

Fishery Management Report No. 96-3

**Area Management Report for the Recreational
Fisheries of the Kodiak and Alaska
Peninsula/Aleutian Islands Regulatory Areas, 1995**

by

Len Schwarz

July 1996

Alaska Department of Fish and Game

Division of Sport Fish



Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd
Spell out acre and ton.	

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s
Spell out year, month, and week.	

Physics and chemistry

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

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
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
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

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	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
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.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H ₀
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
standard length	SL
total length	TL
variance	Var

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FISHERIES OF THE KODIAK AND ALASKA PENINSULA/ALEUTIAN
ISLANDS REGULATORY AREAS, 1995**

by

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The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Distribution is to state and local publication distribution centers, libraries and individuals and, on request, to other libraries, agencies, and individuals. This publication has undergone regional peer review.

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PREFACE

This report is divided into two sections. *Section I* presents an introductory overview of the Kodiak Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; a historical perspective of recreational angler effort and harvest within management area waters; an approximation of the economic value of the recreational fisheries of the management area; a general description of stocking, research, management, and access activities being conducted in the management area; and a summary of the major fishery and social issues that presently occur in the Kodiak Management Area. Recommendations for solving these social issues including, but not limited to, research, management, access, regulatory changes, stocking, or habitat options are also presented. *Section II* provides a more detailed summary of all the major fisheries that occur in the Kodiak Management Area. Included in this section are a description and historical perspective of each fishery, the objective governing the management of each fishery (if any have been established), description of the recent performance of each fishery, a description of recent Board of Fisheries actions with respect to each fishery, a description of any social or biological issues surrounding each fishery, and a description of any ongoing or recommended research or management activities directed at each fishery. None of the sport fisheries in the Kodiak Management Area have fisheries management plans associated with them and usually are not restricted by emergency order inseason. Inseason management approaches are discussed for applicable fisheries. If information is available, the fishery outlook for the immediate future is presented.

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SECTION I: MANAGEMENT AREA OVERVIEW

Section I presents an introductory overview of the Kodiak Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; an historical perspective of recreational angler effort and harvest within management area waters; an approximation of the economic value of the recreational fisheries of the management area; and a general description of stocking, research, management, partnership, aquatic education, viewing, and access activities being conducted in the management area.

MANAGEMENT AREA DESCRIPTION

The Kodiak sport fish management area (KMA) includes all waters of the Kodiak Island Archipelago, the Alaska Peninsula south of a line from Cape Douglas to Cape Menshikoff, and the Aleutian Islands (Figure 1). This management area is comprised of two sport fishing regulatory areas: the Kodiak Regulatory Area and the Alaska Peninsula/Aleutian Islands Regulatory Area. With the exception of the road accessible streams located in Kodiak, Adak, Cold Bay, and Dutch Harbor, virtually all sport fisheries in the KMA are remote and relatively difficult to access. A coastal climate with high precipitation and mild temperatures characterize much of the KMA.

Principal land managers in the KMA include the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, various native corporations, and the State of Alaska. The communities of Kodiak and Dutch Harbor/Unalaska, with populations of 14,600 and 4,300, respectively, are the two largest communities. The area also includes approximately 20 villages with year-round inhabitants. A major U.S. Navy Base on Adak Island is in the process of closing, and the past population of 5,000 people was reduced to 100 people in 1995. The base is scheduled for complete closure in 1997.

Management and research functions for the KMA are based in the Kodiak area office. The Division of Sport Fish staff stationed in Kodiak include one permanent full time Fisheries Biologist III (Len Schwarz) and one permanent full time clerical position (Doris Mensch) which is shared with the Division of Wildlife Conservation staff. The Fisheries Biologist III position acts as the area management biologist and the project leader for all area research projects. This position is assisted by one permanent seasonal Fisheries Biologist I position (Bob Begich) who acts as crew leader for two of the three area research projects and by six supporting permanent-seasonal technicians. Support is also provided to the area staff from the Sport Fish Division Research and Technical Services (RTS) staff.

ALASKA BOARD OF FISHERIES ACTIVITIES

The process of developing fishing regulations appropriate for fisheries in the KMA occurs within the established Alaska Board of Fisheries process. Public input concerning regulation changes and allocation issues is provided for in this process through various means including direct testimony to the Board of Fisheries and through participation in local fish and game advisory committees. These advisory committees have been established throughout Alaska to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes. Most active committees meet at least once each year, usually in the fall prior to the

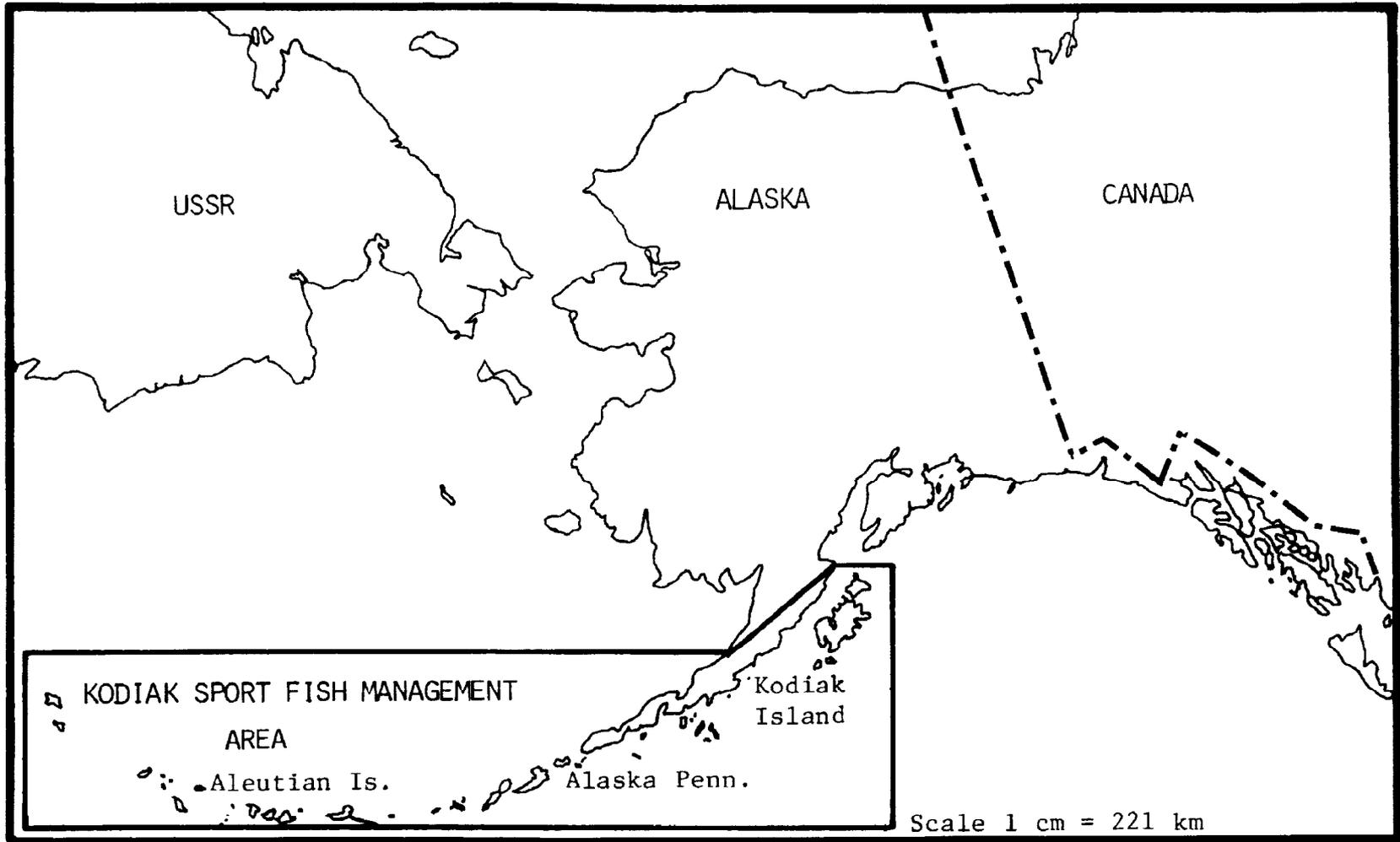


Figure 1.-The Kodiak Management Area: Kodiak Island Archipelago, Alaska Peninsula, and Aleutian Islands.

Board meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow for direct public interaction with staff involved with resource issues of local concern. Within the KMA there are seven fish and game advisory committees: Chignik, False Pass, King Cove, Kodiak, Nelson Lagoon, Sand Point, and Dutch Harbor/Unalaska.

Under the current operating schedule, the Board of Fisheries meets on a 3-year cycle. Alaska Peninsula/Aleutian Island proposals will be heard during the 1997/1998 meetings. Proposals regarding the Kodiak Regulatory Area were heard during the December 1995 meeting.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing KMA waters can target all five species of North American Pacific salmon (pink *Oncorhynchus gorbuscha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*) in both fresh and salt water. In addition, there are saltwater sport fisheries for halibut *Hippoglossus stenolepis*, rockfish *Sebastes* and lingcod *Ophiodon elongatus*. There are also fisheries for Dolly Varden *Salvelinus malma*/Arctic char *Salvelinus alpinus* and steelhead/rainbow trout *O. mykiss* as well as fisheries for stocked landlocked coho and Arctic grayling *Thymallus arcticus*.

The Division of Sport Fish classifies sport fisheries into one of three levels based on a combination of yield (harvest) and angler-cost criteria. Level I fisheries are defined as high yield, low angler-cost fisheries. These fisheries are typically entry level fisheries that anglers can participate in at little direct cost. Level III fisheries are defined as low yield, high cost fisheries. These fisheries are typically remote, guided, or special management fisheries that have a high cost associated with participation. Level II fisheries fall between Level I and Level III fisheries and are defined as basic yield, intermediate-cost fisheries.

The KMA offers diverse fishing opportunities for the recreational angler. Stocked lakes and road-accessible salmon and Dolly Varden fisheries near the cities of Kodiak and Dutch Harbor provide Level I fisheries. Marine waters near Kodiak and Unalaska islands offer Level II fisheries for halibut and rockfish. Another example of a Level II fishery in the KMA is boat-accessible salmon fisheries on Afognak Island. Remote steelhead trout and chinook salmon stocks, such as those in the Karluk and Ayakulik rivers, which are accessible by aircraft, offer Level III fisheries.

RECREATIONAL ANGLER EFFORT

From 1977 through 1994¹ an average of 97,730 angler-days have been expended by recreational anglers fishing KMA waters (Table 1). Recreational angler effort increased annually from 1977 through 1982, after which effort generally stabilized between 90,000 and 110,000 angler-days through 1990. The estimated sport effort for the KMA peaked during 1991 with 139,480 angler days (Mills 1992). The 1994 effort of 116,413 angler days was slightly higher than the recent 10-year average of 107,640 angler days (Mills 1984-1994, Howe et al. 1995).

¹ Effort and harvest figures cited in this report are from Mills 1979-1994 and Howe et al. 1995, unless otherwise noted. Effort and harvest figures presented in Howe et al. 1995 are found in Appendix J. Numbers presented in the text throughout this report have been rounded off to the nearest ten. Numbers in the tables represent the actual estimate or count.

Table 1.-Number of angler-days of effort expended by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	KMA Total	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
		Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
		Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA	Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA
1977	53,144					11,581	22	14,957	36	26,606	64	41,563	78
1978	53,268					8,766	12	19,063	43	25,439	57	44,502	84
1979	72,014					12,969	18	23,124	39	35,921	61	59,045	82
1980	84,667					19,760	23	27,646	43	37,261	57	64,907	77
1981	93,645	11,828	44	15,378	57	27,206	29	29,857	45	36,582	55	66,439	71
1982	105,752	9,075	37	15,439	63	24,514	23	41,113	51	40,125	49	81,238	77
1983	103,818	8,035	46	9,329	54	17,364	17	40,217	47	46,237	54	86,454	83
1984	101,126	10,428	57	8,038	44	18,466	18	34,213	41	48,447	59	82,660	82
1985	97,893	3,153	24	9,899	76	13,052	13	33,032	39	51,809	61	84,841	87
1986	98,479	6,479	30	14,834	70	21,313	22	31,762	41	45,404	59	77,166	78
1987	98,969	7,445	32	15,874	68	23,319	24	38,671	51	36,979	49	75,650	76
1988	91,631	8,484	38	13,822	62	22,306	24	30,522	44	38,803	56	69,325	76
1989	110,868	11,420	46	13,286	54	24,526	22	35,485	41	50,857	59	86,342	78
1990	116,197	16,057	46	18,537	54	34,594	30	34,969	43	46,634	57	81,603	70
1991	139,478	20,851	49	21,793	51	42,644	31	42,668	44	54,166	56	96,834	69
1992	107,482	13,903	61	8,802	39	22,705	21	36,485	43	48,292	57	84,777	79
1993	114,286	14,774	70	6,192	30	20,966	18	41,762	45	51,558	55	93,320	82
1994	116,413	10,673	62	6,608	38	17,281	15	44,312	45	54,820	55	99,132	85
MEAN ^a	97,729	10,901	47	11,710	53	21,296	22	33,326	43	40,554	57	76,433	78

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Historically, nearly 80% of the total recreational angler effort from the KMA has occurred in the waters of the Kodiak Regulatory Area. From 1977 through 1994, waters of the Kodiak Regulatory Area have supported an average of 76,430 angler-days of sport fishing effort (Table 1). In comparison, average sport effort in the Alaska Peninsula/Aleutian Island Regulatory Area from 1977 through 1994 has been 21,300 angler-days (Table 1).

The most popular fishery in the KMA in terms of recreational angling effort expended since 1985 has been the fresh and marine waters of the Kodiak Road System (Figure 2). Since 1985, these waters have accounted for just over half of the recreational angling effort expended in the KMA. The Buskin River is the most heavily fished stream both along the Kodiak Road System and in the Kodiak Regulatory Area, averaging over 20,000 angler-days of fishing effort annually (Table 2). Other major freshwater fisheries along the Kodiak Road System occur on the Pasagshak, Olds, and American rivers; the various road accessible lakes near Kodiak; and in the marine waters of Chiniak and Marmot bays (Table 2). Popular fisheries in the remote area include the fresh and marine waters of the Afognak/Shuyak islands group and freshwater fisheries in the Karluk and Ayakulik rivers.

In the Alaska Peninsula/Aleutian Island regulatory area the fresh and marine waters of Adak Island have represented the most popular fishery in terms of recreational angling effort expended since 1985 (Table 3). Adak Island waters have accounted for an average of approximately 13,370 angler-days of recreational fishing effort since 1985 (Table 3). The Adak Navy base is in the process of closing. The base closure will have the effect of reducing the fishing effort in the regulatory area by over 50%. The major fisheries now will include marine and freshwater fisheries around the town of Unalaska and Cold Bay. In 1994 these fisheries totaled 9,110 angler days.

RECREATIONAL FISH HARVEST

From 1977 through 1994, an average of 99,870 fish have been harvested (kept) by sport anglers fishing KMA waters (Table 4; Appendices A1-A13). As was the case with recreational angler effort, harvests from KMA waters generally increased from 1977 through 1982, after which harvests have remained relatively stable. About 45% of the historic sport harvest has been salmon, of which nearly half has been pink salmon (Table 4). Dolly Varden/Arctic char have comprised the largest single species harvest accounting for nearly 25% of the historic harvests (Table 4, Figure 3). On average, Kodiak Regulatory Area waters have accounted for 77,700 sport harvested fish from 1977 through 1994, or 78% of the average KMA sport harvest (Table 5). Dolly Varden, pink and coho salmon, and halibut have accounted for most of the sport harvest. From 1977 through 1994, these four species have accounted for an average of approximately 70% of the total sport harvest from Kodiak Regulatory Area waters (Table 5).

Waters of the Alaska Peninsula/Aleutian Islands Regulatory Area have accounted for an average of 23,190 sport harvested fish from 1977 through 1994, or about 24% of the average KMA sport harvest (Table 6). Dolly Varden and pink, coho, and sockeye salmon have accounted for most of the sport harvest. From 1977 through 1994, these four species have accounted for an average of about 73% of the total sport harvest from Alaska Peninsula/Aleutian Islands Regulatory Area waters (Table 6).

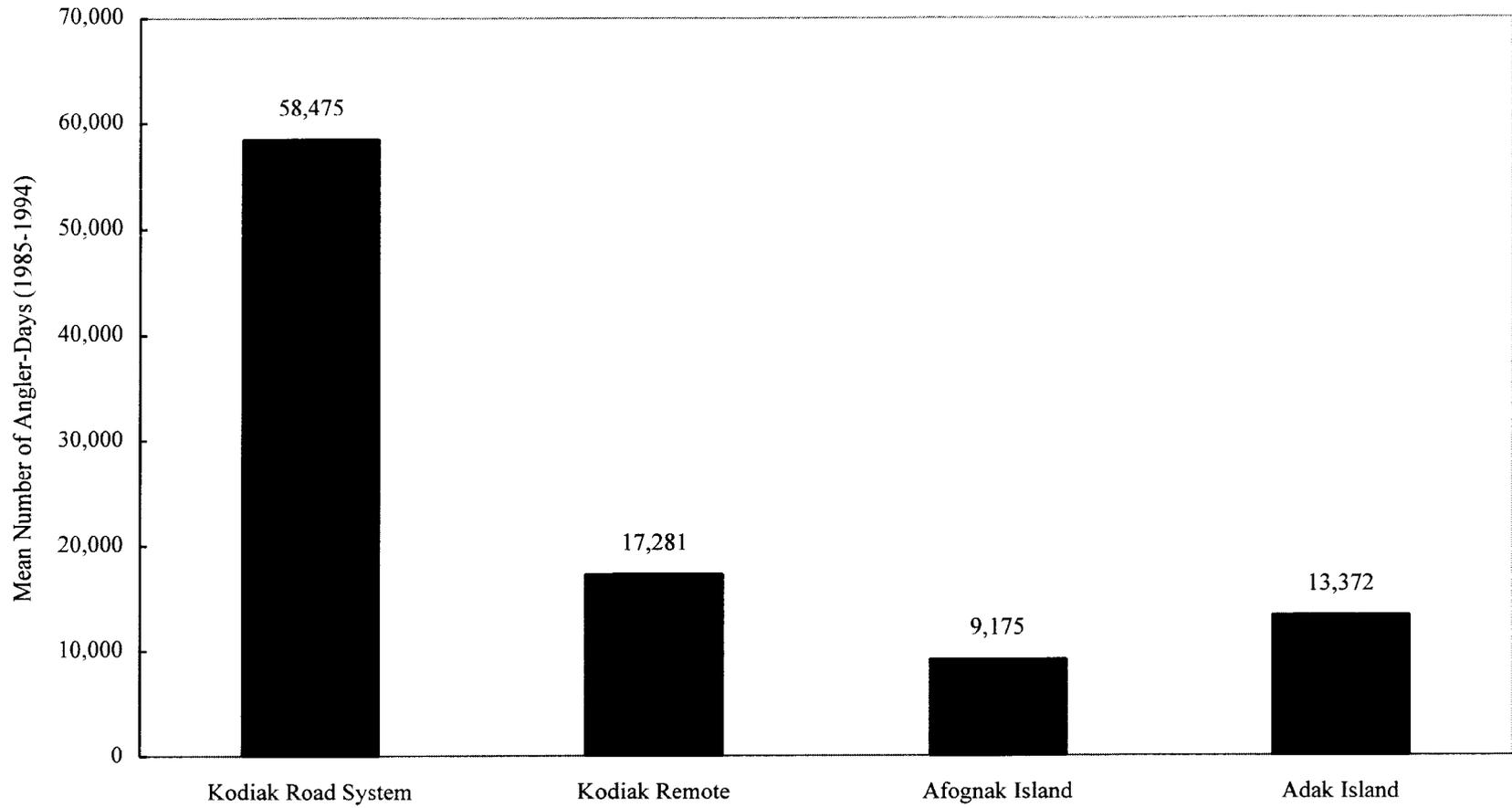


Figure 2.-Distribution of fishing effort expended by recreational anglers fishing KMA waters, 1985-1994, by area fished.

Table 2.-Number of angler-days of effort expended by sport anglers fishing Kodiak Regulatory Area waters, by location, 1980-1994.

Fishery	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Mean (85-94)
Kodiak Road System																
Buskin River & Mouth	20,149	19,403	20,404	18,354	24,108	34,109	24,506	16,481	18,457	26,347	19,560	21,991	15,482	17,072	16,534	21,054
Pasagshak River & Mouth	6,754	4,434	3,344	7,608	4,751	6,117	5,504	5,723	5,111	5,707	8,471	5,876	6,359	4,485	4,907	5,826
Olds River & Mouth				886	3,145	1,200	3,578	1,938	4,147	5,378	3,247	5,583	5,079	5,592	3,438	3,919
American River & Mouth				2,770	1,974	729	4,419	3,622	3,038	3,506	3,359	4,291	3,276	5,006	3,321	3,457
Roadside Lakes	1,257	982	2,474	2,918	2,492	1,562	582	1,390	1,677	969	1,666	1,541	2,261	1,186	1,277	1,411
Other Fresh Waters				3,324	6,257	4,721	3,165	1,607	1,965	3,555	2,172	5,206	3,757	1,226	4,664	3,204
Marine Boat						2,823	9,939	14,868	7,070	9,007	11,547	14,328	15,587	14,556	14,844	11,456
Marine Shore						4,403	7,321	10,110	9,146	9,559	7,115	11,122	7,507	7,234	7,957	8,148
Total	28,160	24,819	26,222	35,860	42,727	55,664	59,014	55,739	50,611	64,028	57,137	69,938	59,308	56,357	56,942	58,475
Kodiak Remote Area																
Karluk River System			3,514	2,216	1,339	3,158	1,070	3,919	2,530	2,609	3,393	4,547	5,430	6,894	10,948	4,450
Red River System				554	1,272	91	317	638	377	1,165	815	1,780	3,340	4,566	5,473	1,856
Other Fresh Waters	9,101	11,763	10,389	5,908	2,391	1,352	2,463	2,303	1,552	2,211	3,531	2,864	2,767	4,646	3,469	2,716
Marine Boat	9,796	17,391	21,086	24,042	22,268	11,157	2,168	3,164	2,052	1,738	2,126	4,183	3,332	7,095	9,193	4,621
Marine Shore	17,850	12,466	20,027	16,175	11,945	12,129	2,214	758	1,911	4,348	4,074	3,774	1,109	3,215	2,847	3,638
Total	36,747	41,620	55,016	48,895	39,215	27,887	8,232	10,782	8,422	12,071	13,939	17,148	15,978	26,416	31,930	17,281
Afognak/Shuyak/Barren Islands																
Fresh Water				1,699	718	774	29		109	213	718	487	541	885	789	493
Marine Boat						486	7,890	6,610	7,163	8,507	7,454	7,003	7,401	8,274	7,901	6,860
Marine Shore						30	2,001	2,519	3,020	1,523	2,355	2,258	1,549	1,388	1,570	1,821
Total	0	0	0	1,699	718	1,290	9,920	9,129	10,292	10,243	10,527	9,748	9,491	10,547	10,260	9,175
Regulatory Area Total	64,907	66,439	81,238	86,454	82,660	84,841	77,166	75,650	69,325	86,342	81,603	96,834	84,777	93,320	99,132	84,931

Table 3.-Number of angler-days of effort expended by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, by location, 1981-1994.

Fishery	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Mean (85-94)
Adak Island															
Marine		4,896	5,080	6,710	884	1,638	2,033	3,875	4,177	9,187	12,316	3,546	4,314	521	4,259
Fresh Water		4,026	5,445	3,323	5,531	11,694	12,417	11,642	9,569	15,242	14,963	4,862	2,735	524	9,113
Total		8,922	10,525	10,033	6,415	13,332	14,450	15,517	13,746	24,429	27,279	8,358	7,049	1,045	13,372
Unalaska Island															
Marine					816	1,808	1,569	129	541	1,461	3,215	1,452	736	3,642	1,567
Fresh Water					1,596	362	21	197	239	56	1,161	1,218	321	1,381	655
Total					2,412	2,170	1,590	326	780	1,517	4,376	2,670	1,057	5,023	2,222
Cold Bay															
Marine		1,211		212	35	452	1,895	1,376	1,080	870	801	1,163	429	2,169	1,037
Fresh Water		5,271		692	555	1,251	1,132	327	1,320	2,342	2,634	3,094	925	1,916	1,561
Total		6,482		904	590	1,703	3,027	1,703	2,400	3,212	3,435	4,257	1,354	4,085	2,598
Other															
Marine	11,828	2,968	2,955	3,506	1,418	2,581	1,948	3,104	5,442	4,539	6,121	7,742	9,265	4,341	4,408
Fresh Water	15,378	6,142	3,884	4,023	2,217	1,527	2,304	1,656	2,158	897	2,455	896	2,211	2,787	1,911
Total	27,206	9,110	6,839	7,529	3,635	4,108	4,252	4,760	7,600	5,436	8,576	8,638	11,476	7,128	6,319
Regulatory Area Total															
Marine	11,828	9,075	8,035	10,428	3,153	6,479	7,445	8,484	11,240	16,057	22,453	13,903	14,774	10,673	11,355
Fresh Water	15,378	15,439	9,329	8,038	9,899	14,834	15,874	13,822	13,286	18,537	21,213	10,020	6,192	6,608	13,290
Total	27,206	24,514	17,364	18,466	13,052	21,313	23,319	22,306	24,526	34,594	43,666	23,923	20,966	17,281	24,645

Table 4.-Number of fish harvested (kept) by sport anglers fishing Kodiak Management Area waters, 1977-1994.

YEAR	SALMON						MARINE			FRESH WATER FISHERIES							
	TOTAL	PINK	COHO	SOCK-		CHUM	RAZOR CLAMS	HALI- BUT	ROCK- FISH	DOLLY VARDEN	ARCTIC GRAYLING	RAIN-	LAND-	STEEL-	LING COD	OTHER FISH	
				EYE	CHINOOK							TROUT	LOCKED SALMON	HEAD TROUT			SMELT
1977	69,843	14,634	5,722	1,848	1,113	1,869	7,474	994	2,810	15,900	153	1,747	229	232	9,969	5,149	
1978	62,158	18,374	6,033	2,241	583	1,619	3,208	1,721	1,907	16,962	370	1,590	90	162	4,523	2,775	
1979	93,368	19,698	12,496	4,134	1,176	591	8,363	3,013	3,599	33,311	209	1,345	373	318	2,515	2,227	
1980	109,869	30,093	14,319	4,114	723	1,334	11,826	3,651	1,489	30,685	1,223	3,211	628	671	4,103	1,799	
1981	101,440	20,650	11,696	4,698	1,264	1,166	3,452	7,711	6,663	31,482	648	1,653	379	313	3,024	6,641	
1982	131,583	30,462	14,627	4,532	2,576	2,567	1,944	9,977	4,170	36,065	707	3,715	712	258	2,620	16,651	
1983	81,376	12,870	9,678	4,438	1,295	963	2,000	8,809	3,314	30,192	136	4,348	954	302	0	2,077	
1984	109,333	17,343	15,892	6,358	1,196	1,609	7,360	9,148	9,347	28,528	361	2,828	1,547	696	96	7,024	
1985	88,891	15,426	15,032	8,225	1,133	915	4,970	7,839	4,890	22,562	870	3,119	889	790	25	2,206	
1986	122,822	17,365	25,458	6,233	830	541	7,064	11,975	5,165	26,459	15	928	726	321	0	19,742	
1987	92,081	13,532	19,402	4,562	1,002	792	2,155	11,465	8,547	15,831	594	1,849	1,116	253	462	10,519	
1988	126,625	31,296	21,379	8,853	2,153	1,824	4,614	9,697	13,244	22,592	382	964	18	853	0	8,756	
1989	113,458	29,176	23,700	13,173	2,226	941	1,477	11,847	5,325	18,635	726	1,861	1,587	788	0	1,996	
1990	107,324	29,997	20,065	8,224	1,156	412	173	11,679	6,519	21,052	86	1,528	1,330	1,120	0	3,983	
1991	114,863	20,789	21,327	7,057	2,752	1,656	119	17,309	9,259	21,418	150	1,504	3,982	613	0	2,345	4,583
1992	80,155	11,473	16,920	8,408	2,671	913	973	13,505	6,566	11,525	120	1,195	887	96	1,222	1,753	1,928
1993	100,859	15,570	22,889	10,526	5,738	896	1,286	17,660	8,358	10,233	50	483	3,087	332	67	1,120	2,564
1994	75,794	6,032	14,600	13,502	3,303	380	4,322	17,312	5,743	6,608	41	731	0	243	0	1,199	1,808
MEAN	99,866	19,710	16,180	6,729	1,827	1,166	4,043	9,740	5,939	22,224	380	1,881	1,030	451	1,590	1,776	5,688
PERCENT	100	20	16	7	2	1	4	10	6	22	0	2	1	0	2		6

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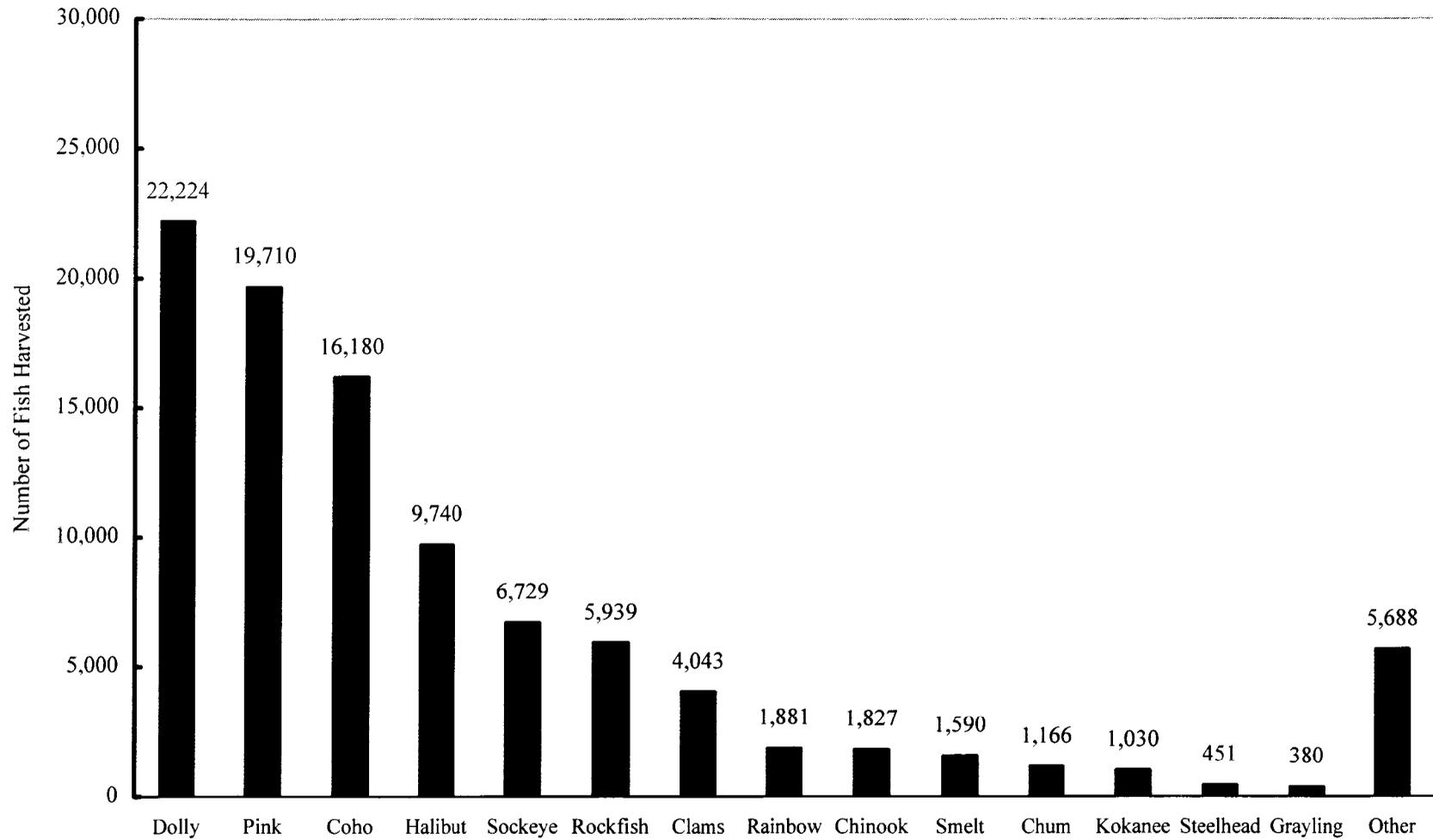


Figure 3.-Average composition of the historical harvests of fish by recreational anglers fishing KMA waters, 1977-1994.

Table 5.-Number of fish harvested (kept) by sport anglers fishing Kodiak Regulatory Area waters, 1977-1994.

YEAR	TOTAL	PINK	COHO	SOCK-		CHUM	RAZOR	HALI-	ROCK	LING	DOLLY	ARCTIC	RAIN-	LAND-	STEEL-	OTHER	
				EYE	CHINOOK		CLAMS	BUT	FISH	COD		GRAY-	BOW	LOCKED	HEAD		
1977	61,220	14,519	4,716	1,255	483	1,645	7,474	994	2,810		14,536	54	1,472	229	232	5,652	5,149
1978	53,066	17,739	4,927	1,776	350	1,287	3,208	1,721	1,907		15,805	325	994	90	162	0	2,775
1979	76,437	15,871	11,522	2,436	752	500	8,363	3,013	3,599		25,421	127	972	373	318	943	2,227
1980	80,498	18,969	12,692	2,178	327	525	11,826	3,651	1,489		20,663	465	2,523	628	671	2,092	1,799
1981	70,911	12,259	10,584	1,620	789	637	3,452	6,858	6,242		19,516	119	886	379	313	2,160	5,097
1982	97,948	18,850	13,329	3,055	1,120	1,324	1,944	9,180	3,992		23,771	225	3,380	712	258	2,620	14,188
1983	62,204	8,936	7,823	3,150	729	816	2,000	8,545	3,252		19,439	126	4,296	954	302	0	1,836
1984	89,182	12,779	14,612	5,385	921	1,321	7,360	8,179	8,231		23,092	286	2,592	1,547	696	0	2,181
1985	76,907	13,423	13,625	7,536	762	865	4,970	7,303	4,691		17,516	820	2,564	106	790	25	1,911
1986	96,756	14,509	20,873	5,259	520	336	7,064	10,960	4,479		20,657	15	841	0	321	0	10,922
1987	72,715	11,662	16,912	4,165	379	560	2,155	9,869	6,501		8,763	72	1,448	434	253	462	9,080
1988	100,164	19,044	18,809	6,222	1,564	1,546	4,614	7,749	11,369		18,663	182	855	0	853	0	8,694
1989	81,679	17,794	19,802	6,789	1,087	631	1,477	10,435	5,070		14,266	189	1,534	60	788	0	1,757
1990	61,218	7,464	13,728	6,056	996	191	173	9,134	3,842		14,235	86	1,484	52	1,120	0	2,657
1991	77,399	12,106	17,691	5,049	2,508	1,517	119	12,110	8,215	1,352	13,082	98	1,296	0	613	0	2,995
1992	57,730	5,904	13,668	6,240	2,217	625	973	10,860	5,652	1,454	7,389	120	1,179	151	96	140	1,062
1993	79,662	12,324	21,241	7,849	5,092	504	1,286	14,169	7,569	922	6,299	16	374	0	332	67	1,618
1994	67,539	5,336	12,406	12,502	3,166	290	4,322	14,910	5,019	1,014	5,981	41	731	0	243	0	1,578
MEAN	77,699	13,304	13,831	4,918	1,320	839	4,043	8,312	5,218	1,186	16,060	187	1,634	451	800	1,299	4,307
PERCENT	100	17	18	6	2	1	5	11	7	2	21	0	2	1	1	2	6

Table 6.-Number of fish harvested by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, 1977-1994.

YEAR	TOTAL	SOCK-						ROCK	LING	DOLLY	ARCTIC	RAINBOW	LANDLOCKED	OTHER	
		PINK	COHO	EYE	CHINOOK	CHUM	HALIBUT	FISH	COD	VARDEN	GRAYLING	TROUT	SALMON	SMELT	FISH
1977	8,623	115	1,006	593	630	224	0	0	1,364	99	275	0	4,317	0	
1978	9,092	635	1,106	465	233	332	0	0	1,157	45	596	0	4,523	0	
1979	16,931	3,827	974	1,698	424	91	0	0	7,890	82	373	0	1,572	0	
1980	29,731	11,124	1,627	1,936	396	809	0	0	10,022	758	688	0	2,011	0	
1981	30,529	8,391	1,112	3,078	475	529	853	421	11,966	529	767	0	864	1,544	
1982	33,635	11,612	1,298	1,477	1,456	1,243	797	178	12,294	482	335	0	0	2,463	
1983	19,172	3,934	1,855	1,288	566	147	264	62	10,753	10	52	0	0	241	
1984	20,151	4,564	1,280	973	275	288	969	1,116	5,436	75	236	0	96	4,843	
1985	11,984	2,003	1,407	689	371	50	536	199	5,046	50	555	783	0	295	
1986	26,066	2,856	4,585	974	310	205	1,015	686	5,802	0	87	726	0	8,820	
1987	19,366	1,870	2,490	397	623	232	1,596	2,046	7,068	522	401	682	0	1,439	
1988	26,461	12,252	2,570	2,631	589	278	1,948	1,875	3,929	200	109	18	0	62	
1989	31,779	11,382	3,898	6,384	1,139	310	1,412	255	4,369	537	327	1,527	0	239	
1990	46,106	22,533	6,337	2,168	160	221	2,545	2,677	6,817	0	44	1,278	0	1,326	
1991	35,948	8,683	3,636	2,088	244	159	5,199	1,044	993	8,336	57	290	3,982	0	1,557
1992	22,405	5,569	3,252	2,168	454	288	2,645	914	299	4,136	0	16	736	1,082	866
1993	21,197	3,246	1,648	2,677	646	392	3,491	789	198	3,934	34	109	3,087	0	946
1994	8,285	696	2,194	1,000	137	90	2,402	724	185	627	0	0	0	0	230
MEAN	23,192	6,405	2,348	1,816	507	327	1,427	721	419	6,163	194	292	713	804	1,382
PERCENT	100	28	10	8	2	1	6	3	2	27	1	1	3	3	6

During 1994, 75,790 fish were harvested by sport anglers fishing KMA waters (Table 4). This harvest was the lowest on record since 1978 and represented 2.3% and 2.8% of the total statewide and southcentral region sport harvests, respectively, during 1994 (Howe et al. 1995). The largest fisheries in terms of fish harvested during 1994 were for halibut, coho and sockeye salmon. These species accounted for 23%, 19%, and 18%, respectively, of the total 1994 KMA sport harvest.

RECREATIONAL FISH CATCH AND RELEASE

Estimates of the number of fish caught and released by sport anglers fishing KMA waters became available for the first time during 1990 (Mills 1991). Estimates, computed for 1994 using the statewide harvest survey (Howe et al. 1995), show that of the 195,040 fish caught by sport anglers fishing KMA waters, 61% (or 119,210 fish) were released (Table 7). Considerable variability exists in the percent of fish released depending on the species and regulatory area fished (Figure 4). For example, only 33% of the coho caught by sport anglers were released, whereas 93% of the steelhead caught were released (Table 7).

COMMERCIAL AND SUBSISTENCE SALMON HARVESTS

Salmon returning to KMA streams are also harvested by various commercial fisheries. In all cases, harvests in the commercial fisheries (Appendices B and C) are much larger than associated sport fisheries. Fish stocks of the KMA are also harvested in various subsistence fisheries.

ECONOMIC VALUE OF SPORT FISHERIES

There are no direct estimates available to assess the economic value of the recreational fisheries of the KMA. The Jones and Stokes Associates, Inc. (1987) survey of southcentral sport fisheries did not specifically address the sport fisheries of the KMA. A rough approximation of the economic value of the sport fisheries of the KMA can be made, however, by applying the direct expenditures per angler-day values for southcentral Alaska resident and nonresident sport anglers through the Jones and Stokes survey to the estimated sport effort of the KMA (Table 8). Based on this method, the economic value of the sport fisheries of the KMA during 1986 was approximately 12 million dollars. This compares to an estimated value of 127 million dollars for southcentral Alaska sport fisheries during 1986 (Jones and Stokes Associates Inc. 1987).

STOCKING PROGRAM INVENTORY

Stocking has been used to increase and diversify the opportunities available to sport anglers fishing KMA waters. Various species and life stages have historically been stocked including anadromous chinook smolt and coho salmon fingerlings along with landlocked coho and rainbow trout fingerlings. Nearly all of the stocking has taken place within waters of the Kodiak Road System; however, some stocking has occurred in several remote waters of the KMA (Chignik, Port Lions, Ouzinkie).

During 1995, approximately 714,460 hatchery-reared fish were stocked into KMA waters (Table 9). Most of the stockings were comprised of anadromous coho salmon smolt into lakes (Figure 5). Of these coho salmon stockings, approximately 478,000 were stocked into remote lakes, primarily to provide fish for commercial fisheries. Other species stocked included anadromous

Table 7.-Number of fish, by species, harvested and released by sport anglers fishing Kodiak Management Area waters during 1994.

Species	Kodiak Management Area Total				Kodiak Regulatory Area				Alaska Peninsula/Aleutian Islands Regulatory Area			
	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.
	Pink Salmon	6,032	20,559	26,591	77	5,336	18,833	24,169	78	696	1,726	2,422
Coho Salmon	14,600	7,269	21,869	33	12,406	6,474	18,880	34	2,194	795	2,989	27
Sockeye Salmon	13,502	14,088	27,590	51	12,502	13,529	26,031	52	1,000	559	1,559	36
Chinook Salmon	3,303	3,914	7,217	54	3,166	3,749	6,915	54	137	165	302	55
Chum Salmon	380	3,953	4,333	91	290	2,534	2,824	90	90	1,419	1,509	94
Dolly Varden	6,608	34,809	41,417	84	5,981	30,196	36,177	83	627	4,613	5,240	88
Other	1,808	5,017	6,825	74	1,578	4,044	5,622	72	230	973	1,203	81
Rainbow Trout	731	3,082	3,813	81	731	3,082	3,813	81	0	0	0	0
Steelhead Trout	243	3,359	3,602	93	243	3,359	3,602	93	0	0	0	0
Landlocked Salmon	0	0	0	0	0	0	0	0	0	0	0	0
Arctic Grayling	41	498	539	92	41	498	539	92	0	0	0	0
Halibut	17,312	13,465	30,777	44	14,910	12,242	27,152	45	2,402	1,223	3,625	34
Rockfish	5,743	6,650	12,393	54	5,019	5,965	10,984	54	724	685	1,409	49
Lingcod	1,199	2,548	3,747	68	1,014	2,260	3,274	69	185	288	473	61
Smelt	0	0	0	0	0	0	0	0	0	0	0	0
Clams	4,322	0	4,322	0	4,322	0	4,322	0	0	0	0	0
Total	75,824	119,211	195,035	61	67,539	106,765	174,304	61	8,285	12,446	20,731	60

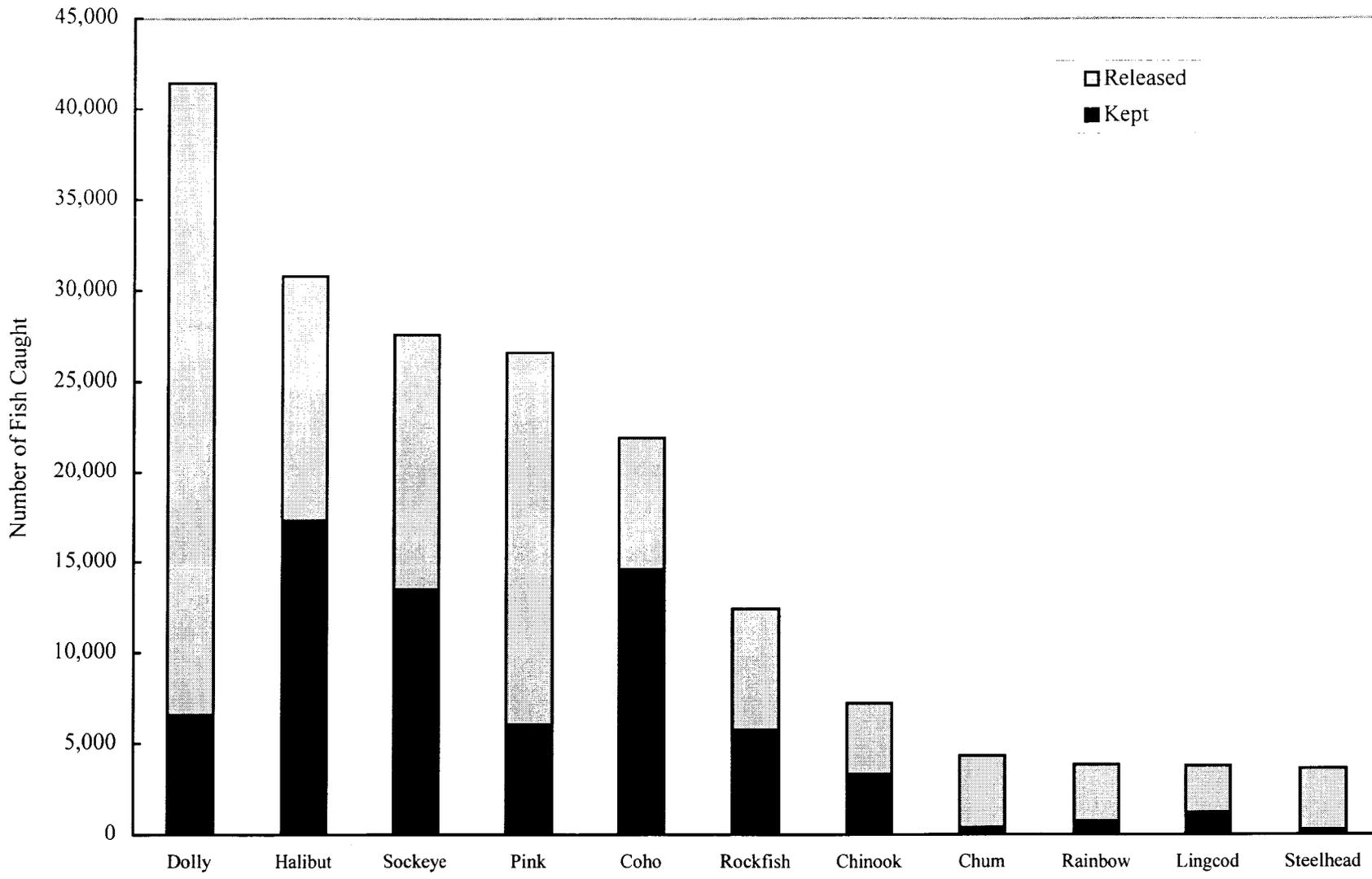


Figure 4.-Number of fish kept and released, by species, by recreational anglers fishing KMA waters during 1994.

Table 8.-Estimated economic value of KMA sport fisheries during 1986.

Angler Type	SOUTHCENTRAL ALASKA			KODIAK MANAGEMENT AREA		
	Angler-Days ^a	Expenditures ^b	\$/Ang-Day	Angler-Days ^a	\$/Ang-Day ^c	Expenditures
Resident	1,153,660	\$ 74,163,000	\$ 64.29	68,936	\$ 64.29	\$ 4,431,549
Non- Resident	201,488	\$ 52,892,000	\$262.51	29,473	\$262.51	\$ 7,736,867
BOTH	1,355,148	\$127,055,000	--- ^d	98,479	--- ^d	\$12,168,416

^a From Mills 1987.

^b From Jones and Stokes Associates, Inc. 1987.

^c Computed from southcentral Alaska sport fisheries.

^d Not computed.

Table 9.-Releases of hatchery-reared fish into KMA waters, 1988-1995.

Species		Actual							
Size		1988	1989	1990	1991	1992	1993	1994	1995
R. Trout	Horseshoe L	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Fingerling	Jack L	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Aurel L	4,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
	Big L	3,600	3,600	3,600	3,600	1,800	3,600	7,950	4,000
	Tanignak L	3,000	3,700	6,000	6,000	0	6,000	6,000	6,000
	Bull L	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	Cascade L	3,300	3,300	3,300	3,300	800	3,300	0	3,300
	Lee L	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
	Twin L	3,500	4,000	4,000	4,000	4,000	4,000	4,000	4,000
	Lilly L	1,600	1,600	1,600	900	800	1,600	5,100	1,730
	Heitman L	3,200	3,200	3,200	3,300	800	3,250	0	3,250
	Long L	3,600	3,600	3,600	3,600	900	0	3,600	3,600
	Caroline L	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
	Lupine L	1,600	1,600	1,000	1,600	1,600	1,600	1,600	1,600
	Dragon Fly L	1,500	1,500	1,500	1,500	1,600	1,550	1,500	1,550
	Cicely L	1,200	1,200	1,200	1,200	1,200	1,150	1,150	1,150
	Abercrombie	4,000	3,700	3,700	3,700	3,200	3,700	8,350	6,300
	Margaret L	1,600	1,600	1,600	1,700	800	1,600	6,850	1,730
	Jupiter L	3,200	3,600	3,600	3,600	900	3,600	0	3,600
	Saturn L	2,700	2,400	2,400	2,400	600	2,400	0	2,400
	Dolgoi L	5,600	0	5,200	5,200	1,300	5,150	5,150	5,150
	Chignik L	0	0	2,000	5,000	5,000	0	5,000	5,000
	Rainbow Total	55,400	49,800	58,700	61,800	31,500	53,700	62,450	65,560
Chinook	Island L	0	114,400	110,000	56,000	94,700	66,950	90,700	0
Smolt	Mission L	0	0	0	31,000	0	0	0	0
	Buskin River	0	0	0	0	0	0	0	83,758 ^a
	Chinook Total	0	114,400	100,000	87,000	94,700	66,950	90,700	83,758
Arctic	Aurel L.	20,000	14,200	20,000	20,000	20,000	20,000	20,000	0
Grayling	Cascade L	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0
Fry	Cicely L	10,000	8,200	10,000	10,000	10,000	10,000	10,000	0
	Heitman L	30,000	30,000	30,000	30,000	30,000	30,000	30,000	0
	Grayling Total	70,000	62,400	70,000	70,000	70,000	70,000	70,000	0 ^b

-continued-

Table 9.-Page 2 of 2.

Species// Size		Actual							
		1988	1989	1990	1991	1992	1993	1994	1995
<u>Anadromous</u>									
Coho	Mayflower L	6,500	6,900	2,500	6,500	3,250	16,000	16,400	3,809
Fingerling	Island L	22,500	22,500	8,500	22,500	22,500	16,000	47,400	23,523
	Dark L	7,500	7,500	7,500	7,500	7,500	8,000	18,000	12,571
	Mission L	10,000	10,000	10,000	12,700	7,500	8,000	30,200	20,285
^c	Little Kitoi L	5,600	33,500	0	0	0	139,147	0	87,000
	Orbin L	7,500	7,500	7,500	5,100	3,750	8,000	0	0
	Kalsin L	17,500	19,500	0	19,340	8,200	8,000	0	0
	Potatoe Patch L	7,500	7,500	0	9,500	7,500	0	20,000	4,857
	Ouzinkie L	20,000	20,000	0	0	15,000	15,052 ^d	0	16,000
^c	Crescent L	241,000	203,000	0	191,400	69,000	60,000 ^d	163,680	167,000
^c	Little Kitoi L	5,600	33,500	0	0	0	139,147	0	87,000
^c	Hidden L	137,600	239,800	0	250,900	0	0	0	0
^c	Jenifer L	0	0	0	0	162,000	135,486	0	165,000
^c	Ruth	0	0	0	0	0	0	0	59,000
	Subtotal remote	384,200	476,300	0	442,300	306,200	334,633	163,680	478,000
	Subtotal road	99,200	101,400	36,000	83,200	60,200	69,052	132,000	81,045
	Subtotal both	483,200	577,700	36,000	525,500	366,400	403,685	295,680	559,045
<u>Landlocked</u>									
Coho	Pony L	2,100	2,600	0	2,400	0	0	4,200	3,238
Fingerling	Southern L	2,700	2,400	0	0	0	0	0	2,857
	Total	4,800	5,000	0	2,400	0	0	4,200	6,095
All Species	GRAND TOTAL	613,400	809,300	264,700	746,700	562,600	594,335	523,030	714,458

^a These fish were from Willow Creek brood stock, 39,161 of which were coded wire tagged. Prior to 1995 the brood stock was from Crooked Creek, and smolt were not tagged.

^b Project terminated in 1995 because stocking did not generate a fishery.

^c Remote location outside of the Kodiak Road System.

^d Presmolt.

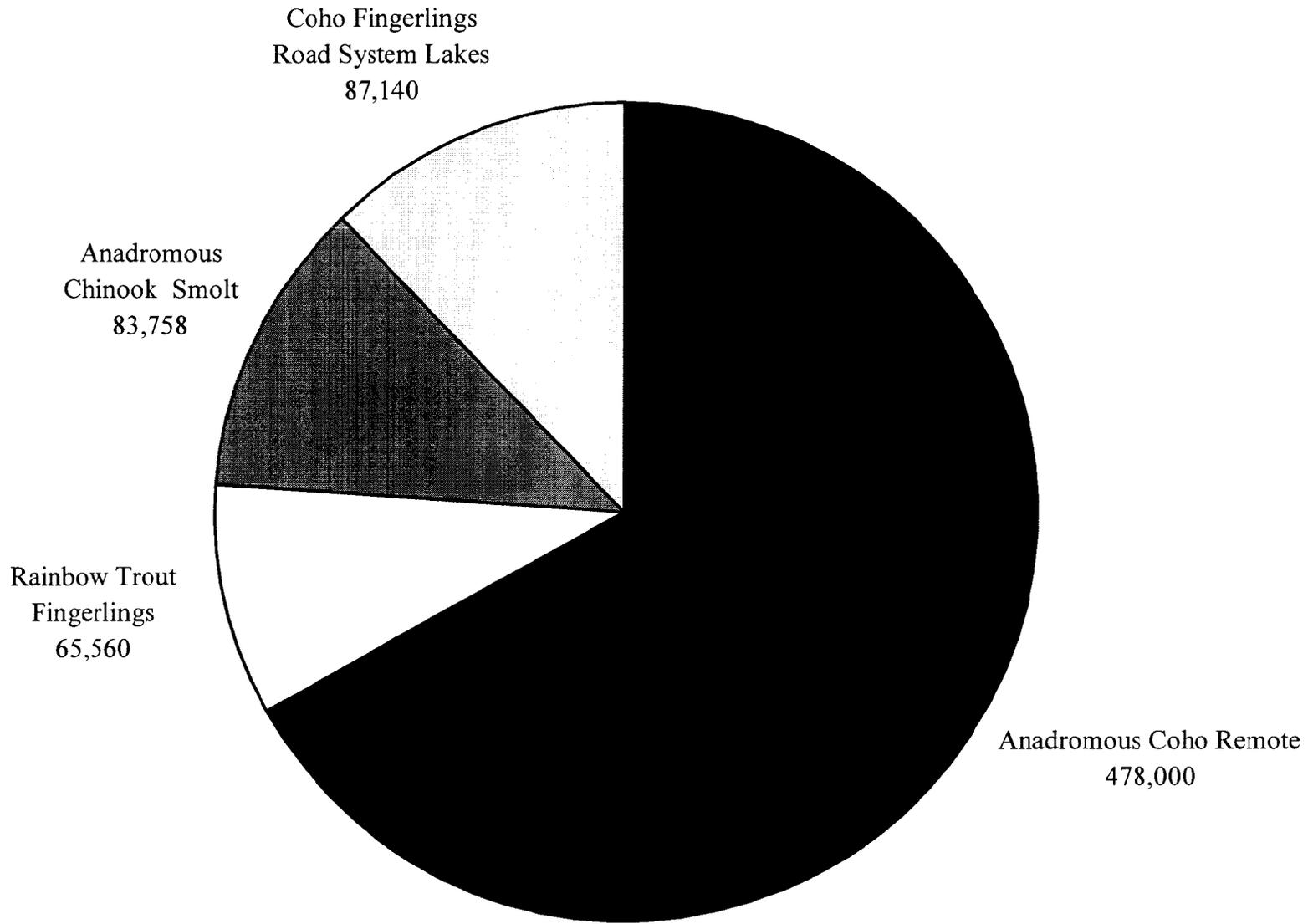


Figure 5.-Stockings of hatchery-reared fish into KMA waters during 1995.

chinook salmon smolts and nonanadromous coho salmon fingerlings and rainbow trout fingerlings. These stockings were aimed at providing fish for recreational anglers.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are four major research activities ongoing in the KMA. The first involves continued operation of the Buskin River weir to determine the numbers and age, sex, and length compositions of the coho and sockeye salmon immigrations to the Buskin River. The second research program, initiated in 1991, involves the steelhead trout resource of the Karluk River. Historically, this resource has supported one of the largest steelhead trout returns in Alaska. Kelt emigration data from the late 1980s, however, indicated that this stock was depressed. Current objectives of the research program are to obtain estimates of population size and the number of steelhead trout harvested in the commercial, subsistence and sport fisheries.

A third research program, initiated in 1992, involves the dockside sampling of recreationally harvested marine groundfish at the Kodiak boat harbor. This program has the objective of defining the species composition and age, sex, and size compositions of recreational groundfish harvests returning to the Kodiak boat harbor. The long-term goal of this project is to determine important life history characteristics of these species necessary to assess the long-term health and sustained yields of these stocks. During the 1994 season an additional element was added to this project. Chinook salmon harvested by saltwater anglers were checked for adipose finclips. The ratio of clipped fish to unclipped fish was documented. The fish that had clips had coded wire tags removed so streams of origin could be determined.

A fourth research program, initiated in June 1993, deals with the chinook salmon populations in the KMA, primarily the Karluk, Ayakulik and Chignik rivers. Age, sex and size data were collected from the Karluk and Ayakulik rivers escapement. Also on these two rivers, rafters were censused at the weir for chinook catch and effort data. In Chignik, the commercial chinook purse seine catch from the Chignik Lagoon was sampled for age, sex and size data. These data are assumed to be similar to that of the escapement.

There are several routine management activities that are ongoing in the KMA. These activities include:

1. Participation in the Alaska Board of Fisheries process,
2. Fishery monitoring and inseason fishery management (a list of emergency orders issued for KMA fisheries from 1989 through 1995 is presented in Appendix H),
3. Involvement with the public,
4. Habitat monitoring and permit review, and
5. Annual fish stockings.

ACCESS PROGRAMS

The Federal Aid program stipulates that a portion of the federal funds passed on to states be used to increase opportunities for angler access to sport fisheries.

As various native corporations and private landowners begin to develop their land use plans on Kodiak Island, the need to ensure public access becomes more critical. As a result a list of prioritized objectives was developed, and these are listed below:

1. Extension of the Anton Larsen Bay boat launch ramp,
2. Parking lot improvement adjacent to the Anton Larsen Bay boat ramp,
3. Secure access along the Olds and American rivers,
4. Secure access along the Karluk River,
5. Secure access along the Ayakulik River,
6. Secure access in Afognak Lagoon,
7. Secure access in the Anton Larsen River,
8. Determine the land status of stocked lakes along the Kodiak Road System and pursue securing access.

A synopsis of each is presented in Appendix I.

During the fall of 1994 construction of the parking lots along the Russian, Olds, American and Buskin rivers was initiated and completed in 1995. Also an extension of the Anton Larsen Bay boat launch ramp was completed in 1995.

MANAGEMENT AREA FISHERY OBJECTIVES

The Division of Sport Fish recommended several priority criteria to guide the establishment of fishery objectives (internal memo from Norval Netsch, Sport Fish Director to Carl Rosier, Fish and Game Commissioner, dated 3/27/91). These include:

1. **Management and protection of existing fish resources.** This criterion directs that divisional activities should strive to manage and protect Alaska's wild stocks of fish resources for future generations.
2. **Public use and benefits of existing fish resources.** This criterion directs that divisional activities should strive towards making Alaska's fishery resources available for public use and benefit on a sustained yield basis.
3. **Rehabilitation of depressed stocks and damaged habitat.** This criterion directs that divisional activities should strive to restore and maintain fish habitat damaged by man's activities.
4. **Enhancement of natural production or creation of new opportunities.** This criterion directs that the division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively affect other fisheries.

To date, no specific fishery objectives have been developed for KMA sport fisheries. It is anticipated that specific objectives will be developed in the near future. Participation of the public in the development of these objectives is desired and will be solicited.

Although no specific fishery objectives have been established to date, an assumption of past and current fisheries management has been to assure for the sustained yield of the various fisheries stocks that occur within the KMA while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

MAJOR BIOLOGICAL AND SOCIAL ISSUES FOR THE KMA

Compared to other management areas in Region II, there are relatively few major biological or social issues surrounding the KMA sport fisheries. The few major issues that do exist are as follows:

1. Karluk River Steelhead Trout. Historically, the Karluk River has supported one of the largest steelhead trout returns in Alaska. Kelt emigration data during the late 1980s, however, indicated that this stock was depressed. A research project, described in the section on steelhead trout, was initiated in 1992 to assess this resource. Initial results are that the population has recovered, and the 1995 spawning population was at record levels.
2. Karluk River Chinook Salmon (harvest). There has been an increase in the angler use of Kodiak chinook salmon stocks. As the record escapements achieved during the period of 1988-1991 return to more average levels, increasing sport harvest may require more definitive management. Creel surveys were conducted in June 1994 on the Karluk and Ayakulik rivers along with escapement, age, sex and length sampling. These data will allow for the refinement of escapement goals and fisheries monitoring to ensure escapement goals are set at optimum levels and are achieved.
3. Karluk and Ayakulik Rivers Chinook Salmon (access). In recent years, there has been a marked increase in participation in the Karluk and Ayakulik rivers' chinook salmon fisheries. Increase in participation has occurred in spite of a lack of access facilities for recreational anglers. The department is currently investigating land purchase alternatives and easement clarification and resolution to address this issue.
4. Kodiak Road System Salmon Escapements. The Kodiak Road System is the most heavily fished area on the entire island, accounting for over half of the angler days in the Kodiak Management area. There are several small coho salmon stocks located along the road system which are susceptible to overharvest due to their small size (Salonie Creek, American River, Olds River and Roslyn Creek). Coho escapement into these streams should be monitored to ensure these small stocks are not overharvested and, do not as a result, decline in abundance.
5. Stocking Program. Although over 70,000 rainbow trout and nonanadromous salmon have been stocked into KMA waters in recent years, effort directed towards these stocked fish and harvest of the stocked fish has remained low. Greater education of the fishing public is recommended to increase utilization of these stocked fish.

SECTION II: MAJOR FISHERIES OVERVIEW

Section II provides a more detailed summary of all major fisheries that occur in the Kodiak Management Area. Included in this section are a description and historical perspective of each fishery, the objective governing the management of each fishery, description of the recent performance of each fishery, a description of recent Board of Fisheries actions with respect to each fishery, a description of any social or biological issues surrounding each fishery, and a description of any ongoing or recommended research or management activities directed at each fishery. The inseason management approach and/or outlook are presented if applicable. The major fisheries of the Kodiak Management Area which will be discussed are:

Kodiak Road System Fisheries

Dolly Varden Fishery

Pink Salmon Fishery

Coho Salmon Fishery

Sockeye Salmon Fishery

Landlocked Lakes Stocked Fisheries

Adak Island Fisheries

Dolly Varden Fishery

Salmon Fishery

Afognak/Shuyak Islands Fisheries

Coho Salmon Fisheries

Karluk and Ayakulik (Red) Rivers Fisheries

Steelhead Trout Fisheries

Chinook Salmon Fisheries

Sockeye Salmon Fishery

North Kodiak Island Archipelago Marine Fisheries

Developing Fisheries

Mill Bay Chinook Salmon Fishery

Chiniak Bay Chinook Salmon Fishery

Other Fisheries

KODIAK ROAD SYSTEM FISHERIES

The Kodiak Road System includes all fresh waters on Kodiak Island east of a line extending southward from Craig Point on the west side of Anton Larsen Bay to the westernmost point of Saltery Cove, and all saltwater bays and all salt waters within 1 mile of all points of land within the freshwater area described above, including Spruce, Woody and Long islands (Figure 6). All fisheries in this area can be accessed by road or small boat launched from the City of Kodiak.

The waters of the Kodiak Road System support the most popular fisheries in the KMA in terms of recreational angling effort expended since 1985. Since 1985, these waters have accounted for just over half of the recreational angling effort expended in the KMA. The Buskin River is the most heavily fished stream both along the Kodiak Road System and in the Kodiak Regulatory Area, averaging approximately 20,000 angler-days of fishing effort annually (Table 2).

There are five major freshwater fisheries that occur in the waters of the Kodiak Road System. These fisheries target Dolly Varden, coho salmon, pink salmon, sockeye salmon, and stocked fish in landlocked lakes. Saltwater fisheries along the road target salmon, halibut and rockfish.

KODIAK ROAD SYSTEM DOLLY VARDEN FISHERY

FISHERY DESCRIPTION AND HISTORICAL PERSPECTIVE

Dolly Varden are available to anglers throughout the year along the Kodiak Road System, however, peak fishing opportunities typically occur as the fish migrate to and from overwintering (Buskin, Saltery and Pasagshak lakes) and spawning areas (Buskin, American, Olds, and Pasagshak rivers). Peak harvest typically occurs in May and from mid-July through September. Spawning begins in September and continues into November.

All streams along the Kodiak Road System are open continuously to fishing for Dolly Varden, with the exception of an area on the Buskin River extending 300 feet downstream and 300 feet upstream of the Buskin River weir which is closed to fishing when the weir is in operation. The daily bag and possession limit is 10 Dolly Varden with no size limit.

From 1985 through 1994, the waters of the Kodiak Road System have accounted for an average harvest of 9,220 Dolly Varden (Table 10). This harvest has represented an average of about one-half of the total KMA Dolly Varden harvest over this period. Major sport fisheries for Dolly Varden in the Kodiak Road System include Buskin, Pasagshak, American, and Olds rivers. Since 1985, these four river systems have accounted for an average of about 70% of the total road system Dolly Varden harvest (Tables 10 and 11). Of these systems, the Buskin River has supported the largest fishery for Dolly Varden. Since 1977, the average harvest of Dolly Varden from the Buskin River has been 7,260 fish (Table 11), making this river the largest in terms of numbers of Dolly Varden harvested in the KMA and one of the largest fisheries for Dolly Varden in Alaska.

A research project to assess the structure and status of the Buskin River Dolly Varden stocks was initiated during the early 1980s. As part of this work, fishery and migration statistics have been estimated (Table 12). From 1984 through 1990, creel surveys documented that anglers fishing the Buskin River during the spring Dolly Varden emigration expended an average of 4,390 angler-days of effort to harvest 5,530 Dolly Varden. From 1988 through 1990, these surveys

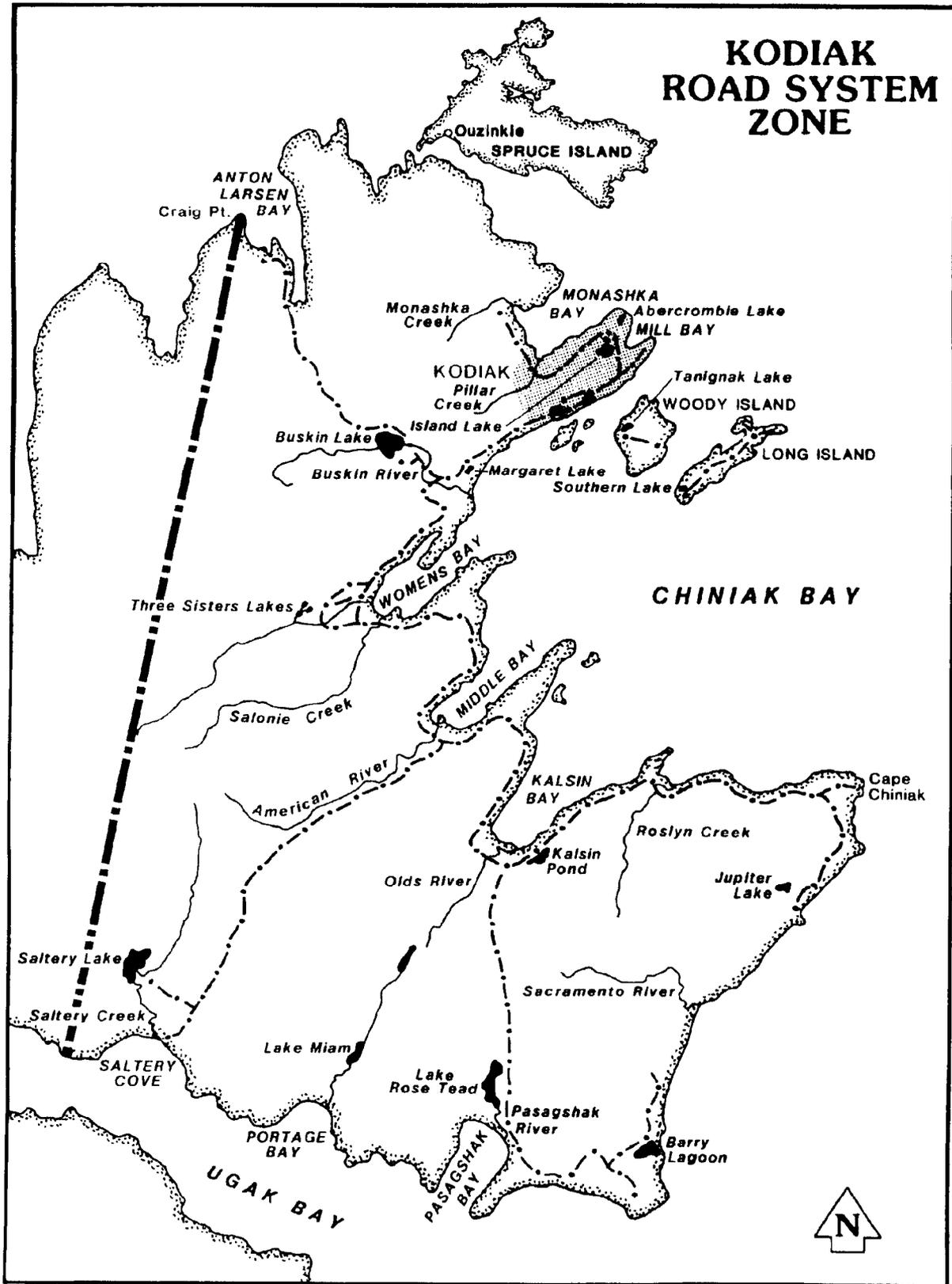


Figure 6.-Geographic boundaries of the Kodiak Road System Zone.

Table 10.-Harvest and release of Dolly Varden from Kodiak Road System waters of the Kodiak Management Area, 1985-1994.

Year	KMA Harvest	Kodiak Road System		
		Harvest	Release	% of KMA Harvest
1985	22,562	13,055		58
1986	26,459	16,391		62
1987	15,831	7,859		50
1988	22,592	12,482		55
1989	18,635	10,470		56
1990	21,052	9,558	19,853	45
1991	21,418	9,718	9,447	46
1992	11,951	4,572	19,498	39
1993	10,233	3,955	22,577	39
1994	6,608	4,130	13,956	63
MEAN	19,816	9,219	17,066	51

Note: From 1985-1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 11.-Harvest of Dolly Varden from selected Kodiak Road System streams, 1977-1994.

Year	Buskin River		Pasagshak River		American River		Olds River		Total	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	10,353		617						10,970	
1978	8,003		443						8,446	
1979	15,150		982						16,132	
1980	9,159		475						9,634	
1981	9,376		1,162						10,538	
1982	10,167		692						10,859	
1983	8,454		1,332		126		10		9,922	
1984	9,477		1,072		848		249		11,646	
1985	10,261		152		46		91		10,550	
1986	10,367		933		107		321		11,728	
1987	4,238		688		417		290		5,633	
1988	5,293		1,055		800		200		7,348	
1989	7,092		618		448		259		8,417	
1990	4,209	11,471	138	2,363	845	1,380	293	1,087	5,485	21,786
1991	4,337	7,623	1,124	1,398	375	245	288	260	6,124	9,526
1992	2,319	8,258	352	1,106	360	3,605	360	893	3,391	13,862
1993	1,150	4,346	194	1,316	115	6,261	468	1,919	1,927	13,842
1994	1,208	3,481	205	726	671	5,144	358	1,142	2,442	10,493
MEAN	7,256		634		429		265		8,434	
MEAN (85-94)	5,047	7,036	638	1,382	419	3,327	292	1,060	6,365	13,902

Table 12.-Fishery and migration statistics for the Buskin River Dolly Varden resource, 1981-1993.

Year	Reference	FISHERY STATISTICS			FISHERY STATISTICS		MIGRATION STATISTICS	
		April 15-Jun 15 ^a			Entire Year ^b		(Weir Counts)	
		Effort (Ang-Days)	Harvest	Catch & Release	Harvest	Catch & Release	Emigration	Immigration ^c
1981	Murray 1982		8,437		9,376			
1982					10,167			
1983	Murray 1984		6,668		8,454			
1984	Murray 1985	3,410	5,460		9,477			
1985	Murray 1986		8,712		10,261	21,797	20,545	
1986	Murray 1987	4,284	4,065		10,367	40,773	24,110	
1987	Murray 1988a	4,619	4,766		4,238	29,919	32,848	
1988	Murray 1989	4,523	3,569	5,067	5,293	31,260	34,306	
1989	Murray 1990	5,204	5,761	5,567	7,092	35,605	30,851	
1990	Whalen 1991	4,268	2,362	3,993	4,830	11,471	91,107 ^d	6,416 ^e
1991					4,337	7,623	30,725 ^d	NO DATA ^f
1992					2,319	8,258	74,451 ^d	NO DATA ^f
1993					1,150	5,496	NO DATA ^f	NO DATA ^f
Mean		4,385	5,533	4,876	7,626	9,117	44,428	24,846

^a Data from creel survey conducted during the emigration period only.

^b Information from Statewide Harvest Survey.

^c Immigration counts stop when weir operation stops on approximately October 1. Fish continue to migrate through October and November, so the counts listed here are partial counts of the total immigration.

^d Vexar mesh was placed over the weir in these years insuring fish over 210 mm total length could not pass through the weir pickets uncounted. In previous years, fish under 300 mm total length could pass through the weir uncounted.

^e Partial count due to weir washout, not included in mean.

^f The weir was not operated during the peak immigration period. Data not included in the mean.

also collected information on released fish and documented that anglers fishing during the spring emigration have also caught and released an average of 4,880 Dolly Varden.

RECENT FISHERY PERFORMANCE

The sport harvest of Dolly Varden from Kodiak Road System waters during 1994 was 4,130 fish, 55% below the historical mean harvest for the area (Table 10). Although the harvest was the second lowest on record and about 5,000 fish below the average, catch figures remained high at over 18,000 fish. Anglers chose to release over 75% of the fish they caught (Table 10). The Buskin River again supported the largest harvest of Dolly Varden on the road system (Table 11).

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource.

RECENT BOARD OF FISHERIES ACTIONS

The last regulation affecting Dolly Varden was adopted during the 1987 Alaska Board of Fisheries meeting. The bag and possession limit for Dolly Varden was reduced from 20 to 10 fish daily and in possession. This change was adopted to prevent the overharvest of Dolly Varden stocks that occur within the Kodiak Road System.

CURRENT ISSUES

Emigration counts from the Buskin River drainage were 91,107, 30,725 and 74,451 Dolly Varden in 1990, 1991 and 1992, respectively (Table 12). The decrease of 60,000 fish in 1991 may have been due to a large decrease in population size or the population may have overwintered in salt water or elsewhere outside the Buskin drainage during the winter of 1990-1991. If the poor emigration count during 1991 (30,725 Dolly Varden) was due to a large decrease in population size, then we might expect to find a reduced number of spawning fish on the major spawning grounds (American and Olds rivers). Significant reductions of spawning fish could indicate the need for fishery restrictions to assure adequate numbers of spawning fish. Research to answer these concerns was conducted in the fall of 1993 and is discussed below.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A major research program has been underway since 1986 (Murray 1987, 1988a, 1989, 1990) to assess the stock structures and sustainable yields of Dolly Varden in the Chiniak Bay area. Work included operation of weirs to count emigrating Dolly Varden from Buskin, Genevieve and Louise lakes (all within the Buskin River drainage), and mark-recapture experiments to determine population size and stock structure at fall spawning grounds.

Results of this work to date indicate that Chiniak Bay Dolly Varden exhibit a similar life history to that documented for anadromous Dolly Varden in southeastern Alaska. Buskin Lake appears to provide the major overwintering site for Chiniak Bay Dolly Varden stocks. Dolly Varden migrate out of Buskin Lake during the spring and reside primarily in marine waters during the summer. During late summer and fall, they enter streams primarily in the Chiniak Bay area to feed and/or spawn. While the Buskin drainage is the major overwintering site, it is not the only spawning system. Other major spawning locations for Dolly Varden that overwinter in Buskin Lake include the American and Olds rivers; both of which are tributaries of Chiniak Bay. Throughout late summer and fall, Dolly Varden return to Buskin Lake to overwinter. Because of

these life history characteristics, the Dolly Varden of Chiniak Bay can be considered one stock for purposes of fisheries management.

The point estimate of 5,881 spawning fish in 1993 was the highest ever recorded for the American River, although its 95% confidence limits overlap with past estimates (Table 13). The dramatic population drop observed at the Buskin River weir in 1991 does not appear to have resulted in a noticeable reduction in the 1993 American River spawning population. The point estimate of 8,454 spawning Dolly Varden in 1993 is by far the highest ever recorded for the Olds River, although its 95% confidence limits overlap with past estimates (Table 13). We did not detect a drop in the Olds River spawning population linked to the low 1991 weir count. Even if the lower limits of the population estimates are used, the 1993 spawning populations appeared to be at least average in size.

In summary, the dramatic decrease in the size of the overwintering population in Buskin Lake counted in the spring of 1991 did not result in a reduction in the number of spawning fish in the Olds and American rivers in 1993. The overwintering population is always very large (ranging from 30,000 to 90,000 fish) in comparison to the number of spawners in the Olds and American rivers (fewer than 15,000 fish). From what we have seen, the Buskin River and Lake population can fluctuate dramatically from year to year, but not suffer a general decline as long as the spawners are not affected. Sport harvest of Dolly Varden from the Buskin River, which now averages less than 5,000 fish annually, is trivial in comparison to the fluctuations we have observed, and is not likely to affect the population size. However, sport harvest of the spawning populations should be monitored to assure that the spawning stock is not significantly reduced.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

The last population abundance research was conducted in the spring of 1992 and fall of 1993. The large emigration count of 74,451 Dolly Varden from Buskin Lake, and the large spawning population estimates on the American and Olds rivers in the fall of 1993 both indicated that the Dolly Varden population was above average in abundance when compared to other years. Since continued population monitoring is not scheduled, sport catches will be used as an indicator of population abundance.

It is important to focus on catches and not harvests when using the sport fishery as an indicator of population size. Since 1992 there has been a trend for anglers to release Dolly Varden, and road system harvests have averaged only 4,220 fish since 1992, less than half the pre-1992 average (Table 10). Since 1992, however, catch has remained high, averaging about 23,000 fish.

A weakness in using sport fish catch as a tool to gauge Dolly Varden population size is that an unknown portion of the Dolly Varden catch is made incidentally while anglers are fishing for sockeye, pink and coho salmon. The total Dolly Varden catch is influenced by the amount of fishing effort that occurs during these salmon fisheries, which may vary from year to year based on weather conditions and run strength. Therefore, the incidental Dolly Varden catch from year to year is not directly comparable, as it may be due to a function of fishing effort and not population abundance.

Keeping these limitations in mind, sport fish catches will be used as a general indicator of Dolly Varden population abundance. If Dolly Varden catches drop far below average, mark and

Table 13.-American and Olds River Dolly Varden population abundance estimates, 1988-1993.

American River					
Year	Abundance	SE	95% Confidence Interval		
			Lower limit	Upper limit	
1988 ^a	3,048	419	2,227	3,869	
1989 ^b	4,125	805	2,547	5,703	
1990 ^c	3,947	540	2,889	5,005	
1991 ^d	3,375	469	2,456	4,294	
1993 ^e	5,881	1,352	3,232	8,530	

Olds River					
Year	Abundance	SE	95% Confidence Interval		
			Lower limit	Upper limit	
1989 ^b	3,856	545	2,547	5,703	
1991 ^f	2,669	197	2,456	4,294	
1993	8,454	2,715	3,132	13,775	

^a S. Sonnichsen, Alaska Department of Fish and Game, Anchorage, personal communication.

^b Sonnichsen 1990.

^c Whalen 1991.

^d Whalen 1992.

^e The length distribution shifted between events in 1993, indicating that this estimate may be biased.

^f Whalen 1992. This estimate is biased due to unequal capture probabilities between sublocations and among size groups.

recapture spawning population estimates can be made on the American and Olds rivers to determine if the population has declined and if fisheries restrictions should be implemented.

KODIAK ROAD SYSTEM PINK SALMON FISHERY

HISTORICAL PERSPECTIVE

Pink salmon return to Kodiak Road System streams from mid-July through early September. Peak immigration typically occurs during the second week of August. Spawning occurs in stream reaches both upstream and downstream of road system bridges beginning in August.

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon (other than chinook salmon) year-round. The Buskin River upstream of Bridge No. 1 is closed to fishing for salmon from August 1 through September 10. The remaining streams along the Kodiak Road System that flow into Monashka and Chiniak bays are open to salmon (other than chinook salmon) fishing year-round in the reaches downstream of the highway bridges, and closed from August 1 through September 10 in reaches upstream of the highway bridges. The bag and possession limit for salmon over 20 inches in length is 5, no more than 2 of which may be sockeye or coho salmon.

From 1985 through 1994, the waters of the Kodiak Road System have accounted for an average harvest of 10,040 pink salmon. This represents an average of 59% of the total KMA pink salmon harvest over this period (Table 14). About 58% of this harvest has been from freshwater systems (Table 14). Pink salmon returning to streams along the Kodiak Road System are also harvested in commercial and subsistence fisheries (Appendices C and D). Commercial harvests are larger than sport harvests whereas subsistence harvests are significantly smaller than sport harvests.

Major sport fisheries for pink salmon in the Kodiak Road System occur on the Buskin, Pasagshak, American, and Olds rivers. Since 1977, these four river systems have accounted for an average harvest of 5,710 pink salmon, or 57% of the total Kodiak Road System pink salmon harvest (Table 15). Of these systems, the Buskin River has supported the largest fishery for pink salmon. Since 1985, the average harvest of pink salmon from the Buskin River has been 3,090 fish (Table 15). Other significant fisheries for pink salmon in this zone occur along the shorelines and marine waters of Chiniak and Ugak bays.

RECENT FISHERY PERFORMANCE

The pink salmon runs along the Kodiak Road system were generally weak from 1990-1992. Commercial harvest of pinks in Monashka and Chiniak bays averaged 275,000 from 1980 to 1988 but decreased to only 121,000 from 1990-1992 (Appendix C). Combining the highest aerial survey counts for each year in the three largest producers (Buskin, American and Olds rivers) during the years 1980 to 1988 averaged a yearly combined count of over 200,000 pink salmon; this figure decreased to 85,000 during 1990-1992 (Appendix F). Similar to the decrease in the commercial harvest and escapements, the sport fish harvest also decreased. The 1985-1989 average pink salmon sport fish harvest along the Kodiak Road system was 10,700 but dropped to 7,000 in 1990-1992 (Table 14). The 1993 road system harvest of 10,790 was more in keeping with past years.

The 1994 road system harvest of pink salmon was estimated by the SWHS at 4,240 (Table 14). This is the lowest harvest on record. Although the harvest was low, anglers released over 5 fish

Table 14.-Harvest of pink salmon from Kodiak Road System waters of the Kodiak Management Area, 1985-1994.

Year	Kodiak Road System					
	KMA Harvest	Release	Freshwater Harvest	Saltwater Harvest	Total Harvest	% of KMA
1985 ^a	15,426		6,455	2,930	9,385	61
1986	17,365		8,594	3,699	12,293	71
1987	13,532		6,157	4,710	10,867	80
1988	31,296		8,968	7,638	16,606	53
1989	29,176		9,820	5,269	15,089	52
1990	29,997	35,533	4,841	1,695	6,536	22
1991	12,106	22,166	5,930	4,313	10,243	85
1992	11,473	29,454	3,031	1,345	4,376	38
1993	15,570	47,822	6,159	4,610	10,789	69
1994	6,032	20,559	2,979	1,261	4,240	70
MEAN	18,197	31,106	5,898	3,747	10,042	59

Note: From 1985-1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 15.-Harvest of pink salmon from selected Kodiak Road System streams, 1977-1994.

Year	Buskin River		Pasagshak River		American River		Olds River		Total	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	3,868		1,423						5,291	
1978	4,752		1,006						5,758	
1979	4,036		1,173						5,209	
1980	6,122		1,731						7,853	
1981	3,856		713						4,569	
1982	7,357		94						7,451	
1983	4,196		178		430		199		5,003	
1984	4,701		499		835		611		6,646	
1985	3,812		501		380		440		5,133	
1986	5,810		321		948		1,086		8,165	
1987	2,354		706		1,729		1,105		5,904	
1988	5,202		327		1,310		982		7,821	
1989	4,402		804		1,397		2,325		8,928	
1990	2,841	4,705	183	487	1,000	2,742	488	1,938	4,512	9,872
1991	1,942	2,430	601	1,124	1,472	3,170	1,246	1,916	5,261	8,640
1992	1,557	3,710	403	559	513	2,070	476	2,409	2,949	8,748
1993	1,104	5,276	381	927	560	6,400	2,676	7,712	4,721	20,315
1994	751	3,102	81	398	314	2,166	694	3,926	1,840	9,592
MEAN (85-94)	3,088	3,845	447	699	973	3,310	1,161	3,580	5,706	11,433

for every fish they harvested in selected index streams (Table 15). The reason for the low sport fish harvest is unclear as road system stream escapements were above average (Appendix F1).

The 1995 pink salmon return along the Kodiak road system was above average. Most stream escapements were above average (Appendix F1). The commercial harvest of 1,175,000 (Appendix C1) also indicates a large return. Although the sport catches and harvest are not available at this time, catches are expected to be above average due to the large return.

RECENT BOARD OF FISHERIES ACTIONS

During the December 1995 Alaska Board of Fisheries meeting the Board adopted a staff proposal that extended the upriver salmon fishing closure from August 1 through September 10 to August 1 through September 15. Effective during the 1996 fishing season, streams draining into Monashka and Chiniak bays will be closed to salmon fishing upstream of the Chiniak Highway from August 1 through September 15; with the exception of the Buskin River which will be closed upstream of Bridge No. 1 from August 1 to September 15.

The last board action regarding pink salmon bag and possession limits on the road system occurred in 1987 when the bag and possession limit for salmon (other than chinook salmon) was reduced to 5 for fish over 20 inches in length of which not more than 2 may be coho salmon and 2 may be sockeye salmon. The limits had previously been 6 daily, only 2 of which could be coho salmon, and 12 in possession, only 4 of which could be coho salmon.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. Even-year minimum escapement goals for pink salmon have been established for the major streams producing pink salmon along the road system (Buskin 60,000; American 30,000; Olds 30,000). During odd years, minimum goals are: Buskin 100,000, American, 30,000; and Olds River, 30,000. The sport fishery will be managed so that spawning escapements approximate minimum spawning escapement goals.

CURRENT ISSUES

Pink salmon escapements to the Kodiak Road system commonly exceeded 500,000 fish during the 1980s (Appendix F). During this same period, sport fish harvests averaged about 12,000 fish, or about 2% of the total inriver returns (Table 14). Under these conditions, manipulating the sport fish harvest would do little to effect achieving escapement goals. However, from 1990 to 1992 pink salmon returns along the road system were weak, and foregoing a sport harvest would add to the spawning escapement and reproductive potential of the stocks. The exceptionally poor return in 1992 prompted restrictions in the sport fishery. The bag limit was reduced along the Kodiak road system by emergency order to 2 fish per day and the fishery was closed in the Buskin, American and Olds rivers. The large returns since 1993 reversed this trend for poor returns. No restrictions are expected in the near future for this fishery. Inseason monitoring of returns will continue, and if spawning escapements are significantly below minimum goals, then the sport fishery will be restricted.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

No specific research or management activities are directed at this fishery. The weir on the Buskin River was not operated during the majority of the pink salmon return in 1995 due to budgetary constraints. This will likely continue to be the case into the future. Historical time-of-

entry data for the Buskin River are listed in Appendix G2. Beginning in 1991, aerial surveys have been used to estimate the pink salmon escapement in area streams, and should be continued.

OUTLOOK

The Division of Commercial Fisheries Management and Development conducts a research project in order to forecast the return of pink salmon. The forecasted commercial harvest for 1996 is approximately 3.7 million fish which is substantially low for an even year. Along the Kodiak road system returns are expected to be poor.

INSEASON MANAGEMENT APPROACH

The magnitude of the pink salmon return to the Kodiak road system will be judged using comparative commercial catch statistics and aerial survey data. If it appears that the return is significantly below average and minimum escapement goals will not be met the sport fishery may be restricted.

If restrictions on the fishery are necessary to achieve minimum escapements, these restrictions should be initiated on or before August 10, the normal peak of the return. The options for restricting the fishery are numerous and include lowering the bag limit, closing specific waters or decreasing fishing time. The option selected will be the one that disrupts or limits sport fishing opportunity the least but still adds a significant number of fish to the spawning escapement.

It is recognized that the sport fishery generally does not greatly influence the reproductive potential of stock, largely because of the large spawning escapements involved and the relatively small sport harvests. For example, sport harvests during even years on the Buskin River have averaged approximately 4,340 fish since 1978. The minimum escapement goal for even years on the Buskin River is 60,000 fish. Even if spawning escapements were slightly below minimum, the sport removal of about 4,340 fish would not greatly impact the stock's ability to produce an abundant return. For this reason, the sport fishery will not be restricted unless it appears that spawning escapement will not be reached by a significant amount.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No additional research or management activities are recommended for this fishery at present. At this time, no changes in regulation are recommended with respect to this fishery.

KODIAK ROAD SYSTEM COHO SALMON FISHERY

HISTORICAL PERSPECTIVE

Wild and stocked coho salmon return to Kodiak Road System streams from late August through October. Peak immigration typically occurs during mid-September. Spawning occurs in stream reaches both upstream and downstream of road system bridges beginning in October.

Beginning in 1984, anadromous coho salmon fingerlings have been stocked into seven different Kodiak Road System drainages. Returns from these stocking efforts have established major sport fisheries in several locations along the Kodiak Road System. The largest fisheries occur at Mill Bay and Mission and Kalsin beaches. Fisheries for stocked returns also occur at Mayflower Beach. Stocking was discontinued at Kalsin Pond in 1994, and the last return from these stockings will occur in 1997. These releases have averaged 83,000 fingerlings from 1988 through 1995 (Table 9).

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon (other than chinook salmon) year-round. The Buskin River upstream of Bridge No. 1 is closed to fishing for all salmon from August 1 through September 10. The remaining streams along the Kodiak Road System which flow into Monashka and Chiniak bays are open to salmon (other than chinook salmon) fishing year-round in the reaches downstream of the highway bridges, and closed from August 1 through September 10 in reaches upstream of the highway bridges. The bag and possession limit for salmon other than chinook salmon is 5 salmon 20 inches or more in length, of which no more than 2 may be coho or sockeye salmon.

From 1985 through 1994, the average harvest of coho salmon from waters of the Kodiak Road System was 11,400, accounting for an average of 58% of the total KMA coho salmon harvest over this period (Table 16). About 70% of the Kodiak road system harvest has been from the Buskin, Pasagshak, Olds, and American rivers (Tables 16 and 17). Of these systems, the Buskin and Pasagshak rivers have supported the largest fisheries for coho salmon. Since 1985, the average harvest of coho salmon from the Buskin and Pasagshak rivers has been 3,290 and 2,220 fish, respectively (Table 17). Other significant fisheries for coho salmon in this area occur along the shorelines and marine waters of Chiniak and Ugak bays.

RECENT FISHERY PERFORMANCE

By regulation, salmon fishing in streams flowing into Monashka and Chiniak bays was confined to waters below the road system bridges and below Bridge No. 1 on the Buskin River from August 1 through September 10. During the 1995 season, as the September 11 regulatory opening date for waters upstream of the highway bridges approached, attempts were made to ensure that the coho return was strong enough to sustain the increased effort in upstream areas and still assure that escapement goals could be achieved. As in the past, the main indicator stream for Chiniak and Monashka Bay coho salmon stocks was the Buskin River.

Over the 11 years of operation of the Buskin River weir (1985-1995), coho salmon escapements have averaged 8,420 fish through October 1 (Table 18). A formal escapement goal defined in terms of how many coho salmon are needed for spawning in order to assure maximum propagation of future runs has not been established. However, an interim range of 5,300 to 8,300 is currently used. Information from creel surveys indicated approximately 20% of Buskin harvest occurs above the weir (700 coho on an average year). In order to achieve the minimum number of desired spawners (5,300) a weir count of 6,000 fish is needed in order to allow for a sport fish harvest above the weir and still ensure that spawning objectives are met.

A decision to extend the upriver salmon fishing closure must be made by September 7 so there will be enough time to notify the public that the scheduled opening on September 11 will not occur. Using the average time of entry for coho salmon stocks into the Buskin River, an average of about 29% of the coho salmon escapement has gone through the weir by September 7 (Appendix G3). If the 1995 run had a normal time of entry pattern, about 1,700 coho salmon were required to have passed through the weir by September 7 to achieve an average weir count of 6,000 coho salmon by October 1. The actual weir count during 1995 on September 7 was

Table 16.-Harvest of coho salmon from Kodiak Road System waters of the Kodiak Management Area, 1985-1994.

Year	KMA	Kodiak Road System	
	Harvest	Harvest	% of KMA
1985	8,727	8,130	54
1986	20,479	14,007	55
1987	17,355	11,500	59
1988	18,298	13,475	63
1989	20,176	14,910	63
1990	20,065	8,364	42
1991	17,691	12,147	69
1992	16,920	7,676	45
1993	21,240	15,099	71
1994	14,600	8,645	59
MEAN	17,701	11,395	58

Note: From 1985-1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 17.-Harvest of coho salmon from selected Kodiak Road System streams, 1977-1994.

Year	Buskin River	Pasagshak River	American River	Olds River	Total
1977	890	1,169			2,059
1978	1,018	1,043			2,061
1979	2,870	2,409			5,279
1980	2,643	2,480			5,123
1981	2,269	1,015			3,284
1982	2,431	1,100			3,531
1983	2,307	1,322	378	31	4,038
1984	1,871	1,646	486	561	6,140
1985	2,937	2,292	349	562	6,142
1986	4,251	2,951	826	1,651	9,679
1987	3,133	3,477	435	235	7,280
1988	3,474	2,637	1,710	1,273	9,094
1989	4,984	2,100	1,500	2,571	11,155
1990	1,521	2,105	849	948	5,423
1991	4,121	1,296	722	1,778	7,917
1992	1,474	1,733	583	1,085	4,875
1993	4,125	2,073	2,340	1,838	10,376
1994	2,429	973	642	1,082	5,126
MEAN (85-94)	3,286	2,223	1,002	1,306	7,835

Table 18.-Numbers of anadromous fish passed through the Buskin River weir, 1985-1995.

Year	Dolly Varden	Steelhead	Sockeye	Pink	Dolly Varden	Coho	Chum	
	Emigration	Kelts ^a	Salmon	Salmon ^b	Immigration	Salmon ^f	Salmon	Chinook
1985	21,797	223	18,010	153,026	20,540	9,474	7	
1986	41,659	71	8,939	98,958	24,110	9,939	51	
1987	29,919	105	12,690	27,892	32,848	11,103 ^g	79	
1988	30,336	357	12,144	203,578	34,386	6,782 ^g	84	
1989	35,603	205	17,853	159,123	33,306	9,930 ^g	79	
1990	91,107 ^c	150 ^d	10,528 ^h	42,889	6,416 ^e	6,222	18	
1991	30,725 ^c	148 ^d	9,789	37,636 ⁱ	812 ⁱ	8,929	21	
1992	74,451 ^c	201 ^d	9,782	25,141 ⁱ	868 ⁱ	6,535	9	6
1993	140 ^j	13 ^j	9,526	53,484 ⁱ	4,960 ⁱ	6,813	22	8
1994	j	19 ^j	11,783	89,711 ⁱ	220 ⁱ	8,146	17	7
1995	j	15 ^j	15,520	72,820 ⁱ	5,401 ⁱ	8,694	43	8

^a Steelhead kelts are fish which have overwintered in the lake, spawned in the river during the spring, and are returning to the sea.

^b Does not include an estimated 18,000, 12,000, 2,500, 30,000, 28,000, and 11,563 pink salmon spawning below the weir in 1985, 1986, 1987, 1988, 1989, and 1990, respectively.

^c A small Vexar mesh was placed over the weir in order to obtain a complete count during 1990, 1991, and 1992. Prior to 1990 only fish greater than 300 mm were effectively counted. Starting in 1990 the weir was moved to the outlet of Buskin Lake.

^d The weir was moved to Buskin Lake outlet. These steelhead were not kelts but prespawning ripe fish.

^e A flood during peak immigration made it impossible to estimate migration. This figure is a partial count.

^f A total of 350, 400, and 600 coho were estimated below the weir when it was removed in 1986, 1987, and 1988, respectively. These estimates were added to the weir counts.

^g The 1987 return of coho was enhanced by the stocking of 40,000 fry in 1984, the 1988 return by the stocking of 44,000 fry in 1985, and the 1989 return by the stocking of 50,000 fry in 1986.

^h Since 1990 the weir was moved upriver to the outlet of Buskin Lake. Sockeye entering the tributary lakes of Louise and Genevieve are not counted at the upriver location.

ⁱ The weir was not operated during late July and early August. Pink salmon counts have been expanded by aerial surveys or time of entry data in order to estimate escapement. Dolly Varden immigration counts are incomplete and have not been expanded to estimate a total immigration.

^j The weir was not operated in April and May. These counts are incomplete and have not been expanded to estimate total escapement.

2,219 coho salmon, and as a result the waters upstream of the Chiniak Highway opened as scheduled on September 11.

Anglers reported good catches in late August and early September, especially in the Buskin and Olds rivers. However, Kodiak experienced flooding in September and October which hampered fishing. September of 1995 was the second wettest September in history, with 19.44 inches of rainfall. October was also wetter than average, with 9.99 inches of rain. Sport catches and harvest for 1995 are not available yet, however these are expected to be below average because of the poor fishing conditions caused by flooding in September.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. The fishery will be managed so that a minimum spawning escapement of 5,300 coho will be achieved in the Buskin River. The fishery will also be managed so that other index coho systems along the road continue to receive sufficient spawning escapements (American and Olds rivers, Salonie Creek, Roslyn and Pasagshak rivers).

RECENT BOARD OF FISHERIES ACTIONS

During the December 1995 Kodiak Board of Fisheries meeting, background information was given to the Board explaining the regulation that closes salmon fishing in waters above the highway for streams that drain into Chiniak and Monashka bays from August 1-September 10 (and above Bridge No. 1 on the Buskin River). This regulation has been in effect for over 20 years. The original intent of this regulation was to protect spawning pink salmon. The lower rivers were left open to fishing and allowed angler fishing opportunities for bright pink salmon and early arriving cohos. As fishing pressure has increased for coho salmon in recent years, this upriver closure has been used by fisheries managers to protect coho salmon as well as pink salmon. If it appears that coho salmon are abundant and escapement goals will be achieved, these upriver areas are opened to fishing as scheduled on September 11. If the return appears weak or cannot be evaluated, the upriver fishing closures are extended so that harvests will be reduced and spawning objectives met. The main tool to evaluate run strength is the Buskin River weir.

The Buskin River weir has been used to regulate fishing season for all the streams that drain into Chiniak and Monashka bays, however, this return may or may not be indicative of the run strength in other nearby streams. Also by September 10 only about 30% of the return has occurred, making it difficult to assess run strength by this date. An additional problem is that several of the local index streams have shown below average year-end coho escapements.

In the Chiniak and Monashka bay coho salmon fisheries the season opening date had been delayed in 5 of the past 10 years. This created an unorderly fishery for the public and enforcement officials. Using the Buskin River weir to regulate the open season for all streams had lead to a situation where escapement goals were achieved on the Buskin River but sometimes were not achieved in other index streams. The department proposed a regulation change in an attempt to improve management of this fishery. The upriver opening date was delayed until September 16. This delay in opening date should help increase escapements into index streams. The public will be able to depend on this opening date since there is little inseason information to make adjustments on the opening dates of these index streams. The upriver opening date on the Buskin River would also be delayed until September 16, which would give the department more

time to evaluate run strength. If escapement objectives in the Buskin River could be assured at an earlier date based on weir information, then the upriver section of the Buskin River could be opened earlier than September 16. This proposal was expected to increase the orderliness of the fishery and result in achieving escapement objectives in all area streams. The Board accepted this proposal, and for the 1996 fishing season a new regulation will be in effect which will extend the upriver salmon fishing closure from August 1-September 10 to August 1-September 15.

CURRENT ISSUES

Based on informal angler interviews, it appears that the recreational fishery for coho salmon in the Kodiak Road System is the most important sport fishery in the Kodiak Management Area in terms of angler preference. Since 1985 the Kodiak road system coho salmon sport harvest has averaged 58% of the total coho salmon harvest in the entire KMA (Table 16). The sport harvest on the road system has averaged 11,400 fish followed by the commercial fishery of 6,520 (Appendix C) and the subsistence fishery of 2,740 fish (Appendix D). Due to its proximity to the town of Kodiak and high angler interest, the sport fishery has the potential to overharvest the coho salmon resource. In order to document the history of road system coho salmon stocks so that these populations and fisheries can be studied and managed, a report was written (Schwarz 1993). In this report harvest from all fisheries, run timing, escapement and stocking statistics for the years 1980-1990 were compiled. This report along with data in recent Kodiak area annual management reports can be used to evaluate stock status and effectiveness of management practices.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A weir on the Buskin River and foot or aerial surveys on other area streams are currently used to estimate escapement levels. Scale samples are taken from the Buskin River sport harvest as well as during the coho egg take so that brood tables can be developed and escapement goals refined.

INSEASON MANAGEMENT APPROACH

As stated under the section on recent Board of Fisheries Actions, there will be a new regulation in effect for the 1996 season where streams that flow into Monashka and Chiniak bays will be closed to salmon fishing from August 1 through September 15 upstream of the Chiniak Highway and upstream of Bridge No. 1 on the Buskin River. Streams other than the Buskin will open on September 16 unless there is some inseason information that indicates that escapement objectives will not be met. The Buskin River weir will be used to monitor coho escapement into the Buskin River. The section of the Buskin River above Bridge No. 1 may be opened as early as September 11 if it appears that minimum escapement objectives will still be met, even if the fishery is opened early. (In order to achieve a minimum of 5,300 spawning coho the weir count on September 7 must be about 1,700 fish). If the fishery is not opened on September 11 it will not be opened until minimum escapement objectives can be assured. When deciding on a September 16 opening date, a weir count of 2,400 must be achieved by the end of counting on September 12. The evaluation should be made by September 12 so that if the upriver closure needs to be extended past September 16, there will be time to notify the public.

If the upriver closure is not sufficient to ensure minimum escapements are achieved, additional restrictions may be implemented (reduction in bag limits, additional area closures or time closures). The weir count by October 1 should be 6,000 in order to ensure that 5,300 spawning fish remain after the sport fish removal.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Maintaining operation of the Buskin River weir in order to gauge run strength in season of the Chiniak Bay coho salmon run is essential. This management tool allows for conservation of the resource as well as providing maximum fishing opportunities to anglers.

In addition to the Buskin River there are many smaller streams which provide fishing opportunities on the Kodiak road system: Monashka, Pillar, Sargent, Russian, Salonie, American, Olds, Roslyn, Chiniak, Pasagshak, Saltery and Miam. The only way to evaluate whether the existing management system is effectively providing for stock conservation is to monitor escapement levels in these streams annually. Although escapement surveys are conducted after all fisheries have taken place, they still provide the data necessary to observe trends. If decreasing trends were noted over 2 or 3 years then the management strategy could be adjusted to better provide for stock conservation. Without documenting escapement after the fisheries have occurred it is difficult to evaluate management strategies. It is recommended that the above mentioned streams be walked at least once to document spawning escapement. The six largest streams should be walked twice. Results of these surveys are listed in Appendix E.

As fishing effort for coho salmon along the road system continues to increase, the stocking program will increase in importance. This project provides additional fishing opportunities as well as relieving fishing pressure on the wild stocks. The 1994 Statewide Harvest Survey documented a harvest of 362 coho with 1,977 angler days at Mill Bay, a return location for stocked adults. In 1994 the SWHS estimated 1,839 angler-days expended with a harvest of 217 coho salmon from the shoreline at Mission Beach (M. Mills, ADF&G, Anchorage, personal communication). Starting in 1993, brood source eggs were taken from the Buskin River instead of from Afognak. The change in this program was initiated over concerns that returning adults would stray into local streams and genetically mix with wild stocks. Buskin returns are typically 2 to 3 weeks later returning than Afognak coho salmon, the previous brood source, so fishing opportunities in mid to late August for stocked coho will be lost due to the change in brood source. The Kodiak Regional Aquaculture Association is incubating and rearing Buskin River coho salmon eggs free of charge at the Pillar Creek fish hatchery. The involvement in this project for the return of angling opportunity is cost effective and should be continued.

KODIAK ROAD SYSTEM SOCKEYE SALMON FISHERY

HISTORICAL PERSPECTIVE

Three sockeye salmon populations are present along the Kodiak Road system: the Buskin, Pasagshak, and Saltery river populations. Sockeye salmon return to Kodiak Road system lakes from June through August with peak immigration varying by stream. Saltery supports the latest returning sockeye salmon run on the road system. Because of the limited access into Saltery Cove (4-wheel drive or float plane) the Buskin and Pasagshak receive most of the fishing effort. Spawning occurs in mid August.

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon (other than chinook salmon) year-round. The Buskin River upstream of Bridge No. 1 is closed to fishing for salmon from August 1 through September 10. The remaining streams along the Kodiak Road System which flow into Monashka and Chiniak bays are open to salmon fishing year-round in the reaches downstream of the highway bridges,

and closed from August 1 through September 10 in reaches upstream of the highway bridges. The bag and possession limit is 5 salmon 20 inches or more in length, of which no more than 2 may be sockeye or coho salmon.

From 1985 through 1994, the average harvest of sockeye salmon from waters of the Kodiak Road system has been 3,600, accounting for an average of 43% of the total KMA sockeye salmon harvest over this period (Table 19). About 78% of the road system harvest has been from the Buskin and Pasagshak rivers (Table 20). Since 1985, the average harvest of sockeye salmon from these two river systems has been 1,980 and 670 fish, respectively (Table 20). Another significant fishery for sockeye salmon in this area occurs in Saltery River.

RECENT FISHERY PERFORMANCE

The sport harvest of sockeye salmon from Kodiak Road System waters during 1994 (5,418) was the highest on record (Table 19). This harvest accounted for 40% of the total sockeye salmon harvest from KMA waters during 1994 (Table 19). Usually the Buskin and Pasagshak rivers support the largest harvest of sockeye salmon (Table 20). However, in 1994 Saltery supported a larger harvest (1,240) than the Pasagshak (860). Catches in all three rivers were significantly above average.

During 1995, sockeye salmon returns were above average in the Buskin and average at Pasagshak and Saltery rivers (Appendix F). Although harvest and catch estimates are not yet available for 1995, they are expected to be similar to 1994.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. The Buskin River fishery will be managed so that a minimum spawning escapement of 8,000 fish is achieved in Buskin Lake. The minimum spawning escapement objective in Saltery is 20,000 sockeye. Escapement trends will be monitored in Pasagshak through aerial surveys, to ensure that at least average escapement into this lake is occurring. Aerial survey counts have varied considerably since 1980 but have averaged 8,250 fish (Appendix F).

RECENT BOARD OF FISHERIES ACTIONS

At the December 1995 Board of Fisheries meeting in Kodiak the Board accepted a public proposal to increase the daily bag limit at Saltery Cove to 5 sockeye. The previous bag limit for salmon other than chinook was 5, only 2 of which could be coho or 2 of which could be sockeye. The Board concluded that since the minimum escapement goal of 20,000 had been doubled every year for the past 5 years and that sport catch and effort was relatively low due to restricted access, that raising the bag limit from 2 sockeye to 5 sockeye would not jeopardize stock conservation or change the character of the fishery. The possession limit was not changed and remains one daily bag limit (5 salmon over 20 inches).

Table 19.-Harvest of sockeye salmon from Kodiak Road System waters of the Kodiak Management Area, 1985-1994.

Year	KMA Harvest	Kodiak Road System	
		Harvest	% of KMA
1985	8,225	3,832	46
1986	6,233	3,424	54
1987	4,562	2,590	56
1988	8,853	4,166	47
1989	13,173	4,004	30
1990	8,224	2,901	35
1991	5,049	2,814	55
1992	8,408	3,140	37
1993	7,849	3,685	47
1994	13,502	5,418	40
MEAN	8,408	3,597	43

Note: From 1985-1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 20.-Harvest of sockeye salmon from selected Kodiak Road System streams, 1977-1994.

Year	Buskin River	Pasagshak River	Saltery	Total	% of Road System
			Cove Streams		
1977	228	176		404	
1978	493	85		578	
1979	424	236		660	
1980	388	284		672	
1981	173	205		378	
1982	304	199		503	
1983	1,233	192		1,425	
1984	1,179	374		1,571	
1985	3,484	182		3,666	96
1986	2,339	428		2,767	81
1987	1,503	417		1,920	74
1988	2,274	819		3,093	74
1989	1,816	1,244	390	3,450	86
1990	998	1,018	417	2,433	84
1991	1,575	815		2,390	85
1992	1,981	427	518	2,926	93
1993	1,544	543	563	2,650	72
1994	2,573	861	1,237	4,671	86
MEAN (85-91)	1,981	666		2,715	78

CURRENT ISSUES

Due to its proximity to the town of Kodiak, the Buskin River sockeye salmon resource receives considerable sport and subsistence fishing pressure. The subsistence fishery is the major user with harvests averaging 4,200 sockeye salmon from 1980-1994 (Appendix D). Over this same period, the average sport harvest of sockeye salmon from the Buskin River has been 1,560. There is no directed commercial fishery on the Buskin River sockeye salmon stocks. The average commercial harvest in Womens Bay during nondirected commercial fisheries from 1980-1994 has been 100 sockeye (Appendix C). Since 1985, the average escapement of sockeye salmon to the Buskin River weir has been 12,410 (Table 18). Current exploitation rates appear to be sustainable. However, escapement must be monitored to ensure that the reproductive potential of the stock is not diminished by failing to meet escapement objectives as user group demands increase.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A weir is currently operated on the Buskin River to count immigrating sockeye salmon. Scale samples are being collected from the escapement as well as from the subsistence harvest so that brood year tables can be constructed and escapement goals evaluated. Currently subsistence harvests are tabulated from returned permits. Sport harvests are obtained through the Statewide Harvest Survey (Howe et al. 1995).

INSEASON MANAGEMENT APPROACH

A biological minimum escapement goal for the Buskin River of 8,000 sockeye is currently under review for formal adoption and in the interim is being used to manage the fishery. Since 1985, sockeye have been enumerated through a weir on the Buskin River and time of entry data are available for this period (Appendix G1). If escapement counts through the weir drop to a point where a minimum escapement of 8,000 sockeye cannot be assured, then the sport fishery will be restricted. Restrictions could consist of reducing the bag limit or closing specific areas or times, depending on how much the sport harvest needed to be reduced to achieve the minimum spawning objective.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Staff recommends continued operation of the weir on the Buskin River to count immigrating sockeye salmon. Also, biological sampling of the escapement and subsistence harvest should be continued so that brood tables can be constructed.

KODIAK ROAD SYSTEM LANDLOCKED LAKES STOCKED FISHERIES

HISTORICAL PERSPECTIVE

Stocking has and is currently being used to increase and diversify the opportunities for sport anglers fishing Kodiak Road System landlocked lakes. Several species of fish at various life stages have been stocked, including rainbow trout fingerlings, Arctic grayling fry, and coho salmon fingerling.

Regulations governing the stocked lakes vary by species. Within the Kodiak Road System, with the exception of the Saltery and Buskin lake drainages, populations of rainbow trout are limited to hatchery-produced fish planted into landlocked lakes; the bag and possession for rainbow trout

is 10 fish, only 1 of which may be 20 inches or more in length. Daily bag and possession limits for Arctic grayling are 10 fish with no size limits. Bag and possession limits for salmon other than chinook salmon are 10 per day, 10 in possession for fish less than 20 inches.

From 1984 through 1994, an average of 1,480 angler-days has been expended by recreational anglers fishing landlocked lakes along the Kodiak Road System (Table 21). This effort has represented on average only about 1% (Table 21) of the total sport fishing effort expended by recreational anglers fishing KMA waters over this period (Howe et al. 1995). The average harvest of rainbow trout, Arctic grayling, and nonanadromous salmon from stocked lakes from 1984 through 1994 has totaled 770, 130, and 210 fish, respectively (Table 21). Road system harvests have represented nearly half of the harvests of rainbow trout. During 1995, approximately 65,560 rainbow fingerlings were stocked along the Kodiak road system (Table 9). An additional 5,000 rainbow trout fingerlings were stocked in a lake next to the Chignik runway. A total of 6,095 coho fingerlings were stocked in two landlocked lakes on the Kodiak Road System, and Pony (also called Sawmill Lake) and Southern Lake on Long Island.

MANAGEMENT OBJECTIVES

The management objectives for this fishery are to provide angling opportunities and diversity through a landlocked lake stocking project.

RECENT BOARD OF FISHERIES ACTIONS

The Board of Fisheries has taken no specific actions with respect to this fishery in recent years. At the December 1995 meeting in Kodiak the Board rejected a public proposal that would have allowed six poles to be fished through the ice in the road system zone. The Board rejected this proposal because they did not think allowing six poles to be fished was in keeping with the character of a sport fishery. Currently two poles are allowed to be fished through the ice by each angler.

CURRENT ISSUES

Effort directed towards these stocked fish and harvest of the stocked fish has remained relatively low (Table 21). The costs for these projects are also relatively low, averaging less than \$4,000 per year for all species combined. There are no major management issues regarding this fishery at present.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Several lakes currently stocked are located on private property. An agreement to grant public access should be obtained if these lakes are continued to be stocked.

The Arctic grayling catch and harvest have remained very low from the four lakes which are stocked. Because a fishery failed to develop for grayling, stocking was terminated in 1995, and the program was discontinued.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Greater education of the sport fishing public is recommended to increase utilization of these stocked fish. A map of stocked lakes with pictures of successful anglers fishing through the ice and in open waters should be developed and displayed at the Kodiak Fish and Game office to help make anglers aware of fishing opportunities in stocked lakes.

Table 21.-Number of angler-days of sport fishing effort and number of rainbow trout, Arctic grayling, and landlocked salmon harvested by anglers fishing roadside lakes along Kodiak Road System, 1984-1994.

Year	Effort (Angler-Days)			Rainbow Trout Harvest			Arctic Grayling Harvest			Landlocked Salmon Harvest		
	Lakes	KMA	% of KMA	Lakes	KMA	% of KMA	Lakes	KMA	% of KMA	Lakes	KMA	% of KMA
1984	2,442	101,126	2	1,446	2,828	51	249	361	69	1,547	1,547	100
1985	1,532	97,893	2	1,173	3,119	36	516	870	59	106	889	12
1986	582	98,479	1	367	928	40	15	15	100	0	726	0
1987	1,390	98,969	1	1,394	1,849	75	72	594	12	434	1,116	39
1988	1,646	91,631	2	490	964	51	109	382	29	0	18	0
1989	969	110,868	1	787	1,861	42	189	726	26	60	1,587	4
1990	1,475	116,197	1	812	1,528	53	52	86	61	35	1,330	2
1991	1,541	139,478	1	472	1,296	36	65	98	66	0	0	0
1992	2,261	107,482	2	901	1,179	75	120	120	100	151	887	17
1993	1,186	114,286	1	98	483	20	8	50	16	0	3,087	9
1994	1,277	116,413	1	470	731	64	24	41	51	0	0	0
MEAN	1,482	108,438	1	765	1,525	49	129	304	54	212	1,016	16

ADAK ISLAND FISHERIES

Adak Island is situated approximately mid-way on the Aleutian Island chain (Figure 7). The community of Adak and a large U.S. Naval Base on the island are the major population centers. During the early 1990s approximately 5,500 people lived on Adak. All fisheries on the island can be accessed either by road or small boat launched from the community of Adak.

The marine and fresh waters of Adak Island supported the third most popular fisheries in the KMA in terms of recreational angling effort expended since 1985 (Table 3, Figure 2). Since 1985, these waters have accounted for nearly 15% of the recreational angling effort expended in the KMA, averaging 13,370 angler-days (Table 3).

The Navy Base on Adak is in the process of closing, and the population in 1995 was reduced from 5,000 people to 100 people. The base is scheduled for complete closure in 1997. The 1994 angling effort dropped to 1,050 angler-days, a 92% reduction in angling effort from the 1985-1994 average. The closure of the navy base and subsequent cessation of the sport fishery at Adak will cause a 50% reduction in angling effort in the Alaska Peninsula/Aleutian Islands Regulatory Area.

ADAK SPORT FISHERY 1994

Only 19 anglers reported fishing from Adak in the 1994 Statewide Harvest Survey. Of the 19 responses received, 11 fished from boats in salt water, 1 from the saltwater shore, and 7 fished in fresh water. The estimated total fishing effort was 1,045 angler-days (M. Mills, ADF&G, Anchorage, personal communication). Estimated harvests included 143 chinook, 161 sockeye, 187 pink salmon, 215 Dolly Varden, 126 halibut and 29 rockfish (M. Mills, ADF&G, Anchorage, personal communication). Tables 22 and 23 are provided to show how much the harvest declined in 1994. The Dolly Varden harvest dropped from an average of 3,150 to 220 (Table 22). Table 23 shows that the Adak pink salmon harvest averaged 5,440 fish from 1982-1994, but dropped to 187 fish in 1994. The Adak pink salmon harvest used to account for 25% of the entire management area pink salmon harvest but fell to 3% in 1994. The sockeye harvest dropped from an average harvest of 1,140 to 161 fish. No coho were reported harvested in 1994. The average harvest for coho was 1,170 fish. Angling effort and harvest are expected to continue to decline as the base nears complete closure.

AFOGNAK/SHUYAK ISLAND FISHERIES

The Afognak/Shuyak Island group lies northeast of Kodiak Island. For purposes of this discussion, the group includes the fresh and nearby salt waters surrounding Afognak, Shuyak, Raspberry, Whale, and Marmot islands (Figure 8).

The marine and fresh waters of the Afognak/Shuyak Island group support the fourth most popular fishery in the KMA in terms of recreational angling effort expended since 1985 (Figure 2). Since 1985, these waters have accounted for nearly 10% of the recreational angling effort expended in the KMA. There are two major fisheries that occur in the waters of the Afognak/Shuyak Island group. These fisheries target coho salmon and halibut. The halibut fishery is discussed under marine bottomfish.

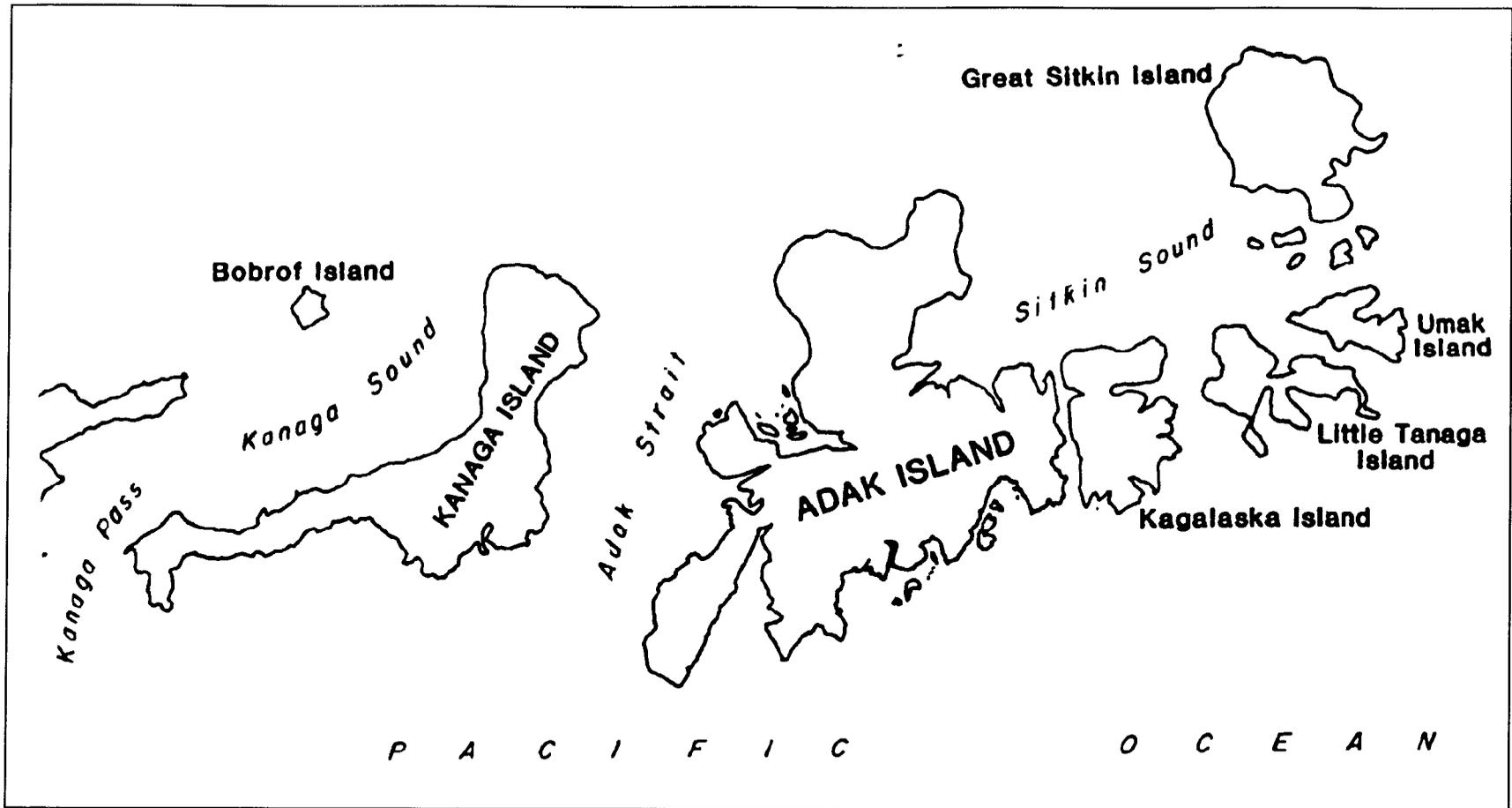


Figure 7.-Adak Island and surrounding waters.

Table 22.-Harvest of Dolly Varden from Adak Island waters of the Kodiak Management Area, 1982-1994.

	KMA	Adak Island	
	Harvest	Harvest	% of KMA
1982	36,065	3,365	9
1983	30,192	4,374	15
1984	28,528	3,254	11
1985	22,562	2,653	12
1986	26,459	2,819	11
1987	15,831	3,631	23
1988	22,592	1,237	6
1989	18,635	3,137	17
1990	21,052	5,591	27
1991	21,418	3,036	14
1992	11,525	2,007	17
1993	10,233	2,247	22
1994	6,608	215	3
MEAN	20,900	2,921	14

Table 23.-Harvest of pink, coho, and sockeye salmon from Adak Island waters of the Kodiak Management Area, 1982-1994.

Year	Pink Salmon				Coho Salmon		Sockeye Salmon	
	Freshwater	Saltwater	Total	% of KMA	Harvest	% of KMA	Harvest	% of KMA
1982	2,170	6,571	8,741	29				
1983	713	1,783	2,496	19				
1984	304	3,786	4,090	24				
1985	1,907	0	1,907	12	311	4	149	2
1986	2,267	233	2,500	14	698	3	218	4
1987	1,143	127	1,270	9	86	1	81	2
1988	10,272	495	10,767	34	1,021	5	2,816	32
1989	3,405	4,730	8,135	28	2,236	11	2,366	18
1990	9,939	9,549	19,488	65	3,658	18	1,832	22
1991	4,257	2,204	6,461	31	1,571	7	1,450	18
1992	2,894	1,512	4,406	28	566	3	649	8
1993	1,227	384	1,611	10	411	2	1,627	15
1994	102	85	187	3	0	0	161	1
MEAN	3,122	2,419	5,443	25	1,057	6	1,135	12

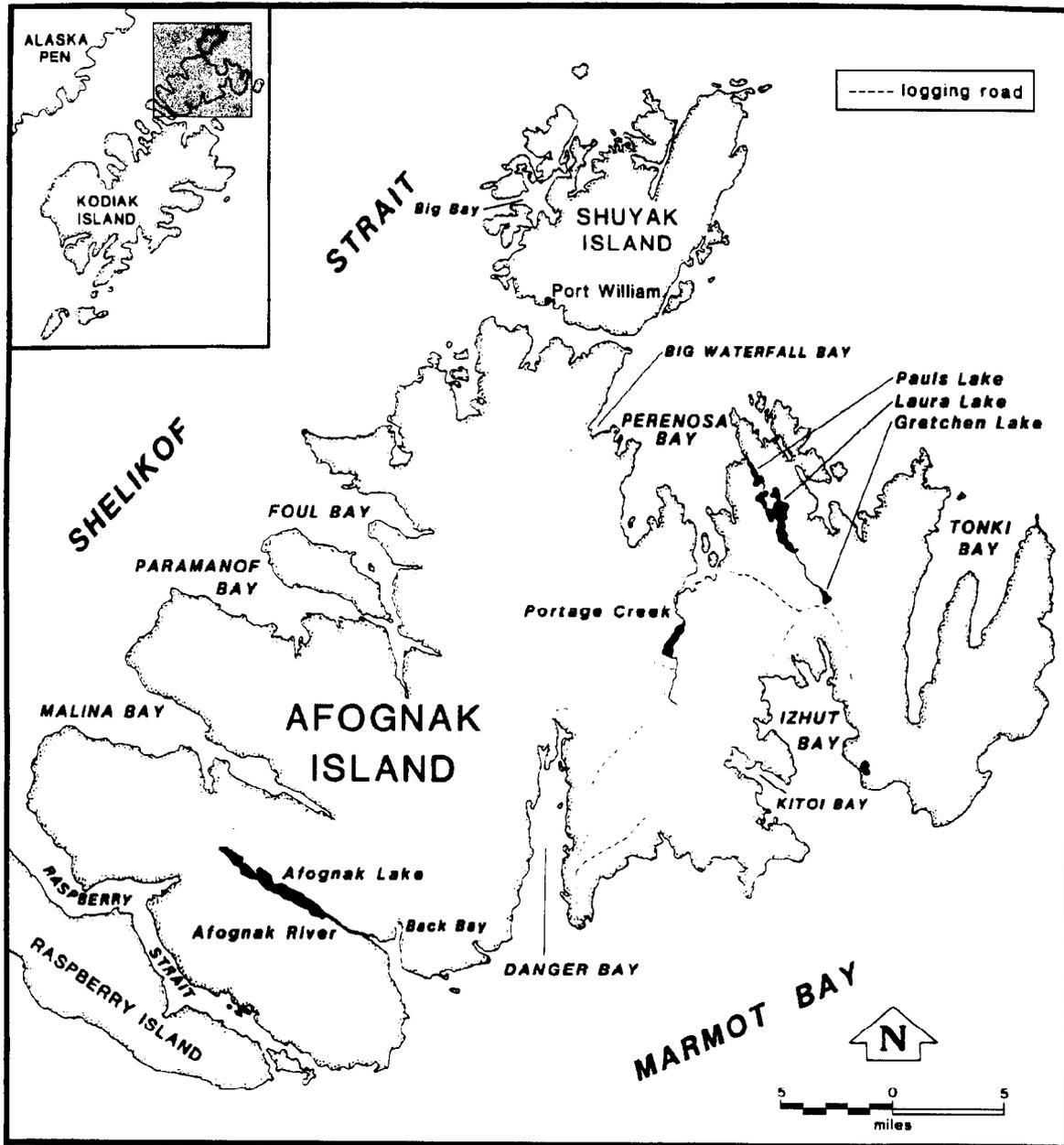


Figure 8.-Afognak/Shuyak islands and surrounding waters.

AFOGNAK/SHUYAK ISLAND COHO SALMON FISHERIES

HISTORICAL PERSPECTIVE

Coho salmon return to Afognak/Shuyak Island waters from mid August through mid October. Peak immigration typically occurs during early September, with spawning beginning in October.

In the remote waters of the Kodiak Regulatory Area (including the Afognak/Shuyak Island group), the daily bag and possession limits for salmon (other than chinook salmon) greater than 20 inches has been 5, and for fish under 20 inches 10.

From 1986 through 1994, the waters of the Afognak/Shuyak Island area accounted for an average harvest of 3,090 coho salmon, accounting for an average of 19% of the total KMA coho salmon harvest over this period (Table 24). Nearly all of the harvest has occurred in salt water with the majority occurring in the marine waters off Afognak Island.

A creel survey of selected coho salmon fisheries on Afognak and Shuyak islands was conducted during 1987 (Murray 1988b). Results of this survey conducted at five sites (Table 25) showed that anglers fished an estimated 3,520 angler-hours to harvest an estimated 1,320 coho salmon. In 1987 the Afognak Lagoon coho fishery, which is the largest fishery on Afognak, was not surveyed so the harvest estimate for the surveyed sites cannot be compared to the Statewide Harvest Survey for the entire Afognak/Shuyak area. In 1990 a creel survey was conducted in Afognak Bay and Lagoon and estimated 3,700 angler-hours and harvest an estimated 3,010 coho salmon. An estimated 1,106 coho were released (Schwarz and Sonnichsen 1991). The 1990 SWHS estimate for the entire Afognak/Shuyak Island area was 3,096. These two estimates are not comparable because the creel survey estimate is just for a portion of the total Afognak/Shuyak Island area. However, the closeness of the two estimates shows that the SWHS serves as an order-of-magnitude estimator for the Afognak/Shuyak Island coho salmon fisheries.

RECENT FISHERY PERFORMANCE

The sport harvest of coho salmon from Afognak/Shuyak Island waters during 1994 (2,350) was about average (Table 24). This harvest accounted for 16% of the total coho salmon harvest from KMA waters during 1994. In addition to the harvest of 2,250 coho salmon from Afognak/Shuyak Island waters during 1994, an additional 490 coho salmon were estimated to have been caught and released by sport anglers fishing Afognak/Shuyak Island waters during 1994 (Howe et al. 1995). Based on this, anglers released an estimated 17% of the coho salmon they caught fishing Afognak/Shuyak Island waters during 1994.

Sport fishing opportunities for coho salmon in the Afognak/Shuyak Island area were good during 1995, especially in Afognak, Pauls Bay, Shuyak Island and Marka Bay. Returning coho were abundant in all these systems. Harvest information for the 1995 season is not available at this time. However, the harvest is expected to be similar to 1994.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource.

Table 24.-Harvest of coho salmon from Afognak/Shuyak islands waters of the Kodiak Management Area, 1986-1994.

Year	KMA	Afognak/Shuyak Islands	
	Harvest	Harvest	% of KMA
1986	20,479	5,091	20
1987	17,355	4,383	23
1988	18,298	3,802	18
1989	20,176	2,718	12
1990	20,065	3,096	15
1991	17,691	3,232	18
1992	16,540	3,652	22
1993	22,889	2,746	12
1994	14,600	2,346	16
MEAN	17,698	3,093	19

Table 25.-Creel survey statistics for selected sport fisheries for coho salmon on Afognak and Shuyak islands, 1987 and 1990.

Year	Location	Effort (Angler-Days)	Harvest (Number of Fish)	Release
1987	Portage Creek	1,972	589	
	Pauls Bay	729	159	
	Big Bay	427	378	
	Carry Inlet	289	106	
	Shangin Bay	107	92	
	All Sites	3,524	1,324	
1990	Afognak Lagoon	3,700 ^a	3,010	1,016

^a Angler hours

RECENT BOARD OF FISHERIES ACTIONS

At the December 1995 Board of Fisheries meeting in Kodiak, a public proposal to increase the remote zone possession limit for salmon other than chinook salmon to two daily bag limits was adopted as a regulation. Beginning in 1996 anglers fishing in the remote zone will be allowed to keep two daily bag limits in their possession, or up to 10 salmon other than kings. This provision will most likely be used by anglers who travel to Afognak via boat, overnight, and return with two daily bag limits.

CURRENT ISSUES

There has been a perception in the past that sport anglers have overexploited the coho salmon resource in Afognak/Shuyak island waters. Monitoring of selected fisheries on the islands during 1987 and again during 1990 demonstrated this perception to be in error. In addition, escapements at weirs on Afognak and Shuyak islands have been above average (Table 26). Given such findings, we do not recommend continuing these programs.

Marka Bay on Afognak Island supports a small but popular coho salmon fishery. There have been increasing complaints of crowding and bag limit violations in this fishery.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are currently no ongoing research or management activities specifically directed at this fishery. Coho salmon escapements into some of the major drainages are monitored with weirs (Afognak Lake, Pauls Lake and Big Bay) (Table 26).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Based on the creel survey conducted during 1990, it is apparent that the Afognak (Litnik) Lagoon fishery for coho salmon is a major fishery rivaling harvest in the Buskin and Pasagshak river sport fisheries. To better monitor the growth of this sport fishery, staff recommends that this location be defined as a specific site in future statewide sport fishing postal survey forms. Other than monitoring these fisheries through the Statewide Harvest Survey, we recommend no specific research or management activities for this fishery at present. Sport Fish personnel should visit Marka Bay to become familiar with this fishery.

KARLUK AND AYAKULIK (RED) RIVERS FISHERIES

The Karluk and Ayakulik (also known as Red River) are located on the southwest end of Kodiak Island (Figure 9). Anglers fishing the Karluk River typically gain access to the river in one of three fashions. Anglers fly into the village of Karluk via either float or wheel plane and subsequently fish Karluk Lagoon and the lower Karluk River (Figure 9). Others fly into Karluk Lake and float the Karluk River downstream either to the portage or all the way downstream to Karluk Lagoon. Finally, access may be gained by flying into the portage reach of the Karluk River via float plane. Anglers accessing the river in this manner either fish just this reach or float down to the Lagoon. Anglers fishing the Ayakulik River (Figure 9) typically gain access to the fishery by float-equipped aircraft. The major access location on the upper Ayakulik River is at the confluence of the Ayakulik and Bare Creek. The Karluk and Ayakulik rivers support native stocks of steelhead trout and all five species of North American Pacific salmon. Chinook and coho salmon are the preferred salmon species; however, both rivers have large runs of sockeye and pink salmon which are also harvested by anglers.

Table 26.-Coho salmon counts at weirs on Afognak and Shuyak islands, 1985-1994

Year	Afognak		Pauls Bay		Portage Creek		Big Bay ^a		Bear Creek ^a	
	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation
1985	13,847	29-Sep	9,535	12-Sep						
1986	5,082	28-Sep	9,403	3-Sep						
1987	11,469	24-Sep	4,767	11-Sep	3,710	20-Sep			833	23-Sep
1988	9,772	9-Sep	5,563	3-Sep	2,354	4-Sep	1,771	2-Oct	967	6-Sep
1989	13,050	20-Sep	7,919	10-Sep	5,928	28-Aug	1,799	11-Sep	441	7-Sep
1990	13,380	17-Sep	3,668	7-Sep	4,277	8-Sep	1,535	30-Sep	926	15-Sep
1991	14,409	8-Sep	Not operated				2,823	28-Sep	Not operated	
1992	16,415	15-Sep	Not operated				931	18-Sep	925	8-Sep
1993	6,637	12-Sep	10,664	2-Sep			2,281	25-Sep	2,048	6-Sep
1994	11,965	18-Sep	12,538	6-Sep			2,065	26-Sep	Not operated	
Average	11,603		8,007		4,067		1,886		1,023	

^a Big Bay and Bear Creek weirs are located on Shuyak Island.

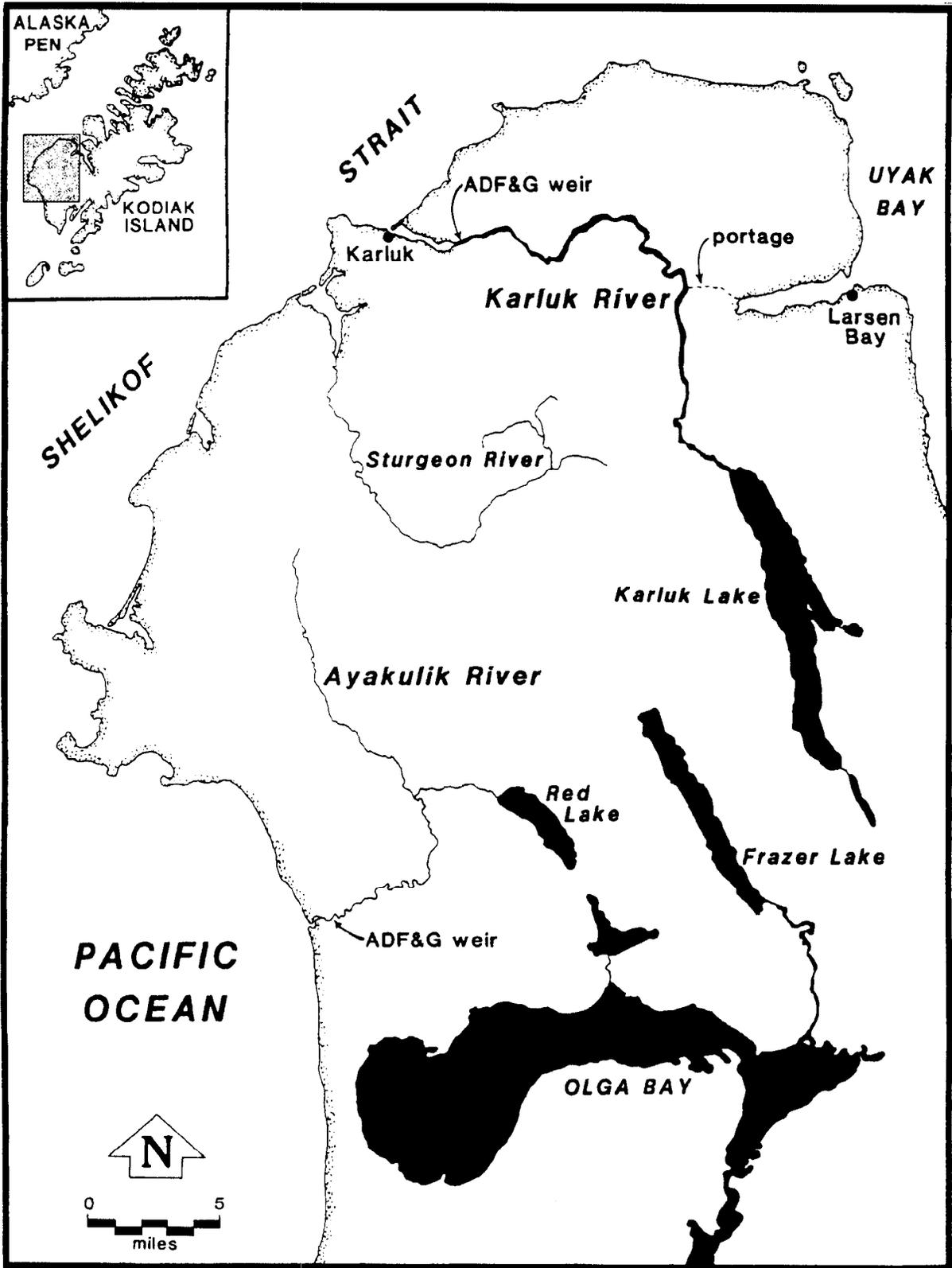


Figure 9.-The Karluk and Ayakulik rivers.

KARLUK AND AYAKULIK RIVERS STEELHEAD TROUT FISHERIES

HISTORICAL PERSPECTIVE

Sixteen river systems on Kodiak and Afognak islands are known to support populations of steelhead trout (Figure 10), of which the Karluk and Ayakulik rivers support the largest populations. Steelhead trout returning to the Karluk and Ayakulik rivers are fall-run fish which begin entering the Lagoon and lower river in mid-August and may continue immigration through the winter months. The peak of the run occurs in late October. The majority of spawning takes place from April through early June.

Daily bag and possession limits for steelhead/rainbow trout in the remote portions of the Kodiak Regulatory Area (including the Karluk and Ayakulik rivers) are 2 fish, only 1 of which may be 20 inches or more in length. Fishing for steelhead trout in flowing waters is closed from April 1 through June 14 to protect spawning fish.

From 1983 through 1994, sport anglers have harvested an average of 130 and 60 steelhead trout from Karluk and Ayakulik River drainage waters, respectively (Table 27). This harvest has accounted for an average of 24% and 10% of the total KMA steelhead trout harvest from KMA waters over this period (Table 27). The Karluk River supports the largest fishery. However, fishing pressure on the Ayakulik River has increased in recent years. Other sources of mortality for steelhead trout returning to these two rivers include: incidental harvest in the commercial salmon fisheries along the Alaska Peninsula and southwest side of Kodiak Island and the subsistence fisheries conducted by the residents of Karluk and Larsen Bay villages (Begich 1992, 1993, 1995a, 1995b).

The annual return of steelhead trout entering the Karluk and Ayakulik rivers is not known because weirs located in the lower river on both systems are not operated past September, when the majority of the immigration occurs. However, after overwintering and spawning, surviving postspawn steelhead trout (kelts) emigrate downstream and pass through a weir located near the mouth of both rivers. Mortality associated with spawning is not fully understood; however, it has been estimated at the Karluk River from 1992 through 1995. Over these years the survival of steelhead from prespawn capture to postspawn weir emigration has ranged from 51%-67% (Table 28). Kelt counts on the Karluk River have ranged from 210 to 7,014 over the past 5 years (Table 29). A 4-year trend of low kelt counts beginning in 1986 indicated a declining population at the Karluk River. However, in recent years the number of emigrating kelts has increased, with the 1993 and 1994 counts being the highest on record. At the Ayakulik, kelt counts have been stable averaging 988 fish since 1981 with a 1995 count of 1,134 fish (Table 29).

RECENT FISHERY PERFORMANCE

According to the Statewide Harvest Survey (Howe et al. 1995), the sport harvest of steelhead trout from the Karluk River drainage waters during 1994 was 80 fish with 1,387 fish released (Table 30). Effort and catch data were also obtained from a creel census conducted at the Karluk River Portage from October 4 through November 11, 1994. A total of 25 steelhead were harvested, and 2,939 were released. These figures represent data from anglers interviewed at the Portage and the outfitter's camp, as well as information from eight rafters who harvested four steelhead and released 341. A total of 586 angler-days of fishing effort occurred. The Statewide

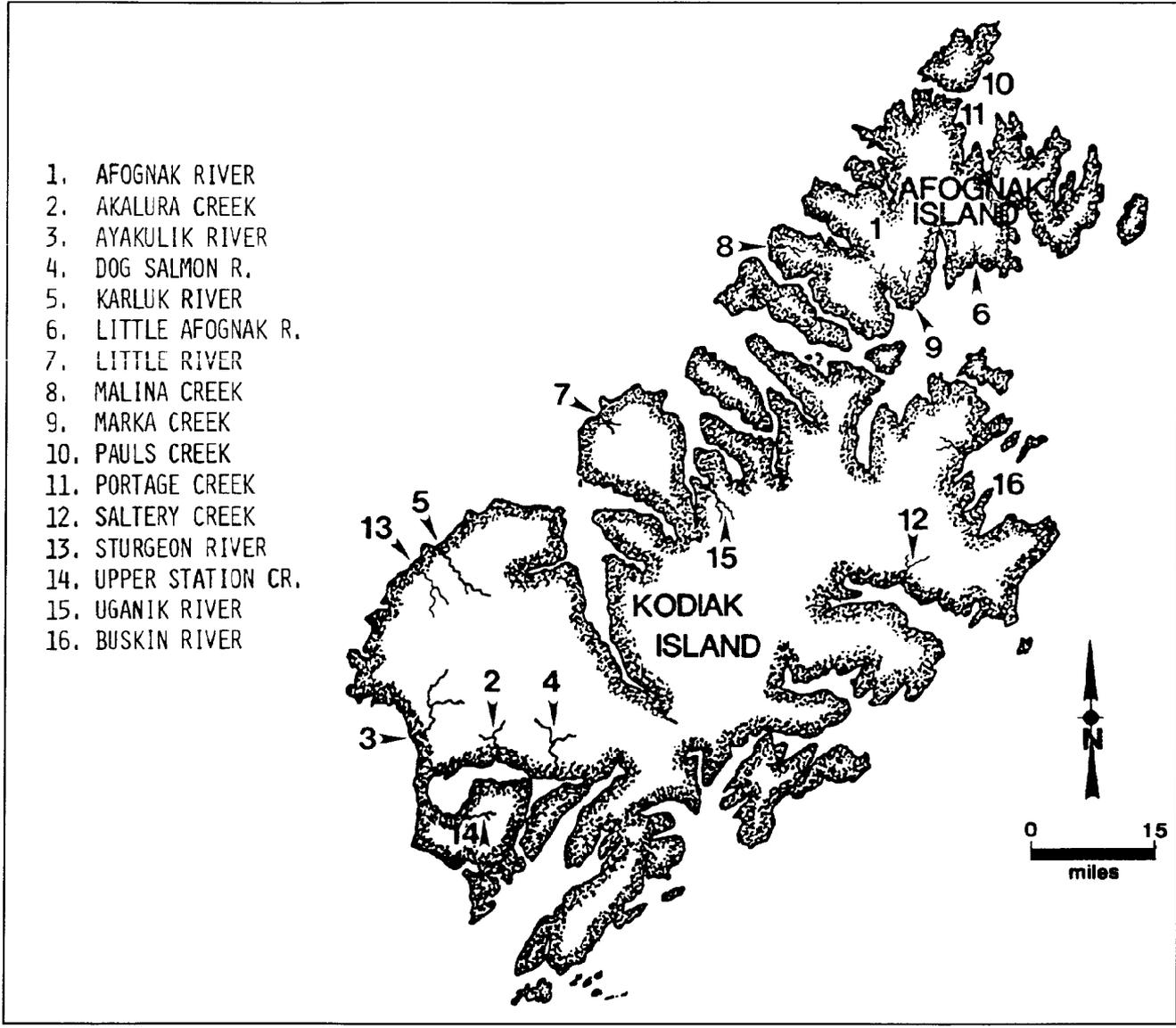


Figure 10.-Locations of steelhead trout stocks on Afognak and Kodiak Island.

Table 27.-Harvest of steelhead trout from the Karluk and Ayakulik (Red) River drainages, 1984-1994.

Year	Karluk River		Red River		Total KRA ^a
	Harvest	# Released	Harvest	# Released	Harvest
1984	300		49		696
1985	304		15		790
1986	70		0		321
1987	90		0		253
1988	109		91		853
1989	30		279		778
1990	86	1,053	17		1,120
1991	148	961	96	228	327
1992	40	898	16	418	96
1993	189	3,446	0	2,000	433
1994	80 ^b	1,387	46	869	234
MEAN	131	1,549	55	878	536

Note: Reported catches of rainbow trout from the Ayakulik and Karluk drainages are treated as steelhead. The rainbow trout populations in these drainages are so small, relative to the steelhead populations, that reported rainbows are probably misidentified steelhead.

^a This harvest estimate is calculated by adding the steelhead reported in the Statewide Harvest Survey under Saltwater total, Karluk, Ayakulik, Saltery, Other streams and other lakes. Rainbow trout reported in the Karluk and Ayakulik Rivers are also counted as steelhead. Steelhead reported under roadside lakes are considered as rainbow trout.

^b In 1994 a creel census occurred on the Karluk River during the chinook and steelhead return in June. A total of 5 and 268 steelhead were harvested and released during the June chinook fishery.

Table 28.-Karluk River steelhead spawning population research summary, 1992-1995.

Year	Spawning		# Initial	# Repeat	# Multi repeat	Spawning	Previous year's	
	Population	Sex Composition						Spawners
	Size	Male	Female					
1992	4,107 (± 263)		3,203	739	165	2,752 (67%)	339	
1993	7,026 (± 604)	2,339 (± 302)	4,687 (± 461)	6,113	843	70	4,075 (58%)	356
1994	9,116 (± 1,023)	4,928 (±680)	4,188 (± 629)	7,384	1,641	91	4,649 (51%)	852
1995	10,801 (± 857)	4,174 (± 641)	6,629 (± 760)	8,965	1,620	217	6,697 (62%)	1,145

Table 29.-Counts of steelhead trout kelts from the Karluk and Ayakulik (Red) River drainages, 1981-1995.

Year	Karluk River	Ayakulik River
1981	2,194	1,108
1982	1,096	54
1983	4,203	1,351
1984	2,512	1,306
1985	1,924	693
1986	296	1,016
1987	687	727
1988	210	918
1989	611	789
1990	1,029	970
1991	1,475	910
1992	2,862	1,174
1993	4,259	1,517
1994	4,910	1,150
1995	7,014	1,134
MEAN	2,352	988

Table 30.-Statewide steelhead catches by river in order of magnitude, 1993 and 1994.

Stream	1994 ^a		1993 ^a		1993 & 1994 Total catch	1990-1995	Population Characteristics	Management Approach
	Harvest	Release	Harvest	Release		Estimated spawning Population Range		
Kasilof/Crooked Cr ^b	1,262	4,894	2,237	5,280	13,673			
Situk	42	3,186	0	4,321	7,549			
Anchor	0	3,388	0	3,321	6,709			
Karluk	80	1,387	189	3,446	5,102	3,000-11,000	Fall run.	2 fish/day only 1 over 20".
Ayakulik	46	869	0	2,000	2,915	1,500-3,000	Fish overwinter in rivers	Spawning closure April 1-June 14
Deep Creek	0	904	0	1,234	2,138			
Sitkah	0	403	19	854	1,276	500-1,500	Spring run	1 fish per day must be over 36"
Niniichik	0	660	0	386	1,046			
Wards Cove Cr/Lk ^b	23	513	50	450	1,037			
Petersburg Cr	108	547	49	304	1,008			
Buskin River	9	533	0	404	946	200-400	Fall run. Fish overwinter in Buskin Lake	Closed 1970-1995. Starting 1996 Nov & Dec hook & release
Staney Cr	0	554	0	359	913			
Karta	0	658	10	115	783			
Thorne	0	608	9	145	753			
Ketchikan Cr	0	347	0	329	676			
Klawok River	75	194	0	360	629			
Naha	15	243	0	367	625			

^a Data from Statewide Harvest Survey

^b Hatchery enhanced

Harvest Survey estimated a harvest of 46 steelhead and a release of 869 in the Ayakulik River. The steelhead harvest from these two rivers represented 54% of the harvest in the entire KMA during 1994.

Steelhead trout fisheries on the Karluk and Ayakulik rivers are primarily catch and release. Since 1991 approximately 94% of all steelhead trout caught on both rivers were released. The current bag and possession limit for steelhead trout over 20 inches is one fish. This regulation, coupled with the remote location of the rivers and a lack of public facilities for freezing fish, dictates a low retention rate.

Effort and catch estimates for 1995 are not available from the Statewide Harvest Survey at this time. The creel survey at the Karluk Portage was repeated in 1995. From October 1 to November 10 a total of 32 steelhead was harvested, and 2,466 were released. These figures represent information collected from anglers exiting the river from the Portage, the outfitter's camp and 14 anglers who rafted the river, exiting at the lagoon. A total of 612 angler-days of fishing effort was expended.

Although these figures represent a large percentage of the total fall fishery, they still represent minimums because steelhead caught in the lagoon during August, September and October are not accounted for. The Karluk and Ayakulik Rivers currently have the potential to generate some of the highest steelhead catches in the state of Alaska. Figure 11 and Table 30 show that the catch of steelhead trout in the Karluk and Ayakulik rivers produced the fourth and fifth largest catches of steelhead in the state when considering the 1993 and 1994 fishing years. Future trends in sport catch and effort will depend upon several factors including: maintenance of current steelhead abundance levels, public access, and public awareness of the quality of these steelhead trout fisheries. The Karluk and Ayakulik steelhead fisheries are definitely examples of level III fisheries, with a high cost of participation and a low yield in terms of harvested fish. In order for this fishery to continue to grow, there must be anglers willing to pay the price of getting to these fisheries and brave what are typically poor weather conditions with very limited camping facilities (especially on the Ayakulik River). Even if effort into these fisheries does not grow, these fisheries provide diversity in the KMA, offering anglers an uncrowded, remote experience with excellent fishing for steelhead trout.

MANAGEMENT OBJECTIVE

Specific fishery objectives have not been formally established for Karluk and Ayakulik rivers steelhead trout fisheries to date. An assumption of past and current fisheries management, however, has been to follow the guidelines set forth in the Cook Inlet and Copper River Basin Rainbow and Steelhead Trout Management Policy for wild stocks of steelhead trout (ADF&G 1986). This policy provides future Fisheries Boards, staff managers, and the sport fishing public with:

1. Management policies and implementation directives for area rainbow and steelhead trout fisheries;
2. A systematic approach for developing sport fishing regulations that includes a process for rational selection of waters for such special management as catch and release, trophy areas, and high yield fisheries; and

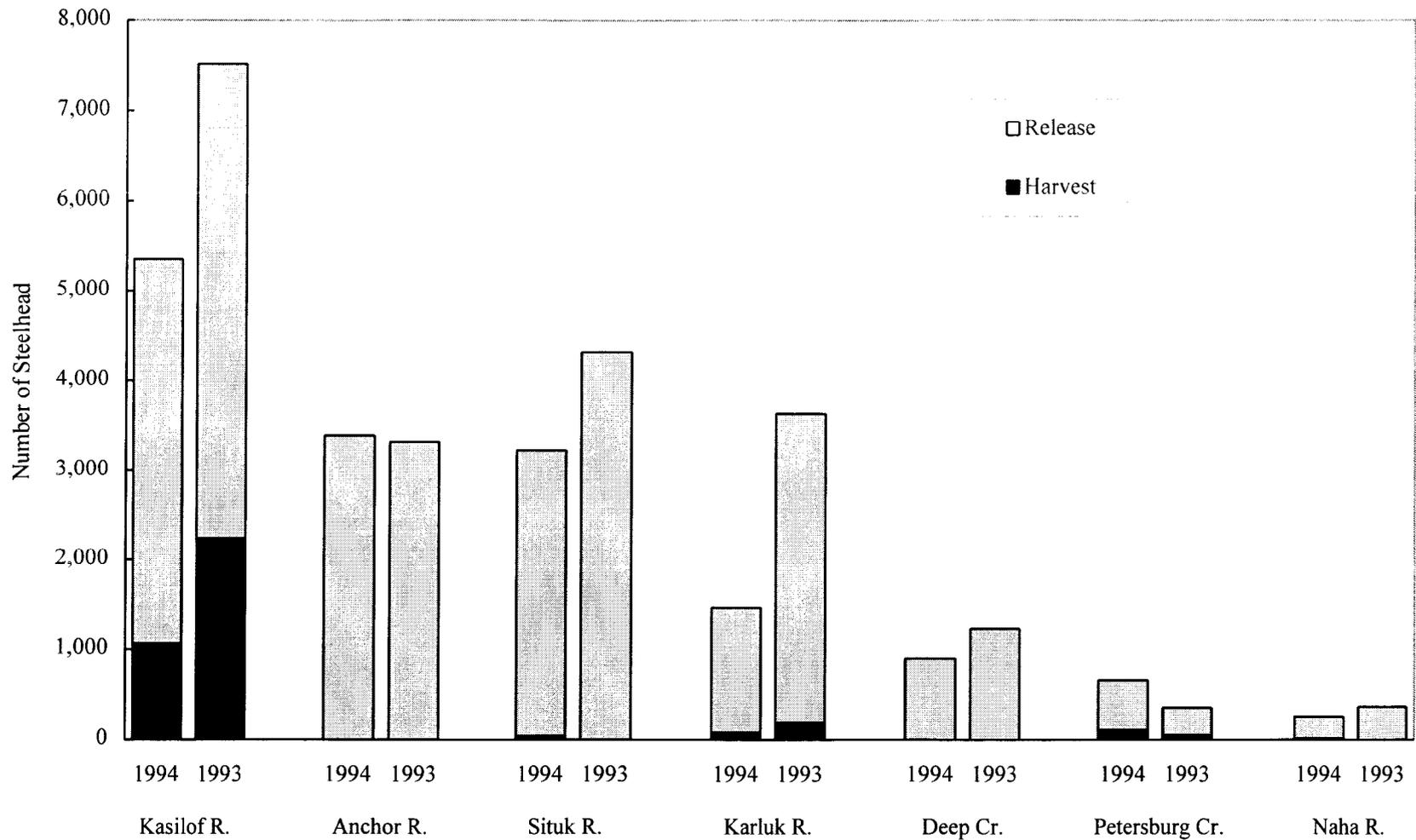


Figure 11.-Sport caught steelhead catches from Alaskan rivers reporting the highest catches during 1993 and 1994.

3. Recommended research objectives.

A primary research objective is to establish a relationship between spawning population size and spring kelt counts. Once this relationship is established, monitoring the size of the spawning population will be possible through examining kelt counts.

RECENT BOARD OF FISHERIES ACTIONS

During the December 1995 Board of Fisheries meeting in Kodiak, the Board rejected a public proposal that would have prohibited the use of bait in fresh water of the Kodiak remote zone. The department's position on this proposal was that it was too broad and applied to too many species. The department stated that although we were opposed to the proposal, we were not opposed to prohibiting the use of bait in specific streams for specific species as identified through a planning process used to develop special use areas. Steelhead stocks on Kodiak Island are the most likely species to which special use plans would be applied. The department will work with anglers who are interested in developing special use areas, following the guidelines used in the Cook Inlet and Copper River Basin Rainbow and Steelhead Trout Management Policy for wild stocks of steelhead trout.

CURRENT ISSUES

Average kelt counts declined in the late 1980s (Table 29). In response to this decline, the Division of Sport Fish initiated a research project on the Karluk River. The abundance of steelhead, as indicated by kelt counts, began to increase in 1990, and the 1995 count of 7,091 was the highest on record. This rebound in steelhead trout abundance is encouraging and makes additional sport fisheries restrictions for stock preservation unnecessary at this time.

Annual subsistence harvest by residents of Larsen Bay village has averaged 336 steelhead trout since 1991 (Begich 1995b). This is a rod and reel fishery which occurs during the winter and spring months. State regulations do not designate rod and reel as a legal subsistence gear type for subsistence fishing on Kodiak Island. Federal regulations do allow rod and reel as a legal subsistence gear type but disallow the taking of steelhead as a subsistence species on Kodiak Island. So the current subsistence fishery is in violation of both state and federal regulations. The harvesting of steelhead from the Karluk River is legally limited to a season of June 15 to March 31, and the daily bag limit is 2 steelhead trout of which only one may be over 20 inches in length. It has been documented through departmental surveys that the subsistence fishery has existed for several years, takes place during April, and that residents often exceed daily bag and possession limits, even though there are no regulations in place that permit it. A program to inform participants that the fishery is illegal and the process available to make it a legal fishery should be undertaken. State regulations do allow for the retention of incidentally caught steelhead in legal subsistence fisheries.

Maintaining effective kelt emigration through salmon counting weirs is essential. Repeat and multirepeat spawners add significantly to future years' fishery and spawning population (Table 28). In addition, repeat spawners are larger fish (Begich 1995a and 1995b) which are a desirable component of the sport fishery. Delayed downstream passage due to weirs results in increased mortality to kelts. Downriver passages or traps have proven effective, and aluminum traps have been built and incorporated into the weirs on the Karluk since 1992 and since 1993 on the Ayakulik. These traps provide an opening in the weir for fish moving downstream. Once the steelhead enter the trap they can be sampled and released downstream.

A paramount concern involves maintaining adequate angler access to these recreational fisheries as native owners and the Kodiak National Wildlife Refuge develop their land management strategies.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Since 1991, the Division of Sport Fish has conducted a comprehensive research project on the Karluk River steelhead population. This study has investigated the magnitude of the incidental commercial harvest of steelhead from marine waters near the Karluk River. The study estimated sport harvest, documented subsistence harvest and estimated the number of spawning adult steelhead in the Karluk for the 1992, 1993, 1994 and 1995 spring spawning populations. In 1994 and 1995 the study was expanded to include an onsite autumn angler survey. The complete results of the first 4 years of study are presented in Begich (1992, 1993, 1995a, 1995b). A summary of the important findings follows and are listed in Table 28.

From August 15 through September 30, commercial purse seine and set gill net catches from selected waters along the southwest portion of Kodiak Island were sampled for the bycatch of steelhead trout. The total estimated catch of steelhead trout in these fisheries was 705, 417, 41 and 293 in 1991, 1992, 1993 and 1994, respectively.

All kelts emigrating through the weir since 1992 have been tagged. Therefore, any repeat spawner caught in the commercial fishery of Karluk origin would have a tag in it. It was hoped that the contribution of Karluk stocks to the incidental mixed-stock harvest could be estimated by determining the percentage of incidentally-caught repeat spawners that were tagged. However, there were insufficient numbers of tagged fish among the 54 steelhead that were observed during sampling to estimate the Karluk River contribution to the incidental steelhead harvest. However, it is probable that the steelhead catch is comprised of mixed stocks due to the proximity of other steelhead systems to the Karluk (Figure 10).

Sport harvest of steelhead at the Karluk is low. Approximately 94% of all steelhead caught since 1990 have been released. Angler participation in the Karluk River fishery is increasing, and the number of fish caught has increased from about 1,000 fish per year to a record 3,635 steelhead trout in 1993 (Table 27). After the 1993 sport fishery it was apparent that reports of good steelhead fishing on the Karluk River were circulating among anglers. In anticipation of increased angling effort during the 1994 season, a department tent camp was established on the Karluk Portage so that the fishery could be monitored. From October 4 through November 11, 1994, 585 angler-days were expended to harvest 25 steelhead with a release of 2,942. Five steelhead were caught per angler-day. Additionally, 12 coho salmon were harvested with 273 released, 34 Dolly Varden harvested with 2,603 released and 5 sockeye salmon harvested with 162 released.

The creel survey at the Karluk Portage was repeated in 1995. From October 1 to November 10 a total of 32 steelhead were harvested, and 2,466 were released. These figures represent information collected from anglers exiting the river from the Portage, the outfitter's camp and 14 anglers who rafted the river, exiting at the lagoon. A total of 612 angler-days of fishing effort was expended.

Finally the fall census does not consider the June catch of steelhead kelts which occurs incidentally during the chinook salmon fishery. In 1994 a creel census for chinook salmon was conducted at the Karluk Portage and weir. During the chinook salmon census anglers were also

asked if they caught any steelhead. A harvest of five steelhead and a release of 268 fish was documented, indicating that steelhead kelts caught in June make up a very small portion of the total steelhead catch, and steelhead catches reported in the Statewide Harvest Survey are mostly made up of steelhead taken in the directed fall fishery.

To summarize, the 1994 fall census documented a harvest of 25 steelhead with a release of 2,942. A chinook salmon census documented a harvest of five steelhead with a release of 268 fish. This brings the 1994 documented harvest to 30 steelhead and a release of 3,210 fish. Although this census represents most of the catch that took place, it should still be considered a minimum number because it does not account for catches that were made in Karluk Lagoon. This documented catch compares with an estimate from the statewide harvest survey of 80 steelhead harvested and a release of 1,387. The Statewide Harvest Survey draws its sample from anglers who purchased licenses between January 1 and September 30. This is done so that the survey can be completed in a timely fashion, and is generally not a problem because most of the fishing for the year has been completed. However, the steelhead fishery is an exception because the main fishery occurs in October. Anglers who purchased their licenses in the spring and fish for steelhead in October are included in the pool of anglers who could be sent questionnaires about their fishing activity and catch. However, anglers who buy their licenses in October or November will not be included in the pool of sampled anglers. Because of this methodology, the Statewide Harvest Survey underestimates the Karluk steelhead fishing effort and catch. This is especially true because nonresidents who fish in October and November are likely not to purchase their licenses until they enter the state. Based on the 1994 and 1995 creel surveys, nonresident anglers accounted for 66% and 76% of the angler days expended in the fishery. Nonresident anglers also accounted for 77% and 80% of the total steelhead catch.

The subsistence harvest was again documented in 1994 and was zero from Larsen Bay and 35 from Karluk Village (Table 31, Begich 1995b). Harvests have averaged 336 from Larsen Bay and 47 from Karluk Village since 1991. The estimated abundance of steelhead spawning in the Karluk River during the spring of 1995 was 10,801 (± 857 fish at a 95% confidence limit) (Table 28, Begich 1995b). The majority of the population has been comprised of initial spawners, ranging from 78% to 87% and averaging 82% since 1992. Repeat spawners have accounted for less than 20% of the population, ranging from 12% to 18% and averaging 18% since 1992. Sampling at the Ayakulik began in 1993. The Ayakulik kelt emigration has averaged 68% initial spawners (74%, 66% and 64% initial spawners in 1993, 1994, and 1995, respectively).

Spawning survival has ranged from 51% to 67%. The spawning survival was 62% in 1995 (Table 30, Begich 1995b).

The Karluk steelhead population had fish present from 15 age groups. In 1995 the dominant age groups for spawning population were 2.3, 2.3s2 and 2.2². These age groups made up 61%, 13% and 10% of the population, respectively. The kelts sampled at the weir had 2.3, 2.2 and 2.3s2 as the dominant age groups, making up 49%, 22% and 12% of the population, respectively. The Ayakulik kelt population in 1995 was dominated by age groups 2.3, 2.3s2 and 2.2 making up 44%, 24% and 17% of the population, respectively.

Table 31.-Incidental commercial and subsistence harvests of steelhead, Larsen Bay and Karluk Village, 1991-1994.

Year	Incidental harvest of Steelhead in Commercial Salmon Fishery ^a	Larsen Bay Subsistence Harvest ^b	Harvest (Number of Fish)
1991	705	263	47
1992	417	697	107
1993	41	382	0
1994	293	0	35

^a Includes steelhead retained for personal use as recorded on catch calendars. Does not include steelhead that were released live from commercial gill nets.

^b These are estimates calculated by multiplying the average number of steelhead harvested per household by the total number of households in the village.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Field work in the research program initiated during 1991 is scheduled to continue until July of 1997. A graduate intern position was created in January 1996, and Karluk steelhead will be the focus of the graduate program. The graduate program is expected to be completed in June 1998.

Fifth and sixth mark-and-recapture experiments to estimate the abundance of the spawning population at the Karluk River will occur in the spring of 1996 and 1997. Information gained will include spawning survival, age class composition and verification of scale age determination from tag recoveries in addition to spawner abundance. Establishing the relationship between the number of kelts and the number of spawners will make it possible to monitor the spawning steelhead population via kelt counts at the weir after the project has ended.

² The "s" in the age designation indicates that the fish spawned. This is evident by the presence of a spawning check which occurs when the fish partially reabsorbs some of its scale during spawning. After spawning the fish may survive and return to sea. After a period at sea, the fish will return again to spawn and will be termed a repeat spawner. So, for example, the fish that was designated a 2.3s2 age was a fish that spent 2 years in fresh water, spent 3 years in salt water, returned to the river and spawned, returned to sea for 2 years, returned to the river and was sampled shortly before spawning again. This fish was about to become a repeat spawner after it had spawned the second time.

The incidental harvest of steelhead in the commercial fishery and the subsistence harvest will no longer be monitored. The sport fishery will be monitored through the Statewide Harvest Survey and no longer monitored by a creel census.

A major source of mortality for steelhead trout of Karluk origin, which has been identified but not investigated, is the June commercial salmon fishery. During this time, abundance of steelhead is high in nearshore fisheries within close proximity to the Karluk River. These are the kelts which have survived to emigrate back to the sea. Monitoring of this fishery would be difficult and costly. Generally kelts are easily identified in commercial catches and immediately removed from the catch. Therefore, samplers would need to be stationed on vessels when the catch is landed. The mobile purse seine fleet in Kodiak waters numbers some 391 vessels, and monitoring the incidental kelt catch in selected areas would be difficult.

A method to improve the way the Statewide Harvest Survey estimates the Kodiak steelhead harvest should be investigated.

KARLUK AND AYAKULIK RIVERS CHINOOK SALMON FISHERIES

HISTORICAL PERSPECTIVE

The Karluk and Ayakulik rivers support the only populations of native chinook salmon in the Kodiak Regulatory Area. Chinook salmon return to the Karluk and Ayakulik rivers from late May through mid-July, with 50% of the immigration usually passing weirs located in the lower rivers by June 15. Chinook salmon in the Karluk River spawn from the outlet of Karluk Lake downstream to just above the Lagoon. Few, if any, chinook salmon enter Karluk Lake or the tributaries to the lake. Spawning occurs from mid-August through mid-September. The distribution of spawning chinook salmon in the Ayakulik River begins just above tide water and extends upriver. One of the major spawning tributaries is a fork on the Ayakulik just upriver from the Red River. Few fish, if any, enter Red Lake. Spawning occurs from late July through late August. Anglers generally fish for chinook salmon on the Ayakulik River below the Red River confluence. Anglers often mistakenly call the Ayakulik the "Red River." Fishing for chinook salmon is open year-round throughout both the Karluk and Ayakulik rivers. The bag and possession limit is 3 fish, only 2 of which may be over 28 inches. In addition, there is a provision which allows the harvest of 10 chinook salmon under 20 inches in length. The Statewide Sport Fish Harvest Survey provides estimates of harvest for the recreational fisheries in these waters. Complete or partial creel surveys were also conducted in both rivers during 1993, 1994 and 1995. Chinook salmon bound for both the Karluk and Ayakulik rivers are also harvested in commercial and subsistence fisheries.

The estimated annual sport harvest of chinook salmon from the Karluk and Ayakulik rivers from 1983 through 1994 has averaged 740 and 450 fish, respectively (Table 32). The largest estimated harvest was 1,630 in the Karluk River and 1,000 in the Ayakulik River, both made in 1993.

table 32

Table 32.-Harvest of chinook salmon from the Karluk and Ayakulik (Red) River drainages, 1984-1994.

Year	Karluk River			Ayakulik River		
	Harvest	Number Released	% of KMA Harvest	Harvest	Number Released	% of KMA Harvest
1983	304		24	145		11
1984	187		16	437		37
1985	472		42	76		7
1986	122		15	76		9
1987	199		20	126		13
1988	819		38	600		28
1989	559		25	390		18
1990	700	2,262	61	252	2,394	22
1991	1,599	3,119	58	563	2,191	20
1992	856	2,754	39	776	3,199	35
1993 ^a	1,634	6,734	31	1,004	4,422	19
1994 ^b	1,483	2,174	45	948	1,029	29
MEAN	740	3,409	35	446	2,645	22

Note: Data in this table are from the Statewide Harvest Survey (Mills 1984-1994, Howe et al. 1995) unless otherwise indicated.

^a A creel census at the Karluk weir and spit, and a creel survey of Karluk Lagoon estimated the harvest and release at 569 and 2,566 respectively. This was an incomplete estimate because it did not account for fishing which was conducted at the Portage.

A complete creel census was conducted on the Ayakulik River in 1993 by USFWS. Harvest and catch were documented at 808 and 2,878 chinook salmon, respectively (Schwarz 1996).

^b In 1994 a creel census occurred above the Karluk weir documenting a harvest of 896 chinook. A creel census in the Ayakulik River documented a harvest of 739 chinook. These estimates were not used to calculate the mean in Table 32.

Escapement of chinook salmon into the Karluk and Ayakulik rivers is enumerated through weirs located near the terminus of each river. Escapement of chinook salmon into the Karluk River has averaged approximately 10,190 fish during the past 14 years (1981-1995), with individual year's totals ranging from 4,430 to 14,440 (Table 33). In the Ayakulik River, escapement of chinook salmon has averaged approximately 11,220 fish during the same period with individual year's totals ranging from 3,320 to 21,370 (Table 33). Based on these escapements, the exploitation rate of the inriver sport fishery has been low, averaging 7% in the Karluk River and 5% in the Ayakulik River.

RECENT FISHERY PERFORMANCE

Harvest of chinook in 1994 from the Karluk and Ayakulik rivers was estimated through the Statewide Harvest Survey at 1,480 and 950 fish, respectively. Additionally, 2,170 fish were released in the Karluk and 1,030 in the Ayakulik (Table 32). These harvests were about double the 1983-1994 average.

Harvest figures for the 1995 season are not yet available from the SWHS, however, all anglers rafting through the Karluk weir were interviewed for catch and effort information. A total of 380 anglers fished for 1,677 angler-days. They harvested 492 and released 2,411 chinook salmon (Table 34). The success of the 1995 rafters compared with past years appears to be the same as in 1994. Harvest levels remained the same per angler, but with 25% fewer anglers the total number of fish caught was also reduced by 25%.

On the Ayakulik River anglers rafting through the weir as well as staying at the lodge next to the weir were interviewed for catch and effort information. A total of 126 anglers fished for 606 angler-days. They harvested 296 chinook salmon and released 2,445 (Table 34). The total harvest from anglers interviewed at the weir dropped from 466 in 1994. Anglers also caught more fish in 1995. Anglers released an average of 19 fish each in 1995 and only 9 in 1994. Also contributing to the decrease in harvest in 1995 was a decrease in the number of anglers, dropping from 203 to 126.

MANAGEMENT OBJECTIVES

The primary management objective is to insure that escapement goals are met in both rivers. Management objectives also include providing angling opportunities at a level that can be supported by the resource. Maintaining public access is an important objective. Department staff should participate with the federal government and private landowners as they develop their land use plans.

RECENT BOARD OF FISHERIES ACTIONS

Two public proposals were considered by the Board of Fisheries at its December 1995 meeting that would have affected the chinook salmon fisheries in the Karluk and Ayakulik rivers. One proposal would have lowered the bag and possession limit for chinook salmon in fresh waters of the remote zone from 3 fish to 1 fish. The other proposal would have prohibited the use of bait in fresh waters of the remote zone. Neither of these proposals were adopted by the Board because the large returns of chinook salmon experienced in recent years made reducing the sport fishery efficiency or harvest unnecessary for conservation purposes.

Table 33.-Escapement and harvest of chinook salmon in the Karluk and Ayakulik (Red) River drainages, 1981-1995.

Year	Escapement	Effort ^a (angler-days)	Sport Harvest ^b	Inriver Exploitation Percent
KARLUK RIVER				
1981	7,575			
1982	7,489	1,552		
1983	11,746	2,142	304	3
1984	7,747	820	187	2
1985	5,362	2,520	472	9
1986	4,429	--	122	3
1987	7,930	--	199	3
1988	13,337	2,128	819	6
1989	10,484	2,420	559	5
1990	14,442	2,969	700	5
1991	14,022	4,547	1,599	11
1992	9,601	5,430	856	9
1993	13,944	6,894	1,634	12
1994	12,049	10,948	1,483	12
1995	12,657			
MEAN	10,188	3,640	744	7
AYAKULIK RIVER				
1981	8,018			
1982	3,320			
1983	15,511		145	1
1984	6,502		437	7
1985	8,151		76	1
1986	6,371		76	1
1987	15,636		126	1
1988	21,370		600	3
1989	15,432		390	3
1990	11,251		252	2
1991	12,988	1,780	563	4
1992	9,135	3,340	776	8
1993	7,819	4,566	1,004	13
1994	9,138	5,473	948	10
1995	17,701			
MEAN	11,217	4,372	449	5

^a This figure represents estimated effort for all species on that river; however, the primary fishery is for chinook.

^b From Statewide Harvest Survey (Mills 1982-1994, Howe et al. 1995).

Table 34.-Comparison of angler chinook catch and effort information obtained at weir sites with total river estimates obtained through the Statewide Harvest Survey and creel surveys, Karluk and Ayakulik rivers.

KARLUK^a								
Year	SWHS		Creel Survey		Interviewed at Weir			
	Harvest	Release	Harvest	Release	Number of Anglers	Angler-days	Harvest	Release
1991	1,599	3,119			162	Not available		
1992	856	2,754			235	807	340	840
1993	1,634	6,734	569 ^b	2,566	244	1,088	369	2,484
1994	1,483	2,174	896	4,339	506	1,650	493	3,385
1995					380	1,677	492	2,411

AYAKULIK^c								
Year	SWHS		Creel Survey		Interviewed at Weir			
	Harvest	Release	Harvest	Release	Number of Anglers	Angler-days	Harvest	Release
1993	1,004	4,422	808	2,878	150	598	433	1,961
1994	948	1,020	739	2,752	203	926	477	1,898
1995					126	606	296	2,445

^a Steelhead catches for rafting anglers were 69, 127 and 209 in 1992, 1993 and 1994, respectively.

^b Incomplete survey. Karluk portage not surveyed.

^c Steelhead catches for the entire Ayakulik River during the chinook salmon fishery were 292 and 400 in 1993 and 1994, respectively.

CURRENT ISSUES

Sport harvest has been a minor component of the chinook salmon resource exploitation (Table 33). Exploitation of the inriver escapement has averaged 7% on the Karluk and 5% on the Ayakulik. These rates have been increasing in recent years and were 12% and 13% on the Karluk and Ayakulik, respectively, in 1993. On the Ayakulik River in 1994, the USFWS documented harvest of 739 chinook salmon, during a year when the weir count of chinook salmon was below average (9,138). After the sport harvest is subtracted and an estimate is made for hook-and-release mortality (7%³ of 2,752), the spawning escapement was 8,206. The spawning escapement was only 1,708 fish above the minimum escapement level of 6,500 for the Ayakulik. There was no commercial fishery in the Ayakulik section in 1994, however the commercial fishery directly in front of the Ayakulik river mouth (subdistricts 256-25, 20, 10) has averaged a harvest of 4,668 chinook salmon since 1990. The smallest harvest occurred in 1995 when 2,477 chinook salmon were harvested (Schwarz 1996). Had a commercial fishery occurred in 1994, it is likely that minimum escapement objectives would not have been met unless the sport fishery was restricted. If sport fishing harvest increases, the sport fishery will have a larger influence on the overall exploitation of the chinook salmon return. This is especially true during small return years as demonstrated during the 1993 Ayakulik River fishery when a record harvest and catch occurred, and the minimum spawning objective was only exceeded by 30 fish. An emergency order restricting the chinook salmon sport fishery has never been issued for the Ayakulik River or the Karluk River. However, restrictions may become necessary to achieve minimum spawning escapement levels during years of poor returns.

The division will be monitoring escapement levels through weir counts to ensure minimum escapements are met. As chinook salmon returns receive more harvest from the commercial and sport fisheries, it is essential that escapement goals are established that will produce optimum returns and harvests. It appears that the current goals (Karluk 4,500-8,000, Ayakulik 6,500-10,000) are working well, as escapements within these ranges have generated excellent returns. In order to refine these goals, the spawning escapement in both rivers is being sampled for age, length and sex data. This will allow the construction of brood tables and evaluation of returns from varying escapement levels.

Another issue is public access to these rivers. The Karluk River is almost entirely owned by various native corporations. Access to fishing along the Karluk River will remain an important issue as native corporations develop land use strategies. There is also a possibility that land along the Karluk River will be purchased and made part of the Kodiak National Wildlife Refuge. If this happens, the land use strategies used by the USFWS will affect angler access as well.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Beginning in June 1993, a major research project was initiated on the Karluk River in order to monitor and document the sport fishing harvest and effort for chinook salmon. In addition, biological data were collected from the escapement and sport harvest. USFWS collected the same information from the Ayakulik River. Time of entry tables for chinook salmon in the Kodiak Management Area, including the Karluk and Ayakulik rivers, are presented in Appendix G. The complete results are presented in a Fishery Data Series report (Schwarz 1996). The 1994

³ Bendock 1991.

creel census at the Karluk River recorded a harvest of 896 chinook salmon with a release of 4,339 (Table 34). Fishing effort was 2,359 angler-days. These figures include data from the Portage area on Karluk River and rafters passing through the Karluk weir. Effort and catch data were not collected below the weir. Effort in water below the weir was judged to be relatively small after a 1993 creel survey documented a harvest of 200 chinook salmon and 484 angler-days of effort below the weir. The 1994 census compares with an estimate from the SWHS (Howe et al. 1995) of 1,483 chinook salmon harvested and 2,174 released (Table 34).

The Ayakulik River was completely censused in 1994 by USFWS, documenting a harvest of 739 and a release of 2,752 chinook salmon. Total fishing effort was 1,533 angler-days.

The Karluk River chinook salmon escapement was sampled at the weir trap in 1994. There were 254 chinook salmon sampled. The two dominant age classes were 1.4 (59%) and 1.3 (19%). The sex ratio was 1.1 males/female. The average length was 811 mm for age 1.4 and 742 mm for age 1.3.

The Ayakulik River chinook salmon escapement was also sampled at the weir trap in 1994. There were 258 chinook salmon sampled. The two dominant age classes were 1.4 (52%) and 1.3 (25%). The sex ratio was 1.6 males/female. The average length was 805 mm for age 1.4 and 724 mm for age 1.3.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Biological age, length, and sex data should continue to be sampled from the Karluk and Ayakulik river weir escapements. These data will allow brood tables to be constructed so that escapement goals can be refined.

Angler effort and catch information for anglers passing through the weir should continue to be collected and used as an inseason indicator of angler success (Table 34).

INSEASON MANAGEMENT APPROACH

The Karluk and Ayakulik rivers will be managed so that minimum escapement levels are met (Karluk 4,500, Ayakulik 6,500). Time of entry data have been compiled (Appendices G4 and G5) so that it is possible to project how many fish should be through the weir on any specific date in order to achieve a minimum spawning escapement objective. In order to achieve minimum spawning escapements, weir counts must total the minimum spawning objective plus the recent 3-year average sport fish harvest so that after the sport fish removal occurs, a minimum spawning escapement will still be present.

The final weir count on the Karluk River should total 6,000 chinook salmon (4,500 minimum spawning goal + 1,200 sport fish harvest above weir + 300 hook-and-release mortality). Using the time of entry data in Appendix G4, an average of 50.3% of the weir count has been made by June 17. In order to achieve the minimum spawning objective a weir count of 3,000 (6,000 x .503) should be obtained by June 17. If the weir count is below 3,000 fish the sport fishery will be restricted so that minimum objectives can be reached. Restrictions may be imposed earlier than the mid point of the run (June 17) if it becomes apparent that the run is below average. Restrictions may include reductions in bag limits, elimination of catch and release fishing, or complete closures. The restriction chosen will be the one that impacts the fishery the least but still allows the minimum escapement objective to be achieved.

On the Ayakulik River the final weir count should total 7,600 (6,500 minimum spawning objective + 900 sport fish removal above the weir + 200 hook-and-release mortality). Similar to the Karluk River, the time of entry data on the Ayakulik River (Appendix G5) indicates that an average of 49.7% of the weir count has occurred by June 13. Therefore, to achieve a minimum spawning escapement a weir count of approximately 3,780 chinook salmon should have occurred by June 13.

KARLUK RIVER SOCKEYE SALMON FISHERY

HISTORICAL PERSPECTIVE

Sockeye salmon return to the Karluk River from June through September. Sockeye salmon in the Karluk River drainage spawn from August through November with about one-third spawning in Karluk Lake and the remaining population spawning in the lake's tributaries. Sockeye salmon bound for the Karluk rivers are harvested in commercial, subsistence, and sport fisheries.

Daily bag and possession limits for salmon, other than chinook salmon, in the remote portions of the Kodiak Regulatory Area have been 5 per day, 5 in possession with no size limits. All fisheries for sockeye salmon are open year-round.

From 1985 through 1994, sport anglers have harvested an average of 1,100 sockeye salmon from Karluk drainage waters (Table 35). This harvest has accounted for an average of 13% of the total KMA sockeye salmon harvest over this period (Table 35). Both Karluk Lake and Karluk River (and its tributaries) support sport fisheries for sockeye salmon. Sport harvests are generally small in relation to past levels of escapement, which were over 1 million sockeye salmon in 1989 and 1991.

RECENT FISHERY PERFORMANCE

The sport harvest of sockeye salmon from Karluk drainage waters during 1994 (3,630) was the highest on record (Table 35). This harvest accounted for 27% of the total sockeye salmon harvest from KMA waters during 1994. The sockeye harvest in the Ayakulik was 1,220 in 1994 and represented 9% of the KMA total harvest. Anglers released 56% of their catch in the Karluk and 59% of their catch in the Ayakulik. Statewide Harvest Survey estimates of sport harvest or catch are not available for this fishery for 1995 at this time.

RECENT BOARD OF FISHERIES ACTIONS

The Alaska Board of Fisheries adopted a public proposal at its December 1995 meeting which allows anglers in the remote area to have two daily bag limits of salmon other than chinook salmon in their possession. In the past, anglers were limited to 5 salmon other than chinook salmon in their possession. Beginning in 1996, anglers will be allowed 10 in their possession.

CURRENT ISSUES

As private native owners and the Kodiak National Wildlife Refuge develop their respective land management strategies, maintaining adequate angler access to the Karluk River fishery will become necessary if this fishery is to exhibit continued growth.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are no specific research or management activities directed at this fishery at present.

Table 35.-Harvest of sockeye salmon from Karluk River drainage waters of the Kodiak Management Area, 1985-1994.

Year	KMA	Karluk River			Ayakulik River		
	Harvest	Harvest	Released	% of KMA	Harvest	Released	% of KMA
1985	8,225	167		2			
1986	6,233	275		4			
1987	4,562	235		5			
1988	8,853	1,256		14			
1989	13,173	899		7			
1990	8,224	1,292		16			
1991	5,049	894		18	179	4,077	4
1992	6,240	798	4,634	13	633	4,389	10
1993	10,507	1,572 ^a	7,015	15	985 ^b	4,854	9
1994	13,502	3,627 ^c	4,678	27	1,223 ^d	1,754	9
MEAN	7,393	1,102	5,442	13	755	3,769	8

Note: Estimates from Mills 1986-1994 and Howe et al. 1995

^a A harvest of 337 and release of 460 sockeye salmon were documented on the Karluk River by an onsite creel census between June 1 and July 10. These figures do not include catches made at the Portage after July 10. From ADF&G creel survey/census.

^b A harvest of 322 and release of 595 sockeye salmon were documented on the Ayakulik River between June 1 and July 10. These figures do not include catches made after July 10. From USFWS creel census.

^c A harvest of 127 and a release of 687 sockeye were documented on the Karluk between June 1 and July 10. These figures do not include catches made below the weir. From ADF&G creel census.

^d A harvest of 558 and release of 1,204 sockeye were documented on the Ayakulik River between June 1 and July 10. These figures do not include catches made after July 10. From USFWS creel census.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No specific research or management activities are recommended for this fishery at present.

NORTH KODIAK ISLAND ARCHIPELAGO MARINE BOTTOMFISH FISHERIES

HISTORICAL PERSPECTIVE

The marine waters of the Kodiak road system zone and the Afognak/Shuyak/Barren islands support a multitude of marine fish stocks. Of these stocks, halibut and rockfish are the most commonly targeted by recreational anglers. Salmon also represent a large portion of the marine catch. The majority of the halibut and rockfish are harvested from late April through early September. The daily bag and possession limits for halibut are 2 and 4, respectively. Bag and possession limits for rockfish and lingcod became effective in the spring of 1993. The bag and possession limits for rockfish are 10 and 20, respectively, and for lingcod 2 and 4. A season was also established for lingcod from July 1 through December 31.

From 1987 through 1994 anglers have expended an average of about 29,000 angler-days each year fishing for marine bottomfish in the KMA. About 75% of this effort is annually expended fishing for halibut with the remaining effort being directed towards rockfish (20%) and lingcod (5%) (Vincent-Lang *In prep*). In general, effort has been relatively stable over this period.

Since 1986, Kodiak road system and Afognak/Shuyak/Barren island marine waters have supported 79% of the total harvest of halibut and 75% of the historical harvest of rockfish from KMA waters (Table 36). From 1986 through 1994, sport anglers have harvested an average of 5,240 halibut and 4,080 rockfish from Kodiak Road System marine fisheries (Table 36). This harvest has accounted for an average of 44% and 35% of the total KMA halibut and rockfish harvest, respectively, over this period. Over this same period, the marine waters in proximity to the Afognak/Shuyak/Barren island group have supported sport harvests of 4,200 halibut and 1,630 rockfish (Table 36). These harvests have represented 35% of the total harvest of halibut and 20% of the rockfish harvest from KMA waters.

Although not a commonly targeted species, lingcod are also harvested in the KMA. The average harvest in the management area is 1,600 fish. The Kodiak road system accounts for an average of 40% of the KMA harvest, while the Afognak islands accounted for 20%.

Bottomfish sport fisheries are managed by Sport Fish staff from the Anchorage and Homer offices. They have compiled a management report which contains additional information regarding these fisheries (Vincent-Lang 1995).

RECENT FISHERY PERFORMANCE

Fishing effort for halibut, rockfish and lingcod in 1994 totaled 40,698 angler-days in the Kodiak area (Vincent-Lang *In prep*).

The sport harvest of halibut from Kodiak Road System marine fisheries during 1994 (6,070) was above average (Table 36). The 1994 rockfish harvest (2,950) was below average. These harvests accounted for 44% and 55% of the total halibut and rockfish harvests, respectively, from KMA waters during 1994.

Table 36.-Harvest of halibut, rockfish and lingcod from Kodiak Road System and Afognak/Shuyak/Barren Island waters of the Kodiak Management Area, 1986-1994.

Year	KMA	Kodiak Road System		Afognak/Shuyak/Barren Is.	
	Harvest	Harvest	% of KMA	Harvest	% of KMA
HALIBUT					
1986	10,960	5,932	54	3,699	34
1987	9,869	4,510	46	4,292	44
1988	7,749	3,600	47	3,512	45
1989	10,435	4,663	45	4,449	43
1990	11,679	4,845	42	3,630	31
1991	12,110	6,004	50	3,878	32
1992	13,505	5,071	38	4,178	31
1993	17,660	6,385	36	5,135	29
1994	17,312	6,074	35	5,039	29
MEAN	12,364	5,242	44	4,201	35
ROCKFISH					
1986	5,165	3,180	62	917	18
1987	8,547	3,223	38	3,278	38
1988	13,244	5,930	45	4,220	32
1989	5,325	2,637	50	1,505	28
1990	6,519	3,251	50	367	6
1991	8,215	5,882	72	1,502	18
1992	6,566	4,316	66	982	15
1993	8,350	5,340	64	781	9
1994	5,743	2,953	51	1,109	19
MEAN	7,520	4,079	55	1,630	20
LINGCOD					
1991	2,345	729	31	259	11
1992	1,753	709	40	484	28
1993	1,120	324	47	198	18
1994	1,199	510	43	273	23
MEAN	1,604	618	40	304	20

Note: Estimates from the Statewide Harvest Survey (Mills 1987-1994, Howe et al. 1995).

The sport harvest of halibut from Afognak/Shuyak/Barren island marine fisheries during 1994 (5,040) was above average while the sport harvest of rockfish during 1994 (1,110) was below average (Table 36). These harvests accounted for 29% and 19% of the total halibut and rockfish harvests, respectively, from KMA waters during 1994.

Effort and harvest estimates for marine bottomfish are not yet available for the 1995 season.

RECENT BOARD OF FISHERIES ACTIONS

The Board of Fisheries adopted regulations affecting rockfish and lingcod fisheries that became effective on Kodiak in June of 1993, halfway through the 1993 fishing season. Rockfish bag and possession limits were established at 10 and 20 fish, respectively, and lingcod limits were established at 2 and 4, respectively. A fishing season of July 1 through December 31 was established for lingcod in order to protect fish during spawning and nest guarding. Finally, a regulation was adopted where lingcod can only be landed by hand or with a landing net. Similar regulations were adopted for the Alaska Peninsula/Aleutian Islands Regulatory Area and went into effect for the 1995 fishing season.

CURRENT ISSUES

Concern was raised that several species of demersal rockfish were being overexploited in areas of high commercial fishing pressure in the KMA. This is especially true for the waters of Chiniak Bay in which most of the area's harvest occurs and where a directed commercial rockfish fishery developed in 1991. Managers believed that levels of commercial and sport harvests experienced during 1991 were not sustainable because similar levels of harvest in other areas of Alaska have led to overexploitation of these species. The department, therefore, proposed limiting rockfish harvests. Restrictions adopted with respect to the sport fishery are listed above. Conservative quotas were placed on the commercial fishery so that no more than 100,000 pounds of rockfish could be harvested per year from Chiniak Bay. There is a 50,000 pound quota for waters near Ugak Bay from Cape Chiniak to Dangerous Cape and shoreward of the 3-mile territorial sea line. These limits were based on the unique life history characteristics of these species (many of these species are long-lived and highly susceptible to overharvest) and other limits adopted for this species in other areas of the state. Although this commercial management plan did not go through the board process and become adopted as a regulation, it is being used to manage this new and developing fishery. The restrictions placed on the commercial and sport fisheries will help ensure stock conservation.

The implementation of the IFQ (Individual Fisheries Quota) harvest strategy by the North Pacific Management Council has the potential to greatly affect the sport fishery for halibut along the Kodiak road system. Since 1990 waters around Kodiak Island have been open to commercial fishing from 2 to 4 days per year. Under the IFQ system, these waters will be open March 15-November 15. If commercial harvest patterns change and more fishermen choose to fish in waters close to the town of Kodiak, the commercial halibut harvest in Chiniak Bay could increase and lower the numbers of fish available to sport anglers. If selection of large halibut by the commercial fishermen occurs due to price differentials based on fish size, then the size composition of the stocks available to sport anglers may also decrease. How the new commercial harvest strategy will affect the sport fishery remains to be seen. However, the division's research project will be able to detect a change in the size and age of the sport harvest of halibut in Chiniak Bay. The Statewide Harvest Survey will also detect a significant change in sport catch.

Unfortunately the International Pacific Halibut Commission has not documented commercial landings by specific location, so it will be impossible to compare how commercial harvest levels in Chiniak Bay change after the implementation of IFQs.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

The sport harvest of groundfish is sampled annually at the primary boat harbors in Kodiak. Data collected from rockfishes, lingcod, and halibut include length, weight, age, sex, gonad condition, and location of capture. These data are monitored for broad trends in species, age, and size composition that may be indicative of overharvest.

It is hoped that abundance and sustained yield can be estimated once a sufficient time series of data is available. Halibut age and size data are summarized and forwarded to the International Pacific Halibut Commission for incorporation into their stock assessment models.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Staff recommends continuation of the current research program.

DEVELOPING FISHERIES

Two fisheries for chinook salmon along the Kodiak Road system began to develop in 1992. Since these are new fisheries, information is very limited. These fisheries are listed in this section to acknowledge they exist, describe them, and recommend possible management concerns if necessary.

MILL BAY CHINOOK SALMON

HISTORICAL PERSPECTIVE

Beginning in 1989, the Department of Fish and Game has stocked chinook salmon smolt in Island Lake, which drains into Mill Bay (Table 9). Approximately 100,000 smolt are transported from Elmendorf fish hatchery to Kodiak each May. These fish used to be transported via barge which is costly and also stresses the fish. In 1991 over half of the smolt died in transport. In 1992 the smolt were flown to Kodiak on a National Guard C-130 as part of a training mission. The fish were released in excellent condition. In 1993, private industry objected to the use of government aircraft to transport the smolt so vessel transportation was again utilized. In 1993, a reduced load of 67,000 smolt was put aboard a hatchery tank truck and shipped via ferry. These smolt arrived in healthy condition. Since then smolt have been shipped via ferry and have arrived in healthy condition. Since the fish are smolt, they migrate to sea immediately after release.

In 1991, several adults returned to Mill Bay, and one 7 lb male was harvested. In 1992, the adult return was much larger. The area biologist collected scales from eight fish which were landed between June 7 and 16. Six of these fish had readable scales, five were 3-ocean fish, and one was a 2-ocean fish. Fish ranged between 15 and 20 pounds. Mill Bay Beach was sporadically observed on eight occasions from June 7 to June 28, and a total of 102 people were seen fishing. The department did not conduct a formal creel survey so an accurate estimate of harvest is not available. Based on sporadic observations and informal interviews from anglers who fished Mill Bay regularly, it was estimated that the harvest of chinook salmon at Mill Bay was approximately 50 fish. The 1992 Statewide Harvest Survey estimated the harvest at 117 chinook salmon.

RECENT FISHERY PERFORMANCE

In 1993 the harvest was estimated at 250 chinook salmon from periodic observations. The Statewide Harvest Survey for 1993 estimated the harvest at 219 chinook salmon. In 1994 a harvest estimate of 50 chinook salmon was made from fishery observations; the Statewide Harvest Survey later estimated 58 chinook salmon harvested (Table 37). Beginning in 1992 chinook salmon were noted in the Buskin River (15-30 fish). These fish were probably a result of stray fish from the Mill Bay chinook salmon stocking project. In 1993, 1994 and 1995 the Buskin River was open to sport fishing for chinook salmon in order to harvest these chinook salmon. (Chiniak Bay streams have been closed to chinook salmon fishing. No natural runs exist in Chiniak Bay).

In 1995 the chinook salmon harvest was estimated at 50-100 chinook salmon based on sporadic observations. Estimates from the Statewide Harvest Survey for 1995 are not available at this time.

CURRENT ISSUES

The 1994 return was the first year when a full complement of age classes returned (i.e. returning adults that had spent 5 years at sea from the 1989 smolt release, 4-year ocean adults from the 1990 smolt release, etc.). In similar programs in the Homer area returns have averaged 3,000 adult chinook salmon. The return of adults in 1994 and 1995 has been less than 300 fish annually, indicating that the current project is not nearly as successful in producing adults as other similar projects. As a result of the poor returns, a fishery has not developed and generated the angler days of fishing opportunity that was originally desired. An attempt to increase the return of adult chinook salmon so that the desired fishery will develop needs to be made.

The current holding location (Island Lake Creek) has several disadvantages. Smolt are not easily held unless water flow conditions are just right, a situation which is not frequently present. As a result smolt have been released after being held and fed for only 1 day. It is possible that the smolt have not fully recovered from their journey via ferry/truck from the Elmendorf Hatchery in Anchorage. If chinook salmon smolt are under stress it is possible that their survival will be lowered and that they may not imprint well enough to return to Mill Bay Beach.

The return location (Mill Bay Beach) also has several disadvantages. Returning adults do not have an attractive holding area where they can school and be available to anglers. Small groups of adults swim around Mill Bay, occasionally swimming within casting distance of the beach. Adults are not able to enter Island Lake, and it appears that after a period of time the fish leave Mill Bay and stray into other streams. During 1994 chinook salmon were documented in streams on Spruce Island, in Little Afognak and in the Buskin River. Several options existed for increasing the return of adult chinook salmon which included improving the holding facilities for smolt in Island Lake Creek, changing brood sources to a Kodiak Island stock, or changing the release location to the Buskin River. A Buskin River release location has several advantages in that it is the most economical change. The Buskin River also provides a return location where adults could school and be accessible to anglers at all times. The large size of the Buskin River would probably make it easier for adults to home to, reducing straying to other drainages.

Table 37.-Sport fish harvest of chinook salmon from the marine waters of Chiniak and Mill bays, 1987-1994.

Year	Mill Bay Harvest	Chiniak Bay Harvest
1987		18
1988		73
1989		84
1990		44
1991		188
1992	117	346
1993	219	1,548
1994	58	398

Note: Estimates from the Statewide Harvest Survey (Mills 1988-1994, Howe et al. 1995).

Finally, the Buskin River provides a large area for anglers to fish from, helping to reduce crowding. The division obtained a fish transport permit to release chinook salmon smolt into Buskin River, and this was done in 1995 (Table 9)

The purpose of the chinook salmon stocking continues to be production of a put-and-take chinook salmon sport fishery. Natural spawning is not desired, as smolt will be stocked annually to produce subsequent returns. For this reason, attempts will be made to maximize harvest of chinook salmon in the Buskin River. Additionally, smolt released have been adipose finclipped and coded wire tagged. Technicians will examine chinook salmon on the Karluk and Ayakulik rivers to ensure that straying from the Buskin River release is not occurring. Mixing of genetic stocks is not desirable, and if it occurs, the stocking program will be terminated. Finally, the banks along the Buskin River will be monitored so that habitat destruction does not occur due to increased angler use. If bank erosion due to anglers is noted, this destruction will be repaired and mitigated or the stocking program will be terminated.

Another issue associated with this fishery is the use of snagging to harvest fish. Snagging is legal in salt water; however, a group of anglers were disappointed with the quality of the chinook salmon harvest at Mill Bay because they believed fish were harassed by snagging tackle and would not bite. A regulation proposal submitted by the public was considered by the Board of Fisheries at its December 1995 meeting which would have closed snagging during specified times along Mill Bay and Mission beaches during the return of stocked chinook and coho salmon. The Board of Fisheries did not adopt this proposal because it was not necessary for stock conservation and because snagging was an efficient way to maximize harvest on stocked fish which were not needed for reproduction. Chinook salmon will continue returning to Mill Bay Beach through 1998. The coho salmon stocking project that produces a return to Mill Bay and Mission beaches will continue, and snagging will continue to be a legal method of harvesting these fish.

CHINIAK BAY CHINOOK SALMON

HISTORICAL PERSPECTIVE

Chiniak Bay is a feeding area for chinook salmon as they grow and mature at sea. These chinook salmon have been harvested in the past in small numbers, often incidentally when anglers are fishing for halibut or rockfish (Table 37). In 1992 anglers began to target on these chinook salmon by trolling. The harvest estimate for the 1992 season was 350 chinook salmon, significantly larger than the 1987-1990 average of 55. In 1993 and 1994 the statewide harvest survey estimated the chinook salmon harvest at 1,550 and 400 fish, respectively.

RECENT FISHERY PERFORMANCE

Anglers continued to troll for chinook salmon in Chiniak Bay during the 1995 season. Success was not as high as in 1993 but better than 1994. Based on informal interviews with anglers and charter boat operators the harvest is likely to approximate 600 chinook salmon, a significant decrease from the harvest of 1,550 fish in 1993.

The reason for the decrease in catch is unknown. However, it is likely that it is due to a drop in abundance of chinook salmon feeding in Chiniak Bay waters. The commercial harvest of chinook salmon in the Kodiak area also decreased from 42,000 in 1993 to 23,000 in 1994 and 18,700 in 1995. The commercial harvest of chinook salmon is a nondirected incidental harvest

which occurs when fishing for other species and probably represents an index of chinook salmon abundance around Kodiak Island. Factors such as the amount of fishing time for targeted species will also affect the magnitude of the incidental harvest. Why the abundance of chinook salmon decreased in 1995 is unclear, however the abundance of chinook salmon feeding in Chiniak Bay may fluctuate yearly based on water temperatures, abundance of forage fish, the abundance of Pacific Coast chinook salmon stocks and a multitude of other factors.

CURRENT ISSUES

Harvests of chinook salmon, particularly in marine waters, have received increasing attention throughout the Pacific Northwest in recent years. Management of chinook salmon is difficult because of the highly migratory nature of the species. Chinook salmon are often harvested far beyond the political boundaries encompassing their natal streams, resulting in the conflicts frequently documented in the fisheries literature and news media. Conflicts concerning implementation of the Endangered Species Act (ESA), U.S.-Canada treaty negotiations, and allocations between competing users are some of the major issues which could develop regarding this fishery. The small harvest currently occurring in the Chiniak Bay sport fishery could preclude this fishery from becoming controversial. Also, as stated under the section on recent performance, this fishery may not be an expanding fishery as much as a sporadic opportunistic fishery, depending on fish abundance which changes annually based on a variety of environmental conditions.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Beginning in 1994 systematic sampling of the sport harvest of troll-caught chinook salmon for biological data and coded wire tags began. From May 28 through September 11, 112 chinook salmon were examined for the presence of coded wire tags, and 63 were sampled for age, length and sex information. Results are listed in the 1994 Annual Management Report (Tables 34 and 35 from Schwarz 1995). Attempts were made to sample the sport harvest from charter and private vessels when they returned to harbor. In addition, marked ADF&G totes were left at the harbor for collection of sport caught halibut, rockfish, lingcod and salmon carcasses. Chinook salmon carcasses left in these totes were checked for the presence of coded wire tags. These fish could not be sampled for biological data since they were already filleted. In addition to the sampling project information, department personnel reported their off-duty sport harvest from trips they made. These data were added to the data collected during the sampling project. Two of the three coded wire tags recovered were made from chinook salmon harvested by department employees. All three fish were tagged in British Columbia. Two of the tagging locations were 40 miles south of the Alaska/Canadian border, at Masset and Kitimat River. The third release location was Snootli Creek, about 200 miles south of the Alaska/Canada border.

This study was continued in 1995. Of the 201 chinook salmon observed for coded wire tags, only one chinook salmon had a tag (Table 38). This tag was from a private nonprofit hatchery near Sitka (Medvejie) and the fish was released on June 2, 1993. It was captured in Chiniak Bay on September 3, 1995. Of the 164 chinook salmon sampled for age data in 1995, the dominant age classes were 1.2 and 1.3, which made up 26% and 51% of the sample, respectively (Table 39). During 1994, 75% of the sample were age 1.3 and 18% age 1.2.

Table 38.-Chinook salmon examined for the presence of coded wire tags from the Chiniak Bay sport fishery harvest, 1995.

Date	# Chinook Observed	# Chinook with CWT	CWT Release location
10-Jun	1	0	
19-Jul	7	0	
22-Jul	10	0	
23-Jul	6	0	
26-Jul	10	0	
27-Jul	9	0	
28-Jul	19	0	
29-Jul	21	0	
30-Jul	8	0	
31-Jul	3	0	
2-Aug	4	0	
4-Aug	5	0	
13-Aug	2	0	
16-Aug	7	0	
17-Aug	15	0	
18-Aug	20	0	
19-Aug	6	0	
22-Aug	7	0	
23-Aug	2	0	
24-Aug	8	0	
25-Aug	10	0	
26-Aug	6	0	
2-Sep	3	0	
3-Sep	12	1	Sitka (Medvejie) released on June 2, 1993.
Total	201	1	

Table 39.-Age composition by age and mean length at age for chinook salmon in the Kodiak marine sport fishery, 10 June through 3 September 1995.

	Age									Total
	0.3	0.4	1.1	1.2	1.3	1.4	1.5	2.2	2.3	
Females:										
Sample Size	1	1	0	8	21	3	0	2	0	36
Percent	1.3	1.3		10.5	27.6	3.9		2.6		47.4
SE Percent	1.3	1.3		3.5	5.2	2.2		1.8		5.8
Mean length	593	781		660	816	814		726		772 ^a
SE mean length				19	15	28		85		14
Minimum length	593	781		569	670	786		641		569
Maximum length	593	781		735	941	841		810		941
Males:										
Sample Size	2	0	1	15	16	3	1	0	2	40
Percent	2.6		1.3	19.7	21.1	3.9	1.3		2.6	52.6
SE Percent	1.8		1.3	4.6	4.7	2.2	1.3		1.8	5.8
Mean length	809		471	655	821	808	765		801	743 ^b
SE mean length	2			23	18	34			30	18
Minimum length	807		471	520	631	741	765		771	471
Maximum length	810		471	814	940	851	765		830	940
All:										
Sample Size	3	1	2	36	71	16	2	3	5	139 ^c
Percent	2.2	0.7	1.4	25.9	51.1	11.5	1.4	2.2	3.6	100.0
SE Percent	1.2	0.7	1.0	3.7	4.2	2.7	1.0	1.2	0.0	0.0
Mean length	737	781	456	671	811	802	786	691	807	763 ^d
SE mean length	72		15	12	8	18	21	60	20	8
Minimum length	593	781	441	520	630	655	765	622	746	441
Maximum length	810	781	471	814	941	951	807	810	846	951

^a n = 45, including 9 females for which age was not estimated.

^b n = 41, including 1 male for which age was not estimated.

^c Includes 63 fish for which age was estimated but sex was not recorded.

^d n = 164, including 9 females and 1 male for which age was not estimated and 15 fish for which age was not estimated and sex was not recorded.

OTHER FISHERIES

Several smaller fisheries for other species also occur in the KMA. These include fisheries for wild rainbow trout and stocked Arctic grayling, chum salmon, smelt, and clams. Because these fisheries are generally small, little specific management or research is directed towards them nor have specific management or fishery objectives been set for the fisheries. A brief summary of these fisheries is provided below.

RAINBOW TROUT

Wild stocks of rainbow trout occur in several systems within the Kodiak Archipelago. Some of the more well known rainbow trout systems include the Afognak River, Malina River, Upper Station Creek and Little River. All of these populations are comprised of small numbers of fish. The size of the fish is also small. Documenting the harvest is difficult because of the small fishing effort that these remote populations receive. Documenting harvest is further complicated because anglers confuse steelhead and rainbow trout. A steelhead is a type of rainbow trout which spends part of its life in salt water. On Kodiak, steelhead attain a larger size due to better growing conditions experienced in salt water. However, the only definite way to distinguish whether some fish are large rainbows or small steelhead is to examine a scale under a microscope for saltwater growth. Appendix A8 lists harvest estimates from the Statewide Harvest Survey for rainbow trout in stocked lakes, rainbow trout in wild populations and steelhead in fresh water. In 1994 an estimated 2,751 rainbow trout were caught and 261 were harvested from wild populations.

Very little is known about the locations of rainbow trout populations in the Aleutians or in streams along the Alaska Peninsula draining into the Pacific. These populations are even more remote and less fished than the populations on Kodiak. For these reasons catch and harvest estimates are not listed for the Aleutians/Alaska Peninsula.

The average sport harvest and catch of wild rainbow trout from the waters of the Kodiak Regulatory Area from 1989 through 1994 has been 480 and 4,301 respectively. In addition, approximately 20 roadside lakes are stocked along the Kodiak road system. The harvest and catch of rainbow trout from these lakes in 1994 was estimated by Mills at 470 and 1,062, respectively (Appendix A8).

ARCTIC GRAYLING

Arctic grayling were stocked in four lakes on the Kodiak Road system. There are no native populations of grayling on Kodiak Island. Anglers occasionally report catching a grayling; however, a fishery has failed to develop for these fish, and as a result the stocking program was terminated after fish were released in 1994. The Statewide Harvest Survey provides estimates of harvest. However, these estimates are based on very few questionnaire respondents so the estimates are not precise. The estimates listed in Appendix A13 reflect these small harvests. The harvest in 1994 was 41 fish.

The distribution of grayling in the Aleutians and in streams on the Alaska Peninsula which flow into the Pacific is unknown by department staff. However, some native grayling populations may exist and anglers traveling to these remote areas may catch some.

CHUM SALMON

Chum salmon have not been typically targeted by recreational anglers in the KMA, however, some are taken incidentally to other salmon species. An average of only 1,160 chum salmon have been harvested per year by sport anglers from KMA waters from 1977 through 1994 (Appendix A11). Most (72%) of the annual chum salmon harvest has occurred in the waters of the Kodiak Regulatory Area.

CLAMS

From 1977 through 1994, the average harvest of razor clams has been 4,040, all of which were reported from the Kodiak Regulatory Area (Appendix A7). Kodiak Island has several beaches which produce razor clams. There probably is a reporting problem in that many people may be reporting all clams harvested as razor clams. It appears unlikely that the large harvests reported are possible given the small number of beaches which produce razor clams in the Kodiak regulatory area.

OTHER FISH

From 1977 through 1994, the average harvest of other fish in the Kodiak management area has been 5,688 (Table 4). This harvest has represented an average of 7% of the total sport fish harvest from KMA waters over this period. Other fish may include such species as cod, flounder and sculpins.

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**APPENDIX A. RECREATIONAL FISH HARVESTS BY
SPECIES, BY ANGLERS FISHING KODIAK MANAGEMENT
AREA WATERS, 1977-1994**

Appendix A1.-Number of Dolly Varden/Arctic char harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula/Aleutian Island Regulatory Area							Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	15,900					1,364	9	1,084	8	13,452	93	14,536	91
1978	16,962					1,157	7	2,830	18	12,975	82	15,805	93
1979	33,311					7,890	24	5,281	21	20,140	79	25,421	76
1980	30,685					10,022	33	2,979	14	17,684	86	20,663	67
1981	31,482	3,402	28	8,564	72	11,966	38	2,441	13	17,075	88	19,516	62
1982	36,065	4,695	38	7,599	62	12,294	34	5,931	25	17,840	75	23,771	66
1983	30,192	2,843	26	7,910	74	10,753	36	3,934	20	15,505	80	19,439	64
1984	28,528	1,536	28	3,900	72	5,436	19	4,814	21	18,278	79	23,092	81
1985	22,562	659	13	4,387	87	5,046	22	2,291	13	15,225	87	17,516	78
1986	26,459	2,069	36	3,733	64	5,802	22	6,375	31	14,282	69	20,657	78
1987	15,831	2,083	30	4,985	71	7,068	45	2,299	26	6,464	74	8,763	55
1988	22,592	2,148	55	1,781	45	3,929	17	8,004	43	10,659	57	18,663	83
1989	18,635	1,392	32	2,977	68	4,369	23	2,771	19	11,495	81	14,266	77
1990	21,052	2,524	37	4,293	63	6,817	32	6,042	42	8,193	58	14,235	68
1991	21,418	3,920	47	4,416	53	8,336	39	2,996	23	10,086	77	13,082	61
1992	11,525	1,810	44	2,326	56	4,136	36	1,540	21	5,849	79	7,389	64
1993	10,008	1,677	45	2,032	55	3,709	37	1,644	26	4,655	74	6,299	63
1994	6,608	368	59	259	41	627	9	1,281	21	4,700	79	5,981	91
MEAN ^a	22,212	2,223	37	4,227	62	6,151	28	3,585	22	12,478	76	16,061	72

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A2.-Number of pink salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula/Aleutian Island Regulatory Area								Kodiak Island Regulatory Area					
	KMA Total	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total		
		Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA	
1977	14,634					115	1	5,074	35	9,445	65	14,519	99	
1978	18,374					635	4	7,693	43	10,046	57	17,739	97	
1979	19,698					3,827	19	8,853	56	7,018	44	15,871	81	
1980	30,093					11,124	37	8,223	43	10,746	57	18,969	63	
1981	20,650	6,555	78	1,836	22	8,391	41	4,677	38	7,582	62	12,259	59	
1982	30,462	8,593	74	3,019	26	11,612	38	8,153	43	10,697	57	18,850	62	
1983	12,870	3,200	81	734	19	3,934	31	2,780	31	6,156	69	8,936	69	
1984	17,343	4,011	88	553	12	4,564	26	4,314	34	8,465	66	12,779	74	
1985	15,426	672	34	1,331	67	2,003	13	5,739	43	7,684	67	13,423	87	
1986	17,365	350	12	2,506	88	2,856	16	4,769	33	9,740	67	14,509	84	
1987	13,532	681	36	1,189	64	1,870	14	5,252	45	6,410	55	11,662	86	
1988	31,296	1,640	13	10,612	87	12,252	39	10,040	53	9,004	47	19,044	61	
1989	29,176	7,252	64	4,130	36	11,382	39	7,566	43	10,228	58	17,794	61	
1990	29,997	12,301	55	10,232	45	22,533	75	2,476	33	4,988	67	7,464	25	
1991	20,789	3,923	45	4,760	55	8,683	42	5,132	42	6,974	58	12,106	58	
1992	11,473	2,538	46	3,031	54	5,569	49	2,113	36	3,791	64	5,904	51	
1993	15,534	1,983	62	1,227	38	3,210	21	5,637	46	6,687	54	12,324	79	
1994	6,032	594	85	102	15	696	12	2,147	40	3,189	60	5,336	88	
MEAN ^a	19,747	3,921	56	3,151	44	6,307	31	5,646	41	7,795	59	13,440	73	

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A3.-Number of coho salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula/Aleutian Island Regulatory Area							Kodiak Island Regulatory Area					
	KMA Total	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
		Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	5,722					1,006	18	1,172	25	3,544	75	4,716	82
1978	6,033					1,106	18	1,433	29	3,494	71	4,927	82
1979	12,496					974	8	3,606	31	7,916	69	11,522	92
1980	14,319					1,627	11	5,442	43	7,250	57	12,692	89
1981	11,696	475	43	637	57	1,112	10	4,449	42	6,135	58	10,584	91
1982	14,627	491	38	807	62	1,298	9	6,612	50	6,717	50	13,329	91
1983	9,678	943	51	912	49	1,855	19	2,025	26	5,798	74	7,823	81
1984	15,892	1,059	83	221	17	1,280	8	6,945	48	7,667	53	14,612	92
1985	15,032	523	37	884	63	1,407	9	6,209	46	7,416	54	13,625	91
1986	25,458	1,062	23	3,523	77	4,585	18	9,220	44	11,653	56	20,873	82
1987	19,402	1,567	63	923	37	2,490	13	8,056	48	8,856	52	16,912	87
1988	21,379	558	22	2,012	78	2,570	12	6,786	36	12,023	64	18,809	88
1989	23,700	2,288	59	1,610	41	3,898	16	5,338	27	14,464	73	19,802	84
1990	20,065	1,360	22	4,977	79	6,337	32	5,916	43	7,812	57	13,728	68
1991	21,327	1,045	29	2,591	71	3,636	17	6,790	62	10,901	62	17,691	83
1992	16,540	1,099	38	1,773	62	2,872	17	5,640	41	8,028	59	13,668	83
1993	22,693	965	66	487	34	1,452	6	7,877	37	13,364	63	21,241	94
1994	14,600	772	35	1,422	65	2,194	15	5,187	42	7,219	58	12,406	85
MEAN ^a	15,818	1,013	45	1,560	55	2,240	14	5,398	40	8,180	60	13,579	86

100

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A4.-Number of halibut harvested by sport anglers fishing KMA waters, 1977-1994.

Year	KMA Total	Alaska Peninsula & Aleutian Island		Kodiak Island	
		Harvest	% of KMA	Harvest	% of KMA
1977	994	0	0	994	100
1978	1,721	0	0	1,721	100
1979	3,013	0	0	3,013	100
1980	3,651	0	0	3,651	100
1981	7,711	853	11	6,858	89
1982	9,977	797	8	9,180	92
1983	8,809	264	3	8,545	97
1984	9,148	969	11	8,179	89
1985	7,839	536	7	7,303	93
1986	11,975	1,015	9	10,960	92
1987	11,465	1,596	14	9,869	86
1988	9,697	1,948	20	7,749	80
1989	11,847	1,412	12	10,435	88
1990	11,679	2,545	22	9,134	78
1991	17,309	5,199	30	12,110	70
1992	13,505	2,645	20	10,860	80
1993	17,660	3,491	20	14,169	80
1994	17,312	2,402	14	14,910	86
MEAN	9,739	1,426	12	8,136	88

Appendix A5.-Number of sockeye salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula/Aleutian Island Regulatory Area							Kodiak Island Regulatory Area					
	KMA Total	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
		Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,848					593	32	102	8	1,153	92	1,255	68
1978	2,241					465	21	479	27	1,297	73	1,776	79
1979	4,134					1,698	41	330	14	2,106	87	2,436	59
1980	4,114					1,936	47	809	37	1,369	63	2,178	53
1981	4,698	994	32	2,084	68	3,078	66	669	41	951	59	1,620	35
1982	4,532	1,058	72	419	28	1,477	33	1,079	35	1,976	65	3,055	67
1983	4,438	534	42	754	59	1,288	29	986	31	2,164	69	3,150	71
1984	6,358	913	94	60	6	973	15	1,272	24	4,113	76	5,385	85
1985	8,225	199	29	490	71	689	8	1,714	23	5,822	77	7,536	92
1986	6,233	174	18	800	82	974	16	1,590	30	3,669	70	5,259	84
1987	4,562	231	58	166	42	397	9	1,106	27	3,059	73	4,165	91
1988	8,853	2,198	84	433	17	2,631	30	1,019	16	5,203	84	6,222	70
1989	13,173	5,147	81	1,237	19	6,384	49	1,606	24	5,183	76	6,789	52
1990	8,224	1,181	55	987	46	2,168	26	1,985	33	4,071	67	6,056	74
1991	7,057	1,287	64	721	36	2,008	29	960	19	4,089	81	5,049	72
1992	8,408	1,470	68	698	32	2,168	26	1,299	21	4,941	79	6,240	74
1993	10,507	1,976	74	682	36	2,658	25	1,968	25	5,881	75	7,849	75
1994	13,502	374	37	626	63	1,000	7	1,825	15	10,677	85	12,502	93
MEAN ^a	6,728	1,266	57	725	43	1,810	29	1,155	25	3,762	75	4,918	71

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A6.-Number of rockfish harvested by sport anglers fishing KMA waters, 1977-1994.

Year	KMA Total	Alaska Peninsula & Aleutian Island		Kodiak Island	
		Harvest	% of KMA	Harvest	% of KMA
1977	2,810	0	0	2,810	100
1978	1,907	0	0	1,907	100
1979	3,599	0	0	3,599	100
1980	1,489	0	0	1,489	100
1981	6,663	421	6	6,242	94
1982	4,170	178	4	3,992	96
1983	3,314	62	2	3,252	98
1984	9,347	1,116	12	8,231	88
1985	4,890	199	4	4,691	96
1986	5,165	686	13	4,479	87
1987	8,547	2,046	24	6,501	76
1988	13,244	1,875	14	11,369	86
1989	5,325	255	5	5,070	95
1990	6,519	2,677	41	3,842	60
1991	9,259	1,044	11	8,215	89
1992	8,106	2,454	30	5,652	70
1993	8,350	781	9	7,569	91
1994	5,761	742	13	5,019	87
MEAN	6,025	807	10	5,218	90

**Appendix A7.-Number of clams
harvested by sport anglers fishing
KMA waters, 1977-1994.**

	Kodiak Island
	Harvest
1977	7,474
1978	3,208
1979	8,363
1980	11,826
1981	3,452
1982	1,944
1983	2,000
1984	7,360
1985	4,970
1986	7,064
1987	2,155
1988	4,614
1989	1,477
1990	173
1991	119
1992	973
1993	1,286
1994	4,322
MEAN	4,041

Appendix A8.-Number of rainbow trout and steelhead caught and harvested by sport anglers fishing in fresh waters of the Kodiak regulatory area.

Year	Rainbow Trout Stocked Lakes ^a		Rainbow Trout Wild Populations ^b		Steelhead Fresh water ^c	
	Caught	Harvested	Caught	Harvested	Caught	Harvested
	1989		777		807	
1990	2,831	812	4,352	672	3,108	672
1991	843	472	8,346	765	1,720	244
1992	1,314	901	3,324	246	1,552	80
1993	1,055	135	2,750	128	6,480	199
1994	1,062	470	2,751	261	3,400	146

^a Listed under roadside lakes in the Statewide Harvest Survey. Reports of harvested steelhead are assumed to be rainbow trout.

^b Listed under other streams, other lakes, Buskin, Pasagshak and Saltery rivers in the Statewide Harvest Survey report. Only fish reported as rainbow trout are counted.

^c Listed under Buskin, Pasagshak, Karluk, Red and Saltery, other streams and other lakes. Saltwater catches are not included. In the Karluk and Red rivers rainbow trout are considered as steelhead.

Appendix A9.-Number of smelt harvested by sport anglers fishing KMA waters, 1977-1994.

Year	KMA Total	Alaska Peninsula & Aleutian Island		Kodiak Island	
		Harvest	% of KMA	Harvest	% of KMA
1977	9,969	4,317	43	5,652	57
1978	4,523	4,523	100	0	0
1979	2,515	1,572	63	943	38
1980	4,103	2,011	49	2,092	51
1981	3,024	864	29	2,160	71
1982	2,620	0	0	2,620	100
1983	0	0	0	0	0
1984	96	96	100	0	0
1985	25	0	0	25	100
1986	0	0	0	0	0
1987	462	0	0	462	100
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	1,222	1,082	89	140	11
1993	67	0	0	67	100
1994	0	0	0	0	0
MEAN	1,660	862	41	844	54

Appendix A10.-Number of chinook salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula/Aleutian Island Regulatory Area							Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,113					630	57	34	7	449	93	483	43
1978	583					233	40	12	3	338	97	350	60
1979	1,176					424	36	98	13	654	87	752	64
1980	723					396	55	60	18	267	82	327	45
1981	1,264	129	28	346	73	475	38	194	25	595	75	789	62
1982	2,576	1,351	93	105	7	1,456	57	167	15	953	85	1,120	44
1983	1,295	493	87	73	13	566	44	198	27	531	3	729	56
1984	1,196	112	41	163	59	275	23	210	23	711	77	921	77
1985	1,133	0	0	371	100	371	33	162	21	600	79	762	67
1986	830	0	0	310	100	310	37	168	32	352	68	520	63
1987	1,002	42	7	581	93	623	62	54	14	325	86	379	38
1988	2,153	31	5	558	95	589	27	145	9	1,419	91	1,564	73
1989	2,226	234	21	905	80	1,139	51	120	11	967	89	1,087	49
1990	1,156	140	88	20	13	160	14	66	7	930	93	996	86
1991	2,752	56	23	168	77	244	9	198	8	2,310	92	2,508	91
1992	2,671	210	46	244	54	454	17	585	26	1,632	74	2,217	83
1993	5,738	147	23	499	67	646	11	2,454	48	2,638	52	5,092	89
1994	3,303	117	85	20	15	137	4	668	21	2,498	79	3,166	96
MEAN ^a	1,822	218	40	312	61	507	35	311	18	1,003	82	1,315	66

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A11.-Number of chum salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Year	Alaska Peninsula /Aleutian Island Regulatory Area							Kodiak Island Regulatory Area					
	KMA Total	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
		Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,869					224	12	633	39	1,012	62	1,645	88
1978	1,619					332	21	624	49	663	52	1,287	80
1979	591					91	15	382	76	118	24	500	85
1980	1,334					809	61	405	77	120	23	525	39
1981	1,166	335	63	194	37	529	45	151	24	486	76	637	55
1982	2,567	472	38	771	62	1,243	48	639	48	685	52	1,324	52
1983	963	0	0	147	100	147	15	462	57	354	43	816	85
1984	1,609	126	44	162	56	288	18	799	61	522	40	1,321	82
1985	915	0	0	50	100	50	6	167	19	698	81	865	95
1986	541	25	12	180	88	205	38	122	36	214	64	336	62
1987	792	23	10	209	90	232	29	198	35	362	65	560	71
1988	1,824	0	0	278	100	278	15	73	5	1,473	95	1,546	85
1989	941	104	34	206	67	310	33	225	36	406	64	631	67
1990	412	0	0	221	100	221	54	36	19	155	81	191	46
1991	1,612	0	0	95	100	95	6	417	27	1,100	73	1,517	94
1992	913	273	95	15	5	288	32	92	15	533	85	625	68
1993	786	282	100	0	0	282	36	252	50	252	50	504	64
1994	380	83	92	7	8	90	24	100	34	190	66	290	76
MEAN ^a	1,157	124	36	136	66	318	28	321	39	519	62	840	72

^a Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A12.-Number of steelhead trout harvested by sport anglers fishing Kodiak Management Area waters, 1977-1994.

Kodiak Island Regulatory Area					
Year	Salt Water		Fresh Water ^a		Area Total
	Harvest	Percent	Harvest	Percent	Total
1977	3	1	229	99	232
1978	0	0	162	100	162
1979	9	3	309	97	318
1980	17	3	654	98	671
1981	0	0	313	100	313
1982	0	0	259	100	258
1983	10	3	292	97	302
1984	124	18	572	82	696
1985	426	54	364	46	790
1986	168	52	153	48	321
1987	181	72	72	29	253
1988	636	67	308	33	944
1989	249	34	489	66	738
1990	448	40	672	60	1,120
1991	428	64	244	36	672
1992	48	38	80	62	128
1993	249	55	199	45	443
1994	97	40	146	60	243
MEAN	172	31	307	69	478

Note: No significant harvest occurs in the Alaska Peninsula/Aleutian Island Regulatory area. All reported harvest is from the Kodiak Island Regulatory area.

^a Listed in Mills as steelhead under Buskin, Pasagshak, Karluk, Red, Saltery, other streams and other lakes. In the Karluk and Red rivers rainbow trout are also considered to be steelhead.

**Appendix A13.-Number of Arctic
grayling harvested by sport anglers
fishing KMA waters, 1977-1994.**

Kodiak Island	
	Harvest ^a
1977	54
1978	325
1979	124
1980	465
1981	119
1982	225
1983	126
1984	286
1985	820
1986	15
1987	72
1988	182
1989	189
1990	86
1991	98
1992	120
1993	16
1994	41
MEAN	187

^a All of the harvest occurs in fresh water.

**APPENDIX B. COMMERCIAL SALMON HARVESTS
FOR THE KMA**

Appendix B1.-Commercial harvests (thousands of fish) of pink salmon from KMA waters, 1977-1995.

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA			AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN				
1977	1,449	1	0	1,450	605	6,252	8,307
1978	5,609	467	38	6,114	985	15,004	22,103
1979	6,571	5	539	7,115	2,057	11,287	20,459
1980	7,962	302	2,598	10,861	1,126	17,290	29,278
1981	5,036	11	303	5,350	1,163	10,337	16,850
1982	6,735	12	1,448	8,195	876	8,076	17,147
1983	2,828	3	2	2,833	321	4,603	7,757
1984	11,589	27	2,310	13,926	446	10,884	25,256
1985	4,434	3	0	4,437	175	7,335	11,947
1986	4,032	23	43	4,097	647	11,504	16,249
1987	1,209	4	0	1,212	247	5,073	6,533
1988	7,045	65	183	7,293	2,997	14,262	24,552
1989	7,293	4	7	7,304	888	22,649	30,841
1990	2,866	518	283	3,666	555	5,984	10,206
1991	10,616	4	0	10,620	1,169	16,643	28,432
1992	9,770	194	312	10,276	1,554	3,311	15,141
1993	9,928	5	0	9,933	1,648	34,019	45,600
1994	9,180	225	859	10,265	431	8,163	18,859
1995	16,294	12	0	16,306	2,065	42,831	61,202
MEAN	6,866	99	469	7,434	1,050	13,448	21,932
ODD MEAN	6,565	5	85	6,655	1,034	16,103	23,793
EVEN	7,199	204	897	8,302	1,068	10,498	19,865

Appendix B2.-Commercial harvests (thousands of fish) of coho salmon from KMA waters, 1977-1995.

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA			AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN				
1977	2	34	0	36	17	28	82
1978	61	63	0	124	20	49	193
1979	356	113	0	469	93	141	704
1980	274	128	0	402	118	139	659
1981	162	155	0	318	79	122	519
1982	256	238	0	494	300	344	1,138
1983	128	75	0	203	62	158	423
1984	309	199	0	508	110	230	848
1985	173	168	0	341	207	284	832
1986	236	164	0	400	117	168	685
1987	225	172	0	397	150	192	739
1988	506	234	0	740	370	303	1,413
1989	444	228	0	672	67	141	880
1990	307	193	0	500	130	294	924
1991	317	217	0	534	166	325	1,025
1992	418	207	0	625	311	280	1,216
1993	220	64	0	284	229	313	826
1994	256	241	0	497	237	296	1,030
1995	263	136	0	399	282	308	989
MEAN	259	159	0	418	161	217	797

Appendix B3.-Commercial harvests (thousands of fish) of sockeye salmon from KMA waters, 1977-1995.

ALASKA PENINSULA/ALEUTIAN ISLAND AREA							
YEAR	SOUTH	NORTH		AREA	CHIGNIK	KODIAK	GRAND
	PENINSULA	PENINSULA	ALEUTIAN	TOTAL			
1977	312	471	0	783	1,972	623	3,378
1978	580	896	2	1,478	1,576	1,072	4,126
1979	1,150	1,980	12	3,142	1,064	632	4,838
1980	3,614	1,397	9	5,020	846	651	6,517
1981	2,255	1,845	5	4,105	1,840	1,289	7,234
1982	2,346	1,435	3	3,784	1,522	1,205	6,511
1983	2,557	2,093	4	4,654	1,823	1,232	7,709
1984	2,318	1,735	67	4,120	2,662	1,951	8,733
1985	2,215	2,601	3	4,819	946	1,843	7,608
1986	1,223	2,437	8	3,668	1,646	3,155	8,469
1987	1,450	1,209	0	2,659	1,899	1,793	6,351
1988	1,473	1,528	4	3,005	796	2,698	6,499
1989	2,661	1,719	8	4,388	1,157	2,629	8,174
1990	2,387	2,416	12	4,815	2,094	5,248	12,157
1991	2,322	2,392	1	4,715	1,896	5,704	12,315
1992	3,446	3,575	3	7,024	1,277	4,168	12,469
1993	3,689	3,867	0	7,556	1,697	4,378	13,631
1994	2,107	2,753	0	4,860	1,619	2,877	9,356
1995	3,039	3,273	0	6,311	1,724	4,485	12,520
MEAN	2,164	2,085	7	4,258	1,582	2,507	8,346

Appendix B4.-Commercial harvests (thousands of fish) of chinook salmon from KMA waters, 1977-1995.

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA			AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN				
1977	0	6	0	6	1	1	8
1978	1	14	0	15	2	3	20
1979	2	17	0	19	1	2	22
1980	5	17	0	22	2	1	25
1981	10	18	0	28	3	1	32
1982	10	30	0	40	5	1	46
1983	27	30	0	57	6	4	67
1984	9	23	0	32	4	5	41
1985	8	24	0	32	2	5	39
1986	6	12	0	18	3	4	25
1987	9	14	0	23	3	5	31
1988	11	17	0	28	7	22	57
1989	7	11	0	18	4	5	27
1990	17	12	0	29	10	19	58
1991	8	9	0	17	3	22	42
1992	8	13	0	21	11	24	56
1993	14	24	0	38	20	42	100
1994	10	19	0	28	4	23	55
1995	17	8	0	25	5	19	49
MEAN	9	17	0	27	5	11	42

Appendix B5.-Commercial harvests (thousands of fish) of chum salmon from KMA waters, 1977-1995.

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA			AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN				
1977	243	129	0	372	111	1,072	1,555
1978	547	163	0	710	121	814	1,645
1979	483	66	0	549	188	358	1,095
1980	1,351	700	5	2,056	313	1,076	3,445
1981	1,770	707	7	2,484	580	1,345	4,409
1982	2,273	331	6	2,610	390	1,266	4,266
1983	1,707	349	11	2,067	159	1,085	3,311
1984	1,657	797	34	2,487	63	649	3,200
1985	1,393	671	14	2,078	26	431	2,535
1986	1,750	271	39	2,060	177	1,126	3,363
1987	1,376	369	0	1,745	127	682	2,554
1988	1,905	394	1	2,300	267	1,426	3,993
1989	994	157	0	1,151	2	836	1,989
1990	1,238	126	1	1,365	270	577	2,212
1991	1,587	191	0	1,778	261	1,029	3,068
1992	1,317	342	1	1,660	222	680	2,562
1993	1,048	135	0	1,183	122	588	1,893
1994	2,192	84	1	2,276	227	739	3,242
1995	1,723	99	0	1,823	381	1,532	3,736
MEAN	1,298	320	7	1,724	211	910	2,846

**APPENDIX C. COMMERCIAL SALMON HARVESTS WITHIN
THE KODIAK ROAD SYSTEM ZONE 1980-1995**

Appendix C1.-Commercial harvest of salmon from stat areas along the Kodiak road system, 1980-1995.

STAT AREA	1980					1983				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	9	275	15,743	1,798	3	292	330	13,878	519
22 (Womens Bay)	4	2	543	37,055	6,683	29	212	886	46,923	3,940
23 (Middle Bay)	0	4	433	16,644	4,047	2	11	73	8,775	749
24 (Kalsin Bay)	36	14	6,069	211,390	17,076	65	238	766	58,957	4,542
25 (Chiniak Pt)	0	0	75	6,536	3,455	90	479	2,068	17,244	984
21 (Outer)	0	1	837	14,100	2,338	32	282	2,614	48,103	1,071
Chiniak/Monashka Bay Total	40	30	8,232	301,468	35,397	221	1,514	6,737	193,880	11,805
259-41 (Pasagshak/Saltery)	2	315	1,832	44,674	18,879	140	5,727	2,316	20,175	24,036

STAT AREA	1981					1984				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	15	59	290	34,942	1,542	0	738	1,240	9,843	1,313
22 (Womens Bay)	1	29	1,106	60,684	9,847	3	302	5,282	51,510	3,983
23 (Middle Bay)	0	30	30	22,204	5,905	0	153	2	2,507	115
24 (Kalsin Bay)	58	116	1,366	156,663	19,063	4	48	4,252	18,580	3,455
25 (Chiniak Pt.)	1	200	644	98,895	3,408	0	3	192	9,097	81
21 (Outer)	0	61	1,197	43,532	2,122	10	491	3,580	37,464	1,857
Chiniak/Monashka Bay Total	75	495	4,633	416,920	41,887	17	1,735	14,548	129,001	10,804
259-41 (Pasagshak/Saltery)	71	21,792	1,048	220,819	83,607	189	16,937	1,485	20,169	13,748

STAT AREA	1982					1985				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	4	370	495	60,272	4,210	1	205	86	292	620
22 (Womens Bay)	6	252	5,245	153,342	9,566	3	75	666	101,537	6,513
23 (Middle Bay)	8	5	121	10,652	8,094	0	12	298	7,915	1,599
24 (Kalsin Bay)	51	45	1,839	100,775	12,302	9	44	332	18,425	6,649
25 (Chiniak Pt.)	4	22	700	26,709	1,458	1	1	3	2,741	2,469
21 (Outer)	0	59	3,105	71,919	858	1	272	1,523	72,499	2,514
Chiniak/Monashka Bay Total	73	753	11,505	423,669	36,488	15	609	2,908	203,409	20,364
259-41 (Pasagshak/Saltery)	10	2,747	2,787	794	6,802	23	3,508	1,619	2,465	589

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STAT AREA	1992					1995				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	1,625	97	760	196	3	23	336	92,353	249
22 (Womens Bay)	0	0	0	138	17	1	80	224	152,975	5,116
23 (Middle Bay)	0	0	0	567	392	2	79	1,303	233,051	13,121
24 (Kalsin Bay)	0	0	0	57	0	4	67	3,988	190,894	5,407
25 (Chiniak Pt.)	144	48,228	6,604	32,028	15,223	2	584	748	165,292	2,801
21 (Outer)	15	3,086	369	2,021	1,184	2	153	420	153,512	6,901
Chiniak/Monashka Bay Total	159	52,939	7,070	35,571	17,012	14	986	7,019	988,077	33,595
259-41 (Pasagshak/ Saltery)	27	5,900	222	1,992	3,751	106	19,591	927	187,109	13,574

STAT AREA	1993				
	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	0	0	0	0
22 (Womens Bay)	1	9	7	2,045	22
23 (Middle Bay)	1	1	73	116,360	759
24 (Kalsin Bay)	5	26	40	97,652	325
25 (Chiniak Pt.)	27	2,864	969	168,770	1,363
21 (Outer)	11	3,941	544	64,055	525
Chiniak/Monashka Bay Total	45	6,841	1,633	448,882	2,994
259-41 (Pasagshak/ Saltery)	281	34,638	714	107,668	599

STAT AREA	1994				
	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	19	649	38,793	141
22 (Womens Bay)	0	3	15	956	1,173
23 (Middle Bay)					
24 (Kalsin Bay)	3	14	2	19,534	887
25 (Chiniak Pt.)	263	2,718	2,317	23,332	10,054
21 (Outer)	42	1,134	641	9,172	6,376
Chiniak/Monashka Bay Total	281	3,888	3,624	91,787	18,631
259-41 (Pasagshak/ Saltery)	78	11,903	106	2,530	1,940

**APPENDIX D. SUBSISTENCE SALMON HARVESTS WITHIN
THE KODIAK ROAD SYSTEM ZONE 1980-1994**

Appendix D1.-Subsistence harvests of salmon from locations along the Kodiak road system, 1980-1994.

AREA	1980					1983				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	68	138	11	0	37	11	36	14
Womens Bay	0	30	144	94	2	0	44	106	241	36
Middle Bay	0	0	8	4	52	0	90	43	77	10
Kalsin Bay	2	13	0	18	1	1	27	64	60	12
Buskin River	17	4,279	1,239	751	94	11	5,690	1,470	672	66
Chiniak	13	153	256	332	56	0	40	427	154	37
Roslyn Creek	0	10	137	45	20	0	0	20	8	3
Isthmus Pt.	0	0	21	5	5	0	0	6	0	0 a
Cliff Pt.	0	8	29	31	6			21	1	0
Chiniak Bay Total	32	4,529	1,902	1,418	247	12	5,928	2,168	1,249	178
Saltery	0	68	0	27	0			4		5
Pasagshak	0	0	18	23	0	5	365	20	10	
(Permits returned island wide 756 = 61%)						(Permits returned island wide 1,082 = 83%)				
Permits issued island wide 1,239)						Permits issued island wide 1,307)				

AREA	1981					1984				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	15	5	95	32	0	45	156	42	8
Womens Bay	0	38	20	174	53	0	6	91	83	21
Middle Bay	0	4	1	28	19	0	0	0	0	0
Kalsin Bay	0	4	152	142	8	1	8	445	68	38
Buskin River	1	4,742	860	533	45	26	565	109	29	10
Chiniak	3	368	306	123	16	1	0	249	69	64
Roslyn Creek	0	0	88	15	3	0	0	100	37	10
Isthmus Pt.	0	0	0	0	0	0	0	0	0	0
Cliff Pt.	0	28	0	1	2	1	0	6	0	0
Chiniak Bay Total	4	5,199	1,432	1,111	178	29	624	1,156	328	151
Saltery	0	3	1	1	0	1	3	44	0	3
Pasagshak	0	28	16	21	0	13	491	76	12	0
(Permits returned island wide 733 = 63%)						(Permits returned island wide 1,084 = 87%)				
Permits issued island wide 1,166)						Permits issued island wide 1,240)				

AREA	1982					1985				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	76	31	3	0	67	113	62	2
Womens Bay	0	131	115	192	23	2	767	656	162	34
Middle Bay	0	13	95	110	10	0	1	15	0	0
Kalsin Bay	0	66	279	180	24	0	15	337	153	159
Buskin River	22	6,748	1,754	1,340	87	21	5,326	1,898	728	117
Chiniak	0	25	470	168	46	0	6	89	13	46
Roslyn Creek	0	0	245	37	0	0	10	221	22	48
Isthmus Pt.	0	0	0	0	0	2	0	41	0	4 a
Cliff Pt.	0	0	0	0	0	0	3	0	0	0
Chiniak Bay Total	22	7,019	3,034	2,058	193	25	6,195	3,370	1,140	410
Saltery	0	0	42	0	0	1	62	82	35	9
Pasagshak	1	83	17	18	0	3	163	117	2	0
(Permits returned island wide 993 = 78%)						(Permits returned island wide 1,204 = 82%)				
Permits issued island wide 1,276)						Permits issued island wide 1,476)				

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AREA	1986						1989					
	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	114	138	58	9	8	1	7	83	31	1
Womens Bay	5	0	60	33	0	1	4	0	23	50	0	10
Middle Bay	2	0	0	2	14	0	0	0	0	0	0	0
Kalsin Bay	15	0	29	312	23	35	14	0	4	143	25	7
Buskin River	362	7	5,303	2,585	934	110	206	5	3,312	1,251	425	74
Chiniak	7	0	4	90	49	20	5	0	35	70	3	10
Roslyn Creek	8	0	5	188	5	24	10	0	10	262	5	42
Isthmus Pt.	1	0	0	20	0	0	2	0	0	6	0	0
Cliff Pt.	0	0	0	0	0	0	0	0	0	0	0	0
Chiniak Bay Total	412	7	5,515	3,368	1,083	199	249	6	3,391	1,859	489	144
Saltery		0	199	91	1	0		0	179	0	3	0
Pasagshak		6	64	35	5	0		0	78	28	22	1
(Permits returned island wide 1,080 = 87%)						(Permits returned island wide 687 ^b)						
Permits issued island wide 1,243)												
AREA	1987						1990					
	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	16	0	23	133	109	20	15	0	20	167	22	22
Womens Bay	1	0	0	4	12	7	8	0	67	36	9	9
Middle Bay	23	0	144	33	25	4	2	0	0	14	0	0
Kalsin Bay	18	0	80	379	50	27	20	1	4	379	61	48
Buskin River	300	61	3,375	1,743	541	75	291	8	3,448	1,785	325	91
Chiniak	2	0	50	25	2	10	6	0	112	26	36	3
Roslyn Creek	15	2	23	311	78	46	12	0	11	249	6	16
Isthmus Pt.	0	0	0	0	0	0	0	0	0	0	0	0
Cliff Pt.	1	0	28	0	1	2	1	0	0	0	10	0
Chiniak Bay Total	376	63	3,695	2,633	817	189	355	9	3,662	2,656	469	189
Saltery		1	87	67	35	23		9	14	303	7	3
Pasagshak		9	82	51	13	15		35	3	598	60	11
(Permits returned island wide 969 = 86%)						(Permits returned island wide = 1,176 ^b)						
Permits issued island wide 1,124)												
AREA	1988						1991					
	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	40	110	88	2		0	15	85	10	3
Womens Bay	7	0	0	81	9	25		0	30	24	19	14
Middle Bay	0	0	0	0	0	0		0	0	60	3	6
Kalsin Bay	13	0	61	209	53	16		1	6	247	70	57
Buskin River	220	30	3,099	1,475	313	55		7	4,301	1,449	208	56
Chiniak	2	0	0	10	0	0		0	0	37	0	0
Roslyn Creek	9	1	0	299	44	37		0	0	160	39	17
Isthmus Pt.	0	0	0	0	0	0		0	0	0	0	0
Cliff Pt.	0	0	0	0	0	0		0	0	10	0	0
Chiniak Bay Total	263	31	3,200	2,184	507	135		8	4,352	2,072	349	153
Saltery		3	145	17	10	2		2	406	3	27	78
Pasagshak		0	84	0	11	9		2	1,645	216	60	10
(Permits returned island wide 663 = 60%)						(Permits returned island wide = 1,145)						
Permits issued island wide 1,098)												

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1992						
AREA	Permits					
	Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay		5	31	202	27	0
Womens Bay		0	28	64	18	2
Middle Bay		14	0	0	0	0
Kalsin Bay		0	147	276	21	2
Buskin River		25	3,295	1,499	267	114
Chiniak		3	48	169	57	16
Roslyn Creek		7	1	236	11	13
Mayflower		0	23	0	0	0
Chiniak Bay Total		54	3,550	2,469	401	147
Saltery		2	309	0	6	14
Pasagshak		5	1,499	118	34	7

(Permits returned island wide = 851 as of 4/19/93)

1993						
AREA	Permits					
	Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	7	0	12	32	3	12
Womens Bay	3	0	0	4	3	10
Middle Bay	1	0	0	3	0	0
Kalsin Bay	9	4	0	82	17	0
Buskin River	277	56	4,745	1,719	375	51
Chiniak	4	2	0	49	51	0
Roslyn Creek	10	9	1	148	4	17
Mayflower	2	0	0	25	0	6
Chiniak Bay Total	313	71	4,758	2,062	453	96
Saltery	17	1	328	33	17	0
Pasagshak	85	2	2,253	276	115	15

1994						
AREA	Permits					
	Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	29	0	12	238	3	0
Womens Bay	5	0	16	26	0	0
Middle Bay	2	0	0	0	6	0
Kalsin Bay	32	4	2	225	55	35
Buskin River	507	30	4,899	2,167	414	35
Chiniak	25	40	12	180	3	3
Roslyn Creek	0	0	0	0	0	0
Mayflower	8	0	0	54	3	8
Chiniak Bay Total	608	74	4,941	2,890	484	81
Saltery	30	2	392	110	11	18
Pasagshak	98	7	1,554	112	73	25

^a Fishing occurred at Mayflower not Isthmus Pt.

^b Beginning in 1989, 2,900 permits were mailed out to potential subsistence fishermen.

**APPENDIX E. COHO SALMON ESCAPEMENT COUNTS
WITHIN THE KODIAK ROAD SYSTEM ZONE 1980-1995**

Appendix E1.-Coho salmon escapements into streams along the Kodiak road system, 1980-1995.

Year	Monashka		Pillar		Buskin	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	72	20-Oct	68	20-Oct	1,021	20-Oct
1981	57	28-Oct	33	28-Oct	919	28-Oct
1982	-	-	-	-	500 a	27-Aug
					750 a	7-Oct
1983	24	20-Oct	15	20-Oct	243	26-Oct
1984	-	-	-	-	1,905	19-Sep
1985	135	11-Sep	140	28-Oct	9,474 b	26-Oct
1986	172	17-Oct	44	17-Oct	9,589 b	2-Oct
					1,985	15-Oct
					1,493	30-Oct
1987	12	12-Nov	102	12-Nov	11,103 b	1-Oct
					559	29-Oct
1988	-	-	-	-	6,182 b	24-Sep
					600	25-Sep
1989	150 a	13-Sep	25	30-Aug	9,930 b	2-Oct
1990	53	23-Oct	45	23-Oct	6,222 b	26-Sep
					734	20-Oct
					1,604	31-Oct
1991	55	18-Sep	70	18-Sep	8,929 b	28-Sep
1992	2		300		6,535 b	7-Oct
1993	145	5-Oct	69	3-Oct	6,813 b	30-Sep
1994	1,749	27-Sep	199	28-Sep	8,146	29-Sep
1995					8,694	1-Oct

Year	Sargent		Russian		Salonie	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	72	20-Oct	68	20-Oct	1,021	20-Oct
1981	44	26-Oct	47	26-Oct	919	28-Oct
1982	130	4-Nov	87	28-Oct	388	26-Oct
1983	16	24-Oct	23	24-Oct	127	24-Oct
1984	61	5-Nov	150 a	11-Sep	300 a	11-Sep
1985	87	28-Oct	358	28-Oct	30 a	12-Sep
					189	31-Oct
					67	25-Oct
1986	41	26-Oct	109	26-Oct	29	3-Sep
					179	12-Sep
					152	25-Sep
1987	24	12-Nov	37	21-Nov	154	15-Oct
					315	18-Oct
					49	19-Nov
1988	0	23-Aug	0	23-Aug	0	23-Aug
1989	0	12-Sep	0	12-Sep	0	12-Sep
1990	60	28-Oct	16	21-Oct	142	21-Oct
					187	4-Nov
1991	-		-		-	
1992	0 a	3-Sep	50 a	3-Sep	98	22-Oct
1993	83	12-Oct	133	13-Oct	274	18-Oct
					253	31-Oct
1994					226	22-Sep
1995					521	12-Oct

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Year	American		Olds		Roslyn		Kalsin			
	Number of fish	Date								
1980	903	30-Oct	780	28-Oct	628	27-Nov	240	6-Nov		
1981	1,130 a	13-Oct	800 a	13-Oct	360 a	13-Oct	166	27-Oct		
	627	30-Oct	434	29-Oct	314	22-Oct				
1982	360 a	7-Oct	645 a	7-Oct	240 a	7-Oct	133	27-Oct		
	266	28-Oct	1,375	27-Oct	525	25-Oct				
1983	420 a	22-Sep	800 a	22-Sep	49	21-Oct	32	16-Nov		
	114	25-Oct	173	25-Oct						
1984	350 a	11-Sep	4,500 a	22-Aug	76	6-Nov				
1985	65 a	20-Sep	900 a	20-Sep	150 a	5-Sep	450 a	5-Sep		
	439	30-Oct	1,648	25-Sep	78 a	20-Sep	60 a	20-Sep		
					93	24-Sep				
					189	30-Oct				
1986	99	5-Sep	1,178	5-Sep	358	4-Sep	110	24-Oct		
	201	15-Sep	1,849	11-Sep	342	10-Sep				
	221	24-Oct	1,549	17-Oct	370	19-Sep				
					306	25-Sep				
1987	555	19-Oct	842	18-Oct	280	14-Sep	45	17-Oct		
	453	14-Nov	683	14-Nov	0	18-Oct				
					47	9-Nov				
1988			0	23-Aug						
1989	2,500 a	13-Sep	800 a	13-Sep	222	16-Sep				
			769	28-Oct	335	25-Oct				
1990	20	6-Sep	15	6-Sep	40	6-Sep	63	15-Oct		
	419	19-Oct	1,706	17-Oct	648	16-Oct				
	290	27-Oct	1,014	3-Nov	676	30-Oct				
	316	6-Nov								
1991	-	-	900 a	6-Sep	50 a	22-Aug	-			
			570	9-Sep	882	4-Oct				
1992	600 a	21-Sep	950 a	21-Sep	100 a	3-Sep				
	181	20-Oct	320	18-Oct	70	21-Oct				
1993	412	20-Oct	525	5-Oct	148	15-Oct				
			474	31-Oct	137	22-Oct				
1994	194	6-Oct	243	14-Oct	130	21-Oct				
			395	21-Oct						
1995	4,000 a	8-Sep	7,500 a	8-Sep	322	12-Oct				
	169	10-Oct	2,642	11-Oct						

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Year	Chiniak		Pasagshak		Saltery	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	32	8-Nov	850	23-Aug	212 a	7-Nov
			1,330	20-Oct		
			1,330	20-Nov		
1981	170	2-Nov	320 a	21-Oct	720 a	21-Oct
					959	5-Nov
1982	155	25-Oct	175	27-Oct	400 a	7-Oct
					2,176	2-Nov
1983	25	21-Oct	1,500 a	23-Aug	700 a	9-Sep
			1,920	28-Oct		
1984	76	6-Nov	1,540	1-Nov	2,100 a	10-Sep
					520 a	6-Oct
1985	66	24-Sep	400 a	6-Sep	4,022 b	28-Sep
	86	28-Oct	3,000 a	29-Oct		
1986	48	20-Oct	1,998	14-Oct	11,009 b	12-Sep
			3,524	22-Oct		
			3,571	29-Oct		
1987	15	9-Nov	1,023	18-Oct	11,376 b	1-Oct
			2,519	13-Nov		
1988			2,000 a	23-Aug	4,702 b	12-Sep
1989			800 a	12-Sep	5,332 b	26-Sep
			1,800 a	13-Sep		
1990	48	5-Nov	303	15-Oct	2,847 b	17-Sep
			908	28-Oct		
			2,178	15-Nov		
					187	4-Nov
1991	-		0	5-Oct	747 b	4-Sep
1992	-		3,000 a	3-Sep	1,000 a	21-Sep
			5	19-Oct		
1993			612	25-Oct	3,500 a	13-Sep
			1,337	6-Nov		
1994	-		-		2,173 b	22-Sep
1995	-		-		6,500 a	8-Sep

-continued-

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Year	Miami		Hurst	
	Number of fish	Date	Number of fish	Date
1980	200 a	23-Aug	218	31-Oct
1981	300 a	22-Aug		
	740 a	21-Oct		
1982	220	7-Oct	266	2-Nov
1983	500 a	31-Aug	48	15-Nov
	20 a	7-Sep		
1984	1,000 a	10-Sep	50 a	10-Sep
	1,050 a	16-Oct	339	8-Nov
1985	160	6-Sep	55 a	20-Sep
	1,060 a	20-Sep		
	1,500 a	4-Oct		
1986			427	28-Oct
1988	250 a	30-Aug		
1989	1,400 a	13-Sep	0 a	12-Sep
1990			372	29-Oct
1991	300 a	30-Aug		
	3,500 a	6-Sep		
1992	1,300 a	21-Sep		
1993	4,700 a	13-Sep		
1994	-	-		
1995	2,500 a	8-Sep		

Note: All unmarked estimates were documented on foot surveys.

^a Aerial survey estimates.

^b Weir counts.

**APPENDIX F. PINK, SOCKEYE AND CHUM SALMON
ESCAPEMENT COUNTS WITHIN THE KODIAK ROAD
SYSTEM ZONE 1980-1995**

Appendix F1.-Pink, sockeye, and chum salmon peak escapement counts for streams along the Kodiak road systems, 1980-1995.

Year	Monashka		Pillar		Buskin			
	Pink	Date	Pink	Date	Pink	Date	Sockeye	Date
1980	3,300	25-Aug	30	25-Aug	95,000	20-Aug	3,814	15-Aug
1981	1,300	26-Aug	400	26-Aug	70,000	28-Aug	7,846	14-Aug
1982	2,800	1-Sep	277	17-Sep	120,000	27-Aug	3,600	27-Aug
1983	1,100	31-Aug	420	31-Aug	53,000	23-Aug	4,669	30-Aug
1984	4,600	3-Aug	500	31-Jul	100,000	11-Sep	4,875	11-Sep
1985	8,500	5-Sep	5,040	11-Sep	171,028 a		18,010 a	
1986	5,500	9-Sep	6,215	9-Sep	98,958		8,939	
1987	225	21-Jul	300	17-Aug	27,892		12,690	
1988	2,000	15-Aug	1,000	15-Aug	203,648		12,144	
1989	8,000	30-Aug	42,100	27-Aug	159,123		17,853	
1990	2,700	14-Aug	11,580	20-Aug	42,889		10,528	
1991	7,800	30-Aug	6,000	30-Aug	37,736		9,794	
1992	7,700	7-Sep	11,900	7-Sep	25,141		9,711	
1993	3,600	17-Aug	6,200	17-Aug	53,484		9,526	
1994	7,000	2-Sep	17,000	2-Sep	128,000		11,783	
1995	7,000	16-Aug	20,000	16-Aug	72,826		15,520	

	Sargent				Russian				Salonie			
	Pink	Date	Chum	Date	Pink	Date	Chum	Date	Pink	Date	Chum	Date
1980	2,800	20-Aug			8,000	20-Aug	4,000	20-Aug	3,000	20-Aug	1,400	20-Aug
1981	1,400	22-Aug			5,600	22-Aug	500	22-Aug	10,000	22-Aug	200	22-Aug
1982	10,000	27-Aug	1,500	27-Aug	8,000	11-Aug	2,000	11-Aug	12,000	27-Aug	1,000	11-Aug
1983	300	11-Aug	50	11-Aug	2,000	23-Aug	500	23-Aug	5,500	23-Aug	2,000	23-Aug
1984	1,800	11-Sep	100	11-Sep	6,000	10-Aug	4,800	11-Sep	2,800	11-Sep	1,100	11-Sep
1985	4,000	5-Sep	2,500	5-Sep	10,400	5-Sep	7,600	5-Sep	20,400	5-Sep	10,000	20-Sep
1986	3,500	18-Aug			14,000	18-Aug	4,000	18-Aug	18,000	18-Aug	5,000	18-Aug
1987	300	25-Aug			18,200	25-Aug	10,000	15-Sep	1,000	25-Aug		
1988	19,000	23-Aug			12,000	23-Aug	8,000	23-Aug	15,000	23-Aug	500	23-Aug
1989	22,000	12-Sep			36,500	12-Sep	1,800	12-Sep	113,000	12-Sep		
1990	4,900	18-Aug			4,180	18-Aug	200	18-Aug	4,140	18-Aug		
1991	250	2-Aug			900	12-Aug			9,000	22-Aug		
1992	1,240	3-Sep			2,700	3-Sep	2,365	3-Sep				
1993	14,500	9-Aug			17,500	9-Aug	700	9-Aug	52,500	9-Aug		
1994	10,000	5-Aug			8,500	2-Aug			300	22-Sep		
1995	13,500	18-Aug			140,000	18-Aug			194,500	18-Aug	300	18-Aug

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	American				Olds				Roslyn			
	Pink	Date	Chum	Date	Pink	Date	Chum	Date	Pink	Date	Chum	Date
1980	47,000	23-Aug	4,000	1-Sep	67,700	8-Aug	8,500	23-Aug	52,000	23-Aug		
1981	45,000	22-Aug	2,500	22-Aug	40,000	22-Aug	500	22-Aug	1,500	25-Jul		
1982	36,000	27-Aug	3,000	11-Aug	60,000	27-Aug	2,500	27-Aug	30,000	27-Aug		
1983	64,000	7-Sep	10,000	7-Sep	27,000	23-Aug	11,000	7-Sep	2,800	7-Sep		
1984	30,000	28-Aug	8,400	11-Sep	31,500	22-Aug	15,000	28-Aug	17,000	31-Aug		
1985	140,000	20-Sep	10,400	5-Sep	65,000	5-Sep	8,000	22-Aug	7,800	5-Sep		
1986	21,000	18-Aug	4,000	18-Aug	52,000	16-Aug	3,000	16-Aug	27,000	18-Aug		
1987	112,000	25-Aug	800	12-Aug	48,100	25-Aug	2,600	12-Aug	12,000	25-Aug		
1988	500	25-Jul			90,000	23-Aug	15,000	23-Aug	42,000	23-Aug		
1989	126,000	25-Sep	11,000	25-Sep	46,000	30-Aug	1,400	13-Sep	39,400	30-Aug	200	30-Aug
1990	22,000	21-Aug	8,000	13-Aug	21,000	13-Aug	1,400	18-Aug	39,450	18-Aug		
1991	49,000	22-Aug	12,000	22-Aug	22,500	12-Aug	2,500	2-Aug	23,000	22-Aug		
1992	17,900	3-Sep	4,500	3-Sep	24,500	3-Sep	3,000	8-Aug	9,400	8-Aug	123	14-Aug
1993	52,700	10-Sep	2,000	10-Sep	58,000	5-Aug	7,000	17-Aug	21,000	5-Aug	700	5-Aug
1994	95,000	11-Aug	5,100	11-Aug	78,500	11-Aug	5,000	11-Aug	24,000	9-Aug		
1995	142,000	8-Sep	8,000	8-Sep	130,000	8-Sep	1,500	31-July	30,500	18-Aug		

	Chiniak		Pasagshak				Saltery					
	Pink	Date	Pink	Date	Sockeye	Date	Pink	Date	Sockeye	Date	Chum	Date
1980	5,500	20-Aug			3,484	19-Aug	38,000	23-Aug	31,600	3-Aug		
1981	650	27-Jul	2,000	4-Aug	2,759	26-Aug	57,000	4-Aug	43,300	4-Aug	7,000	4-Aug
1982	4,500	25-Aug			5,400	27-Aug	25,000	27-Aug	28,000	26-Jul	8,000	31-Aug
1983	3,000	23-Aug	400	31-Jul	3,458	2-Sep	28,000	9-Sep	46,400	10-Aug	5,000	23-Aug
1984	11,000	31-Aug	3,500	27-Aug	3,700	13-Aug	28,000	28-Aug	120,000	20-Jul	10,000	3-Aug
1985	9,700	6-Sep	11,000	6-Aug	1,700	4-Sep	7,107 b		1,890 b		43 b	
1986	7,000	18-Aug			3,200	18-Aug	23,011		38,314		203	
1987	9,400	10-Aug	2,000	12-Aug	14,000	12-Aug	39,687		22,705		121	
1988	-		2,000	23-Aug	20,000	23-Aug	7,646		25,654		28	
1989	-		2,000	13-Sep	14,300	13-Sep	214,541		30,937		14	
1990	22,550	18-Aug			4,680	28-Sep	313		29,541		9	
1991	10,000	2-Aug	2,000	6-Sep	25,000	30-Aug	33,812		52,577		18	
1992	4,500	3-Sep	500	3-Sep	3,590	3-Sep	5,800		44,450		250	
1993	74,000	5-Aug	300	15-Jul	16,000	15-Jul	92,078		77,186		5,000	13-Sep
1994	24,000	9-Aug	500	1-Aug	2,400	1-Aug	16,664		58,975		500	8-Aug
1995	28,000	18-Aug	4,600	4-Aug	12,500	30-July	85,000		43,859		103	8-Aug

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	Miami				Hurst	
	Pink	Date	Sockeye	Date	Pink	Date
1980	16,000	3-Aug	300	13-Jul	10,000	8-Aug
1981	12,280	22-Aug			6,000	22-Aug
1982	20,000	17-Aug	200	27-Aug	5,000	27-Aug
1983	16,000	31-Aug	800	10-Aug	3,500	23-Aug
1984	21,000	27-Aug	1,500	29-Jul	1,000	27-Aug
1985	39,800	6-Aug			1,500	27-Aug
1986	19,000	18-Aug			9,000	18-Aug
1987	19,800	12-Aug	700	25-Aug	11,100	25-Aug
1988	8,000	30-Aug	1,200	30-Aug	5,600	30-Aug
1989	40,000	11-Sep	950	12-Sep	96,000	26-Aug
1990	9,970	14-Aug	1,900	13-Aug	6,700	20-Aug
1991	43,000	6-Sep	2,300	30-Aug	15,450	22-Aug
1992	4,400	3-Sep	270	5-Aug	3,800	8-Aug
1993	25,000	23-Aug	1,200	23-Aug		
1994	11,400	11-Aug	800	8-Aug		
1995	60,300	9-Sep	2,000	27-July	31,500	6-Aug

Note: These figures represent the largest aerial survey count of the year and not an estimate of total escapement. Dates for surveys are provided because during some years a stream may only be flown once, possibly before or after the run has started. In these cases the dates will show that the low peak count was due to the date it was flown and not necessarily the low abundance of fish.

^a Aerial surveys unless otherwise noted.

^b 1985-1990 are weir counts. Does not include fish spawning below the weir.

APPENDIX G. TIME OF ENTRY TABLES FOR:

**BUSKIN RIVER SOCKEYE SALMON,
BUSKIN RIVER PINK SALMON,
BUSKIN RIVER COHO SALMON,
KARLUK RIVER CHINOOK SALMON,
AYAKULIK RIVER CHINOOK SALMON,
CHIGNIK RIVER CHINOOK SALMON**

Appendix G1.-Immigration of sockeye salmon through the Buskin River weir, 1985-1994.

Date	1985		1986		1987		1988		1989		1990 ^a	
	No.	%	No.	%								
20-May	27	0.1	4	0	146	1.2	10	0.1	0	0	0	0
21-May	27	0.1	4	0	151	1.2	11	0.1	0	0	0	0
22-May	27	0.1	4	0	156	1.2	11	0.1	0	0	0	0
23-May	27	0.1	4	0	156	1.2	11	0.1	1	0	0	0
24-May	28	0.2	4	0	156	1.2	12	0.1	1	0	0	0
25-May	28	0.2	4	0	156	1.2	29	0.2	1	0	1	0
26-May	42	0.2	37	0.4	156	1.2	36	0.3	11	0.1	1	0
27-May	63	0.3	40	0.4	164	1.3	67	0.6	25	0.1	1	0
28-May	103	0.6	40	0.4	166	1.3	90	0.7	65	0.4	16	0.2
29-May	164	0.9	40	0.4	166	1.3	99	0.8	72	0.4	16	0.2
30-May	196	1.1	65	0.7	180	1.4	100	0.8	106	0.6	16	0.2
31-May	202	1.1	65	0.7	194	1.5	101	0.8	133	0.7	17	0.2
1-Jun	218	1.2	65	0.7	195	1.5	101	0.8	147	0.8	17	0.2
2-Jun	830	4.6	66	0.7	195	1.5	102	0.8	197	1.1	17	0.2
3-Jun	1184	6.6	712	8	196	1.5	236	1.9	297	1.7	28	0.3
4-Jun	1538	8.5	1035	11.6	196	1.5	301	2.5	447	2.5	735	7
5-Jun	1892	10.5	1035	11.6	196	1.5	486	4	623	3.5	983	9.3
6-Jun	2246	12.5	1035	11.6	199	1.6	655	5.4	863	4.8	1918	18.2
7-Jun	2600	14.4	1218	13.6	414	3.3	669	5.5	1258	7	2049	19.5
8-Jun	2633	14.6	1311	14.7	655	5.2	819	6.7	2040	11.4	2492	23.7
9-Jun	2827	15.7	1404	15.7	735	5.8	880	7.2	2655	14.9	2829	26.9
10-Jun	3342	18.6	1424	15.9	1335	10.5	890	7.3	2861	16	2937	27.9
11-Jun	3646	20.2	1442	16.1	2935	23.1	909	7.5	3752	21	3178	30.2
12-Jun	3950	21.9	1559	17.4	4136	32.6	909	7.5	3937	22.1	3527	33.5
13-Jun	4254	23.6	1676	18.7	4936	38.9	931	7.7	4153	23.3	3999	38
14-Jun	4558	25.3	1793	20.1	5336	42	1019	8.4	4627	25.9	4335	41.2
15-Jun	4863	27	1910	21.4	5389	42.5	1037	8.5	4934	27.6	4631	44
16-Jun	4886	27.1	2027	22.7	5700	44.9	1540	2.7	5537	31	4860	46.2
17-Jun	4914	27.3	2144	24	6222	49	4033	33.2	6550	36.7	5140	48.8
18-Jun	4969	27.6	2261	25.3	6482	51.1	4171	34.3	6770	37.9	5252	49.9

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Date	1991		1992		1993		1994		1985-94
	No	%	No.	%	No.	%	No.	%	Avg. %
20-May	0	0	0	0	0	0	0	0	0.1
21-May	0	0	0	0	0	0	0	0	0.1
22-May	0	0	0	0	0	0	0	0	0.2
23-May	0	0	0	0	0	0	0	0	0.2
24-May	0	0	2	0	0	0	0	0	0.2
25-May	0	0	3	0	0	0	0	0	0.2
26-May	0	0	4	0	0	0	0	0	0.2
27-May	20	0.2	7	0.1	0	0	0	0	0.3
28-May	35	0.4	7	0.1	0	0	0	0	0.4
29-May	35	0.4	7	0.1	0	0	0	0	0.4
30-May	154	1.6	7	0.1	69	0.7	0	0	0.7
31-May	154	1.6	7	0.1	120	1.3	0	0	0.8
1-Jun	165	1.7	11	0.1	138	1.4	0	0	0.9
2-Jun	321	3.3	11	0.1	348	3.7	5	0.1	1.6
3-Jun	902	9.2	12	0.1	581	6.1	188	1.6	3.7
4-Jun	912	9.3	12	0.1	973	10.2	440	3.7	5.7
5-Jun	912	9.3	121	1.2	1421	14.9	595	5	7.1
6-Jun	1218	12.4	142	1.5	1565	16.4	750	6.4	9.1
7-Jun	1265	12.9	601	6.1	1609	16.9	1399	11.9	11.1
8-Jun	1380	14.1	623	6.4	2211	23.2	1704	14.5	13.4
9-Jun	1478	15.1	760	7.8	2445	25.7	1822	15.5	15
10-Jun	1844	18.8	1722	17.6	2628	27.6	1949	16.5	17.7
11-Jun	2469	25.2	1758	18	2936	30.8	2056	17.4	21
12-Jun	2710	27.7	2002	20.5	3428	36	2406	20.4	24
13-Jun	3431	35	2515	25.7	3929	41.2	2758	23.4	27.6
14-Jun	4135	42.2	2531	25.9	3995	41.9	3094	26.3	29.9
15-Jun	4730	48.3	2876	29.4	4016	42.2	3366	28.6	31.9
16-Jun	4744	48.4	2963	30.3	4308	45.2	3835	32.5	34.1
17-Jun	4794	48.9	2988	30.6	4661	48.9	3956	33.6	38.1
18-Jun	5025	51.3	3251	33.3	4860	51	4343	36.9	39.9

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Date	1985		1986		1987		1988		1989		1990 ^a	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
19-Jun	5247	29.1	2378	26.6	6579	51.8	4260	35.1	6779	38	5504	52.3
20-Jun	5490	30.5	2495	27.9	6788	53.5	4344	35.8	7000	39.2	5648	53.6
21-Jun	5658	31.4	2612	29.2	7126	56.2	4708	38.8	7500	42	5907	56.1
22-Jun	6124	34	2729	30.5	7313	57.6	4924	40.5	7732	43.3	6056	57.5
23-Jun	6332	35.2	2731	30.6	7912	62.3	5104	42	7900	44.3	6292	59.8
24-Jun	7475	41.5	2733	30.6	8435	66.5	5181	42.7	8304	46.5	6444	61.2
25-Jun	7671	42.6	2835	31.7	8884	70	5250	43.2	8784	49.2	6852	65.1
26-Jun	7978	44.3	2937	32.9	9257	72.9	5564	45.8	9184	51.4	7010	66.6
27-Jun	8261	45.9	3019	33.8	9556	75.3	5750	47.3	9490	53.2	7050	67
28-Jun	9075	50.4	3101	34.7	9781	77.1	5758	47.4	9830	55.1	7122	67.6
29-Jun	9121	50.6	3256	36.4	9930	78.3	5945	49	10173	57	7125	67.7
30-Jun	9208	51.1	3411	38.2	10005	78.8	5946	49	10436	58.5	7559	71.8
1-Jul	10045	55.8	3411	38.2	10008	78.9	5956	49	10839	60.7	7621	72.4
2-Jul	10312	57.3	3411	38.2	10045	79.2	5960	49.1	11123	62.3	7783	73.9
3-Jul	10590	58.8	3554	39.8	10150	80	6000	49.4	11277	63.2	7893	75
4-Jul	10694	59.4	3573	40	10154	80	6010	49.5	11451	64.1	7909	75.1
5-Jul	11242	62.4	3985	44.6	10156	80	6014	49.5	11638	65.2	7909	75.1
6-Jul	11295	62.7	4444	49.7	10159	80.1	7269	59.9	11720	65.6	7913	75.2
7-Jul	12358	68.6	4599	51.4	10185	80.3	7346	60.5	11874	66.5	7933	75.4
8-Jul	12462	69.2	4605	51.5	10188	80.3	7353	60.5	12096	67.8	7963	75.6
9-Jul	12547	69.7	4619	51.7	10189	80.3	7378	60.8	12521	70.1	8201	77.9
10-Jul	12660	70.3	4640	51.9	10251	80.8	7422	61.1	12706	71.2	8205	77.9
11-Jul	13093	72.7	4661	52.1	10292	81.1	7521	61.9	12790	71.6	8205	77.9
12-Jul	13266	73.7	4674	52.3	10300	81.2	7617	62.7	12841	71.9	8205	77.9
13-Jul	13341	74.1	4704	52.6	10307	81.2	8948	73.7	13032	73	8206	77.9
14-Jul	13603	75.5	4803	53.7	10320	81.3	8952	73.7	13062	73.2	8341	79.2
15-Jul	14750	81.9	4943	55.3	10437	82.2	8976	73.9	13676	76.6	8381	79.6
16-Jul	15354	85.3	4951	55.4	10456	82.4	9007	74.2	13931	78	8413	79.9
17-Jul	15513	86.1	5144	57.5	10481	82.6	9038	74.4	14041	78.6	8653	82.2
18-Jul	15513	86.1	5233	58.5	10489	82.7	9048	74.5	14259	79.9	8653	82.2

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Date	1991		1992		1993		1994		1985-94
	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jun	5255	53.7	3599	36.8	5237	55	4955	42.1	42
20-Jun	5485	56	3891	39.8	5395	56.6	5745	48.8	44.2
21-Jun	5715	58.4	4042	41.4	5654	59.4	6875	58.3	47.1
22-Jun	5856	59.8	4380	44.8	5801	60.9	7242	61.5	49.1
23-Jun	5914	60.4	5230	53.5	5879	61.7	7599	64.5	51.4
24-Jun	6080	62.1	5264	53.9	6132	64.4	8282	70.3	54
25-Jun	6194	63.2	5466	55.9	6308	66.2	8415	71.4	55.9
26-Jun	6368	65	5595	57.2	6401	67.2	8643	73.4	57.7
27-Jun	6413	65.5	5927	60.6	6577	69	8874	75.3	59.3
28-Jun	6473	66.1	6750	69.1	6666	70	9035	76.7	61.4
29-Jun	6510	66.5	6841	70	6684	70.2	9164	77.8	62.3
30-Jun	6638	67.8	6887	70.5	6699	70.3	9187	78	63.4
1-Jul	6692	68.3	6897	70.6	6827	71.7	10001	84.9	65
2-Jul	7040	71.9	7014	71.8	6865	72.1	10037	85.2	66.1
3-Jul	7184	73.4	7042	72	6906	72.5	10341	87.8	67.2
4-Jul	7265	74.2	7126	72.9	6911	72.5	10415	88.4	67.6
5-Jul	7342	75	7168	73.3	7003	73.5	10547	89.5	68.8
6-Jul	7402	75.6	7205	73.7	7004	73.5	10648	90.4	70.6
7-Jul	7480	76.4	7236	74	7015	73.6	10663	90.5	71.7
8-Jul	7503	76.6	7248	74.2	7047	74	10680	90.6	72
9-Jul	7599	77.6	7319	74.9	7067	74.2	10718	91	72.8
10-Jul	7614	77.7	7345	75.1	7070	74.2	10724	91	73.1
11-Jul	7680	78.4	7374	75.4	7135	74.9	11044	93.7	74
12-Jul	7688	78.5	7414	75.9	7202	75.6	11151	94.6	74.4
13-Jul	7693	78.5	7466	76.4	7209	75.7	11250	95.5	75.9
14-Jul	7707	78.7	7527	77	7254	76.1	11275	95.7	76.4
15-Jul	7748	79.1	7585	77.6	7366	77.3	11276	95.7	77.9
16-Jul	7825	79.9	7597	77.7	7388	77.6	11299	95.9	78.6
17-Jul	7831	80	7598	77.7	7634	80.1	11405	96.8	79.6
18-Jul	7956	81.2	7684	78.6	7679	80.6	11483	97.5	80.2

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Date	1985		1986		1987		1988		1989		1990 ^a	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
19-Jul	15513	86.1	5395	60.4	10500	82.7	10285	84.7	14423	80.8	8668	82.3
20-Jul	15513	86.1	5737	64.2	10514	82.9	10425	85.8	14499	81.2	8718	82.8
21-Jul	15513	86.1	5869	65.7	10526	82.9	10440	86	14797	82.9	8803	83.6
22-Jul	15513	86.1	5953	66.6	10575	83.3	10457	86.1	14898	83.4	8899	84.5
23-Jul	15558	86.4	6055	67.7	10588	83.4	10468	86.2	15168	85	8917	84.7
24-Jul	15614	86.7	6076	68	10604	83.6	10478	86.3	15420	86.4	8935	84.9
25-Jul	15643	86.9	6140	68.7	10653	83.9	10528	86.7	15531	87	8954	85
26-Jul	15732	87.4	6234	69.7	10850	85.5	10648	87.7	15650	87.7	8957	85.1
27-Jul	15863	88.1	6305	70.5	10887	85.8	10713	88.2	15692	87.9	9008	85.6
28-Jul	16019	88.9	6558	73.4	10937	86.2	10756	88.6	15789	88.4	9299	88.3
29-Jul	16196	89.9	6662	74.5	11115	87.6	11520	94.9	15911	89.1	9386	89.2
30-Jul	16403	91.1	6733	75.3	11157	87.9	11543	95.1	16211	90.8	9424	89.5
31-Jul	16641	92.4	6870	76.9	11197	88.2	11554	95.1	16326	91.4	9475	90
1-Aug	16796	93.3	7191	80.4	11267	88.8	11591	95.4	16472	92.3	9755	92.7
2-Aug	16858	93.6	7368	82.4	11300	89	11640	95.8	16521	92.5	9812	93.2
3-Aug	16947	94.1	8020	89.7	11339	89.4	11686	96.2	16743	93.8	9973	94.7
4-Aug	17027	94.5	8178	91.5	11393	89.8	11744	96.7	16766	93.9	10033	95.3
5-Aug	17113	95	8264	92.4	11412	89.9	11758	96.8	16868	94.5	10082	95.8
6-Aug	17231	95.7	8377	93.7	11428	90.1	11796	97.1	16940	94.9	10137	96.3
7-Aug	17235	95.7	8597	96.2	11443	90.2	11850	97.6	17029	95.4	10196	96.8
8-Aug	17282	96	8732	97.7	11458	90.3	11869	97.7	17154	96.1	10249	97.3
9-Aug	17361	96.4	8782	98.2	11514	90.7	11883	97.9	17219	96.4	10290	97.7
10-Aug	17443	96.9	8807	98.5	11578	91.2	11905	98	17262	96.7	10326	98.1
11-Aug	17502	97.2	8866	99.2	11759	92.7	11911	98.1	17317	97	10381	98.6
12-Aug	17564	97.5	8867	99.2	11819	93.1	11926	98.2	17389	97.4	10414	98.9
13-Aug	17614	97.8	8882	99.4	11837	93.3	11937	98.3	17421	97.6	10433	99.1
14-Aug	17680	98.2	8885	99.4	11847	93.4	11939	98.3	17470	97.9	10452	99.3
15-Aug	17715	98.4	8885	99.4	11858	93.4	11946	98.4	17519	98.1	10468	99.4
16-Aug	17739	98.5	8885	99.4	11865	93.5	11962	98.5	17663	98.9	10479	99.5
17-Aug	17783	98.7	8885	99.4	11871	93.5	12092	99.6	17676	99	10482	99.6

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Date	1991		1992		1993		1994		1985-94
	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jul	7961	81.3	7845	80.3	7681	80.6	11597	98.4	81.8
20-Jul	7977	81.4	7874	80.6	7681	80.6	11599	98.4	82.4
21-Jul	8004	81.7	7907	80.9	7681	80.6	11600	98.4	82.9
22-Jul	8033	82	7938	81.2	7693	80.8	11602	98.5	83.4
23-Jul	8164	83.4	8019	82	7704	80.9	11605	98.5	83.9
24-Jul	8227	84	8204	83.9	7707	80.9	11605	98.5	84.3
25-Jul	8254	84.3	8253	84.4	7759	81.5	11605	98.5	84.7
26-Jul	8307	84.8	8268	84.6	7771	81.6	11605	98.5	85.2
27-Jul	8360	85.4	9711	99.4	7772	81.6	11606	98.5	87
28-Jul	8413	85.9	9711	99.4	7792	81.8	11607	98.5	87.8
29-Jul	8466	86.4	9711	99.4	7858	82.5	11607	98.5	89
30-Jul	8519	87	9711	99.4	8287	87	11607	98.5	89.9
31-Jul	8572	87.5	9711	99.4	9526	100	11607	98.5	91.6
1-Aug	8625	88.1	9711	99.4	9526	100	11607	98.5	92.5
2-Aug	8678	88.6	9711	99.4	9526	100	11607	98.5	92.9
3-Aug	8731	89.1	9711	99.4	9526	100	11607	98.5	94
4-Aug	8784	89.7	9711	99.4	9526	100	11607	98.5	94.4
5-Aug	8837	90.2	9711	99.4	9526	100	11607	98.5	94.7
6-Aug	8890	90.8	9711	99.4	9526	100	11607	98.5	95
7-Aug	8942	91.3	9711	99.4	9526	100	11607	98.5	95.4
8-Aug	8994	91.8	9711	99.4	9526	100	11607	98.5	95.7
9-Aug	9046	92.4	9711	99.4	9526	100	11607	98.5	96
10-Aug	9098	92.9	9711	99.4	9526	100	11607	98.5	96.2
11-Aug	9150	93.4	9711	99.4	9526	100	11607	98.5	96.5
12-Aug	9202	94	9711	99.4	9526	100	11607	98.5	96.7
13-Aug	9254	94.5	9711	99.4	9526	100	11607	98.5	96.8
14-Aug	9306	95	9711	99.4	9526	100	11607	98.5	96.9
15-Aug	9358	95.5	9711	99.4	9526	100	11607	98.5	96.9
16-Aug	9410	96.1	9711	99.4	9526	100	11645	98.8	97.1
17-Aug	9462	96.6	9711	99.4	9526	100	11645	98.8	97.2

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Date	1985		1986		1987		1988		1989		1990 ^a	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
18-Aug	17801	98.8	8900	99.6	11899	93.8	12101	99.6	17704	99.2	10482	99.6
19-Aug	17832	99	8901	99.6	11925	94	12105	99.7	17726	99.3	10485	99.6
20-Aug	17845	99.1	8901	99.6	11950	94.2	12110	99.7	17733	99.3	10486	99.6
21-Aug	17863	99.2	8902	99.6	11968	94.3	12127	99.9	17741	99.4	10486	99.6
22-Aug	17890	99.3	8904	99.6	11984	94.4	12133	99.9	17747	99.4	10486	99.6
23-Aug	17905	99.4	8911	99.7	12024	94.8	12133	99.9	17749	99.4	10487	99.6
24-Aug	17909	99.4	8917	99.8	12084	95.2	12135	99.9	17749	99.4	10487	99.6
Season Total	18,010		8,939		12,690		12,144		17,853		10,528	
Ending Date	19-Sep		1-Oct		30-Sep		30-Sep		2-Oct		30-Sep	

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Date	1991		1992		1993		1994		1985-94
	No.	%	No.	%	No.	%	No.	%	Avg. %
18-Aug	9514	97.1	9711	99.4	9526	100	11645	98.8	97.1
19-Aug	9566	97.7	9711	99.4	9526	100	11647	98.8	97.2
20-Aug	9618	98.2	9711	99.4	9526	100	11652	98.9	97.2
21-Aug	9670	98.7	9711	99.4	9526	100	11656	98.9	97.3
22-Aug	9722	99.3	9711	99.4	9526	100	11662	99	97.3
23-Aug	9730	99.3	9711	99.4	9526	100	11663	99	99.1
24-Aug	9732	99.4	9711	99.4	9526	100	11670	99	99.1
Season	9,794		9,782		9,526		11,783		12,105
Total									
Ending									
Date	30-Sep		7-Oct		30-Sep		29-Sep		

^a Beginning in 1990 the weir was moved to the outlet at Buskin Lake for June and July. Fish immigrating to tributary lakes (Genevieve and Louise) are no longer counted.

Appendix G2.-Immigration of pink salmon through the Buskin River weir, 1985-1990.

Date	1985		1986		1987		1988		1989		1990		1985-90
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
20-Jul	1885	1.2	742	0.7	108	0.4	215	0.1	600	0.4	44	0.1	0.5
21-Jul	2696	1.8	946	1	143	0.5	315	0.2	884	0.6	536	1.2	0.9
22-Jul	3507	2.3	1174	1.2	247	0.9	562	0.3	1041	0.7	605	1.4	1.1
23-Jul	4341	2.8	1505	1.5	277	1	795	0.4	1383	0.9	626	1.5	1.3
24-Jul	6259	4.1	1612	1.6	323	1.2	1110	0.5	2033	1.3	678	1.6	1.7
25-Jul	7084	4.6	1971	2	477	1.7	1754	0.9	2648	1.7	743	1.7	2.1
26-Jul	8591	5.6	2302	2.3	604	2.2	2539	1.2	4615	2.9	751	1.8	2.7
27-Jul	11394	7.4	2588	2.6	763	2.7	3494	1.7	6254	3.9	896	2.1	3.4
28-Jul	13787	9	3530	3.6	941	3.4	4683	2.3	9150	5.8	1833	4.3	4.7
29-Jul	17650	11.5	4159	4.2	1287	4.6	8142	4	13169	8.3	2591	6	6.4
30-Jul	22116	14.5	5222	5.3	2014	7.2	11486	5.6	16556	10.4	3320	7.7	8.5
31-Jul	24363	15.9	6679	6.7	3258	11.7	17442	8.6	19346	12.2	3617	8.4	10.6
1-Aug	25217	16.5	7576	7.7	4752	17	23632	11.6	24346	15.3	4348	10.1	13
2-Aug	30196	19.7	9252	9.3	5616	20.1	34693	17	27776	17.5	5770	13.5	16.2
3-Aug	42604	27.8	14658	14.8	6994	25.1	46631	22.9	34573	21.7	7192	16.8	21.5
4-Aug	54018	35.3	17970	18.2	8111	29.1	62144	30.5	39103	24.6	8614	20.1	26.3
5-Aug	64523	42.2	22236	22.5	9037	32.4	72327	35.5	46383	29.1	10036	23.4	30.9
6-Aug	75544	49.4	25812	26.1	9818	35.2	83068	40.8	55848	35.1	11458	26.7	35.5
7-Aug	83174	54.4	29557	29.9	10746	38.5	104004	51.1	65128	40.9	12880	30	40.8
8-Aug	88566	57.9	33503	33.9	11439	41	113334	55.7	73423	46.1	14302	33.3	44.7
9-Aug	97014	63.4	37651	38	12210	43.8	129929	63.8	82283	51.7	15724	36.7	49.6
10-Aug	106269	69.4	40484	40.9	12871	46.1	143643	70.6	89529	56.3	17146	40	53.9
11-Aug	110618	72.3	48508	49	15006	53.8	151624	74.5	91733	57.6	18568	43.3	58.4
12-Aug	116456	76.1	53571	54.1	16214	58.1	157449	77.3	95984	60.3	19990	46.6	62.1
13-Aug	120075	78.5	56314	56.9	16945	60.8	162002	79.6	98984	62.2	21412	49.9	64.6
14-Aug	122958	80.4	57889	58.5	17339	62.2	165859	81.5	102280	64.3	22834	53.2	66.7
15-Aug	125903	82.3	60897	61.5	17553	62.9	168933	83	105612	66.4	24256	56.6	68.8
16-Aug	127214	83.1	61924	62.6	17804	63.8	173405	85.2	111225	69.9	25908	60.4	70.8
17-Aug	128122	83.7	62705	63.4	18065	64.8	182537	89.7	114120	71.7	26459	61.7	72.5
18-Aug	128932	84.3	65193	65.9	18294	65.6	184808	90.8	126176	79.3	27610	64.4	75

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Date	1985		1986		1987		1988		1989		1990		1985-90
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Aug	129751	84.8	65730	66.4	18640	66.8	185785	91.3	132550	83.3	28712	66.9	76.6
20-Aug	129990	84.9	65910	66.6	19121	68.6	188096	92.4	134700	84.7	29194	68.1	77.5
21-Aug	130524	85.3	66135	66.8	19530	70	190966	93.8	136100	85.5	29388	68.5	78.3
22-Aug	132593	86.6	66712	67.4	19935	71.5	191457	94	137235	86.2	29906	69.7	79.3
23-Aug	133019	86.9	67777	68.5	20295	72.8	192233	94.4	138139	86.8	30096	70.2	79.9
24-Aug	133285	87.1	68342	69.1	21151	75.8	192946	94.8	139593	87.7	30422	70.9	80.9
25-Aug	133670	87.4	70415	71.2	21648	77.6	194118	95.4	143958	90.5	31423	73.3	82.5
26-Aug	134216	87.7	76519	77.3	22250	79.8	199510	98	147047	92.4	31961	74.5	84.9
27-Aug	134874	88.1	80710	81.6	22449	80.5	200099	98.3	147872	92.9	33059	77.1	86.4
28-Aug	135652	88.6	81768	82.6	22663	81.3	200599	98.5	148434	93.3	33901	79	87.2
29-Aug	136776	89.4	82298	83.2	23096	82.8	201299	98.9	148999	93.6	34692	80.9	88.1
30-Aug	139361	91.1	83655	84.5	23498	84.2	201899	99.2	149968	94.2	34833	81.2	89.1
31-Aug	140876	92.1	85220	86.1	23728	85.1	202466	99.5	151271	95.1	35209	82.1	90.9
1-Sep	141821	92.7	86094	87	24167	86.6	202930	99.7	153395	96.4	35576	82.9	91.9
2-Sep	142709	93.3	87062	88	24721	88.6	202930	99.7	155278	97.6	36097	84.2	93.5
3-Sep	144729	94.6	87832	88.8	25052	89.8	202930	99.7	155573	97.8	38750	90.3	94.1
4-Sep	145825	95.3	88259	89.2	25385	91	202930	99.7	155673	97.8	39388	91.8	94.8
5-Sep	146706	95.9	89557	90.5	25658	92	202930	99.7	155963	98	39765	92.7	95.9
6-Sep	147406	96.3	91417	92.4	26591	95.3	203009	99.7	156315	98.2	39991	93.2	97.2
7-Sep	148436	97	94880	95.9	27283	97.8	203578	100	157015	98.7	40138	93.6	97.7
8-Sep	149411	97.6	95101	96.1	27313	97.9	203578	100	157413	98.9	40970	95.5	98.2
9-Sep	149753	97.9	95251	96.3	27619	99	203578	100	158220	99.4	41411	96.6	98.4
10-Sep	150300	98.2	95460	96.5	27729	99.4	203578	100	158335	99.5	41446	96.6	98.8
Season													
Total	153,026		98,958		27,892		203,578		159,123		42,889		114,244
Ending													
Date	21-Sep		1-Oct		19-Sep		6-Sep		28-Sep		25-Sep		

Note: The Buskin River weir was not operated during the peak pink salmon immigration after 1990.

Appendix G3.-Immigration of coho salmon through the Buskin River weir, 1985-1994.

Date	1985		1986		1987		1988		1989		1990	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-Aug	4	0	6	0.1	0	0	0	0	0	0	1	0
2-Aug	8	0.1	8	0.1	0	0	0	0	1	0	1	0
3-Aug	14	0.1	21	0.2	1	0	2	0	1	0	1	0
4-Aug	14	0.1	23	0.2	1	0	2	0	1	0	1	0
5-Aug	17	0.2	29	0.3	2	0	3	0	1	0	1	0
6-Aug	23	0.2	31	0.3	2	0	3	0	1	0	1	0
7-Aug	32	0.3	33	0.3	5	0	4	0.1	2	0	1	0
8-Aug	38	0.4	53	0.5	5	0	6	0.1	6	0.1	1	0
9-Aug	44	0.5	91	0.9	5	0	7	0.1	7	0.1	1	0
10-Aug	45	0.5	219	2.2	10	0.1	8	0.1	10	0.1	1	0
11-Aug	50	0.5	239	2.4	14	0.1	9	0.1	10	0.1	1	0
12-Aug	54	0.6	288	2.9	24	0.2	11	0.2	14	0.1	1	0
13-Aug	63	0.7	313	3.1	33	0.3	17	0.3	16	0.2	1	0
14-Aug	70	0.7	333	3.4	36	0.3	20	0.3	20	0.2	1	0
15-Aug	77	0.8	392	3.9	42	0.4	20	0.3	25	0.3	1	0
16-Aug	88	0.9	449	4.5	50	0.5	26	0.4	35	0.4	2	0
17-Aug	100	1.1	507	5.1	51	0.5	60	1	44	0.4	18	0.3
18-Aug	127	1.3	571	5.7	66	0.6	72	1.2	71	0.7	42	0.7
19-Aug	136	1.4	613	6.2	68	0.6	92	1.5	105	1.1	56	0.9
20-Aug	160	1.7	650	6.5	81	0.7	112	1.8	133	1.3	101	1.6
21-Aug	192	2	751	7.6	104	0.9	197	3.2	148	1.5	161	2.6
22-Aug	238	2.5	840	8.5	117	1.1	222	3.6	159	1.6	195	3.1
23-Aug	264	2.8	918	9.2	139	1.3	232	3.8	171	1.7	231	3.7
24-Aug	278	2.9	962	9.7	195	1.8	245	4	185	1.9	259	4.2
25-Aug	299	3.2	986	9.9	276	2.5	298	4.8	310	3.1	280	4.5
26-Aug	311	3.3	1184	11.9	315	2.8	650	10.5	370	3.7	340	5.5
27-Aug	318	3.4	1438	14.5	349	3.1	1110	18	381	3.8	356	5.7
28-Aug	333	3.5	1651	16.6	367	3.3	1610	26	393	4	380	6.1
29-Aug	344	3.6	1763	17.7	388	3.5	2260	36.6	429	4.3	402	6.5
30-Aug	379	4	3496	35.2	407	3.7	3260	52.7	478	4.8	428	6.9
31-Aug	413	4.4	3805	38.3	418	3.8	3651	59.1	519	5.2	436	7
1-Sep	430	4.5	3924	39.5	430	3.9	3790	61.3	852	8.6	444	7.1

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Date	1991		1992		1993		1994		1986-94 ^a
	No.	%	No.	%	No.	%	No.	%	Avg. %
1-Aug	0	0	0	0	0	0	0	0	0
2-Aug	0	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0	0	0	0
8-Aug	0	0	0	0	0	0	0	0	0.1
9-Aug	0	0	0	0	0	0	0	0	0.1
10-Aug	0	0	0	0	0	0	0	0	0.1
11-Aug	0	0	0	0	0	0	0	0	0.1
12-Aug	0	0	0	0	0	0	0	0	0.3
13-Aug	0	0	0	0	0	0	0	0	0.4
14-Aug	0	0	0	0	0	0	0	0	0.4
15-Aug	0	0	0	0	0	0	0	0	0.5
16-Aug	0	0	0	0	0	0	0	0	0.6
17-Aug	0	0	0	0	0	0	4	0	0.8
18-Aug	0	0	0	0	0	0	4	0	1
19-Aug	0	0	0	0	1	0.1	12	0.1	1.2
20-Aug	0	0	0	0	134	2	31	0.4	1.6
21-Aug	0	0	0	0	138	2	48	0.6	2
22-Aug	0	0	0	0	224	3.3	68	0.8	2.4
23-Aug	155	1.7	0	0	302	4.4	77	0.9	2.9
24-Aug	173	1.9	0	0	333	4.9	130	1.6	3.3
25-Aug	198	2.2	25	0.4	400	5.9	144	1.8	3.9
26-Aug	236	2.6	132	2	467	6.9	153	1.9	5.3
27-Aug	261	2.9	219	3.4	534	7.8	176	2.2	6.8
28-Aug	310	3.5	261	4	635	9.3	185	2.3	8.3
29-Aug	373	4.2	299	4.6	736	10.8	191	2.3	10.1
30-Aug	437	4.9	459	7	837	12.3	193	2.4	14.4
31-Aug	475	5.3	618	9.5	938	13.8	198	2.4	16
1-Sep	492	5.5	799	12.2	1030	15.1	203	2.5	17.3

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Date	1985		1986		1987		1988		1989		1990	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2-Sep	452	4.8	4087	41.1	481	4.3	4116	66.6	991	10	456	7.3
3-Sep	458	4.8	4267	42.9	510	4.6	4231	68.4	1041	10.5	463	7.4
4-Sep	464	4.9	4358	43.8	523	4.7	4298	69.5	1062	10.7	556	8.9
5-Sep	466	4.9	4475	45	539	4.9	4364	70.6	1167	11.8	853	13.7
6-Sep	466	4.9	4540	45.7	987	8.9	4431	71.7	1231	12.4	943	15.2
7-Sep	468	4.9	4984	50.1	1947	17.5	4553	73.6	1298	13.1	1000	16.1
8-Sep	468	4.9	5065	51	2561	23.1	4573	74	1365	13.7	1042	16.7
9-Sep	469	5	5130	51.6	4367	39.3	4624	74.8	2240	22.6	1138	18.3
10-Sep	469	5	5178	52.1	5071	45.7	4757	76.9	2295	23.1	1242	20
11-Sep	469	5	5200	52.3	5669	51.1	4986	80.7	2783	28	1249	20.1
12-Sep	469	5	5239	52.7	5789	52.1	5160	83.5	3133	31.6	1301	20.9
13-Sep	469	5	5265	53	6047	54.5	5305	85.8	3684	37.1	1743	28
14-Sep	469	5	5321	53.5	6231	56.1	5387	87.1	4034	40.6	1886	30.3
15-Sep	474	5	5408	54.4	6521	58.7	5427	87.8	4814	48.5	2222	35.7
16-Sep	479	5.1	5466	55	7558	68.1	5448	88.1	5144	51.8	2565	41.2
17-Sep	503	5.3	5537	55.7	8062	72.6	5476	88.6	5965	60.1	3565	57.3
18-Sep	723	7.6	5613	56.5	8398	75.6	5490	88.8	6645	66.9	4065	65.3
19-Sep	879	9.3	5711	57.5	8904	80.2	5645	91.3	7645	77	4565	73.4
20-Sep	969	10.2	5794	58.3	9297	83.7	5686	92	8177	82.3	4965	79.8
21-Sep	1009	10.7	5947	59.8	9416	84.8	5725	92.6	8617	86.8	5165	83
22-Sep	2563	27.1	5974	60.1	9616	86.6	5748	93	9074	91.4	5365	86.2
23-Sep	2881	30.4	6046	60.8	9866	88.9	5828	94.3	9153	92.2	5515	88.6
24-Sep	3258	34.4	6193	62.3	10341	93.1	6182	100	9359	94.2	5608	90.1
25-Sep	3877	40.9	6233	62.7	10498	94.6	6182	100	9516	95.8	5830	93.7
26-Sep	6486	68.5	6596	66.4	10777	97.1	6182	100	9601	96.7	5959	95.8
27-Sep	6596	69.6	7346	73.9	10848	97.7	6182	100	9651	97.2	5959	95.8
28-Sep	7345	77.5	7401	74.5	10914	98.3	6182	100	9701	97.7	6222	100
29-Sep	7810	82.4	7464	75.1	10993	99	6182	100	9752	98.2	6222	100
30-Sep	8275	87.3	7488	75.3	11078	99.8	6182	100	9805	98.7	6222	100
1-Oct	8740	92.3	9335	93.9	11103	100	6182	100	9836	99.1	6222	100

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Date	1991		1992		1993		1994		1986-94 ^a
	No.	%	No.	%	No.	%	No.	%	Avg. %
2-Sep	652	7.3	870	13.3	1123	16.5	214	2.6	18.8
3-Sep	807	9	897	13.7	1242	18.2	229	2.8	19.7
4-Sep	1320	14.8	920	14.1	1357	19.9	235	2.9	21
5-Sep	1562	17.5	942	14.4	1472	21.6	295	3.6	22.6
6-Sep	1659	18.6	976	14.9	1587	23.3	397	4.9	23.9
7-Sep	1861	20.8	1041	15.9	1702	25	421	5.2	26.4
8-Sep	2461	27.6	1187	18.2	1822	26.7	470	5.8	28.5
9-Sep	2511	28.1	1377	21.1	1928	28.3	530	6.5	32.3
10-Sep	2820	31.6	1406	21.5	2065	30.3	640	7.9	34.3
11-Sep	3169	35.5	1442	22.1	2161	31.7	1017	12.5	37.1
12-Sep	3776	42.3	1493	22.8	2459	36.1	1635	20.1	40.2
13-Sep	4689	52.5	1532	23.4	2777	40.8	1796	22	44.1
14-Sep	5147	57.6	1638	25.1	3062	44.9	1933	23.7	46.6
15-Sep	5605	62.8	1713	26.2	3179	46.7	3526	43.3	51.6
16-Sep	6063	67.9	1773	27.1	3952	58	4464	54.8	56.9
17-Sep	6521	73	3085	47.2	4506	66.1	4804	59	64.4
18-Sep	6847	76.7	3268	50	4555	66.9	5737	70.4	68.6
19-Sep	7131	79.9	3314	50.7	4687	68.8	6090	74.8	72.6
20-Sep	7399	82.9	3345	51.2	4942	72.5	6381	78.3	75.7
21-Sep	7867	88.1	3378	51.7	5157	75.7	6683	82	78.3
22-Sep	7934	88.9	3383	51.8	5241	76.9	6985	85.7	80.1
23-Sep	8154	91.3	3385	51.8	5291	77.7	7330	90	81.7
24-Sep	8374	93.8	3390	51.9	5413	79.5	7550	92.7	84.2
25-Sep	8541	95.7	3410	52.2	5696	83.6	7731	94.9	85.9
26-Sep	8722	97.7	3425	52.4	6022	88.4	7912	97.1	87.9
27-Sep	8868	99.3	5193	79.5	6297	92.4	7966	97.8	92.6
28-Sep	8929	100	5513	84.4	6469	95	8070	99.1	94.3
29-Sep	8929	100	5649	86.4	6641	97.5	8088	99.3	95.1
30-Sep	8929	100	5820	89.1	6813	100	8146	100	95.9
1-Oct	8929	100	5935	90.8	6813	100	8146	100	98.2

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Date	1985a	1986	1987	1988	1989	1990
Season						
Total	9,474	9,939	11,103	6,182	9,930	6,222
Ending						
Date	23-Oct	3-Oct	1-Oct	23-Sep	2-Oct	28-Sep

Date	1991	1992	1993	1994	1985-94a Avg.
Season					
Total	8,929	6,535	6,813	8,146	8,327
Ending					
Date	28-Sep	7-Oct	1-Oct	29-Sep	29-Sep

^a The year 1985 was not used in calculating the average time of entry, due to the late return of coho salmon to the Buskin River.

Appendix G4.-Immigration of chinook salmon through the Karluk River weir, 1986-1995.

	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	0	0.0	3	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	33	0.3	41	0.3	0.1
21-May	0	0.0	13	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	45	0.4	45	0.4	0.1
22-May	0	0.0	21	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	65	0.5	58	0.5	0.1
23-May	0	0.0	31	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	128	1.1	103	0.8	0.2
24-May	3	0.1	74	0.9	0	0.0	4	0.0	0	0.0	0	0.0	0	0.0	0	0.0	142	1.2	160	1.3	0.3
25-May	5	0.1	122	1.5	0	0.0	12	0.1	0	0.0	0	0.0	0	0.0	56	0.4	223	1.9	166	1.3	0.5
26-May	8	0.2	145	1.8	5	0.0	30	0.3	0	0.0	5	0.0	0	0.0	96	0.7	267	2.2	238	1.9	0.7
27-May	10	0.2	181	2.3	26	0.2	62	0.6	0	0.0	126	0.9	1	0.0	212	1.5	331	2.7	260	2.1	1.1
28-May	13	0.3	258	3.3	27	0.2	87	0.8	0	0.0	202	1.4	28	0.3	320	2.3	405	3.4	318	2.5	1.4
29-May	19	0.4	287	3.6	41	0.3	130	1.2	42	0.3	301	2.1	63	0.7	438	3.1	489	4.1	328	2.6	1.8
30-May	38	0.9	347	4.4	89	0.7	165	1.6	278	1.9	386	2.8	89	0.9	714	5.1	540	4.5	366	2.9	2.6
31-May	53	1.2	394	5.0	105	0.8	210	2.0	537	3.7	478	3.4	183	1.9	971	7.0	635	5.3	405	3.2	3.3
1-Jun	99	2.2	419	5.3	157	1.2	305	2.9	646	4.5	570	4.1	270	2.8	1,517	10.9	743	6.2	529	4.2	4.4
2-Jun	152	3.4	515	6.5	276	2.1	451	4.3	1,090	7.5	700	5.0	405	4.2	1,943	13.9	855	7.1	754	6.0	6.0
3-Jun	202	4.6	638	8.0	319	2.4	524	5.0	1,311	9.1	1,310	9.3	529	5.5	2,233	16.0	1,204	10.0	907	7.2	7.7
4-Jun	319	7.2	730	9.2	409	3.1	580	5.5	1,586	11.0	1,545	11.0	601	6.3	2,559	18.4	1,459	12.1	1,094	8.6	9.2
5-Jun	430	9.7	813	10.3	521	3.9	824	7.9	1,943	13.5	1,879	13.4	818	8.5	3,206	23.0	1,835	15.2	1,290	10.19	11.6
6-Jun	479	10.8	1,075	13.6	641	4.8	978	9.3	2,429	16.8	2,199	15.7	985	10.3	3,405	24.4	2,000	16.6	1,491	11.78	13.4
7-Jun	606	13.7	1,186	15.0	761	5.7	1,241	11.8	2,969	20.6	2,675	19.1	1,148	12.0	3,852	27.6	2,206	18.3	1,587	12.54	15.6
8-Jun	659	14.9	1,259	15.9	818	6.1	1,419	13.5	3,433	23.8	3,119	22.2	1,365	14.2	4,453	31.9	2,614	21.7	1,966	15.53	18.0
9-Jun	724	16.3	1,432	18.1	1,107	8.3	1,705	16.3	4,456	30.9	3,744	26.7	1,699	17.7	4,917	35.3	2,869	23.8	2,305	18.21	21.2
10-Jun	828	18.7	1,476	18.6	1,655	12.4	1,976	18.8	5,432	37.6	3,967	28.3	1,947	20.3	5,399	38.7	3,114	25.8	2,785	22.0	24.1
11-Jun	951	21.5	1,660	20.9	2,139	16.0	2,299	21.9	5,810	40.2	4,318	30.8	2,329	24.3	5,833	41.8	3,467	28.8	3,091	24.42	27.1
12-Jun	1,209	27.3	1,841	23.2	2,369	17.8	2,555	24.4	6,631	45.9	5,160	36.8	2,857	29.8	6,187	44.4	4,198	34.8	3,534	27.92	31.2
13-Jun	1,291	29.1	1,963	24.8	3,106	23.3	2,954	28.2	6,825	47.3	5,627	40.1	3,259	33.9	6,705	48.1	4,709	39.1	4,058	32.06	34.6
14-Jun	1,347	30.4	2,402	30.3	3,608	27.1	3,277	31.3	7,321	50.7	5,935	42.3	3,705	38.6	7,161	51.4	5,245	43.5	4,339	34.28	38.0
15-Jun	1,628	36.8	2,581	32.5	4,141	31.0	3,591	34.3	7,598	52.6	6,350	45.3	4,093	42.6	7,411	53.1	5,774	47.9	4,885	38.6	41.5
16-Jun	1,869	42.2	2,749	34.7	5,158	38.7	4,058	38.7	7,919	54.8	6,893	49.2	4,527	47.2	7,542	54.1	6,304	52.3	5,174	40.88	45.3
17-Jun	2,082	47.0	2,832	35.7	5,663	42.5	4,471	42.6	8,070	55.9	7,187	51.3	4,893	51.0	7,995	57.3	6,645	55.1	5,662	44.73	48.3
18-Jun	2,255	50.9	3,110	39.2	6,277	47.1	5,071	48.4	8,361	57.9	7,916	56.5	5,233	54.5	8,290	59.5	6,971	57.9	6,049	47.79	52.0

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jun	2,537	57.3	3,674	46.3	6,869	51.5	5,477	52.2	8,949	62.0	8,449	60.3	5,609	58.4	8,935	64.1	7,143	59.3	6,495	51.32	56.3
20-Jun	2,764	62.4	3,882	49.0	7,434	55.7	5,649	53.9	9,576	66.3	8,769	62.5	5,988	62.4	9,250	66.3	7,464	61.9	6,970	55.07	59.6
21-Jun	2,867	64.7	4,285	54.0	7,743	58.1	6,145	58.6	10,183	70.5	9,313	66.4	5,274	54.9	9,568	68.6	7,816	64.9	7,589	60.0	62.1
22-Jun	2,993	67.6	4,511	56.9	8,210	61.6	6,749	64.4	10,820	74.9	9,753	69.6	6,542	68.1	9,965	71.5	8,194	68.0	7,859	62.09	66.5
23-Jun	3,186	71.9	4,724	59.6	8,854	66.4	7,022	67.0	11,383	78.8	10,145	72.4	6,803	70.9	10,526	75.5	8,373	69.5	8,303	65.6	69.7
24-Jun	3,444	77.8	4,838	61.0	9,317	69.9	7,486	71.4	11,845	82.0	10,596	75.6	6,991	72.8	10,721	76.9	8,645	71.7	8,776	69.34	72.8
25-Jun	3,669	82.8	5,155	65.0	10,220	76.6	7,799	74.4	12,210	84.5	11,001	78.5	7,184	74.8	11,008	78.9	9,014	74.8	9,105	71.94	76.2
26-Jun	3,898	88.0	5,592	70.5	10,593	79.4	8,049	76.8	12,570	87.0	11,380	81.2	7,487	78.0	11,325	81.2	9,205	76.4	9,432	74.52	79.3
27-Jun	3,977	89.8	5,950	75.0	11,157	83.7	8,303	79.2	12,876	89.2	11,638	83.0	7,779	81.0	11,505	82.5	9,648	80.1	9,710	76.72	82.0
28-Jun	4,036	91.1	6,057	76.4	11,511	86.3	8,477	80.9	13,075	90.5	11,892	84.8	7,968	83.0	11,668	83.7	9,835	81.6	9,875	78.0	83.6
29-Jun	4,112	92.8	6,200	78.2	11,718	87.9	8,708	83.1	13,246	91.7	12,139	86.6	8,159	85.0	11,793	84.6	10,107	83.9	10,092	79.73	85.3
30-Jun	4,183	94.4	6,396	80.7	11,908	89.3	9,061	86.4	13,399	92.8	12,370	88.2	8,332	86.8	11,978	85.9	10,344	85.8	10,251	81.0	87.1
1-Jul	4,200	94.8	6,549	82.6	12,063	90.4	9,260	88.3	13,579	94.0	12,560	89.6	8,475	88.3	12,184	87.4	10,427	86.5	10,672	84.32	88.6
2-Jul	4,222	95.3	6,759	85.2	12,219	91.6	9,293	88.6	13,651	94.5	12,743	90.9	8,583	89.4	12,569	90.1	10,533	87.4	10,920	86.28	89.9
3-Jul	4,223	95.3	6,876	86.7	12,284	92.1	9,420	89.9	13,743	95.2	12,860	91.7	8,658	90.2	12,708	91.1	10,631	88.2	11,082	87.56	90.8
4-Jul	4,224	95.4	7,006	88.3	12,321	92.4	9,511	90.7	13,808	95.6	12,962	92.4	8,744	91.1	12,845	92.1	10,767	89.4	11,265	89.0	91.6
5-Jul	4,246	95.9	7,088	89.4	12,466	93.5	9,616	91.7	13,867	96.0	13,127	93.6	8,810	91.8	12,925	92.7	10,829	89.9	11,350	89.67	92.4
6-Jul	4,285	96.7	7,172	90.4	12,590	94.4	9,764	93.1	13,934	96.5	13,267	94.6	8,853	92.2	13,039	93.5	10,876	90.3	11,419	90.22	93.2
7-Jul	4,330	97.8	7,258	91.5	12,668	95.0	9,818	93.6	13,966	96.7	13,323	95.0	8,929	93.0	13,146	94.3	10,923	90.7	11,509	90.93	93.9
8-Jul	4,336	97.9	7,345	92.6	12,686	95.1	9,838	93.8	14,025	97.1	13,390	95.5	8,977	93.5	13,191	94.6	11,046	91.7	11,643	92.0	94.4
9-Jul	4,337	97.9	7,434	93.7	12,762	95.7	9,872	94.2	14,033	97.2	13,434	95.8	8,996	93.7	13,248	95.0	11,078	91.9	11,686	92.33	94.7
10-Jul	4,342	98.0	7,499	94.6	12,841	96.3	9,904	94.5	14,044	97.2	13,484	96.2	9,023	94.0	13,302	95.4	11,138	92.4	11,839	93.54	95.2
11-Jul	4,349	98.2	7,547	95.2	12,873	96.5	9,955	95.0	14,069	97.4	13,546	96.6	9,094	94.7	13,359	95.8	11,189	92.9	11,915	94.14	95.6
12-Jul	4,368	98.6	7,570	95.5	12,875	96.5	10,023	95.6	14,074	97.5	13,619	97.1	9,129	95.1	13,385	96.0	11,230	93.2	11,955	94.45	96.0
13-Jul	4,374	98.8	7,609	96.0	12,933	97.0	10,045	95.8	14,081	97.5	13,646	97.3	9,141	95.2	13,408	96.2	11,276	93.6	12,006	94.86	96.2
14-Jul	4,374	98.8	7,632	96.2	12,969	97.2	10,081	96.2	14,107	97.7	13,692	97.6	9,181	95.6	13,470	96.6	11,301	93.8	12,072	95.38	96.5
15-Jul	4,374	98.8	7,650	96.5	13,004	97.5	10,113	96.5	14,112	97.7	13,714	97.8	9,201	95.8	13,495	96.8	11,327	94.0	12,111	95.69	96.7
16-Jul	4,374	98.8	7,691	97.0	13,040	97.8	10,145	96.8	14,130	97.8	13,733	97.9	9,215	96.0	13,532	97.0	11,347	94.2	12,144	95.95	96.9
17-Jul	4,374	98.8	7,706	97.2	13,061	97.9	10,168	97.0	14,145	97.9	13,746	98.0	9,241	96.3	13,547	97.2	11,355	94.2	12,182	96.25	97.1
18-Jul	4,374	98.8	7,723	97.4	13,078	98.1	10,185	97.1	14,158	98.0	13,765	98.2	9,275	96.6	13,589	97.5	11,357	94.3	12,204	96.42	97.2

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jul	4,375	98.8	7,739	97.6	13,104	98.3	10,207	97.4	14,175	98.2	13,775	98.2	9,294	96.8	13,607	97.6	11,365	94.3	12,211	96.48	97.4
20-Jul	4,375	98.8	7,755	97.8	13,123	98.4	10,215	97.4	14,203	98.3	13,785	98.3	9,309	97.0	13,623	97.7	11,367	94.3	12,239	96.7	97.5
21-Jul	4,375	98.8	7,773	98.0	13,135	98.5	10,236	97.6	14,212	98.4	13,800	98.4	9,318	97.1	13,648	97.9	11,420	94.8	12,266	96.91	97.6
22-Jul	4,375	98.8	7,787	98.2	13,154	98.6	10,242	97.7	14,222	98.5	13,810	98.5	9,335	97.2	13,694	98.2	11,472	95.2	12,285	97.06	97.8
23-Jul	4,377	98.8	7,799	98.3	13,160	98.7	10,261	97.9	14,240	98.6	13,820	98.6	9,341	97.3	13,728	98.5	11,538	95.8	12,298	97.16	98.0
24-Jul	4,377	98.8	7,810	98.5	13,167	98.7	10,278	98.0	14,253	98.7	13,825	98.6	9,350	97.4	13,736	98.5	11,623	96.5	12,314	97.29	98.1
25-Jul	4,380	98.9	7,819	98.6	13,175	98.8	10,280	98.1	14,263	98.8	13,837	98.7	9,360	97.5	13,759	98.7	11,687	97.0	12,345	97.53	98.2
26-Jul	4,383	99.0	7,826	98.7	13,185	98.9	10,280	98.1	14,281	98.9	13,849	98.8	9,371	97.6	13,765	98.7	11,697	97.1	12,375	97.77	98.3
27-Jul	4,386	99.0	7,837	98.8	13,193	98.9	10,288	98.1	14,291	99.0	13,870	98.9	9,394	97.8	13,768	98.7	11,728	97.3	12,393	97.91	98.5
28-Jul	4,387	99.1	7,844	98.9	13,197	99.0	10,292	98.2	14,297	99.0	13,879	99.0	9,404	97.9	13,776	98.8	11,770	97.7	12,418	98.11	98.6
29-Jul	4,391	99.1	7,848	99.0	13,219	99.1	10,298	98.2	14,305	99.1	13,889	99.1	9,433	98.3	13,788	98.9	11,777	97.7	12,472	98.54	98.7
30-Jul	4,393	99.2	7,862	99.1	13,223	99.1	10,309	98.3	14,309	99.1	13,899	99.1	9,450	98.4	13,789	98.9	11,797	97.9	12,481	98.61	98.8
31-Jul	4,396	99.3	7,865	99.2	13,228	99.2	10,315	98.4	14,312	99.1	13,919	99.3	9,480	98.7	13,803	99.0	11,814	98.0	12,485	98.64	98.9
1-Aug	4,397	99.3	7,871	99.3	13,241	99.3	10,329	98.5	14,316	99.1	13,920	99.3	9,499	98.9	13,827	99.2	11,823	98.1	12,489	98.67	99.0
2-Aug	4,399	99.3	7,873	99.3	13,247	99.3	10,336	98.6	14,323	99.2	13,935	99.4	9,510	99.1	13,830	99.2	11,826	98.1	12,492	98.7	99.0
3-Aug	4,405	99.5	7,878	99.3	13,266	99.5	10,341	98.6	14,330	99.2	13,941	99.4	9,524	99.2	13,832	99.2	11,838	98.2	12,522	98.93	99.1
4-Aug	4,407	99.5	7,884	99.4	13,267	99.5	10,351	98.7	14,348	99.3	13,947	99.5	9,528	99.2	13,838	99.2	11,862	98.4	12,528	99.0	99.2
5-Aug	4,409	99.5	7,890	99.5	13,272	99.5	10,360	98.8	14,352	99.4	13,950	99.5	9,535	99.3	13,847	99.3	11,893	98.7	12,529	99.0	99.3
6-Aug	4,413	99.6	7,894	99.5	13,273	99.5	10,372	98.9	14,364	99.5	13,957	99.5	9,542	99.4	13,860	99.4	11,901	98.8	12,532	99.0	99.3
7-Aug	4,413	99.6	7,896	99.6	13,274	99.5	10,375	99.0	14,366	99.5	13,963	99.6	9,545	99.4	13,869	99.5	11,929	99.0	12,536	99.0	99.4
8-Aug	4,422	99.8	7,900	99.6	13,279	99.6	10,378	99.0	14,372	99.5	13,969	99.6	9,545	99.4	13,871	99.5	11,979	99.4	12,546	99.12	99.5
9-Aug	4,423	99.9	7,902	99.6	13,287	99.6	10,381	99.0	14,379	99.6	13,976	99.7	9,547	99.4	13,872	99.5	11,995	99.6	12,566	99.28	99.5
10-Aug	4,423	99.9	7,908	99.7	13,293	99.7	10,393	99.1	14,383	99.6	13,983	99.7	9,549	99.5	13,878	99.5	12,007	99.7	12,588	99.45	99.6
11-Aug	4,423	99.9	7,912	99.8	13,299	99.7	10,402	99.2	14,389	99.6	13,989	99.8	9,552	99.5	13,892	99.6	12,009	99.7	12,596	99.52	99.6
12-Aug	4,426	99.9	7,915	99.8	13,303	99.7	10,403	99.2	14,396	99.7	13,991	99.8	9,556	99.5	13,896	99.7	12,017	99.7	12,618	99.69	99.7
13-Aug	4,426	99.9	7,916	99.8	13,304	99.8	10,404	99.2	14,398	99.7	13,992	99.8	9,557	99.5	13,898	99.7	12,020	99.8	12,624	99.74	99.7
14-Aug	4,426	99.9	7,918	99.8	13,308	99.8	10,407	99.3	14,398	99.7	13,995	99.8	9,559	99.6	13,902	99.7	12,023	99.8	12,631	99.79	99.7
15-Aug	4,426	99.9	7,920	99.9	13,311	99.8	10,411	99.3	14,398	99.7	13,999	99.8	9,563	99.6	13,903	99.7	12,025	99.8	12,632	99.8	99.7
16-Aug	4,426	99.9	7,923	99.9	13,312	99.8	10,413	99.3	14,399	99.7	14,000	99.8	9,575	99.7	13,911	99.8	12,027	99.8	12,632	99.8	99.8
17-Aug	4,427	100.0	7,924	99.9	13,316	99.8	10,418	99.4	14,400	99.7	14,001	99.9	9,578	99.8	13,913	99.8	12,030	99.8	12,633	99.81	99.8

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %	
18-Aug	4,427	100.0	7,924	99.9	13,317	99.9	10,429	99.5	14,400	99.7	14,002	99.9	9,578	99.8	13,919	99.8	12,032	99.9	12,634	99.82	99.8	
19-Aug	4,427	100.0	7,925	99.9	13,320	99.9	10,432	99.5	14,401	99.7	14,006	99.9	9,578	99.8	13,923	99.8	12,035	99.9	12,634	99.82	99.8	
20-Aug	4,427	100.0	7,925	99.9	13,324	99.9	10,436	99.5	14,403	99.7	14,008	99.9	9,580	99.8	13,928	99.9	12,036	99.9	12,634	99.82	99.8	
21-Aug	4,428	100.0	7,927	100.0	13,328	99.9	10,438	99.6	14,405	99.7	14,008	99.9	9,584	99.8	13,932	99.9	12,042	99.9	12,635	99.83	99.9	
22-Aug	4,428	100.0	7,927	100.0	13,329	99.9	10,446	99.6	14,409	99.8	14,008	99.9	9,585	99.8	13,934	99.9	12,042	99.9	12,636	99.83	99.9	
23-Aug	4,428	100.0	7,928	100.0	13,330	99.9	10,454	99.7	14,413	99.8	14,009	99.9	9,591	99.9	13,936	99.9	12,045	100.0	12,637	99.84	99.9	
24-Aug	4,428	100.0	7,929	100.0	13,331	100.0	10,458	99.8	14,415	99.8	14,010	99.9	9,594	99.9	13,938	100.0	12,046	100.0	12,639	99.86	99.9	
25-Aug	4,428	100.0	7,929	100.0	13,332	100.0	10,463	99.8	14,417	99.8	14,011	99.9	9,595	99.9	13,940	100.0	12,047	100.0	12,640	99.87	99.9	
26-Aug	4,429	100.0	7,929	100.0	13,332	100.0	10,464	99.8	14,422	99.9	14,013	99.9	9,596	99.9	13,940	100.0	12,049	100.0	12,641	99.87	99.9	
27-Aug	4,429	100.0	7,930	100.0	13,332	100.0	10,465	99.8	14,427	99.9	14,014	99.9	9,596	99.9	13,942	100.0	12,049	100.0	12,643	99.89	99.9	
28-Aug	4,429	100.0	7,930	100.0	13,332	100.0	10,468	99.8	14,428	99.9	14,015	100.0	9,596	99.9	13,943	100.0	12,049	100.0	12,650	99.94	100.0	
29-Aug	4,429	100.0	7,930	100.0	13,334	100.0	10,472	99.9	14,432	99.9	14,016	100.0	9,596	99.9	13,943	100.0	12,049	100.0	12,652	100.0	100.0	
30-Aug	4,429	100.0	7,930	100.0	13,336	100.0	10,473	99.9	14,432	99.9	14,016	100.0	9,596	99.9	13,943	100.0	12,049	100.0	12,654	100.0	100.0	
31-Aug	4,429	100.0	7,930	100.0	13,337	100.0	10,473	99.9	14,433	99.9	14,016	100.0	9,596	99.9	13,943	100.0	12,049	100.0	12,655	100.0	100.0	
1-Sep	4,429	100.0	7,930	100.0	13,337	100.0	10,475	99.9	14,436	100.0	14,020	100.0	9,596	99.9	13,943	100.0	12,049	100.0	12,656	100.0	100.0	
2-Sep	4,429	100.0	7,930	100.0	13,337	100.0	10,476	99.9	14,441	100.0	14,020	100.0	9,596	99.9	13,944	100.0	12,049	100.0	12,656	100.0	100.0	
Season																						
Total	4,429		7,930		13,337		10,484		14,442		14,022		9,601		13,944		12,049		12,657			

Appendix G5.-Immigration of chinook salmon through the Ayakulik River weir, 1986-1995.

	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	77	1.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	0.0	0	0.0	0.1
21-May	83	1.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	15	0.2	0	0.0	0.1
22-May	90	1.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	205	2.2	0	0.0	39	0.4	0	0.0	0.4
23-May	104	1.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	361	4.0	21	0.3	63	0.7	0	0.0	0.7
24-May	117	1.8	30	0.4	0	0.0	0	0.0	0	0.0	0	0.0	800	8.8	28	0.4	88	1.0	0	0.0	1.2
25-May	144	2.3	36	0.5	15	0.1	0	0.0	0	0.0	20	0.2	885	9.7	37	0.5	100	1.1	0	0.0	1.4
26-May	156	2.4	85	1.1	284	1.3	0	0.0	0	0.0	78	0.6	1,042	11.4	44	0.6	129	1.4	0	0.0	1.9
27-May	309	4.9	167	2.1	401	1.9	0	0.0	800	7.1	113	0.9	1,351	14.8	103	1.3	158	1.7	2	0.0	3.5
28-May	319	5.0	225	2.8	560	2.6	0	0.0	1,318	11.7	380	2.9	1,588	17.4	241	3.1	204	2.2	11	0.1	4.8
29-May	337	5.3	270	3.4	714	3.3	0	0.0	1,709	15.2	566	4.4	1,699	18.6	326	4.2	210	2.3	22	0.1	5.7
30-May	407	6.4	361	4.6	892	4.2	0	0.0	2,137	19.0	603	4.6	1,836	20.1	370	4.7	265	2.9	29	0.2	6.7
31-May	499	7.8	415	5.2	1,021	4.8	7	0.0	2,409	21.4	655	5.0	2,012	22.0	821	10.5	294	3.2	41	0.2	8.0
1-Jun	647	10.2	491	6.2	1,106	5.2	58	0.4	3,100	27.6	671	5.2	2,045	22.4	1,927	24.6	328	3.6	127	0.7	10.6
2-Jun	726	11.4	526	6.6	1,176	5.5	202	1.3	3,797	33.7	697	5.4	2,385	26.1	3,118	39.9	568	6.2	349	2.0	13.8
3-Jun	763	12.0	538	6.8	1,400	6.6	255	1.7	4,144	36.8	711	5.5	2,879	31.5	3,225	41.2	694	7.6	532	3.0	15.3
4-Jun	864	13.6	913	11.5	1,634	7.6	387	2.5	4,393	39.0	772	5.9	2,957	32.4	3,352	42.9	1,304	14.3	2,818	15.9	18.6
5-Jun	892	14.0	1,285	16.2	1,872	8.8	494	3.2	4,988	44.3	961	7.4	3,030	33.2	3,585	45.8	1,565	17.1	3,602	20.3	21.0
6-Jun	936	14.7	2,071	26.1	2,086	9.8	804	5.2	5,708	50.7	1,544	11.9	3,384	37.0	3,623	46.3	1,636	17.9	4,111	23.2	24.3
7-Jun	1,023	16.1	2,442	30.8	2,278	10.7	1,272	8.2	5,787	51.4	3,068	23.6	4,073	44.6	3,686	47.1	1,860	20.4	4,397	24.8	27.8
8-Jun	1,165	18.3	2,611	32.9	2,426	11.4	1,408	9.1	6,659	59.2	4,164	32.1	4,273	46.8	3,708	47.4	2,731	29.9	5,167	29.2	31.6
9-Jun	1,483	23.3	2,743	34.6	2,590	12.1	1,520	9.8	6,893	61.3	5,852	45.1	4,414	48.3	3,861	49.4	3,257	35.6	5,466	30.9	35.0
10-Jun	1,576	24.7	3,157	39.8	2,857	13.4	2,134	13.8	7,005	62.3	7,116	54.8	4,480	49.0	4,154	53.1	3,641	39.8	5,671	32.0	38.3
11-Jun	1,686	26.5	3,580	45.1	3,975	18.6	2,967	19.2	7,157	63.6	7,714	59.4	4,624	50.6	4,537	58.0	3,797	41.6	5,936	33.5	41.6
12-Jun	1,812	28.4	3,671	46.3	5,045	23.6	4,073	26.4	7,216	64.1	8,268	63.7	4,848	53.1	4,807	61.5	4,293	47.0	6,245	35.3	44.9
13-Jun	2,037	32.0	3,804	48.0	7,117	33.3	4,966	32.2	7,427	66.0	8,311	64.0	5,115	56.0	5,041	64.5	4,321	47.3	7,213	40.7	48.4
14-Jun	2,816	44.2	4,044	51.0	7,586	35.5	5,580	36.2	7,433	66.1	8,728	67.2	5,261	57.6	5,160	66.0	4,544	49.7	7,470	42.2	51.6
15-Jun	3,194	50.1	4,158	52.4	7,897	37.0	6,732	43.6	7,448	66.2	8,858	68.2	5,435	59.5	5,255	67.2	4,825	52.8	7,800	44.1	54.1
16-Jun	3,407	53.5	4,432	55.9	8,979	42.0	7,357	47.7	7,698	68.4	8,884	68.4	5,626	61.6	5,437	69.5	4,933	54.0	8,160	46.1	56.7
17-Jun	3,718	58.4	5,006	63.1	10,020	46.9	8,238	53.4	7,948	70.6	9,001	69.3	5,807	63.6	5,553	71.0	5,155	56.4	8,633	48.8	60.1
18-Jun	3,923	61.6	5,411	68.2	10,268	48.0	9,192	59.6	8,198	72.9	9,168	70.6	5,901	64.6	5,664	72.4	5,347	58.5	9,021	51.0	62.7

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jun	3,988	62.6	5,714	72.1	12,263	57.4	9,218	59.7	8,448	75.1	9,259	71.3	6,085	66.6	5,834	74.6	5,461	59.8	9,368	52.924	65.2
20-Jun	4,053	63.6	5,971	75.3	12,340	57.7	10,032	65.0	8,578	76.2	9,295	71.6	6,116	67.0	5,917	75.7	5,536	60.6	9,781	55.257	66.8
21-Jun	4,124	64.7	6,137	77.4	13,453	63.0	10,259	66.5	8,983	79.8	9,317	71.7	6,520	71.4	5,936	75.9	5,771	63.2	11,126	62.855	69.6
22-Jun	4,225	66.3	6,689	84.4	14,292	66.9	10,440	67.7	9,242	82.1	9,482	73.0	6,672	73.0	6,041	77.3	5,931	64.9	11,797	66.646	72.2
23-Jun	4,245	66.6	6,690	84.4	14,676	68.7	10,587	68.6	9,605	85.4	9,698	74.7	7,189	78.7	6,075	77.7	6,190	67.7	12,269	69.312	74.2
24-Jun	4,301	67.5	6,719	84.7	15,276	71.5	10,865	70.4	9,890	87.9	10,274	79.1	7,430	81.3	6,118	78.2	6,789	74.3	13,292	75.092	77.0
25-Jun	4,382	68.8	6,744	85.0	15,967	74.7	11,077	71.8	10,095	89.7	10,614	81.7	7,527	82.4	6,490	83.0	7,229	79.1	14,207	80.261	79.7
26-Jun	4,411	69.2	6,759	85.2	16,323	76.4	11,836	76.7	10,137	90.1	10,754	82.8	7,667	83.9	6,732	86.1	7,724	84.5	14,618	82.583	81.8
27-Jun	4,460	70.0	6,768	85.3	17,161	80.3	12,084	78.3	10,180	90.5	10,815	83.3	7,800	85.4	6,778	86.7	7,906	86.5	15,177	85.741	83.2
28-Jun	4,506	70.7	6,795	85.7	17,640	82.5	12,347	80.0	10,202	90.7	11,419	87.9	7,933	86.8	6,872	87.9	7,990	87.4	15,557	87.888	84.8
29-Jun	4,808	75.5	6,815	85.9	18,038	84.4	13,192	85.5	10,400	92.4	11,916	91.7	8,067	88.3	6,908	88.3	8,093	88.6	15,702	88.707	86.9
30-Jun	4,960	77.9	6,841	86.3	18,522	86.7	13,312	86.3	10,561	93.9	12,039	92.7	8,153	89.3	6,947	88.8	8,261	90.4	16,291	92.034	88.4
1-Jul	5,231	82.1	6,852	86.4	18,886	88.4	13,396	86.8	10,656	94.7	12,122	93.3	8,221	90.0	6,960	89.0	8,443	92.4	16,446	92.91	89.6
2-Jul	5,410	84.9	6,869	86.6	19,212	89.9	13,430	87.0	10,739	95.4	12,338	95.0	8,285	90.7	7,186	91.9	8,522	93.3	16,676	94.209	90.9
3-Jul	5,488	86.1	6,876	86.7	19,277	90.2	13,651	88.5	10,809	96.1	12,370	95.2	8,395	91.9	7,234	92.5	8,619	94.3	16,771	94.746	91.6
4-Jul	5,610	88.1	7,006	88.3	19,370	90.6	13,815	89.5	10,821	96.2	12,465	96.0	8,474	92.8	7,266	92.9	8,661	94.8	16,810	94.966	92.4
5-Jul	5,710	89.6	7,088	89.4	19,398	90.8	14,148	91.7	10,834	96.3	12,514	96.4	8,503	93.1	7,288	93.2	8,691	95.1	16,850	95.192	93.1
6-Jul	5,747	90.2	7,172	90.4	19,664	92.0	14,251	92.3	10,877	96.7	12,549	96.6	8,581	93.9	7,368	94.2	8,740	95.6	16,914	95.554	93.8
7-Jul	5,839	91.6	7,258	91.5	19,883	93.0	14,543	94.2	10,894	96.8	12,572	96.8	8,660	94.8	7,408	94.7	8,806	96.4	17,155	96.915	94.7
8-Jul	5,855	91.9	7,345	92.6	20,211	94.6	14,667	95.0	10,948	97.3	12,589	96.9	8,750	95.8	7,438	95.1	8,832	96.7	17,182	97.068	95.3
9-Jul	5,994	94.1	7,434	93.7	20,410	95.5	14,668	95.0	10,953	97.4	12,610	97.1	8,755	95.8	7,471	95.5	8,873	97.1	17,220	97.283	95.9
10-Jul	6,031	94.7	7,499	94.6	20,416	95.5	14,669	95.1	10,970	97.5	12,636	97.3	8,768	96.0	7,530	96.3	8,942	97.9	17,315	97.819	96.3
11-Jul	6,040	94.8	7,547	95.2	20,449	95.7	14,721	95.4	10,970	97.5	12,638	97.3	8,840	96.8	7,547	96.5	8,973	98.2	17,359	98.068	96.5
12-Jul	6,119	96.0	7,570	95.5	20,493	95.9	14,862	96.3	10,971	97.5	12,640	97.3	8,891	97.3	7,573	96.9	8,990	98.4	17,376	98.164	96.9
13-Jul	6,180	97.0	7,609	96.0	20,562	96.2	14,943	96.8	10,973	97.5	12,691	97.7	8,916	97.6	7,587	97.0	9,008	98.6	17,414	98.379	97.3
14-Jul	6,194	97.2	7,632	96.2	20,836	97.5	14,962	97.0	10,999	97.8	12,709	97.9	8,958	98.1	7,615	97.4	9,025	98.8	17,420	98.413	97.6
15-Jul	6,197	97.3	7,650	96.5	20,881	97.7	14,991	97.1	11,025	98.0	12,711	97.9	8,967	98.2	7,649	97.8	9,036	98.9	17,459	98.633	97.8
16-Jul	6,222	97.7	7,691	97.0	20,948	98.0	14,998	97.2	11,042	98.1	12,715	97.9	8,984	98.3	7,659	98.0	9,054	99.1	17,490	98.808	98.0
17-Jul	6,259	98.2	7,706	97.2	20,949	98.0	15,013	97.3	11,042	98.1	12,721	97.9	9,003	98.6	7,682	98.2	9,069	99.2	17,512	98.932	98.2
18-Jul	6,283	98.6	7,723	97.4	20,963	98.1	15,019	97.3	11,042	98.1	12,728	98.0	9,018	98.7	7,704	98.5	9,082	99.4	17,516	99.0	98.3

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jul	6,289	98.7	7,739	97.6	20,965	98.1	15,077	97.7	11,042	98.1	12,728	98.0	9,020	98.7	7,704	98.5	9,088	99.5	17,549	99.141	98.4
20-Jul	6,296	98.8	7,755	97.8	21,033	98.4	15,092	97.8	11,051	98.2	12,733	98.0	9,030	98.9	7,706	98.6	9,094	99.5	17,577	99.299	98.5
21-Jul	6,299	98.9	7,773	98.0	21,058	98.5	15,127	98.0	11,076	98.4	12,749	98.2	9,054	99.1	7,708	98.6	9,099	99.6	17,581	99.322	98.7
22-Jul	6,312	99.1	7,787	98.2	21,065	98.6	15,160	98.2	11,087	98.5	12,795	98.5	9,060	99.2	7,713	98.6	9,104	99.6	17,585	99.345	98.8
23-Jul	6,312	99.1	7,799	98.3	21,085	98.7	15,192	98.4	11,093	98.6	12,809	98.6	9,060	99.2	7,716	98.7	9,105	99.6	17,599	99.424	98.9
24-Jul	6,312	99.1	7,810	98.5	21,093	98.7	15,209	98.6	11,105	98.7	12,835	98.8	9,069	99.3	7,749	99.1	9,108	99.7	17,610	99.486	99.0
25-Jul	6,312	99.1	7,819	98.6	21,113	98.8	15,210	98.6	11,107	98.7	12,835	98.8	9,076	99.4	7,749	99.1	9,111	99.7	17,618	99.531	99.0
26-Jul	6,312	99.1	7,826	98.7	21,123	98.8	15,241	98.8	11,115	98.8	12,836	98.8	9,080	99.4	7,757	99.2	9,111	99.7	17,620	99.542	99.1
27-Jul	6,312	99.1	7,837	98.8	21,135	98.9	15,257	98.9	11,118	98.8	12,881	99.2	9,081	99.4	7,758	99.2	9,113	99.7	17,628	99.588	99.2
28-Jul	6,312	99.1	7,844	98.9	21,173	99.1	15,258	98.9	11,133	99.0	12,886	99.2	9,086	99.5	7,771	99.4	9,115	99.7	17,637	99.638	99.2
29-Jul	6,312	99.1	7,848	99.0	21,184	99.1	15,268	98.9	11,158	99.2	12,892	99.3	9,088	99.5	7,778	99.5	9,116	99.8	17,649	99.706	99.3
30-Jul	6,312	99.1	7,862	99.1	21,204	99.2	15,310	99.2	11,169	99.3	12,897	99.3	9,091	99.5	7,781	99.5	9,118	99.8	17,651	99.718	99.4
31-Jul	6,325	99.3	7,865	99.2	21,206	99.2	15,318	99.3	11,180	99.4	12,901	99.3	9,094	99.6	7,781	99.5	9,118	99.8	17,659	99.763	99.4
1-Aug	6,333	99.4	7,871	99.3	21,210	99.3	15,323	99.3	11,192	99.5	12,901	99.3	9,098	99.6	7,788	99.6	9,120	99.8	17,664	99.791	99.5
2-Aug	6,336	99.5	7,873	99.3	21,212	99.3	15,341	99.4	11,200	99.5	12,906	99.4	9,100	99.6	7,788	99.6	9,125	99.9	17,670	99.825	99.5
3-Aug	6,339	99.5	7,878	99.3	21,225	99.3	15,354	99.5	11,209	99.6	12,915	99.4	9,105	99.7	7,789	99.6	9,127	99.9	17,675	99.853	99.6
4-Aug	6,342	99.5	7,884	99.4	21,236	99.4	15,360	99.5	11,216	99.7	12,922	99.5	9,108	99.7	7,795	99.7	9,127	99.9	17,681	99.887	99.6
5-Aug	6,344	99.6	7,890	99.5	21,250	99.4	15,367	99.6	11,218	99.7	12,926	99.5	9,111	99.7	7,795	99.7	9,127	99.9	17,685	99.91	99.7
6-Aug	6,345	99.6	7,894	99.5	21,272	99.5	15,375	99.6	11,222	99.7	12,936	99.6	9,115	99.8	7,796	99.7	9,127	99.9	17,687	99.921	99.7
7-Aug	6,346	99.6	7,896	99.6	21,289	99.6	15,378	99.7	11,228	99.8	12,938	99.6	9,119	99.8	7,797	99.7	9,127	99.9	17,693	100.0	99.7
8-Aug	6,350	99.7	7,900	99.6	21,291	99.6	15,383	99.7	11,233	99.8	12,942	99.6	9,122	99.9	7,798	99.7	9,127	99.9	17,694	100.0	99.8
9-Aug	6,350	99.7	7,902	99.6	21,301	99.7	15,388	99.7	11,233	99.8	12,947	99.7	9,125	99.9	7,799	99.7	9,127	99.9	17,694	100.0	99.8
10-Aug	6,354	99.7	7,908	99.7	21,311	99.7	15,396	99.8	11,237	99.9	12,954	99.7	9,126	99.9	7,808	99.9	9,128	99.9	17,695	100.0	99.8
11-Aug	6,357	99.8	7,912	99.8	21,330	99.8	15,398	99.8	11,238	99.9	12,972	99.9	9,130	99.9	7,808	99.9	9,129	99.9	17,696	100.0	99.9
12-Aug	6,360	99.8	7,915	99.8	21,334	99.8	15,406	99.8	11,239	99.9	12,978	99.9	9,130	99.9	7,809	99.9	9,131	99.9	17,697	100.0	99.9
13-Aug	6,360	99.8	7,916	99.8	21,336	99.8	15,408	99.8	11,239	99.9	12,988	100.0	9,131	100.0	7,809	99.9	9,133	99.9	17,697	100.0	99.9
14-Aug	6,360	99.8	7,918	99.8	21,340	99.9	15,414	99.9	11,242	99.9	12,988	100.0	9,131	100.0	7,809	99.9	9,135	100.0	17,698	100.0	99.9
15-Aug	6,361	99.8	7,920	99.9	21,344	99.9	15,421	99.9	11,242	99.9	12,988	100.0	9,131	100.0	7,813	99.9	9,137	100.0	17,699	100.0	99.9
16-Aug	6,362	99.9	7,923	99.9	21,347	99.9	15,421	99.9	11,245	99.9	12,988	100.0	9,133	100.0	7,817	100.0	9,137	100.0	17,699	100.0	99.9
17-Aug	6,365	99.9	7,924	99.9	21,356	99.9	15,425	100.0	11,246	100.0	12,988	100.0	9,134	100.0	7,818	100.0	9,137	100.0	17,700	100.0	100.0

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	1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		10 Year
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
18-Aug	6,368	100.0	7,924	99.9	21,360	100.0	15,428	100.0	11,246	100.0	12,988	100.0	9,134	100.0	7,818	100.0	9,137	100.0	17,700	100.0	100.0
19-Aug	6,369	100.0	7,925	99.9	21,364	100.0	15,429	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,818	100.0	9,137	100.0	17,700	100.0	100.0
20-Aug	6,369	100.0	7,925	99.9	21,367	100.0	15,429	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,818	100.0	9,137	100.0	17,700	100.0	100.0
21-Aug	6,370	100.0	7,927	100.0	21,368	100.0	15,430	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,818	100.0	9,137	100.0	17,701	100.0	100.0
22-Aug	6,371	100.0	7,927	100.0	21,369	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,137	100.0	17,701	100.0	100.0
23-Aug	6,371	100.0	7,928	100.0	21,369	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
24-Aug	6,371	100.0	7,929	100.0	21,370	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
25-Aug	6,371	100.0	7,929	100.0	21,370	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
26-Aug	6,371	100.0	7,929	100.0	21,370	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
27-Aug	6,371	100.0	7,930	100.0	21,370	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
28-Aug	6,371	100.0	7,930	100.0	21,370	100.0	15,431	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
29-Aug	6,371	100.0	7,930	100.0	21,370	100.0	15,432	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
30-Aug	6,371	100.0	7,930	100.0	21,370	100.0	15,432	100.0	11,249	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
31-Aug	6,371	100.0	7,930	100.0	21,370	100.0	15,432	100.0	11,250	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
1-Sep	6,371	100.0	7,930	100.0	21,370	100.0	15,432	100.0	11,250	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
2-Sep	6,371	100.0	7,930	100.0	21,370	100.0	15,432	100.0	11,251	100.0	12,988	100.0	9,135	100.0	7,819	100.0	9,138	100.0	17,701	100.0	100.0
Season																					
Total	6,371		7,930		21,370		15,432		11,251		12,988		9,135		7,819		9,138		17,701		

Appendix G6.-Chignik River chinook salmon escapement, time of entry, 1984-1994.

Date	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1984-94
	% Total ^a	% Avg.										
20-Jun	2	1	1	1	0	1	1	1	1	1	1	1
21-Jun	3	1	3	1	0	1	1	2	1	1	1	1
22-Jun	3	1	4	1	1	1	1	2	1	1	1	1
23-Jun	3	1	5	1	1	1	1	2	1	2	1	2
24-Jun	4	1	7	2	1	1	1	2	2	4	2	2
25-Jun	4	1	8	2	1	1	3	3	4	5	2	3
26-Jun	4	1	10	2	2	1	5	3	4	7	2	4
27-Jun	4	1	11	5	3	2	5	4	5	9	2	5
28-Jun	12	2	13	6	3	2	6	6	9	11	4	7
29-Jun	14	2	14	7	5	10	7	6	11	14	6	9
30-Jun	16	4	15	8	6	10	10	7	15	16	9	10
1-Jul	17	10	17	9	6	12	12	9	18	17	10	13
2-Jul	18	12	18	13	7	13	14	11	21	19	11	14
3-Jul	25	13	20	14	13	23	16	13	23	23	14	18
4-Jul	28	13	27	15	19	28	19	15	28	29	19	22
5-Jul	29	14	32	16	26	29	23	19	34	33	25	25
6-Jul	35	20	35	17	27	30	26	22	37	38	30	29
7-Jul	50	29	38	19	30	35	30	23	41	42	32	34
8-Jul	54	32	40	24	33	38	36	36	48	43	38	38
9-Jul	58	32	48	29	41	40	46	42	53	44	43	43
10-Jul	62	33	51	39	57	45	48	45	58	49	49	49
11-Jul	65	35	52	42	66	46	50	50	64	56	53	53
12-Jul	67	39	60	45	71	48	53	52	69	61	58	57
13-Jul	69	46	64	52	72	58	55	56	72	68	61	61
14-Jul	75	48	69	54	74	61	61	60	75	74	63	65
15-Jul	78	55	73	63	77	67	66	63	81	77	66	70
16-Jul	80	60	76	68	78	68	68	68	82	82	73	73
17-Jul	85	61	78	70	81	69	71	69	84	85	78	76
18-Jul	87	66	81	73	84	70	75	69	86	88	82	78

-continued-

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Date	1984 % Total	1985 % Total	1986 % Total	1987 % Total	1988 % Total	1989 % Total	1990 % Total	1991 % Total	1992 % Total	1993 % Total	1994 % Total ^a	1984-94 % Avg.
19-Jul	89	68	82	74	86	72	78	72	88	93	84	81
20-Jul	89	70	87	79	88	74	81	79	90	95	88	84
21-Jul	90	73	89	84	90	75	86	80	91	95	89	86
22-Jul	92	78	90	87	92	83	90	87	92	95	91	89
23-Jul	94	80	94	90	92	87	91	90	93	96	93	91
24-Jul	94	82	96	92	93	89	92	93	94	97	95	92
25-Jul	95	85	96	96	94	90	93	95	95	97	96	94
26-Jul	96	88	97	97	96	92	95	96	96	98	97	95
27-Jul	97	92	98	97	96	93	97	97	97	98	98	96
28-Jul	99	95	98	98	98	95	98	98	97	99	99	98
29-Jul	99	97	99	99	99	99	99	99	99	99	99	99
30-Jul	99	98	99	99	99	99	99	99	99	99	99	99
31-Jul	100	100	100	100	100	100	100	100	100	100	100	100
Season Total	5,548	3,144	3,612	2,624	4,868	3,316	4,364	4,545	3,806	1,946	3,016	

Note: Percentages are based on weir passage estimates and a 3-day lag time applied to catches made in Chignik Lagoon (statistical area 271-10) to approximate arrival at the weir. In addition, percentages do not include 1- and 2-ocean chinook which cannot be distinguished from sockeye salmon at the weir counting gate.

^a Starting in 1994 underwater video cameras were used to count fish. One and 2-ocean chinook salmon were counted. In the past these small chinook salmon were not distinguishable from sockeye and abundance estimates of small chinook were made based on scale samples. Also beginning in 1994 each fish was actually counted. In previous years 10-minute counts were made each hour and these counts were expanded to generate an estimated count.

**APPENDIX H. EMERGENCY ORDERS ISSUED FOR THE
KMA, 1989-1995**

Appendix H1.-1989 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-17-89	9/11/89 12:01 a.m.	Extended the closure for freshwater streams flowing into Monashka and Chiniak Bays to sport fishing for salmon beginning 12:01 a.m. September 11, 1989 through 12:01 a.m. October 1, 1989 including the Buskin River upstream of Bridge #1. Low escapement of coho salmon and late spawning of pink salmon was the stated justification.
2-SS-4-18-89	9/18/89	Rescinded E.O. # 2-SS-4-17-89. Surveys and weir counts indicated sufficient escapement had been achieved and more fish were returning daily.

Appendix H2.-1990 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-27-90	9/6/90 Noon	Closed Morris Cove Creek, Humpy Cove Creek, Summers Bay Creek, Captains Bay Creek, Unalaska Creek from the outlet of Unalaska Lake to the downstream end of the Church Hole to sport fishing. Extremely low water hindered coho escapement plus illegal snagging was increasingly common.
2-SS-4-31-90	9/21/90 6:00 a.m.	Above waters were reopened, with the exception of Unalaska Creek from the Iliulik Bridge to the Church Hole. Normal water flows were allowing escapement to occur.
2-SS-4-28-90	9/11/90 12:01 a.m.	Extended the closure of salmon sport fishing upstream of the highway in streams flowing into Monashka and Chiniak bays. The Buskin River remained closed above Bridge #1. Coho escapement in the Buskin, Roslyn, American and Olds were below average.
2-SS-4-33-90	9/26/90 6:00 a.m.	Above waters were opened to salmon sport fishing. Normal coho escapement was being achieved.

Appendix H3.-1991 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-PS-4-11-91	6/15/91 Midnight	Closed the fresh waters of Unalaska, Iliukliuk, Humpy, and Summers Cove due to low escapements and high harvests.

Appendix H4.-1992 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-PS-4-30-92	8/17/92	<p>The majority of streams along the Kodiak Road System Zone are experiencing the third consecutive year of below average pink salmon escapements. Eight index streams were surveyed on August 13 and minimum escapement goals are expected to be reached in only two of these streams. The Buskin, American and Olds rivers are the major pink salmon producing streams in Chiniak Bay and only about one half of the minimum escapement goal is expected to be reached in these streams. In order to conserve the pink salmon resources along the Kodiak Road System Zone and still allow for a limited harvest where stocks are not severely depressed, the bag and possession limit for pink salmon is being reduced to 2 fish and the Buskin, American and Olds rivers are being closed to pink salmon fishing.</p>
2-SS-4-32-92	9/11/92	<p>Coho salmon escapement counts through the Buskin River weir are low for this time of year, and the count of 1,187 as of September 8 may indicate a below average return. The 1992 Buskin River parent year had the lowest coho escapement since a weir was installed in 1985, and this also indicates that the 1992 coho return may be weak. Other index streams in Chiniak Bay also have had low numbers of coho in them.</p> <p>In order to ensure that escapement goals are met and that the reproductive potential of the coho stocks is not damaged, salmon fishing will remain closed above the highway for streams flowing into Monashka and Chiniak Bays, with the exception of the Buskin River which will remain closed above Bridge No. 1. This enclosure does not affect saltwater fishing or streams that do not flow into Chiniak or Monashka Bay.</p>

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Emergency Order Number	Effective Date	Action/Justification
2-SS-4-32-92	9/11/92	<p>Coho salmon exhibit wide ranging dates of when they return which vary from year to year and are often influenced by weather conditions and water levels in streams. The Department will continue to monitor escapement into the Buskin River and other indexed streams and if escapement improves, waters above the Chiniak Highway will be opened to fishing.</p>
2-SS-4-35-92	10/7/92	<p>Coho salmon escapements into Chiniak and Monashka Bay streams have been late and below average in number. In order to ensure that sufficient spawning escapement occurred so that strong returns would continue in the future, sport fishing for salmon above the Chiniak Highway and Bridge #1 on the Buskin River was closed.</p> <p>The Department has continued to monitor escapements, and in early October minimum spawning goals were surpassed so that a sport fish harvest above the Chiniak Highway can now occur without damaging the reproductive potential of the coho stocks. The Buskin River is the major producer of coho in Chiniak Bay, and the weir allows accurate counts of escapement. On October 1 the weir count was 6,000 coho with daily counts averaging about 100 coho. Since minimum escapement goals have been exceeded at this time and because fish are still entering the rivers, flowing waters above the Chiniak Highway and above Bridge #1 on the Buskin River will be open to salmon fishing effective Wednesday, October 7.</p>

Appendix H5.-1993 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-09-93	6/3/93	The Buskin River was open to sport fishing for king salmon. Returning adult king salmon from the Mill Bay stocking project were straying into the Buskin River. Opening the Buskin River to king salmon fishing would allow these fish to be harvested.

Appendix H6.-1994 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-08-94	5/28/94	<p>In 1989 the Department of Fish and Game initiated a king salmon stocking program in Mill Bay. This program was intended to create a put-and-take fishery where all returning adult king salmon would be harvested by anglers. Yearly stocking of king salmon smolt is intended to maintain the return, so natural spawning of adult kings is not needed. Some returning adults strayed from Mill Bay and entered the Buskin River drainage. The Buskin River is currently closed to king salmon fishing by regulation and has no natural run. This Emergency Order opened sport fishing for king salmon in the Buskin River drainage so that the returning adults to the Mill Bay stocking project could be harvested.</p>
2-SS-4-40-94	9/11/94	<p>Coho salmon escapement counts through the Buskin River weir were low for the time of year, and the count of 400 as of September 6 indicated a below average return. Other index streams in Chiniak Bay also had low numbers of coho in them.</p> <p>In order to ensure that escapement goals were met and that the reproductive potential of the coho stocks was not damaged, salmon fishing remained closed above the highway for streams flowing into Monashka and Chiniak bays, with the exception of the Buskin River which remained closed above Bridge No. 1. The closure did not affect saltwater fishing or streams that do not flow into Chiniak or Monashka Bay.</p>

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Emergency Order Number	Effective Date	Action/Justification
2-SS-4-42-94	9/17/94	<p>Coho salmon escapements into Chiniak and Monashka Bay streams had been late and below average in number. In order to ensure that sufficient spawning escapement occurred so strong returns would continue in the future, sport fishing for salmon above the Chiniak Highway and Bridge #1 on the Buskin River was closed.</p> <p>The Department continued to monitor escapements. Weir counts improved on September 14, and interim spawning goals were surpassed so that a sport fish harvest above the Chiniak Highway could occur without damaging the reproductive potential of the coho stocks. The Buskin River is the major producer of coho in Chiniak Bay, and the weir allows accurate counts of escapement. On September 14 the season total weir count was 3,526 with daily counts averaging about 300 coho. Since interim escapement goals had been exceeded and because fish were still entering the rivers, it was anticipated that spawning goals would be met. Therefore, flowing waters above the Chiniak Highway and above Bridge #1 on the Buskin River were open to salmon fishing effective Saturday, September 17.</p>

Appendix H7.-1995 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-05-95	5/20/95	In 1989 the Department of Fish and Game initiated a king salmon stocking program in Mill Bay. This program was intended to create a put-and-take fishery where all returning adult king salmon would be harvested by anglers. Yearly stocking of king salmon smolt is intended to maintain the return, so natural spawning of adult kings is not needed. Some returning adults strayed from Mill Bay and entered the Buskin River drainage. The Buskin River is currently closed to king salmon fishing by regulation and has no natural run. This Emergency Order opened sport fishing for king salmon in the Buskin River drainage so that the returning adults to the Mill Bay stocking project could be harvested.

**APPENDIX I. PRIORITIZED SYNOPSES OF ACCESS
PROJECTS RECOMMENDED FOR THE KMA**

Appendix II.-Prioritized synopses of access projects recommended for the KMA.

Extension of the Anton Larsen Bay boat launch ramp: Anglers launch boats from this existing boat launch in order to gain access to popular halibut fishing waters around Whale Island. Vessels also launch here to fish for sockeye and coho salmon returning to Afognak and Crescent lakes, as well as many smaller salmon systems. Currently it is very difficult to launch at low tide. In order to remedy this situation the boat ramp is being extended. Work should be completed in 1995.

Parking lot improvement adjacent to the Anton Larsen Bay boat ramp: This is a cooperative project with the Kodiak Island Borough. Currently people launching their vessels at the boat launch must park their vehicles and trailers alongside of a very narrow road. This project will create a parking lot which will help alleviate traffic congestion and also increase the safety of individuals using the facility. The Kodiak borough plans to improve the current dock which is located next to the boat ramp.

Secure access along the Olds and American rivers: Currently the Olds and American rivers produce 17% of the freshwater fishing effort along the Kodiak road system. Fishing effort concentrates in three areas, around the two river bridges and at the mouth of the Olds River. This land is owned by a local native corporation, and anglers are currently trespassing on private land. Actions should be taken so that public access can be assured in the future.

Secure access along the Karluk River: The Karluk River provides for one of the best sport fisheries within the Kodiak Management Area. It provided 7,000 angler days in 1993. A catch of 8,000 chinook, 3,500 steelhead, 3,500 coho, 7,000 sockeye salmon and 10,000 Dolly Varden was reported from the Karluk River in 1993. Unfortunately the entire river system and lagoon are located on private property. Anglers are currently allowed to fish by purchasing use permits from the native corporation that owns this land. As these private landowners develop their land use plans there is no guarantee that public access will be allowed. Currently the Exxon Valdez Trustee Council is in negotiation with the landowners to purchase land for public use. The division should try to develop alternate plans to guarantee public access in case the trustee council's negotiations fail.

Secure access along the Ayakulik River: The Ayakulik River is similar to the Karluk in that it provides an excellent remote sport fishery. In 1993 it produced 4,500 angler days with a reported catch of 5,300 chinook, 1,500 coho, 5,000 sockeye and 2,000 steelhead. The Ayakulik River is different than the Karluk in that the upper river is in the Kodiak Wildlife Refuge and currently open to sport fishing by the general public. The river mouth, however, is largely in private ownership. Many anglers who raft the river are in a trespass situation when they end their trip and are waiting to be picked up. Steps should be taken to assure there is public access for rafters to exit the fishery.

Secure access on Afognak Lagoon: The Afognak Lagoon fishery is located 25 miles NW of the town of Kodiak or 15 miles from the boat ramp facility at Anton Larsen Bay, which the department is currently improving. Access to the Afognak Lagoon fishery is mainly by motor boat from Kodiak. However, some people do fly over and are dropped off. The main fishery is for coho and occurs in the saltwater lagoon. In 1990 the department conducted a creel survey and documented a harvest of 3,010 coho and a release of 1,016 fish. Angler hours from August

10 to September 10 were estimated at 3,700. Besides coho there is a sockeye run of about 80,000 fish and also a return of pink salmon and Dolly Varden.

Fishing, boat mooring and camping tend to concentrate around the washed-out bridge where the lagoon narrows to 50 feet in width. Acquiring public land in this area should be pursued.

Secure access along the Anton Larsen River: The Anton Larsen River has a small run of pink salmon, and during July and August families drive out to the river and set up campsites. They will spend several days camping and fishing for pink salmon. The camping area is also a starting place for the hike up to Cascade Lake which is stocked by the department with rainbow trout and grayling. This area does not generate large numbers of angler days; however, it does provide another recreational opportunity along the road system. Cascade Lake is one of the most productive stocked lakes. It is probably the most heavily used and is a very beautiful lake. The hour-long hike into the lake makes it attractive to backpackers.

Purchasing or securing access to a small parcel of land along the mouth of the Anton Larsen River should be pursued.

Land status investigation of road system stocked lakes: Twenty-three lakes within the Kodiak road system zone have been stocked with landlocked rainbows, grayling and coho over the past 10 years. Land access was never an issue in the past. However, landowners are now starting to develop and use their lands. It is now time for the department to review the lake stocking program. The land and access status of each lake should be described. If the lakes are not on public land, the private landowner should be approached and asked to grant public access to the stocked lake. If public access is not guaranteed then the lake should no longer be stocked.

**APPENDIX J. KMA HARVEST, CATCH AND PARTICIPATION
DURING 1994, FROM STATEWIDE HARVEST SURVEY**

Appendix J1.-Kodiak Area sport fish harvest and effort by fisheries and species, 1994.

	Days							DV											
	Anglers	Trips	Fished	KS	SS	LL	RS	PS	CS	AC	SH	RT	GR	SM	HA	RF	LC	RCL	Other
SALTWATER:																			
Boat - Chiniak Bay Area	5,425	11,250	14,419	398	1,533	0	520	361	22	27	0	0	0	0	5,964	2,874	491	0	503
Boat - Afognak Island Area	2,410	2,970	4,969	107	1,377	0	312	357	37	189	22	0	0	0	2,418	868	139	0	217
Boat - Barren Islands	1,602	1,475	2,206	10	10	0	0	0	19	0	0	0	0	0	2,240	132	76	0	28
Boat - Shuyak Area	238	215	726	0	180	0	15	10	0	11	0	0	0	0	334	97	19	0	0
Boat - Uyak Bay	313	207	425	0	0	0	0	0	0	56	0	0	0	0	144	29	0	0	0
Boat - Other	4,118	5,704	9,193	89	280	0	88	359	15	118	0	0	0	0	3,574	928	231	1,146	461
Shoreline - Chiniak Bay Area	2,326	5,077	5,980	10	638	0	114	874	7	667	75	0	0	0	110	79	19	3,038	148
Shoreline - Afognak Island Area	570	1,114	1,570	6	789	0	686	34	0	112	0	0	0	0	47	12	39	0	9
Shoreline - Mill Bay	311	1,668	1,977	48	362	0	38	26	0	0	0	0	0	0	0	0	0	0	0
Shoreline - Other	681	1,580	2,847	0	18	0	52	126	0	101	0	0	0	0	79	0	0	138	47
SALTWATER TOTAL	11,161^a	31,260	44,312	668	5,187	0	1,825	2,147	100	1,281	97	0	0	0	14,910	5,019	1,014	4,322	1,413
FRESHWATER:																			
Buskin River	4,193	14,971	16,534	0	2,429	0	2,573	751	0	1,208	9	0	17	0	0	0	0	0	83
Pasagshak River	2,329	4,034	4,907	0	973	0	861	81	25	205	0	0	0	0	0	0	0	0	46
Karluk River and Lagoon	3,203	3,518	10,948	1,483	251	0	3,627	68	19	445	71	9	0	0	0	0	0	0	18
American River	1,699	2,879	3,321	0	642	0	0	314	95	671	0	0	0	0	0	0	0	0	0
Olds River (or Creek)	1,670	3,074	3,438	0	1,083	0	0	694	7	358	0	0	0	0	0	0	0	0	0
Red River (Ayakulik)	1,472	1,443	5,473	948	96	0	1,223	0	0	0	21	25	0	0	0	0	0	0	0
Saltery Cove Streams	341	1,066	1,271	10	544	0	1,237	60	15	411	0	0	0	0	0	0	0	0	0
Other Remote Streams	1,013	2,394	2,824	19	624	0	1,030	93	0	549	11	103	0	0	0	0	0	0	18
Other Road System Streams	1,392	2,888	3,393	38	426	0	75	1,079	29	510	0	8	0	0	0	0	0	0	0
Roadside Lakes	594	723	1,277	0	21	0	0	0	0	73	0	470	24	0	0	0	0	0	0
Other Lakes	1,014	678	1,434	0	130	0	51	49	0	270	0	150	0	0	0	0	0	0	0
FRESHWATER TOTAL	10,648^a	37,668	54,820	2,498	7,219	0	10,677	3,189	190	4,700	112	765	41	0	0	0	0	0	165
GRAND TOTAL	16,906^a	68,928	99,132	3,166	12,406	0	12,502	5,336	290	5,981	209	765	41	0	14,910	5,019	1,014	4,322	1,578

From: Howe et al. 1995. Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

^a Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J2.-Kodiak Area sport fish catch and effort by fisheries and species, 1994.

	Anglers	Days					DV													
		Trips	Fished	KS	SS	LL	RS	PS	CS	AC	SH	RT	GR	SM	HA	RF	LC	RCL	Other	
SALTWATER:																				
Boat - Chiniak Bay Area	5,425	11,250	14,419	617	1,779	0	520	1,142	33	245	0	0	0	0	9,706	5,153	1,335	0	1,275	
Boat - Afognak Island Area	2,410	2,970	4,969	136	1,628	0	359	504	292	724	127	0	0	0	4,121	2,212	583	0	573	
Boat - Barren Islands	1,602	1,475	2,206	10	20	0	0	8	38	0	0	0	0	0	5,706	487	143	0	28	
Boat - Shuyak Area	238	215	726	0	310	0	15	46	0	106	0	0	0	0	407	153	121	0	0	
Boat - Uyak Bay	313	207	425	0	0	0	0	0	0	123	0	0	0	0	243	29	0	0	0	
Boat - Other	4,118	5,704	9,193	105	685	0	945	947	104	1,295	0	0	0	0	6,572	2,112	1,005	1,146	2,497	
Shoreline - Chiniak Bay Area	2,326	5,077	5,980	10	766	0	152	2,912	36	1,357	75	0	0	0	173	323	29	3,038	314	
Shoreline - Afognak Island Area	570	1,114	1,570	6	899	0	976	119	22	453	0	0	0	0	56	12	58	0	9	
Shoreline - Mill Bay	311	1,668	1,977	166	362	0	38	171	0	81	0	0	0	0	0	0	0	0	0	
Shoreline - Other	681	1,580	2,847	0	168	0	87	277	0	651	0	0	0	0	168	503	0	138	113	
SALTWATER TOTAL	11,161^a	31,260	44,312	1,050	6,617	0	3,092	6,126	525	5,035	202	0	0	0	27,152	10,984	3,274	4,322	4,809	
FRESHWATER:																				
Buskin River	4,193	14,971	16,534	88	3,963	0	3,630	3,853	51	4,689	542	120	17	0	0	0	0	0	92	
Pasagshak River	2,329	4,034	4,907	30	1,640	0	1,586	479	25	931	11	0	153	0	0	0	0	0	250	
Karluk River and Lagoon	3,203	3,518	10,948	3,657	824	0	8,305	386	154	3,734	996	471	10	0	0	0	0	0	112	
American River	1,699	2,879	3,321	0	1,133	0	0	2,480	382	5,815	0	0	266	0	0	0	0	0	246	
Olds River (or Creek)	1,670	3,074	3,438	0	1,629	0	0	4,620	270	1,500	0	0	0	0	0	0	0	0	0	
Red River (Ayakulik)	1,472	1,443	5,473	1,968	374	0	2,977	528	652	1,353	497	418	10	0	0	0	0	0	0	
Saltery Cove Streams	341	1,066	1,271	10	906	0	2,025	392	58	2,152	0	183	0	0	0	0	0	0	0	
Other Remote Streams	1,013	2,394	2,824	64	875	0	3,861	1,472	489	5,714	400	1,683	10	0	0	0	0	0	18	
Other Road System Streams	1,392	2,888	3,393	38	650	0	282	3,331	152	1,169	7	16	0	0	0	0	0	0	0	
Roadside Lakes	594	723	1,277	0	21	0	0	0	0	147	0	1,062	73	0	0	0	0	0	95	
Other Lakes	1,014	678	1,434	10	248	0	273	502	66	3,938	58	749	0	0	0	0	0	0	0	
FRESHWATER TOTAL	10,648^a	37,668	54,820	5,865	12,263	0	22,939	18,043	2,299	31,142	2,511	4,702	539	0	0	0	0	0	813	
GRAND TOTAL	16,906^a	68,928	99,132	6,915	18,880	0	26,031	24,169	2,824	36,177	2,713	4,702	539	0	27,152	10,984	3,274	4,322	5,622	

From: Howe et al. 1995. Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

^a Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J3.-Naknek River Drainage-Alaska Peninsula Area sport fish harvest and effort by fisheries and species, 1994.

	Anglers	Trips	Days		DV																
			Fished	KS	SS	RS	KO	PS	CS	LKT	AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	Other
SALTWATER:																					
Boat - Cold Bay Area	288	1,593	1,922	29	317	0	0	171	73	0	45	0	0	0	0	0	0	343	0	37	92
Boat - Dutch Harbor	442	1,582	2,056	0	0	70	0	171	0	0	18	0	0	0	0	0	0	908	20	0	46
Boat - Other	962	2,793	3,939	40	190	228	0	67	10	0	54	0	0	0	0	0	0	1,124	646	55	9
Shoreline	526	2,307	2,756	48	265	76	0	185	0	0	251	0	0	0	0	0	0	27	58	93	83
SALTWATER TOTAL	1,890^a	8,275	10,673	117	772	374	0	594	83	0	368	0	0	0	0	0	0	2,402	724	185	230
FRESHWATER:																					
Cold Bay Area (incl Russel Creek)	392	1,916	1,916	20	1,422	626	0	102	7	0	259	0	0	0	0	0	0	0	0	0	0
Naknek River & Tributaries	2,827	7,422	12,005	3,692	1,940	575	0	25	36	44	401	366	240	0	350	0	8,653	0	0	0	0
Brooks River	1,635	2,374	4,566	0	10	331	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0
American Creek	549	676	1,833	0	0	0	0	0	0	0	199	113	0	0	0	0	0	0	0	0	0
King Salmon River	387	451	605	219	0	9	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0
Other Streams	1,443	2,997	5,700	737	1,248	529	29	426	0	0	787	8	20	0	0	0	0	0	0	0	0
Ugashik System	889	1,544	2,315	106	739	263	0	0	19	59	275	19	10	10	278	0	0	0	0	0	0
Becharof System	284	916	1,771	20	426	90	0	34	15	0	193	95	72	29	0	0	3,828	0	0	0	0
Other Systems	119	566	524	143	0	123	0	102	0	0	215	0	0	0	0	0	0	0	0	0	0
Naknek Lake - Bay of Islands	410	512	747	67	0	44	0	0	0	15	9	0	0	0	54	0	0	0	0	0	0
Naknek Lake - Other	412	579	700	0	0	142	0	0	0	48	47	43	10	0	27	0	0	0	0	0	0
Brooks Lake	321	591	642	0	0	19	0	0	0	169	0	114	0	0	0	0	0	0	0	0	0
Other Lakes	416	1,329	1,923	76	496	44	0	0	0	165	179	47	0	0	0	0	0	0	0	0	0
FRESHWATER TOTAL	7,264^a	21,873	35,247	5,080	6,281	2,795	29	689	96	500	2,564	824	352	39	709	0	12,481	0	0	0	0
GRAND TOTAL	8,335^a	30,148	45,920	5,197	7,053	3,169	29	1,283	179	500	2,932	824	352	39	709	0	12,481	2,402	724	185	230

From: Howe et al. 1995. Naknek River Drainage-Alaska Peninsula (Area R): All Alaskan waters, including drainages, between Cape Douglas and the community of Naknek; including the Naknek River drainage, and the Aleutian Island chain. Does not include Cape Douglas.

^a Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J4.-Naknek River Drainage-Alaska Peninsula Area sport fish catch and effort by fisheries and species, 1994.

	Anglers	Days										DV									
		Trips	Fished	KS	SS	RS	KO	PS	CS	LT	AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	Other
SALTWATER:																					
Boat - Cold Bay Area	288	1,593	1,922	29	634	28	0	171	365	0	448	0	0	0	0	0	416	167	153	139	
Boat - Dutch Harbor	442	1,582	2,056	0	0	70	0	254	0	0	134	0	0	0	0	0	1,301	135	28	547	
Boat - Other	962	2,793	3,939	90	334	749	0	101	27	0	403	0	0	0	0	0	1,881	975	153	138	
Shoreline	526	2,307	2,756	48	274	76	0	472	0	0	894	0	0	0	0	0	27	132	139	379	
SALTWATER TOTAL	1,890^a	8,275	10,673	167	1,242	923	0	998	392	0	1,879	0	0	0	0	0	3,625	1,409	473	1,203	
FRESHWATER:																					
Cold Bay Area (incl. Russel Creek)	392	1,916	1,916	135	1,747	636	0	1,424	1,117	0	3,361	0	0	0	0	0	0	0	0	0	
Naknek River & Tributaries	2,827	7,422	12,005	5,014	3,188	1,539	0	738	926	396	2,409	10,113	3,212	0	2,084	0	8,664	0	0	189	
Brooks River	1,635	2,374	4,566	58	136	1,921	0	65	19	117	716	12,301	2,081	0	0	0	0	0	0	0	
American Creek	549	676	1,833	0	0	577	0	0	0	165	4,158	3,871	418	0	0	0	0	0	0	142	
King Salmon River	387	451	605	317	0	9	0	43	29	0	206	17	0	0	0	0	0	0	0	0	
Other Streams	1,443	2,997	5,700	938	2,467	1,934	36	1,090	22	165	6,713	1,759	2,086	0	0	0	0	0	0	102	
Ugashik System	889	1,544	2,315	164	1,586	1,020	0	32	92	121	3,951	498	889	48	938	0	0	0	0	0	
Becharof System	284	916	1,771	130	590	239	0	358	147	0	1,604	194	740	29	0	0	3,828	0	0	0	
Other Systems	119	566	524	143	0	142	27	469	0	0	690	8	0	0	0	0	0	0	0	0	
Naknek Lake - Bay of Islands	410	512	747	76	0	87	0	0	0	392	172	1,028	57	0	869	0	0	0	0	0	
Naknek Lake - Other	412	579	700	10	111	467	0	0	0	140	1,205	620	429	0	134	0	0	0	0	0	
Brooks Lake	321	591	642	0	30	271	0	16	0	919	27	1,450	0	0	0	0	0	0	0	0	
Other Lakes	416	1,329	1,923	76	910	566	0	171	0	2,154	1,398	2,465	0	71	203	0	0	0	0	0	
FRESHWATER TOTAL	7,264^a	21,873	35,247	7,061	10,765	9,408	63	4,406	2,352	4,569	26,610	34,324	9,912	148	4,228	0	12,492	0	0	433	
GRAND TOTAL	8,355^a	30,148	45,920	7,228	12,007	10,331	63	5,404	2,744	4,569	28,489	34,324	9,912	148	4,228	0	12,492	3,625	1,409	473	1,636

From: Howe et al. 1995. Naknek River Drainage-Alaska Peninsula (Area R): All Alaskan waters, including drainages, between Cape Douglas and the community of Naknek; including the Naknek River drainage, and the Aleutian Island chain. Does not include Cape Douglas.

^a Angler totals may not equal sum of sites due to some anglers fishing at more than one site.