

Fishery Management Report No. 09-52

**Fishery Management Report for Sport Fisheries in the
Kuskokwim-Goodnews Management Area, 2008**

by

John Chythlook

December 2009

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

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

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by

John Chythlook
Division of Sport Fish, Bethel/Fairbanks

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

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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.

John Chythlook
Alaska Department of Fish and Game, Division of Sport Fish
P.O. Box 1467, Bethel, AK 99559-1467, USA

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PREFACE

This report provides information for the Kuskokwim-Goodnews Management Area 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 the management strategies that are developed from that information. In addition, this report includes a description of the fisheries regulatory process, the geographic, administrative, and regulatory boundaries, funding sources, and other information concerning Division of Sport Fish management programs within the area.

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

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

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

This area management report provides information regarding the Kuskokwim-Goodnews Management Area and its fisheries for 2008, with preliminary information from the 2009 season. This report is organized into two primary sections: a management area overview including a description of the management area 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.

ABSTRACT

Sport fisheries season summaries and management for 2008 with preliminary information for 2009 in the Kuskokwim-Goodnews Management Area are presented. The Kuskokwim-Goodnews Management Area consists of all waters of the Kuskokwim River drainage, Kuskokwim Bay, and waters extending from the Naskonat Peninsula in the north to the south side of Cape Newenham in the south. Sport and subsistence fisheries target all five Pacific salmon species, as well as rainbow trout *Oncorhynchus mykiss*, Dolly Varden *Salvelinus malma*, sheefish *Stenodus leucichthys*, Arctic grayling *Thymallus arcticus* and northern pike *Esox lucius*. In 2008, angler-days totaled 25,862 with the largest proportion coming from the Kanektok River drainage (0.31). Coho salmon was the predominant sport species harvested in 2008 with 4,490 fish taken, followed by Dolly Varden (1,892) and king salmon (1,122). Summaries of major sport, commercial, and subsistence fisheries within the Kuskokwim-Goodnews Management Area are detailed, including descriptions of recent performances, Alaska Board of Fisheries regulatory actions, social and biological issues, and descriptions of ongoing research and management activities.

Key words: Southwest Alaska, Bethel, Kuskokwim River, Aniak, McGrath, Kuskokwim Bay, Kanektok River, Holitna River, sport fisheries, subsistence, king salmon, coho salmon, pink salmon, Arctic grayling, Dolly Varden, sheefish, northern pike.

EXECUTIVE SUMMARY

This document provides a wide array of information specific to the recreational angling opportunities that exist within the Kuskokwim-Goodnews Management Area. Information specific to the proposals that the Alaska Board of Fisheries (BOF) will address at its January 26–31, 2010 meeting are contained within several sections of this report. Information regarding **proposal 66** and chum salmon harvest in the Aniak River and effort by the sport fishery can be found in Tables 3, 4, and 5 on pages 19-21.

INTRODUCTION

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

Region III is the largest geographic region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 1,146,000 km² (442,500 mi²) 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 30,000) is the largest community.

For administrative purposes Sport Fish Division has divided Region III into six 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);
- Upper Tanana River Management Area (the Tanana River drainage upstream from Banner Creek and the Little Delta River);
- Lower Tanana River Management Area (the Tanana River drainage downstream from Banner Creek and the Little Delta River); and,
- Kuskokwim-Goodnews Management Area (the entire Kuskokwim River drainage and Kuskokwim Bay drainages).

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

THE ALASKA BOARD OF FISHERIES

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

Division of Administration provides administrative and logistical support for the BOF and ACs. During 2008, ADF&G had direct support responsibilities for 82 ACs in the state.

Within the Kuskokwim-Goodnews Management Area there are five ACs: Lower Kuskokwim, Central Bering Sea, Central Kuskokwim, Stony-Holitna, and McGrath committees. In addition, Lower Yukon and Togiak ACs often comment on proposals concerning Kuskokwim-Goodnews fisheries.

RECENT BOARD OF FISHERIES ACTIONS

The BOF meets annually, but deliberates on each individual regulatory area on a 3-year cycle, most recently for the Kuskokwim-Goodnews Management Area in February 2007. Most of the actions that involved the Kuskokwim region were directed toward commercial fisheries. However, a significant action that is important to the sport fisheries was the repeal of the stock of concern designations for chum *Oncorhynchus keta* and king salmon *Oncorhynchus tshawytscha*, and allowing the use of up to 8-inch mesh gear in the District 1 commercial salmon fishery.

The only action that was directed specifically toward a sport fishery on the Kuskokwim River drainage concerned the Aniak River. In order to align the regulations governing subsistence rod and reel fishing and sport fish regulations, chum salmon were added to the sport fish daily aggregate and possession limit for salmon and the subsistence rod and reel limit is linked to the sport limit. This action was directly related to the repeal of the stock of concern designation for chum salmon in the Kuskokwim drainage.

From 2001 to 2003, the BOF adopted an aggregate (group) daily limit for the Aniak River subsistence rod and reel and sport fisheries. This action was taken to align subsistence and sport fishing regulations. Subsistence anglers (any Alaskan resident) were restricted during the period of June 1 through August 31 to an aggregate daily limit of six fish, of which no more than three could be salmon, and three resident fish species upstream of Doestock Creek. Additionally, subsistence anglers could not retain rainbow trout *Oncorhynchus mykiss* upstream of Doestock Creek between June 1 through August 31. In the sport fishery, rainbow trout could not be retained throughout the drainage at any time. All other resident fish species had a daily and possession limit of one; however, the aggregate daily limit only allowed three fish a day in the Aniak River. This restrictive nature of the Aniak River sportfishing regulations were based on a precautionary approach driven by local social concerns. Additionally, the waters upstream of Doestock Creek were restricted to unbaited, single-hook, artificial lures year-round following the catch-and-release implementation of the *Southwest Rainbow Trout Management Plan* in the 1990s.

In 2004, the BOF reinstated the Aniak River sport daily and possession limits to those prior to 2001. The BOF acknowledged the high sport effort the Aniak River received, yet the harvest level remained low and there were no conservation concerns.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (EO) authority (5 AAC 75.003, 2007) to modify time, area, and daily/possession limit regulations. EOs are implemented to address conservation issues not adequately controlled by existing regulations. Once implemented, an EO is in effect until the situation is resolved or the BOF can formally take up the issue. EOs are also used as a tool for inseason management of fisheries. In-season management is usually in accordance with a

fisheries management plan approved by the BOF. There were no emergency orders issued under this authority for the Kuskokwim-Goodnews Management Area during 2008-2009.

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 also has established a priority for subsistence use of fish and game by Alaskan residents (AS 16.05.258) on all lands and waters, but cannot discriminate between rural and urban residents (Alaska State Constitution Article VIII, sections 3 and 15). Because of this difference, the federal government asserted authority to ensure a priority subsistence use of fish and game for rural residents on federal lands and certain adjacent waters. On October 1, 1999 the federal government asserted regulatory authority for assuring the rural priority for subsistence fisheries on federal public lands, which includes non-navigable waters on public lands. Following the “Katie John” decision by the 9th Circuit Court in 1995, the federal government expanded the definition of public land to include waters for which the federal agencies assert federal reserved water rights. Under current practice, the federal land management agencies adopt regulations to provide for the priority subsistence use by qualified rural residents in non-navigable waters within federal public lands (including Bureau of Land Management (BLM) lands) and in navigable waters adjacent to or within federal conservation system units (generally does not include BLM lands). The State retains all other fish and wildlife management authorities, including management on federal land.

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

Within the Kuskokwim-Goodnews Management Area the subsistence fisheries under federal management include those in the Yukon Delta National Wildlife Refuge and the Togiak National Wildlife Refuge. The Kuskokwim-Goodnews Area fisheries fall mainly under the purview of the Yukon-Kuskokwim Delta RAC and peripherally the Western Interior RAC and Bristol Bay RAC.

REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT

STAFFING

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

fisheries. The regional management biologist assigned to the Region III headquarters 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, *In prep a-b*). 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 nonresident). Information gathered from the survey includes participation (number of anglers and days fished), number of fish caught and number harvested by species and site. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaskan waters as well as the sport harvest. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. Survey results for each year are not available until the following year; hence, the results for 2008 were not available until fall 2009. 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 in-season management.

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

1. Estimates based on fewer than 12 responses should not be used other than to document that sport fishing occurred;
2. Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends; and,
3. Estimates based on 30 or more responses are generally representative of levels of fishing effort, catch, and harvest.

For purposes of reporting and organizing statistics in the SWHS, the Kuskokwim-Goodnews Management Area is designated as survey area (V).

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The Kuskokwim-Goodnews Management Area includes those drainages beginning from the headwaters of the Kuskokwim River and all drainages in Kuskokwim Bay (Figure 2). Additionally, the Kuskokwim-Goodnews Management Area includes all drainages that flow into the Bering Sea north of Cape Newenham and south of, and including the Ninglick River drainage to the north. Nunivak, St. Matthew, and adjacent islands are also included within the area as well.

The Kuskokwim-Goodnews Management Area is partitioned into three sections; lower Kuskokwim River, upper Kuskokwim River, and Kuskokwim Bay (Figure 2).

The Kuskokwim-Goodnews Management Area includes substantial parts of two National Wildlife Refuges, the Yukon-Kuskokwim Delta Refuge and the Togiak Refuge. Nearly half of the Yukon-Kuskokwim Delta Refuge is within the Kuskokwim-Goodnews Management Area, as are several thousand acres of the Togiak Refuge in the headwaters of Kuskokwim Bay streams.

FISHERY RESOURCES

Sport fisheries began to develop in the Kuskokwim-Goodnews Management Area during the mid 1980s (Chythlook 2006, Lafferty 2003). It was during this time period that sport fisheries in this area were captured in the SWHS. Largely, sport fisheries of the Kuskokwim-Goodnews Management Area were small, isolated, and received little effort and hence, low catch and harvest (Tables 1, 2). As sport fisheries developed, the SWHS started to partition the prominent area fisheries by stream/river (Table 3).

Angling effort in the Kuskokwim-Goodnews Management Area is third in ranking of the angling effort in the AYK region, second to the Upper Copper/Upper Susitna and Tanana Management areas. The amount of fishing effort in the area is directly related to the remoteness of the area and difficulty and expense in getting there.

Angling effort in the lower Kuskokwim River and Kuskokwim Bay reached a high of 26,400 angler-days in 1997, and has fluctuated between 17,000 and 26,000 in recent years, suggesting a fairly stable amount of fishing effort in this area. Even with increased publicity the area has received in national fishing and hunting magazines, as well as local press, effort has remained stable. The static effort may be related to sustained high fuel and transportation costs to and within the region. There are three sport fisheries that dominate the area; they are the Kanektok, Aniak, and Goodnews rivers. All three of these streams provide salmon fisheries for all five Pacific salmon, as well as rainbow trout, in a remote Alaska setting. Other rivers in the lower Kuskokwim River area that receive very small to moderate fishing pressure are the Kisaralik and Kwethluk rivers (Table 3). Most other rivers in the area do not receive enough fishing effort to show up in the SWHS. In the upper portion of the Kuskokwim River, the Holitna River drainage is spoken of as a “breadbasket” for its production of salmon, but there isn’t much effort expended in angler-days in spite of its large size. The majority of the upper Kuskokwim River drainage sees very little effort (Table 4).

Subsistence fisheries for salmon have a long history on the Kuskokwim River, with harvests documented throughout the river dating as far back as 1922 (Burkey et al. 2000). The subsistence fishery for king salmon is the most important, and regularly reaches harvests of over

80,000 for the entire Kuskokwim River drainage based on ADF&G Subsistence Division's 10- and 15-year averages (Simon et. al. 2007).

Commercial fisheries in the Kuskokwim-Goodnews drainages are relatively small and center on the lower Kuskokwim River (District 1) and in Kuskokwim Bay at the Kanektok and Goodnews Rivers (Districts 4 and 5, respectively). They are important to the local economies, but may be somewhat irregular in prosecution due to factors including market issues, processing capacity, exceptionally high chum salmon catches, and run strength (J. Linderman ADF&G Division of Commercial Fisheries, personal communication).

Sport fisheries in the Kuskokwim-Goodnews Management Area are small by comparison to other sport fisheries in the state with better access (Tables 1, 2). The majority of the effort occurs in the Kuskokwim Bay area, focusing mainly on the Kanektok River. Fishing pressure on the Kanektok River averages about 7,000 angler-days annually (Table 3). Rainbow trout are the most desired species for anglers on the Kanektok River, though fishing for other resident species such as Arctic grayling *Thymallus arcticus* and Dolly Varden *Salvelinus malma* occurs there also, as well as for salmon, especially king and coho *Oncorhynchus kisutch* salmon. Important rainbow trout sport fisheries also occur in lower Kuskokwim rivers: the Kisaralik/Kasigluk, Kwethluk, and Aniak Rivers. Fishing for the five Pacific salmon species occurs throughout much of the Kuskokwim River and Kuskokwim Bay drainages. The rivers that drain into the central and upper Kuskokwim River, such as the Holitna River, attract a moderate number of sport anglers annually (Table 4).

ESTABLISHED MANAGEMENT PLANS AND POLICIES

Regulations governing fisheries in the Kuskokwim-Goodnews Management Area are found in 5 AAC 71.015 through 5 AAC 71.995 (sport fishing), in 5 AAC 77.200 through 5 AAC 77.240 (personal use), in 5 AAC 01.250 through 5 AAC 01.295 (subsistence fishing), and in 5 AAC 07.001 through 5 AAC 07.650 (commercial fishing and management plans).

Currently, there are three management plans specific to sport fisheries in the Kuskokwim-Goodnews Management Area: the *Southwest Rainbow Trout Plan*, the *Wild Arctic Grayling Management Plan* (5 AAC 71.055), and the *Lake Trout Management Plan* (5 AAC 71.040). These plans address time, area, and method and means of harvesting salmon and resident fish species in designated waters. The objectives are to distribute the opportunity to harvest a small proportion of the sustainable surplus over the fishing season without unnecessary disruptions to the sport fishery.

In the past, management plans have been designed to provide managers guidance over inseason management, frequently addressing salmon management. Salmon management in the Kuskokwim-Goodnews Management Area is governed by subsistence regulations and several management plans directed at controlling commercial fisheries harvests. Subsequently, managers from Division of Commercial Fisheries (CFD) take a lead role in the management of salmon in this area of the state. Most subsistence and commercial fishing regulations are interconnected to provide opportunity to harvest salmon surpluses in the Kuskokwim River drainage.

Salmon Management Plans

Subsistence fishing seasons and periods are the guiding regulations in the harvest of salmon in the Kuskokwim River (5 AAC 01.260, 2004). There are two salmon management plans that

guide subsistence, commercial, and sport fishing management in the Kuskokwim-Goodnews Management Area, including streams in Kuskokwim Bay. These include the:

1. *Kuskokwim River Salmon Rebuilding Management Plan* (5 AAC 07.365, 2004); and,
2. *District 4 (Quinhagak) Salmon Management Plan* (5 AAC 07.367, 2004).

During the 2007 BOF meeting, the stock of concern designation for Kuskokwim River king salmon and Kuskokwim River chum salmon was discontinued, both of which were first designated as stocks of concern during the 2001 BOF meeting. The ‘windows’ system remained in regulation, however, with the understanding that ‘windows’ would not be used if chum and king salmon returns remain strong during any given year.

The *Policy for the Management of Sustainable Salmon Fisheries* (SSFP, 5 AAC 39.222) applies to the king and chum salmon management plans of the Yukon and Kuskokwim rivers. Comprehensive rebuilding measures were instituted in 2001 by placing windows of salmon passage in migratory routes in freshwater and marine environments. Windows included: restrictions to the Area M fishery, moving the northern commercial fishing boundary of W-4 (Quinhagak) three miles south (Oyak Creek), closing the Kuskokwim River commercial fishery during the months of June and July, adjusting the subsistence fishing schedule to four consecutive fishing days in the Kuskokwim River and basing sport fishery restrictions on in-season abundance, except for the Aniak River. Many of the existing and a few new restrictions in the Aniak River sport fishery were included within the *Kuskokwim River Salmon Rebuilding Management Plan* (5 AAC 07.365, 2007), including continuation of the king salmon season from May 1 to July 25, with a daily limit of 2 king salmon 20 inches or greater and an annual limit of 2 king salmon 20 inches or greater. On the Aniak River, a combined daily and possession limit of three other salmon species (pink *Oncorhynchus gorbuscha*, sockeye *Oncorhynchus nerka*, chum and coho) per day remains in effect. Inclusion of chum salmon in the daily aggregate limit was reinstated in the Aniak River by BOF action in 2007.

Emergency Orders were issued in 2001, 2002, and 2003 to reduce the daily and possession limit for king and chum salmon in the Kuskokwim River drainage. In 2002, these measures were also forced by a closure of the Kuskokwim River to sport fishing by the FSB. Such measures did not prove necessary during the subsequent 2004–2007 seasons, though there was a precautionary EO in place in 2004 to reduce king daily and possession limits that was rescinded early in the season.

Resident Fish Management Plans

As recently as the 1990s, sport fishing daily limits for resident fish species were generous and were used as a surrogate for subsistence uses in the Kuskokwim River drainage. Management of resident fish species in the Kuskokwim-Goodnews Management Area is under subsistence and sport fishing regulations. Subsistence regulations of the Kuskokwim Area are an exception to resident species management throughout the state of Alaska. This area, the lower Yukon and the Northern Area are some of the few areas of the state where a resident of Alaska can harvest unlimited quantities of resident fish (except rainbow trout) under subsistence regulations.

Southwest Alaska Rainbow Trout Management Plan

During its February 1990 meeting, the BOF adopted regulations implementing criteria for establishing special management areas for trout (ADF&G 1990). Special management areas were created to provide a diversity of sport fishing opportunity, such as catch-and-release, fly-fishing only, or trophy designation.

This management plan has three primary aspects:

1. Native rainbow trout populations will be managed to maintain historic size and age composition and at stock levels sufficient such that enhancement (or stocking) is not needed to supplement wild populations.
2. A diversity of sport fishing opportunities for wild trout should be provided through establishment of special management areas by regulation. Selection of areas for special management will be based on criteria to be adopted by the BOF. Selection criteria is inclusive of the following: stock status, history of special management, proximity to local community, legal access, overlap with freshwater net fisheries, abundance and size of rainbow trout, water characteristics, clear geographical boundaries, importance of the rainbow trout fishery to sport fishing industry, and geographical distribution of special management.
3. Management strategies should be consistent with prudent economic development of the state's recreational sport fishing industry and at the same time, acknowledge the intrinsic value of these fishery resources to the people of Alaska.

Implementation of this plan:

- Expanded the Wild Trout Zone from the Iliamna River drainage to include the drainages of Bristol Bay, Kuskokwim Bay and Lower Kuskokwim River including the Aniak River drainage.
- Established eight catch-and-release areas.
- Established six fly-fishing catch-and-release only areas.
- Established eleven unbaited, single-hook, artificial lure only areas to protect rainbow trout stocks in Southwest Alaska.

In March 2003, the BOF adopted a statewide *Policy for the Management of Sustainable Wild Trout Fisheries* (5 AAC 75.222). This policy provides guidelines to the BOF and ADF&G for developing regulations and managing wild trout populations. ADF&G and BOF will continue to review rainbow trout regulations that are not under special management designation.

Land Use Management Plans

The Togiak and Yukon-Kuskokwim National Wildlife refuges have developed Fisheries Management Plans (FMPs) for refuge lands within the Kuskokwim-Goodnews Management Area. These plans generally acknowledge state authority for management of sport fisheries and have little direct effect on the day-to-day management of the area's fisheries. ADF&G staff have worked with U.S. Fish and Wildlife Service (USFWS) refuge staff to develop these plans. These plans are essentially a list of fishery-related issues and concerns and projects that address these concerns. Each refuge plan has a 5-year duration, after which a review process begins. In 1999, the Togiak FMP was adopted and a comprehensive conservation planning phase was implemented. The Togiak Comprehensive Conservation Plan (CCP) has been under development and public review was initiated in December 2001. This plan still remains in the review process. There are significant numbers of suggestions within this plan that address sport-fishing issues in Kuskokwim Bay. The state has responded to several sport fishing issues within the Togiak CCP, particularly the issue of the quality of sport fishing and subsistence opportunities. The Yukon-Kuskokwim Delta Refuge FMP was adopted in 1992 and has been gradually implemented.

A Public Use Management Plans (PUMP) has been adopted for the Togiak Refuge and allows for certain activities on refuge lands. Commercial sport fishing services are a significant portion of the Togiak Refuge PUMP. Much of the sport fishing effort within the Togiak Refuge is guided; therefore, the plan affects guided access and activities that affect opportunity in the sport fisheries. In general, the PUMP established levels of commercial use under land lease requirements on a river-by-river basis. Unguided uses are presently unconstrained in the Togiak PUMP. The Togiak PUMP is complex, requiring operators to submit prospectus applications and bid for the privilege to lease refuge lands for the purpose of providing angler services.

The Togiak PUMP was adopted in 1991. Since adoption, four minor amendments have been made. In 1995, Togiak Refuge began review and revision of the plan when the amount of guided use equaled visitor use. Currently, the plans include a matrix of options that may potentially govern use patterns on rivers that flow through the refuge (Appendix A1). ADF&G has opposed many of the options listed in the matrix, and continues to support efforts to maintain access for unguided visitors to these rivers without potentially unnecessary regulation. ADF&G assisted refuge staff during the 2005 review process of the Togiak CCP and has continued to offer comments toward implementation of this plan. More discussion is scheduled between state and federal counterparts, with the results likely to be an impasse.

MAJOR ISSUES

1. Development of new sport fisheries in rural Alaska. Relatively rapid development of sport fisheries in remote areas has resulted in friction between local residents and non-local anglers. In many instances, local people have historically enjoyed nearly exclusive use of fishery resources. Sport fishing guides and other anglers seeking less crowded fishing opportunities in wilderness settings continue to “discover” less well known, but potentially high quality fisheries. As popular fishing destinations in Bristol Bay and Southcentral Alaska become increasingly crowded, anglers and guides are likely to continue to travel farther to participate in Alaska’s fisheries. In addition to the social friction caused by this change in use patterns of remote areas and to some extent because of this friction, ADF&G will increasingly be expected to provide information on the status of stocks for which there is minimal information. This is likely to be the biggest challenge in the management of sport fisheries in the Kuskokwim-Goodnews Management Area.
2. Rod and reel subsistence. In 2000, the BOF included rod and reel gear as a legal subsistence fishing method for harvest during the open water season in the Association of Village Council Presidents (AVCP) area of the lower Yukon and Kuskokwim rivers. In 2001, rod and reel subsistence fishing was extended upstream to include the remainder of the Kuskokwim River drainage by emergency regulation in response to a petition to the BOF from Nikolai Native Village and the Western Interior RAC. Until these actions were taken, rod and reel for subsistence fishing was permitted only through the ice under state regulations. The primary concern with this potential change is how to manage for sustainable fish populations with legalization of rod and reel gear for subsistence fishing. It is likely that rural resident use patterns have incorporated rod and reel in past subsistence harvests, and legalization of this gear will not greatly affect local use patterns. Since all Alaskans qualify for subsistence, resident anglers could choose to rod and reel fish under subsistence regulations instead of sport fish regulations. Resident fishing effort has not yet declined as a result of this regulation change, based on the SWHS. The greatest concerns

relate to changes in urban resident behavior in regard to license sales, visitation to rural fisheries, and harvests of fish populations, and ability to measure these harvests in the absence of harvest surveys or permits.

3. Federal fishery regulation for subsistence in Alaska's navigable waters. In October 1999, federal fishery managers assumed responsibility for ensuring a rural subsistence priority on navigable waters adjacent to or within the boundaries of federal conservation units. There is widespread concern that one result of this action will be reduced opportunity for sport fishing throughout the state. Because of the large amount of federal public land and the high proportion of subsistence users within the Kuskokwim-Goodnews Management Area, this loss of opportunity is a concern for sport fishermen in the area. Recent proposals to the FSB to exclude recreational anglers from popular fisheries have required substantial efforts by ADF&G staff to maintain current opportunities.
4. Jurisdictional issues involving navigable water bodies. Jurisdiction over navigable water bodies that run through federal conservation units is in dispute between state and federal managers. For example, land managers of the Togiak National Wildlife Refuge are investigating implementation of several options put forward in the Togiak CCP and PUMP that restrict access to individuals seeking to gain access to sport fisheries in waters in which jurisdiction is contested, namely on the Goodnews, Kanektok, and Togiak Rivers (Togiak PUMP). In a similar issue, land status surrounding the Arolik River continues to be in dispute between the federal and state governments. BLM determined that portions of the Arolik River were non-navigable and under the Alaska Native Claims Settlement Act (ANCSA) conveyed shore-lands to Qanirtuuq Inc. as part of its entitlement under the Act. However, the State of Alaska received title to inland navigable water bodies as provided in the Statehood Act of 1958 and the U.S. Submerged Lands Act of 1953. Therefore, the State of Alaska asserts that those shore-lands were not in federal ownership and were not BLM's to convey.

ACCESS PROGRAMS

The Wallop-Breaux amendment to the Federal Aid in Sport Fish Restoration Act (D-J) mandates that at least 15% of federal funds collected from taxes on boat gas and sport fishing equipment be used by states for the development and maintenance of motorized boating access facilities. A broad range of access facilities can be approved for funding if 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.

To date, relatively few access projects have been proposed for the rural Kuskokwim area. An upgrade of the boat launching site in the community of McGrath has been considered, as well as the possibility of access projects involving boating facilities in Bethel or Aniak. None of these project possibilities have advanced beyond initial discussion at this time. Presently, there are no major access issues for sport fishing in the Kuskokwim-Goodnews Management Area, largely because of the remote character of the entire region.

INFORMATION AND EDUCATION

Information regarding regulations, publications, fishing reports, news releases and emergency orders for the Kuskokwim-Goodnews Management Area can be found at the ADF&G, Division of Sport Fish website (www.sf.adfg.state.ak.us/statewide/index.cfm). The Togiak National

Wildlife Refuge and Yukon Delta National Wildlife Refuge are the two federal land units within the area, and a portion of the major rivers in the area are within these lands and have their own corresponding reports and news releases at their website (<http://togiak.fws.gov>).

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 and Kid's Fish & Game Fun Day, and the Becoming an Outdoorswoman (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

Sport fishing effort and harvest in the Kuskokwim-Goodnews Management Area remains low for most tributary rivers, and indeed for the entire region (Tables 1–4). Sport fishing effort from 2002 to 2007 averaged over 22,000 angler-days, the majority in the Kuskokwim Bay tributaries (Tables 1 and 3). The Kanektok River receives the most effort in angler-days and in the last 10 years has received roughly a third of the effort expended for the lower Kuskokwim (Table 3). The Kanektok River undoubtedly receives this attention due to the rainbow trout fishery, which is renowned through coverage in national fishing magazines and publications.

The majority of the sport fishing effort occurs in three areas: Kuskokwim Bay tributaries (including the Kanektok, Goodnews, and Arolik Rivers), the Aniak River, and the lower Kuskokwim tributaries near Bethel (Kwethluk and Kisaralik Rivers)(Table 3). There is some sport fishing effort in the Holitna river, but considering the size of this drainage, effort remains exceptionally low (Table 4).

Fishing effort in the Kuskokwim-Goodnews Management Area has remained stable overall, with a slight overall increase in 2008. The 2008 effort was 14% more than the recent five-year average (Table 1). It was anticipated that there would be a drop in travel to the area due to travel restrictions that followed September 11, 2001, but effort remained relatively stable comparable to that prior to 2001 (Tables 3 and 4). There has been considerable speculation that this stability in effort may be relatively short-lived, however, as anecdotally many individuals and guides throughout the region expressed concern over the high energy costs. This wasn't realized in 2008, however with economic conditions deteriorating in late 2008, the 2009 data may show a corresponding decrease in sport fish effort.

Coho salmon is the primary sport fish species that is harvested in the Kuskokwim-Goodnews Management Area (Table 2). This is also the case in the upper Kuskokwim and Holitna river drainages (Table 4). Arctic grayling surpasses coho salmon in numbers of fish caught in the upper Kuskokwim River, but sockeye salmon are the primary sport fish species caught in the Holitna River (Table 5).

SECTION II: FISHERIES

SALMON FISHERIES

King Salmon

Background and Historical Perspective

King salmon are present in most streams throughout the Kuskokwim-Goodnews Management Area. King salmon are predominantly caught and harvested in tributaries of Kuskokwim Bay and tributaries of the lower Kuskokwim River. The largest sport fisheries for king salmon are located in the Kanektok and Aniak rivers. These two sport fisheries average approximately 6,700 and 3,100 angler-days of effort, respectively, for all fish species (Table 3). Very few king salmon are caught and harvested in the sport fisheries in the upper Kuskokwim tributaries, including the Holitna River.

The Kuskokwim River and tributaries contain large runs of king salmon, but many streams are broad and turbid, thus directing sport fishing effort to clearwater tributaries. These salmon fisheries attract a very small number of anglers to western Alaska each year.

Sport harvest and catch of king salmon are estimated through the SWHS. These estimates of harvest and catch are summarized in previous Fishery Management Reports (FMR) (Lafferty 2001, 2003, Chythlook 2006, 2009). Additional Kuskokwim-Goodnews Management Area commercial and subsistence harvest information for 2003–2005 can be found in Whitmore et al. (2005). Division of Sport Fish has monitored both the Kanektok and Aniak river sport fisheries with additional inseason harvest surveys and stock assessment projects in the past (Minard 1987; Minard and Brookover 1988; Dunaway and Bingham 1992; Dunaway and Fleischman 1995; Dunaway 1997; Lafferty and Bingham 2002). Additionally, the USFWS, Togiak Refuge, has collected age and size data from king salmon spawning in the Kanektok River since 1994 (Lisac and MacDonald 1995; MacDonald 1996; M. J. Lisac, U.S. Fish and Wildlife Service, personal communication).

Sport harvests of king salmon are minor in comparison to the commercial and subsistence harvests of the area (Tables 7, 8 and 9). However, there is angler desire to participate in the king salmon fisheries of the Kuskokwim-Goodnews area. The average angler trip length in western Alaska is at least six days. Kuskokwim Bay sport fisheries average about 10,000 angler-days per season, which is about half the total effort for season; total angler-days for the Kuskokwim River and Kuskokwim Bay averages near 20,000 (Table 3).

Historically, approximately 3,000 anglers were harvesting just over 1,000 king salmon from a total catch of nearly 11,000 king salmon during 1995–2007 (Tables 10 and 11). Harvests during the last 5 years have remained similar, though the catch numbers have fluctuated greatly in the last few years. Catches in the Kuskokwim Bay area exceeded 21,000 king salmon in 2005, while in 2008, catches were near 2,000 king salmon. Regardless of numbers of king salmon caught, it is doubtful that hooking mortality is a significant factor, as all of the studies associated with delayed mortality of salmon when caught with hook and line gear in Alaska are conducted in areas adjacent to marine waters (Stuby 2002). Most anglers participate in the Kuskokwim-Goodnews Management Area king salmon fisheries via float trips in tributary headwaters, a significant distance from estuarine waters. Furthermore, most of the popular sport fisheries have significant river segments under unbaited, single-hook, artificial lure requirements to protect

rainbow trout. Accepting that delayed hooking mortality is minor, 10% or less (Bendock and Alexandersdottir 1992), overall fishing mortality (harvest + delayed mortality) can account for an additional 1,000 king salmon from the area sport fisheries, and bring the total removal by the sport fishery to around 2,500 king salmon under current regulations. Kuskokwim-Goodnews Management Area sport harvest of king salmon is small when compared to harvests of king salmon in the Nushagak River and other areas on the road system or with better access such as the Southcentral region and Kenai River.

The harvest of king salmon in the Kuskokwim River drainage sport fisheries has remained low (around 1,000 in recent years) (Tables 4, 11). This is probably due in part to care taken to not retain sport caught king salmon in the Kuskokwim River due to perceptions regarding the sport fishery and the stock of concern designation placed on king salmon stocks in 2001. The BOF removed the stock of concern designation for Kuskokwim River king salmon at its 2007 meeting, but many sport fishermen and guides still exercise restraint in harvesting king salmon. Catches of king salmon in the sport fishery follow a general trend, for each fish harvested, 10 are caught and released in this area.

Recent Fishery Performance

In 2008, the subsistence fishing schedule was not implemented due to the anticipation of above-average run strength of king and chum salmon, and discontinuation of the stock of concern designation for these species by the BOF (J. Linderman ADF&G Division of Commercial Fisheries, personal communication).

Lack of processing capacity, commercial interest, and poor chum salmon market conditions resulted in no commercial salmon fishing openings during June or July during the majority of the king, sockeye, and chum salmon runs (J. Linderman ADF&G Division of Commercial Fisheries, personal communication).

As is usually the case, the majority of the king salmon sport fishery was prosecuted in the lower Kuskokwim River and Kuskokwim Bay, though there is always a minimal catch and harvest in the upper Kuskokwim River, which includes the Holitna river drainage (Tables 4 and 5).

Sport fishing reports from the Kuskokwim Bay fisheries were generally poor throughout the Kuskokwim Bay drainages, and some individuals and guide businesses complained of very low water early in the season. Catches and harvest in the Kuskokwim Bay fisheries were well below average (Table 10). This differed markedly from the Kuskokwim River tributaries, where guide businesses and individual anglers characterized the king salmon catch and harvest as normal. Catch and harvest levels for king salmon were near the 5- and 10-year averages for the lower Kuskokwim River drainages (Table 11). Water levels increased at the end of June and sport fishing reports improved in the Kuskokwim Bay fisheries, though catch and harvest remained low until the king salmon closure on July 25. Sport guiding operators and individual sport anglers in the lower Kuskokwim streams qualified fishing as good, but were disappointed with low water conditions early in the season, which made it difficult to catch king salmon. Sport anglers in the Holitna River drainage took very few king salmon, with very little corresponding catch (Tables 4 and 5).

Division of Commercial Fisheries characterized king salmon abundance in the Kuskokwim River as average to below average, with the exceptions of the Kwethluk, Tuluksak, and George Rivers, which did not achieve the lower end of their escapement goal ranges. Kogrukluk River king

salmon escapement (a tributary of the Holitna River and often used as a gauge of the strength of a salmon run) was within the escapement goal range, and aerial survey goals were exceeded or within range ((J. Linderman ADF&G Division of Commercial Fisheries, personal communication; Table 6).

Fishery Objectives and Management

ADF&G has focused on assessing salmon escapements and harvest monitoring through several programs in the Kuskokwim River area. Commercial harvest monitoring is conducted through fish tickets and surveys are utilized to estimate harvests from the subsistence and sport fisheries. Salmon escapement is monitored through aerial surveys, sonar, test fishing, and weirs in the Kuskokwim River. The primary king salmon escapement programs in the Kuskokwim River drainage are aerial surveys and the Kogrukluk River weir. There have been recent weir additions to further ADF&G understanding of Kuskokwim River drainage escapements, as well as mark-recapture studies (J. Linderman ADF&G Division of Commercial Fisheries, personal communication).

Most Kuskokwim River king salmon escapement objectives are based on aerial survey information. Often these aerial surveys are sporadic, because of aircraft availability or weather conditions, and this method of evaluating escapement has been unsatisfactory in understanding Kuskokwim River drainage king salmon production. Therefore, ADF&G has invested in weir operations in locations where feasible. Generally, location of these weirs is not based on the proportion of the total run using a tributary, but on the suitability of the site for weir maintenance. Many of the larger tributaries and probably the larger stocks of king salmon, such as the Aniak and Holitna rivers, have no complete assessment other than sporadic aerial surveys of king salmon or a singular tributary weir on the Kogrukluk River (Holitna tributary). The test fishing in the lower Kuskokwim River, near Bethel, only provides indices of daily passage and not a measure of escapement.

Current Issues and Fishery Outlook

Kuskokwim River and Tributaries

ADF&G's ability to forecast king salmon returns is limited, but recent year returns indicate that at least average run strength should continue in the following years. Subsistence and sport fisheries in 2008, though lower than the exceptional 2004 and 2005 years, were normal, though many subsistence users characterized this fishery as poor to average (J. Linderman and J. Estensen, ADF&G Division of Commercial Fisheries, personal communication). The Division of Commercial Fisheries considered the 2008 escapements as average to below average at all escapement projects with the exception of the Kwethluk, Tuluksak, and George rivers which were characterized as below average.

Kuskokwim Bay Tributaries

The 2008 king salmon escapement into the Goodnews River was within the escapement goal range of 1,500–2,900 salmon past the weir with an estimated passage of 1,983 (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication). Division of Commercial Fisheries has been operating an escapement weir since 2002 on the Kanektok River to enumerate salmon escapement. The weir is located more than 40 miles upstream and therefore counts only salmon that spawn upstream of the weir site. Escapement in the lower 40 miles of the Kanektok River is estimated with aerial surveys. In 2008, operation of the weir was delayed until July 17th

due to persistent high water. In addition, the operation of the weir was discontinued on August 21st in an attempt to avoid high water that had caused problems with weir removal in years past. Due to late start-up of the weir and early cessation of operations, escapement counts were incomplete. Subsequent aerial surveys suggested that the escapement counts were within the escapement goal of 3,500 to 8,000, at 3,659, but without the complete weir counts, characterization of run strength is difficult. The possibility of a future radiotelemetry project to assess the spawning contribution downstream of the weir has been discussed, and will continue to be reviewed.

Recent Board of Fisheries Actions

In January 2007, the BOF considered and approved an action allowing 8” or greater gillnet mesh size as an allowable gear type in Kuskokwim River fisheries by EO only. Other than that, the BOF has not considered any actions regarding king salmon in the Kuskokwim River and Kuskokwim Bay during the past two BOF meeting cycles for the area.

A directed commercial fishery for king salmon in the Kuskokwim River is unlikely due to current subsistence demands and public concern over commercial harvests, yet with current levels of returning king salmon, pressure from commercial fishermen to open a directed commercial fishery has been mounting. The proposal adopted by the BOF at its 2007 AYK meeting provides the opportunity for a directed commercial king salmon fishery; however, the prosecution of this fishery may be extremely limited due to lack of overall public support. This will be revisited at the January 2010 BOF meeting under proposal 67.

Current or Recommended Research and Management Activities

In recent years, weirs have been used to enumerate escapements on the Kwethluk, Tuluksak, George, Kogruklu, Tatlawiksuk, and Takotna rivers (Whitmore et al. 2008). A new weir was added to the Salmon Fork of the Aniak River for the 2006–2008 seasons, but it is unknown how long this will continue, pending availability of funding. Kuskokwim River king salmon projects in recent years are improving ADF&G’s ability to count escapement and are integral to complying with the *Policy for the Management of Sustainable Salmon Fisheries* and the development of escapement objectives. In addition, from 2001 to 2004 a mark-recapture study was conducted on the Holitna River to estimate abundance of king salmon in that system (Wuttig and Evenson 2002; Chythlook and Evenson 2003; Stroka and Brase 2004; Stroka and Reed 2005). Because of the success of this project in 2001, it was continued in 2002 and 2003. Additionally, in 2002, a mainstem mark-recapture project was implemented by Division of Commercial Fisheries to assess king, chum, and coho salmon abundance upstream of Kalskag. Division of Sport Fish has supported an ongoing king salmon radiotelemetry project that occurred on the mainstem Kuskokwim from 2002 through 2006 (Stuby 2007). Division of Commercial Fisheries continued this project in 2007. Aerial surveys conducted by Division of Commercial Fisheries remain an important component of king salmon assessment in the Kuskokwim-Goodnews area (Table 6).

In both of the main Kuskokwim Bay drainages (Goodnews River and Kanektok River), it has been suggested that the distance of the weir from the mouth of the river is inadequate for counting king salmon. This is partially mitigated by the aerial surveys that are conducted. It may be important to gain insight into the percentage of king salmon that spawn below the weir, and thus, be able to extrapolate the number of king salmon returning to the river. To this end,

Division of Sport Fish has been working to start a king salmon radiotelemetry project on the Kanektok River. If successful, it may add valuable information to the weir project.

Discussions regarding operating a sonar on the Kanektok have developed, but at this point have not moved beyond discussion. Species identification has been an issue at other sonar sites, and would have to be considered on the Kanektok as well, given that all five salmon species use the river, and that there are large runs of Dolly Varden and other resident species.

Coho Salmon

Background and Historic Perspective

Coho salmon are present in the majority of area streams and are caught and harvested in tributaries of the Kuskokwim Bay and tributaries of the lower Kuskokwim River. There is a large commercial harvest of coho salmon in the Kuskokwim River. In the last 20 years the commercial harvest has ranged from 23,593 in 1999 to 937,300 coho salmon in 1996 (Table 12). The historic commercial harvest has averaged approximately 450,000 coho salmon in the Kuskokwim River (Whitmore *et. al.* 2008). The Kuskokwim River itself is characterized by broad channels and turbid water, thereby limiting sport fishing largely to clear water tributaries of the Kuskokwim River and Kuskokwim Bay. The largest coho salmon sport fisheries are located in the Kanektok and Aniak rivers (Tables 15 and 16). These two sport fisheries average approximately 7,100 and 3,100 angler-days of effort, respectively, for all fish species (Tables 3 and 4), based on a 10-year average.

Sport harvests and catch of coho salmon are estimated through the SWHS. Commercial and subsistence harvests are managed by Division of Commercial Fisheries located in Bethel (Burkey *et al.* 1997-2001, Ward *et al.* 2003, Whitmore *et al.* 2005, J. Linderman ADF&G Division of Commercial Fisheries, personal communication). The Kanektok River has the most complete commercial, subsistence, and sport harvest, and escapement information on coho salmon in the area (Table 13). Division of Sport Fish has monitored both the Kanektok and Aniak rivers with additional inseason harvest surveys and stock assessment projects in the past (Minard 1987; Minard and Brookover 1988; Dunaway and Bingham 1992; Dunaway and Fleischman 1995; Dunaway 1997; Lafferty and Bingham 2002). Data from the Division of Sport Fish Guide Logbook program collected since 2006 should add more precision to catch and harvest estimates based on the SWHS (Sigurdsson and Powers 2009). Additionally, USFWS staff from the Togiak Refuge has collected age and size data from coho salmon spawning in the Kanektok Rivers since 1994 (Lisac and MacDonald 1995, MacDonald 1996).

Prior to 1987 the daily limits for coho salmon were very liberal, allowing 15 fish per day, 30 fish in possession. In 1987, the BOF recognized the significance of the harvest potential of the Kanektok River sport fishery and reduced daily and possession limits to 5 fish. These limits remained the standard for most of the area, except recent changes in the Aniak River. The liberal daily and possession limits were adopted to accommodate subsistence fishers who were using rod and reel for subsistence purposes, but were required to purchase a sport fishing license. Repeatedly, harvest surveys conducted on the Kanektok River indicate that sport anglers rarely (7%-15%) had taken a full daily limit of coho salmon and most of the anglers (61%–66%) elected to take no fish, even though 95% of them had caught and released a fish (Dunaway and Bingham 1992, Dunaway and Fleischman 1995).

Recent Fishery Performance

Sport harvests of coho salmon are very small in comparison to the commercial and subsistence harvests in the area (Tables 12, 13 and 14). However, angler desire to participate in coho salmon fisheries is great. From 2003 to 2007 approximately 6,300 coho salmon were harvested, while approximately 45,000 coho salmon were caught and released (Tables 12, 15 and 16). Delayed mortality has been a concern in some coho fisheries within the state; however, these coho fisheries are near estuarine waters. Most of the anglers participating in the Kuskokwim-Goodnews Management Area fisheries are on float trips in tributary headwaters, and furthermore these headwaters have special management regulations to protect rainbow trout, with only unbaited single-hook, artificial lures permitted. Accepting that delayed hooking mortality is minor (15% or less)(Stuby 2002), the overall mortality of coho salmon caused by the area sport fisheries is approximately 9,000 coho salmon. This mortality is considered sustainable given escapement levels.

In 2008, coho salmon escapements were characterized as above average at all of the seven tributary weirs with the exception of the weir on the Tuluksak River (J. Linderman ADF&G Division of Commercial Fisheries, personal communication). Escapement at Kogruklu River was near the upper limit of the escapement goal range. Coho salmon escapement increased in 2008 compared to recent years of coho salmon abundance (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication.). In 2007, all user groups, including sport, commercial, and subsistence users, reported slightly lower than average size and weights. In 2006, Division of Commercial Fisheries staff observed that coho salmon averaged about a pound lighter than previous years, based on commercial fish ticket information. Sport fish catch rates remained stable throughout Kuskokwim Bay and the lower Kuskokwim River, though anglers reported average catch rates early in the season (Tables 15 and 16). Sport harvest for the entire management area at the end of the season was above average, (Table 12).

Fishery Objectives and Management

ADF&G has focused on assessing salmon escapements and harvests through several programs in the Kuskokwim-Goodnews area. Harvest monitoring is conducted through commercial fish tickets and surveys designed to estimate harvests from subsistence and sport fisheries. Salmon escapement is monitored through aerial surveys, sonar, test fishing and weirs in the Kuskokwim River drainage. The primary coho salmon escapement programs in the Kuskokwim River drainage are aerial surveys, and the Kogruklu River weir. The Bethel test fishery only provides indices of daily passage. Recent weir projects in the Kwethluk, Tuluksak, George, Kogruklu, Tatlawiksuk, Takotna, and Salmon rivers have been added to the escapement assessment projects within the area. There is consideration for more weir operations in the future. Mark-recapture methods were used on the mainstem of the Kuskokwim River utilizing fish wheels to capture and estimate coho salmon populations upstream of Kalskag from 2004 to 2006 (Pawluk et al. 2006).

There are only a few escapement objectives for coho salmon in this area, and weather conditions seldom allow reliable aerial surveys to be flown to index coho salmon escapements. However, salmon escapement or weir projects in recent years are improving ADF&G's ability to enumerate coho salmon escapement (Molyneaux and Brannian 2006) and begin the process to develop escapement objectives in accordance with ADF&G's *Policy for statewide salmon escapement goals* (5 AAC 39.223).

Current Issues and Fishery Outlook

Kuskokwim River

Recent trends in coho salmon production have provided surpluses for commercial and sport fisheries during the past 10 years. Coho salmon returns to the area have fluctuated during the last 5 years, with especially large returns in 2003 and 2004. Coho salmon return to the Kuskokwim River drainage primarily at 4 years of age; the 2005 brood was the main parent year for the 2009 return. If these escapements are any indication of coho salmon returns to the Kuskokwim-Goodnews area, ADF&G could expect a better than average return to the area. Average weights for coho salmon were normal in 2007 and 2008, in comparison with the 2006 season, where weights were nearly a pound less than average (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication). At the time, the lower than average weights suggested that recruitment may be decreasing due to poor ocean conditions. This didn't materialize for the 2008 season, though it may be a situation to watch out for. This information will, of course, only be available as various fisheries are prosecuted, and as run strength is assessed by commercial fishery performance, test fishing, and escapement assessment.

Recent Board of Fisheries Actions

Concerns from the Central Kuskokwim AC prompted the BOF to create the *Aniak River Salmon Management Plan* out of its regular 3-year cycle during the March 2000 meeting. This temporary plan was a series of species-specific regulations restricting daily and possession limits and implementing catch-and-release for chum and coho salmon with a sunset clause. From May 1 through August 31 only one coho salmon could be harvested above the Buckstock River, and chum salmon could not be possessed year-around in this section of the Aniak River. The Aniak River sport fishery became the most restrictive remote fishery within Alaska. The sunset clause attached to the *Aniak River Salmon Management Plan* required the BOF to review this set of regulations during its January 2001 meeting. Members of the public and sport fishery industry indicated that these temporary regulations were far too restrictive; a compromise set of regulations was accepted based on an aggregate daily limit. Aggregate daily limits were consistent with the subsistence regulations of the Aniak River; however, subsistence possession limits were more generous. Sport anglers were allowed up to three (3) coho salmon a day in the Aniak River; in all other locations of the Kuskokwim River anglers were allowed a daily limit of five (5) coho salmon.

Current or Recommended Research and Management Activities

A study using radiotelemetry and mark-recapture methods based on the existing Kuskokwim River weir projects operated in 2008. This project used the combined expertise that divisions of Sport Fish and Commercial Fisheries have gained through the recent king and sockeye salmon projects (Stuby 2007, S. Gilk, ADF&G Division of Commercial Fisheries, personal communication). Studies that evaluate catch-and-release mortality (Stuby 2002) in Kuskokwim-Goodnews Management Area sport fisheries may be useful. Such studies could answer questions brought about by the general public regarding catch-and-release mortality.

Chum Salmon

Background and Historic Perspective

Kuskokwim-Goodnews area chum salmon stocks are primarily harvested for subsistence and commercial uses. There has been a long history of subsistence use of chum salmon in the

Kuskokwim River; chum salmon were documented as being used for subsistence in 1922 (Burkey et al. 2000). In the past, the subsistence fishery has had few restrictions and most of the harvest has been taken using gillnets, either drift or setnet. Directed commercial fishing for chum salmon in the Kuskokwim River started in 1971. In 1983, escapement based-management began in the Kuskokwim River. This fishery continued and expanded with a record harvest of 1.4 million in 1988 (Table 17). Since then, harvests declined to less than 100,000 in the mid-1990s and more recently, to less than 50,000 chum salmon. Commercial harvests of Kuskokwim River chum salmon have generally declined from harvests that occurred in the 1980s, first due in part to low returns in the late 1990s, and now, largely due to low market demand. During recent record chum salmon returns, chum salmon have not been actively targeted. During the last few years, the chum salmon harvest has been incidental to the harvest of coho salmon in the Kuskokwim River. The harvest of chum salmon is also incidental to the directed commercial fisheries for sockeye salmon in Kuskokwim Bay.

Recent Fishery Performance

On average, sport harvests of chum salmon represent less than one percent of the total Kuskokwim-Goodnews Management Area chum salmon harvests (Table 17). There is active angler participation in the chum salmon fishery. Approximately 200 chum salmon were harvested and 17,000 chum salmon released annually from 2003 to 2007 (Tables 4, 5, 18, 19). It is assumed there is very little hooking mortality because many of the anglers are on float trips in tributary headwaters and these headwaters have special management regulations to protect rainbow trout (i.e., unbaited single-hook, artificial lures). Accepting that delayed hooking mortality is minor, at most 10%, the overall removal of chum salmon is less than 2,000 fish in sport fisheries of the Kuskokwim-Goodnews Management Area.

Fishery Objectives and Management

Chum salmon escapement goals were established in 1983 for several Kuskokwim River tributaries based on average observed escapements, since 1960. Escapement-based management assumes that providing adequate numbers of spawners will produce sustainable yields of salmon and return salmon runs of historic levels. As ADF&G's knowledge of stock specific production increases, refinements can be made to provide sustainable yields.

ADF&G has focused on assessing salmon escapements and harvests through several programs in the Kuskokwim-Goodnews Management Area. Harvest monitoring is conducted through commercial fish tickets and surveys designed to estimate harvests from the subsistence and sport fisheries. Salmon escapement is monitored through aerial surveys, sonar, test fishing and weirs in the Kuskokwim River drainage. In the past, the primary method of assessing chum salmon escapement in the Kuskokwim-Goodnews Management Area was by aerial survey. With the addition of several weirs to the area, the existing Aniak River sonar, and Bethel test fishery, aerial surveys have been phased out as an index method.

In 2007, the subsistence fishing schedule ("windows") was not implemented. This was in part because of the removal of the stock of concern designation during the January 2007 BOF meeting, and partly, because of very strong run indicators and corresponding escapement. Importantly, in 2005 and subsequently in 2006, the Aniak River sonar project and Kogrukluk River weir on the Holitna River system exceeded the upper end of their escapement goals (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication). With sustained low prices offered dockside to commercial fishermen for chum salmon, combined with

very large runs in recent years, chum salmon have recovered from the exceptionally low escapements observed in 1999 and 2000.

Current Issues and Fishery Outlook

Recent trends in chum salmon production have provided large surpluses for commercial and sport fisheries in the past 3 years. Chum salmon harvests in the commercial fisheries in Kuskokwim Bay are incidental to directed fisheries at king, sockeye, and coho salmon. In the Kuskokwim River proper, ostensibly a chum salmon fishery, large catches of chum salmon in relation to the more commercially valuable species will often shut down the commercial fishery due to lack of processing capacity.

Considering the large numbers of chum salmon returning in 2005 through 2008, the outlook for chum salmon in the Kuskokwim-Goodnews Management Area is above average.

Recent Board of Fisheries Actions

In March 2000, the BOF created two Aniak River management plans, one for salmon and one for resident fish. The *Aniak River Salmon Management Plan* was a series of species-specific regulations restricting daily/possession limits and implementing catch-and-release for chum and coho salmon. Chum salmon could not be possessed year-round. From May 1 through August 31 only one coho salmon could be harvested above the Buckstock River. However, the mechanics of implementing this management plan became complex because emergency regulations are only valid for 180 days and the change in daily/possession limits was greater than the 180-day limit. With concurrence from the BOF, a permanent regulation was created with a sunset clause. This sunset clause required the BOF to address this regulation at every AYK BOF meeting with or without a proposal addressing this regulation. The regulation became effective on May 9 and expired on December 31, 2000.

During the BOF meeting in 2001, members of the public and sport fishing industry indicated that these temporary regulations were far too restrictive; a compromise set of regulations was accepted based on an aggregate daily limit. Aggregate daily limits were consistent with subsistence regulations of the Aniak River; however, subsistence possession limits were more generous. The sport fishery for chum salmon in the Aniak River remained no-retention, allowing catch-and-release fishing. Along with the removal of the stock of concern status, the chum salmon retention clause was removed from Aniak River sport fish regulations at the 2007 BOF meeting. The chum salmon retention clause remained in the *Kuskokwim River Salmon Rebuilding Plan*: this needs to be addressed so there are not contradictory regulations for chum salmon retention by the sport fishery on the Aniak River. This will be addressed through **proposal 66** at the January 2010 BOF meeting.

Current or Recommended Research and Management Activities

Few research needs have been identified as the general health of the chum salmon runs throughout the Kuskokwim-Goodnews Management Area has been quite good. Division of Commercial Fisheries has archived chum salmon samples from throughout the Kuskokwim River drainage for future genetics work.

Sockeye Salmon

Background and Historic Perspective

Sockeye salmon are present in the Kuskokwim River drainage, but are more plentiful in Kuskokwim Bay tributaries. The sockeye salmon stocks of the Kanektok and Goodnews rivers are the largest in the Kuskokwim-Goodnews Management Area. Sockeye stocks of the Kuskokwim River are relatively small and located sporadically throughout the drainage, with the largest occurring in the Holitna River drainage (S. Gilk, ADF&G Division of Commercial Fisheries geneticist, personal communication). Most anglers venturing to western Alaska are interested in king salmon and rainbow trout opportunities; however, sockeye and coho salmon opportunities have been becoming increasingly important to recreational anglers. Anglers seeking sockeye salmon fishing opportunities in the Kanektok and Goodnews rivers focus their efforts during the month of July prior to the king salmon spawning season closure of July 25. Sport harvests and effort are estimated through the SWHS, while commercial and subsistence harvests are managed by Division of Commercial Fisheries located in Bethel and are reported in their Fisheries Management Report series (Ward et al. 2003; Whitmore et al. 2005, 2008).

As with the other Pacific salmon, on average, sport harvests of sockeye salmon represent less than one percent of the total Kuskokwim-Goodnews Management Area sockeye salmon harvests (Table 20). Commercial fisheries of Kuskokwim Bay target sockeye salmon from late June through mid-July. The annual commercial sockeye salmon harvest in the Quinhagak (District 4) and Goodnews Bay (District 5) districts has averaged more than 60,000 and 40,000 fish, respectively (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication). Sockeye salmon commercial harvests were above average in Kuskokwim Bay in 2007, with about 110,000 taken in the commercial fishery in the Quinhagak district and about 43,000 taken in the Goodnews Bay district.

Recent Fishery Performance

With the strong returns recently, sport anglers in the Kuskokwim Bay streams have responded by catching more sockeye salmon, with a record catch of over 14,000 in 2006. In 2008, the numbers were more normal, at about 8,700 caught. Recreational sockeye salmon catches in the Kanektok and Goodnews rivers in recent years have been a few thousand. Harvest in Kuskokwim Bay rivers has not increased as much as the catch, with most anglers practicing catch-and-release. In general, for the Goodnews and Kanektok Rivers, one sockeye salmon is harvested per 10 caught (Table 21). A small sport fishery for sockeye salmon exists on lower Kuskokwim River tributaries such as the Aniak, Kisaralik, and Kwethluk, but historically the catches have averaged 500 fish, with 2007 being a standout year with over 1,600 salmon caught (Table 22). The 2008 sport fish catch of sockeye salmon in the lower Kuskokwim River tributaries stood at over 1,000 (Table 22), which suggests that there may be a slight trend toward increasing use by sport anglers on these systems. As with the Kuskokwim Bay rivers, the harvest remains low (Table 22).

Fishery Objectives and Management

Sockeye salmon management of Kuskokwim Bay is outlined under the *District 4 Salmon Management Plan* (5 AAC 07.367, 2004), sockeye management in Goodnews Bay, District 5 follows a similar regulation pattern, although there is no formal management plan (Ward et al. 2003; Whitmore et al. 2005). Escapement-based management has been challenging in

Kuskokwim Bay. In the past, escapements have been evaluated by aerial surveys; however, multiple salmon species and frequent poor survey conditions have made documenting salmon escapements difficult. Finding different methods of assessing salmon escapements has not been an easy task, within the Kanektok River, towers and sonar have been attempted, but water conditions, staff availability, and budgetary constraints have limited salmon enumeration effectiveness. A resistance-board weir has been successful; unfortunately, the weir site is 42 miles upstream from the mouth and commercial fishery. This weir site appears to be functional, but additional assessment may need to be done to evaluate the escapement spawning downstream of the weir. The Goodnews River weir is located on the Middle Fork, 15 miles upstream of the mouth and commercial fishery, and represents an index of salmon escapement into the entire drainage. Aerial surveys are still used to estimate salmon escapement in other tributaries of the Goodnews River drainage. Additional salmon assessment has been conducted to evaluate the contribution of salmon escapement in the mainstem of the Goodnews River in relation to index counts from the weir (Menard 1998 and 1999; Estensen 2003). Salmon escapement objectives for the Goodnews River were established in 1992 (Buklis 1993) at 25,000 sockeye salmon by either tower or weir counts in the Middle Fork of the Goodnews River, along with aerial survey indices of the main fork and lakes with an escapement objective of 15,000 sockeye salmon. The Kanektok River aerial escapement objective for sockeye salmon is 15,000 fish. Successful aerial surveys counting salmon escapement in the Kanektok and Goodnews Rivers have been dismal historically, with very few surveys conducted during peak spawning, and this has made escapement-based management problematic. However, commercial fisheries management has followed a simple fishing schedule based on fishery performance in relation to the historic mean CPUE of the commercial fishery and this has worked to provide sustained yields.

Current Issues and Fishery Outlook

In 2008 there was a strong return of sockeye salmon to the Kuskokwim River drainage and Kuskokwim Bay, though the overall abundance has declined since the record years of 2005 and 2006. Sockeye salmon arrived later than usual and weir projects characterized the run arrival as one of the latest on record. The 2008 year showed good returns on the Kanektok River, but high water kept the weir from operating until July 17th, leaving the weir count incomplete. In addition, the weir was pulled early on August 21st due to fears of high water keeping it from being pulled. The Goodnews River escapement goal for sockeye salmon was within range at nearly 37,000 sockeye (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication). For the Kuskokwim River, 2008 sockeye salmon escapement was about average, not near the record numbers observed in 2005 and 2006. With four good years of returns in the Kuskokwim Bay and Kuskokwim River drainage streams, all indications are that the sockeye returns for 2009 will remain above average, though it is difficult to predict whether this will continue.

Recent Board of Fisheries Actions

No recent BOF actions have occurred for sockeye salmon. Although sockeye salmon catches have increased in the mainstem Kuskokwim River in recent years, the majority of the sockeye salmon fishery occurs in the Kuskokwim Bay. Kuskokwim Bay fisheries are subject to the *District 4 Salmon Management Plan*, as prescribed by the BOF. This management plan sets guideline dates for the opening of the commercial salmon fishery before June 16th. The plan also describes management strategy based on percentages of king salmon and sockeye salmon in the commercial catch.

Current or Recommended Research and Management Activities

Current research on sockeye salmon radiotelemetry and sampling for genetics has been undertaken by Division of Commercial Fisheries (S. Gilk ADF&G Division of Commercial Fisheries geneticist, personal communication). Approximately half of the sockeye salmon in the Kuskokwim River have origins in the Holitna River drainage, followed by the Aniak River, and distantly by other smaller drainages.

RESIDENT SPECIES FISHERIES

Rainbow Trout

Background and Historic Perspective

Combining salmon and rainbow trout fishing is probably one of the major attractions for anglers to the Kuskokwim-Goodnews Management Area. Area rainbow trout stocks are extremely important to the people of the state and to recreational and tourism based services that contribute to the state's economy.

Rainbow trout of the Kuskokwim-Goodnews Management Area are found only in the lower Kuskokwim River tributaries and tributaries of Kuskokwim Bay. These stocks of rainbow trout are at the northern range of their geographic distribution. Many of these rainbow trout stocks are small, slow growing, mature at older age, and are not particularly abundant. With any population on the edge of its distribution, it is more sensitive to changes in climate and food availability. The *Southwest Alaska Rainbow Trout Management Plan* (ADF&G 1990) recognizes these factors and provides a policy for conservative management and maintenance of rainbow trout stocks in the lower Kuskokwim River and Kuskokwim Bay.

Rainbow trout stocks of the Kanektok River are considered "world class" with notoriety for high catch rates; the peak catch of 27,000 rainbow trout occurred in 1997. For the most current 5-year period approximately 9,500 rainbow trout were caught annually with virtually no harvest being reported during that period (Table 23). Rainbow trout catch rates from the Kanektok River rival those of the premier rainbow trout stocks of Alagnak and Copper rivers of Bristol Bay and the trophy rainbow trout area on the Kenai River, between Kenai and Skilak lakes. The Kanektok River is the largest rainbow trout fishery in the Kuskokwim Bay and lower Kuskokwim River. Recently, angling effort in the Kanektok River has fluctuated slightly (Table 3), with angling effort in the past 5 years ranging from approximately 9,000 to 11,000 angler-days. Overall, the rainbow trout catch in Kuskokwim Bay drainages has remained steady in the last 5 years, ranging from 11,000 to 16,000 peaking at 22,000 fish in 2008, the highest reported catch since 2006. The sport fishing industry continues to report good catches and rainbow trout across all size categories.

Sport fishing effort, catch, and harvest are estimated by the SWHS. In the past, subsistence harvest surveys have focused on salmon, but in 2000 the Division of Subsistence began to estimate resident fish harvests, including rainbow trout on a community basis. Data are still spotty since estimates are based on communities rather than drainage of harvest. Division of Commercial Fisheries manages all subsistence fisheries in the region.

Recent Fishery Performance

Angler effort in all sport fisheries of the Kanektok River has seen a rapid increase from 1,500 angler-days in 1983 to over 12,000 angler-days in 1988 (Lafferty 2003, Chythlook 2006). Since

1988, effort has fluctuated from 3,000 to 9,000 angler-days and most likely reflects the availability of guiding services. In recent years, approximately 8,000 angler-days have been expended in the Kanektok River and about 1,800 in the Goodnews River in 2008 (Table 3). Angler effort in the Aniak River sport fisheries was greater than 5,500 during a peak in 1998 but has since fluctuated between 2,000 and 4,500 angler-days (Table 3). Angler effort in the Aniak River is directed primarily towards king and coho salmon, but rainbow trout are an important attraction. Total areawide rainbow trout sport harvests have rarely exceeded 1,500 fish as seen in 1988 (Lafferty 2003, Chythlook 2006), and the recent 5-year average is less than 200 rainbow trout (Tables 23 and 24).

In 2008, weather conditions were cold and wet throughout the season, in contrast to the 2007 season, where weather conditions were characterized as normal. Sport fish catches were good, and improved through the summer in both Kuskokwim River and Kuskokwim Bay drainages and were later reported to be average throughout the summer at most Kuskokwim Bay/Kuskokwim River locations. This is reflected in high catch rates reported by the SWHS for lower Kuskokwim River drainages, which far exceeded the 5- and 10-year averages of approximately 8,000 fish (Table 23 and 24). The 2008 catch for the lower Kuskokwim River drainages was over 32,000 rainbow trout caught (Table 24). In the Kuskokwim Bay drainage, the most recent 5- and 10-year averages were exceeded (Table 23), with over 22,000 rainbow trout caught. This, however, is not an increase over historic catches that occurred in the late 1990s (Tables 23 and 24). Though catch rates were better than average, nearly all sport-caught rainbow trout caught in the entire Kuskokwim-Goodnews area were released.

Fishery Objectives and Management

During the mid-1980s daily limits were adopted in the Kuskokwim-Goodnews Management Area to eliminate excessive harvests. Daily limits at this time were very liberal, providing opportunity for local people to meet their subsistence needs. During its February 1990 meeting, the BOF adopted regulations implementing a comprehensive management plan for rainbow trout in Southwest Alaska (ADF&G 1990). The plan provides guidance in the form of policy that gives the BOF and the public clear understanding of the underlying principles by which rainbow stocks are to be managed and provides guidance to the BOF in developing future regulations. In conjunction with the adoption of this plan, the Aniak River drainage (Figure 3) was designated a catch-and-release special management area above its confluence with the Doestock River with unbaited, single-hook, artificial lure restrictions.

During 1997, upper sections of the Kisaralik, Kwethluk, and entire length of the Kasigluk rivers were recognized as special rainbow trout waters under the guidelines of the *Southwest Alaska Rainbow Trout Management Plan* (ADF&G 1990) resulting in regulations allowing only unbaited, single-hook, artificial lures.

Current Issues and Fishery Outlook

The rainbow trout stocks of the Kuskokwim-Goodnews Management Area provide high catch rates in all size classes; strong indicators of healthy fish populations. Local anglers and the guiding industry continue to provide positive comments on rainbow trout stocks. Some concerns have been raised about rainbow trout stocks on the Aniak River. These concerns, voiced by some guides and individuals, generally involve a decreasing quality in the fishery, in the form of a lower number of large rainbow trout, and less rainbow trout in general. The outlook for rainbow trout stocks in the Kuskokwim-Goodnews Management Area is generally good.

Rainbow trout greater than 25 inches are occasionally caught. In the short term the impacts of rod and reel subsistence fishing appear to be minor, but resident fish populations rebuild slowly, particularly on the edge their distribution range.

In March 2003, the BOF adopted the *Statewide Management Standards for Wild Trout* (5 AAC 75.220, 2003) that consolidated regulations for rainbow trout stocks not under special management. Within the Kuskokwim-Goodnews Management Area this includes the Kasigluk, Arolik, Kisaralik and Kwethluk rivers which are not under special management regulations under the *Southwest Rainbow Trout Management Plan*. There are currently no major biological concerns for rainbow trout fisheries in the Kuskokwim River drainage and Kuskokwim Bay. With close attention to sport and subsistence harvests to ensure the health of local stocks, area stocks should continue to provide good angling opportunities for the 2009 season and beyond.

Recent Board of Fisheries Actions

During the 2000 March BOF meeting, a subsistence rod and reel provision was adopted in the AVCP region of the Yukon-Kuskokwim Delta area. All Alaskan residents are considered subsistence users under state statues and there were no daily or possession limits for subsistence users utilizing rod and reel, except for rainbow trout. A potential issue of this rod and reel subsistence provision was that sport fishing regulations in the AVCP region apply only to nonresident anglers, as Alaska resident anglers could choose to fish with rod and reel under subsistence regulations. Local residents of Aniak were concerned with this change and sought additional protection in the Aniak River. A temporary *Aniak River Subsistence Management Plan* was created and the regulations mirrored the sport fishing regulations. As a result, the first subsistence catch-and-release fishery was created in the Aniak River.

During the January 2001 BOF meeting, additional regulations were adopted to protect lower Kuskokwim River rainbow trout in the sport fishery. Catch-and-release regulations are currently in effect for the entire Aniak River drainage rainbow trout sport fishery and gear restrictions remain in effect upstream of Doestock Creek. The rainbow trout regulations for lower Kuskokwim River tributaries of the Kasigluk and Kwethluk rivers were made consistent for both systems. The daily and possession limit were reduced from two, with only one over 20 inches in length to one less than 14 inches in length, to protect mature spawning fish in designated reaches of these streams. The downstream section below the Akiak Lodge site on the Kisaralik River was also included in this management regime to provide consistent rainbow trout regulations for the area.

At its January 2004, meeting the BOF adopted regulations for the Arolik, Kasigluk, lower Kisaralik, and Kwethluk which aligned the rainbow trout regulations in these four rivers with the *Statewide Management Standards for Wild Trout*. The daily and possession limit became two fish, only one 20 inches or greater in length, and created an annual limit of two fish 20 inches or greater in length.

Current or Recommended Research and Management Activities

Several on-site creel surveys in the Kanektok and Aniak rivers have been done to verify catch, harvest, and angler effort (Lafferty and Bingham 2002; Adams 1996; Dunaway 1997; Dunaway and Fleischman 1995; Dunaway and Bingham 1992; Wagner 1991; Minard 1990; Minard and Brookover 1988; Minard 1987; Alt 1986). The emphasis of these studies was on the sport fisheries that included rainbow trout fisheries as part of the study, except the study by Wagner

(1991). Wagner attempted to estimate rainbow trout using a mark-recapture experiment, although several of the assumptions were invalid and a biased population estimate of 15,000 to 20,000 rainbow trout was obtained for a 32-kilometer study section. Expanding this information to a drainagewide estimate, abundance of Kanektok rainbow trout was estimated to be in the range of 40,000 to 80,000 fish in 1986 and 1987.

Another tagging study of Kisaralik River rainbow trout in 1997 by the USFWS estimated the rainbow trout population to be in excess of 16,000 rainbow trout in a 79-km study section (Harper et. al. 2005). The rainbow trout density estimates range from 200 rainbow trout/km in the Kisaralik River to 650 rainbow trout/km in the Kanektok River. Although these mark-recapture experiments were flawed because of the egress and migration of tagged fish within the study site, the density estimates are a rough approximation of density and provide confidence that existing catches by SWHS are sustainable. Area rainbow trout stocks continue to be conservatively managed.

A rainbow trout radiotelemetry project began in the Aniak River drainage in fall of 2008. This project will follow the radiotagged fish the next two seasons in an attempt to gain insight into spawning areas and migratory habits. Depending on the results of the radiotelemetry study concerning fidelity of rainbow trout to specific areas in the Aniak River drainage, there is potential to do a mark-recapture study following the completion of the radiotelemetry work.

In the near future, similar work may be conducted on the Kanektok and Goodnews Rivers. Meetings with interested parties (including Togiak National Wildlife Refuge, Kenai Fisheries Resource Office, and ADFG Sport Fish Division staff) resulted in a cooperative radiotelemetry study in the Kanektok River drainage being initiated in 2009.

In addition, proposed work on the Kisaralik and Kwethluk Rivers may be conducted as early as fall 2011. There is interest in updating the 1997 Kisaralik River study done by the USFWS to monitor for change in the 10+ years since that study was completed. ADF&G and Yukon Delta National Wildlife Refuge staff have both expressed interest in this project.

Dolly Varden/Arctic Char

Background and Historical Perspective

Dolly Varden/Arctic char (DV/AC) of the Kuskokwim River drainage are found throughout the area. Distribution of both Dolly Varden and Arctic char *Salvelinus alpinus* overlap in this area of Alaska, and it is potentially difficult to differentiate between the species. Populations of Dolly Varden are both anadromous and freshwater resident. Arctic char are primarily lake residents in this part of Alaska. The distributions and external characteristics of these species make identification a challenge. For management purposes, these closely related species are treated as a composite.

Anglers focusing on DV/AC target mainly clear water tributaries and lakes of the area. Within the Kuskokwim-Goodnews Management Area, the largest catches of DV/AC occur in tributaries of Kuskokwim Bay and the Aniak River. Many DV/AC are caught incidentally while anglers are fishing for salmon and rainbow trout. Regulations in place to protect rainbow trout also protect other resident fish species such as DV/AC. With catches generally exceeding 15,000 DV/AC, the Kanektok River is the largest fishery in the Kuskokwim Bay and lower Kuskokwim River (Table 25). The 2008 year was an exceptional year for DV/AC catch on the Kanektok River, with over 36,000 caught (Table 25). The Goodnews and Aniak river DV/AC fisheries are

the next largest sport fisheries in the area. The Aniak River saw more catches (nearly 17,000) than in recent years (Tables 25 and 26), though not as high as the catches reported in 1998 (over 21,000) (Table 26). These three fisheries are of primary interest to the angling public; angling services have increased in recent years as each of these streams gains popularity. Local residents seek DV/AC when salmon are not available as a fresh source of fish. Stock sizes of DV/AC in the Kuskokwim-Goodnews Management Area remain unknown.

Recent Fishery Performance

In 2008, weather conditions beginning in late May were cool and wet, but improved in early summer, with average temperatures, average rain and associated river levels. Catches were characterized as above average at most Kuskokwim Bay/Kuskokwim River locations. This is reflected in catch rates reported by the SWHS, which were above average in the Kuskokwim Bay at nearly 47,000 caught, and lower Kuskokwim River at over 26,000 caught (Tables 25 and 26). Though catch rates were above average, nearly all sport-caught DV/AC caught in the entire Kuskokwim-Goodnews Management Area were released. Beginning in mid-August, conditions deteriorated somewhat due to rain with high, turbid water, and catches were reported to be below average in most locations.

Fishery Objectives and Management

Sport fishing effort, catch and harvest are estimated by the SWHS; estimates from the annual report are reviewed to ensure that sport harvests remain within sustainable yields. Sport fishing regulations are developed to match effort and harvest within sustainable bounds. Current regulations and harvests appear to be within sustainable levels for DV/AC of the Kuskokwim River drainage. High catches with low harvests are good indications of healthy fish stocks. Declining sport harvests of DV/AC from the early 1980s to the 1990s can be attributed to additional protection from the *Southwest Alaska Rainbow Trout Management Plan* resulting in conservative methods and means (no bait, single-hook regulations) and changing attitudes of anglers regarding the harvest of DV/AC (Tables 25 and 26).

Current Issues and Fishery Outlook

The DV/AC stocks of the Kuskokwim-Goodnews Management Area are well protected in the area sport fisheries with current regulations. The outlook for DV/AC and other resident fish species in the Kuskokwim-Goodnews area is currently good. ADF&G has invested substantial effort in regulation development to protect resident fish species.

There are currently no major biological concerns for DV/AC fisheries in the Kuskokwim-Goodnews Management Area. Area stocks should continue to provide good angling opportunities for the 2009 season.

Recent Board of Fisheries Actions

The BOF at its 2004 meeting reinstated individual daily and possession limits for resident species in the Aniak River drainage over the aggregate daily and possession limits that were adopted in 2001. The current DV/AC limit in the Aniak River drainage is 3 fish, no size limit. Kuskokwim Bay rivers (Kanektok, Arolik, and Goodnews) have the same limit for AC/DV, as does the entire Holitna River drainage. Upper Kuskokwim River drainages upstream of the Holitna River are governed by the general regulation for AC/DV and lake trout *Salvelinus namaycush* which for flowing waters is a daily limit of 10 per day, only two 20 inches or greater and only 2 may be lake trout. In lakes, the aggregate daily and possession limit for DV/AC and

lake trout is 2 fish, no size limit. The rest of the Kuskokwim River drainages downstream of the Holitna River, with the exceptions already named, have a DV/AC daily limit of 5 fish, with only two 20 inches or longer.

Current or Recommended Research and Management Activities

No major activities are planned or recommended for AC/DV in the near future. However, in conjunction with other studies, incidentally-caught DV/AC should be measured and fin clips taken. Other agencies (USFWS) are developing a baseline genetic database to which any samples taken can be added.

Arctic Grayling

Background and Historical Perspective

Arctic grayling are probably the most widely distributed and abundant resident fish in the Kuskokwim-Goodnews Management Area. Arctic grayling are found throughout many lakes, streams and clear water tributaries of the area. Nonresident anglers access most of the area via fly-in float trips on many of these tributaries. Anglers typically catch Arctic grayling while targeting salmon and rainbow trout. Current sport fishing regulations for rainbow trout provide additional protection to other fish species with gear and hook restrictions in local tributaries. Recent Arctic grayling harvests in Kuskokwim River and Kuskokwim Bay drainages are between 500 and 600 fish (Tables 27 and 28). Recent sport catches are between 18,000–30,000 Arctic grayling. The Aniak River is the largest Arctic grayling fishery in the area, with the Kisaralik and Kanektok rivers supporting the next largest sport fisheries.

Recent Fishery Performance

In 2008 Arctic grayling catches in both Kuskokwim River and Kuskokwim Bay drainages were reported to be above average at most Kuskokwim Bay/Kuskokwim River locations (Tables 27 and 28). Nearly all sport-caught Arctic grayling caught in the entire Kuskokwim-Goodnews Management Area were released. Beginning in mid-August, conditions deteriorated somewhat due to rain causing high, turbid water, and catches were reported to be below average in most locations.

Fishery Objectives and Management

Sport fishing effort, catch, and harvest are estimated by the SWHS; estimates from the annual report are reviewed to ensure that sport harvests do not exceed sustained yield. The focus of sport fishing regulation development is to enhance opportunity and provide sustainable harvests. Current regulations appear to be maintaining harvests within sustainable levels for Arctic grayling in the Kuskokwim-Goodnews Management Area. High catch rates with low harvests indicate healthy fish stocks. The declining harvest rates of Arctic grayling from the early 1980s to the 1990s can be attributed to more restrictive regulations and changing attitudes of anglers regarding the harvest of Arctic grayling (Tables 27 and 28), as well as development of more stringent regulations regarding catch-and-release of rainbow trout, especially in the Aniak River and lower Kuskokwim Rivers. These systems now require unbaited, single-hook, artificial lures, which reduces the catch (and harvest) of Arctic grayling as well as providing added protection for the rainbow trout.

Current Issues and Fishery Outlook

Arctic grayling stocks of the Kuskokwim-Goodnews Management Area are well protected with the current sport fishing regulations. There are currently no major biological concerns for Arctic grayling fisheries in the area. Area stocks should continue to provide good angling opportunities for the 2009 season.

Recent Board of Fisheries Actions

During its January 2001 meeting, the BOF established an aggregate daily limit for resident fish species for both subsistence and sport anglers in the Aniak River. A six fish resident species limit was enacted for subsistence anglers during June, July and August. Sport anglers were restricted to an aggregate three (3) resident fish limit, but only allowing one fish of the following species: DV/AC, Arctic grayling, lake trout, sheefish *Stenodus leucichthys*, northern pike *Esox lucius* and burbot *Lota lota* in any combination.

The 2004 BOF meeting reinstated individual daily limits for resident species in the Aniak River. The current Aniak River Arctic grayling daily and possession limit is 2 fish, no size limit.

Northern Pike

Background and Historic Perspective

Most northern pike are harvested in lakes, streams and tributaries of the Kuskokwim River drainage. Very few pike (less than 50) are harvested in the Kuskokwim Bay area. The largest northern pike sport fishery occurs in the Aniak River; however, there are a number of sloughs and unnamed lakes that provide northern pike fishing opportunities in the area (Table 29). Local anglers seek northern pike when salmon are not available as a fresh source of fish, mostly during the winter months. Most local Bethel subsistence effort is focused during the winter at the mouth of the Johnson River. Localized depletion is evident from repeated comments of only small “hammer handle” northern pike in the subsistence harvest. Stock sizes of northern pike in the Kuskokwim River drainage remain unknown.

Recent Fishery Performance

Northern pike harvests are declining in the lower Kuskokwim River. The recent 5- and 10-year average harvests in the lower Kuskokwim River are below 400 fish (Table 29). In 2008, only 69 northern pike were estimated to be harvested in the lower Kuskokwim River. Catch of northern pike during these same periods decreased to approximately 1,000 fish in 2008, from an average of near 2,000 for the 5- and 10-year averages. In the upper Kuskokwim River drainage, above Aniak, catch and effort has remained relatively stable, with catch and harvest mainly in the Holitna River (Table 4). The 2003–2007 catch averages near 2,500 for the upper Kuskokwim River, which is slightly higher than the 1998–2007 catch average. Harvest has remained similar, ranging from about 400 to 1,500 in the 10-year period from 1998–2007 (Tables 4 and 5).

Fishery Objectives and Management

Sport fishing effort, catch, and harvest are estimated by the SWHS; estimates from the annual report are reviewed to ensure that sport harvests do not exceed sustainable yield. The focus of sport fishing regulation development is to enhance opportunity and provide sustainable harvests. Current harvests appear to be within sustainable levels for northern pike in the Kuskokwim-Goodnews Management Area. High catches with low harvests indicate healthy fish stocks (Table 29). Annual sport harvests of northern pike have fluctuated in recent years, but harvests

have remained very low (Table 29). The Kuskokwim River northern pike daily and possession limit is 10, with no size limit, except for the following: for those waters downstream of the Holitna River to the mouth of the Kuskokwim River, the daily and possession limit is 5, with only one over 30 inches.

Current Issues and Fishery Outlook

There are no current biological concerns in the sport fisheries for northern pike in this area. There were no reported problems by anglers having difficulties locating northern pike during 2007 and 2008. Area stocks should continue to provide good angling opportunities for the 2009 season.

Recent Board of Fisheries Actions

During its January 2001 meeting, the BOF established an aggregate daily limit for resident fish species for both subsistence and sport anglers in the Aniak River. A six resident fish species limit was enacted for subsistence anglers during June, July and August. Sport anglers were restricted to an aggregate three (3) resident fish limit, but only allowing one fish of the following species: DV/AC, Arctic grayling, lake trout, sheefish, northern pike and burbot in any combination.

The 2004 BOF meeting reinstated individual daily and possession limits in the Aniak River, which reverted to the 5 northern pike daily and possession limit, with only one over 30”.

Current or Recommended Research and Management Activities

An evaluation of the subsistence fishery at the mouth of the Johnson River should be conducted to investigate public comments regarding the small size of the northern pike harvested during the winter fishery.

Sheefish

Background and Historical Perspective

Most sheefish are harvested in streams and tributaries within the Kuskokwim River drainage. The largest sheefish sport fishery occurs in the Holitna River. This harvest and catch of sheefish by the sport fishery remains very low (Table 30). A few local anglers have recently begun prospecting for sheefish in the lower tributaries of the Kuskokwim River. Local anglers seek sheefish in spring and fall when salmon are not available as a fresh source of fish. Stock sizes of sheefish in the Kuskokwim River drainage are unknown. Previous work suggests that there may be at least two stocks, one specific to spawning in the Upper Kuskokwim near Big River, and the other near Highpower Creek. These were observed in spawning condition in late fall (Alt 1987). Other Kuskokwim area projects have noted high concentrations of sheefish at various times in other areas of the Kuskokwim River (Lisa Stuby, ADF&G Division of Commercial Fisheries (retired) personal communication).

Recent Fishery Performance

There were no reported problems by anglers having difficulties locating sheefish during recent years in the Kuskokwim River drainage, except for poor fishing conditions attributed to high water or late breakup. Generally, local people in the lower river near Bethel tend to harvest sheefish during the king salmon fishery, while people in the upper river, especially near the

Holitna and Aniak Rivers, and upriver areas near McGrath tend to catch sheefish mid-summer through to late fall, and occasionally through the ice during winter.

Fishery Objectives and Management

Sport fishing effort, catch and harvest are estimated by the SWHS. Estimates from the annual report are reviewed to ensure that sport harvests remain within sustainable yields. The focus of sport fishing regulation development is to enhance opportunity and provide sustainable harvests. Current harvests appear to be within sustainable levels for sheefish of the Kuskokwim River drainage. High catches with low harvests indicate healthy fish stocks (Tables 4, 5 and 30).

Current Issues and Fishery Outlook

There are no current biological concerns for the sheefish fisheries in this area. Area stocks should continue to provide good angling opportunities for the 2009 season.

Recent Board of Fisheries Actions

During its January 2001 meeting, the BOF established an aggregate daily limit for resident fish species for both subsistence and sport anglers in the Aniak River. A six fish resident species limit was enacted for subsistence anglers during June, July and August. Sport anglers were restricted to an aggregate three (3) resident fish limit, but only allowing one fish of the following species: DV/AC, Arctic grayling, lake trout, sheefish, northern pike and burbot in any combination.

The 2004 BOF meeting reinstated individual daily limits for resident species in the Aniak River. The current Aniak River sheefish daily and possession limit is 2 fish, no size limit.

Current or Recommended Research and Management Activities

A radiotelemetry project began in 2007, with the hopes of identifying spawning and overwintering locations and genetic information. This project gained some feeding and overwintering data, as well as having confirmed some spawning locations in the upper Kuskokwim River at Highpower Creek and Big River. Currently, this project is scheduled to run through 2011 (tracking sheefish tagged in 2007 and 2008 via aerial surveys).

Lake Trout

Background and Historical Perspective

Most lake trout are harvested in lakes of the headwater rivers and tributaries within the Kuskokwim-Goodnews Management Area. Many of these lakes are located in the lower Kuskokwim River and Kuskokwim Bay area. Anglers utilize lakes in the headwaters to begin float trips on adjacent streams and rivers. However there are a few local anglers with float or ski planes fishing on local lakes for lake trout throughout the year. Local residents commonly seek lake trout when salmon are not available as a fresh source of fish. Stock sizes of lake trout in the lakes of the Kuskokwim-Goodnews Management Area are unknown. Lake trout in the area are similar to other Alaskan lake trout stocks. They are long-lived, slow-growing, late-maturing fish that can be easily overexploited in a relatively short period of time. Many of the lakes that contain lake trout are high altitude alpine lakes that have a short open water period with a short growing period. Historical harvests of lake trout in other locations in the state of Alaska suggest that past sport fishing practices can rapidly deplete lake trout stocks in small lakes.

Recent Fishery Performance

There were no angler reports of problems of locating lake trout in 2008 in the Kuskokwim-Goodnews Management Area. Generally, lake trout catches have remained relatively low, with correspondingly low harvests. Kuskokwim Bay catch rates averaged under 600 for the 1998-2007 period, with harvests averaging near 30 (Table 31). For the lower Kuskokwim River drainage, similar catch and harvest rates were observed, with the 1998–2007 average harvest near 50, with average catch under 400 (Table 32).

Fishery Objectives and Management

Sport fishing effort, catch, and harvest are estimated by the SWHS; estimates from the annual report are reviewed to ensure that sport harvests are sustainable. Sport fishing regulations are developed to match effort and daily limits to maintain harvest within sustainable yields. Current harvests appear to be within sustainable levels for lake trout of the Kuskokwim-Goodnews Management Area. Recent catch and harvest data suggest overall very low fishing pressure from the sport fishery.

Current Issues and Fishery Outlook

Exploitation of area lake trout stocks appears to be low due to low levels of angler effort resulting in low harvests (Table 32). It is difficult to distinguish lake trout from lake-resident DV/AC inhabiting the same lake from external characteristics and markings. Occasionally there is some misidentification between DV/AC and lake trout. Some of the large harvests that arise in the SWHS report need further investigation from time to time to ensure proper identification for accurate reporting. Lake trout studies conducted in Region III have shown that even low levels of harvest can overexploit small populations of lake trout.

The outlook for lake trout and other resident fish species in the Kuskokwim-Goodnews Management Area is good. ADF&G and the BOF have invested substantial effort in regulation development to protect resident fish species. Currently, ADF&G has not identified a biological concern for lake trout fisheries in the area. Area stocks should continue to provide good angling opportunities for the 2009 season.

Recent Board of Fisheries Actions

During its January 2001 meeting, the BOF established an aggregate daily limit for resident fish species for both subsistence and sport anglers in the Aniak River. A six resident fish species daily limit was enacted for subsistence anglers during June, July and August. Sport anglers were restricted to an aggregate three (3) resident fish daily limit, but only allowing one fish of the following species: DV/AC, Arctic grayling, lake trout, sheefish, northern pike and burbot in any combination.

This regulation was replaced with individual daily limits at the 2004 BOF meeting. The current daily and possession limit for lake trout is 2 per day, except for restrictions in the Aniak River.

Current or Recommended Research and Management Activities

In the near future there should be monitoring activity on at least one of the headwater lakes in either Kuskokwim Bay or the lakes that drain into the lower Kuskokwim River. A good candidate would be Aniak Lake or Pegati Lake, since they both receive a fair number of visitors, and similar lake trout utilization (Tables 31 and 32). These lake/river systems have a similar size and lake trout catch and harvest to the other lower Kuskokwim River or Kuskokwim Bay lakes.

They may be able to serve as proxy for the health of the lake trout stocks in nearby air-accessible lakes.

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TABLES AND FIGURES

Table 1.—Annual sport fishing effort (angler-days) for Alaska, Region III, and the Kuskokwim-Goodnews Management Area waters as estimated by the SWHS, 1990–2008.

Year	Statewide	Region III	Percent of Statewide	Kuskokwim Mgmt Area	Percent of Region III
1990	2,453,284	245,629	10.0	15,858	6.5
1991	2,456,328	219,922	9.0	13,055	5.9
1992	2,540,374	181,852	7.2	14,404	7.9
1993	2,559,408	220,972	8.6	14,505	6.6
1994	2,719,911	209,987	7.7	18,117	8.6
1995	2,787,670	270,141	9.7	16,289	6.0
1996	2,006,528	201,166	10.0	16,420	8.2
1997	2,079,514	238,856	11.5	27,318	11.4
1998	1,856,976	227,841	12.3	27,913	12.3
1999	2,499,152	304,522	12.2	26,563	8.7
2000	2,627,805	241,574	9.2	20,030	8.3
2001	2,262,346	194,531	8.6	20,673	10.6
2002	2,259,091	220,276	9.8	20,645	9.4
2003	2,219,398	206,705	9.3	24,369	11.8
2004	2,473,961	217,041	8.8	25,406	11.7
2005	2,463,929	183,535	7.4	19,447	10.6
2006	2,298,092	175,274	7.6	22,389	12.8
2007	2,543,674	204,032	8.0	21,206	10.4
2008	2,315,601	183,084	7.9	25,862	14.1
1998–2007 Average	2,350,442	217,533	9.3	22,864	10.7
2003–2007 Average	2,399,811	197,317	8.2	22,563	11.5

Table 2.–Kuskokwim-Goodnews Management Area (including Kuskokwim Bay drainages) sport fishing harvest by species, 1998–2008.

Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Averages	
												1998-2007	2003-2007
King Salmon	3,401	1,400	1,181	1,384	1,397	734	1,197	2,184	1,277	218	1,037	1,437	1,122
Coho Salmon	4,897	3,974	3,294	4,474	4,265	5,297	7,096	5,591	3,793	675	6,344	4,336	4,490
Sockeye Salmon	1,867	1,154	822	422	267	289	512	792	864	110	1,109	710	513
Pink Salmon	133	0	10	11	143	46	416	66	187	0	32	101	143
Chum Salmon	596	520	359	176	598	67	117	608	158	55	262	325	201
Rainbow Trout	539	510	106	17	76	204	457	141	107	0	219	216	182
Lake Trout	141	128	152	63	134	244	497	233	83	0	22	168	211
Dolly Varden/Arctic char	1,581	2,038	1,612	1,698	2,026	2,710	2,539	2,135	1,937	138	2,038	1,841	1,892
Arctic Grayling	3,554	1,290	361	807	1,464	1,259	1,953	1,287	637	631	713	1,324	1,153
Northern Pike	2,711	548	531	474	443	783	1,543	3,749	406	73	165	1,126	1,311
Whitefish	1,220	9	214	20	54	89	975	209	58	51	96	290	276
Burbot	185	228	588	50	15	87	111	75	0	0	0	134	55
Sheefish	277	268	250	124	81	45	182	1,079	173	174	191	265	331
Smelt	3,333	0	68	0	0	0	281	0	291	0	304	397	114
Halibut	350	0	53	0	0	0	0	32	0	0	0	44	6

Table 3.–Sport fishing effort (angler-days) in the lower Kuskokwim River and Kuskokwim Bay drainages, 1992–2008.

Year	Kuskokwim Bay				Lower Kuskokwim River					Grand Total
	Kanektok	Goodnews	Other	Total	Aniak	Kisaralik	Kwethluk	Other	Total	
1992	4,972	1,387	2,068	8,427	2,604	.a	640	1,654	4,898	13,325
1993	3,791	2,276	2,844	8,911	2,056	.a	554	2,275	4,885	13,796
1994	6,505	2,038	1,406	9,949	1,815	1,463	466	1,124	4,868	14,817
1995	5,512	1,030	743	7,285	3,569	369	387	1,600	5,925	13,210
1996	8,305	2,322	625	11,252	3,964	1,525	1511	2,891	9,891	21,143
1997	9,706	5,011	1,807	17,999	4,778	1,578	642	1,445	8,443	26,442
1998	8,114	4,007	1,158	13,626	5,548	1,021	1498	1,306	9,373	22,999
1999	8,194	8,353	705	17,560	3,235	1,316	402	1,992	6,945	24,505
2000	7,231	4,038	121	11,403	2,141	2,084	1,131	472	6,100	17,503
2001	9,063	2,826	201	12,206	2,121	1,304	1,069	258	4,752	16,958
2002	5,885	3,215	271	10,136	2,688	2,410	920	1,620	7,638	17,774
2003	7,655	3,622	133	11,659	2,998	1,439	2,646	3,548	10,631	22,290
2004	6,364	2,499	410	10,729	4,186	2,071	2,021	340	8,618	19,347
2005	5,789	2,612	32	8,854	2,497	714	2,022	525	5,758	14,612
2006	7,861	2,833	342	11,682	3,096	.a	1,922	1,867	9,034	22,389
2007	5,071	3,375	960	9,406	3,363	.a	1,067	4,414	9,217	18,623
2008	8,024	3,738	969	10,775	4,559	2,576	1,092	1,958	10,185	25,862
Average 1998–2007	7,123	2,988	433	11,726	3,187	1,545	1,470	1,634	7,807	19,700
Average 2003–2007	6,548	3,738	375	10,466	3,228	1,408	1,936	2,139	8,652	19,452

^a Due to low number of respondents reporting fishing in the Kisaralik River, data for the Kisaralik River is included in the Other total.

Table 4.—Sport fishing effort and harvest of principal species in the upper Kuskokwim River drainage, 1998–2008.

	Year											Averages	
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1998–2007	2003–2007
All Kuskokwim drainages upstream of the Aniak River (including Holitna)													
Fishing Effort (angler-days)	2,557	2,207	2,453	3,531	3,090	2,249	4,121	2,758	1,630	2,304	1,516	2,690	2,430
	Harvests												
King Salmon	174	36	55	219	ND	48	186	241	29	218	231	123	159
Chum Salmon	167	ND	13	41	ND	ND	ND	325	ND	55	45	120	142
Sockeye Salmon	ND	33	23	152	ND	ND	144	379	181	110	ND	146	204
Coho Salmon	95	1,028	730	408	227	1,446	1,504	602	148	675	1,175	686	925
Arctic Grayling	1,858	142	179	458	108	536	1,651	597	314	631	106	647	639
Northern Pike	278	144	186	330	74	483	862	1,536	340	73	80	431	562
Sheefish	43	130	92	124	ND	45	156	803	153	174	81	191	235
Dolly Varden	67	112	71	253	ND	629	765	337	421	138	306	310	433
Holitna River													
Fishing Effort (angler-days)	771	1,236	791	1,853	1,296	1,748	993	1,452	542	683	599	1,137	1,003
	Harvests												
King Salmon	54	25	22	73	53	48	136	180	16	86	122	69	98
Chum Salmon	ND	ND	ND	41	19	ND	ND	293	ND	ND	45	118	169
Sockeye Salmon	ND	ND	12	48	16	ND	124	345	136	ND	ND	114	202
Coho Salmon	ND	893	426	153	339	998	819	263	85	144	288	458	433
Arctic Grayling	124	74	38	154	144	259	846	403	43	152	13	224	286
Northern Pike	103	106	112	145	78	249	820	1,136	312	20	ND	308	507
Sheefish	35	102	58	124	18	15	156	349	14	ND	81	104	110
Dolly Varden	25	112	112	73	53	48	136	180	16	138	163	82	87

Table 5.—Sport fishing catch of principal species in the upper Kuskokwim River drainage, 1998–2008.

	Year											Averages	
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1998–2007	2003–2007
<i>All Kuskokwim drainages upstream of the Aniak River (including Holitna)</i>													
King Salmon	1,121	1,332	217	3,497	707	833	1,086	581	436	218	1,852	1,003	631
Chum Salmon	278	474	61	1,013	762	1,500	1,131	2,530	2,115	55	656	992	1,466
Sockeye Salmon	84	75	242	1,765	24	105	333	573	180	110	42	349	260
Coho Salmon	294	3,460	3,742	5,037	3,887	7,989	9,641	5,415	843	675	3,600	4,098	4,913
Arctic Grayling	11,015	1,636	2,149	7,255	2,428	8,646	15,161	2,192	2,637	631	2,013	5,375	5,853
Northern Pike	2,094	2,914	2,735	3,469	2,133	2,345	5,527	6,023	362	73	1,527	2,768	2,866
Sheefish	771	813	883	2,974	307	768	883	3,460	200	174	537	1,123	1,097
Dolly Varden	364	589	313	387	1,922	4,144	7,554	1,152	2,123	138	5,472	1,869	3,022
<i>Holitna River</i>													
King Salmon	335	240	22	823	210	272	619	470	173	171	992	334	341
Chum Salmon	25	135	ND	350	426	209	426	1,638	802	ND	408	501	769
Sockeye Salmon	84	ND	124	951	24	105	270	467	431	81	42	282	271
Coho Salmon	ND	2,005	1,404	4,027	613	4,699	3,046	2,168	400	1,019	1,239	2,153	2,266
Arctic Grayling	8,303	1,016	381	4,859	1,200	5,492	10,241	1,218	704	2,793	1,351	3,621	4,090
Northern Pike	1,379	2,146	2,292	2,579	699	1,318	4,628	3,105	2,512	954	1,112	2,161	2,503
Sheefish	729	745	512	381	270	59	591	2,843	142	ND	174	697	909
Dolly Varden	305	589	200	2,229	618	3,256	3,921	313	1,218	1,581	4,065	1,423	2,058

Table 6.–Peak aerial survey index counts of king salmon in tributaries of the lower Kuskokwim River, 1983–2008.^a

Year	Ek River	Kwethluk River	Kisaralik River	Tuluksak River	Aniak River	Kipchuk River ^b	Salmon River ^b
1983	188	471	731	129	1,909		231
1984		273	157	93	1,409		
1985	1,118	629		135			
1986					909		336
1987	1,739	975		60		193	516
1988	2,255	766	840	188	945		244
1989	1,042	1,157	152		1,880	994	631
1990	1,983	1,295	631	166	1,255	537	596
1991	1,312	1,002		342	1,564	885	583
1992					2,284	670	335
1993					2,687	1,248	1,082
1994		848	1,021		1,848	1,520	1,218
1995			1,243		3,174	1,215	1,442
1996					3,496		983
1997			439	173	2,187	855	980
1998		27	457		2,239	353	
1999							
2000					714	182	152
2001							598
2002		1,795	2,285		1,856	1,615	1,236
2003	1,236	2,628	654	94	3,514	1,493	1,242
2004	4,653	6,801	6,913	1,196	5,569	1,868	2,177
2005		5,002	4,081	672		1,944	4,097
2006			4,734		5,639	1,618	
2007			1,373	173	3,984	2,147	1,458
2008		487	1,493		3,022	1,061	589
				SEG			
		580 -1,800	400 -1,200		1,200 -2,300		600

^a Estimates are from peak aerial surveys conducted between July 20 and July 31 under fair, good, or excellent conditions.

^b Tributaries of Aniak River.

Table 7.—Harvest of king salmon in the commercial, subsistence, test and sport fisheries of the Kuskokwim River, 1995–2008.

Year	Harvest				Total
	Commercial ^a	Subsistence ^b	Test Fishery	Sport ^c	
1995	30,846	96,436	1,421	541	129,244
1996	7,419	78,063	247	1,432	87,161
1997	10,441	81,577	332	1,227	93,577
1998	17,359	81,265	210	1,434	100,268
1999	4,705	73,194	98	252	78,249
2000	444	64,893	874	105	66,316
2001	90	73,610	86	90	73,876
2002	72	71,334	288	72	71,766
2003	158	67,788	409	158	68,513
2004	2,300	80,065	691	2,300	85,356
2005	4,784	70,393	608	4,784	80,569
2006	2,777	63,177	352	2,777	69,083
2007	179	68,645	503	179	69,506
2008	8,865	70,014	420	708	80,007
1998–2007 Average	3,287	71,436	412	1,215	77,111
2003–2007 Average	2,040	70,014	513	2,040	75,880

^a District 1 and 2.

^b Estimated subsistence harvest expanded from villages surveyed.

^c Statewide Harvest Survey (1977–2007).

Table 8.—Harvest of king salmon in the commercial, subsistence, and sport fisheries in the Goodnews River, 1995–2008.

Year	Harvest			
	Commercial ^a	Subsistence ^b	Sport	Total
1995	2,922	552	41	3,515
1996	1,375	526	157	2,058
1997	2,039	449	86	2,574
1998	3,675	718	431	4,824
1999	1,888	871	223	2,982
2000	4,442	703	243	5,388
2001	1,519	895	147	2,561
2002	979	857	224	2,060
2003	1,412	649	10	3,483
2004	2,565	851	100	3,516
2005	2,035	868	0	2,903
2006	2,892	676	79	3,647
2007	3,112	24	177	3,313
2008	1,278	ND	78	
1998–2007 Average	2,454	711	163	3,468
2003–2007 Average	2,407	614	73	3,372

^a Goodnews District commercial harvest (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication).

^b Subsistence harvest by the community of Goodnews (J. Linderman, ADF&G Division of Commercial Fisheries, personal communication).

Table 9.–Harvest of king salmon in the commercial, subsistence, and sport fisheries in the Kanektok River, 1995–2008.

Year	Harvest			Total
	Commercial ^a	Subsistence ^b	Sport	
1995	38,584	2,746	739	42,069
1996	14,165	3,075	689	17,929
1997	35,510	3,433	1,632	40,575
1998	23,158	4,041	1,475	28,674
1999	18,426	3,167	854	22,447
2000	21,229	3,106	833	25,168
2001	12,775	2,923	947	16,645
2002	11,480	2,475	779	14,734
2003	14,444	3,898	323	18,665
2004	25,465	3,726	228	29,419
2005	24,195	3,083	520	27,798
2006	19,184	3,521	754	23,459
2007	19,573	3,412	633	23,618
2008	1,281	ND	220	ND
1998–2007 Average	18,993	3,335	735	23,063
2003–2007 Average	20,572	3,528	492	24,592

^a Quinhagak District commercial harvest. Source: J. Linderman, ADF&G Division of Commercial Fisheries, personal communication.

^b Subsistence harvest by the community of Quinhagak. Source: J. Linderman, ADF&G Division of Commercial Fisheries, personal communication.

Table 10.–Sport fishing harvest and catch of king salmon in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	739	3,226	41	279	42	174	822	3,679
1996	689	6,354	157	1,126	190	2,197	1,036	9,677
1997	1,632	13,244	86	1,569	147	203	1,865	15,016
1998	1,475	9,528	431	3,171	107	376	2,013	13,075
1999	854	4,205	223	3,823	12	140	1,089	8,168
2000	833	6,086	243	1,527	0	0	1,076	7,613
2001	947	10,842	147	2,769	0	212	1,094	13,823
2002	779	3,815	224	1,594	75	482	1,078	5,891
2003	323	3,480	10	695	0	47	343	4,222
2004	228	2,758	100	1,754	12	7,800	340	5,292
2005	520	10,116	0	375	0	0	520	21,127
2006	754	7,292	79	2,243	0	399	1,277	13,414
2007	633	6,331	177	1,461	922	1,997	1,732	9,789
2008	78	2,490	220	365	0	138	298	2,993
1998–2007 Average	735	6,445	163	1,941	113	1,145	1,056	10,241
2003–2007 Average	492	5,995	73	1,306	187	2,049	842	10,769

Table 11.—Sport fishing harvest and catch of king salmon in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	279	2,729					42	174	321	2,903
1996	592	3,375					190	1,038	782	4,413
1997	801	12,943	49	678	49	108	49	128	948	13,857
1998	1,058	5,896	6	74	75	467	44	167	1,183	6,604
1999	134	2,776	0	12	0	0	109	153	243	2,941
2000	10	435	10	343	20	171	0	0	40	949
2001	12	713	0	62	43	77	16	16	71	868
2002	135	1,759	46	531	30	195	0	33	211	2,518
2003	12	874	75	335	103	861	163	1,880	353	4,167
2004	335	1,103	58	1,774	150	778	12	1,074	671	4,047
2005	189	594	40	907	68	385	0	123	331	2,071
2006	29	1,201	86	359	183	493	31	630	415	2,871
2007	218	5,380	446	1,096	93	733	62	62	819	7,271
2008	26	3,612	148	1,578	149	844	154	762	477	6,796
1998–2007 Average	213	2,073	77	549	77	416	44	414	434	3,431
2003–2007 Average	157	1,830	141	894	119	650	54	754	518	4,085

^a King salmon harvest and catch in the Kisaralik and Kwethluk Rivers in 1995 and 1996 is included in the Other Rivers category.

Table 12.—Harvest of coho salmon in the commercial, subsistence, and sport fisheries in the Kuskokwim-Goodnews Management Area (including Kuskokwim Bay and upper Kuskokwim River), 1995–2008.

Year	Harvest			Total
	Commercial	Subsistence ^a	Sport ^b	
1995	555,539	36,277	1,497	593,313
1996	1,099,853	32,741	3,423	1,136,017
1997	166,648	29,032	2,408	198,088
1998	311,910	27,210	2,419	341,539
1999	32,251	27,755	1,998	62,004
2000	307,439	35,670	1,689	344,798
2001	220,804	31,686	1,204	253,694
2002	113,199	34,413	2,030	149,642
2003	346,555	38,791	5,297	390,643
2004	539,897	55,575	7,096	602,568
2005	205,762	28,838	5,591	240,191
2006	224,990	32,809	3,793	261,592
2007	189,456	26,720	2,504	218,680
2008	260,497	ND	6,344	
1998–2007 Average	249,226	33,947	3,362	286,535
2003–2007 Average	301,332	36,547	4,856	342,735

^a Estimated subsistence harvest expanded from villages surveyed.

^b Statewide Harvest Survey (1977–2007).

Table 13.—Harvest of coho salmon in the commercial, subsistence, and sport fisheries in the Kanektok River, 1995–2008.

Year	Harvest			Total
	Commercial ^a	Subsistence ^b	Sport	
1995	66,203	2,561	970	69,734
1996	118,718	1,467	875	121,060
1997	32,862	1,264	1,220	35,346
1998	80,183	1,702	751	82,636
1999	6,184	2,021	1,091	9,296
2000	30,529	1,088	799	32,425
2001	18,531	1,525	2,448	22,504
2002	26,695	1,099	1,784	29,578
2003	49,833	2,047	1,076	54,157
2004	82,398	1,209	1,362	52,493
2005	51,708	1,443	1,006	48,833
2006	26,831	1,019	1,742	29,592
2007	34,710	1,143	1,087	36,940
2008	40,760	ND	1,541	
1998–2007 Average	40,760	1,430	1,340	39,845
2003–2007 Average	49,096	1,372	1,297	44,403

^a Quinhagak (District 4) commercial harvest.

^b Subsistence harvests by the community of Quinhagak.

Table 14.–Harvest of coho salmon in the commercial, subsistence, and sport fisheries in the Goodnews River, 1995–2008.

Year	Harvest			Total
	Commercial ^a	Subsistence ^b	Sport	
1995	17,875	305	114	18,294
1996	43,836	352	466	44,654
1997	2,983	397	855	4,235
1998	21,246	331	574	22,151
1999	2,474	582	789	3,845
2000	15,531	517	795	16,843
2001	9,275	616	822	10,713
2002	3,041	297	429	3,767
2003	12,730	1,110	42	13,882
2004	23,690	1,411	622	25,723
2005	11,735	839	1,046	12,781
2006	12,436	704	553	13,693
2007	13,689	20	211	13,920
2008	22,547	ND	220	
1998–2007 Average	12,585	643	592	13,732
2003–2007 Average	14,856	817	480	16,000

^a Goodnews Bay (District 5) commercial harvest.

^b Subsistence harvests by the communities of Goodnews Bay and Platinum.

Table 15.–Sport fishing harvest and catch of coho salmon in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	970	3,602	114	761	233	623	1,317	4,988
1996	1,251	5,084	466	1,375	379	1,153	2,096	7,612
1997	1,220	14,366	855	2,915	924	2,455	2,989	19,736
1998	751	15,017	574	7,852	246	921	1,571	23,790
1999	1,091	13,677	789	12,185	23	1,902	1,903	27,764
2000	799	13,043	795	9,045	0	0	1,594	22,088
2001	2,448	21,941	822	8,431	0	832	3,270	31,204
2002	1,784	10,922	429	6,889	22	1,353	2,235	19,164
2003	1,076	19,257	681	15,845	58	231	1,815	35,333
2004	1,362	23,845	622	10,985	0	3,656	1,984	38,486
2005	520	13,279	1,046	11,541	0	2,397	1,566	27,217
2006	1,742	12,282	553	7,091	24	243	2,319	19,640
2007	1,087	12,768	211	3,528	0	625	1,298	16,358
2008	1,541	18,083	220	5,425	552	948	2,313	24,456
1998–2007 Average	1,266	15,603	652	9,339	37	1,216	1,956	26,104
2003–2007 Average	1,157	16,286	623	9,798	16	1,430	1,796	27,407

Table 16.—Sport fishing harvest and catch of coho salmon in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Other Rivers		Lower Kuskokwim Total ^a	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	852	2,246	b	b	b	b	233	623	1,085	2,869
1996	986	3,746	b	b	b	b	196	5,233	1,182	8,979
1997	978	4,576	182	838	274	490	102	127	1,536	6,031
1998	1,128	3,639	172	2,638	714	3,204	61	184	2,075	9,665
1999	436	3,971	270	2,315	131	774	98	700	935	7,760
2000	440	8,531	199	1,231	220	1,705	0	52	859	11,519
2001	335	2,186	195	2,605	237	1,608	19	39	786	6,438
2002	673	3,193	167	1,766	153	310	78	374	1,071	5,643
2003	405	11,480	377	1,518	824	6,276	68	1,093	1,674	20,367
2004	1,207	6,337	226	2,457	649	3,608	279	1,104	2,361	13,506
2005	1,164	3,813	298	751	387	588	24	24	1,873	5,176
2006	169	4,233	184	2,027	669	2,626	36	36	425	8,922
2007	339	3,553	84	801	96	1,225	373	1,026	892	5,681
2008	799	7,969	807	5,029	117	1,026	857	3,010	2,580	17,034
1998–2007 Average	708	4,962	263	1,998	373	1,953	173	973	1,381	9,256
2002–2006 Average	657	5,883	234	1,511	525	2,865	156	657	1,445	10,730

^a Coho salmon reported as caught in the mainstem Kuskokwim River or unspecified streams are not included in this total.

^b Coho salmon caught in the Kisaralik and Kwethluk Rivers included in the Other Rivers category for these years.

Table 17.—Harvest of chum salmon in the commercial, subsistence, test and sport fisheries in the Kuskokwim River, 1995–2008.

Year	Harvest				Total
	Commercial ^a	Subsistence ^b	Test Fishery	Sport	
1995	605,918	67,862	17,473	226	691,479
1996	207,877	88,965	2,864	280	299,986
1997	17,026	39,970	790	86	57,872
1998	207,809	63,537	1,140	291	272,777
1999	23,006	43,601	562	180	67,349
2000	11,570	51,696	1,038	26	64,330
2001	1,272	49,874	1,743	112	53,001
2002	1,900	72,603	2,666	53	77,203
2003	2,764	43,320	1,713	67	47,864
2004	20,429	52,374	1,810	117	74,730
2005	69,139	46,036	4,459	608	120,242
2006	44,070	64,206	3,547	158	111,836
2007	10,763	51,308	3,237	424	65,732
2008	30,798	ND	ND	121	
1998–2007 Average	39,272	53,856	2,192	204	95,506
2003–2007 Average	29,443	51,449	2,953	275	84,081

^a Districts 1 and 2, only; no chum harvests reported in District 3.

^b Estimated subsistence harvest expanded from villages surveyed.

Table 18.—Sport fishing harvest and catch of chum salmon in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.—
2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	213	5,049	0	315	5	82	218	5,446
1996	200	8,155	0	351	9	352	209	8,858
1997	212	11,041	24	1,111	62	560	298	12,712
1998	213	11,560	50	2,955	11	192	274	14,707
1999	293	14,241	47	7,561	0	16	340	21,818
2000	231	10,200	12	4,243	0	24	243	14,467
2001	43	6,457	21	2,188	0	129	64	8,774
2002	446	10,779	99	4,059	0	695	545	15,533
2003	14	7,138	14	3,195	0	3,195	28	10,402
2004	33	4,715	0	1,757	0	2,309	33	8,781
2005	108	9,241	0	1,481	0	0	108	10,722
2006	145	21,528	0	5,566	0	0	145	26,986
2007	15	7,971	0	3,026	0	1,362	15	12,359
2008	48	9,232	26	922	67	1,113	141	11,267
1998–2007 Average	154	10,383	24	3,603	1	792	180	14,455
2003–2007 Average	63	10,119	3	3,005	0	1,373	66	13,850

Table 19.—Sport fishing harvest and catch of chum salmon in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Other Rivers		Lower Kuskokwim Total ^a	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	127	2,785	b	b	b	b	5	82	132	2,867
1996	110	3,888	b	b	b	b	56	3,588	166	7,476
1997	86	2,369	0	9	0	53	0	125	86	2,556
1998	101	2,664	0	163	8	296	15	378	124	3,501
1999	139	4,055	0	456	41	176	0	22	180	4,709
2000	0	3,914	13	2,091	0	85	0	0	13	6,090
2001	0	1,899	0	106	71	425	0	213	71	2,643
2002	0	2,096	0	745	34	455	0	428	34	3,724
2003	0	2,347	0	450	0	0	25	598	25	3,395
2004	0	1,602	0	606	70	308	0	0	70	2,516
2005	0	788	0	247	0	0	80	595	80	1,630
2006	0	2,135	0	80	0	2,089	13	129	13	5,161
2007	0	3,191	0	140	0	21	21	161	21	3,513
2008	45	2,427	31	2,465	0	960	0	801	76	6,653
1998–2007 Average	24	2,469	1	508	22	386	15	252	63	3,688
2003–2007 Average	0	2,013	0	305	14	484	28	297	42	3,243

^a Does not include chum salmon reported as caught in the Kuskokwim River mainstem in the SWHS.

^b Chum salmon catch and harvest in the Kisaralik and Kwethluk rivers is included in the Other Rivers section.

Table 20.—Harvest of sockeye salmon in the commercial, subsistence, test and sport fisheries in the Kuskokwim River, 1995–2008.

Year	Harvest				Total
	Commercial	Subsistence ^a	Test Fishery ^b	Sport ^c	
1995	92,500	27,791		95	120,606
1996	33,878	34,213		315	68,220
1997	21,989	40,097		423	62,160
1998	60,906	35,425		178	96,396
1999	16,976	46,677		54	63,699
2000	4,130	41,783		46	46,144
2001	84	48,601	510	231	50,175
2002	84	25,499	228	26	26,694
2003	282	34,452	0	289	35,023
2004	9,748	32,433	742	512	42,693
2005	27,645	33,878	1,062	792	62,315
2006	12,618	30,226	519	187	43,594
2007	703	33,234	488	382	34,807
2008	15,601	ND	ND	273	
1998–2007 Average	13,318	36,221	507	270	50,154
2003–2007 Average	10,199	32,845	562	432	43,686

^a Estimated subsistence harvest expanded from villages surveyed.

^b Test fishery sockeye harvests not available.

^c Statewide Harvest Survey (1977–2007).

Table 21.—Sport fishing harvest and catch of sockeye salmon in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	148	733	34	380	42	64	224	1,177
1996	335	2,157	87	1,119	120	186	542	3,462
1997	607	2,155	61	1,625	10	248	678	4,028
1998	942	3,987	502	3,402	60	148	1,504	7,537
1999	496	4,537	561	1,999	0	278	1,057	6,814
2000	694	5,700	82	997	11	11	787	6,708
2001	83	1,415	108	1,128	0	358	191	2,901
2002	73	1,423	149	3,112	3	195	225	4,830
2003	107	5,082	42	1,502	0	60	149	6,644
2004	112	1,330	0	891	0	331	112	2,552
2005	156	5,692	0	683	0	43	156	6,418
2006	523	11,450	98	2,798	12	276	633	14,524
2007	385	3,481	84	903	0	0	469	4,384
2008	654	6,777	104	1,185	78	758	836	6,331
1998–2007 Average	357	4,410	163	1,742	9	170	528	6,331
2003–2007 Average	257	5,407	45	1,355	2	142	304	6,904

Table 22.—Sport fishing harvest and catch of sockeye salmon in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	43	166	ND	ND	ND	ND	10	21	53	187
1996	186	367	ND	ND	ND	ND	ND	ND	186	367
1997	391	353	ND	ND	ND	ND	ND	ND	391	353
1998	195	367	ND	ND	ND	ND	ND	ND	195	367
1999	21	407	ND	ND	ND	ND	ND	ND	21	407
2000	23	286	0	117	ND	ND	0	12	23	415
2001	24	222	34	156	0	37	21	21	79	436
2002	26	54	0	16	0	61	0	101	26	232
2003	0	390	74	75	42	42	42	182	116	647
2004	119	185	22	45	65	218	11	11	217	459
2005	0	606	22	22	0	0	112	112	134	740
2006	16	1,042	67	160	0	0	12	253	50	1,464
2007	0	118	0	179	0	0	329	150	272	1,654
2008	102	450	410	171	0	188	0	14	273	1,062
1998–2007 Average	42	368	27	96	15	51	66	119	113	682
2003–2007 Average	27	468	37	96	21	52	101	142	158	993

Table 23.—Sport fishing harvest and catch of rainbow trout in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	198	3,046	43	1,263	10	1,324	251	5,633
1996	138	6,833	36	1,581	0	914	174	9,328
1997	231	27,325	433	9,653	68	2,323	732	39,301
1998	0	13,567	97	5,738	8	1,598	105	20,813
1999	73	11,151	133	5,926	12	2,229	218	19,306
2000	0	6,019	0	2,446	11	134	11	8,599
2001	0	7,984	0	2,312	0	593	0	10,889
2002	0	8,846	32	2,915	0	2,732	32	14,493
2003	0	8,455	44	3,125	0	453	44	12,033
2004	68	8,525	68	2,540	12	5,183	148	16,248
2005	0	7,070	0	2,747	0	1,769	0	11,586
2006	0	11,793	0	3,446	0	5,412	67	20,651
2007	11	11,538	105	2,451	40	2,638	156	16,627
2008	0	16,375	47	3,051	10	2,794	57	22,220
1998–2007 Average	15	9,495	48	3,365	8	2,274	78	15,125
2003–2007 Average	16	9,476	43	2,862	10	3,091	83	15,429

Table 24.—Sport fishing harvest and catch of rainbow trout in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Kwethluk/Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	0	1,581	ND	ND	ND	ND	9	1,234	9	2,815
1996	24	3,347	ND	ND	ND	ND	357	3,329	381	6,676
1997	53	12,293	218	7,060	227	334	24	2,040	522	21,727
1998	349	5,004	0	1,289	69	980	23	2,242	441	9,515
1999	175	4,659	0	1,877	117	269	12	143	304	6,948
2000	24	4,643	47	3,076	24	1,054	0	0	95	8,773
2001	0	1,268	0	1,010	17	896	0	8	17	3,182
2002	0	2,942	29	5,520	0	3,398	15	1,275	44	13,135
2003	0	2,477	21	1,241	ND	ND	21	650	42	4,368
2004	0	1,908	99	3,134	117	1,027	0	0	216	6,069
2005	0	1,077	78	3,378	ND	ND	53	487	131	4,942
2006	0	4,772		4,339	0	5,990	0	4,612	0	15,531
2007	0	7,243	21	1,457	31	3,277	0	409	52	10,929
2008	0	13,081	136	9,237	26	6,688	0	3,005	162	32,011
1998–2007 Average	55	3,599	31	2,632	47	2,262	13	1,210	139	8,339
2003–2007 Average	0	3,495	55	2,710	49	3,431	15	1,232	88	8,368

Table 25.—Sport fishing harvest and catch of Dolly Varden/Arctic char in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok Rivers		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	212	6,231	158	2,336	95	1,110	465	9,677
1996	474	13,954	240	4,352	118	1,223	832	19,529
1997	789	41,748	1,071	23,498	35	2,255	1,895	67,501
1998	368	24,287	460	16,680	0	668	828	41,635
1999	615	21,700	917	18,174	67	4,059	1,599	43,933
2000	417	13,490	658	11,422	12	424	1,087	25,336
2001	543	15,673	418	12,613	44	815	1,005	29,101
2002	497	15,555	664	14,436	97	2,975	1,258	32,966
2003	457	16,988	555	19,016	0	298	1,012	36,302
2004	482	29,990	331	10,886	289	14,829	1,102	55,705
2005	256	17,443	742	18,994	12	3,198	1,010	39,635
2006	339	30,420	395	7,270	396	7,889	1,143	45,592
2007	232	22,617	256	5,572	139	1,357	627	29,546
2008	223	36,492	231	7,865	45	2,192	499	46,549
1998–2007 Average	421	20,816	540	13,506	106	3,651	1,067	37,975
2003–2007 Average	353	23,492	456	12,348	167	5,514	979	41,356

Table 26.—Sport fishing harvest and catch of Dolly Varden/Arctic char in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River		Kwethluk River		Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	481	3,454	ND	ND	ND	ND	95	1,110	576	4,564
1996	159	4,883	ND	ND	ND	ND	642	3,367	801	8,250
1997	316	12,066	413	4,708	243	243	14	1,189	986	18,206
1998	394	21,053	92	599	14	188	102	1,595	602	23,435
1999	114	5,909	181	3,875	0	44	34	342	329	10,170
2000	40	5,333	367	3,664	47	95	0	36	454	9,128
2001	87	1,857	320	2,454	33	142	0	22	440	4,475
2002	212	6,288	345	4,494	53	2,223	11	1,020	621	14,025
2003	178	4,033	432	2,693	77	1,196	155	164	765	8,086
2004	288	6,496	114	4,343	230	2,376	27	27	659	13,242
2005	296	2,477	246	1,241	106	237	0	650	542	4,368
2006	150	7,064	14	3,655	76	365	147	4,566	373	12,547
2007	291	7,193	147	1,311	0	1,586	238	1,464	727	10,957
2008	948	16,771	113	6,627	36	1,874	0	825	1,097	32,011
1998–2007 Average	2,025	6,770	226	2,833	64	845	71	989	551	11,043
2003–2007 Average	241	5,453	191	2,649	98	1,152	113	1,374	613	9,840

Table 27.—Sport fishing harvest and catch of Arctic grayling in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

Year	Kanektok River		Goodnews River		Arolik/Other Rivers		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	0	1,128	14	412	167	1,952	181	3,492
1996	0	2,960	47	941	66	2,702	113	6,603
1997	99	5,335	74	2,706	88	1,883	261	9,924
1998	33	5,576	28	3,126	105	1,586	166	10,288
1999	159	4,218	84	2,544	194	1,638	437	8,400
2000	25	3,632	0	1,726	0	86	25	5,444
2001	47	3,955	65	2,431	19	458	131	5,844
2002	47	3,622	221	2,543	0	1,182	268	7,347
2003	0	3,888	42	1,130	0	380	42	5,398
2004	33	3,417	130	2,343	60	1,329	223	8,418
2005	11	1,895	29	749	0	51	40	2,695
2006	28	2,180	17	1,044	20	1,726	65	4,950
2007	30	1,259	0	4,339	0	1,243	30	6,841
2008	0	7,220	26	2,331	55	2,249	81	11,800
1998–2007 Average	41	3,364	62	2,198	40	968	143	6,563
2003–2007 Average	20	2,528	44	1,921	16	946	80	5,660

Table 28.—Sport fishing harvest and catch of Arctic grayling in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River ^a		Kwethluk River		Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	53	2,266	ND	ND	ND	ND	167	1,952	220	4,218
1996	103	5,102	ND	ND	ND	ND	158	2,711	261	7,813
1997	162	15,089	303	3,746	256	499	20	984	741	20,318
1998	715	11,930	64	984	8	1,408	90	1,333	877	15,655
1999	437	8,659	63	3,641	0	226	211	609	711	13,135
2000	42	5,950	29	3,605	38	995	0	946	109	11,496
2001	77	3,300	64	3,356	77	3,058	0	69	218	9,783
2002	172	11,518	507	8,184	226	3,000	25	2,263	930	24,965
2003	58	6,787	280	3,188	ND	ND	121	1,518	459	11,493
2004	0	3,844	45	4,669	23	697	11	147	79	9,357
2005	108	2,149	346	2,822	ND	ND	131	1,248	585	6,219
2006	58	2,357	83	1,845	97	2,701	0	1,111	258	8,112
2007	38	4,242	38	1,255	0	3,440	64	1,792	47	10,729
2008	253	5,794	121	9,911	42	2,828	84	2,949	500	21,482
1998–2007 Average	171	6,074	152	3,355	59	1,941	65	1,104	427	12,094
2003–2007 Average	52	3,876	158	2,756	40	2,279	65	1,163	286	9,182

^a For some years, the Kisaralik and Kwethluk Arctic Grayling catch and harvest totals are included in the Other Rivers category.

Table 29.—Sport fishing harvest and catch of northern pike in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim rivers, 1995–2008.

Year	Aniak River		Kisaralik River ^a		Kwethluk River		Other Rivers		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	77	623	ND	ND	ND	ND	164	1,423	241	2,046
1996	10	399	ND	ND	ND	ND	176	1,950	186	2,349
1997	42	303	21	119	0	206	99	270	162	898
1998	553	1,883	67	67	18	247	85	241	723	2,438
1999	94	674	0	27	ND	ND	66	189	160	890
2000	0	298	11	55	0	153	296	557	307	1,063
2001	65	493	0	0	14	41	65	78	144	612
2002	45	655	0	47	78	350	131	645	254	1,697
2003	10	1,756	0	65	ND	ND	24	467	34	2,288
2004	121	713	0	692	289	1,603	166	965	576	3,973
2005	77	805	247	283	ND	ND	591	1,148	915	2,236
2006	0	877	0	114	0	152	66	552	66	2,043
2007	60	927	357	0	143	10	1,865	128	273	3,292
2008	60	539	9	232	0	33	0	276	69	1,080
1998–2007 Average	103	908	68	135	77	365	336	497	345	2,053
2003–2007 Average	54	1,016	121	231	144	588	542	652	373	2,766

^a For some years, the Kisaralik and Kwethluk harvest and catch of northern pike is included in the Other Rivers category.

Table 30.—Sport fishing harvest and catch of sheefish in the Aniak and lower Kuskokwim rivers and the Holitna and upper Kuskokwim rivers 1995–2008.

Year	Aniak River		Other Lower Kuskokwim Rivers		Total Lower Kuskokwim		Holitna River		Other Upper Kuskokwim		Upper Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	9	623	103	1,160	103	1,160	113	472	38	150	151	622
1996	20	89	64	372	64	372	26	206	21	306	47	512
1997	22	225	149	694	149	694	168	1,098	42	296	310	1,394
1998	30	47	94	789	124	836	35	729	8	771	43	836
1999	81	290	27	69	108	359	102	745	28	813	130	359
2000	0	7	158	158	158	165	58	512	34	371	92	883
2001	0	232	0	0	0	232	124	381	0	129	124	510
2002	51	133	0	0	51	133	18	270	12	12	287	30
2003	0	0	0	0	0	0	30	59	15	768	45	827
2004	0	0	0	29	0	29	156	591	0	292	156	883
2005	32	32	162	325	194	357	349	2,843	454	617	803	3,460
2006	0	141	0	0	20	182	14	142	139	200	153	342
2007	0	0	261	261	261	261	0	0	174	191	174	191
2008	0	67	0	0	0	67	81	174	0	364	81	538
1998–2007 Average	24	88	70	163	92	255	89	627	86	416	201	832
2003–2008 Average	6	35	85	123	95	166	110	727	156	414	266	1,141

Table 31.—Sport fishing harvest and catch of lake trout in the Kanektok, Goodnews, Arolik, and other Kuskokwim Bay rivers, 1995–2008.

	Kanektok River		Goodnews River		Arolik River ^a		Other Locations		Kuskokwim Bay Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	80	90	20	38	0	0	27	125	127	253
1996	27	182	9	283	0	0	0	203	36	668
1997	113	154	23	211	0	0	137	499	273	864
1998	0	333	40	230	0	0	0	29	40	592
1999	0	33	25	450	0	0	0	9	25	492
2000	0	61	9	163	0	0	0	63	9	287
2001	0	19	9	152	0	0	0	0	9	171
2002	10	50	0	91	0	32	17	57	27	230
2003	0	30	59	2,532	0	0	0	249	59	2811
2004	30	81	0	163	0	0	0	65	30	146
2005	18	72	0	0	0	0	0	209	18	72
2006	0	50	11	58	0	235	41	109	52	452
2007	0	26	0	14	42	42	0	141	0	223
2008	0	162	0	0	0	0	22	436	22	598
1998–2007 Average	6	76	15	385	4	31	6	93	27	548
2003–2007 Average	10	52	14	553	8	55	8	155	32	741

Table 32.—Sport fishing harvest and catch of lake trout in the Aniak, Kisaralik, Kwethluk and other lower Kuskokwim locations, 1995–2008.

Year	Aniak River		Kisaralik River ³		Kwethluk River		Other Locations		Lower Kuskokwim Total	
	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1995	61	163	ND	ND	ND	ND	27	125	88	288
1996	9	54	ND	ND	ND	ND	56	203	65	257
1997	56	179	90	170	0	0	96	189	242	538
1998	9	62	67	282	0	0	15	44	91	388
1999	18	18	0	67	0	0	0	24	18	109
2000	9	27	0	9	0	0	28	120	37	156
2001	17	34	37	37	0	0	0	0	54	71
2002	0	58	17	57	36	181	54	975	107	1,271
2003	68	94	0	113	ND	ND	102	339	170	546
2004	30	45	0	0	60	60	0	33	78	138
2005	18	145	0	0	ND	ND	0	632	18	777
2006	0	0	0	0	0	0	0	0	0	0
2007	0	432	0	0	0	0	0	0	0	432
2008	0	0	0	0	0	0	0	176	0	176
1998–2007 Average	17	92	12	57	12	30	30	217	57	389
2003–2007 Average	23	143	0	23	20	20	20	201	53	379

³ For some years, the Kisaralik and Kwethluk Lake Trout catch and harvest is included in the Other Rivers category.

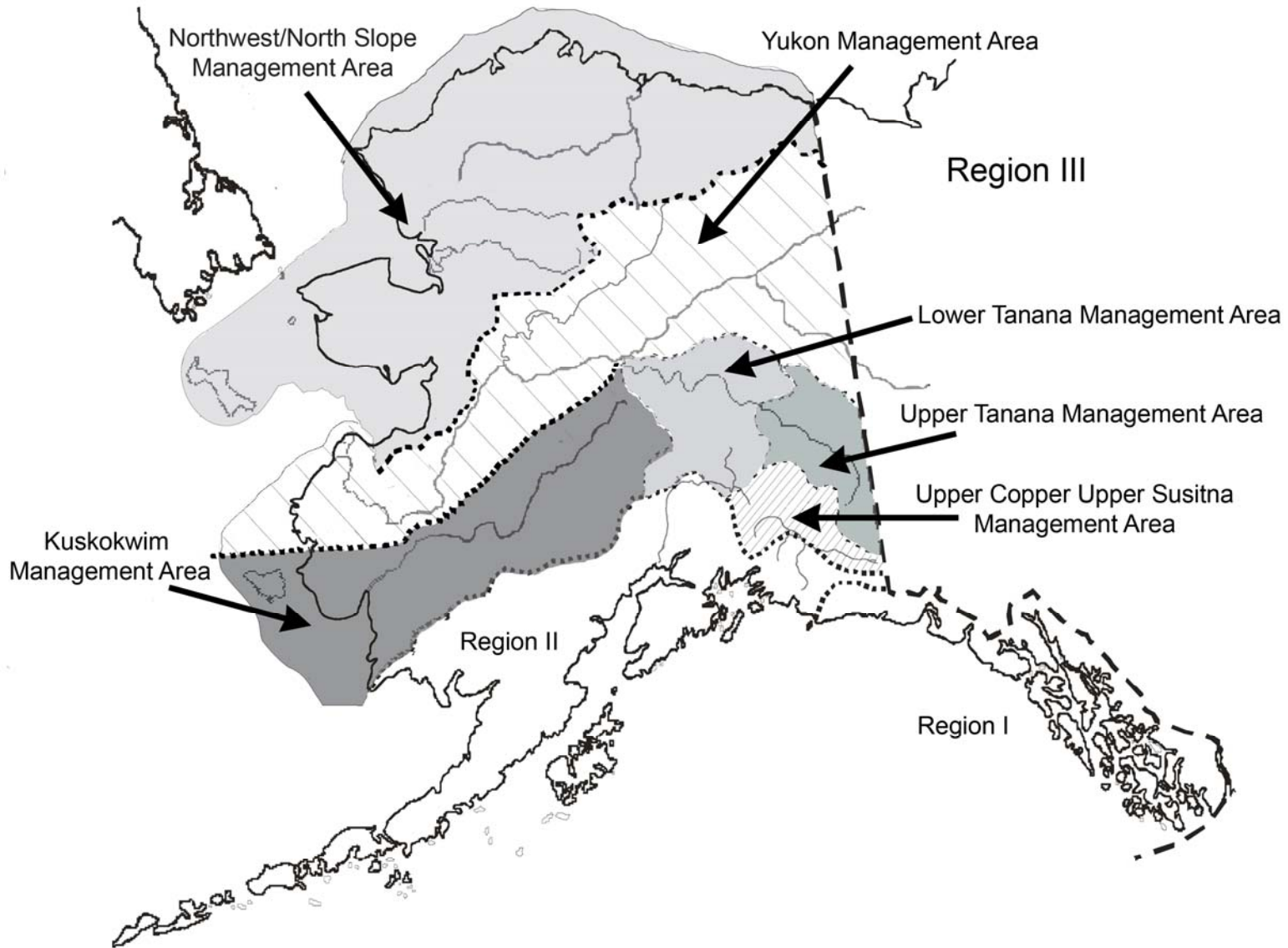


Figure 1.—Map of the sport fish regions in Alaska and the six Region III management areas.

KUSKOKWIM-GOODNEWS DRAINAGES

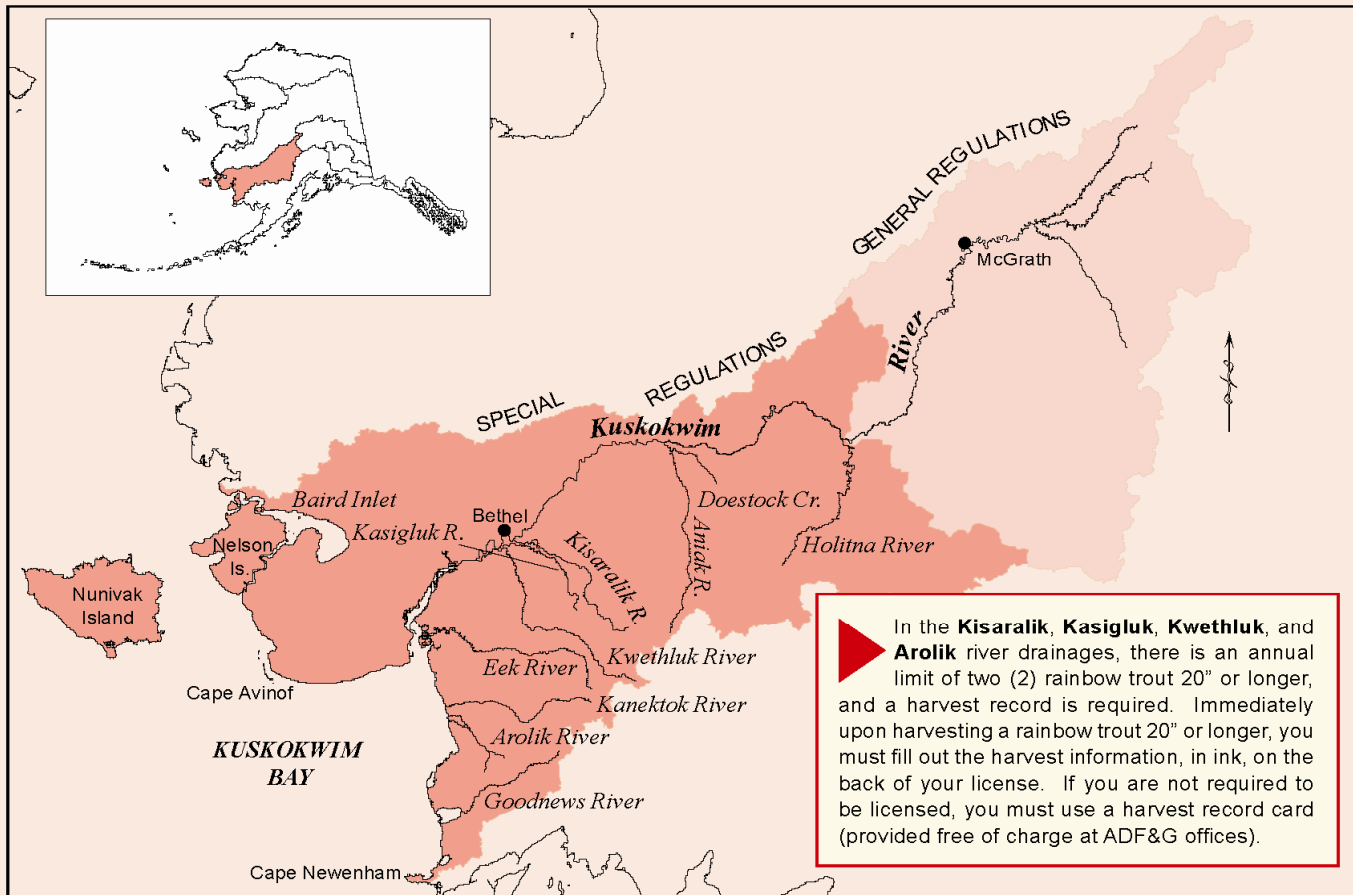


Figure 2.—Kuskokwim-Goodnews Management Area.

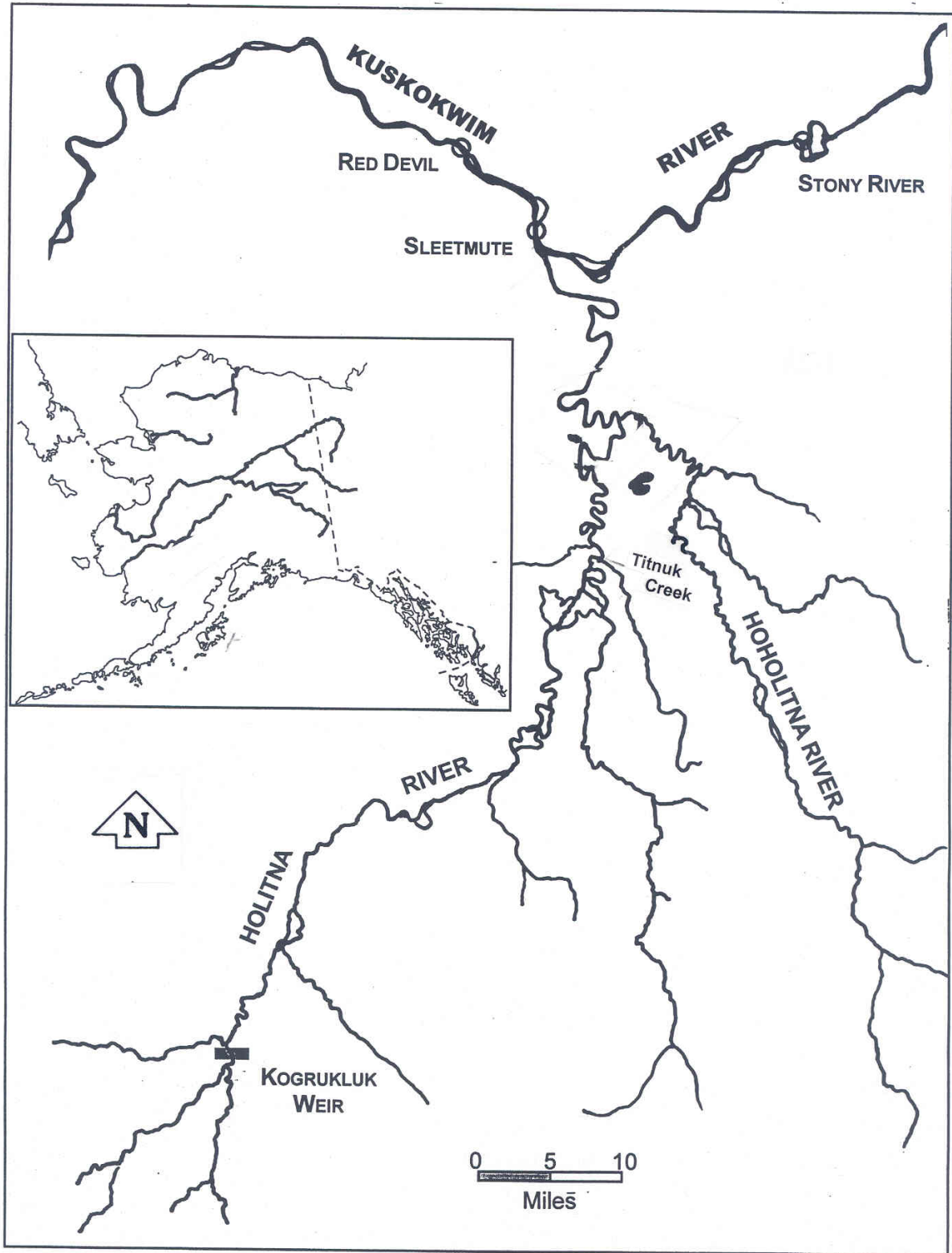


Figure 3.—Holitna River drainage.



Figure 4.—Aniak River drainage.

APPENDIX A
TOGIAK NATIONAL WILDLIFE REFUGE PUBLIC USE
MANAGEMENT PLAN DIRECTION AND ALTERNATIVES

Appendix A1.—Togiak National Wildlife Refuge draft public use management plan.

Chapter 2: Public Use Management Plan Direction and Alternatives

Table 2-3 Alternatives for the Togiak Refuge Draft Public Use Management Plan

	Alternative A (current management)	Alternative B	Alternative C (Preferred Alternative)	Alternative D	Alternative E
Issue 1. Public Use at Cape Peirce Wildlife Viewing Area and Public Facilities at Sangor Lake	Management Direction —Emphasize wildlife viewing that complements the research and study of fish, wildlife, plants, and their habitats	Management Direction —Same as Alternative A	Management Direction —Facilitate wildlife viewing that complements the protection and preservation of the area’s natural and cultural resource values	Management Direction —Emphasize a structured wildlife-viewing experience.	Management Direction —Emphasize wildlife viewing and educational and outreach programs that focus on cultural and natural significance of the area
	Visitation —Maximum one flight per day and six people at one time	Visitation —Same as Alternative A	Visitation —Additional opportunities for as many as two flights per day and 12 people at one time. Guide or refuge staff may accompany. At low use levels refuge manager may waive permits.	Visitation —Same as Alternative C	Visitation —Same as Alternative C
	Allocation —Permits for all visitors issued on first-come, first-served basis	Allocation —50 percent commercially guided/ and 50 percent general public; unused permits available through a common pool	Allocation —Same as Alternative B	Allocation —100 percent commercially guided use	Allocation —30 percent commercially guided and 70 percent general public (accompanied by Refuge staff); unused permits available through a common pool

	Alternative A (current management)	Alternative B	Alternative C (Preferred Alternative)	Alternative D	Alternative E
	Facilities —No facilities constructed. An outhouse could be constructed to protect natural resources and public health	Facilities —Same as Alternative A	Facilities —Minimal facilities for as many as 12 people to ensure public health, and safety (i.e., tent platforms, food storage, outhouse)	Facilities —Moderate facilities to accommodate as many as 12 people, (i.e., one cabin, tent platform, and outhouse)	Facilities —Same as Alternative D, plus accommodations for interpretive cultural and natural history programs (i.e., large cabin with meeting area and outhouse)
Issue 2. Unguided Recreational Opportunities: Kanektok and Goodnews River Watersheds	No limits	Kanektok —One trip every other day; maximum four boats and 12 people per trip Goodnews —Limit to existing level of use	One trip every other day, and on the Goodnews River only, two trips on weekends during peak use seasons (June 25–July 15; August 10–September 7); maximum four boats and 12 people per trip. Permits required. At low use levels refuge manager may waive permits.	Voluntary trip registration available all season	One trip every three days; maximum three boats and nine people per trip
Issue 3. Waste Management	Bury waste 100 feet from surface waters on public lands only; outhouses at Kagati and Goodnews lakes	If monitoring suggests standards are at risk of being exceeded, require all float groups to carry out solid human waste on the Kanektok River	In addition to actions in Alternative B, work with partners to facilitate the construction and voluntary use of DEC-approved disposal sites for packing out human waste	Same as Alternative B	Implement human-waste pack-out program for all users as DEC-approved disposal sites become available and accessible

Chapter 2: Public Use Management Plan Direction and Alternatives

Table 2-4 Issue 4. Commercial Sport Fishing Guide Alternatives for the Togiak Refuge Public Use Management Plan Revision Draft

	Alternative A (current management)	Alternative B	Alternative C (Preferred Alternative)	Alternative D	Alternative E
Goodnews River North Fork	Motorized Up to 9 motorboats and 18 clients at one time. Average use 1990–2001; 17 trips per year Float —One trip per week; maximum 4 boats and 12 people per trip	Same as Alternative A	Motorized —One boat and three people per day Float —One trip per week (with option of using Middle Fork); maximum four boats and 12 people per trip	Motorized —Temporary camp; maximum nine motorboats and 27 people per day Float —One trip every other day; maximum four boats and 12 people per trip	Same as Alternative A
Middle Fork	Motorized —One temporary camp; two boats and six people per day Float—None	Motorized —One temporary camp, three boats and 10 people per day Float—None	Motorized —Same as Alternative A Float —One trip per week (with option of using North Fork); maximum four boats and 12 people per trip	Motorized —One temporary camp; three motorboats and 10 people per day Float —One trip every week; maximum four boats and 12 people per trip	Same as Alternative A
Osviak and Matogak Rivers	No permits	Same as Alternative A	Same as Alternative A	Motorized —One trip per week (either river); maximum two boats and six people per trip	Same as Alternative A
Togiak River	Motorized —Maximum seven motorboats and 28 people per day Float —Two trips per week; two boats and eight people per trip	Same as Alternative A	Same as Alternative A	Motorized —Maximum 14 motorboats and 42 people per day Float —Two trips per week maximum two boats and eight people per trip	Same as Alternative A

NOTES: Management activities undertaken by the Service, or by volunteers, cooperators, or contractors working for the Service, with limited exception, are exempt from compatibility review [Part 603, Compatibility, of the Service Manual (Draft)].
The term “temporary” refers to any structure or other human-made improvement that can be readily and completely dismantled and removed from the site when the period of authorized use terminates.
Management of activities occurring on navigable waters will be coordinated with the appropriate state agency.