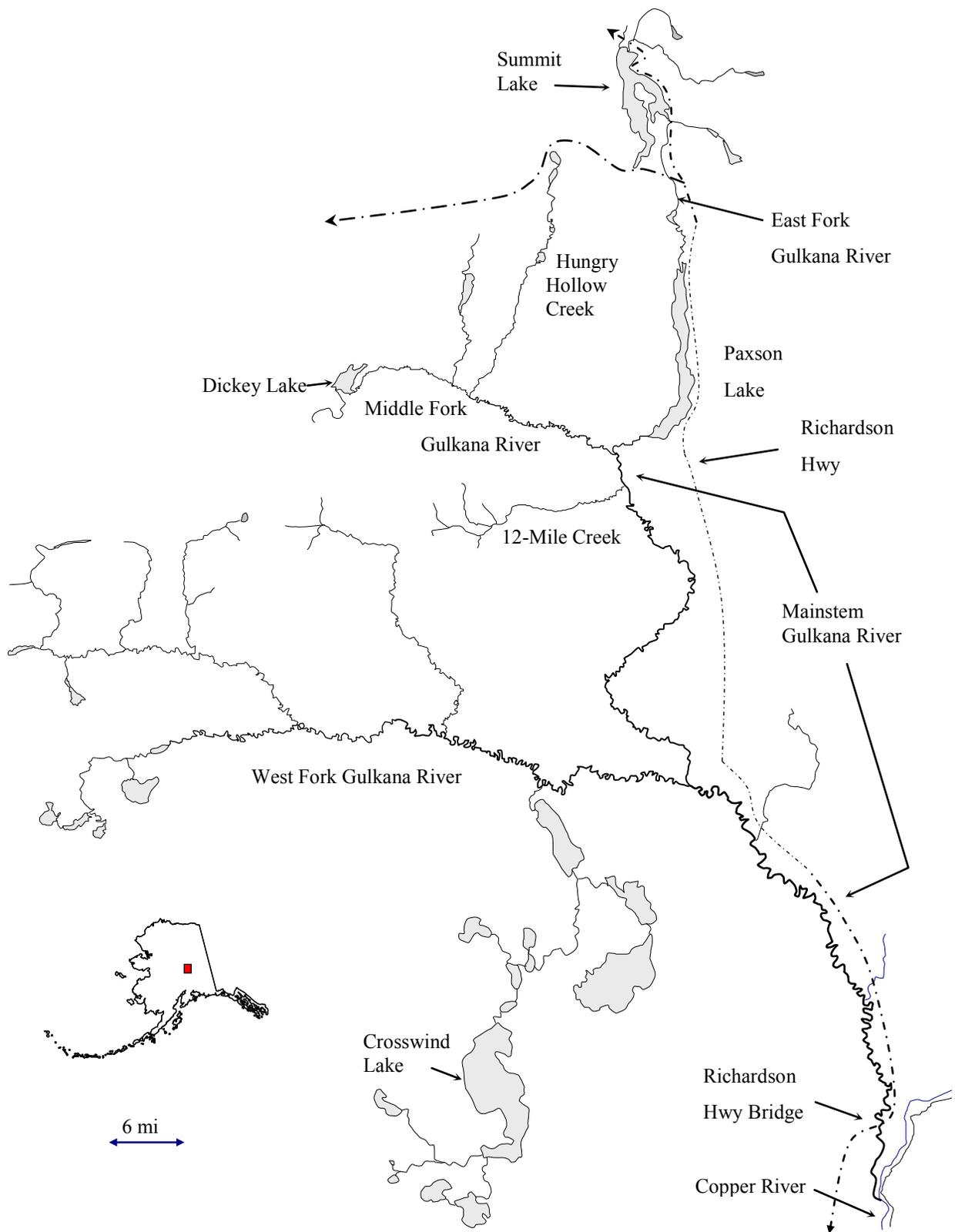


Figure 2.—Gulkana River drainage.

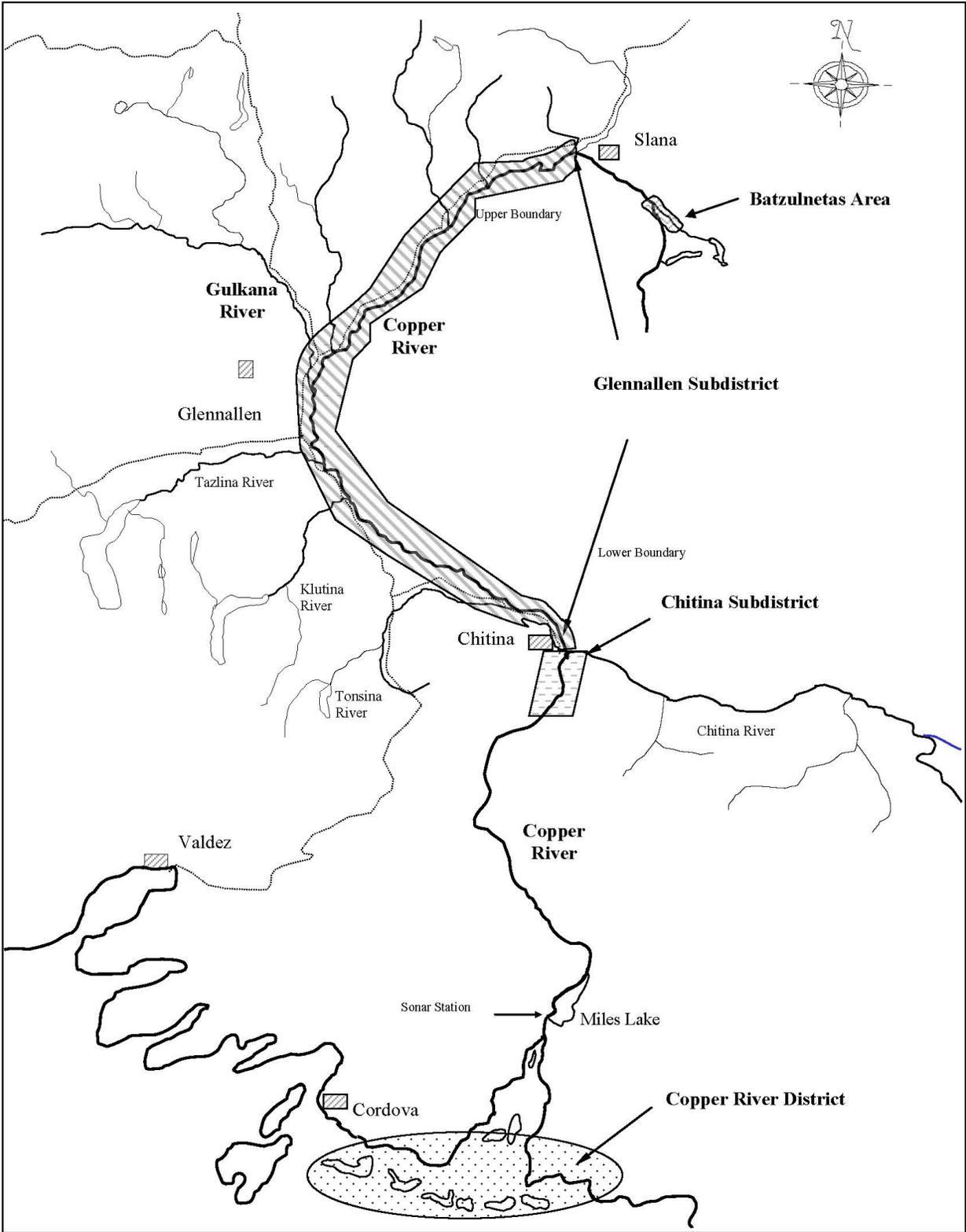


Figure 3.—Upper Copper River fishery subdistricts and areas.

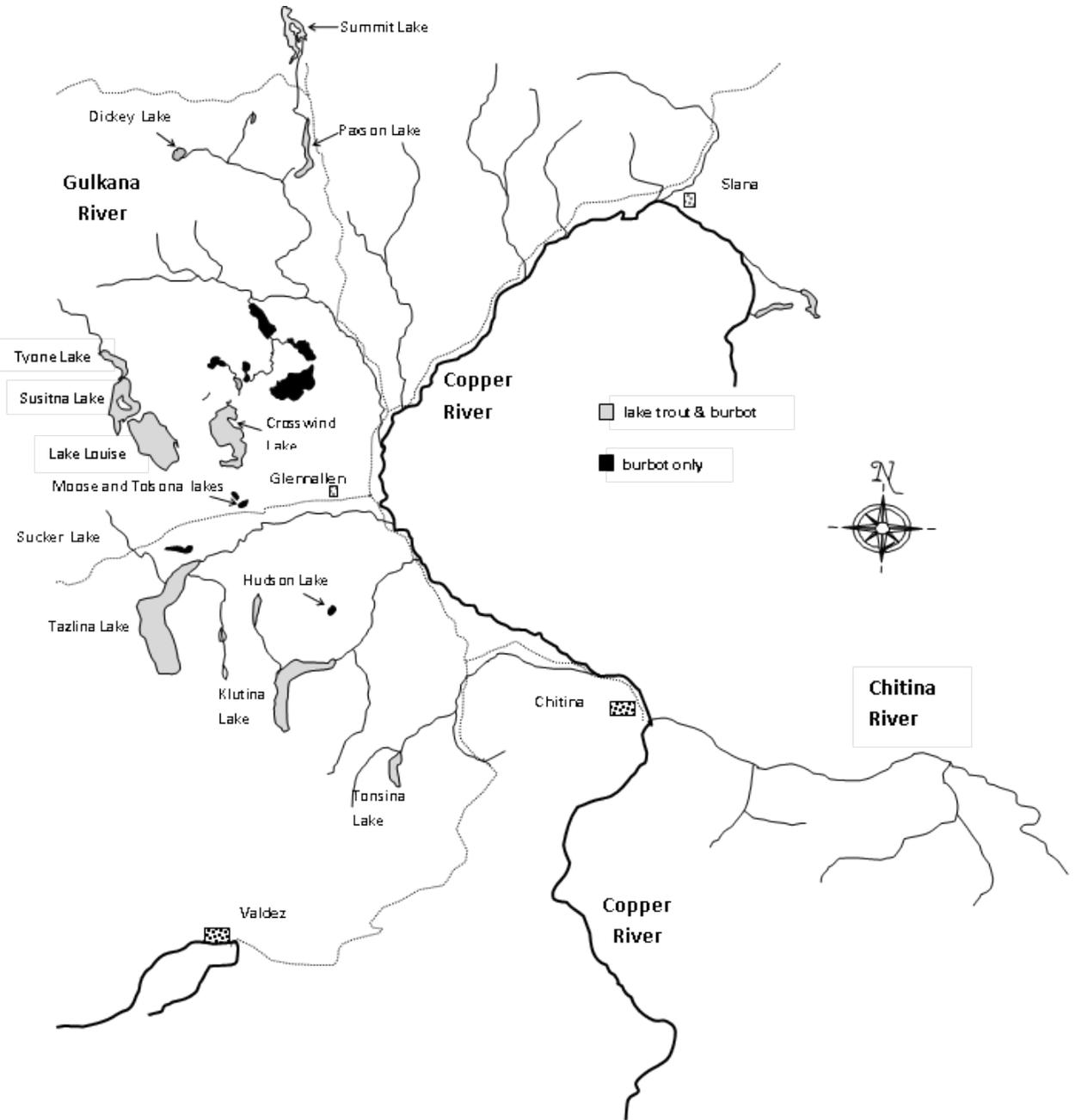


Figure 4.—Major lake trout and burbot fisheries in the UCUSMA

APPENDIX A

Appendix A.—Emergency orders issued for UCUSMA sport, personal use, and subsistence fisheries during 2010 and 2011.

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.

-continued-

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.
2011	3-RS-01-11	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 3, 2011. Beginning on Friday, July 1, 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.
2011	3-RS-01-11	Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River through August 31, 2011. The Chitina Subdistrict will open for a 33-hour period from 08:00 a.m. Saturday, June 4 until 05:00 p.m. Sunday June 5.
2011	3-RS-02-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 6–June 12. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 6 until 11:59 p.m. Sunday June 12. 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.
2011	3-RS-03-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 13–June 19, 2011. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 13 until 11:59 p.m. Sunday, June 19.
2011	3-RS-04-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 20–June 26, 2011. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 20 until 11:59 p.m. Sunday, June 26.

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Year	E. O. Number	Explanation
2011	3-RS-05-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 27–July 3, 2011. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 27 until 11:59 p.m. Sunday, July 3. 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 2011 season.
2011	3-RS-06-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 4–July 10, 2011. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 4 until 11:59 p.m. Sunday, <i>July 10</i> .
2011	3-RS-07-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 11–July 17, 2011. The Chitina Subdistrict will be open from 5:00 p.m. Monday, July 11 until 11:59 p.m. Sunday, July 17.
2011	3-RS-08-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 18–July 24, 2011. The Chitina Subdistrict will be open from 12:00 p.m. Tuesday, July 19 until 11:59 p.m. Sunday, July 24.
2011	3-RS-09-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 25–July 31, 2011. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 25 until 11:59 p.m. Sunday, July 31. 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.
2011	3-RS-10-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 1 –August 7, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 1 until 11:59 p.m. Sunday, August 7. 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
2011	3-RS-11-11	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 8 –August 31, 2010. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 8 until 11:59 p.m. Wednesday, August 31. In addition, this emergency order establishes the weekly period from 12:01 a.m. Monday, August 8 until 11:59 p.m. Sunday, August 14 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.
2011	3-KS-03-11	Reduces the annual limit for king salmon 20 inches or more in length in the Upper Copper River drainage from four to two fish. This emergency order also prohibits retention of king salmon in all flowing waters of the Copper River upstream of the Klutina River effective 12:01 a.m. Saturday June 25, 2011. The use of bait and treble hooks in these waters is also prohibited. 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 25, 2011.

APPENDIX B

Appendix B1.–Federal subsistence permits and harvest^a from the Copper River, Chitina Subdistrict, 2002–2011

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	18	2,324	30	0	0
2011	83	ND	ND	ND	ND	ND	ND

^a Reported harvest only 2002–2004; Expanded (estimates harvest from nonreturned permits) harvest 2005–2010

Appendix B2.–Federal subsistence permits and harvest^a from the Copper River, Glennallen Subdistrict, 2002–2011.

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	326	14,137	81	42	62
2011	274	ND	ND	ND	ND	ND	ND

^a Reported harvest only 2002–2004; Expanded (estimates harvest from nonreturned permits) harvest 2005–2010.

APPENDIX C

Appendix C.–Reference information specific to 2011 Alaska Board of Fisheries proposals.

Proposal	Proposal Subject	Text (page #)	Table #	Figure #	Appendix
54	Copper River subsistence and personal use	25	1, 7, 12, 14, 15	3	A, B
55	Copper River subsistence and personal use	25	1, 7, 12, 14, 15	3	A, B
56	Copper River subsistence and personal use	25	7, 14, 15	3	A, B
57	Whitefish subsistence fisheries	33	16	1, 4	
58	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
59	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
60	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
61	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
62	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
63	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
64	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
65	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
66	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
67	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
68	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
69	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
70	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
71	Whitefish subsistence fisheries	33	16, 17, 18, 19	1, 4	
72	Copper River personal use	25	12, 15	3	A, B
73	Copper River personal use	25	7, 15	3	A, B
74	Copper River personal use	25	7, 15	3	A, B
75	Copper River personal use	25	7, 12, 15	3	A, B
76	Copper River personal use	25	15	3	A, B
126	Gulkana River king salmon sport fishery	11	7, 8, 10	2	A, B
127	Copper River guided sport fisheries	6, 15	9		
128	Nonresident sport fish shipping limits				
129	Lake trout sport fisheries	37	17, 18, 19	4	
130	Lake Louise and Crosswind Lake lake trout sport fisheries	37	17, 18, 19	4	
132	Paxson and Summit lakes lake trout sport fisheries	37	17, 18, 19	2, 4	
133	Paxson and Summit lakes lake trout sport fisheries	37	17, 18, 19	2, 4	
134	Lake Louise, Susitna, Tyone lakes guided sport fisheries		9	4	
135	Lake Louise, Susitna, Tyone lakes guided sport fisheries		9	4	
136	Summit Lake rainbow trout sport fishery				
137	<i>Wild Arctic Grayling Management Plan</i>		5, 6		
138	Tolsona Lake burbot sport fishery	40	19		