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Report to the Alaska Board of Fisheries for the Recreational Fisheries of Bristol Bay, 2010–2012

by

Jason E. Dye

and

Craig J. Schwanke

November 2012

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et 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

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by

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The Special Publication series was established by the Division of Sport Fish in 1991 for the publication of techniques and procedures manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Special Publications are intended for fishery and other technical professionals. Special Publications are available through the Alaska State Library, Alaska Resources Library and Information Services (ARLIS) and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone editorial and peer review.

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ABSTRACT

This report summarizes sport fisheries addressed in Bristol Bay proposals to the Alaska Board of Fisheries during 2012. Fisheries include Nushagak and Naknek rivers rainbow trout *Oncorhynchus mykiss,* Togiak, Kulukak, Nushagak, and Naknek rivers king salmon *O. tshawytscha*, and Ugashik River coho salmon *O. kisutch*. The sport fisheries are described, and estimates of sport effort, catch, harvest, and escapement are provided. Overviews of management for each fishery are provided, such as pertinent sport fishing regulations and management plans, including the *Nushagak-Mulchatna King Salmon Management Plan* and the *Southwest Alaska Rainbow Trout Management Plan.*

Key words: Bristol Bay Sport Fish Management Area, Alaska Board of Fisheries, management plan, Nushagak River, Togiak River, Kulukak River, Ugashik River, Naknek River, rainbow trout, *Oncorhynchus mykiss,* king salmon, *Oncorhynchus tshawytscha*, coho salmon*, Oncorhynchus kisutch.*

MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The purpose of this report is to summarize sport fisheries addressed in Bristol Bay proposals to the Alaska Board of Fisheries (board) during 2012. The Bristol Bay Sport Fish Management Area (BBMA) is part of the Division of Sport Fish (SF) Southcentral Region (Region II) and includes all waters and drainages flowing into Bristol Bay between Cape Newenham on the northwest to Cape Menshikof on the southeast (Figure 1).

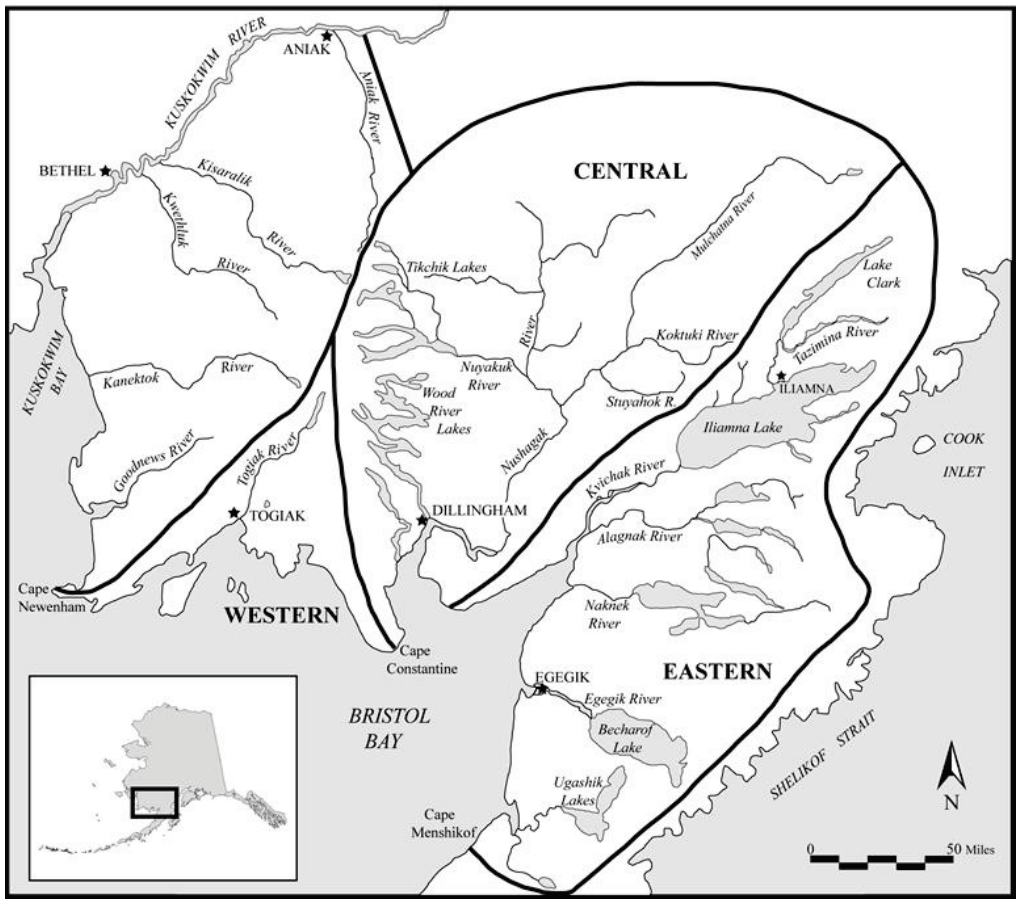

Figure 1.-Bristol Bay Sport Fish Management Area, showing the Eastern, Central, and Western sections.

The following proposals will be considered by the board in December 2012 and will directly affect sport fisheries:

Proposal 2: Prohibit harvest of rainbow trout and sport fishing with bait and multiple hooks upstream of the Chichitnok River in the Nushagak River drainage.

Proposal 3: Require the use of barbless hooks in all unbaited, single-hook, artificial fly waters in Bristol Bay.

Proposal 4: Change the definition of bait in the waters of Bristol Bay to include any substance placed in fresh water by a person for the purpose of attracting fish by scent.

Proposal 5: Reduce the bag limit for coho salmon in the Ugashik, Dog Salmon, and King Salmon rivers from five per day, five in possession to one per day, one in possession.

Proposal 6: Maintain the current bag and possession limit, but allow two king salmon over 28 inches or greater in length per day instead of one as currently in codified regulations.

Proposal 7: Reduce the bag limit to two per day, two in possession, and maintain that only one may be 28 inches or greater in length.

Proposal 8: Reduce the bag limit to one per day, three in possession, and maintain that only one may be 28 inches or greater in length in the Togiak and Kulukak rivers.

Proposal 9: Allocate time and area for sport fishing on the Naknek River drainage amongst user groups.

Proposal 239: Prohibit the use of multiple hook lures and bait during the Nushagak River king salmon fishery.

The sport fisheries of this large region are more easily discussed by dividing the management area into three geographic sections: Eastern, Central, and Western (Figure 1). The sections are based on general habitat types and are somewhat arbitrary. However, for some species, particularly rainbow trout, the sections represent distinct differences in the character of the fisheries or biology of local stocks.

The Eastern Section includes all drainages from the Kvichak River to the area's southern boundary at Cape Menshikof (Figure 1). Major federal jurisdictions in the Eastern Section include the Lake Clark National Park and Preserve, Katmai National Park and Preserve, and the Becharof National Wildlife Refuge. The Central Section is composed of the drainages entering Nushagak Bay, and is dominated by the Nushagak and Wood River systems. The Wood-Tikchik State Park falls within the Central Section boundaries. The Western Section includes all drainages from Cape Constantine on the Nushagak Peninsula west to Cape Newenham and contains portions of the Togiak National Wildlife Refuge. The Togiak River is the major drainage within the section.

Major communities located within the area include Iliamna, Dillingham, King Salmon, Naknek, Togiak, Egegik, and Pilot Point. The management area is not linked to the state's highway system, although local roads provide sport fishermen with limited access near the major

communities. Float-equipped aircraft, and to a lesser extent boats, are commonly used to access the area's many remote fisheries.

Although the Alaska Department of Fish and Game (department) has management jurisdiction for fisheries in the BBMA, the U.S. Fish and Wildlife Service, National Park Service, and U.S. Geological Survey manage federal public lands and conduct research in the area.

INFORMATION SOURCES FOR MANAGEMENT

The department utilizes several sources of information to manage fisheries in the BBMA. One of the primary means for monitoring sport fishing effort, catch, and harvest is the Statewide Harvest Survey (SWHS), a mail survey (Mills 1979–1980, 1981a-b, 19821994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b; Jennings et al. *In prep*[1]). This survey, begun in 1977, estimates the number of angler-days of sport fishing effort expended by anglers in Alaskan waters (residents as well as nonresidents), and harvest by species. The survey provides estimates of effort and harvest on a site-by-site basis, but is not designed to provide estimates of effort directed toward a single species. Beginning in 1990, the survey was modified to include estimates of catch (release plus harvest) on a site-by-site basis. The precision of any estimate from the SWHS is dependent on the number of respondents for that fishery. While the survey is a useful management tool for collecting a large amount of data with relatively little expense, it does not reliably report data on specific sites with a low number of angler responses. Data from sites with fewer than 12 responses is not typically reported and may be grouped with other sites to give an estimate for a larger geographical area. The BBMA includes portions of three areas defined in the SWHS: a portion of the Naknek River Drainage-Alaska Peninsula Area (Area R), excluding the saltwater fisheries and freshwater fisheries of Cold Bay and the Aleutian Islands; the Kvichak area (Area S); and the Nushagak area (Area T).

In addition to the SWHS, since 2005, SF has operated the freshwater logbook program, which requires sport fishing guide businesses to record sport fishing effort, catch, and harvest by freshwater commercially-guided clients (Sigurdsson and Powers 2009–2012).

Creel surveys have been selectively used to ground-truth the SWHS and freshwater logbook programs for fisheries of interest or for fisheries that require more detailed information or inseason management. These include the Alagnak River (Brookover 1989; Dunaway 1990, 1994; Naughton and Gryska 2000; Collins and Dye 2003), the Kvichak River (Dunaway and Fleischman 1996), Lower Talarik Creek (Russell 1977; Minard 1990; Minard et al. 1992; and unpublished data[2]), and the Nushagak River (Dye *In prep*[3]).

Area staff also conduct stock assessment projects. For example, on the Nushagak and Mulchatna rivers, significant monitoring and stock assessment projects have been conducted intermittently since 1986 (Minard 1987; Minard and Brookover 1988; Dunaway et al. 1991;

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[1] Jennings, G. B., K. Sundet, and A.E. Bingham. *In prep* Estimates of participation, catch, and harvest in Alaska sport fisheries during 2011. Alaska Dept. of Fish & Game, Fishery Data Series, Anchorage.

[2] Memos summarizing the Lower Talarik Creek rainbow trout projects; located at Alaska Department of Fish and Game, Division of Sport Fish, Dillingham. 1997 data from J. Dye, dated October 15, 1997, Dillingham; 1998 data from C. Schwanke, dated December 1, 1998; 1999 data from J. Dye to Bob Clark, dated November 15, 2000; 2000 data from J. Dye and M. Cavin to Bob Clark, dated November 15, 2000; 2001 data from J. Dye to Bob Clark, dated January 2002; 2003 data from C. Collins to James Hasbrouck, dated August 12, 2004; 2004 data from T. Jaecks to James Hasbrouck, dated January 23, 2005.

[3] Dye, J.E. *In prep* Survey of the Chinook salmon sport fishery in the lower Nushagak River, Alaska, 2007. Alaska Dept. of Fish & Game, Fishery Data Series, Anchorage.

Dunaway and Bingham 1992; Dunaway and Fleischman 1995; Minard et al. 1998; Dye 2005; Cappiello and Dye 2006; Dye *In prep*).

Commercial and subsistence harvests of salmon are monitored and reported by the Division of Commercial Fisheries (CF) and the Division of Subsistence (Jones et al. 2012). For larger fisheries, forecasts of each season's run are provided by CF and are reported in a statewide salmon forecast summary (Salomone et al. 2011; Jones et al. 2012; *In prep*[4]).

Escapements of some salmon stocks are monitored by counting towers, sonar, or aerial index surveys. For example, in the Nushagak River, escapement is estimated by sonar as the salmon migrate upriver (Jones et al. 2012*, In prep*). Historically, aerial index surveys of king salmon in the Nushagak, Togiak, Alagnak, and Naknek rivers drainages are also conducted. Due to recent budget shortfalls, most of these aerial index surveys have been suspended for the last three years.

SPORT EFFORT AND HARVEST

BBMA contains some of the most productive Pacific salmon *Oncorhynchus sp.*, rainbow trout *O. mykiss*, Arctic grayling *Thymallus arcticus*, Arctic char *Salvelinus alpinus*, and Dolly Varden *S. malma* waters in the world. The area has been acclaimed for its sport fisheries since the 1930s.

Total sport effort in the BBMA increased from about 25,000 angler-days in 1977 to a peak of more than 116,000 angler-days in 1995. From 2006 through 2010, effort averaged 88,450 angler-days annually (Table 1, Figure 2). Effort during 2011 was 87,000 angler-days. From 2006 through 2011, guided sport fishing effort has averaged 33,800 angler-days (Table 2). Sport effort is expected to stabilize or slowly increase during the foreseeable future.

Historically, more than 60% of the effort occurred in the waters of the Eastern Section of the BBMA (Table 1). Although the Eastern Section effort still dominates, the percentage has declined slightly with the growth of fisheries in the Central Section (Table 1, Figure 3). The Eastern Section accounted for 61% of the total effort from 2006 through 2010. The Central Section typically accounts for the second largest proportion of effort, followed by the Western Section. During 2011, distribution of effort among sections was similar to recent years.(Figure 3).

Sockeye *O. nerka*, king *O. tshawytscha* and coho *O. kisutch* salmon are the most popular species harvested in the BBMA, with fewer Dolly Varden or Arctic char, Arctic grayling, and rainbow trout being taken annually. An apparent decline in harvests of nonsalmon species is likely due, in part, to the increasingly accepted catch-and-release ethic among sport anglers, as well as bag limit reductions for Dolly Varden, or Arctic char, northern pike *Esox lucius*, and Arctic grayling adopted by the board in 1997, 2001, and 2006.

[4] Jones, M., T. Sands, S. Morstad, T. Baker, G. Buck, F. West, P. Salomone, and T. Krieg. *In prep* 2012 Bristol Bay area annual management report. Alaska Dept. of Fish & Game, Fishery Management Report , Anchorage.

Table 1.-Sport fishing effort by section and drainage, Bristol Bay Sport Fish Management Area, 1977–2011.

Drainage	Avg 77–96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg 06–10	2011
Eastern																	
Naknek R.	12,911	13,673	13,988	21,189	22,529	12,401	21,020	13,398	16,956	12,699	14,928	17,744	14,444	16,850	16,828	16,159	14,465
Brooks R.	3,195	3,971	2,916	1,418	3,227	3,226	3,381	2,027	3,317	1,945	3,887	3,882	3,951	2,513	3,469	3,540	4,227
Kvichak R.	3,077	3,947	3,339	5,095	7,365	4,763	5,313	5,380	4,219	5,463	7,022	5,557	5,849	6,015	6,061	6,101	6,045
Copper R.	1,621	2,782	2,191	3,359	2,194	2,134	2,485	2,271	1,349	1,082	1,868	2,513	1,520	1,959	1,756	1,923	2,246
Alagnak R.	5,749	11,062	7,715	6,411	7,589	8,576	10,614	9,956	9,028	11,228	11,747	8,881	8,652	5,541	6,549	8,274	5,669
Newhalen R.	4,329	3,773	3,506	5,178	3,063	3,337	1,556	1,959	1,842	1,273	2,169	1,643	1,470	1,370	968	1,524	1,048
Lake Clark	2,594	3,132	1,462	2,331	1,429	4,328	1,985	1,472	2,886	1,244	1,103	1,377	2,008	1,725	1,964	1,635	1,586
Other	7,871	17,771	16,872	22,917	20,930	15,137	4,160	7,289	17,216	14,083	14,028	18,944	15,872	10,177	13,828	14,570	14,824
Subtotal[a]	41,346	60,111	51,989	67,898	68,326	53,902	50,514	43,752	56,813	49,017	56,752	60,541	53,766	46,150	51,423	53,726	50,110
Central																	
Nushagak	6,694	8,866	15,933	15,028	16,150	14,040	13,396	16,834	18,869	17,841	15,302	16,970	14,936	13,991	8,671	13,974	11,329
Mulchatna	3,202	2,356	3,145	2,642	2,306	3,761	2,807	3,706	2,218	3,071	3,930	3,084	1,524	1,157	879	2,115	1,548
Agulowak		1,389	1,434	2,028	2,469	2,311	2,712	2,012	2,712	4,094	2,804	3,966	2,040	1,641	1,953	2,481	2,065
Agulukpak		1,384	923	1,102	1,402	1,437	1,225	688	1,473	1,406	1,086	1,249	1,239	1,430	924	1,186	2,480
Wood River L.[b]	5,403	4,918	3,653	5,678	8,885	6,685	6,988	8,866	8,884	10,547	6,596	7,300	6,484	3,893	4,013	5,657	9,146
Tikchik/ Nuyakuk	2,106	2,380	1,722	1,899	1,826	2,619	2,433	2,433	2,899	2,001	1,009	2,145	2,070	1,419	1,278	1,584	4,255
Other	2,534	5,908	3,886	4,043	5,637	6,297	1,193	1,215	3,693	3,519	8,129	2,371	1,185	1,060	997	2,748	983
Subtotal[a]	19,939	27,201	30,696	32,420	38,675	37,150	30,754	35,754	38,774	42,479	38,856	37,085	29,478	24,591	18,715	29,745	31,806
Western																	
Togiak	1,612	2,943	5,206	4,059	4,700	4,931	4,340	4,380	6,249	6,235	4,772	5,181	4,695	3,638	3,636	4,384	4,326
Other	437	59	162	153	137	187	108	108	160	37	70	37	249	1,583	1,034	595	758
Subtotal[a]	2,049	3,002	5,368	4,212	4,837	5,118	4,448	4,488	6,409	6,272	4,842	5,218	4,944	5,221	4,670	4,979	5,084
Total	63,334	90,314	88,053	104,530	111,838	96,170	85,716	83,994	101,996	97,768	100,450	102,844	88,188	75,962	74,808	88,450	87,000

Source: Estimates from Alaska SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

Note: "Effort" = participation (number of days fished); "angler-day" = the time spent fishing by one person for any part of a day.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

Table 2.–Total guided sport fishing effort in angler-days in selected waters of Bristol Bay, 2006–2011.

Drainage	2006	2007	2008	2009	2010	Avg 06–10	2011
Nushagak River downstream of Mulchatna River	8,559	7,632	7,738	5,539	3,920	6,678	4,056
Nushagak River upstream of Mulchtna River	741	715	330	100	630	503	732
Togiak River	2,485	2,211	1,818	1,223	873	1,722	1,094
Kulukak River	329	340	321	285	213	298	204
Ugashik River	186	434	339	216	302	295	406
Naknek River	4,006	3,981	4,273	3,923	3,160	3,869	4,162
All Bristol Bay drainages	40,038	38,573	37,879	29,906	26,739	34,627	29,658

Source: Freshwater logbook database and Sigurdsson and Powers (Sigurdsson and Powers 2009–2012).

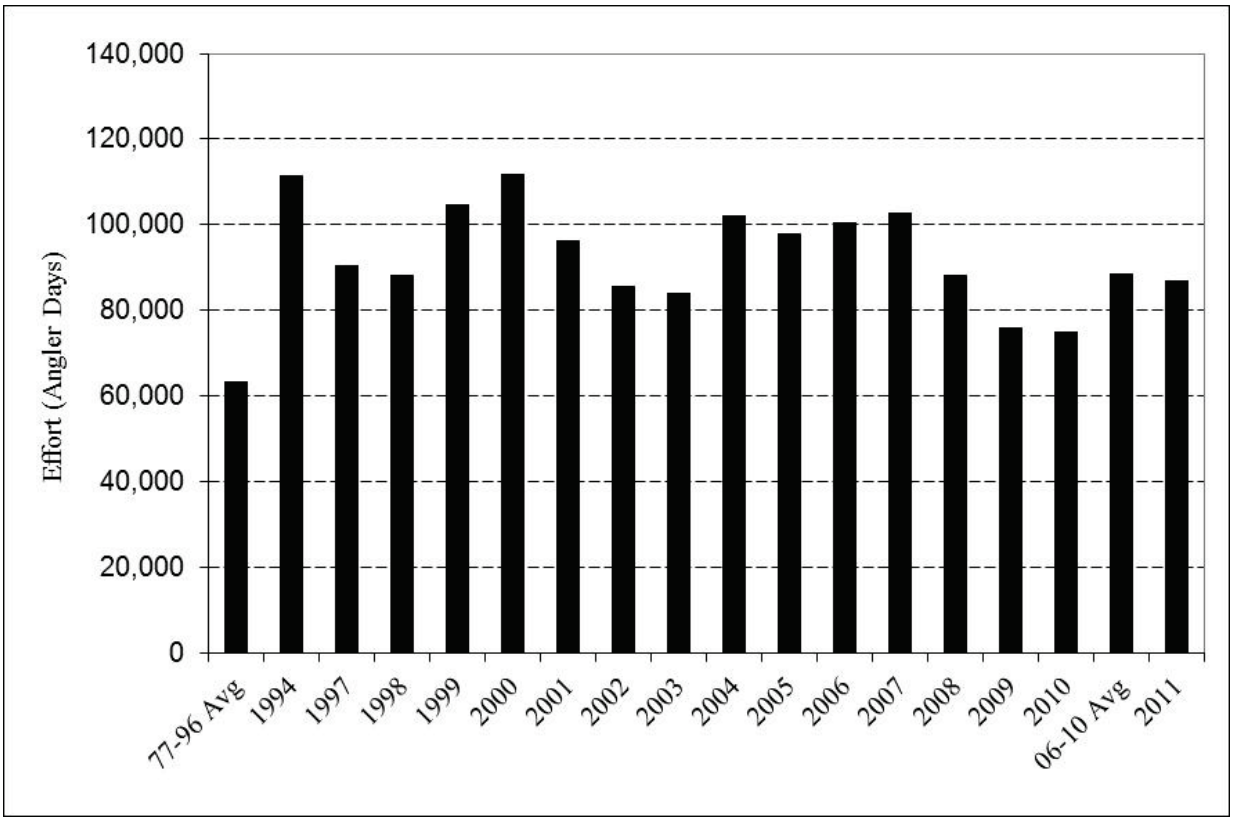

Figure 2.-Sport fishing effort in angler-days for the Bristol Bay Sport Fish Management Area, 1977–2011.

MANAGEMENT PLANS AND POLICIES

Appendix A1 lists the various management plans adopted or implemented by the board that guide the department's management of Bristol Bay sport fisheries. For those plans specifically adopted as a regulation, the Alaska Administrative Code (AAC) is provided. Additional information is provided later in the pertinent fishery sections. There are other management plans that address commercial salmon fisheries that do not directly address sport fisheries management, but may affect sport fisheries to some extent. These plans are more fully discussed under the specific sport fishery where such plans may be a factor.

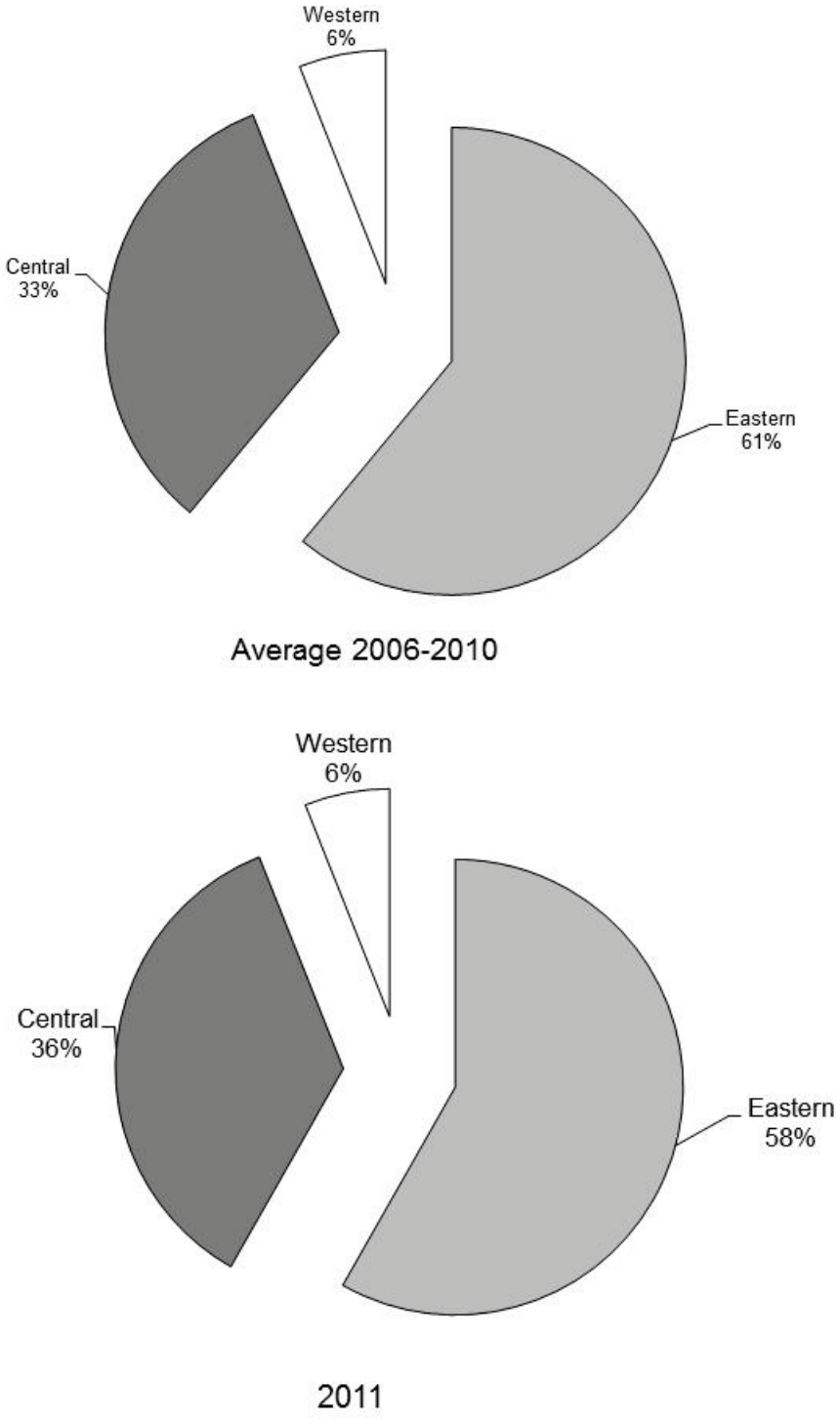

Figure 3.–Percentage of sport fishing effort expended in the Eastern, Central, and Western sections of Bristol Bay, 2006–2010 average (top) and 2011 (bottom).

KING SALMON FISHERIES

AREAWIDE FISHERY DESCRIPTION

Bristol Bay is home to several world-class king salmon sport fisheries. The peak of the sport king salmon fishery occurs from mid-June to mid-July in the lower reaches of the Alagnak, Nushagak, Naknek, and Togiak rivers, as well as several smaller rivers (Figure 4). King salmon stocks throughout the management area experienced a period of high productivity from the late 1970s through the early 1980s. From about 1984 through 2009, king salmon abundance in Bristol Bay returned to previous levels. With some exceptions, during 2010 through 2012, king salmon abundance decreased significantly.

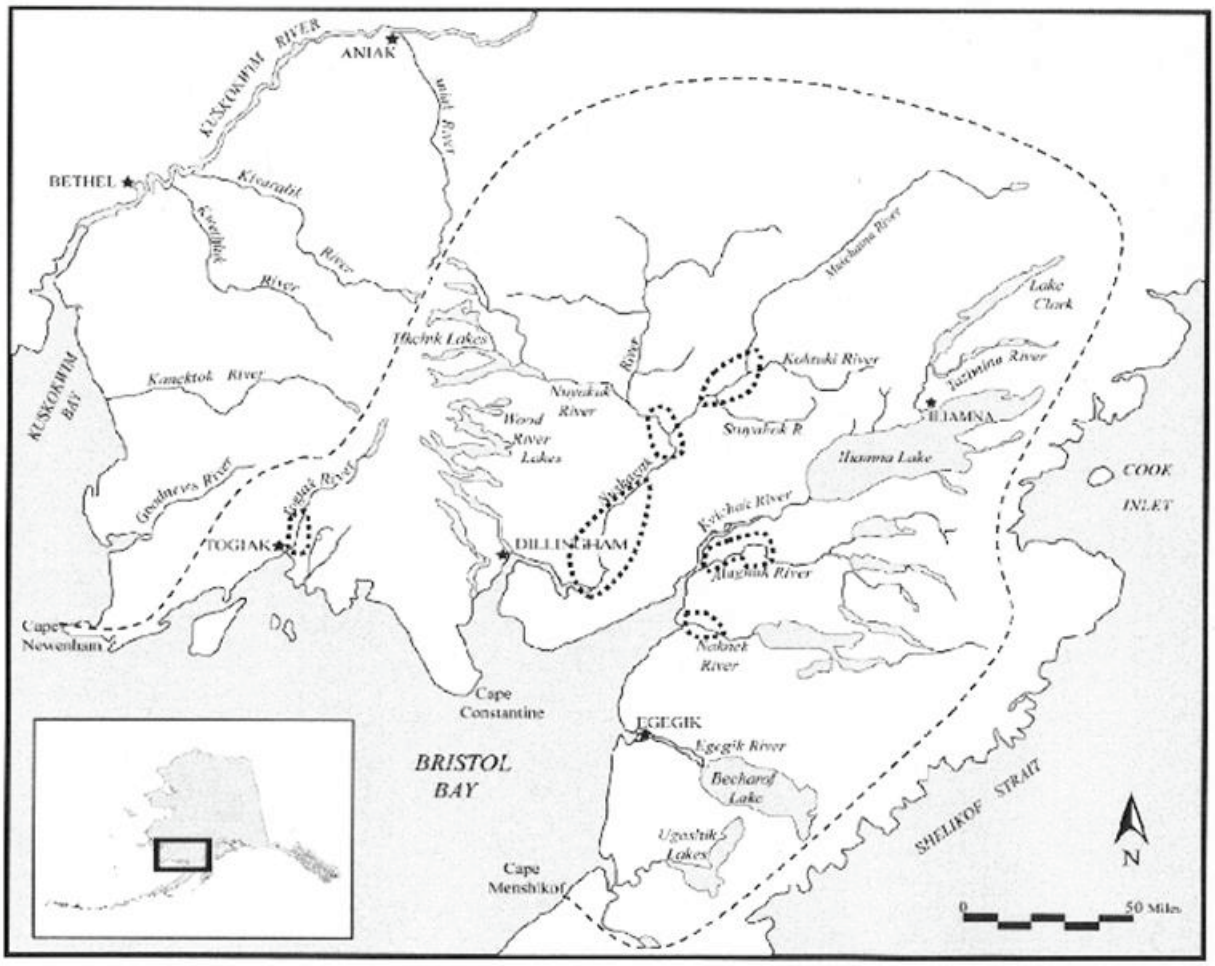

Figure 4.-Popular king salmon sport fisheries in the Bristol Bay Sport Fish Management Area.

The Bristol Bay commercial fishery generally takes the majority of the area's annual king salmon harvest. The majority of these fish are harvested incidentally during the sockeye salmon commercial fishery. Before 2001, the annual commercial harvest usually ranged from 23,000 to over 140,000 king salmon, with an average of over 77,000. Since 2001, the commercial harvest ranged from 24,600 (2008) to 114,300 (2004), with an average of 56,000 fish annually. Subsistence harvests from 2001 through 2010 averaged approximately 15,000 king salmon annually, ranging from a low of about 12,600 (2006) fish up to 21,200 fish (2003) (Jones et al. 2012).

The king salmon sport fisheries within the area, like the sport fisheries for most species, are fished primarily by guided anglers. With few exceptions, the guided to unguided angler ratio is about 3 to 1. Anglers usually keep less than 50% of the fish they catch, especially since adoption of areawide annual bag limits (see management section below).

Sport fishing harvests of king salmon have loosely followed trends in abundance, reaching peaks of 17,404 fish in 1987 and 17,544 fish in 1994. King salmon typically account for approximately 20–30% of the sport salmon harvest in Bristol Bay. The 2006 through 2010 sport harvest estimate averaged slightly less than 11,000 king salmon (Table 3). The 2011 sport harvest for the entire Bristol Bay area was 10,412 king salmon (Table 3) and the 2011 commercial harvest was 39,625 king salmon (Jones et al. 2012).

AREAWIDE FISHERY MANAGEMENT AND OBJECTIVES

Since 1960, bag limits for king salmon in Bristol Bay, and across Alaska, have become increasingly conservative and complex. Sweeping regulatory changes to the area's king salmon fisheries were adopted during the November and December 1997 board meetings. A Bristol Bay-wide annual limit of five king salmon was adopted, and in the Nushagak River drainage, anglers were further restricted to an annual limit of four king salmon. Bag limits in several other major fisheries were reduced slightly. Season closures of July 25 or 31 were adopted for all Bristol Bay waters to protect spawning king salmon.

In 2001, a statewide regulation (5 AAC 67.010(b)) created a bag and possession limit for king salmon, under 20 inches of 10 per day in all fresh waters open to king salmon sport fishing, except for the Nushagak River drainage. The limit is in addition to the limits for king salmon, 20 inches or longer. King salmon under 20 inches do not count toward the annual limit of four and are in addition to the bag limit for king salmon 20 inches or longer. The sole exception is the Nushagak River, which has a bag and possession limit of five king salmon under 20 inches per day.

In the drainages of the Alagnak, Egegik, Kvichak, Igushik, Naknek, Snake, and Ugashik rivers, the bag and possession limits for king salmon are uniform at three per day, one of which may exceed 28 inches in length (5 AAC 67.020(1)).

Anglers are prohibited from removing a king salmon from the water before releasing the fish in all fresh waters of Bristol Bay. Any king salmon removed from the water must be kept and becomes part of an angler's bag limit. The goal of this regulation is to improve the potential survival of released king salmon and to encourage anglers to be more careful with the fish they release.

Appendix C1 provides a chronology of the bag limit regulatory changes affecting king salmon sport fisheries in all drainages of Bristol Bay.

Table 3.-Sport harvest of king salmon, by section and drainage, Bristol Bay Sport Fish Management Area, 1977–2011.

Drainage	Avg 77–96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg 06–10	2011
Eastern																	
Naknek R.	3,485	4,231	3,443	2,697	2,105	2,656	2,170	2,412	3,004	2,140	2,558	1,431	1,285	2,279	1,266	1,764	2,416
Brooks R.	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kvichak R.	143	47	239	0	167	61	18	183	27	217	80	68	344	91	0	117	110
Copper R.	18	0	17	22	20	0	0	0	27	0	0	0	26	0	0	5	0
Alagnak R.	709	982	1,531	592	501	508	305	334	1,146	1,008	1,052	1,007	394	199	418	614	1,317
Newhalen R.	4	0	0	0	0	0	0	0	13	0	0	0	78	0	0	16	0
Lake Clark	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	8	0
Other	288	1,110	813	423	379	109	140	144	557	267	460	0	156	10	26	130	40
Subtotal[a]	4,656	6,382	6,043	3,734	3,172	3,334	2,633	3,073	4,774	3,632	4,150	2,506	2,325	2,579	1,710	2,654	3,883
Central																	
Nushagak	2,399	3,343	5,350	3,894	5,785	5,623	3,693	5,590	6,773	7,399	7,429	9,212	6,505	6,217	3,843	6,641	4,762
Mulchatna	870	154	265	262	200	221	191	317	40	134	44	287	91	58	0	96	82
Agulowak		0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0
Agulukpak		0	30	25	0	0	0	0	0	0	0	0	0	0	0	0	22
Wood River L.[b]	90	23	57	58	0	208	104	186	87	15	94	111	26	48	16	59	8
Tikchik/Nuyakuk	35	0	170	12	0	25	58	48	93	61	0	170	104	0	64	68	50
Other	185	186	120	372	268	12	68	21	40	101	57	34	26	163	0	56	32
Subtotal[a]	3,578	3,706	5,992	4,653	6,253	6,089	4,114	6,162	7,033	7,710	7,624	9,814	6,752	6,486	3,923	6,920	4,956
Western																	
Togiak	251	1,165	763	644	478	1,004	76	706	1,388	1,734	1,064	1,501	892	606	591	1,279	1,438
Other	6	0	130	0	0	0	0	0	0	0	0	0	0	0	0	0	135
Subtotal[a]	256	1,165	893	644	478	1,004	76	706	1,388	1,734	1,064	1,501	892	606	591	1,279	1,573
Total	8,490	11,253	12,928	9,031	9,903	10,427	6,823	9,941	13,195	13,076	12,838	13,821	9,969	9,671	6,224	10,852	10,412

Source: Estimates from Alaska SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, Alaska Department of Fish and Game, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Until 1997, Agulowak and Agulukpak rivers were included in Wood River Lakes.

NAKNEK RIVER

Fishery Description

The Naknek River is located on the Alaska Peninsula near the communities of King Salmon, Naknek, and South Naknek. The Naknek River (Figure 4) king salmon sport fishery commences May 1 and continues through July 31, when it closes by regulation to protect spawning fish. The peak angling weeks are from about June 22 to July 14. Effort is concentrated in a 12-mile stretch of the Naknek River adjacent to the community of King Salmon. This fishery is one of the most popular sport fisheries in the area, and accounts for roughly 15% of all the king salmon harvested by sport fishermen in the BBMA. Several factors contribute to the popularity of the Naknek River, including ease of access and regularly-scheduled airline service into King Salmon. This fishery has a significant amount of unguided effort, reasonably good catch rates, and a high retention rate. Of the estimated 2011 catch of 5,684 king salmon, 2,416 or nearly 43%, were kept (Jennings et al. *In prep.*).

Based on the SWHS, the estimated king salmon sport harvest from 2000 to 2011 ranged from a high of 3,004 in 2004 to a low of 1,266 in 2010, with an average of 2,119 fish from the Naknek River drainage (Table 4). Angler effort for all species on the Naknek River has decreased from highs of over 20,000 angler-days in the early 2000s to a recent 5-year average over 14,000 (Tables 1 and 4).

Based on freshwater logbook data, the average estimated king salmon harvest for guided anglers has decreased from over 1,000 fish in 2006 to 427 in 2010. Similarly, the estimated king salmon catch by guided anglers has decreased from over 1,200 fish in 2006 to about 650 fish in 2010 and 2011. Guided effort has remained fairly stable, with a 2006 to 2011 average of over 3,200 angler days.

Fishery Management and Objectives

In 2006, the escapement goal was changed to a sustainable escapement goal (SEG) of 5,000 king salmon as assessed by aerial survey (Table 4). While managing for escapement, consideration is also given to maintaining the historical distribution of spawning salmon within the four primary spawning areas of Paul's Creek, King Salmon Creek, Big Creek, and the mainstem of the Naknek River near Rapids Camp.

Sport harvests and effort are estimated through the SWHS and reported by Mills (1979–1994); Howe et al. (1995, 1996, 2001 a-d); Walker et al. (2003); and Jennings et al. (2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b; Jennings et al. *In prep.*). Commercial and subsistence harvests are monitored by the Division of Commercial Fisheries and are reported in its annual management report series (Jones et al. 2012). Division of Subsistence also reports harvests of king salmon from their comprehensive household surveys. SF has conducted significant monitoring and stock assessment projects on a routine schedule (Coggins and Bingham 1993; Gryska and Naughton 2001).

Escapement of king salmon is estimated by fixed-wing aerial surveys of the four primary spawning areas during the presumed peak of spawning in early to mid-August. Aerial counts are left unexpanded and are considered minimum estimates of escapement. Results of the escapement surveys indicate the mainstem of the Naknek River, along with Big Creek, comprises approximately 87% of the observed escapement. Except in 2000, recent escapements have met or exceeded the escapement goal, but escapements in the smaller tributaries remain a source of concern. Surveys have not been conducted since 2009 due to budget shortfalls.

Table 4.–King salmon commercial, subsistence, and sport harvest plus escapement for the Naknek River, 1970–2012.

Year	Harvest				Escapement index [d]
	Commercial[a]	Subsistence[b]	Sport[c]	Total	
1970	18,481	300	NA	NA	4,145
1971	10,254	200	NA	NA	2,885
1972	2,262	400	NA	NA	2,791
1973	951	600	NA	NA	2,536
1974	480	1,000	NA	NA	NA
1975	964	700	NA	NA	3,452
1976	4,064	900	NA	NA	7,131
1977	4,373	1,300	1,005	6,678	NA
1978	6,930	1,200	2,628	10,758	NA
1979	10,415	1,200	2,264	13,879	NA
1980	7,517	1,500	2,729	11,746	NA
1981	11,048	1,000	2,581	14,629	4,271
1982	12,425	1,100	3,264	16,789	8,610
1983	8,955	1,000	3,545	13,500	7,830
1984	8,972	900	4,524	14,396	4,995
1985	5,697	1,179	5,038	11,914	NA
1986	3,188	1,295	6,160	10,643	3,917
1987	5,175	1,289	9,069	15,533	4,450
1988	6,538	1,057	5,291	12,886	11,730
1989	6,611	970	3,224	10,805	2,710
1990	5,068	985	2,796	8,849	7,000
1991	3,584	1,152	3,115	7,851	4,391
1992	5,724	1,444	2,633	9,801	2,691
1993	7,477	2,080	2,603	12,160	8,016
1994	6,016	1,843	3,692	11,551	9,678
1995	5,084	1,431	4,153	10,668	4,960
1996	4,195	1,574	2,984	8,753	5,010
1997	2,839	2,764	4,231	9,834	10,453
1998	2,444	2,433	3,443	8,320	5,505
1999	1,295	1,567	2,856	5,718	NA
2000[e]	1,027	894	2,105	4,026	3,233
2001[f]	914	869	2,656	4,439	6,340
2002[g]	777	837	2,170	3,784	7,593
2003[h]	564	1,221	2,412	4,197	6,081
2004[i]	1,274	1,075	3,004	5,353	12,878
2005[j]	1,303	1,047	2,140	4,490	NA
2006[j]	2,294	881	2,558	5,733	NA
2007[j]	2,294	712	1,431	4,437	5,498
2008[k]	1,326	719	1,285	3,330	5,390
2009[l]	974	392	2,279	3,645	NA
2010[l]	369	422	1,266	2,057	NA
2011[l]	2,693	617	2,416	5,726	NA

-continued-

Table 4.–Part 2 of 2.

Year	Harvest				Escapement index [d]
	Commercial[a]	Subsistence[b]	Sport[c]	Total	
1970–2011					
Average	4,639	1,096	3,130	8,825	5,872
Percent	53%	12%	35%		
2006–2011					
Average	1,531	572	1,735	3,839	5,444
Percent	40%	15%	45%		
2012[l]	863	NA	NA	NA	NA

NA = data not available

Source: Estimates from Alaska SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, Alaska Dept. of Fish and Game, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates. Escapement estimates are from Alaska Dept. of Fish and Game - Division of Commercial Fisheries Salmon Spawning Ground Surveys in the Bristol Bay, Alaska.

[a] Naknek-Kvichak District commercial harvests likely include Naknek, Alagnak, and Kvichak stocks. The harvests reported above for Naknek River stocks are therefore considered maximums. Source: 1970 department fish ticket database, 1971–1978 ADF&G (1991), 1979–1990 Glick et al (2000), 1991–2011 Jones et al (2012)).

[b] Naknek-Kvichak District harvests. Harvests are extrapolated for all permits issued, based on returns. Permit and harvest estimates prior to 1989 based on the community where the permit was issued. Estimates from 1989 to the present are based on the district fished. Source: 1971–1978 ADF&G (1991), 1979–1990 Glick et al (2000), 1991–2011 Jones et al (2012)).

[c] Previous reports showed sport harvest estimates from 1970 to 1976. These estimates were based either on voluntary angler reporting forms given to military anglers or on-site creel surveys (1971 and 1975). The 1970–1976 estimates can be found in Gwartney and Russell (1977). They are not directly comparable to the SWHS estimates for 1977–2005 (Mills 1979–1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, 2007, 2009a) and so are not reported.

[d] Actual raw counts made from fixed wing aerial surveys. Source: Browning et al. (2002) and Higgins et al (2004, Appendix Table 2).

[e] Limited commercial fishing in the Naknek-Kvichak District until July 3, then fishing in the Naknek River Special Harvest Area (NRSHA) for the remainder of the season.

[f] Limited setnet commercial fishing in the Naknek-Kvichak District until June 24, then fishing in the Naknek River Special Harvest Area for the remainder of the season.

[g] No commercial fishing openings in the Naknek-Kvichak District.

[h] No commercial fishing in the Naknek-Kvichak District during the season; aerial survey does not include Big Creek.

[i] Majority of commercial fishing took place in NRSHA; commercial fishing in Naknek-Kvichak District began July 12.

[j] Majoring of commercial fishing took place in the Naknek River and some in the Alagnak River Special Harvest Area.

[k] Majority of drift fishing took place in the Naknek Section of the Naknek-Kvichak District, while setnet occurred in entire district. No NRSHA.

[l] No escapement surveys were conducted due to budget constraints.

Concern over low escapements and increasing sport harvest prompted the board in 1987 to adopt a regulation package addressing Naknek River king salmon. The key elements of that package included the following:

1) establishing a season for king salmon (May 1 to July 31)
2) artificial-lure-only designation
3) reduction in bag and possession limits to three per day, one of which may be over 28 inches.

Beginning in the early 1990s, increasing portions of Paul's and King Salmon creeks were closed to king salmon fishing to protect spawning stocks in these waters. In 1995, the outlets of Paul's and King Salmon creeks into the Naknek River were closed to angling to protect important holding areas for king salmon.

In 1997, closures to king salmon angling in Paul's and King Salmon creeks were clarified, and an annual limit of five king salmon per angler was adopted for this fishery. The annual harvest limit was Bristol Bay-wide and required anglers to record the date and location of each king salmon taken.

With the advent of the annual limit on king salmon, a number of local anglers had expressed strong interest in taking smaller king salmon on the Naknek River. In January 2001, the board added the opportunity to harvest 10 king salmon per day under 20 inches in length, and prohibited anglers from removing king salmon from the water if the fish were to be released (ADF&G 2012). The board also restricted most of Big Creek to catch-and-release angling for king salmon during its January 2001 meeting (ADF&G 2012). The Big Creek regulation grew from a locally-generated proposal designed to address recent concerns for the Big Creek king salmon escapement.

As described earlier in this report, a particular concern for some Naknek River anglers is management of the Naknek-Kvichak commercial sockeye salmon fishery. When conservation concerns for the Kvichak River sockeye salmon stocks require area restrictions in the Naknek-Kvichak District, commercial fishing may be allowed in the lower reaches of the Naknek River under the terms of the *Naknek River Sockeye Salmon Special Harvest Area Plan* (NRSHA) (5 AAC 06.360). The plan was adopted by the board in 1987. Since adoption of the plan, there have been numerous NRSHA fishery openings to protect Kvichak River sockeye stocks, however there have been no openings in the NRSHA since 2007. . During NRSHA openings a higher percentage of the Naknek River escapement is exposed to gillnets, raising the concern of a number of guides and anglers. The board has amended the plan several times and in 2001, adopted amendments to address the quality of salmon of all species escaping through the NRSHA openings.

2012 Season

Sport catch and harvest will not be available until 2013. However, anglers reported that sport fishing for king salmon on the Naknek River was fair in 2012. Escapement was not assessed due

to budget constraints. Commercial harvest of king salmon in the Naknek-Kvichak District during 2012 was 863[5].

NUSHAGAK AND MULCHATNA RIVERS

Fishery Description

The Nushagak drainage supports the largest sport, commercial, and subsistence fisheries for king salmon in the BBMA (tables 3 and 5).

Sport fishing effort is concentrated in three areas (Figure 4): the lower Nushagak River near the village of Portage Creek, the middle section of the Nushagak River in the vicinity of the village of Ekwok, and the midsection of the Mulchatna River between the Stuyahok and Koktuli rivers. Between 1992 and 1997, effort in the Ekwok area was highly variable. Since about 1999, the lower river fishery has begun to expand steadily upriver to Ekwok and the two areas are merging into a single fishery. Angling for king salmon in the middle section of the Mulchatna River seems to have diminished since bait was prohibited there in 1992. Although sport fishing for king salmon does occur in some of the tributaries of the drainage, the overall impact of that activity, in terms of harvest, is considered minimal.

Uplands along much of the Nushagak River are privately owned. The Land Department of Choggiung Limited, an Alaska Native-owned corporation, administers a recreational land management program. Since its inception in the mid-1980s, this program has grown to include the lands of the adjoining villages of Ekwok, New Stuyahok, and in some years, Koliganek. This system has matured into a sound and profitable venture for the corporations. Private and commercial land-use permits sold by the program allow anglers access to desirable campsites while engaged in recreational fishing and hunting.

King salmon stocks in the Nushagak-Mulchatna drainage have been variable in recent years. The 2009 and 2010 runs were well below average and did not achieve the 75,000 fish inriver goal. The 2011 run was above average and exceeded the inriver goal. Total runs of Nushagak-Mulchatna king salmon averaged 106,126 fish from 2007 through 2011, ranging from 69,079 in 2010 to 126,003 fish in 2008 (Table 5).

Total harvest by commercial, subsistence, and sport fisheries averaged 48,498 king salmon from 2007 through 2011. The majority (62%) of the harvest was taken by the commercial fishery, 25% was taken by the subsistence fishery, and 13% by sport anglers. After a period of relative stability from 1991 through 2008, the sport harvest has been declining recently. Sport harvest of king salmon averaged 5,818 fish from 2007 through 2011 (Table 5).

King salmon escapement into the Nushagak and Mulchatna rivers was estimated by aerial surveys beginning in 1967. Since 1987, sonar has been used to estimate the inriver run of king salmon to the Nushagak drainage. The sonar is considered a slight improvement over the aerial survey program since it gives a real-time estimate of escapement on which management decisions can be based.

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[5] Alaska Department of Fish and Game, Division of Commercial Fisheries 2012 Bristol Bay Salmon Summary. News Release 9/21/12, http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main.

Table 5.-Comparison of total run, commercial, subsistence, and sport harvests, inriver sonar estimate, and escapement for king salmon, Nushagak River drainage, 1989–2012.

		Harvests Below Sonar					Harvests Above Sonar		Spawning Escapement	
Year	Total Run[a]	Commercial Harvest[b]	Commercial Subsistence Removals[c]	Subsistence Harvest[d]	Sport Harvest[e]	Inriver Sonar estimate[f]	Subsistence Harvest[g]	Sport Harvest[h]	Sonar Estimate[f,i]	Aerial Survey Estimate[j]
1989	103,247	17,637	632	5,273	1,404	78,302	2,217	2,210	73,875	
1990	87,990	14,812	1,198	7,228	797	63,955	3,981	2,689	57,285	
1991	133,629	19,718	1,971	5,796	1,793	104,351	5,860	3,758	94,733	
1992	140,000	47,563	907	6,838	1,844	82,848	5,843	2,911	74,094	
1993	173,290	62,976	1,867	8,227	2,408	97,812	7,615	3,492	86,706	
1994	228,697	119,478	1,126	7,703	4,436	95,954	6,661	6,191	83,103	
1995	175,612	79,942	1,327	6,483	2,238	85,622	5,891	2,713	77,018	
1996	135,570	72,011	730	8,356	2,346	52,127	6,855	3,045	42,228	
1997	164,975	64,160	544	8,187	931	40,705	6,587	2,566		82,000
1998	243,187	117,065	805	6,182	1,640	117,495	5,271	4,188	108,037	
1999	79,890	10,893	927	4,805	934	62,331	4,325	3,304	54,703	
2000	75,215	12,055	1,052	4,346	1,389	56,374	4,072	4,628	47,674	
2001	119,026	11,568	1,078	5,625	1,600	99,155	5,057	4,299	89,799	
2002	134,237	39,473	717	5,713	1,193	87,141	4,851	2,500	79,790	
2003	135,497	42,615	672	9,979	2,203	80,028	8,035	3,752	68,241	
2004	228,466	100,601	440	8,458	2,567	116,400	6,712	4,339	105,349	
2005	244,793	62,308	532	6,531	2,863	172,559	5,329	5,702	161,528	
2006	217,542	84,010	956	4,727	3,166	124,683	4,288	4,307	116,088	
2007	121,959	51,473	418	7,180	3,581	60,464	5,732	6,088	48,644	
2008	126,003	18,670	346	7,041	3,305	96,641	5,573	3,395	87,673	
2009	115,249	24,058	389	6,871	2,451	81,480	5,477	3,903	72,100	
2010	69,079	25,580	382	4,833	1,659	36,625	3,935	2,248	30,443	
2011	98,341	29,811	365	6,895 [k]	1,542	59,728	5,201 [k]	3,302	51,225	
1989–2011 Average	145,717	48,941	843	6,664	2,099	84,903	5,403	3,719	77,743	
2007–2011 Average	106,126	29,964	380	6,564	2,508	66,988	5,496	3,787	58,017	
2012	NA	11,501	NA	NA	NA	107,786	NA	NA	NA	

Note: units = number of king salmon.

-continued-

Table 5.–Part 2 of 2.

NA = data not available

[a] Run refers to an aggregation of salmon of all ages returning from ocean feeding grounds to spawn in any given year.

[b] Total Nushagak District commercial harvest. Sources: 1967–1970 (Bucher et al. 1987, Appendix Table 39); 1971–1985 (Brookover et al. 1991, Appendix Table 31); 19861987 (Salomone et al. 2007, Appendix Table A19); 1988–2011 (Jones et al. 2012, Appendix Table A19).

[c] Nushagak Bay Commercial Harvest from Division of Subsistence Database. Source: ADF&G Division of Subsistence, Subsistence Database from James Fall, Anchorage.

[d] Includes Nushagak Bay and Igushik and is estimated as 57% of the total Nushagak subsistence king harvest. Source: Jones et al 2012.

[e] 1977–1996 is 50% of Nushagak River system sport harvest. 1997–2009 is Nushagak River, Black Point to sonar. Source: SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*) and (unpublished 2008–2009 data, Gretchen Jennings, SWHS project manager, ADF&G, Division of Sport Fish, Anchorage).

[f] Sonar estimates for 1989–2006 are Bendix counts, 2007–2009 are DIDSON counts, and 2010–2012 are DIDSON counts converted to Bendix counts.

[g] Estimated as 43% of total Nushagak subsistence king harvest. Source: Jones et al 2012.

[h] 1977–1996 is 50% of Nushagak River system sport harvest, plus Mulchatna River system, Tikchik/Nuyakuk, and Koktuli River harvest reported in Mills (1979–1980, 1981a-b, 1982–1994) and Howe et al. (1995, 1996, 2001a). 1997–2001 is 50% of Nushagak River, Black Point to Iowithla, Nushagak upstream of Iowithla, Mulchatna River system, Tikchik/Nuyakuk and Koktuli River (Howe et al. 2001b-d; Walker et al. 2003; Jennings et al. 2004); 2002 to 2011 is Nushagak River, excluding Black Point to sonar (Jennings et al. 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b, *In prep*) and (unpublished 2008–2009 data, Gretchen Jennings, SWHS project manager, ADF&G, Division of Sport Fish, Anchorage)).

[i] 1986–1996 and 1998–2012 estimates are sonar estimates, minus subsistence and sport harvest above sonar.

[j] Source: Glick et al 2000.

[k] Data not available at the time of publication. Recent five-year average used.

Fishery Management and Objectives

Under the *Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361, adopted January 1992; amended December 1994, November 1997, January 2001, and December 2003) king salmon are managed to attain an inriver run of 75,000 fish, which provides 65,000 spawning fish, a reasonable opportunity to harvest king salmon in the inriver subsistence fishery, and a guideline harvest level (GHL) in the sport fishery of 5,000 fish. If the inriver run exceeds 75,000 king salmon, then the GHL does not apply. If the inriver run falls below 75,000 king salmon, restrictive actions are required for the sport fishery. If the inriver run falls below 55,000 king salmon, additional restrictive actions are required for the sport fishery. If the inriver run falls below 40,000 king salmon, the sport fishery is closed and the subsistence fishery may be restricted.

Since 1972, smaller runs and increasing sport effort have prompted restrictive actions on inshore commercial and sport fisheries. To remain within the sport fishery GHL of 5,000 fish, the bag and possession limit is two king salmon per day, of which only one may be longer than 28 inches in length (ADF&G 2009). Only four of the five king salmon allowed in an angler's Bristol Bay annual harvest may come from the Nushagak-Mulchatna drainage. Additionally, in the Nushagak-Mulchatna drainage, there is a bag and possession limit of five per day for king

salmon under 20 inches. King salmon under 20 inches do not count toward the annual limit of four and are in addition to the bag limit for king salmon 20 inches or longer.

Appendix D1 provides a chronology of significant regulation changes to the *Nushagak and Mulchatna King Salmon Management Plan.*

2012 Season

Due to uncertainty with past estimates of escapement, there was no preseason forecast for the 2012 Nushagak-Mulchatna king salmon run. Through June 25, inriver escapement projections indicated that less than 55,000 fish would enter the river in 2012. Additionally, due to low runs of Nushagak king salmon in recent years and poor performance of king salmon stocks statewide in 2012, a conservative approach was warranted to slow down the Nushagak sport harvest. On June 28, and in accordance with the management plan, the bag, possession, and annual limit for king salmon, 20 inches or greater in length, in the waters of the Nushagak-Mulchatna drainage were reduced from two per day, only one of which could be 28 inches or greater in length, with an annual limit of four, to one per day, with an annual limit of two. Through July 1, an estimated 46,945 king salmon had passed the Portage Creek sonar. Therefore, the department was able to project that the inriver run of king salmon would likely exceed 55,000 fish and the reduction of the annual limit in place for the sport fishery was no longer warranted. Because the projection remained below 75,000 fish, the bag and possession limit for king salmon, 20 inches or greater in length, remained at one per day. Through July 5, an estimated 61,854 king salmon had passed the Portage Creek sonar. The department was then able to project that the inriver return of king salmon would likely exceed 75,000 fish, and the reduction of the bag and possession limit in place for the sport fishery was no longer warranted. The preliminary total estimate of king salmon passing the sonar was 107,786 fish. No directed king salmon commercial fishing periods, allowing large-mesh gillnets, occurred in the Nushagak District. There were 11,501 king salmon landed during commercial sockeye salmon fishery openings. Harvest estimates for the sport and subsistence fisheries are not available, but anecdotal information suggests average to above average harvests occurred in both fisheries.

KULUKAK RIVER

Fishery Description

The Kulukak River (Figure 4) is a remote drainage within the Togiak National Wildlife Refuge (TNWR). Due to its remote location, sport fishing for king salmon on the Kulukak River is almost exclusively guided anglers. Freshwater logbook data for the Kulukak River indicate the estimated average annual king salmon harvest and catch of guided anglers was eight and 354 fish, respectively, from 2006 to 2011. The number of guided angler-days has decreased from a peak of 340 in 2007 to 204 in 2011.

Fishery Management and Objectives

Catch-and-harvest estimates of the sport, commercial, and subsistence catch are used to gauge run performance after the season. King salmon escapement is not estimated for the Kulukak River.

2012 Season

Sport catch and harvest will not be available until 2013; however, anglers reported that sport fishing for king salmon on the Kulukak River was average in 2012.

TOGIAK RIVER

Fishery Description

The Togiak River (Figure 4) is one of three major river systems within the TNWR The relatively small king salmon sport fishery on the Togiak River is concentrated along the lower 15 miles of the river and runs from late June through the month of July. The Togiak River supports the second largest king salmon run in Bristol Bay, but its remote location, refuge regulations on guides, and ongoing friction between user groups have limited development of the fishery. Based on the SWHS, the estimated king salmon sport harvest from 2000 to 2011 has ranged from a high of 1,501 in 2007 to a low of 76 in 2002, with an average of 956 fish from the Togiak River drainage (Table 6). The sport catch of king salmon from 2000 to 2011 has ranged from a high of 13,766 in 2006 to a low of 547 in 2002, with an average of 6,762. Angler effort for the Togiak River drainage has decreased from highs of over 6,000 angler days in 2004 through 2005 to a recent five-year average of 4,384 (Table 1).

Based on freshwater logbook data, the average estimated king salmon harvest for guided anglers has decreased annually from over 1,000 fish in 2006 and 2007 to 455 in 2011. Similarly, the estimated king salmon catch by guided anglers has decreased from over 6,000 fish in 2006 and 2007 to just over 2,000 fish in 2010 and 2011. This decrease in harvest and catch coincides with a decrease in guided angler-days from 2,211 in 2007 to 873 in 2010.

Fishery Management and Objectives

Escapement of king salmon into the Togiak River has been estimated by aerial survey from fixed-wing aircraft since 1980. Aerial counts are expanded to account for missed fish and therefore, represent total escapement estimates. In 2006 the escapement goal for Togiak king salmon became a sustainable escapement goal (SEG) of 9,300 fish.

Sport harvest and effort are estimated through the SWHS and reported by Mills (1979–1994), Howe et al. (1995, 1996, 2001 a-d), Walker et al. (2003), and Jennings et al. (2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b, *In prep*). Commercial and subsistence harvests are monitored by the Division of Commercial Fisheries and are reported in its annual management report series (Jones et al. 2012). The Division of Subsistence also reports on subsistence harvests of king salmon (Fall et al. 2012). Area personnel have conducted monitoring and stock assessment projects on this stock in the past (Dunaway 1990; Gryska and Naughton 2000).

From 1987 to 1992, estimated escapement was less than the escapement goal (Table 6). The goal has been achieved in all years since 1992 that a complete survey was conducted. Estimated escapements from 1998 through 2002, the most recent five years of consecutive complete surveys, averaged 14,050 fish. No surveys have been conducted for the last three years due to budget shortfalls. Reduced commercial fishing time during the last half of June is primarily responsible for the improved escapement levels.

First effective in the 1998 season, the board adopted several regulation changes that affected the Togiak king salmon sport fishery. The May 1 through July 31 king salmon sport fishery season was established by the board to protect spawning salmon. The same winter 1997 board meeting resulted in an annual limit of five king salmon for sport anglers throughout Bristol Bay waters. In addition, guides were no longer allowed to harvest fish while guiding. These measures were designed to moderate the brief fishing season throughout the Bristol Bay drainage and to spread the harvest among more anglers.

2012 Season

Sport catch and harvest will not be available until 2013; however, anglers reported that sport fishing for king salmon on the Togiak River was average in 2012. Commercial harvest of king salmon in the Togiak District was 4,613[5].

Table 6.–Escapement and commercial (Togiak Section only), subsistence, and sport harvests of king salmon from the Togiak River, 1969–2012.

	Harvest					Total
Year	Commercial[a]	Subsistence[b]	Sport[c]	Total	Escapement[d]	Run
1969	20,092	NA	NA	NA	NA	NA
1970	28,618	NA	NA	NA	NA	NA
1971	26,105	NA	NA	NA	NA	NA
1972	17,099	NA	NA	NA	NA	NA
1973	9,225	NA	NA	NA	NA	NA
1974	9,284	1,200	NA	NA	NA	NA
1975	7,206	800	NA	NA	NA	NA
1976	28,513	500	NA	NA	NA	NA
1977	33,827	400	62	34,289	NA	NA
1978	53,460	300	35	53,795	NA	NA
1979	28,677	200	78	28,955	NA	NA
1980	10,858	900	34	11,792	12,000	23,792
1981	22,744	400	0	23,144	27,000	50,144
1982	33,607	400	231	34,238	17,000	51,238
1983	35,669	700	535	36,904	22,000	58,904
1984	19,958	600	87	20,645	26,000	46,645
1985	33,110	600	224	33,934	14,000	47,934
1986	16,267	700	525	17,492	8,000	25,492
1987	14,555	700	137	15,392	11,000	26,392
1988	13,212	429	0	13,641	10,000	23,641
1989	9,049	551	234	9,834	10,540	20,374
1990	9,651	480	172	10,303	9,107	19,410
1991	6,019	470	284	6,773	12,667	19,440
1992	11,806	1,361	271	13,438	10,413	23,851
1993	10,054	784	225	11,063	16,035	27,098
1994	9,350	904	663	10,917	19,353	30,270
1995	10,768	448	581	11,797	16,438	28,235
1996	8,113	471	790	9,374	11,476	20,850
1997	5,357	667	1,165	7,189	11,495	18,684
1998	12,867	782	763	14,412	11,666	26,078
1999	11,919	1,244	644	13,807	12,263	26,070
2000	7,858	1,116	470	9,444	16,897	26,341
2001	9,937	1,612	1,006	12,555	15,158	27,713
2002	2,801	703	76	3,580	14,265	17,845
2003	3,138	1,208	706	5,052	5668[e]	NA
2004	9,310	1,094	1,388	11,792	15,990	27,782
2005	10,461	1,528	1,734	13,723	13,521	27,244
2006	16,225	1,630	1,064	18,919	1670[e]	NA
2007	7,755	1,234	1,501	10,489	NA	NA
2008	3,094	1,337	892	5,323	2140[e]	NA
2009	4,397	827	606	5,830	NA	NA
2010	5,082	1,162	591	6,835	NA	NA
2011	3,094	966	1,438	5,871	2140[e]	NA

-continued-

Table 6.–Part 2 of 2.

Year	Harvest				Escapement[d]	Total Run
	Commercial[a]	Subsistence[b]	Sport[c]	Total		
1969–2011						
Average	15,121	811	549	16,481	14,571	31,052
Percent	92%	5%	3%			
2007–2011						
Average	4,684	1,109	1,006	6,799	NA	NA
Percent	69%	16%	15%			
2012	4,613	NA	NA	NA	NA	NA
Percent	NA	NA	NA			

NA = data not available

Source: Estimates from Alaska SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, Alaska Department of Fish and Game, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

[a] Togiak Section only commercial harvest. Source: Alaska Department of Fish and Game, CMFMDD Fish Ticket Database, Jobs 23080 and 23078 requested by Saree Timmons, October 19 2000. Does not include salmon kept for personal use. Data for 2000 to 2005 from Jones et al. (2012).

[b] Togiak District subsistence harvest. Sources: Salmone et al 2011; Jones et al 2012.

[c] Sport harvest from Togiak River System (Mills 1979–1994, Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b, *In prep*).

[d] Togiak River drainage total, estimated by aerial survey and expanded for missed fish. Sustainable escapement goal is 9,300 fish (Jones et al. 20012.

[e] The aerial survey conducted was incomplete; three sections of the mainstem and two tributaries were not surveyed.

COHO SALMON FISHERIES

AREAWIDE FISHERY DESCRIPTION

Coho salmon are a very popular component of the Bristol Bay sport fishery. Coho salmon fisheries occur from late July through September, with some isolated runs of fish available into October. While many BBMA anglers pursue coho salmon with the assistance of a guide, this readily-caught species is quite popular with unguided anglers. Given run timing, this species often serves as a popular activity for hunters and rainbow trout anglers visiting the area. Significant fisheries occur in the Alagnak, Egegik, Mulchatna, Naknek, Nushagak, Togiak, and Ugashik rivers, as well as a host of smaller, lesser known waters (Figure 5).

AREAWIDE HARVEST

The Bristol Bay commercial fishery generally takes the majority of the area's annual coho salmon harvest. Before 1992, the annual commercial harvest usually ranged from 100,000 to over 600,000 coho salmon (Weiland et al. 2001). Since 2001, poor markets and increasingly erratic and poor runs have reduced the commercial take to levels ranging from 8,410 (2002)

to117,000 (2008), with an average of 63,000 fish annually (Jones et al. 2012). Subsistence harvests from 2001 through 2010 averaged over 6,800 coho salmon annually, ranging from a low of about 4,600 fish up to 8,400 fish (Jones et al. 2012). From 2001 through 2010, the annual estimated sport harvest averaged 14,220 coho salmon and reached a peak of 17,900 fish in 2004 (Table 7). The recent five-year average (2006–2010) harvest was over 14,700 fish. In 2011, anglers harvested 13,535 fish (Table 7).

Annual estimates of harvest (Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b) indicate that despite the five fish bag limit (in most waters), coho salmon are harvested in approximately the same total numbers as king salmon, which have more restrictive bag limits (tables 3 and 7). Except for the Kvichak River drainage, where the limit is two coho salmon per day and the Alagnak River drainage, where the limit is three per day, the limits for coho salmon are five salmon per day, no size limit. The five per day limit has been in effect since 1972. The lower limits for the Kvichak and Alagnak drainages were adopted during the 1997 board meetings (first effective in the 1998 season) to protect small runs in the Kvichak River system and to address modest runs and large angling effort on the Alagnak River. The lack of escapement data that can help to establish biological escapement goals and harvest strategies for all user groups continues to be a major concern.

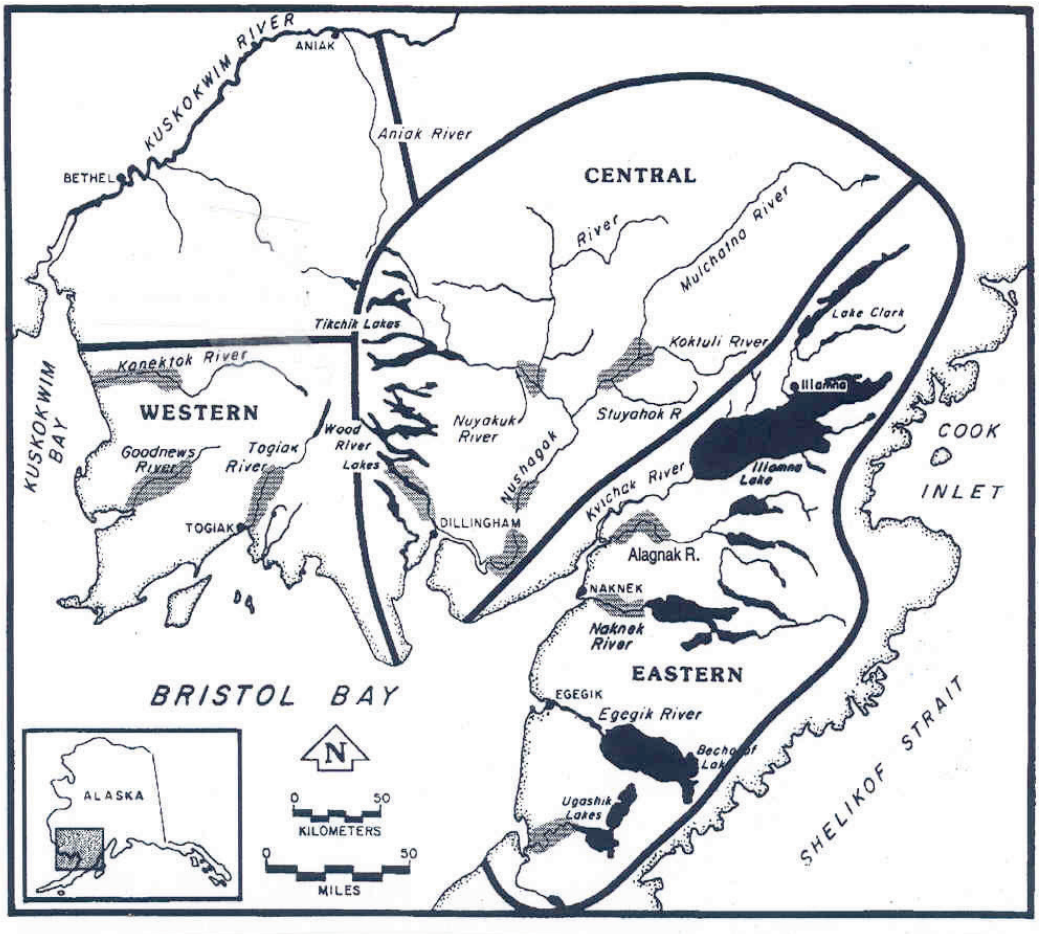

Figure 5.-Popular coho salmon sport fisheries in Bristol Bay.

Table 7.–Sport harvest of coho salmon from the waters of Bristol Bay by fishery, 1977–2011.

Drainage	Avg 77–96	1990	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg 06–10	2011
Eastern																		
Naknek R.	1,930	2,179	3,879	2,547	3,672	3,549	4,732	4,756	6,327	7,333	2,714	4,015	4,218	5,830	4,325	4,970	4,672	2,879
Brooks R.	44	200	156	305	22	41	11	152	0	275	0	49	53	118	72	57	70	0
Kvichak R.	215	444	535	97	146	262	567	568	368	594	1,186	700	588	1,070	839	1,031	846	1,212
Copper R.	0	0	22	61	177	0	286	36	81	0	0	0	138	48	105	16	61	36
Alagnak R.	518	194	763	100	305	480	252	530	531	1,550	756	1,466	493	1,022	785	764	906	819
Newhalen R.	247	467	406	77	178	74	244	0	46	366	0	0	58	54	0	32	29	0
Lake Clark	17	0	110	17	0	0	46	259	0	65	0	0	0	77	0	0	15	9
Other	838	2,017	1,973	977	2,005	1,421	1,435	2,643	1,597	994	2,763	2,115	1,470	1,438	1,224	1,726	1,595	2,494
Subtotal[a]	3,809	5,501	7,844	4,181	6,505	5,827	7,573	8,944	8,950	11,177	7,419	8,345	7,018	9,657	7,350	8,596	8,193	7,449
Central																		
Nushagak	539	331	237	1,033	361	1,762	2,113	1,416	917	2,814	1,835	1,810	2,399	6,390	3,371	2,261	3,246	2,997
Mulchatna	212	95	111	67	0	143	152	115	138	181	244	546	460	29	31	111	235	127
Agulowak			89	0	85	11	57	0	265	0	0	129	210	110	181	42	134	100
Agulukpak			11	0	24	63	172	0	12	52	0	61	38	0	0	0	20	0
Wood River L.[b]	377	131	476	242	264	1,114	391	215	1,305	799	857	628	752	182	636	378	515	1,038
Tikchik/Nuyakuk	105	12	78	85	73	293	126	0	0	418	0	36	48	77	76	448	137	46
Other	155	622	152	222	233	299	68	290	310	215	133	395	244	287	174	309	282	199
Subtotal[a]	637	1,191	1,154	1,649	1,040	3,685	3,079	2,036	2,947	4,479	3,069	3,605	4,151	7,075	4,469	3,549	4,570	4,507
Western																		
Togiak	551	367	780	1,020	1,109	840	904	1,475	2,074	2,321	1,959	2,214	1,970	3,420	1,556	772	1,986	1,232
Other	32	60	0	0	49	42	34	0	12	0	0	0	0	0	0	0	0	347
Subtotal[a]	583	427	780	1,020	1,158	882	938	1,475	2,086	2,321	1,959	2,214	1,970	3,420	1,556	772	1,986	1,579
Total	5,029	7,119	9,778	6,850	8,703	10,394	11,590	12,455	13,983	17,977	12,447	14,164	13,139	20,152	13,375	12,917	14,749	13,535

Source: Estimates from Alaska SWHS reports (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, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, Alaska Department of Fish and Game, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Until 1997, Agulowak and Agulukpak rivers were included in Wood River Lakes.

UGASHIK RIVER DRAINAGE

Fishery Description

The Ugashik River drainage (Figure 5) is located on the Alaska Peninsula about 128 km south of the community of King Salmon. Much of the drainage is within the boundaries of Alaska Peninsula National Wildlife Refuge. The local population center of Pilot Point, at the outlet of the Ugashik River has a long history of a commercial fishing and subsistence-based economy. The drainage has been well-known for producing some of the biggest Arctic grayling in Alaska, as well as providing good angling for sockeye and coho salmon, and Dolly Varden or Arctic Char. The Ugashik Lakes area is accessible only by float plane or by boat from the village of Ugashik and Pilot Point, 40 km downstream from the Lower Ugashik Lake outlet. Most angler effort is nonresident guided anglers who access the river by flying out from nearby area lodges for day-fishing trips.

Coho salmon angling in the drainage is popular from mid August through early September, and combines well with anglers seeking a mixed bag of Dolly Varden or Arctic char, and grayling. Available information suggests peak coho salmon run timing to Ugashik drainage occurs in late August. The most popular fishing sites are the "Narrows," a short stream connecting Upper and Lower Ugashik Lakes, the outlet of Lower Ugashik Lake, and the outlets of larger streams where they flow into the big lakes.

The Ugashik River drainage has historically been a popular destination for coho salmon anglers from lodges in Bristol Bay; however recent angling effort in the drainage has decreased from over 2,000 angler-days during 2000 through 2002 to a recent five-year average of 1,219. The sport harvest of coho salmon decreased from a high of 921 in 2005 to a low of 72 fish in 2011 (Table 8). Similarly, the sport catch of coho salmon has shown a declining trend since 2005, from over 4,000 coho salmon to less than 1,000 in 2011. Some users are concerned that the decreasing trend of coho salmon harvest and catch may be due to lower than desired coho salmon escapements.

Based on freshwater logbook data, the average estimated coho salmon catch and harvest by guided anglers from 2006 to 2011 was 317 and 84 fish, respectively, from the Ugashik drainage, which includes the Ugashik, King Salmon, and Dog Salmon rivers.

Fishery Management and Objectives

Escapement of coho salmon in the Ugashik drainage has been estimated with aerial surveys since 1981. Estimated escapement has ranged from 400 in 1991 to 20,100 in 2006; however, on many years a complete survey of the drainage was not conducted due to poor weather and survey conditions (Table 8). As a result, survey results are minimum estimates of escapement and do not provide a reliable index to assess Ugashik drainage coho salmon escapement.

2012 Season

Sport catch and harvest will not be available until 2013. Reports from anglers during the 2012 season indicated a below average coho salmon run. No aerial surveys were conducted to assess coho salmon escapement during 2012.

Table 8.–Angler effort, coho salmon harvests, and escapement for the Ugashik River,1983–2012.

Year	Effort[a]	Harvest				Escapement[d]
		Sport[b]	Commercial[c]	Subsistence[c]	Total	
1983	769	157	7,816	100	8,073	NA
1984	1,609	611	68,451	200	69,262	6,100
1985	954	0	60,815	143	60,958	18,880
1986	627	31	25,770	335	26,136	8,455
1987	1,682	215	14,785	272	15,272	17,000
1988	528	186	52,355	330	52,871	28,280
1989	998	234	33,942	214	34,390	11,515
1990	1,383	840	32,906	280	34,026	12,610
1991	1,627	97	42,622	614	43,333	400
1992	2,001	445	35,794	397	36,636	790
1993	1,918	92	2,387	495	2,974	705
1994	2,315	739	19,250	579	20,568	760
1995	905	346	13,800	290	14,436	NA
1996	2,195	491	13,163	298	13,952	8,275
1997	2,513	631	7,156	311	8,098	9,400
1998	1,442	223	13,007	485	13,715	1,459
1999	2,008	830	2,289	271	3,390	10,210
2000	2,403	513	1,269	467	2,249	12,070
2001	2,961	690	976	357	2,023	4,540
2002	2,118	856	464	460	1,780	3,805
2003	1,317	529	994	392	1,915	19,670
2004	1,017	408	4,744	234	5,386	5,440
2005	882	921	8,162	249	9,332	9,850
2006	443	393	3,087	339	3,819	20,100
2007	1,393	336	1,954	281	2,571	3,500
2008	598	74	2,220	222	2,516	6,240
2009	868	233	2,602	131	2,966	NA
2010	1,390	251	467	135	853	NA
2011	1,844	72	452	136	660	4,900
1983–2011 Average	1,473	395	16,334	311	17,040	8,998
Percent[e]		2%	96%	2%		
2007–2011 Average	1,219	193	1,539	181	1,913	4,880
Percent[e]		10%	80%	10%		
2012	NA	NA		NA	NA	NA

Source: Estimates from Alaska SWHS reports (Mills 1979–1980, 1981a-b, 19821994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, ADF&G, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

[a] From department annual statewide harvest surveys.

[b] From department annual statewide harvest surveys.

[c] Commercial and subsistence harvests from ADF&G - Division of Commercial Fisheries annual management reports.

[d] Escapement estimates from ADF&G Division of Commercial Fisheries Salmon spawning ground surveys in the Bristol Bay, Alaska. Counts may be variable due to timing, conditions, etc.

[e] Percent of the sum of the averages.

RAINBOW TROUT FISHERIES AREAWIDE FISHERY DESCRIPTION

Wild rainbow trout stocks are a cornerstone of the multimillion-dollar recreational fishing industry of the BBMA. Sport fishing opportunity for both guided and unguided anglers occurs primarily during the ice-free season, generally from June through October, although fisheries in early and late winter are gaining some popularity. Found throughout the area, the most popular rainbow trout waters include tributaries of the Kvichak River drainage, the Naknek River drainage, portions of the Nushagak/Mulchatna River drainages, and streams of the Wood River Lakes system (Figure 6).

The rainbow trout fisheries within the BBMA underwent rapid growth from the late 1970s to mid-1980s, with annual harvests peaking in 1983. From 2003 through 2007, annual harvests averaged 1,787 fish (Table 9). The species' importance to the recreational fisheries is not adequately described by estimates of harvest. Results of the SWHS, as well as field studies, show clearly that during the last 10 to 15 years, the retention rate, or number of fish kept from total catch, has declined steadily, while the total effort and catch has remained stable or increased (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, 2010 a-b, 2011 a-b, *In prep*; Minard 1989, 1990; Brookover 1989; Dunaway 1993). Estimates of catch (number of fish kept plus fish released) were first available from the SWHS in 1991, and have ranged from about 79,000 to 227,000 fish annually (Table 10). From 2006 through 2010, the annual catch averaged 196,825 rainbow trout. It is evident the angling public has embraced the concept of catch-and-release for rainbow trout and has voluntarily reduced their harvests throughout the area.

Prior to 1993, rainbow trout were explicitly excluded from harvest under the subsistence priority. The status of rainbow trout as a subsistence species was changed in 1993 when the board allowed rainbow trout caught incidentally to other species to be retained by subsistence users. In 1994, the board recognized subsistence uses finfish other than salmon, including rainbow trout, in the Bristol Bay Area (5 AAC 01.336). The board has found that 250,000 usable pounds of fish other than salmon are reasonably necessary for subsistence uses in the Bristol Bay Area (5 AAC 01.336). The subsistence taking of rainbow trout from nonnavigable waters located within federal land holdings (National Wildlife Refuges and National Parks) has been allowed since December 1991. In 2002, the Federal Subsistence Board adopted regulations allowing rod-and-reel subsistence harvest of rainbow trout in federally-managed subsistence fisheries in the Bristol Bay area.

SOUTHWEST ALASKA RAINBOW TROUT MANAGEMENT PLAN

In February 1990, the board adopted regulations implementing a comprehensive management plan for rainbow trout in the area previously known as the Southwest Alaska Management Area. This area included the BBMA; the waters flowing into Kuskokwim Bay from Cape Newenham to the outlet of the Kuskokwim River; and the Kuskokwim River and tributaries from the Aniak River to Kuskokwim Bay (ADF&G 1990). Still in force, this plan is not a regulation, but is used as a policy guiding the board and the public. It provides a clear understanding of the underlying principles by which rainbow trout stocks are to be managed and provides guidance for the board in developing future regulations. In 1998, the board adopted *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013). This regulation embodies most of the criteria that originated, and is still used, in the *Southwest Alaska Rainbow Trout Management Plan*.

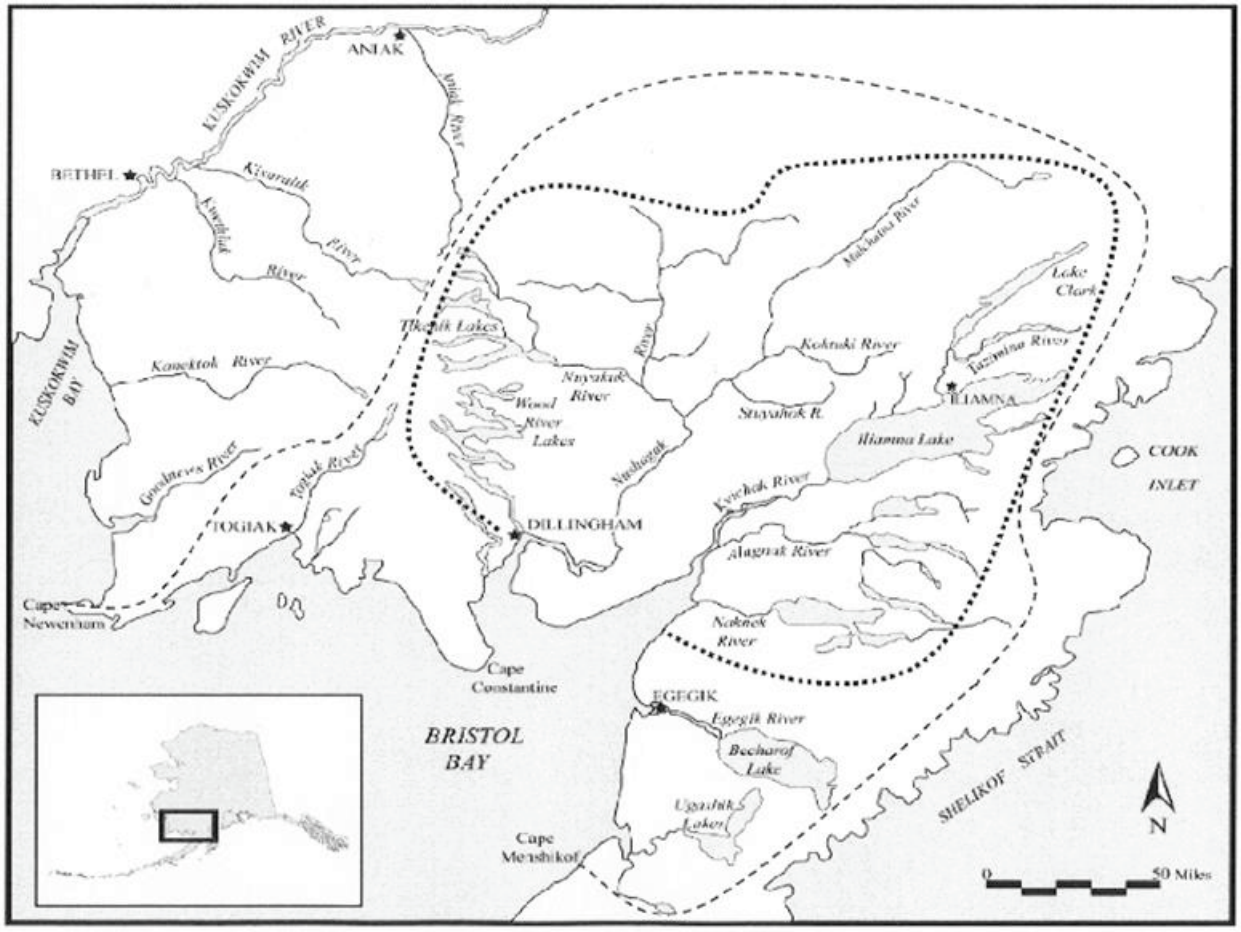

Figure 6.-Popular rainbow trout sport fisheries in the Bristol Bay Sport Fish Management Area.

Table 9.-Sport harvest of rainbow trout by section and drainage, Bristol Bay Sport Fish Management Area, 1977–2011.

Drainage	Avg 77–96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg 06–10	2011
Eastern																	
Naknek R.	1,189	246	388	343	450	160	760	171	272	175	196	307	175	60	226	193	589
Brooks R.	95	0	0	0	24	0	0	0	0	358	22	152	0	0	0	35	0
Kvichak R.	274	27	25	135	506	155	176	497	193	221	0	457	136	38	60	138	20
Copper R.	85	0	0	49	56	0	0	0	14	0	0	0	0	0	0	0	0
Alagnak R.	254	254	35	57	33	166	71	11	163	413	47	20	66	0	0	27	20
Newhalen R.	226	254	377	724	101	371	48	54	89	77	72	10	272	0	87	88	0
Lake Clark	16	119	0	12	11	0	8	21	27	0	0	0	0	0	0	0	0
Other	1,681	705	514	508	277	86	32	11	212	31	191	677	430	187	57	308	971
Subtotal[a]	3,820	1,605	1,339	1,828	1,458	938	1,095	765	970	1,275	528	1,623	1,079	285	430	789	1,600
Central																	
Nushagak	237	84	257	251	87	229	72	220	164	74	39	243	32	105	99	104	98
Mulchatna	409	684	163	278	35	92	122	85	37	36	298	262	25	23	186	159	96
Agulowak		15	43	23	0	0	0	21	397	22	72	76	77	9	0	47	67
Agulukpak		0	0	0	0	0	13	33	0	21	0	0	0	0	0	0	0
Wood River L.[b]	437	329	71	131	152	78	68	279	156	55	104	169	31	17	34	71	33
Tikchik/Nuyakuk	89	44	0	0	31	0	17	0	0	0	0	0	0	10	0	2	0
Other	575	302	80	270	190	46	21	42	117	132	67	0	0	0	17	17	20
Subtotal[a]	1,746	1,458	614	953	495	445	313	680	871	340	580	750	165	164	336	399	314
Western																	
Togiak drainage	96	15	8	11	24	0	8	10	102	287	0	152	11	13	0	35	47
Other	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal[a]	108	15	8	11	24	0	8	10	102	287	0	152	11	13	0	35	47
Total	5,674	3,078	1,961	2,792	1,977	1,383	1,416	1,455	1,943	1,902	1,108	2,525	1,255	462	766	1,223	1,961

Source: Estimates from Alaska SWHS reports (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, 2011 a-b, *In prep*). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Until 1997, Agulowak and Agulukpak rivers were included in Wood River Lakes.

Table 10.-Estimated sport catch of rainbow trout, by fishery, in the Bristol Bay Sport Fish Management Area, 1991–2011.

Drainage	Avg 77–96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg 06–10	2011
Eastern																	
Naknek R.	14,435	13,737	12,795	17,946	30,738	16,198	30,635	26,183	20,497	16,431	15,555	25,692	19,886	23,410	20,759	21,060	21,869
Brooks R.	10,108	16,166	6,157	5,718	11,635	12,414	19,124	9,707	9,728	8,804	13,399	14,284	15,891	14,648	13,127	14,270	16,144
Kvichak R.	10,011	15,705	5,584	7,753	13,342	19,411	20,284	27,494	25,564	13,435	31,293	30,912	24,545	23,644	18,739	25,827	13,753
Copper R.	13,190	29,158	15,164	20,745	10,569	7,508	34,251	22,504	15,164	8,273	13,571	14,548	14,644	18,751	25,418	17,386	18,247
Alagnak R.	22,103	29,881	9,711	10,781	10,586	28,415	26,148	58,896	19,371	37,195	40,008	39,564	22,194	19,153	34,597	31,103	15,576
Newhalen R.	3,144	1,403	3,803	7,178	3,848	1,271	2,174	1,414	2,720	2,600	2,654	1,615	1,696	357	1,209	1,506	0
Lake Clark	478	1,104	432	344	33	732	496	151	2,043	415	47	2,309	13	1,233	151	751	20
Other	40,866	56,114	33,980	51,337	46,128	7,854	46,882	5,247	48,673	36,884	63,275	59,502	72,946	65,139	14,822	55,137	46544
Subtotal[a]	114,334	163,268	87,626	121,802	126,879	93,803	179,994	151,596	143,760	124,037	179,802	188,426	171,815	84,109	62,926	137,416	132,153
Central																	
Nushagak	9,167	12,304	10,649	15,575	8,599	11,177	12,810	13,268	11,956	6,638	5,609	6,616	5,478	11,785	2,926	6,483	3,937
Mulchatna	4,716	4,866	3,576	3,693	4,534	3,206	2,239	4,785	5,201	2,001	4,046	4,429	2,365	1,954	901	2,739	795
Agulowak		8,140	6,906	3,941	4,762	4,228	7,024	4,270	5,230	6,885	7,465	10,760	8,026	5,281	2,517	6,810	2,567
Agulukpak		11,382	3,413	6,122	6,526	4,156	4,982	3,803	8,335	4,966	6,130	5,965	4,767	5,374	3,413	5,130	5,744
Wood River L.[b]	8,656	5,366	3,856	2,504	6,081	4,019	3,952	3,978	4,575	7,270	6,773	5,784	4,058	2,221	3,293	4,426	5,403
Tikchik/Nuyakuk	1,837	3,531	1,708	1,104	3,483	1,380	1,544	2,584	5,167	1,038	588	1,426	1,016	695	720	889	1,083
Other	3,073	7,347	3,663	5,597	3,178	1,546	1,172	528	5,018	2,538	3,331	1,329	1,014	460	277	1,282	841
Subtotal[a]	27,448	52,936	33,771	38,536	37,163	29,712	33,723	33,216	45,482	31,336	33,942	36,309	26,724	27,770	14,047	27,758	20,370
Western																	
Togiak drainage	1,401	1,810	1,773	1,691	1,924	1,907	1,694	2,041	5,716	3,475	2,261	2,282	3,977	3,638	2,256	2,883	3,242
Other	129	0	31	207	62	37	0	0	445	0	0	0	121	0	0	24	0
Subtotal[a]	1,529	1,810	1,804	1,898	1,986	1,944	1,694	2,041	6,161	3,475	2,261	2,282	4,098	3,638	2,256	2,907	3,242
Total	143,311	218,014	123,201	162,236	166,028	125,459	215,411	186,853	195,403	158,848	216,005	227,017	202,637	115,517	79,229	196,825	155,765

Source: 1991–2012 estimates from Alaska SWHS reports (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, 2011a-b, *In prep*). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

Note: "Catch" = fish harvested plus fish released; "harvest" = fish kept.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Until 1997, Agulowak and Agulukpak rivers were included in Wood River Lakes.

Intent of the Plan

The intent of the *Southwest Alaska Rainbow Trout Management Plan* is to promote conservative wild stock management. Conservative wild stock management does not necessarily preclude limited harvest of rainbow trout for food or trophies, but does not adhere to maximum yield principles which emphasize harvest. Additionally, in a plan that emphasizes wild trout management, mitigating losses of wild stocks through enhancement or stocking is not considered a desirable management alternative.

Conservative wild stock management is guided by both biological considerations and social concerns. Growth in the region's rainbow trout sport fisheries is inevitable, but by managing the area's wild rainbow trout stocks conservatively, the potential for serious long-term resource problems is minimized. The *Southwest Alaska Rainbow Trout Management Plan* contains three policies intended to protect the biological integrity of the region's wild trout stocks and maximize their recreational benefits and economic potential. The policies guide development of sport fishing regulations and provide the department, management biologists, board members, and the public with clear direction as to how rainbow trout fisheries in the BBMA should be managed. The three policies are as follows:

1) ***Policy I***: Native rainbow trout populations will be managed to maintain historic size and age compositions, and at stock levels sufficient such that stocking is not needed to enhance or supplement the wild population.

2) ***Policy II***: A diversity of sport fishing opportunities for wild rainbow trout should be provided through establishment of special management areas by regulation. Selection of areas for special management will be based on criteria to be adopted by the board.

3) ***Policy III***: Management strategies should be consistent with prudent economic development of the state's recreational sport fishing industry, while at the same time, acknowledge the intrinsic value of this fishery resource to the people of Alaska.

Plan Implementation

Regulations based on the *Southwest Alaska Rainbow Trout Management Plan* were adopted by the board in February 1990. These regulations were designed to implement the three management policies contained in the rainbow trout management plan:

1) Expand the Wild Trout Zone from the Iliamna drainage to include the drainages of Bristol Bay and Kuskokwim Bay, and the Kuskokwim River from Aniak River downstream

2) Establish eight catch-and-release areas in the Bristol Bay Management Area and three catch-and-release areas in the Lower Kuskokwim Management Area (Figure 7).

3) Establish six artificial fly-only/catch-and-release-only areas (Figure 8).

4) Establish 11 unbaited single-hook artificial lure only areas to protect rainbow trout stocks (Figure 9).

Adoption of regulations implementing the management policies contained in this plan was not expected to be a one-time effort. Rather, policy implementation was understood to be a long-term process, with the policies being used as the framework for development of a very important and unique resource. This has been the case and special management regulations have since

been adopted using this process for the Kvichak River in Bristol Bay, and the Kanektok, Kwethluk, Kasigluk, and Kisaralik rivers in the Kuskokwim area during the board meetings held in the fall and winter of 1997. This plan has also proved to be a useful guide for rainbow trout management in other parts of the state.

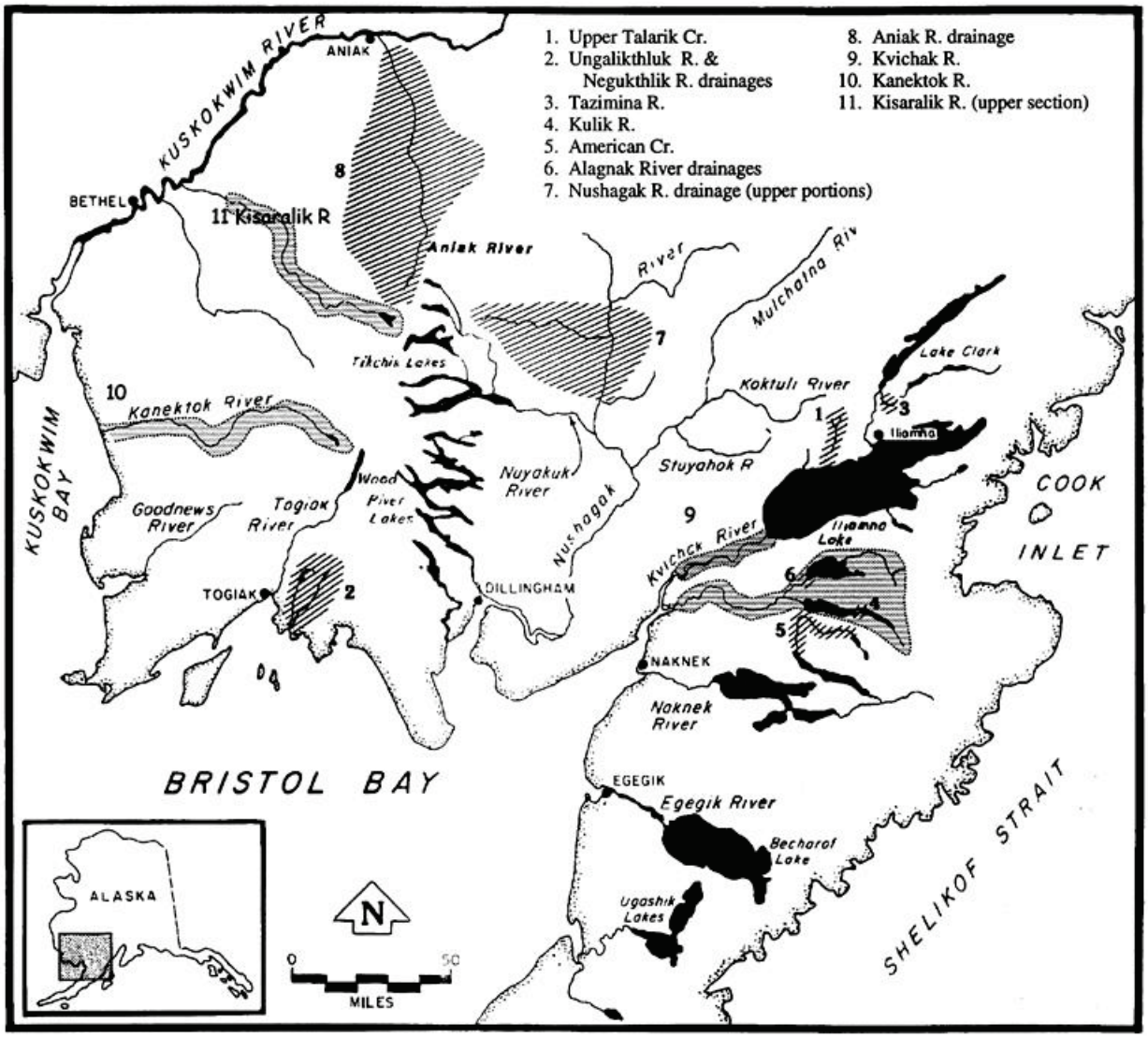

Figure 7.-Catch-and-release special management areas for rainbow trout in the Bristol Bay Sport Fish Management Area.

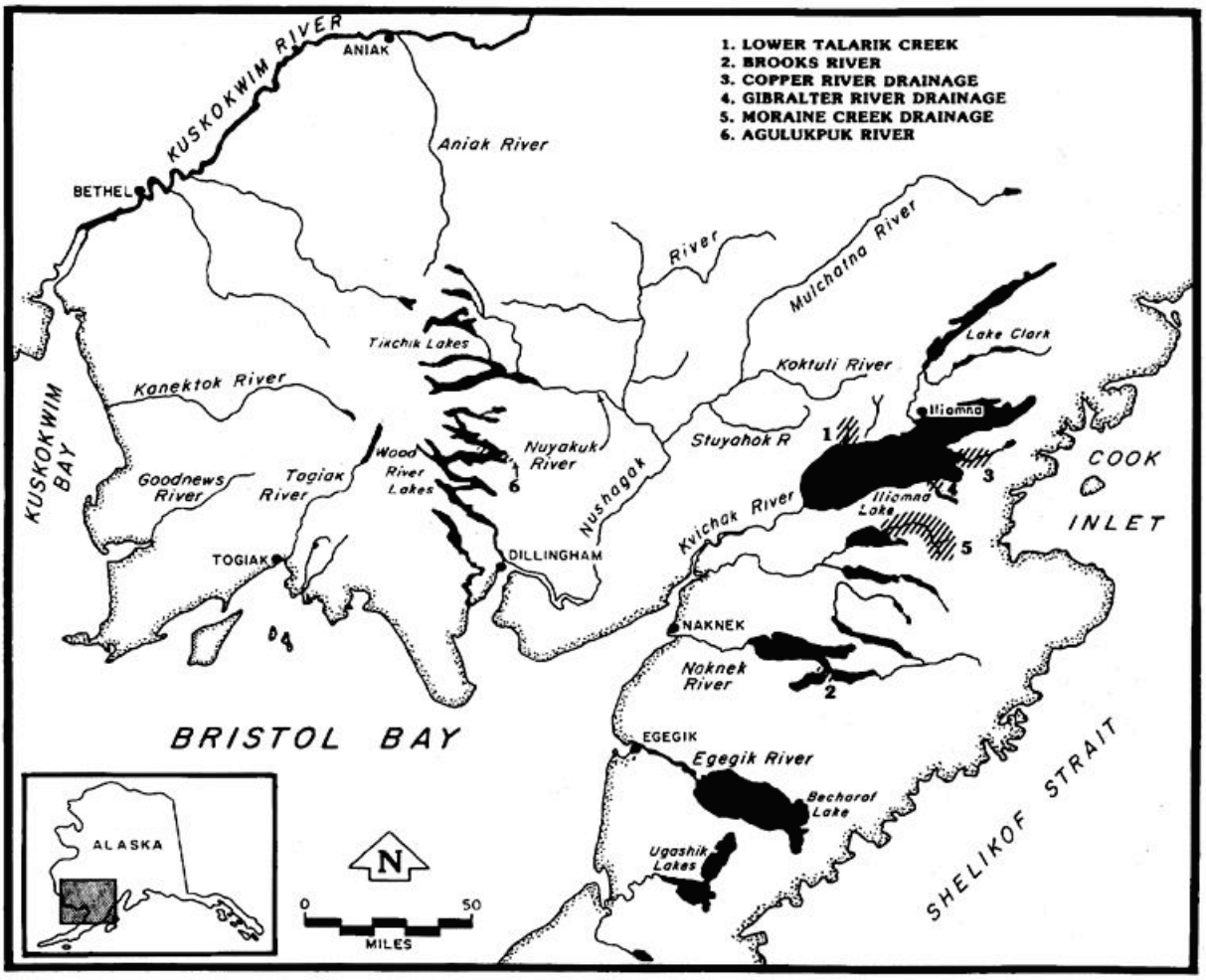

Figure 8.-Fly-only/catch-and-release special management areas for rainbow trout in the Bristol Bay Sport Fish Management Area.

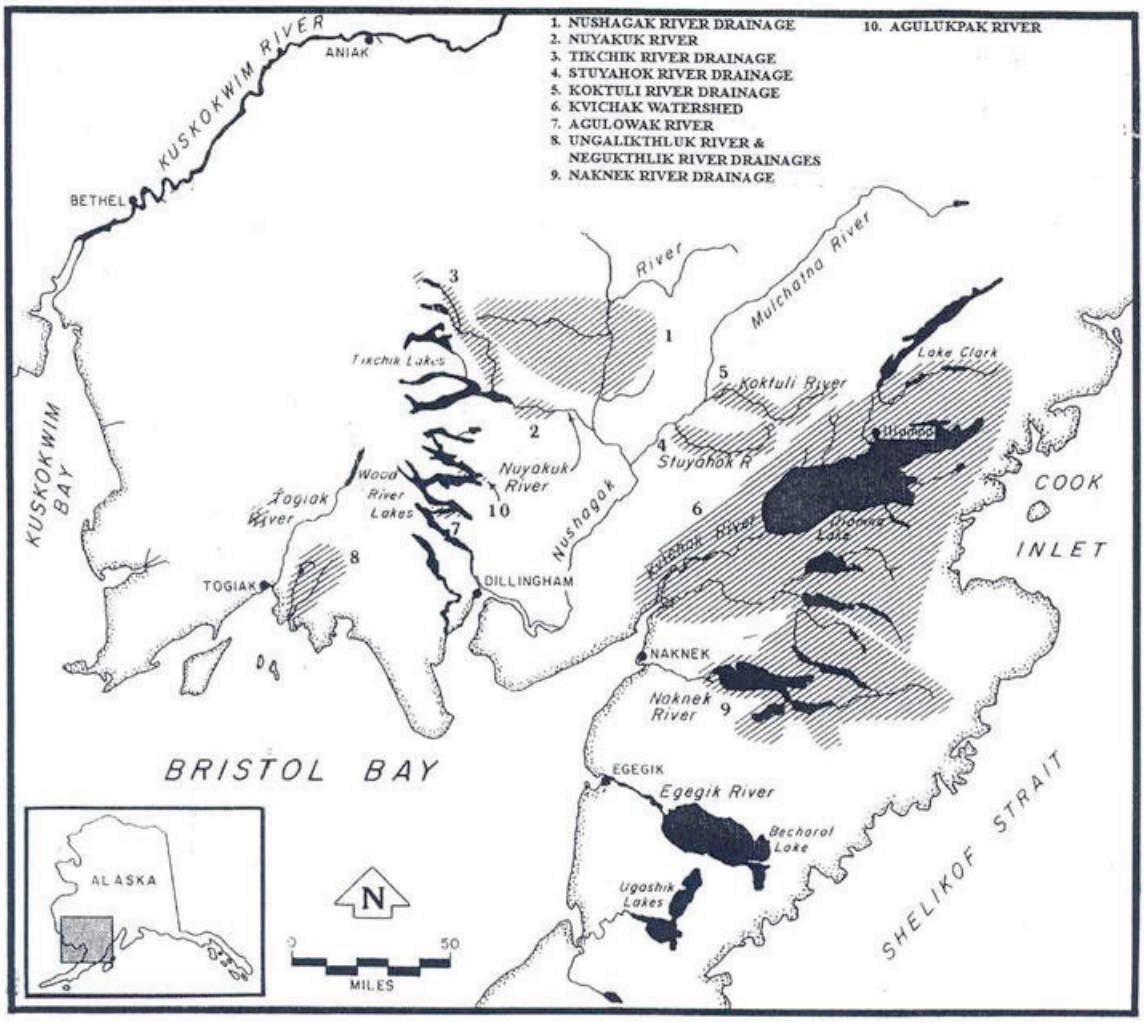

Figure 9.-Unbaited single-hook artificial lure special management areas for rainbow trout in the Bristol Bay Sport Fish Management Area.

UPPER NUSHAGAK RIVER

Fishery Description

The upper Nushagak River consists of the stretch of river upstream of the confluence with the Nuyakuk River. The upper Nushagak River provides an attractive alternative to more crowded rainbow trout fisheries in the area. The rainbow trout are not as large as those in other rivers of the area, but are abundant. There are approximately six camps situated in this section of river that are operated by sport guide services. In addition, this section of the river is popular for float trips.

Sport fishing effort in the Nushagak River, upstream of the Mulchatna River, has been steadily declining since 2000, reaching a low of 955 angler-days in 2011. Since 2000, annual rainbow trout harvest in the Nushagak River, upstream of the Mulchatna River, has been highly variable and ranged from a low of 0 (2002, 2003, 2005, and 2009) to a high of 109 (2004) and has averaged 36.

Fishery Management and Objectives

The upper Nushagak rainbow trout fishery is managed to maintain historical age and size composition of rainbow trout.

The upper Nushagak River, between Harris Creek and the Chichitnok River, including the King Salmon River, has been designated as a special management area, restricted to unbaited single-hook tackle and catch-and-release for rainbow trout since 1990. Sport effort, catch, and harvest are estimated via the SWHS. Subsistence harvests are not well monitored and the best information is obtained from a household survey of freshwater fish harvest conducted by the Division of Subsistence. Recent five-year angler effort has averaged 1,372 angler-days.

Size composition data for rainbow trout between Harris Creek and the Chichitnok River was collected by the Division of Sport Fish in 1999 and 2006. The average size of fish was approximately 16 inches and no fish larger than 23 inches were sampled.

NAKNEK RIVER

Fishery Description

The Naknek River supports the largest average sport harvest of rainbow trout in the BBMA (Table 11). The first significant recreational use of Naknek River stocks occurred in the mid-1950s when two recreational camps were constructed by the military for use by military personnel. The camps, one located at the outlet of Naknek Lake (Lake Camp) and one at the lower reach of the rapids (Rapids Camp) provided bases for significant sport fishing opportunity until 1974. During that time period, civilians discovered the bountiful resources and effort continued to grow. By the mid 1980s, there were numerous guiding services working the river regularly, with others less frequently. Boat rental and lodging services, available in King Salmon, provided the necessary support needed by the unguided angler.

The majority of the rainbow trout sport fishery takes place in the upper reach of the river, from Rapids Camp upstream to the outlet of Naknek Lake, and has three periods of activity: March to April 10, June 8 to June 30, and August 15 to freeze-up in October. While rainbow trout may be found during July and early August, the huge influx of salmon during this time tends to depress rainbow trout angling. A few determined anglers seek rainbow trout whenever there is open water, and fishing through the ice is a popular activity for some anglers and some subsistence users.

Guided sport fishing effort on the Naknek River has been relatively stable since 2006, ranging from a low of 3,160 angler-days in 2010 to a high of 4,273 angler-days in 2008, and averaging 3,918. Total sport fishing effort in the Naknek River has significantly declined since a peak of 22,529 angler-days in 2000 and has remained relatively stable since 2003, averaging 15,019 angler-days. Rainbow trout catch in the Naknek River has declined from a peak of nearly 31,000 fish in 2000, but has been increasing since 2006 and has been stable relative to effort.

Fishery Management and Objectives

Naknek River rainbow trout stocks are managed to maintain the historical size composition reported in the early 1980s. Research projects on rainbow trout populations throughout the BBMA, as well as angler reports, strongly suggest the rainbow trout population is currently at historical size composition.

There is a long history of special regulations for Naknek River rainbow trout stocks, dating back to statehood. Seasons, limits, and gear restrictions were initially liberal. However, as effort increased, reports of declining catch rates and smaller size of the catchable population increased. Department studies conducted in the late 1980s verified the suspected decline. Available data, supported by public opinion, indicate the stocks have recovered. Current regulations still reflect the remedial actions adopted in 1990 and allow for harvest of one rainbow trout per day, less than 18 inches in length during summer and fall, and a winter season harvest of five per day, less than 18 inches in length. The spawning season closure is in effect from April 10 to June 7, and only single-hook artificial lures may be used in the area above Rapids Camp. In 1997, the board restricted hook gap size to one-half inch or less from March 1 through April 9 and June 8 through July 31 to protect rainbow trout.

Table 11.–Naknek River sport fishing effort and rainbow trout harvest and catch, 1997–2011.

Year	Total effort (Angler-days)	Rainbow Trout Harvest	Rainbow Trout Catch
1997	13,673	246	13,737
1998	13,988	388	12,795
1999	21,189	343	17,946
2000	22,529	450	30,738
2001	12,401	160	16,198
2002	21,020	760	30,635
2003	13,398	171	26,183
2004	16,956	272	20,497
2005	12,699	175	16,431
2006	14,928	196	15,555
2007	17,744	307	25,692
2008	14,444	175	19,886
2009	16,850	60	23,410
2010	16,828	226	20,759
Average 2006–2010	16,159	193	21,060
2011	14,465	589	21,869

Source: Estimates from Alaska SWHS reports (Mills 1979–1980, 1981a-b, 19821994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010 a-b, 2011 a-b, *In prep*) and the SWHS database (*unpublished* 2008 data, Gretchen Jennings, SWHS project manager, ADF&G, Division of Sport Fish, Anchorage). 1996–1998 estimates were revised in 2001, so they may not match previously published estimates.

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APPENDIX A: VARIOUS MANAGEMENT PLANS ADOPTED OR IMPLEMENTED BY THE ALASKA BOARD OF FISHERIES THAT GUIDE MANAGEMENT OF BRISTOL BAY SPORT FISHERIES

Appendix A1.–Various management plans adopted or implemented by the Alaska Board of Fisheries that guide management of Bristol Bay sport fisheries.

Nushagak-Mulchatna King Salmon Management Plan

Management of the subsistence, commercial, and sport fisheries for Nushagak king salmon stocks is governed by the *Nushagak-Mulchatna King Salmon Management Plan* (5 AAC 06.361). The plan was first adopted by the board in January 1992 and most recently modified during the December 2003 meeting.

Kvichak River Drainage Sockeye Salmon Management Plan

To ensure biological spawning escapement requirements of sockeye salmon into the Kvichak River drainage, the board adopted the *Kvichak River Drainage Sockeye Salmon Management Plan* (5 AAC 67.025) during the January 2001 meeting. The impetus for this plan was the poor sockeye salmon runs of 1999 and 2000. This is an inriver plan that addresses sport and subsistence fisheries only.

Southwest Alaska Rainbow Trout Management Plan

In February 1990, the board overhauled nearly all regulations for rainbow trout fisheries in the two management areas now known as the BBMA and Kuskokwim-Goodnews Sport Fish Management Area. The new regulations implemented the *Southwest Alaska Rainbow Trout Management Plan* without adopting the plan's language into regulation. However, the board recognized the plan as a guiding policy to achieve and maintain a more orderly and comprehensive mix of rainbow trout angling opportunities throughout the two areas. The *Southwest Alaska Rainbow Trout Management Plan* promotes conservative wild stock management (ADF&G 1990). In 1998, the board adopted *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013; subsequently amended as 5 AAC 75.210). This regulation embodies most of the original criteria used in the *Southwest Alaska Rainbow Trout Management Plan.*

Policy for the Management of Sustainable Salmon Fisheries

In March 2000, the board adopted the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222), that became an integral part of the board's yearly review of the state's salmon fisheries. The policy contains five fundamental principles for sustainable salmon management, each with criteria to be used by the department and the board to evaluate the health of the state's salmon fisheries, and address any conservation issues and problems as they arise. The five fundamental principles of the policy are as follows:

1) Wild salmon populations and their habitats must be protected to maintain resource productivity.
2) Fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning.
3) Effective salmon management systems should be established and applied to regulate human activities that affect salmon.
4) Public support and involvement for sustained use and protection of salmon resources must be maintained.
5) In the face of uncertainty, salmon stocks, fisheries, artificial propagation and essential habitats must be managed conservatively.

The policy requires that the department describe the extent to which salmon fisheries and their habitats conform to explicit principles and criteria. In response to these reports, the board must review fishery management plans or create new ones. If a salmon stock concern is identified in the course of this review, the management plan will contain measures to address the concern, including needed research, habitat improvements, or new regulations.

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Statewide Policy and Plan for Management of Sustainable Wild Rainbow Trout Fisheries

The board adopted the *Policy for the Management of Sustainable Wild Trout Fisheries* (5 AAC 75.222), and *Statewide Management Standards for Wild Trout* (5 AAC 75.220) in March 2003. The policies provide principles and criteria to ensure conservation, sustainability, and optimal sustained yield and benefits for wild trout, and provides direction to the board and the department as to how those principles and criteria are to be applied in the regulatory process. The plan ensures conservative management of wild trout fisheries while recognizing existing plans and policies that guide management of wild trout on a regional basis.

In most areas of the state, conservative management for wild rainbow trout, cutthroat trout, and steelhead trout, in combination, means a bag and possession limit of two fish, of which only one may be 20 inches or greater in length, with an annual limit of two fish 20 inches or greater in length. The plan recognizes existing plans and policies that guide management of wild trout on a regional basis, and allows the board to adopt regulations that deviate from the plan, as necessary, to address sustainability or optimal sustained yield issues, establish special management areas, or liberalize harvest opportunities in specific water bodies under other criteria.

APPENDIX B: KING SALMON SPORT FISHERY MANAGEMENT ACTIONS BY DATE, 2010–2012

Emergency Orders Issued in 2010–2012

There were four emergency orders (EOs) issued in 2010, two issued in 2011, and three issued in 2012.

2010

Emergency Order No.: 2-KS-5-25-10

Issued June 25, 2010

Effective Date 12:01 a.m., Sunday, June 27, 2010

Expiration Date 11:59 p.m., Friday, December 31, 2010

Unless superseded by subsequent Emergency Order

This EO reduced the bag and possession limit for king salmon 20 inches or greater in length from two fish, only one of which may exceed 28 inches in length, to one fish 20 inches or greater in length in all waters of the Nushagak-Mulchatna drainage.

Emergency Order No.: 2-KS-5-29-10

Issued June 29, 2010

Effective Date 12:01 AM, Wednesday, June 30, 2010

Expiration Date 11:59 PM, Friday, December 31, 2010

Unless superseded by subsequent EO

This EO prohibited retention of king salmon in all waters of the Nushagak-Mulchatna drainage. Any king salmon caught could not be removed from the water and had to be released immediately. This EO also prohibited use of bait in all waters of the Nushagak-Mulchatna drainage through July 31.

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Emergency Order No.: 2-KS-5-32-10

Issued July 2, 2010

Effective Date 12:01 a.m., Monday, July 5, 2010

Expiration Date 11:59 p.m., Saturday, July 31, 2010

Unless superseded by subsequent EO

This EO closed sport fishing for king salmon and prohibited use of bait in all waters of the Nushagak-Mulchatna drainage. This closure prohibited all sport fishing for king salmon, including catch-and-release fishing. King salmon could not be retained or possessed; king salmon accidentally caught while fishing for other species could not be removed from the water and had to be released immediately.

Emergency Order No.: 2-KS-5-37-10

Issued July 13, 2010

Effective Date 12:01 AM, Thursday, July 15, 2010

Expiration Date 11:59 PM, Friday, December 31, 2010

Unless superseded by subsequent EO

This EO reduced the bag and possession limit for king salmon, 20 inches or greater in length from three, only one of which could exceed 28 inches in length, to one king salmon 20 inches or greater in length; and reduced the annual limit of king salmon, 20 inches or greater in length, from five to three fish in all waters of the Alagnak River drainage. If an angler had already harvested three or more king salmon, 20 inches or greater in length, from the Alagnak River drainage prior to Thursday, July 15, 2010, they could not harvest additional king salmon greater than 20 inches in the Alagnak River drainage during 2010. The limit for king salmon less than 20 inches remained at 10 per day, 10 in possession.

2011

Emergency Order No.: 2-KS-5-14-11

Issued June 22, 2011

Effective Date 12:01 AM, Friday, June 24, 2011

Expiration Date 11:59 PM, Saturday, December 31, 2011

Unless superseded by subsequent EO

The bag and possession limits for king salmon, 20 inches in length or greater in the Nushagak-Mulchatna River , was reduced from two per day, only one of which could be greater than 28 inches in length, to one per day. In addition, the annual limit of king salmon, 20 inches or greater in length from the Nushagak-Mulchatna drainage, was reduced from four fish to two. The limit for king salmon, less than 20 inches, remained at five per day, five in possession, no annual limit. Up to two king salmon recorded prior to Friday, June 24, on the harvest portion of an Alaska sport fishing license or harvest record card did not count against the two king salmon, 20 inches or greater in length, that could be harvested on or after June 24.

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Emergency Order No.: 2-KS-5-19-11

Issued July 12, 2011

Effective Date 12:01 AM, Wednesday, July 13, 2011

Expiration Date 11:59 PM, Saturday, December 31, 2011

Unless superseded by subsequent EO

This EO superseded EO 2-KS-5-14-11, issued at Dillingham June 22, 2011. The annual limit for king salmon, 20 inches in length or greater in the Nushagak-Mulchatna River drainage, was restored from two fish to four. The bag and possession limit of king salmon, 20 inches or greater in length from the Nushagak-Mulchatna drainage, remained at one per day. The limit for king salmon, less than 20 inches, remained at five per day, five in possession, no annual limit. All king salmon recorded prior to Wednesday, July 13, on the harvest portion of an Alaska sport fishing license or harvest record card counted against the annual limit of four king salmon, 20 inches or greater in length.

2012

Emergency Order No.: 2-KS-5-25-12

Issued June 26, 2012

Effective Date 12:01 AM, Thursday, June 28, 2012

Expiration Date 11:59 PM, Monday, December 31, 2012

Unless superseded by subsequent EO

The bag, possession, and annual limit for king salmon, 20 inches or greater in length in the waters of the Nushagak-Mulchatna drainage, are reduced from two per day, only one of which could be 28 inches or greater in length, with an annual limit of four, to one per day, with an annual limit of two. Up to two king salmon recorded before Thursday, June 28 on the harvest portion of an Alaska sport fishing license or harvest record card did not count against the two king salmon, 20 inches or greater in length, that may be harvested on or after June 28. Bag and possession limits for king salmon, under 20inches in length, remained at five per day; no annual limit.

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Emergency Order No.: 2-KS-5-30-12

Issued July 2, 2012

Effective Date 12:01 AM, Tuesday, July 3, 2012

Expiration Date 11:59 PM, Monday, December 31, 2012

Unless superseded by subsequent EO

This EO superseded EO No. 2-KS-5-25-12, issued June 26, 2012. This EO restored the annual limit for king salmon, 20 inches in length or greater in the Nushagak-Mulchatna River drainage, from two fish to four. The bag and possession limit of king salmon, 20 inches or greater in length from the Nushagak-Mulchatna drainage, remained at one per day. The limit for king salmon, less than 20 inches, remained at five per day, five in possession, no annual limit. All king salmon recorded prior to Tuesday, July 3, on the harvest portion of an Alaska sport fishing license or harvest record card counted against the annual limit of four king salmon, 20 inches or greater in length.

Emergency Order No.: 2-KS-5-36-12

Issued July 6, 2012

Effective Date 12:01 AM, Saturday, July 7, 2012

Expiration Date 11:59 PM, Monday, December 31, 2012

Unless superseded by subsequent EO

This EO rescinded EOs 2-KS-5-25-12, issued June 26, 2012, and 2-KS-5-30-12, issued July 2, 2012. Regulatory provisions for Nushagak River king salmon reverted to those embodied under 5 AAC 67.022(g)(1). Effectively, this EO restored the bag and possession limit for king salmon, 20 inches in length or greater in the Nushagak-Mulchatna River drainage, from one fish per day to two fish per day, of which only one could be 28 inches or greater in length. The limit for king salmon, less than 20 inches, remained at five per day, five in possession, no annual limit.

Appendix B1.–Part 5 of 5.

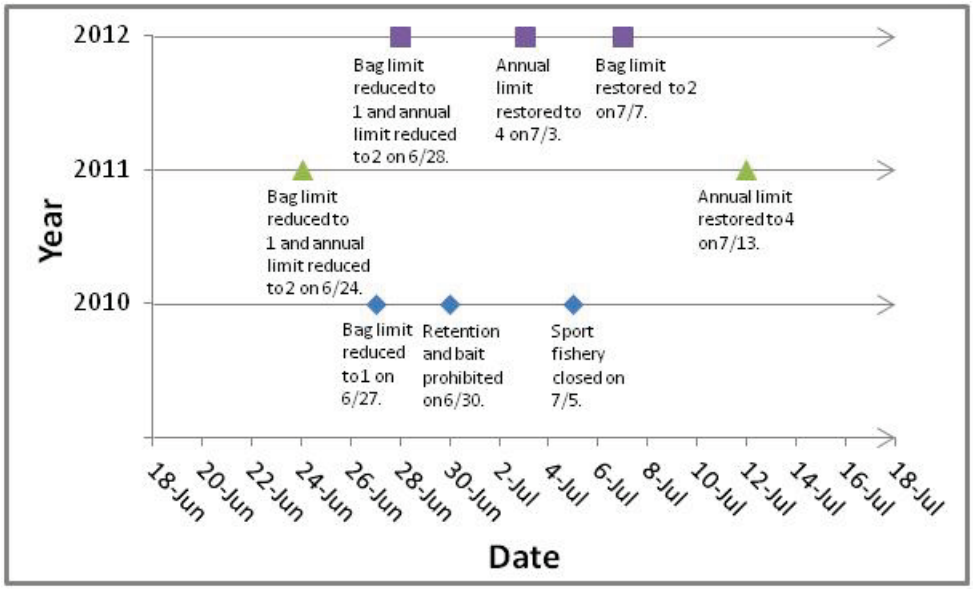

Figure10–Nushagak River king salmon sport fishery management actions by date, 2010–2012.

APPENDIX C: A CHRONOLOGY OF THE BAG LIMIT REGULATORY CHANGES AFFECTING KING SALMON SPORT FISHERIES IN ALL DRAINAGES OF BRISTOL BAY

Appendix C1.–Bag limit regulatory changes affecting king salmon sport fisheries in all drainages of Bristol Bay.

Effective Year	Regulation
1965	10 salmon (all species combined) per day, no size limit.
1972	Five king per day, only two of which may be over 26 inches.
1976	Five king per day, only two of which may be over 28 inches.
1988	Three king per day, only two of which may be over 28 inches.
1998	Daily bag and possession limits on several waters reduced to three per day, only two of which may be over 28 inches. Annual limit of five king salmon. Spawning closures for all waters.
2001	Daily bag and possession limits on most Eastern and most Central section waters (except Nushagak and Wood River drainages) reduced to three per day, only one of which may be over 28 inches. All waters except Nushagak drainage allow harvest of 10/day under 20 inches. All fish released must remain in the water from Cape Menshikof to Cape Constantine.
2003	All fish released must remain in the water from Cape Menshikof to Cape Pierce. Harvest of five/day under 20 inches allowed in the Nushagak drainage.

APPENDIX D: A CHRONOLOGY OF SIGNIFICANT REGULATION CHANGES TO THE *NUSHAGAK AND MULCHATNA KING SALMON MANAGEMENT PLAN*

Appendix D1.–A chronology of significant regulation changes to the *Nushagak and Mulchatna King Salmon Management Plan.*

Effective Year	Regulation
1990	Sport season established from January 1 to July 25 upstream of and including the Iowithla River. Spawning season closure adopted to afford drainage-wide protection to spawning king salmon stocks.
1992	Gear restricted to single-hook artificial lures for the portion of the Mulchatna River between the Koktuli and Stuyahok rivers.
1992	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) is adopted, capping the sport harvest at 5,000 fish and establishing an escapement projection of 65,000 as the trigger for inseason restrictions in the sport fishery.
1994	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) is amended, setting the sport allocation as a guideline harvest rather than a cap.
1997	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) was amended, by establishing an escapement projection of 55,000 king salmon below which inseason restrictions in the sport fishery must be imposed. The 55,000 fish "trigger" was adopted when analysis showed this escapement level was not likely to show a difference in the expected productivity versus that expected at the 65,000 fish trigger. In addition, the 65,000 fish "trigger" had become quite disruptive to the sport fishery by precipitating frequent inseason restrictions.
1997	The daily bag and possession limit was reduced to two king salmon per day, only one over 28 inches. An annual harvest limit of four king salmon was adopted for the whole Nushagak/Mulchatna drainage.
1997	Guides were prohibited from retaining any species of fish while guiding (Bristol Bay-wide).
1997	The Kokwok River and the Nushagak River upstream from its confluence with Harris Creek were closed to angling for king salmon.
1997	A July 31 spawning season closure was adopted for the Nushagak River drainage downstream from the Iowithla River outlet.
1997	The commercial fishery was to be managed to allow pulses of king salmon to enter the Nushagak River untouched.
2001	The Alaska Board of Fisheries amended the management plan to allow a catch-and-release fishery when the final inriver abundance is projected to be below 55,000 fish, but above 40,000 fish. The amended plan also stipulates that when the king salmon sport fishery is restricted to catch-and-release or is closed for conservation, the use of bait must be prohibited.
2001	A regulation allowing a daily bag limit of 10 king salmon less than 20 inches total length (508 mm TL) statewide, specifically excluded the Nushagak-Mulchatna river drainage until the department could study the potential effects of the regulation on the spawning populations and the escapement goal.
2001	As with most other Bristol Bay drainages, the Nushagak drainage was included in the regulation prohibiting anglers from removing king salmon from the water if the fish were to be released.
2003	A daily bag and possession limit for king salmon under 20 inches of five per day is implemented on the Nushagak drainage. King salmon under 20 inches do not count toward the annual limit of four and are in addition to the daily bag limit for king salmon 20 inches or longer. The *Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) was amended so that if inriver projections fall below 75,000, a bag limit of one per day, one in possession, no size limit, is imposed on the sport fishery. The seasonal limit would not be adjusted.