Fishery Management Report No. 95-3

1994 Area Management Report for the Recreational Fisheries of the Kodiak and Alaska Peninsula/Aleutian Islands Regulatory Areas

by

Len Schwarz

June 1995

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

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

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
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_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

FISHERY MANAGEMENT REPORT NO. 95-3

1994 AREA MANAGEMENT REPORT FOR THE RECREATIONAL FISHERIES OF THE KODIAK AND ALASKA PENINSULA/ALEUTIAN ISLANDS REGULATORY AREAS

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 is 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, partnership, aquatic education, viewing, 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, aquatic education, 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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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 on Kodiak and Adak islands, 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 and a major U.S. Navy Base on Adak Island.

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 southcentral regional 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 in areas that might be affected. Most active committees meet at least once each year, usually in the fall prior to the 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 1994/1995 meetings. Proposals regarding the Kodiak Regulatory Area will be heard during the 1995/1996 meeting.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing KMA waters can target all five species of North Pacific salmon (pink *Oncorhynchus gorbuscha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook

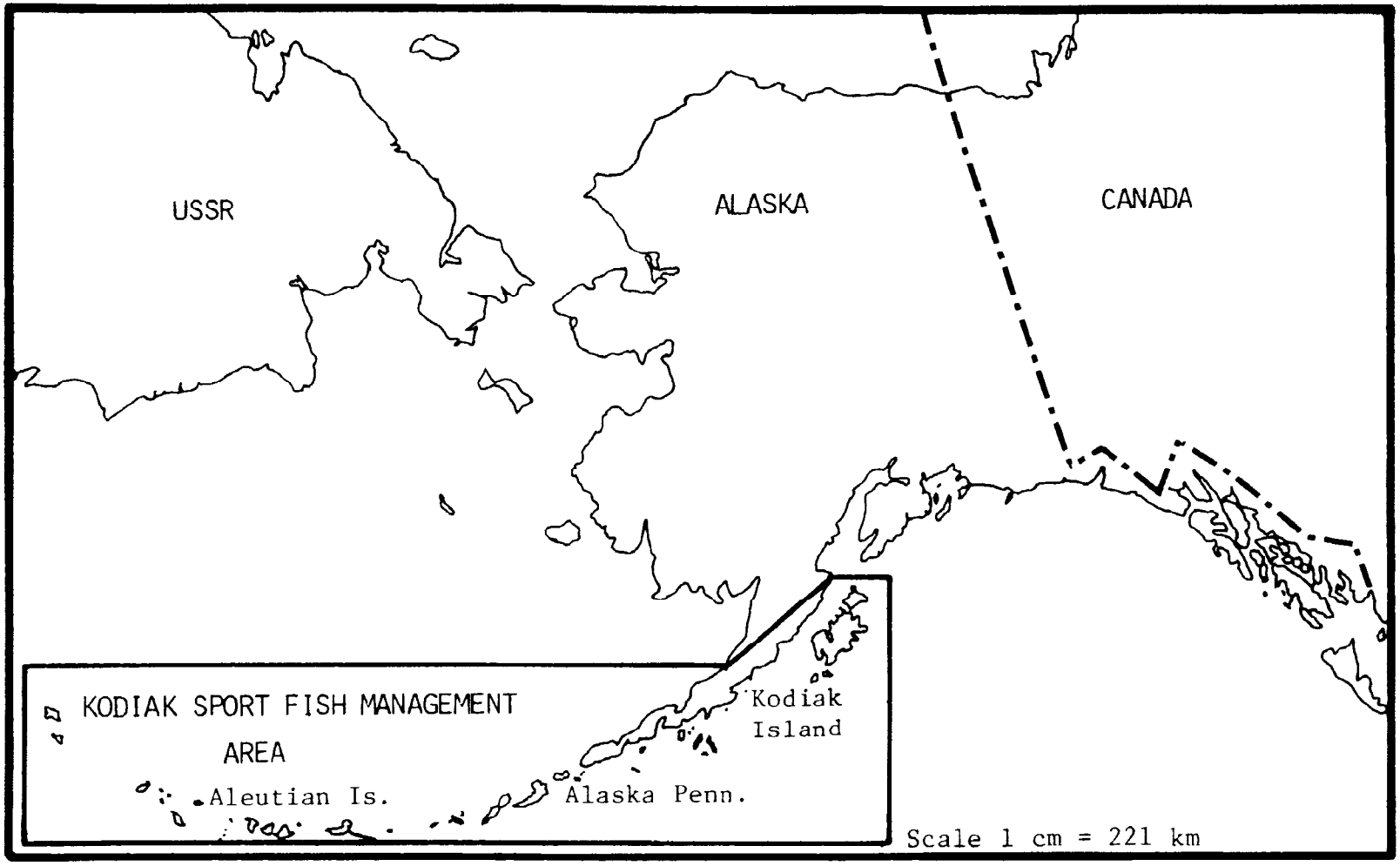

Figure 1.-The Kodiak Management Area: Kodiak Island Archipelago, Alaska Peninsula, and Aleutian Islands.

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 1 fisheries are defined as high yield, low angler-cost fisheries. These fisheries are typically entry level fisheries that anglers can participate 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 City of Kodiak and on Adak and Unalaska islands provide Level I fisheries. Marine waters near Kodiak, Adak, and Unalaska islands offer Level II fisheries for halibut and rockfish. Other examples of Level II fisheries in the KMA include boat-accessible salmon fisheries on Kodiak and Afognak islands. 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 1993[1] an average of 96,630 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 139,500 angler days (Mills 1992). The 1993 effort of 114,290 angler days was slightly higher than the recent 10-year average of 106,590 angler days (Mills 1983-1992).

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 1993, waters of the Kodiak Regulatory Area have supported an average of 75,100 angler-days of sport fishing effort (Table 1). In comparison, average sport effort in the Alaska Peninsula/Aleutian Island Regulatory Area from 1977 through 1993 has been 21,530 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

[1] Effort and harvest figures cited in this report are from Mills 1979-1994, unless otherwise noted. Effort and harvest figures presented in Mills 1994 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, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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			44	15,378	57	27,206	29	29,857	45	36,582	55	66,439	71
1982	93,645,752	11,829,075	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
MEAN [a]	96,630	10,918	46	12,103	54	21,533	22	32,680	43	39,715	57	75,098	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.

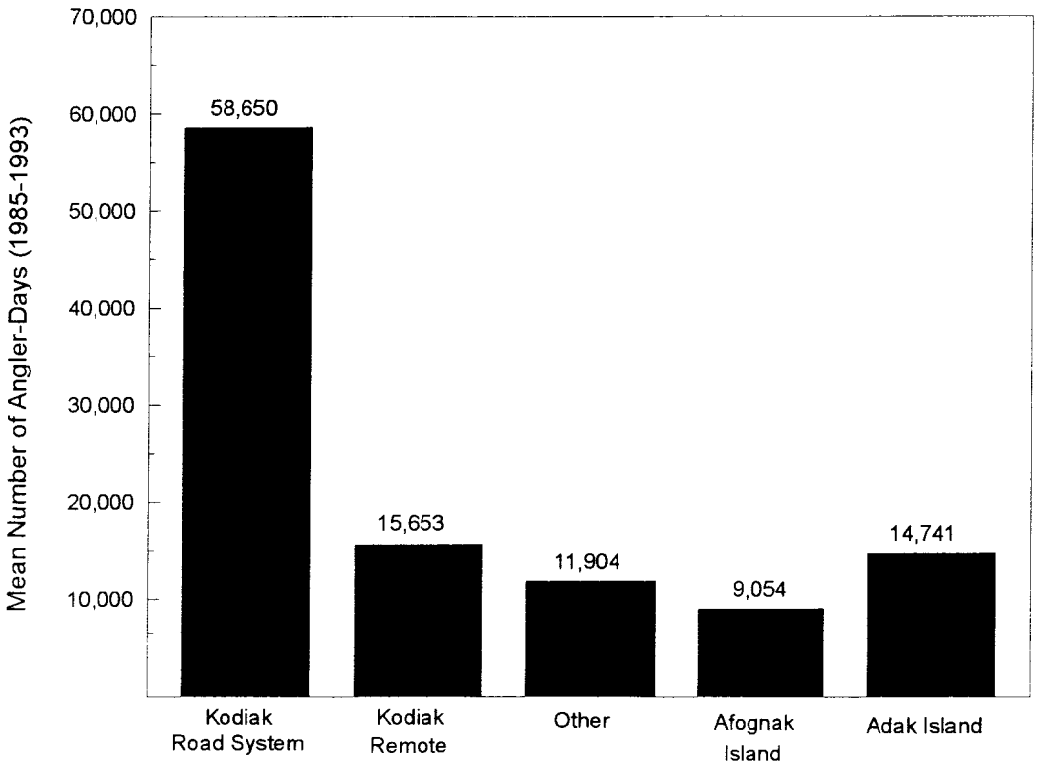

Figure 2.-Distribution of fishing effort expended by recreational anglers fishing KMA waters, 1985-1993.

the Kodiak Regulatory Area, averaging about 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).

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 14,740 angler-days of recreational fishing effort since 1985 (Table 3).

Other popular fisheries in the KMA include the fresh and marine waters of the Afognak/Shuyak Islands group, the Kodiak Remote Zone (notably the Karluk and Ayakulik River systems), Cold Bay, and Unalaska Island.

RECREATIONAL FISH HARVEST

From 1977 through 1993, an average of 101,280 fish have been harvested (kept) by sport anglers fishing KMA waters (See 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 historical 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 historical harvests (Table 4, Figure 3).

On average, Kodiak Regulatory Area waters have accounted for 76,300 sport harvested fish from 1977 through 1993, or 75% of the average KMA sport harvest (Table 5). Dolly Varden, pink and coho salmon, and halibut have accounted for most of the historical sport harvest. From 1977 through 1992, 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 24,250 sport harvested fish from 1977 through 1993, 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 historical sport harvest. From 1977 through 1993, 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).

During 1993, 100,860 fish were harvested by sport anglers fishing KMA waters (Table 4). This harvest was almost the same as the historical average harvest from KMA waters and represented 2.7% and 3.3% of the total statewide and southcentral region sport harvests, respectively, during 1993 (Mills 1994). The largest fisheries in terms of fish harvested during 1993 were for coho, halibut and pink salmon. These species accounted for 23%, 18%, and 15%, respectively, of the total 1993 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 1993 using the statewide harvest survey (Mills 1994), show that of the 326,670 fish caught by sport anglers fishing KMA waters, 69% (or 225,812 fish) were released (Table 7). Considerable variability

Table 2.-Number of angler-days of effort expended by sport anglers fishing Kodiak Regulatory Area waters, by location, 1979-1993.

Fishery	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Mean (85-93)
Kodiak Road System																
Buskin River & Mouth	19,336	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	21,556
Pasagshak River & Mouth	5,785	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	5,929
Olds River & Mouth					886	3,145	1,200	3,578	1,938	4,147	5,378	3,247	5,583	5,079	5,592	3,972
American River & Mouth					2,770	1,974	729	4,419	3,622	3,038	3,506	3,359	4,291	3,276	5,006	3,472
Roadside Lakes	1,258	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	1,426
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	3,042
Marine Boat							2,823	9,939	14,868	7,070	9,007	11,547	14,328	15,587	14,556	11,080
Marine Shore							4,403	7,321	10,110	9,146	9,559	7,115	11,122	7,507	7,234	8,169
Total	26,379	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	58,646
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	3,728
Red River System					554	1,272	91	317	638	377	1,165	815	1,780	3,340	4,566	1,454
Other Fresh Waters	9,542	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	2,632
Marine Boat	7,750	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	4,113
Marine Shore	15,374	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	3,726
Total	32,666	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	15,653
Afognak/Shuyak/Barren Islands																
Fresh Water					1,699	718	774	29		109	213	718	487	541	885	460
Marine Boat							486	7,890	6,610	7,163	8,507	7,454	7,003	7,401	8,274	6,745
Marine Shore							30	2,001	2,519	3,020	1,523	2,355	2,258	1,549	1,388	1,849
Total	0	0	0	0	1,699	718	1,290	9,920	9,129	10,292	10,243	10,527	9,748	9,491	10,547	9,054
Regulatory Area Total	59,045	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	83,353

Table 3.-Number of angler-days of effort expended by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, by location, 1981-1993.

Fishery	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Mean (85-93)
Adak Island														
Marine			5,080	6,710	884	1,638	2,033	3,875	4,177	9,187	12,316	3,546	4,314	4,674
Fresh Water		4,896	5,445	3,323	5,531	11,694	12,417	11,642	9,569	15,242	14,963	4,862	2,735	10,067
Total		4,026	8,922	10,525	10,033	6,415	13,332	14,450	15,517	13,746	24,429	27,279	8,358	7,049	14,741
Unalaska Island														
Marine					816	1,808	1,569	129	541	1,461	3,215	1,452	736	1,303
Fresh Water					1,596	362	21	197	239	56	1,161	1,218	321	574
Total					2,412	2,170	1,590	326	780	1,517	4,376	2,670	1,057	1,877
Cold Bay														
Marine				212	35	452	1,895	1,376	1,080	870	801	1,163	429	911
Fresh Water		1,211	5,271		692	555	1,251	1,132	327	1,320	2,342	2,634	3,094	925	1,522
Total			6,482		904	590	1,703	3,027	1,703	2,400	3,212	3,435	4,257	1,354	2,433
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	4,415
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	1,814
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	6,229
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	11,431
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	14,033
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	25,464

Table 4.-Number of fish harvested (kept) by sport anglers fishing Kodiak Management Area waters, 1977-1993.

		SALMON					MARINE			FRESH WATER FISHERIES							
YEAR	TOTAL	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	RAZOR CLAMS	HALI-BUT	ROCK-FISH	DOLLY VARDEN	ARCTIC GRAYLING	RAIN-BOW TROUT	LAND-LOCKED SALMON	STEEL-HEAD TROUT	SMELT	LING COD	OTHER FISH
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
MEAN		20,515	16,273	6,331	1,741	1,212	4,027	9,295	5,951	23,143	400	1,992	1,091	478	1,684	1,739	5,916
PERCENT		20	16	6	2	1	4	9	6	23	0	2	1	0	2	2	6

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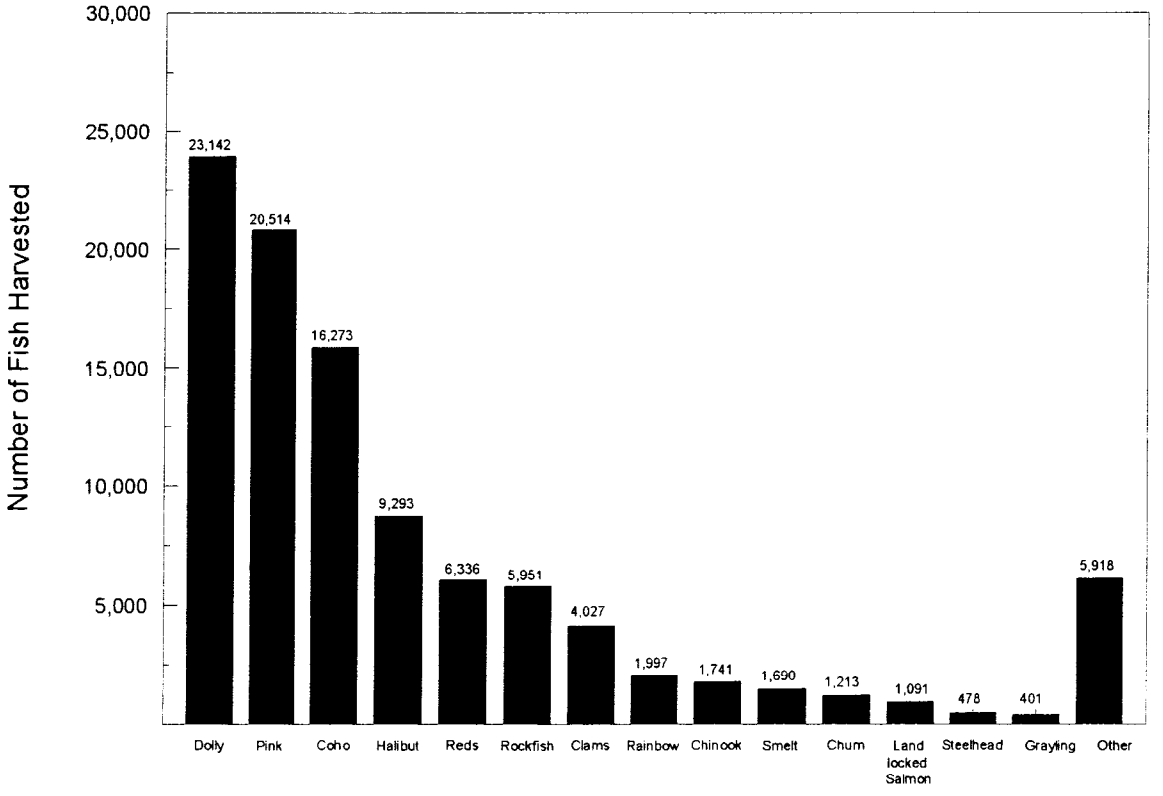

Figure 3.-Average composition of the historical harvests of fish by recreational anglers fishing KMA waters, 1977-1993.

Table 5.-Number of fish harvested (kept) by sport anglers fishing Kodiak Regulatory Area waters, 1977-1993.

YEAR	TOTAL	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	RAZOR CLAMS	HALI-BUT	ROCK FISH	LING COD	DOLLY VARDEN	ARCTIC GRAY-LING	RAIN-BOW TROUT	LAND-LOCKED SALMON	STEEL-HEAD TROUT	SMELT	OTHER FISH
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
MEAN	78,297	13,773	13,915	4,472	1,212	872	4,027	7,924	5,230	1,375	16,653	1,688	336	478	833	1,375	4,468
PERCENT	100	18	18	6	2	1	5	10	7	2	22	2	0	1	1	2	6

Table 6.-Number of fish harvested by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, 1977-1993.

YEAR	TOTAL	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	HALIBUT	ROCK FISH	LING COD	DOLLY VARDEN	ARCTIC GRAYLING	RAINBOW TROUT	LANDLOCKED SALMON	SMELT	OTHER 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
MEAN	24,069	6,741	2,358	1,864	529	341	1,369	721	497	6,489	205	309	755	851	1,450
PERCENT	100	28	10	8	2	1	6	3	2	27	1	1	3	4	6

Table 7.-Number of fish, by species, harvested and released by sport anglers fishing Kodiak Management Area waters during 1993.

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	15,570	48,227	63,797	76	12,324	45,255	57,579	79	3,246	2,972	6,218	48
Coho Salmon	22,889	23,059	45,948	50	21,241	20,167	41,408	49	1,648	2,892	4,540	64
Sockeye Salmon	10,526	19,926	30,452	65	7,849	19,262	27,111	71	2,677	664	3,341	20
Chinook Salmon	5,738	15,595	21,333	73	5,092	13,633	18,725	73	646	1,962	2,608	75
Chum Salmon	896	4,148	5,044	82	504	3,043	3,547	86	392	1,105	1,497	74
Dolly Varden	10,223	54,312	64,545	84	6,299	45,812	52,111	88	3,934	8,500	12,434	68
Other	2,564	10,650	13,214	81	1,618	2,681	4,299	62	946	7,969	8,915	89
Rainbow Trout	483	7,331	7,814	94	374	5,416	5,790	94	109	1,915	2,024	95
Steelhead Trout	332	4,778	5,110	94	332	4,778	5,110	94	0	0	0	0
Landlocked Salmon	3,087	65	3,152	2	0	0	0	0	3,087	65	3,152	2
Arctic Grayling	50	747	797	94	16	194	210	92	34	553	587	94
Halibut	17,660	23,136	40,796	57	14,169	15,043	29,212	51	3,491	8,093	11,584	70
Rockfish	8,358	11,793	21,151	59	7,569	7,985	15,554	51	789	3,808	4,597	83
Lingcod	1,120	2,045	3,165	65	922	1,482	2,404	62	198	563	761	74
Smelt	67	0	67	0	67	0	67	0	0	0	0	0
Clams	1,286	0	1,286	0	1,286	0	1,286	0	0	0	0	0
Total	100,859	225,812	326,671	69	79,662	184,751	264,413	70	21,197	41,061	62,258	66

exists in the percent of fish released depending on the species and regulatory area fished (Figure 4). For example, half of the coho caught by sport anglers were returned, whereas 94% 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 B1-B5 and C) are much larger than associated sport fisheries. Fish stocks of the KMA are also harvested in various subsistence and personal use fisheries. Harvests in these fisheries are relatively small when compared to either the commercial or sport fishery.

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 (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 estimated 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 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, rainbow trout fingerlings and Arctic grayling fry. Nearly all of the stocking has taken place within waters of the Kodiak Road System; however, some stockings have occurred in several remote waters of the KMA (Chignik, Port Lions, Ouzinkie).

During 1994, approximately 523,000 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 164,000 were stocked into remote lakes (Crescent Lake) primarily to provide fish for commercial fisheries. Other species stocked included anadromous chinook salmon smolts and nonanadromous coho salmon fingerlings, rainbow trout fingerlings, and Arctic grayling fry. 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 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 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

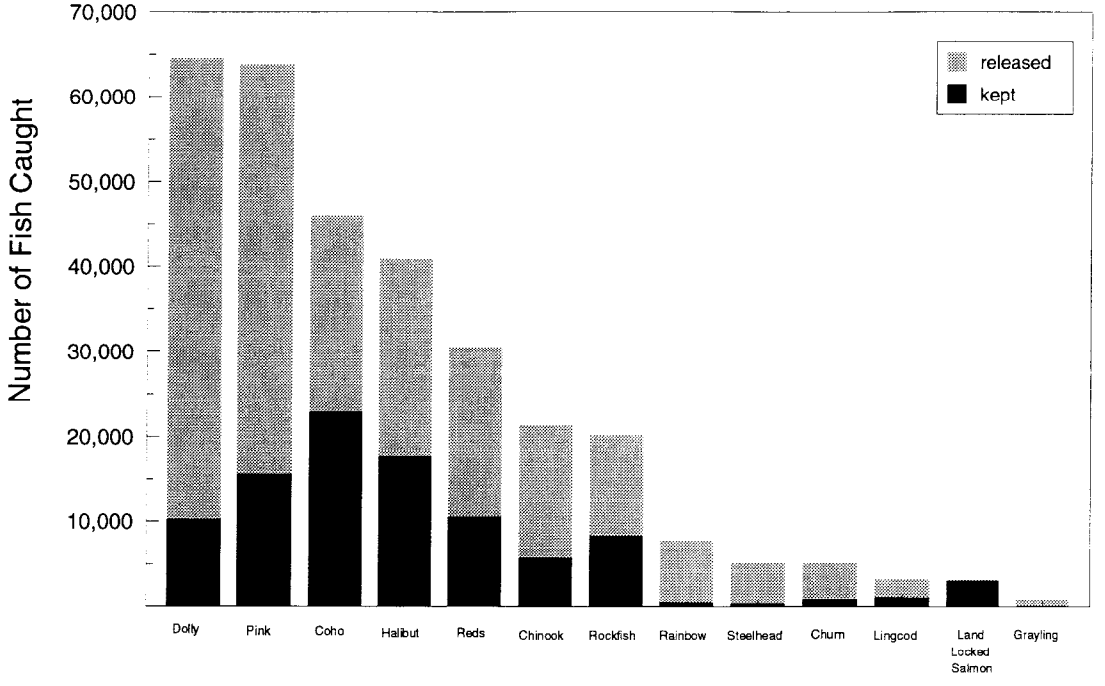

Figure 4.-Number of fish kept and released, by species, by recreational anglers fishing KMA waters during 1993.

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 1987.

[c] Computed from southcentral Alaska sport fisheries.

[d] Not computed.

Table 9.-Releases of hatchery-reared fish into KMA waters, 1988-1994.

Species/			Actual						
Size	Anadromous	Site	1988	1989	1990	1991	1992	1993	1994
R. Trout	No	Horseshoe L	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Fingerling	No	Jack L	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	No	Aurel L	4,000	3,000	3,000	3,000	3,000	3,000	3,000
	No	Big L	3,600	3,600	3,600	3,600	1,800	3,600	7,950
	No	Tanigak L	3,000	3,700	6,000	6,000	0	6,000	6,000
	No	Bull L	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	No	Cascade L	3,300	3,300	3,300	3,300	800	3,300	0
	No	Lee L	2,800	2,800	2,800	2,800	2,800	2,800	2,800
	No	Twin L	3,500	4,000	4,000	4,000	4,000	4,000	4,000
	No	Lilly L	1,600	1,600	1,600	900	800	1,600	5,100
	No	Heitman L	3,200	3,200	3,200	3,300	800	3,250	0
	No	Long L	3,600	3,600	3,600	3,600	900	0	3,600
	No	Caroline L	1,400	1,400	1,400	1,400	1,400	1,400	1,400
	No	Lupine L	1,600	1,600	1,000	1,600	1,600	1,600	1,600
	No	Dragon Fly L	1,500	1,500	1,500	1,500	1,600	1,550	1,500
	No	Cicely L	1,200	1,200	1,200	1,200	1,200	1,150	1,150
	No	Abercrombie	4,000	3,700	3,700	3,700	3,200	3,700	8,350
	No	Margaret L	1,600	1,600	1,600	1,700	800	1,600	6,850
	No	Jupiter L	3,200	3,600	3,600	3,600	900	3,600	0
	No	Saturn L	2,700	2,400	2,400	2,400	600	2,400	0
	No	Dolgoi L	5,600	0	5,200	5,200	1,300	5,150	5,150
	No	Chignik L	0	0	2,000	5,000	5,000	0	5,000
	No	Rainbow Total	55,400	49,800	58,700	61,800	31,500	53,700	62,450
Chinook	Yes	Island L	0	114,400	110,000	56,000	94,700	66,950	90,700
Smolt		Mission L	0	0	0	31,000	0	0	0
	Yes	Chinook Total	0	114,400	100,000	87,000	94,700	66,950	90,700
A. grayling	No	Aurel L	20,000	14,200	20,000	20,000	20,000	20,000	20,000
Fry	No	Cascade L	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	No	Cicely L	10,000	8,200	10,000	10,000	10,000	10,000	10,000
	No	Heitman L	30,000	30,000	30,000	30,000	30,000	30,000	30,000
	No	Grayling Total	70,000	62,400	70,000	70,000	70,000	70,000	70,000

-continued-

Table 9.-Page 2 of 2.

Species/			Actual						
Size	Anadromous	Site	1988	1989	1990	1991	1992	1993	1994
Coho	Yes	Mayflower L	6,500	6,900	2,500	6,500	3,250	16,000	16,400
Fingerling	Yes	Island L	22,500	22,500	8,500	22,500	22,500	16,000	47,400
	Yes	Dark L	7,500	7,500	7,500	7,500	7,500	8,000	18,000
	Yes	Mission L	10,000	10,000	10,000	12,700	7,500	8,000	30,200
	Yes [a]	Little Kitoi L	5,600	33,500	0	0	0	139,147	0
	Yes	Orbin L	7,500	7,500	7,500	5,100	3,750	8,000	0
	Yes	Kalsin L	17,500	19,500	0	19,340	8,200	8,000	0
	Yes	Potatoe Patch L	7,500	7,500	0	9,500	7,500	0	20,000
	Yes [a]	Crescent L	241,000	203,000	0	191,400	69,000	60,000 *	163,680
	Yes [a]	Hidden L	137,600	239,800	0	250,900	0	0	0
	Yes	Ouzinkie L	20,000	20,000	0	0	15,000	15,052 *	0
	Yes [a]	Jenifer L	0	0	0	0	162,000	135,486	0
	Yes	Sub-Total remote	384,200	476,300	0	442,300	306,200	334,633	163,680
	Yes	Sub-Total road	99,200	101,400	36,000	83,200	60,200	69,052	132,000
	Yes	Sub-Total both	483,200	577,700	36,000	525,500	366,400	403,685	295,680
Coho	No	Pony L	2,100	2,600	0	2,400	0	0	4,200
Fingerling	No	Southern L	2,700	2,400	0	0	0	0	0
	No	Sub-Total	4,800	5,000	0	2,400	0	0	4,200
	Both	Coho Total	488,000	582,700	36,000	527,900	366,400	403,685	299,680
All Species	Both	GRAND TOTAL	613,400	809,300	264,700	746,700	562,600	594,335	523,030

[a] Remote location outside of the Kodiak Road System.

* Pre smolt.

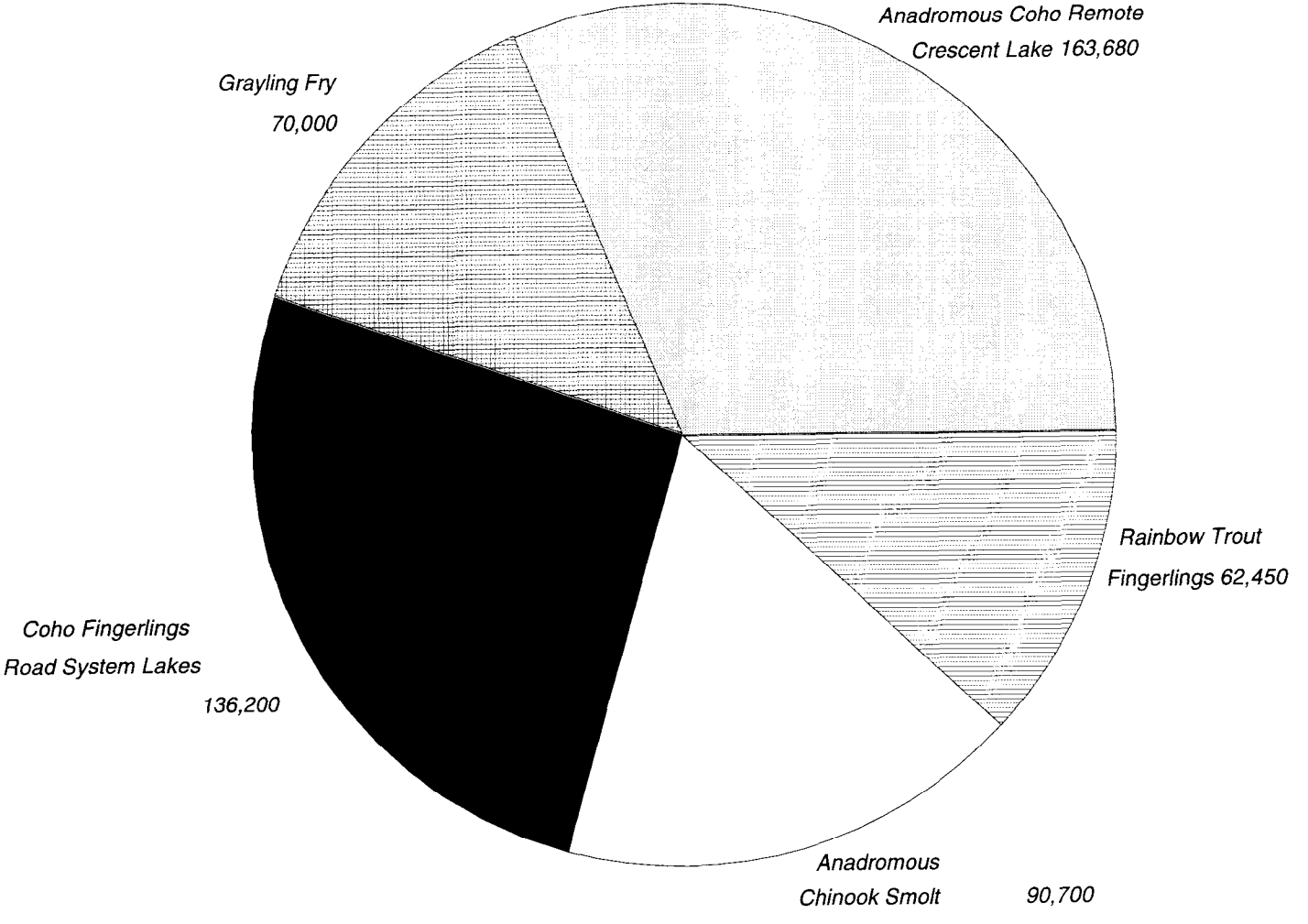

Figure 5.-Stockings of hatchery-reared fish into KMA waters during 1994.

program are to obtain estimates of population size and the number of steelhead trout harvested in the commercial, subsistence and sport fisheries. This research project was initiated in 1991. A third research program was initiated in 1992 and involves the dockside sampling of recreationally harvested marine groundfishes 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 Finally, a fourth research program was initiated in June 1993 and 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 River escapement. Age, sex and size data were also collected from the sport fish harvest from those rivers. On the Karluk River, every angler fishing above the weir was interviewed in order to document the chinook harvest. The U.S. Fish and Wildlife Service interviewed all anglers fishing on the Ayakulik. In Chignik, the commercial chinook purse seine catch from the 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 1994 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 but not completed.

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 criterium 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 criterium 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 criterium 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 criterium 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 follow:

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 1994 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 again 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 River Chinook Salmon (access). In recent years, there has been a marked increase in the 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 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 stocks located along the road system which are susceptible to overharvest due to their small size (Salonie, American, Olds and Roslyn Creek). Coho escapement into these streams should be monitored to ensure these small stocks don't become overharvested and, as a result, decline in abundance.

5. Stocking Program. Although over 100,000 rainbow trout, Arctic grayling, 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. 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
Steelhead Trout 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 (mainly Buskin Lake) and spawning areas (Buskin, American, Olds, and Pasagshak River). 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 1993, the waters of the Kodiak Road System have accounted for an average harvest of 9,780 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 7,650 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, selected 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 have expended an average of 4,390 angler-days of effort to harvest 5,530 Dolly Varden. From 1988 through 1990, these

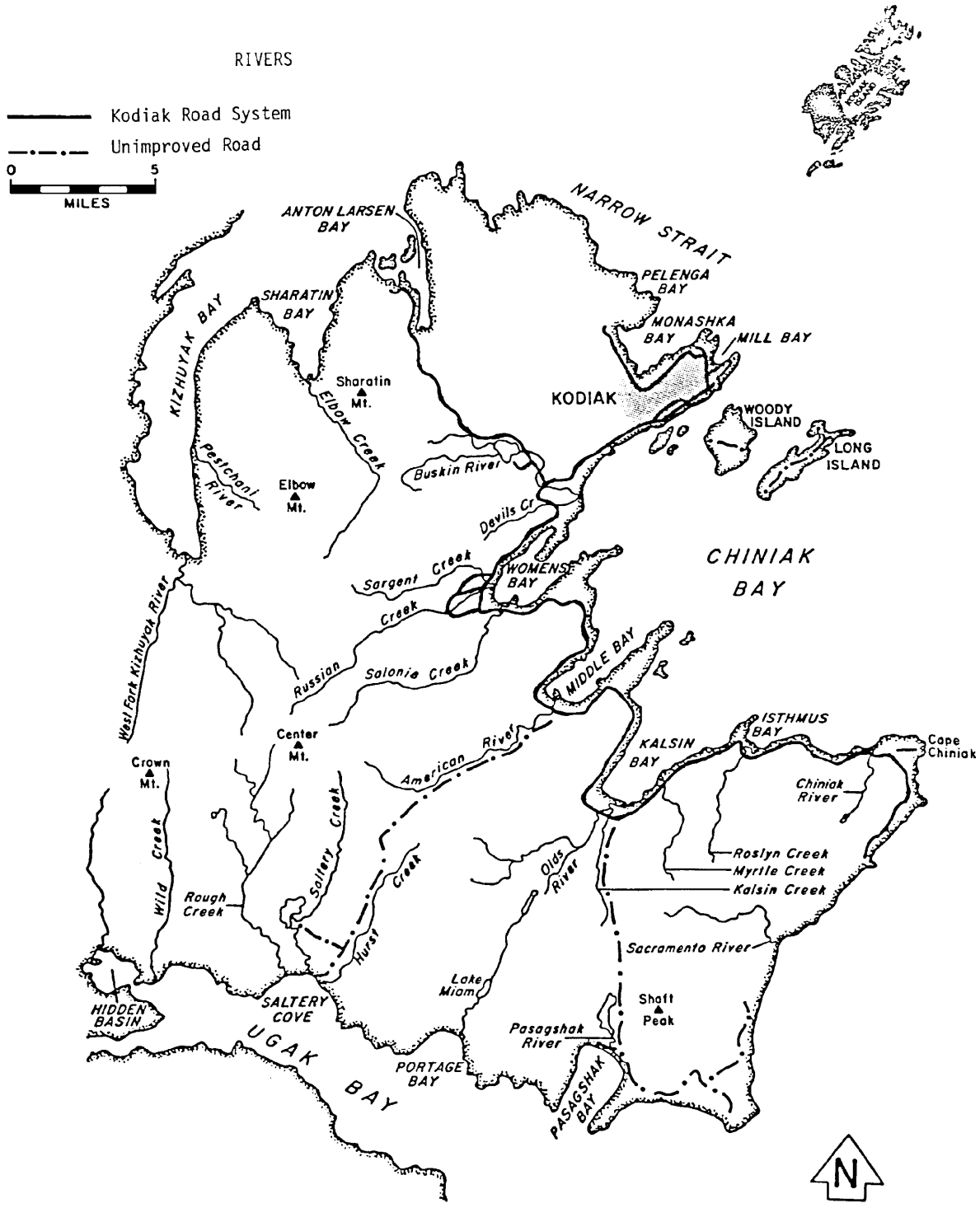

Figure 6.-Geographic boundaries of the Kodiak Road System Zone.

Table 10.-Harvest of Dolly Varden from Kodiak Road System[a] waters of the Kodiak Management Area, 1985-1993.

	KMA	Kodiak Road System		
Year	Harvest	Catch	Harvest	% of KMA
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	29,411	9,558	45
1991	21,418	19,165	9,718	46
1992	11,951	24,070	4,572	39
1993	10,233	26,532	3,955	39
MEAN	21,350	24,794	9,784	50

[a] Includes Buskin, Pasagshak, American, and Olds rivers, Marine boat and shore, roadside lakes, and other fresh water on the road system as identified from individual responses to Mills.

Table 11.-Harvest of Dolly Varden from selected Kodiak Road System streams, 1977-1993.

Year	Buskin River	Pasagshak River	American River	Olds River	Total
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	4,830	138	845	293	6,106
1991	4,337	1,124	375	288	6,124
1992	2,319	352	360	360	3,391
1993	1,150	194	115	468	1,927
MEAN	7,648	696	407	257	8,786
MEAN (85-93)	5,541	686	391	285	6,801

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

		FISHERY STATISTICS April 15-Jun 15[a]			FISHERY STATISTICS Entire Yearb		MIGRATION STATISTICS (Weir Counts)	
Year	Reference	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		5,460		9,477			
1985	Murray 1986		8,712		10,261		21,797	20,545
1986	Murray 1987	3,410	4,065		10,367		40,773	24,110
1987	Murray 1988 [a]	4,619	4,766		4,238		29,919	32,848
1988	Murray 1989	4,284	3,569	5,067	5,293		31,260	34,306
1989	Murray 1990		5,761	5,567	7,092		35,605	30,851
1990	Whalen 1991	4,523	2,362	3,993	4,830	11,471	91,107 [d]	6,416 [e]
1991		5,204			4,337	7,623	30,725 [d]	NO DATA [f]
1992		4,268			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.

surveys 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. From 1985 through 1992, an average of 44,430 and 24,850 Dolly Varden have been counted emigrating from and immigrating into the Buskin River, respectively.

RECENT FISHERY PERFORMANCE

The sport harvest of Dolly Varden from Kodiak Road System waters during 1993 was 3,955 fish, 60% below the historical mean harvest for the area (Table 10). Although the harvest rate was the lowest on record and about 6,000 fish below the average, catch figures remained above average, indicating that anglers were choosing to release more fish during the 1993 fishing season (Table 10). Approximately 89% or almost 2,300 fish of the Dolly Varden caught along the road system were released in 1993 (22,580 fish). 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 commensurate with the ability of the fisheries resource to support that level of use.

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 against 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. Data analysis was unclear as to whether the decrease of 60,000 fish in 1991 was due to a large decrease in population size or to the possibility that the population overwintered 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 could 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 and mark-recapture experiments to determine population size and stock structure.

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. Results of the tagging project, however, suggested that a portion of the adult population may not be overwintering in Buskin Lake every winter. 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 then 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 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 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.

In summary, the fact that no decrease in the abundance of spawning fish in 1993 was observed supports the possibility that in 1991 a portion of the Chiniak Bay Dolly Varden population did not overwinter in Buskin Lake. Valid age data are lacking for the 1991 emigration and the 1993 spawning population. Knowing if an age class was missing or low in abundance during the 1991 emigration but present during the 1993 spawning population would be a more definitive answer to the question of overwintering in 1993. In any case, the 1993 spawning population appears to be average even if the lower limit of the population estimate is used as the population size.

Recommended Research and Management Activities

The fact that spawning abundance was average to above average in 1993 and that the emigration count from Buskin Lake in 1992 was the second largest count ever recorded, 74,451 (Table 12), there appears to be no conservation problem at this time. Also there is a definite trend for increased catch and release of Dolly Varden. The catch in 1993 was above average. However, the harvest was the lowest ever documented (Table 10). Due to the evolving nature of the fishery, there is no need to directly study the abundance of Dolly Varden along the Kodiak road system. If catches of Dolly Varden decline, as indicated by the statewide harvest survey, then further study and possible conservation measures could be considered.

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) 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 (other than chinook) fishing year-round in the reaches downstream of the

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

[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.

Olds River

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

[b] Sonnichsen 1990.
[d] Whalen 1992. This estimate is biased due to unequal capture probabilities between sublocations and among size groups.

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 1993, the waters of the Kodiak Road System have accounted for an average harvest of 10,690 pink salmon. This represents an average of 58% 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 1985, these four river systems have accounted for an average harvest of 5,930 pink salmon, or nearly 56% 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 3,230 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 have generally been weak from 1990-1992. Commercial harvest of pinks in Monashka and Chiniak bays averaged 275,000 from 1980 to 1988 but decreased to only 137,000 from 1990-1992 (Appendix C). Combining the highest aerial survey counts for each year in the three largest producers (Buskin, American and Olds) 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 pink salmon was estimated by Mills at 10,790 (Table 14). The 1993 return of pink salmon marked the end of a trend for below average returns. The commercial harvest in the Kodiak area of 34 million pink salmon was a record, tripling the average harvest. The majority of streams throughout the KMA received desired escapement levels.

The 1994 pink return along the Kodiak road system was also above average. The 1994 sport fish harvest is not available at this time but is expected to be similar to the 1993 harvest. Escapement goal was achieved in most streams (Appendix F).

RECENT BOARD OF FISHERIES ACTIONS

The last board action regarding pink salmon occurred in 1987 where the bag and possession limit for salmon (other than chinook) was reduced to 5 and 5 fish, respectively, 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.

Table 14.-Harvest of pink salmon from Kodiak Road System[a] waters of the Kodiak Management Area, 1985-1993.

Year	KMA Harvest	Kodiak Road System			
		Freshwater	Saltwater	Total	% of KMA
1985	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	4,841	1,695	6,536	22
1991	12,106	5,930	4,313	10,243	85
1992	11,473	3,031	1,345	4,376	38
1993	15,570	6,159	4,610	10,789	69
MEAN	19,549	6,222	4,023	10,687	58

[a] Includes Buskin, Pasagshak, American and Olds rivers, Marine Boat + shore Chiniak Bay, roadside lakes and other fisheries on the Kodiak road system as identified from individual responses to Mills.

Table 15.-Harvest of pink salmon from selected Kodiak Road System streams, 1977-1993.

Year	Buskin River	Pasagshak River	American River	Olds River	Total
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	183	1,000	488	4,512
1991	1,942	601	1,472	1,246	5,261
1992	1,557	403	513	476	2,949
1993	1,104	381	560	2,676	4,721
MEAN (85-92)	3,225	469	1,033	1,203	5,933

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level commensurate with the ability of the fisheries resource to support. 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 escapements 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 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 closed in the Buskin, American and Olds rivers. The large returns in 1993 and 1994 reversed the 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 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. Aerial surveys have been utilized beginning in 1991 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 1995 is approximately 18 million fish which is above average for an odd year. Along the Kodiak road system returns are expected to be at least average.

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.

A large increase in fishing effort was noted during the 1993 pink salmon season along the Olds River and Chiniak Creek but was absent in 1994. If these large increases in fishing effort are noted in 1994 and the run is determined to be weak, onsite observations should be made to determine if significant harvests are occurring as a result of the large fishing effort. 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 odd years on the Buskin River have averaged approximately 3,000 fish since 1979. The minimum escapement goal for odd years on the Buskin River is 60,000 fish. Even if spawning escapements were slightly below minimum, the sport removal of about 3,000 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, Mission and Kalsin beaches. Fisheries for stocked returns also occur at Mayflower and Russian River beaches. These releases have averaged 83,000 fingerlings from 1988 through 1994 (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) 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) 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 coho or sockeye salmon.

From 1985 through 1993, the average harvest of coho salmon from waters of the Kodiak Road System has been 11,700, 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,

Table 16.-Harvest of coho salmon from Kodiak Road System[a] waters of the Kodiak Management Area, 1985-1993.

Year	KMA Harvest	Kodiak Road System Harvest	Kodiak Road System % 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
MEAN	18,045	11,701	58

[a] Includes Buskin, Pasagshak, American, Olds Rivers, Marine boat and shore, Chiniak Bay, roadside lakes, and other fresh water on the Kodiak road system as identified from individual responses to Mills.

Table 17.-Harvest of coho salmon from selected Kodiak Road System streams, 1977-1993.

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
MEAN (85-93)	3,336	2,296	1,035	1,327	7,994

the average harvest of coho salmon from the Buskin and Pasagshak rivers has been 3,340 and 2,300 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, coho salmon fishing in streams flowing into Monashka and Chiniak bays was confined to waters below the road system bridges and below Bridge #1 on the Buskin River from August 1 through September 10. During the 1993 season as the September 10 regulatory opening date for waters upstream of the highway bridges approached, attempts were made to insure that the coho salmon run was strong enough to sustain the increased effort from upstream areas directed at the stocks 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 remained the Buskin River. Over the 10 years of operation of the Buskin River weir (1985-1994), coho salmon escapements have averaged about 8,390 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, an inriver goal of 6,000 fish is needed in order to allow for a sport fish harvest above the weir. 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 1994 run had a normal time of entry pattern, an escapement of about 1,700 coho salmon would have been required to have passed through the weir by September 7 to achieve an average escapement of 6,000 coho salmon by October 1. The actual escapement during 1994 on September 7 was 470 coho salmon, and as a result the waters upstream of the Chiniak Highway did not open as scheduled on September 11. On September 14 rainfall ended a 3-week drought, and 1,593 coho were counted through the weir that day. An emergency announcement was made, and waters above Bridge #1 and the Chiniak Highway were opened on September 17. The final weir count in the Buskin was 8,146 fish between the minimum and desired goals. Sport harvests of coho along the road system are not available for 1993 yet. Coho harvests should be about average based on the size of the return (Table 18, Appendix E). However, due to low water conditions and high water temperatures coho seemed sluggish and did not readily bite.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level commensurate with the ability of the fisheries resource to support. 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 coho systems along the road continue to receive sufficient spawning escapements (American, Olds, Salonie, Roslyn, Pasagshak).

RECENT BOARD OF FISHERIES ACTIONS

The most recent regulation concerning coho salmon was adopted by the Alaska Board of Fisheries during their 1987 meeting and reduced the bag and possession limit for salmon on the Kodiak road system (other than chinook) to 5 fish for fish over 20 inches in length of which not

Table 18.-Numbers of anadromous fish passed through the Buskin River weir, 1985-1994.

Year	Dolly Varden Emigration	Steelhead Kelts[a]	Sockeye Salmon	Pink Salmon[b]	Dolly Varden Immigration	Coho Salmon[f]	Chum 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

[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 pre-spawning 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.

[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] From 1990 to 1993 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. Dolly Varden counts are incomplete and pink counts have been expanded by aerial surveys or time of entry data in order to estimate escapement.

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

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.

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. The sport fishery harvests the majority of the return (11,700, Table 16) followed by the commercial fishery (7,350, Appendix C) and the subsistence fishery (2,700, 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 resource. In order to document what has occurred with the road system coho stocks so that these populations and fisheries can be studied and managed, a report was compiled (Schwarz 1993). In this report, harvest from all fisheries, run timing, escapement and stocking statistics for the years 1980-1990 are compiled.

During the 1993 season, crowding became a major social issue. Main locations of concern were Chiniak Creek (during the pink return) and the Olds River. Fishing effort levels increased dramatically when a local church began facilitating regular fishing outings for church members residing off Kodiak Island. The Division of Sport Fish implemented a voluntary log book program with the major user as well as sporadic onsite creel survey to ensure the increase in fishing effort did not result in an overharvest of the resource. Department personnel observed as many as 278 anglers fishing at the mouth of the Olds River at one time. During the coho run the Olds River normally has 15 to 20 anglers fishing during the morning or evening. Harvests average about 40 fish per day during a normal return. During the 1993 season this increase in fishing effort did not result in an increase in harvest so restrictions were not placed on the fishery, and escapement objectives in the Olds River were met. The crowding which occurred in 1993 did not occur in 1994.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A weir on the Buskin River and foot/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

During the 1970s, pink salmon stocks on the Kodiak road system were rebuilding, and waters above the Chiniak Highway were closed by regulation to salmon fishing from August 1 through September 10 in order to protect spawning pink salmon. This regulation also provides a sanctuary for coho salmon which migrate upstream during this period. If the coho return appears below average in strength, the first fishery restriction has been to extend the closure of waters above the Chiniak Highway to salmon fishing.

The Buskin River is the largest producer of coho salmon on the Kodiak road system and is used as an indicator of coho run strength in Chiniak Bay. A weir is maintained on the Buskin River, and average time of entry data are available (Appendix G3). Under normal run timing, 38% of the escapement has occurred by September 10. This means that to achieve a minimum inriver escapement of 6,000 coho by October 1, approximately 2,160 fish should be through the weir by September 10. If an inriver goal of 6,000 coho is achieved a spawning goal of 5,300 is also achieved based on average sport fish harvest statistics. River water levels can slow immigration,

and this is also considered when evaluating weir counts to gauge run strength. If the return is judged to be below average to the point that minimum escapement levels may not be reached, then the closure of waters above the Chiniak Highway is extended. If the upriver closure is not sufficient to ensure minimum escapements are achieved then additional restrictions may be implemented (reduction in bag limits, additional area closures, or time closures).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

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

As mentioned before, coho often react to low water conditions by holding in salt water and not entering the river systems. This behavior makes it difficult to estimate run strength. The current regulation opens water above the Chiniak Highway and Bridge #1 on the Buskin River on September 11. A decision whether to allow upriver waters to open as scheduled or to extend the closure must be made by September 8 in order to give sufficient notice to the public. On September 8 only 30% of the run has occurred on average. However, since 1985 there has been as little as 5% and up to 75% of the escapement counted through the weir. Accessing the run strength of the return is very difficult at this date. As a result the closure has been extended 5 of the last 10 years. During years when the August 1-September 10 closure was extended the upper rivers were eventually opened when it became apparent that the run was strong enough to open upriver waters and still achieve minimum escapement goals (Table 19). In these years opening dates ranged from September 17-October 7 and averaged September 28.

Emergency orders are disruptive to the sport fishery and, in the case of the Chiniak coho fishery, have been made before run strength can adequately be accessed. As a result the department is considering proposing that the upriver waters do not open until a later date. This will be less disruptive to the fishing public and also allows a more accurate assessment of coho run strength. If it becomes clear early in the season that the run is strong the upriver waters can be opened to fishing by emergency order.

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 1992 statewide harvest survey documented a harvest of 600 coho with 1,300 angler days at Mill Bay, a return location for

Table 19.-Harvest of sockeye salmon from Kodiak Road System[a] waters of the Kodiak Management Area, 1985-1993.

Year	KMA Harvest	Kodiak Road System Harvest	Kodiak Road System % 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
MEAN	7,842	3,395	43

[a] Includes Buskin, Pasagshak, Saltery, Marine boat and shore, Chiniak Bay, roadside lakes, and other fresh water on the Kodiak road system as identified from individual responses to Mills.

stocked adults. In 1993 Mills estimated 1,000 angler days expended with a harvest of 400 coho at Mill Bay and Mission Beach. 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. The change in the project now requires sport fish staff to be involved with an egg take and outstocking. Total involvement is probably less than 1 week for staff. The Kodiak Regional Aquaculture Association is incubating and rearing those 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 on the Kodiak Road system: the Buskin, Pasagshak, and Saltery 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 only) 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) 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 1993, the average harvest of sockeye salmon from waters of the Kodiak Road system has been 3,400, accounting for an average of 43% of the total KMA sockeye salmon harvest over this period (Table 19). About 77% 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 1,950 and 660 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 1993 (3,690) was about average (Table 19). This harvest accounted for 47% of the total sockeye salmon harvest from KMA waters during 1993 (Table 19). Usually the Buskin and Pasagshak rivers support the largest harvest of sockeye salmon (Table 20). However, in 1993 Saltery supported a larger harvest (560) than the Pasagshak (540).

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

Table 20.-Harvest of sockeye salmon from selected Kodiak Road System streams, 1977-1993.

Year	Buskin River	Pasagshak River	Saltery Cove Streams	Total	% of Road System
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
MEAN (85-91)	1,946	655		2,600	77

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level commensurate with the ability of the fishery resource to support. The Buskin River fishery will be managed so that a minimum spawning escapement of 8,000 fish is achieved in Buskin Lake. Escapement trends will be monitored in Pasagshak and Saltery lakes through aerial surveys, to ensure that escapement into these lakes is being met.

RECENT BOARD OF FISHERIES ACTIONS

The most recent regulation affecting sockeye salmon occurred in 1987 when the Alaska Board of Fisheries reduced the bag and possession limit for salmon (other than chinook) to 5 and 5 fish, respectively, 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.

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 4,150 sockeye salmon from 1980-1993 (Appendix D). Over this same period, the average sport harvest of sockeye salmon from the Buskin River has been 1,970. 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 1980-1993 has been 100 sockeye (Appendix C). Since 1985, the average escapement of sockeye salmon to the Buskin River weir has been 12,110 (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 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. An attempt will be made to expand these reported harvests to an estimated total harvest by interviewing people who did not return their permits.

INSEASON MANAGEMENT APPROACH

A biological minimum escapement goal 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 are 10 per day, 10 in possession for fish less than 20 inches.

From 1984 through 1993, an average of 1,500 angler-days have 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 (Mills 1994). The average harvest of rainbow trout, Arctic grayling, and nonanadromous salmon from stocked lakes from 1984 through 1993 has totaled 800, 140, and 260 fish, respectively (Table 21). Road system harvests have represented nearly half of the harvests of rainbow trout and Arctic grayling and 18% of the harvests of all of the landlocked salmon from KMA waters over this period (Table 21).

During 1993, approximately 136,700 fry and fingerlings were stocked into landlocked lakes of the KMA (Table 9).

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.

CURRENT ISSUES

Although over 150,000 rainbow trout, Arctic grayling, and nonanadromous salmon have been stocked along the Kodiak Road system in recent years, effort directed towards these stocked fish and harvest of the stocked fish has remained relatively low (Table 21). The cost of these projects are relatively low, averaging less than $4,000 per year for all species combined There are no other 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 grayling harvest is very low from the four lakes which are stocked. Test netting should be conducted to determine if stocked grayling fry are surviving.

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, 1984-1993.

	Effort (Angler-Days)			Rainbow Trout Harvest			Arctic Grayling Harvest			Landlocked Salmon Harvest		
Year	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
MEAN	1,502	107,641	1	795	1,604	48	139	331	54	233	1,118	18

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Greater education of the sport fishing public is recommended to increase utilization of these stocked fish.

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 support the second most popular fisheries in the KMA in terms of recreational angling effort expended since 1985 (Figure 2). Since 1985, these waters have accounted for nearly 15% of the recreational angling effort expended in the KMA (Table 3).

There are two major fisheries that occur in the waters of Adak Island. These fisheries target Dolly Varden and Pacific salmon.

ADAK ISLAND DOLLY VARDEN FISHERY

HISTORICAL PERSPECTIVE

Dolly Varden are available to anglers in a number of Adak Island streams throughout the year. Peak abundance, however, typically occurs in May and July through September. All streams on Adak Island are open year-long to fishing for Dolly Varden and the daily bag and possession limit is 10 Dolly Varden with no size limit.

From 1982 through 1993, the Dolly Varden stocks of Adak Island have supported an average harvest of 3,150 Dolly Varden, accounting for an average of 15% of the total KMA Dolly Varden harvest over this period (Table 22). Several streams and nearshore marine waters on Adak Island support sport fisheries for Dolly Varden.

RECENT FISHERY PERFORMANCE

The sport harvest of Dolly Varden from Adak Island waters during 1993 (2,250) was below the 12-year mean (3,150). In addition to the harvest of 2,010 Dolly Varden from Adak Island waters during 1993, an additional 3,908 Dolly Varden were estimated to have been caught and released by sport anglers fishing Adak Island waters during 1993 (Mills 1994). Based on this, anglers released an estimated 63% of the Dolly Varden they caught fishing Adak Island waters during 1993.

No estimates of catch or harvest of Dolly Varden are available for this fishery during 1994 at this date.

RECENT BOARD OF FISHERIES ACTIONS

The most recent regulation affecting Dolly Varden on Adak occurred during the 1987 Alaska Board of Fishery meeting, when the bag and possession limit for Dolly Varden was reduced from 20 to 10 fish daily and in possession. This change did not reduce the number of Dolly Varden harvested from Adak area waters.

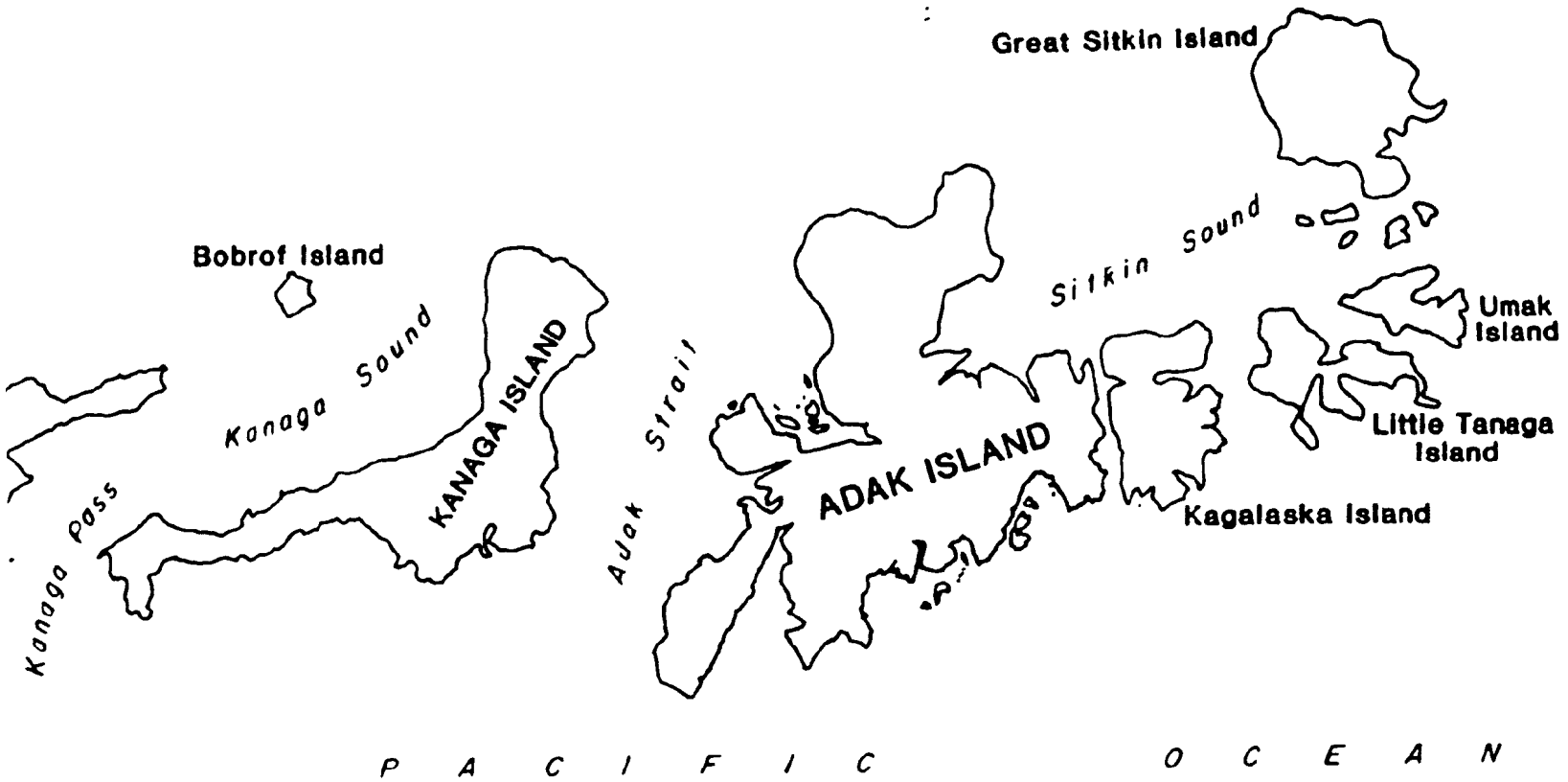

Figure 7.-Adak Island and surrounding waters.

Table 22.-Harvest of Dolly Varden from Adak Island waters of the Kodiak Management Area, 1982-1993.

	KMA	Adak Island	
Year	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
MEAN	22,091	3,146	15

CURRENT ISSUES

The Navy base in Adak has undergone a large reduction in personnel. The population of the base dropped from 5,500 to about 1,000 during the 1994 fishing season. During the 1995 fishery season only about 400 personnel are expected to be on the base. The 93% reduction in personnel should have a dramatic impact on the average number of angler days per year (14,740 1981-1993), as well as the annual catch and release.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

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

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No specific 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.

ADAK ISLAND SALMON FISHERIES

HISTORICAL PERSPECTIVE

Pink salmon return to several Adak Island streams from mid-July through early September. Peak pink salmon immigration occurs during the second week of August with spawning typically beginning in mid August. Coho salmon return to Adak Island streams from late August through mid October. Peak coho salmon immigration occurs during September with spawning typically beginning in early October. Sockeye salmon return to a number of Adak Island streams from June through August. Peak sockeye salmon immigration varies by stream but typically occurs during late June to early July. Spawning occurs in streams beginning in July.

From 1982 through 1993, the pink salmon stocks of Adak Island have supported an average harvest of 5,990 pink salmon, accounting for an average of 27% of the total KMA pink salmon harvest over this period (Table 23). Several streams on Adak Island and nearshore marine waters support sport fisheries for pink salmon. Pink salmon returning to Adak Island streams are also harvested in subsistence fisheries. From 1985 through 1992, the coho salmon stocks of Adak Island have supported an average sport harvest of 1,170 coho salmon, accounting for an average of 7% of the total KMA coho salmon harvest over this period (Table 23). Over this same period, the sockeye salmon stocks of Adak Island have supported an average harvest of 1,240 sockeye salmon, accounting for an average of 13% of the total KMA sockeye salmon harvest over this period (Table 23). Several streams on Adak Island support sport fisheries for sockeye salmon.

Commercial fisheries targeting salmon have not occurred in the Aleutian Islands west of Unalaska Island with exception of the Atka/Amlia experimental fishery. The Board of Fisheries created a commercial fishery for a 3-year duration beginning in 1992 after which it would be reviewed for renewal. During 1989 the Alaska Board of Fisheries revoked the subsistence fishery on Adak Island and established a personal use fishery. Since 1989, about 60 people have obtained personal use permits annually. Annual salmon harvests in this fishery have ranged between 400-800 sockeye salmon, 40-150 pink salmon, and 20-50 coho salmon.

RECENT FISHERY PERFORMANCE

The sport harvest of pink salmon from Adak Island waters during 1993 (1,610) was about 4,000 fish below average (Table 23). This harvest accounted for 10% of the total pink salmon harvest

Table 23.-Harvest of pink, coho, and sockeye salmon from Adak Island waters of the Kodiak Management Area, 1982-1993.

	Pink Salmon				Coho Salmon		Sockeye Salmon	
Year	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
MEAN	3,374	2,614	5,989	27	1,174	7	1,243	13

from KMA waters during 1992. In addition to the harvest of 1,610 pink salmon from Adak Island waters during 1993, an additional 1,320 pink salmon were estimated to have been caught and released by sport anglers fishing Adak Island waters during 1993 (Mills 1994). Based on this, anglers released an estimated 45% of the pink salmon they caught fishing Adak Island waters during 1993.

The sport harvest of coho salmon from Adak Island waters during 1993 (411) was about 760 fish below average (Table 23). This harvest accounted for 2% of the total coho salmon harvest from KMA waters during 1992. In addition to the harvest of 410 coho salmon from Adak Island waters during 1993, an additional 260 coho salmon were estimated to have been caught and released by sport anglers fishing Adak Island waters during 1993 (Mills 1994). Based on this, anglers released an estimated 38% of the coho salmon they caught fishing Adak Island waters during 1992.

The sport harvest of sockeye salmon from Adak Island waters during 1993 (1,630) was 380 fish above average. This harvest accounted for 15% of the total sockeye salmon harvest from KMA waters during 1993. Anglers released 384 or 19% of the sockeye salmon they caught.

Recent Board of Fisheries Actions

There have been no specific actions taken by the Board of Fisheries in recent years regarding this fishery.

Current Issues

As mentioned under the section on Dolly Varden the Adak Naval station is undergoing a 93% reduction in personnel. The number of angler days expended on Adak in 1993 was 3,050. This is the lowest number since 1985 and less than one-half the average (1985-1993). The reduction of angler effort in 1993 could explain the below average catches. Angler effort is expected to decrease significantly during the 1994 fishery and is expected to decline further during the 1995 season.

Ongoing Research and Management Activities

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

Recommended Research and Management Activities

No specific 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.

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 and their nearby land masses (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.

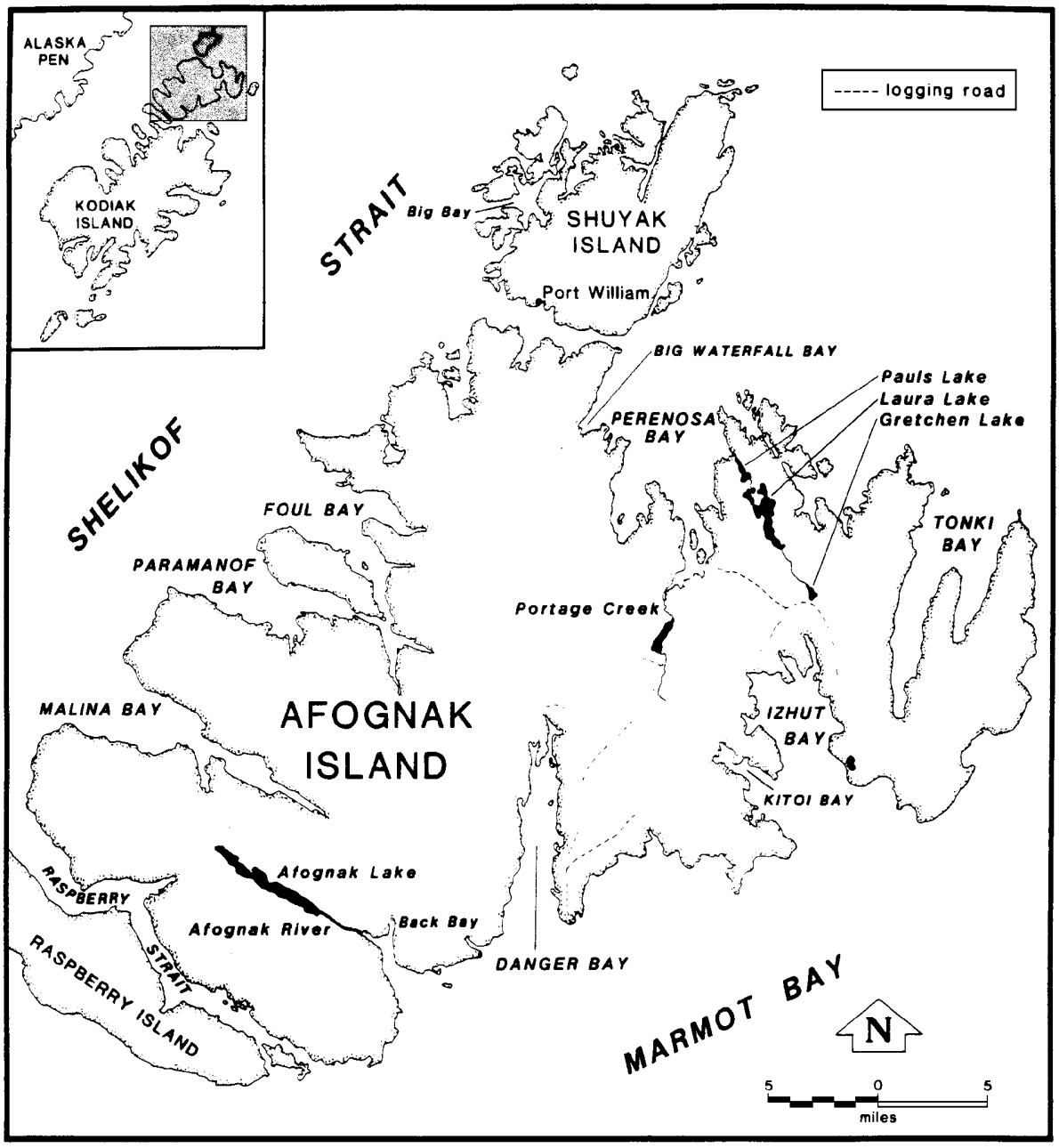

Figure 8.-Afognak/Shuyak Islands and surrounding waters.

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) greater than 20 inches is 5, and for fish under 20 inches 10.

From 1986 through 1993, the waters of the Afognak/Shuyak Island area accounted for an average harvest of 3,190 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 1,324 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 mail 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 harvested an estimated 3,010 coho. An estimated 1,106 coho were released (Schwarz and Sonnichsen 1991).

The 1990 harvest estimated for Afognak Lagoon of 3,010 coho compares with a mail survey estimate for the entire Afognak/Shuyak Island area of 3,096. Again, these two estimates cannot be compared because the creel survey estimate is just for a portion of the total Afognak/Shuyak Island area. However, the closeness of these two estimates shows that the mail survey 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 1993 (2,746) was about average (Table 24). This harvest accounted for 12% of the total coho salmon harvest from KMA waters during 1993. In addition to the harvest of 2,746 coho salmon from Afognak/Shuyak Island waters during 1993, an additional 1,620 coho salmon were estimated to have been caught and released by sport anglers fishing Afognak/Shuyak Island waters during 1992 (Mills 1993). Based on this, anglers released an estimated 37% of the coho salmon they caught fishing Afognak/Shuyak Island waters during 1993.

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

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level commensurate with the ability of the fishery resource to support.

Table 24.-Harvest of coho salmon from Afognak/Shuyak Islands waters of the Kodiak Management Area, 1986-1993.

Year	KMA Harvest	Afognak/Shuyak Islands Harvest	Afognak/Shuyak Islands % 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
MEAN	18,085	3,186	19

Table 25.-Creel survey statistics for selected sport fisheries for coho salmon on Afognak and Shuyak Islands, 1987, 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	1,016
1990	Afognak Lagoon	3,700 [a]	3,010	

[a] Angler hours

RECENT BOARD OF FISHERIES ACTIONS

The most recent action affecting this fishery occurred in 1987 when the Alaska Board of Fisheries reduced the bag and possession limit for salmon (other than chinook) from 6 daily and 12 in possession to 5 and 5, respectively.

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. Given such findings, we do not recommend continuing these programs.

Marka Bay on Afognak Island supports a small but popular coho 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 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 (Red) rivers 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 is at the confluence of the Ayakulik and Bare Creek. The Karluk and Ayakulik rivers support the native stocks of steelhead trout and all five species of 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 weir counts for selected rivers on Afognak and Shuyak Islands, 1985-1994

	River									
	Afognak		Pauls Bay		Portage Creek		Big Bay[a]		Bear Creek	
Year	# 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		28-Sep		3-Sep						
1987	5,081	24-Sep	9,403	11-Sep	3,710	20-Sep			833	23-Sep
1988		9-Sep		3-Sep	2,354	4-Sep		2-Oct	967	6-Sep
1989	9,772	20-Sep	5,563	10-Sep	5,928	28-Aug	1,771	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		18-Sep		6-Sep			2,065	26-Sep	Not operated	
Average	11,965		12,538		4,067		1,886		1,023	

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

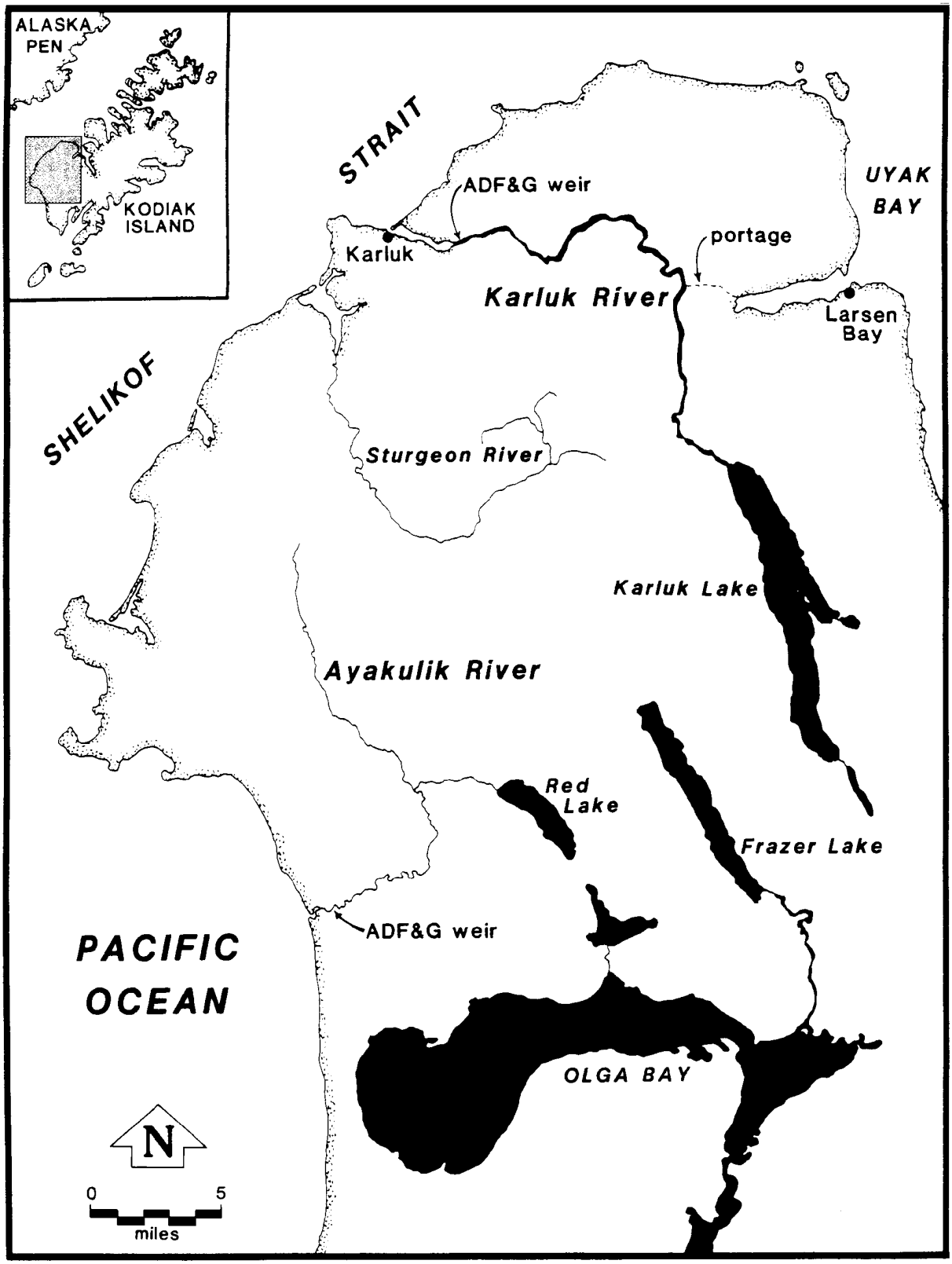

Figure 9.-The Karluk and Ayakulik rivers.

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 mid-October. 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 1993, sport anglers have harvested an average of 90 and 60 steelhead trout from Karluk and Ayakulik River drainage waters, respectively (Table 27). This harvest has accounted for an average of 18% and 9% of the total KMA steelhead trout harvest from KMA waters over this period (Table 27). The Karluk River supports the largest fishery. However, the Ayakulik River is receiving more fishing pressure in recent years. Other sources of mortality for steelhead trout returning to these two rivers include: 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, 1995).

The annual return of steelhead trout entering the Karluk and Red rivers is not known because weirs 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 1994. Over these years the survival of steelhead from prespawn capture to postspawn weir emigration has averaged approximately 58% (Begich 1995). Kelt counts on the Karluk River have ranged from 210 to 4,910 over the past 14 years (Table 28). A 4-year trend of 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 977 fish since 1981 with a 1994 count of 1,150 fish (Table 28).

RECENT FISHERY PERFORMANCE

Sport harvest of steelhead trout from the Karluk and Ayakulik River drainage waters during 1993 was 189 and 0 fish, respectively (Table 27). These harvests accounted for 36% of the total steelhead trout harvest from KMA waters during 1993 (Table 27). The number of fish released on the Karluk during 1993 was 3,450 with 2,000 released on the Ayakulik.

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

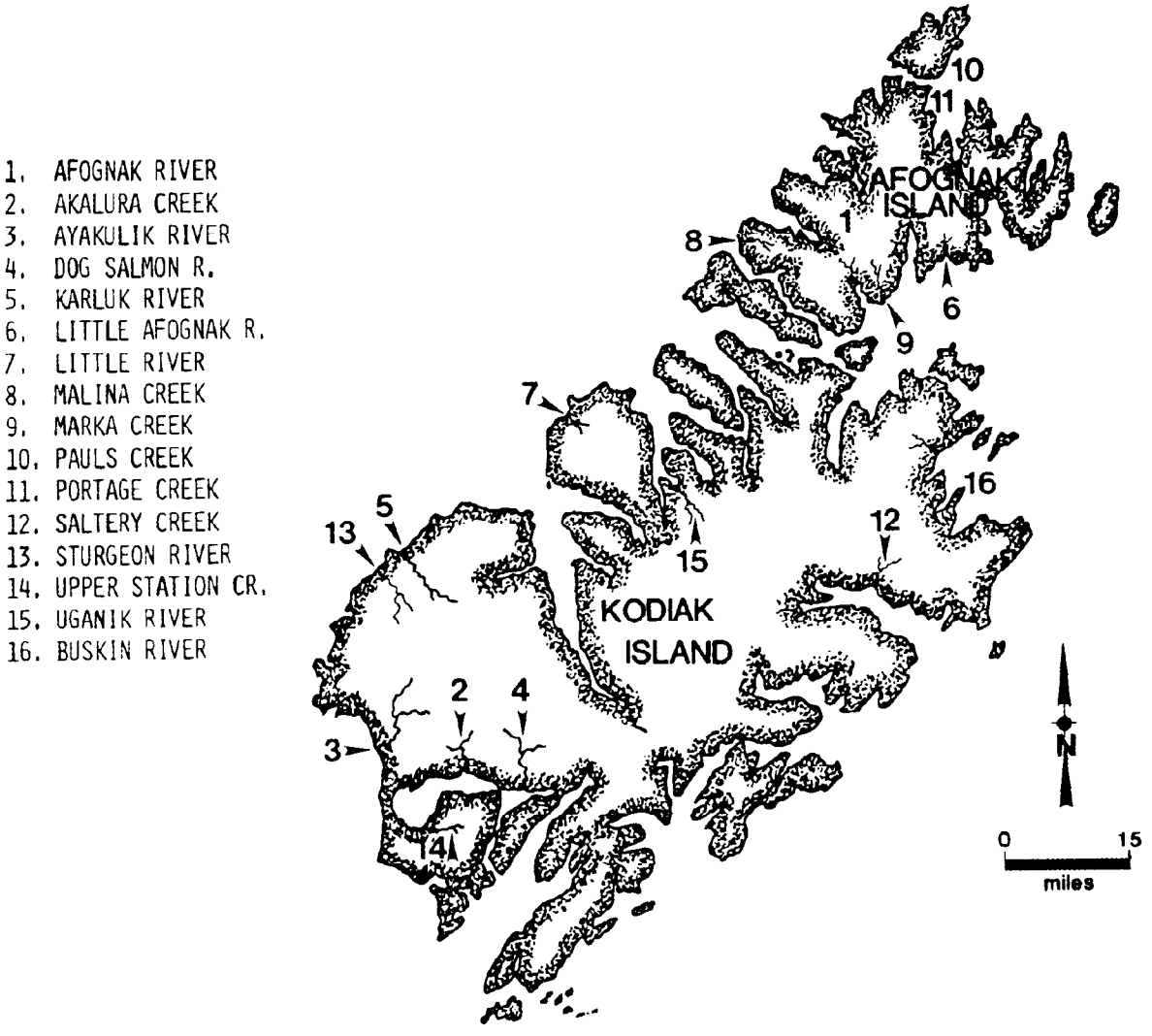

Figure 10.-Locations of steelhead trout stocks on Afognak and Kodiak Island.

Table 27.-Harvest of steelhead trout from the Karluk and Red (Ayakulik) River drainages, 1984-1993.[a]

	Catch		Karluk River		Red River		Total KRA[c]
Year	#Kelts	#Fall	Harvest	# Released	Harvest	# Released	Harvest
1984			150		49		696
1985			167		15		790
1986			0		0		321
1987			72		0		253
1988			18		91		853
1989			20		279		778
1990			86	1,053	17		1,120
1991			148	961	96	228	327
1992			40	898	16	418	96
1993		836 2,799	189	3,446	0	2,000	433
MEAN			89 [b]	1,590	56	882	576

[a] 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.

[b] Rainbow trout have not been added to the 1984-89 Karluk harvest.

[c] This harvest estimate is calculated by adding the steelhead reported in the statewide harvest survey under Saltwater total, Karluk, Red, Saltery, Other streams and other lakes. Rainbow trout reported in the Karluk and Red Rivers are also counted as steelhead. Steelhead reported under road-side lakes are considered as rainbow trout.

Table 28.-Counts of steelhead trout kelts from the Karluk and Red (Ayakulik) River drainages, 1981-1994.

Year	Karluk River	Red 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
MEAN	2,019	977

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 dictates a low retention rate.

Harvest, release and catch data were obtained by a creel census at the Karluk River from October 4 through November 1994. A total of 25 steelhead were harvested and 2,942 were released. Estimates of harvest and release at the Ayakulik River will be obtained from the statewide harvest mail survey and are not yet available at this time.

The Karluk River currently has the potential to generate one of the highest steelhead catches in the state of Alaska. Figure 11 shows that the catch of steelhead trout in the Karluk River increased markedly from 1992 to 1993 and produced the third largest steelhead trout catch in the state of Alaska during 1993. Similarly, catch at the Ayakulik increased from 434 fish in 1992 to 2,000 fish in 1993 (Table 27). 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.

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
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 1987 the Board of Fisheries adopted a proposal effective in 1988, which reduced the bag and possession limits for steelhead trout from 3 fish daily, 6 in possession over 20 inches, and 10 fish daily, 20 in possession under 20 inches; to 2 fish daily and in possession, only 1 of which may be 20 inches or more in length. This conservative action was taken to bring the management strategy for wild trout fisheries in the KMA in line with the strategy used to manage wild trout fisheries throughout southcentral Alaska. Additionally, in 1985, fishing for steelhead trout in flowing waters was closed from April 1 through June 14 to protect spawning fish.

The reduction in bag limit has resulted in less emphasis on utilizing steelhead trout as "table fare." The long-term benefit of this regulation will be the maintenance of high quality fisheries for steelhead trout. The spawning season closure protects adult fish during the critical spawning period.

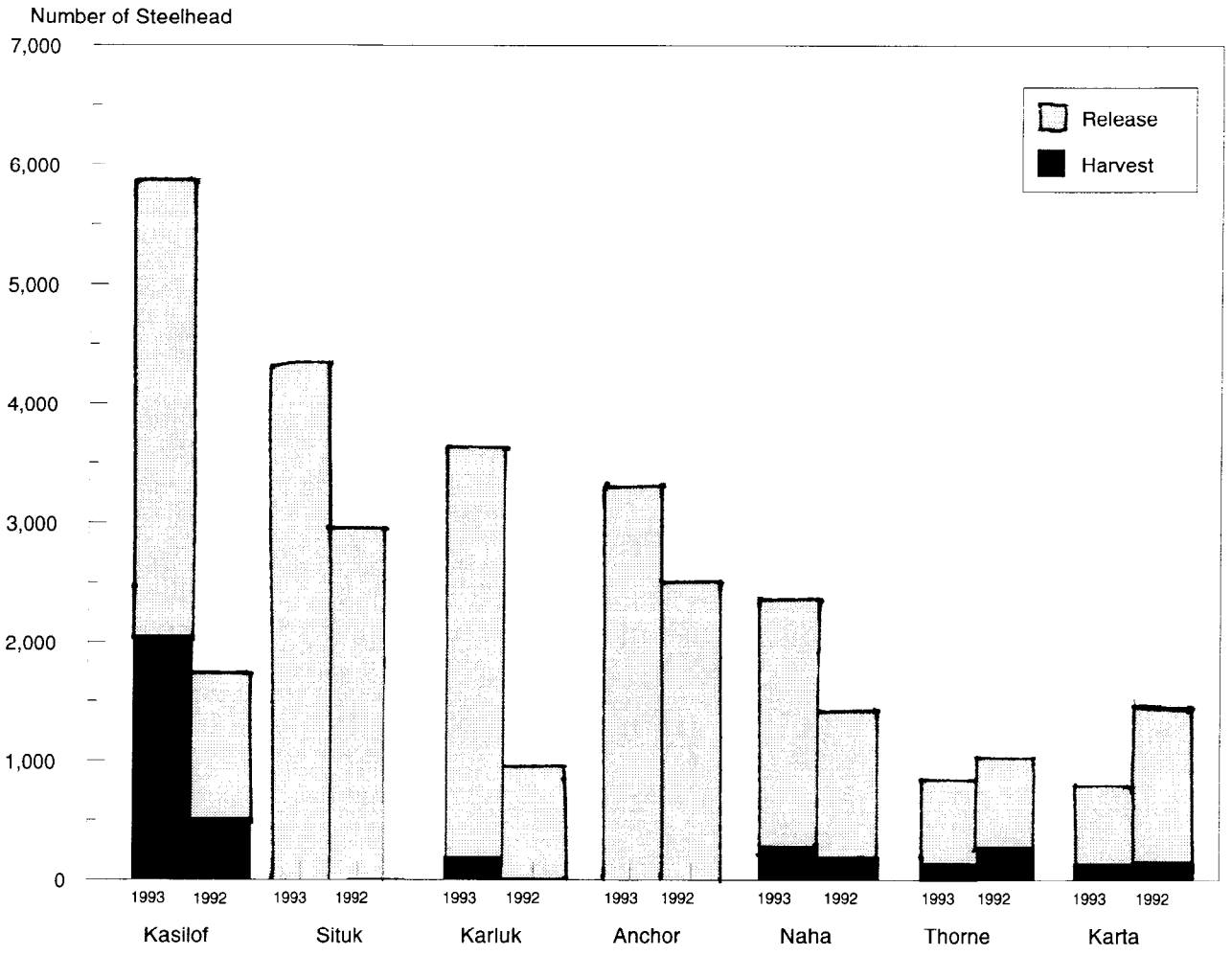

Figure 11.-Sport caught steelhead catches from Alaskan rivers reporting the highest catches during 1992 and 1993.

CURRENT ISSUES

Average kelt counts declined from 2,430 (1982-1985) to 450 (1986-1989) (Table 28). 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 1994 count of 4,910 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 396 steelhead trout since 1990. 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 gear type for subsistence fishing on Kodiak Island. Federal regulations do allow rod and reel as a legal 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. Therefore, the harvesting of steelhead from the Karluk River is 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 this 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. This regulation makes the Karluk Lagoon steelhead harvest legal.

Maintaining effective kelt emigration through salmon counting weirs is essential. 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 1993 on the Ayakulik.

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 from the 1991 and 1992 return years. This study was repeated in 1992 and 1993. In 1994 the study was expanded to include an onsite autumn angler survey. The complete results of the first 3 years of study are presented in Begich (1992, 1993, 1995). A summary of the important findings follows.

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 819 in 1991 and 417 in 1992 and 58 in 1993. During 1993 no sampling occurred after August 31 due to limited fishing periods and weak returns of salmon to the Karluk River. Contribution of repeat spawning steelhead of Karluk origin could not be estimated due to an insufficient number of tag

returns. However, it is probable that the steelhead catch is comprised of mixed stocks due to the proximity of other steelhead systems near the Karluk (Figure 9). 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 is increasing, and the number of released fish has increased from less than 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 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 were harvested with 273 released, 34 Dolly Varden harvested with 2,603 released and 5 sockeye salmon harvested with 162 released. This census provides minimum figures because it does not account for fish caught before October 4 or after November 10. However, relatively little fishing effort occurs for steelhead during this time. The census also did not occur in Karluk Lagoon. The Karluk Lagoon fishery mainly occurs in September and is concentrated on coho salmon, although some steelhead are also caught. Although the census was not a complete documentation it represents a very large percentage of the directed fall steelhead catch.

What the fall census does not provide is documentation of the June catch which occurs incidentally during the chinook salmon fishery. All of the individual responses to the statewide harvest survey for 1993 on the Karluk River were analyzed in the following way in order to separate the catch of fall steelhead from June kelts:

1. If an angler made one trip to the Karluk and caught steelhead and chinook salmon, the steelhead were assumed to be kelts.
2. If an angler made one trip to the Karluk and caught steelhead and coho salmon, the steelhead were assumed to be caught in the fall.
3. If an angler made more than one trip and caught steelhead and coho but no chinook, the steelhead were assumed to be taken in the fall.
4. If an angler made more than one trip and caught steelhead, chinook and no coho, then the steelhead were assumed to be taken as kelts in June.
5. If an angler catches no chinook or coho but reports over 10 steelhead, then the steelhead are assumed to be fall-caught.
6. If an angler catches no chinook or coho but reports under 10 steelhead, then the steelhead are assumed to be kelts caught in June.

The following results were achieved:

	June kelts	Fall steelhead
Statement 1:	77	
2:		263
3:		51
4:	50	
5:		123
6:	4	
	131	437

The 110 respondents reported catching 640 rainbow trout/steelhead. Applying the questions above to these respondents allowed determining the time of capture for 568 of these steelhead (89%). Fall-caught steelhead represented 77% of the determinable catch. If this percentage is applied to the 1993 estimated catch of 3,635 steelhead, then 77% (2,799) were caught in the directed fall fishery, and 23% (836) were caught incidentally during the June chinook salmon fishery.

The statewide harvest survey will provide estimates of the harvest and catch of steelhead in 1994. The 1994 fall census documented a catch of 2,942 steelhead. If the 1994 catch of kelts in June was the same as the 1993 estimate (836), the total 1994 catch should approximate at least 3,780. Angling effort during the directed fall fishery can be expected to increase as word continues to spread about the good fishing on the Karluk. Angling effort would have been greater during the fall of 1994 had it not been for strong predominant northwest winds which hampered access to the river. Subsistence harvest has been sporadically estimated since 1982. Harvests among the villages of Karluk and Larsen Bay have ranged from 17 to 697 fish. Since 1990 Larsen Bay residents have harvested an average of 396 steelhead trout per year. The average annual harvest by Karluk residents over this same time is 51 fish.

The estimated abundance of steelhead spawning in the Karluk River during 1992 was 4,107 (SE = 134) fish, 1993 7,026 (SE = 308) fish, and 9,116 (SE = 522) in 1994. From 1992 through 1993 the majority of the population has been composed of initial spawning fish, (78%, 87% and 81%, respectively). In all years, fish which are spawning for the second time have made up less than 20% of the spawning population (18%, 12% and 18%, respectively). Survival of steelhead trout from prespawn capture to weir emigration has decreased since 1992. The overall survival of spawning steelhead has averaged approximately 58%.

Sampling at the Ayakulik has been conducted during the 1993 and 1994 kelt emigration. During 1993 and 1994, 74% and 66%, respectively, of the emigrant population were initial spawning fish.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

The research program initiated during 1991 is scheduled to continue until July of 1996. Also, staff should actively participate in the land use planning in the Karluk and Ayakulik areas.

A fourth mark and recapture experiment to estimate the abundance of the spawning population at the Karluk River will occur in 1995. 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 after the project has ended.

Like the previous four years, during the autumn of 1994 selected commercial salmon fisheries near the Karluk River were sampled for the incidental harvest of steelhead trout. An estimate of steelhead bycatch is not available at this time. However, five tagged steelhead of Karluk origin were recovered during sampling. Therefore, an assessment of the contribution of repeat spawners of Karluk origin in the total estimated bycatch may be attainable. The commercial catch will again be sampled in 1995. In addition, October 1994 marked the commencement of an autumn creel census on-the-grounds to monitor the steelhead trout sport fishery at the Karluk River. This census will again be conducted in 1995 as effort is expected to increase.

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 a close proximity of 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, a sampler(s) would need to be stationed on a vessel(s) when the catch is landed. In addition, the mobile purse seine fleet in Kodiak waters numbers some 391 vessels, and monitoring the incidental kelt catch in selected areas would be difficult.

During 1992 the Karluk River generated the seventh highest steelhead catch in the state of Alaska and in 1993 it produced the third largest catch. The Karluk River steelhead fishery has been characterized by low angler participation and high catch rates. As public awareness of this fishery increases, so will angler participation, harvest and total catch. With increased steelhead trout abundance and public interest it will not be surprising if the Karluk River produces the largest steelhead trout catch in the state.

KARLUK AND AYAKULIK RIVERS CHINOOK SALMON FISHERIES

HISTORICAL PERSPECTIVE

The Karluk and Ayakulik (Red) 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 the weir located in the lower rivers. 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, if any, fish enter Red Lake. Spawning occurs from late July through late August. 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. Creel surveys were also conducted in both rivers during 1993 and 1994. 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 been 680 and 460 fish, respectively (Table 29). The largest estimated harvest was 1,630 in the Karluk River and 1,000 in the Ayakulik River, both made in 1993.

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 10,010 fish during the past 13 years (1981-1994), with individual year's totals ranging from 4,430 to 14,440 (Table 30). In the Ayakulik River, escapement of chinook salmon has averaged approximately 10,750 fish during the same period with individual year's totals ranging from 3,320 to 21,370 (Table 30). Based on these escapements, the exploitation rate of the inriver sport fishery has been low, averaging 7% in the Karluk and 4% in the Ayakulik.

RECENT FISHERY PERFORMANCE

Harvests of chinook salmon during 1993 from the Karluk and Ayakulik rivers were estimated by Mills at 1,630 and 1,000, respectively (Table 29). These are the largest harvests on record for each system. Escapement of chinook salmon into the Karluk and Ayakulik rivers during 1993 was 13,940 and 7,820 respectively (Table 30). In addition to the 1,630 chinook harvested in 1993 in the Karluk River, 6,734 were caught and released. In the Ayakulik, 4,420 were caught and released.

Harvest figures are not available from the statewide harvest summary for the 1994 season. However, a creel census was conducted on the Karluk River by the Sport Fish Division and documented a harvest of 896 chinook and a release of 4,339. Angler-days were estimated at 2,359. The Ayakulik River was completely censused in 1994 by the United States Fish and Wildlife Service (USFWS) documenting a harvest of 739 chinook and a release of 2,752. Angler effort was estimated at 1,533.

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 commensurate with the ability of the fishery resource to support. 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

The Board of Fisheries has taken no specific actions with respect to this fishery in recent years.

CURRENT ISSUES

Sport harvest has been a minor component of the chinook salmon resource exploitation (Table 30). Exploitation of the inriver escapement has averaged 7% on the Karluk and 4% on the Ayakulik. These rates have been increasing in recent years and were 12% and 13% on the Karluk and Ayakulik, respectively, in 1993. In 1994, the USFWS documented the third largest

Table 29.-Harvest of chinook salmon from the Karluk and Ayakulik (Red) River drainages, 1984-1993[a].

	Karluk River			Ayakulik River			
Year	Harvest	% of KMA	Number Released	Harvest	% of KMA	Number Released	Total Harvest
1983	304	24		145	11		449
1984	187	16		437	37		624
1985	472	42		76	7		548
1986	122	15		76	9		198
1987	199	20		126	13		325
1988	819	38		600	28		1,419
1989	559	25		390	18		949
1990	700	61	2,262	252	22	2,394	952
1991	1,599	58	3,119	563	20	2,191	2,162
1992	856	39	2,754	776	35	3,199	1,632
1993[b]	1,634	31	6,734	1,004 [c]	19	4,422	2,638
1994[d]	896				739		
MEAN	678	34	3,717	404	21	3,051	1,021

[a] Data in this table are from the Statewide harvest survey unless otherwise indicated.

[b] 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.

[c] 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.

[d] 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 29.

Table 30.-Escapement and harvest of chinook salmon in the Karluk and Ayakulik (Red) River drainages, 1981-1994.

Year	Escapement	Effort[a] (angler-days)	Harvest	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	4,566	1,634	--
1994	12,049			12
MEAN	10,012		677	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	6,894	1,004	--
1994	9,138			13
MEAN	10,754		404	4

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

harvest of 739 chinook, during a year when the weir count of chinook was below average (9,138). After the sport harvest is subtracted and an estimate is made for hook-and-release mortality (7%[2] of 2,752), the spawning escapement was 8,206. The 1994 spawning escapement in the Ayakulik was only 1,706 fish above the minimum escapement level of 6,500. The commercial fishery directly in front of the Ayakulik river mouth (256-25, 20, 10) has averaged a harvest of 4,668 chinook salmon since 1990. The smallest harvest occurred in 1993 when 3,087 chinook were harvested. Had a commercial fishery occurred, it is likely that minimum escapement objectives would not have been met unless the sport fishery would have been restricted. If sport fishing harvest increases, the sport fishery will have a larger influence on the overall exploitation of the chinook return. This is especially true during small returns and fish are still vulnerable to the sport fishery as demonstrated during the 1993 Ayakulik 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 sport fishery has never been issued for the Ayakulik or the Karluk. However, this may become necessary to achieve minimum spawning escapement levels during poor returns.

The division will be monitoring escapement levels through weir counts to ensure minimum escapements are met. As chinook returns receive more harvest from the commercial and sport fisheries, it is essential that escapement goals are established that will result in optimum returns and harvests. It appears that the current goals (Karluk 4,500-8,000, Ayakulik 6,500-10,000) are working well, as escapement within these ranges has 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.

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. Also there is a possibility that land along the Karluk 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.

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. In addition, biological data were collected from the escapement and sport harvest. USFWS, in a cooperative effort, collected the same information from the Ayakulik River. In addition, biological data were collected for the Chignik River escapement. Time of entry data for the Chignik River are presented in Appendix G6. The complete results will be presented in a Fishery Data Series report (Schwarz *In prep*).

Results for 1994 in the Karluk River indicated a harvest of 896 chinook with a release of 4,339. Fishing effort was estimated at 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 which documented a harvest of 200 chinook and 484 angler-days of effort.

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[2] Bendock 1991.

The Ayakulik River was completely censused in 1994 by USFWS documenting a harvest of 739 and a release of 2,752 chinook. Total fishing effort was 1,533 angler-days. The Karluk River chinook escapement was sampled at the weir trap. There were 258 chinook sampled. The two dominant age classes were 1.4 (59%) and 1.3 (19%). The sex ratio was 1.1 male/female. The average length was 811 mm for age 1.4 and 742 mm for age 1.3.

The Ayakulik River chinook escapement was also sampled at the weir trap. There were 258 chinook 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 weir escapement and from the Chignik Lagoon purse seine harvest. These data will allow brood tables to be constructed so that escapement goals can be refined.

Weight data should also be collected at the Karluk and Ayakulik weirs so that it could be used to access the degree to which immature chinook salmon were being harvested in the Karluk and Ayakulik areas. This information will be helpful when developing brood tables, enabling a more accurate apportionment of the west side commercial chinook salmon harvest to the Karluk and Ayakulik rivers.

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 exist (Appendix G4, 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 escapement objective. In order to achieve minimum spawning escapements, an inriver goal must be set so that after the sport fish removal occurs, a minimum spawning escapement will still be present.

The Karluk River will have an inriver goal of 5,700 chinook (4,500 minimum spawning goal + 900 sport fish harvest above weir + 300 hooking mortality). Using the time of entry data on 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 2,867 (5,700 x .503) should be obtained by June 17. If the weir count is below 2,867 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, and restrictions will be necessary to achieve minimum objectives. Restrictions may include reductions in bag limits, elimination of daily 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.

The inriver escapement goal for the Ayakulik River for the 1995 season is 7,500 (6,500 minimum spawning objective + 800 sport fish removal above the weir + 200 hooking mortality). Similar to the Karluk River, the time of entry data on the Ayakulik River (Appendix G5) indicated 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 3,730 chinook should have occurred by June 13. The 1995 sockeye forecast in the Ayakulik is expected to be at a 10-year record low. The 1994 forecast was less than 1% off, and the confidence in the 1995 forecast

is good. If a commercial sockeye fishery does not occur it is likely that the sport fishery will have to be restricted in order to achieve minimum spawning escapement goals.

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, in the remote portions of the Kodiak Regulatory Area are 5 per day, 5 in possession with no size limits. All fisheries for sockeye salmon are open year-round.

From 1985 through 1993, sport anglers have harvested an average of 820 sockeye salmon from Karluk drainage waters (Table 31). This harvest has accounted for an average of 11% of the total KMA sockeye salmon harvest over this period (Table 31). 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 1993 (1,570) was the highest on record (Table 31). This harvest accounted for 15% of the total sockeye salmon harvest from KMA waters during 1993. The sockeye harvest in the Ayakulik was 990 in 1993 and represented 9% of the KMA total harvest. Anglers released 82% of their catch in the Karluk and 83% of their catch in the Ayakulik.

Statewide harvest survey estimates of sport harvest or catch are not available for this fishery for 1994 at this time. However, the creel census on the Karluk and Ayakulik documented harvest of 127 and 568 for these two rivers, respectively. These harvest censuses ended July 10 so they do not provide documentation for the entire year.

RECENT BOARD OF FISHERIES ACTIONS

The Alaska Board of Fisheries took no specific actions with respect to this fishery during their last meeting.

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.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

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

Table 31.-Harvest of sockeye salmon from Karluk River drainage waters of the Kodiak Management Area, 1985-1993.

	KMA	Karluk River			Ayakulik River		
Year	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
MEAN	6,714	821	5,825	11	599	4,440	8

[a] A harvest of 337 and release of 460 sockeye salmon was documented on the Karluk River 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.

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 limit for rockfish is 10 and 20, respectively, and for lingcod 2 and 4. A season was also established for lingcod, from July 1 through December 31.

From 1986 through 1993 anglers have expended an average of about 25,000 angler-days 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%). In general, effort has been relatively stable over this period.

Since 1986, Kodiak road system and Afognak/Shuyak/Barren Island marine waters have supported 81% of the total harvest of halibut and 76% of the historical harvest of rockfish from KMA waters (Table 32). From 1986 through 1993, sport anglers have harvested an average of 5,140 halibut and 4,220 rockfish from Kodiak Road System marine fisheries (Table 32). This harvest has accounted for an average of 45% and 56% 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 4,100 halibut and 1,700 rockfish (Table 32). These harvests have represented just under 40% of the total harvest of halibut and nearly 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 1,740 fish. The Kodiak road system accounts for an average of 39% of the harvest, while the Afognak islands accounted for 19%.

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

RECENT FISHERY PERFORMANCE

Fishing effort in marine waters in 1993 totaled 41,760 angler-days in the Kodiak Regulatory area and 14,774 in the Alaska Peninsula/Aleutian Island Regulatory areas (Appendix J1). The amount of fishing effort directed at bottomfish can be estimated by assuming that because 44% of the marine catch was bottomfish, 47% of the marine fishing effort was targeted at bottomfish. The estimated fishing effort for bottomfish in the KMA was 24,875 angler-days (41,760 + 14,774 x 0.44).

The sport harvests of halibut and rockfish from Kodiak Road System marine fisheries during 1993 (6,385 and 5,340, respectively) were above average (Table 32). These harvests accounted for 36% and 64% of the total halibut and rockfish harvests, respectively, from KMA waters during 1993.

Table 32.-Harvest of halibut and rockfish from Kodiak Road System and Afognak/Shuyak/Barren Island waters of the Kodiak Management Area, 1986-1993.

	KMA	Kodiak Road System		Afognak/Shuyak/Barren Is.	
Year	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
MEAN	11,745	5,138	45	4,096	36
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
MEAN	7,742	4,220	56	1,695	20
LINGCOD					
1991	2,345	729	31	259	11
1992	1,753	709	40	484	28
1993	1,120	324	47	198	18
	1,739	654	39	314	19

The sport harvest of halibut from Afognak/Shuyak/Barren Island marine fisheries during 1993 (5,140) was above average while the sport harvest of rockfish during 1993 (780) was below average (Table 32). These harvests accounted for 29% and 9% of the total halibut and rockfish harvests, respectively, from KMA waters during 1993.

Effort and harvest estimates for marine bottomfish are not yet available for the 1994 season.

RECENT BOARD OF FISHERIES ACTIONS

Regulations were adopted by the Board of Fisheries which affected rockfish and lingcod. These regulations became effective in June of 1993 so they became effective 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. These regulations only apply to the Kodiak regulatory area and not to the Alaska Peninsula and Aleutian Islands Regulatory area.

CURRENT ISSUES

Concern was raised that several species of demersal rockfish were being overexploited in areas of high fishing pressure in the KRA. This is especially true for the waters of Chiniak Bay in which most of the area's harvest occurs and where a directed rockfish fishery developed in 1991. Managers believed that levels of commercial and sport harvests experienced during 1991 were not sustainable in that similar levels of harvest in other areas of Alaska have lead to over-exploitation 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 commercial rockfish harvest in 1993 from Chiniak/Marmot Bay (stat areas 525 805, 525 806, 525 731 and 525 733) was 23,705 pounds. The commercial harvest from Ugak Bay (stat area 525 701 was 23,422 pounds.

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 harvest patterns change and more fishermen choose to fish in waters close to the town of Kodiak, the 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 halibut harvest 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. Approximately 100,000 smolt are transported from Elmendorf fish hatchery to Kodiak each May. These fish were 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 the fish are smolt, they migrate to sea immediately after release. In 1994 90,700 smolt were shipped via ferry and released in good condition into Island Lake Creek (Table 9).

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 impossible. Based on sporadic observations and informal interviews from anglers who fished

Mill Bay regularly, it was estimated that the harvest of chinook at Mill Bay was approximately 50 fish. The 1992 statewide harvest survey estimated the harvest at 117 chinook.

RECENT FISHERY PERFORMANCE

In 1993 the harvest was estimated at 250 chinook from periodic observations. The statewide harvest survey for 1993 estimated the harvest at 219 chinook. During 1992 and 1993 chinook salmon were noted in the Buskin River (15-30 fish each year). These fish were probably a result of stray fish from the Mill Bay chinook stocking project. In 1993 the Buskin River was open to sport fishing for chinook salmon in order to harvest these chinook. (Chiniak Bay streams are closed to chinook salmon fishing. No natural runs exist in Chiniak Bay). If straying continues, the Buskin River should continue to be open, either by emergency order or by permanent regulation, so that these stocked fish can be harvested.

In 1994 the chinook harvest was estimated at 50 chinook based on sporadic observations. Estimates from the statewide harvest survey for 1994 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. The return of adults over the past several years indicates 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 should be made to increase the return of adult chinook so that the desired fishery will develop.

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 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 are 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 exist for increasing the return of adult chinook and include 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. Finally, the Buskin River provides a large area for anglers to fish from, helping

to reduce crowding. The Division is currently pursuing a change in release location to the Buskin River for the 1995 smolt release.

Snagging in salt water is currently legal. A group of anglers were disappointed with the quality of the chinook harvest at Mill Bay Beach because they believed fish were harassed by snagging tackle and would not bite. These anglers petitioned the Board of Fisheries to adopt an agenda change which would address this concern. No proposals were submitted addressing this issue because the proposal deadline was in April, and the first fishable return of chinook did not return until June so the problem was not noted until after the proposal deadline. The Board of Fisheries did not accept the agenda change to consider this issue because a conservation issue was not involved. The Kodiak area will be open for regulation changes again in 1995. Conflicts between snaggers and nonsnaggers are expected to increase as the fishery develops. A similar problem occurs in the same area for the hatchery return of coho salmon.

CHINIAK BAY CHINOOK SALMON

HISTORICAL PERSPECTIVE

Chiniak Bay is a feeding area for chinook salmon as they grow and mature at sea. These chinook have been harvested in the past in small numbers, often incidentally when anglers are fishing for halibut or rockfish (Table 33). In 1992 anglers began to target on these chinook by trolling. The harvest estimate for the 1992 season is 350 chinook, significantly larger than the 1987-1990 average of 55. In 1993 the statewide harvest survey estimated the chinook harvest at 1,550 fish.

RECENT FISHERY PERFORMANCE

Anglers continued to troll for chinook in Chiniak Bay during the 1994 season. However, success was not as high as in 1993. Based on informal interviews with anglers and charter boat operators the harvest is likely to approximate 500 chinook, 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 feeding in Chiniak Bay waters. The commercial harvest of chinook in the Kodiak area also decreased from 42,000 to 23,000 during 1993 and 1994, respectively. The commercial harvest of chinook is a nondirected incidental harvest which occurs when fishing for other species and probably represents an index of chinook 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 decreased in 1994 is also unclear. However, the abundance of chinook 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

Table 33.-Sport fish harvest of chinook salmon from the marine waters of Chiniak Bay 1987-1993.

Year	Harvest
1987	18
1988	73
1989	84
1990	44
1991	188
1992 [a]	346
1993 [b]	1,548

[a] Does not include 117 chinook harvested in Mill Bay/shoreline of Chiniak Bay. These fish are returning adults from a department stocking project.

[b] Does not include 219 chinook harvested in Mill Bay/shoreline of Chiniak Bay.

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 which depends 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 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 Tables 34 and 35. Attempts were made to sample the sport harvest from charter and private vessels when they returned to harbor. In addition, marked department totes were left at the harbor for collection of sport caught halibut, rockfish, lingcod and salmon carcasses. Chinook carcasses left in these totes where 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 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/Canadian border.

OTHER FISHERIES

Several smaller fisheries for other species also occur in the KMA. These include fisheries for wild rainbow trout and 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. Physical size 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 steelhead and rainbow trout. In 1993 an estimated 2,750 rainbow trout were caught, and 128 were harvested from wild populations located within the Kodiak Island Archipelago.

Table 34.-Chinook salmon examined for the presence of coded wire tags from the Chiniak Bay sport fishery harvest 1994.

Date	# Chinook Observed	# Chinook with CWT	Catch area	CWT Release location/TAG CODE
28-May	3	1	Cape Chiniak	MASSET B.C. 02-05-17
30-Jul	4	0	Cape Chiniak	
30-Jul	1	0	Cape Chiniak	
2-Aug	1	0	Buoy 4	
5-Aug	14	0	Chiniak Bay	
7-Aug	1	0	Chiniak Bay	
11-Aug	2	0	Cape Chiniak	
12-Aug	6	0	Buoy 4	
13-Aug	6	0	N.W. District	
14-Aug	4	0	Chiniak Bay	
15-Aug	3	2	Cape Chiniak	Kitimat B.C. 18-04-31 SNOOTLI B.C. 02-15-23
17-Aug	2	0	Cape Chiniak	
18-Aug	1	0	N.W. District	
19-Aug	2	0	Chiniak Bay	
19-Aug	1	0	Buoy 4	
24-Aug	5	0	N.W. District	
27-Aug	2	0	Chiniak Bay	
28-Aug	6	0	Chiniak Bay	
29-Aug	2	0	Chiniak Bay	
30-Aug	5	0	Chiniak Bay	
1-Sep	1	0	N.W. District	
2-Sep	2	0	Chiniak Bay	
3-Sep	2	0	N.W. District	
7-Sep	3	0	N.W. District	
8-Sep	9	0	Chiniak Bay	
8-Sep	1	0	Buoy 4	
8-Sep	1	0	N.W. District	
9-Sep	2	0	N.W. District	
9-Sep	2	0	Chiniak Bay	
9-Sep	6	0	Buoy 4	
11-Sep	12	0	Buoy 4	
Total	112	3		

Table 35.-Age composition by age and mean length at age for chinook salmon in the Kodiak marine sport fishery, 28 June through 11 September 1994.

	Age									
	0.4	1.1	1.2	1.3	1.4	1.5	2.2	2.3	2.4	Total
Females:										
Sample Size	0	0	5	13	1	1	0	0	0	20
Percent			7.9	20.6	1.6	1.6				31.7
SE Percent			3.4	5.1	1.6	1.6				5.9
Mean length			681	762	875	761				759 [a]
SE mean length			19	14						12 [a]
Minimum length			643	635	875	761				635 [a]
Maximum length			741	813	875	761				875 [a]
Males:										
Sample Size	0	1	3	10	1	0	0	0	0	15
Percent		1.6	4.8	15.9	1.6					23.8
SE Percent		1.6	2.7	4.6	1.6					5.4
Mean length		512	709	813	916					789 [b]
SE mean length			10	20						23 [b]
Minimum length		512	691	735	916					512 [b]
Maximum length		512	726	931	916					931 [b]
All:										
Sample Size	0	1	11	47	2	1	0	1	0	63 [c]
Percent		1.6	17.5	74.6	3.2	1.6		1.6		100
SE Percent		1.6	4.8	5.5	2.2	1.6		1.6		0
Mean length		512	678	802	896	761		771		779 [d]
SE mean length			13	9	21					9 [d]
Minimum length		512	590	635	875	761		771		512 [d]
Maximum length		512	741	931	916	761		771		931 [d]

[a] Includes 8 fish for which age was not estimated.

[b] Includes 4 fish for which age was not estimated.

[c] Includes a total of 28 fish for which sex was not recorded.

[d] Includes 47 fish for which sex was not recorded and age was not estimated.

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 of wild rainbow trout from the waters from 1979 through 1992 has been 1,802 in the Kodiak regulatory area and 325 from the Alaska Peninsula/Aleutian Islands regulatory area. In addition, approximately 20 roadside lakes are stocked along the Kodiak road system. The catch of rainbow trout from these lakes in 1993 was estimated by Mills at 1,040 with a harvest of 100 fish (Appendix J).

ARCTIC GRAYLING

Arctic grayling are 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. The statewide harvest survey provides estimates of harvest. However, these estimates are based on very few questionnaire respondents so the estimates are not very precise. The estimates listed in Appendix A13 reflect these small harvests. The harvest in 1993 was 16 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 incidental to other salmon species. An average of only 1,200 chum salmon have been harvested per year by sport anglers from KMA waters from 1977 through 1993 (Appendix A11). Most (72%) of the annual chum salmon harvest has occurred in the waters of the Kodiak Regulatory Area.

CLAMS

From 1977 through 1992, the average harvest of razor clams has been 4,027, 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 1993, the average harvest of other fish in the Kodiak management area has been 5,920 (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, 1977-1993

Appendix A1.-Number of Dolly Varden/Arctic char harvested by sport anglers fishing Kodiak Management Area waters, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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		72	11,966	38	2,441	13	17,075	88	19,516	62
1982	36,065	4,695	38	8,564	62	12,294	34	5,931	25	17,840	75	23,771	66
1983	30,192	2,843	26	7,599	74	10,753	36	3,934	20	15,505	80	19,439	64
1984	28,528	1,536	28	7,910	72	5,436	19	4,814	21	18,278	79	23,092	81
1985	22,562	659	13	3,900 4,387	87	5,046	22	2,291	13	15,225	87	17,516	78
1986	26,459	2,069	36		64	5,802	22	6,375	31	14,282	69	20,657	78
1987	15,831	2,083	30	3,733	71	7,068	45	2,299	26	6,464	74	8,763	55
1988	22,592	2,148	55	4,985	45	3,929	17	8,004	43	10,659	57	18,663	83
1989	18,635	1,392	32	1,781	68	4,369	23	2,771	19	11,495	81	14,266	77
1990	21,052	2,524	37	2,977	63	6,817	32	6,042	42	8,193	58	14,235	68
1991	21,418	3,920	47	4,293	53	8,336	39	2,996	23	10,086	77	13,082	61
1992	11,525	1,810	44	4,416	56	4,136	36	1,540	21	5,849	79	7,389	64
1993	10,008	1,677	45	2,326	55	3,709	37	1,644	26	4,655	74	6,299	63
MEAN [a]	23,130	2,366	36	2,032	64	6,476	29	3,721	22	12,935	76	16,654	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 A2.-Number of pink salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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
MEAN [a]	20,554	4,177	54	3,385	46	6,637	32	5,852	41	8,066	59	13,917	68

[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, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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		57	1,112	10	4,449	42	6,135	58	10,584	91
1982	14,627	491	38		62	1,298	9	6,612	50	6,717	50	13,329	91
1983	9,678	943	51	637	49	1,855	19	2,025	26	5,798	74	7,823	81
1984	15,892	1,059	83	807	221 17	1,280	8	6,945	48	7,667	53	14,612	92
1985	15,032	523	37	912	63	1,407	9	6,209	46	7,416	54	13,625	91
1986	25,458	1,062	23		77	4,585	18	9,220	44	11,653	56	20,873	82
1987	19,402	1,567	63	884 3,523	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		41	3,898	16	5,338	27	14,464	73	19,802	84
1990	20,065	1,360	22	1,610	79	6,337	32	5,916	43	7,812	57	13,728	68
1991	21,327	1,045	29	4,977	71	3,636	17	6,790	62	10,901	62	17,691	83
1992	16,540	1,099	38	2,591	62	2,872	17	5,640	41	8,028	59	13,668	83
1993	22,693	965	66	1,773	34	1,452	6	7,877	37	13,364	63	21,241	94
MEAN [a]	15,890	1,032	46	487 1,57	54	2,243	14	5,410	40	8,237	60	13,648	86

[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 water, 1977-1993.

		Alaska Peninsula & Aleutian Island		Kodiak Island	
	KMA				
Year	Total	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
MEAN	9,294	1,369	12	7,738	88

Appendix A5.-Number of sockeye salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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		1,058	72	419	28	1,477	33	1,079	35	1,976	65	3,055	67
1983	4,532	2,438	534	42	754	59	1,288	29	986	31	2,164	69	3,150	71
1984	6,358	913	94		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	60 800	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		2,198	84	433	17	2,631	30	1,019	16	5,203	84	6,222	70
1989	8,853	13,173	5,147	81	1,237	19	6,384	49	1,606	24	5,183	76	6,789	52
1990		1,181	55	987	46	2,168	26	1,985	33	4,071	67	6,056	74
1991	8,224	1,287	64	721	36	2,008	29	960	19	4,089	81	5,049	72
1992	7,057	1,470	68	698	32	2,168	26	1,299	21	4,941	79	6,240	74
1993	8,408	10,507	1,976	74	682	36	2,658	25	1,968	25	5,881	75	7,849	75
MEAN [a]	6,330	1,335	59	733	41	1,858	30	1,116	26	3,356	74	4,472	70	

[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, 1977-1993.

		Alaska Peninsula & Aleutian Island		Kodiak Island	
Year	KMA Total	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
MEAN	6,041	811	10	5,230	90

Appendix A7.-Number of clams harvested by sport anglers fishing KMA waters, 1977-1993.

	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
MEAN	4,027

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

	Rainbow Trout Stocked Lakes[a]		Rainbow Trout Wild Populations[b]		Steelhead Fresh water[c]	
Year	Caught	Harvested	Caught	Harvested	Caught	Harvested
1989		777		807		489
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

[a] Listed under roadside lakes in the statewide harvest survey. Steelhead are considered as rainbow.

[b] Listed under other streams, other lakes, Buskin, Pasagshak and Saltery Rivers in the statewide harvest survey. Only fish reported as rainbows are counted as rainbows.

[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, 1977-1993.

		Alaska Peninsula & Aleutian Island		Kodiak Island	
	KMA				
Year	Total	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
MEAN	1,758	913	43	894	57

Appendix A10.-Number of chinook salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1993.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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		73	475	38	194	25	595	75	789	62
1982		1,351	93	105	7	1,456	57	167	15	953	85	1,120	44
1983	2,576	1,295	493	87	346 13	566	44	198	27	531	3	729	56
1984	1,196	112	41		59	275	23	210	23	711	77	921	77
1985	1,133	0	0	73	371 100	371	33	162	21	600	79	762	67
1986	830	0	0	163	310	100	310	37	168	32	352	68	520
1987	1,002	42	7		581	93	623	62	54	14	325	86	379
1988	2,153	31	5		558	95	589	27	145	9	1,419	91	1,564
1989	2,226	234	21			80	1,139	51	120	11	967	89	1,087
1990	1,156	140	88			13	160	14	66	7	930	93	996
1991	2,752	56	23	905	168	77	244	9	198	8	2,310	92	2,508
1992	2,671	210	46	20		54	454	17	585	26	1,632	74	2,217
1993	5,738	147	23			67	646	11	2,454	48	2,638	52	5,092
MEAN [a]	1,735	226	36	244 499		64	529	37	290	18	915	82	1,206

[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, 1977-1993.

		Alaska Peninsula /Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	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		37	529	45	151	24	486	76	637	55
1982	2,567	472	38		62	1,243	48	639	48	685	52	1,324	52
1983	963	0	0	194	147 100	147	15	462	57	354	43	816	85
1984	1,609	126	44	771	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	162	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		104	34		67	310	33	225	36	406	64	631	67
1990	412	0	0		221 100	221	54	36	19	155	81	191	46
1991	941 1,612	0	0	206	95 100	95	6	417	27	1,100	73	1,517	94
1992	913	273	95		5	288	32	92	15	533	85	625	68
1993		282	100		0 0	282	36	252	50	252	50	504	64
MEAN [a]	1,203	127	32	15	70	331	28	334	39	538	62	872	72
	786			146									

[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[a], 1977-1993.

	Kodiak Island Regulatory Area				
	Salt Water		Fresh Water[b]		Area Total
Year	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
MEAN	176	30	316	70	492

[a] No significant harvest occurs in the Alaska Peninsula/Aleutian Island Regulatory area. All reported harvest is from the Kodiak Island Regulatory area.

[b] 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, 1977-1993[a].

	Kodiak Island
	Harvest
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
MEAN	196

[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, 1977-1993.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			GRAND TOTAL
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
MEAN	6,175	97	474	6,746	1,027	12,030	19,803
ODD MEAN	5,484	4	94	5,583	919	13,133	19,636
EVEN MEAN	6,951	201	902	8,057	1,148	10,790	19,991

Appendix B2.-Commercial harvests (thousands of fish) of coho salmon from KMA waters, 1977-1993.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			GRAND TOTAL
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
MEAN	259	156	0	415	150	207	772

Appendix B3.-Commercial harvests (thousands of fish) of sockeye salmon from KMA waters, 1977-1993.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			GRAND 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
MEAN	2,116	1,976	8	4,102	1,572	2,369	8,041

Appendix B4.-Commercial harvests (thousands of fish) of chinook salmon from KMA waters, 1977-1993.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			GRAND TOTAL
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
MEAN	9	17	0	27	5	10	41

Appendix B5.-Commercial harvests (thousands of fish) of chum salmon from KMA waters, 1977-1993.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			GRAND TOTAL
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
MEAN	1,220	347	8	1,686	200	884	2,770

APPENDIX C. COMMERCIAL SALMON HARVESTS WITHIN THE KODIAK ROAD SYSTEM ZONE 1980-1994

Appendix C1.-Commercial harvest of salmon from stat areas along the Kodiak road system, 1980-1994.

	1980					1983				
STAT AREA	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 (Woman's 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 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

	1981					1984				
STAT AREA	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 (Woman's 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 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

	1982					1985				
STAT AREA	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 (Woman's 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 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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	1986					1989				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	1,522	77	24,694	1,320					
22 (Woman's Bay)	3	106	1,065	48,689	6,463	EXXON VALDEZ OIL SPILL/				
23 (Middle Bay)	0	1	71	629	2,073	NO COMMERCIAL HARVEST				
24 (Kalsin Bay)	0	3	447	15,333	1,185					
25 (Chiniak Pt.)	0	0	0	0	0					
21 (Outer)	0	214	181	12,955	182					
Chiniak Bay Total	3	1,846	1,841	102,300	11,223					
259-41 (Pasagshak/ Saltery)	130	16,203	1,189	1,036	3,217					

	1987					1990				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	3,251	916	30,959	2,492	0	0	0	4,311	30
22 (Woman's Bay)	1	256	2,334	136,068	9,463	2	17	1	3,157	1,242
23 (Middle Bay)	1	147	359	52,766	9,311	4	3	1	7,689	2,033
24 (Kalsin Bay)	16	17	3,310	36,654	6,183	11	0	7	10,847	556
25 (Chiniak Pt.)	0	1	235	5,665	139	0	0	0	0	0
21 (Outer)	1	16	6,330	14,555	1,822	10	494	91	5,436	1,822
Chiniak Bay Total	19	3,688	13,489	276,657	29,410	27	514	100	31,440	5,683
259-41 (Pasagshak/ Saltery)	202	3,405	9,425	5,962	5,408	410	12,595	46	5,870	2,508

	1988					1991				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	6	244	319	89,121	3,616	0	92	73	350	30
22 (Woman's Bay)	6	92	254	118,140	17,290	2	16	15	21,781	1,143
23 (Middle Bay)	13	8	89	26,493	19,966	7	1	4	23,261	4,391
24 (Kalsin Bay)	61	89	1,773	59,461	10,148	49	534	178	68,380	3,671
25 (Chiniak Pt.	23	9	345	38,691	11,973	218	13,153	5,630	86,842	14,291
21 (Outer)	26	289	1,349	87,339	8,687	7	609	607	95,824	3,691
Chiniak Bay Total	135	731	4,129	419,245	71,680	283	14,405	6,507	296,438	27,217
259-41 (Pasagshak/ Saltery)	10	2,747	2,787	794	6,802	180	6,787	94	20,143	5,885

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1992

STAT AREA	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	1,625	97	760	196
22 (Woman's Bay)	0	0	0	138	17
23 (Middle Bay)	0	0	0	567	392
24 (Kalsin Bay)	0	0	0	57	0
25 (Chiniak Pt.)	144	48,228	6,604	32,028	15,223
21 (Outer)	15	3,086	369	2,021	1,184
Chiniak Bay Total	159	52,939	7,070	35,571	17,012
259-41 (Pasagshak/ Saltery)	27	5,900	222	1,992	3,751

1993

STAT AREA	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	0	0	0	0
22 (Woman's 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 Bay Total	45	6,841	1,633	448,882	2,994
259-41 (Pasagshak/ Saltery)	281	34,638	714	107,668	599

1994

STAT AREA	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	19	649	38,793	141
22 (Woman's 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 Bay Total	281	3,888	3,624	91,787	18,631

APPENDIX D. SUBSISTENCE SALMON HARVESTS WITHIN THE KODIAK ROAD SYSTEM ZONE 1980-1993

Appendix D1.-Subsistence harvests of salmon from locations along the Kodiak road system, 1980-1993.

	1980					1983				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	68	138	11	0	37	11	36	14
Woman's 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)				

	1981					1984				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	15	5	95	32	0	45	156	42	8
Woman's 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)				

	1982					1985				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	76	31	3	0	67	113	62	2
Woman's 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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1986

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	114	138	58	9
Woman's Bay	5	0	60	33	0	1
Middle Bay	2	0	0	2	14	0
Kalsin Bay	15	0	29	312	23	35
Buskin River	362	7	5,303	2,585	934	110
Chiniak	7	0	4	90	49	20
Roslyn Creek	8	0	5	188	5	24
Isthmus Pt.	1	0	0	20	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	412	7	5,515	3,368	1,083	199
Saltery		0	199	91	1	0
Pasagshak		6	64	35	5	0

(Permits returned island wide 1,080 = 87%
Permits issued island wide 1,243)

1989

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	8	1	7	83	31	1
Woman's Bay	4	0	23	50	0	10
Middle Bay	0	0	0	0	0	0
Kalsin Bay	14	0	4	143	25	7
Buskin River	206	5	3,312	1,251	425	74
Chiniak	5	0	35	70	3	10
Roslyn Creek	10	0	10	262	5	42
Isthmus Pt.	2	0	0	6	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	249	6	3,391	1,859	489	144
Saltery		0	179	0	3	0
Pasagshak		0	78	28	22	1

(Permits returned island wide 687[b]

1987

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	16	0	23	133	109	20
Woman's Bay	1	0	0	4	12	7
Middle Bay	23	0	144	33	25	4
Kalsin Bay	18	0	80	379	50	27
Buskin River	300	61	3,375	1,743	541	75
Chiniak	2	0	50	25	2	10
Roslyn Creek	15	2	23	311	78	46
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	1	0	28	0	1	2
Chiniak Bay Total	376	63	3,695	2,633	817	189
Saltery		1	87	67	35	23
Pasagshak		9	82	51	13	15

(Permits returned island wide 969 = 86%
Permits issued island wide 1,124)

1990

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	15	0	20	167	22	22
Woman's Bay	8	0	67	36	9	9
Middle Bay	2	0	0	14	0	0
Kalsin Bay	20	1	4	379	61	48
Buskin River	291	8	3,448	1,785	325	91
Chiniak	6	0	112	26	36	3
Roslyn Creek	12	0	11	249	6	16
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	1	0	0	0	10	0
Chiniak Bay Total	355	9	3,662	2,656	469	189
Saltery	9	14	303	7	3	0
Pasagshak	35	3	598	60	11	15

(Permits returned island wide = 1,176[b]

1988

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	40	110	88	2
Woman's Bay	7	0	0	81	9	25
Middle Bay	0	0	0	0	0	0
Kalsin Bay	13	0	61	209	53	16
Buskin River	220	30	3,099	1,475	313	55
Chiniak	2	0	0	10	0	0
Roslyn Creek	9	1	0	299	44	37
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	263	31	3,200	2,184	507	135
Saltery		3	145	17	10	2
Pasagshak		0	84	0	11	9

(Permits returned island wide 663 = 60%
Permits issued island wide 1,098)

1991

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay		0	15	85	10	3
Woman's Bay		0	30	24	19	14
Middle Bay		0	0	60	3	6
Kalsin Bay		1	6	247	70	57
Buskin River		7	4,301	1,449	208	56
Chiniak		0	0	37	0	0
Roslyn Creek		0	0	160	39	17
Isthmus Pt.		0	0	0	0	0
Cliff Pt.		0	0	10	0	0
Chiniak Bay Total		8	4,352	2,072	349	153
Saltery		2	406	3	27	78
Pasagshak		2	1,645	216	60	10

(Permits returned island wide = 1,145)

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		1992				
AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay		5	31	202	27	0
Woman's 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
Woman's 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

[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 1980-1994

Appendix E1.-Coho salmon escapements[a] into streams along the Kodiak road system, 1980-1994.

	Monashka		Pillar		Buskin	
Year	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 b	27-Aug
					750 b	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 c	26-Oct
1986	172	17-Oct	44	17-Oct	9,589 c	2-Oct
					1,985	15-Oct
					1,493	30-Oct
1987	12	12-Nov	102	12-Nov	11,103 c	1-Oct
					559	29-Oct
1988	-	-	-	-	6,182 c	24-Sep
					600	25-Sep
1989	150 b	13-Sep	25	30-Aug	9,930 c	2-Oct
1990	53	23-Oct	45	23-Oct	6,222 c	26-Sep
					734	20-Oct
					1,604	31-Oct
1991	55	18-Sep	70	18-Sep	8,929 c	28-Sep
1992	2		300		6,535 c	7-Oct
1993	145	5-Oct	69	3-Oct	6,813 c	30-Sep
1994	1,749	27-Sep	199	28-Sep	8,146	29-Sep

	Sargent		Russian		Salonie	
Year	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 b	11-Sep	300 b	11-Sep
1985	87	28-Oct	358	28-Oct	30 b	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 b	3-Sep	50 b	3-Sep	98	22-Oct
1993	83	12-Oct	133	13-Oct	274	18-Oct
					253	31-Oct
1994					226	22-Sep

-continued-

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	American		Olds		Roslyn		Kalsin	
Year	Number of fish	Date	Number of fish	Date	Number of fish	Date	Number offish	Date
1980	903	30-Oct	780	28-Oct	628	27-Nov	240	6-Nov
1981	1,130 b	13-Oct	800 b	13-Oct	360 b	13-Oct	166	27-Oct
	627	30-Oct	434	29-Oct	314	22-Oct		
1982	360 b	7-Oct	645 b	7-Oct	240 b	7-Oct	133	27-Oct
	266	28-Oct	1,375	27-Oct	525	25-Oct		
1983	420 b	22-Sep	800 b	22-Sep	49	21-Oct	32	16-Nov
	114	25-Oct	173	25-Oct				
1984	350 b	11-Sep	4,500 b	22-Aug	76	6-Nov		
1985	65 b	20-Sep	900 b	20-Sep	150 b	5-Sep	450 b	5-Sep
	439	30-Oct	1,648	25-Sep	78 b	20-Sep	60 b	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		
			1,164	28-Oct	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 b	13-Sep	800 b	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 b	6-Sep	50 b	22-Aug	-	
			570	9-Sep	882	4-Oct		
1992	600 b	21-Sep	950 b	21-Sep	100 b	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				

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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 b	7-Nov
			1,330	20-Oct		
			1,330	20-Nov		
1981	170	2-Nov	320 b	21-Oct	720 b	21-Oct
					959	5-Nov
1982	155	25-Oct	175	27-Oct	400 b	7-Oct
					2,176	2-Nov
1983	25	21-Oct	1,500 b	23-Aug	700 b	9-Sep
			1,920	28-Oct		
1984	76	6-Nov	1,540	1-Nov	2,100 b	10-Sep
					520 b	6-Oct
1985	66	24-Sep	400 b	6-Sep	4,022 c	28-Sep
	86	28-Oct	3,000 b	29-Oct		
1986	48	20-Oct	1,998	14-Oct	11,009 c	12-Sep
			3,524	22-Oct		
			3,571	29-Oct		
1987	15	9-Nov	1,023	18-Oct	11,376 c	1-Oct
			2,519	13-Nov		
1988			2,000 b	23-Aug	4,702 c	12-Sep
1989			800 b	12-Sep	5,332 c	26-Sep
			1,800 b	13-Sep		
1990	48	5-Nov	303	15-Oct	2,847 c	17-Sep
			908	28-Oct	268	29-Oct
			2,178	15-Nov		
					187	4-Nov
1991	-		0	5-Oct	747 c	4-Sep
1992	-		3,000 b	3-Sep	1,000 b	21-Sep
			5	19-Oct		
1993			612	25-Oct	3,500 b	13-Sep
			1,337	6-Nov		
1994	-		-		2,173 c	22-Sep

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

[a] All unmarked estimates were documented on foot surveys.

[b] Aerial survey estimates.

[c] Weir counts.

APPENDIX F. PINK, SOCKEYE AND CHUM SALMON ESCAPEMENT COUNTS WITHIN THE KODIAK ROAD SYSTEM ZONE 1980-1994

Appendix F1.-Pink, sockeye, and chum salmon peak escapement[a] counts for streams along the Kodiak road systems, 1980-1994[b].

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 b		18,010 b	
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	18-Aug	11,783	

	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		

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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		

	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 c		1,890 c		43 c	
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

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	Miam				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		

[a] 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.

[b] Aerial surveys unless otherwise noted.

[c] 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.

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

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	1991		1992		1993		1994		1985-94
Date	No.	%	No.	%	No.	%	No.	%	Avg. %
20-May	0	0		0	0	0	0	0	0.1
21-May	0	0		0	0	0	0	0	0.1
22-May	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	0	0	0	0	0	0	0.2
25-May	0	0	0	0	0	0	0	0	0.2
26-May	0	0	0	0	0	0	0	0	0.2
27-May	20	0.2	2	7	0.1	0	0	0	0.3
28-May	35	0.4	3	7	0.1	0	0	0	0.4
29-May	35	0.4	4	7	0.1	0	0	0	0.4
30-May	154	1.6		7	0.1	69	0.7	0	0.7
31-May	154	1.6		7	0.1	120	1.3	0	0.8
1-Jun	165	1.7		11	0.1	138	1.4	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		9.3			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	912	1380	14.1	121	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		18.8			17.6	2628	27.6	1949	16.5	17.7
11-Jun		25.2			18	2936	30.8	2056	17.4	21
12-Jun	1844	27.7	1722		20.5	3428	36	2406	20.4	24
13-Jun	2469	35	1758		25.7	3929	41.2	2758	23.4	27.6
14-Jun	2710	42.2	2002		25.9	3995	41.9	3094	26.3	29.9
15-Jun	3431	48.3	2515		29.4	4016	42.2	3366	28.6	31.9
16-Jun	4135	48.4	2531		30.3	4308	45.2	3835	32.5	34.1
17-Jun	4730	48.9	2876		30.6	4661	48.9	3956	33.6	38.1
18-Jun	4744	51.3	2963		33.3	4860	51	4343	36.9	39.9
	4794		2988							
	5025		3251							

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	1985			1986		1987		1988		1989			1990 a	
Date		No.	%		No.	%	No.	%	No.	%		No.	%	No.	%
19-Jun			29.1			26.6	6579	51.8	4260	35.1			38	5504	52.3
20-Jun			30.5			27.9	6788	53.5	4344	35.8		7000	39.2	5648	53.6
21-Jun	5247		31.4	2378		29.2	7126	56.2	4708	38.8	6779		42	5907	56.1
22-Jun	5490		34	2495		30.5	7313	57.6	4924	40.5			43.3	6056	57.5
23-Jun	5658		35.2	2612		30.6	7912	62.3	5104	42	7500		44.3	6292	59.8
24-Jun	6124		41.5	2729		30.6	8435	66.5	5181	42.7	7732	8304	46.5	6444	61.2
25-Jun	6332		42.6	2731		31.7	8884	70	5250	43.2	7900		49.2	6852	65.1
26-Jun	7475		44.3	2733		32.9	9257	72.9	5564	45.8		9184	51.4	7010	66.6
27-Jun	7671		45.9	2835		33.8	9556	75.3	5750	47.3	8784		53.2	7050	67
28-Jun	7978		50.4	2937		34.7	9781	77.1	5758	47.4		9830	55.1	7122	67.6
29-Jun	8261		50.6	3019		36.4	9930	78.3	5945	49	9490	10173	57	7125	67.7
30-Jun	9075		51.1	3101		38.2	10005	78.8	5946	49		10436	58.5	7559	71.8
1-Jul	9121	10045	55.8	3256	3411	38.2	10008	78.9	5956	49		10839	60.7	7621	72.4
2-Jul	9208	10312	57.3	3411	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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	1991			1992		1993		1994		1985-94
Date		No.	%		No.	%	No.	%	No.	%	Avg. %
19-Jun			53.7			36.8	5237	55	4955	42.1	42
20-Jun			56			39.8	5395	56.6	5745	48.8	44.2
21-Jun	5255		58.4	3599		41.4	5654	59.4	6875	58.3	47.1
22-Jun	5485		59.8	3891		44.8	5801	60.9	7242	61.5	49.1
23-Jun	5715		60.4	4042		53.5	5879	61.7	7599	64.5	51.4
24-Jun	5856		62.1	4380		53.9	6132	64.4	8282	70.3	54
25-Jun	5914		63.2	5230		55.9	6308	66.2	8415	71.4	55.9
26-Jun	6080		65	5264		57.2	6401	67.2	8643	73.4	57.7
27-Jun	6194		65.5	5466		60.6	6577	69	8874	75.3	59.3
28-Jun	6368		66.1	5595		69.1	6666	70	9035	76.7	61.4
29-Jun	6413		66.5	5927		70	6684	70.2	9164	77.8	62.3
30-Jun	6473		67.8	6750		70.5	6699	70.3	9187	78	63.4
1-Jul	6510	6692	68.3	6841		70.6	6827	71.7	10001	84.9	65
2-Jul	6638	7040	71.9	6887		71.8	6865	72.1	10037	85.2	66.1
3-Jul		7184	73.4	6897		72	6906	72.5	10341	87.8	67.2
4-Jul		7265	74.2	7014		72.9	6911	72.5	10415	88.4	67.6
5-Jul		7342	75	7042		73.3	7003	73.5	10547	89.5	68.8
6-Jul		7402	75.6	7126		73.7	7004	73.5	10648	90.4	70.6
7-Jul		7480	76.4	7168		74	7015	73.6	10663	90.5	71.7
8-Jul		7503	76.6	7205		74.2	7047	74	10680	90.6	72
9-Jul		7599	77.6	7236		74.9	7067	74.2	10718	91	72.8
10-Jul		7614	77.7	7248		75.1	7070	74.2	10724	91	73.1
11-Jul		7680	78.4	7319		75.4	7135	74.9	11044	93.7	74
12-Jul		7688	78.5	7345		75.9	7202	75.6	11151	94.6	74.4
13-Jul		7693	78.5	7374		76.4	7209	75.7	11250	95.5	75.9
14-Jul		7707	78.7	7414		77	7254	76.1	11275	95.7	76.4
15-Jul		7748	79.1	7466		77.6	7366	77.3	11276	95.7	77.9
16-Jul		7825	79.9	7527		77.7	7388	77.6	11299	95.9	78.6
17-Jul		7831	80	7585		77.7	7634	80.1	11405	96.8	79.6
18-Jul		7956	81.2	7597		78.6	7679	80.6	11483	97.5	80.2
				7598							
				7684							

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	1985		1986		1987		1988		1989		1990a	
Date	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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	1991		1992		1993		1994		1985-94
Date	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jul	7961	81.3		80.3	7681	80.6	11597	98.4	81.8
20-Jul	7977	81.4		80.6	7681	80.6	11599	98.4	82.4
21-Jul	8004	81.7	7845	80.9	7681	80.6	11600	98.4	82.9
22-Jul	8033	82	7874	81.2	7693	80.8	11602	98.5	83.4
23-Jul	8164	83.4	7907	82	7704	80.9	11605	98.5	83.9
24-Jul	8227	84	7938	83.9	7707	80.9	11605	98.5	84.3
25-Jul	8254	84.3	8019	84.4	7759	81.5	11605	98.5	84.7
26-Jul	8307	84.8	8204	84.6	7771	81.6	11605	98.5	85.2
27-Jul	8360	85.4	8253	99.4	7772	81.6	11606	98.5	87
28-Jul	8413	85.9	8268	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
			9711						
			9711						

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	1985		1986		1987		1988		1989		1990 a	
Date		%		%	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	

No.

No.

No.

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

	1985		1986		1987		1988		1989		1990		1985-90
Date	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		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	946 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		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	1971 2588	2.6	763	2.7	3494	1.7	6254	3.9	896	2.1	3.4
28-Jul	13787	9		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	3530 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
19-Aug	129751	84.8	65730	66.4	18640	66.8	185785	91.3	132550	83.3	28712	66.9	76.6

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	1985		1986		1987		1988		1989		1990		1985-90
Date	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
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		

[a] 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.

	1985		1986		1987		1988		1989		1990	
Date	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		0.1	0	0	0	0	1	0	1	0
3-Aug	14	0.1		0.2	1	0	2	0	1	0	1	0
4-Aug	14	0.1		0.2	1	0	2	0	1	0	1	0
5-Aug	17	0.2	8	0.3	2	0	3	0	1	0	1	0
6-Aug	23	0.2	21	0.3	2	0	3	0	1	0	1	0
7-Aug	32	0.3	23	0.3	5	0	4	0.1	2	0	1	0
8-Aug	38	0.4	29	0.5	5	0	6	0.1	6	0.1	1	0
9-Aug	44	0.5	31	0.9	5	0	7	0.1	7	0.1	1	0
10-Aug	45	0.5	33	2.2	10	0.1	8	0.1	10	0.1	1	0
11-Aug	50	0.5	53	2.4	14	0.1	9	0.1	10	0.1	1	0
12-Aug	54	0.6	91	2.9	24	0.2	11	0.2	14	0.1	1	0
13-Aug	63	0.7		3.1	33	0.3	17	0.3	16	0.2	1	0
14-Aug	70	0.7		3.4	36	0.3	20	0.3	20	0.2	1	0
15-Aug	77	0.8		3.9	42	0.4	20	0.3	25	0.3	1	0
16-Aug	88	0.9		4.5	50	0.5	26	0.4	35	0.4	2	0
17-Aug	100	1.1		5.1	51	0.5	60	1	44	0.4	18	0.3
18-Aug	127	1.3		5.7	66	0.6	72	1.2	71	0.7	42	0.7
19-Aug	136	1.4	507	6.2	68	0.6	92	1.5		1.1	56	0.9
20-Aug	160	1.7	571	6.5	81	0.7	112	1.8		1.3	101	1.6
21-Aug	192	2	613	7.6	104	0.9	197	3.2	105	1.5	161	2.6
22-Aug	238	2.5	650	8.5	117	1.1	222	3.6	133	1.6	195	3.1
23-Aug	264	2.8	751	9.2	139	1.3	232	3.8	148	1.7	231	3.7
24-Aug	278	2.9	840	9.7	195	1.8	245	4	159	1.9	259	4.2
25-Aug	299	3.2	918	9.9	276	2.5	298	4.8	171	3.1	280	4.5
26-Aug	311	3.3	962	1184 11.9	315	2.8	650	10.5	185	370 3.7	340	5.5
27-Aug	318	3.4	986	1438 14.5	349	3.1	1110	18	310	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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	1991		1992			1993		1994		1986-94a
Date	No.	%		No.	%	No.	%	No.	%	Avg. %
1-Aug	0	0			0	0	0	0	0	0
2-Aug	0	0			0	0	0	0	0	0
3-Aug	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	0	302	4.4	77	0.9	2.9
24-Aug	173	1.9	0	0	0	333	4.9	130	1.6	3.3
25-Aug	198	2.2	0	25	0.4	400	5.9	144	1.8	3.9
26-Aug	236	2.6			2	467	6.9	153	1.9	5.3
27-Aug	261	2.9			3.4	534	7.8	176	2.2	6.8
28-Aug	310	3.5			4	635	9.3	185	2.3	8.3
29-Aug	373	4.2	132		4.6	736	10.8	191	2.3	10.1
30-Aug	437	4.9	219		7	837	12.3	193	2.4	14.4
31-Aug	475	5.3	261		9.5	938	13.8	198	2.4	16
1-Sep		5.5	299		12.2	1030	15.1	203	2.5	17.3
			459							
			618			-continued-				
	492		799							

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	1985		1986		1987		1988		1989		1990	
Date	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		10.7		59.8	9416	84.8	5725	92.6		86.8	5165	83
22-Sep		27.1		60.1	9616	86.6	5748	93		91.4	5365	86.2
23-Sep	1009	30.4	5947	60.8	9866	88.9	5828	94.3	8617	9153 92.2	5515	88.6
24-Sep	2563	34.4	5974	62.3	10341	93.1	6182	100	9074	94.2	5608	90.1
25-Sep	2881	40.9	6046	62.7	10498	94.6	6182	100		95.8	5830	93.7
26-Sep	3258	68.5	6193	66.4	10777	97.1	6182	100	9359	96.7	5959	95.8
27-Sep	3877	69.6	6233	73.9	10848	97.7	6182	100	9516	97.2	5959	95.8
28-Sep	6486	77.5	6596	74.5	10914	98.3	6182	100	9601	97.7	6222	100
29-Sep	6596	82.4	7346	75.1	10993	99	6182	100	9651	98.2	6222	100
30-Sep	7345	87.3	7401	75.3	11078	99.8	6182	100	9701	98.7	6222	100
1-Oct	7810	92.3	7464	93.9	11103	100	6182	100	9752	99.1	6222	100
	8275		7488						9805			
	8740		9335						9836			

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

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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, 1984-1994.

Date		1984		1985		1986		1987		1988		1989	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
20-May		0	0	0	0	0	0	3	0.1	0	0	0	0
21-May	1984	0	0	0	0	0	0	13	0.2	0	0	0	0
22-May		0	0	0	0	0	0	21	0.3	0	0	0	0
23-May		12	0.2	1	0.1	0	0	31	0.4	0	0	0	0
24-May		83	1.1	3	0.1	3	0.1	74	0.9	0	0	4	0.1
25-May		186	2.4	7	0.1	5	0.1	122	1.5	0	0	12	0.1
26-May		205	2.7	17	0.3	8	0.2	145	1.8	5	0.1	30	0.3
27-May		332	4.3	17	0.3	10	0.2	181	2.3	26	0.2	62	0.6
28-May		551	7.1	65	1.2	13	0.3	258	3.3	27	0.2	87	0.8
29-May		745	9.6	120	2.2	19	0.4	287	3.6	41	0.3	130	1.2
30-May		907	11.7	156	2.9	38	0.9	347	4.4	89	0.7	165	1.6
31-May		1123	14.5	173	3.2	53	1.2	394	4.9	105	0.8	210	2
1-Jun		1345	17.4	216	4	99	2.2	419	5.3	157	1.2	305	2.9
2-Jun		1534	19.8	258	4.8	152	3.4	515	6.5	276	2.1	451	4.3
3-Jun		1933	24.9	322	6	202	4.6	638	8.1	319	2.4	524	5
4-Jun		2126	27.4	362	6.8	319	7.2	730	9.2	409	3.1	580	5.5
5-Jun		2352	30.4	439	8.2	430	9.7	813	10.3	521	3.9	824	7.9
6-Jun		2628	33.9	515	9.6	479	10.8	1075	13.6	641	4.8	978	9.3
7-Jun		2875	37.1	605	11.3	606	13.7	1186	14.9	761	5.7	1241	11.8
8-Jun		3073	39.7	648	12.1	659	14.9	1259	15.9	818	6.1	1419	13.5
9-Jun		3606	46.6	864	16.1	724	16.4	1432	18.1	1107	8.3	1705	16.3
10-Jun		4144	53.5	968	18.1	828	18.7	1476	18.6	1655	12.4	1976	18.9
11-Jun		4386	56.6	1105	20.6	951	21.5	1660	20.9	2139	16	2299	21.9
12-Jun		4592	59.3	1308	24.4	1209	27.3	1841	23.2	2369	17.8	2555	24.4
13-Jun		4800	61.9	1452	27.1	1291	29.2	1963	24.8	3106	23.3	2954	28.2
14-Jun		4913	63.4	1806	33.7	1347	30.4	2402	30.3	3608	27.1	3277	31.3
15-Jun		5193	67	1989	37.1	1628	36.8	2581	32.6	4141	31.1	3591	34.3
16-Jun		5410	69.8	2091	39	1869	42.2	2749	34.7	5158	38.7	4058	38.7
17-Jun		5643	72.8	2336	43.6	2082	47	2832	35.7	5663	42.5	4471	42.7
18-Jun		5938	76.7	2503	46.7	2255	50.9	3110	39.2	6277	47.1	5071	48.4

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				1991			1992		1993		1994			1984-94
Date		No.	%		No.	%	No.	%	No.	%		No.	%	Avg. %
20-May		0	0			0	0	0	0	0		33	0.3	0.1
21-May	1990	0	0			0	0	0	0	0		45	0.4	0.1
22-May		0	0			0	0	0	0	0		65	0.5	0.1
23-May		0	0	0		0	0	0	0	0		128	1.1	0.2
24-May		0	0	0		0	0	0	0	0		142	1.2	0.3
25-May		0	0	0		0	0	0	56	0.4		223	1.9	0.6
26-May		0	0	0		0.1	0	0	96	0.7		267	2.2	0.6
27-May		0	0	0	126	0.2	1	0.1	212	1.5		331	2.8	0.8
28-May		0	0	0	202	0.9	28	0.3	320	2.3		405	3.4	1.8
29-May		42	0.3	5	301	1.4	63	0.7	438	3.1		489	4.1	2.5
30-May		278	1.9			2.2	89	0.9	714	5.1			4.5	3.3
31-May		537	3.7			2.8	183	1.9	971	6.9			5.3	4.3
1-Jun			4.5	386		3.4	270	2.8	1517	10.9	540		6.2	5.5
2-Jun		1090	7.6	478	700	4.1	405	4.2	1943	13.9	635	855	7.1	7.1
3-Jun	646		9.1	570		4.9	529	5.5	2233	16	743		10	8.8
4-Jun			10.9			9.3	601	6.3	2559	18.4			12.1	10.6
5-Jun	1311		13.5	1310		11.1	818	8.5	3206	22.9	1204		15.2	12.8
6-Jun	1586		16.8	1545		13.4	985	10.3	3405	24.4	1459		16.6	14.8
7-Jun	1943		20.6	1879		15.7	1148	11.9	3852	27.6	1835		18.3	17.2
8-Jun	2429		23.8	2199		19.1	1365	14.2	4453	31.9	2000		21.7	19.4
9-Jun	2969		30.9	2675		22.2	1699	17.7	4917	35.3	2206		23.8	22.9
10-Jun	3433		37.6	3119		26.7	1947	20.3	5399	38.7	2614		25.8	26.3
11-Jun	4456		40.3	3744		28.3	2329	24.3	5833	41.8	2869		28.8	29.2
12-Jun	5432		43.8	3967		30.8	2857	29.8	6187	44.4	3114		34.8	32.7
13-Jun	5810		47.3	4318		36.8	3259	33.9	6705	48.1	3467		39.1	36.3
14-Jun	6631		50.7	5160		40.1	3705	38.6	7161	51.4	4198		43.5	40
15-Jun	6825		52.6	5627		42.3	4093	42.6	7411	53.2	4709		47.9	43.4
16-Jun	7321		54.8	5935		45.3	4527	47.2	7542	54.1	5245		52.3	46.9
17-Jun	7598		55.9	6350		49.2	4893	50.9	7995	57.3	5774		55.2	50.3
18-Jun	7919		57.9	6893		51.3	5233	54.5	8290	59.5	6304		57.9	53.6
	8070			7187			-continued-				6645			
	8361			7916							6971			

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				1985		1986		1987		1988		1989	
Date		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
19-Jun		6051	78.1	2618	48.8	2537	57.3	3674	46.3	6869	51.5	5477	52.2
20-Jun	1984	6125	79.1	2773	51.7	2764	62.4	3882	48.9	7434	55.7	5649	53.9
21-Jun		6212	80.2	2911	54.3	2867	64.7	4285	54	7743	58.1	6145	58.6
22-Jun		6366	82.2	3099	57.8	2993	67.6	4511	56.9	8210	61.6	6749	64.4
23-Jun		6508	84	3284	61.3	3186	71.9	4724	59.6	8854	66.4	7022	66.9
24-Jun		6655	85.9	3398	63.4	3444	77.8	4838	61	9317	69.9	7486	71.4
25-Jun		6796	87.7	3501	65.3	3669	82.8	5155	65	10220	76.6	7799	74.4
26-Jun		6905	89.1	3716	69.3	3898	88	5592	70.5	10593	79.4	8049	76.8
27-Jun		6978	90.1	3902	72.8	3977	89.8	5950	75	11157	83.6	8303	79.2
28-Jun		7078	91.4	4016	74.9	4036	91.1	6057	76.4	11511	86.3	8477	80.9
29-Jun		7153	92.3	4137	77.2	4112	92.8	6200	78.2	11718	87.9	8708	83.1
30-Jun		7220	93.2	4340	80.9	4183	94.5	6396	80.7	11908	89.3	9061	86.4
1-Jul		7278	93.9	4448	82.9	4200	94.8	6549	82.6	12063	90.5	9260	88.3
2-Jul		7322	94.5	4538	84.6	4222	95.3	6759	85.2	12219	91.6	9293	88.6
3-Jul		7361	95	4598	85.8	4223	95.4	6876	86.7	12284	92.1	9420	89.9
4-Jul		7393	95.4	4666	87	4224	95.4	7006	88.4	12321	92.4	9511	90.7
5-Jul		7451	96.2	4705	87.8	4246	95.9	7088	89.4	12466	93.5	9616	91.7
6-Jul		7473	96.5	4865	90.7	4285	96.8	7172	90.4	12590	94.4	9764	93.1
7-Jul		7490	96.7	4938	92.1	4330	97.8	7258	91.5	12668	94.9	9818	93.7
8-Jul		7513	96.9	4974	92.8	4336	97.9	7345	92.6	12686	95.1	9838	93.8
9-Jul		7529	97.2	5021	93.6	4337	97.9	7434	93.8	12762	95.7	9872	94.2
10-Jul		7541	97.3	5051	94.2	4342	97.9	7499	94.6	12841	96.3	9904	94.5
11-Jul		7553	97.5	5099	95.1	4349	98	7547	95.2	12873	96.5	9955	94.9
12-Jul		7574	97.8	5142	95.9	4368	98.2	7570	95.5	12875	97.5	10023	95.6
13-Jul		7588	97.9	5157	96.2	4374	98.6	7609	95.9	12933	96.9	10045	95.8
14-Jul		7594	98	5167	96.4	4374	98.8	7632	96.2	12969	97.2	10081	96.2
15-Jul		7614	98.3	5190	96.8	4374	98.8	7650	96.5	13004	97.5	10113	96.5
16-Jul		7626	98.4	5212	97.2	4374	98.8	7691	96.9	13040	97.8	10145	96.8
17-Jul		7637	98.6	5221	97.4	4374	98.8	7706	97.2	13061	97.9	10168	96.9
18-Jul		7656	98.8	5228	97.5	4374	98.8	7723	97.4	13078	98.1	10185	97.2

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				1991		1992		1993		1994		1984-94
Date		No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jun		8949	61.9	8449	56.5	5609	58.4	8935	64.1	7143	59.3	57.7
20-Jun	1990	9576	66.3	8769	60.3	5988	62.4	9250	66.3	7464	61.9	60.8
21-Jun		10183	70.5	9313	62.5	5274	65.4	9568	68.6	7816	64.9	63.8
22-Jun		10820	74.9	9753	66.4	6542	68.1	9965	71.5	8194	68	67.2
23-Jun		11383	78.8	10145	69.6	6803	70.9	10526	75.5	8373	69.5	70.4
24-Jun		11845	82	10596	72.4	6991	72.8	10721	76.9	8645	71.8	73.2
25-Jun		12210	84.6	11001	75.6	7184	74.8	11008	78.9	9014	74.8	76.4
26-Jun		12570	87	11380	78.5	7487	77.9	11325	81.2	9205	76.4	79.5
27-Jun		12876	89.2	11638	81.2	7779	81	11505	82.5	9648	80.1	82.2
28-Jun		13075	90.5	11892	83	7968	82.9	11668	83.7	9835	81.6	83.9
29-Jun		13246	91.7	12139	84.8	8159	84.9	11793	84.6	10107	83.9	85.6
30-Jun		13399	92.8	12370	86.6	8332	86.8	11978	85.9	10344	85.9	87.5
1-Jul		13579	94	12560	88.2	8475	88.3	12184	87.4	10427	86.5	88.9
2-Jul		13651	94.5	12743	89.6	8583	89.4	12569	90.1	10533	87.4	90.1
3-Jul		13743	95.2	12860	90.9	8658	90.2	12708	91.1	10631	88.2	90.9
4-Jul		13808	95.6	12962	91.7	8744	91.1	12845	92.1	10767	89.4	91.7
5-Jul		13867	96	13127	92.4	8810	91.8	12925	92.7	10829	89.9	92.5
6-Jul		13934	96.5	13267	93.6	8853	92.2	13039	93.5	10876	90.3	93.5
7-Jul		13966	96.7	13323	94.6	8929	93	13146	94.3	10923	90.7	94.2
8-Jul		14025	97.1	13390	95	8977	93.5	13191	94.6	11046	91.7	94.7
9-Jul		14033	97.2	13434	95.5	8996	93.7	13248	95	11078	91.9	95.1
10-Jul		14044	97.2	13484	95.8	9023	93.9	13302	95.4	11138	92.4	95.4
11-Jul		14069	97.4	13546	96.2	9094	94.7	13359	95.8	11189	92.9	95.9
12-Jul		14074	97.5	13619	96.6	9129	95.1	13385	95.9	11230	93.2	96.2
13-Jul		14081	97.5	13646	97.1	9141	95.2	13408	96.2	11276	93.6	96.5
14-Jul		14107	97.7	13692	97.3	9181	95.6	13470	96.6	11301	93.8	96.7
15-Jul		14112	97.7	13714	97.7	9201	95.8	13495	96.8	11327	94	96.9
16-Jul		14130	97.8	13733	97.8	9215	95.9	13532	97.1	11347	94.2	97.2
17-Jul		14145	97.9	13746	97.9	9241	96.3	13547	97.2	11355	94.2	97.3
18-Jul		14158	98	13765	98	9275	96.6	13589	97.5	11357	94.3	97.5

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Date		1984		1985		1986		1987		1988		1989	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
19-Jul		7660	98.9	5234	97.6	4375	98.8	7739	97.6	13104	98.3	10207	97.4
20-Jul		7670	99	5236	97.7	4375	98.8	7755	97.8	13123	98.4	10215	97.4
21-Jul		7674	99.1	5240	97.7	4375	98.8	7773	98	13135	98.5	10236	97.6
22-Jul		7676	99.1	5252	97.9	4375	98.8	7787	98.2	13154	98.6	10242	97.7
23-Jul		7680	99.1	5261	98.1	4377	98.8	7799	98.4	13160	98.7	10261	97.9
24-Jul		7684	99.2	5262	98.1	4377	98.8	7810	98.5	13167	98.7	10278	98
25-Jul		7688	99.2	5268	98.3	4380	98.9	7819	98.6	13175	98.8	10280	98.1
26-Jul		7694	99.3	5268	98.3	4383	98.9	7826	98.7	13185	98.9	10280	98.1
27-Jul		7704	99.4	5269	98.3	4386	99	7837	98.8	13193	98.9	10288	98.1
28-Jul		7719	99.7	5276	98.4	4387	99.1	7844	98.9	13197	98.9	10292	98.2
29-Jul		7723	99.7	5284	98.6	4391	99.1	7848	98.9	13219	99.1	10298	98.2
30-Jul		7729	99.8	5289	98.6	4393	99.2	7862	99.1	13223	99.2	10309	98.3
31-Jul		7733	99.8	5290	98.7	4396	99.3	7865	99.2	13228	99.2	10315	98.4
1-Aug		7736	99.9	5292	98.7	4397	99.3	7871	99.3	13241	99.3	10329	98.5
2-Aug		7740	99.9	5294	98.7	4399	99.3	7873	99.3	13247	99.3	10336	98.6
3-Aug		7742	99.9	5295	98.8	4405	99.5	7878	99.3	13266	99.5	10341	98.6
4-Aug		7742	99.9	5296	98.8	4407	99.5	7884	99.4	13267	99.5	10351	98.7
5-Aug		7742	99.9	5299	98.8	4409	99.6	7890	99.5	13272	99.5	10360	98.8
6-Aug		7744	99.9	5314	99.1	4413	99.6	7894	99.6	13273	99.5	10372	98.9
7-Aug		7744	99.9	5315	99.1	4413	99.6	7896	99.6	13274	99.5	10375	98.9
8-Aug		7744	99.9	5319	99.2	4422	99.8	7900	99.6	13279	99.6	10378	98.9
9-Aug		7745	99.9	5319	99.2	4423	99.9	7902	99.7	13287	99.6	10381	99
10-Aug		7745	99.9	5319	99.2	4423	99.9	7908	99.7	13293	99.7	10393	99.1
11-Aug		7745	99.9	5322	99.3	4423	99.9	7912	99.8	13299	99.7	10402	99.2
12-Aug		7745	99.9	5335	99.5	4426	99.9	7915	99.8	13303	99.8	10403	99.2
13-Aug		7745	99.9	5342	99.6	4426	99.9	7916	99.8	13304	99.8	10404	99.2
14-Aug		7745	99.9	5347	99.7	4426	99.9	7918	99.9	13308	99.8	10407	99.3
15-Aug		7746	99.9	5348	99.7	4426	99.9	7920	99.9	13311	99.8	10411	99.3
16-Aug		7746	99.9	5350	99.8	4426	99.9	7923	99.9	13312	99.8	10413	99.3
17-Aug		7746	99.9	5351	99.8	4427	99.9	7924	99.9	13316	99.8	10418	99.4

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				1991		1992		1993		1994		1984-94
Date		No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jul		14175	98.2	13775	98.1	9294	96.8	13607	97.6	11365	94.3	97.6
20-Jul	1990	14203	98.4	13785	98.2	9309	96.9	13623	97.7	11367	94.3	97.7
21-Jul		14212	98.4	13800	98.3	9318	97.1	13648	97.9	11420	94.8	97.8
22-Jul		14222	98.5	13810	98.4	9335	97.2	13694	98.2	11472	95.2	97.9
23-Jul		14240	98.6	13820	98.4	9341	97.3	13728	98.5	11538	95.8	98.1
24-Jul		14253	98.7	13825	98.5	9350	97.4	13736	98.5	11623	96.5	98.3
25-Jul		14263	98.8	13837	98.6	9360	97.5	13759	98.7	11687	97	98.4
26-Jul		14281	98.9	13849	98.6	9371	97.6	13765	98.7	11697	97.1	98.5
27-Jul		14291	98.9	13870	98.7	9394	97.8	13768	98.7	11728	97.3	98.6
28-Jul		14297	99	13879	98.8	9404	97.9	13776	98.8	11770	97.7	98.7
29-Jul		14305	99.1	13889	98.9	9433	98.3	13788	98.9	11777	97.7	98.8
30-Jul		14309	99.1	13899	99	9450	98.4	13789	98.9	11797	97.9	98.9
31-Jul		14312	99.1	13919	99.1	9480	98.7	13803	98.9	11814	98.1	99
1-Aug		14316	99.1	13920	99.3	9499	98.9	13827	98.9	11823	98.1	99
2-Aug		14323	99.2	13935	99.3	9510	98.9	13830	99.2	11826	98.2	99.1
3-Aug		14330	99.2	13941	99.4	9524	99.1	13832	99.2	11838	98.3	99.2
4-Aug		14348	99.4	13947	99.4	9528	99.2	13838	99.2	11862	98.5	99.2
5-Aug		14352	99.4	13950	99.5	9535	99.3	13847	99.2	11893	98.7	99.3
6-Aug		14364	99.5	13957	99.5	9542	99.4	13860	99.3	11901	98.8	99.4
7-Aug		14366	99.5	13963	99.5	9545	99.4	13869	99.4	11929	99	99.4
8-Aug		14372	99.5	13969	99.6	9545	99.4	13871	99.5	11979	99.4	99.5
9-Aug		14379	99.6	13976	99.6	9547	99.4	13872	99.5	11995	99.5	99.5
10-Aug		14383	99.6	13983	99.7	9549	99.5	13878	99.5	12007	99.6	99.6
11-Aug		14389	99.6	13989	99.7	9552	99.5	13892	99.5	12009	99.7	99.6
12-Aug		14396	99.7	13991	99.8	9556	99.5	13896	99.6	12017	99.7	99.7
13-Aug		14398	99.7	13992	99.8	9557	99.5	13898	99.7	12020	99.7	99.7
14-Aug		14398	99.7	13995	99.8	9559	99.6	13902	99.7	12023	99.8	99.7
15-Aug		14398	99.7	13999	99.8	9563	99.6	13903	99.7	12025	99.8	99.8
16-Aug		14399	99.7	14000	99.8	9575	99.7	13911	99.7	12027	99.8	99.8
17-Aug		14400	99.7	14001	99.8	9578	99.8	13913	99.8	12030	99.8	99.8

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				1985		1986		1987		1988		1989	
Date		No.	%		No.	%	No.	%	No.	%	No.	%	No.	%
18-Aug		7746	99.9			99.8	4427	99.9	7924	99.9	13317	99.9	10429	99.5
19-Aug	1984	7746	99.9			99.8	4427	99.9	7925	99.9	13320	99.9	10432	99.5
20-Aug		7746	99.9	5351		99.8	4427	99.2	7925	99.9	13324	99.9	10436	99.5
21-Aug		7747	100	5351		99.8	4428	99.9	7927	99.9	13328	99.9	10438	99.6
22-Aug		7747	100	5352		99.9	4428	99.9	7927	99.9	13329	99.9	10446	99.6
23-Aug		7747	100	5353		99.9	4428	99.9	7928	99.9	13330	99.9	10454	99.7
24-Aug		7747	100	5354		99.9	4428	99.9	7929	99.9	13331	99.9	10458	99.8
25-Aug		7747	100	5354		99.9	4428	99.9	7929	99.9	13332	99.9	10463	99.8
26-Aug		7747	100	5355		99.9	4429	100	7929	99.9	13332	99.9	10464	99.8
27-Aug		7747	100	5357		99.9	4429	100	7930	100	13332	99.9	10465	99.8
28-Aug		7747	100	5358		99.9	4429	100	7930	100	13332	99.9	10468	99.9
29-Aug		7747	100	5360		100	4429	100	7930	100	13334	99.9	10472	99.9
30-Aug		7747	100	5360		100	4429	100	7930	100	13336	99.9	10473	99.9
31-Aug		7747	100	5362		100	4429	100	7930	100	13337	100	10473	99.9
1-Sep			100	5362		100	4429	100	7930	100	13337	100	10475	99.9
2-Sep			100	5362		100	4429	100	7930	100	13337	100	10476	99.9
Season	7747			5362										
Total	7747	7,747		5362			4,429		7,930		13,337		10,484	

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5,362

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				1991		1992		1993		1994		1984-94
Date		No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
18-Aug		14400	99.7		99.9	9578	99.8	13919	99.8		99.9	99.8
19-Aug	1990	14401	99.7		99.9	9578	99.8	13923	99.8		99.9	99.8
20-Aug		14403	99.7	14002	99.9	9580	99.8	13928	99.9	12032	99.9	99.8
21-Aug		14405	99.7	14006	99.9	9584	99.8	13932	99.9	12035	99.9	99.9
22-Aug		14409	99.7	14008	99.9	9585	99.8	13934	99.9	12036	99.9	99.9
23-Aug		14413	99.8	14008	99.9	9591	99.9	13936	99.9	12042	99.9	99.9
24-Aug		14415	99.8	14008	99.9	9594	99.9	13938	99.9	12042	99.9	99.9
25-Aug		14417	99.8	14009	99.9	9595	99.9	13940	99.9	12045	99.9	99.9
26-Aug		14422	99.9	14010	99.9	9596	99.9	13940	99.9	12046	100	99.9
27-Aug		14427	99.9	14011	99.9	9596	99.9	13942	99.9	12047	100	99.9
28-Aug		14428	99.9	14013	99.9	9596	99.9	13943	99.9	12049	100	99.9
29-Aug		14432	99.9	14014	99.9	9596	99.9	13943	99.9	12049	100	99.9
30-Aug		14432	99.9	14015	99.9	9596	99.9	13943	99.9	12049	100	99.9
31-Aug		14433	99.9	14016	99.9	9596	99.9	13943	99.9	12049	100	99.9
1-Sep			99.9	14016	99.9	9596	99.9	13943	99.9	12049	100	99.9
2-Sep			99.9	14016	99.9	9596	99.9	13944	99.9	12049	100	99.9
Season		14436		14020						12049		
Total		14441	14,442	14020		9,601		13,944		12049	12,049	
				14,022								

Appendix G5.- Immigration of chinook salmon through the Ayakulik River weir, 1984-1994.

				1985		1986		1987		1988		1989	
Date		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
20-May		0	0	0	0	77	1.2	0	0	0	0	0	0
21-May	1984	19	0.3	0	0	83	1.3	0	0	0	0	0	0
22-May		62	0.9	0	0	90	1.4	0	0	0	0	0	0
23-May		692	10.6	0	0	104	1.6	0	0	0	0	0	0
24-May		806	12.4	0	0	117	1.8	30	0.2	0	0	0	0
25-May		989	15.2	0	0	144	2.3	36	0.2	15	0.1	0	0
26-May		1226	18.9	0	0	156	2.5	85	0.5	284	1.3	0	0
27-May		1556	23.9	0	0	309	4.9	167	1.1	401	1.9	0	0
28-May		1840	28.3	0	0	319	5	225	1.4	560	2.6	0	0
29-May		1989	30.6	0	0	337	5.3	270	1.7	714	3.3	0	0
30-May		2086	32.1	0	0	407	6.4	361	2.3	892	4.2	0	0
31-May		2191	33.7	0	0	499	7.8	415	2.7	1021	4.8	7	0.1
1-Jun		2229	34.3	0	0	647	10.2	491	3.1	1106	5.2	58	0.4
2-Jun		2329	35.8	0	0	726	11.4	526	3.4	1176	5.5	202	1.3
3-Jun		2416	37.2	328	4	763	11.9	538	3.4	1400	6.6	255	1.7
4-Jun		2584	39.7	445	5.5	864	13.6	913	5.8	1634	7.7	387	2.5
5-Jun		2644	40.7	612	7.5	892	14	1285	18.2	1872	8.8	494	3.2
6-Jun		2809	43.2	1109	13.6	936	14.6	2071	13.3	2086	9.8	804	5.2
7-Jun		3089	47.5	1498	18.4	1023	16.1	2442	15.6	2278	10.7	1272	8.2
8-Jun		3238	49.8	2614	32.1	1165	18.3	2611	16.7	2426	11.4	1408	9.1
9-Jun		3480	53.5	3707	45.5	1483	23.3	2743	17.5	2590	12.1	1520	9.9
10-Jun		3846	59.2	4518	55.4	1576	24.7	3157	20.2	2857	13.4	2134	13.8
11-Jun		4006	61.6	4753	58.3	1686	26.5	3580	22.9	3975	18.6	2967	19.2
12-Jun		4159	63.9	4909	60.2	1812	28.4	3671	23.5	5045	23.6	4073	26.4
13-Jun		4225	64.9	5033	61.8	2037	31.9	3804	24.3	7117	33.3	4966	32.2
14-Jun		4396	67.6	5087	62.4	2816	44.2	4044	25.9	7586	35.5	5580	36.2
15-Jun		4498	69.2	5217	64	3194	50.1	4158	26.6	7897	36.9	6732	43.6
16-Jun		4599	70.7	5340	65.5	3407	53.5	4432	28.3	8979	42	7357	47.7
17-Jun		4655	71.6	5583	68.5	3718	58.4	5006	32	10020	46.9	8238	53.4
18-Jun		4796	73.8	5750	70.5	3923	61.6	5411	34.6	10268	48.1	9192	59.6

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Date		1990		1991		1992		1993		1994		1984-93
		No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
20-May		0	0	0	0	0	0	0	0	4	0.1	0.1
21-May	1990	0	0	0	0	0	0	0	0	15	0.2	0.2
22-May		0	0	0	0	205	2.2	0	0	39	0.4	0.5
23-May		0	0	0	0	361	3.9	21	0.3	63	0.7	1.6
24-May		0	0	0	0	800	8.8	28	0.4	88	1	2.2
25-May		0	0	20	0.2	885	9.7	37	0.5	100	1.1	2.7
26-May		0	0	78	0.6	1042	11.4	44	0.6	129	1.4	3.4
27-May		800	7.1	113	0.9	1351	14.8	103	1.3	158	1.7	5.2
28-May		1318	11.7	380	2.9	1588	17.4	241	3.1	204	2.2	6.8
29-May		1709	15.2	566	4.4	1699	18.6	326	4.2	210	2.3	7.8
30-May		2137	18.9	603	4.6	1836	20.1	370	4.7	265	2.9	8.8
31-May		2409	21.4	655	5	2012	22	821	10.5	294	3.2	10.1
1-Jun		3100	27.6	671	5.2	2045	22.4	1927	24.7	328	3.6	12.4
2-Jun		3797	33.8	697	5.4	2385	26.1	3118	39.9	568	6.2	15.3
3-Jun		4144	36.8	711	5.5	2879	31.5	3225	41.3	694	7.6	17
4-Jun		4393	39.1	772	5.9	2957	32.4	3352	42.9	1304	14.3	19
5-Jun		4988	44.3	961	7.4	3030	33.2	3585	45.9	1565	17.1	21
6-Jun		5708	50.7	1544	11.9	3384	37	3623	46.3	1636	17.9	24
7-Jun		5787	51.4	3068	23.6	4073	44.6	3686	47.1	1860	20.4	27.6
8-Jun		6659	59.2	4164	32.1	4273	46.8	3708	47.4	2731	29.9	32.1
9-Jun		6893	61.3	5852	45.1	4414	48.3	3861	49.4	3257	35.6	36.5
10-Jun		7005	62.3	7116	54.8	4480	49	4154	53.1	3641	39.8	40.5
11-Jun		7157	63.6	7714	59.4	4624	50.6	4537	58	3797	41.6	43.7
12-Jun		7216	64.1	8268	63.7	4848	53.1	4807	61.5	4293	46.9	46.9
13-Jun		7427	66	8311	63.9	5115	55.9	5041	64.5	4321	47.3	49.7
14-Jun		7433	66.1	8728	67.2	5261	57.6	5160	65.9	4544	49.7	52.6
15-Jun		7448	66.2	8858	68.2	5435	59.5	5255	67.2	4825	52.8	54.9
16-Jun		7698	68.4	8884	68.4	5626	61.6	5437	69.5	4933	53.9	57.2
17-Jun		7948	70.6	9001	69.3	5807	63.6	5553	71	5155	56.4	60.2
18-Jun		8198	72.9	9168	70.6	5901	64.6	5664	72.4	5347	58.5	62.5

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				1985		1986		1987		1988		1989	
Date		No.	%		No.	%	No.	%	No.	%	No.	%	No.	%
19-Jun			77.9			71	3988	62.6	5714	36.5	12263	57.4	9218	59.7
20-Jun	1984		78.9			73.2	4053	63.6	5971	38.2	12340	57.7	10032	65
21-Jun	5068		79.7	5789		74.7	4124	64.7	6137	45	13453	62.9	10259	66.5
22-Jun	5133		82	5963		75.7	4225	66.3	6689	49.2	14292	66.9	10440	67.7
23-Jun	5183		84.4	6092		76.8	4245	66.6	6690	55.4	14676	68.7	10587	68.6
24-Jun	5333		85.5	6173		78.9	4301	67.5	6719	60.2	15276	71.5	10865	70.4
25-Jun	5490		86.1	6259		81.9	4382	68.8	6744	61.7	15967	74.7	11077	71.8
26-Jun	5560		88.2	6436		86.6	4411	69.2	6759	64.1	16323	76.4	11836	76.7
27-Jun	5597		90.9	6678		87.9	4460	70	6768	70.8	17161	80.3	12084	78.3
28-Jun	5734		92.4	7060		88.9	4506	70.7	6795	73.2	17640	82.6	12347	80
29-Jun	5909		92.6	7168		89.9	4808	75.5	6815	74.7	18038	84.4	13192	85.5
30-Jun	6009		92.9	7253		90.6	4960	77.9	6841	77.2	18522	86.7	13312	86.3
1-Jul	6018	6144	94.5	7331		92.3	5231	82.1	6852	79.4	18886	88.4	13396	86.8
2-Jul	6040	6192	95.2	7387		92.4	5410	84.9	6869	81.7	19212	89.9	13430	87
3-Jul		6238	95.9	7519		93.6	5488	86.1	6876	86.7	19277	90.2	13651	88.5
4-Jul		6263	96.3	7533		93.6	5610	88.1	7006	88.4	19370	90.6	13815	89.5
5-Jul		6270	96.4	7626		93.6	5710	89.6	7088	89.4	19398	90.8	14148	91.7
6-Jul		6299	96.9	7626		93.7	5747	90.2	7172	90.4	19664	92	14251	92.4
7-Jul		6308	97	7631		94.9	5839	91.7	7258	91.5	19883	93	14543	94.2
8-Jul		6312	97.1	7634		95.6	5855	91.9	7345	92.6	20211	94.6	14667	95
9-Jul		6342	97.5	7742		95.8	5994	94.1	7434	93.8	20410	95.5	14668	95.1
10-Jul		6361	97.8	7793		96.1	6031	94.7	7499	94.6	20416	95.5	14669	95.1
11-Jul		6371	97.9	7806		96.5	6040	94.8	7547	95.2	20449	95.7	14721	95.4
12-Jul		6384	98.2	7829		96.9	6119	96	7570	95.5	20493	95.9	14862	96.3
13-Jul		6417	98.7	7863		97.4	6180	97	7609	95.9	20562	96.2	14943	96.8
14-Jul		6432	98.9	7897		97.7	6194	97.2	7632	96.2	20836	97.5	14962	97.1
15-Jul		6438	99	7935		97.8	6197	97.3	7650	96.5	20881	97.7	14991	97.5
16-Jul		6438	99	7962		97.9	6222	97.7	7691	96.9	20948	98	14998	97.2
17-Jul		6444	99.1	7974		97.9	6259	97.2	7706	97.2	20949	98	15013	97.3
18-Jul		6448	99.2	7983		98.1	6283	98.6	7723	97.4	20963	98.1	15019	97.3
				7986										
				7993										

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				1991			1992		1993		1994			1984-94
Date			No.	%			No.	%	No.	%		No.	%	Avg. %
19-Jun				75.1			71.3	6085	66.6	5834	74.6			59.8	64.8
20-Jun	1990			76.2			71.6	6116	66.9	5917	75.7			60.6	66.2
21-Jun	8448			79.8	9259		71.7	6520	71.4	5936	75.9	5461		63.2	68.7
22-Jun	8578			82.1	9295		73	6672	73	6041	77.3	5536		64.9	70.7
23-Jun	8983			85.4	9317		74.7	7189	78.7	6075	77.7	5771		67.7	73.2
24-Jun	9242	9890		87.9	9482	10274	79.1	7430	81.3	6118	78.3	5931	6789	74.3	75.9
25-Jun	9605			89.7	9698		81.7	7527	82.4	6490	83	6190	7229	79.1	78.3
26-Jun				90.1			82.8	7667	83.9	6732	86.1		7724	84.5	80.8
27-Jun	10095			90.5	10614		83.3	7800	85.4	6778	86.7		7906	86.5	82.8
28-Jun	10137			90.7	10754		87.9	7933	86.8	6872	87.9		7990	87.4	84.4
29-Jun	10180			92.4	10815		91.8	8067	88.3	6908	88.4		8093	88.6	86.5
30-Jun	10202			93.9	11419		92.7	8153	89.3	6947	88.9		8261	90.4	87.9
1-Jul	10400	10656		94.7	11916		93.3	8221	89.9	6960	89		8443	92.4	89.4
2-Jul	10561	10739		95.5	12039		95	8285	90.7	7186	91.9		8522	93.3	90.7
3-Jul		10809		96.1	12122		95.2	8395	91.9	7234	92.5		8619	94.3	92
4-Jul		10821		96.2	12338		95.9	8474	92.8	7266	92.9		8661	94.8	92.9
5-Jul		10834		96.3	12370		96.4	8503	93.1	7288	93.2		8691	95.1	93.6
6-Jul		10877		96.7	12465		96.6	8581	93.9	7368	94.2		8740	95.6	94.2
7-Jul		10894		96.8	12514		96.8	8660	94.8	7408	94.7		8806	96.4	94.9
8-Jul		10948		97.3	12549		96.9	8750	95.8	7438	95.1		8832	96.7	95.6
9-Jul		10953		97.4	12572		97.1	8755	95.8	7471	95.6		8873	97.1	96.1
10-Jul		10970		97.5	12589		97.3	8768	95.9	7530	96.3		8942	97.9	96.4
11-Jul		10970		97.5	12610		97.3	8840	96.8	7547	96.5		8973	98.2	96.7
12-Jul		10971		97.5	12636		97.3	8891	97.3	7573	96.9		8990	98.4	97.1
13-Jul		10973		97.5	12638		97.7	8916	97.6	7587	97		9008	98.6	97.5
14-Jul		10999		97.8	12640		97.9	8958	98.1	7615	97.4		9025	98.8	97.8
15-Jul		11025		97.9	12691		97.9	8967	98.2	7649	97.8		9036	98.9	97.9
16-Jul		11042		98.1	12709		97.9	8984	98.4	7659	97.9		9054	99.1	98.1
17-Jul		11042		98.1	12711		97.9	9003	98.6	7682	98.3		9069	99.2	98.3
18-Jul		11042		98.1	12715		98	9018	98.7	7704	98.5		9082	99.4	98.4
					12721										
					12728										

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Date		1984 No.	1984 %	1985 No.	1985 %	1986 No.	1986 %	1987 No.	1987 %	1988 No.	1988 %	1989 No.	1989 %
19-Jul		6449	99.2		98.1	6289	98.7	7739	97.6	20965	98.1	15077	97.7
20-Jul	1984	6458	99.3		98.2	6296	98.8	7755	97.8	21033	98.4	15092	97.8
21-Jul		6465	99.4	7994	98.2	6299	98.9	7773	98	21058	98.5	15127	98
22-Jul		6465	99.4	8001	98.2	6312	98.1	7787	98.2	21065	98.6	15160	98.2
23-Jul		6465	99.4	8003	98.4	6312	98.1	7799	98.4	21085	98.7	15192	98.4
24-Jul		6467	99.5	8004	98.4	6312	98.1	7810	98.5	21093	98.7	15209	98.6
25-Jul		6468	99.5	8018	98.4	6312	98.1	7819	98.6	21113	98.8	15210	98.6
26-Jul		6470	99.5	8020	98.7	6312	98.1	7826	98.7	21123	98.8	15241	98.8
27-Jul		6473	99.6	8023	98.8	6312	99.1	7837	98.8	21135	98.9	15257	98.9
28-Jul		6476	99.6	8048	98.8	6312	99.1	7844	98.9	21173	99.1	15258	98.9
29-Jul		6476	99.6	8049	98.9	6312	99.1	7848	98.9	21184	99.1	15268	98.9
30-Jul		6477	99.6	8056	98.9	6312	99.1	7862	99.1	21204	99.2	15310	99.2
31-Jul		6477	99.6	8063	98.9	6325	99.3	7865	99.2	21206	99.2	15318	99.3
1-Aug		6478	99.6	8064	98.9	6333	99.4	7871	99.3	21210	99.3	15323	99.3
2-Aug		6478	99.6	8064	99	6336	99.5	7873	99.3	21212	99.3	15341	99.4
3-Aug		6481	99.7	8067	99.1	6339	99.5	7878	99.3	21225	99.3	15354	99.5
4-Aug		6482	99.7	8073	99.2	6342	99.5	7884	99.4	21236	99.4	15360	99.5
5-Aug		6482	99.7	8081	99.3	6344	99.6	7890	99.5	21250	99.4	15367	99.6
6-Aug		6483	99.7	8085	99.3	6345	99.6	7894	99.6	21272	99.5	15375	99.6
7-Aug		6484	99.7	8092	99.6	6346	99.6	7896	99.6	21289	99.6	15378	99.7
8-Aug		6486	99.8	8097	99.6	6350	99.7	7900	99.6	21291	99.6	15383	99.7
9-Aug		6488	99.8	8115	99.6	6350	99.7	7902	99.7	21301	99.7	15388	99.7
10-Aug		6488	99.8	8115	99.7	6354	99.7	7908	99.7	21311	99.7	15396	99.8
11-Aug		6490	99.8	8115	99.8	6357	99.8	7912	99.8	21330	99.8	15398	99.8
12-Aug		6490	99.8	8129	99.8	6360	99.8	7915	99.8	21334	99.8	15406	99.8
13-Aug		6490	99.8	8132	99.8	6360	99.8	7916	99.8	21336	99.8	15408	99.8
14-Aug		6491	99.8	8132	99.8	6360	99.8	7918	99.9	21340	99.9	15414	99.9
15-Aug		6492	99.9	8133	99.8	6361	99.8	7920	99.9	21344	99.9	15421	99.9
16-Aug		6493	99.9	8134	99.8	6362	99.9	7923	99.9	21347	99.9	15421	99.9
17-Aug		6496	99.9	8135	99.8	6365	99.9	7924	99.9	21356	99.9	15425	99.9
				8136									
				8137									

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				1991		1992		1993		1994		1984-93
Date		No.	%		No.	%	No.	%	No.	%	No.	%	Avg. %
19-Jul		11042	98.1			98	9020	98.7	7704	98.5	9088	99.5	98.5
20-Jul	1990	11051	98.2			98	9030	98.9	7706	98.6	9094	99.5	98.6
21-Jul		11076	98.4	12728		98.2	9054	99.1	7708	98.6	9099	99.6	98.7
22-Jul		11087	98.5	12733		98.5	9060	99.2	7713	98.6	9104	99.6	98.8
23-Jul		11093	98.6	12749		98.6	9060	99.2	7716	98.7	9105	99.6	98.9
24-Jul		11105	98.7	12795		98.8	9069	99.3	7749	99.1	9108	99.7	98.9
25-Jul		11107	98.7	12809		98.8	9076	99.4	7749	99.1	9111	99.7	99
26-Jul		11115	98.8	12835		98.8	9080	99.4	7757	99.2	9111	99.7	99.1
27-Jul		11118	98.8	12835		99.2	9081	99.4	7758	99.2	9113	99.7	99.1
28-Jul		11133	98.9	12836		99.2	9086	99.5	7771	99.4	9115	99.8	99.2
29-Jul		11158	99.2	12881		99.3	9088	99.5	7778	99.5	9116	99.8	99.3
30-Jul		11169	99.3	12886		99.3	9091	99.5	7781	99.5	9118	99.8	99.4
31-Jul		11180	99.4	12892		99.3	9094	99.6	7781	99.5	9118	99.8	99.4
1-Aug		11192	99.5	12897		99.3	9098	99.6	7788	99.6	9120	99.8	99.5
2-Aug		11200	99.6	12901		99.4	9100	99.6	7788	99.6	9125	99.9	99.5
3-Aug		11209	99.6	12901		99.4	9105	99.7	7789	99.6	9127	99.9	99.5
4-Aug		11216	99.7	12906		99.5	9108	99.7	7795	99.7	9127	99.9	99.6
5-Aug		11218	99.7	12915		99.5	9111	99.7	7795	99.7	9127	99.9	99.6
6-Aug		11222	99.7	12922		99.6	9115	99.8	7796	99.7	9127	99.9	99.6
7-Aug		11228	99.8	12926		99.6	9119	99.8	7797	99.7	9127	99.9	99.7
8-Aug		11233	99.8	12936		99.7	9122	99.9	7798	99.7	9127	99.9	99.7
9-Aug		11233	99.8	12938		99.7	9125	99.9	7799	99.7	9127	99.9	99.8
10-Aug		11237	99.9	12942		99.7	9126	99.9	7808	99.9	9128	99.9	99.8
11-Aug		11238	99.9	12947		99.9	9130	99.9	7808	99.9	9129	99.9	99.8
12-Aug		11239	99.9	12954		99.9	9130	99.9	7809	99.9	9131	99.9	99.9
13-Aug		11239	99.9	12972		100	9131	99.9	7809	99.9	9133	99.9	99.9
14-Aug		11242	99.9	12978		100	9131	99.9	7809	99.9	9135	99.9	99.9
15-Aug		11242	99.9	12988		100	9131	99.9	7813	99.9	9137	99.9	99.9
16-Aug		11245	99.9	12988		100	9133	99.9	7817	99.9	9137	99.9	99.9
17-Aug		11246	99.9	12988		100	9134	99.9	7818	99.9	9137	99.9	99.9
				12988									
				12988									

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				1985		1986		1987		1988		1989	
Date		No.	%		No.	%	No.	%	No.	%	No.	%	No.	%
18-Aug		6499	99.9			99.8	6368	99.9	7924	99.9	21360	99.9	15428	99.9
19-Aug	1984	6500	99.9			99.9	6369	99.9	7925	99.9	21364	99.9	15429	99.9
20-Aug		6501	99.9	8138		99.9	6369	99.2	7925	99.9	21367	99.9	15429	99.9
21-Aug		6502	100	8139		99.9	6370	99.9	7927	99.9	21368	99.9	15430	99.9
22-Aug		6502	100	8140		99.9	6371	100	7927	99.9	21369	99.9	15431	99.9
23-Aug		6502	100	8141		99.9	6371	100	7928	99.9	21369	99.9	15431	99.9
24-Aug		6502	100	8142		99.9	6371	100	7929	99.9	21370	100	15431	99.9
25-Aug		6502	100	8144		99.9	6371	100	7929	99.9	21370	100	15431	99.9
26-Aug		6502	100	8144		99.9	6371	100	7929	99.9	21370	100	15431	99.9
27-Aug		6502	100	8146		99.9	6371	100	7930	100	21370	100	15431	99.9
28-Aug		6502	100	8148		100	6371	100	7930	100	21370	100	15431	99.9
29-Aug		6502	100	8149		100	6371	100	7930	100	21370	100	15432	100
30-Aug		6502	100	8151		100	6371	100	7930	100	21370	100	15432	100
31-Aug		6502	100	8151		100	6371	100	7930	100	21370	100	15432	100
1-Sep			100	8151		100	6371	100	7930	100	21370	100	15432	100
2-Sep			100	8151		100	6371	100	7930	100	21370	100	15432	100
Season	6502			8151										
Total	6502	6,502		8151			6,371		7,930		21,370		15,432	

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8,151

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				1991		1992		1993		1994		1984-94
Date		No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
18-Aug		11246	99.9		100	9134	99.9	7818	99.9	9137	99.9	99.9
19-Aug	1990	11249	99.9		100	9135	100	7818	99.9	9137	99.9	99.9
20-Aug		11249	99.9	12988	100	9135	100	7818	99.9	9137	99.9	99.9
21-Aug		11249	99.9	12988	100	9135	100	7818	99.9	9137	99.9	99.9
22-Aug		11249	99.9	12988	100	9135	100	7819	100	9137	99.9	99.9
23-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	99.9
24-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	99.9
25-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	99.9
26-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	99.9
27-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	100
28-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	100
29-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	100
30-Aug		11249	99.9	12988	100	9135	100	7819	100	9138	100	100
31-Aug		11250	99.9	12988	100	9135	100	7819	100	9138	100	100
1-Sep			99.9	12988	100	9135	100	7819	100	9138	100	100
2-Sep			100	12988	100	9135	100	7819	100	9138	100	100
Season	11250			12988								
Total	11251	11,251		12988		9,135		7,819		9,138		
				12,988								

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

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

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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[b]	1984-94 % Avg.
19-Jul	89			74	86	72	78	72	88	93	84	81
20-Jul	89			79	88	74	81	79	90	95	88	84
21-Jul	90	68	82	84	90	75	86	80	91	95	89	86
22-Jul	92	70	87	87	92	83	90	87	92	95	91	89
23-Jul	94	73	89	90	92	87	91	90	93	96	93	91
24-Jul	94	78	90	92	93	89	92	93	94	97	95	92
25-Jul	95	80	94	96	94	90	93	95	95	97	96	94
26-Jul	96	82	96	97	96	92	95	96	96	98	97	95
27-Jul	97	85	96	97	96	93	97	97	97	98	98	96
28-Jul	99	88	97	98	98	95	98	98	97	99	99	98
29-Jul	99	92	98	99	99	99	99	99	99	99	99	99
30-Jul	99	95	98	99	99	99	99	99	99	99	99	99
31-Jul	100	97	99	100	100	100	100	100	100	100	100	100
Season Total	5,548	98 100	99 100	2,624	4,868	3,316	4,364	4,545	3,806	1,946	3,016	

[a] 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.

[b] 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, 1989-1994

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 fresh water 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	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.
2-SS-4-32-92	9/11/92	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. 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.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-32-92	9/11/92	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.
2-SS-4-35-92	10/7/92	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. 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.

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	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.
2-SS-4-40-94	9/11/94	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. 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.

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Emergency Order Number	Effective Date	Action/Justification
2-SS-4-42-94	9/17/94	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. 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.

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

Appendix I1.-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 SPORT FISH EFFORT, CATCH, AND HARVEST BY FISHERY AND SPECIES, FROM MILLS STATEWIDE HARVEST SURVEY, 1993

Appendix J1.-Kodiak Area[a] sport fish harvest and effort by fisheries and species, 1993.

	Anglers	Trips	Days Fished	KS	SS	LL	RS	PS	CS	DV AC	SH	RT	GR	SM	HA	RF	LC	RCL	OTHER
SALTWATER:																			
Boat - Chiniak Bay Area	4,391	11,813	14,556	1,548	2,093	0	419	1,350	157	343	144	0	0	11	6,074	4,912	425	0	1,018
Boat - Afognak Island Area	1,783	3,615	5,427	317	1,537	0	617	208	0	28	19	0	0	0	1,967	1,370	195	0	187
Boat - Barren Islands	1,740	1,667	1,911	18	28	0	0	0	0	18	0	0	0	22	2,800	312	28	0	54
Boat - Shuyak Area	237	366	936	0	143	0	0	45	0	88	0	0	0	0	199	19	29	0	0
Boat - Other	2,560	4,270	7,095	334	1,205	0	239	266	16	177	21	0	0	34	2,346	421	87	0	198
Shoreline - Chiniak Bay Area	2,086	6,495	7,234	172	1,481	0	206	3,260	37	737	41	0	0	0	311	428	99	0	98
Shoreline - Afognak Island Area	646	1,137	1,388	18	1,038	0	270	47	0	53	10	0	0	0	169	64	9	559	9
Shoreline - Other	1,176	3,033	3,215	47	352	0	217	461	42	200	9	0	0	0	303	43	50	727	45
SALTWATER TOTAL	10,858 b	32,396	41,762	2,454	7,877	0	1,968	5,637	252	1,644	244	0	0	67	14,169	7,569	922	1,286	1,609
FRESHWATER:																			
Buskin River	4,059	13,995	17,072	0	4,125	0	1,544	1,104	37	1,150	0	0	0	0	0	0	0	0	0
Pasagshak River	2,301	4,338	4,485	0	2,073	0	543	381	0	194	0	0	0	0	0	0	0	0	9
Karluk River and Lagoon	2,161	2,516	6,894	1,634	845	0	1,572	211	0	580	41	148	0	0	0	0	0	0	0
American River	2,019	3,668	5,006	0	2,340	0	0	560	72	115	0	0	0	0	0	0	0	0	0
Olds River (or Creek)	2,388	5,006	5,592	0	1,838	0	0	2,676	26	468	0	0	0	0	0	0	0	0	0
Red River (Ayakulik)	1,016	933	4,566	1,004	260	0	985	0	0	45	0	0	0	0	0	0	0	0	0
Saltery Creek	291	688	1,226	0	392	0	563	55	0	492	0	0	0	0	0	0	0	0	0
Other Streams	1,656	4,237	4,475	0	938	0	474	1,578	67	1,450	10	49	0	0	0	0	0	0	0
Roadside Lakes	485	1,146	1,186	0	285	0	52	69	50	29	37	98	8	0	0	0	0	0	0
Other Lakes	414	824	1,056	0	268	0	148	53	0	132	0	79	8	0	0	0	0	0	0
FRESHWATER TOTAL	9,605 b	37,351	51,558	2,638	13,364	0	5,881	6,687	252	4,655	88	374	16	0	0	0	0	0	9
GRAND TOTAL	15,323 b	69,747	93,320	5,092	21,241	0	7,849	12,324	504	6,299	332	374	16	67	14,169	7,569	922	1,286	1,618

[a] Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

[b] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J2.-Kodiak Area[a] sport fish catch and effort by fisheries and species, 1993.

	Anglers	Trips	Days Fished	KS	SS	LL	RS	PS	CS	DV AC	SH	RT	GR	SM	HA	RF	LC	RCL	OTHER
SALTWATER:																			
Boat - Chiniak Bay Area	4,391	11,813	14,556	2,677	2,841	0	586	5,092	368	2,301	144	0	0	11	11,832	9,012	960	0	1,458
Boat - Afognak Island Area	1,783	3,615	5,427	363	2,216	0	721	1,311	43	252	19	0	0	0	3,731	3,250	503	0	399
Boat - Barren Islands	1,740	1,667	1,911	18	38	0	0	0	0	18	0	0	0	22	7,539	312	86	0	134
Boat - Shuyak Area	237	366	936	0	564	0	0	505	0	263	103	0	0	0	366	19	29	0	0
Boat - Other	2,560	4,270	7,095	1,467	1,596	0	1,225	1,980	100	1,544	21	0	0	34	4,351	1,534	521	0	1,353
Shoreline - Chiniak Bay Area	2,086	6,495	7,234	208	2,422	0	399	8,962	323	2,840	52	0	0	0	521	497	99	0	147
Shoreline - Afognak Island Area	646	1,137	1,388	18	1,547	0	367	955	146	297	237	0	0	0	367	64	9	559	9
Shoreline - Other	1,176	3,033	3,215	57	621	0	304	3,473	168	1,765	19	0	0	0	505	866	197	727	586
SALTWATER TOTAL	10,858 b	32,396	41,762	4,808	11,845	0	3,602	22,278	1,148	9,280	595	0	0	67	29,212	15,554	2,404	1,286	4,086
FRESHWATER:																			
Buskin River	4,059	13,995	17,072	103	6,747	0	2,520	6,380	80	5,496	404	320	0	0	0	0	0	0	88
Pasagshak River	2,301	4,338	4,485	10	4,681	0	918	1,308	28	1,510	0	0	0	0	0	0	0	0	63
Karluk River and Lagoon	2,161	2,516	6,894	8,369	3,332	0	7,015	1,288	73	9,986	2,190	1,445	0	0	0	0	0	0	0
American River	2,019	3,668	5,006	0	4,112	0	0	6,960	503	6,376	0	0	0	0	0	0	0	0	62
Olds River (or Creek)	2,388	5,006	5,592	0	2,962	0	0	10,388	1,205	2,387	0	0	0	0	0	0	0	0	0
Red River (Ayakulik)	1,016	933	4,566	5,426	1,448	0	4,854	272	8	1,679	1,443	557	0	0	0	0	0	0	0
Saltery Creek	291	688	1,226	0	1,156	0	2,298	1,899	46	2,422	0	79	0	0	0	0	0	0	0
Other Streams	1,656	4,237	4,475	9	3,731	0	2,145	6,176	223	9,927	163	1,437	84	0	0	0	0	0	0
Roadside Lakes	485	1,146	1,186	0	945	0	289	129	233	356	37	1,038	17	0	0	0	0	0	0
Other Lakes	414	824	1,056	0	449	0	3,470	501	0	2,692	278	914	109	0	0	0	0	0	0
FRESHWATER TOTAL	9,605 b	37,351	51,558	13,917	29,563	0	23,509	35,301	2,399	42,831	4,515	5,790	210	0	0	0	0	0	213
GRAND TOTAL	15,323 b	69,747	93,320	18,725	41,408	0	27,111	57,579	3,547	52,111	5,110	5,790	210	67	29,212	15,554	2,404	1,286	4,299

[a] Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

[b] 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[a] sport fish harvest and effort by fisheries and species, 1993.

	Anglers	Trips	Days Fished	KS	SS	RS	KO	PS	CS	LT	DV AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	OTHER
SALTWATER:																					
Boat - Adak Island Area	608		4,314	0	153	1,417	0	384	0	0	565	0	0	0	0	0	0	1,310	311	119	153
Boat - Other	1,223	2,994 3,593	7,725	78	421	328	0	419	282	0	319	0	0	0	0	0	0	1,988	437	49	744
Shoreline	767		2,735	69	391	231	0	1,180	0	0	793	0	0	0	0	0	0	193	33	30	49
SALTWATER TOTAL	2,182 b	2,098 8,683	14,774	147	965	1,976	0	1,983	282	0	1,677	0	0	0	0	0	0	3,491	781	198	946
FRESHWATER:																					
Cold Bay Area (including Russel Creek)	174		925	0	229	472	0	0	0	0	350	0	0	0	0	0	0	0	0	0	0
Adak Island Area	413	269 2,328	2,735	0	258	210	3,087	1,227	0	0	1,682	0	0	0	0	0	0	0	0	0	0
Naknek River & Tributaries	3,629	9,980	13,674	2,603	1,034	946	0	9	34	28	568	842	501	0	0	0	3,746	0	0	0	0
Brooks River	1,971		5,565	0	36	586	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0
American Creek	464	3,282 688	1,659	0	0	0	0	0	0	0	44	0	0	0	8	0	0	0	0	0	0
Other Streams	1,315		4,218	503	486	195	0	112	92	9	644	162	127	0	28	0	1,677	0	0	0	0
Ugashik System	641	3,129 965	1,918	150	92	174	0	0	0	72	248	0	0	0	19	0	0	0	0	0	0
Becharof System	422		888	9	48	149	0	0	0	9	171	18	37	0	0	0	0	0	0	0	0
Naknek Lake - Bay of Islands	495	490 800	1,160	18	19	0	0	0	0	40	28	10	17	0	75	0	0	0	0	0	0
Naknek Lake - Other	292		844	0	0	106	0	0	0	29	19	18	0	0	0	0	0	0	0	0	0
Brooks Lake	345		900	0	10	101	0	0	0	28	0	9	0	0	0	0	0	0	0	0	0
Other Lakes	299	868 999	1,872	41	76	145	416	0	18	101	321	9	0	0	0	0	0	0	0	0	0
FRESHWATER TOTAL	7,595 b	792 24,590	36,358	3,324	2,288	3,084	3,503	1,348	144	325	4,075	1,068	682	0	130	0	5,423	0	0	0	0
GRAND TOTAL	9,160 b	33,273	51,132	3,471	3,253	5,060	3,503	3,331	426	325	5,752	1,068	682	0	130	0	5,423	3,491	781	198	946

[a] 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.

[b] 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[a] sport fish catch and effort by fisheries and species, 1993.

	Anglers	Trips	Days Fished	KS	SS	RS	KO	PS	CS	LT	DV AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	OTHER
SALTWATER:																					
Boat - Adak Island Area	608		4,314	0	248	1,792	0	671	0	0	2,173	0	0	0	0	0	0	3,057	565	565	3,060
Boat - Other	1,223	2,994	3,593	7,725	177	490	354	0	1,088	282	0	1,569	0	0	0	0	0	0	8,244	3,914	118	5,663
Shoreline	767			2,735	106	849	231	0	1,755	0	0	2,148	0	0	0	0	0	0	283	118	78	123
SALTWATER TOTAL	2,182 b	2,096	8,683	14,774	283	1,587	2,377	0	3,514	282	0	5,890	0	0	0	0	0	0	11,584	4,597	761	8,846
FRESHWATER:																					
Cold Bay Area (including Russel Creek)	174			925	0	1,462	617	0	0	202	0	883	0	0	0	0	0	0	0	0	0	69
Adak Island Area	413		2,328	2,735	0	420	219	3,152	2,263	0	0	3,982	0	0	0	0	0	0	0	0	0	0
Naknek River & Tributaries	3,629	269	9,980	13,674	6,519	2,187	3,029	0	104	249	97	4,727	16,443	4,158	505	252	0	3,835	0	0	0	29
Brooks River	1,971			5,565	18	549	10,504	0	0	0	224	1,166	13,575	1,227	8	0	0	0	0	0	0	0
American Creek	464		688	1,659	0	17	642	0	9	0	230	9,855	5,816	177	9	169	0	0	0	0	0	0
Other Streams	1,315	3,282		4,218	2,404	2,641	1,948	0	1,350	995	74	5,958	2,050	2,175	0	197	0	1,707	0	0	0	98
Ugashik System	641			1,918	1,115	837	566	0	0	100	131	3,288	272	568	0	880	0	0	0	0	0	0
Becharof System	422	3,129		888	341	275	695	0	0	0	9	3,723	1,404	1,265	0	0	0	0	0	0	0	0
Naknek Lake - Bay of Islands	495	965	800	1,160	37	19	0	0	0	0	730	232	2,094	54	0	2,663	0	0	0	0	0	0
Naknek Lake - Other	292	490		844	0	67	868	0	0	0	160	1,238	900	280	0	160	0	0	0	0	0	0
Brooks Lake	345			900	20	153	442	0	0	8	654	78	1,306	9	0	0	0	0	0	0	0	0
Other Lakes	299	868	999	1,872	123	420	188	986	29	18	975	1,342	1,113	0	8	0	0	0	0	0	0	0
FRESHWATER TOTAL	7,595 b	792	24,590	36,358	10,577	9,047	19,718	4,138	3,755	1,572	3,284	36,472	44,973	9,913	530	4,321	0	5,542	0	0	0	196
GRAND TOTAL	9,160 b		33,273	51,132	10,860	10,634	22,095	4,138	7,269	1,854	3,284	42,362	44,973	9,913	530	4,321	0	5,542	11,584	4,597	761	9,042

[a] 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.

[b] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.