

**Fishery Management Report No. 13-19**

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**Fishery Management Report for the Recreational  
Fisheries of the Upper Copper/Upper Susitna River  
Management Area, 2011**

by

**Mark A. Somerville**

May 2013

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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.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
<b>Weights and measures (English)</b>		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	$E$
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	$\geq$
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	$\leq$
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
		latitude or longitude	lat. or long.	minute (angular)	'
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
<b>Physics and chemistry</b>				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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FISHERIES OF THE UPPER COPPER/UPPER SUSITNA RIVER  
MANAGEMENT AREA, 2011**

by

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

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# TABLE OF CONTENTS

	<b>Page</b>
LIST OF TABLES.....	iv
LIST OF FIGURES.....	iv
LIST OF APPENDICES.....	iv
ABSTRACT.....	1
EXECUTIVE SUMMARY.....	1
INTRODUCTION.....	1
Alaska Board of Fisheries.....	3
Advisory Committees.....	3
Recent Board of Fisheries Actions.....	3
ADF&G Emergency Order Authority.....	5
Federal Subsistence.....	6
Region III Division of Sport Fish Research and Management Staffing.....	6
Statewide Harvest Survey.....	7
Sport Fish Guide Licensing and Logbook program.....	7
SECTION I: MANAGEMENT AREA OVERVIEW.....	8
Management Area Description.....	8
Fishery Resources.....	8
Established Management Plans and Policies.....	9
Major Issues.....	11
Access Programs.....	14
Information and Education.....	14
Sport Fishing Effort, Harvest, and Catch.....	15
SECTION II: FISHERIES.....	15
King Salmon Sport Fisheries.....	15
Background and Historic Perspective.....	15
Gulkana River King Salmon Sport Fishery.....	17
Background and Historic Perspective.....	17
Recent Fishery Performance.....	19
Fishery Objectives and Management.....	20
Current Issues and Fishery Outlook.....	20
Recent Board of Fisheries Actions.....	21
Current or Recommended Research and Management Activities.....	21
Klutina River King Salmon Sport Fishery.....	21
Background and Historical Perspective.....	21
Recent Fishery Performance.....	22
Fishery Objectives and Management.....	23
Current Issues and Fishery Outlook.....	23
Recent Board of Fisheries Actions.....	24
Current or Recommended Research and Management Activities.....	24

## TABLE OF CONTENTS (Continued)

	<b>Page</b>
Other Copper River Basin King Salmon Sport Fisheries.....	24
Background and Historical Perspective.....	24
Fishery Objectives and Management .....	26
Current Issues and Fishery Outlook .....	26
Recent Board of Fisheries Actions .....	26
Current or Recommended Research and Management Activities .....	26
Sockeye Salmon Sport Fisheries .....	26
Background and Historic Perspective .....	26
Recent Fishery Performance .....	28
Fishery Objectives and Management .....	28
Current Issues and Fishery Outlook .....	28
Recent Board of Fisheries Actions .....	29
Current or Recommended Research and Management Activities .....	29
Copper River Personal Use and Subsistence Salmon Fisheries.....	29
Background and Historical Perspective.....	29
Recent Fishery Performance .....	33
Fishery Objectives and Management .....	33
Current Issues and Fishery Outlook .....	35
Recent Board of Fisheries Actions .....	35
Current or Recommended Research and Management Activities .....	36
Resident Species Subsistence Fisheries .....	36
Background and Historical Perspective.....	36
Recent Fishery Performance .....	37
Fishery Objectives and Management .....	37
Current Issues and Fishery Outlook .....	37
Recent Board of Fisheries Actions .....	37
Current or Recommended Research and Management Activities .....	37
Arctic Grayling Sport Fisheries .....	38
Background and Historical Perspective.....	38
Recent Fishery Performance .....	38
Fishery Objectives and Management .....	38
Current Issues and Fishery Outlook .....	39
Recent Board of Fisheries Actions .....	39
Current or Recommended Research and Management Activities .....	39
Lake Trout Sport Fisheries .....	39
Background and Historical Perspective.....	39
Recent Fishery Performance .....	40
Fishery Objectives and Management .....	40
Current Issues and Fishery Outlook .....	41
Recent Board of Fisheries Action.....	41
Current or Recommended Research and Management Activities .....	41
Burbot Sport Fisheries .....	42
Background and Historical Perspective.....	42
Recent Fishery Performance .....	42
Fishery Objectives and Management .....	42
Current Issues and Fishery Outlook .....	43
Recent Board of Fisheries Actions .....	43
Current or Recommended Research and Management Activities .....	43

## TABLE OF CONTENTS (Continued)

	<b>Page</b>
Wild Rainbow and Steelhead Trout Sport Fisheries .....	43
Background and Historical Perspective .....	43
Recent Fishery Performance .....	44
Fishery Objectives and Management .....	45
Current Issues and Fishery Outlook .....	45
Recent Board of Fisheries Actions .....	45
Ongoing or Recommended Research and Management Activities .....	45
Dolly Varden Sport Fisheries .....	46
Background and Historical Perspective .....	46
Recent Fishery Performance .....	46
Fishery Objectives and Management .....	46
Current Issues and Fishery Outlook .....	46
Recent Board of Fisheries Action .....	47
Ongoing and Recommended Research and Management .....	47
Upper Copper / Upper Susitna Management Area stocked waters .....	47
Background and Historical Perspective .....	47
Recent Fishery Performance .....	47
Fishery Objectives and Management .....	48
Current Issues and Fishery Outlook .....	48
Recent Board of Fisheries Action .....	48
Current or Recommended Research and Management Activities .....	48
ACKNOWLEDGMENTS .....	48
REFERENCES CITED .....	49
TABLES .....	57
FIGURES .....	83
APPENDIX A .....	89
APPENDIX B .....	91
APPENDIX C .....	96

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Reported subsistence and personal use (Glennallen and Chitina Subdistricts) harvests <sup>a</sup> of king, sockeye, and coho salmon in the Copper River, 1992–2011.....	58
2. Commercial harvests of king and sockeye salmon in the Copper River District, 1993–2012.....	59
3. Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1992–2011. ....	60
4. Sport fishing effort (angler-days) in the UCUSMA by drainage, 1992–2011.....	61
5. Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters (including stocked waters), 1992–2011. ....	62
6. Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1992–2011. ....	63
7. Summary of king salmon harvests and upriver escapement in the Copper River 1992–2011. ....	64
8. Harvest of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1992–2011.....	65
9. Harvest Summary data for guided anglers in the Upper Copper River drainage, 2006–2011. <sup>a</sup> .....	66
10. Catch of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1992–2011. ....	67
11. Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, 1992–2011.....	68
12. Summary of sockeye harvests and upriver escapement in the Copper River 1992–2011. ....	69
13. Distribution of sockeye salmon in major drainages in the Copper River, 2005–2009. ....	70
14. Number of permits issued and expanded salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1992–2011. ....	71
15. Number of permits issued and expanded salmon harvested during the Chitina Subdistrict personal use salmon fishery in the Copper River, 1992–2011. ....	72
16. Number of freshwater finfish subsistence permits issued and harvest from UCUSMA waters, 1992 – 2011.....	73
17. Harvest of wild Arctic grayling by recreational anglers in the UCUSMA by drainage, 1992–2011. ....	74
18. Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, 1992–2011. ....	75
19. Percent of lake trout released in five UCUS lakes during years with 24” minimum size limits and with no size limits, 1990–2011 <sup>a</sup> .....	76
20. Sustainable yield (Lake Area model) and harvest of lake trout from UCUSMA lakes greater than 500 ha in size.....	77
21. Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, 1992–2011.....	78
22. Sport catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, 1992–2011.....	79
23. Harvest of wild Dolly Varden by sport anglers fishing UCUSMA waters by drainage, 1992–2011. ....	80
24. Stocking schedule for lakes in the UCUSMA. ....	81
25. Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1992–2011.....	82

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Map of the sport fish regions in Alaska and the five Region III management areas. ....	84
2. The Upper Copper/Upper Susitna Management Area (UCUSMA). ....	85
3. Gulkana River drainage. ....	86
4. Upper Copper River fishery subdistricts and areas. ....	87
5. Major lake trout and burbot fisheries in the UCUSMA. ....	87

## LIST OF APPENDICES

<b>Appendix</b>	<b>Page</b>
A. Listing of the addresses and contact numbers for information sources regarding UCUSMA information. ....	90
B. Emergency orders issued for UCUSMA sport, personal use, and subsistence fisheries during 2011 and 2012.....	92
C1. Federal subsistence permits and harvest <sup>a</sup> from the Copper River, Chitina Subdistrict, 2002–2011.....	97
C2. Federal subsistence permits and harvest <sup>a</sup> from the Copper River, Glennallen Subdistrict, 2002–2011.....	97

## **ABSTRACT**

Seasonal summaries for subsistence, sport, and personal use fisheries for 2011 and preliminary information for 2012 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 fishing effort and harvest in 2011 was the lowest in the UCUSMA since 1977. Sport angler effort was estimated at 31,993 angler-days and sport catch was 53,526 fish in 2011. Estimated sport harvest totaled 14,248 fish with sockeye salmon the primary species targeted, accounting for 54% of the harvest. In the Glennallen Subdistrict state subsistence fishery a total of 62,477 salmon were harvested in 2011, exceeding the previous 5- and 10-year average harvests. Sockeye salmon comprised over 95% of the subsistence harvest. The Chitina Subdistrict personal use fishery state harvest totaled 131,265 salmon in 2011, also exceeding the previous 5- and 10-year average harvests.

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

## **EXECUTIVE SUMMARY**

This document provides a wide array of information specific to the recreational angling opportunities and personal use and subsistence fisheries that exist within the Upper Copper/Upper Susitna Management Area (UCUSMA). Information specific to the recreational, personal use and subsistence fisheries within the UCUSMA during 2011 and including preliminary data from 2012 are presented, along with a brief history of these fisheries and past Alaska Board of Fisheries (BOF) decisions that have affected them.

## **INTRODUCTION**

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

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

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

groups to assess the need for and development of fisheries management plans, and to propose regulatory strategies.

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

This area management report provides information regarding the UCUSMA and its fisheries for 2011, with preliminary information from the 2012 season. This report is organized into 2 primary sections: a management area overview including a description of the UCUSMA and a summary of effort, harvest and catch for the area, and a section on the significant area fisheries including specific harvest and catch by species and drainage.

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

Region III is the largest geographic region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 442,500 mi<sup>2</sup> (1,146,000 km<sup>2</sup>) of land, some of the state's largest river systems (Yukon, Kuskokwim, Colville, Noatak, Upper Copper and Upper Susitna River drainages), thousands of lakes, thousands of miles of coastline, and streams. Regional coastline boundaries extend from Cape Newenham in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is very sparsely populated, with the most densely populated center located in the Tanana River Valley. Fairbanks (population about 35,000, Fairbanks North Star Borough population of about 99,000) is the largest community.

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

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

- Upper Copper/Upper Susitna Management Area (the Copper River drainage upstream of Canyon Creek and Haley Creek, and the Susitna River drainage above the Oshetna River);
- Tanana River Management Area (the Tanana River drainage); and,
- Kuskokwim Management Area (the entire Kuskokwim River drainage and Kuskokwim Bay drainages).

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

## **ALASKA BOARD OF FISHERIES**

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

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

## **ADVISORY COMMITTEES**

Local ACs have been established throughout the state to assist the Boards of Fisheries and Game in assessing fisheries and wildlife issues and proposed regulation changes. AC meetings allow opportunity for direct public interaction with ADF&G staff attending the meetings that answer questions and provide clarification concerning proposed regulatory changes regarding resource issues of local and statewide concerns. The Boards Support Section within ADF&G's Division of Administrative Services provides administrative and logistical support for the BOF and ACs. During 2011, ADF&G had direct support responsibilities for 81 ACs in the state.

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

## **RECENT BOARD OF FISHERIES ACTIONS**

The BOF meets annually, but deliberates on each individual regulatory area on a 3-year cycle. The last regular cycle meeting for the UCUSMA occurred in December 2011 in Valdez. At that meeting, the BOF adopted 6 of 35 proposals specific to Upper Copper River subsistence, personal use and UCUSMA sport fisheries.

The BOF amended and adopted 1 proposal affecting the freshwater finfish (other than salmon) subsistence fishery in Lake Louise, Susitna, and Tyone lakes. The channels between Lake

Louise and Susitna Lake and between Susitna Lake and Tyone Lake were closed to the taking of whitefish *Coregonus* and *Prosopium sp* with gillnets.

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

The BOF adopted a proposal that amended the *Copper River King Salmon Management Plan* to include management guidance to the department specific to the Chitina Subdistrict personal use and Glennallen Subdistrict subsistence fisheries which provides authority to the department to restrict king salmon *Oncorhynchus tshawytscha* harvest for conservation.

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

The BOF adopted a department proposal to add 1 day to the Arctic grayling *Thymallus arcticus* spawning closure from April 1–May 30 to April 1–May 31 in the Wild Arctic Grayling Management Plan. This aligned the dates in the plan with the dates in regulation and was the intent when the plan was adopted in 2004. The BOF also adopted a department proposal opening Tolsona Lake to sport fishing for burbot *Lota lota* with a bag and possession limit of two fish. Tolsona Lake had been closed to burbot fishing since 1998 and the burbot population had recovered sufficiently to allow harvest.

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

At the December 2008 meeting in Cordova, the BOF adopted 12 of 33 proposals specific to Upper Copper River subsistence, personal use and UCUSMA sport fisheries.

Two proposals were adopted affecting regulations concerning the Glennallen Subdistrict subsistence fishery. The BOF adopted proposals that moved regulatory language found in 5 AAC 01.630(e)(6) (Subsistence fishing permits) to 5 AAC 01.620 (Lawful gear and gear specifications) and moved regulatory language found in 5 AAC 01.630(e)(9) to 5 AAC 01.645(a). A third proposal was adopted by the BOF removing 5 AAC 24.360(c) which was

created in 2000 when the Chitina Subdistrict fishery was classified a subsistence fishery and should have been removed when the Chitina fishery was reclassified as a personal use fishery in 2003. None of these actions affected management of the Glennallen Subdistrict subsistence or Chitina Subdistrict personal use fisheries.

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

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

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

The BOF adopted 3 proposals concerning resident species in the UCUSMA. These updated the list of stocked waters in the UCUSMA, removed outdated regulations for rainbow/steelhead trout on Tolsona Lake, and repealed the Lake Burbot Management plan which had become redundant since the components of the plan had been incorporated into the area regulations.

Actions taken during BOF meetings prior to December 2008 specific to the UCUSMA are summarized in Somerville 2008 and Taube 2006a-b.

## **ADF&G EMERGENCY ORDER AUTHORITY**

ADF&G has emergency order (EO) authority (5 AAC 75.003) to modify time, area, and bag/possession limit regulations. EOs are implemented to address conservation issues for resident species. EOs are also implemented as a tool for inseason management of salmon fisheries. Inseason management is usually in accordance with a fisheries management plan

approved by the BOF. EOs issued under this authority for the UCUSMA during 2011 and 2012 are summarized in Appendix B.

## **FEDERAL SUBSISTENCE**

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

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

Within the UCUSMA the subsistence fisheries for which the federal government asserts management responsibility include those within and adjacent to the Wrangell-St. Elias National Park and Preserve (including the Copper River mainstem from Haley Creek upstream) and the Gulkana River National Wild River corridor. The UCUSMA fisheries fall under the purview of the Southcentral Regional Advisory Council (SCRAC). The SCRAC's most recent meeting was held in October 2012 in Homer. At this meeting, no federal fisheries proposals for the Prince William Sound Area were addressed.

## **REGION III DIVISION OF SPORT FISH RESEARCH AND MANAGEMENT**

### **STAFFING**

The Region III SF staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, a regional management biologist, an area biologist for each of the 5 management areas, 1 or more assistant area management biologists, and two stocked water biologists. Area biologists evaluate fisheries and propose and implement management strategies through plans and regulation in order to meet divisional goals.

A critical part of these positions is interaction with the BOF, ACs, and the general public. Stocked waters biologists plan and implement the regional stocking program for recreational fisheries. The regional management biologist assigned to the Region III office in Fairbanks also administers the regional fishing and boating access program.

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

## **STATEWIDE HARVEST SURVEY**

Sport fishing effort and harvest of sport fish species in Alaska have been estimated and reported annually since 1977 using a mail survey (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995-1996, 2001a-d, Walker et al. 2003, Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, 2011a-b, *In prep*). The Statewide Harvest Survey (SWHS) is designed to provide estimates of effort, harvest, and catch on a site-by-site basis. It is not designed to provide estimates of effort directed towards a single species. Species-specific catch per unit effort (CPUE) information can seldom be derived from the report. Two types of questionnaires are mailed to a stratified random sample of households containing at least one individual with a valid fishing license (resident or non-resident). Information gathered from the survey includes participation (number of anglers and days fished), number of fish caught and number harvested by species and site. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaskan waters, as well as the sport harvest. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. Survey results for each year are not available until the following year; hence, the results for 2011 were not available until fall 2012. 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; Clark 2009). In general, estimates from smaller fisheries with low participation are less precise than those of larger fisheries with high participation. Therefore, the following guidelines were implemented for evaluating survey data:

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 SF has operated a program to register and/or license both sport fishing guides and sport fishing guide businesses and to collect information on sport fishing participation,

effort, and harvest by saltwater and freshwater guided clients (Sigurdsson and Powers 2009). In 1998, the BOF adopted statewide sport fishing guide regulations (5 AAC 75.075) which required all sport fishing guides and businesses to register annually with the ADF&G. At this time the BOF also adopted statewide regulations that required logbooks for saltwater charter vessels. The logbooks collected information on charter activity (location, effort, and harvest) that was necessary for the BOF for allocation and management decisions specific to king salmon, 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 2009–2012).

## **SECTION I: MANAGEMENT AREA OVERVIEW**

### **MANAGEMENT AREA DESCRIPTION**

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

### **FISHERY RESOURCES**

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

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

A total of 28 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 in Anchorage and Fairbanks. The stocked-lake fisheries provide additional and diversified angling opportunity and reduce harvest pressure on wild fish stocks.

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

The BOF has established 1 personal use and 2 subsistence salmon fisheries in the Upper Copper River District. The SF has the lead management responsibility for these fisheries (as opposed to Division of Commercial Fisheries (CF) which manages most of the state subsistence fisheries). From 2006–2010, an average of 171,354 salmon was reported harvested annually in these fisheries (Table 1). Sockeye salmon comprise about 95% of the total harvest.

Returns of salmon to the Copper River also support commercial fisheries in the Copper River District (CRD), located near the mouth of the Copper River. From 2007–2011, an average of 1,161,490 sockeye salmon and 17,627 king salmon were commercially harvested in the Copper River District (Table 2).

## **ESTABLISHED MANAGEMENT PLANS AND POLICIES**

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

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

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

Some UCUSMA fisheries have been the focus of allocative conflicts. These conflicts have led the BOF to establish several management plans and policies to guide the fisheries in the area. The goal of these plans is to allocate fish resources among users and to provide managers with

guidelines to maintain a sustained yield of the fish stocks in the area. The following management plans and policies have been adopted by the BOF for UCUSMA fish stocks:

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

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

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

*Copper River Personal Use Dip Net Salmon Fishery Management Plan (5 AAC 77.591).* This management plan establishes fishing seasons, open area, gear, bag limits, and seasonal harvest level for a personal use fishery in the Copper River. The harvest will be distributed throughout the season based on projected daily sonar counts from the Miles Lake sonar counter. Harvest will be adjusted, based on actual sonar counts, through reduction or increase of fishing times by emergency order. The permit limit may be increased during weeks of harvestable surplus determined from actual sonar counts.

*Wild Arctic Grayling Management Plan (5 AAC 52.055).* 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 BOF 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 one or more management actions if there is a conservation or biological concern for the sustainability of the fishery or a stock harvested in that fishery. These actions include reduction of bag and possession limit, reduction of fishing time, allowing only catch-and-release, and modification of methods and means of harvest. The plan also specifies allowable measures to reduce harvest if the harvest level exceeds sustainable yield for a 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 three management approaches under which the department shall manage stocked waters in the UCUSMA: 1) the regional management approach; 2) the conservative management approach; and, 3) the special management approach. Stocked waters may be reclassified through a proposal from the public, department or BOF during the BOF's meeting cycle.

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

## **MAJOR ISSUES**

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

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

As a result of the actions taken through the CRKSMP, king salmon harvests have declined in the commercial, personal use, and sport fisheries. The department considers the king salmon resources of the Copper River fully utilized and while king salmon harvests have declined with the inception of the management plan, the allocation issues between the different user groups remain controversial.

*Copper River Personal Use and Subsistence Salmon Fisheries:* The Chitina Subdistrict dip net salmon fishery has been controversial since its inception. Its designation as a

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

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

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

Access to the Chitina Subdistrict fishery has long been an issue between dipnetters and the two local Native corporations (Ahtna Inc. and Chitina Native Corporation). From the early 1990s through 2003 an access fee was associated with the State issued dip net permit. In 2000, DOT conducted a survey of the O'Brien Creek Road from Chitina to Haley Creek and determined that the road ROW provided access to the Copper River from the road for a majority of its distance in the fishery. As a result of the survey, the Alaska Legislature removed the access fee from the permit. This action was opposed by

Ahtna Inc. and Chitina Native Corporation who remained concerned over trespass and vandalism allegedly caused by dipnetters. In July 2004, Chitina Native Corporation blocked access to the Copper River at O'Brien Creek, a primary river access point and boat launching area for charter operators and private boats, forcing these boat operators to launch approximately 3 miles upstream at the Chitina-McCarthy Bridge. This also reduced the parking and camping area used by many of the fishery participants. The state did not dispute the blocked access, as the survey indicated that this land was outside of the ROW, but has tried to negotiate access at this point with the corporations. In 2005, Chitina Native Corporation instituted a fee based access permit where the general public can now purchase access across Corporation lands for the day or the season. However, even with the access permit, access to the river and trespass on Corporation lands is still a contentious issue.

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

*Burbot and lake trout fisheries:* The lakes of the UCUSMA have historically supported some of the largest sport fisheries for burbot and lake trout in Alaska. Stock assessment work indicated that many burbot and lake trout stocks were depressed due to overfishing in the early 1980s. Based on these and other findings, the BOF adopted management plans for burbot (1989) and lake trout (2006) stocks in UCUSMA lakes. Under these management plans, the BOF 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 Lake Louise, Susitna, Tyone, Crosswind, Paxson and Summit lakes, regulations have been adjusted for lake trout retention and allow for a limited period when bait is permitted to facilitate a burbot ice fishery while providing protection to the lake trout populations.

*Freshwater subsistence fisheries:* At the 2008 BOF meeting a positive C&T determination was made for the freshwater fishes in the Prince William Sound Area which includes the entire UCUSMA. Freshwater subsistence permits were issued in the UCUSMA since 1960, but the positive C&T determination formalized this practice. The majority of permits issued for freshwater subsistence fishing are for gillnetting whitefish between October 1 and March 31. From 1964 through 2004, the maximum number of permits issued for subsistence fishing in any year was 13. In 2009, 28 permits were

issued for fishing whitefish with a gillnet. With low participation, the subsistence whitefish fishery garnered little notice from other user groups. With the increase in subsistence permits and especially increases on popular sport fishing lakes (generally the road accessible fisheries of Lake Louise and Paxson Lake) concern by sport anglers over potential impacts on lake trout and burbot has been elevated and may be a continuing issue into the future.

## **ACCESS PROGRAMS**

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

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

## **INFORMATION AND EDUCATION**

Information regarding regulations, publications, stocking and fishing reports, news releases and EOs for the UCUSMA can be found from the *Fishing* and *Sport* links at the ADF&G website (<http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main>). In addition, many of these publications as well as some additional publications regarding fishing opportunities in the UCUSMA can be found at the area ADF&G office in Glennallen and the regional ADF&G office in Fairbanks. Information regarding the Gulkana Wild River (BLM) and Wrangell-St. Elias National Park (USNPS) can be obtained from the respective agency offices in Glennallen and Copper Center. The Ahtna Incorporated has its headquarters located in Glennallen and can be visited for information regarding access to corporation-owned lands. The Greater Copper Valley Chamber of Commerce can be a source for commercial operators located in the UCUSMA. A listing of the addresses and contact numbers for these information sources can be found in Appendix A.

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

## **SPORT FISHING EFFORT, HARVEST, AND CATCH**

Effort, harvest, and catch statistics for UCUSMA sport fisheries have been estimated from response to the SWHS and reported under the headings of the “Upper Copper River Drainage” (Area I) and the “Susitna River Drainage” (Area M) (Mills 1979-1980, 1981a-b, 1982-1994, Howe et al. 1995-1996, 2001a-d, Walker et al. 2003, Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, 2011a-b, *In prep*). Estimated angler effort in the UCUSMA averaged 2.1% of the overall statewide effort and 24.7% of the Region III effort from 2006-2010 and was 1.7% of the overall statewide effort and 22.1% of the Region III effort in 2011 (Table 3).

Anglers expended a total of 31,993 angler-days of effort in UCUSMA drainages in 2011, which is the lowest angler activity since 1977 when sport fishing effort was first estimated (Table 4). Angler effort in the UCUSMA has generally remained between 40,000 and 60,000 angler-days with the exception of the period from 1992 through 1995 when angler effort peaked at 102,951 angler-days in 1995. The majority of effort in the UCUSMA occurs in the Gulkana and Klutina river drainages, representing approximately 68% of the total area effort in the past decade.

Sockeye salmon are the predominant species harvested in the UCUSMA representing 55% (15,383 fish average) of all species harvested from 2006-2010 and 54% (7,727 fish) in 2011 (Table 5). The next most harvested species, from 2006-2010, were Arctic grayling (4,044 fish) and king salmon (3,186 fish) followed by burbot, lake trout, rainbow trout, Dolly Varden, and whitefish.

Arctic grayling are the predominant species caught in the UCUSMA representing 46% (46,900 fish) of all species caught from 2006-2010 and 37% (19,738 fish) in 2011 (Table 6). The next most caught species, from 2006-2010, were sockeye salmon (21,768 fish), and lake trout (9,247 fish) followed by king salmon, rainbow trout, burbot, Dolly Varden, and whitefish.

## **SECTION II: FISHERIES**

This section provides a summary of sport fisheries by species that were considered significant in the UCUSMA in 2011. Discussion of each fishery will address: 1) historical perspective; 2) recent fishery performance (stock status); 3) fishery objectives and management; 4) current issues; 5) recent actions by the BOF; and, 6) ongoing and recommended management and research activities. Recent fishery performance will focus on data from 2011; however, observations or research data regarding these fisheries in 2012 will be presented when available. A summary of the historical (prior to 1992) sport harvest of fish in the UCUSMA by species can be found in Somerville (2008) and data from 1992-2011 are presented in Table 5 for harvest and Table 6 for catch.

### **KING SALMON SPORT FISHERIES**

#### **Background and Historic Perspective**

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

King salmon returning to the Copper River drainage pass through the Copper River Delta and enter the Copper River in early May. The peak timing in the Lower Copper River is from mid-May to mid-June, with the return essentially complete by July 1. However, small numbers of

king salmon continue to enter the Copper River through August. King salmon make their way to spawning areas in the Upper Copper River tributaries through June and July and spawn mid-July through August. There are no known king salmon spawning streams downstream of Haley Creek.

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

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

The *Copper River King Salmon Management Plan* 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. From 1969–1981 the commercial harvest of king salmon averaged 19,961 fish (Somerville 2008). In 1982, commercial harvest spiked to over 47,000 king salmon and to over 52,000 king salmon in 1983 after which, the overall return and harvest of king salmon declined through 1990 with a commercial harvest of 21,702 king salmon that year. While commercial harvests decreased from 1983–1990, king salmon harvests increased in the combined personal use, subsistence, and sport fisheries in the Upper Copper River (Somerville 2008). By 1991 the king salmon resource was showing signs of stress evidenced by a trend of below average escapements to some systems (Roberson and Whitmore 1991). Because most of these fisheries are comprised of mixed stocks, the contribution to the harvest by each spawning stock cannot be quantified and king salmon productivity cannot be assessed using stock specific spawner-recruit relationships (Brady et al. 1991; Roberson and Whitmore 1991).

Beginning with 1991, harvests in all king salmon fisheries entered an increasing trend (Table 7). This trend peaked in 1998 with an overall harvest of 87,343 king salmon in the Copper River fisheries. King salmon harvests have declined since 1999 with the most dramatic decline beginning in 2008. From 1999 to 2005 total king salmon harvest ranged from 44,829–79,794 fish (Table 7). Over the last 5 years (2006–2010) the total king salmon harvest has averaged 29,530 fish. The total king salmon harvest in 2011 was 25,895 fish. King salmon escapement has averaged 28,886 fish from 1999–2010 and met or exceeded the sustainable escapement goal (SEG) for the Copper River in 7 of those years. King salmon escapement achieved the SEG in 2011 and was estimated at 27,994 fish.

King salmon sport fisheries occur in various tributaries of the Copper River. Fisheries on the Gulkana and Klutina rivers account for 96% of the sport caught king salmon in the UCUSMA (Table 8). In 1994 an annual bag limit of 5 king salmon was established for the Upper Copper River drainage in an attempt to stem rising king salmon harvests. Harvest of king salmon continued to increase through 1996 when it peaked at 9,116 fish (Table 8). In 1997, guides were prohibited to operate on Tuesdays during the king salmon season, but this appeared to have little or no effect on guided harvests. In 2000, the annual limit for king salmon in the Upper Copper River drainage was reduced from 5 to 4 and the guide restriction was repealed. Sport harvest of king salmon has declined since 1997. From 2006–2010 sport harvest of king salmon in the UCUSMA averaged 3,186 fish and totaled 1,753 fish in 2011 (Table 8).

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 (Sigurdsson and Powers 2009–2012). The number of guides operating on area rivers has increased since the early 1980s. For example, prior to the 1986 season, only one individual specialized in guiding anglers for king salmon on the Gulkana River. By 1989, 5 guides were operating on the Gulkana River (Potterville and Webster 1990) and from 2006 through 2011, 18–29 guides operated annually on the Gulkana River (D. Sigurdsson, Sport Fish Biologist, ADF&G, Anchorage, personal communication; Table 9). On the Klutina River 19–28 guides operated there annually since 2005 when logbooks became required.

To more accurately assess king salmon abundance in the Copper River, research was initiated in 1995 to estimate the timing and contribution of king salmon stocks from its major tributaries. In 1996, a weir was operated on the Gulkana River to enumerate king salmon in tandem with a creel survey to estimate king salmon harvest (LaFlamme 1997). From 1997 to 1999, a coded-wire tagging study was conducted in the Gulkana, Klutina, Tonsina, and East Fork Chistochina rivers. Unfortunately, marking wild king salmon fry 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 1999–2004, radiotelemetry studies were used to determine king salmon distribution and timing of entry into the spawning streams of the Copper River (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005a). Estimates of total escapement were obtained during these studies from a mark-recapture experiment in which king salmon were captured and tagged during the radio-transmitter deployment and then recaptured in the Chitina Subdistrict personal use fishery. In 2002 a separate mark-recapture study was initiated using only fish wheels as the means to capture (for marking) and recapture marked and unmarked king salmon. This continuing study, conducted by the Native Village of Eyak and LGL, Inc., has provided a post-season estimate of annual king salmon escapement to the Copper River since 2003 (Smith et al. 2003; Smith 2004; Smith and van den Broek 2005a-b; van den Broek et al. 2008, 2009a-c, 2011, *In prep*).

## **Gulkana River King Salmon Sport Fishery**

### ***Background and Historic Perspective***

The Gulkana River drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana. The section of the Gulkana River upstream from Sourdough has been designated as “wild” under the Wild and Scenic Rivers Act of 1968. Access

to the river, downstream of Paxson Lake, is limited to 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<sup>th</sup>. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork (Figure 3).

Spawning escapement of king salmon in the Gulkana River, upstream of the West Fork, has been documented since 1966 by aerial index counts (Brady et al. 1991; Roberson and Whitmore 1991; Taube 2006a-b). A weir was operated on the Gulkana River in 1996 to provide a count of king salmon escapement concurrent with a creel survey conducted that same year (LaFlamme 1997). The estimated total inriver run in 1996 was 13,840 and estimated spawning escapement was 11,399.

In 2002 ADF&G initiated a multi-year project with BLM to estimate the escapement of king salmon in the Gulkana River (Taras and Sarafin 2005; Perry-Plake et al. 2007; Perry-Plake and Antonovich 2009; Perry-Plake and Huang 2011; Savereide 2010, 2011; Maclean and Huang 2012). A counting tower site was established approximately 2 miles upstream of the West Fork confluence to enumerate king salmon migrating upstream. From 2002–2004 a radiotelemetry tracking station was installed at the tower site to collect data in conjunction with the Copper River king salmon radiotelemetry project. These data enabled the estimation of the proportion of radiotagged king salmon that entered the Gulkana River and migrated past the tower. The telemetry data indicated that 50%–86% of the Gulkana River king salmon return passed the counting tower during these years (Taras and Sarafin 2005; Perry-Plake et al. 2007). The estimated escapement passing the counting tower has generally decreased each year since 2002 and has ranged from 6,390 in 2002 to 1,730 in 2012. The final estimated king salmon escapement in 2011 was 3,804 fish and in 2012 was 1,730 fish (Maclean and Huang 2012). A long-term goal of this project is to establish a king salmon SEG for the Gulkana River.

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

that were guided or used bait had higher harvest and catch rates. Shore anglers caught as many king salmon as boat anglers, but harvested more and expended more time to catch a king salmon. According to both creel surveys, approximately 50% of the harvest occurred on weekends.

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

### ***Recent Fishery Performance***

King salmon sport harvests in the Gulkana River peaked in the 1990s with harvest exceeding 5,000 king salmon in several years through 1998. After 1998, king salmon harvests began to decline (Table 8). The sport harvest of king salmon in the Gulkana River averaged 1,941 fish over the last 5 years (2006–2010) and 2,413 fish from 2001–2010. Angler effort on the Gulkana River, which is presumed to be primarily focused toward king salmon, also 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 (2006–2010) of 18,479 angler-days. Angler effort in 2011 was the lowest ever recorded for the Gulkana River at 8,541 angler-days and most likely reflects inseason restrictions and closure of the king salmon fishery (Appendix B).

On June 25, 2011, retention of king salmon was prohibited in the flowing waters of the Copper River Drainage upstream of the Klutina River, including the Gulkana River. In addition, the annual limit for king salmon 20 inches or more in length was reduced from four to two fish, of which only one king salmon could be retained from any individual tributary in the remainder of the Upper Copper River drainage. As a result of these management actions, the 2011 harvest of 563 king salmon from the Gulkana River was the second lowest ever recorded (Table 8).

In 2012, management action was again taken to restrict the king salmon fishery in the Gulkana River. On June 30, the retention of king salmon was prohibited in the Gulkana River and portion of the Copper River from the confluence of the Gulkana and Copper rivers to an ADF&G marker located approximately 500 yards downstream. Furthermore, the use of bait and treble hooks in the Gulkana River was prohibited. The annual limit for king salmon 20 inches or more in length was reduced from four to one fish in the remainder of the Upper Copper River drainage. The final escapement estimate for king salmon in the Gulkana River for 2012 was the lowest count (1,730 king salmon) since the tower project's inception (Maclean and Huang 2012).

### ***Fishery Objectives and Management***

The goal of past and current management of king salmon on the Gulkana River has been to ensure sustained yield, but there is currently no spawning escapement goal specific to the Gulkana River. The *Copper River King Salmon Fishery Management Plan* was developed in 1996 to provide for king salmon escapement at or above average historic levels. To meet this goal, escapement objectives (post-season indices of escapement only) were developed for several river systems based on the 1977–1995 average aerial index count for those systems. Only years in which the systems were surveyed between July 17 and 31 were used in the average as this was considered the peak spawning period. An aerial escapement index objective of 1,200 king salmon has been used for the Gulkana River. An inseason escapement count target of 4,070 king salmon past the Gulkana River counting tower was developed using an expansion of the aerial survey indices from 2002–2011 to the tower counts for those years (Maclean and Huang 2012). This target is not a formal escapement goal, but rather a target to help guide inseason management decisions.

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

### ***Current Issues and Fishery Outlook***

Increased use by floaters and powerboat operators on the Gulkana River has intensified conflicts between these user groups and has instigated health concerns by local residents who use the Gulkana River as a source of drinking water. There are currently no restrictions on the number of rafts or for operating motorized boats for the purposes of floating the river, fishing or transporting anglers on the Gulkana River. At the 1999, 2003, and 2008 BOF meetings, proposals were submitted to limit motor boat use on the Gulkana River. None of these proposals were addressed, as they fell outside the purview of the BOF. However, BLM has authority within the designated wild section of the river to establish a permit system for camping on their lands and thus limit the number of trips per year or number of people per trip. No such permit system has yet been implemented, but BLM currently issues portable toilets for rafting groups floating the river from Paxson Lake to the Sourdough boat launch.

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

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

Fishing effort for king salmon on the Gulkana River is influenced by water level and clarity, publicity regarding inseason run strength, and management actions on other roadside king salmon fisheries (such as the Kenai and Deshka rivers). Based on recent returns of king salmon and a consistent downturn in fishing effort statewide, fishing effort is expected to remain stagnant for the foreseeable future.

### ***Recent Board of Fisheries Actions***

There were 3 proposals before the BOF at their 2011 meeting which concerned the Gulkana River king salmon fishery. Proposal 126 sought to change the king salmon season on the Gulkana River from 7 days per week from January 1–July 19 to 5 days per week from June 10–August 10. This proposal failed. Proposal 127 sought to restrict sport fish guides in some undetermined way if the Copper River District commercial drift gillnet fishery was closed for conservation measures. Proposal 128 sought to limit nonresident anglers to shipping only a single daily bag limit of fish from the state and establish a permitting system to ensure compliance. The BOF took no action on these proposals.

### ***Current or Recommended Research and Management Activities***

A goal of the Gulkana River counting tower project is to provide data to develop a spawning escapement goal (SEG). The counting tower has already proven to be effective for inseason management and should be maintained as a future management tool. A new radiotelemetry study on king salmon may provide more detailed information on king salmon movements and spawning locations within the Gulkana River drainage to verify current assumptions with regard to the location of the Gulkana counting tower and provide information for use in any future land use or river crossing decisions.

## **Klutina River King Salmon Sport Fishery**

### ***Background and Historical Perspective***

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

The Klutina River supports the second largest sport fishery for king salmon in the UCUSMA. King salmon begin entering the Klutina River in late June, with the run continuing into August. The king salmon sport fishery opens on July 1, peaks during the third week of July, and continues until the season closes on August 11. King salmon spawn from late-July through August in tributary streams of the river and lake and in the mainstem of the river. Most spawning is believed to occur upstream of a point adjacent to mile 19.2 on the Klutina Lake

Road. Current open seasons for king salmon and areas closed to sport fishing for king salmon on the Klutina River provide protection to king salmon spawners. On the Klutina River from an ADF&G marker located adjacent to Mile 19.2 of the Klutina Lake Road upstream to Klutina Lake, king salmon may be taken only from July 1 through July 19. From 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  $\geq 20$  inches is 1 fish. The Upper Copper River drainagewide annual bag limit of 4 king salmon  $\geq 20$  inches per year includes the Klutina River.

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

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

### ***Recent Fishery Performance***

Fishing effort (Table 4), harvest (Table 8) and catch (Table 10) of king salmon in the Klutina River increased during the 1990s peaking in 1999 (15,687 angler-days, harvest of 3,489 fish and catch of 8,637 fish). Starting in 2000, the annual king salmon bag limit was reduced from 5 to 4 fish  $\geq 20$  inches and coincided with a dramatic decrease in angler effort and king salmon harvest and catch in the Klutina River, which is the only major king salmon fishery in the UCUSMA open after July 20<sup>th</sup>. The harvest of king salmon from the Klutina River has ranged from 1,136 to 1,873 fish from 2000–2008. From 2009–2012 management actions were taken to ensure adequate spawning escapement in light of a weak king salmon return (Appendix B; Somerville 2011). These management actions led to king salmon harvests in 2009 (733 fish), 2010 (863 fish), and 2011 (1,043 fish) that were the lowest since 1990 (Table 8). On June 25, 2011, the annual limit for king salmon  $\geq 20$  inches 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. No further restrictions were taken in 2011. The 2011 harvest of 1,043 king salmon was below the 2006–2010 average harvest of 1,116 king salmon.

In 2012, management action was again taken to restrict the king salmon fishery in the UCUSMA and the Klutina River. On June 30, the annual limit for king salmon 20 inches or more in length was reduced from 4 to 1 fish. Anecdotal reports from the subsistence fishery and anglers and guides continued to indicate the king salmon run was weak in the Klutina River. On July 28, retention of king salmon and the use of bait and treble hooks were prohibited in the Klutina River and all waters of the Upper Copper River Drainage downstream of the upstream bank of the Klutina River.

### ***Fishery Objectives and Management***

Although no specific fishery objectives have been established for this stock, the underlying goal of fisheries management is to ensure sustained yield. Continued aerial index counts of the clearwater tributaries will be used to monitor Klutina River king salmon returns inseason along with anecdotal reports from the subsistence, personal use and sport fisheries; and catch data from the Copper River commercial gillnet fishery and NVE/LGL project fish wheels.

The Klutina River king salmon return is managed as a single stock. Anglers and guides consider the return to be 2 separate stocks of kings, comprising an early and late run. Radiotelemetry data indicate that early returning fish primarily spawn in Manker and St. Anne creeks and the later returning king salmon primarily spawn in the mainstem Klutina River (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005a). However, early and late returning king salmon do spawn in both locations, and there is sufficient overlap in entry timing of both tributary and mainstem spawning king salmon into the Klutina River that no distinct temporal differences between early and late returning king salmon has been identified. Genetic sampling conducted from 2003–2005 did not have sufficient resolution to determine a significant genetic difference between the tributary and mainstem spawners (Seeb et al. 2009).

### ***Current Issues and Fishery Outlook***

Radiotelemetry indicated that 10%–12% of the total Copper River king salmon escapement from 2002–2004 spawned in the Klutina River, compared to the 17%–27% that spawned in the Gulkana River during the same period (Savereide 2005a). Since 1995 the king salmon sport harvest from the Klutina River has comprised 30%–40% of the overall Upper Copper River drainage sport harvest. While harvest levels rose from 2000–2003, they have since declined (Table 8). The recent downward trend in Klutina River king salmon harvest and a similar decline in king salmon harvest on the Gulkana River may be an indication of declining king salmon runs to these two rivers. Strong sockeye salmon runs since 2006 have increased popularity of the Klutina River leading to historically high angler effort since 2007 (Table 4). Although the increased angler effort appears to be primarily directed toward sockeye salmon, the increased number of anglers may create carry-over effort directed toward king salmon. Greater angler effort directed toward king salmon may increase exploitation rates on the Klutina River king salmon above a level generated normally by those anglers specifically targeting king salmon. This situation may increase the risk of overharvest during years of low production and high angler effort. Continued low escapements may make future restrictions to the fishery necessary.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna Native Corporation. Ahtna allows access across its lands along the Klutina Lake Road with the purchase of access passes. If fees increase without increased access this may

result in conflicts between fishery users and the corporation or increased congestion in areas of the Klutina River that are not corporation lands.

### ***Recent Board of Fisheries Actions***

There were 2 proposals before the BOF at their 2011 meeting which indirectly concerned the Klutina River king salmon fishery. Proposal 127 sought to restrict sport fish guides in some undetermined way if the Copper River District commercial drift gillnet fishery was closed for conservation measures. Proposal 128 sought to limit nonresident anglers to shipping only a single daily bag limit of fish from the state and establish a permitting system to ensure compliance. The BOF took no action on these proposals.

### ***Current or Recommended Research and Management Activities***

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

Management of the Klutina River king salmon stock would benefit from a system to count or estimate the king salmon run to the Klutina River drainage. However, current technology does not appear to be able to provide reliable and accurate species apportionment between sockeye salmon and king salmon, as these two species run timings overlap.

## **Other Copper River Basin King Salmon Sport Fisheries**

### ***Background and Historical Perspective***

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

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

In 2011 and 2012, drainage wide Copper River management actions were taken to ensure adequate spawning escapement in light of a poor king salmon run (Appendix B). On June 25, 2011, the annual limit for king salmon  $\geq 20$  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 (Appendix B). No further restrictions were taken in 2011.

In 2012, management action was again taken to restrict the king salmon fishery in the UCUSMA. On June 30, the annual limit for king salmon 20 inches or more in length was reduced from 4 to 1 fish. Anecdotal reports from the subsistence fishery and anglers and guides continued to indicate the king salmon run was weak. On July 28, retention of king salmon and the use of bait and treble hooks were prohibited in the Klutina River and all waters of the Upper Copper River Drainage downstream of the upstream bank of the Klutina River which included the Tonsina River.

In 2009, the SWHS estimated a harvest of 58 king salmon from the Tonsina River, but no king harvest was reported in 2010 or 2011 (Table 8). The sport harvest of king salmon in the Tonsina River has averaged 32 fish over the last five years (2006–2010) and 75 fish over the last 10 years (2001–2010; Table 8).

From 1999 to 2004, a radiotelemetry study of king salmon in the Copper River drainage provided annual estimates of total upriver escapement, as well as migratory timing through the Chitina Subdistrict personal use fishery, timing into the spawning tributaries, and distribution and proportion of king salmon in spawning tributaries (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003, 2004, 2005a). From 2002–2004 the Tonsina River king salmon run represented approximately 12% of the total Copper River return, a similar percentage as the run in the Klutina River.

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

Current regulations allow sport fishing for king salmon in the Tonsina River from July 1 through July 19 above the downstream edge of the Alyeska Pipeline access bridge and from July 1 through August 10 downstream of the access bridge. The July 20 closure date for the upper river provides protection for spawning king salmon. Tonsina Lake and all tributaries to the Tonsina River are closed to king salmon fishing. The current bag and possession limit for king salmon over 20 inches in this drainage is 1 fish, with an annual bag 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 dramatically dropped after 1999 with no catch reported until 2007 and 2008 and no harvest reported after 1998. The average escapement index for the Tazlina drainage was 576 king salmon from 1977–2004 (65% from Kaina Creek, 35% from Mendeltna Creek). Aerial index counts on Kaina and Mendeltna creeks were discontinued after 2004, due to minimal sport fishing effort and harvest and based upon radiotelemetry studies (Evenson and Wuttig 2000; Wuttig and Evenson 2001; Savereide and Evenson 2002; Savereide 2003-2005a) that indicated the Tazlina River represented less than 5% of the total Copper River return of king salmon.

### ***Fishery Objectives and Management***

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

### ***Current Issues and Fishery Outlook***

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

### ***Recent Board of Fisheries Actions***

There were no proposals before the BOF at their 2011 meeting which directly affected the other Copper River Basin king salmon fisheries.

### ***Current or Recommended Research and Management Activities***

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

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

## **SOCKEYE SALMON SPORT FISHERIES**

### ***Background and Historic Perspective***

In the UCUSMA, only the Copper River drainage supports wild and enhanced stocks of sockeye salmon. Wild stocks are widely distributed and are present in approximately 125 of the Upper Copper River tributaries, while enhanced stocks are limited to the Gulkana River from production at the Gulkana Hatchery near Paxson. The abundance of salmon migrating into the Copper River has been estimated annually since 1978 by sonar at Miles Lake. Although there is no species apportionment program in place, it is assumed that most of the fish passing the sonar are sockeye salmon. From 1966–1993, the escapement of sockeye salmon to the Copper River tributaries was documented by the Division of Commercial Fisheries through aerial index counts to monitor spawner distribution in the drainage (Brady et al. 1991). This aerial index count program was discontinued in 1993. A reduced aerial index count program, which targeted high priority index sites, was reinstated in 2000 (Hollowell et al. 2007).

From 2006–2010 sport harvest of sockeye salmon from UCUSMA waters averaged 15,383 fish (Table 11). The sockeye salmon sport harvest in 2011 (7,727 fish) was the lowest since 2008 and was dominated by the Klutina River where 6,025 sockeye were harvested. The primary sport fisheries for sockeye occur in the Klutina and Gulkana rivers, accounting for an average of 96% of the UCUSMA sockeye harvest from 2001–2010.

In addition to harvest in the tributary based recreational fisheries, sockeye salmon stocks of the Upper Copper River drainage are harvested in the Copper River District commercial drift gillnet fishery, the Chitina Subdistrict personal use fishery, and the Glennallen Subdistrict subsistence fishery (Table 12). The management of these fisheries is based on the abundance of all Copper River drainage stocks, as counted past the Miles Lake sonar station. Under the *Copper River District Salmon Management Plan* (5 AAC 24.360), the department is directed to manage the commercial fishery to achieve an inriver allocation of 15,000 salmon (all species) for sport fishery harvest, 61,000–82,500 sockeye salmon (wild stocks only) for subsistence harvest, 100,000–150,000 (including hatchery stocks) for personal use harvest, 360,000–750,000 sockeye salmon for spawning escapement, and an amount determined annually for hatchery brood and surplus stocks.

Since 1999, the Klutina River (Figure 2) has supported the largest sockeye salmon sport fishery in the UCUSMA (Table 11). Sockeye salmon begin returning to the Klutina River in mid-June and continue through August. The Klutina River accounted for 33%–54% of the sockeye salmon radiotagged in the Copper River from 2005 to 2009 (Wade et al. 2010; Table 13). Spawning activity is known to occur in various locations of the river, lake, and tributaries.

Prior to 1999, the Gulkana River supported the largest sockeye salmon recreational fishery in the UCUSMA. The sockeye salmon run to the Gulkana River is composed of both wild and hatchery stocks and has accounted for 7%–19% of the sockeye salmon radiotagged in the Copper River from 2005–2009 (Wade et al. 2010; Table 13). The Gulkana Hatchery has been producing sockeye salmon since the early 1970s and in the late 1990s produced enhanced returns of up to 800,000 adult salmon (Sharp et al. 2000). A strontium chloride otolith marking program was begun for hatchery fish in 2000. Issues with the strontium marking process caused mortality in marked sockeye salmon fry during brood years 2000 and 2001 significantly reducing adult returns from those brood years. Since 2000, hatchery returns have ranged from about 88,000 to 475,000 sockeye salmon (S. Moffit, Commercial Fisheries Biologist, ADF&G, Cordova, personal communication).

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

Sockeye salmon passage has been recorded at a king salmon counting tower project initiated in 2002 on the mainstem Gulkana River upstream of the West Fork (Taras and Sarafin 2005; Perry-Plake et al. 2007; Perry-Plake and Antonovich 2009; Perry-Plake and Huang 2011; Savereide 2010, 2011, Maclean and Huang 2012). These counts are considered minimums as sockeye salmon are still entering the system after the tower project ends. Between 2002–2011, an estimated 11,400 to 41,919 sockeye salmon (including hatchery fish) passed the tower from May 27 to August 14 each year.

### ***Recent Fishery Performance***

Sockeye salmon harvest from the Klutina River increased dramatically over all previous years in 2006 and has continued to remain high (Table 11). Sockeye salmon harvests from the Klutina River averaged 13,716 fish from 2006–2010 compared to the average harvest from 1996–2005 of 5,629 sockeye salmon and the previous high harvest of 7,219 sockeye salmon in 2000. In 2011 the sockeye salmon sport harvest dropped closer to the historic average with 6,025 sockeye salmon harvested. However, based on observed angler effort and success, the 2012 harvest will likely be similar to the 2006–2010 average. Annual aerial surveys of the Klutina River drainage indicate that the high sport harvests of sockeye salmon since 2006 are coincident with historically high aerial survey indices in Mahlo and St. Anne creeks during 2006–2009 (Botz et al. 2013). Aerial surveys on these streams were about average in 2010 and 2011.

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 salmon peaked from 1996–2000 with total runs ranging from 474,000 to 1,119,000 sockeye salmon. Sockeye salmon sport harvest declined after 2000 reaching a low of only 575 sockeye harvested from the Gulkana River in 2008. In 2011, sport anglers harvested 785 sockeye salmon in the Gulkana River. Sockeye salmon returns in the Gulkana River are currently underutilized by sport anglers primarily due to the late timing of enhanced sockeye salmon and low king salmon returns which have led to overall reduced fishing effort on the river.

### ***Fishery Objectives and Management***

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

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

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

### ***Current Issues and Fishery Outlook***

Issues and conflicts involving the Gulkana and Klutina rivers sockeye salmon fisheries are similar to those previously noted for the king salmon fishery. 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 as well as with the strength of the hatchery sockeye 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 equally or more directed toward sockeye salmon. It appears unlikely that sport angler harvest of sockeye salmon will have any significant impact on

the Klutina River stocks. 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 based on the radiotelemetry distribution data.

### ***Recent Board of Fisheries Actions***

There were no proposals submitted during the 2011 BOF cycle that affected sockeye salmon sport fisheries in the UCUSMA.

### ***Current or Recommended Research and Management Activities***

Sockeye salmon sport fish harvests will continue to be monitored with the SWHS. An aerial index count program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. The present management guidelines of the commercial, personal use, and subsistence fisheries are thought to provide sustainability of the Gulkana and Klutina 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 one of many traditional fishing camps along the Copper River. By 1920, fish wheels had replaced dip nets as the primary means of capturing salmon in the mainstem Copper River, but weirs and funnel traps were used in clear water tributaries until the 1940s. The use of dip nets to capture salmon in the Copper River began to increase in the 1940s and 1950s as more residents from outside the Copper River Basin communities participated in the Copper River fisheries.

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

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established a priority subsistence use of fish and game for federally-qualified residents on lands and waters for which the federal government asserts jurisdiction. The state of Alaska has also established a priority for subsistence use of fish and game by Alaskan residents (AS 16.05.258) on all lands and waters, but cannot discriminate between rural and urban residents (Alaska State Constitution Article VIII, sections 3 and 15). Because of this difference, the federal government asserted authority to ensure a priority subsistence use of fish and game for rural residents on federal lands and certain adjacent waters. To comply with ANILCA the Joint Boards of Fisheries and Game adopted a regulation in 1982 stating that only "rural" residents had "customary and traditional use" of fish and game and established 8 criteria for identifying "customary and traditional uses." This regulation excluded many individuals from participating in Copper River subsistence fisheries, thereby precluding them from harvesting fish for their personal use. This led the BOF to establish personal use fisheries in 1982 (5 AAC 77.001). These fisheries were created to provide Alaskans who became ineligible to harvest fish under new subsistence regulations the opportunity to harvest fish for consumption as food or use as bait. Personal use fisheries, like commercial and sport fisheries, were not given a "priority" in terms of allocation as with subsistence fisheries. In 1989, the McDowell decision reversed the "rural preference" and once again allowed all Alaskan residents to participate in subsistence fisheries under state regulations.

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

In 1984, based on analysis of the 8-point criteria found in 5 AAC 99.010, the BOF created a personal use salmon fishery in the Copper River drainage under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.590). At its December 1999 meeting, the BOF ruled in favor of a positive customary and traditional (C&T) determination for the Chitina Subdistrict and this fishery became a subsistence fishery (5 AAC 01.647(k)). Along with classifying the Chitina Subdistrict as a subsistence use area, the annual limit of king salmon was reduced from 4 to 1 fish. In February 2003, the BOF reversed its positive C&T determination for the Chitina Subdistrict and reinstated the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.591). The BOF viewed this as a name and allocation priority change only. Management of the fishery continued as it had prior to the 1999 ruling, based upon the number of fish passing the Miles Lake sonar. The king salmon annual limit for the fishery was left at 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 4). The season is open from June 1 through September 30, unless closed by emergency order. Only Alaska residents may participate in this subsistence fishery. A free subsistence permit is required to participate in the fishery. Users must record their harvest on their permit prior to leaving the fishing site and return the permit upon completing fishing for the season. The limits are 30 salmon for a household of 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 emergency order between June 7 and June 15. The mainstem Copper River between the downstream edge of the Chitina-McCarthy Bridge and a department marker located about 200 yards upstream of Haley Creek (in Wood Canyon) is open to personal use fishing (Figure 4). Both a valid Alaska sport fishing license and a free personal use permit are required to participate in the fishery. From 1991–1999, a fee of \$10 was attached to the permit and from 2000–2003, the permit fee was \$25. A portion of this fee was paid to Ahtna and Chitina Native Corporations for access across their lands. The permit fee was discontinued after 2003 and Chitina Native Corporation established their own access fee program 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 BOF has mandated that a household may not be issued both a Glennallen Subdistrict subsistence salmon fishing permit and a Chitina Subdistrict personal use salmon fishing permit in the same year.

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

Spawning escapement (sockeye salmon)	360,000–750,000
Spawning escapement (other salmon)	17,500
Glennallen Subdistrict Subsistence harvest (salmon)	61,000–82,500
Chitina Subdistrict Personal Use harvest (salmon)	100,000–150,000
Sport fishery harvest (salmon)	15,000
Hatchery brood stock (sockeye salmon)	Estimated annually
Hatchery surplus (sockeye salmon)	Estimated annually
TOTAL	Announced annually

Hatchery brood stock and hatchery surplus are adjusted annually based on the anticipated return of wild and hatchery stocks. Prior to 1997, maximum harvest for the Chitina Subdistrict was

60,000 salmon, with 25% of fish in excess of the inriver goal allocated to the personal use fishery. From 1997–1999, maximum harvest for the Chitina Subdistrict was 100,000 salmon, excluding fish in excess of the inriver goal and not including any salmon harvested after August 31. In 1998, the BOF adopted a proposal that allows permit holders, who have filled their original limit, to take 10 additional sockeye salmon in weeks when a harvestable surplus of 50,000 salmon or greater will be available in the Chitina Subdistrict. This supplemental harvest is exclusive of the maximum harvest level. A supplemental harvest period has occurred at least once during the season in 12 of the 14 years since this provision was adopted (no supplemental periods occurred in 2003 or 2009). From 2000–2002, 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 Subdistrict or Glennallen Subdistrict in which to participate. As a result, the National Park Service issued separate federal subsistence fishing permits to federally qualified subsistence users beginning in 2002 (Appendix C1; Appendix C2). Although this change did not affect overall subsistence harvest from the Copper River, the number of state permits issued decreased after 2001 (Table 14), with at least a portion of the federally qualified residents opting for a federal rather than state permit.

Annual harvests from the Glennallen Subdistrict subsistence fishery have been estimated since 1965. The fishery experienced rapid growth from 1980 through 1983, when a peak harvest of about 119,000 salmon were taken (Somerville 2008). Under the subsistence fishery management plan, harvests decreased substantially in 1984 to about 29,000 salmon. Subsistence harvests gradually increased from 1984 through 2001 and held between 60,000 and 90,000 fish annually through 2011 including that portion of the harvest taken through federal subsistence permits (Table 14, Appendix C2).

Harvests in the Chitina Subdistrict fishery have been estimated since its establishment in 1984. From 1984 through 1988, harvests remained relatively stable, averaging about 47,000 salmon annually (Somerville 2008). After 1988, harvests in the personal use fishery generally increased through 1999. The harvest from the Chitina Subdistrict fishery declined from 1999–2003 to levels similar to the early 1990s (Table 15). From 2003–2007 the harvest steadily increased again before dropping off to 2003 levels in 2008 and 2009. Overall harvest from the Chitina Subdistrict fishery generally tracks closely with the number of permits issued in respective years (Table 15). The 2011 harvest was 133,221 salmon from the Chitina Subdistrict including federal harvest (Table 15, Appendix C1).

Sockeye are the primary species harvested in the Glennallen Subdistrict, while king salmon comprise less than 5% and coho salmon less than 1% of the annual harvest (Table 14). King salmon were traditionally present in the Glennallen and Chitina Subdistrict fisheries by June 1 and, on average, 80% of the king salmon harvest was taken by July 12 and 95% by July 25 (Roberson and Whitmore 1991). King salmon run timing and harvest rates have remained similar to these trends through 2012.

### ***Recent Fishery Performance***

A total of 1,306 state and 280 federal permits (1,586 total permits) were issued for the Glennallen Subdistrict in 2011 (Table 14; Appendix C2). In 2012 a total of 1,800 permits were issued (1,529 state and 271 federal) which is the highest number of permits issued for the Glennallen Subdistrict since 1983. The total permits issued (state and federal) have increased steadily since 1991 in the Glennallen Subdistrict.

Total harvest from the Glennallen Subdistrict subsistence fishery for 2011 was 79,518 salmon including the federal harvest (Table 14; Appendix C2). Since the issuance of permits by the federal government, total harvest under state permits has averaged 61,886 salmon from 2001–2010 (Table 14) and total harvest under federal permits has averaged 16,311 salmon from 2002–2010 (Appendix C2). The 2012 harvest under state permits was 78,851 salmon. The 2012 harvest under federal permits was 17,223 salmon.

A total of 9,217 state and 83 federal permits (9,300 total permits) were issued for the Chitina Subdistrict personal use fishery in 2011 (Table 15, Appendix C1). In 2012 a total of 10,105 permits were issued (10,016 state and 89 federal) which is the highest number of permits ever issued for the Chitina Subdistrict. However, only 58% of these permits were actually fished in 2012. Total harvest from the Chitina Subdistrict for 2011 was 133,221 salmon including the federal harvest (Table 15; Appendix C1). Since the issuance of permits by the federal government, total harvest under state permits has averaged 113,134 salmon from 2001–2010 (Table 15) and total harvest under federal permits has averaged 1,415 salmon from 2002–2010 (Appendix C1). The 2012 harvest under state permits was 129,362 salmon and under federal permits was 936 salmon.

### ***Fishery Objectives and Management***

The Glennallen Subdistrict subsistence fishery is managed under the *Copper River Subsistence Salmon Management Plan* (5 AAC 01.647). This plan stipulates management objectives and guidelines, with allocations for each fishery outlined in the *Copper River District Salmon Management Plan* (5 AAC 24.360). In 2005, the BOF amended the amounts necessary for subsistence (ANS) for the Glennallen Subdistrict (5 AAC 01.616). These amounts are 25,500–39,000 salmon for the portion of the Subdistrict from the Chitina-McCarthy Bridge upstream to the mouth of the Tonsina River; 23,500–31,000 salmon from the Tonsina River to the mouth of the Gakona River; and 12,000–12,500 salmon from the Gakona River to the mouth of the Slana River (and including the Batzulnetas fishery). The ANS amounts are based on the combined reported state and federal harvest, not the final estimated harvest 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). The weekly fishing periods and limits established by EO

are based on the projected inriver returns. Actual inriver returns are estimated in season by sonar located at Miles Lake. The harvest is distributed throughout the season, based upon the projected sonar counts. Adjustments are made to the preseason schedule based on the actual sonar counts, by increasing or decreasing fishing time. When the department determines that a weekly harvestable surplus of 50,000 salmon or more will be present in the Chitina Subdistrict, a supplemental permit for 10 additional fish is available to a permit applicant that has already met their annual limit. The maximum harvest level (based on historical harvest levels) for the Chitina Subdistrict is 100,000–150,000 salmon, not including salmon above the inriver goal or salmon harvested after August 31. The fishery is open by regulation for the month of September.

The 2011 Chitina Subdistrict personal use fishery opened on June 4, one day later than scheduled. Salmon passage by the Miles Lake sonar was 12,713 salmon below projected, warranting a reduction in fishing time from 66 to 33 hours for the first week of the fishery (Appendix B). The fishery opened for the second period by emergency order for a 168-hour opening on June 6 as scheduled. Due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the second period was also a supplemental period. The fishery opened for the third period by emergency order for a 168-hour opening on June 13 as scheduled and remained open as scheduled in periods 4–6. As of June 17 a total of 17,370 king salmon were harvested in the CRD commercial drift gillnet fishery which was 10,308 fish below the recent 10-year average. Copper River king salmon migratory timing and 5-year average harvest rates indicated insufficient numbers of king salmon to sustain a king salmon fishery and still attain a spawning escapement of 24,000 or more king salmon to the Copper River. Beginning with the fifth period, on June 27, the Chitina Subdistrict was closed to the retention of king salmon for the remainder of the 2011 season.

Salmon numbers past the Miles Lake sonar from June 20–July 3 were above the projected salmon counts for this period by 9,517 fish and resulted in an increase of 26 hours from the 125-hour preseason schedule for the seventh fishing period. Salmon numbers past the sonar from June 27 to July 3 were above the projected salmon counts by 19,081 fish, justifying an increase of 39 hours over the preseason projection of 93 hours during the eighth period. Fishing hours were also increased for the ninth period by 6 hours from a preseason schedule of 162 hours to 168 hours based on a surplus of 72,538 salmon past the Miles Lake sonar during the week of July 4 through July 10. The fishery remained open during the tenth period and was open to continuous fishing from August 8 to 31 and remained open by regulation through September 30<sup>th</sup>. Due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the 9th, 10th and 11th periods were also supplemental periods.

The 2012 Chitina Subdistrict personal use fishery opened on June 7 as scheduled. Salmon passage by the Miles Lake sonar was 55,199 salmon above projected (Appendix B). Due to a greater than 50,000 salmon surplus above the weekly salmon escapement objective, the first period was also a supplemental period. The fishery opened for the second period by emergency order for a 168-hour opening on June 11 as scheduled. The second period was also a supplemental period. As of June 7, a total of 9,363 king salmon were harvested in the CRD commercial drift gillnet fishery which was less than half the recent 10-year average 21,081 king salmon. Copper River king salmon migratory timing and 5-year average harvest rates indicated insufficient numbers of king salmon to sustain a king salmon fishery and still attain a spawning escapement of 24,000 or more king salmon to the Copper River. Beginning with the third period, on June 18, the Chitina Subdistrict was closed to the retention of king salmon for the

remainder of the 2012 season. The fishery opened for the third period for sockeye salmon by emergency order for a 168-hour opening as scheduled and remained open as scheduled in periods 4 and 5.

The fishery opened for the sixth period by emergency order for a 168-hour opening as scheduled. Salmon numbers past the Miles Lake sonar from June 18–July 1 were above the projected salmon counts for this period by 77,704 fish allowing a supplemental period during the sixth opener. Salmon numbers past the sonar continued to exceed the projected counts by more than 50,000 fish each week for weeks 7–10 allowing the fishery to remain open each of these weeks and maintain supplemental openings as well through August 12. The fishery remained open by emergency order from August 13–31 and then was open by regulation through September 30.

### ***Current Issues and Fishery Outlook***

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

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

### ***Recent Board of Fisheries Actions***

The status of the Chitina Subdistrict as a subsistence or personal use fishery continues to be an issue in that fishery. In March 2010, the BOF held a special 2-day meeting at the end of the statewide finfish meeting to consider 2 proposals addressing a court ruling that remanded, back to the BOF, the case against the BOF's 2003 negative Customary and Traditional (C&T) finding for the Chitina Subdistrict. A proposal defining subsistence way of life as "a way of life that is based on consistent, long-term reliance upon the fish and game resources for the basic necessities of life," was adopted. The second proposal sought a positive C&T finding for the Chitina Subdistrict, considering the new definition of "subsistence way of life." This proposal failed.

Eight proposals were submitted to the 2011 BOF meeting that concerned the Chitina Subdistrict personal use salmon fishery, 4 of which failed and 3 had no action taken and one was amended and carried. Proposals 54 and 55 requested the BOF to reconsider the Customary and Traditional Use determination for the Chitina Subdistrict. No action was taken on these proposals with the BOF citing no new information or error in their earlier decisions to warrant reconsideration. Proposals 72–75 sought changes in king salmon or sockeye salmon limits in the personal use fishery and all failed. A commercial fishery proposal (118) to further restrict the Copper River District commercial drift gillnet fishery from fishing within the inside closure area during its first two statistical weeks was amended and carried. As a result the Copper River District commercial fishery was limited to a single 12-hr opener in the inside closure area during the first 2 weeks of the fishery and the Chitina Subdistrict personal use dip net fishery opening dates were

delayed from opening as early as June 1 and no later than June 11 to opening no earlier than June 7, but prior to June 15. These changes were made to increase the number of early run sockeye and king salmon into the Glennallen Subdistrict subsistence fishery and increase spawning escapement for these early run timing stocks. No action was taken on proposal 76 due to the amendments made to proposal 118.

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

### ***Current or Recommended Research and Management Activities***

Daily sampling in the Chitina Subdistrict personal use fishery (sockeye and king salmon) and Glennallen Subdistrict subsistence fishery (king salmon only) occurs annually from the opening of the fishery in June through the majority of the sockeye salmon run ending at the end of August. Otoliths and length of sockeye harvested in the fishery are collected. Otoliths are examined to determine age and for the presence of a strontium chloride mark that was imprinted on hatchery sockeye fry prior to release from the Gulkana River hatchery. The collected data are used to estimate hatchery contribution to the Copper River sockeye salmon run and to determine age and length composition of the Chitina Subdistrict sockeye salmon harvest. Scales and length data are collected from king salmon harvested in both fisheries for use in stock composition models. Sampling technicians provide a department presence in the Chitina area 6 days per week. They also monitor compliance with fishery regulations, educate subsistence and personal use fishers on the regulations and emergency orders, and note any violations observed.

From 2005–2009, ADF&G assisted the Native Village of Eyak and LGL, Inc., in conducting a radiotelemetry study to estimate sockeye salmon distribution throughout the Upper Copper River drainage and the run 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 River, Chitina River, Lower Copper River (stocks downstream of Haley Creek), Gulkana River and finally the Tonsina River stocks (Wade et al. 2007; 2008; 2009; 2010). 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 (Table 13).

The Native Village of Eyak continues to conduct a mark-recapture study on king salmon to estimate total inriver abundance past the Miles Lake Sonar and conducted a similar study on sockeye salmon from 2007–2009. 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 their 2008 meeting, the BOF made a

positive C&T determination for the freshwater fishes in the Prince William Sound Area which includes the entire UCUSMA with an ANS of 25,000–42,000 useable pounds of fish. Prior to 2002 the maximum number of permits issued for subsistence fishing in any year was 10 in 1992 and 1997, and a maximum harvest of 2,976 fish in 1995 (Table 16). 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 2006–2010 was 1,909 fish with an average bycatch of nontarget species of 31 fish (Table 16). In 2011, 24 permits were issued for fishing whitefish with a gillnet and a single permit was issued for fishing whitefish and burbot with a spear. A total of 20 of these permits were fished, with a total reported harvest of 981 whitefish and 1 burbot, from a total of 5 lakes. Beginning in 2011, retention of any species other than whitefish or longnose suckers *Catostomus catostomus* from a gillnet was prohibited by permit stipulation. This change was made to remove any incentive for a permit holder to target lake trout or burbot with gillnets whose intended use was for harvesting whitefish.

### ***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. More efficient gear is permitted for the abundant, high productivity species (whitefish and longnose suckers), while selective gear is permitted for the less abundant, low productivity species (lake trout and burbot).

### ***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 (generally for the road accessible fisheries of Lake Louise and Paxson Lake) sport anglers took notice of these fisheries and their unintended bycatch of popular sport species such as lake trout. As the subsistence whitefish fishery gained popularity the department has developed additional permit stipulations to ensure compliance with the fishery and to ensure sustainability of the various fish populations within targeted waters.

### ***Recent Board of Fisheries Actions***

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

### ***Current or Recommended Research and Management Activities***

Harvest in the freshwater finfish subsistence fishery is monitored through a permit system which requires permit holders to 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 would provide data useful in the management of the freshwater finfish subsistence fishery.

## **ARCTIC GRAYLING SPORT FISHERIES**

### ***Background and Historical Perspective***

Arctic grayling were the most heavily harvested fish in the UCUSMA from 1977–1995 (Somerville 2008). Harvests declined after 1988 and have been surpassed nearly every year since 1996 by sockeye salmon and by king salmon in 2005 and 2007 (Table 5). The decline in harvest from 1988–1999 most likely resulted from more restrictive regulations that reduced overall bag limits and limited anglers to only 1 fish over 14 inches in the Gulkana River drainage to ensure the sustained yield of the area’s Arctic grayling stocks (Taube 2002). In 2003, the bag and possession limit in lakes was reduced to 5 Arctic grayling. Continued declines in harvest may reflect a general decline in fishing effort areawide since 2000.

Arctic grayling are harvested throughout the UCUSMA. The Gulkana River drainage averaged 38% of the total UCUSMA harvest from 2006–2010 (Table 17). The Susitna River drainage accounted for 31% of the harvest during this period followed by smaller tributary streams in the Upper Copper River drainage (14%) and the Tazlina River drainage (12%).

### ***Recent Fishery Performance***

Harvest of wild Arctic grayling has averaged 4,487 fish over the last 10 years (2001–2010) and 3,816 fish over the last 5 years (2006–2010) (Table 17). Total harvest of wild Arctic grayling in 2011 was 1,808 fish.

### ***Fishery Objectives and Management***

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

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

The bag limit for Arctic grayling in the remainder of the Gulkana River (5 fish, only one  $\geq$  14 inches), which was established in 1986 (Taube 2002), deviates slightly from the 3 management approaches outlined in the *Wild Arctic Grayling Management Plan*. However, previous estimates of abundance indicate that current exploitation rates on the major stock units of Arctic grayling in the Gulkana River drainage appear sustainable given current harvest levels. Data

from stock assessments also indicate that the restriction limiting anglers to only 1 Arctic grayling  $\geq 14$  inches allowed the population to reach and maintain historic levels (Fish and Roach 1999). A similar assessment was conducted in 2002 on the upper reaches to determine the impacts of the 1996 regulatory change to catch-and-release and provide background information for any future BOF proposals (Wuttig 2007). No stock assessments have been conducted on the Gulkana River since 2002.

### ***Current Issues and Fishery Outlook***

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

### ***Recent Board of Fisheries Actions***

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

### ***Current or Recommended Research and Management Activities***

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

## **LAKE TROUT SPORT FISHERIES**

### ***Background and Historical Perspective***

The UCUSMA is the only area in Alaska where numerous lake trout fisheries exist along the road system (Figure 5). Lake trout are harvested mainly from lakes within the Susitna River drainage (Lake Louise, Susitna, and Tyone lakes) and the Gulkana River drainage (Paxson, Summit, and Crosswind lakes; Table 18).

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 annually (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 Lake Louise, Susitna, and Tyone lakes in the Tyone River drainage in 1987. The minimum size limit was imposed to allow female lake trout to spawn once before reaching harvestable size.

In 1994, the minimum size limit for lake trout was increased from 18 to 24 inches in Lake Louise, Susitna, Tyone, Crosswind, Paxson and Summit lakes, and the bag limit was reduced from 2 to 1 lake trout in the Lake Louise, Susitna, Tyone, and Crosswind lakes. The minimum

size limit was increased to better protect female lake trout spawning for the first time in these lakes 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-inch minimum size restriction, the number of lake trout released by anglers in Crosswind, Paxson, and Summit lakes and Lake Louise, Susitna and Tyone lakes increased from an average of 63% released prior to the restriction (1990–1993) to an average 80% for all the years following (1994–2005; Table 19). Concern arose that although harvest decreased, the overall catch rate did not decrease and in many cases increased so that effective harvest (harvest plus 10% of the catch minus the harvest, to account for hooking mortality) was still exceeding the sustainable yield levels in the larger UCUSMA lake trout fisheries. The department initiated a regional review of lake trout regulations and management in 2002 and developed a lake trout management plan which was adopted by the BOF in 2005 (Burr 2006). A separate proposal that year was adopted that removed the minimum size limit for lake trout in Paxson and Summit lakes, 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–April 15 to provide for a more effective burbot fishery.

### ***Recent Fishery Performance***

Total harvest of lake trout averaged 1,335 fish from 2006–2010 (Table 18). Harvests from the Susitna River drainage accounted for 52% and the Gulkana River drainage accounted for 32% of the annual UCUSMA harvest from 2006–2010. Lake Louise (35%), Crosswind (13%), and Paxson (12%) lakes accounted for over half the annual average lake trout harvest in the UCUSMA from 2006–2010. The harvest of 726 lake trout from the UCUSMA in 2011 was the lowest recorded harvest for the UCUSMA. Harvest declined in nearly all fisheries in the area and most likely reflects the drop in overall fishing effort from 2010 to 2011 (Table 3).

### ***Fishery Objectives and Management***

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

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

Because estimates of the average weight of lake trout from most lakes in the UCUSMA are unavailable, the sustainable harvest of lake trout has been estimated based on the probable range of lake trout weights (1.0 to 4.0 kg) depending on the area of the lake. Based on Evans et al. (1991) and these assumed weights, lakes in the UCUSMA which are less than 500 ha appear

capable of sustaining harvest and catch mortalities of 147 to 231 lake trout annually. Lakes, larger than 500 ha, appear capable of sustaining annual harvest and catch mortalities of 320 to 585 lake trout. Estimates of sustained yield for the larger lake trout fisheries in the UCUSMA are found in Table 20.

### ***Current Issues and Fishery Outlook***

A reduced bag limit, prohibition of bait during the open water period and removal of the size limit have reduced effective harvest in Paxson and Summit lakes to sustainable levels. These changes were implemented in 2006 and it was expected that the average release rate of lake trout would decline to the pre-size limit percentages of 48%–54% (Table 19). Such a decline did not occur until 2011 when zero lake trout were released in Paxson Lake and 40% were released in Summit Lake.

Effective harvest of lake trout in Lake Louise has exceeded the sustainable yield predicted by the Lake Area model in 8 of the last 10 years (2001–2010). Additionally, some lake trout have been harvested as incidental take in gillnets targeting whitefish in the subsistence whitefish fishery on that lake. Actions taken by the BOF at the 2011 meeting will likely reduce overall harvest of lake trout in Lake Louise.

### ***Recent Board of Fisheries Action***

The BOF considered 7 proposals at its 2011 meeting in Valdez that addressed lake trout sport fisheries in the UCUSMA. Two proposals to implement spawning closures failed as did 2 proposals banning commercial guiding on Lake Louise. Proposals to lengthen the time bait is allowed on Paxson and Summit lakes and impose a maximum size limit for lake trout on Lake Louise and Crosswind Lake also failed. The BOF carried a proposal by ADF&G to remove the size limit for lake trout and prohibit the use of bait from April 16–October 31 in Lake Louise, Susitna, Tyone, and Crosswind lakes.

### ***Current or Recommended Research and Management Activities***

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 2002–2004 (Scanlon 2004; Wuttig 2010).

Length and weight data were collected from Lake Louise in the fall of 2006 and assessment to estimate abundance was to continue in 2007 and 2008. However, review of the past data indicated that movement of lake trout between Lake Louise, Susitna, and Tyone lakes may affect any estimate of abundance. Therefore, a more extensive research project must be developed including radiotelemetry to assess movement of lake trout between the 3 lakes prior to starting a mark-recapture study.

Lake trout research in Alaska lakes has provided a length-weight relationship and future sampling can focus on collecting lengths alone. Length data for Susitna Lake and Crosswind Lake needs to be collected to update the Lake Area model yield estimates. 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 5) and prior to 1990, these waters supported an average of 56% of the statewide sport harvest of this species (Somerville 2008). The largest historical fishery occurred in Lake Louise, Susitna, and Tyone lakes (Table 20). Other fisheries occur in various lakes of the Gulkana River drainage (e.g., Paxson, Summit, and Crosswind lakes), Tazlina River drainage, and smaller remote lakes scattered throughout the UCUSMA.

With rapid growth in the fishery from 1979–1985, burbot stocks in the UCUSMA were in danger of being overexploited (Somerville 2008). A research program was initiated in 1986 to evaluate the life history of Interior Alaska burbot and to determine stock status and sustained yields of burbot fisheries in the UCUSMA. Annual results of these studies are summarized in Lafferty et al. (1990-1992), Lafferty and Bernard (1993), Parker et al. (1987-1989), Schwanke and Bernard (2005a, 2005b), Schwanke and Perry-Plake (2007), Schwanke (2009b), Taube et al. (1994, 2000), and Taube and Bernard (1995, 1999, 2001, 2004). Concern over the sustainability of burbot fisheries in the UCUSMA also led to adoption of increasingly restrictive regulations and some complete fishery closures, most of which were reopened once stocks recovered (Somerville 2008).

More recent studies on burbot abundance have occurred in Crosswind and Tolsona lakes. An abundance survey of the burbot population in Crosswind Lake was conducted in 2006 and 2007 (Schwanke 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). Tolsona Lake has been closed to burbot fishing by either emergency order or by regulation since 1998. Stock assessment on Tolsona Lake occurred on an annual basis from 1986 to 2010 with a goal to open the fishery when the burbot population rebuilt to 1,500 burbot  $> 18$  inches (Taube and Bernard 2001). Based on results from 2009 and 2010 sampling, it appears the burbot population 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 1,647 fish from 2006–2010 (Table 21). Total harvest of burbot from UCUSMA lakes has ranged from 575–2,997 over that same period. The 2011 harvest of 556 burbot is the lowest ever recorded for the UCUSMA.

### ***Fishery Objectives and Management***

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

### ***Current Issues and Fishery Outlook***

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

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

### ***Recent Board of Fisheries Actions***

The BOF repealed the *Lake Burbot Management Plan* at the 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 emergency order authority (5 AAC 75.003).

The BOF opened Tolsona Lake to burbot fishing at the 2011 meeting in Valdez. The bag limit was set at 2 burbot with 2 burbot in possession.

### ***Current or Recommended Research and Management Activities***

The burbot stock assessment program in the UCUSMA continues on a limited scale. A monitoring program has been proposed for Lake Louise on a 3-to-5-year schedule. Lake Louise burbot populations were sampled in 1999 and again in 2005 to assess the impact of the fishery reopening in 2003 (Taube et al. 2000; Schwanke and Perry-Plake 2007). Catch per unit effort was estimated with baited hoop traps to monitor population trends. Baseline data was collected on the Copper River burbot population in 2003 (Schwanke and Bernard 2005b). If future harvest levels increase significantly, the Lake Louise population should continue to be monitored.

## **WILD RAINBOW AND STEELHEAD TROUT SPORT FISHERIES**

### ***Background and Historical Perspective***

The UCUSMA is the northernmost extent of the natural range of rainbow and steelhead trout in North America. The area's widely distributed stocks of wild rainbow and steelhead trout display generally low production with little ability to sustain harvests. To assure that these stocks are not overexploited, a conservative regulation plan was developed and implemented in several UCUSMA drainages to manage the fisheries targeting these stocks. This plan was guided by the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy* (CISFPT Unpublished).

In 1988, the waters of Lower Hanagita Lake and the Hanagita River from Lower Hanagita Lake to the Tebay River were restricted to a catch-and-release fishery for rainbow/steelhead trout. In 1990, the Gulkana River drainage fishery was restricted to catch-and-release. In 2005, the remainder of the Hanagita River drainage (upstream of Lower Hanagita Lake) and the Tebay River downstream of the Hanagita River confluence were included in the area closed to the retention of rainbow/steelhead trout. Regulations restricting waters supporting rainbow/steelhead

trout to only unbaited, single-hook, artificial lures were adopted for the flowing waters of Tebay River drainage in 1988, all flowing waters of the Gulkana River drainage above a point on the mainstem Gulkana River 7.5 miles upstream of the confluence of the West Fork in 1990, and for all flowing waters of the UCUSMA in 1999. Spawning closures were established around the identified rainbow/steelhead trout spawning areas on the Middle Fork of the Gulkana River in 1997 and Twelvemile Creek (a tributary of the Gulkana River) in 2003. Additionally, the retention of rainbow or steelhead trout incidentally taken in the Copper River Personal Use Fishery was prohibited in 1997.

Summit Lake and its outlet stream Bridge Creek in the Tebay drainage constitute a unique rainbow trout fishery within the UCUSMA. Test netting, hook-and-line sampling and visual surveys from 1982–1985 showed that these waters contained the largest nonanadromous rainbow trout in the Copper River drainage, with individual fish measuring over 32 inches in length and weighing up to 20 pounds (Williams and Potterville 1985). Sampling also indicated that the unique size structure of this population was fragile. Special regulations (bag limit of 1 fish  $\geq$ 32 inches) were established in 1988 for these waters to provide anglers the opportunity to harvest a "trophy trout" while maintaining the overall population structure. However, sampling in late 1990s (Fleming 2000) indicated that only 27% of all rainbow trout sampled ( $> 3,000$  fish) were greater than 12 inches, with a maximum size of 18 inches. As a result, the "trophy trout" regulations were repealed at the 1999 BOF meeting and changed to a bag and possession limit of 10 per day, maximum size limit of 12 inches, and an open season of July 1–May 31. In addition, the department initiated a research study in 2002 to remove a percentage of rainbow trout from Summit Lake on an annual basis to reduce the population density to determine if growth can be promoted (Wuttig *In prep*).

All other waters supporting wild rainbow/steelhead trout stocks are managed under a 2 fish bag limit of which only 1 fish may be  $\geq$ 20 inches. The season is year-round with the exception of the Middle Fork Gulkana River and Twelvemile Creek spawning closure (April 15–June 14) and Our Creek (tributary to Moose Lake), which is closed from April 1–May 31 to protect spawning Arctic grayling.

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

### ***Recent Fishery Performance***

A total of 262 wild rainbow trout were reported harvested from the UCUSMA in 2011, which is above the 2006–2010 average of 248 fish. The overall catch of 3,794 wild rainbow trout in 2011 was the 2<sup>nd</sup> lowest harvest since 1983 and was below the 2006–2010 average of 4,998 fish (Table 22). Over the last 5 years (2006–2010) the Gulkana River drainage has accounted for 78% of the wild rainbow catch in the UCUSMA.

No steelhead trout have been reported harvested since 1999. The catch of steelhead trout in the UCUSMA declined from a high of 334 fish in 2000 to 0 steelhead trout in 2011. The Gulkana River drainage accounted for 97% of the steelhead catch in the UCUSMA from 2006–2010. Historic trends in the area's wild rainbow/steelhead fishery are difficult to ascertain, as annual harvest and catch estimates have been small and fluctuate markedly.

### ***Fishery Objectives and Management***

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

### ***Current Issues and Fishery Outlook***

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

With adoption of more restrictive regulations, particularly in the Gulkana River drainage, harvests of rainbow and steelhead trout have declined from the historic average. Since 1999 the total UCUSMA catch of wild rainbow trout has ranged from a low of 3,790 to a high of 12,806 with no particular trend (Table 22).

### ***Recent Board of Fisheries Actions***

At the 2011 meeting, the BOF adopted 1 proposal specific to rainbow trout/steelhead. The BOF changed the bag limit for rainbow trout in Summit Lake of the Tebay River drainage from 10 fish  $\leq$  12 inches to 10 fish  $\leq$  18 inches. The spawning closure in Bridge Creek, the outlet of Summit Lake was also rescinded at this meeting.

### ***Ongoing or Recommended Research and Management Activities***

The research project initiated in 2002 to alter the size distribution of rainbow trout in Summit Lake to approach that of the trophy fishery the lake supported during the early 1980s was discontinued in 2012, but fish up to 23 inches were captured during the most recent sampling. Data from the project indicate that maximizing sport harvest of rainbow trout, up to 18 inches in length, is the most feasible regulatory means to attempt to maintain the improved size structure of the rainbow trout population in Summit Lake (Wuttig *in prep*). Due to the remote nature of this fishery (fly-in only) it is uncertain whether sport harvest alone can maintain the current size structure.

Stock assessment of the Gulkana River rainbow trout population was initiated in 2004. The project objective was to estimate abundance of rainbow trout from Paxson Lake to 2 miles downstream of Sourdough. Feasibility work was conducted in August and September of 2004 and a mark-recapture study was conducted in 2005 (Schwanke and Taras 2009). The abundance of rainbow trout  $\geq$ 275 mm FL was 5,238 fish (SE=689; 95% CI = 3,888-6,588) and for rainbow trout 160–274 mm FL was 6,850 fish (SE = 1,023; 95% CI = 4,845-8,855).

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

A radiotelemetry study was conducted on rainbow trout in the Gulkana River beginning in 2009. Approximately 100 rainbow trout were tagged and tracked. Previously undocumented spawning areas were identified in the West Fork Gulkana and Gulkana River Mainstem above the confluence with the West Fork (Schwanke *in prep*).

## **DOLLY VARDEN SPORT FISHERIES**

### ***Background and Historical Perspective***

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

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

Sport fisheries in the Klutina and Tonsina river drainages have traditionally accounted for an average of 77%–85% of the Dolly Varden harvest in the UCUSMA (Somerville 2008). These fisheries occur primarily in the Little Tonsina River and the Upper Klutina River, generally before the king salmon fishery begins in late June and after the king salmon fishery closes. Harvests of Dolly Varden, in the UCUSMA, peaked at 6,001 fish in 1985 (Somerville 2008). The bag and possession limit for Dolly Varden has been 10 per day since at least the early 1970s.

### ***Recent Fishery Performance***

Total harvest of Dolly Varden in the UCUSMA declined significantly after 2004 (Table 23). From 2000–2004 the annual harvest of Dolly Varden averaged 1,441 fish. Over the last 5 years (2006–2010) this average has been 630 fish. Total harvest of Dolly Varden in the UCUSMA in 2011 was the lowest ever recorded at 231 fish.

### ***Fishery Objectives and Management***

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

### ***Current Issues and Fishery Outlook***

There is a lack of biological and stock data for UCUSMA Dolly Varden populations. It is not known whether both resident and anadromous populations exist within individual systems. It is assumed, based upon the large observed size (2 pounds or more) of Dolly Varden harvested from the Klutina and Tonsina river drainages, that these fish are anadromous. Secondly, Dolly Varden are routinely caught in subsistence fish wheels on the Copper River indicating these fish may be migrating upstream from Prince William Sound.

There have been no indications that the populations of Dolly Varden in the UCUSMA are declining. Declines in harvest appear to reflect a general decline in angler effort. However, the

SWHS does not distinguish effort between individual species. Without a creel survey to assess the proportion of effort directed at individual species, the current effort data is only specific to drainage or system trends. If fishing effort in the UCUSMA as a whole increases, it is anticipated that Dolly Varden harvest will also increase.

#### ***Recent Board of Fisheries Action***

There were no proposals before the BOF in 2008 or 2011 specific to the Dolly Varden fisheries in the UCUSMA.

#### ***Ongoing and Recommended Research and Management***

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

### **UPPER COPPER / UPPER SUSITNA MANAGEMENT AREA STOCKED WATERS**

#### ***Background and Historical Perspective***

ADF&G stocks approximately 28 lakes in the UCUSMA providing fishing opportunities for popular game species in locations where fishing opportunities are limited or didn't exist (Table 24). The lake stocking program serves a segment of the public who want to fish, but must remain on or near the road system. All but 4 of the 28 stocked lakes are road-accessible or within 2 miles of a road and have trail access. This program provides increased fishing opportunities and offers a diversity of species in rural areas where minimal opportunity exists for sport fishing. It also diverts effort from wild populations in areas for which the department has conservation concerns. Stocked lakes vary in size from 1.5 to 500 acres.

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

#### ***Recent Fishery Performance***

Angler effort on stocked waters has been tracked since 1990. Effort peaked in the UCUSMA at 7,623 angler-days in 1992 (Table 25). In 2011, angler effort on stocked waters was 3,117 angler-days, which is above the latest 5-year average (2006–2010) of 2,104 angler days.

Anglers harvested 845 stocked fish in 2011 and caught 4,995 stocked fish for a catch rate of 1.6 fish per angler-day (Table 25). The average catch per effort for the last 5 years has been 1.8 fish per day fished. The average harvest from 2006–2010 was 1,161 stocked fish.

Rainbow trout comprised 84% of the harvest, and 86% of the catch of stocked fish from 2006–2010. Arctic grayling, which have not been stocked since 2004 still, comprised 9% of the stocked lake harvests and catches from 2006–2010.

Silver Lake on the McCarthy Road and other stocked lakes in the Chitina area have been the most popular stocked lakes in the UCUSMA since the early 1990s, respectively averaging 37% and 66% of all UCUSMA stocked lake angler-days from 2006–2010. Silver Lake accounted for 37% of the rainbow trout harvest from all UCUSMA stocked lakes and lakes in the Chitina area and along the McCarthy Road (5 lakes total) accounted for 53% of the harvest (Jennings et al. *In prep*) in 2011.

### ***Fishery Objectives and Management***

The *Upper Copper River and Upper Susitna River Area Stocked Waters Management Plan* (5 AAC 52.065), requires the department to manage stocked waters in the AYK Region to meet public demand for diverse fishing opportunities. Sport fishing effort and harvest are estimated through the Statewide Harvest Survey. All 28 stocked lakes in the UCUSMA are managed under the regional approach, with a bag and possession limit of 10 fish (all stocked species combined), only 1 fish 18 inches or larger.

### ***Current Issues and Fishery Outlook***

Due to aging hatcheries, disease issues, and delays in construction of new hatchery facilities stocking schedules, number of fish stocked, and the availability of catchable sized fish has fluctuated and generally declined over the past 5 years. The inconsistent stocking of UCUSMA lakes over this period has diminished angler success and subsequently, angler effort. Fortunately, new hatcheries in Fairbanks and Anchorage are producing all sizes of fish and stocking levels have improved as of 2011.

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

### ***Recent Board of Fisheries Action***

The BOF adopted Proposal 115 at the 2008 BOF meeting in Cordova to add Kathleen and Tolsona lakes to the stocked waters list.

### ***Current or Recommended Research and Management Activities***

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

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## **TABLES**

Table 1.—Reported subsistence and personal use (Glennallen and Chitina Subdistricts) harvests<sup>a</sup> of king, sockeye, and coho salmon in the Copper River, 1992–2011.

Year	Harvest			Total
	King salmon	Sockeye salmon	Coho salmon	
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
2011	3,834	183,674	2,042	190,332
Average 2006–2010	4,319	164,376	2,134	171,354
Average 2001–2010	4,829	163,729	2,406	171,421

<sup>a</sup> Starting with 2002, includes federal fishery harvests in the Glennallen and Chitina Subdistricts, and Batzulnetas.

Table 2.—Commercial harvests of king and sockeye salmon in the Copper River District, 1993–2012.

Year	King salmon harvest	Sockeye salmon harvest
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	9,457	896,469
2010	9,645	635,961
2011	18,500	2,052,432
2012 <sup>a</sup>	11,617	1,855,905
Average 2007–2011	17,627	1,161,490
Average 2002–2011	27,768	1,212,043

<sup>a</sup> Data for 2012 are preliminary.

Table 3.—Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1992–2011.

Year	Effort (angler-days)			% Effort by UCUSMA	
	UCUSMA	Region III	Statewide	Region III	Statewide
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	46,592	217,041	2,473,961	21.5%	1.9%
2005	41,628	183,535	2,463,929	22.7%	1.7%
2006	38,670	175,274	2,297,961	22.1%	1.7%
2007	52,837	204,032	2,543,674	25.9%	2.1%
2008	47,571	183,084	2,315,601	26.0%	2.1%
2009	53,409	194,019	2,216,445	27.5%	2.4%
2010	40,912	184,824	2,000,167	22.1%	2.0%
2011	31,993	144,755	1,919,313	22.1%	1.7%
Average 2006–2010	46,680	188,247	2,274,770	24.7%	2.1%
Average 2001–2010	46,916	196,293	2,305,217	23.9%	2.0%

Table 4.–Sport fishing effort (angler-days) in the UCUSMA by drainage, 1992–2011.

Year	Gulkana River drainage			Upper Susitna drainage			Copper River						Other Sites			Area total
	Lakes	Streams	Total	Lakes	Streams	Total	Klutina	Tazlina	Tonsina	Upstream of Gulkana	Downstream of Klutina <sup>a</sup>	Stocked lakes	Lakes	Streams	Total	
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	16,534	1,540	725	1,726	974	2,049	400	250	650	52,232
2011	2,407	6,134	8,541	4,609	1,423	6,032	9,915	1,366	535	408	1,366	3,117	233	480	713	31,993
Average 2006–2010	3,439	15,040	18,479	7,259	1,138	8,396	14,735	833	660	1,302	853	2,104	700	1,128	1,828	49,190
Average 2001–2010	4,444	16,372	20,816	6,381	897	7,278	12,163	744	826	1,248	853	2,387	971	897	1,868	48,182

<sup>a</sup> Copper River drainage streams and lakes below the confluence with the Klutina River and excluding the Tonsina River drainage.

Table 5.—Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters (including stocked waters), 1992–2011.

Year	King salmon	Sockeye salmon	Coho salmon	Steelhead trout	Rainbow trout <sup>a</sup>	Dolly Varden <sup>a</sup>	Lake trout	Arctic grayling <sup>a</sup>	Burbot	Whitefish	Landlocked salmon <sup>a</sup>	Other fish	Total fish
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
2011	1,753	7,727	21	0	1,065	231	726	1,849	556	298	10	12	14,248
Average 2006–2010	3,186	15,383	47	0	1,229	702	1,335	4,044	1,647	554	33	45	28,204
Average 2001–2010	3,918	11,455	147	0	1,975	1,113	1,639	4,973	1,592	859	90	224	27,985

<sup>a</sup> Includes fish harvested in stocked waters. Landlocked salmon includes stocked king and coho salmon.

Table 6.—Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1992–2011.

Year	King salmon	Sockeye salmon	Coho salmon	Steelhead trout	Rainbow trout <sup>a</sup>	Dolly Varden <sup>a</sup>	Lake trout	Arctic grayling <sup>a</sup>	Burbot	Whitefish	Landlocked salmon <sup>a</sup>	Other fish	Total fish
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
2011	7,025	11,873	21	0	8,292	1,058	3,846	19,738	1,157	483	10	23	53,526
Average 2006–2010	8,687	21,768	58	63	8,241	2,390	9,247	46,900	2,681	1,194	176	53	101,458
Average 2001–2010	12,080	17,959	324	92	11,872	3,475	9,704	58,299	2,608	1,881	277	262	118,833

<sup>a</sup> 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 1992–2011.

Year	Copper River						Upriver return estimate	Estimated total return	Upriver escapement	Estimate source
	Commercial harvest <sup>a</sup>	District subsistence harvest	Sport harvest <sup>b</sup>	Glennallen Subdistrict harvest <sup>c</sup>	Chitina Subdistrict harvest <sup>c</sup>	Total harvest				
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	63,508	353	6,742	3,278	5,913	79,794	32,090	95,951	16,157	ADF&G
2000	32,018	689	5,531	4,856	3,168	46,262	38,047	70,754	24,492	ADF&G
2001	40,551	826	4,904	3,553	3,113	52,947	39,778	81,155	28,208	ADF&G
2002	39,552	549	5,098	4,217	2,056	51,472	32,873	72,974	21,502	ADF&G
2003	49,031	710	5,717	3,092	1,921	60,471	44,764	94,505	34,034	NVE
2004	38,889	1,106	3,435	3,982	2,502	49,914	40,564	80,559	30,645	NVE
2005	35,764	260	4,093	2,618	2,094	44,829	30,333	66,357	21,528	NVE
2006	31,309	779	3,425	3,229	2,681	41,423	67,789	99,877	58,454	NVE
2007	40,276	1,145	5,123	3,939	2,722	53,205	46,349	87,770	34,565	NVE
2008	12,067	470	3,616	3,218	2,022	21,393	41,343	53,880	32,487	NVE
2009	10,394	212	1,355	3,036	223	15,220	32,401	43,007	27,787	NVE
2010	10,582	276	2,409	2,425	718	16,410	22,323	33,181	16,771	NVE
2011	19,788	212	1,753	3,062	1,080	25,895	33,889	53,889	27,994	NVE
Average 2006–2010	20,926	576	3,186	3,169	1,673	29,530	42,041	63,543	34,013	
Average 2001–2010	30,842	633	3,918	3,331	2,005	40,728	39,852	71,327	30,598	

<sup>a</sup> Includes commercial, personal use, educational, and donated harvests from the Copper River District.

<sup>b</sup> Includes sport harvest from Copper River District and delta and Upper Copper River.

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

Table 8.—Harvest of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1992–2011.

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		
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
2011	0	536	27	563	1,043	0	0	0	107	40	1,753
Average 2006–2010	327	1,532	82	1,941	1,116	32	0	0	79	18	3,186
Average 2001–2010	520	1,749	144	2,413	1,331	75	0	1	49	48	3,918

Table 9.—Harvest Summary data for guided anglers in the Upper Copper River drainage, 2006–2011.<sup>a</sup>

Site	Year	Guides	Clients	Trips	King salmon	Sockeye salmon	Coho salmon	Dolly Varden	Arctic grayling	Rainbow trout	Lake trout
Gulkana River drainage <sup>b</sup>	2006	27	874	240	478	68	0	0	0	3	0
Gulkana River drainage <sup>b</sup>	2007	28	1,251	364	754	64	0	0	7	0	10
Gulkana River drainage <sup>b</sup>	2008	29	1,001	284	504	11	0	1	8	0	2
Gulkana River drainage <sup>b</sup>	2009	19	364	109	147	33	0	0	0	0	6
Gulkana River drainage <sup>b</sup>	2010	18	452	139	197	14	0	0	0	0	0
Gulkana River drainage <sup>b</sup>	2011	19	463	144	192	33	0	0	15	0	0
Klutina River drainage <sup>c</sup>	2006	22	1,614	476	842	913	0	154	45	0	0
Klutina River drainage <sup>c</sup>	2007	28	1,657	500	904	967	0	161	39	2	2
Klutina River drainage <sup>c</sup>	2008	22	1,571	470	688	266	4	84	21	4	0
Klutina River drainage <sup>c</sup>	2009	28	1,203	359	374	540	5	225	31	3	0
Klutina River drainage <sup>c</sup>	2010	25	1,286	407	563	356	0	184	6	1	0
Klutina River drainage <sup>c</sup>	2011	19	953	307	387	189	0	93	2	3	0
Tonsina River drainage <sup>d</sup>	2006	7	51	13	18	0	0	0	0	0	0
Tonsina River drainage <sup>d</sup>	2007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tonsina River drainage <sup>d</sup>	2008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tonsina River drainage <sup>d</sup>	2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tonsina River drainage <sup>d</sup>	2010	4	18	6	6	0	0	0	0	0	0
Tonsina River drainage <sup>d</sup>	2011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

<sup>a</sup> Harvest data is total harvest and may exceed the harvest reported by area and site in Sigurdsson and Powers 2009–2012 since harvest cannot be reported for sites or drainages with 3 or fewer guides reporting in a given year.

<sup>b</sup> Includes all sections of the Gulkana River, Crosswind Lake, Paxson Lake, and Mud Lake.

<sup>c</sup> Includes Klutina River and Klutina Lake.

<sup>d</sup> Includes Tonsina River and Tonsina Lake.

Table 10.—Catch of king salmon by recreational anglers fishing in the UCUSMA by drainage, 1992–2011.

Year	Gulkana River				Klutina River drainage	Tonsina River drainage	Tazlina River drainage	Copper River			Area total
	Upper river	Lower river	Unspecified	Total				Upstream of Gulkana	Downstream of Klutina	Other waters	
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
2011	64	2,372	161	2,597	3,476	72	17	0	802	61	7,025
Average 2006–2010	1,031	4,699	90	5,820	2,543	106	17	6	153	42	8,687
Average 2001–2010	1,866	5,755	334	7,956	3,548	271	9	70	164	63	12,080

Table 11.–Harvest of sockeye salmon by recreational anglers fishing UCUSMA drainages, 1992–2011.

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		
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
2011	0	684	101	785	6,025	0	46	0	871	0	7,727
Average 2006–2010	247	881	25	1,153	13,716	36	10	0	429	37	15,383
Average 2001–2010	348	950	76	1,373	9,616	44	5	2	274	142	11,455

Table 12.–Summary of sockeye harvests and upriver escapement in the Copper River 1992–2011.

Year	Commercial harvest <sup>a</sup>	CRD subsistence harvest <sup>b</sup>	Sport harvest <sup>c</sup>	Glennallen Subdistrict harvest <sup>d</sup>	Chitina Subdistrict harvest <sup>d</sup>	Total harvest	Upriver return estimate <sup>e</sup>	Estimated total return	Spawning escapement <sup>f</sup>
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	818,507	2,708,888	457,589
2000	881,419	4,360	14,550	59,497	107,856	1,067,682	598,790	1,633,508	345,961
2001	1,325,690	3,072	8,467	83,787	132,108	1,553,124	838,427	2,237,918	533,816
2002	1,249,920	3,067	8,559	58,800	86,543	1,406,889	797,390	2,192,176	583,824
2003	1,192,164	1,607	7,739	60,623	81,513	1,343,646	702,327	2,043,029	507,958
2004	1,048,603	1,822	7,416	73,214	108,527	1,239,582	643,539	1,833,686	448,457
2005	1,333,574	939	8,791	86,140	122,463	1,551,907	824,792	2,276,773	516,996
2006	1,498,423	4,505	14,410	76,056	124,810	1,718,204	891,917	2,592,750	580,202
2007	1,903,858	6,184	24,732	83,338	126,154	2,144,266	873,252	2,961,568	613,129
2008	323,096	4,001	12,656	57,632	82,318	479,703	677,001	1,141,223	477,952
2009	902,940	1,810	14,429	60,517	90,917	1,070,613	677,347	1,721,695	469,089
2010	643,086	2,016	16,057	84,856	140,811	886,826	901,488	1,715,714	502,992
2011	2,061,525	1,818	8,565	75,375	129,985	2,277,268	880,342	3,097,537	607,657
Average 2006–2010	1,054,281	3,703	16,457	72,480	113,002	1,259,922	804,201	2,026,590	528,673
Average 2001–2010	1,142,135	2,902	12,326	72,496	109,616	1,339,476	782,748	2,071,653	523,442

<sup>a</sup> Includes commercial harvest plus homepack, donated, and educational harvests.

<sup>b</sup> Includes State and Federal subsistence harvests in the Copper River District (CRD).

<sup>c</sup> Includes sport harvest in the Copper River Delta and the Upper Copper River upstream of Haley Creek

<sup>d</sup> These data are expanded to reflect unreported state harvest and include reported federal harvest (2002–2004) and expanded federal harvest beginning in 2005.

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

<sup>f</sup> Upriver return escapement minus upriver sockeye harvests.

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

Year	River system						
	Lower Copper River	Chitina River	Tonsina River	Klutina River	Tazlina River	Gulkana River	Upper Copper River
2005	7.4	5.0	4.7	35.1	12.4	7.0	28.4
2006	5.8	8.1	5.5	44.5	11.4	15.6	9.1
2007	9.1	5.4	5.1	54.2	9.8	9.4	7.1
2008	8.2	8.2	1.7	33.7	18.6	19.2	10.3
2009	12.4	5.0	2.7	33.2	5.7	16.4	24.5
Average 2005–2008	7.6	6.7	4.3	41.9	13.0	12.8	13.7

*Source:* (Smith et al. 2006; Wade et al. 2007; Wade et al. 2009; Wade et al. 2010).

Table 14.—Number of permits issued and expanded salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1992–2011 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of permits issued	Estimated salmon harvest			Total <sup>a</sup>
		King	Sockeye	Coho	
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	1,306	2,319	59,622	372	62,477
Average 2006–2010	1,151	2,604	56,830	293	59,813
Average 2001–2010	1,104	2,834	58,552	434	61,886

<sup>a</sup> Total harvest includes steelhead and other species.

Table 15.—Number of permits issued and expanded salmon harvested during the Chitina Subdistrict personal use salmon fishery in the Copper River, 1992–2011 (does not include federal subsistence fishery permit numbers or harvests).

Year	Number of permits issued	Estimated salmon harvest			
		King	Sockeye	Coho	Total <sup>a</sup>
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 <sup>b</sup>	8,151	3,168	107,856	3,657	114,884
2001 <sup>b</sup>	9,458	3,113	132,108	2,720	138,425
2002 <sup>b</sup>	6,804	2,023	85,968	1,934	90,242
2003	6,441	1,903	80,796	2,533	85,496
2004	8,156	2,495	107,312	2,860	113,176
2005	8,230	2,043	120,013	1,869	124,403
2006	8,497	2,663	123,261	2,715	129,103
2007	8,377	2,694	125,126	1,742	130,222
2008	8,041	1,999	81,359	2,711	86,476
2009	7,958	214	90,035	1,712	92,228
2010	9,970	700	138,487	2,013	141,565
2011	9,217	1,067	128,052	1,702	131,265
Average 2006–2010	8,569	1,654	111,654	2,179	115,919
Average 2001–2010	8,193	1,985	108,447	2,281	113,134

<sup>a</sup> Total expanded includes unidentified salmon.

<sup>b</sup> 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, 1992–2011.

Year	Permits				Harvest <sup>a</sup>				
	Total Issued	Total Fished	Water bodies permitted	Water bodies fished	Whitefish	Lake trout	Burbot	Other	Total
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
2011 <sup>b</sup>	25	20	5	5	981	0	1	0	982
Average 2006–2010	20	14	5	3	1,909	16	8	7	1,940
Average 2001–2010	16	11	5	4	1,745	12	5	13	1,775

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

<sup>b</sup> Retention of species other than whitefish or longnose suckers taken with gillnets was prohibited by permit stipulation beginning in 2011. Other species may be taken with spear, fyke net, or seine.

Table 17.–Harvest of wild Arctic grayling by recreational anglers in the UCUSMA by drainage, 1992–2011.

Year	Gulkana River drainage	Upper Susitna River drainage	Klutina River drainage	Tonsina River drainage	Tazlina River drainage		Copper River drainage		Other lakes and streams	Area total
					Mendeltna Creek	Other lakes and streams	Above Gulkana	Below Klutina		
1992	4,021	2,044	346	781	255	445	413	15	1,422	9,742
1993	4,071	2,746	681	814	867	481	935	336	821	11,752
1994	4,253	3,662	363	363	906	984	884	123	1,796	13,334
1995	4,159	3,982	285	261	1,041	1,171	953	166	1,661	13,679
1996	3,263	2,949	183	192	570	849	608	194	1,279	10,087
1997	3,228	1,332	165	82	462	468	475	269	1,785	8,266
1998	2,975	1,797	517	495	579	490	527	150	589	8,119
1999	2,482	1,564	530	368	79	650	1,108	67	798	7,646
2000	2,062	2,181	134	123	245	274	588	0	954	6,561
2001	1,753	686	267	128	70	120	589	29	630	4,272
2002	2,646	928	566	180	23	370	2,598	62	537	7,910
2003	2,132	1,047	575	58	23	312	1,466	0	236	5,849
2004	1,331	819	197	112	65	73	805	124	589	4,115
2005	1,553	380	59	86	0	500	432	96	540	3,646
2006	1,179	998	77	8	46	359	194	137	298	3,296
2007	729	387	138	0	97	130	840	144	19	2,484
2008	1,665	1,431	17	59	190	34	616	42	76	4,130
2009	1,522	1,216	47	35	0	85	462	0	1,078	4,445
2010	2,081	1,850	57	12	107	90	210	89	227	4,723
2011	532	1,195	0	10	0	0	14	28	29	1,808
2006 – 2010 <sup>a</sup>	1,435	1,176	67	23	88	140	464	82	340	3,816
2001 – 2010 <sup>a</sup>	1,659	974	200	68	62	207	821	72	423	4,487

<sup>a</sup> Average for years listed.

Table 18.—Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, 1992–2011.

Year	Gulkana River drainage					Upper Susitna River drainage				Klutina River drainage	Tazlina River drainage	Other sites	Area total
	Paxson Lake	Summit Lake	Crosswind Lake	Other lakes & streams	Gulkana total	Lake Louise	Susitna Lake	Other lakes & streams	Upper Susitna total				
1992	1,118	524	378	240	2,260	1,033	324	348	1,705	39	62	208	4,274
1993	778	344	311	276	1,709	1,316	669	375	2,360	28	0	617	4,714
1994	262	353	429	110	1,154	1,463	426	477	2,366	74	15	743	4,352
1995	507	224	94	90	915	946	200	419	1,565	71	0	547	3,098
1996	297	120	339	336	1,092	662	381	306	1,349	22	11	239	2,713
1997	452	158	96	142	848	585	52	100	737	33	23	342	1,983
1998	205	59	238	39	541	625	131	135	891	12	56	318	1,818
1999	342	220	525	68	1,155	430	176	216	822	35	16	196	2,224
2000	228	79	297	27	631	563	131	93	787	18	83	190	1,709
2001	302	74	44	86	506	259	110	118	487	17	0	235	1,245
2002	328	66	299	60	753	458	152	138	748	0	122	592	2,215
2003	399	102	403	104	1,008	393	128	80	601	52	0	193	1,854
2004	46	107	105	30	288	770	30	347	1,147	14	0	595	2,044
2005	50	32	519	71	672	370	429	478	1,277	66	16	323	2,354
2006	61	10	191	32	294	200	148	42	390	0	0	53	737
2007	77	56	97	54	284	340	61	0	401	0	0	279	964
2008	173	67	90	0	330	604	206	85	895	0	0	245	1,470
2009	191	125	295	18	629	493	217	230	940	25	58	223	1,875
2010	268	192	164	0	624	697	73	101	871	0	54	82	1,631
2011	42	37	50	36	165	239	122	62	423	0	75	63	726
Average 2006–2010	154	90	167	21	432	467	141	92	699	5	22	176	1,335
Average 2001–2010	190	83	221	46	539	458	155	162	776	17	25	282	1,639

Table 19.–Percent of lake trout released in five UCUS lakes during years with 24” minimum size limits and with no size limits, 1990–2011<sup>a</sup>.

Year	Paxson	Summit	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	<b>79%</b>	<b>65%</b>	<b>79%</b>	<b>71%</b>	<b>67%</b>	72%
1995	<b>71%</b>	<b>81%</b>	<b>90%</b>	<b>66%</b>	<b>76%</b>	77%
1996	<b>85%</b>	<b>84%</b>	<b>72%</b>	<b>78%</b>	<b>82%</b>	80%
1997	<b>78%</b>	<b>77%</b>	<b>79%</b>	<b>80%</b>	<b>89%</b>	81%
1998	<b>88%</b>	<b>85%</b>	<b>85%</b>	<b>75%</b>	<b>66%</b>	80%
1999	<b>89%</b>	<b>67%</b>	<b>80%</b>	<b>91%</b>	<b>82%</b>	82%
2000	<b>89%</b>	<b>77%</b>	<b>67%</b>	<b>82%</b>	<b>86%</b>	80%
2001	<b>84%</b>	<b>88%</b>	<b>93%</b>	<b>83%</b>	<b>87%</b>	87%
2002	<b>91%</b>	<b>82%</b>	<b>69%</b>	<b>85%</b>	<b>79%</b>	81%
2003	<b>88%</b>	<b>84%</b>	<b>72%</b>	<b>88%</b>	<b>69%</b>	80%
2004	<b>75%</b>	<b>62%</b>	<b>88%</b>	<b>81%</b>	<b>96%</b>	80%
2005	<b>96%</b>	<b>95%</b>	<b>77%</b>	<b>86%</b>	<b>58%</b>	82%
2006	79%	92%	<b>60%</b>	<b>86%</b>	<b>81%</b>	80%
2007	88%	59%	<b>92%</b>	<b>85%</b>	<b>88%</b>	82%
2008	82%	94%	<b>93%</b>	<b>67%</b>	<b>85%</b>	84%
2009	72%	86%	<b>89%</b>	<b>86%</b>	<b>76%</b>	82%
2010	86%	87%	<b>89%</b>	<b>89%</b>	<b>89%</b>	88%
2011	0%	40%	<b>86%</b>	<b>86%</b>	<b>72%</b>	57%
Average 1990–1993	48%	54%	70%	56%	70%	60%
Average 1994–2005	83%	79%	79%	80%	77%	80%
Average 2006–2011	68%	76%	85%	83%	82%	79%

Note: From 1990 through 1993 in Paxson, Summit, and Susitna lakes and Lake Louise the bag limit for lake trout was 2 fish over 18” and for Crosswind Lake it was 2 fish any size. A 24” minimum size limit went into effect prior to the 1994 fishing season in all five lakes. Beginning in 2006 in Paxson and Summit lakes and in 2012 in Lake Louise, and Crosswind and Susitna lakes, the bag limit became one lake trout of any size and bait was restricted from April 16 through October 31.

<sup>a</sup> Numbers in **bold** print indicate years with a 1 fish over 24” bag limit.

Table 20.–Sustainable yield (Lake Area model) and harvest of lake trout from UCUSMA lakes greater than 500 ha in size.

Lake	Harvest <sup>a</sup>	Road accessible	Sustainable yield	Size
Crosswind	266	No	361	> 24 inches
Paxson	220	Yes	585	Any Size
Summit	160	Yes	413	Any Size
Tanada	29	No	399	Any Size
Copper	51	No	341	Any Size
Lake Louise	745	Yes	540	> 24 inches
Susitna	201	Yes	321	> 24 inches

<sup>a</sup>Average harvest from SWHS 2007–2011 + 10% mortality factor for released fish

Table 21.–Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, 1992–2011.

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
1992	127	152	177	456	0	533	8	541	347	0	151	1,495
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
2011	61	60	36	157	144	36	48	228	146	0	25	556
Average 2006–2010	41	233	113	387	471	182	20	673	123	6	457	1,647
Average 2001–2010	168	358	129	655	273	179	22	474	99	11	354	1,592

Table 22.–Sport catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, 1992–2011.

Year	Gulkana River drainage <sup>a</sup>				Klutina River drainage	Tazlina River drainage	Tonsina River drainage	Copper River drainage		Other sites	Area total
	Upper River	Lower River	Gulkana R. other	Total				Upstream of Gulkana	Downstream of Klutina		
1992	1,496	166	0	1,662	103	253	293	0	1,908	2,581	6,800
1993	2,468	305	0	2,773	958	99	98	79	663	1,954	6,624
1994	3,088	149	143	3,380	95	207	290	161	3,454	4,926	12,513
1995	3,397	495	66	3,958	37	0	234	0	1,233	1,247	6,709
1996	5,140	1,371	183	6,694	42	10	26	0	1,584	2,389	10,745
1997	7,816	199	99	8,114	53	125	0	218	3,062	4,770	16,342
1998	3,429	1,317	682	5,428	8	48	25	0	4,993	557	11,059
1999	5,699	1,743	261	7,703	23	108	83	128	553	1,706	10,304
2000	5,354	1,281	194	6,829	267	0	78	0	1,496	1,622	10,292
2001	2,806	961	381	4,148	256	0	36	0	767	1,120	6,327
2002	5,166	2,525	31	7,722	7	0	105	14	349	1,538	9,735
2003	5,496	676	332	6,504	66	48	0	0	0	6,188	12,806
2004	3,995	787	0	4,782	27	26	81	0	535	761	6,212
2005	2,967	1,251	405	4,623	87	21	331	0	374	1,422	6,858
2006	1,361	405	205	1,971	58	741	67	0	488	465	3,790
2007	3,173	652	210	4,035	21	0	0	0	73	124	4,253
2008	4,183	593	624	5,400	38	0	61	0	1,707	208	7,414
2009	3,700	328	0	4,028	172	101	10	0	0	296	4,607
2010	3,044	999	28	4,071	117	113	15	0	422	188	4,926
2011	1,684	622	615	2,921	132	81	33	0	384	243	3,794
Average 2006 - 2010	3,092	595	213	3,901	81	191	31	0	538	256	4,998
Average 2001 - 2010	3,589	918	222	4,728	85	105	71	1	472	1,231	6,693

<sup>a</sup> In 1991, the Gulkana River was closed to the harvest of rainbow trout.

Table 23.–Harvest of wild Dolly Varden by sport anglers fishing UCUSMA waters by drainage, 1992–2011.

Year	Klutina River drainage	Tazlina River drainage	Tonsina River drainage	Copper River drainage		Other sites	Area total
				Upstream of Gulkana	Downstream of Klutina		
1992	1,294	57	630	0	0	16	1,997
1993	1,818	26	689	106	0	534	3,173
1994	1,250	11	216	56	9	56	1,598
1995	712	44	500	66	48	325	1,695
1996	838	0	462	1,043	24	208	2,575
1997	549	0	107	135	44	257	1,092
1998	1,092	16	98	0	16	367	1,589
1999	1,818	22	363	32	45	110	2,390
2000	257	0	498	10	102	77	944
2001	644	54	795	0	11	65	1,569
2002	725	0	369	22	215	57	1,388
2003	1,009	54	0	67	20	0	1,150
2004	886	0	150	120	891	106	2,153
2005	423	0	82	13	0	373	891
2006	219	0	146	0	58	150	573
2007	362	0	99	154	15	82	712
2008	204	0	0	22	59	0	285
2009	620	0	93	33	0	197	943
2010	268	0	29	88	121	132	638
2011	64	0	96	62	9	0	231
Average 2006–2010	335	0	73	59	51	112	630
Average 2001–2010	536	11	176	52	139	116	1,030

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

Table 24.—Stocking schedule for lakes in the UCUSMA.

Area (access) lake	Lake size (Acres)	Species	Stocking years	Year last stocked	Number stocked <sup>a</sup>
<b>Glenn Highway</b>					
Arizona Lake	25	Grayling	Alternate	2003	800 F
Buffalo Lake	4	Rainbow	Annual	2012	540 C
DJ Lake	4	Rainbow	Alternate	2010	400 F
Gergie Lake	60	Rainbow	Alternate	2010	11,964 F
Little Junction Lake	5	Grayling	Alternate	2000	200 C
Ryan Lake	45	Rainbow	Annual	2012	520 C
Tex Smith Lake	15	Rainbow	Annual	2012	871 C
Tolsona Lake	320	Rainbow	Alternate	2012	2,015 C
<b>Richardson Highway</b>					
Dick Lake	40	Arctic Char	Alternate	2012	490 C
Pippin Lake	160	Rainbow	Annual	2012	5,958 C
Squirrel Creek Pit	5	Grayling	Annual	2001	800 C
		Rainbow	Annual	2012	1,267 C
<b>Lake Louise Road</b>					
Connor Lake	18	Grayling	Alternate	2003	775 F
Crater Lake	16	Rainbow	Alternate	2012	2,247 F
Junction Lake	18	Grayling	Alternate	2003	793 F
Little Crater Lake	2	Rainbow	Alternate	2010	400 F
Old Road Lake	1.5	Rainbow	Annual	2012	480 C
Peanut Lake	12	Rainbow	Alternate	2012	2,228 F
Round Lake	2	Rainbow	Annual	2012	526 C
<b>Edgerton Highway</b>					
Three Mile Lake	20	Rainbow	Alternate	2012	1,516 C
Two Mile Lake	17	Rainbow	Alternate	2012	1,919 C
<b>McCarthy Road</b>					
Sculpin Lake	190	Rainbow	Annual	2011	14,246 F
Silver Lake <sup>b</sup>	500	Rainbow	Annual	2012	15,062 F
Strelna Lake	290	Coho	Annual	2012	5,009 F
		Rainbow	Alternate	2011	10,340 F
<b>Remote Lakes</b>					
John Lake	160	Arctic char	Alternate	2011	2,000 F
Kathleen Lake		Rainbow	Alternate	2012	980 F
North Jans Lake	58	Rainbow	Alternate	2012	4,878 F
South Jans Lake	100	Coho	Annual	2010	19,603 F
		Rainbow	Alternate	2012	4,878 F
Tolsona Mt. Lake	75	Rainbow	Alternate	2010	10,078 F

<sup>a</sup> F = fingerling, C = catchable, and S = subcatchable

<sup>b</sup> Silver Lake was stocked with fish transferred from Summit Lake in the Chitina River drainage from 2003–2011.

Table 25.—Effort, harvest, and catch statistics by species for stocked lakes in the UCUSMA 1992–2011.

Year	Days fished (effort)	Catch						Harvest				
		Rainbow trout	Coho salmon	Arctic grayling	Arctic char	Total	Catch rate (catch / effort)	Rainbow trout	Coho salmon	Arctic grayling	Arctic char	Total
1992	7,623	20,612	508	3,998	0	25,118	3.3	8,280	379	1,623	0	10,282
1993	4,782	16,676	56	3,760	0	20,492	4.3	6,327	56	852	0	7,235
1994	5,561	12,674	496	4,055	45	17,270	3.1	4,209	80	1,167	0	5,456
1995	5,441	10,270	109	4,189	0	14,568	2.7	4,252	42	804	0	5,098
1996	3,759	9,190	693	6,230	0	16,113	4.3	4,000	414	726	0	5,140
1997	2,160	4,525	444	1,969	0	6,938	3.2	1,677	274	570	0	2,521
1998	3,346	11,224	1039	1,389	0	13,652	4.1	4,739	395	223	0	5,357
1999	3,841	4,505	309	4,694	22	9,530	2.5	3,044	232	1265	0	4,541
2000	3,689	8,038	800	2,954	298	12,090	3.3	2,546	436	521	47	3,560
2001	4,396	13,204	513	3,315	43	17,075	3.9	1,964	282	473	43	2,762
2002	2,377	6,870	0	6,966	179	14,015	5.9	2,901	0	1939	0	4,862
2003	3,374	4,777	0	3,309	495	8,581	2.5	2,426	0	688	428	3,609
2004	1,461	6,624	0	531	0	7,155	4.9	1,615	0	62	0	1,677
2005	2,313	4,096	0	86	0	4,182	1.8	1,440	0	253	0	1,693
2006	2,790	4,125	0	232	357	4,714	1.7	1,618	0	91	204	1,913
2007	1,974	1,666	0	559	0	2,225	1.1	573	0	282	0	855
2008	1,453	2,819	0	275	444	3,538	2.4	694	0	101	111	906
2009	2,254	2,563	0	445	0	3,008	1.3	1013	0	35	0	1048
2010	2,049	5,044	31	208	73	5,356	2.6	1006	31	0	44	1081
2011	3,117	4,498	0	497	0	4,995	1.6	803	0	42	0	845
Average 2006–2010	2,104	3,243	6	344	175	3,768	1.8	981	6	102	72	1,161
Average 2001–2010	2,444	5,179	54	1,593	159	6,985	2.8	1,525	31	392	83	2,041

## **FIGURES**

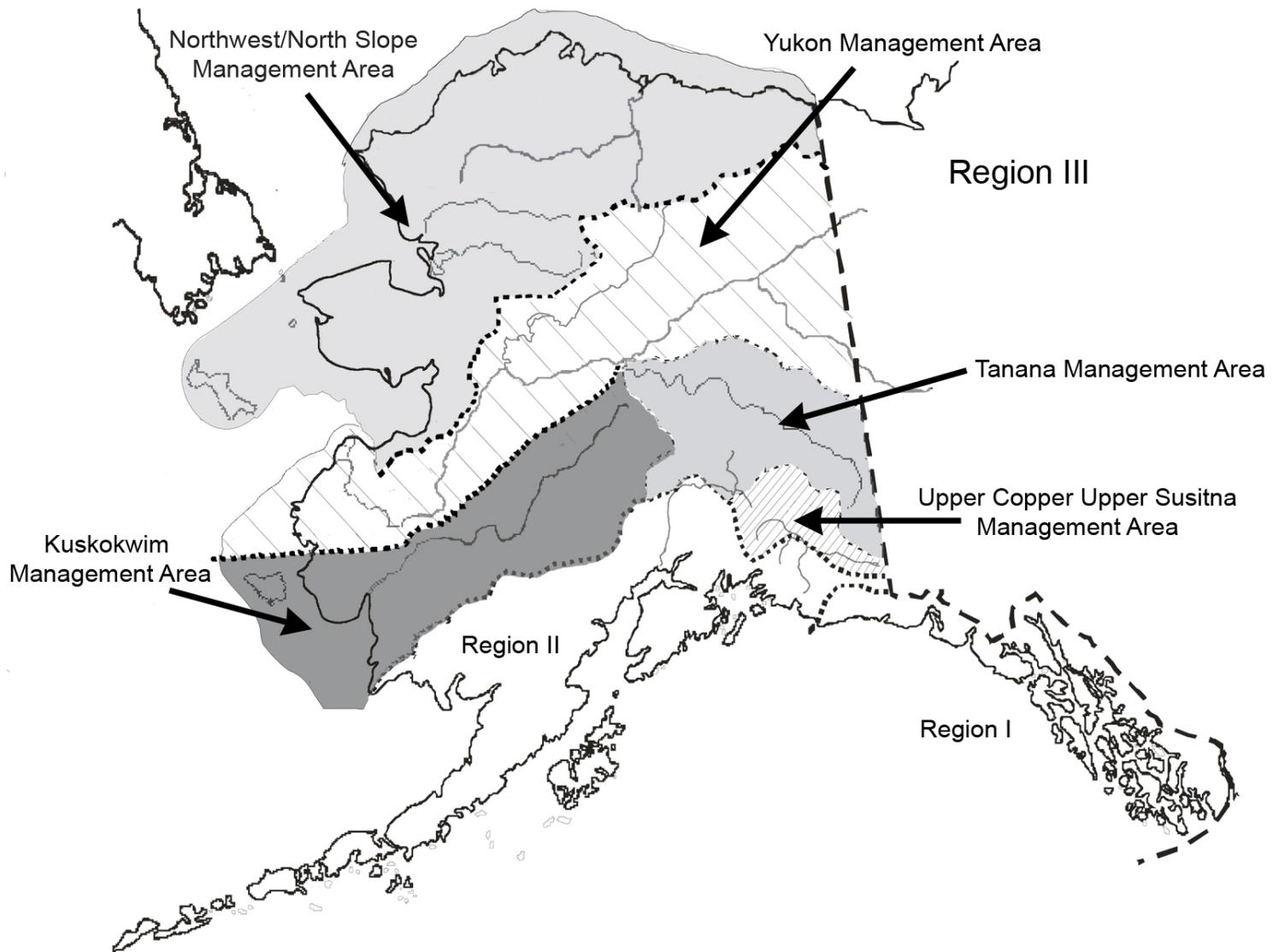


Figure 1.—Map of the sport fish regions in Alaska and the five Region III management areas.

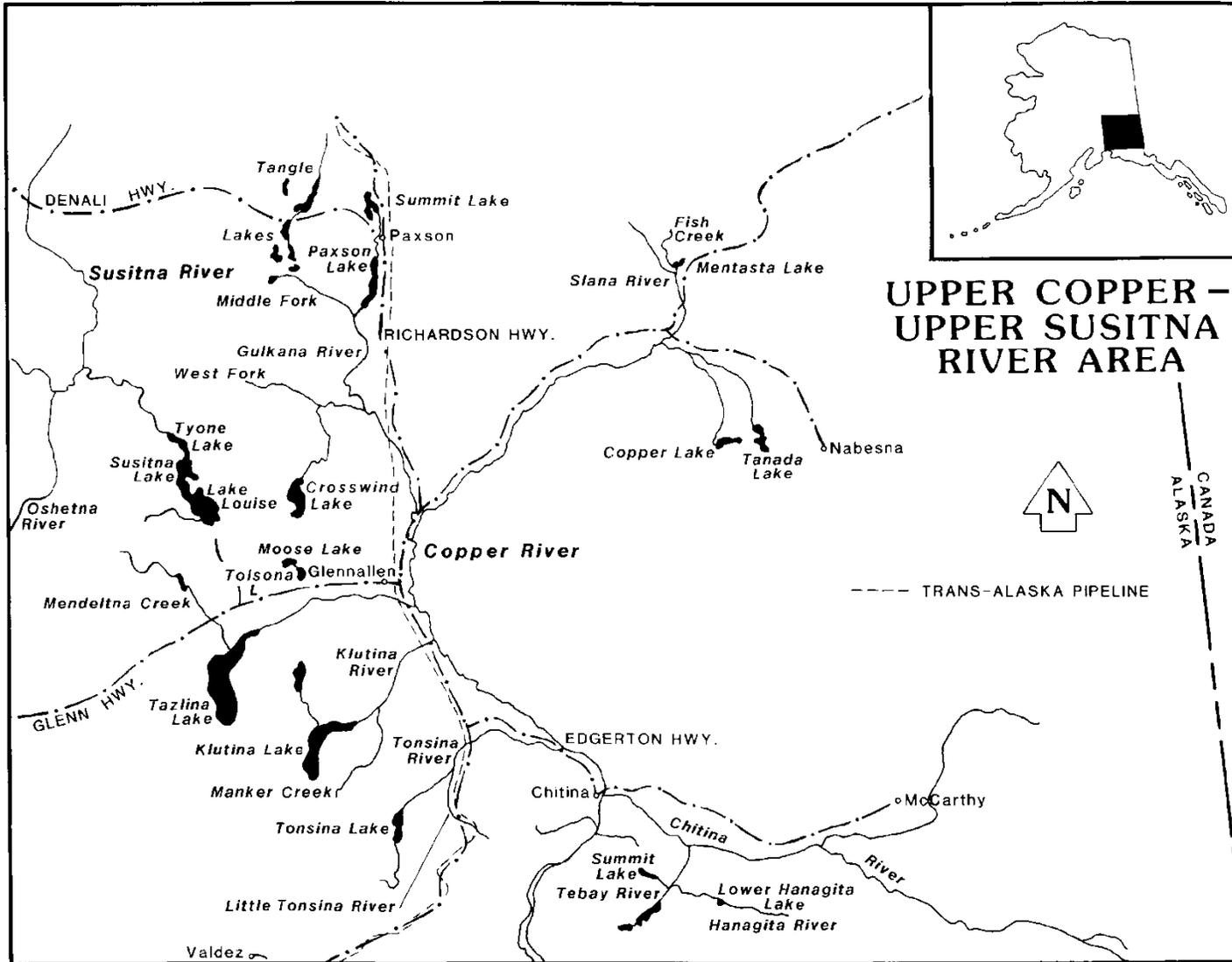


Figure 2.—The Upper Copper/Upper Susitna Management Area (UCUSMA).

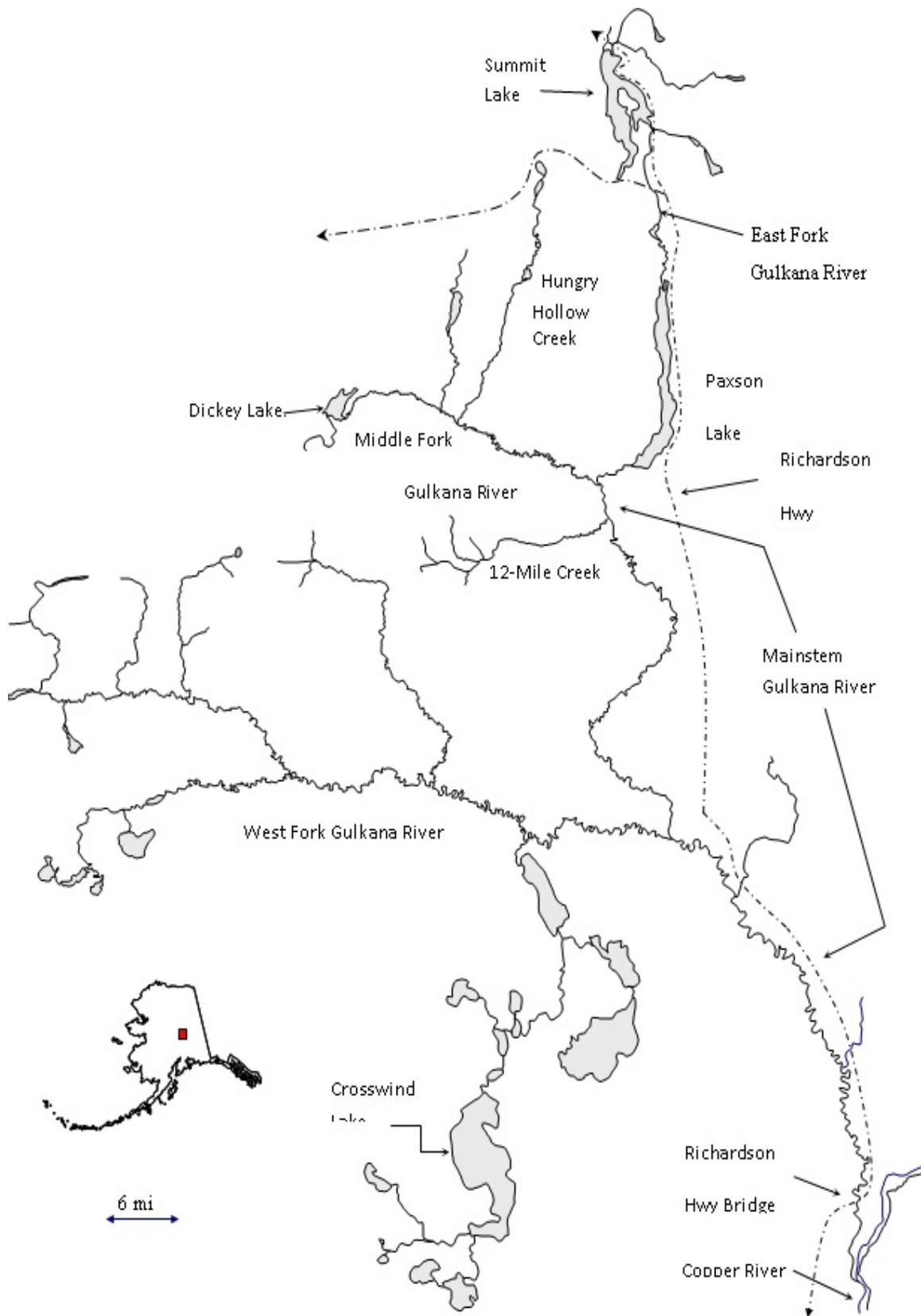


Figure 3.—Gulkana River drainage.

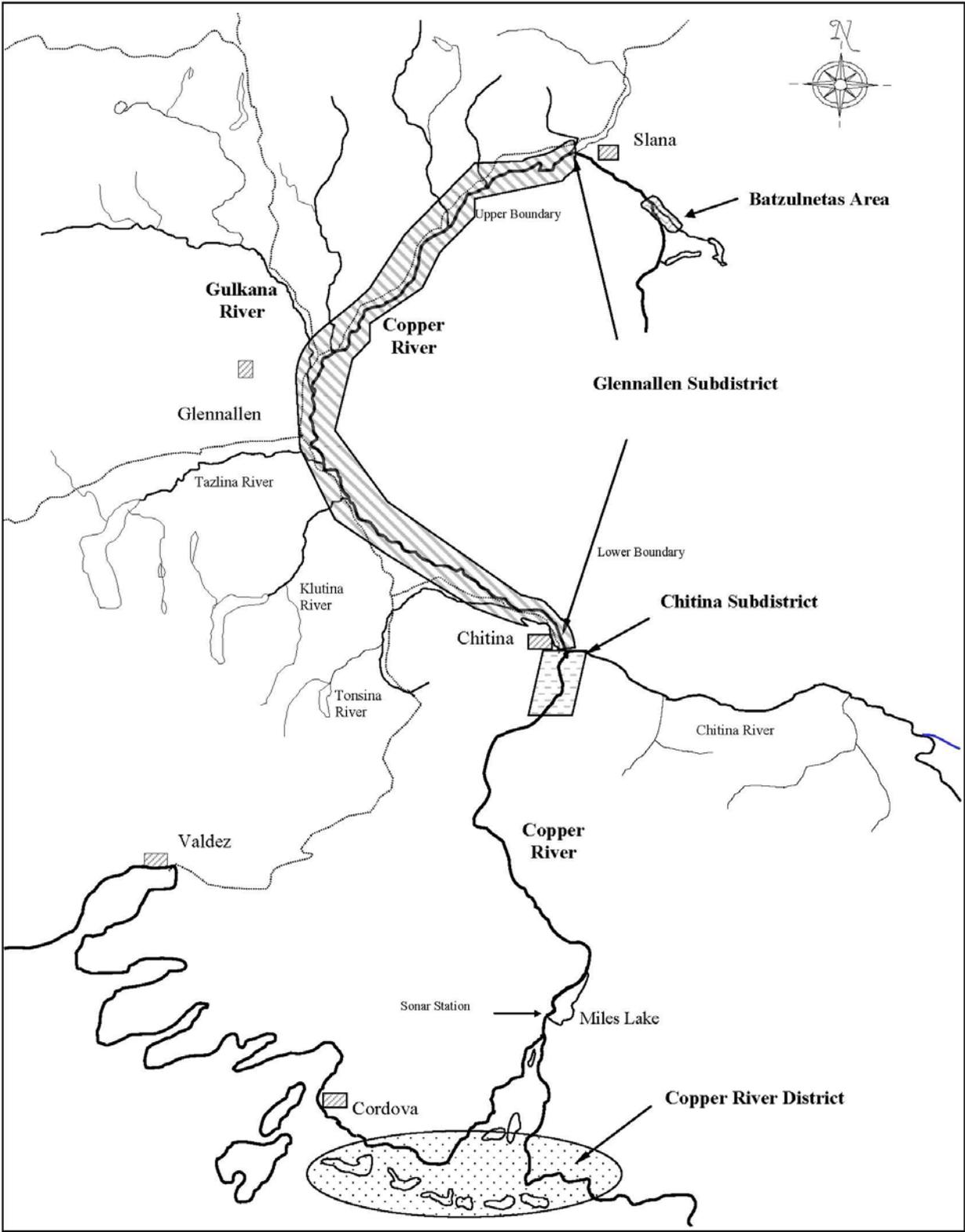


Figure 4.—Upper Copper River fishery subdistricts and areas.

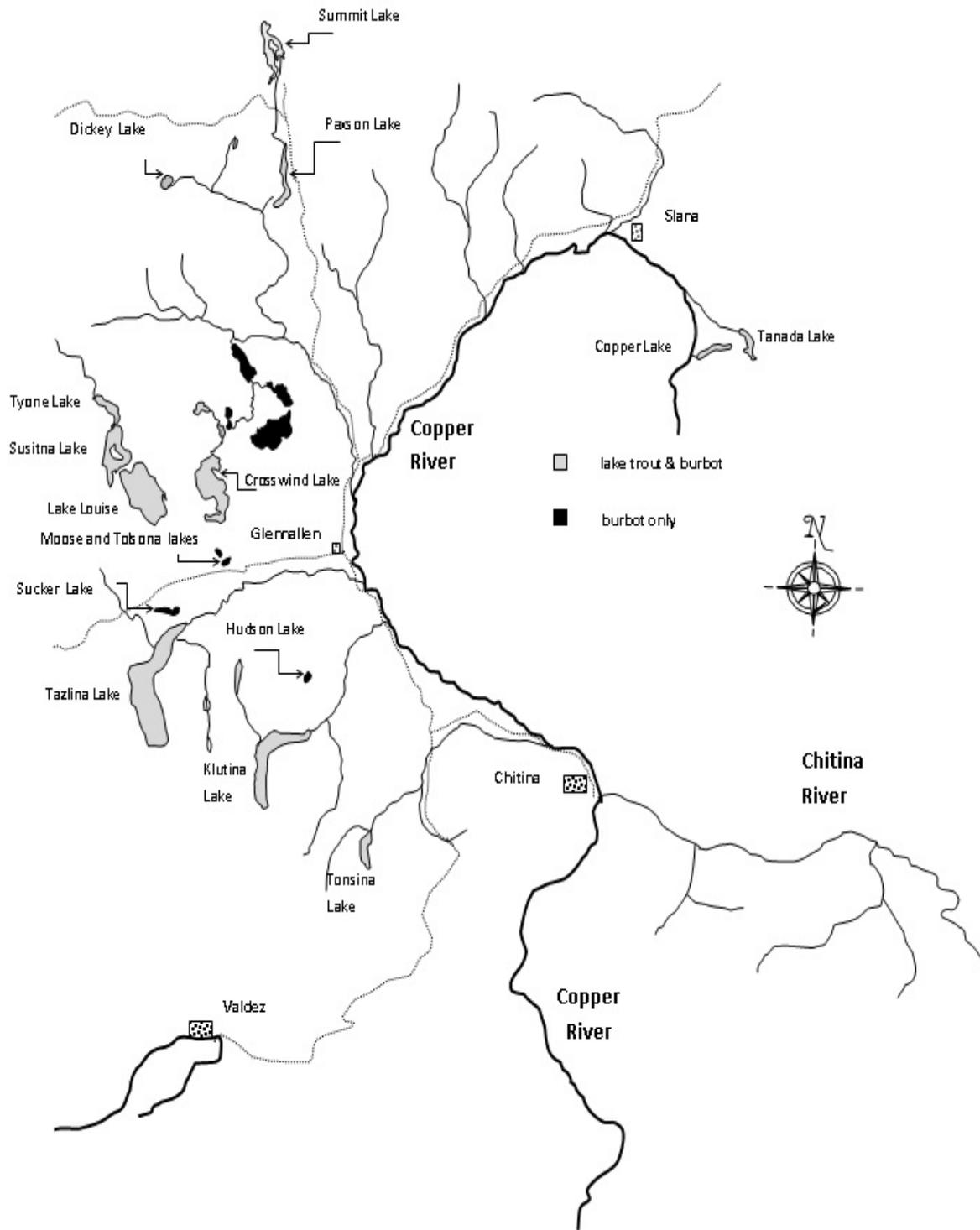


Figure 5.—Lake trout and burbot fisheries in the UCUSMA.

## **APPENDIX A**

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

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

## **APPENDIX B**

Appendix B.–Emergency orders issued for UCUSMA sport, personal use, and subsistence fisheries during 2011 and 2012.

Year	E. O. Number	Explanation
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 Sunday, 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 12 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.
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 2012 season.
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. 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
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, July 10.

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Year	E. O. Number	Explanation
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 12:01 a.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 12:01 a.m. Monday, July 18 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, 2011. 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.
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, 2011. 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.
2012	3-RS-01-12	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 1, 2012. Beginning on Friday, July 6, 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.
2012	3-RS-01-12	Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River District through August 31, 2012. The Chitina Subdistrict will be open for a 96-hour period from 12:01 a.m. Thursday, June 7 through 11:59 p.m. Sunday, June 10. 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
2012	3-RS-02-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 11–June 17, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 11 until 11:59 p.m. Sunday, June 17. 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.
2012	3-RS-03-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 18–June 24, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 18 until 11:59 p.m. Sunday, June 24. 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 2012 season.
2012	3-RS-04-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period June 25–July 1, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, June 25 until 11:59 p.m. Sunday, July 1.
2012	3-RS-05-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 2–July 8, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 2 until 11:59 p.m. Sunday, July 8.
2012	3-KS-05-12	Reduces the annual limit for king salmon 20 inches or more in length in the Upper Copper River drainage from four fish to one fish. This emergency order also prohibits retention of king salmon in the Gulkana River and that portion of the Copper River from the confluence of the Gulkana and Copper Rivers to an ADF&G marker located approximately 500 yards downstream effective 12:01 a.m. Saturday, June 30, 2012. The use of bait and treble hooks in these waters is also prohibited. Any king salmon retained prior to June 30 is counted toward the annual limit of one king salmon.
2012	3-RS-06-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 9–July 15, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 19 until 11:59 p.m. Sunday, July 15. 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.
2012	3-RS-07-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 16–July 22, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 16 until 11:59 p.m. Sunday, July 22. 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
2012	3-RS-08-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 23–July 29, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 23 until 11:59 p.m. Sunday, July 29. 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.
2012	3-KS-08-12	Prohibits retention of king salmon from the Klutina River and all waters of the Upper Copper River drainage downstream of the upstream bank of the Klutina River effective 12:01 a.m. Saturday, July 28, 2012. The use of bait in these waters is also prohibited.
2012	3-RS-09-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period July 30–August 5, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, July 30 until 11:59 p.m. Sunday, August 5. 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.
2012	3-RS-10-12	Amends the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the Upper Copper River for the period August 6–August 31, 2012. The Chitina Subdistrict will be open from 12:01 a.m. Monday, August 6 until 11:59 p.m. Friday, August 31. In addition, this emergency order establishes the weekly period from 12:01 a.m. Monday, August 6 until 11:59 p.m. Sunday, August 12 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.

## **APPENDIX C**

Appendix C1.–Federal subsistence permits and harvest<sup>a</sup> from the Copper River, Chitina Subdistrict, 2002–2011.

Year	Permits issued	Permits returned	Salmon harvested				
			King	Sockeye	Coho	Steelhead	Other
2002	122	89	33	575	0	0	0
2003	100	82	18	717	70	0	0
2004	111	83	7	1,215	18	0	0
2005	76	64	51	2,450	0	0	0
2006	75	62	18	1,549	20	0	0
2007	97	86	28	1,028	41	0	0
2008	82	70	23	959	100	0	0
2011	68	62	9	882	11	0	0
2010	92	79	18	2,324	30	0	0
2011	83	68	13	1,933	10	0	0
Average	90	75	22	1,363	30	0	0

<sup>a</sup> Reported harvest only 2002–2004; Expanded (estimates harvest from non-returned permits) harvest 2005–2011

Appendix C2.–Federal subsistence permits and harvest<sup>a</sup> from the Copper River, Glennallen Subdistrict, 2002–2011.

Year	Permits issued	Permits returned	Salmon harvested				
			King	Sockeye	Coho	Steelhead	Other
2002	201	162	564	7,950	81	62	0
2003	221	184	554	13,616	152	5	0
2004	262	206	636	17,704	152	12	0
2005	275	224	389	21,927	187	0	41
2006	254	220	460	18,346	28	15	71
2007	281	238	663	17,624	57	9	122
2008	270	219	837	14,475	229	26	52
2011	277	227	543	13,668	34	19	110
2010	270	236	326	14,137	81	42	62
2011	280	240	743	15,753	223	5	317
Average	259	216	572	15,520	122	20	78

<sup>a</sup> Reported harvest only 2002–2004; Expanded (estimates harvest from non-returned permits) harvest 2005–2011.