Fishery Management Report No. 10-51

2008-2010 Recreational Fisheries Overview and Historical Information for North Kenai Peninsula: Fisheries under Consideration by the Alaska Board of Fisheries, February 2011

by

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and

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December 2010

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANAGEMENT REPORT NO. 10-51

2008-2010 RECREATIONAL FISHERIES OVERVIEW AND HISTORICAL INFORMATION FOR NORTH KENAI PENINSULA: FISHERIES UNDER CONSIDERATION BY THE ALASKA BOARD OF FISHERIES, FEBRUARY 2011

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

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ABSTRACT

This report provides information on fisheries in the North Kenai Peninsula Management Area under consideration by the Alaska Board of Fisheries in February 2011. An overview of information for the 2008-2010 recreational fisheries is included and provides updated fishery statistics with inseason assessment data from 2010. Summary information is provided for estimates of effort, catch, and harvest through 2009. The following recreational fisheries are included: Kenai River Chinook salmon *Oncorhynchus tshawytscha* early and late runs, Kasilof River Chinook salmon early and late runs, Russian River sockeye salmon *O. nerka* early and late runs, Kenai River sockeye salmon late run, Kenai River coho salmon *O. kisutch*, areawide coho salmon, Kenai River resident species (rainbow trout *O. mykiss* and Dolly Varden *Salvelinus malma*), and areawide northern pike. The Kenai and Kasilof rivers sockeye salmon personal use fisheries are also discussed.

Key words: North Kenai Peninsula Management Area, 2008–2010 season overview, Kenai River, Kasilof River, Russian River, Chinook salmon, sockeye salmon, coho salmon, rainbow trout, Dolly Varden, northern pike, personal use, dip net, Alaska Board of Fisheries.

MANAGEMENT OVERVIEW

This report provides information on fisheries under consideration by the Alaska Board of Fisheries (BOF) in February 2011:

(1) Kenai River early-run Chinook salmon fisheries
(2) Kenai River late-run Chinook salmon fisheries
(3) Kasilof River Chinook salmon early-run recreational fisheries
(4) Kasilof River Chinook salmon late-run recreational fisheries
(5) Russian River sockeye salmon early-run recreational fisheries
(6) Russian River sockeye salmon late-run recreational fisheries
(7) Kenai River sockeye salmon late-run recreational fisheries
(8) Kenai River coho salmon recreational fisheries
(9) Northern Kenai Peninsula Management Area coho salmon recreational fisheries
(10) Kenai River resident species recreational fisheries
(11) Northern Kenai Peninsula Management Area sockeye salmon personal use fishery
(12) Northern Kenai Peninsula Management Area northern pike fishery

An overview of the area, sport and personal use fisheries, as well as a season summary of the 2010 Northern Kenai Peninsula Management Area recreational fisheries are incorporated into this document.

MANAGEMENT AREA DESCRIPTION

The Northern Kenai Peninsula Management Area (NKPMA) includes all Kenai Peninsula freshwater drainages from the north bank of Ingram Creek south to the south bank of Kasilof River (Figure 1). On the west side of Cook Inlet, the management area comprises freshwater drainages from West Forelands south to Spring Point, which is just north of Chinitna Bay. Marine waters of NKPMA are all waters from the latitude of East Forelands south to the latitude of Kasilof River; all marine waters in close proximity (several miles) to the west side of Cook Inlet from West Forelands south to Spring Point. This area is administered from the Soldotna office of the Alaska Department of Fish and Game (ADF&G).

Larger communities located within the NKPMA include Kenai and Soldotna. Smaller communities are Cooper Landing, Hope, Moose Pass, Nikiski, and Sterling. This management area is linked to the state's highway system via the Sterling and Seward Highways, which

provide sport anglers access to many of the area's major fisheries. Remote areas of the NKPMA (west side of Cook Inlet) can be accessed via wheel or float equipped aircraft, or boat.

MANAGEMENT PLANS AFFECTING FISHERIES

Upper Cook Inlet fisheries (commercial, sport, personal use, and subsistence) have been the focus of intensive, allocative debates for many years. These controversial issues have prompted the BOF to establish management plans and regulatory policies that allocate the area's fisheries resources among various user groups. These plans provide for the sustained yield of fishery resources and establish management actions (in specific situations), and guidelines for ADF&G fisheries managers.

Management plans germane to NKPMA fisheries are:

1. *Upper Cook Inlet Salmon Management Plan* (5 AAC 21.363)
2. *Kenai River and Kasilof River Early-run King Salmon Management Plan* (5 AAC 57.160)
3. *Kenai River Late-run King Salmon Management Plan* (5 AAC 21.359)
4. *Kenai River Late-run Sockeye Salmon Management Plan* (5 AAC 21.360)
5. *Russian River Sockeye Salmon Management Plan* (5 AAC 57.150)
6. *Kasilof River Salmon Management Plan* (5 AAC 21.365)
7. *Big River Sockeye Salmon Management Plan* (5 AAC 21.368)
8. *Upper Cook Inlet Personal Use Salmon Fishery Management Plan* (5 AAC 77.540)
9. *Riparian Habitat Fishery Management Plan for the Kenai Peninsula Area* (5 AAC 56.180)
10. *Riparian Habitat Fishery Management Plan for the Kenai River Drainage Area* (5 AAC 57.180)
11. *Kenai River Coho Salmon Management Plan* (5 AAC 57.170)

FISHERIES RESOURCES

The NKPMA offers diverse fishing opportunities for recreational anglers. Anglers can target four species of Pacific salmon (Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka,* coho *O. kisutch*, and pink *O. gorbuscha*). Fisheries for these species occur primarily in freshwater and, to a lesser degree, in the salt waters of Cook Inlet. Anglers can also target salmon and trout stocked by the Division of Sport Fish (SF) into various landlocked lakes. Popular fisheries for resident stocks of rainbow trout *O. mykiss,* Dolly Varden *Salvelinus malma,* and lake trout *S. namaycush* also occur. Fisheries target resident stocks of Arctic grayling *Thymallus arcticus* and introduced stocks of northern pike *Esox lucius* as well. The area's anadromous stocks of Dolly Varden, steelhead trout *O. mykiss,* and eulachon *Thaleichthys pacificus* also provide NKPMA sport fishing opportunities.

Marine sport fisheries offer limited opportunities. Adjacent to the mouths of the Kenai and Kasilof rivers and the waters of Cook Inlet within the management area, small numbers of anglers target halibut *Hippoglossus stenolepis*, razor clams *Siliqua patula,* and several species of hardshell clams.

Two runs of wild Kenai River Chinook salmon combine to support the largest recreational fishery for this species in Alaska. Stocked and naturally-produced (a population consisting of both wild fish and naturalized hatchery fish) Chinook salmon returns to Crooked Creek support an early-run fishery in Kasilof River. A late run comprised of wild Chinook salmon also

provides sport fishing opportunity at the Kasilof River. Chinook salmon have also been stocked into one roadside landlocked lake to provide additional fishing opportunity, primarily during winter months.

The Russian River supports an early and late sockeye salmon run. These wild stocks maintain the second largest recreational sockeye salmon fishery in the state. As a result of changes to the management of Kenai River sockeye salmon and increased inriver run goals, the Kenai River recreational sport fishery for sockeye salmon has grown into the largest recreational fishery for this species in Alaska.

The NKPMA also supports personal use sockeye salmon dip net fisheries at the mouths of the Kenai and Kasilof rivers, and a personal use gillnet fishery at the mouth of the Kasilof River. The personal use fisheries on both the Kenai and Kasilof rivers are managed with established seasons and provide sockeye salmon harvest opportunities for Alaska residents.

Wild coho salmon returns to Kenai River support the largest recreational freshwater coho salmon fishery in Alaska. The Kasilof River and numerous smaller streams also support smaller coho salmon sport fisheries. Additional fishing opportunity for coho salmon is provided through a program of stocking landlocked lakes on the Kenai Peninsula.

Pink salmon return in large numbers to NKPMA drainages during even-numbered years. A significant recreational fishery for this species occurs on the Kenai River. Harvests in the Kenai River have increased during even years because of liberalized bag and possession limits (6 pink salmon daily). Chum salmon *O. keta* returns to NKPMA streams on the east side of Cook Inlet are quite small and provide a relatively small sport fishery.

Wild rainbow trout populations occur in numerous lakes and streams throughout the NKPMA. Flowing waters that support major rainbow trout fisheries include the Kenai River, Russian River, and the streams and lakes of the Swanson River and Moose River drainages. The Kenai River supports the largest recreational freshwater fishery for rainbow trout in Alaska. To provide alternative fishing opportunities, several landlocked lakes are also stocked with rainbow trout.

Steelhead trout currently provide recreational fishing opportunity in Kasilof River. Steelhead production is thought to originate from two primary sources. A stocked return of this species was developed in the 1980s using wild stocks indigenous to Crooked Creek. The stocking program was discontinued in 1995 due to excessive straying of hatchery trout into the Kenai River system. Since 1995, steelhead trout production in Crooked Creek has resulted from natural production. Tributaries of Tustumena Lake (Nikolai and Shantalilik creeks) also maintain wild production.

Dolly Varden are found in most freshwater drainages of the NKPMA. This species supports a major fishery in the Kenai River drainage. Numerous smaller streams and lakes also support Dolly Varden, thus providing additional recreational angling opportunity at roadside as well as more remote locations.

Lake trout are found primarily in four lakes within the NKPMA. Hidden, Kenai, Skilak, and Tustumena lakes support a modest fishery for lake trout, with Hidden Lake receiving most of the fishing effort.

Arctic grayling are present in remote areas of the Kenai River drainage. The Arctic grayling in Crescent, Fuller, and Twin lakes were introduced during the early 1950s and now support self-

sustaining populations. SWHS results indicate Crescent Lake supports modest participation and harvest. To provide additional fishing opportunity for this species, two roadside landlocked lakes (Arc and Scout lakes) were stocked with Arctic grayling in 2010.

RECENT RECREATIONAL ANGLER EFFORT

This section provides generalized participation trends in the NKPMA. Summarized data depicting angler effort and harvest for the sport fisheries in the NPKMA are shown for the years 1977 through 2009 in Tables 1-5. Statewide Harvest Survey (SWHS) data for the 2010 season will be available in mid-2011.

Since 1977, recreational angler effort has been estimated using the SWHS, a mail survey (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b).

Additionally, creel surveys have been selectively implemented for fisheries that require inseason or hatchery stock composition information for management purposes. The following historical summaries of recreational angler effort in the NKPMA are based on estimates produced from the SWHS mail surveys (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003;. Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b).

From 2007 through 2009, the NKPMA accounted for 21% of the total statewide recreational effort (Table 1). In 2009, participation approximated 463,616 angler-days in NKPMA waters. Angler participation between 2006 and 2007 increased from 462,749 to 539,283 angler-days and has since declined from 484,148 angler-days in 2008 to 463,616 angler-days in 2009 (Table 1; Figure 2).

The Kenai River accounts for the largest recreational fishery in the NKPMA. From 2007 to 2009, this river accounted for 73% to 76% of the area's total recreational angling effort, or 337,217 to 410,381 angler-days annually (Table 1). Historically, as well as today, most of this effort occurs downstream from the Soldotna Bridge (i.e., Sterling Highway Bridge) to Cook Inlet with salmon, rainbow trout, and Dolly Varden being the most abundant species harvested (Tables 2–3).

Other fresh waters of the Kenai Peninsula support major recreational fisheries (Tables 4–5) as well. Of these, Russian River supports the largest fishery, with the most participation directed towards early- and late-run sockeye salmon. The Kasilof River supports a major fishery directed at early-run Chinook salmon as well as fisheries for late-run Chinook salmon and coho salmon. Also of significance is the Swanson River sport fishery which is primarily directed at coho salmon and rainbow trout, the Quartz Creek fishery for resident species, primarily Dolly Varden, and the NKPMA stocked lakes fishery which supports much of the area's rainbow trout harvests (Tables 4–5).

Personal use salmon fisheries at the mouths of the Kenai and Kasilof rivers continue to be popular with the public. From 2008 to 2010, personal use fishing effort averaged 25,020 and 6,930 days fished in the Kenai and Kasilof rivers personal use dip net fisheries, respectively (Table 6). Effort in the Kasilof River personal use gillnet fishery increased from 1,533 days fished in 2008 to 1,855 days fished in 2010 (Table 6). The harvest of salmon from each of the NKPMA personal use fisheries increased from 2008 to 2009. Sockeye salmon are the predominant species harvested (Table 6).

KENAI RIVER CHINOOK SALMON RECREATIONAL FISHERIES

2011 PROPOSALS TO THE ALASKA BOARD OF FISHERIES CONCERNING KENAI RIVER CHINOOK SALMON SPORT FISHERY ISSUES

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat); Regulations" (ADF&G 2010a) will likely have some impact on the sport fisheries targeting Chinook salmon in the Kenai River:

> Proposal Numbers: 207, 208, 209, 210, 211, 212, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 241, 242, 245, 246, 247, 250, and 253.

BACKGROUND AND HISTORICAL PERSPECTIVE

Information about harvest, catch, and fishing effort is available from the SWHS and creel surveys conducted in the lower portion of Kenai River (Hammarstrom 1974-1981; Hammarstrom and Larson 1982-1984, 1986; Hammarstrom et al. 1985; Hammarstrom 1988-1994, 1992a-b, 1993-1994; King 1995-1997; Marsh 1999, 2000; McKinley and Fleischman 2010; Reimer et al. 2002; Reimer 2003, 2004a-b, 2007;Eskelin 2007, 2009-2010; Jeffrey Perschbacher Division of Sport Fish Biologist, Soldotna, personal communication). The 2010 SWHS survey results will not be available until the fall of 2011. Chinook salmon catch and harvest data provided for the 2010 season contained in this document were estimated inseason and are ***considered preliminary*** until the SWHS results are available.

Chinook salmon return to Kenai River in two distinct runs, early and late. The first run usually has "fishable" numbers by mid-May and it peaks in mid-June. The majority of the stocks have passed through the fishery by late June. Late-run fish are present in July and early August. Early-run Chinook salmon primarily spawn in tributaries to the Kenai River. Most of the spawning occurs in two primary tributaries, the Killey and Funny Rivers. Late-run fish are primarily mainstem Kenai River spawners.

The recreational fishery for Chinook salmon in the Kenai River is internationally recognized due to its proximity to major population centers, relative ease of access, and large-sized Chinook salmon. Consequently, large numbers of anglers participate in this recreational fishery every year. Because of the high level of participation in relation to the total number of Chinook salmon in the return, the fishery is strictly regulated. Chinook salmon fishing is limited to a 50-mile area downstream from Skilak Lake (Figure 3). The season is January 1 through July 31. By regulation, the early-run Kenai River Chinook salmon fishery ends on June 30. The daily bag and possession limit is one Chinook salmon, 20 inches or greater in length, with a protected slot limit (no retention, must be released) for Chinook salmon less than 46 inches and greater than or equal to 55 inches in total length. The annual (January 1-December 31) limit is two fish. However, Chinook salmon harvested prior to July 1 that are 20 inches or more in length but less than 28 inches in length do not count toward the annual limit of two fish. During 2008, the BOF, modified the annual limit for Chinook salmon less than 28 inches but greater than 20 inches and also adjusted the protected slot limit by changing it from 44 to 55 inches to 46 to 55 inches.

The majority of the harvest is taken by anglers in boats. After retaining a Chinook salmon that counts toward the annual limit, an angler is prohibited from fishing from a boat in the Kenai River downstream from Skilak Lake for the remainder of that day.

The Kenai River Chinook salmon fishery supports an industry that provides sport fishing guide services. Since 1982, guides have been required to register with the Alaska Department of Natural Resources (DNR). Guided anglers are more intensively regulated than unguided anglers. This is due, in part, to the guided fishermen's greater harvest efficiency and the general concern regarding harvest parity between guided and unguided anglers.

Nearly all of the river area available to Chinook salmon fishing is managed as a state park by the Department of Natural Resources, Division of Parks and Outdoor Recreation (DPOR). In 1986, DPOR reduced the maximum size of outboard motors that could be legally used on the river to 50 horsepower. In 1987, the maximum legal horsepower was further reduced to 35 horsepower. In 2008, a DPOR regulation became effective that raised the maximum size of outboard motors that can be legally used on the river to 50 horsepower, provided those greater than 35 horsepower be four-stroke or two-stroke direct fuel injection (DFI) outboard motors. In addition, during the month of July, all outboard motors operating on the Kenai River must be four-stroke or two-stroke DFI. This regulation will end after 2012 when at that time all outboard motors operating on the Kenai River beginning in 2013 must be four-stroke or two-stroke DFI year-round. There is no evidence to indicate that the change in horsepower will change angler efficiency.

Under current BOF policy, the early-run is managed for the inriver sport and guided sport fishery. Although known to be relatively minor, early-run fish are intercepted in the mixed-stock Cook Inlet marine sport fishery prior to their entry into the Kenai River (Begich 2007, 2010a). In addition, there are small numbers of early-run Chinook salmon harvested in the Kenaitze Indian Tribal Association's educational fishery (Table 7). Commercial harvests of early-run Chinook salmon are considered insignificant. By regulation, drift gillnetting in the Central District does not commence until the third Monday in June or June 19, whichever is later, and the eastside setnet fishery does not commence until June 25 or, if 50,000 sockeye have been estimated to have passed the Kasilof River sonar, by June 20 in the Kasilof Section.

In 1984, ADF&G implemented an experimental sonar program to determine the number of Chinook salmon that return to Kenai River. From 1984 to 1994, the sonar counter used dual-beam transducer technology. Beginning in 1995 to the present, the sonar program adopted split-beam technology to improve the estimation of Chinook salmon returning to the Kenai River. This estimate is the traditional target strength sonar (TS-based) estimate.

Estimation uncertainty, due to the problem of differentiating between the various salmon species migrating together into the Kenai River has necessitated that the sonar program employ several different methods to better separate Chinook salmon from the more numerous sockeye salmon in the final estimates (Bosch and Burwen 2000). Since inception, the sonar program has continuously evolved. The focus of this work has been to investigate limitations of the technology to classify species detected by sonar and to address the bias in the estimates of Chinook salmon passage that are used to manage the stocks. Annual experiments to assess the utility of new sonar technology such as Dual Frequency Identification Sonar (DIDSON) as well as re-evaluation of split-beam technology have been undertaken. The first DIDSON trials initiated in 2002 showed promise for distinguishing between large and small fish however the

technology did not have the capability to monitor the entire distance across the Kenai River. Testing and development of DIDSON for the Kenai River Chinook salmon stock assessment program continued and resulted in the successful deployment of DIDSON sonar operated simultaneously with the split-beam sonar in 2010.

Methods have been developed to improve the information about the Chinook salmon passage rate into the Kenai River. During 2002, the ADF&G began generating a split-beam sonar-based echo length standard deviation (ELSD) estimator of Chinook salmon passage thought to be superior at differentiating between salmon species. In addition, the ADF&G standardized the Chinook salmon test-netting program conducted at the sonar station which allowed a net-apportioned split-beam sonar estimate of the daily Chinook passage rate to be calculated. This suite of Chinook salmon sonar passage estimates, in combination with the Chinook salmon abundance indices of catch per unit effort (CPUE) in the lower river creel survey and in the test netting program, help to evaluate the accuracy of the TS-based sonar estimates of Chinook salmon passage. The ELSD-based estimates, the net apportioned estimates, as well as creel and netting CPUE estimates, help managers to assess inseason run strength during occasions when TS-based sonar data is not consistent with all other sources of information and is biased by an unknown amount. The ELSD-based and net apportioned estimates of Chinook salmon passage are reported annually in ADF&G's Fishery Data Series (Jim Miller, Division of Sport Fish Biologist, Anchorage, personal communication). The CPUE estimates from the Kenai River Chinook salmon creel survey and test-netting programs are reported in a similar manner each year (Jeffrey Perschbacher, Division of Sport Fish Biologist, Soldotna, personal communication).

A Kenai River Chinook salmon genetic stock identification (GSI) research program was initiated in 2005. This study establishes baseline genetic structure for Kenai River Chinook salmon. Populations of various tributary and mainstem spawning fish appear to be sufficiently unique to enable genetic stock identification (Begich et al. 2010). Presently this research is using mixed-stock samples collected from the test-netting program as well as from the creel survey harvests to identify stock-specific run timing and stock composition of inriver harvests. This information will improve escapement calculations for early- and late-run stocks. In addition, information on return timing for specific stocks or sub-stocks would help managers refine present and future regulations. An approach for using the GSI data has been developed to obtain estimates of abundance. A stock specific abundance and run-timing model (SSART) uses GSI data from the inriver netting program and creel survey, Chinook salmon passage estimates at weirs located on the Kenai River tributaries of Funny and Russian rivers, estimates of harvest from the creel survey and daily CPUE from the test netting project. Preliminary SSART estimates of Chinook salmon abundance are available for the years 2006–2009. The next phase of genetics research will collect and analyze mixed-stock samples collected in Cook Inlet marine commercial fisheries to identify stock compositions of harvests. Combined with information from the Pacific coast-wide Chinook salmon genetic database, this information may enable estimating harvest of Kenai River fish in mixed-stock marine fisheries.

Total Kenai River Chinook salmon sport fish harvest declined steadily from 1993 through 1998 then rebounded from 1999 through 2006 (Table 3). The most recent 10-year (2000–2009) average Kenai River Chinook salmon sport fish harvest from both runs combined was 18,315 fish. Harvests have been on the decline since 2007, during 2007-2009 the average Kenai River Chinook salmon sport fish harvest from both runs combined was 14,060 fish.

KENAI RIVER EARLY-RUN CHINOOK SALMON

Fishery Management Objectives

In 1988, the Board of Fisheries adopted the management plan for early-run Kenai River Chinook salmon. Since 2005, this plan has mandated an optimum escapement goal (OEG) of 5,300 to 9,000 fish. Currently, the *Kenai River and Kasilof River Early-Run King Salmon Management Plan* (5 AAC 57.160) also identifies the possible management actions that can be implemented at given escapement levels. The original and current plan both enforce fishing without bait to reduce angler efficiency. In 2008, the BOF modified the management plan to allow bait, by emergency order (EO), when the optimum escapement goal (OEG) can be projected, provided the resulting harvest does not cause the escapement to decline below the lower bound of the OEG. The strategy of restricting bait in the fishery until a given escapement level can be projected has remained an integral component to the management of this fishery. The plan outlines management options and allowable alternatives to assure achievement of the escapement objective.

The fishery begins without the use of bait and is limited to the use of only one single hook artificial lure. Fishing from guided vessels is not allowed on Sundays and Mondays, and fishing from motorized vessels is not allowed on Mondays, with the exception of Memorial Day. If the escapement is projected to be greater than 5,300 fish, ADF&G shall establish, by emergency order (EO), a period of time and area of the Kenai River, from Skilak Lake downstream to Cook Inlet, in which bait may be used. If the spawning escapement is projected to be less than 5,300 fish, ADF&G can implement trophy fishing provisions that prohibit the retention of Chinook salmon less than 55 inches in total length, or close the Kenai River to retention of all Chinook salmon. Additionally, the plan contains options that enable fishery managers to protect early-run Chinook salmon in the mainstem of the Kenai River. These include restricting the use of bait and prohibiting the retention of Chinook salmon greater than 20 inches but less than 55 inches in total length upstream of the Sterling Highway Bridge, from July 1 through July 14.

Inseason Management Approach

The primary objective of inseason management is to achieve a spawning escapement within the OEG range of 5,300 to 9,000 early-run Chinook salmon. Achievement of this escapement objective requires information on the number of early-run Chinook salmon entering the river; the ability to project the total number of Chinook salmon in the inriver run, and an estimate of the harvest and final spawning escapement.

The number of fish entering the river is estimated by the Chinook salmon sonar in the lower, mainstem Kenai River near river mile (RM) 8.5 (Figure 3). The sonar uses split-beam technology and generates a daily estimated passage estimate referred to as the “traditional” TS-based sonar estimate. ELSD-based, net apportioned, as well as creel and netting CPUE estimates are also generated. The sonar is usually operational on May 16 and the early-run Chinook salmon run is assessed daily with these various estimates through June 30. The early-run Kenai River Chinook salmon fishery ends by regulation on June 30. Estimates of Chinook salmon passage into the Kenai River for a given day are typically available to fishery managers by noon the following day.

Harvest is estimated inseason by an onsite creel survey. This survey begins on or about mid-May, as soon as water levels rise sufficiently to permit anglers and ADF&G staff to safely use

boats on the lower Kenai River downstream of the Sterling Highway Bridge. Harvest estimates are typically generated as needed by managers, but daily estimates can be calculated if required for management actions.

A preliminary estimate of spawning escapement is projected inseason using a mean run timing model. This estimate is based upon the projected inriver return minus the projected harvest (including Chinook salmon mortality associated with catch-and-release fishing).

In order to publicize fishery information, the Soldotna ADF&G office has two recorded message phone lines. One phone line provides a general weekly fishing forecast and the other offers a brief summary of the daily weir counts and sonar passage estimates for major Kenai Peninsula fisheries. A brief summary of the early-run fishery status is provided on the message phone as well. The message phone lines may receive several hundred calls daily during the peak of the fishery. The message phone gives the public reliable access to fishery information, and increases the efficiency of the Soldotna ADF&G staff. The traditional TS-based sonar passage estimates are relayed to the public on the phone system daily and are also posted on the SF "fish count" web page. In addition, area staff complete a weekly summary of the status of the Chinook salmon run that is posted on the SF "fishing report by management area" web page for the Kenai River/Upper Kenai. The summary may also be accessed on the SF "fish count" web page when a data query for Kenai River Chinook salmon is completed.

The public is also kept informed about the fishery via news releases to newspaper, radio, and TV news media. News releases and requests from the broadcast media are commonly conducted because they distribute relevant information quickly regarding the status of the fishery and pending management actions.

Restrictive management actions in this fishery are socially and economically disruptive. These disruptions may be minimized by informing the public in a timely and efficient manner. Prior to any likely change in management action, continuous updates regarding the status of the fishery are provided in all available forums. Whenever possible, ADF&G staff strive to issue formal announcements (news releases) regarding EOs that change the management of the fishery at least 24 hours before a given action becomes effective.

2008 Fishery Performance

The 2008 preseason forecast of the inriver early-run Chinook salmon run was approximately 16,000 fish, which was near the long-term average of 16,500 fish (forecasts for 2008–2010 are from T. McKinley, Sport Fish Biologist, ADF&G, Soldotna, personal communication). The cumulative TS-based sonar passage estimate for the early run was 15,355 fish through June 30 (Table 7). Of 23 years on record through 2008, 14 years were higher and 8 years were lower than the 2008 run. ADF&G issued an EO on Friday, May 30, allowing the use of bait beginning 12:01 AM Sunday, June 1 from the mouth of the Kenai River upstream to a point 100 yards downstream of the confluence of the Moose and Kenai rivers (EO 2-KS-1-07-08; Appendix A1). After subtracting an estimated harvest (including catch-and-release mortality) of approximately 3,600 fish for the entire river from the TS-based sonar passage estimate, the estimate of escapement was about 11,732 Kenai River early-run Chinook salmon for the 2008 season (Table 7). Values from the Chinook salmon indices of abundance maintained a consistent relationship during most of the run indicating the split beam sonar was not subjected to a level of bias that made determination of run strength difficult. Estimates of escapement using sonar and weir data indicated an escapement near the mid-point of the OEG (5,300-9,000).

2009 Fishery Performance

The 2009 preseason forecast of the inriver early run of Chinook salmon was approximately 13,500 fish, which was below the long-term average of 16,500 fish. The cumulative TS-based sonar passage estimate for the early-run was 11,334 fish through June 30 (Table 7). Evaluation of the daily Chinook salmon passage estimates indicated the TS-based sonar passage estimates were positively biased as the TS-based sonar estimates were high in value, while all other sources of abundance data were low in value. Because the estimates were positively biased (overestimated), the total inriver run was smaller than indicated by the TS-based traditional sonar estimates. Consequently, no inseason actions were taken during early-run fishery. For the 24 years on record through 2009, the total inriver run was the 5th lowest TS-based sonar passage estimate on record and the estimated harvest, 1,466 fish for the entire river (Table 7), was the lowest estimated early-run harvest on record for a fishery that was prosecuted without restrictive management actions i.e. catch-and-release trophy fishing only or closure. The resulting escapement estimated from the TS-based sonar estimate was approximately 9,771 fish (Table 7). Although the escapement estimate exceeded the OEG (5,300-9,000), other escapement estimates using sonar and weir data indicate an escapement between the lower bound and mid-point of the OEG range.

2010 Fishery Performance

The preseason forecast for early-run Chinook salmon was approximately 10,400 fish. The cumulative TS-based sonar passage estimate for the early run was 13,248 fish through June 30 (Table 7). During the developing stages of the run, low numbers of Chinook salmon were detected by the TS-based sonar as well as for all other run strength estimates using sonar and CPUE. The projected inseason run strength using a mean run time model and resulting projected escapement indicated run strength would not be sufficient to support harvest and achieve the OEG (5,300-9,000). An EO was issued on June 3 that closed the Kenai River to Chinook salmon fishing on June 5 (EO 2-KS-1-12-10; Appendix A3). Run strength increased during mid-June. This increase was unexpected because it occurred later than increases historically observed for this stock. Due to this increase, the closure was rescinded to allow catch-and-release fishing on June 12 (EO 2-KS-1-16; Appendix A3). By June 14, the fishery was further liberalized by EO to allow retention of Chinook salmon and on June 18, use of bait was allowed from the mouth of the river upstream to a point approximately 100 yards downstream of the confluence of the Moose and Kenai rivers (EOs 2-KS-1-19-10 and 2-KS-1-21-10; Appendix A3). The resulting **preliminary inseason** estimated harvest including catch-and-release mortality for the entire river was approximately 1,337 fish (Table 7). The **preliminary inseason** estimated escapement from TS-based sonar was approximately 11,824 early-run Chinook salmon (Table 7). This estimate will be refined in 2011. Escapement estimates using other sonar and weir data indicate an escapement between the lower bound and mid-point of the OEG range.

The 2010 season was the eighth year of the slot limit for early-run Kenai River Chinook salmon. From 2003 through 2007, the slot limit was 44 to 55 inches total length; the slot limit was 46 to 55 inches total length from 2008 to 2010. **Preliminary inseason** 2010 age composition results from the Chinook salmon netting program indicate the numbers of ocean-age-5 fish comprised less than 1% of the run, while ocean-age-2 fish accounted for 25% of the run (Jeffrey Perschbacher, ADF&G Fishery Biologist, Soldotna, personal communication). From 2008 through 2010, ocean-age-5 fish comprised an average of 1.3% of the run and ocean-age-2 fish accounted for 18% (Jeffrey Perschbacher, ADF&G Fishery Biologist, Soldotna, personal

communication). It is not known why the relative abundance of ocean-age-5 fish has declined and ocean-age-2 fish has increased. Since 2003, regulations stipulate all retained trophy Chinook salmon (greater than 55 inches total length) must be sealed by ADF&G within three days of harvest. One trophy Chinook salmon (caught in 2005) was sealed in May or June during the early-run Chinook salmon fishing seasons between 2003 and 2010.

KENAI RIVER LATE-RUN CHINOOK SALMON

Fishery Management Objectives

The Kenai River late-run Chinook salmon fishery is managed according to provisions of the *Kenai River Late-Run King Salmon Management Plan* (5 AAC 21.359). Late-run stocks of Kenai River Chinook salmon are caught by the commercial drift gillnet fishery and the commercial set gillnet fishery along the east side of Cook Inlet, both of which target sockeye salmon. Commercial fisheries that intercept late-run Kenai River Chinook salmon are managed under provisions of the *Kenai River Late-Run Sockeye Salmon Management Plan* (5 AAC 21.360). Incidental commercial harvests of these stocks have been the subject of intense allocation debates among recreational and commercial user groups since the early 1980s. As a result, the Kenai River Late-run Sockeye Salmon Management Plan contains provisions to reduce incidental harvests of Kenai River-bound Chinook salmon.

During the spring of 1999, the BOF amended both of these plans. The most significant change was the revision of the biological escapement goal (BEG) and the management actions associated with these objectives. Under the previous *Kenai River King Salmon Management Plan*, the BEG was established as an optimum goal of 22,300 Chinook salmon with management directives centered around projected escapement levels of less than 15,500 fish, 15,500 to 19,000 fish, and greater than 22,300 fish. Under the revised management plan the BEG was established as a range of 17,800 to 35,700 Chinook salmon. Management directives were also established to link inseason regulatory actions with abundance of sockeye salmon. The current management objective, as outlined in the plan, is to achieve a biological escapement goal from 17,800 to 35,700 Chinook salmon.

Inseason Management Approach

The primary objective of inseason management is to attain an escapement that falls within the BEG range of 17,800 to 35,700 late-run Chinook salmon. Achieving this objective requires an estimate of the number of late-run Chinook salmon entering the river; an estimate of the harvest; the ability to project the total inriver run, and an estimate of the total harvest and the spawning escapement.

Late-run sonar estimates begin when the late-run fishery opens by regulation (July l) and concludes on approximately August 10. The passage of late-run Chinook salmon into the river is estimated daily by sonar at RM 8.5. Estimates available to management staff on a daily basis include the TS-based sonar estimate, ELSD-based estimate, net apportioned estimate as well as creel and netting CPUE. The large numbers of sockeye salmon migrating during the late run complicate estimation of Chinook salmon passage with the split-beam sonar. Consequently, alternative techniques for estimating escapement are also used. Such techniques include estimates based on historical exploitation rates in the recreational fishery and historical exploitation rates in the commercial set gillnet fishery.

The lower river sport fishery is the predominant source of inriver sport harvest. This harvest is estimated by an onsite creel survey in the lower Kenai River below the Sterling Highway Bridge. Harvest above the Soldotna Bridge is estimated indirectly with the SWHS. The late-run creel survey begins July 1 and continues until the end of the fishery. The fishery is closed by regulation on July 31. However, the duration of the fishery may be adjusted by emergency order predicated on the magnitude of the inriver return. Harvest estimates are usually generated weekly. Daily estimates are calculated when needed to aid fishery managers.

The spawning escapement is projected inseason using a historical, run-timing model. Spawning escapement is the inriver run (from sonar) less the projected sport harvest (from creel survey). The projected sport harvest includes estimated mortality associated with catch-and-release fishing estimates (Bendock and Alexandersdottir 1992). During most years, the spawning escapement can be projected with reasonable accuracy by approximately July 20.

The recreational fishery for late-run Chinook salmon in the Kenai River is one of the largest and quite possibly, the most controversial fishery in Alaska. Interaction with the user groups affected by management decisions is critical to the successful implementation of any inseason management action.

The Soldotna SF office distributes information about the late-run Kenai River Chinook salmon fishery in a similar manner as described above for Kenai River early-run Chinook salmon.

2008 Fishery Performance

The pre-season forecast was for an inriver run of approximately 57,000 late-run Kenai River Chinook salmon. This forecasted run strength was above the 1986–2007 average inriver run of approximately 42,000 fish (forecasts for 2008–2010 are from T. McKinley, Sport Fish Biologist, ADF&G, Soldotna, personal communication). The cumulative inriver run estimate was 34,641 (Table 8). The estimated riverwide sport harvest (including those harvested below the sonar and catch-and- release mortality) was 11,138 fish resulting in a TS-based sonar escapement estimate of 24,144 fish (Table 8). Sonar operations ended earlier than anticipated on August 3 due to target detection problems caused by an abundance of pink salmon near the sonar station. Other escapement estimates using sonar data indicate an escapement between the mid-point and lower bound of the BEG (17,800-35,700).

The commercial fisheries in the Central District of the Upper Cook Inlet Management Area harvested approximately 6,647 Chinook salmon and of this commercial harvest, about 6,352 were harvested in the eastside setnet (ESSN) fishery (Table 8). The 2008 ESSN harvest was below the 1998–2007 harvest average of 11,251 Chinook salmon. Reasons for this low harvest were likely due to the combination of below-average Chinook salmon abundance and the restricted fishing schedule of the ESSN fishery beginning July 27, except in the Kasilof River Special Harvest Area, because of low sockeye salmon abundance.

A total of four late-run Chinook salmon were brought to ADF&G personnel to be sealed as required for Chinook salmon over 55 inches in total length caught by sport anglers during 2008. None of these fish were actually over 55 inches in total length. Results from the test netting program indicated the run was comprised of about 58% ocean-age-4, 6% ocean-age-5, 22% ocean-age-3, and 9% ocean-age-2 fish (Jeffrey Perschbacher, ADF&G Fishery Biologist, Soldotna, personal communication).

2009 Fishery Performance

During 2009, a total of approximately 37,500 Chinook salmon were forecasted to reach the sonar station. The total number of fish in the run estimated by traditional based sonar was 25,688 Chinook salmon (Table 8). This was the lowest run of the 24 years on record through 2009. The 2009 fishery experienced a very low harvest due to low Chinook salmon abundance and a flood event over the traditional peak of the fishery during late July. The estimated riverwide harvest, including those harvested below the sonar as well as catch-and-release fishing mortality, was 9,036 Chinook salmon (Table 8). The late-run sport harvest of about 7,900 fish above the sonar provided a TS-based sonar spawning escapement estimate slightly below the BEG (17,800-35,700) of 17,158 Chinook salmon (Table 8). Other escapement estimates using sonar data indicated an escapement below the BEG.

Low abundance of late-run Chinook salmon and restrictions to the commercial fishing schedule during late July due to low sockeye salmon abundance resulted in the 2009 ESSN harvest of 5,588 Chinook salmon (Table 8). This was the lowest harvest recorded for this fishery since 1998.

The age composition estimates from the test netting program indicated the run was comprised of about 48% ocean-age-4 and 3% ocean-age-5 fish, while ocean-age-2 fish accounted for 34% of the run (Jeffrey Perschbacher, ADF&G Fishery Biologist, Soldotna, personal communication). Four Chinook salmon were brought to ADF&G for sealing. One of these fish was larger than 55 inches total length.

2010 Fishery Performance

During 2010, the pre-season forecasted run size was approximately 34,000 Chinook salmon, well below the 1986–2009 average of approximately 42,000 fish. Evaluation of the daily Chinook salmon passage estimates indicated the sonar passage estimates were high in value, while all other sources of abundance data were low in value. Because the TS-based sonar passage estimates of Chinook salmon were positively biased by an unknown amount, the total inriver run was smaller than indicated by the TS-based sonar. The discrepancy between the TS-based sonar Chinook salmon passage estimates and performance of the sport fishery and test netting program were evident, as catch rates were low. The **preliminary inseason** harvest estimate for the ESSN fishery was 7,059 Chinook salmon and this harvest was below the most recent 10-year average (2000–2009) harvest of 10,990 Chinook salmon (Table 8).

The **preliminary inseason** total run estimated by TS-based sonar was 48,343 fish (Table 8). The **preliminary inseason** estimated late-run sport harvest of approximately 5,375 of which about 4,900 were harvested above the sonar provided a TS-based sonar spawning escapement of 43,358 Chinook salmon (Table 8). Other escapement estimates using sonar data indicate the escapement is near the lower bound of the BEG (17,800-35,700). These estimates will be refined during 2011.

Results from the test net catches at the sonar site as well as from the creel survey indicate the age structure of Chinook salmon changed as the run progressed. During approximately the first 12 days of July, the run was comprised of low numbers of larger older fish (ocean-age-4 and 5), thereafter the numbers of larger older fish increased. Overall, **preliminary inseason** estimates indicate that about 34% of the run was comprised ocean-age-4 and 5% ocean-age-5 fish, while ocean-age-2 fish accounted for 21% of the Chinook salmon run (Jeffrey Perschbacher, ADF&G

Fishery Biologist, Soldotna, personal communication). No Chinook salmon were brought to ADF&G for sealing during the 2010 late-run fishery.

KASILOF RIVER CHINOOK SALMON RECREATIONAL FISHERY

2011 PROPOSALS TO THE ALASKA BOARD OF FISHERIES CONCERNING KASILOF RIVER CHINOOK SALMON SPORT FISHERY ISSUES

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat); Regulations" (ADF&G 2010a) will likely have some impact on the sport fisheries targeting Chinook salmon in the Kasilof River:

Proposal Numbers: 254, 255, 256, 257, 258, 259, 260, 262, and 263.

BACKGROUND AND HISTORICAL PERSPECTIVE

The hatchery stocks of early-run Chinook salmon that return to the Kasilof River were originally developed from wild fish in Crooked Creek, a tributary to the Kasilof River, approximately 6 miles upstream from Cook Inlet (Figure 4). The Kasilof River also supports a wild stock of late-run Chinook salmon. ADF&G began evaluating early-run escapement numbers and estimating naturally-produced stock (a population consisting of both wild fish and naturalized hatchery fish) and hatchery stock returns to a weir located at the former Crooked Creek hatchery facility in 2002. In addition, a creel survey has been conducted since 2004 to estimate the catch and harvest of naturally- and hatchery-produced early-run Chinook salmon. A research project was conducted from 2005 through 2008 to estimate abundance, spawning distribution, and run timing for late-run Kasilof River Chinook salmon (Reimer and Fleischman *In prep.*).

The recreational fishery for early-run Chinook salmon in the Kasilof River occurs from late May through June. The run-timing of the majority of the early-run precedes the commercial set gillnet fishery on the eastside beaches of Cook Inlet. There is a personal use gillnet fishery that occurs from June 15 through June 24 at the mouth of the Kasilof River. The personal use gillnet fishery harvests primarily sockeye salmon returning to Tustumena Lake and small numbers of Chinook salmon which originate from Crooked Creek (Table 6).

The Kasilof River Chinook salmon sport fishery is limited by regulation to January 1 through July 31. During the early run (late May through June 30), the river is open in its entirety to Chinook salmon fishing. During the July late-run fishery, the area upstream from the Sterling Highway Bridge is closed to Chinook salmon fishing to protect spawning fish. The early-run is harvested by relatively large numbers of both shore and boat anglers, whereas the late-run is harvested primarily by boat anglers because discharge of the Kasilof River during July makes it difficult for anglers to effectively fish for Chinook salmon from shore. Participation and harvest is greater for the early-run although research projects indicate the abundance is higher for the late-run stock.

Harvest estimates for early-run and late-run Kasilof River Chinook salmon have been estimated by the Statewide Harvest Survey since 1996. Since 2004, ADF&G has conducted a creel survey to determine the early run harvest and to separate the harvests by hatchery and naturally-

produced stock composition. Between 2004 and 2010, the average angler harvest for early-run Kasilof River Chinook salmon was 2,152 fish (Table 9). From 2004 to 2009 the average angler harvest for late-run Kasilof River Chinook salmon was 1,165 fish (Table 10). The growth of fishing effort from drift boats has increased in this fishery over the past decade and now the angler effort from drift boats greatly exceeds the shore based angler effort (Table 11).

KASILOF RIVER EARLY-RUN CHINOOK SALMON

Fishery Management Objectives

The Kasilof River early-run Chinook salmon fishery is supported primarily by stocked Chinook salmon of Crooked Creek origin and supplemented by natural production in Crooked Creek. The Kasilof River early-run Chinook salmon return is managed to ensure that a sustainable escapement goal (SEG) of 650 to 1,700 naturally-produced Chinook salmon reach the spawning grounds above Crooked Creek weir and to harvest hatchery-produced Chinook salmon. Objectives for this fishery achieved through the enhancement program are to generate a return of approximately 3,000 hatchery-produced Chinook salmon, generating approximately 17,500 angler-days of annual sport fishing opportunity directed at Chinook salmon in the Kasilof River. The last objective is to stock approximately 105,000 Chinook salmon smolt in Crooked Creek annually.

During 2003, regulations were adopted which prohibited the retention of naturally-produced early-run Chinook salmon, and anglers were prohibited from using multiple hooks. Beginning in 2005, retention of naturally-produced fish was allowed two days each week; on Tuesday and Saturday. In addition, the Alaska Board of Fisheries (BOF) granted ADF&G emergency order authority to allow retention of naturally-produced early-run Chinook on a third day each week when returns are strong. Thursday was added as the third day each week anglers could retain naturally-produced Chinook salmon from the Kasilof River by emergency order in 2006 and 2007. This emergency order (EO) was issued each year during mid-May prior to the peak of the run. In 2008 the board modified the early-run Chinook salmon fishing regulations by adding Thursday as the third day each week anglers could retain naturally-produced Chinook salmon. In addition, during 2008 the bag and possession limit regulation for hatchery-produced fish was increased from one to two.

Inseason Management Approach

Currently by regulation, hatchery-produced fish are allowed to be harvested seven days each week and either hatchery or naturally-produced fish are allowed to be harvested three days per week (e.g., Tuesday, Thursday, and Saturday). The *Kenai River and Kasilof River Early-run King Salmon Management Plan* directs ADF&G to achieve the sustainable escapement goal, to provide reasonable harvest opportunities over the entire run while ensuring adequate escapement of naturally-produced Chinook salmon, and to minimize the effects of conservation actions for the Kenai River on the Kasilof River. Since Chinook salmon do not reach the weir at Crooked Creek until the later part of June and early July, run-strength is evaluated from creel survey data. Typically, the highest catch rates are observed prior to June 10. The Chinook salmon harvest is estimated post-season, harvest estimates are not available inseason.

2008 Fishery Performance

The first management objective, ensuring an SEG of 650 to 1,700 naturally-produced Chinook salmon reach the spawning grounds, was met in 2008. A total of 879 naturally-produced Chinook salmon and 302 hatchery-produced Chinook salmon passed upstream of the weir to spawn (Table 9) for a total spawning escapement of 1,181 fish. The estimate of angler hours from the creel survey was 61,813 angler-hours of fishing effort (Table 11). The final management objective, stocking 105,000 Chinook salmon smolt into Crooked Creek annually, was also achieved in 2008 when 114,588 were stocked (Table 12).

The harvest estimate from the onsite creel survey was 1,984 Chinook salmon of which 832 fish were naturally-produced (Table 9). The estimated 2008 total return was approximately 3,398 Chinook salmon of which 1,850 (55%) were naturally-produced.

2009 Fishery Performance

During 2009 the estimated total catch from the creel survey was 2,276 Chinook salmon which was well below the 2004-2008 average of 4,805 fish (Table 11). The first management objective, ensuring an SEG of 650 to 1,700 naturally-produced king salmon was not achieved as a total of 617 fish were counted through the weir at Crooked Creek (Table 9). In addition, 117 hatchery-produced Chinook salmon reached the spawning grounds for a total escapement of 734 Chinook salmon (Table 9). Effort estimated from the creel survey was 48,911 angler-hours and was the lowest since the creel survey began in 2004 (Table 11). The estimated harvest was 1,532 of which 576 (38%) were naturally-produced and 956 (68%) were hatchery-produced (Table 9). The total run was estimated to be 2,461 Chinook salmon (Table 9). To support the early run fishery, 115,035 smolt were released into Crooked Creek (Table 12).

2010 Fishery Performance

To minimize the effects of conservation actions for Kenai River Chinook salmon, the ADF&G issued an EO effective June 5 prohibiting the retention of naturally-produced Chinook salmon (EO 2-KS-1-13-10; Appendix A3). This emergency order was rescinded by emergency order on June 14 (EO KS-1-20-10; Appendix A3). During 2010, the SEG of 650 to 1,700 naturally-produced Chinook salmon was achieved with an escapement of 1,088 naturally-produced fish passing through the weir at Crooked Creek (Table 9). An additional 260 hatchery-produced fish raised the total escapement to 1,348 Chinook salmon (Table 9). The **preliminary inseason** estimate of effort and harvest from the onsite creel survey was 52,973 angler-hours and a Chinook salmon harvest of 273 naturally-produced and 1,060 hatchery-produced fish (Tables 9 and 11). A total of 106,145 Chinook salmon smolt were released back into Crooked Creek during 2010 (Table 12).

KASILOF RIVER LATE-RUN CHINOOK SALMON

Fishery Management Objectives

The Kasilof River late-run Chinook salmon sport fishery is not specifically addressed in a BOF-adopted management plan. ADF&G objectives adopted for this fishery include providing an opportunity for angler participation at a level that can be supported by the fisheries resource and associated habitat. Also, to ensure through appropriate management and research programs, that the Chinook salmon population does not decline below the levels necessary to ensure sustained

yield. Harvest has been monitored via the SWHS since 1996 and has averaged 1,020 Chinook salmon (Table 10).

Inseason Management Approach

There has been no inseason management in the history of this fishery. The fishery is managed through existing regulations. These regulations are conservative, permitting a harvest of late-run Kasilof River Chinook salmon downstream from the Sterling Highway Bridge only through July 31. For Chinook salmon 20 inches or more in total length, the daily bag and possession limit is one fish and the annual limit for Chinook salmon in Cook Inlet is five fish.

2008-2010 Fishery Performance

There has been no inseason data collected for the management of the Kasilof River Chinook salmon late-run. During 2005-2008, ADF&G research projects collected information on run timing, spawning distribution, and inriver abundance of late-run Kasilof River Chinook salmon post-season (Reimer and Fleischman *In prep*). Catches of Chinook salmon for the research program were relatively stable from 2005 to 2008. Information on run strength or sport fishery performance is collected via angler reports during the season as well as from the SWHS. The SWHS results indicate the run has been relatively stable from 1996-2008 (Table 10). The largest harvest estimated for this fishery was 2,164 fish during 2009 (Table 10). There have been changes in the commercial fisheries targeting sockeye salmon bound for the Kasilof River in recent years due to large numbers of sockeye salmon passage at the ADF&G sonar station at the Kasilof River in excess of escapement needs. These commercial fishery changes included the implementation of terminal commercial fishing periods at the mouth of the Kasilof River annually from 2005 through 2008. These terminal commercial fishing periods are designed to reduce sockeye salmon escapement, however Chinook salmon are also harvested. All of the commercially harvested Chinook salmon bound for the Kasilof River during these terminal fishery periods are presumed to be of Kasilof River origin. During 2009 and 2010, the terminal fishery was not operated. The estimated Chinook salmon sport harvest from the Kasilof River of 2,164 fish during 2009 was nearly double all previous Chinook salmon harvests estimated for this sport fishery (Table 10).

Occasionally, anglers bring in harvested Kasilof River late-run Chinook salmon, over 50 pounds in total weight, to ADF&G to participate in the trophy fish program. The trophy fish program is voluntary and participating anglers receive a “Trophy Fish” certificate for taking fish that meet the minimum weight standard of 50 pounds. In 2010, two “Trophy Fish” certificates were issued to anglers for late-run Chinook salmon harvested in the Kasilof River.

RUSSIAN RIVER SOCKEYE SALMON RECREATIONAL FISHERIES

2011 Proposals to the Alaska Board of Fisheries Concerning Russian River Sockeye Salmon Sport Fishery Issues

The following proposals published in “The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations” (ADF&G 2010b) will likely have some

impact on the sport fisheries targeting sockeye salmon in the Russian River and Russian River sanctuary:

Proposal Numbers: 243 and 251.

BACKGROUND AND HISTORICAL PERSPECTIVE

The Russian River is a clearwater tributary to the Kenai River located near the community of Cooper Landing approximately 100 miles south of Anchorage (Figure 5). Lands bordering this river are federally managed. The public can access the Russian River via the Kenai-Russian River ferry operated by a private concessionaire. The ferry is located at the Kenai National Wildlife Refuge parking area on the north shore of the Kenai River just downstream from the confluence with the Russian River. Additional access is provided at the Chugach National Forest campground on the Russian River (Figure 6).

The drainage supports one of the largest returns of sockeye salmon to upper Cook Inlet (UCI) and provides one of the largest freshwater recreational fisheries for sockeye salmon in Alaska. In addition, coho, Chinook, and pink salmon also spawn in the Russian River drainage as well as resident populations of rainbow trout and Dolly Varden. The drainage is closed to fishing for Chinook salmon but supports recreational fisheries for the other species.

Sockeye salmon return to the Russian River during two distinct time periods. An early-run arrives at the confluence of the Kenai and Russian rivers in early June. Because of this early run timing, these fish are not harvested in the (UCI) commercial salmon fisheries. The primary harvest of these fish occurs in the inriver recreational fishery at the Russian River. Early-run fish typically congregate at the confluence of the Russian and Kenai rivers for several days prior to moving into the clear waters of Russian River. A late-run, part of the larger late-run of UCI sockeye salmon, arrives at the confluence in mid-July and typically migrates directly into Russian River. This run has two discrete components: one that spawns in the upper reaches of the drainage (upstream of the weir) and one that spawns in the lower river reaches (downstream of the weir). The population component that spawns in the lower river reaches is more closely related (genetically) to the mainstem Kenai River sockeye salmon stocks than to the population component spawning upstream of the weir (Seeb et al. 1996). Typically, the spawning escapement of the late-run exceeds that of the early-run. For the most part, spawning locations used by the late-run are distinct from locations used by the early-run. Because of their run timing, late-run sockeye salmon are harvested by a combination of commercial, recreational, and personal use user groups.

The recreational fishery for both early- and late-run sockeye salmon occurs primarily in the lower 3 miles of Russian River and in a 1-mile stretch of the Kenai River below its confluence with Russian River. Both runs support intense fisheries. The most recent 10-year (2000–2009) average harvest of early and late-run sockeye salmon is approximately 41,068 and 25,396 fish respectively (Table 13). Federal subsistence fishery harvests have also occurred at the Russian River since 2007. Sockeye salmon from both runs support an annual federal subsistence fishery harvest of approximately 1,000 fish with the majority of this harvest taken from the early run (Table 13).

The most recent 10-year average (2000–2009) of combined early and late-run angler effort has averaged 60,965 angler-days per year (Table 13). At times, more than 1,000 anglers simultaneously fish this 4-mile reach. The two public campgrounds and day use parking areas

managed by federal agencies are routinely filled to capacity and are not able to completely meet public demand for access to the fishery. During peak fishing times, waiting periods of several hours are often required for parking, and reservations made months in advance are required for camping areas.

In 1993, the ADF&G, SF purchased property that adjoins U.S. Fish and Wildlife Service (USFWS) lands along the north shore of the Kenai River directly across from the confluence of Kenai and Russian rivers. The 4.4-acre property, formerly the site of the privately owned Sportsman's Lodge, was purchased for $375,000. This purchase was made with Federal Dingell-Johnson (D-J) funds to provide a launch and take-out area for boat anglers fishing the Kenai River and to provide an additional 50 to 75 parking places for anglers. Purchase of this property and subsequent improvements in 2000 have partially alleviated parking issues in this area during peak days of the fishery.

Historically, as angler effort has increased in this fishery, the regulations governing the recreational fishery have become more restrictive to ensure sustainability of the stock. In 1965, the use of treble hooks was prohibited in an effort to reduce snagging. In 1966, terminal gear was limited to flies and a fly-fishing-only area was designated. In 1967, the BOF required that only fish hooked in the head, mouth, or gills could be retained and in 1969, this regulation was amended to include all fresh waters of the Kenai Peninsula. In 1973, the regulation was further amended to require that fish hooked elsewhere than in the mouth be released immediately.

Currently, the sport fishery is restricted to terminal tackle consisting of a single-hook, unweighted fly, with a maximum hook gap of 3/8 inch or less. This measure was implemented to reduce angler efficiency and lessen the angler's ability to snag fish illegally. This affords an increased measure of protection to fish as they near their spawning destinations. In order to protect "schooled" fish that hold in the confluence area of the Kenai and Russian rivers (termed the "sanctuary"), the sanctuary is closed to recreational fishing until the lower end of the early-run escapement range is projected. Only the lower 3 miles of the Russian River drainage, from 100 yards upstream of its mouth to an ADF&G marker 600 yards downstream of the falls, are open to salmon fishing. The upstream portion of Russian River (e.g., above the ADF&G marker below the falls) is closed to all salmon fishing to allow fish to migrate and spawn in the remainder of the drainage.

RUSSIAN RIVER SOCKEYE SALMON MANAGEMENT OBJECTIVES

Management of this fishery is governed by the *Russian River Sockeye Salmon Management Plan* (5 AAC 57.150). The primary management objective, as directed in the plan, is to achieve an escapement goal of 14,000 to 37,000 early-run sockeye salmon and 30,000 to 110,000 late-run sockeye salmon in the Russian River system. The escapement goal range for both runs have been achieved or exceeded in all years since 1977, based upon the management plan in effect at that time (Tables 13).

The *Russian River Sockeye Salmon Management Plan* recognizes that commercial users as well as mainstem Kenai and Russian River recreational anglers harvest late-run sockeye salmon stocks bound for the Russian River drainage. It stipulates how the burden of conservation shall be distributed between commercial and recreational users. In the event that conservation measures are required to achieve the minimum escapement goal, ADF&G may restrict Kenai River drainage recreational fisheries downstream to, and including, Skilak Lake. Restrictions to the commercial fishery shall be limited to meeting the inriver escapement goal for Kenai River

late-run sockeye salmon as outlined in the *Kenai River Late-Run Sockeye Salmon Management Plan* (5 AAC 21.360).

The SEG ranges for both runs are based on weir counts that have sustained the fishery. Although precise biological data is collected annually at the weir it has not been sufficient to develop BEGs for both runs. In the case of the early run, addition of the most recent three years (2001-2003 brood years) of biological data allowed ADF&G to recommend a BEG of 22,000-42,000 for the 2011 BOF meeting. Since the Russian River late-run is a component of the larger late-run returning to the Kenai River drainage, the total returns for late-run Russian River sockeye salmon are not known. Genetic stock identification (GSI) was undertaken to identify the degree to which late-run Russian River sockeye salmon are harvested by the various mixed-stock marine commercial, personal use and sport fisheries in order to reconstruct the total return of late-run Russian River sockeye (Eskelin et al. *In prep.*). This will enable ADF&G to better assess late-run sockeye salmon production in the Russian River drainage.

INSEASON MANAGEMENT APPROACH

The early- and late-run fisheries are managed by escapements counted at a weir at the outlet of Lower Russian Lake. In years of low abundance, the escapement is achieved through inseason restrictions to the recreational fishery. In years of high abundance, the fisheries are liberalized to provide additional harvest opportunity. The weir is installed during early June each year and is removed from the river during early September. Early-run sockeye salmon are classified as those that pass through the weir from the weir installation date through July 14, while fish passing through the weir from July 15 until the weir is removed are classified as late-run sockeye salmon.

Sockeye salmon run strength is determined by examining three indicators: weir counts, instream fish estimates, and observed fishery performance. Weir counts are the primary indicator of run strength. Historical weir counts provide the mean migratory run timing statistics to project inseason abundance and escapement. An estimation of run strength can generally be made several days prior to the historic mid-point of the run (June 29 or 30 for the early run and August 5 for the late run). In some years, fish have been late or have "held" in the Kenai River. Weir counts are supplemented by onsite enumeration of the fish present downstream from the weir, including the area between the weir and the falls, the falls area, lower Russian River, and the sanctuary area (Figure 6). In addition, observed fishery performance in the Kenai River downstream from the sanctuary area for the early run and throughout the entire fishery downstream to Skilak Lake in the late run are used as an indicator of run strength. If inseason restrictions become necessary in order to achieve the escapement goal, the *Russian River Sockeye Salmon Management Plan* specifies several options to ensure adequate escapement which include bag limit reductions and closures by area and time in the Russian River as well as the mainstem Kenai River downstream to and including Skilak Lake. When inseason restrictions are implemented, they remain in place until the lower end of the escapement range is projected.

The sockeye salmon recreational fishery opens June 11 and closes August 20 by regulation. Early-run returns have been high in recent years and the recreational fishery has often been liberalized inseason. The liberalization of the fishery is generally implemented by opening the 700-yard sanctuary area at the confluence of the Kenai and Russian rivers to fishing. The sanctuary area opens by regulation after the early run period on July 15. However, it is opened

by EO for the remainder of the sockeye salmon fishing season when information indicates the lower end of the early-run SEG (14,000-37,000) will be achieved. Experience has proven that a daytime opening facilitates an orderly expansion of fishing opportunity in the fishery. Late evening and midnight openings are avoided. If weir counts, instream fish estimates, and observed performance of the fishery remain high and the projected escapement is greater than the upper bound of the SEG, the bag limit is increased to contain the escapement into Lower Russian Lake within the SEG. Typically, the bag limit increase is applied in all waters of the Kenai and Russian rivers fly-fishing-only waters, which include the Russian River, the Russian River sanctuary, and that portion of the Kenai River from ADF&G regulatory marker located below the Ferry Crossing on the Kenai River downstream to the power line crossing (Figure 6). Historically, the bag and possession limit has been increased from 3 fish to 4 or 6 fish.

2008 EARLY-RUN FISHERY PERFORMANCE

The weir was operational by June 7, 2008. The 2008 sockeye salmon sport fishery was liberalized with the issuance of one EO on June 24 that opened the sanctuary area to fishing for sockeye salmon on June 26 because ADF&G had determined that the minimum early-run sockeye salmon spawning escapement goal of 14,000 fish would be achieved (EO 2-RS-1-13-08; Appendix A1). The final early-run sockeye salmon escapement through the Russian River weir was 30,989 fish and was within the SEG (Table 13). The estimated early-run Russian River sockeye salmon sport harvest was 42,492 and the 2008 total return was 74,409 fish (Table 13).

2009 EARLY-RUN FISHERY PERFORMANCE

The weir was installed on June 9 at Lower Russian Lake. On June 10, large numbers of sockeye salmon were observed in the Russian River sanctuary area. The 2009 fishery was liberalized on two occasions. The first EO opened the sanctuary area to fishing for sockeye salmon on June 15 because ADF&G determined that the minimum early-run sockeye salmon spawning escapement goal of 14,000 fish would be achieved (EO 2-RS-1-13-09; Appendix A2). The increase in the projected escapement, high catch rates in the sport fishery, and presence of excessive numbers of sockeye salmon downstream of the weir and in the Russian River Falls as well as large numbers in the area of the Russian River open to fishing resulted in the issuance of a second EO that increased the bag and possession limit to 6 and 12 sockeye salmon in the area of the Kenai and Russian rivers fly-fishing-only waters downstream to Jim's Landing at the Kenai River RM 69.5 (EO 2-RS-1-14-09; Appendix A2). The lower bound of the SEG (14,000–37,000) was achieved on June 14 and the resulting escapement was 52,178 sockeye salmon, while the estimated harvest was 59,097 fish (Table 13). The 2009 total run was approximately 111,818 and is one of the largest early-runs on record (Table 13).

2010 EARLY-RUN FISHERY PERFORMANCE

Following installation of the weir on June 9, initial stream surveys of the Russian River and sanctuary area at the start of the sport fishery on June 11 indicated few sockeye were present. Stream survey observations were corroborated by reports of low catch rates in the sport fishery and relatively low numbers of sockeye salmon counted through the weir each day through mid-June. The numbers of anglers fishing the area was observed to be lower than in previous years and catch rates were also low due to low sockeye salmon abundance. No management actions were taken for the 2010 early-run sockeye salmon sport fishery. The lower bound of the SEG (14,000–37,000) was achieved on June 30 and the final escapement was 27,074 sockeye salmon

(Table 13). The 2010 estimates of fishing effort and harvest will be available when the SWHS is published in mid-2011.

2008 Late-Run Fishery Performance

Sockeye salmon classified as late-run fish where enumerated at Russian River weir from July 15 through September 11. The 2008 late-run sockeye salmon escapement through the Russian River weir was 46,638 fish and was within the SEG range of 30,000 to 110,000 fish (Table 13). This was below the previous 10-year (1998–2007) average escapement of 91,642 fish. The lower goal range of 30,000 fish was achieved on August 15, 2008. This was later than anticipated and the lowest late-run escapement count through the weir since 1996 (Table 13). The total return of late-run fish to the Russian River area was 70,796 and was similar to the 2007 run of 70,229 (Table 13). No management actions were taken for the 2008 late-run Russian River sockeye salmon sport fishery. Sport fishing catch rates were only fair in the Russian River, however catch rates were generally better in the Kenai River below the Russian River.

2009 Late-Run Fishery Performance

The weir was removed on August 31 after a total escapement of 80,088 late-run sockeye salmon had been counted (Table 13). The escapement was within the SEG (30,000–110,000) and was near the previous 10-year (1999-2008) average escapement of 84,957 fish. Fishery observations indicated that catch rates were good to excellent. The resulting sport harvest of 33,935 fish is the largest estimated for the late-run fishery since 1990 (Table 13). The total return of late-run sockeye salmon was approximately 114,454 fish (Table 13). No management actions were taken for the 2009 late-run Russian River sockeye salmon sport fishery.

2010 Late-Run Fishery Performance

During the 2010 season, the late-run Russian River Area sockeye salmon sport fishery was closed on August 12 by EO on August 10 (EO 2-RS-1-43-10; Appendix A3). The EO closed the sockeye salmon sport fishery in the Kenai and Russian rivers fly-fishing-only waters downstream to the power line below the Russian River Ferry Crossing because ADF&G was not able to project that the SEG of 30,000 to 110,000 sockeye salmon would be achieved. An increase in the passage rate of sockeye salmon occurred August 20. The lower bound of the SEG (30,000–110,000) was obtained on August 25 and the escapement was 38,848 sockeye salmon through September 7 (Table 13). The 2010 late-run Russian River sockeye salmon sport fishery was characterized by low sockeye abundance and low angler success rates. The 2010 estimates of fishing effort, harvest, and estimate of the total run to the area will be available when the SWHS is published in mid-2011.

KENAI RIVER LATE-RUN SOCKEYE SALMON RECREATIONAL FISHERIES

2011 Proposals to the Alaska Board of Fisheries Concerning Kenai River Late-Run Sockeye Salmon Sport Fishery Issues

There are no proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab

(Statewide Except Southeast/Yakutat) Regulations" (ADF&G 2010b) that would have any level of impact on the sport fisheries targeting late-run sockeye salmon in the Kenai River:

BACKGROUND AND HISTORICAL PERSPECTIVE

The Kenai River originates at Kenai Lake near the community of Cooper Landing and terminates in Cook Inlet adjacent to the city of Kenai. The river is glacial and approximately 82 miles in length. It is paralleled for much of its length by the highway road system making it the most accessible of Alaska's major salmon producing rivers (Figure 7).

Historically, snagging was the traditional harvest method for taking sockeye salmon in the Kenai River. It was generally believed that this species would not strike a lure or accept bait and that conventional (non-snagging) techniques could not be used to harvest these fish. When the number of sport anglers was relatively small, snagging posed neither a biological nor a social problem. However, as the population of Southcentral Alaska expanded and the Kenai River sport fishery increased in popularity, anglers began to oppose the practice as an unethical harvest method. Anti-snagging measures, first adopted at the Russian River, culminated in 1975 with the BOF promulgating Alaska's present freshwater anti-snagging regulation. In 1979, snagging was prohibited in salt water within a 1-mile radius of the Kenai River mouth and in 1984 all snagging in salt water north of Anchor Point was similarly prohibited.

Because snagging was no longer a legal harvest method in either fresh or salt water, anglers began to experiment with alternative terminal tackle in an attempt to legally harvest sockeye salmon in the Kenai River. Initial efforts were moderately successful with annual harvests averaging 23,584 sockeye salmon from 1977 through 1981 (Mills 1979-1980, 1981a-b, 1982).

Between 1982 and 1985, the average harvest increased to 48,570 (Table 14). This dramatic increase is attributed to the use of coho flies as terminal gear. The coho flies are drifted along the bank similar to the technique used for a number of years at the Russian River. The belief that sockeye salmon could not be harvested with conventional tackle was gradually dispelled and this innovative technique prompted additional anglers to seek these fish. The change in fishing technique, coupled with relatively clear water in 1982 and 1983, played a large role in the increased harvests. The larger harvests were further influenced by the magnitude of the inriver runs, which exceeded 600,000 sockeye in both 1982 and 1983 (Table 15). A sonar count of 344,571 fish (Table 15) resulted in a reduced 1984 sport harvest (15,702 fish; Table 14). Kenai River late run sockeye salmon sport fish harvests from 1981 to 2009 have ranged from 15,702 to 308,850 and averaged 174,631 fish (Table 14).

The recreational fishery for sockeye salmon in the Kenai River is characterized as follows:

1. Large numbers of sockeye salmon must be present to provide acceptable harvest rates.
2. The fishery is short in duration, usually from July 16 to August 5, or approximately 20 days.
3. The fishery is affected by water conditions; i.e., high water levels with high discharge inundate shore fishing locations with turbid water and generally decreases angler efficiency whereas average discharge with clear water increases catch rates.
4. Only a percentage of the total angler effort is directed toward sockeye salmon, irrespective of run strength or fishing conditions. This is a result of the Kenai River being a multi-species fishery in July and August, with only a percentage of the total angler effort directed toward sockeye salmon. ADF&G expects a steady increase in angler effort as the population of

Alaska increases. Angler participation in the Chinook salmon sport fishery, coho salmon sport fishery, and during even years, the sport fishery for pink salmon, as well as fishing effort for resident rainbow trout and Dolly Varden, account for the remainder of total angler participation.

KENAI RIVER SOCKEYE SALMON LATE-RUN MANAGEMENT OBJECTIVES

Kenai River late-run sockeye salmon are managed under provisions of the *Kenai River Late-Run Sockeye Salmon Management Plan* (5 AAC 21.360). SF manages the inriver sport fishery. Late-run Kenai River sockeye salmon are a component of the harvest of the Upper Cook Inlet commercial fishery managed by the Division of Commercial Fisheries (CF). Since 1999, the Kenai River has been managed to achieve an optimum escapement goal (OEG) of 500,000 to 1,000,000 sockeye salmon. The OEG represents the actual spawning escapement, defined as the inriver sonar estimate less inriver sport harvest above the Soldotna Bridge. The plan also directs ADF&G to do three things:

1. manage Kenai River late-run sockeye salmon primarily for commercial uses
2. minimize commercial harvests of Northern District coho salmon, late-run Kenai River Chinook salmon, and Kenai River coho salmon; and provide reasonable opportunity to harvest salmon in those sport and guided sport fisheries
3. manage all fisheries to meet the OEG, achieve inriver goals, and distribute escapements evenly within the OEG range and in proportion to run size

Inriver goals set in the plan are ranges of sockeye salmon passing the sonar at RM 19 (Figure 8) of the Kenai River, and are derived from three levels of projected run strength. Ranges of projected run strength and corresponding inriver (sonar) goals are outlined in the following plan:

Projected Run Strength	Inriver (Sonar) Goal
1. less than 2 million fish	650,000-850,000 sockeye salmon
2. 2-4 million fish	750,000-950,000 sockeye salmon
3. greater than 4 million fish	850,000-1,100,000 sockeye salmon

The ADF&G, Division of Commercial Fisheries (CF) operates the RM 19 sonar and is responsible for managing UCI commercial fisheries to achieve the inriver (sonar) goals. It is the responsibility of the ADF&G, SF to assess inriver harvests and to take steps to ensure that the OEG range is achieved by issuing EOs to restrict or liberalize the sport harvest if necessary.

INSEASON MANAGEMENT APPROACH

Historically, management of this fishery has changed in concert with changes in the *Kenai River Late-Run Sockeye Salmon Management Plan*. Prior to the late 1980s, management of the sockeye salmon recreational fishery was accomplished through changes to bag and possession limits. Sport harvests were not large enough to significantly impact spawning escapements. Growth in this fishery during the late 1980s and early 1990s witnessed significantly greater inriver harvests.

In 1996, the BOF amended the management plan to incrementally increase the inriver escapement goals for late-run Kenai River sockeye salmon. The inriver goal during the 1996 season was established at 550,000 to 800,000 fish. The inriver goal was subsequently increased to 550,000 to 825,000 fish in 1997 and 550,000 to 850,000 fish in 1998. The inriver goal

changed under the tiered management system adopted by the BOF in 1999. Since that time, the inriver goal (described above) is based on the abundance of late-run Kenai River sockeye salmon.

The management of the inriver recreational fishery relies on sonar estimates of inriver run strength, escapement and postseason assessment of the sport harvest from the SWHS. There is no need to assess the recreational harvest of sockeye salmon inseason, provided that the inriver goal can be met. The current management plan provides a buffer or escapement gap between the inriver goal and the lower limit of the OEG range. This gap between the lower limit of the OEG and the inriver goal estimated at the sonar is intended to provide for inriver recreational harvests. If the inriver goal (sonar estimate) is achieved, the recreational fishery can be prosecuted without restriction. This management strategy for the Kenai River recreational sockeye salmon fishery depends heavily upon the successful management of the commercial salmon fishery in UCI to meet the inriver goal. Achieving the inriver goal provides sockeye salmon for inriver harvests and achieves the OEG.

2008 FISHERY PERFORMANCE

The 2008 preseason forecast for Kenai River late-run sockeye salmon was for an approximate run of 3 million fish. This forecasted run size was near the long-term average run-size of just over 3.0 million. In season, the preliminary run size was estimated to be less than forecasted but in the range of 2 to 4 million fish. However due to the strength of the 2008 Kenai River sockeye salmon run during late July, the Kenai River sockeye sport fishery bag and possession limits were not liberalized.

The actual run lagged behind the historic average during the week of July 25–31 and did not increase in strength. By August 1, the run was projected to be less than 2.0 million fish, (in the range of 1.8 to 1.9 million fish). Based on this projection, the inriver goal according to the management plan is 650,000 to 850,000 fish. In an effort achieve this goal, two EOs were issued restricting the Kenai River sockeye salmon late-run sport fishery. The first EO issued on July 30 closed sport fishing for sockeye salmon effective August 1 downstream of the sonar at RM 19 of the Kenai River (EO 2-RS-1-24-08; Appendix A1). The second EO issued on August 4 reduced the bag and possession limit of sockeye salmon to 1 fish, upstream of the sonar, except in Kenai and Russian rivers fly-fishing-only waters, effective August 6 (EO 2-RS-1-25-08; Appendix A1).

The final estimates for the 2008 sockeye salmon run indicate the total run was about 2.3 million fish (Shields 2009). The number of sockeye salmon estimated by the sonar was 614,946 (Table 15). After accounting for the sport harvest above the sonar, the estimated spawning escapement was 407,118 sockeye salmon and was below the OEG range (500,000-1,000,000) (Table 15).

2009 FISHERY PERFORMANCE

The 2009 preseason forecast for Kenai River late-run sockeye salmon was for a run of approximately 2.4 million fish (Shields 2010a). On July 24, ADF&G used inseason assessment data to project that the 2009 Kenai River sockeye salmon run was less than 2 million fish. Based on this projection, the inriver goal is 650,000 to 850,000 fish. At that time approximately 500,000 sockeye salmon had passed the sonar. The minimum inriver escapement goal of 650,000 fish in the Kenai River was achieved on August 2, and by August 5 the cumulative passage estimate had exceeded 700,000 sockeye salmon. The final sockeye salmon passage estimate past the sonar was 745,170 fish (Table 15). The final estimated escapement was

503,659 fish, which was within the OEG range (500,000-1,000,000). The final estimated total abundance of Kenai River late-run sockeye salmon was approximately 2.4 million fish, similar to the preseason forecasted run strength. During 2009, no inseason management actions were taken for the Kenai River late-run sockeye salmon sport fishery.

2010 Fishery Performance

The 2010 preseason forecast for Kenai River late-run sockeye salmon was for a run of approximately 1.7 million fish (Shields 2010b). This forecasted run size was below the long-term average run size of just over 3.0 million sockeye salmon. On July 23, the inseason run size was estimated to be greater than 2 million fish. Due to the strength of the 2010 Kenai River sockeye salmon run, an EO was issued on July 23 to increase the bag and possession limit to 6 fish effective July 24 (EO 2-RS-1-39-10; Appendix A3).

Although the final estimates for the 2010 Kenai River sockeye salmon run are not available, **preliminary results** indicate a total run of about 3.2 million fish. The estimated number of sockeye salmon to pass the sonar counter was 970,662 fish (Table 15). When sport harvest estimates become available in mid-2011, the 2010 Kenai River sockeye salmon spawning escapement is expected to be within the OEG range (500,000-1,000,000).

KENAI RIVER COHO SALMON RECREATIONAL FISHERIES

2011 Proposals to the Alaska Board of Fisheries Concerning Kenai River Coho Salmon Sport Fishery Issues

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations" (ADF&G 2010b) will likely have some impact on the sport fisheries targeting coho salmon in the Kenai River:

Proposal Numbers: 223, 204, 205, 206, 213, and 214.

Background and Historical Perspective

Run timing of coho salmon bound for the Kenai River and other Kenai Peninsula systems is slightly later than many Northern District systems. Anecdotal evidence suggests that two runs of coho salmon migrate into Kenai River. However, creel surveys conducted from 1991 to 1993 and in 1998 indicate that two distinct runs are not readily discernable from harvest rate data (Clark et al. *Unpublished*). Furthermore, recoveries of returning adult coho salmon, marked as smolt, in the Kenai River indicate that time of entry and time of spawning are independent of time of marking as smolt (Clark et al. *Unpublished*). As a result, coho salmon in the Kenai River are managed with harvest information and smolt abundance as a single stock.

Coho salmon typically begin entering Kenai River in late July and continue through mid-September, and at much reduced levels into late-November. It is assumed that the Kenai River has the only significant late-season coho salmon run in Cook Inlet. Recreational effort shifts to coho salmon almost immediately after the termination of the Chinook salmon season at the end of July or during the first week in August. The inriver sport fishery occurs downstream from

Kenai Lake to the river's terminus at Cook Inlet (Figure 8). Unlike the highly mobile Chinook salmon fishery, the coho salmon fishery is conducted from anchored boats as well as from shore. Beginning in the year 2000, bag and possession limits were reduced to 2 fish. Additionally, a 3-day closure was adopted to provide a temporal break between the intensely targeted Chinook salmon fishery at the end of July and the traditional start of coho salmon fishing during the first week in August. In 2002, the BOF adopted the closure as an allocative means to reduce overall harvest of coho salmon by sport anglers as part of the *Kenai River Coho Salmon Conservation Management Plan*. The plan established a coho salmon fishing season end date of September 30 and also included various restrictions on the use of bait as well as restrictions to guided anglers. Coho salmon fishing regulations were liberalized for the Kenai River by the BOF in 2005. Changes resulted in a net gain in fishing time and area and also incorporated less restrictive fishing methods. Several liberalizations allowed for the Kenai River coho salmon sport fishery included the following:

1. The 31-day season was extended for coho salmon fishing within the Kenai River drainage: from September 30 to October 31.

2. Bait was allowed through the entire season downstream of the Upper Killey River.

3. The August 1–3 coho salmon fishing closure downstream of Skilak Lake was repealed, allowing a continuous season from July 1 through October 31.

4. The regulation prohibiting fishing after a person takes a bag limit of 2 coho salmon below Upper Killey River was reduced to below the Soldotna bridge, allowing a person to continue to fish upstream of the Soldotna bridge.

5. Fishing from a guide vessel was allowed on Monday for species other than coho salmon upstream of the confluence of the Moose and Kenai rivers.

Coho salmon fishing regulations were also liberalized for the Kenai River by the BOF in 2008. Changes resulted in an increase in the bag and possession limit as well as a net gain in fishing time. The most recent liberalizations allowed for the Kenai River coho salmon sport fishery included the following:

1. A bag and possession limit increase from 2 coho salmon to 3 coho salmon within Kenai River beginning September 1, except within the Russian River and Kenai/Russian Rivers fly-fishing only waters area.

2. A 30 day season extension for coho salmon fishing within the Kenai River drainage downstream of Skilak Lake: from October 31 to November 30.

Kenai River coho salmon stocks are subject to commercial exploitation in Upper Cook Inlet (UCI) (Table 16). Data from a comprehensive coded wire tagging (CWT) program indicated that Kenai River coho salmon stocks in UCI commercial salmon fisheries were principally

harvested in the Central District eastside setnet (ESSN) fishery along the entire coastline of the Kenai Peninsula, most of this harvest was taken from the setnet fisheries on Coho and Ninilchik beaches (south of the Kasilof River) (Carlon and Hasbrouck 1996-1998; Massengill and Carlon 2004a-b, 2007a-b;Massengill 2008; Massengill and Evans 2007; Robert Massengill ADF&G Sport Fish Biologist, Soldotna, personal communication). The majority of the total harvest of Kenai River stocks occurs in the recreational fisheries of the Kenai River (Table 16).

Kenai River coho salmon are also harvested in personal use and subsistence fisheries. In 1981 and 1983-1993, there was a fall personal use or subsistence set gillnet fishery for coho salmon on the eastside beaches that were open to commercial setnetting (Table 16). This fishery was open in September, and therefore harvested late-running coho salmon. In 1985 and 1991 through 1994, there was also a subsistence set gillnet fishery on Central and Northern District beaches that were open to commercial setnetting. This fishery was generally open on scheduled days from May through September, with the open periods concentrated in July (Brannian and Fox 1996).

Kenai River coho salmon are also harvested in the Kenai inriver personal use dip net fishery (Tables 16 and 6). This fishery has existed in various forms in most years since 1981 and targets Kenai River sockeye salmon in late July and early August. It is described in more detail in the *Kenai River Sockeye Salmon Dip Net Fishery* section of this report. In March 1997, the Alaska BOF changed the closing date of this fishery from August 5 to July 31, to reduce the harvest of coho salmon. The personal use fishery was extended EO from August 3 through 10 during 2006 due to a late return of sockeye salmon to Kenai River.

Despite relatively stable harvests in the recreational fishery through the early 1990s, fisheries managers became increasingly concerned that the current harvest levels could not be sustained.

The SF began a stock assessment program in 1992 which focused upon the estimation of annual smolt production as an indicator of future abundance (Carlon 2000, 2003; Carlon and Hasbrouck 1997-1998). Data from this program indicated a decline in smolt abundance from approximately 1,000,000 from 1992 to 1993 to less than 500,000 in 1995. Because this decline in smolt abundance was likely to result in reduced adult returns to the Kenai River, the BOF addressed this fishery in March 1997.

In 1998, the SF began an adult coho salmon tagging program to estimate the number of adult coho salmon returning to Kenai River. This program provided data to estimate the number of adult coho salmon returning to the Sterling Highway Bridge at RM 20 in Soldotna, with acceptable levels of accuracy and precision from 1999-2004. In addition, this inriver estimate in combination with the sport harvest data from the SWHS enabled ADF&G to estimate total returns, spawning escapement, and exploitation of Kenai River coho salmon. These estimates, combined with the smolt abundance estimates, also provided estimates of smolt to adult survival.

From 1999 through 2004, the coho salmon returns averaged about 140,000 fish with harvests averaging just over 62,000 fish. From 2000 to 2004, exploitation rates ranged from about 35% to 47%. Smolt abundance ranged from nearly 580,000 to 1,200,000 with marine survival ranging from 6 to 32% (Carlon and Evans 2007; Massengill and Evans 2007).

From 2005 through 2007, the focus of the coho salmon stock assessment program was to estimate smolt abundance through a mark-recapture project. In this project, smolt were tagged in the spring and early summer at Moose River. Fish wheels operated upstream of the Soldotna

Bridge at RM 28 captured returning adults in order to estimate the number of smolt leaving the system. Smolt tagging was discontinued in 2007 and returning adults were sampled for tags during 2008 (Robert Massengill, Division of Sport Fish Biologist, Soldotna, personal communication).

Annual Kenai River Drainage-wide coho salmon sport harvests averaged 47,213 fish (1993-1999), while harvests have averaged 54,865 fish (2000–2009; Table 16). The sport harvests of coho salmon in the Kenai River have increased from 9,537 fish in 1977 to a record high of 86,711 fish in 1994 (Table 17, Figure 9). The Kenai River coho salmon sport harvest from 1981 to 1999 averaged 47,371 fish, the most recent 10-year average sport harvest (2000–2009) is 49,839 fish (Table 17).

KENAI RIVER COHO SALMON MANAGEMENT OBJECTIVES

In March 1997, the BOF adopted the *Kenai River Coho Salmon Management Plan* (5 AAC 21.357). This plan contained regulations that reduced the total (combined sport and commercial) harvest by approximately 20%. In the spring of 2000, the BOF amended this plan again and adopted it as the *Kenai River Coho Salmon Conservation Management Plan*. It contains management directives and outlines the burden of conservation between various user groups in the NKPMA**.** It directs ADF&G to minimize the incidental take of Kenai River coho salmon stocks in the commercial fishery. It also directs ADF&G to manage Kenai River coho salmon stocks primarily for sport and guided sport uses in order to provide fishermen with reasonable opportunity to harvest these stocks over the entire run, as measured by the frequency of restrictions.

Prior to the February–March meeting of the BOF in 1999, early-run Kenai River coho salmon were addressed in the *Upper Cook Inlet Salmon Management Plan* (5 AAC 21.363). This BOF-adopted management plan directed ADF&G to minimize the harvest of this species in the Cook Inlet commercial salmon fishery. In 1999, the BOF amended this plan.

In 2005 the *Kenai River Coho Salmon Conservation Management Plan* was repealed. The resulting plan, *Kenai River Coho Salmon Management Plan* (5AAC 57.170) provides the current regulatory framework and guidelines for management to ensure an adequate escapement of coho salmon into Kenai River.

In addition to the aforementioned management plan, department objectives are

1) to provide opportunity for angler participation at a level that can be supported by the fisheries resource and associated habitat and
2) to ensure, through appropriate management and research programs, that the spawning escapement does not decline below levels necessary to ensure sustained yield.

INSEASON MANAGEMENT APPROACH

Currently, there are no cost effective methods available to accurately estimate the inriver coho salmon return inseason. Because of the lack of quantitative data to assess coho salmon stock status, an escapement goal has not been established. With the exception of 1997 when use of bait was prohibited and the coho salmon bag and possession was reduced to l fish and in 2004 when the coho salmon season was extended 31 days from September 30 to October 31, there has been no inseason management of this fishery.

Inseason fishery performance from 1999 through 2007 was gauged by fish wheel catches from the coho salmon stock assessment program, through direct observation by research and management staff, and by information provided by anglers. Escapement was not estimated from ADF&G fish wheels inseason. The capture rates from this project indicated the Kenai River coho salmon run size as estimated by the index as being low, medium or high in magnitude. Currently, inseason fishery performance is assessed through information provided by anglers.

The SWHS is currently used to assess the Kenai River coho salmon fishery performance postseason (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b). Results from this survey are typically available during the year following the season. A comprehensive CWT project in Cook Inlet has estimated the annual smolt outmigration from the Moose River drainage. These estimates were previously thought to be a useful management tool, under the assumption that there is a correlation between the magnitude of smolt outmigration and the magnitude of total return. However research results indicate that the correlation is weak due to variation in smolt to adult survival.

2008–2010 Fishery Performance

Inseason run strength and fishing success were gauged by reports volunteered by guides and individual anglers. Final harvest estimates are provided by the SWHS.

The *Kenai River Coho Salmon Management Plan* was established to prevent the over exploitation of the stock in times of average or below-average returns. Although no estimate for the total return of coho salmon to Kenai River is available, estimates of harvest from the SWHS for the 2008 and 2009 coho salmon fisheries indicated run strength for both years were approximately average. The estimated harvest was approximately 51,624 fish and 49,960 fish in 2008 and 2009, respectively (Table 17). These harvests were above the 1981 to 2007 average estimated harvest of approximately 47,111 coho salmon (Table 17). Reports from anglers during the 2010 Kenai River coho salmon sport fishery indicated the fishery started out very slow but improved. Poor to fair coho salmon catches were reported in early August, though catch rates improved in late-August. Reports indicated that good fishing waned later in the run during September. Coho salmon were caught throughout the drainage and the run timing appeared to be normal with bright fish present throughout the run.

NORTH KENAI PENISULA MANAGEMENT AREA COHO SALMON RECREATIONAL FISHERIES

2011 Proposals to the Alaska Board of Fisheries Concerning NKPMA Coho Salmon Sport Fishery Issues

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations" (ADF&G 2010a) will likely have some impact on the sport fisheries targeting coho salmon in the NKPMA:

Proposal Numbers: 223, 204, 205, 206, 213, and 214.

BACKGROUND AND HISTORICAL PERSPECTIVE

Run timing of coho salmon bound for NKPMA systems is slightly later than many Northern District systems. Coho salmon typically begin entering systems in late July and continue through mid-September. The Kasilof and Swanson rivers support the major coho salmon fisheries outside of the Kenai River drainage with smaller fisheries also occurring at Crooked, Resurrection and Six Mile creeks. Unlike the Chinook salmon fisheries, area coho salmon fisheries are generally more accommodating to angler participation, i.e., easy to access, shore or boat fishing with a wide variety of terminal tackle and less specialized equipment. Beginning in the year 2000, bag and possession limits were reduced to 2 fish.

Similar to Kenai River, NKPMA coho salmon stocks are assumed to be subject to an unknown degree of commercial exploitation in Upper Cook Inlet (UCI). Kasilof River coho salmon are also harvested in the personal use fishery (Table 6). The Kasilof River personal use fishery is open through August 7.

Sport harvests of coho salmon in the Kasilof and Swanson river drainages as well as in Six Mile and Resurrection creeks has increased, with some variation, for the most recent 10-year average (2000–2009) over those observed historically (Table 18).

NKPMA COHO SALMON MANAGEMENT OBJECTIVES

This fishery is not specifically addressed in any management plan adopted by the BOF of Fisheries. ADF&G objectives for this fishery are

1) to provide opportunity for angler participation at a level that can be supported by the fisheries resource and associated habitat and
2) to ensure, through appropriate management and research programs, that the spawning escapement does not decline below levels necessary to ensure sustained yield.

INSEASON MANAGEMENT APPROACH

Currently, no active research programs are associated with this fishery. Harvest is estimated by the SWHS. With allowances for variation, this survey indicates a relatively stable fishery. A stable fishery may indicate relatively stable populations with sufficient numbers of coho salmon in the spawning escapements to ensure the fishery continues to be managed for sustained yield. The fishery has not been managed inseason with the exception of 1997 when use of bait was prohibited and the coho salmon bag and possession was reduced to l fish and is managed inseason by regulation.

2008–2010 FISHERY PERFORMANCE

Inseason run strength and fishing success were gauged by staff observation and those volunteered by guides and individual anglers.

The estimated harvest in the Kasilof River was 3,613 in 2008 and 2,725 in 2009 (Table 18). Harvest during each year was above the long term (1981–1999) average harvest of 2,519 coho salmon. The most recent 10-year (2000–2009) average harvest is 3,547 fish. Harvests in the Swanson River drainage showed a similar pattern of a larger coho salmon harvest in 2008 (2,814) than in 2009 (1,790) (Table 18). Coho salmon harvest estimates in both Six Mile and Resurrection creeks during 2008 and 2009 were larger than the long-term average harvests

estimated for these systems. Reports from anglers during the 2010 coho salmon fishery indicated the fishery was relatively stable with fair to good coho salmon catches reported from early August until September. ADF&G expects that the 2010 harvests of coho salmon from these fisheries will be near the recent 10-year average for each system.

NORTH KENAI PENINSULA MANAGEMENT AREA RESIDENT SPECIES RECREATIONAL FISHERIES

KENAI RIVER RAINBOW TROUT RECREATIONAL FISHERY

2011 Proposals to the Alaska Board of Fisheries Concerning Kenai River Rainbow Trout Sport Fishery Issues

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations (ADF&G 2010a) will likely have some impact on the sport fisheries targeting rainbow trout in the Kenai River:

Proposal Numbers: 215, 216, 248, and 249.

Background and Historical Perspective

The Kenai River is the most heavily utilized river for freshwater sport fishing in Alaska and one of the largest rainbow trout fisheries in the United States. Although most of the anglers participate in the river's salmon fisheries, the Kenai River drainage also supports a major rainbow trout fishery with annual catches that have ranged from 8,720 to 202,875 fish since 1984 (Table 19, Figure 10).

Increasing public concern for the rainbow trout resource and a scarcity of biological and fishery data from the early years of the fishery prompted the BOF to adopt increasingly restrictive regulations, implemented in the years outlined below:

1959–1964	Season: Areawide spring closure from April 1 to about May 26.
	Bag limit: Combined trout/char/grayling/salmon under 16 inches: 10/day, only 2 over 20 inches.
1965–1977	Season: Kenai River changes to no closed season.
1978	Daily bag limit: (Areawide) Combined trout/char/grayling/salmon under 16 inches: 10/day, only 1 over 20 inches.
1979	Annual bag limit: (Areawide) Harvest record required for rainbow/steelhead trout over 20 inches - 2/year.
1980–1981	Annual bag limit: (Areawide) Increased to 5 rainbow/steelhead trout over 20 inches.
	Gear restriction: (Kenai River) In flowing waters upstream from the Moose River to Kenai Lake only single-hook, artificial lures allowed from January 1 to May 31.

1982–1983 Season: (Kenai River) Spring closure from January 1 to June 14 (excludes Skilak Lake).

Bag limit: (Areawide) Changed to 5 rainbow trout with only 1 over 20 inches.

1984–1986 Season: (Kenai River) Spring and fall closure from November 1 to June 14 (includes Skilak Lake).

Bag limit: (Kenai River) Changed to 3/day, only 1 over 20 inches.

Annual bag limit: (Areawide) Rainbow/steelhead trout over 20 inches—changed to 2/year.

Gear restriction: (Kenai River) In addition to spring single-hook, artificial lure restriction, only artificial lures may be used between Skilak and Kenai lakes from January 1 to December 31.

1987–1988 Season: (Kenai River) Spring and fall closure from November 1 through June 14 (includes Skilak Lake).

Bag limit: (Kenai River) Reduced to 2/day; 1 daily over 20 inches.

Annual bag limit: (Areawide) Rainbow/steelhead trout over 20 inches—remained at 2/year.

Gear restriction: (Kenai River) Artificial lures only upstream from Skilak to Kenai Lake. Single hook restriction repealed. No bait permitted in Skilak Lake and in the Kenai River downstream to Moose River from November 1 through May 31.

1989-1990 Area between Skilak and Kenai lakes designated a trophy trout area. Only trout 20 inches or larger could be retained. Susitna-West Cook Inlet annual limit remained at 2 trout over 20 inches. Terminal tackle in upper Kenai River limited to single-hook artificial lures.

1991 Trophy trout area extended to include half-mile radius of Skilak Lake inlet. Minimum length of trophy trout increased to 24 inches.

1993 Length at which a trout in the trophy trout area could be retained increased to 30 inches. The bag and possession limits for trout in Skilak Lake and the Kenai River downstream from Skilak Lake were reduced to 1 fish. The trophy trout area was closed to <u>all</u> fishing from April 15 through June 10.

1997 Former trophy trout area becomes catch-and-release area. Area extended 1/4 mile into Kenai Lake. No retention of trout permitted in this area and no retention permitted in the flowing waters upstream of Kenai Lake. Trout season in all waters of the Kenai River drainage is now June 15 through April 15. All flowing waters upstream of the Upper Killey River closed to all fishing from April 15 through June 14. From June 15 through October 31 in all lakes tributary to Kenai Lake supporting wild trout, the bag and possession limits are 2 trout, only 1 of which may be 20 inches or greater.

From November 1 through April 14 the bag and possession limits in lakes supporting wild trout are 5; only 1 may be 20 inches or greater. The bag and possession limits were not changed in stocked lakes.

1998 The use and placement of beads was regulated in all flowing waters of the Kenai River drainage. Beads must be either fixed to the line or hook, or be free moving on the line or leader. A bead not attached to the hook was defined as an attractor, not a fly.

In Slikok Creek a tributary of the lower Kenai River, the fishing season for rainbow trout was established as August 16 through April 14.

2002 Established a maximum size limit of less than 18 inches in all waters of the Kenai River from the mouth of the Moose River upstream to Skilak Lake with a limit of 1 daily/1 in possession. Allowed the use of beads fixed on the line within 2 inches of fly, lure, or hook throughout the drainage and clarified the single-hook regulation to mean one single hook.

2005 Rescinded the catch-and-release only regulation for rainbow trout in the upper Kenai River area by establishing a bag limit for rainbow trout of 1 day/1 in possession under a maximum size limit of less than 16 inches in flowing waters of the Kenai River drainage above Skilak Lake (upper river) and established a bag limit of rainbow trout 1 day/1 in possession under a maximum size limit of less than 18 inches in all waters of the Kenai River downstream of and including Skilak Lake. The spring spawning seasonal closure was aligned throughout the drainage, designated from May 2 through June 10. Reduced the bag limit in the Moose River drainage lakes and ponds from 5 day/5 in possession to 2 day/2 in possession and in flowing waters of the Moose River drainage from 2 day/2 in possession to 1 day/1 in possession under a maximum size limit of less than 18 inches.

2008 The area from the Skilak Lake outlet downstream to the Upper Killey River closed to all fishing from May 2 through June 10.

In 1986, ADF&G, began to compile population and fishery databases for use in formulation of a drainage-wide management strategy for Kenai River rainbow trout. During 1986 a mark-recapture program designed to estimate the rainbow trout population in section 004 from Jim's Landing upstream to the powerline near Russian River (Figure 11) (Lafferty 1989). The rainbow trout population estimates for section 004 were 3,663 fish in 1986 and 4,947 fish in 1987 (Lafferty 1989).

In 1987, the study was expanded to include two sections (002 and 003) of the river below Skilak Lake in the middle river (Lafferty 1989; Figure 11). Lafferty (1989) concluded that the best estimates of rainbow trout abundance, 150 mm (6 inches) or greater in length, for the two river sections was 610 and 1,750 fish, respectively (Table 20). This study also concluded that these estimates were likely negatively biased.

In 1995, the population estimate was repeated in section 004 (Hayes and Hasbrouck 1996). Data analysis in 1995 included a reevaluation of the 1986 and 1987 data to provide comparable estimates. Estimates of abundance of rainbow trout, 300 mm (12 inches) or greater in length, in section 004 in 1986, 1987, and 1995 were 2,520, 3,472, and 5,598 fish, respectively (Table 20).

This study concluded that the rainbow trout population in the upper Kenai River had increased and that there was an increased number of rainbow trout in each 2-inch size class of the population from 12 to 22 inches in length. It was further concluded that the upper Kenai River rainbow trout population numbers had been maintained at a high level and that section 004 could serve as an index of abundance of the upper Kenai River rainbow trout population.

In 1998, additional research was instituted to reassess the population of rainbow trout in the Kenai River drainage. This study was a multi-year study that addressed multiple sections of the river. Primary aspects of this work were to repeat the mark-recapture programs in the area below Skilak Lake and in the upper river section to compare population estimates among years (Larson and Hansen 2000; King and Breakfield 2007).

The middle river estimate of abundance in 1999 was 7,833 fish, compared to 1,750 fish during 1987 (Larson and Hansen 2000). The estimated number of rainbow trout had increased by 400% in the 12 year between studies. Final conclusions were that the population was increasing and the numbers of fish in each size class were increasing, with the exception of large fish (those over 24 inches in length). Over this same period, rainbow trout catches in the middle river increased from 6,430 fish in 1987 to 32,050 fish in 1999 (Table 19). Harvest remained relatively stable and averaged about 802 fish from 1987 to 1999.

In 2001 the fourth rainbow trout population estimate in 16 years was derived for the upper river index area (King and Breakfield 2007). The estimated number of rainbow trout, 12 or more inches in length, increased from 5,598 fish in 1995 to 6,826 fish in 2001 and was nearly 300% higher than the population size estimated in the mid-1980s (King and Breakfield 2007). The reported catch of rainbow trout in the upper river from 1986 to 1987 averaged 2,945 fish and the catch increased to 33,475 fish in 1995 and was 78,836 fish in 2000 (Table 19).

During 2009, abundance of rainbow trout in the upper river was indexed for the fifth time (Eskelin and Evans *In prep.*). The estimated number of rainbow trout, 12 or more inches in length was 5,083 fish in 2009 (Table 20). The 2001 data was reevaluated in 2009 using different assumptions resulting in an estimated population size of 6,364 fish (Table 20). The 2009 estimate is lower than the 2001 estimate of 6,364 fish but within the range of abundances estimate from this area since 1995. The decline was attributed to a slight reduction in the estimated numbers of smaller rainbow trout. The numbers of large rainbow trout increased slightly over abundance estimates conducted previously.

Based on these positive findings about the status of the upper and middle Kenai River rainbow trout stocks, ADF&G did not have a concern for the health of the stocks.

In 2010, a rainbow trout radio telemetry project was initiated to define the seasonal movements and spring spawning distribution of rainbow trout in the middle and lower sections of the Kenai River. Results from this project were not available at the time this report was published.

Kenai River Rainbow Trout Management Objectives

Management objectives for this fishery were first developed from and were contained in the *Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy* (CIRTMP; ADF&G 1987). This policy was adopted by the BOF in 1986 for Cook Inlet waters, and was amended in 1988 to include the Copper River Basin. This plan was replaced in 1998 by the *Criteria for establishing management areas for trout* (5 AAC 75.013) which was replaced by the *Special management areas and liberal harvest opportunities for trout* (5 AAC 75.210) in 2003.

This most recent version of the plan establishes the criteria for considering proposed regulatory changes for bodies of water that would diversify sport fishing opportunity through the liberalization of harvest opportunities for rainbow trout.

As specified in the plan, the Kenai River rainbow trout fishery is managed for sustained yield. The fishery provides a diversity of sport fishing opportunities for wild rainbow trout through establishment of special management areas by regulation. These management areas provide for diverse fishing practices as well as modest harvest opportunity.

Fishery objectives for the Kenai River rainbow trout fishery are as follows:

1) To provide the opportunity for angler participation at a level that can be supported by the fisheries resource and associated habitat.

2) To ensure, through appropriate management and research programs, that the trout population does not decline below levels necessary to ensure sustained yield.

Inseason Management Approach

The Kenai River rainbow trout fishery is highly restricted and inseason management is directed by regulation. The adoption of the rainbow trout spring spawning season fishing closure in 2005 resulted in a net gain in fishing time and fishing area for rainbow trout anglers in the Kenai River drainage. However anglers are still allowed to fish for Dolly Varden in the middle and lower Kenai River below the Upper Killey River during the spring closure. Currently, the rainbow trout populations in the Kenai River watershed are considered to be relatively robust. Information from the SWHS indicates the sport fishing effort for rainbow trout in the Kenai River remains very popular. Reports from the general public and staff observations indicate rainbow trout fishing during the fall, winter, and early spring prior to the spawning closure on May 2 is still gaining popularity.

2008–2010 Fishery Performance

Sport harvest and catch for the Kenai River rainbow trout fishery is determined by the SWHS (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b). Total catches of Kenai River rainbow trout have been increasing steadily since the mid-1980s (Table 19; Figure 10). The most recent 10-year (2000-2009) average catch and harvest, as determined from the SWHS, is 145,420 and 2,780 fish respectively (Table 19). The most recent 10-year (2000–2009) average percent of rainbow trout retained of fish caught in the flowing waters of the Kenai River is only about 2.0% (Table 19). ADF&G estimates that the 2010 total catch will be above the most recent average.

Retention of rainbow trout by anglers has increased slightly since the mid to late 1990s (Table 19). Retention of fish in the former catch-and-release fishery between Kenai and Skilak lakes has been allowed since the 2005 season for trout that are 16 inches or less. Retention in this fishery increased sharply from an estimated harvest of 267 fish in 2005 to about 941 in 2008 (Table 19). During 2009, the estimated harvest of rainbow trout in this section between the lakes was 399 fish (Table 19). For the entire river as numbers of retained rainbow trout increased, the overall percentage of retention has declined due to more anglers participating in the fishery. These lower rates of retention may indicate that more anglers have adapted a catch-and-release philosophy. The percentage of the total number of rainbow trout caught in the Kenai River in

2009 that were retained dropped to 1.2% (Table 19). This is the lowest percentage on record for fish retention. ADF&G predicts that this trend will continue and the 2010 catch and harvest data will be similar to 2009 data.

Anglers reported fair to good rainbow trout fishing in the upper Kenai River in June and July, 2010. Fish size was reported to be average when compared with previous years. Late summer and fall fishing was reported to be very good. Reports from anglers participating in the fishery and ADF&G staff observations suggest that the rainbow trout and Dolly Varden fishing was considered slightly below average in August when the sockeye salmon started spawning. In both the middle river (between Skilak Lake and Moose River) and the lower river, incidental catches of rainbow trout and Dolly Varden were reported to be similar to recent years. ADF&G did not receive reports from anglers during the season that indicated that the rainbow trout stocks in the Kenai River were declining, failing, weak, or that fish size had changed appreciably.

KENAI RIVER DOLLY VARDEN/ARCTIC CHAR RECREATIONAL FISHERIES

2011 Proposals to the Alaska Board of Fisheries Concerning Kenai River Dolly Varden/Arctic Char Sport Fishery Issues

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations"(ADF&G 2010a) will likely have some impact on the sport fisheries targeting Dolly Varden/Arctic Char in the Kenai River drainage:

Proposal Number: 215.

Background and Historical Perspective

Dolly Varden are harvested in all areas of Kenai River. Harvest and catch of this species is determined by the SWHS (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b). The open season for Dolly Varden fishing is January 1 through December 31, except in those areas of the river upstream of Skilak Lake, where more restrictive seasons apply. Prior to 1984, the bag and possession limit was 10 Dolly Varden of any size. Beginning in 1984, this limit was reduced to 5 Dolly Varden of any size. In 1990, the BOF chose a more conservative management approach and reduced the daily bag and possession limit for the upper Kenai River to 2 fish, only 1 of which could be 24 inches or larger. The bag and possession limit for the remainder of the drainage was unchanged until 1992 when the BOF reduced the limit from 5 to 2 fish of any size. In 1996, the limit for all Kenai Peninsula flowing waters was reduced to 2 fish including a protected slot limit prohibiting retention of fish between 12 and 24 inches and an open season from June 15 through April 14 was also established. . In 1998, spawning season closures were established in three upper Kenai River tributaries that were identified as important for Dolly Varden production. Fishing was prohibited from September 15 through October 31 in Cooper Creek, Quartz Creek, and Snow River.

The Kenai River is assumed to support both resident and anadromous Dolly Varden populations. Only limited biological information is available regarding both populations. Resident fish are believed to inhabit the entire river, including both Skilak and Kenai lakes. Seasonal movements of these resident fish are not known, but it is assumed that a percentage of the stream-residing

fish overwinter in Skilak and Kenai Lakes. The anadromous population is believed to enter Kenai River in July and it is assumed that some of these fish also overwinter in Skilak Lake and probably Kenai Lake. Dolly Varden outmigrate from both of these lakes in April and May. Harvest estimates presented in Table 21 do not differentiate between resident and anadromous populations.

A Kenai River Dolly Varden study was initiated in 1996. The primary objective of this study was to locate major staging areas of Dolly Varden within the Kenai River watershed upstream of Skilak Lake. Future Dolly Varden studies will investigate the age, maturity and availability of Dolly Varden in these locations.

A number of staging areas, where Dolly Varden congregate, have been located by deploying various trapping devices and conducting visual observations. The U.S. Fish and Wildlife Service (USFWS) conducted a Dolly Varden radio-telemetry study. During 1998 and 1999, radio transmitters were placed in Dolly Varden in the Kenai River, selected tributaries, and Skilak and Kenai lakes. The radio-telemetry study provided information on major staging areas, seasonal fish movements, and overwintering areas.

Research findings indicate Dolly Varden occupy most tributary streams to Kenai Lake and the Kenai River. Staging areas containing spawning fish were identified in Quartz, Summit, and Cooper creeks and the Snow River; Quartz Creek and its associated tributaries was also suspected of supporting one of the major spawning populations upstream of Skilak Lake. To date, no major Dolly Varden staging areas have been located within Kenai Lake during summer or fall. Radio-telemetry data indicate Dolly Varden prefer traveling throughout the pelagic zone of Kenai Lake during the summer and fall rather than along the shoreline. During winter, fish may frequent the area around Porcupine Island. Porcupine Island is one of the few areas within Kenai Lake having a shallow gravel bottom, which may be preferred overwintering habitat for Dolly Varden.

During the 2002 BOF meeting, changes were made pertaining to size retention and bag and possession limit of Dolly Varden. In the Kenai River drainage upstream of the Upper Killey River, the protected slot limit was removed and the bag limit was changed to 1 per day and 1 in possession less than 18 inches in length. In 2005, the BOF aligned the Dolly Varden regulations in the Kenai River to be the same or similar to those for rainbow trout. The bag and possession limit remained 1 fish however the maximum length of a Dolly Varden was restricted to less than 16 inches in waters above Skilak Lake with a season of June 11 through May 1. In the Kenai River below Skilak Lake the bag and possession limit was reduced to 1 fish less than 18 inches and the season was open the entire year.

Kenai River Dolly Varden Management Objectives

This Dolly Varden fishery is not directly addressed in a management plan adopted by the BOF.

Department objectives for this fishery are

1) to provide the opportunity for angler participation at a level that can be supported by the fisheries resource and associated habitat and

2) to ensure, through appropriate management and research programs that the Kenai River Dolly Varden population does not decline below the level necessary to ensure sustained yield.

Inseason Management Approach

Inseason management has not been required in this fishery. The fishery is managed by existing regulations. Populations of Dolly Varden currently appear to be robust.

2008–2010 Fishery Performance

This fishery is not creel surveyed or monitored inseason. Harvest estimates are derived from the SWHS; (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, In prep a-b). Catch for this species was first estimated by the SWHS in 1990. Estimates reflect a fishery with a peak harvest in 1984 of 31,407 fish (Table 21; Figure 12). The significant decline for 1986 and 1987 harvests is attributed to the more restrictive bag limit (5 fish) and adoption of a voluntary catch-and-release philosophy. Harvests from 1988 through 1993 stabilized at 10,000 to 15,000 fish. The most recent 10-year average (2000–2009) Dolly Varden harvest from the Kenai River is 4,900 fish (Table 21). This decline is likely due to more conservative regulations.

The 2009 SWHS estimate of total catch of Dolly Varden in the Kenai River is 143,944 fish and is below the 2007 harvest estimate of 166,618 fish (Table 21). Similar to the Kenai River rainbow trout fishery, the percentage of Dolly Varden being retained is declining despite large catches, indicating further adoption of catch-and-release practices by anglers (Table 21). The 2009 percentage of Dolly Varden retained (1.9%) is the lowest percentage on record and is slightly above half of the total percentage of the most recent 10-year average (2000–2009) of 4.4% (Table 21). The trend of anglers retaining low percentages of Dolly Varden caught in the Kenai River sport fisheries is expected to continue. ADF&G projects that the 2010 season's sport fishing effort and harvest should be similar to the 2009 season.

NORTH KENAI PENINSULA MANAGEMENT AREA PERSONAL USE FISHERIES

2011 PROPOSALS TO THE ALASKA BOARD OF FISHERIES CONCERNING NORTH KENAI PENINSULA PERSONAL USE DIP NET FISHERIES ISSUES

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations" (ADF&G 2010a) will likely have some impact on the personal use dip net fisheries targeting sockeye salmon in the Kenai and Kasilof rivers:

> Proposal Numbers: 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, and 328.

KENAI RIVER SOCKEYE SALMON DIP NET FISHERY

Background and Historical Perspective

The *Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan* (5 AAC 77.540) was adopted at the 1981 BOF meeting. This plan provided for a personal use dip net fishery in the Kenai and Kasilof Rivers that targeted sockeye salmon and a personal use gillnet fishery in the marine waters at the mouth of Kasilof River. The fishery could occur on the Kenai River after an escapement of 500,000 sockeye salmon was projected. As with other personal use dip net

fisheries, only Alaska residents could participate. A sport fishing license was required; no other permits were required. The bag and possession limits were 6 sockeye salmon that were not in addition to other marine and freshwater sport fishing limits. Legal gear was confined to a dip net. Regulations restricted the fishery in the Kenai River to the lower section of the river downstream from the Warren Ames Bridge near the City of Kenai (Figure 13).

Prior to 1987, the Kenai River personal use dip net fishery occurred only in 1982 and 1983. Harvest is unknown in 1982, and only 7,562 sockeye were taken in 1983 (Table 22). The reasons for the low harvest were a combination of unperfected angler technique, relatively clear water, and relatively small numbers of fish present.

In 1987 the dip net fishery opened at 12 noon on July 23, remained open for the next 13.5 days, and closed on August 5. Total sockeye salmon escapement to the Kenai River was a record 1.6 million fish (Table 22). During the peak of the fishery, dipnetting was successfully conducted 24 hours a day. A harvest of 24,086 sockeye salmon was estimated by the Statewide Harvest Survey (SWHS) (Mills 1988; Table 22).

At the 1988 BOF meeting, the trigger point for opening the Kenai River personal use dip net fishery was raised to 700,000 sockeye salmon, the upper end of the new escapement goal. Projected escapement exceeded 700,000 fish in 1989, so the personal use fishery occurred. In 1990, projected escapement was below 700,000 sockeye salmon, so there was no personal use fishery that year.

In 1989, the Alaska Supreme Court's decision in the McDowell case had the effect of making all Alaska residents subsistence users. In December, 1990, the BOF adopted the *Upper Cook Inlet Subsistence Salmon Management Plan.* Under this plan, subsistence fishing was allowed in most marine waters of Upper Cook Inlet (UCI) normally open to commercial gillnet fishing. Set gillnet fishing was also allowed in Knik Arm, as well as dip net fishing in the mouths of the Kenai and Kasilof rivers. Permits were required to participate in these subsistence fisheries and a valid Alaska resident sport fishing license was not required. The annual bag and possession limit was 25 salmon per head of household of which no more than 5 could be Chinook salmon. In addition, a household was allowed another 10 salmon for each household member, of which no more than 1 could be a Chinook salmon.

The *Cook Inlet Personal Use Dip Net Fishery Management Plan* was still in place, however, this management plan specified that personal use fisheries in the Kasilof and Kenai rivers could not occur on the same day as the subsistence dip net fishery. The escapement level that triggered the personal use dip net fishery in the Kenai River was set at 700,000 sockeye salmon in years when a subsistence dip net fishery occurred and 400,000 sockeye salmon if there was no subsistence fishery.

Escapement in 1991 was less than 700,000 sockeye salmon (Table 22) so the Kenai River personal use dip net fishery did not occur. Subsistence dip net fishing was open on the Kenai River on May 25 and August 3 only; all other openings in Kenai River were canceled due to legal challenges and court action. Reported sockeye salmon harvest in the Kenai River subsistence dip net fishery was 10,468 fish, with 75% of permits returned (Brannian and Fox 1996).

There were no legal challenges during the 1992 fishing season, so the subsistence dip net fishery was open for a total of 34 days, including 3 days in May, 4 days in June, and every Wednesday

and Saturday in July, August, and September (Brannian and Fox 1996). Reported harvest, with 43% of the permits returned, was 16,240 sockeye salmon (Brannian and Fox 1996). The Kenai River personal use dip net fishery allowed under the *Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan* also took place in 1992 (Table 22). It was restricted to days when the subsistence fishery was not open, continued to have a possession limit of 6 sockeye salmon, and did not require a permit.

The Alaska State Legislature during the 1992 session passed legislation that required the Alaska Boards of Fisheries and Game (Joint Boards) to identify nonsubsistence areas where dependence on subsistence was not a principle characteristic of the economy, culture, and way of life. During their November 1992 meeting the Joint Boards established the Anchorage/Mat-Su/Kenai nonsubsistence area. The BOF also rescinded the *Upper Cook Inlet Subsistence Salmon Management Plan*. This ended all subsistence fisheries in UCI except the Tyonek subsistence fishery. The personal use dip net fishery remained in place. The escapement trigger for opening the personal use dip net fishery on the Kenai River was now 400,000, and once the fishery opened, fishing could be continuous. The 1993 personal use fishery opened on July 17 and closed on July 31, with an estimated harvest of 33,467 sockeye salmon (Table 22).

In October 1993, Superior Court Judge Dana Fabe (in Kenaitze v. Alaska) found unconstitutional the provision in the 1992 state subsistence law that directed the Joint Boards to designate nonsubsistence areas. This ruling was appealed by the State of Alaska to the Alaska Supreme Court where a stay was granted on March 10, 1994. The full court vacated this stay on April 11, 1994. A special meeting of the Joint Boards was convened on April 28, 1994 by teleconference. As a result of these meetings, the *Upper Cook Inlet Subsistence Salmon Management Plan* was readopted on April 28, 1994.

Because there was not enough time for a formal board meeting prior to the 1994 season, the BOF directed that the Commissioner of ADF&G should exercise his emergency regulatory authority to adopt subsistence fishing regulations for the 1994 fishery. The BOF directed that this fishery should mirror the 1992 subsistence fishery. Subsistence fishing periods were again on select Wednesdays and Saturdays from late May to the end of September. The annual bag and possession limits were again 25 salmon per head of household of which no more than 5 could be Chinook salmon. In addition, a household was allowed another 10 salmon for each household member, of which no more than 1 could be a Chinook salmon. A permit was required to participate, but not a sport fishing license. Reported subsistence dip net harvest, with 48% of the permits returned, was 13,897 sockeye salmon (Brannian and Fox 1996). The personal use dip net fishery remained in place. The escapement trigger for personal use fisheries to begin for years when a subsistence fishery occurs remained at 700,000 sockeye salmon. The trigger for years without a subsistence fishery was changed to 450,000 sockeye salmon to reflect a new minimum escapement goal. In 1994, a sonar count of 700,000 could not be projected prior to July 31 and the personal use dip net fishery did not occur despite a sonar count in excess of 1 million (Table 22).

In 1995, subsistence fisheries were scheduled to begin on May 20; however, in early May, the Alaska Supreme Court overturned the October 1993 Superior Court decision. This ruling reestablished the Anchorage/Mat-Su/Kenai nonsubsistence area. The BOF convened an emergency meeting by teleconference on May 24, 1995 to close subsistence fisheries in the now nonsubsistence area. The BOF delegated authority to the ADF&G Commissioner to readopt the *Upper Cook Inlet Subsistence Salmon Management Plan* as a personal use fishery. The 1995 dip

net fishery was therefore prosecuted as a personal use fishery, having the same regulations as the 1994 subsistence fishery, and still requiring a permit. This permitted fishery was open on select Wednesdays and Saturdays from late May to the end of September. To further complicate the situation, the old personal use fishery allowed under the *Cook Inlet Personal Use Salmon Dip Net Management Plan* was still in place. It still had a possession limit of 6 sockeye salmon and did not require a permit. The nonpermitted personal use fishery triggered by a projected escapement count of 450,000 fish opened at 6:00 AM, July 25. The fishery occurred daily except Wednesdays and Saturdays, when the permitted fishery occurred. The nonpermitted fishery closed July 31, with a total fishing time of 4.75 days. The estimate of permitted Kenai River sockeye salmon personal use dip net harvest was 18,502 (Brannian and Fox 1996). This includes a known harvest of 11,771 fish from returned permits (Ruesch and Fox 1996) and an estimate of the harvest from those that had permits but did not return them. The SWHS estimated total 1995 Kenai River sockeye salmon personal use harvest (both permitted and nonpermitted) to be 14,352 sockeye salmon (Table 22).

During 1996, the BOF established a July 10–August 5 season; fishing was permitted 24 hours per day. The permitting system for the personal use dip net fishery was developed and initiated in 1996. Since then, one permit is issued for all four (UCI) personal use salmon fisheries (Kenai River dip net, Kasilof River dip net, Kasilof River gillnet, and Fish Creek dip net). The area open to those dipnetting from a boat was restricted to that area from a marker immediately upstream from the Kenai City Dock to the downstream edge of the Warren Ames Bridge (Figure 14). In 1997, the season ending date was amended to July 31 due to expected low abundance of Kenai River coho salmon stocks. During 1996, the estimated sockeye salmon harvest for the 27-day personal use dip net fishery was 102,821 fish, while the estimated harvest for the 22-day 1997 fishery was 114,619 sockeye salmon (Table 22).

The fishery was modified again in 1999 by closure of a section of the lower Kenai River to dipnetting from shore along the bluff on the north side of the river in response to increased erosion of lands owned by the City of Kenai (Figure 13). In addition, harvested salmon from the personal use fishery must be recorded "immediately" (defined as "before concealing the salmon from plain view or transporting it from the fishing site").

During 2008, the BOF adopted an outboard motor regulation for the Kenai River personal use fishery. The current regulation, that was also effective for the 2008 season, is that fish may not be taken from a boat powered by a two-stroke motor, other than direct fuel injection (DFI). This regulation was adopted in response to high hydrocarbon levels in the lower Kenai River during peak-use days in late July.

Kenai River Personal Use Dip Net Fishery Management Objectives

This fishery is managed under provisions of the *Kenai River Late-Run Sockeye Salmon Management Plan* (5 AAC 21.360) and the *Upper Cook Inlet Personal Use Salmon Fishery Management Plan* (5 AAC 77.540). The fishery objective is to implement provisions contained in the respective management plans. The fishery primarily targets sockeye salmon.

Inseason Management Approach

Management of this fishery is the joint responsibility of the CF and SF. The CF is responsible for operation of the Kenai River sonar counter that estimates sockeye salmon entering the river. The personal use dip net fishery opens and closes by regulation. Inseason management by the

SF would be required only in the event the minimum inriver escapement goal for sockeye salmon could not be projected.

All participants in this personal use fishery are required to be Alaska residents with a valid Alaska sport fishing license to get a free permit or be a member of a household with a permit and be named on that permit. Permits are household permits that allow all members of the household to fish under the same permit. Completed permits must be returned to ADF&G following the fishing season. Persons who do not comply with the reporting requirement are sent reminder letters to prompt their response. Since 1996, harvest and effort in the Kenai River personal use dip net fishery has been estimated from reported harvest on returned permits. All permit holders who returned their permits before the second reminder letter was mailed are considered compliant households. Information obtained by permit holders who returned their permits after the second reminder letter was mailed are considered non-compliant households. Participation and harvest by non-compliant households was estimated by calculating the mean participation (household days fished) and harvest by species for non-compliant permits that were returned. These were then expanded to include all non-respondents. Total estimates of participation and harvest by species for the fishery were obtained by summing the estimates for the non-compliant households with the information obtained from compliant households.

The Kenai River personal use fishery opens by regulation on July 10 for the daily hours of 6:00 AM through 11:00 PM and closes at 11:00 PM on July 31. Given sufficient run strength of greater than 2 million Kenai River late-run sockeye salmon, the personal use fishery may be liberalized to a 24-hour per day fishery. The liberalization typically occurs during the last week in July.

2008 Fishery Performance

Over the 22 day season from July 10 through July 31 the total harvest of sockeye salmon during 2008 was approximately 234,109 fish (Table 6 and 22). This sockeye salmon harvest was larger than the 1996–2007 average sockeye salmon harvest of 175,055 fish but less than the 2007 estimated sockeye salmon harvest of 291,270 fish (Table 6). A total of 1,362 Chinook; 2,609 coho; 10,631 pink; and 504 chum salmon were also harvested in the Kenai River personal use dip net fishery during 2008 (Table 6).

In season, the preliminary Kenai River sockeye salmon run size was estimated to be less than the forecasted run of 3 million fish. The actual numbers of fish in the run lagged behind the historic average for the week of July 25–31 and did not increase in run strength. No management actions were taken for the 2008 Kenai River personal use dip net fishery. By August 1, the run was projected to be less than 2.0 million fish. The estimated run size was 2.3 million fish (Shields 2009).

2009 Fishery Performance

During the 2009 dip net fishery, 339,993 sockeye; 1,189 Chinook; 2,401 coho; 5,482 pink; and 285 chum salmon were harvested for a total of 349,350 salmon (Table 6). This is the highest sockeye salmon harvest estimated for the Kenai River personal use dip net fishery. The estimated number of days fished increased from 20,676 days in 2008 to 26,043 days fished in 2009 (Tables 6 and 22). No management actions were taken for the 2009 Kenai River personal use dip net fishery prior to the close of the fishery on July 31. The finalized estimated total abundance of late-run Kenai River sockeye salmon was 2.4 million fish (Shields 2010a).

2010 Fishery Performance

The 2010 estimated harvest of sockeye salmon from the Kenai River personal use dip net fishery was 389,552 fish (Table 22). This is larger than the most recent 5-year (2005–2009) average of approximately 257,700 sockeye salmon (Table 22). The fishery was open for 22 consecutive days without disruption and fishing time was increased by emergency order for the final 8 days (July 24–31) (EO 2-RS-1-40-10; Appendix A3). The **preliminary results** indicate a total Kenai River sockeye salmon run of approximately 3.2 million fish (Shields 2010b). Large daily estimates of sockeye passage at the sonar and near normal run timing provided excellent opportunities. Finalized 2010 harvest estimates will be available by early 2011 following the collection and processing of personal use permit data.

The most recent 5-year (2005–2009) average for participation in the personal use fishery was 20,448 days fished and participation in the 2010 Kenai River personal use dip net fishery was 28,342 days fished (Table 22). Reasons for the increased harvest and participation include, 1) the total sockeye salmon run strength was larger than the previous 2 years and 2) inseason management action allowed additional fishing time in the Kenai River personal use dip net fishery, which had not occurred since 2007.

Observations by ADF&G indicated that success varied from poor to excellent depending upon the daily influx of sockeye salmon into the Kenai River. Actions of the commercial fishing fleet and/or the natural run timing of the salmon entering the Kenai River determined a dipnetter's success on any particular day. During 2010, the total number of Kenai River sockeye salmon to pass ADF&G's sonar station was 970,662 fish (Table 22). This cumulative estimate of the inriver run of sockeye salmon to reach the sonar station was the largest since 2006 and about 225,000 fish greater than the 2009 cumulative estimate of 745,170 fish (Table 22). During the 22 days the 2010 Kenai River personal use dip net fishery was open, daily sockeye salmon passage estimates at the sonar site ranged from approximately 5,000 to 82,000 fish per day and daily sockeye salmon passage estimates above 40,000 fish per day occurred on 7 days (Shields 2010b).

KASILOF RIVER PERSONAL USE DIP NET AND GILLNET FISHERIES

Background and Historical Perspective

In the spring of 1981, the BOF adopted a *Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan*. The BOF's intent was to provide for salmon dip net fisheries in Cook Inlet, allowing Alaska residents an opportunity to harvest sockeye salmon for their personal consumptive needs without disrupting existing fisheries. Personal use dip net fisheries did not initially open until ADF&G determined that specific escapement goals were met and/or subsistence, commercial, and other sport users have had, or will have, reasonable opportunity to harvest fish in excess of spawning requirements. In recent years, this criterion has been relaxed.

Participants in the fishery include local and regional residents from the Southcentral Alaska area. Sockeye salmon are the target species in the fishery, however small numbers of coho and pink salmon are also caught and retained. Fishing takes place from both banks of the Kasilof River as well as from small boats. The majority of the effort occurs along the north bank of the river where there is good road access and parking spaces. Typically, catch rates are highest 2.5 hours before and after high tide; however, during the peak of large runs, sockeye salmon are harvested at virtually all tide levels.

In 1981 and 1982, harvest and angler participation in the dip net fishery were determined by creel census. Because the fishery is managed by monitoring sonar counts above the fishery, the creel survey was deemed unnecessary and it was discontinued. Harvest and estimates of angler participation were determined by the SWHS through 1995 (Mills 1982-1994; Howe et al. 1995, 1996) and by returned permits in 1996 through 2004.

From 1981 through 1988, the Kasilof River dip net fishery (Figure 15) was open approximately 2-3 weeks each year from mid-July through early August. The popularity of this fishery increased annually, with record levels of both harvest and effort occurring in 1986 (Table 23). Average harvest and angler participation from 1981 through 1988 was 14,120 sockeye salmon and 7,170 days fished, respectively (Table 23). From 1981 to 1988, the personal use fishery harvested 1 to 14% of the total number of sockeye salmon that entered Kasilof River annually (calculated from Table 23).

In 1989 and 1990, the minimum sonar count established by the BOF to open this fishery was not achieved or was achieved too late to provide reasonable dipnetting opportunity. Therefore, the personal use dip net fishery did not open during these years.

In 1990, the BOF established subsistence set and dip net fisheries for the UCI. The dip net fishery occurred in the mouths of the Kenai and Kasilof rivers. The allowable days and times subsistence dipnetting occurred was provided for by regulation. The area open to subsistence dipnetting in these rivers was identical to the area where personal use dipnetting occurs when the latter fishery is open. Permits were required for these subsistence fisheries and a valid Alaska resident sport fishing license was not required to participate. The annual bag and possession limits were 25 salmon per head of household of which no more than 5 could be Chinook salmon. In addition, a household was allowed another 10 salmon for each household member, of which no more than 1 could be a Chinook salmon. The BOF determined that subsistence and personal use dipnetting would not occur concurrently and they amended the *Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan* accordingly. The revised plan stated that when the personal use fishery occurs in either the Kenai or Kasilof rivers, it (personal use) will be closed at 12:01 AM on those days that the subsistence fishery occurs, reopening again at 12:01 AM the following day.

The *Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan* was further amended as it pertained to the Kasilof River. The escapement goal, which triggers the opening of the personal use dip net fishery, was raised from the minimum goal of 150,000 to the maximum escapement goal of 250,000. However, during years when the subsistence dip net fishery did not occur, the personal use fishery would open when the minimum sockeye salmon escapement goal of 150,000 could be projected.

A subsistence fishery occurred in 1991. However, the maximum sonar count goal of 250,000 was not realized, and the personal use dip net fishery was not opened. The reported 1991 subsistence harvest, with 75% of the permits returned, was 907 sockeye salmon (Brannian and Fox 1996). Regulation of the subsistence fishery was identical in 1992. The maximum sonar count goal was not achieved in 1992, and again, a personal use dip net fishery in the Kasilof River did not occur. Reported 1992 subsistence harvest, with 43% of the permits returned, was 1,230 sockeye salmon (Brannian and Fox 1996).

During the 1992 session, the Alaska State Legislature passed legislation that required the Joint Boards to identify nonsubsistence areas where dependence on subsistence was not a principle

characteristic of the economy, culture, and way of life. During their November 1992 meeting, the Joint Boards established the Anchorage/Mat-Su/Kenai non-subsistence area. The BOF also rescinded the *Upper Cook Inlet Subsistence Salmon Management Plan*. This ended all subsistence fisheries in Upper Cook Inlet except the Tyonek subsistence fishery. The personal use dip net fishery remained in place. The trigger point for the opening of the personal use fishery reverted to the minimum projected sonar count of 150,000. The sonar count for 1992 was 184,178 sockeye salmon (Table 23). The minimum sonar count (150,000) could not be projected with assurance until August l. By this late date, there were insufficient sockeye salmon entering the river to prosecute a successful dip net fishery, and as a result, the personal use fishery did not occur for the fifth consecutive year.

In October 1993, Superior Court Judge Dana Fabe (in Kenaitze v. Alaska) found unconstitutional the provision in the 1992 state subsistence law that directed the Joint Boards to designate nonsubsistence areas. This ruling was appealed by the State of Alaska to the Alaska Supreme Court where a stay was granted on March 10, 1994. The full court vacated this stay on April 11, 1994. A special meeting of the Joint Boards was convened on April 28, 1994 by teleconference. As a result of these meetings, the *Upper Cook Inlet Subsistence Salmon Management Plan* was readopted on April 28, 1994.

Because there was not enough time for a formal board meeting prior to the 1994 season, the BOF directed that the Commissioner of ADF&G should exercise his emergency regulatory authority to adopt regulations for the 1994 fishery. The BOF directed that this fishery should mirror the 1992 subsistence fishery. Subsistence fishing periods were again on select Wednesdays and Saturdays from late May to the end of September. The annual bag and possession limits were again 25 salmon per head of household of which no more than 5 could be Chinook salmon. In addition, a household was allowed another 10 salmon for each household member, of which no more than 1 could be a Chinook salmon. A permit was required to participate, but not a sport fishing license. Reported 1994 subsistence dip net harvest, with 48% of the permits returned, was 2,735 sockeye salmon (Brannian and Fox 1996).

The personal use dip net fishery remained in place; however ADF&G adopted a trigger sonar count of 150,000 fish to open the 1994 fishery. This was apparently an administrative error; the intent was to use the same 250,000 trigger as in 1992. This notwithstanding, a sonar count of 150,000 was the trigger which opened the Kasilof River personal use dip net fishery in 1994. A sonar count of 150,000 was assured the morning of July 22; the personal use dip net fishery was opened at 12:00 noon and continued through August 5. As this fishery could not open on days subsistence dip netting occurred, the fishery was restricted to July 22, 24, 25, 26, 28, 29, and 31 and August 1, 2, 4, and 5. Total fishing time was 10.5 days (Table 23).

In 1995, subsistence fisheries were scheduled to begin on May 20; however, in early May the Alaska Supreme Court overturned the October 1993 Superior Court decision. This ruling reestablished the Anchorage/Mat-Su/Kenai nonsubsistence area. The BOF convened an emergency meeting by teleconference on May 24, 1995 to close subsistence fisheries in the now nonsubsistence area. The BOF delegated authority to the Commissioner of ADF&G to readopt the *Upper Cook Inlet Subsistence Salmon Management Plan* as a personal use fishery. The 1995 dip net fishery was therefore prosecuted as a personal use fishery, having the same regulations as the 1994 subsistence fishery, and still requiring a permit. This permitted fishery was open on select Wednesdays and Saturdays from late May to the end of September. To further complicate the situation, the old personal use fishery allowed under the Cook Inlet Personal Use Salmon Dip

Net Management Plan was still in place. It still had a possession limit of 6 sockeye salmon and did not require a permit. The nonpermitted personal use fishery triggered by a projected escapement count of 150,000 fish, opened at 6:00 PM, July 17. The 1995 non permitted personal use dip net fishery occurred daily except Wednesdays and Saturdays, when the permitted fishery occurred. The nonpermitted fishery closed July 31, with a total fishing time of 10.25 days (Table 23).

The estimated harvest from the 1995 permitted Kasilof River sockeye salmon personal use dip net fishery was 6,371 fish (Brannian and Fox 1996). This includes a known harvest of 4,572 from returned permits (Brannian and Fox 1996) and an estimate of the harvest from those who had permits but did not return them. The SWHS estimated total Kasilof River sockeye salmon personal use harvest (both permitted and nonpermitted) to be 4,160 fish (Howe et al. 1996, Table 23).

At the 1996 BOF meetings, a 27-day fishing season was established, which opened by regulation on Ju1y 10 through August 5 for 24-hours per day. The regulations adopted by the BOF established a personal use dip net fishery that was independent of the abundance of returning salmon and was not tied to the fisheries management plans for other user groups. The harvest estimate from the 1996 Kasilof River sockeye salmon personal use dip net fishery was 11,197 fish (Table 23; Reimer and Sigurdsson 2004). This included a known harvest from 13,452 returned permits and an estimate of the harvest from those who had permits but did not return them.

Regulations governing the Kasilof River personal use dip net fishery from 1996 to 2001 remained the same. Between 1996 and 2001, dipnetter participation in the fishery fluctuated somewhat but averaged 2,571 days fished (calculated from Table 6). The 1996–2001 average sockeye salmon harvest from this fishery was 27,460 (calculated from Table 6) fish. The average total dip net harvest for other salmon species during this period was 133 Chinook, 685 coho, 471 pink, and 36 chum salmon (calculated from Table 6).

New regulations were adopted by the BOF for the 2002 Kasilof River personal use dip net fishery which extended the fishing season up to 44 days per year. Beginning in 2002, the new season dates for this fishery were from June 25 through August 7. The 2002 salmon harvest for the Kasilof River personal use dip net fishery was 46,769 sockeye, 106 Chinook, 1,197 coho, 1,862 pink, and 139 chum salmon (Table 6). This includes a known harvest from 14,284 returned permits and an estimate of the harvest from those who had permits but did not return them (Brannian and Fox 1996). During 2002, dipnetter participation in the fishery was 4,020 days fished (Tables 6 and 23).

A personal use gillnet fishery also occurs in June at the mouth of Kasilof River, targeting sockeye salmon (Figure 16). This fishery began in 1982. Major changes to personal use fishing in Cook Inlet were adopted by the BOF in 1996. The personal use gillnet harvest of salmon in Cook Inlet was prohibited except at the mouth of the Kasilof River. From 1996 through 2001 it opened on June 16 and closed by emergency order issued by CF when approximately 10,000-20,000 fish had been taken. The fishery typically lasted for about 9 days. The gillnet fishery is included in the *Upper Cook Inlet personal use fishery management plan.* Harvest in the gillnet fishery counts toward the permit holder's total allowable harvest in all four Upper Cook Inlet personal use fisheries (Kenai dip net, Kasilof dip net, Fish Creek dip net, and Kasilof gillnet). In the gillnet fishery, participants are allowed to keep all the Chinook salmon that they catch. From

1996 through 2001, the Kasilof River personal use gillnet fishery was monitored inseason by the CF and is discussed in the annual management report (Fox and Shields 2001). Final estimates of harvest and effort since 1996 have been made by expanding known returned permits to include permits not returned (Reimer and Sigurdsson 2004, Dunker 2010; Dunker and Lafferty 2007). During 2002, the BOF adopted regulations for the Kasilof River personal use gillnet fishery, establishing a June 15 through June 24 season. Although the personal use permit system is administered by the SF, inseason management authority of the gillnet fishery is the responsibility of the Division of Commercial Fisheries. The regulations governing the Kasilof River personal use gillnet and dip net fisheries have remained unchanged from 2002-2010.

KASILOF RIVER PERSONAL USE DIP NET AND GILLNET FISHERY MANAGEMENT OBJECTIVES

Regulation and management of this fishery are governed by the *Upper Cook Inlet Personal Use Salmon Fishery Management Plan* (5 AAC 77.540). The fishery objective is to implement the provisions of the BOF-adopted management plan.

Inseason Management Approach

Management of this fishery is the joint responsibility of the CF and the SF. The CF is responsible for operation of the Kasilof River sonar counter which enumerates sockeye salmon entering the river. The personal use gillnet and dip net fisheries open and close by regulation. Inseason management by the SF would be required only in the unlikely event the minimum sonar count and biological escapement goal could not be projected and achievement of these goals required restrictions to the dip net fishery or if the projected run strength exceeded the upper goal range. On the occasion that the upper goal range of the BEG of 150,000-250,000 sockeye salmon is projected to be exceeded, ADF&G staff has the tools to liberalize the personal use fishery. The Kasilof River personal use dip net fishery area has been expanded for shoreline and boat-based dip netting. The shoreline-based dip netting area is expanded to the Sterling Highway Bridge and the area opened to dip netting from boats is also expanded upriver to river mile 3 below Trujillo's landing. Both liberalizations are enacted when the rate of sockeye salmon escapement is proceeding at a rate greater than that needed to ensure the BEG (150,000-250,000) is met.

Participants in this personal use fishery are required to get a permit, and are required to return the permit to ADF&G, regardless of whether or not they fished. Persons who do not comply with the reporting requirement are sent reminder letters to prompt their response. Since 1996, harvest and effort in the Kenai River personal use dip net and gillnet fishery have been estimated from reported harvest on returned permits. All responses prior to the second reminder letter are treated as a census of "compliant" permits. Responses from the second (and up to fourth in some years) reminder letters are considered to be a sample of the "noncompliant" permits. Estimates of mean harvest and effort from the noncompliant permits are expanded by the known total number of noncompliant permits and used to generate the total estimate of "noncompliant" harvest and effort. This estimate is then added to the sum of the harvest and effort from the compliant permits to generate the estimate of total harvest for the fishery.

2008 Fishery Performance

The 2008 sockeye salmon run to the Kasilof River resulted in an estimated escapement of 305,199 sockeye salmon (Table 23). Personal use harvest of sockeye salmon was 23,432 fish in the gillnet fishery and 54,051 fish in the dip net fishery (Table 6). The estimated total run of Kasilof River sockeye salmon was about 1 million fish (Shields 2009). On July 17, an emergency order (EO) for the Kasilof River personal use dip net fishery expanded the area for shoreline- and boat-based dipnetting as described above (EO 2-RS-1-23-08; Appendix A1). This emergency order was an effort to contain the sockeye salmon escapement within the BEG (150,000–250,000 fish) as described above. Because the escapement rate of sockeye salmon into the Kasilof River was proceeding at a rate greater than that needed to ensure the BEG was met, commercial fishing effort near the Kasilof River increased. These practices include additional commercial fishing in the Kasilof Section and to conduct a terminal harvest fishery that allowed commercial fishing nets up to the mouth of the river. During these terminal fishery periods, personal use dip net harvests were drastically reduced.

2009 Fishery Performance

The personal use harvest of sockeye salmon during 2009 was above the most recent 5-year (2004-2008) average harvest for the Kasilof River personal use fisheries. The gillnet fishery harvested an estimated 26,646 sockeye salmon, while the dip net fishery harvest was 73,035 sockeye salmon (Table 6). The previous 5-year average (2004-2008) harvests for the gillnet and dip net fisheries are 23,854 and 48,991 sockeye salmon, respectively (calculated from Table 6). Similar to 2008, the 2009 sockeye salmon run to the Kasilof River was proceeding at a rate greater than that needed to ensure the BEG (150,000-250,000) was met. An emergency order was issued on July 17 to expand the area shoreline- and boat based dip netting effective July 18 (EO 2-RS-1-24-09; Appendix A2). The estimated escapement was 297,125 sockeye salmon (Table 23). The total run abundance was estimated to be approximately 845,000 sockeye salmon (Shields 2010a).

2010 Fishery Performance

The 2010 Kasilof River personal use fisheries produced good opportunities to harvest sockeye salmon periodically throughout the season depending upon daily passage rates of sockeye salmon into the river. During commercial fishery closures, personal use dip net harvests may significantly increase and the inverse may also be experienced. The estimated harvest of sockeye salmon in the personal use gillnet fishery was 21,924 fish, while the dip net harvest was 70,774 fish (Tables 6 and 23). Harvest in the Kasilof River personal use fisheries was lower in 2010 than in 2009, however effort remained similar (Tables 6 and 22).

The 2010 Kasilof River sockeye salmon run resulted in an estimated escapement of 267,013 salmon past ADF&G's sonar station (Table 23). No inseason management actions were taken for the Kasilof River personal use dip net fishery during 2010. Although final estimates for the 2010 Kasilof River sockeye run are not available, **preliminary results** indicate a total run of about 845,000 fish (Shields 2010b).

NORTH KENAI PENINSULA MANAGMEMENT AREA NORTHERN PIKE RECREATIONAL FISHERY

2011 PROPOSALS TO THE ALASKA BOARD OF FISHERIES CONCERNING NORTHERN PIKE IN THE NORTH KENAI PENINSULA MANAGEMENT AREA SPORT FISHERY ISSUES

The following proposals published in "The Alaska Board of Fisheries 2010/2011 Proposed Changes in the Cook Inlet, Kodiak, and Chignik Areas Finfish; and King and Tanner crab (Statewide Except Southeast/Yakutat) Regulations" (ADF&G 2010a) will likely have some impact on the sport fisheries targeting northern pike in the North Kenai Peninsula Management Area:

Proposal Numbers: 223 and 244.

BACKGROUND AND HISTORICAL PERSPECTIVE

Northern pike are not indigenous to the Kenai Peninsula. This species was illegally introduced into Derks Lake, tributary to Soldotna Creek, in the mid-1970s. From this initial introduction, they spread rapidly through the Soldotna Creek drainage, including East and West Mackey Lakes, Soldotna Creek, and Soldotna (Sevena) Lake. They are also present in Stormy Lake in the Swanson River drainage.

Northern pike are a predator species, and reports from anglers indicated that as the number of northern pike in the drainage increased, numbers of rainbow trout and Dolly Varden declined. Soldotna Lake, prior to the introduction of northern pike, was reputed to support one of the most robust rainbow trout populations on the Kenai Peninsula. Soldotna Lake's reputation as a trout producer declined steadily in the 1980s as northern pike became the dominant species.

There were considerable concerns by both the public and ADF&G that northern pike would become established in the mainstem Kenai River, negatively impacting this river's salmon and trout populations. Although small numbers of northern pike have been caught in the Kenai River mainstem (Table 24), there is no evidence to date that northern pike are reproducing in the mainstem Kenai River, and negative impacts to the river's salmon and trout cannot be measured directly. Northern pike have, however, used the Kenai River as a migratory corridor. A weir operated by the U.S. Fish and Wildlife Service (USFWS) at Soldotna Creek near its confluence with the Kenai River documented the passage of northern pike from the creek to the Kenai River during 2009 and 2010. Because northern pike are present in the Soldotna Creek drainage and have negatively impacted salmonid production there, northern pike have probably negatively impacted the Kenai River drainage's salmonid production.

In spring 1986, a weir was established on the east fork of Moose River in conjunction with a rainbow trout study. One northern pike was known to have passed through the structure. Information from the SWHS also indicates that anglers have harvested small numbers of pike in the lakes (Afonasi, Imeri, Watson, Equmen, Peterson, Kelly, and Hikers lakes) of this drainage. Harvests of northern pike are too small to be estimated for specific lakes (Table 24).

Northern pike were also illegally introduced into three unnamed lakes about 6 miles south of Soldotna in the early to mid-1980s. These lakes are accessed via Tote Road and it is assumed local residents introduced the northern pike. These lakes are fortunately landlocked.

Although there is some local interest in northern pike fishing, this species supports a minor if not insignificant sport fishery. The best northern pike fishing is in Stormy, East and West Mackeys, and Soldotna (Sevena) lakes. The Mackeys and Soldotna (Sevena) lakes are almost entirely bordered by private land and access is limited, whereas Stormy Lake is surrounded by public lands within the boundaries of the Captain Cook State Park and Kenai National Wildlife Refuge. A small outlet stream drains from the southwest corner of Stormy Lake into the lower tidally influenced area of the Swanson River, a major Kenai Peninsula coho salmon producer. Northern pike have been present in Stormy Lake for about three-decades as indicated from information provided by ADF&G staff and the public. The largest northern pike sampled by ADF&G and reported by the sport fishing public have been harvested from Stormy Lake. Reports of northern pike harvest elsewhere in the Swanson River drainage have not been confirmed by ADF&G. Some fishing by local residents, including spear fishing during the winter months, occurs throughout the year. Northern pike harvested in the east fork of the Moose River are probably caught incidentally to rainbow trout and Dolly Varden. Total northern pike harvest on the Kenai Peninsula has historically averaged about 284 fish annually (Table 24). Two of the Northern Kenai Peninsula's stocked lakes, Scout and Arc lakes, contained northern pike. These lakes were successfully treated with rotenone in 2008 (Arc Lake) and 2009 (Scout Lake) to eradicate the northern pike. Stocking has since resumed and these lakes are considered to be restored (Robert Massengill, Division of Sport Fish Biologist, Soldotna, personal communication).

NORTH KENAI PENINSULA MANAGEMENT AREA NORTHERN PIKE FISHERY OBJECTIVES

This fishery is not specifically addressed in any management plan adopted by the BOF. Northern pike were illegally introduced on the Kenai Peninsula. The ADF&G objective for this fishery is to provide the opportunity for angler participation to continue at increased levels so that northern pike populations decline.

INSEASON MANAGEMENT APPROACH

There has been no inseason management in the history of this fishery. The fishery is managed through existing regulations. Regulations are liberal because northern pike were illegally introduced into Kenai Peninsula waters and because they compete with resident trout and salmon species. Currently, there is no bag limit or closed season for northern pike in the NKPMA.

Beginning in 2003 and continuing through 2008, ADF&G began to aggressively target and remove northern pike from lakes within the NKPMA (Begich and McKinley 2005, Begich 2010b, Massengill 2010, *In prep-a*, *b*). The invasive species removal project (basically netting northern pike) took place during the open water season. During the years of this project, several thousand northern pike were captured with variable mesh gillnets and removed from four lakes of the Soldotna Creek drainage. Gillnets were fished for tens of thousands of hours among Derks and Sevena lakes, and East and West Mackey lakes. Initially no other adult fish species were captured in these lakes. Subsequent sampling of these lakes over the years indicated that the northern pike population has been reduced, temporarily, and that the size and age structure has been changed to smaller and younger fish. Interestingly, as the numbers of northern pike removed from lakes in the Soldotna Creek drainage increased over time, bycatch of non-pike species increased. The bycatch included rainbow trout, Dolly Varden, juvenile coho salmon, and stickleback. During 2009, a northern pike radio telemetry project was initiated at Stormy Lake.

The objectives of this project were to define seasonal movements, spawning distribution, and spawning time so that future eradication efforts can be effectively planned.

2008–2010 FISHERY PERFORMANCE

The 2009 SWHS results did not detect harvest of northern pike in the NKPMA (Table 24). The sudden decrease in northern pike harvests is likely due to increased eradication efforts of northern pike in area lakes, particularly at Soldotna (Sevena) Lake and to some extent the East and West Mackey lakes. According to the SWHS, most of the northern pike harvested in NKPMA waters during 2008 and 2009 were from Stormy Lake and the Tote Road Lakes (Table 24).

During 2010, ADF&G did receive several reports of anglers encountering northern pike in various NKPMA lakes. Two lakes, Hall and Tiny lakes near Soldotna, were verified to contain northern pike by ADF&G. Intensive gillnetting efforts were initiated during the fall prior to ice-cover to remove as many northern pike as possible from these lakes. ADF&G projects that the total 2010 harvest of northern pike within the NKPMA will be approximately equal to the 2009 season. This reduced level of harvest is expected as the direct result of the removal of thousands of northern pike from the NKPMA by ADF&G's invasive species removal project. SF staff are developing plans to remove invasive species from NKPMA waters. Projects are underway for Stormy Lake and the Soldotna Creek drainage. These efforts include developing a database of limnological characteristics of the lakes and waterways in these drainages known to support northern pike. This work is necessary for rotenone treatments and other eradication efforts to be successful.

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TABLES AND FIGURES

Table 1.–Angler-days of effort expended by recreational anglers fishing Kenai Peninsula Management Area waters, 1977–2009.

	Kenai River		Russian River[a]		Kasilof River		Other NKPMA[b]		NKPMA	Percent	Alaska
Year	Effort	%NKPMA	Effort	%NKPMA	Effort	%NKPMA	Effort	%NKPMA	Total	of State	Total
1977	122,138	52	69,510	29	ND	0	44,655	19	236,303	20	1,198,486
1978	164,264	60	69,860	26	ND	0	38,707	14	272,831	21	1,286,063
1979	178,485	63	55,000	20	ND	0	47,773	17	281,258	21	1,364,739
1980	171,803	63	56,330	21	ND	0	46,252	17	274,385	18	1,488,962
1981	178,716	65	51,030	19	8,311	3	37,205	14	275,262	19	1,420,772
1982	231,948	69	51,480	15	13,238	4	39,186	12	335,852	21	1,623,090
1983	229,228	73	31,860	10	16,675	5	37,537	12	315,300	18	1,732,528
1984	270,422	72	49,550	13	25,697	7	31,584	8	377,253	20	1,866,837
1985	323,045	76	50,770	12	24,103	6	27,743	7	425,661	22	1,943,069
1986	335,051	71	52,250	11	36,115	8	49,883	11	473,299	23	2,071,412
1987	289,165	58	113,010	23	42,703	9	55,336	11	500,214	23	2,152,886
1988	374,630	69	72,030	13	43,965	8	51,651	10	542,276	23	2,311,291
1989	377,892	73	60,570	12	39,318	8	38,649	7	516,429	23	2,264,079
1990	342,711	66	84,710	16	40,437	8	51,114	10	518,972	21	2,453,284
1991	323,662	64	85,741	17	46,208	9	46,444	9	502,055	20	2,456,328
1992	332,573	66	60,499	12	49,774	10	58,537	12	501,383	20	2,540,374
1993	324,355	65	58,093	12	57,127	11	59,897	12	499,472	20	2,559,408
1994	340,904	66	64,134	12	50,821	10	62,757	12	518,616	19	2,719,911
1995	377,710	70	48,185	9	50,012	9	62,485	12	538,392	19	2,787,670
1996	265,986	69	50,122	13	33,585	9	36,574	9	386,267	19	2,006,528
1997	247,898	68	46,914	13	32,287	9	38,828	11	365,927	18	2,079,514
1998	216,650	66	47,942	15	26,487	8	38,771	12	329,850	18	1,856,976
1999	307,446	68	64,536	14	40,263	9	42,694	9	454,939	18	2,499,152
2000	358,569	68	69,864	13	46,654	9	50,196	10	525,283	20	2,627,805
2001	298,817	69	55,972	13	39,034	9	37,837	9	431,660	19	2,261,941
2002	312,815	68	68,263	15	35,198	8	44,099	10	460,375	20	2,259,091
2003	321,044	73	50,448	11	30,840	7	39,410	9	441,742	20	2,219,398
2004	376,313	75	60,784	12	29,889	6	36,265	7	503,251	20	2,473,961
2005	388,677	76	55,801	11	30,436	6	36,133	7	511,047	21	2,463,929
2006	329,122	71	70,804	15	26,323	6	36,500	8	462,749	20	2,297,961
2007	410,381	76	57,755	11	28,246	5	42,901	8	539,283	21	2,543,674
2008	360,344	74	55,444	11	29,939	6	38,421	8	484,148	21	2,315,601
2009	337,217	73	64,518	14	24,545	5	37,336	8	463,616	21	2,244,224
Mean	297,575	69	60,721	14	30,249	7	43,738	10	432,283	20	2,133,059

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010a-b, *In prep* a). Creel data from Pappas and Marsh 2004.

Note: ND = no data collected.

[a] Russian River effort totals from 1977–1995 are from an in-season creel survey. 1996–2009 are from SWHS.

[b] No breakdown of other lakes/streams available from 1977–1982. Those years contain Kasilof River totals and may contain some non-NKPMA data.

Table 2.–Angler-days of sport fishing effort for the Kenai River by section, 1977–2009.

Year	Cook Inlet to Soldotna Bridge	Soldotna Bridge[a] to Moose River	Moose River to Skilak Outlet	Skilak Inlet to Kenai Lake	Kenai River Reach Not Specified[a]	Kenai River Total
1977	ND	ND	ND	ND	ND	122,138
1978	ND	ND	ND	ND	ND	164,264
1979	ND	ND	ND	ND	ND	178,485
1980	ND	ND	ND	ND	ND	171,803
1981	91,763	35,877	33,701	17,375	ND	178,716
1982	119,164	49,372	39,170	24,242	ND	231,948
1983	109,067	52,266	41,442	26,453	ND	229,228
1984	150,824	42,644	40,976	35,978	ND	270,422
1985	163,690	66,100	55,904	36,536	815	323,045
1986	181,035	63,876	51,171	38,969	ND	335,051
1987	141,203	66,807	41,128	40,027	ND	289,165
1988	203,728	79,727	55,334	35,470	371	374,630
1989	198,697	93,508	53,135	31,562	990	377,892
1990	169,818	82,331	43,401	47,112	49	342,711
1991	151,592	82,552	45,067	44,157	294	323,662
1992	150,249	81,378	49,774	51,172	ND	332,573
1993	162,171	70,353	38,583	53,013	235	324,355
1994	170,944	71,440	39,222	59,298	ND	340,904
1995	206,127	81,280	43,432	46,871	ND	377,710
1996	131,751	61,059	32,465	40,711	ND	265,986
1997	120,873	58,618	32,645	35,762	ND	247,898
1998	95,378	56,342	36,218	28,712	ND	216,650
1999	157,493	69,331	41,573	39,049	ND	307,446
2000	178,460	92,056	41,911	46,142	ND	358,569
2001	153,356	75,249	34,918	35,294	ND	298,817
2002	142,492	78,165	33,228	52,937	5,993	312,815
2003	143,144	90,072	35,804	40,815	11,209	321,044
2004	166,202	100,180	51,188	49,814	8,929	376,313
2005	168,570	111,806	40,903	51,892	15,506	388,677
2006	151,623	91,912	35,667	40,624	9,296	329,122
2007	164,411	110,099	60,820	67,164	7,887	410,381
2008	161,607	90,811	47,204	50,655	10,067	360,344
2009	132,059	87,360	48,661	60,319	8,818	337,217
Mean	134,469	66,442	37,717	37,216	5,747	297,575

Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

Note: ND = no data collected.

[a] Prior to 2002, this data was listed under the "Other Streams" category, and only separated out in the detail SWHS data.

Table 3.–Kenai River sport fish harvest by species, 1977–2009.

Year	Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Rainbow Trout	Dolly Varden	Arctic Grayling	Smelt	Total
1977	7,585	23,196	9,537	163	0	4,438	7,423	187	56,550	109,079
1978	7,130	33,619	10,823	26,579	0	9,272	17,140	90	15,832	120,485
1979	8,843	16,887	15,276	127	0	14,644	34,687	127	10,690	101,281
1980	4,942	25,468	26,838	18,580	0	9,807	26,794	17	150,554	263,000
1981	11,318 [a]	19,721	22,324	86	0	18,685	34,862	65	41,126	148,187
1982	11,496 [a]	50,103	39,415	25,572	0	12,673	16,484	188	49,355	205,286
1983	17,519 [a]	71,267	22,678	1,825	0	13,658	30,106	189	85,126	242,368
1984	14,220 [a]	15,702	59,644	28,562	0	15,687	31,407	51	47,455	212,728
1985	16,540 [a]	57,337	44,635	1,306	186	14,981	26,287	104	26,460	187,836
1986	18,586 [a]	72,398	60,110	19,924	563	2,425	5,775	120	33,124	213,025
1987	27,086 [a]	240,819	33,210	941	144	2,185	7,630	156	53,773	365,944
1988	35,420 [a]	152,751	48,785	15,795	849	2,133	10,977	692	18,223	285,625
1989	18,322 [a]	277,906	55,275	1,421	520	1,927	10,083	151	31,398	397,003
1990	9,151 [a]	120,788	60,325	27,385	312	3,535	11,982	51	36,563	270,092
1991	10,016 [a]	161,678	76,163	2,416	8	3,329	14,517	0	6,334	274,461
1992	10,267 [a]	242,491	52,310	10,029	0	1,977	14,462	0	14,971	346,507
1993	27,881	137,179	50,538	1,003	0	2,574	12,724	0	6,619	238,518
1994	26,865	93,616	86,711	8,701	0	1,576	8,486	0	3,391	229,346
1995	23,655	125,428	46,183	991	0	2,150	9,523	0	987	208,917
1996	15,359	186,291	42,293	15,406	464	1,560	7,484	123	7,366	276,346
1997	20,103	177,133	16,164	1,371	154	1,910	6,957	131	8,874	232,797
1998	9,534	164,536	26,967	8,926	79	2,015	6,079	25	8,175	226,336
1999	22,667	200,574	31,637	1,895	333	3,784	7,568	64	4,942	273,464
2000	17,724	230,983	48,519	19,081	350	3,459	7,427	93	29,286	356,922
2001	19,908	200,762	49,782	2,069	498	2,422	6,528	76	23,012	305,057
2002	14,249	225,917	59,650	22,995	959	6,019	5,781	146	20,036	355,752
2003	21,974	286,089	46,657	2,847	94	2,278	6,113	42	11,841	377,935
2004	22,036	294,793	65,952	20,638	123	3,311	5,845	277	41,085	454,060
2005	23,544	294,287	50,411	5,112	52	2,517	4,316	62	9,206	389,507
2006	21,540	173,425	37,639	12,448	52	2,499	3,218	10	2,307	253,138
2007	15,824	308,850	38,017	3,308	30	2,666	3,276	12	3,221	375,204
2008	15,131	230,030	38,006	15,108	227	3,214	3,766	31	2,270	307,783
2009	11,225	252,319	49,960	4,038	89	2,454	2,718	13	4,796	327,612
Mean	12,392	156,495	43,104	9,898	184	5,387	12,377	100	26,211	270,655

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

[a] 1981–1992 totals revised to include fish originally excluded due to a size range of <16 or <20inches.

Table 4.–Angler-days of sport fishing effort for other Northern Kenai Peninsula Area drainages by fishery, 1977–2009.

Year	Quartz Creek	Stocked Lakes	Swanson River	Hidden Lake	Swanson R Canoe Route	Swan Lakes Canoe Route	Skilak Lake	Kenai Lake	Crescent lake	Tustemena Lake	Other NKPMA Fisheries[a]	Total
1977 [a]	ND	ND	ND	7,462	8,183	ND	ND	ND	ND	ND	29,010	44,655
1978 [a]	ND	ND	ND	4,028	6,376	ND	ND	ND	ND	ND	28,303	38,707
1979 [a]	ND	ND	ND	5,974	5,769	ND	ND	ND	ND	ND	36,030	47,773
1980 [a]	ND	ND	ND	5,783	6,697	ND	ND	ND	ND	ND	33,772	46,252
1981 [a]	ND	ND	ND	4,761	5,235	ND	ND	ND	ND	ND	27,209	37,205
1982 [a]	ND	ND	ND	6,278	6,329	ND	ND	ND	ND	ND	26,579	39,186
1983 [a]	691	3,018	2,124	6,761	7,014	ND	422	1,180	540	253	15,534	37,537
1984	3,413	870	ND [b]	4,835	5,671	3,597	67	502	770	351	11,508	31,584
1985	451	1,473	ND [b]	3,676	4,058	3,000	121	607	243	1,734	12,380	27,743
1986	4,146	2,538	ND [b]	6,254	9,831	3,608	413	2,722	1,147	291	18,933	49,883
1987	5,361	2,054	ND [b]	12,532	7,353	4,980	4,129	580	960	1,576	15,811	55,336
1988	3,965	4,433	10,368	4,820	3,674	2,929	3,838	855	1,255	1,419	14,095	51,651
1989	4,893	2,068	5,484	1,152	2,189	3,570	2,810	377	1,052	923	14,131	38,649
1990	5,655	3,730	6,091	4,188	2,487	2,402	2,817	1,042	971	2,200	19,531	51,114
1991	5,354	3,423	5,830	4,426	2,586	2,830	4,120	1,064	1,223	1,596	13,992	46,444
1992	7,906	5,590	4,897	4,172	3,397	2,934	3,820	1,536	1,014	1,600	21,671	58,537
1993	9,152	5,480	5,690	5,030	2,818	2,332	3,289	2,586	1,713	1,055	20,752	59,897
1994	7,241	10,515	5,039	3,014	2,498	1,295	1,805	2,624	1,836	1,587	25,303	62,757
1995	5,179	8,204	4,637	4,443	2,228	2,262	2,957	3,240	1,874	1,332	26,129	62,485
1996 [c]	3,018	5,380	3,907	2,305	2,564	1,184	1,780	878	756	910	13,892	36,574
1997 [c]	3,422	6,018	3,514	2,592	2,268	2,284	2,360	1,745	961	1,710	11,954	38,828
1998 [c]	3,166	5,876	3,422	1,576	1,671	1,515	1,645	520	1,186	985	17,209	38,771
1999	4,708	5,151	3,606	2,017	3,279	2,022	1,182	1,462	1,266	599	17,402	42,694
2000	2,423	7,969	5,839	1,804	2,929	1,742	2,072	1,033	1,504	1,368	21,513	50,196
2001	3,105	6,543	4,060	1,604	3,345	816	1,701	2,509	1,099	731	12,324	37,837
2002	4,245	7,641	4,249	1,412	1,396	2,296	1,668	2,502	1,457	871	16,362	44,099
2003	4,357	4,802	3,807	1,761	1,150	1,148	2,068	1,097	1,412	802	17,006	39,410
2004	6,589	4,978	2,878	1,902	762	580	2,460	497	1,104	972	13,543	36,265
2005	6,106	8,205	3,552	1,548	1,334	932	594	2,072	1,028	684	10,078	36,133
2006	5,582	6,488	3,533	1,975	1,136	794	1,152	619	790	455	13,976	36,500
2007	8,694	3,079	4,481	2,449	2,231	2,097	1,462	648	1,389	525	15,846	42,901
2008	7,105	2,822	5,006	1,543	2,221	1,341	1,692	728	959	750	14,254	38,421
2009	6,217	3,707	2,698	3,559	1,923	400	1,126	687	1,609	764	14,646	37,336
Mean	4,894	4,891	4,553	3,868	3,715	2,111	1,984	1,330	1,153	1,039	18,808	43,738

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

Note: ND = no data collected.

[a] Swanson River Canoe Route totals from "Canoe Route Systems" total in SWHS and includes Swanson River and Swan Lake Canoe Route data. No breakdown of "Other Lakes/Streams" available from 1977–1982. Those years contain Kasilof River totals and may contain some non-NKPMA data.

[b] No separate Swanson River data, only Swanson River Canoe Route data is listed in SWHS.

[c] SWHS data from revised estimates November 25, 2009.

Table 5.–Sport fish harvest for systems other than the Kenai River mainstem in the Northern Kenai Peninsula Management Area, 1977–2009.

Year	Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Rainbow Trout	Dolly Varden	Arctic Grayling	Smelt	Total
1977 [a]	0	49,625	2,303	1,854	36	16,996	10,783	1,400	14,972	97,969
1978 [a]	251	64,321	3,985	3,591	351	14,933	12,583	2,197	32,310	134,522
1979 [a]	283	37,900	2,621	1,136	18	18,099	19,633	1,391	31	81,112
1980 [a]	310	57,222	3,169	1,576	34	22,096	19,655	2,109	8,190	114,361
1981 [a]	1,307	34,689	2,884	1,976	140	23,003	17,397	1,826	4,860	88,082
1982 [a]	2,367	47,387	4,136	2,544	170	18,208	10,041	2,015	4,776	91,644
1983	3,189	27,240	2,654	377	105	17,703	18,272	1,455	0	70,995
1984	4,648	59,441	5,886	1,733	0	12,742	12,893	998	75	98,416
1985	3,608	70,105	2,651	783	0	13,369	6,483	1,248	1,400	99,647
1986	8,012	70,892	6,484	2,336	26	12,890	11,162	1,758	0	113,560
1987	5,623	181,638	9,959	1,449	72	7,659	6,917	850	0	214,167
1988	5,652	86,986	13,188	2,382	72	7,163	5,437	581	0	121,461
1989	4,121	73,888	19,219	892	431	5,408	6,559	982	16	111,516
1990	3,151	63,221	7,508	4,264	272	11,252	10,221	747	0	100,636
1991	5,734	105,429	10,914	807	66	9,129	8,663	1,419	0	142,161
1992	7,231	64,204	10,576	5,899	221	13,911	9,268	775	0	112,085
1993	9,829	59,205	11,627	1,612	148	12,010	12,717	1,268	280	108,696
1994	7,334	77,619	13,356	2,373	175	12,382	8,981	1,636	0	123,856
1995	6,699	41,871	11,674	2,897	220	11,929	7,010	1,863	0	84,163
1996 [b]	6,139	62,099	12,573	4,033	188	7,878	4,167	948	0	98,025
1997 [b]	6,761	55,955	8,367	1,681	244	14,133	6,456	1,187	1,621	96,405
1998 [b]	4,857	72,831	10,345	8,180	321	10,979	3,488	872	0	111,873
1999	8,291	73,747	10,130	1,078	230	11,494	3,460	1,040	352	109,822
2000	9,943	79,370	10,759	4,581	619	14,972	4,491	1,154	9	125,898
2001	8,866	60,792	11,702	2,139	137	7,818	2,922	980	11	95,367
2002	5,302	93,363	17,287	6,151	150	13,441	3,002	982	0	139,678
2003	5,302	60,795	14,946	2,459	145	8,225	2,809	1,153	304	95,199
2004	4,424	66,084	15,028	4,193	209	5,360	4,066	874	0	100,335
2005	4,689	62,443	10,473	1,190	108	5,228	1,798	739	0	86,668
2006	3,423	90,598	13,085	5,134	483	4,880	1,327	387	0	119,317
2007	3,761	59,195	7,791	3,831	61	6,912	2,394	570	0	84,515
2008	3,789	75,792	11,622	6,420	150	5,176	1,871	773	0	105,593
2009	3,801	101,634	11,023	5,972	184	4,921	1,576	883	0	129,994
Mean	4,809	69,321	9,392	2,955	175	11,585	7,833	1,184	2,097	109,325

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

[a] No breakdown of other lakes/streams available from 1977–1982. Those years may contain some non-NKPMA data, especially the smelt harvests.

[b] SWHS data from revised estimates November 25, 2009.

Table 6.–Anglers-days of effort and harvest for Kenai River and Kasilof River personal use fisheries, 1981–2009.

Year	Days Open	Days Fished	Sockeye	Chinook	Coho	Pink	Chum	Total
Kasilof River Dip Net								
1996	27	1,300	11,197	50	334	103	17	11,701
1997	27	1,091	9,737	35	90	19	19	9,900
1998	27	3,421	45,161	134	731	610	74	46,710
1999	27	3,611	37,176	127	286	264	52	37,905
2000	27	2,622	23,877	134	1,004	841	34	25,890
2001	27	3,382	37,612	138	766	307	23	38,846
2002	44	4,020	46,769	106	1197	1862	139	50,073
2003	44	3,874	43,870	57	592	286	30	44,835
2004	44	4,432	48,315	44	668	396	90	49,513
2005	44	4,500	43,151	16	538	658	102	44,465
2006	44	5,763	56,144	55	1,057	992	105	58,353
2007	44	4,627	43,293	35	487	383	136	44,334
2008	44	5,552	54,051	46	509	787	143	55,536
2009	44	7,650	73,035	34	1,441	1,274	173	75,957
2010	44	7,588	70,774	31	1,768	974	279	73,826
Min.	27	1,091	9,737	16	90	19	17	9,900
Mean	37	4,229	42,944	69	765	650	94	44,523
Max.	44	7,650	73,035	138	1,768	1,862	279	75,957

Year	Days Open	Days Fished	Sockeye	Chinook	Coho	Pink	Chum	Total
Kasilof River Gillnet								
1996	5	582	9,506	46	0	8	1	9,561
1997	5	815	17,997	65	1	102	3	18,168
1998	5	1,075	15,975	126	0	15	12	16,128
1999	10	1,287	12,832	442	25	10	10	13,319
2000	13	1,252	14,774	514	9	17	10	15,324
2001	8	1,001	17,201	174	6	11	7	17,399
2002	10	1,025	17,980	192	12	30	13	18,227
2003	10	1,206	15,706	400	107	9	4	16,226
2004	10	1,272	25,417	163	58	6	0	25,644
2005	11	1,506	26,609	87	326	16	1	27,039
2006	10	1,724	28,867	287	420	11	6	29,591
2007	10	1,569	14,943	343	68	2	0	15,356
2008	10	1,533	23,432	151	65	35	23	23,706
2009	10	1,761	26,646	127	165	14	11	26,963
2010	10	1,855	21,924	136	23	23	1	22,106
Min.	5	582	9,506	46	0	2	0	9,561
Mean	9	1,298	19,321	217	86	21	7	19,650
Max.	13	1,855	28,867	514	420	102	23	29,591

Year	Days Open	Days Fished	Sockeye	Chinook	Coho	Pink	Chum	Total
Kenai River Dip Net								
1996	27	10,503	102,821	295	1,932	2,404	175	107,627
1997	22	11,023	114,619	364	559	619	58	116,219
1998	18	10,802	103,847	254	1,011	1,032	85	106,229
1999	22	13,738	149,504	488	1,009	1,666	102	152,769
2000	22	12,354	98,262	410	1,449	1,457	193	101,771
2001	22	14,772	150,766	638	1,555	1,326	155	154,440
2002	22	14,840	180,028	606	1,721	5,662	551	188,568
2003	22	15,263	223,580	1,016	1,332	1,647	249	227,824
2004	22	18,513	262,831	792	2,661	2,103	387	268,774
2005	22	20,977	295,496	997	2,512	1,806	321	301,132
2006	20	12,685	127,630	1,034	2,235	11,127	551	142,577
2007	22	21,861	291,270	1,509	2,111	1,939	472	297,301
2008	22	20,676	234,109	1,362	2,609	10,631	504	249,215
2009	22	26,043	339,993	1,189	2,401	5,482	285	349,350
2010	22	28,342	389,552	865	2,870	3,655	508	397,450
Min.	18	10,503	98,262	254	559	619	58	101,771
Mean	22	16,826	204,287	788	1,864	3,504	306	210,750
Max.	27	28,342	389,552	1,509	2,870	11,127	551	397,450

Source: Reimer and Sigurdsson 2004; Dunker and Lafferty 2007; K. J. Dunker, Sport Fish Biologist, ADF&G, Anchorage, personal communication. 1996–1997 total reported harvest from returned permits. 1998–2009 summaries of returned permits, expanded to include harvest of permits not returned.

Table 7.–Early-run Kenai River Chinook salmon population data, 1986–2009.

Year	Deep Creek Marine Harvest	Eastside Set Net Harvest	Drift Gill Net Harves	Kenaitze Educational[a]	Inriver Run	Kenai River Sport Harvest [c]	Catch-and-Release Mortality	Spawning Escapement	Total Run
1986	Unknown	Closed	Closed	ND	27,080	8,156	242	18,682	27,080
1987	Unknown	Closed	Closed	ND	25,643	13,557	306	11,780	25,643
1988	Unknown	Closed	Closed	ND	20,880	15,209	340	5,331	20,880
1989	Unknown	Closed	Closed	73	17,992	8,394	149	9,449	18,065
1990	Unknown	Closed	Closed	40	10,768	1,807	378	8,583	10,808
1991	Unknown	Closed	Closed	2	10,939	1,945	152	8,842	10,941
1992	Unknown	Closed	Closed	73	10,087	2,241	236	7,610	10,160
1993	Unknown	Closed	Closed	118	19,921	9,342	286	10,293	20,039
1994	Unknown	Closed	Closed	56	18,403	8,171	285	9,947	18,459
1995	Unknown	Closed	Closed	37	21,884	10,217	357	11,310	21,921
1996	Unknown	Closed	Closed	104	23,505	6,623	287	16,595	23,609
1997	Unknown	Closed	Closed	122	14,963	6,429	349	8,185	15,085
1998	Unknown	Closed	Closed	131	13,103	1,170	254	11,679	13,234
1999	Unknown	Closed	Closed	114	25,666	8,129	261	17,276	25,780
2000	Unknown	Closed	Closed	124	12,479	1,818	185	10,476	12,603
2001	Unknown	Closed	Closed	198	16,676	2,397	205	14,074	16,874
2002	Unknown	Closed	Closed	48	7,162	899	78	6,185	7,210
2003	Unknown	Closed	Closed	126	13,325	2,839	389	10,097	13,451
2004	Unknown	Closed	Closed	72	15,498	3,383	261	11,854	15,570
2005	Unknown	Closed	Closed	76	20,450	3,810	253	16,387	20,526
2006	Unknown	Closed	Closed	65	23,326	4,693	205	18,428	23,391
2007	Unknown	Closed	Closed	16	16,217	3,493	220	12,504	16,233
2008	Unknown	Closed	Closed	40	15,355	3,500	123	11,732	15,395
2009	Unknown	Closed	Closed	49	11,334	1,466	97	9,771	11,383
2010 [d]	Unknown	Closed	Closed	32	13,248	1,337	87	11,824	13,280
Mean	n/a	n/a	n/a	78	17,036	5,241	239	11,556	17,105

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b)**.**; Alexandersdottir and Marsh 1990; Nelson et al. 1999; Hammarstrom and Timmons 2001a; Reimer et al. 2002, Reimer, A. 2003, 2004a-b, 2007; Eskelin, A. 2007, 2009, 2010; J. Perschbacher, Sport Fish Biologist, ADF&G, Soldotna, personal communication; Miller et al. 2010, J. Miller, Division of Commercial Fisheries, ADF&G, Anchorage, personal communication; 1994-2000 Educational data, Kenaitze Indian Tribe.

Note: ND = no data available.

[a] Prior to 1994, there was no educational fishery, this was considered a subsistence fishery.

[b] 1986–1987 Inriver return data is estimated by analysis of tagging data; 1988–2010 is estimated by sonar.

[c] Includes creel survey estimates for the area from Cook Inlet to the Soldotna Bridge and estimates from the SWHS from the Soldotna Bridge to the outlet of Kenai Lake.

[d] Preliminary data. 2010 SWHS information will be available mid-2011; is needed to complete the estimate.

Table 8.–Late-run Kenai River Chinook salmon population data, 1986–2009.

Year	Deep Creek Marine Harvest [a]	Eastside Setnet Harvest [b]	Drift Gillnet Harvest [b]	Commercial Personal Use	Kenaitze Educational	Subsistence	Personal Use Dipnet	Inriver Run Estimated by Sonar [f]	Kenai River Sport Harvest [f,g]	Catch-and-Release Mortality [f]	Spawning Escapement	Total Run
1986	630	19,824	1,834	ND	ND	ND	ND	57,563	9,872	316	47,375	79,837
1987	1,218	21,150	4,552	ND	ND	ND	235	48,123	13,100	123	34,900	74,480
1988	1,487	12,859	2,237	ND	ND	ND	0	52,008	19,695	176	32,137	68,582
1989	1,368	10,914	0	4	ND	ND	0	29,035	9,691	88	19,256	41,344
1990	1,605	4,139	621	91	ND	ND	ND	33,474	6,897	69	26,508	39,943
1991	1,705	4,893	246	130	ND	358	ND	34,614	7,903	16	26,695	41,869
1992	2,115	10,718	615	50	ND	566	0	30,314	7,556	234	22,524	44,142
1993	2,834	14,079	765	110	ND	ND	0	51,991	17,775	478	33,738	69,709
1994	1,869	15,575	464	13	1	709	ND	53,474	17,837	572	35,065	72,093
1995	2,069	12,068	594	36	3	ND	712	44,336	12,609	472	31,255	59,642
1996	2,038	11,564	389	43	1	ND	295	39,356[h]	8,112	337	30,907	53,619
1997	2,931	11,325	627	44	20	ND	364	39,622[h]	12,755	570	26,297	54,688
1998	1,784	5,087	335	48	2	ND	254	34,878	7,515	595	26,768	42,306
1999	1,004	9,463	575	73	4	ND	488	48,069	13,595	682	34,962	60,773
2000	1,052	3,684	270	33	6	ND	410	44,517	15,222	499	29,627	50,770
2001	920	6,009	619	105	8	ND	638	33,916	16,480	825	17,947	43,446
2002	427	9,478	415	14	6	ND	606	41,807	12,607	665	30,464	54,668
2003	200	14,810	1,240	48	11	ND	1,016	41,659	16,943	1,803	23,736	59,759
2004	1,660	21,684	1,526	255	10	ND	792	56,205	17,374	1,019	40,198	84,195
2005[i]	1,040	21,472	1,839	867	11	ND	997	43,240	18,214	1,267	26,046	70,783
2006[i]	938	8,696	1,051	38	11	ND	1,034	37,743	15,811	830	24,423	52,795
2007[i]	797	12,124	896	38	6	0	1,509	42,979	11,441	670	32,618	60,239
2008[i]	517	6,352	295	26	15	0	1,362	34,641	11,138	370	24,144	45,757
2009	256	5,588	859	56	4	0	1,189	25,688	9,036	626	17,158	34,712
2010[j]		7,059	539	40		0		48,343[j]	5,375	55	43,358	60,977
Mean	1,353	11,225	936	98	7	233	595	41,904	12,582	534	29,524	56,845

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).;Hammarstrom and Timmons 2001b; Brannian and Fox 1996; Ruesch and Fox 1996-1999; Reimer and Sigurdsson 2004; Dunker and Lafferty 2007, K. J. Dunker, Sport Fish Biologist, ADF&G, Anchorage, personal communication; Shields 2009–2010a-b.

Note: ND = no data available.

[a] 1986–1998 from Hammarstrom and Timmons 2001b. 1999–2009 from SWHS.

[b] Total number of Chinook salmon harvested in fishery. No commercial drift net fishery conducted in 1989 due to Exxon Valdez oil spill.

[c] Eastside set net personal use data.

[d] Total includes fish harvested from Cohoe, Salamatof, and Kalifornsky Beaches, and the Kenai River.

[e] 1986–1994 from SWHS; 1995 (Ruesch and Fox 1996); 1996–2000 are estimates from returned permits.

[f] Some harvest is below sonar and not counted against escapement.

[g] Sport harvest includes Creel survey estimates for the area from Cook Inlet to the Soldotna Bridge and estimates from the SWHS for Soldotna Bridge to outlet of Kenai Lake.

[h] Sonar counts for 1996 and 1997 were 49,755 and 49,933, respectively (Burwen and Fleischman 1998; Bosch and Burwen 1999). Escapement and total return estimates are calculated using radio telemetry tagging estimates shown here (Hammarstrom and Timmons 2001b).

[i] Harvest estimate does not include Kasilof River terminal fishery which occurred 2005–2008.

[j] Prelimary numbers, biased high by some unknown amount.

Table 9.–Historical summary of early-run Kasilof River/Crooked Creek Chinook salmon stocks, 1996–2010.

	Harvest [a]			Return to the weir [b]			Total Run [b]			Spawning Escapement [b]		
Year	Total	Naturally Produced	Hatchery Produced	Total	Naturally Produced	Hatchery Produced	Total	Naturally Produced	Hatchery Produced	Total	Naturally Produced	Hatchery Produced
1996	5,295	ND	ND	2,224	ND	ND	7,519	ND	ND	764	ND	ND
1997 [c]	5,627	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1998 [c]	4,201	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1999	7,597	ND	ND	1,791			9,388			1,397		
2000	8,815	ND	ND	1,416			10,231			1,077		
2001	7,488	ND	ND	2,586			10,074			2,315		
2002	4,791	0 [d]	0 [d]	3,326			8,117			2,705	813	1,892
2003	3,090	0 [d]	3,090	4,127			7,217			3,597	2,396	1,201
2004	2,407	0 [d]	2,407	4,873	2,641	2,232	7,280	2,641	4,639	4,356	2,196	2,160
2005 [e]	2,665	572	2,093	3,231	2,160	1,071	5,896	2,732	3,164	2,936	1,909	1,027
2006 [e]	2,489	1,057	1,432	2,646	1,589	1,057	5,135	2,646	2,489	2,569	1,516	1,053
2007 [e]	2,654	1,107	1,547	1,527	1,038	489	4,181	2,145	2,036	1,452	965	487
2008 [e]	1,984	832	1,129	1,414	1,018	396	3,398	1,850	1,525	1,181	879	302
2009 [e]	1,532	576	956	929	674	255	2,461	1,250	1,211	734	617	117
2010 [e,f]	1,333	273	1,060	1,352	1,090	262	2,685	1,363	1,322	1,348	1,088	260
Mean (2004-2010)	2,152	631	1,518	2,282	1,459	823	4,434	2,090	2,341	2,082	1,310	772

Source: J. L. Cope, Sport Fish Biologist, ADF&G, Soldotna, personal communication; Howe et al. 2001a-d, Walker et al. 2003; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).

Note: ND = no data collected.

[a] 1996–2003 data from SWHS; 2004–2010 data from inseason creel survey, does not include harvest in Kasilof River personal use fishery.

[b] Excludes age-0.1 fish 1999–2010. Prior to 2004 hatchery returns were not marked at a rate of 100% and hatchery and naturally-produced escapements are estimated.

[c] Weir not operational.

[d] Retention of naturally-produced salmon prohibited for part of 2002 season. Prior to 2004, hatchery returns were not marked at a rate of 100%. The hatchery contribution to the harvest has not been estimated for 2002.

[e] Retention of naturally-produced Chinook salmon limited to Tuesdays and Saturdays in 2005, then changed by EO in 2006–2007 to include Thursdays; in 2008 regulations were changed to allow retention of naturally-produced Chinook salmon on Tuesdays, Thursdays, and Saturdays only, with a limit of 2 Chinook per day of which only one may be naturally-produced—annual limits apply.

Table 10.–Late-run Kasilof River Chinook salmon harvest and abundance, 1996–2009.

Year	Harvest [a]	Inriver Abundance [b]
1996	833	
1997	1,101	
1998	637	
1999	658	
2000	1,086	
2001	1,378	
2002	451	
2003	1,144	
2004	1,038	
2005	1,052	12,097
2006	883	8,611
2007	1,062	8,522
2008	793	8,276
2009	2,164	
Min	451	8,276
Max	2,164	12,097
Mean	1,020	9,377

[a] *Source*: From Statewide Harvest Surveys (SWHS, Howe et al. 1996-1999; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).

[b] *Source*: From Reimer and Fleishman *In prep.*

Table 11.–Fishing effort, catch and harvest of early-run king salmon by angler type, Kasilof River creel survey, May 16 through June 30, 2004–2010.

	Shore Guided				Shore Unguided				Shore Total			
Year	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest
2004	0	0	0	0	5,138	15,096	1,643	503	5,138	15,096	1,643	503
2005	0	0	0	0	5,142	16,452	1,366	497	5,142	16,452	1,366	497
2006	0	0	0	0	7,910	23,199	887	296	7,910	23,199	887	296
2007	0	0	0	0	6,181	17,953	747	329	6,181	17,953	747	329
2008	57	248	14	14	6,511	19,712	564	274	6,568	19,960	578	288
2009	50	204	0	0	6,242	17,091	354	169	6,292	17,295	354	169
2010	4	10	0	0	4,743	14,371	660	170	4,747	14,381	660	170

	Boat Guided				Boat Unguided				Boat Total			
Year	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest
2004	4,328	24,670	3,463	1,479	2,550	12,089	983	426	6,878	36,759	4,446	1,905
2005	4,615	32,840	3,446	1,768	2,297	11,300	743	401	6,912	44,140	4,189	2,169
2006	5,410	38,065	3,330	1,818	2,928	13,994	553	375	8,338	52,059	3,883	2,193
2007	4,625	32,363	3,162	1,940	2,109	10,926	516	384	6,734	43,289	3,678	2,324
2008	4,420	31,113	2,303	1,490	2,325	10,740	304	207	6,745	41,853	2,607	1,697
2009	3,526	24,255	1,711	1,196	1,575	7,361	211	166	5,101	31,616	1,922	1,362
2010	4,790	33,792	2,334	1,089	963	4,800	135	74	5,753	38,592	2,469	1,163

	Guided Total				Unguided Total				Total			
Year	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest	Number Anglers	Angler Hours	Catch	Harvest
2004	4,328	24,670	3,463	1,479	7,688	27,185	2,626	929	12,016	51,855	6,089	2,408
2005	4,615	32,840	3,446	1,768	7,439	27,752	2,109	898	12,054	60,592	5,555	2,666
2006	5,410	38,065	3,330	1,818	10,838	37,193	1,440	671	16,248	75,258	4,770	2,489
2007	4,625	32,363	3,162	1,940	8,290	28,879	1,263	713	12,915	61,242	4,425	2,653
2008	4,477	31,361	2,317	1,504	8,836	30,452	868	481	13,313	61,813	3,185	1,985
2009	3,576	24,459	1,711	1,196	7,817	24,452	565	335	11,393	48,911	2,276	1,532
2010	4,794	33,802	2,334	1,089	5,706	19,171	795	244	10,500	52,973	3,129	1,333
Mean	4,546	31,080	2,823	1,542	8,088	27,869	1,381	610	12,634	58,949	4,204	2,152
% of Total	36%	53%	67%	72%	64%	47%	33%	28%				

Source: Preliminary estimates from the Kasilof River early-run king salmon angler creel survey 2004–2010.

Table 12.–Historical releases of adipose-clipped Crooked Creek Chinook salmon, 1994–2010.

Release year	Broodstock origin	Hatchery	No. of smolt released	No. of AFC smolt released	% AFC
1994	Crooked Creek	Elmendorf	224,784	43,609	19.4%
1995	Homer (Crooked Creek)[a]	Elmendorf	184,049	40,903	22.2%
1996	Homer (Crooked Creek)[a]	Elmendorf	193,180	40,827	21.1%
1997	Homer (Crooked Creek)[a]	Elmendorf	223,201	41,049	18.4%
1998	Homer (Crooked Creek)[a]	Elmendorf	137,338	42,874	31.2%
1999	Homer (Crooked Creek)[a]	Elmendorf	192,304	43,431	22.6%
2000	Crooked Creek	Elmendorf	108,507	108,507	100.0%
2001	Crooked Creek	Elmendorf	109,201	109,201	100.0%
2002	Crooked Creek	Elmendorf	99,547	99,547	100.0%
2003	Crooked Creek	Ft. Richardson	98,800	98,800	100.0%
2004	Crooked Creek	Ft. Richardson	80,601	80,601	100.0%
2005	Crooked Creek	Ft. Richardson	113,613	113,071	99.5%
2006	Crooked Creek	Ft. Richardson	111,705	111,705	100.0%
2007	Crooked Creek	Ft. Richardson	111,382	111,271	99.9%
2008	Crooked Creek	Ft. Richardson	114,588	114,588	100.0%
2009	Crooked Creek	Ft. Richardson	115,035	114,734	99.7%
2010	Crooked Creek	Ft. Richardson	106,145	106,145	100.0%
Mean (1994–1999)			192,476		
Mean (2000–2010)			106,284		

[a] Broodstock collection occurred at the Nick Dudiak Fishing Lagoon. Broodstock at this collection site were Crooked Creek progeny.

Table 13.–Angler effort, harvest, and escapement, Russian River early-run (ER) and late-run (LR) sockeye salmon, 1963–2010.

		Sport Harvest		Subsistence Harvest [b]		Spawning Escapement		Local Return [c]	
Year	Effort[a]	ER	LR	ER	LR	ER	LR	ER	LR
1963	7,880	3,670	1,390	ND	ND	14,380	51,120	18,050	52,510
1964	5,330	3,550	2,450	ND	ND	12,700	46,930	16,250	49,380
1965	9,720	10,030	2,160	ND	ND	21,514	21,820	31,544	23,980
1966	18,280	14,950	7,290	ND	ND	16,658	34,430	31,608	41,720
1967	16,960	7,240	5,720	ND	ND	13,710	49,480	20,950	55,200
1968	17,280	6,920	5,820	ND	ND	9,192	48,880	16,112	54,700
1969	14,930	5,870	1,150	ND	ND	5,000	28,872	10,870	30,022
1970	10,700	5,750	600	ND	ND	5,451	26,200	11,201	26,800
1971	15,120	2,810	10,730	ND	ND	2,654	54,421	5,464	65,151
1972	25,700	5,040	16,050	ND	ND	9,273	79,115	14,313	95,165
1973	30,690	6,740	8,930	ND	ND	13,120	25,068	19,860	33,998
1974	21,120	6,440	8,500	ND	ND	13,164	24,904	19,604	33,404
1975	16,510	1,400	8,390	ND	ND	5,645	31,961	7,045	40,351
1976	26,310	3,380	13,700	ND	ND	14,736	31,939	18,116	45,639
1977	69,510	20,400	27,440	ND	ND	16,061	21,362	36,461	48,802
1978	69,860	37,720	24,530	ND	ND	34,240	34,334	71,960	58,864
1979	55,000	8,400	26,840	ND	ND	19,749	87,852	28,149	114,692
1980	56,330	27,220	33,500	ND	ND	28,624	83,984	55,844	117,484
1981	51,030	10,720	23,720	ND	ND	21,142	44,523	31,862	68,243
1982	51,480	34,500	10,320	ND	ND	56,106	30,800	90,606	41,120
1983	31,860	8,360	16,000	ND	ND	21,272	33,734	29,632	49,734
1984	49,550	35,880	21,970	ND	ND	28,908	92,659	64,788	114,629
1985	50,770	12,300	58,410	ND	ND	30,605	136,969	42,905	195,379
1986	52,250	35,100	30,810	ND	ND	36,338	40,281	71,438	71,091
1987	113,010	154,200	40,580	ND	ND	61,513	53,932	215,713	94,512
1988	72,030	54,780	19,540	ND	ND	50,406	42,476	105,186	62,016
1989	60,570	11,290	55,210	ND	ND	15,278	138,377	26,628	193,587
1990	84,710	30,215	56,180	ND	ND	25,144	83,434	56,931	139,614
1991	85,741	65,390	31,450	ND	ND	31,660	78,175	97,779	109,625
1992	60,499	30,512	26,101	ND	ND	37,117	62,584	67,629	88,685
1993	58,093	37,261	26,772	ND	ND	39,857	99,259	77,118	126,031
1994	64,134	48,923	26,375	ND	ND	44,872	122,277	93,795	148,652
1995	48,185	23,572	11,805	ND	ND	28,603	61,982	52,175	73,787
1996	69,032	39,075	19,136	ND	ND	52,905	34,691	91,980	53,827
1997	60,923	36,788	12,910	ND	ND	36,280	65,905	73,068	78,815
1998	56,121	42,711	25,110	ND	ND	34,143	113,480	76,854	138,590
1999	64,536	34,283	32,335	ND	ND	36,607	139,863	70,890	172,198
2000	69,864	40,732	30,229	ND	ND	32,736	56,580	73,468	86,809
2001	55,972	35,400	18,550	ND	ND	78,255	74,964	113,655	93,514
2002	68,263	52,139	31,999	ND	ND	85,943	62,115	138,082	94,114
2003	50,448	22,986	28,085	ND	ND	23,650	157,469	46,636	185,554
2004	60,784	32,727	22,417	ND	ND	56,582	110,244	89,309	132,661
2005	55,801	37,139	18,503	ND	ND	52,903	59,473	90,042	77,976
2006	70,804	51,167	29,694	ND	ND	80,524	89,160	131,691	118,854
2007[b]	57,755	36,805	16,863	380	298	27,298	53,068	64,483	70,229
2008	55,444	42,492	23,680	928	478	30,989	46,638	74,409	70,796
2009	64,518	59,097	33,935	543	431	52,178	80,088	111,818	114,454
2010						27,074	38,848	27,074	
Mean (1963–2010)	48,541	28,385	21,359	617	402	31,099	64,307	58,980	86,233
Mean (2000–2009)	60,965	41,068	25,396	617	402	52,106	78,980	93,359	104,496

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).; Pappas and Marsh 2004; Subsistence data, USFWS.

Note: ND = no data collected.

[a] Effort is combined early and late run fisheries. 1963–1996 estimated from an in-season creel survey, 1997–2009 estimated from SWHS.

[b] Subsistence fishery started in 2007.

[c] Escapement above weir plus harvest; 1989–1991 includes 60 fish (in 1989) used to test brood source for disease, 1,572 fish (in 1990) and 729 fish (in 1991) used as brood source for stocking in Resurrection Bay.

Table 14.–Kenai River recreational harvest of sockeye salmon by river section as determined by the Statewide Harvest Survey, 1981–2009.

	Cook Inlet to Soldotna Bridge		Soldotna Bridge to Moose River		Moose River to Skilak Lake		Skilak Lake to Kenai Lake		Kenai River Reach Not Specified [a]			Total Effort for All Species
Year	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Total	(Angler-days)
1981	5,270	26.7	5,336	27.1	4,266	21.6	4,849	24.6	ND	ND	19,721	178,716
1982	11,706	23.4	14,829	29.6	12,136	24.2	11,432	22.8	ND	ND	50,103	231,948
1983	22,961	32.2	22,454	31.5	15,180	21.3	10,672	15.0	ND	ND	71,267	229,228
1984	4,419	28.1	2,183	13.9	2,300	14.6	6,800	43.3	ND	ND	15,702	270,422
1985	14,941	26.1	13,025	22.8	13,299	23.2	15,948	27.9	124	0.2	57,213	323,045
1986	21,177	29.3	13,846	19.1	13,533	18.7	23,842	32.9	ND	ND	72,398	335,051
1987	85,020	35.3	65,841	27.3	39,926	16.6	50,032	20.8	ND	ND	240,819	289,165
1988	49,627	32.5	43,494	28.5	29,178	19.1	30,452	19.9	0	0.0	152,751	374,630
1989	111,889	40.4	90,550	32.7	45,844	16.5	28,942	10.4	681	0.2	277,225	377,892
1990	33,213	27.5	37,201	30.8	22,083	18.3	28,291	23.4	0	0.0	120,788	342,711
1991	53,331	33.0	56,059	34.7	24,768	15.3	27,444	17.0	76	0.0	161,602	323,662
1992	80,535	33.2	85,942	35.4	40,616	16.7	35,398	14.6	ND	ND	242,491	332,573
1993	46,873	34.2	41,466	30.2	18,724	13.6	30,116	22.0	0	0.0	137,179	324,355
1994	30,363	32.4	24,307	26.0	12,374	13.2	26,572	28.4	ND	ND	93,616	340,904
1995	49,806	39.7	38,602	30.8	17,606	14.0	19,414	15.5	ND	ND	125,428	377,710
1996	67,324	36.1	51,866	27.8	29,391	15.8	37,710	20.2	ND	ND	186,291	265,986
1997	73,805	41.7	56,784	32.1	23,626	13.3	22,918	12.9	ND	ND	177,133	247,898
1998	57,464	34.9	61,763	37.5	24,315	14.8	20,994	12.8	ND	ND	164,536	216,650
1999	77,865	38.8	61,344	30.6	27,569	13.7	33,796	16.8	ND	ND	200,574	307,446
2000	98,048	42.4	74,132	32.1	30,825	13.3	27,978	12.1	ND	ND	230,983	358,569
2001	86,880	43.3	73,841	36.8	19,616	9.8	20,425	10.2	ND	ND	200,762	298,817
2002	78,964	35.0	79,608	35.2	23,488	10.4	40,115	17.8	3,742	1.7	225,917	312,815
2003	102,689	35.9	116,383	40.7	30,914	10.8	25,771	9.0	10,332	3.6	286,089	321,044
2004	105,521	35.8	111,048	37.7	42,489	14.4	29,185	9.9	6,550	2.2	294,793	376,313
2005	98,114	33.3	115,270	39.2	32,655	11.1	34,779	11.8	13,469	4.6	294,287	388,677
2006	52,364	30.2	71,854	41.4	22,177	12.8	19,941	11.5	7,089	4.1	173,425	329,122
2007	102,521	33.2	116,719	37.8	47,448	15.4	35,248	11.4	6,914	2.2	308,850	410,381
2008	77,882	33.9	82,061	35.7	33,461	14.5	28,803	12.5	7,823	3.4	230,030	360,344
2009	77,568	30.7	88,668	35.1	36,831	14.6	42,247	16.7	7,005	2.8	252,319	337,217
Min.	4,419		2,183		2,300		4,849		3,742		15,702	178,716
Mean	61,315		59,189		25,401		26,556		4,558		174,631	316,665
Max.	111,889		116,719		47,448		50,032		13,469		308,850	410,381

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).

Note: ND = no data available.

[a] SWHS began consistently reporting in 2002.

Table 15.–Kenai River drainage sockeye salmon escapements and inriver harvest, 1981–2009.

						Harvests above Sonar							
Year	Inriver Subsistence, PU, and Educational Harvest [a]	Sport Harvest Below Sonar [b]	Kenai River Sonar Count	Total Inriver Run	Kenai R Below Soldotna Bridge	Kenai R Sonar to Soldotna Bridge	Kenai R Above Soldotna Bridge	Kenai R Reach Not Specified [e]	Skilak Lake	Late Run Russian River	Hidden Lake Personal Use and Sport [c]	Total Harvest Above Sonar	Spawning Escapement
1981	ND	3,116	407,639	410,755	5,270	2,154	14,451	ND	ND	23,720	0	40,325	367,314
1982	Insignificant	6,922	619,831	626,753	11,706	4,784	38,397	ND	ND	10,320	ND	53,501	566,330
1983	7,562	13,577	630,340	651,479	22,961	9,384	48,306	ND	0	16,000	0	73,690	556,650
1984	ND	2,613	344,571	347,184	4,419	1,806	11,283	ND	0	21,970	17	35,076	309,495
1985	ND	8,835	502,820	511,655	14,941	6,106	42,272	124	0	58,410	149	106,937	395,883
1986	ND	12,522	501,157	513,679	21,177	8,655	51,221	ND	13	30,810	0	90,699	410,458
1987	24,090	50,274	1,596,871	1,671,235	85,020	34,746	155,799	ND	2,029	40,580	689	233,843	1,363,028
1988	16,880	29,345	1,021,469	1,067,694	49,627	20,282	103,124	ND	382	19,540	583	143,911	877,558
1989	51,192	66,162	1,599,959	1,717,313	111,889	45,727	165,336	681	1,654	55,210	331	268,258	1,331,701
1990	3,477	19,640	659,520	682,637	33,213	13,573	85,074	0	670	56,180	107	155,604	503,916
1991	13,433	31,536	647,597	692,566	53,331	21,795	108,271	76	2,411	31,450	63,681	227,608	419,989
1992	30,454	47,622	994,798	1,072,874	80,535	32,913	161,956	ND	1,044	26,101	468	222,482	772,316
1993	35,592	27,717	813,617	876,926	46,873	19,156	90,306	0	825	26,772	133	137,192	676,425
1994	15,804	17,954	1,003,446	1,037,204	30,363	12,409	63,253	ND	213	26,375	102	102,352	901,094
1995	15,720	29,451	630,447	675,618	49,806	20,355	75,622	ND	177	11,805	83	108,042	522,405
1996	104,110	39,810	797,847	941,767	67,324	27,514	118,967	ND	307	19,136	225	166,149	631,698
1997	116,107	43,642	1,064,818	1,224,567	73,805	30,163	103,328	ND	312	12,910	274	146,987	917,831
1998	105,497	33,980	767,558	907,035	57,464	23,484	107,072	ND	158	25,110	81	155,905	611,653
1999	150,993	46,043	803,379	1,000,415	77,865	31,822	122,709	ND	0	32,335	859	187,725	615,654
2000	99,571	57,978	624,578	782,127	98,048	40,070	132,935	ND	377	30,229	190	203,801	420,777
2001	152,580	51,374	650,036	853,990	86,880	35,506	113,882	ND	24	18,550	142	168,104	481,932
2002	182,229	46,693	957,924	1,186,846	78,964	32,271	143,211	3,742	1,509	31,999	308	213,040	744,884
2003	227,207	60,722	1,181,309	1,469,238	102,689	41,967	173,068	10,168	96	28,085	302	253,686	927,623
2004	266,937	62,397	1,385,981	1,715,315	105,521	43,124	182,722	5,795	276	22,417	437	254,771	1,131,210
2005	300,105	58,017	1,376,452	1,734,574	98,114	40,097	182,704	13,469	45	18,503	0	254,818	1,121,634
2006	130,486	30,964	1,499,692	1,661,142	52,364	21,400	113,972	7,089	98	29,694	385	172,638	1,327,054
2007	295,866	60,623	867,572	1,224,061	102,521	41,898	199,415	6,876	94	16,863	240	265,386	602,186
2008	239,075	46,053	614,946	900,074	77,882	31,829	144,325	7,823	171	23,680	0	207,828	407,118
2009	343,758	45,868	745,170	1,134,796	77,568	31,700	167,746	7,009	102	33,935	1,019	241,511	503,659
2010			970,662										
Mean (2005–2009)	261,860	48,300	1,020,770	1,330,930	81,690	33,380	161,630	8,450	100	24,540	330	228,440	792,330
Mean. (2000–2009)	223,780	52,070	990,370	1,266,220	88,060	35,990	155,400	6,200	280	25,400	300	223,560	766,810
Mean (1996–2009)	193,890	48,870	952,660	1,195,420	82,640	33,770	143,290	4,430	250	24,530	320	206,600	764,710
Mean (1985–2009)	116,850	41,010	932,360	1,090,210	69,350	28,340	124,330	2,510	520	29,070	2,830	187,570	744,790

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).; Brannian and Fox 1996; Reimer and Sigurdsson 2004, Dunker and Lafferty 2007, K. J. Dunker, Sport Fish biologist, Anchorage, personal communication; King 1995, 1996; Pappas and Marsh 2004; Shields 2009-2010a-b; Educational harvest data, Kenaitze Indian Tribe; 2007-2009 Subsistence data, USFWS. *Note*: ND = no data available.

[a] Personal use harvest not known in 1982; personal use (1981–1995) and subsistence dip net harvest (1991–2,1994) from Brannian and Fox,1996. Educational is total annual Kenaitze educational permit harvest.

[b] In 1994 and 1995 a creel survey was conducted to estimate harvest below the sonar. In 1994, 49.7% of the below Soldotna Bridge harvest was taken below the sonar. In 1995, 68.6 % was taken below the sonar. The average of these two percentages is applied to all other year's below-bridge harvest to estimate the harvest below the sonar.

[c] Sport harvest and 1991 Hidden Lake personal use from SWHS.

[e] SWHS began reporting this data consistently in 2002.

Table 16.–Cook Inlet commercial coho salmon harvest and harvest of Kenai River Drainage coho salmon, 1993–2009.

Year	Commercial Drift Total Harvest [a]	Commercial ESSN Total Harvest [a,b]	Commercial N. District Set Net Total Harvest [a]	Commercial Kalgin Island/ West Side Total Harvest [a]	Drift Fishery Harvest of Kenai River coho salmon [a]	ESSN Harvest of Kenai River coho salmon [a]	N. District Harvest of Kenai River coho salmon [a]	Drainage Wide Kenai River Sport Harvest [c]	Harvest of Russian River coho salmon	Personal Use and Subsistence[d]	Educational	Total Harvest of Kenai River coho salmon	Percent Contribution of select commercial fisheries to the overall harvest of Kenai River coho salmon [e]
1993	121,829	43,098	106,294	35,661	930	6,806	148	52,855	2,290	1,597	427	62,763	12.6
1994	310,114	68,449	144,064	61,166	11,732	14,673	477	91,490	4,607	2,535	829	121,736	22.1
1995	241,473	44,750	89,300	71,431	6,956	13,152	582	50,346	4,077	1,261	868	73,165	28.3
1996	171,434	40,724	78,105	31,405	2,671	11,856	29	47,860	4,599	1,932	592	64,940	22.4
1997	78,662	19,668	37,369	16,705	1,236	2,093	36	20,770	4,586	559	191	24,885	13.5
1998	83,338	18,677	34,359	24,286	1,974	8,096	175	31,579	4,612	1,011	638	43,473	23.6
1999	64,814	11,923	31,446	17,725	818	2,905	171	35,591	3,910	1,009	530	41,024	9.5
2000	131,478	11,078	71,475	22,840	531	2,351	83	52,489	3,938	1,449	656	57,559	5.2
2001	39,418	4,246	45,928	23,719	282	349	1,303	55,027	5,222	1,555	572	59,088	3.3
2002	125,831	35,153	50,292	35,005	1,370	4,688	57	66,160	6,093	1,721	921	74,917	8.2
2003	52,432	10,171	24,015	15,138	330	2,122	126	52,405	5,197	1,332	464	56,779	4.5
2004	198,493	30,137	44,130	36,257	4,251	5,921	977	72,695	6,574	2,661	765	87,270	12.8
2005	144,753	19,543	30,859	29,502	1,533	3,310	176	54,352	3,868	2,512	489	62,372	8.0
2006 [f]	98,473	22,556	20,215	36,450	ND	ND	ND	43,243	5,431	2,235	689	ND	ND
2007 [f]	108,703	23,578	21,563	23,495	ND	ND	ND	41,263	3,169	2,116	543	ND	ND
2008 [f]	89,428	20,143	22,034	18,441	ND	ND	ND	55,520	3,739	2,616	522	ND	ND
2009 [f]	82,096	11,435	37,627	22,050	ND	ND	ND	55,495	5,313	2,410	769	ND	ND
Mean (2005–2009)	104,691	19,451	26,460	25,988				49,975	4,304	2,378	602		
Mean (2000–2009)	107,111	18,804	36,814	26,290				54,865	4,854	2,061	639		
Mean (1993–1999)	153,095	35,327	74,420	36,911	3,760	8,512	231	47,213	4,097	1,415	582		19
Mean (1993–2009)	126,045	25,608	52,299	30,663				51,714	4,543	1,795	616		
Mean (1993–2005)	135,698	27,509	60,587	32,372	2,663	6,025	334	52,586	4,583	1,626	611		13

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a); Massengill 2007a, b; Massengill 2007c;Commercial Fishery data: Shields 2009–2010a; 1993-2006 PU and 1994 Subsistence data: Brannian and Fox 1996; Reimer and Sigurdsson 2004, Dunker and Lafferty 2007, K. J. Dunker, Division of Sport Fish Biologist, ADF&G, Anchorage, personal communication; 2007-2009 Subsistence data, USFWS; Educational data, Kenzaitze Indian Tribe.

Note: ND = no data available

[a] Some commercial harvest estimates have been revised (due to discovery of lost or late fish tickets). The Kenai River coho salmon commercial harvest contribution estimates were generated and reported based on slightly lower total commercial harvest estimates.

[b] Central District eastside setnet (ESSN) commercial fishery.

[c] Drainagewide Kenai River Sport harvest includes Kenai River, Beaver Creek, Funny River, Grant Creek, Hidden Lake, Hidden Creek, Jean Lake, Kenai Lake, Moose River, Quartz Creek, Sevena Lake, Skilak Lake, Soldotna Creek, and Trail Lake. No coho harvest was reported from Cooper Creek, Dry Creek, Grant Lake, Ptarmigan Creek, Ptarmigan Lake, Slikok Creek, or Tern Lake.

[d] Kenai River personal use dip net and subsistence harvest 1993-1995, personal use dip net 1996-2006, personal use dip net and Federal subsistence 2007–2009.

[e] Percent of Kenai River original coho salmon caught in combined Upper Cook Inlet drift gillnets, eastside set gillnet, and Northern District get gillnet commercial harvests, Kalgin Island and West Side setnet harvest.

[f] 2005 was the final year the contribution of Kenai River coho salmon was estimated for Upper Cook Inlet commercial fisheries.

Table 17.–Estimated sport harvest of Kenai River coho salmon by river section, 1977–2009.

	Lower Section [a]			Middle Section [b]			Upper Section [c]			Inter-Lake [d]			Kenai River Reach Not Specified [e]			All Sections		
	Prior to Sept 1	After Sept 1		Prior to Sept 1	After Sept 1		Prior to Sept 1	After Sept 1		Prior to Sept 1	After Sept 1		Prior to Sept 1	After Sept 1		Prior to Sept 1	After Sept 1	
Year			Total			Total			Total			Total			Total			Total
1977	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9,537
1978	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,823
1979	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15,276
1980	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26,838
1981	ND	ND	12,280	ND	ND	3,326	ND	ND	6,178	ND	ND	540	ND	ND	ND	ND	ND	22,324
1982	ND	ND	26,582	ND	ND	3,904	ND	ND	7,200	ND	ND	1,729	ND	ND	ND	ND	ND	39,415
1983	ND	ND	12,231	ND	ND	4,007	ND	ND	4,867	ND	ND	1,573	ND	ND	ND	ND	ND	22,678
1984	ND	ND	40,173	ND	ND	7,596	ND	ND	8,065	ND	ND	3,810	ND	ND	ND	ND	ND	59,644
1985	ND	ND	22,579	ND	ND	6,781	ND	ND	12,774	ND	ND	2,401	ND	ND	100	ND	ND	44,635
1986	ND	ND	38,338	ND	ND	10,336	ND	ND	8,348	ND	ND	3,088	ND	ND	ND	ND	ND	60,110
1987	ND	ND	19,612	ND	ND	6,222	ND	ND	4,077	ND	ND	3,299	ND	ND	ND	ND	ND	33,210
1988	ND	ND	34,690	ND	ND	4,863	ND	ND	5,714	ND	ND	3,427	ND	ND	91	ND	ND	48,785
1989	ND	ND	36,668	ND	ND	7,921	ND	ND	8,236	ND	ND	2,434	ND	ND	16	ND	ND	55,275
1990	ND	ND	40,567	ND	ND	8,446	ND	ND	7,281	ND	ND	4,031	ND	ND	ND	ND	ND	60,325
1991	ND	ND	49,499	ND	ND	13,438	ND	ND	9,520	ND	ND	3,699	ND	ND	7	ND	ND	76,163
1992	ND	ND	33,175	ND	ND	7,579	ND	ND	7,547	ND	ND	4,009	ND	ND	ND	ND	ND	52,310
1993	ND	ND	29,135	ND	ND	9,677	ND	ND	6,771	ND	ND	4,955	ND	ND	ND	ND	ND	50,538
1994	ND	ND	46,345	ND	ND	15,249	ND	ND	12,286	ND	ND	12,831	ND	ND	ND	ND	ND	86,711
1995	20,031	11,808	31,839	4,842	1,131	5,973	2,785	2,794	5,579	2,065	727	2,792	ND	ND	ND	29,723	16,460	46,183
1996	17,551	5,010	22,561	8,347	2,076	10,423	4,371	1,682	6,053	2,457	799	3,256	ND	ND	ND	32,726	9,567	42,293
1997	5,570	1,293	6,863	2,858	1,319	4,177	1,752	1,330	3,082	1,587	455	2,042	ND	ND	ND	11,767	4,397	16,164
1998	9,955	5,506	15,461	3,667	1,430	5,097	2,373	1,833	4,206	1,764	439	2,203	ND	ND	ND	17,759	9,208	26,967
1999	14,413	6,029	20,442	4,732	654	5,386	1,268	1,812	3,080	1,951	778	2,729	ND	ND	ND	22,364	9,273	31,637
2000	22,392	8,444	30,836	8,185	1,880	10,065	3,894	1,159	5,053	1,652	913	2,565	ND	ND	ND	36,123	12,396	48,519
2001	23,501	8,977	32,478	7,381	1,947	9,328	3,565	1,986	5,551	1,672	753	2,425	ND	ND	ND	36,119	13,663	49,782
2002	27,062	9,641	36,703	8,220	2,630	10,850	2,663	2,406	5,069	3,965	886	4,851	1,552	625	2,177	43,462	16,188	59,650
2003	20,093	5,963	26,056	8,961	2,029	10,990	3,160	1,517	4,677	2,690	490	3,180	1,367	352	1,754	36,271	10,351	46,657
2004	29,606	12,010	41,616	9,145	4,055	13,200	3,492	2,234	5,726	2,733	868	3,601	1,135	637	1,809	46,111	19,804	65,952
2005	17,331	7,810	25,141	10,793	3,563	14,356	1,697	2,739	4,436	2,310	2,103	4,413	1,671	339	2,065	33,802	16,554	50,411
2006	13,817	7,132	20,949	4,800	2,331	7,131	1,890	2,939	4,829	2,638	890	3,528	797	405	1,202	23,942	13,697	37,639
2007	12,891	7,443	20,334	6,322	1,133	7,455	3,230	2,361	5,591	2,390	1,400	3,790	621	226	847	25,454	12,563	38,017
2008	20,602	10,562	31,164	6,122	3,161	9,283	2,262	3,012	5,274	3,110	1,426	4,536	796	571	1,367	32,892	18,732	51,624
2009	19,022	9,044	28,066	5,509	2,907	8,416	4,016	3,879	7,895	2,391	1,966	4,357	1,146	80	1,226	32,084	17,876	49,960
Mean (2005–2009)	16,733	8,398	25,131	6,709	2,619	9,328	2,619	2,986	5,605	2,568	1,557	4,125	1,006	324	1,341	29,635	15,884	45,530
Mean (2000–2009)	20,632	8,703	29,334	7,544	2,564	10,107	2,987	2,423	5,410	2,555	1,170	3,725	1,136	404	1,556	34,626	15,182	49,821
Mean (1981–1999)			28,703			8,327			6,378			3,520						47,365
Mean (1995–2009)	18,256	7,778	26,034	6,659	2,150	8,809	2,828	2,246	5,073	2,358	993	3,351	1,136	404	1,556	30,707	13,382	44,097
Mean (1981–2007)			28,635			8,288			6,363			3,452			1,007			47,111

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

Note: ND = no data available.

[a] Cook Inlet to Soldotna bridge.

[b] Soldotna bridge to Moose River.

[c] Moose River to Skilak Lake.

[d] Skilak Lake to Kenai Lake.

e Statewide Harvest Survey began reporting consistently in 2002.

Table 18.–Northern Kenai Peninsula Management Area (except Kenai River drainage) coho salmon sport harvest, 1981–2009.

	Kasilof River Drainage				Swanson River Drainage			Other NKPMA Drainages				
Year	Tustumena Lake[a]	Kasilof River	Crooked Creek	Total	Swanson River	Swanson Canoe Route Lakes	Total	Six Mile Creek	Resurrection Creek	Chickaloon River	Other[b]	Total
1981	NA	335	NA	335	NA	NA	NA	NA	NA	NA	NA	NA
1982	NA	325	NA	325	NA	NA	NA	NA	NA	NA	NA	NA
1983	NA	409	NA	409	525	NA	525	NA	NA	NA	NA	NA
1984	NA	1,085	NA	1,085	1,484	NA	1,484	NA	NA	NA	NA	NA
1985	NA	560	NA	560	NA	187	187	NA	NA	NA	NA	NA
1986	NA	1,783	497	2,280	NA	969	969	45	13	NA	0	58
1987	36	3,785	NA	3,821	NA	1,485	1,485	72	36	NA	0	108
1988	200	2,928	291	3,419	5,603	546	6,149	236	18	NA	55	309
1989	111	4,222	1,952	6,285	6,379	127	6,506	79	127	NA	0	206
1990	236	1,590	486	2,312	1,501	0	1,501	316	125	NA	0	441
1991	52	4,754	265	5,071	811	81	892	125	29	NA	0	154
1992	32	3,304	251	3,587	1,984	49	2,033	49	89	154	97	389
1993	258	3,698	867	4,823	3,477	10	3,487	344	171	439	0	954
1994	30	4,457	1,026	5,513	1,876	0	1,876	534	81	18	27	660
1995	218	5,349	98	5,665	1,132	0	1,132	472	39	0	0	511
1996	144	2,612	471	3,227	2,578	76	2,654	551	224	155	0	930
1997	345	1,286	0	1,631	1,153	0	1,153	381	84	20	56	541
1998	119	2,107	0	2,226	2,371	123	2,494	470	274	115	0	859
1999	48	3,269	0	3,317	2,054	0	2,054	92	233	0	0	325
2000	229	2,965	0	3,194	2,506	0	2,506	429	52	136	0	617
2001	90	3,173	110	3,373	1,959	117	2,076	459	125	19	86	689
2002	93	6,046	35	6,174	2,467	0	2,467	1,025	114	22	163	1,324
2003	46	4,082	0	4,128	3,087	80	3,167	262	125	23	0	410
2004	338	4,217	270	4,825	1,466	45	1,511	582	138	0	0	720
2005	117	3,124	117	3,358	2,367	0	2,367	146	39	120	72	377
2006	85	3,782	54	3,921	2,028	32	2,060	545	121	0	0	666
2007	15	1,740	0	1,755	1,660	10	1,670	252	289	0	0	541
2008	252	3,613	0	3,865	2,814	0	2,814	354	195	0	0	549
2009	61	2,725	63	2,849	1,790	0	1,790	664	103	0	0	767
Mean (1981–1999)	96	2,519	327	2,942	1,733	192	1,925	198	81	47	12	339
Mean (2000–2009)	133	3,547	65	3,744	2,214	28	2,243	472	130	32	32	666
Mean (1981–2009)	109	2,873	236	3,218	1,899	136	2,035	293	98	42	19	452

Source: All harvest estimates from Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

[a] Tustumena Lake data includes harvests from creeks draining into Tustumena Lake (Nikolai Creek 1998, 2000; Glacier Creek 2004).

[b] Harvest data from Ingram Creek (1988, 2001, 2002), Otter Creek (1992, 1994, 1997), Sunrise Creek (2005).

Table 19.–Kenai River rainbow trout catch and harvest by Kenai River section, 1984–2009.

	Cook Inlet to Soldotna Bridge			Soldotna Bridge to Moose River			Moose River to Skilak Outlet			Skilak Inlet to Kenai Lake			Kenai River Reach Not Specified [a]			Kenai River Total		
Year	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest [b]	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest
1984 [c]	3,464	766	22.1	2,911	644	22.1	5,112	1,130	22.1	4,200	928	22.1	ND	ND	ND	15,687	3,468	22.1
1985 [c]	3,398	880	25.9	2,653	850	32.0	5,410	1,500	27.7	3,520	710	20.2	ND	0	ND	14,981	3,940	26.3
1986	2,570	623	24.2	2,380	168	7.1	1,750	901	51.5	2,020	733	36.3	ND	ND	ND	8,720	2,425	27.8
1987	2,220	522	23.5	3,450	670	19.4	6,430	629	9.8	3,870	364	9.4	ND	ND	ND	15,970	2,185	13.7
1988	2,780	295	10.6	1,560	216	13.8	5,880	1,063	18.1	7,580	559	7.4	ND	0	ND	17,800	2,133	12.0
1989	2,020	481	23.8	2,230	354	15.9	6,470	829	12.8	6,870	253	3.7	ND	10	ND	17,590	1,927	11.0
1990	2,624	510	19.4	3,571	943	26.4	5,366	937	17.5	11,995	1,145	9.5	0	0	0.0	23,556	3,535	15.0
1991	3,672	516	14.1	3,844	1,123	29.2	7,930	940	11.9	18,108	740	4.1	31	10	32.3	33,585	3,329	9.9
1992	4,448	427	9.6	3,879	411	10.6	15,127	736	4.9	28,702	403	1.4	ND	ND	ND	52,156	1,977	3.8
1993	6,190	1,149	18.6	5,556	580	10.4	12,651	653	5.2	37,755	192	0.5	0	0	0.0	62,152	2,574	4.1
1994	3,796	506	13.3	3,980	364	9.1	10,968	543	5.0	35,089	163	0.5	ND	ND	ND	53,833	1,576	2.9
1995	4,516	620	13.7	4,087	440	10.8	13,072	780	6.0	33,475	310	0.9	ND	ND	ND	55,150	2,150	3.9
1996	5,513	304	5.5	4,777	646	13.5	8,650	373	4.3	45,471	237	0.5	ND	ND	ND	64,411	1,560	2.4
1997	7,411	739	10.0	6,641	539	8.1	20,047	632	3.2	61,053	0	0.0	ND	ND	ND	95,152	1,910	2.0
1998	5,502	608	11.1	5,380	670	12.5	12,158	737	6.1	42,224	0	0.0	ND	ND	ND	65,264	2,015	3.1
1999	11,415	1,516	13.3	8,325	695	8.3	32,050	1,573	4.9	50,189	0	0.0	ND	ND	ND	101,979	3,784	3.7
2000	16,477	1,292	7.8	9,428	1,083	11.5	18,990	1,084	5.7	78,836	0	0.0	ND	ND	ND	123,731	3,459	2.8
2001	11,216	987	8.8	7,473	868	11.6	22,392	567	2.5	51,130	0	0.0	ND	ND	ND	92,211	2,422	2.6
2002	12,641	995	7.9	8,157	944	11.6	19,355	864	4.5	71,753	0	0.0	2,269	216	9.5	114,175	3,019	2.6
2003	12,844	1,026	8.0	10,913	700	6.4	41,204	372	0.9	54,552	0	0.0	3,536	180	5.1	123,049	2,278	1.9
2004	15,080	1,452	9.6	13,310	978	7.3	34,026	831	2.4	91,443	0	0.0	5,651	50	0.9	159,510	3,311	2.1
2005	14,119	953	6.7	11,585	647	5.6	34,675	607	1.8	57,936	267	0.5	7,949	43	0.5	126,264	2,517	2.0
2006	13,168	588	4.5	13,683	1,109	8.1	33,222	472	1.4	67,741	289	0.4	4,005	41	1.0	131,819	2,499	1.9
2007	11,829	542	4.6	18,832	769	4.1	52,701	684	1.3	90,757	661	0.7	4,851	10	0.2	178,970	2,666	1.5
2008	26,385	696	2.6	20,943	794	3.8	47,956	772	1.6	103,095	941	0.9	4,496	11	0.2	202,875	3,214	1.6
2009	11,502	625	5.4	16,165	543	3.4	67,940	828	1.2	102,745	399	0.4	3,280	59	1.8	201,632	2,454	1.2
Mean (2005–2009)	15,400	680	4.8	16,240	770	5.0	47,300	670	1.5	84,450	510	0.6	4,920	30	0.8	168,310	2,670	1.6
Mean (2000–2009)	14,530	920	6.6	13,050	840	7.3	37,250	710	2.3	77,000	260	0.3				145,420	2,780	2.0
Mean (1984–2009)	8,340	750	12.5	7,530	680	12.4	20,830	810	9.0	44,700	360	4.6				82,780	2,630	7.1

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a). Catch estimates from 1984-1989 are unpublished estimates from the SWHS data base; G. B. Jennings project leader, Sport Fish Biologist, ADF&G, Anchorage; personal communication.

Note: ND = no data available.

[a] SWHS began consistently reporting in 2002.

[b] Retention of rainbow trout was prohibited from 1997 through 2004.

[c] In 1984 and 1985, catch estimates were mistakenly reported as harvest in Mills (1985-1986). Corrected harvest numbers are presented here.

Table 20.–River rainbow trout population estimates for the Kenai River, 1986–2009.

	Upper Kenai River Section 004		Middle Kenai River Section 003		Middle Kenai River Section 002	
Year[a]	Abundance	SE	Abundance	SE	Abundance	SE
1986	2,520	363				
1987	3,472	482	1,750	453	610	
1995	5,598	735				
1999			7,833	1,276		
2001	6,364	606				
2009	5,083	908				

[a] Abundance estimates were reevaluated and may differ slightly from published estimate, 2009 estimate is preliminary.

Table 21.–Kenai River Dolly Varden, catch and harvest by Kenai River section, 1984–2009.

	Cook Inlet to Soldotna Bridge			Soldotna Bridge to Moose River			Moose River to Skilak Outlet			Skilak Inlet to Kenai Lake			Kenai River Reach Not Specified [a]			Kenai River Total		
Year	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest	Catch	Harvest	% Harvest
1984 [b]	ND	7,506	ND	ND	1,966	ND	ND	11,211	ND	ND	10,724	ND	ND	ND	ND	ND	31,407	ND
1985 [b]	ND	7,560	ND	ND	3,277	ND	ND	8,930	ND	ND	6,468	ND	ND	52	ND	ND	26,287	ND
1986	ND	1,249	ND	ND	771	ND	ND	1,928	ND	ND	1,827	ND	ND	ND	ND	ND	5,775	ND
1987	ND	2,429	ND	ND	1,671	ND	ND	2,139	ND	ND	1,391	ND	ND	ND	ND	ND	7,630	ND
1988	ND	3,531	ND	ND	1,266	ND	ND	3,527	ND	ND	2,653	ND	ND	0	ND	ND	10,977	ND
1989	ND	3,414	ND	ND	1,371	ND	ND	3,649	ND	ND	1,630	ND	ND	19	ND	ND	10,083	ND
1990	7,795	2,738	35.1	5,094	2,424	47.6	7,537	2,741	36.4	14,151	4,079	28.8	0	0	0.0	34,577	11,982	34.7
1991	10,665	4,211	39.5	8,116	3,285	40.5	19,363	4,268	22.0	30,601	2,740	9.0	52	13	25.0	68,797	14,517	21.1
1992	11,822	3,777	31.9	5,899	2,516	42.7	26,348	4,900	18.6	34,754	3,269	9.4	ND	ND	ND	78,823	14,462	18.3
1993	13,019	4,599	35.3	6,079	1,539	25.3	20,778	3,503	16.9	36,451	3,057	8.4	26	26	ND	76,353	12,724	16.7
1994	8,752	3,276	37.4	5,185	1,107	21.4	14,584	2,051	14.1	33,168	2,052	6.2	ND	ND	ND	61,689	8,486	13.8
1995	10,146	4,069	40.1	5,399	1,732	32.1	12,447	2,113	17.0	27,103	1,609	5.9	ND	ND	ND	55,095	9,523	17.3
1996	9,787	2,411	24.6	5,973	1,797	30.1	14,506	1,995	13.8	26,245	1,281	4.9	ND	ND	ND	56,511	7,484	13.2
1997	9,955	2,518	25.3	5,268	1,042	19.8	22,266	2,824	12.7	48,883	573	1.2	ND	ND	ND	86,372	6,957	8.1
1998	7,560	1,977	26.2	5,961	1,787	30.0	11,732	1,847	15.7	35,659	468	1.3	ND	ND	ND	60,912	6,079	10.0
1999	14,752	3,867	26.2	6,316	1,086	17.2	20,053	1,932	9.6	31,826	683	2.1	ND	ND	ND	72,947	7,568	10.4
2000	18,261	3,916	21.4	9,122	1,759	19.3	21,291	1,403	6.6	56,375	349	0.6	ND	ND	ND	105,049	7,427	7.1
2001	16,304	3,763	23.1	8,367	1,613	19.3	28,312	789	2.8	54,802	363	0.7	ND	ND	ND	107,785	6,528	6.1
2002	16,414	2,191	13.3	7,751	1,431	18.5	13,384	1,105	8.3	38,481	766	2.0	1,324	288	21.8	77,354	5,781	7.5
2003	15,520	2,996	19.3	9,765	1,318	13.5	25,972	1,066	4.1	50,969	487	1.0	1,459	246	16.9	103,685	6,113	5.9
2004	14,386	1,759	12.2	13,591	2,129	15.7	23,833	1,220	5.1	89,318	452	0.5	5,072	285	5.6	146,200	5,845	4.0
2005	13,501	1,548	11.5	9,629	934	9.7	27,398	1,243	4.5	62,798	565	0.9	5,615	26	0.5	118,941	4,316	3.6
2006	11,405	971	8.5	8,135	1,061	13.0	24,499	515	2.1	52,048	414	0.8	2,211	257	11.6	98,298	3,218	3.3
2007	8,048	1,201	14.9	10,261	764	7.4	52,701	687	1.3	90,757	584	0.6	4,851	40	0.8	166,618	3,276	2.0
2008	19,177	1,154	6.0	17,063	961	5.6	30,579	604	2.0	78,489	1003	1.3	2,293	44	1.9	147,601	3,766	2.6
2009	8,278	1,003	12.1	7,825	842	10.8	34,973	384	1.1	91,815	412	0.4	1,053	77	7.3	143,944	2,718	1.9
Mean (2005–2009)	12,080	1,180	10.6	10,580	910	9.3	34,030	690	2.2	75,180	600	0.8	3,200	90	4.4	135,080	3,460	2.7
Mean (2000–2009)	14,130	2,050	14.2	10,150	1,280	13.3	28,290	900	3.8	66,590	540	0.9	2,980	160	6.6	121,550	4,900	4.4
Mean (1984–2009)	12,280	3,060	17.9	8,040	1,590	16.9	22,630	2,640	8.3	49,230	1,920	3.3				93,380	9,270	8.0

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

Note: ND = no data available.

[a] SWHS began consistently reporting in 2002.

[b] In 1984 and 1985, catch estimates were mistakenly reported as harvest in Mills 1985, 1986. Corrected harvest numbers are presented here.

[c] Retention of rainbow trout was prohibited from 1997 through 2004.

Table 22.–Kenai River personal use sockeye salmon dip net fishery summary, 1981–2009.

Year		Date Opened	Date Closed	Total Days		Dip Net Harvest of Sockeye Salmon [a]	Sockeye Salmon Run to Sonar	Effort (Days Fished) [c]
1981	[d]	ND	ND	ND		ND	407,639	ND
1982		7/26	8/5	10		Unknown	619,831	ND
1983		7/20	8/5	16		7,562	630,340	3,203
1984	[d]	ND	ND	ND		ND	344,571	ND
1985	[d]	ND	ND	ND		ND	502,820	ND
1986	[d]	ND	ND	ND		ND	501,157	ND
1987		7/23	8/5	14		24,086	1,596,871	22,547
1988		7/22	8/5	15		16,880	1,021,469	29,013
1989		7/21	8/5	15		48,976	1,599,959	31,312
1990	[d]	ND	ND	ND		ND	659,520	ND
1991	[e]	ND	ND	ND		ND	647,597	ND
1992	[f]	7/27	8/5	7	[g]	12,189	994,798	10,371
1993		7/17	7/31	15		33,467	813,617	14,896
1994	[e]	ND	ND	ND		ND	1,003,446	ND
1995		7/25	7/31	5	[g]	14,352	630,447	11,122
1996		7/10	8/5	27		102,821	797,847	10,503
1997		7/10	7/31	22		114,619	1,064,818	11,023
1998		7/10	7/28	18		103,847	767,558	10,802
1999		7/10	7/31	22		149,504	803,379	13,738
2000		7/10	7/31	22		98,262	624,578	12,354
2001		7/10	7/31	22		150,766	650,036	14,722
2002		7/10	7/31	22		180,028	957,924	14,840
2003		7/10	7/31	22		223,580	1,181,309	15,263
2004		7/10	7/31	22		262,831	1,385,981	18,513
2005		7/10	7/31	22		295,496	1,376,452	20,977
2006		7/10	8/10	13	[h]	127,630	1,499,692	12,685
2007		7/10	7/31	22		291,270	867,572	21,861
2008		7/10	7/31	22		234,109	614,946	20,676
2009		7/10	7/31	22		339,993	745,170	26,043
2010		7/10	7/31	22		389,552	970,662	28,342
Mean (2005-2009)						257,700	1,020,766	20,448
Mean (2000-2009)						220,397	990,366	17,793
Mean (1996-2010)						204,287	953,862	16,823

Source: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep a-b*).; Brannian and Fox 1996; Reimer and Sigurdsson 2004; Dunker and Lafferty 2007, K. J. Dunker, Sport Fish Biologist, ADF&G, Anchorage, personal communication; Shields 2009.

Note: ND = no data collected.

[a] Harvest not known in 1982; 1996–2009 reported harvest from returned permits, expanded to include permits not returned.

[b] Includes dip net harvest, sport harvest below the river mile 19 sonar, and the sonar estimate at river mile 19.

[c] 1981–1995 is individual days fished. 1996–2009 is household days fished. Each household day fished may include fishing effort by more than one household member named on the household's permit.

[d] No fishery.

[e] Subsistence fishery only.

[f] A subsistence dip net fishery also occurred in 1992.

[g] Fishery closed on Wednesday and Saturday to avoid conflict with concurrent subsistence permit fishery. Total days reflects this closure.

[h] By Emergency Order, the personal use fishery closed on July 21 at 11:00 PM; it reopened on July 31 from 6:00 AM to 11:00 PM; and it reopened a final time from August 3 at 5:00 PM until August 10 at 11:59 PM. Total days reflect this closure.

Table 23.–Kasilof River personal use dip net fishery summary, 1981–2009.

Year	Date Opened	Date Closed	Total Days	Dip Net Harvest of Sockeye Salmon [a]	Sockeye Salmon Run to sonar	Effort (Days Fished) [b]
1981	7/4	7/31	28	10,300	256,625	5,370
1982	7/21	8/5	16	1,800	180,239	2,580
1983	7/15	8/5	21	11,124	210,271	4,417
1984	7/16	8/5	21	12,771	231,685	5,956
1985	7/15	8/5	22	16,284	505,049	9,260
1986	7/15	8/5	22	38,674	275,963	13,929
1987 [c]	7/10	8/5	26	18,454	249,250	8,910
1988	7/22	8/5	15	3,547	151,856	6,930
1989 [d]	ND	ND	ND	ND	158,206	ND
1990 [d]	ND	ND	ND	ND	144,136	ND
1991 [e]	ND	ND	ND	ND	238,269	ND
1992 [e]	ND	ND	ND	ND	184,178	ND
1993 [d]	ND	ND	ND	ND	149,939	ND
1994	7/22	8/5	11 [f]	3,679	205,117	2,361
1995	7/17	7/31	11 [f]	4,160	204,935	2,845
1996	7/10	8/5	27	11,197	249,944	1,300
1997	7/10	8/5	27	9,737	266,025	1,091
1998	7/10	8/5	27	45,161	273,213	3,421
1999	7/10	8/5	27	37,176	312,587	3,611
2000	7/10	8/5	27	23,877	256,053	2,622
2001	7/10	8/5	27	37,612	307,570	3,382
2002	6/25	8/7	44	46,769	226,682	4,020
2003	6/25	8/7	44	43,870	359,633	3,874
2004	6/25	8/7	44	48,315	577,581	4,432
2005	6/25	8/7	44	43,151	348,012	4,500
2006	6/25	8/7	44	56,144	368,092	5,763
2007	6/25	8/7	44	43,293	336,866	4,627
2008	6/25	8/7	44	54,051	305,199	5,552
2009	6/25	8/7	44	73,035	297,125	7,650
2010	6/25	8/7	44	70,774	267,013	7,588
Mean			30.04	30,598	269,910	5,040

Source: Brannian and Fox 1996; Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a-b).. Reimer and Sigurdsson 2004, Dunker and Lafferty 2007, K. J. Dunker, Sport Fish Biologist, ADF&G, Anchorage, personal communication; Shields 2009.

Note: ND = no data collected.

[a] Harvest and participation during 1981 and 1982 are field creel survey estimates. 1982–1995 data from Statewide Harvest Survey 1996–2009 total reported harvest from returned permits, expanded to include permits not returned.

[b] 1981-1995 are individual days fished. 1996-2009 is household days fished. Each household day fished may include fishing effort by more than one household member named on the household's permit.

[c] The fishery was closed from July 14 at 6:00 a.m. to July 15 at 6:00 p.m. as a precautionary measure due to possible oil contamination.

[d] No fishery.

[e] Subsistence fishery only.

[f] Fishery closed on Wednesday and Saturday due to subsistence/personal use permit fishery. Total days reflect this closure.

Table 24.–Northern Kenai Peninsula Management Area catch and harvest of Northern Pike, 1981–2009.

	Kenai River		Soldotna Creek Drainage Lakes				Stormy Lake		Tote Road Lakes		Other Lakes/Streams [a]		Total NKPMA	
			Mackeys Lakes		Sevena Lake									
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1981	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32	0	32
1982	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	105	0	105
1983	ND	ND	ND	294	ND	ND	ND	ND	ND	ND	ND	0	0	294
1984	ND	ND	ND	187	ND	ND	ND	ND	ND	ND	ND	0	0	187
1985	ND	69	ND	52	ND	ND	ND	ND	ND	ND	ND	0	0	121
1986	ND	0	ND	0	ND	ND	ND	ND	ND	ND	ND	0	0	0
1987	ND	12	ND	0	ND	ND	ND	ND	ND	ND	ND	0	0	12
1988	ND	0	ND	0	ND	ND	ND	ND	ND	ND	ND	36	0	36
1989	ND	18	ND	10	ND	ND	ND	ND	ND	ND	ND	39	0	67
1990	10	10	156	10	0	0	0	0	0	0	145	20	311	40
1991	0	0	260	74	0	0	0	0	0	0	25	12	285	86
1992	9	0	9	9	179	85	0	0	0	0	324	145	521	239
1993	26	26	56	28	0	0	0	0	0	0	470	188	552	242
1994	0	0	0	0	0	0	0	0	0	0	789	36	789	36
1995	29	29	225	131	68	29	0	0	0	0	156	59	478	248
1996 [b]	158	92	0	0	32	0	0	0	0	0	85	85	275	177
1997	14	7	213	0	0	0	0	0	0	0	29	21	256	28
1998	7	0	0	0	0	0	0	0	0	0	114	114	121	114
1999	0	0	0	0	47	47	0	0	0	0	376	282	423	329
2000	6	6	76	38	0	0	0	0	0	0	364	115	446	159
2001	0	0	13	13	155	155	103	103	0	0	1,277	914	1,548	1,185
2002	94	12	0	0	322	322	34	34	0	0	12	12	462	380
2003	58	58	0	0	218	218	241	241	0	0	182	182	699	699
2004	553	58	241	241	0	0	45	15	0	0	0	2,007 [c]	839	2,321
2005	12	12	47	47	0	0	165	165	0	0	0	0	224	224
2006	0	0	0	0	0	0	55	55	0	0	0	0	55	55
2007	41	10	0	0	0	0	150	135	413	413	0	0	604	558
2008 [d]	33	25	0	0	0	0	12	12	349	204	13	13	407	254
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean (2005–2009)	17	9	9	9	0	0	76	73	152	123	3	3	258	218
Mean (2000–2009)	80	18	38	34	70	70	81	76	76	62	185	324	528	584
Mean (1981–2009)	53	18	65	42	51	43	40	38	38	31	218	152	321	284

Source: Statewide Harvest Surveys, from Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010a-b, *In prep* a).

Note: ND = no data available.

[a] Includes data from Arc lake, Seven Lake, Island Lake, Derks Lake, "Other Lakes", and "Other Streams". 1981–1982 no breakdown of individual lakes/streams available.

[b] "Other" column includes 53 caught and harvested in SixMile Creek.

[c] Number may be inflated due to one large angler report.

[d] "Other" column includes 13 caught and harvested in Swanson River.

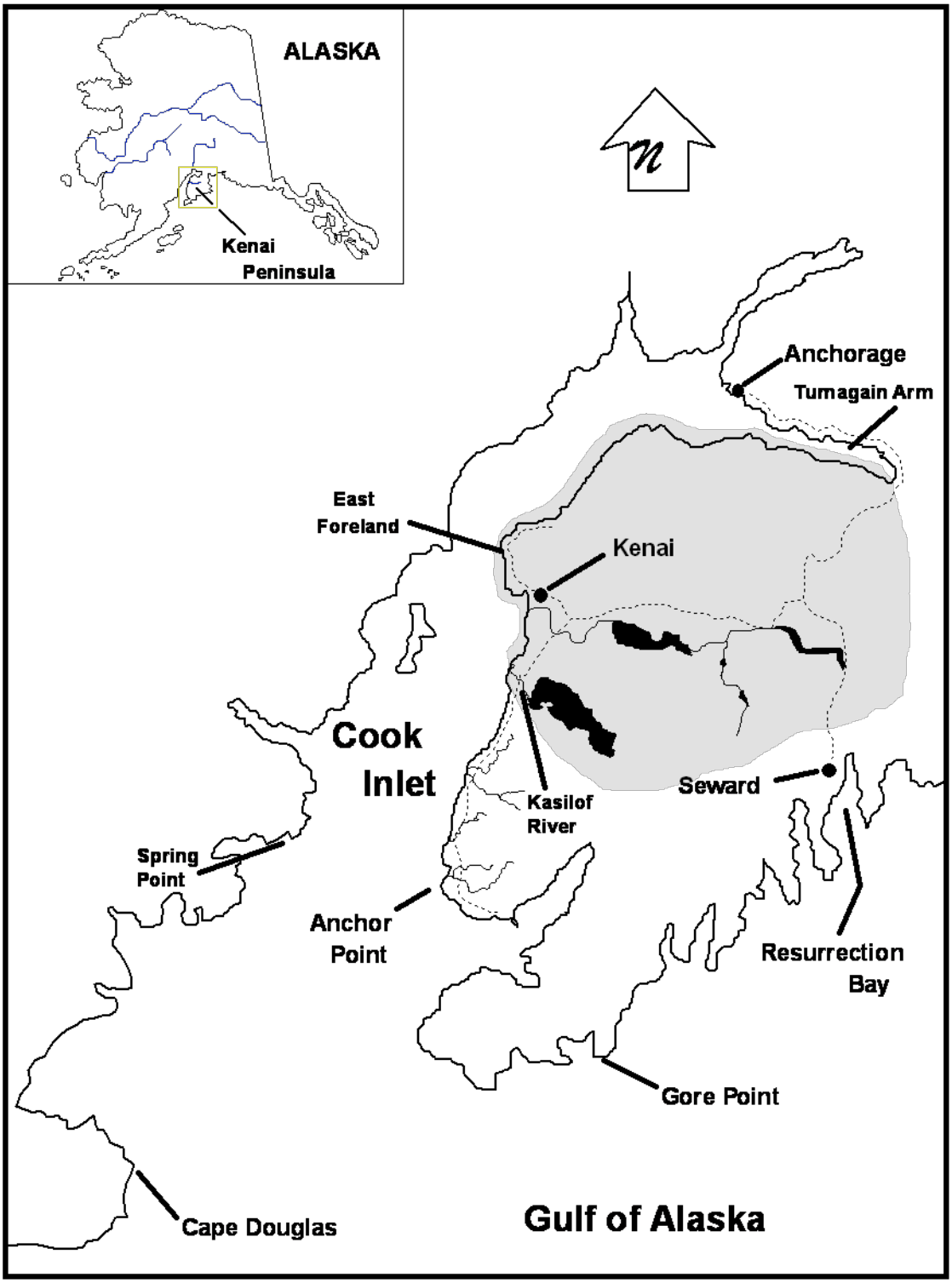

Figure 1.–The Northern Kenai Peninsula Management Area (shaded) includes all freshwater drainages and saltwater fisheries from the Kasilof River north to Turnagain Arm on the Kenai Peninsula.

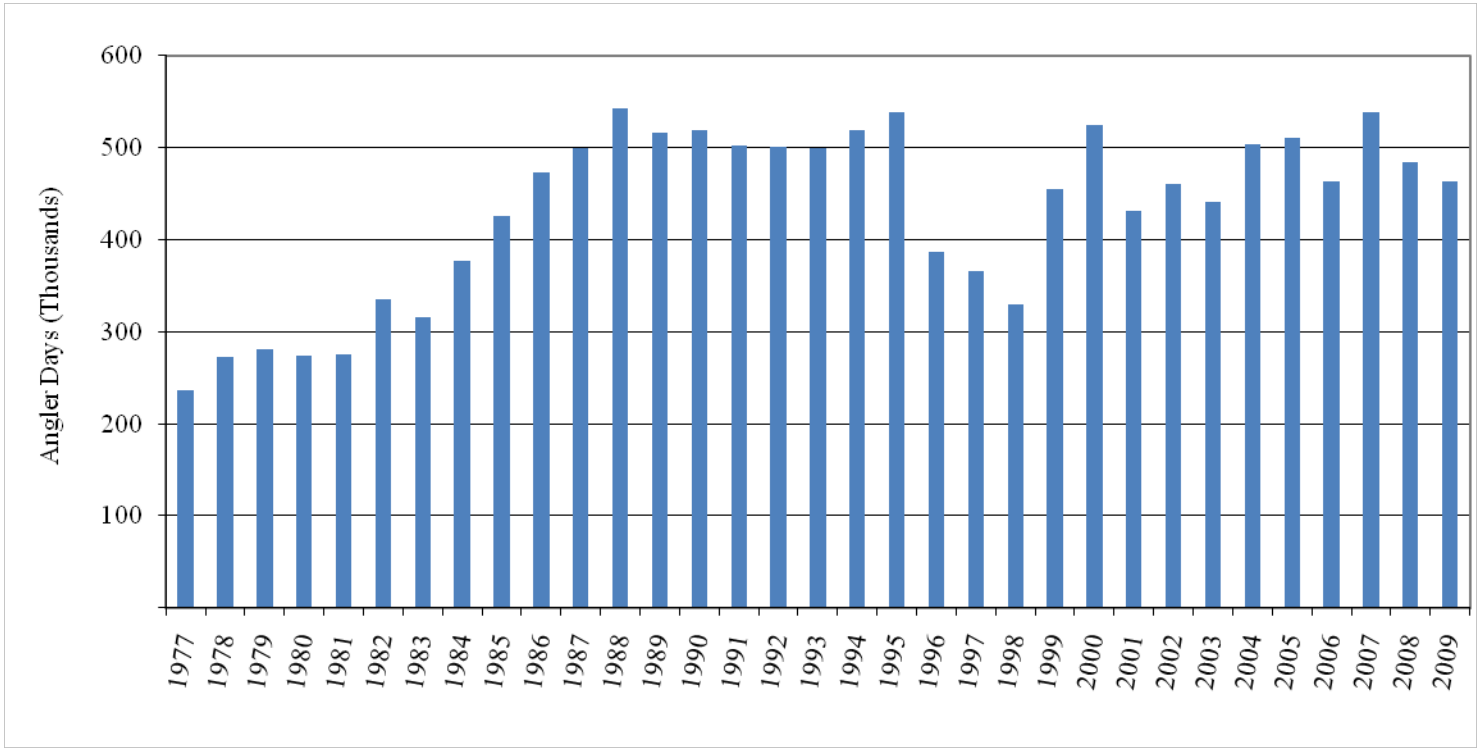

Figure 2.–Recreational angler participation in the Northern Kenai Peninsula Management Area, 1977–2009.

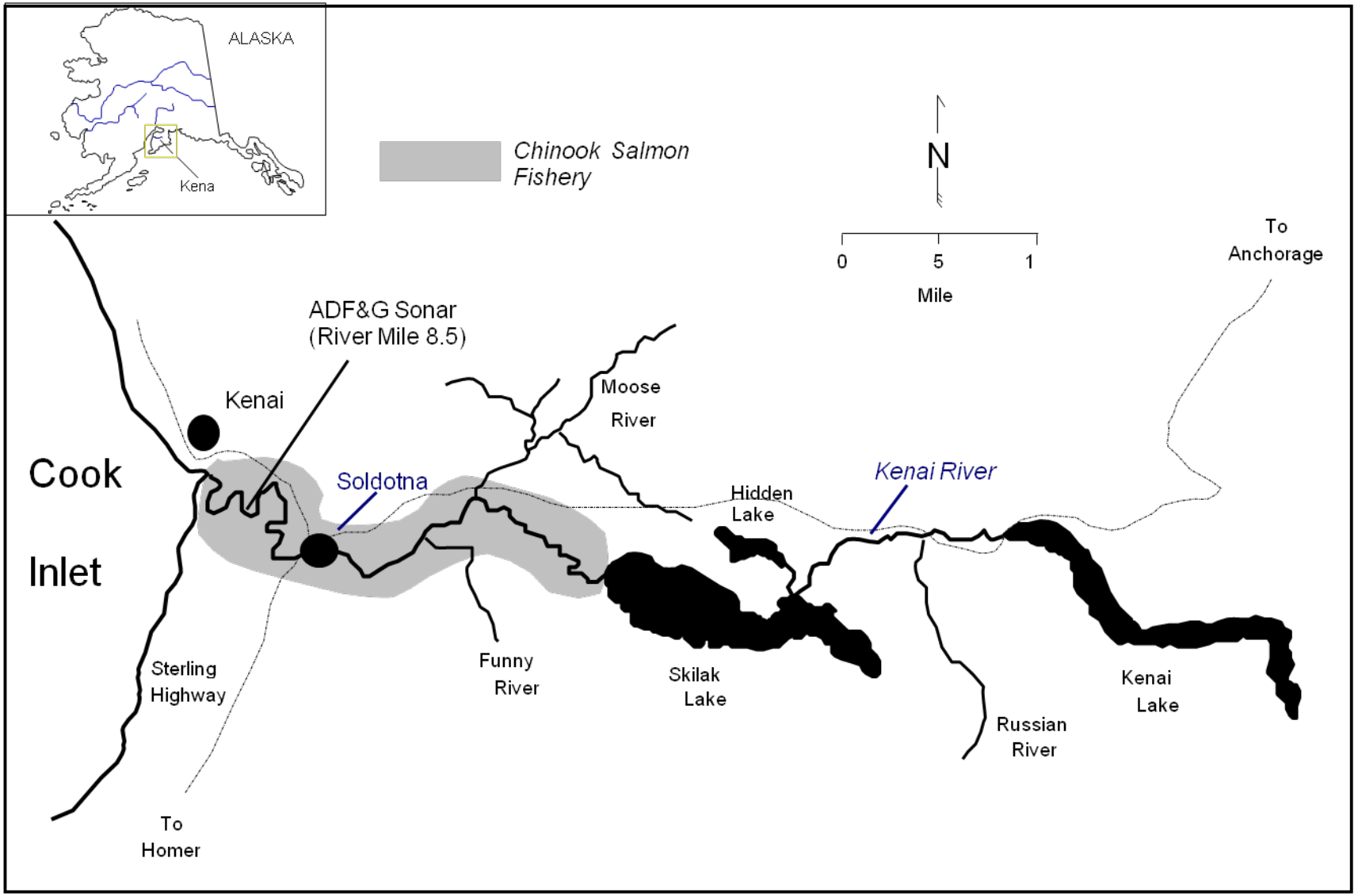

Figure 3.–Kenai River Chinook salmon fishery.

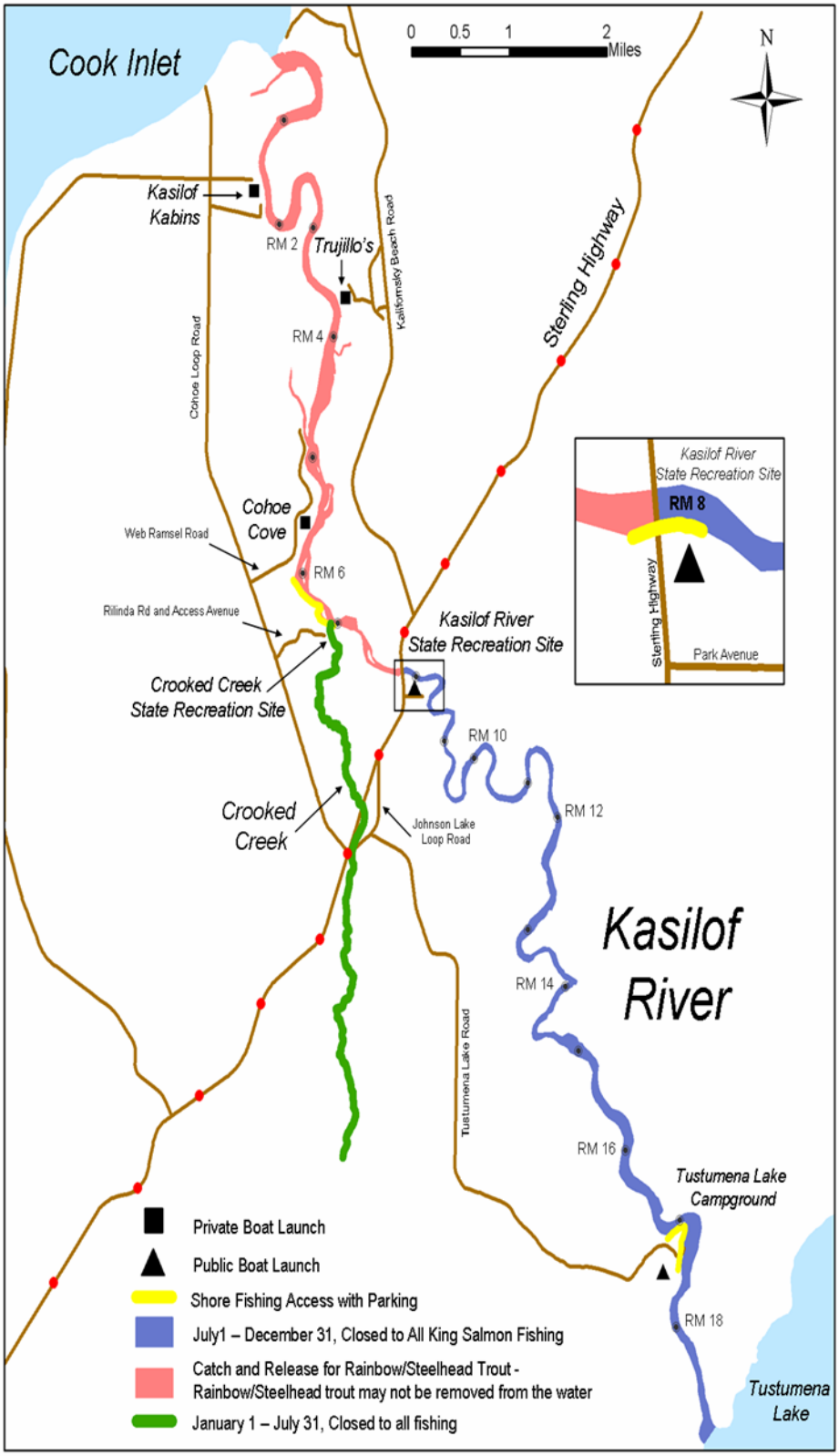

Figure 4.–Map of Kasilof River showing public access and specific regulatory areas.

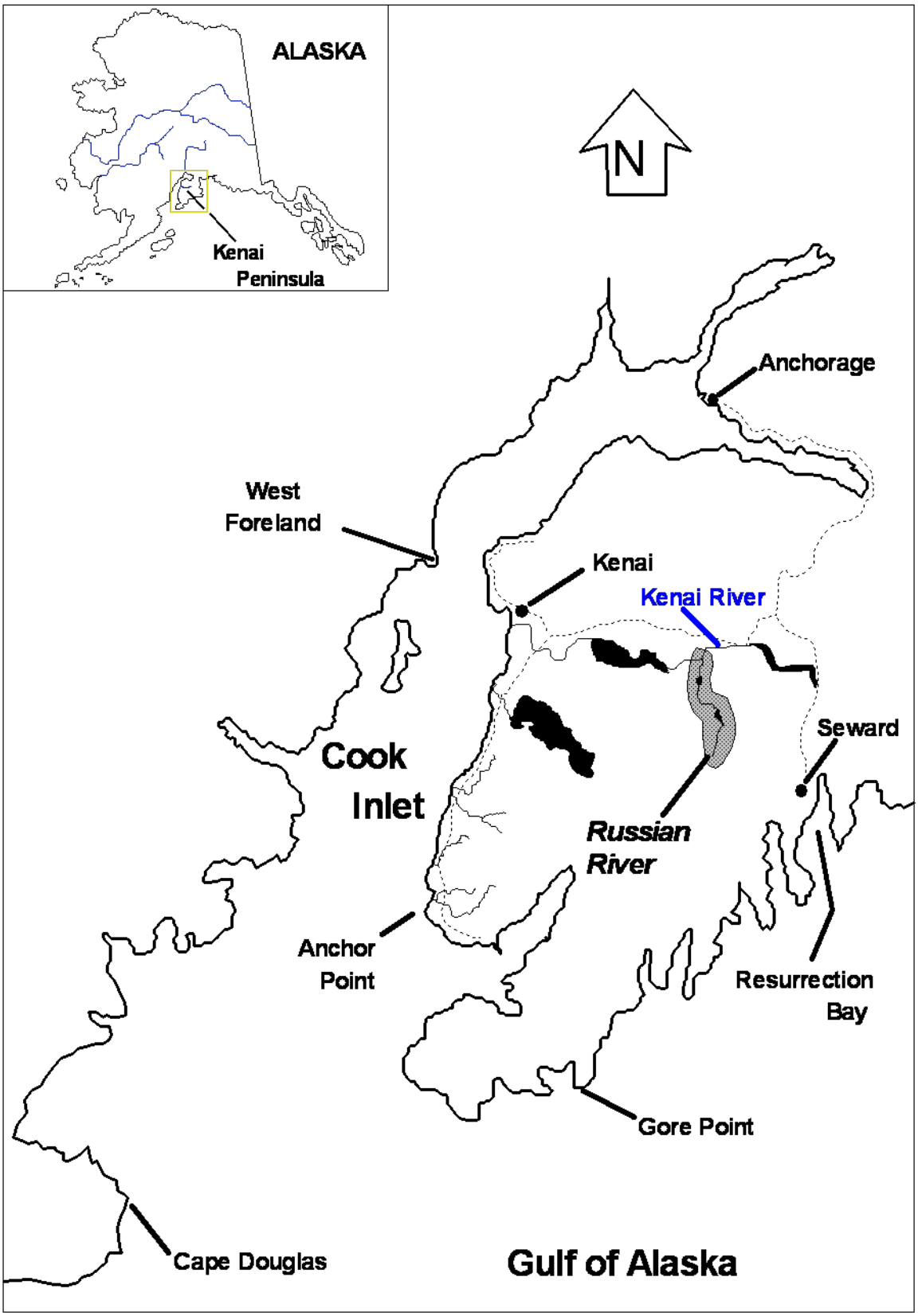

Figure 5.–Location of Russian River on the Kenai Peninsula, Alaska.

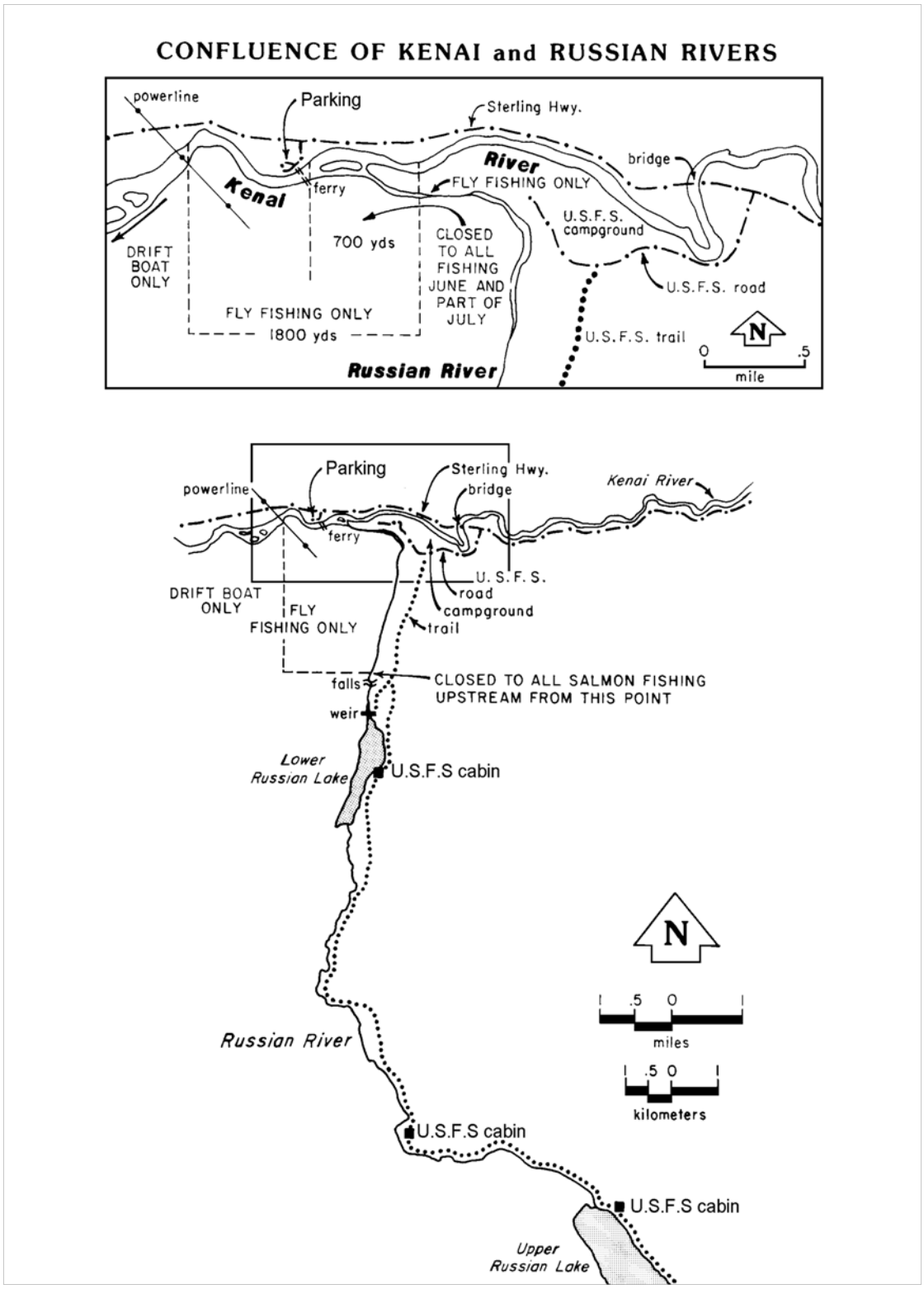

Figure 6.–Map of Russian River drainage.

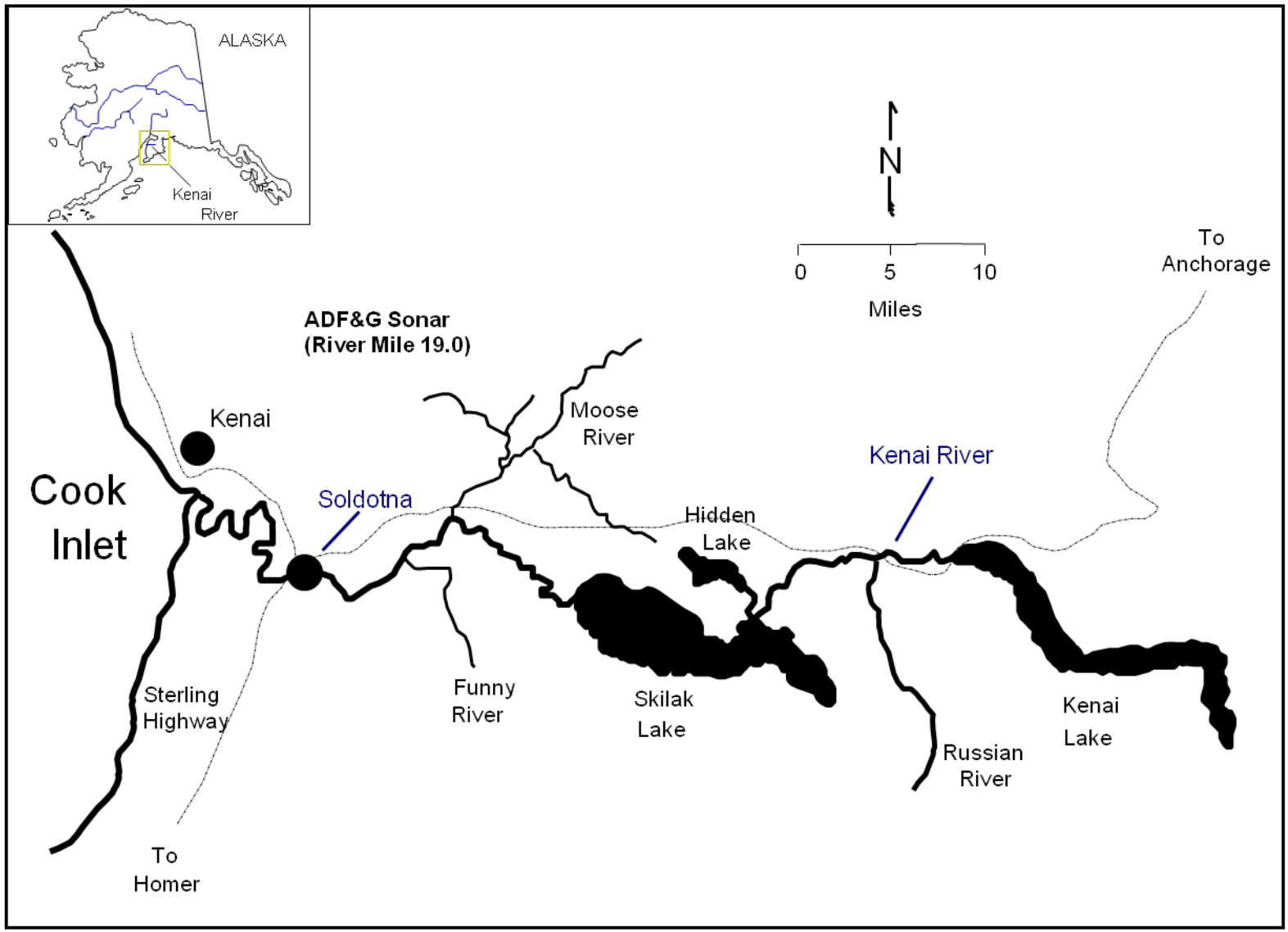

Figure 7.–Map of the Kenai River drainage. Late-run sockeye salmon fishery occurs from Cook Inlet to Kenai Lake.

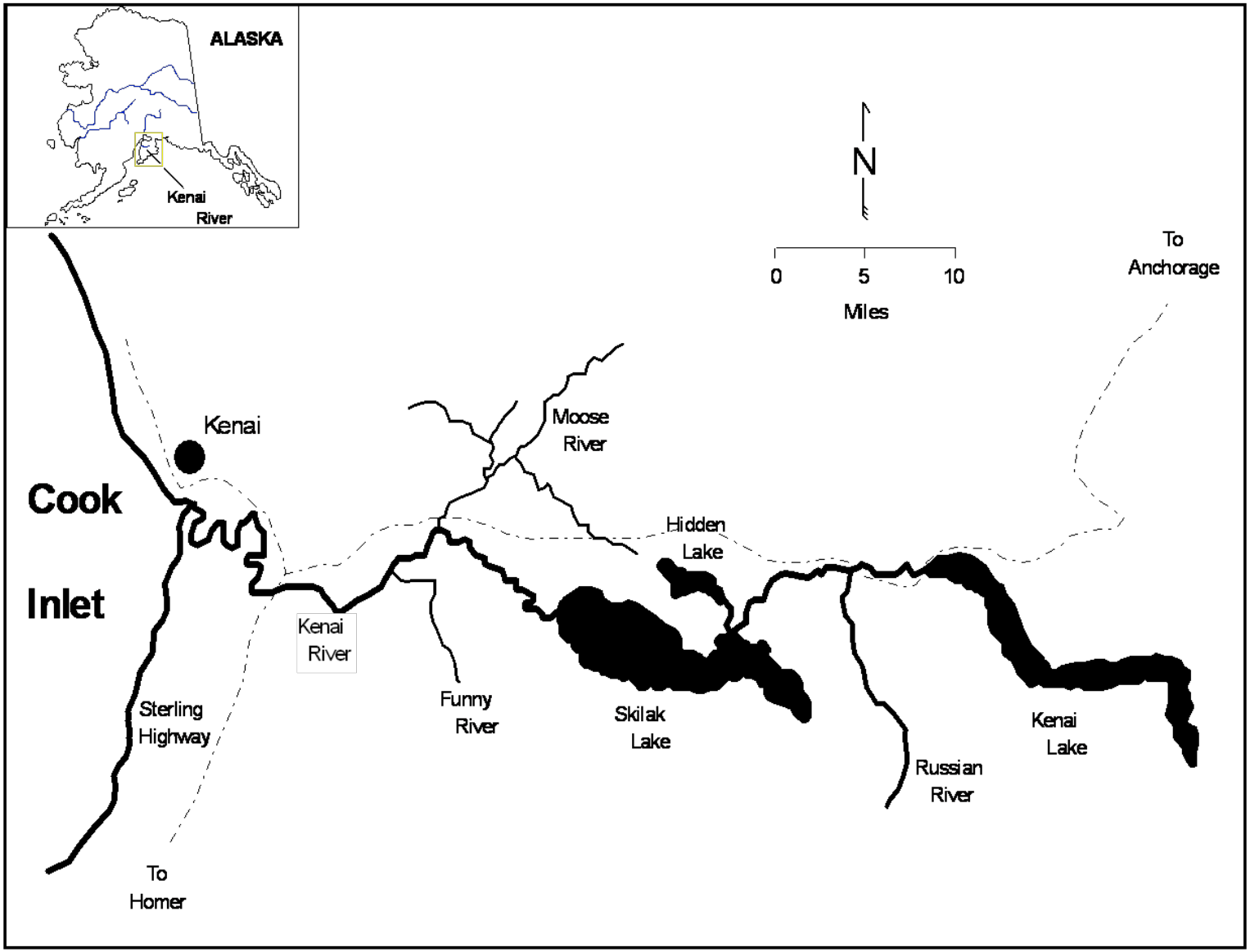

Figure 8.–Map of Kenai River drainage.

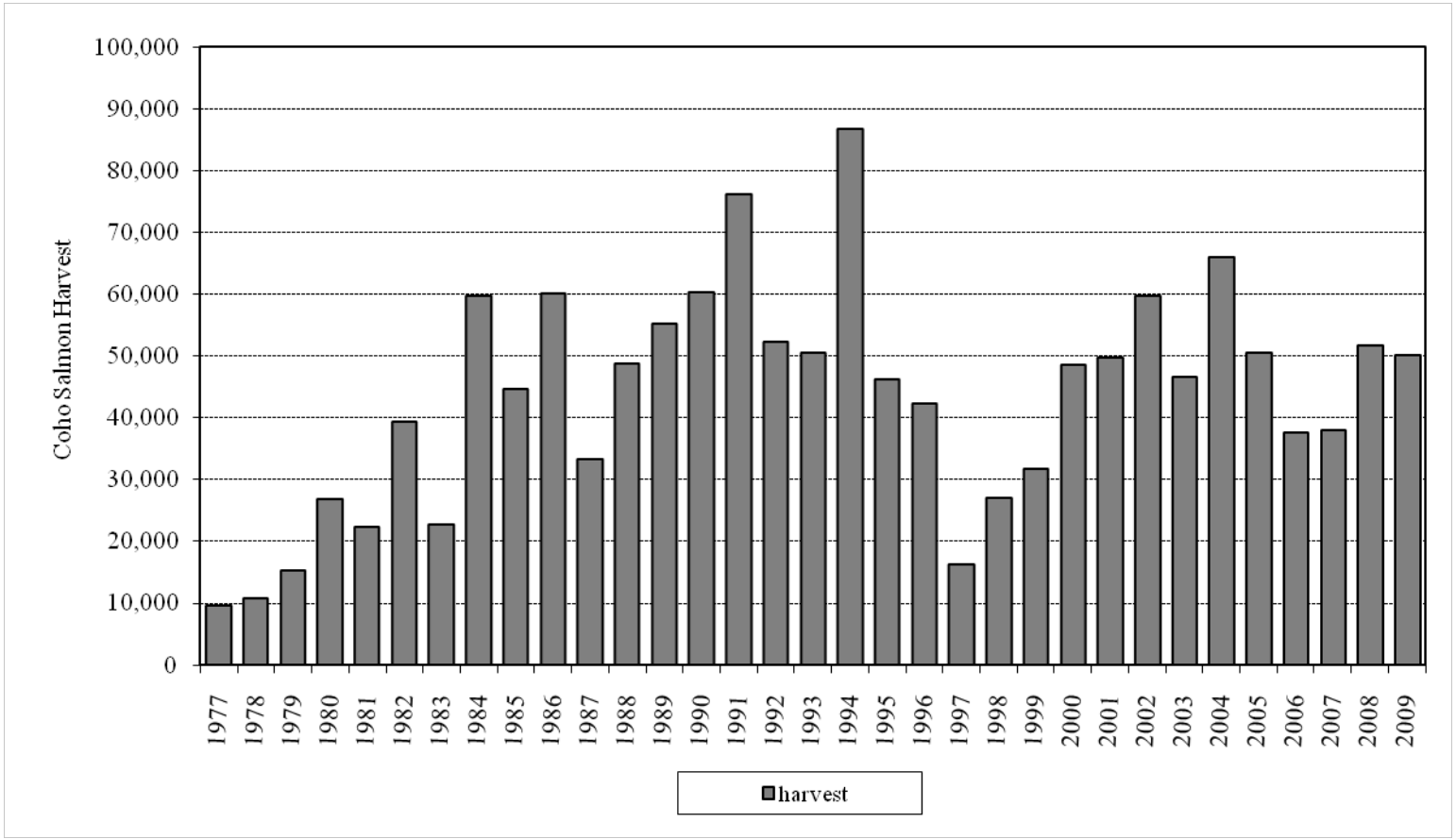

Figure 9.–Total number of coho salmon harvested in the Kenai River sport fishery, 1977–2009.

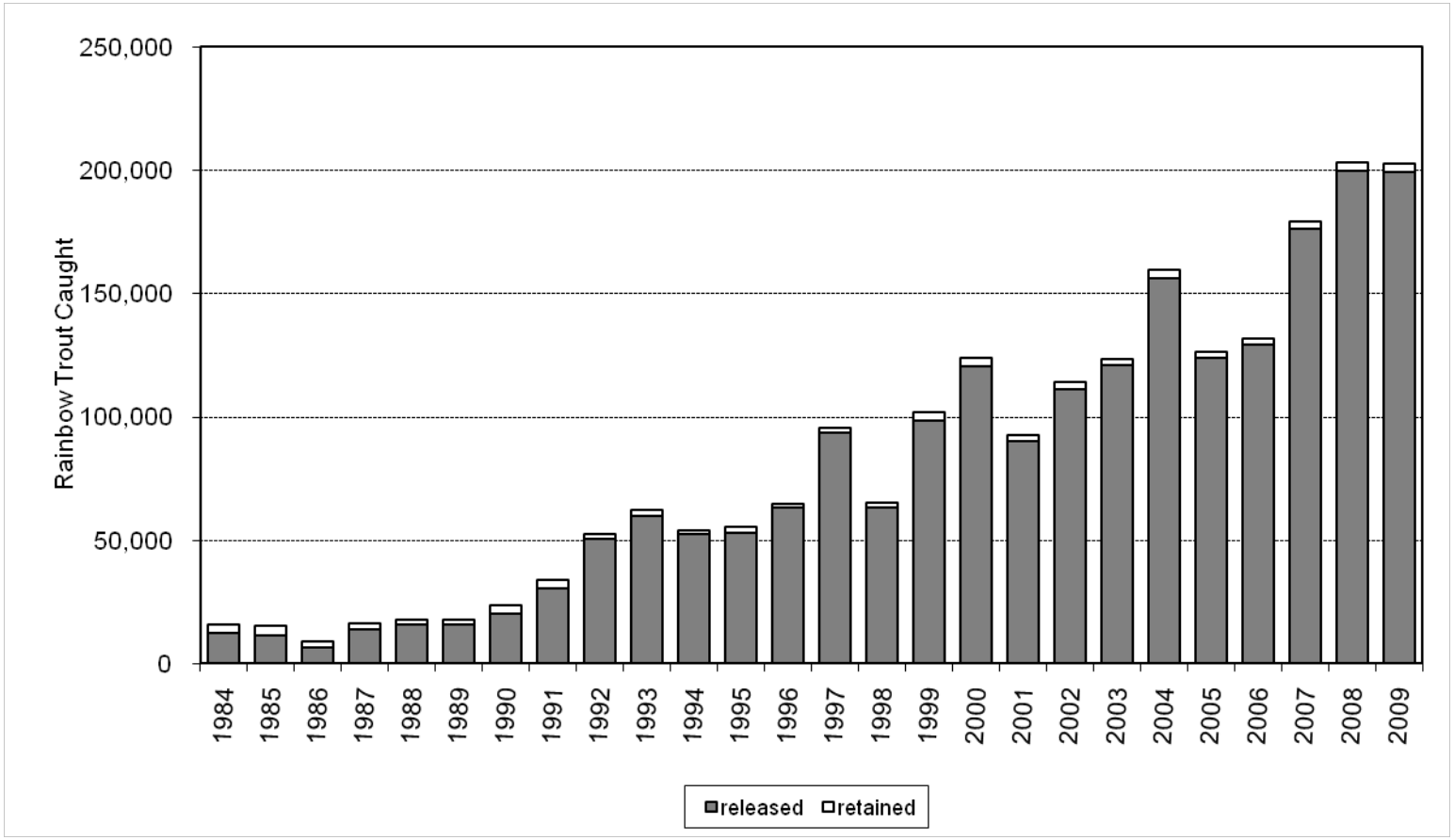

Figure 10.–Total number of rainbow trout caught, showing number released and number retained, Kenai River sport fishery, 1984–2009.

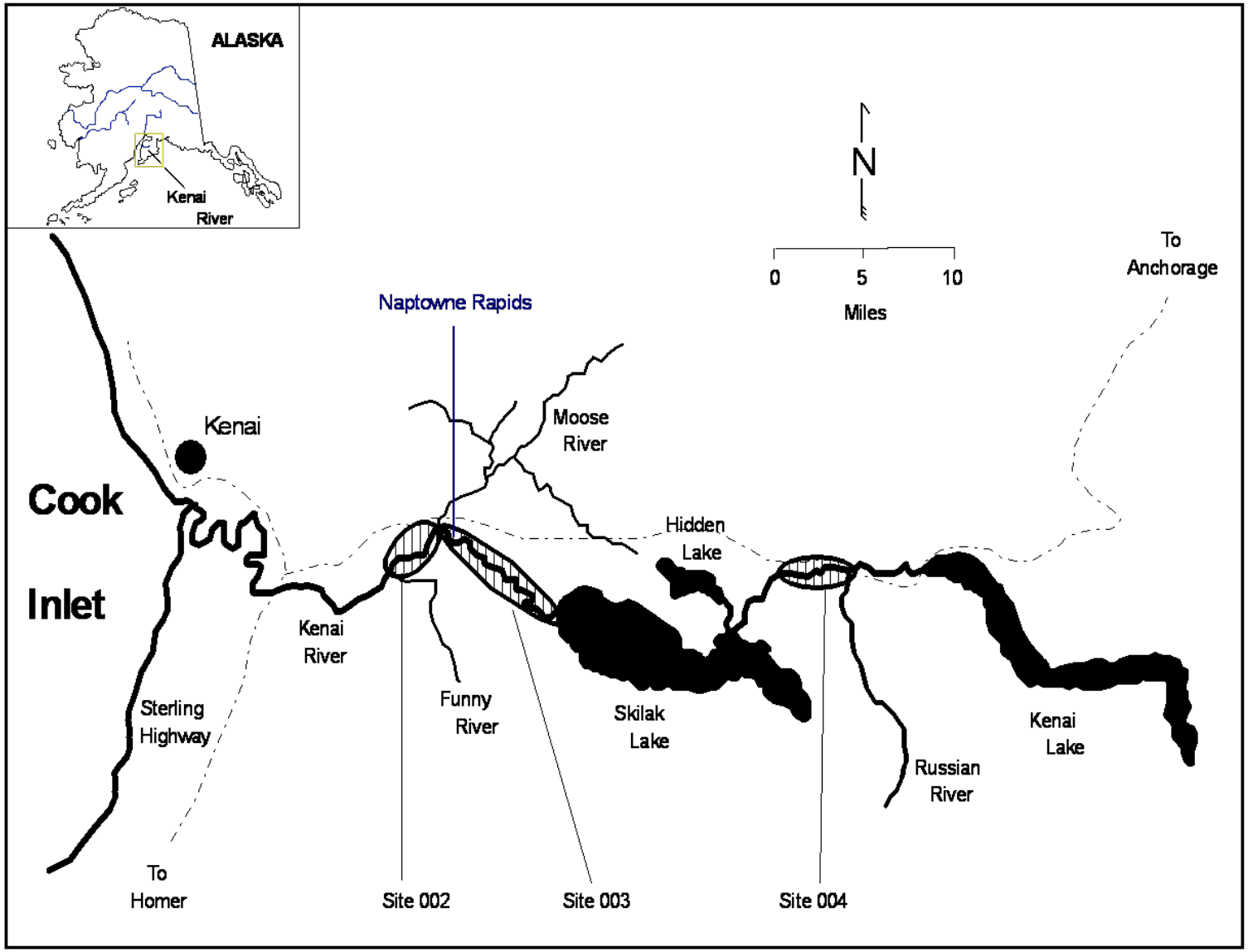

Figure 11.–Map of rainbow trout study areas in the Kenai River drainage.

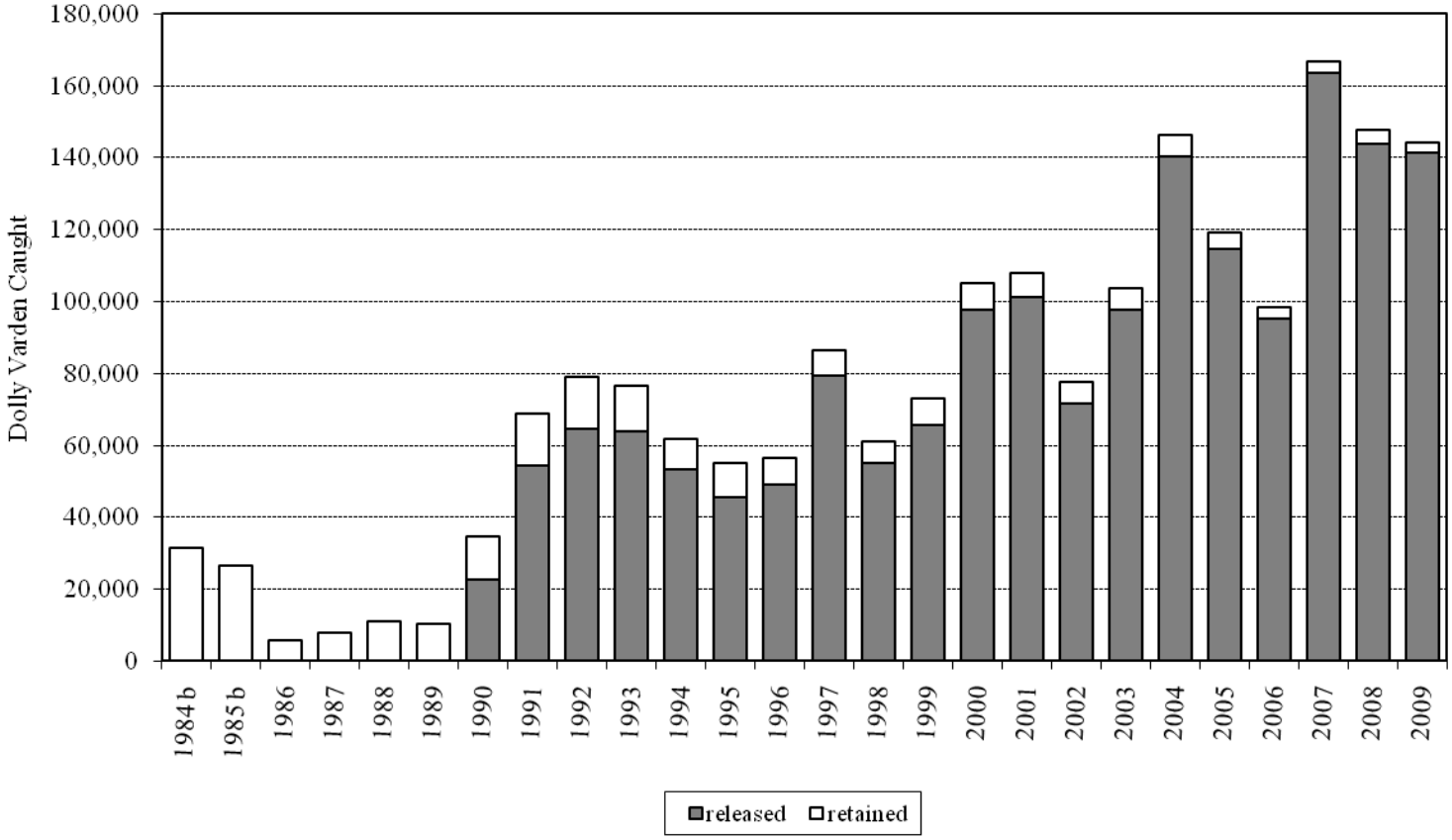

Figure 12.–Total number of Dolly Varden caught, showing number released and number retained, Kenai River sport fishery, 1984–2009.

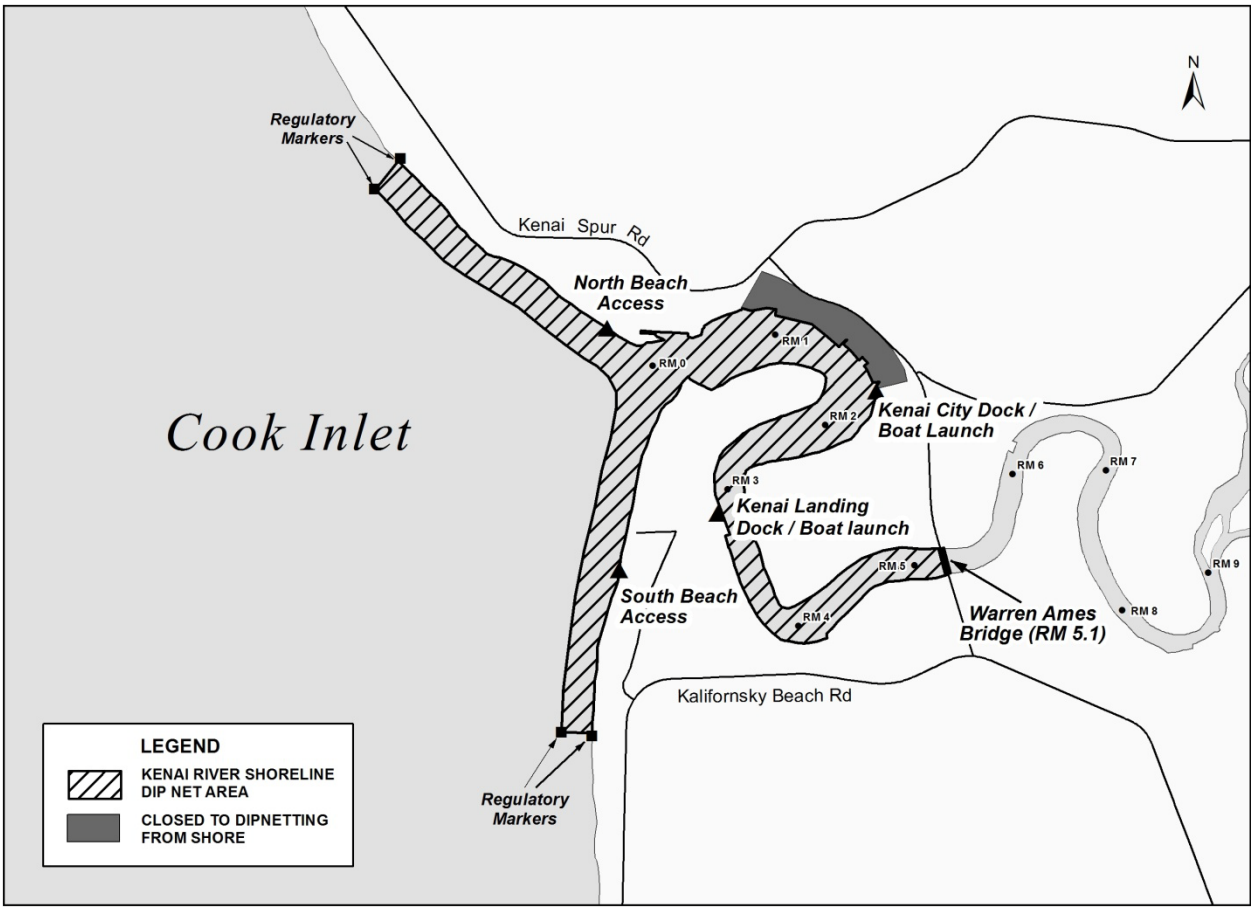

Figure 13.–Map of the Kenai River personal use dip net fishery.

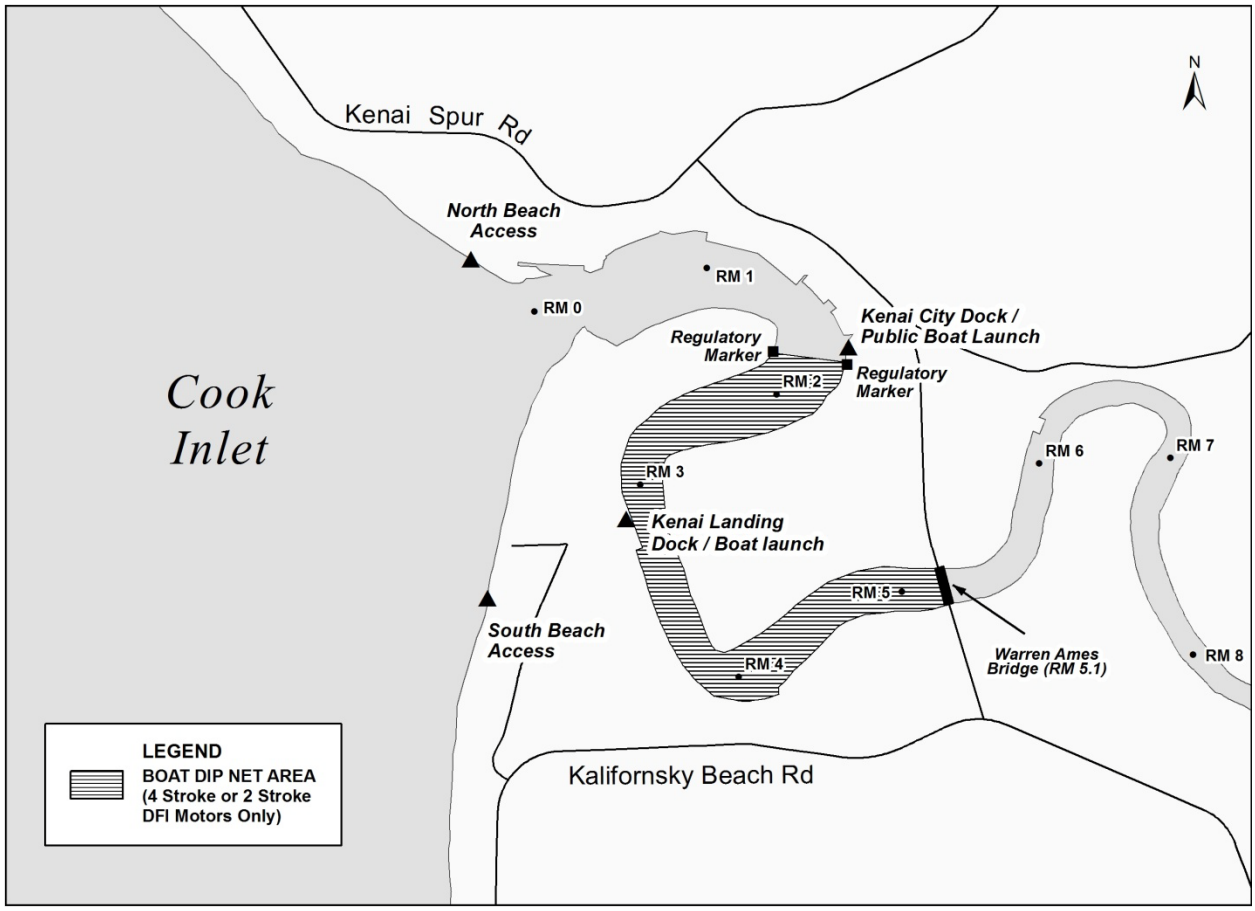

Figure 14.–Map of the Kenai River personal use fishery area open to dipnetting from a boat.

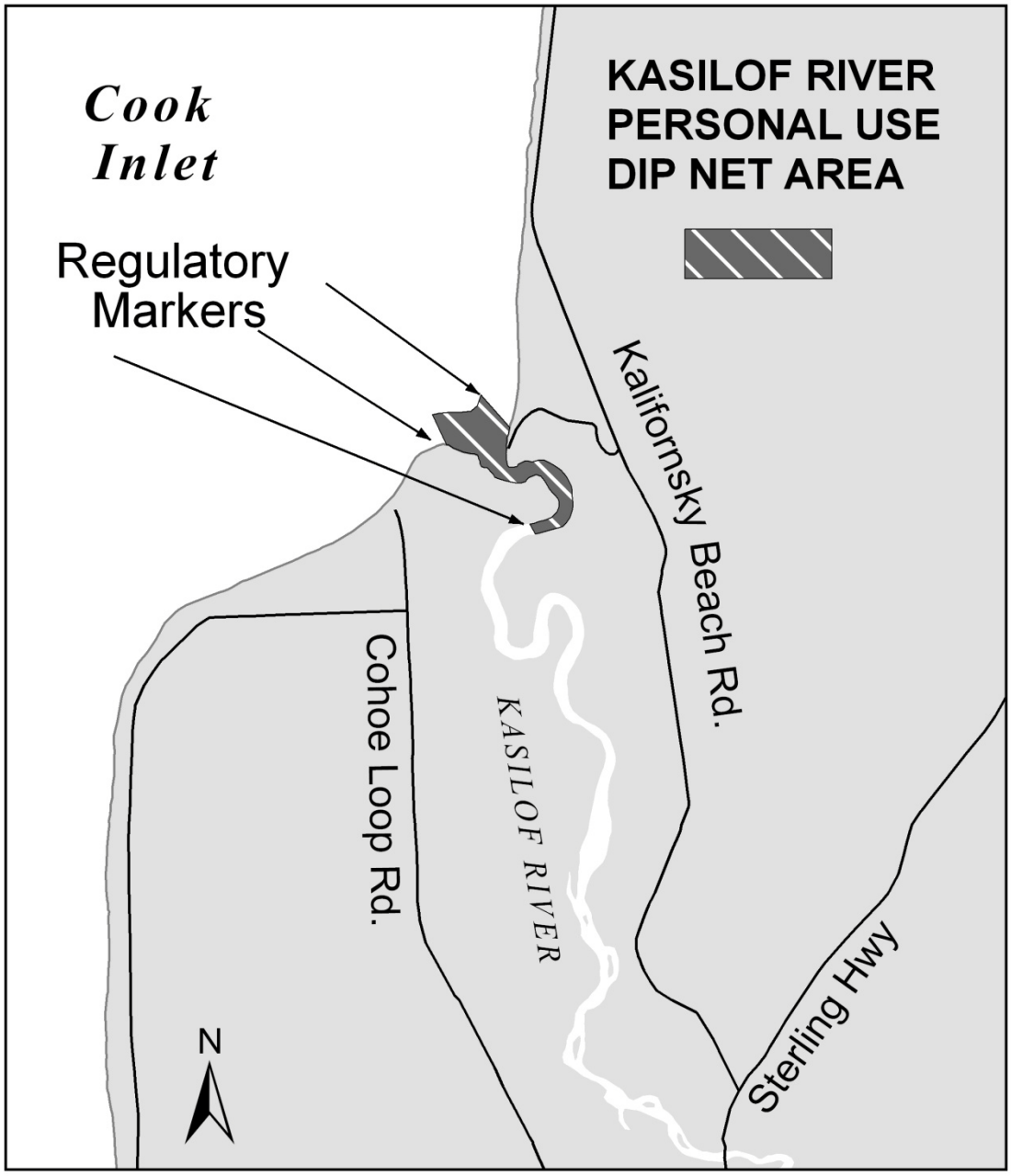

Figure 15.–Map of the Kasilof River personal use fishery area open to dip netting from shore.

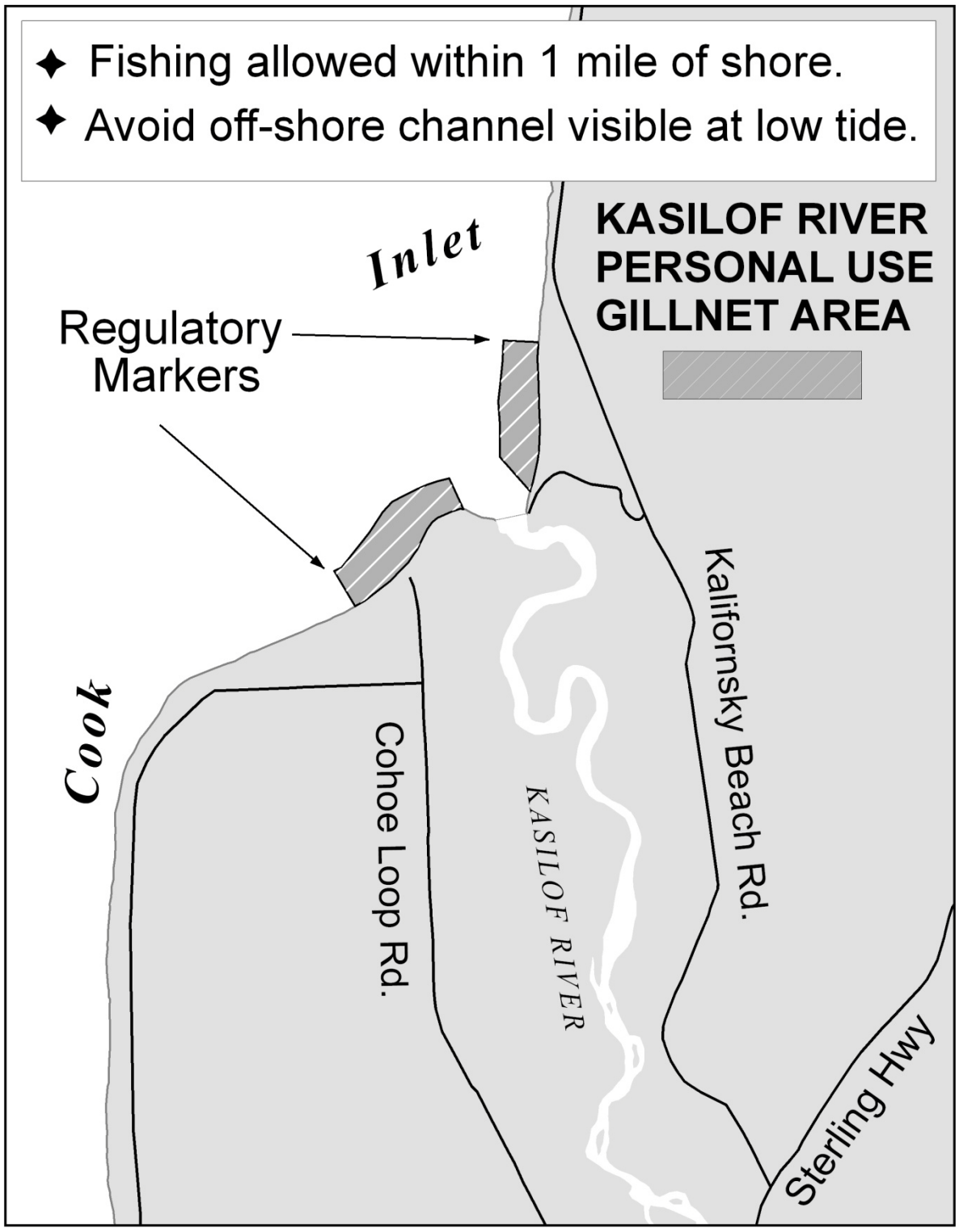

Figure 16.–Map of the Kasilof River personal use fishery area open to set gillnetting.

APPENDIX A
EMERGENCY ORDERS

Appendix A1.–Emergency orders issued for Northern Kenai Peninsula Management Area waters in 2008.

Emergency Order Number	Effective Date	Action/Justification
2-KS-1-07-08	Jun 1 12:01 a.m.	Bait allowed for Kenai River early run king salmon fishing beginning June 1.
2-RS-1-13-08	Jun 26 8:00 a.m.	The Russian River Sanctuary will be open to sockeye salmon sport fishing 8:00a.m., Thursday, June 26.
2-RS-1-23-08	Jul 17 12:01 a.m.	Due to a strong return of sockeye salmon into the Kasilof River, an EO has been issued to expand the area open to dipnetting, effective 12:01 a.m., Thursday, July 17.
2-RS-1-22-08	Jul 17 12:01 a.m.	Due to a strong return of sockeye salmon into the Kasilof River, an EO has been issued to increase the sockeye salmon daily bag and possession limit to six (6) per day, twelve (12) in possession, effective 12:01 a.m., Thursday, July 17.
2-RS-1-24-08	Aug 1 12:01 a.m.	This EO closes the sport fishery for sockeye salmon in the waters of the Kenai River drainage downstream of the Kenai River sockeye salmon counter located at river mile 19.
2-RS-1-25-08	Aug 6 12:06 a.m.	The sockeye salmon bag and possession limit will be reduced to one fish upstream of the Kenai River Sonar counter located at river mile 19.

Appendix A2–Emergency orders issued for Northern Kenai Peninsula Management Area waters in 2009.

Emergency Order Number	Effective Date	Action/Justification
2-RS-1-13-09	Jun 15 8:00 a.m.	The Russian River Sanctuary will be open to sport fishing for sockeye salmon at 8:00a.m., Monday, June 15.
2-RS-1-14-09	Jun 17 12:01 a.m.	Beginning at 12:01a.m., Wednesday, June 17, the daily bag limit will increase to six (6) sockeye salmon and the possession limit will increase to twelve (12) sockeye salmon in the Russian/Kenai River "fly-fishing-only area", downstream to Jim's Landing on the mainstem Upper Kenai River.
2-RS-1-23-09	Jul 18 12:01 a.m.	Due to a strong return of sockeye salmon into the Kasilof River, an EO has been issued to increase the sockeye salmon daily sportfishing bag and possession limits to six (6) per day, twelve (12) in possession, effective 12:01a.m., Saturday, July 18.
2-RS-1-24-09	Jul 18 12:01 a.m.	Due to a strong return of sockeye salmon into the Kasilof River, an EO has been issued to expand the area open to dipnetting, effective 12:01 a.m., July 18.

Appendix A3.–Emergency orders issued for Northern Kenai Peninsula Management Area waters in 2010.

Emergency Order Number	Effective Date	Action/Justification
2-KS-1-12-10	Jun 5 12:01 a.m.	Anglers are advised that emergency closures have been announced for the Kenai River king salmon fishery. These closures will begin at 12:01a.m. Sat., 6/5/10. Please see the emergency order and news release for specifics.
2-KS-1-13-10	Jun 5 12:01 a.m.	Retention of naturally-produced king salmon in the Kasilof River will be prohibited through 11:59p.m., Wed., 6/30/10. Naturally-produced king salmon caught may not be possessed or retained, may not be removed from the water, and must be released immediately.
2-KS-1-16-10	Jun 12 12:01 a.m.	The Kenai River will open to catch-and-release fishing for king salmon 20 inches or greater, but less than 55 inches in length. Harvest will be allowed for king salmon less than 20 inches or 55 inches or greater in length.
2-KS-1-19-10	Jun 15 12:01 a.m.	The 2010 Kenai River early-run king salmon sport fishery will reopen to the harvest of king salmon less than 46 inches in length or greater than 55 inches in length beginning at 12:01a.m., Tue, 6/15/10.
2-KS-1-20-10	Jun 17 12:01 a.m.	Retention of naturally-produced king salmon in the Kasilof River will be allowed on Tuesdays, Thursdays, and Saturdays through Wed., 6/30/10.
2-KS-1-21-10	Jun 19 12:01 a.m.	Sufficient numbers of early-run king salmon have entered the Kenai River to allow anglers to fish with bait from a point approximately 100 yards downstream of the confluence of the Moose and Kenai Rivers.
2-RS-1-39-10	Jul 24 12:01 a.m.	In the Kenai River, the sportfishing bag and possession limit for salmon 16 inches or longer, except for king and coho salmon, will be increased to six. This does not include the Russian River and the Upper Kenai River "fly-fishing-only waters" near the Russian River.
2-RS-1-40-10	Jul 24 11:00 p.m.	The Kenai River personal use dip net fishery will be open 24 hours per day, through 11:59 p.m., Sat., 7/31/10.
2-RS-1-43-10	Aug 12 12:01 a.m.	Sockeye salmon fishing is closed by emergency order in the Russian River and the Kenai River "fly-fishing-only waters" near the Russian River.