

**Fishery Management Report No. 02-02**

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**Area Management Report for the Recreational  
Fisheries of the Kodiak and Alaska  
Peninsula/Aleutian Islands Regulatory Areas,  
1999 and 2000.**

by

**Len Schwarz,**

**Donn Tracy,**

and

**Suzanne Schmidt**

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April 2002

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 <sup>3</sup> /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

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 <sub>A</sub>
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, $\chi^2$ , 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 <sub>2</sub> , etc.
mid-eye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H <sub>0</sub>
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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FISHERIES OF THE KODIAK AND ALASKA PENINSULA/ALEUTIAN  
ISLANDS REGULATORY AREAS, 1999 AND 2000**

by  
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## **SECTION I: MANAGEMENT AREA OVERVIEW**

Section I presents an introductory overview of the Kodiak Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; 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; and a general description of stocking, research, management, partnership, aquatic education, viewing, and access activities being conducted in the management area.

### **MANAGEMENT AREA DESCRIPTION**

The Kodiak sport fish management area (KMA) includes all waters of the Kodiak Island Archipelago, the Alaska Peninsula south of a line from Cape Douglas to Cape Mensehikoff, and the Aleutian Islands (Figure 1). This management area is composed of two sport fishing regulatory areas: the Kodiak Regulatory Area and the Alaska Peninsula/Aleutian Islands Regulatory Area. With the exception of the road-accessible streams located in Kodiak, Adak, Cold Bay, and Dutch Harbor, virtually all sport fisheries in the KMA are remote and relatively difficult to access. A coastal climate with high precipitation and mild temperatures characterizes 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 on their road systems of 13,400 and 4,300, respectively, in the year 2000, are the two largest communities. The management area also includes approximately 20 villages with year-round inhabitants. A major U.S. Navy Base on Adak Island has been closed and the past Adak population of 5,000 people has dropped to several hundred people.

Management and research functions for the KMA are based in the Kodiak area office. The Division of Sport Fish staff stationed in Kodiak includes two permanent full time Fisheries Biologists: Len Schwarz, Area Fisheries Biologist III and Donn Tracy, Assistant Area Biologist II. One permanent full time clerical position (Doris Mensch) is stationed in Kodiak and shared with the Division of Wildlife Conservation staff. Support is also provided to the area staff from the Sport Fish Division southcentral regional Research and Technical Services (RTS) staff. Seasonal staff includes a Fisheries Biologist I, Suzanne Schmidt, and three fish and wildlife technicians. Seasonal staff assist in operating department programs which include operating weirs, biological sampling, creel surveys, stocking, and escapement surveys.

### **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 Fisheries 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

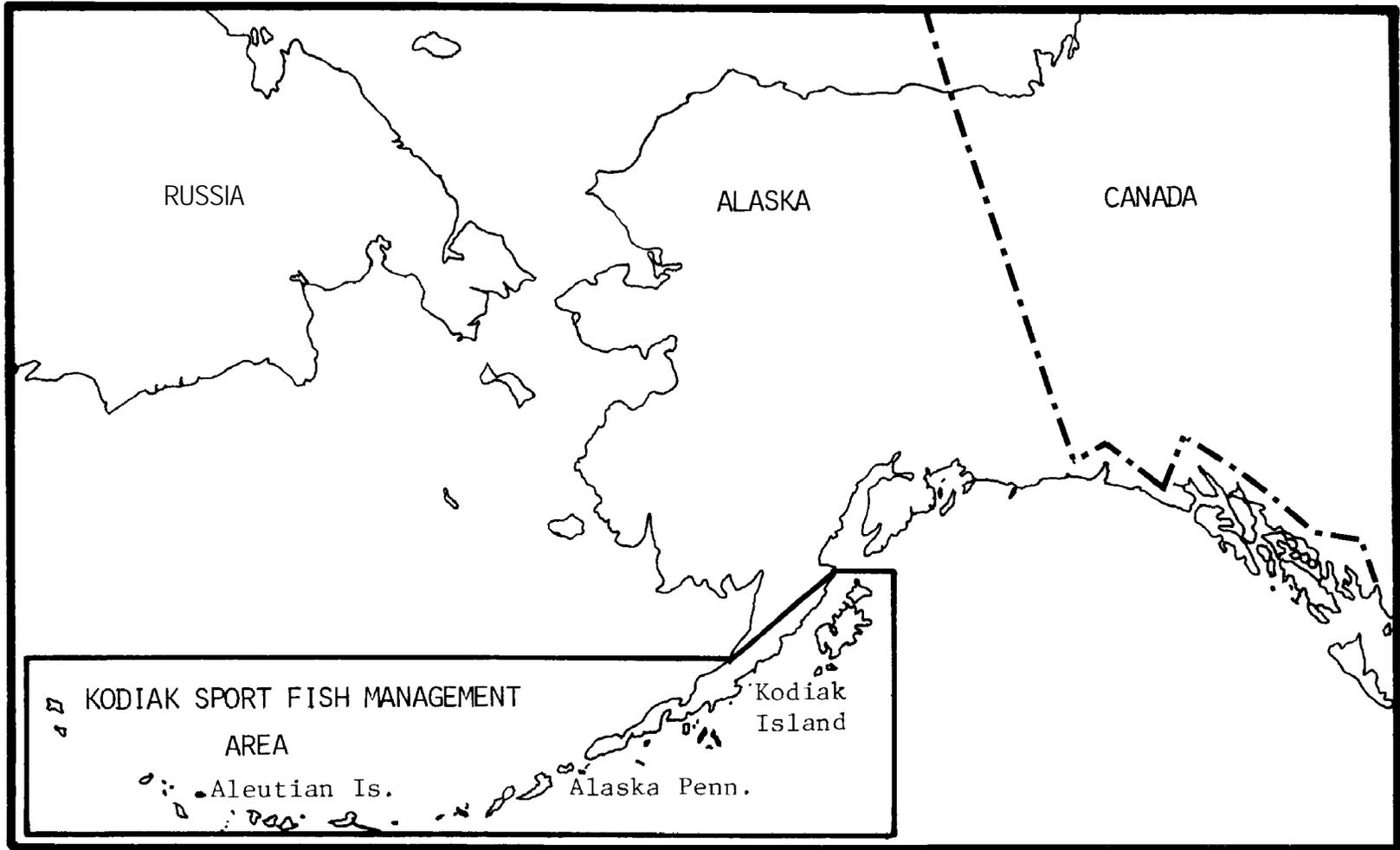


Figure 1.-The Kodiak Management Area: Kodiak Island Archipelago, Alaska Peninsula, and Aleutian Islands.

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

Under the current operating schedule, the Board of Fisheries meets on a 3-year cycle. Alaska Peninsula/Aleutian Island proposals were heard during the January 2001 meeting. Proposals regarding the Kodiak Regulatory Area will be heard during the January 2002 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 *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 salmon.

The Division of Sport Fish classifies sport fisheries into one of three levels based on a combination of yield (harvest) and angler-cost criteria. Level I fisheries are defined as high yield, low angler-cost fisheries. These fisheries are typically entry level fisheries where 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 cities of Kodiak and Dutch Harbor provide Level I fisheries. Marine waters near Kodiak and Unalaska islands offer Level II fisheries for halibut and rockfish. Another example of a Level II fishery in the KMA is boat-accessible salmon fisheries on Afognak Island. Remote steelhead trout and chinook salmon stocks, such as those in the Karluk and Ayakulik rivers which are accessible by aircraft, offer Level III fisheries.

## **RECREATIONAL ANGLER EFFORT**

From 1990 through 1999 an average of 108,180 angler-days were expended by recreational anglers fishing KMA waters (Table 1)<sup>1</sup>. Recreational angler effort increased annually from 1977 through 1982, after which effort generally stabilized between 90,000 and 110,000 angler-days up to 1989 (Figure 2). The estimated sport effort for the KMA peaked during 1991 with 136,490 angler-days. The trend for increasing angler effort reversed itself after the record effort in 1991 and decreased throughout most of the 1990s. Angling effort increased substantially in 1999 to 129,420 and a record effort level of 139,930 angler-days occurred in 2000.

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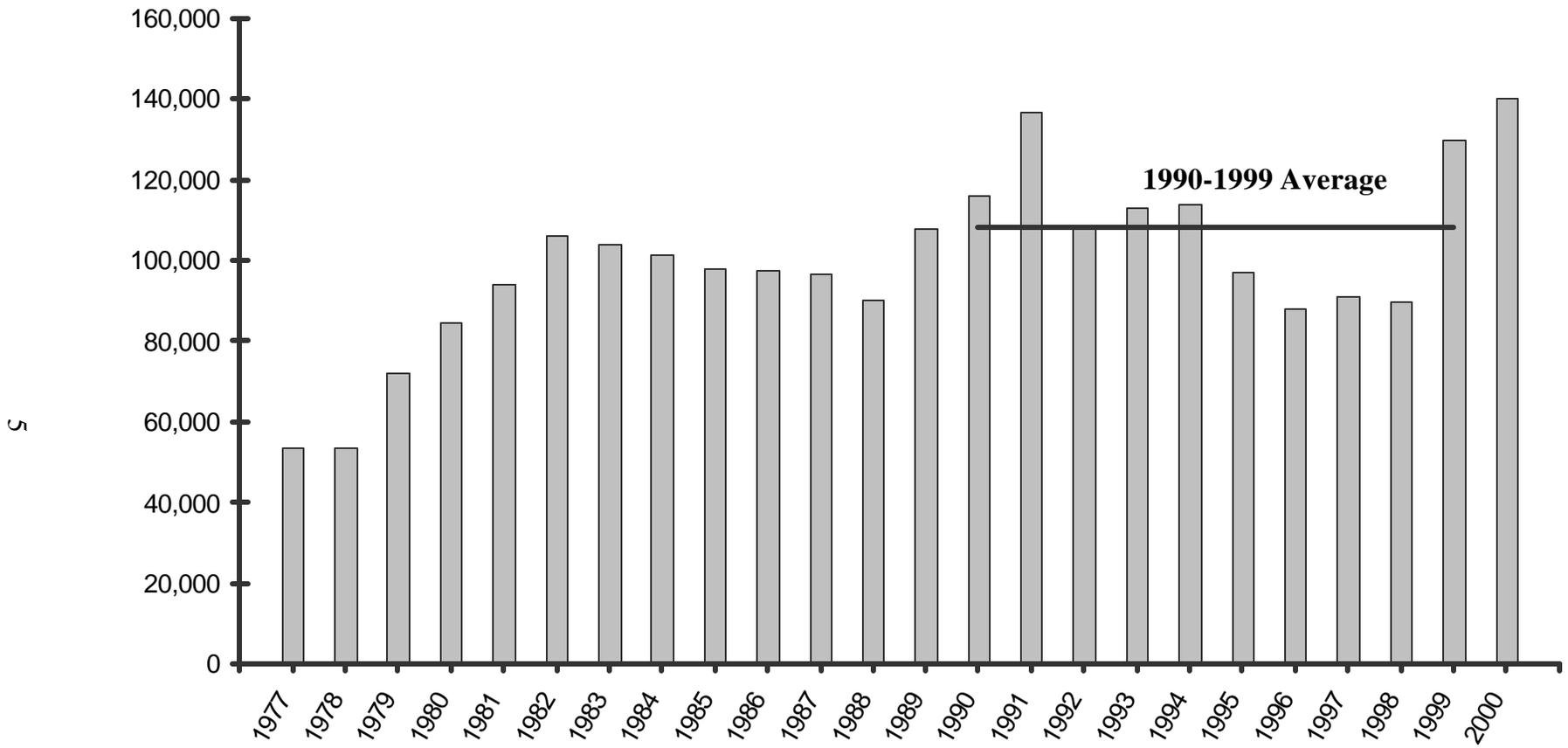
<sup>1</sup> Effort and harvest figures cited in this report are from the Statewide Harvest Survey (Mills 1979-1994, Howe et al. 1995 and 1996, 2001 a-d, and Walker et al. *In prep*), unless otherwise noted. Numbers presented in the text throughout this report have been rounded off to the nearest 10. Numbers in the tables are the actual estimate or count.

**Table 1.-Number of angler-days of effort expended by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total
	Salt Water		Fresh Water		Area Total		Salt Water <sup>a</sup>		Fresh Water		Area Total		
	Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA	Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA	
1977					11,581	22	14,957	36	26,606	64	41,563	78	53,144
1978					8,766	16	19,063	43	25,439	57	44,502	84	53,268
1979					12,969	18	23,124	39	35,921	61	59,045	82	72,014
1980					19,760	23	27,646	43	37,261	57	64,907	77	84,667
1981	11,828	43	15,378	57	27,206	29	29,857	45	36,582	55	66,439	71	93,645
1982	9,075	37	15,439	63	24,514	23	41,113	51	40,125	49	81,238	77	105,752
1983	8,035	46	9,329	54	17,364	17	40,217	47	46,237	53	86,454	83	103,818
1984	10,428	56	8,038	44	18,466	18	34,213	41	48,447	59	82,660	82	101,126
1985	3,153	24	9,899	76	13,052	13	33,032	39	51,809	61	84,841	87	97,893
1986	6,321	32	13,742	68	20,063	21	31,762	41	45,404	59	77,166	79	97,229
1987	7,021	33	14,215	67	21,236	22	38,302	51	36,979	49	75,281	78	96,517
1988	7,967	37	13,515	63	21,482	24	29,732	43	38,803	57	68,535	76	90,017
1989	10,597	47	11,959	53	22,556	21	34,287	40	50,857	60	85,144	79	107,700
1990	15,690	45	19,285	55	34,975	30	34,089	42	46,634	58	80,723	70	115,698
1991	20,833	50	20,785	50	41,618	30	40,702	43	54,166	57	94,868	70	136,486
1992	13,615	53	11,912	47	25,527	24	34,767	42	48,292	58	83,059	76	108,586
1993	14,536	68	6,881	32	21,417	19	39,851	44	51,558	56	91,409	81	112,826
1994	10,351	62	6,221	38	16,572	15	42,106	43	54,820	57	96,926	85	113,498
1995	8,813	65	4,719	35	13,532	14	38,063	46	45,487	54	83,550	86	97,082
1996	6,855	62	4,132	38	10,987	13	33,455	44	43,424	56	76,879	87	87,866
1997	8,534	68	4,002	32	12,536	14	36,842	47	41,513	53	78,355	86	90,891
1998	6,927	64	3,842	36	10,769	12	36,689	47	41,999	53	78,688	88	89,457
1999	10,113	54	8,539	46	18,652	14	47,684	43	63,083	57	110,767	86	129,419
2000	10,133	55	8,387	45	18,520	13	55,576	46	65,831	54	121,407	87	139,927
Average	10,041	52	10,511	54	19,338	20	34,880	44	44,887	56	79,767	80	99,105
1990-1999													
Average	11,627	56	9,032	44	20,659	19	38,425	44	49,098	56	87,522	81	108,181

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Published Statewide Harvest Survey effort estimates for the Kodiak Island Saltwater area included the Barren Islands from 1987-1995. Numbers in this table do not include the Barren Islands.



**Figure 2.-Angler-days of recreational fishing effort expended by anglers fishing Kodiak Management Area waters, 1977-2000.**

Historically, 80% of the total recreational angler effort from the KMA has occurred in the waters of the Kodiak Regulatory Area. From 1977 through 2000, waters of the Kodiak Regulatory Area supported an average of 79,770 angler-days of sport fishing effort (Table 1). In comparison, average sport effort in the Alaska Peninsula/Aleutian Island Regulatory Area from 1977 through 2000 was 19,340 angler-days (Table 1).

The most popular fisheries in the KMA in terms of recreational angling effort expended over the past 10 years has been the fresh and marine waters of the Kodiak Road System (Figure 3). Since 1991, these waters have accounted for more than 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 16,440 angler-days of fishing effort annually from 1990-1999 (Table 2). Other major freshwater fisheries along the Kodiak road system occur on the Pasagshak, Olds, and American rivers; the various road-accessible lakes near Kodiak; and in the marine waters of Chiniak and Marmot bays (Table 2). Popular fisheries in the remote area include the fresh and marine waters of the Afognak/Shuyak islands group and freshwater fisheries in the Karluk and Ayakulik rivers.

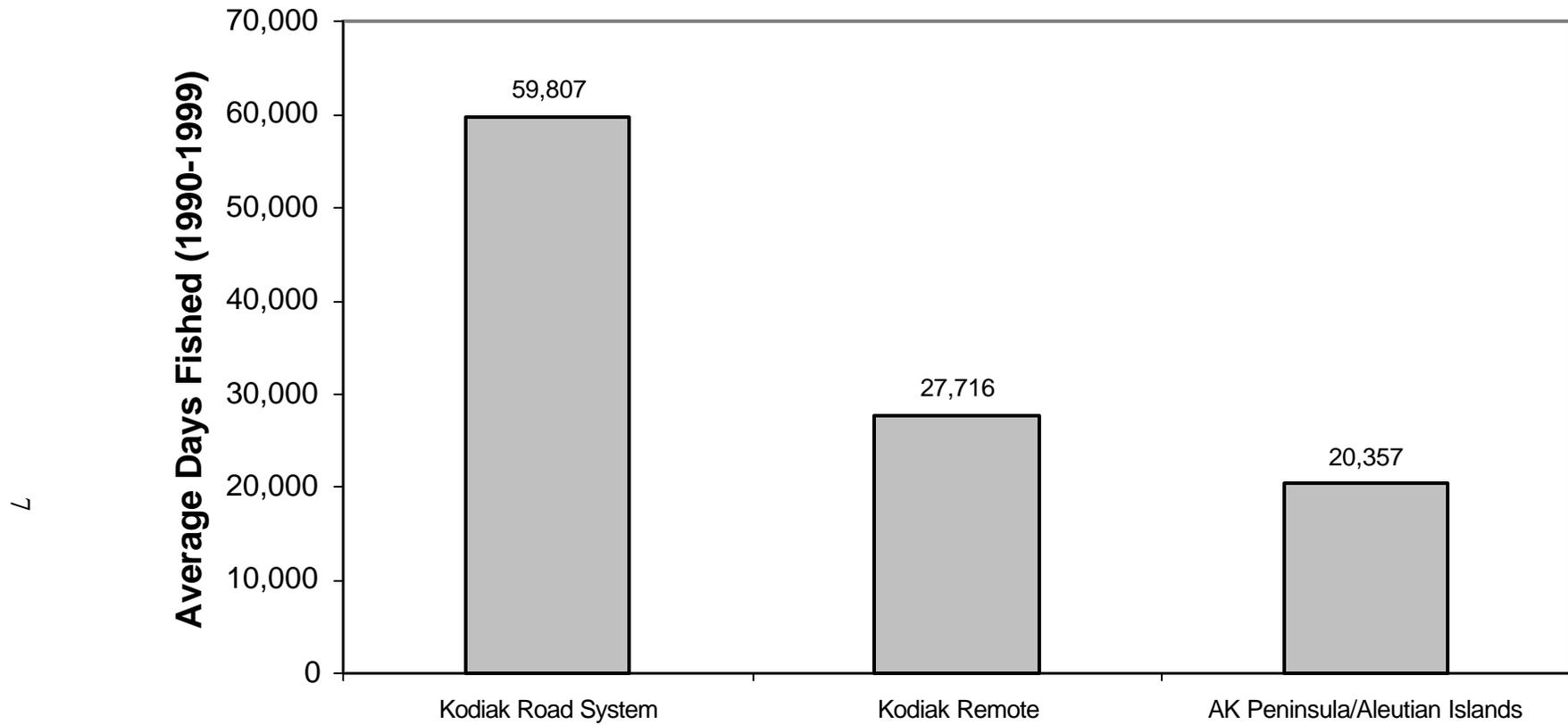
In the Alaska Peninsula/Aleutian Island regulatory area, the fresh and marine waters of Adak Island used to represent the most popular fishery in terms of recreational angling effort expended (Table 3). Prior to closure of the Navy base, the Adak waters averaged 13,620 angler-days per year (1982–1993). Fishing effort in Adak Island waters dropped to an estimated 2,530 angler-days in the 2000 Statewide Harvest Survey. The major fisheries now include marine and freshwater fisheries around the towns of Unalaska and Cold Bay. In 2000 these fisheries totaled 10,780 angler-days.

## **RECREATIONAL FISH HARVEST**

From 1977 through 2000, an average of 93,850 fish were harvested (kept) by sport anglers fishing KMA waters (Table 4; Appendices A1-A13). As was the case with recreational angler effort, harvests from KMA waters peaked in 2000. About 50% of the historical sport harvest was salmon, of which approximately 36% were pink, 39% coho, 16% sockeye, 6% chinook, and 2% chum salmon. Dolly Varden/Arctic char used to contribute the largest single species harvested, accounting for an average historical harvest of 22,560 fish from 1977-1990. However, the contribution of Dolly Varden to the total harvest has significantly dropped in the past few years, and averaged only 11,650 from 1991-2000. In 2000, the Dolly Varden harvest accounted for 11% of the total harvest (Figure 4). In 2000, coho salmon and halibut were the most commonly harvested species, accounting for 45% of the total harvest (Figure 4).

On average, Kodiak Regulatory Area waters accounted for 76,880 sport-harvested fish from 1977 through 2000 (Table 5), or 82% of the average KMA sport harvest. In 2000 the most commonly harvested species were coho salmon, halibut, and sockeye salmon, estimated at 30,980, 21,280, and 16,970 fish, respectively (Table 5). The harvest of these three species made up 61% of the total harvest in 2000.

Waters of the Alaska Peninsula/Aleutian Islands Regulatory Area have accounted for an average of 16,970 sport-harvested fish from 1977 through 2000 (Table 6), or about 18% of the average KMA sport harvest. Dolly Varden, halibut, and pink, coho, and sockeye salmon have accounted for most of the historical sport harvest (Table 6). From 1977 through 2000, these four species have accounted for



**Figure 3.-Recreational fishing effort in Kodiak Management Area waters, 1990-1999, by area fished.**

**Table 2.-Number of angler-days of effort expended by sport anglers fishing Kodiak Regulatory Area waters, by location, 1986-2000.**

Fishery	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average (1990-1999)
<b>Kodiak Road System</b>																
Buskin River & Lake	24,277	16,481	18,426	26,384	19,463	22,601	15,514	17,118	16,547	14,234	14,304	10,769	14,379	19,512	21,497	16,444
Pasagshak R & Lk Rose Tead	5,504	5,143	5,111	5,578	8,443	5,876	6,999	4,888	5,598	5,218	4,757	4,491	3,209	5,538	9,436	5,502
Olds River <sup>a</sup>	3,578	2,083	4,147	5,378	3,158	5,583	5,079	5,806	3,438	5,169	3,062	2,944	4,539	6,852	5,912	4,563
American River	4,419	3,622	3,038	3,506	3,359	4,291	3,276	5,006	3,321	3,267	3,483	4,687	3,058	7,003	4,899	4,075
Saltery Cove Freshwater	624	380	892	1,575	1,027	1,260	1,067	1,914	1,271	1,554	1,743	1,545	2,054	3,308	4,127	1,674
Other Roadside Lakes	553	1,390	1,677	829	1,855	914	1,589	625	608	843	2,141	565	319	894	1,027	1,035
Other Roadside Streams	2,679	1,457	1,444	1,930	1,944	3,031	2,319	2,444	3,440	3,406	3,732	2,803	4,856	6,229	4,016	3,420
Chiniak Bay Boat	9,733	14,307	8,676	8,684	10,754	13,106	13,692	14,566	14,773	13,919	11,783	14,440	12,927	17,823	21,670	13,778
Ugak Bay Boat	612	235	182	30	793	49	416	621	828	2,281	619	1,791	839	926	1,246	916
Other Roadside Boat	260	561	834	661	86	498	395	869	931	333	405	217	232	254	425	422
Roadside Shoreline	9,171	11,016	8,229	13,305	10,129	11,910	7,608	9,073	8,948	6,102	7,051	4,062	8,126	6,752	9,233	7,976
<b>Total</b>	<b>61,410</b>	<b>56,675</b>	<b>52,656</b>	<b>67,860</b>	<b>61,011</b>	<b>69,119</b>	<b>57,954</b>	<b>62,930</b>	<b>59,703</b>	<b>56,326</b>	<b>53,080</b>	<b>48,314</b>	<b>54,538</b>	<b>75,091</b>	<b>83,488</b>	<b>59,807</b>
<b>Kodiak Remote Area</b>																
Karluk River System	1,070	3,857	2,401	2,609	3,326	4,632	5,430	6,916	10,948	6,928	4,679	5,043	4,223	6,239	8,301	5,836
Ayakulik (Red) River System	317	638	377	1,165	815	1,780	3,404	4,625	5,473	1,382	1,524	3,374	1,314	2,165	1,853	2,586
Other Remote Lakes	906	267	741	641	1,108	808	424	916	1,399	756	782	618	629	358	840	780
Other Remote Streams	1,477	1,661	549	1,262	2,136	3,390	3,191	1,300	2,777	2,730	3,217	4,674	3,419	4,985	3,923	3,182
Afognak Lagoon Shoreline						987	843	354	466	580	940	955	600	1,166	1,146	766
Other Afognak/Shuyak Shore	2,001	2,428	2,911	1,414	2,054	817	822	1,256	1,220	3,135	1,246	1,258	537	3,176	1,168	1,552
Pauls Bay Boat									53		853		198	358	1,375	366
Other Afognak Island Boat	7,049	5,614	5,420	5,628	4,955	4,715	4,577	5,347	5,517	5,648	4,653	4,540	4,703	6,139	6,784	5,079
Shuyak Island Boat	673	996	1,000	1,335	636	390	1,099	936	762	422	458	1,014	470	978	1,060	717
Uyak Bay Boat	146		62	262	145	1,573	224	744	1,494	1,066	391	1,343	1,567	1,939	3,506	1,049
Other Remote Boat	1,753	2,560	1,542	2,059	3,086	3,034	4,199	4,931	5,374	2,523	4,432	5,800	4,965	6,916	6,676	4,526
Other Remote Shore	364	585	876	909	1,451	3,623	892	1,154	1,740	2,054	624	1,422	1,525	1,257	1,287	1,574
<b>Total</b>	<b>15,756</b>	<b>18,606</b>	<b>15,879</b>	<b>17,284</b>	<b>19,712</b>	<b>25,749</b>	<b>25,105</b>	<b>28,479</b>	<b>37,223</b>	<b>27,224</b>	<b>23,799</b>	<b>30,041</b>	<b>24,150</b>	<b>35,676</b>	<b>37,919</b>	<b>27,716</b>
<b>Regulatory Area Total<sup>b</sup></b>	<b>77,166</b>	<b>75,281</b>	<b>68,535</b>	<b>85,144</b>	<b>80,723</b>	<b>94,868</b>	<b>83,059</b>	<b>91,409</b>	<b>96,926</b>	<b>83,550</b>	<b>76,879</b>	<b>78,355</b>	<b>78,688</b>	<b>110,767</b>	<b>121,407</b>	<b>87,522</b>

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage.  
Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Olds River includes unidentified Kalsin Bay streams.

<sup>b</sup> Published Statewide Harvest Survey effort estimates for the Kodiak Island Saltwater area included the Barren Islands from 1987-1995. Numbers in this table do not include the Barren Islands.

**Table 3.-Number of angler-days of effort expended by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, by location, 1986-2000.**

Fishery	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average (1990-1999)
<b>Adak Island Area<sup>a</sup></b>																
Boat	1,501	1,652	1,783	4,177	4,114	9,273	3,546	4,314	474	633	515	53			1,807	
Shoreline	137	381	2,123	1,610	5,229	3,227	477	463	222	609	751		26	285		
Fresh Water	11,694	12,417	11,642	9,569	15,242	14,963	4,951	3,008	524	824	396	427			726	
<b>Total</b>	<b>13,332</b>	<b>14,450</b>	<b>15,548</b>	<b>15,356</b>	<b>24,585</b>	<b>27,463</b>	<b>8,974</b>	<b>7,785</b>	<b>1,220</b>	<b>2,066</b>	<b>1,662</b>	<b>480</b>	<b>26</b>	<b>285</b>	<b>2,533</b>	<b>7,455</b>
<b>Unalaska Island Area<sup>b</sup></b>																
Boat	347	160		73	613	1,614	1,421	710	2,158	2,367	2,400	2,383	3,521	4,583	2,493	2,177
Shoreline	1,493	1,409	129	499	848	1,601	672	170	1,555	594	717	1,269	293	752	1,655	847
Fresh Water	362	21	197	256	56	1,161	1,218	321	1,381	935	1,075	557	1,140	5,277	1,865	1,312
<b>Total</b>	<b>2,202</b>	<b>1,590</b>	<b>326</b>	<b>828</b>	<b>1,517</b>	<b>4,376</b>	<b>3,311</b>	<b>1,201</b>	<b>5,094</b>	<b>3,896</b>	<b>4,192</b>	<b>4,209</b>	<b>4,954</b>	<b>10,612</b>	<b>6,013</b>	<b>4,336</b>
<b>Cold Bay Area<sup>c</sup></b>																
Boat	452	1,086	248	831	413	491	992	429	1,922	1,227	516	455	358	744	789	755
Shoreline		809	1,128	249	457	310	523		247	177	109	66	69	947	581	323
Fresh Water	1,251	1,132	327	1,320	2,342	2,634	3,094	925	1,916	1,733	1,241	1,106	1,959	2,515	3,400	1,947
<b>Total</b>	<b>1,703</b>	<b>3,027</b>	<b>1,703</b>	<b>2,400</b>	<b>3,212</b>	<b>3,435</b>	<b>4,609</b>	<b>1,354</b>	<b>4,085</b>	<b>3,137</b>	<b>1,866</b>	<b>1,627</b>	<b>2,386</b>	<b>4,206</b>	<b>4,770</b>	<b>2,992</b>
<b>Other</b>																
Boat	490	825	779	747	609	790	3,483	6,431	3,088	2,414	1,243	3,288	1,420	2,553	1,766	2,532
Shoreline	1,901	699	1,777	2,411	3,407	3,527	2,501	2,019	685	792	604	1,020	1,240	249	1,042	1,604
Fresh Water	435	645	1,349	814	1,645	2,027	2,649	2,627	2,400	1,227	1,420	1,912	743	747	2,396	1,740
<b>Total</b>	<b>2,826</b>	<b>2,169</b>	<b>3,905</b>	<b>3,972</b>	<b>5,661</b>	<b>6,344</b>	<b>8,633</b>	<b>11,077</b>	<b>6,173</b>	<b>4,433</b>	<b>3,267</b>	<b>6,220</b>	<b>3,403</b>	<b>3,549</b>	<b>5,204</b>	<b>5,876</b>
<b>Regulatory Area Total</b>																
Marine	6,321	7,021	7,967	10,597	15,690	20,833	13,615	14,536	10,351	8,813	6,855	8,534	6,927	10,113	10,133	11,627
Fresh Water	13,742	14,215	13,515	11,959	19,285	20,785	11,912	6,881	6,221	4,719	4,132	4,002	3,842	8,539	8,387	9,032
<b>Total</b>	<b>20,063</b>	<b>21,236</b>	<b>21,482</b>	<b>22,556</b>	<b>34,975</b>	<b>41,618</b>	<b>25,527</b>	<b>21,417</b>	<b>16,572</b>	<b>13,532</b>	<b>10,987</b>	<b>12,536</b>	<b>10,769</b>	<b>18,652</b>	<b>18,520</b>	<b>20,659</b>

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Includes general Adak Island area, and Clam Lagoon, Sitkin Sound, Hidden Bay, Shagak Bay, and Andrew Lake.

<sup>b</sup> Includes Unalaska Bay, Captain's Bay, Priest Rock, Reese Bay, and Summer Bay boat, shore, and fresh water.

<sup>c</sup> Includes only Cold Bay boat, shore, and fresh water. (Does not include King Cove boat, shore, or fresh water.)

**Table 4.-Number of fish harvested (kept) by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Salmon					Marine					Freshwater					Total	
	Pink	Coho	Sock-eye	Chinook	Chum	Razor Clams	Hali-but	Rock-fish	Ling-cod	Smelt	Dolly Varden	Arctic Grayling	Rain-bow Trout	Land-locked Salmon	Steel-head Trout		Other Fish
1977	14,519	4,716	1,255	483	1,645	7,474	994	2,810		5,652	14,536	54	1,472	229	232	5,149	61,220
1978	17,739	4,927	1,776	350	1,287	3,208	1,721	1,907		0	15,805	325	994	90	162	2,775	53,066
1979	15,871	11,522	2,436	752	500	8,363	3,013	3,599		943	25,421	127	972	373	318	2,227	76,437
1980	18,969	12,692	2,178	327	525	11,826	3,651	1,489		2,092	20,663	465	2,523	628	671	1,799	80,498
1981	18,814	11,059	2,614	918	972	3,452	7,711	6,663		3,024	22,918	119	897	379	302	6,641	86,483
1982	30,305	14,239	4,333	2,471	2,572	1,944	9,977	4,170		2,620	33,183	225	3,448	712	232	16,651	127,082
1983	12,870	9,657	4,438	1,295	963	2,000	8,809	3,314		0	30,087	126	4,265	954	333	2,077	81,188
1984	17,281	15,793	6,346	1,075	1,459	7,360	9,148	9,347		96	27,281	286	2,380	1,547	945	7,036	107,380
1985	15,426	14,932	7,946	961	915	4,970	7,752	4,890		35	22,458	820	2,774	2,013	927	2,206	89,025
1986	17,315	25,427	6,233	777	541	7,064	11,960	5,165		0	26,214	15	872	726	336	19,742	122,387
1987	13,532	19,147	4,512	853	757	2,155	11,057	8,535		462	15,380	72	1,511	1,116	253	10,476	89,818
1988	31,265	21,379	8,760	1,812	1,701	4,614	8,805	13,244		0	22,429	182	800	18	944	2,568	118,521
1989	28,893	23,312	12,064	2,063	839	1,477	9,893	5,325		0	18,379	615	1,531	1,587	957	1,913	108,848
1990	30,009	20,145	8,265	1,716	412	173	10,417	6,488		0	21,085	141	1,550	1,330	1120	3,966	106,817
1991	20,831	21,283	6,916	2,865	1,676	119	15,246	8,857	2,250	0	21,158	98	1,461	3,982	386	4,400	111,528
1992	11,803	16,943	8,376	2,846	928	973	11,458	6,506	1,660	140	12,238	120	1,179	887	128	1,841	78,026
1993	15,646	22,785	10,549	5,686	896	1,286	14,851	8,038	1,092	1,722	10,494	50	335	3,454	480	2,510	99,874
1994	6,560	15,808	13,716	3,982	361	4,322	15,043	5,611	1,123	0	7,348	41	739	0	243	1,780	76,677
1995	13,166	15,145	9,312	2,825	1,134	0	14,643	4,695	970	0	9,274	9	321	67	94	1,751	73,406
1996	8,098	19,229	9,079	5,143	1,727	1,366	17,418	7,133	1,083	749	13,270	32	538	0	145	1,321	86,331
1997	6,815	25,275	9,202	5,973	424	235	20,350	7,853	1,704	81	10,255	77	588	81	110	654	89,677
1998	13,553	26,990	10,068	4,427	602	178	18,841	4,984	1,367	0	9,856	0	461	64	172	1,569	93,132
1999	15,388	31,003	11,406	6,936	641	884	22,342	5,618	1,753	0	9,191	21	1,057	31	276	639	107,186
2000	12,677	33,582	18,803	10,072	1,118	441	24,267	8,555	2,081	78	13,411	0	955	0	142	1,608	127,790
Average	16,973	18,208	7,524	2,775	1,025	3,162	11,640	6,033	1,508	737	18,014	168	1,401	845	413	4,304	93,850
Percent	18	19	8	3	1	3	12	6	2	1	19	0	1	1	0	5	100

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

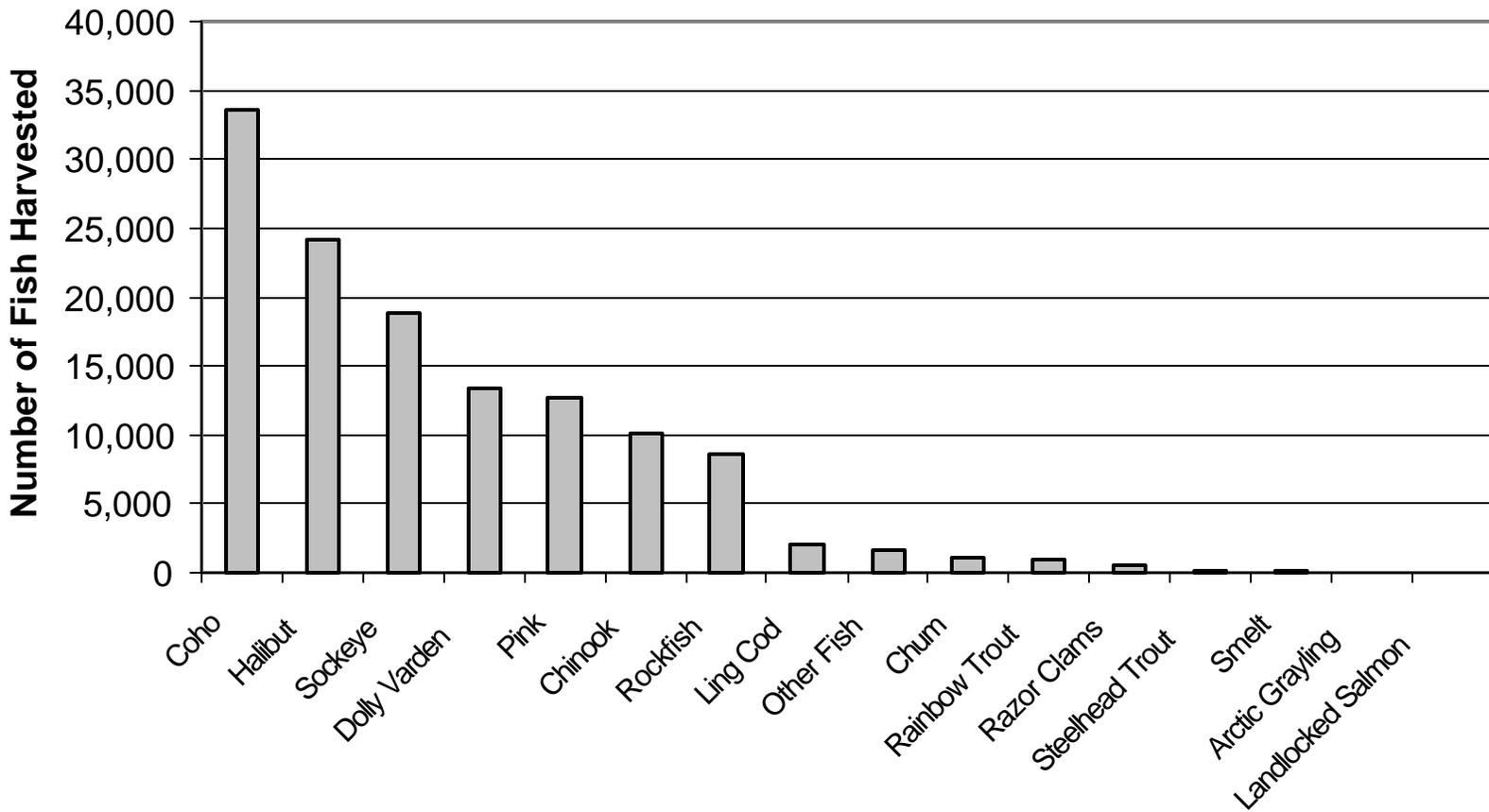


Figure 4.-Composition of harvests by recreational anglers fishing Kodiak Management Area waters, 2000.

**Table 5.-Number of fish harvested (kept) by sport anglers fishing Kodiak Regulatory Area waters, 1977-2000.**

Year	Pink	Coho	Sockeye	Chinook	Chum	Razor Clams	Halibut	Rockfish	Ling- cod	Shark	Dolly Varden	Arctic Grayling	Rainbow Trout <sup>b</sup>	Land- locked Salmon	Steel- head <sup>b</sup>	Smelt	Other Fish	Total
1977	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	61,220
1978	17,739	4,927	1,776	350	1,287	3,208	1,721	1,907			15,805	325	994	90	162	0	2,775	53,066
1979	15,871	11,522	2,436	752	500	8,363	3,013	3,599			25,421	127	972	373	318	943	2,227	76,437
1980	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	80,498
1981	12,259	10,584	1,620	789	637	3,452	6,858	6,242			19,516	119	897	379	302	2,160	5,097	70,911
1982	18,850	13,329	3,055	1,120	1,324	1,944	9,180	3,992			23,771	225	3,406	712	232	2,620	14,188	97,948
1983	8,936	7,823	3,150	729	816	2,000	8,545	3,252			19,439	126	4,265	954	333	0	1,836	62,204
1984	12,779	14,612	5,385	921	1,321	7,360	8,179	8,231			23,092	286	2,343	1,547	945	0	2,181	89,182
1985	13,423	13,625	7,536	762	865	4,970	7,303	4,691			17,516	820	2,427	106	927	35	1,911	76,917
1986	14,509	20,873	5,259	520	336	7,064	10,960	4,479			20,657	15	826	0	336	0	10,922	96,756
1987 <sup>a</sup>	11,662	16,915	4,165	379	560	2,155	9,507	6,501			8,763	72	1,448	434	253	462	9,080	72,356
1988 <sup>a</sup>	19,044	18,809	6,222	1,564	1,546	4,614	6,821	11,369			18,608	182	764	0	944	0	2,506	92,993
1989 <sup>a</sup>	17,794	19,802	6,735	1,075	631	1,477	8,525	5,070			14,266	189	1,365	60	957	0	1,691	79,637
1990 <sup>a</sup>	7,464	13,728	6,056	996	191	173	7,872	3,811			14,235	86	1,484	52	1,120	0	2,640	59,908
1991 <sup>a</sup>	12,062	17,506	4,937	2,508	1,517	119	10,047	7,813	1,257		12,794	98	1,237	0	386	0	2,812	75,093
1992 <sup>a</sup>	5,904	13,660	6,240	2,208	625	973	8,813	5,592	1,361		7,389	120	1,147	151	128	140	975	55,426
1993 <sup>a</sup>	12,324	21,213	7,849	5,074	504	1,286	11,369	7,257	894		6,281	16	226	0	480	45	1,564	76,382
1994 <sup>a</sup>	5,336	12,396	12,502	3,156	271	4,322	12,670	4,887	938		5,981	41	731	0	243	0	1,550	65,024
1995 <sup>a</sup>	11,907	13,187	7,994	2,613	981	0	11,847	4,145	895		6,469	0	283	0	94	0	1,447	61,862
1996	7,076	16,033	7,848	4,631	1,616	1,366	14,205	6,551	1,074	0	11,356	0	538	0	145	727	1,088	74,254
1997	5,449	22,996	7,938	5,691	406	235	17,232	6,164	1,277	38	8,116	0	588	81	110	0	467	76,788
1998	12,266	24,850	8,763	4,052	547	178	15,668	4,547	1,322	63	8,048	0	461	64	172	0	1,170	82,171
1999	12,813	27,781	10,405	6,791	426	884	18,595	5,480	1,726	8	7,864	0	1,057	31	276	0	346	94,483
2000	10,599	30,975	16,972	9,629	955	441	21,284	7,125	1,966	24	11,127	0	955	0	142	78	1,319	113,591
Average	12,481	16,023	6,178	2,380	835	3,162	9,786	5,292	1,271	27	14,238	140	1,350	245	413	623	3,198	76,879
Percent	16	21	8	3	1	4	13	7	2	0	19	0	2	0	1	1	4	100

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Published Statewide Harvest Survey harvest estimates for the Kodiak Area included the Barren Islands from 1987-1995. Numbers in this table do not include the Barren Islands.

<sup>b</sup> Reported rainbow trout harvest from the Karluk and Ayakulik rivers is assumed to be steelhead. Reported steelhead harvest from roadside lakes is assumed to be rainbow trout.

**Table 6.-Number of fish harvested (kept) by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, 1977-2000.**

Year	Pink	Coho	Sockeye	Chinook	Chum	Halibut	Rockfish	Ling-cod	Dolly Varden	Arctic Grayling	Rainbow Trout	Land-locked Salmon	Smelt	Other Fish	Total
1977	0	0	0	0	0	0	0		0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0		0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0		0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0		0	0	0	0	0	0	0
1981	6,555	475	994	129	335	853	421		3,402	0	0	0	864	1,544	15,572
1982	11,455	910	1,278	1,351	1,248	797	178		9,412	0	42	0	0	2,463	29,134
1983	3,934	1,834	1,288	566	147	264	62		10,648	0	0	0	0	241	18,984
1984	4,502	1,181	961	154	138	969	1,116		4,189	0	37	0	96	4,855	18,198
1985	2,003	1,307	410	199	50	449	199		4,942	0	347	1,907	0	295	12,108
1986	2,806	4,554	974	257	205	1,000	686		5,557	0	46	726	0	8,820	25,631
1987	1,870	2,232	347	474	197	1,550	2,034		6,617	0	63	682	0	1,396	17,462
1988	12,221	2,570	2,538	248	155	1,984	1,875		3,821	0	36	18	0	62	25,528
1989	11,099	3,510	5,329	988	208	1,368	255		4,113	426	166	1,527	0	222	29,211
1990	22,545	6,417	2,209	720	221	2,545	2,677		6,850	55	66	1,278	0	1,326	46,909
1991	8,769	3,777	1,979	357	159	5,199	1,044	993	8,364	0	224	3,982	0	1,588	36,435
1992	5,899	3,283	2,136	638	303	2,645	914	299	4,849	0	32	736	0	866	22,600
1993	3,322	1,572	2,700	612	392	3,482	781	198	4,213	34	109	3,454	1677	946	23,492
1994	1,224	3,412	1,214	826	90	2,373	724	185	1,367	0	8	0	0	230	11,653
1995	1,259	1,958	1,318	212	153	2,796	550	75	2,805	9	38	67	0	304	11,544
1996	1,022	3,196	1,231	512	111	3,213	582	9	1,914	32	0	0	22	233	12,077
1997	1,366	2,279	1,264	282	18	3,118	1,689	427	2,139	77	0	0	81	149	12,889
1998	1,287	2,140	1,305	375	55	3,173	437	45	1,808	0	0	0	0	336	10,961
1999	2,575	3,222	1,001	145	215	3,747	138	27	1,327	21	0	0	0	285	12,703
2000	2,078	2,607	1,831	443	163	2,983	1,430	115	2,284	0	0	0	0	265	14,199
Average	4,491	2,185	1,346	395	190	1,855	741	237	3,776	27	51	599	114	1,101	16,970
Percent	26	13	8	2	1	11	4	1	22	0	0	4	1	6	100

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

an average of about 70% of the total sport harvest from Alaska Peninsula/Aleutian Islands Regulatory Area waters. In 2000 the most commonly harvested species was halibut.

During 2000, sport anglers harvested 127,790 fish from KMA waters (Table 4) This harvest was 36% above the historical average. The largest fisheries in terms of fish harvested during 2000 were coho salmon, halibut, and sockeye salmon (Figure 4)

### **RECREATIONAL FISH CATCH-AND-RELEASE**

Estimates of the number of fish caught and released by sport anglers fishing Kodiak Regulatory Area (KRA) waters became available for the first time in 1990 (Mills 1991). Estimates, computed for 2000 using the Statewide Harvest Survey (Walker et al. *In prep*), show that of the 375,779 fish caught by sport anglers fishing KRA waters, 70% (or 262,710 fish) were released (Table 7). Considerable variability exists in the percent of fish released depending on the species and regulatory area fished (Figure 5). For example, only 44% of the halibut caught by sport anglers in the Kodiak Regulatory Area were released, but 97% of the steelhead were released (Table 7).

### **COMMERCIAL AND SUBSISTENCE SALMON HARVESTS**

Various commercial fisheries also harvest salmon returning to KMA streams. In all cases, harvests in the commercial fisheries (Appendices B1-B5 and C1-C5) are much larger than associated sport fisheries. Fish stocks of the KMA are also harvested in various subsistence fisheries.

### **ECONOMIC VALUE OF SPORT FISHERIES**

There are no direct estimates available to assess the economic value of the recreational fisheries of the KMA. The Jones and Stokes Associates, Inc. (1987) survey of southcentral sport fisheries did not specifically address the sport fisheries of the KMA. A rough approximation of the economic value of the sport fisheries of the KMA can be made 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. Based on this method, the economic value of the sport fisheries of the KMA during 1986 was approximately 12 million dollars. This compares to an estimated value of 127 million dollars for southcentral Alaska sport fisheries during 1986 (Jones and Stokes Associates, Inc. 1987). Since 1986, angler-days fished has increased from 97,230 to 139,930 in 2000, a 44% increase in the number of angler-days fished.

Logbook data allow for calculation of direct revenue paid by clients to charter boat operators. In 2000, charter boats reported 11,719 total client-days aboard their boats. Using \$175 for the average cost per angler per day, approximately \$2,050,825 was paid directly to charter boat operators.

### **STOCKING PROGRAM INVENTORY**

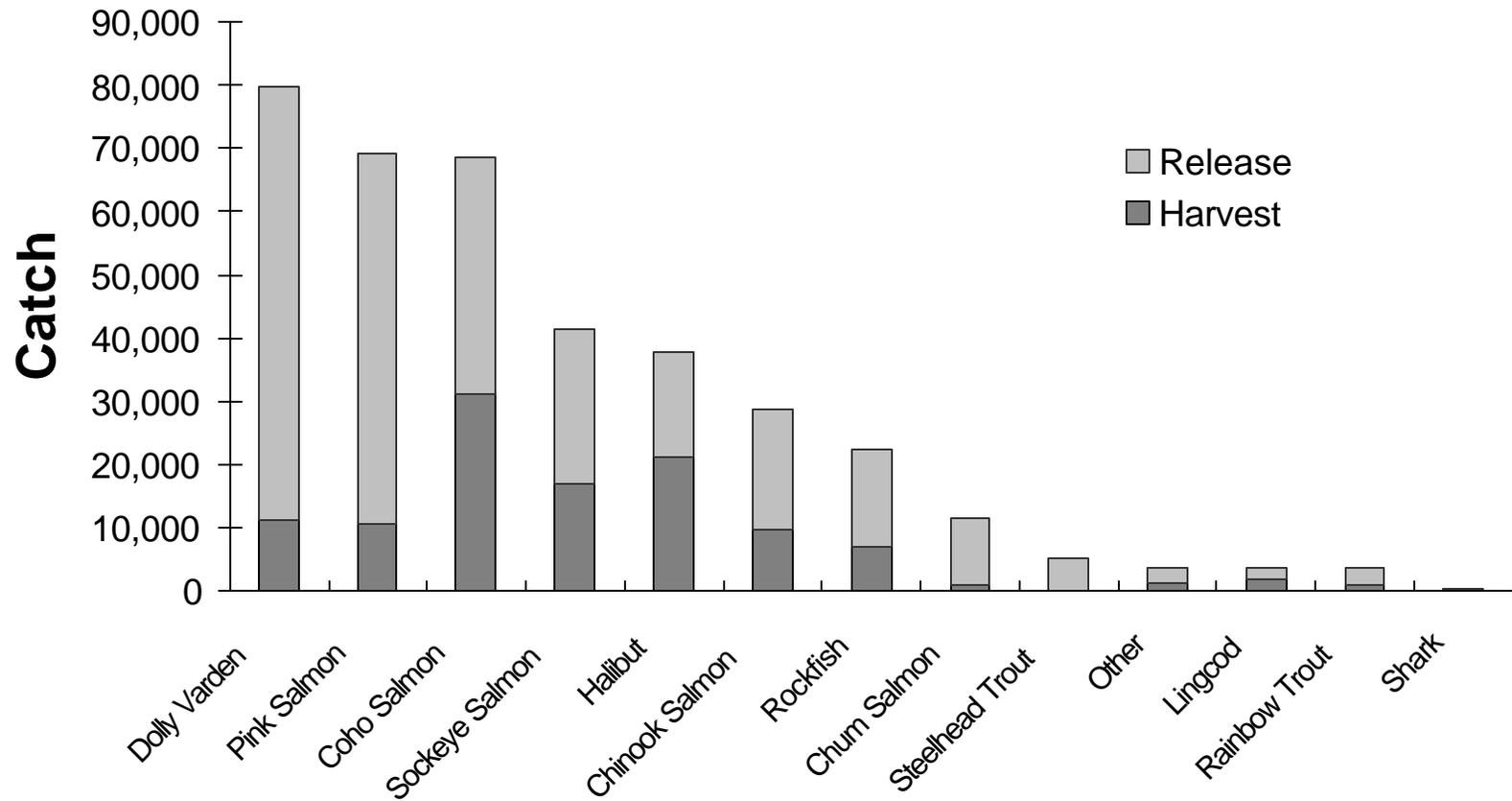
Stocking has been used to increase and diversify the opportunities available to sport anglers fishing KMA waters. Various species and life stages have historically been stocked including anadromous chinook smolt and coho salmon fingerlings along with landlocked coho and rainbow trout fingerlings. Nearly the entire 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, and Ouzinkie).

**Table 7.-Sport harvests and release by species for Kodiak Management Area waters during 2000.**

Species	Kodiak Regulatory Area				Alaska Peninsula/Aleutian Islands Regulatory Area				Total Kodiak Management Area			
	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.
Pink Salmon	10,599	58,565	69,164	85	2,078	5,268	7,346	72	12,677	63,833	76,510	83
Coho Salmon	30,975	37,544	68,519	55	2,607	7,033	9,640	73	33,582	44,577	78,159	57
Sockeye Salmon	16,972	24,542	41,514	59	1,831	401	2,232	18	18,803	24,943	43,746	57
Chinook Salmon	9,629	19,064	28,693	66	443	1,486	1,929	77	10,072	20,550	30,622	67
Chum Salmon	955	10,582	11,537	92	163	8,734	8,897	98	1,118	19,316	20,434	95
Dolly Varden	11,127	68,502	79,629	86	2,284	9,049	11,333	80	13,411	77,551	90,962	85
Other	1,319	2,535	3,854	66	265	912	1,177	77	1,584	3,447	5,031	69
Rainbow Trout	955	2,616	3,571	73	0	459	459	100	955	3,075	4,030	76
Steelhead Trout	142	5,124	5,266	97					142	5,124	5,266	97
Halibut	21,284	16,592	37,876	44	2,983	2,657	5,640	47	24,267	19,249	43,516	44
Rockfish	7,125	15,268	22,393	68	1,430	1,959	3,389	58	8,555	17,227	25,782	67
Lingcod	1,966	1,797	3,763	48	115	685	800	86	2,081	2,482	4,563	54
Shark	24	464	488	95					24	464	488	95
Total <sup>a</sup>	113,072	262,707	375,779	70	14,199	38,643	52,842	73	127,271	301,350	428,621	70

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Totals do not include razor clams or smelt, so do not match totals in Tables 4, 5 and 6.



**Figure 5.-Number of fish kept and released, by species, by recreational anglers fishing Kodiak Regulatory Area waters during 2000.**

During 2001, approximately 146,360 hatchery-reared fish, to be used primarily by recreational anglers, were stocked into KMA waters (Table 8). Most of the stockings were anadromous coho salmon smolt in lakes.

In addition to coho, 55,960 rainbow trout fingerlings were stocked in 19 landlocked lakes along the Kodiak Road System in 2001.

## **ONGOING RESEARCH AND MANAGEMENT ACTIVITIES**

There are four major research activities ongoing in the KMA. The first involves continued operation of the Buskin River weir to determine the numbers and the age, sex, and length compositions of both the coho salmon and sockeye salmon immigrations to the Buskin River.

A second research program initiated in 1992 involves the dockside sampling of recreationally harvested groundfish at the Kodiak boat harbor. The objectives of this program are defining the species composition and age, sex, and size compositions of recreationally-harvested groundfish harvests returning to the Kodiak boat harbor. The long-term goal of this program is to determine important life history characteristics of these stocks to determine sustained yields.

A third research program, initiated in June 1993, deals with the chinook salmon populations in the KMA, primarily the Karluk, Ayakulik and Chignik rivers. Age, sex and size data are collected from the Karluk and Ayakulik rivers escapement. Rafters are censused at the weir on each river for chinook catch and effort data. In Chignik, the commercial chinook salmon purse seine catch from the lagoon is sampled for age, sex and size data. These Chignik data are assumed to be similar to that of the escapement.

Finally, a fourth project, directed towards Kodiak road system coho, was initiated in 1997 and ended in the fall of 2000. This project evaluated the effectiveness of using escapement surveys conducted on foot to monitor coho escapement into index streams. Two years of population estimates using the mark-and-recapture technique were conducted on the American and Olds rivers. Comparing the foot survey counts to the population estimates helped determine the effectiveness of using survey counts to monitor spawning escapement in index streams. In 1999 and 2000 a similar study was conducted on the Pasagshak (Lake Rose Tead) drainage.

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 1999 through 2001 is presented in Appendix H),
3. Implementing a logbook program for charter boats within the KMA,
4. Habitat monitoring and permit review, and
5. Annual egg takes for coho salmon and chinook salmon and fish stockings.

**Table 8.-Releases of hatchery-reared fish into KMA waters, 1994-2001.**

Species/ Size		1994	1995	1996	1997	1998	1999	2000	2001
<b>Landocked</b>									
R. Trout	Abercrombie	8,350	6,300	4,000	3,700	3,700	3,700	700	3,700
Fingerling	Aurel L.	3,000	3,000	2,800	3,000	3,000	2,850	2,500	2,616
	Big L.	7,950	4,000	7,000	3,600	3,600	3,600	2,500	6,461
	Bull L.	2,000	2,000	2,400	2,000	2,100	3,000	0	462
	Caroline L.	1,400	1,400	1,400	1,400	1,600	1,400	1,200	1,385
	Cascade L.	0	3,300	3,300	3,300	3,300	0	0	0
	Chignik L.	5,000	5,000	5,000	0	0	0	0	0
	Cicely L.	1,150	1,150	1,400	1,150	1,400	1,150	1,250	1,230
	Dolgoi L.	5,150	5,150	3,200	5,150	5,150	5,150	0	5,846
	Dragon Fly L.	1,500	1,550	1,550	1,550	1,750	1,600	0	462
	Heitman L.	0	3,250	3,250	3,250	3,250	0	0	6,462
	Horseshoe L.	1,000	1,000	1,000	1,000	1,000	1,000	0	538
	Jack L.	1,000	1,000	1,000	1,000	1,000	1,000	2,160	1,000
	Jupiter L.	0	3,600	3,600	3,600	3,600	3,700	0	4,000
	Lee L.	2,800	2,800	3	2,800	2,800	0	1,250	2,769
	Lilly L.	5,100	1,730	2,000	1,600	1,600	2,600	0	1,600
	Long L.	3,600	3,600	3,600	3,600	3,600	3,400	0	3,600
Lupine L.	1,600	1,600	2,000	1,600	2,100	2,300	0	0	
Margaret L.	6,850	1,730	2,000	1,600	1,600	1,600	0	1,600	
Phill L.	0	0	0	0	0	2,850	0	0	
Saturn L.	0	2,400	2,400	2,400	2,400	2,400	0	4,000	
Tanignak L.	6,000	6,000	6,000	6,000	6,000	4,700	0	6,000	
Twin L.	4,000	4,000	5,000	4,000	1,500	6,000	0	2,231	
Rainbow Total		67,450	65,560	63,903	57,300	56,050	54,000	11,560	55,962

-continued-

**Table 8.-Page 2 of 2.**

Species/ Size		1994	1995	1996	1997	1998	1999	2000	2001
<b>Landlocked</b>									
Coho	Pony L.	4,200	3,238	0	4,200 c	0 d	4000 e	2100 f	0 g
Fingerling <sup>b</sup>	Southern L.	0	2,857	0	6,800 c	0 d	4000 e	0 f	3000 g
Total		4,200	6,095	0	11,000	0	8,000	2,100	3,000
<b>Anadromous</b>									
Coho	Dark L.	18,000	12,570	0	19,700 c	17,300 d	10000 e	7,500 f	8,500 g
Fingerling <sup>b</sup>	Island L.	47,400	23,520	14,000	53,200 c	51,500 d	40,000 e	22,500 f	24,700 g
	Mayflower L.	16,400	3,810	0	13,200 c	16,300 d	16,000 e	7,500 f	9,900 g
	Mission L.	30,200	20,280	14,000	27,900 c	27,800 d	24,000 e	16,500 f	17,300 g
	Ouzinkie L. <sup>h</sup>	16,000	15,000	17,000	16,000 c	14,000 d	15,000 e	15,000 f	15,000 g
	Potatoe Patch L.	20,000	4,860	0	23,200 c	21,600 d	20000 e	7,700 f	10,000 g
Andromous Coho Total		148,000	80,040	45,000	153,200	148,500	125,000	76,700	85,400
<b>Anadromous</b>									
Chinook	Island L.	90,700	0	0	0	0	0	0	0
Smolt	Buskin River	0	83,758 a	103,800	0	0	0	0	0
Chinook Total		90,700	83,758	103,800	0	0	0	0	0
All Species	GRAND TOTAL	312,344	237,448	214,699	223,497	206,548	188,999	92,360	146,363

<sup>a</sup> These fish were from Willow Creek brood stock, 39,161 of which were tagged with coded wire tags. Prior to 1995 the brood stock was from Crooked Creek, and smolt were not tagged.

<sup>b</sup> Prior to 1994 Kitoi Bay hatchery brood stock was used. Starting in 1994, Buskin River coho have been used as a brood stock and incubated at the Pillar Creek Hatchery. Stocking densities were doubled during 1994 through 1998 because fingerling size was small (averaging 0.5 g).

<sup>c</sup> Average size of fingerlings was 0.38 g.

<sup>d</sup> Average size of fingerlings was 0.6 g.

<sup>e</sup> Fingerling size: Pony L. and Southern L. 5 g; Dark L. 3.8 g; Island L. 0.5-1 g; Mayflower L. 3.2 g; Mission L. 1.1-5.5 g; Potato Patch 1.2 g; Ouzinkie unknown size.

<sup>f</sup> Fingerling size: Pony L. and Southern L. 4.5 g; Dark L. 2.0 g; Island L. 0.7-1.5 g; Mayflower L. 4.5 g; Mission L. 2.0-4.5 g; Potato Patch 1.5 g; Ouzinkie unknown size.

<sup>g</sup> All coho fingerlings stocked were 3 g.

<sup>h</sup> Ouzinkie Creek is stocked by Kitoi Bay Hatchery.

## 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. Considerable time is being spent participating in the development of the Kodiak National Wildlife Refuge Comprehensive Conservation Plan as well as the Master Agreement for Protection of Certain Lands and Resources between Koniag, Inc., and the State of Alaska.

A list of prioritized projects and objectives that will facilitate access was also developed. These are listed below:

1. Construct a new boat launch ramp in Anton Larsen Bay,
2. Improve parking lot adjacent to the Anton Larsen Bay boat ramp,
3. Secure access along the Olds and American rivers.
4. Install signs to identify state-owned property that can be used for access along the Karluk River and Ayakulik rivers.
5. Secure access in Afognak Lagoon,
6. Secure access for Cascade Lake near Anton Larsen Bay.

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

## MANAGEMENT AREA FISHERY OBJECTIVES

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

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

Although no specific fishery objectives have been established to date for KMA sport fisheries, an assumption of past and current fisheries management has been to assure the sustained yield of the various fisheries stocks that occur within the KMA, while assuring 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. Major issues are as follows:

1. **Development of the Saltwater Sport Fishery for Chinook Salmon.** A directed saltwater troll fishery for chinook salmon began to develop in 1993 in Chiniak Bay near the town of Kodiak. Concerns about how this fishery is to develop have been expressed by commercial salmon users, charter boat operators, and private anglers. Lengthy meetings (advisory committee meetings; advisory committee appointed work groups; Board of Fisheries teleconferences, public hearing, special meetings; as well as various association meetings) were held to discuss development of this fishery that targets mixed stocks of unknown origin. Annual limits have been the main management tool discussed so far. A proposal to establish a chinook salmon annual limit for the Kodiak Regulatory Area was deferred by the Board of Fisheries to the North Gulf of Alaska King Salmon Task Force. That task force was eliminated in the fall of 2000 due to lack of funding, and the proposal deferred to the January 2002 Board of Fisheries meeting.
2. **Management of the Karluk River Freshwater Chinook Fishery.** In 2001, for the first time in 15 years, the Karluk River experienced a poor chinook salmon return and the minimum escapement objective was not achieved. Another poor return is expected in 2002, because of the small number of 5-year-old fish seen during the 2001 return. The department needs to work with the users of this resource to ensure that the escapement goal is achieved with minimal disruption to the fishery.
3. **Access and Quality of Experience Issues.** Several major land management plans are being considered that will affect access in the Kodiak Management Area. The Kodiak National Wildlife Refuge is updating its Comprehensive Conservation Plan (CCP). This document will greatly affect the use of the refuge and anglers and the department should be involved to ensure that concerns are addressed and appropriate access is maintained. The Master Agreement for Protection of Certain Lands and Resources between Koniag, Inc., the United States of America, and the State of Alaska (Karluk Conservation Easement) is scheduled to become effective in 2002. This conservation easement will limit the number of anglers that may use the uplands during peak periods. Both the CCP and the Karluk Conservation Easement speak to “quality of experience.” These land management plans, as well as a public interest in fishing in uncrowded remote conditions, will bring “quality of experience” considerations to the table while developing fisheries in the remote areas of the Kodiak Regulatory Area. The department should modify the brochure it produced in cooperation with the Department of Natural Resources explaining the complicated land status along the Karluk River. The updated brochure should clearly explain how the river is being managed and what uses are allowed and prohibited.

4. Kodiak Road System Chinook and Coho salmon enhancement programs. The department has released chinook smolt along the road system in various locations in an attempt to provide for a chinook salmon sport fishery. For various reasons these attempts have failed. In 1998 and 1999 the department developed a chinook salmon enhancement plan that will provide for a sport fishery on the road system and is in compliance with genetic, pathology, fisheries management, and environmental concerns. Developing this project was a cooperative effort between the department, the local aquaculture association, and the Kodiak Sport Fishing and Charter Boat Association. There will be a proposal before the Board of Fisheries during the January 2002 meeting to establish a management plan for the enhanced return of chinook salmon to the Kodiak road system (Monashka Bay). This proposal will establish how commercial, subsistence, and sport fisheries will be regulated in order to manage this return.

The coho enhancement program on the Kodiak road system was very successful through 1996, producing returns that generated a significant sport fishery. Since 1997 returns have been poor and angling effort has dropped off as a result. The main reason for poor returns is thought to be the small size of coho fingerlings at release. When the program was successful, fingerlings were obtained from the Kitoi Bay Hatchery and averaged over a gram in weight. The Pillar Creek hatchery has been providing smolt since 1994 and average weights have averaged under 0.5 grams. Beginning in 1999 the Pillar Creek Hatchery made some modifications of its facilities and was able to produce fingerlings significantly over 1 gram in weight. Increased returns can be expected starting in 2002. There are several proposals to the Board of Fisheries for their January 2002 meeting dealing with how the saltwater fishery is managed relating to snagging.

5. Kodiak Road System Salmon Escapements. The Kodiak Road System is the most heavily fished area on the entire island, accounting for over half of the angler-days in the Kodiak Management area. There are several small coho salmon stocks located along the road system which are susceptible to overharvest due to their small size (Salonie Creek, American River, Olds River, and Roslyn Creek). Coho escapement into these streams should be monitored to ensure these small stocks don't become overharvested and decline in abundance. Foot survey estimates of the number of coho salmon in the Pasagshak, American, and Olds rivers during 1997-2000 were found to closely track estimates of the same populations from mark-recapture projects (Begich et al. 2000, Tracy *In prep*).

## **SECTION II: MAJOR FISHERIES OVERVIEW**

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

### **KODIAK ROAD ZONE FISHERIES**

The Kodiak road zone 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 by small boat launched from the City of Kodiak.

Over the past 10 years (1990–1999), the waters of the Kodiak road zone supported the most popular fisheries in the KMA in terms of recreational angling effort expended. Since 1991, these waters have accounted for 68% of the recreational angling effort expended in the Kodiak regulatory area and 56% of the effort in the KMA. The Buskin River is the most heavily fished stream both along the Kodiak road zone and in the Kodiak Regulatory Area, averaging over 16,000 angler-days of fishing effort annually since 1990 (Table 2).

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

### **KODIAK ROAD ZONE SOCKEYE SALMON FISHERY**

#### **Historical Perspective**

Three sockeye salmon populations are present on the Kodiak road zone: the Buskin River, Pasagshak drainage, and Saltery River populations. Sockeye salmon return to Kodiak road zone lakes from June through August, with peak immigration varying by stream. The Saltery River supports the latest returning sockeye salmon run in the road zone. Because of the limited access into Saltery Cove (4-wheel drive, ATV, or floatplane), the Buskin River and Pasagshak drainage used to receive most of the fishing effort. However, beginning in 2000 the Saltery River has caught on as a place to go to fish sockeye salmon in July, and effort and harvest have sharply increased.

The Road Zone bag and possession limits for salmon other than chinook are 5 salmon 20 inches or more in length, of which no more than 2 may be sockeye or coho salmon. Saltery Cove is an exception, where all 5 of the other salmon (not including chinook salmon) may be sockeye salmon.

From 1990 through 1999, the average harvest of sockeye salmon from waters of the Kodiak road zone was 4,050; accounting for an average of 42% of the total KMA sockeye salmon harvest over this period (Table 9). An average of 83% of the road zone harvest from 1990-1999 was from the Buskin, Pasagshak, and Saltery rivers (Table 10).

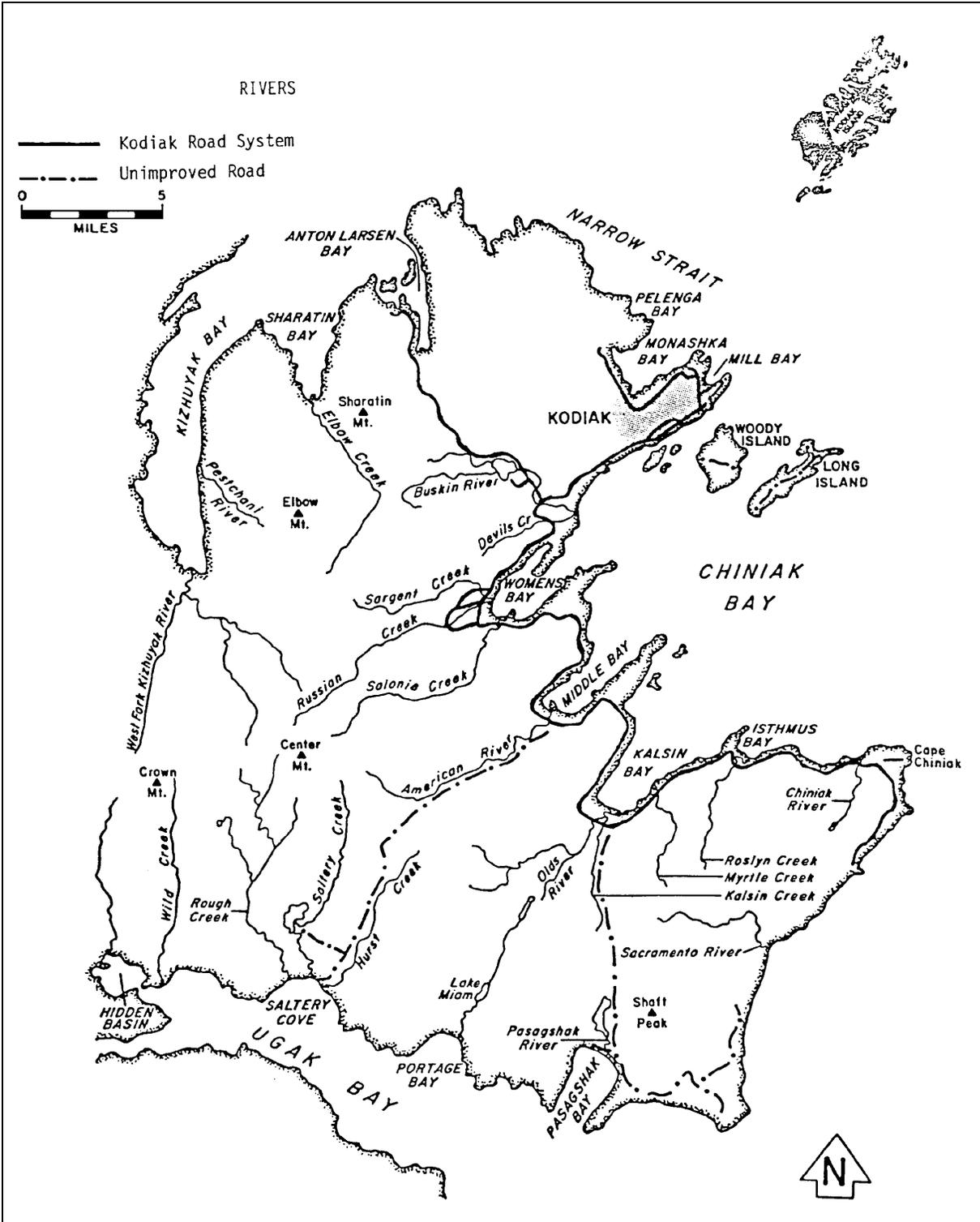


Figure 6.-Geographic boundaries of the Kodiak road zone.

**Table 9.-Harvest of sockeye salmon from Kodiak Road Zone waters of the Kodiak Management Area, 1990-2000.**

Year	Kodiak Road Zone		KMA Harvest
	Harvest	% of KMA	
1990	2,901	35	8,265
1991	3,138	45	6,916
1992	3,215	38	8,376
1993	3,852	37	10,549
1994	5,527	40	13,716
1995	3,241	35	9,312
1996	4,459	49	9,079
1997	4,303	47	9,202
1998	4,562	45	10,068
1999	5,341	47	11,406
2000	10,910	58	18,803
1990-99 Average	4,054	42	9,689

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

### **Recent Fishery Performance**

The sport harvest of sockeye salmon from Kodiak road zone waters during 2000 (10,910) was the highest on record and 2.7 times larger than the recent 10-year average harvest of 4,050 fish (Table 10). The Saltery Cove streams (predominantly the Saltery River) had the largest harvest with 5,150 sockeye, followed by the Pasagshak and Buskin with 2,720 and 2,040 fish, respectively. Escapement goals were achieved in each lake (Table 11 and Appendix F2).

During 2001, sockeye salmon returns were at record levels in the Buskin (weir count of 20,560), average in Saltery (weir count of 45,670), and below average in Pasagshak (aerial survey index count of 3,600 (Table 11, Appendix F). Although escapement goals were achieved in all systems, the Pasagshak escapement of 3,600 was significantly below the average count of 11,180 sockeye. Harvest and catch estimates are not yet available for 2001; however, they are expected to approximate record levels.

**Table 10.-Harvest of sockeye salmon from selected Kodiak Road Zone streams, 1977-2000.**

Year	Buskin River and Lake		Pasagshak River and Lake Rose Tead		Saltery Cove Freshwater		Total		% of Road Zone	Total Road Zone
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Harvest
1977	228		176				404		83	486
1978	493		85				578		80	719
1979	424		236				660		61	1,084
1980	388		284				672		52	1,283
1981	173		205				378		36	1,037
1982	304		199				503		26	1,945
1983	1,233		192		27		1,452		73	2,000
1984	1,197		374		860		2,431		73	3,329
1985	3,484		182		61		3,727		69	5,380
1986	2,339		428		199		2,966		86	3,455
1987	1,503		417		18		1,938		75	2,590
1988	2,274		819		528		3,621		87	4,166
1989	1,816		1,244		535		3,595		90	4,013
1990	998	407	1,018	916	519	71	2,535	1,394	87	2,901
1991	1,575	547	815	749	246	23	2,636	1,319	84	3,138
1992	1,981	1,298	427	346	518	205	2,926	1,849	91	3,215
1993	1,544	976	543	577	902	2,425	2,989	3,978	78	3,852
1994	2,573	1,057	861	725	1,237	788	4,671	2,570	85	5,527
1995	1,087	1,072	571	488	694	790	2,352	2,350	73	3,241
1996	1,881	1,209	723	870	870	1,669	3,474	3,748	78	4,459
1997	1,843	681	1,009	889	703	753	3,555	2,323	83	4,303
1998	1,983	550	614	279	1,453	939	4,050	1,768	89	4,562
1999	1,467	817	1,241	299	1,847	1,697	4,555	2,813	85	5,341
2000	2,041	1,281	2,721	5,812	5,151	2,557	9,913	9,650	91	10,910
1990-99										
Average	1,693	861	782	614	899	936	3,374	2,411	83	4,054

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

Prior to 2000, road zone sockeye salmon harvest was very stable, averaging 4,050 fish (Figure 7). A record harvest occurred during 2000 largely due to the Saltery Cove streams harvest of 5,150. This harvest was 5.7 times larger than the recent 10-year average. The Pasagshak harvest of 2,720 sockeye was also a record harvest and was 3.5 times larger than the recent 10-year average. These sockeye returns peak in mid to late July, which is typically a slow time on the sport fish

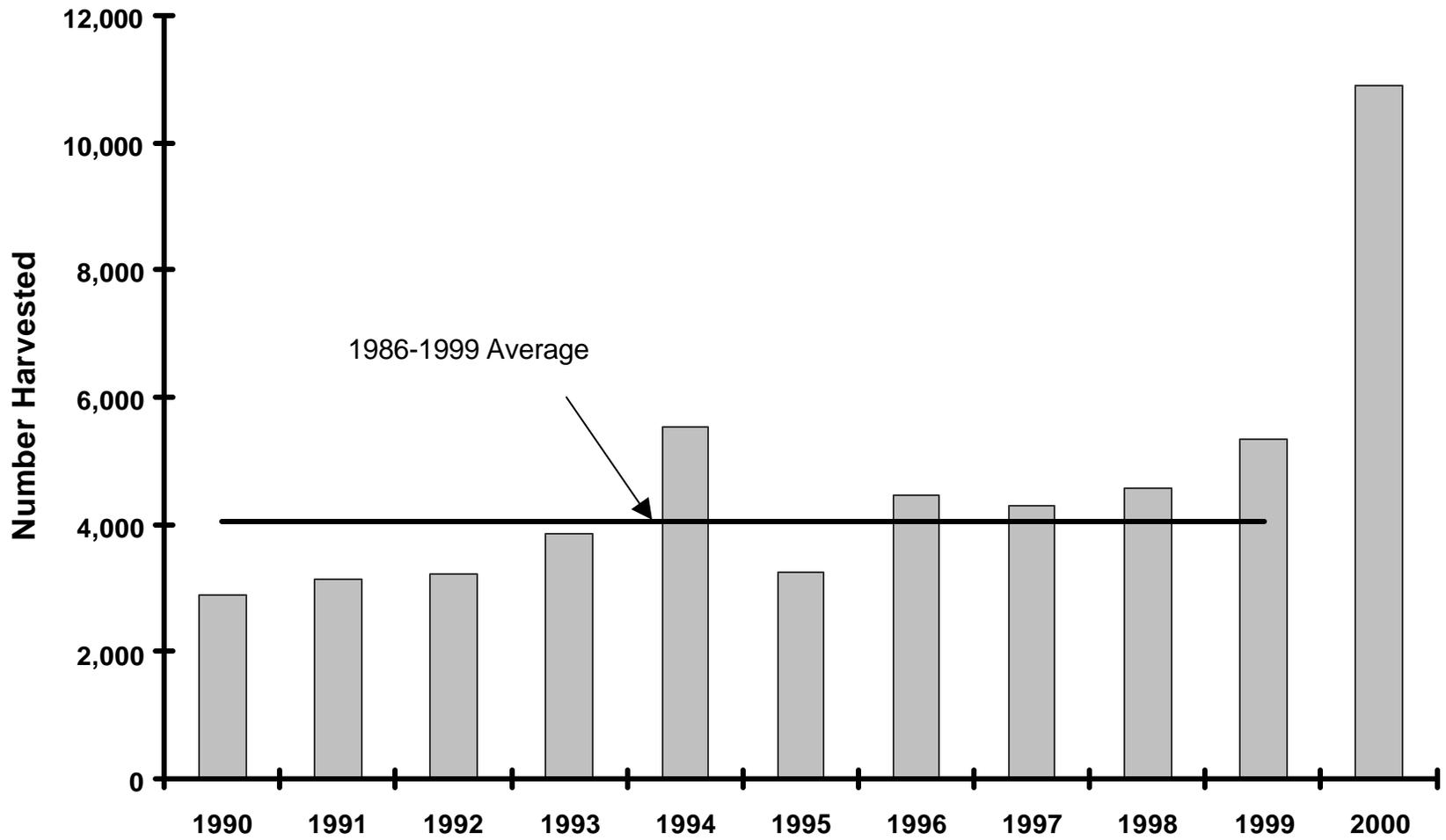
**Table 11.-Escapement counts of sockeye salmon into Kodiak Road Zone lakes, 1990-2001.**

Escapement Goal	Buskin <sup>a</sup> (8,000 - 13,000)	Pasagshak <sup>a</sup> (1,000 - 5,000)	Saltery <sup>b</sup> (15,000 - 30,000)
Year			
1990	10,528	4,680	29,767
1991	9,789	25,000	52,592
1992	9,782	3,590	weir not operated
1993	9,526	16,000	77,186
1994	11,783	2,400	58,975
1995	15,520	12,500	43,859
1996	9,661	21,500	35,488
1997	9,840	13,200	31,016
1998	14,767	1,850	26,263
1999	10,812	9,800	62,821
2000	11,233	6,000	45,604
2001	20,556	3,600	45,668
1991-2000 Average	11,271	11,184	48,200

Source: Brodie *In prep*; Stream Survey Database, Commercial Fisheries Division, Kodiak.

- <sup>a</sup> Pasagshak counts are obtained from aerial surveys, Buskin counts are from a weir. Sport, commercial, and subsistence users harvest below the weirs, so weir counts represent actual spawning escapement.
- <sup>b</sup> Saltery River counts are from a weir. On the Saltery River there is a hatchery egg take which occurs above the weir. The number of fish harvested for the egg take must be subtracted from the weir count to calculate spawning escapement.

calendar in Kodiak. This return is after the freshwater chinook salmon returns but before the pink and coho salmon returns. It appears that anglers are starting to target these stocks more than they have in the past. The large number of vehicles and ATV trailers parked at the trailhead to Saltery Cove prompted the department to implement inseason fisheries monitoring efforts. We conducted a creel census at Saltery Cove exit locations. All anglers leaving the fishery were interviewed. The census occurred on 5 days during the fishery (July 14, 18, 22, 27, and 29) (Figure 8). A total of 273 anglers



Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

**Figure 7.-Sport harvest of sockeye salmon from Kodiak road zone waters, 1986-2000.**

were interviewed, documenting a harvest of 817 sockeye salmon. Twenty-five percent of the anglers were non-resident, 7% state residents from outside of Kodiak, and 68% local Kodiak residents. Results of the creel census are presented in Tables 12 and 13. This creel census was used for fisheries monitoring and was not designed to estimate total harvest; however, Saltery Cove was very busy and it will not be surprising to see the record harvest that occurred in 2000 repeated.

### **Management Objectives**

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. The Buskin River fishery will be managed so that a minimum spawning escapement of 8,000 fish is achieved in Buskin Lake. The minimum spawning escapement objective for the Saltery River is 15,000 sockeye salmon. Escapement trends will be monitored in the Pasagshak drainage through aerial surveys to ensure that at least average escapement into Lake Rose Tead is occurring. The current escapement goal for the Pasagshak drainage is 1,000 to 5,000 sockeye salmon. Aerial survey counts in the Pasagshak have varied considerably since 1980 but have averaged 11,180 over the past 10 years (Table 11 and Appendix F2).

### **Recent Board of Fisheries Actions**

At the December 1995 Board of Fisheries meeting in Kodiak, the Board accepted a public proposal to increase the daily bag limit at Saltery Cove to 5 sockeye salmon. The previous bag limit for salmon other than chinook salmon was 5, only 2 of which could be coho and 2 of which could be sockeye. The Board concluded that raising the bag limit from 2 sockeye to 5 sockeye would not jeopardize stock conservation or change the character of the fishery. The Board reached this conclusion because the escapement had been twice the minimum escapement goal of 20,000 for 5 consecutive years, and the sport catch and effort were relatively low due to restricted access. The possession limit is 1 daily bag limit (5 salmon over 20 inches, only 2 of which may be coho salmon).

After a review of the available data, the department lowered the escapement goal for Saltery Cove, effective at the beginning of the 2001 season. The old range was 20,000 to 40,000. The new range is 15,000 to 30,000 sockeye salmon.

### **Current Issues**

If the Pasagshak drainage sport and subsistence sockeye salmon fisheries continue to grow, more effort will need to be directed to assuring sockeye salmon escapement goals are met. It may become necessary to have inseason information to manage these fisheries so those escapement goals are achieved.

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 5,536 sockeye salmon over the past 10 years (1991–2000, Appendix D). Over this same period, the average sport harvest of sockeye salmon from the Buskin River (1,800 fish) was less than half of the subsistence harvest. There is no directed commercial fishery on the Buskin River sockeye salmon stocks. The average annual commercial harvest in Womens Bay during nondirected commercial fisheries from 1991-2000 was less than 100 sockeye (Appendix C). From 1991 through 2000, the average escapement of sockeye salmon to the Buskin River weir was 11,270 (Table 11). Current exploitation rates appear to be sustainable.

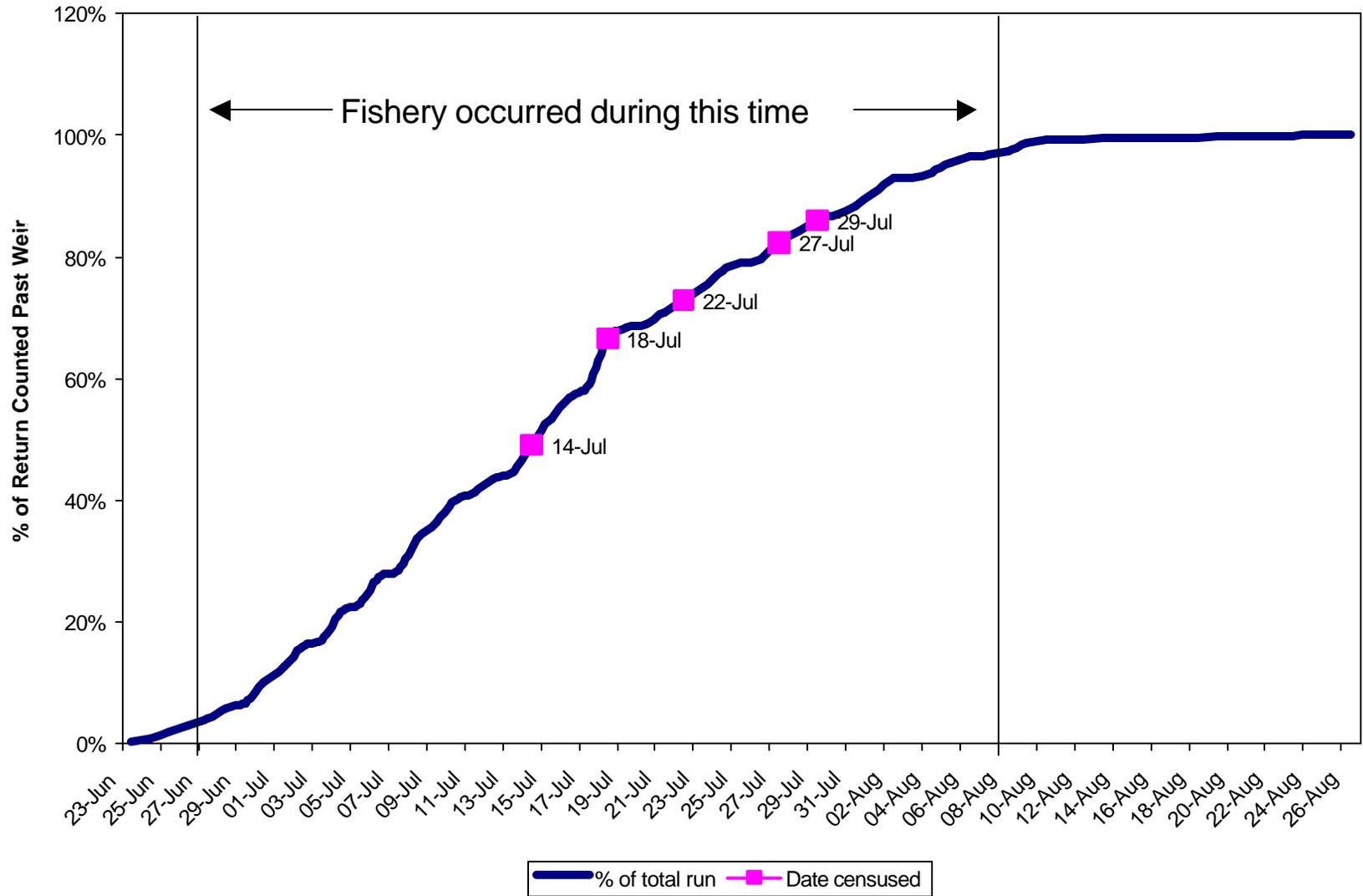


Figure 8.-2001 Saltery River angler interview dates.

**Table 12.-Saltery Cove sockeye angler census, 2001.**

Date	Number of Anglers Interviewed	Number of Sockeye Harvested	Number of Sockeye Released
14-Jul	65	163	127
18-Jul	45	140	111
22-Jul	74	220	152
27-Jul	33	110	159
29-Jul	56	184	134
<b>Totals</b>	<b>273</b>	<b>817</b>	<b>683</b>

**Table 13.-Angler demographics for Saltery Cove sockeye anglers, 2001.**

	Number of Anglers	Number of Sockeye Harvested	Number of Sockeye Released
Guided	30	70	80
Non guided	243	747	603
<b>Total</b>	<b>273</b>	<b>817</b>	<b>683</b>
Non Resident	68	227	191
State Resident	19	86	96
Kodiak Resident	186	504	396
<b>Total</b>	<b>273</b>	<b>817</b>	<b>683</b>

Due to budget cuts within Sport Fish Division, projects were prioritized and the Buskin River sockeye weir project was cancelled in 1999. Projects were cut statewide, and the sockeye weir was the only project cut in the Kodiak Management area. No inseason emergency order affecting the Buskin River sockeye fishery occurred over the 17 years that the weir operated. The current regulatory package in place for the Buskin River effectively assures that the sport fishery does not jeopardize achievement of escapement goals. In addition, the majority of the harvest does not occur in the sport fishery, which brought into question the appropriateness of expending Sport Fish Division funds to monitor the escapement. Commercial Fisheries Division operated the weir for the sockeye salmon return in 1999. Funding to operate the weir during the 2000 and 2001 seasons was applied for and granted under the Federal Subsistence Management program. Funding is also available for the 2002 season. Funding will be requested for years beyond the 2002 season, but this funding is not guaranteed and will have to compete with other ongoing federal subsistence management projects.

### **Ongoing Research and Management Activities**

A weir was operated on the Buskin River to count immigrating sockeye salmon from 1985-2001. Scale samples were collected from the escapement as well as from the subsistence harvest so that brood year tables could be constructed and escapement goals evaluated. Currently subsistence harvests are tabulated from returned permits. Sport harvests are obtained through the Statewide Harvest Survey. As mentioned in the section on current issues, the Sport Fish Division will not operate a weir in the Buskin to enumerate sockeye salmon past the 2002 season, unless additional federal subsistence funds are obtained. If escapement enumeration and age data are not collected, it will not be possible to complete brood year tables and evaluate the effectiveness of current escapement goals.

### **Inseason Management Approach**

Since 1985, sockeye salmon have been enumerated through a weir on the Buskin River and time-of-entry data are available for this period (Appendix G1). An escapement goal range for Buskin Lake of 8,000 to 13,000 sockeye is currently under review for formal adoption as a biological escapement goal (BEG). In the interim, it is being used to manage the fishery. If inseason weir counts are available, and 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 needs to be reduced to achieve the minimum spawning objective. Inseason restrictions have not been necessary in the Buskin River to achieve minimum spawning goals.

Similarly, weir data have allowed time-of-entry patterns to be developed for the Saltery Cove return. The sport fishery will be managed in order to assure that a minimum of 15,000 enter Saltery Lake, where they would be available to spawn. Currently the Kodiak Regional Aquaculture Association conducts an egg take in Saltery Cove Lake, where up to 3,600 adults may be taken. There are no optimum escapement goals (OEG) established in the Saltery system, so at the current time the sport fishery will be managed to ensure that the minimum escapement goal (15,000 sockeye) is achieved.

Inseason information is not available for the Pasagshak drainage sockeye salmon return. If inseason subsistence and sport catches are reported to be very low, attempts will be made to conduct early aerial surveys in mid July. If aerial surveys fail to estimate minimum escapement levels, the sport fishery may be restricted.

## **Recommended Research and Management Activities**

Development of brood tables through sockeye salmon enumeration and age, sex, and size sampling of the escapement and subsistence harvest should be continued on the Buskin River. These data will be used to refine escapement goals. If it is determined that not enough variation in escapement levels has occurred to use this method, other methods to review escapement goals, such as limnology or smolt studies, should be undertaken.

The Pasagshak drainage sockeye salmon escapement goal should be reviewed. Both the sport and subsistence fisheries have grown to the point where harvests are accounting for a significant part of the return. The current escapement goal range of 1,000–5,000 may be too low in light of the fact that the average escapement has been over 11,000 fish and the surface area of Lake Rose Tead is similar to the Buskin and Saltery lakes that have minimum escapement goals of 8,000 and 15,000 sockeye, respectively. Lake Rose Tead is very shallow and may not be comparable to Buskin and Saltery lakes, but based on relative lake size and past production, it is appropriate to review the minimum escapement goal of 1,000 for the Pasagshak drainage. If the subsistence and sport fisheries continue to increase their harvests, it may be necessary to operate a weir on the river for sockeye salmon enumeration so that fisheries can be managed inseason and minimum escapement goals can be assured.

## **KODIAK ROAD ZONE COHO SALMON FISHERY**

### **Historical Perspective**

There are many coho populations located within the Kodiak Road Zone. The largest systems include the Buskin, Pasagshak, Saltery, Olds, Miam, Roslyn, and American rivers. Smaller systems include Salonie, Pillar, Monashka, Sargent, Russian, and Chiniak creeks. Fish begin entering these systems in mid August, and peak in mid September. Spawning occurs in late October through early November.

Regulations for the Kodiak Road Zone are more restrictive than the Remote Zone because the Road Zone receives more fishing effort and salmon returns are relatively smaller. Streams flowing into Chiniak and Monashka bays are closed to salmon fishing upriver of the highway bridges from August 1 through September 15. The Buskin river has a more restrictive exception to these closed waters. The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon year-round; however, waters upstream of Bridge No. 1 are closed to fishing for all salmon from August 1 through September 15. The bag and possession limits for salmon other than chinook are 5 salmon 20 inches or more in length, of which only 2 may be coho salmon and only 2 may be sockeye salmon.

From 1990 through 1999, the average harvest of coho salmon from the Kodiak road zone was 18,340 fish (Table 14), accounting for an average of 56% of the total KMA coho salmon harvest over this period. Thirty-five percent of the entire KRA harvest from 1990-1999 was from the Buskin, Pasagshak, Olds, and American rivers. Of these systems, the Buskin and Pasagshak rivers have supported the largest fisheries for coho salmon (Table 15). Since 1990, average harvests of coho salmon from the Buskin and Pasagshak rivers have been 2,730 and 1,470 fish, respectively (Table 15). Other significant fisheries for coho salmon in this area occur along the road zone shorelines near stream mouths.

**Table 14.-Harvest of coho salmon from Kodiak Road Zone waters of the Kodiak Management Area, 1990-2000.**

Year	Kodiak Regulatory Area	Kodiak Road Zone			Total
		Freshwater <sup>a</sup>	Saltwater Shore <sup>b</sup>	Saltwater Boat <sup>c</sup>	
1990	13,728	6,403	1,487	1,025	8,915
1991	17,506	9,270	2,102	1,056	12,428
1992	13,660	6,032	979	1,108	8,119
1993	21,213	11,705	1,814	2,352	15,871
1994	12,396	6,145	1,009	1,596	8,750
1995	13,187	6,074	940	2,309	9,323
1996	16,033	6,339	570	2,226	9,135
1997	22,996	9,287	968	5,073	15,328
1998	24,850	6,834	787	7,023	14,644
1999	27,781	8,648	826	8,743	18,217
2000	30,975	8,629	2,250	6,315	17,194
<hr/>					
1990-1999					
Average	18,335	7,674	1,148	3,251	12,073

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> The Kodiak Road Zone freshwater totals were calculated by adding numbers from the SWHS database listed for the Buskin, American, Olds, and Pasagshak rivers; Saltery Cove fresh water; other roadside lakes; and other roadside streams. Source: SWHS database, Sport Fish Division, RTS, Anchorage.

<sup>b</sup> Kodiak Road Zone shore totals were calculated by adding numbers from the SWHS database listed for roadside shoreline sites. Source: SWHS database, Sport Fish Division, RTS, Anchorage.

<sup>c</sup> Kodiak Road Zone boat totals were calculated by adding numbers from the SWHS database listed for Chiniak Bay boat, Ugak Bay boat, and other roadside boat.

**Table 15.-Harvest of coho salmon from selected Kodiak Road Zone streams, 1977-2000.**

Year	Buskin River and Lake		Pasagshak River and Lake Rose Tead		American River		Olds River <sup>a</sup>		Total	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
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		1,870		486		611		4,838	
1985	2,178		2,292		349		304		5,123	
1986	4,098		2,951		826		1,651		9,526	
1987	3,133		3,459		435		307		7,334	
1988	3,474		2,601		1,710		1,273		9,058	
1989	4,782		2,065		1,500		2,571		10,918	
1990	1,521	1,565	2,105	1,388	849	573	948	947	5,423	4,473
1991	4,149	1,472	1,296	426	722	1,056	1,778	815	7,945	3,769
1992	1,474	623	1,765	1,596	583	413	1,085	721	4,907	3,353
1993	4,125	2,622	2,274	2,703	2,340	1,772	1,876	1,439	10,615	8,536
1994	2,429	1,534	994	667	642	491	1,083	546	5,148	3,238
1995	2,132	1,373	1,215	621	794	309	833	738	4,974	3,041
1996	2,481	1,872	1,458	2,542	549	474	864	872	5,352	5,760
1997	2,874	2,647	1,468	3,726	1,749	2,085	1,519	1,995	7,610	10,453
1998	2,669	1,619	969	1,978	700	1,830	951	386	5,289	5,813
1999	3,422	3,672	1,195	1,909	1,090	654	1,349	985	7,056	7,220
2000	2,631	3,202	2,691	10,719	480	606	1,712	2,044	7,514	16,571
1990-99										
Average	2,728	1,900	1,474	1,756	1,002	966	1,229	944	6,432	5,566

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Olds River includes unidentified Kalsin Bay streams.

Since 1984, anadromous coho salmon fingerlings have been stocked into seven different Kodiak road zone drainages. Returns from these stocking efforts have established major sport fisheries in several locations along the Kodiak road zone. The largest fisheries occur at Mill Bay and Mission Bay beaches. Fisheries for stocked returns also occur at Mayflower Beach.

### **Recent Fishery Performance**

By regulation, salmon fishing in streams flowing into Monashka and Chiniak bays is confined to waters below the road zone bridges, and below Bridge #1 on the Buskin River, from August 1 through September 15. The coho return in 2000 was impacted by a drought that brought only 3.87 inches of rainfall during the months of August and September. Average rainfall for August and September is 12.14 inches. As a result of the drought, coho salmon delayed entering streams and the upriver closures were extended until October 6, 2000. The reason for the restriction was because escapement, as indexed through the Buskin River weir, was below normal levels. In addition, stream levels were very low which caused fish to be stressed and vulnerable to a fishery. Almost 3 inches of rain fell on October 4 and escapement increased significantly. When it was possible to access the return and determine that increased harvest would not damage stocks, the upriver portions of Chiniak and Monashka Bay streams were opened to salmon fishing. The harvest on the Kodiak road system in 2000 was 17,190 coho, which was above the 10-year average of 12,070 (Table 14). Harvest was significantly above average in the Pasagshak and Olds rivers and returns were excellent (Table 15). Escapement for the key four index streams, 15,390, was slightly above the 1985-2000 average of 13,540 (Table 16). The Buskin and Olds were near average, the Pasagshak count of 6,110 was the highest on record prior to 2001, and the count in the American river of 133 coho was below the minimum goal of 300 fish.

The 2001 season was considerably different than the 2000 season because there was no drought. Stream levels were normal as were time-of-entry patterns for coho salmon in the road zone. The upriver portions of streams flowing into Chiniak and Monashka bays were opened as scheduled by regulation on September 16. High abundance and normal run timing are expected to have produced above average harvests. Department personnel also observed high catch rates in the Buskin and Olds rivers. Escapement for the key four index streams, Buskin, Pasagshak, American and Olds rivers, was above the 1985-2000 average of 13,540 (Table 16). The Buskin River weir count of 13,490 was the highest on record, surpassing the previous record of 11,103 set in 1987 (Table 17). Complete foot surveys for all index streams can be found in Appendix E.

### **Management Objectives**

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

### **Recent Board of Fisheries Actions**

Until 1996, salmon fishing in waters above the highway for streams that drain into Chiniak and Monashka bays were closed from August 1-September 10 (and above Bridge #1 on the Buskin River). This regulation had been in effect for over 20 years. The original intent of the regulation was to protect

**Table 16.-Buskin River weir counts, and peak foot surveys of coho salmon from selected Kodiak Road Zone streams, 1985-2001.**

Escapement Goals	Weir Counts	Foot Surveys			Total count <sup>a</sup> Four index streams
	Buskin River (5,300-8,300)	Pasagshak River (1,500-3,000)	American River (300-400)	Olds River (450-675)	
Year					
1985	9,474		439	1,648	
1986	9,939	3,524	221	1,849	15,533
1987	11,103	2,519	555	842	15,019
1988	6,782				
1989	9,930			769	
1990	6,222	2,178	419	1,706	10,525
1991	8,929			570	
1992	6,535		181	320	
1993	6,813	1,337	412	525	9,087
1994	8,146		194	395	
1995	8,694		169	2,642	
1996	8,439	1,973	69	2,200	12,681
1997	10,926	2,813	2,204	4,064	20,007
1998	9,062	1,917	1,360	2,296	14,635
1999	9,794	3,409	289	1,382	14,874
2000	8,048	6,107	133	1,097	15,385
2001	13,494	6,207	233	3,454	23,388
Average (1985-2000)	8,677	2,864	511	1,487	13,540

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Counts totals are only listed for years when peak counts were achieved for all four index streams.

**Table 17.-Numbers of anadromous fish passed through the Buskin River weir, 1985-2001.**

Year	Dolly Varden Emigration	Steelhead Kelts <sup>a</sup>	Sockeye Salmon	Pink Salmon	Dolly Varden Immigration	Coho Salmon	Chum Salmon	Chinook Salmon
Weir operated upstream of Bridge #1 from April through October								
1985	21,797	223	18,010	153,026 <sup>b</sup>	20,540	9,474	7	
1986	41,659	71	8,939	98,958 <sup>b</sup>	24,110	9,939 <sup>f</sup>	51	
1987	29,919	105	12,690	27,892 <sup>b</sup>	32,848	11,103 <sup>f,g</sup>	79	
1988	30,336	357	12,144	203,578 <sup>b</sup>	34,386	6,782 <sup>f,g</sup>	84	
1989	35,603	205	17,853	159,123 <sup>b</sup>	33,306	9,930 <sup>g</sup>	79	
Beginning in 1990, the weir was located at the outlet of Buskin Lake during the sockeye immigration (June and July) and then moved upstream of Bridge #1 during the coho immigration (mid July through September). From 1990-1992 the weir at the lake outlet was also operated during the spring Dolly Varden emigration.								
1990	91,107 <sup>c</sup>	150 <sup>d</sup>	10,528 <sup>h</sup>	42,889 <sup>b</sup>	6,416 <sup>e</sup>	6,222	18	
From 1991 to the present, the weir is only operated during sockeye and coho emigration.								
1991	30,725 <sup>c</sup>	148 <sup>d</sup>	9,789 <sup>h</sup>	37,736 <sup>i</sup>	812 <sup>i</sup>	8,929	21	
1992	74,451 <sup>c</sup>	201 <sup>d</sup>	9,782 <sup>h</sup>	25,141 <sup>i</sup>	868 <sup>i</sup>	6,535	9	6
1993	140 <sup>j</sup>	13 <sup>j</sup>	9,526 <sup>h</sup>	53,484 <sup>i</sup>	4,960 <sup>i</sup>	6,813	22	8
1994	0 <sup>j</sup>	19 <sup>j</sup>	11,783 <sup>h</sup>	89,711 <sup>i</sup>	220 <sup>i</sup>	8,146	17	7
1995	0 <sup>j</sup>	15 <sup>j</sup>	15,520 <sup>h</sup>	72,826 <sup>i</sup>	5,401 <sup>i</sup>	8,694	43	8
1996	0 <sup>j</sup>	7 <sup>j</sup>	9,661 <sup>h</sup>	50,550 <sup>i</sup>	8,075 <sup>i</sup>	8,439	67	7
1997	0 <sup>j</sup>	14 <sup>j</sup>	9,840 <sup>h</sup>	47,396 <sup>i</sup>	1768 <sup>i</sup>	10,926	52	70
1998	0 <sup>j</sup>	26 <sup>j</sup>	14,767 <sup>h</sup>	134,403 <sup>i</sup>	17,784 <sup>i</sup>	9,062	24	69
1999	na <sup>j</sup>	73 <sup>j</sup>	10,812 <sup>h</sup>	94,322 <sup>i</sup>	na <sup>i</sup>	9,794	31	10
2000	109 <sup>j</sup>	41 <sup>j</sup>	11,233 <sup>h</sup>	42,377 <sup>i</sup>	10,732 <sup>i</sup>	8,048	45	5
2001	225 <sup>j</sup>	57 <sup>j</sup>	20,556 <sup>h</sup>	50,113 <sup>i</sup>	7,539 <sup>i</sup>	13,494	90	0

- <sup>a</sup> Steelhead kelts are fish which have overwintered in the lake, spawned in the river during the spring, and are returning to the sea.
- <sup>b</sup> 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.
- <sup>c</sup> 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.
- <sup>d</sup> The weir was moved to Buskin Lake outlet. These steelhead were not kelts but pre-spawning ripe fish.
- <sup>e</sup> A flood during peak immigration made it impossible to estimate migration. This figure is a partial count.
- <sup>f</sup> A total of 350, 400, and 600 coho were estimated below the weir when it was removed in 1986, 1987, and 1988, respectively. These estimates were added to the weir counts.
- <sup>g</sup> 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.
- <sup>h</sup> Since 1990 the weir was moved upriver to the outlet of Buskin Lake. Sockeye entering the tributary lakes of Louise and Genevieve are not counted at the upriver location.
- <sup>i</sup> The weir was not operated during late July and early August. Pink salmon counts have been expanded by aerial surveys or time-of-entry data in order to estimate escapement. Dolly Varden immigration counts are incomplete and have not been expanded to estimate a total immigration.
- <sup>j</sup> The weir was not operated in April and May. These counts are incomplete and have not been expanded to estimate total escapement.

addition, several of the local index streams showed below average year-end coho salmon escapements in 1991 through 1995.

The season opening date above the highway had been delayed in 5 of the past 10 years. This created a disorderly fishery for the public and enforcement officials. Using the Buskin River weir to regulate the open season for all streams had lead to a situation where escapement goals were achieved on the Buskin River but sometimes were not achieved in other index streams.

At the December 1995 Board of Fisheries meeting, the Department proposed a regulation change to improve management of this fishery. The upriver opening date was delayed until September 16. This proposal has increased the orderliness of the fishery and has helped to achieve escapement objectives in all area streams. This regulation became effective for the 1996 fishing season, extending the upriver salmon fishing closure from August 1-September 15.

### **Current Issues**

The coho sport fishery in fresh water and from the shores of the Kodiak Road Zone receives more effort and harvest than any other area in the KMA during September and early October. When coupled with the saltwater harvest that occurs from boats along the road zone (Table 14), the total harvest in 2000 was 17,190 coho salmon. This compares to a commercial harvest of 2,334 and a subsistence harvest of 2,991 (Appendices C3 and D1). There are no issues between the user groups at this time.

There is a proposal before the Board for their February 2002 meeting that would close snagging in specific saltwater areas during the first part of hatchery returns. The areas include Mill Bay, Mission Beach, and Monashka Bay. The proposal would close snagging during the first part of the return and allow it during the latter part of the return. This proposal is attempting to separate anglers who want to snag from anglers who are attempting to get fish to bite on lures or bait.

### **Ongoing Research and Management Activities**

The intensive sport effort and harvest of coho salmon which occurs within the Kodiak Road Zone makes documenting escapements a high research and management priority. A weir on the Buskin River (Table 17) and foot or aerial surveys on other area streams are currently used to estimate escapement levels. Scale samples are taken from the Buskin River coho return so that brood tables can be developed and escapement goals refined.

During 1997 and 1998, research was conducted on the American and Olds rivers to evaluate if foot surveys are a valid way to monitor escapement (Begich et al. 2000). Population estimates were made during both years using mark-and-recapture methods. Foot surveys were validated as a way to monitor escapements, as observers counted the same proportion of fish during a record return as an average return (Table 18).

Similar investigations were conducted in the Pasagshak drainage during 1999 and 2000. The results of this study are being summarized in an FDS report (Tracy *In prep*). Although insufficient coho were tagged to generate accurate mark-and-recapture estimates, it was determined that foot surveys were an efficient way to document escapement. The tributary streams are very small and it is easy to count all the fish present. Virtually all the coho enter these small tributaries to spawn, but fish school in the lake

**Table 18.-Summary of foot survey counts and mark-recapture population estimates for spawning coho salmon at the American and Olds rivers, 1997 and 1998.**

American River		Olds River	
Date	Count	Date	Count
<u>1997</u>		<u>1997</u>	
10/01	1,467	10/04	3,380
10/09	940	10/10	3,779
10/24	2,204	10/22	4,064
10/31 <sup>a</sup>	2,450		
Abundance estimate <sup>b</sup>	3,576	Abundance estimate <sup>b</sup>	5,872
Standard Error	1,263	Standard Error	559
Lower 95% CI	1,101	Lower 95% CI	4,777
Upper 95% CI	6,051	Upper 95% CI	6,968
<u>1998</u>		<u>1998</u>	
09/08	14	09/08	1,033
09/13	33	10/02	2,296
09/14	80	10/20	1,133
10/02	507		
10/02	621		
10/08	534		
10/21	1,360		
10/27	832		
10/27	795		
Abundance estimate <sup>b</sup>	1,263	Abundance estimate <sup>b</sup>	2,199
Standard Error	168	Standard Error	234
Lower 95% CI	933	Lower 95% CI	1,740
Upper 95% CI	1,593	Upper 95% CI	2,658

Source: Begich et al. 2000.

<sup>a</sup> Helicopter survey.

<sup>b</sup> Mark-recapture population estimate.

in front of these tributaries first and enter the tributaries to spawn only as they ripen. This is unlike the American and Olds where virtually all the coho have entered the rivers and can be counted by early October. The critical element in documenting coho escapement in the Pasagshak drainage is to assure that a peak survey is documented so that they can be compared from year to year. In order to do this, repeated surveys must be conducted during a time when peak surveys are likely to occur (Table 19). In order to document a peak survey, a lower count must both precede and follow the peak count. Conducting a minimum of three surveys, and possibly more, on the Pasagshak drainage in order to document a peak survey is worth the time and effort. The Pasagshak drainage is growing in popularity and produced the largest harvest in fresh water on the road system in 2000 (2,690 fish, Table 15). Fishing effort on the Pasagshak was also the highest on record in 2000, and the record 9,440 angler-days (Table 2) was almost double the recent 10-year average of 5,500 angler-days. During the 2000 season, 29 anglers fishing in float tubes were observed fishing on Pasagshak Lake (Lake Rose Tead). Some of the reasons that Pasagshak coho are gaining in popularity are the coho are very large (fish over 20 pounds are not uncommon), coho entering the Pasagshak drainage are not delayed by drought (they enter a fairly short river which is tidally influence and then hold in the shallow lake where they are accessible to anglers in float tubes), and the Pasagshak drainage is accessible by road. As the coho fishery in Pasagshak develops, monitoring escapement throughfoot surveys will also increase in importance, as this will be how the department will monitor trends in the population. If the population begins to decline below escapement goals, additional restriction on the sport fishery will be necessary.

### **Inseason Management Approach**

As stated under the section on recent Board of Fisheries Actions, a new regulation became effective during the 1996 season. Streams flowing into Monashka and Chiniak bays are closed to salmon fishing from August 1 through September 15 upstream of the Chiniak Highway, and upstream of Bridge #1 on the Buskin River. Streams will open on September 16 unless there is some inseason information that indicates the escapement objectives will not be met.

The Buskin River weir will be used to monitor coho escapement into the Buskin River. The section of the Buskin River above Bridge #1 may be opened as early as September 11 by emergency order if it appears that the minimum escapement objective will be met. (In order to achieve a minimum of 5,300 spawning coho salmon, the weir count on September 7 must be about 1,700 fish). If the fishery is not opened on September 11, it will not be opened until minimum escapement objectives can be assured. A weir count of 2,400 is necessary by the end of counting on September 12, if the upriver waters are to be opened on September 16. 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). The weir count by October 1 should be 6,000 to ensure that 5,300 spawning fish remain after the sport harvest.

### **Recommended Research and Management Activities**

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

**Table 19.-Pasagshak coho salmon foot survey results, 1999-2001.**

1999			
Date	Number of Live Coho	Number of Coho Carcasses	Total of Coho Counted
01-Oct	0	0	0
08-Oct	0	0	0
20-Oct	679	6	685
23-Oct	3,388	21	3,409
09-Nov	1,536	4	1,540
16-Nov	809	9	818
Peak survey date			
23-Oct	3,388	21	3,409
2000			
Date	Number of Live Coho	Number of Coho Carcasses	Total of Coho Counted
02-Oct	0	0	0
09-Oct	6	0	6
11-Oct	376	63	439
13-Oct	325	24	349
16-Oct	1,359	97	1,456
23-Oct	3,082	254	3,336
31-Oct	4,525	640	5,165
08-Nov	4,383	1,724	6,107
14-Nov	2,653	3,389	6,042
21-Nov	893	2,198	3,091
Peak survey date			
08-Nov	4,383	1,724	6,107
2001			
Date	Number of Live Coho	Number of Coho Carcasses	Total of Coho Counted
24-Oct	15	2	17
06-Nov	311	5	316
13-Nov	4,424	53	4,477
23-Nov	5,707	502	6,209
30-Nov	2,443	1,938	4,381
Peak survey date			
23-Oct	5,707	502	6,209

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

In addition to the Buskin River there are many smaller streams that provide fishing opportunities on the Kodiak road zone: Monashka Creek, Pillar Creek, Sargent Creek, Russian Creek, Salonie Creek, American River, Olds River, Roslyn Creek, Chiniak Creek, Pasagshak drainage, Saltery Creek, and Miam Creek. The only method to evaluate the success of the existing management system 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 are noted over 2 or 3 years, then the management strategy can be adjusted to better provide for stock conservation. Without documenting escapement, it is difficult to evaluate the success of management strategies. We recommend 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 can be found in Appendix E.

Currently escapement goals are based on long-term average escapement counts. An attempt is being made to evaluate the escapement goals on the Buskin River by using weir data and age data to construct brood tables. This work should continue. An attempt should be made to refine the escapement goal in the Pasagshak drainage based on evaluating the rearing habitat provided by Pasagshak Lake (Lake Rose Tead). There is also a spawning tributary that parallels the road. This stream receives a large percentage of the spawning fish. It is doubtful if coho eggs deposited in this stream survive because the stream appears to go dry, which may be related to recent road construction. Some pre-emergent sampling should be conducted on this tributary to see if eggs are surviving.

As fishing effort for coho salmon along the road zone continues to increase, the stocking program will increase in importance. This project provides additional fishing opportunities as well as relieving fishing pressure on the wild stocks. The 1994 Statewide Harvest Survey (Howe et al. 1995) documented a harvest of 360 coho salmon, with 2,000 angler-days of effort at Mill Bay beach, a return location for stocked coho. Mission Bay beach received 1,380 days of angler effort with a harvest of 220 coho. Starting in 1993, coho fingerlings were no longer provided by the Kitoi Bay Hatchery. Afognak coho salmon were no longer used as a brood source, in favor of the Buskin River. The change in this program was initiated because of concerns that returning adults of Afognak origin would stray into local streams and genetically mix with wild stocks. Buskin returns are typically 2 to 3 weeks later than Afognak coho, so fishing opportunities in mid to late August for stocked coho will be lost, due to the change in brood source. The Kodiak Regional Aquaculture Association is incubating Buskin coho salmon eggs free of charge at the Pillar Creek fish hatchery. Rearing space at the Pillar Creek Hatchery was very limited and as a result coho fingerlings are stocked soon after they hatch. Released fish have averaged less than 0.5 grams per fish, significantly smaller than the Kitoi Bay Hatchery fingerlings, which averaged over 1 gram per fish. Returns to Mill Bay and Mission Bay beaches were diminished during 1997 and 1998, probably due to the small size of fingerlings at release. In 1997 the Statewide Harvest Survey did not receive any responses from people fishing at either Mill Bay or Mission Bay beaches, indicating a significant drop from what was reported in 1994. Beginning in 1999, coho fingerlings were fed until they reached a much larger size (Table 8). Due to the larger size of released fingerlings, returns to Mill Bay and Mission beaches are expected to increase in the next few years. Fishing effort on these returns should also increase.

## **KODIAK ROAD ZONE PINK SALMON FISHERY**

### **Historical Perspective**

Pink salmon return to Kodiak road zone streams from mid-July through early September. Peak immigration typically occurs during the second week of August. In the Buskin River, 50% of the return has usually passed the weir by the second week of August (Appendix G2). Spawning occurs in stream reaches both upstream and downstream of road system bridges, beginning in August. The returns of pink salmon in odd-numbered years are higher than in even-numbered years.

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon all year long. The remaining streams along the Kodiak road zone that flow into Monashka and Chiniak bays are open to salmon fishing year-round in the reaches downstream of the highway bridges. Waters upstream of Bridge No. 1 on the Buskin River and upstream of the highway bridges on remaining streams are closed to salmon fishing from August 1 through September 15. The bag and possession limits for salmon other than chinook over 20 inches in length are 5, no more than 2 of which may be sockeye or coho salmon.

From 1990 through 1999, the waters of the Kodiak road zone accounted for an average harvest of 7,920 pink salmon. This represents an average of 61% of the total KMA pink salmon harvest over this period (Table 20). An average of 63% of the road zone pink salmon harvest from 1990-1999 occurred in freshwater systems, with 37% occurring in salt water. Pink salmon returning to streams along the Kodiak road zone 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 zone occur on the Buskin, American, and Olds rivers. Since 1990, these three river systems have accounted for an average harvest of 3,640 pink salmon, or 46% of the total Kodiak road zone pink salmon harvest (Table 21). Of these systems, the Buskin River has supported the largest fishery for pink salmon. Since 1990, the average harvest of pink salmon from the Buskin River has been 1,900 fish (Table 21). Other significant fisheries for pink salmon in the Kodiak road zone occur along the shorelines and marine waters of Chiniak and Ugak bays.

### **Recent Fishery Performance**

The pink salmon runs along the Kodiak road zone were generally weak from 1990-1992. Commercial harvest of pink salmon in Monashka and Chiniak bays averaged 275,000 from 1980 to 1988 but decreased to approximately 121,000 from 1990-1992 (Appendix C4). The sport fish harvest also decreased in the early 1990s. The 1986-1989 average pink salmon sport fish harvest along the Kodiak road zone was 14,340 but dropped to 7,240 in 1990-1997 (Table 20, Figure 9). The 1998 pink salmon harvest was good for an odd-numbered year, and 1999 and 2000 harvests were also better than recent years. Pink salmon catches in 2001 are expected to be similar to 1999.

### **Recent Board of Fisheries Actions**

During the December 1995 Alaska Board of Fisheries Meeting the Board adopted a staff proposal that extended the upriver salmon fishing closure from August 1 through September 10 to August 1 through September 15. This regulation became effective for the first time during the 1996 fishing season.

**Table 20.-Harvest of pink salmon from Kodiak Road Zone waters of the Kodiak Management Area, 1986-2000.**

Year	Kodiak Road Zone Harvest <sup>a</sup>				KMA	
	Freshwater	Saltwater	Total	% of KMA	Harvest	Release
1986	9,618	3,882	13,500	78	17,315	
1987	6,356	4,746	11,102	82	13,532	
1988	8,968	8,020	16,988	54	31,265	
1989	10,006	5,781	15,787	55	28,893	
1990	4,914	1,756	6,670	22	30,009	35,761
1991	6,374	4,531	10,905	52	20,831	22,256
1992	3,535	1,637	5,172	44	11,803	31,340
1993	6,224	5,067	11,291	72	15,646	48,938
1994	2,979	1,409	4,388	67	6,560	21,761
1995	5,607	4,650	10,257	78	13,166	36,069
1996	3,275	1,849	5,124	63	8,098	36,105
1997	2,759	1,331	4,090	60	6,815	53,938
1998	6,442	4,450	10,892	80	13,553	55,155
1999	7,509	2,945	10,454	68	15,388	82,848
2000	3,859	3,971	7,830	62	12,677	63,833
1990-1999 Average	4,962	2,963	7,924	61	14,187	42,417

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> The Kodiak Road Zone totals were calculated by adding numbers from the SWHS database listed for the Buskin, American, Olds, and Pasagshak rivers; Saltery Cove freshwater, other roadside lakes; other roadside streams; Chiniak Bay boat; Ugak Bay boat; other roadside boat; and roadside shore.

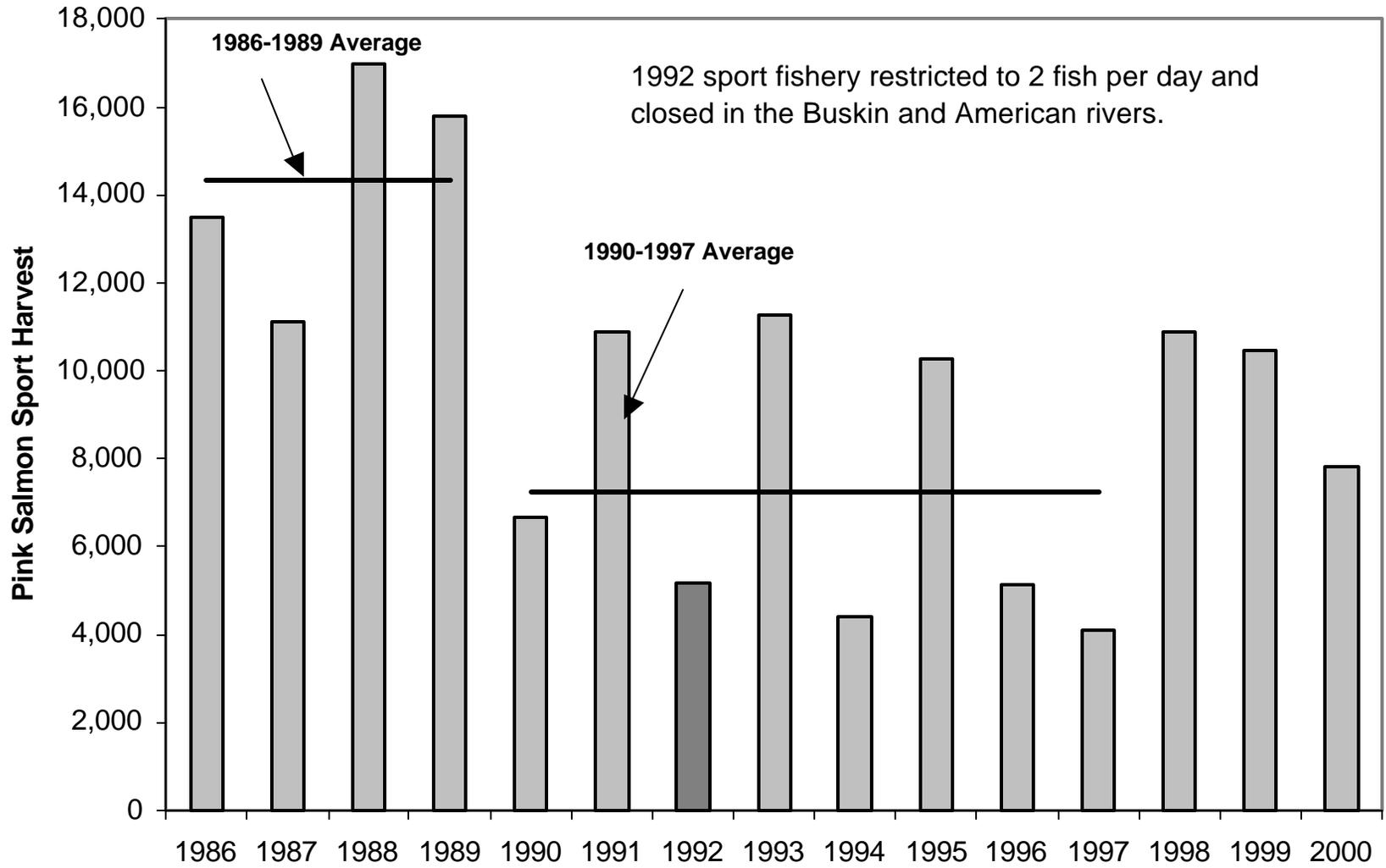
**Table 21.-Harvest of pink salmon from selected Kodiak Road Zone streams, 1977-2000.**

Year	Buskin River and Lake		American River <sup>a</sup>		Olds River <sup>b</sup>		Total	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	3,868						3,868	
1978	4,752						4,752	
1979	4,036						4,036	
1980	6,122						6,122	
1981	3,856						3,856	
1982	7,357						7,357	
1983	4,196		472		199		4,867	
1984	4,701		835		611		6,147	
1985	3,812		380		440		4,632	
1986	5,810		948		1,086		7,844	
1987	2,354		1,739		1,105		5,198	
1988	5,202		1,310		982		7,494	
1989	4,402		1,397		2,325		8,124	
1990	2,804	4,742	1,000	2,742	488	1,938	4,292	9,422
1991	1,942	2,430	1,472	3,170	1,246	1,916	4,660	7,516
1992	1,557	3,710	513	2,070	476	2,409	2,546	8,189
1993	1,104	5,276	560	6,400	2,676	8,201	4,340	19,877
1994	751	3,102	314	2,166	694	3,926	1,759	9,194
1995	2,367	4,621	688	5,277	1,134	3,427	4,189	13,325
1996	1,771	4,665	436	2,778	348	1,497	2,555	8,940
1997	909	3,395	680	9,983	495	4,858	2,084	18,236
1998	3,201	8,701	471	7,265	654	5,028	4,326	20,994
1999	2,573	8,978	2042	15,067	998	7,823	5,613	31,868
2000	1,160	6,274	751	10,956	907	7,280	2,818	24,510
1990-1999								
Average	1,898	4,962	818	5,692	921	4,102	3,636	14,756

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> American River includes unidentified Middle Bay streams.

<sup>b</sup> Olds River includes unidentified Kalsin Bay streams.



Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

**Figure 9.-Kodiak Road Zone pink salmon harvest, 1986-2000.**

Streams draining into Monashka and Chiniak bays were closed to salmon fishing upstream of the Chiniak Highway from August 1 through September 15; with the exception of the Buskin River which was closed upstream of Bridge #1 from August 1 to September 15.

The last Board action regarding pink salmon bag and possession limits in the road zone occurred in 1987, when daily bag and possession limits for salmon (other than chinook salmon) were 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.

### **Management Objectives**

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

### **Current Issues**

Pink salmon escapements to the Kodiak road zone commonly exceeded 500,000 fish during the 1980s (Appendix F1). During this same period, road zone sport fish harvests averaged about 12,000 fish, or about 2% of the total inriver returns. Under these conditions, manipulating the sport fish harvest could do little to affect escapement goals. However, from 1990 to 1992 pink salmon returns along the road system were very weak, and foregoing a sport harvest could add to the spawning escapement and reproductive potential of the stocks (Table 22). The exceptionally poor return in 1992 prompted restrictions in the sport fishery. The bag limit was reduced along the Kodiak road zone by emergency order to 2 fish per day and closed in the Buskin, American and Olds rivers. The large returns since 1993 reversed this trend for poor returns. No restrictions are expected in the near future for this fishery. Inseason monitoring of returns will continue and, if spawning escapements are significantly below minimum goals, the sport fishery will be restricted. The figures in Table 22 represent only a portion of the streams along the road system, but can be used for comparison purposes and as an indication of return strength. (For example, the total escapement shown in Table 22 for 1995 is 587,330 pink salmon. If all the index streams listed in Appendix F1 are totaled for 1995, the index total for the road system is 959,730 pink salmon.)

### **Ongoing Research and Management Activities**

No specific research or management activities are directed at this fishery. The weir on the Buskin River has not been operated during the majority of the pink salmon return since 1990 due to budgetary constraints. This will likely continue to be the case into the future. Aerial surveys have been used since 1991 to estimate the pink salmon escapement in area streams and should be continued (Appendix F1).

**Table 22.-Pink salmon escapement counts in Kodiak Road Zone streams, 1990-2001.**

Year	Buskin River	American River	Olds River	Chiniak Creek	Pillar Creek	Salonie Creek	Total
1990	42,889	22,000	21,000	22,550	11,580	4,140	124,159
1991	37,736	49,000	22,500	10,000	6,000	9,000	134,236
1992	25,141	17,900	24,500	4,500	11,900		83,941
1993	53,484	52,700	58,000	74,000	6,200	52,500	296,884
1994	89,711	95,000	78,500	24,000	17,000	300	304,511
1995	72,826	142,000	130,000	28,000	20,000	194,500	587,326
1996	50,550	33,000	11,000	30,000	8,000	17,000	149,550
1997	47,396	85,000	55,000	35,000	2,500	18,000	242,896
1998	134,403	60,500	42,000	70,000	16,800	36,900	360,603
1999	94,322	30,300	60,500	60,500	16,500	19,000	281,122
2000	42,377	36,100	16,500	13,700	11,900	7,000	127,577
2001	74,294	106,600	59,000	25,000	9,000	48,000	321,894
<hr/>							
1990-1999							
Average	64,846	58,740	50,300	35,855	11,648	39,038	256,523

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

### **Outlook**

The Division of Commercial Fisheries research project of forecasting the return of pink salmon was cancelled in 1999 due to budget cuts. The 2002 return will be produced by the 2000 parent year. Index spawning escapement on the road system (Table 22) during 2000 totaled 127,580, which was below the 1990-1999 average of 256,520 fish. In addition, there was a drought during the key spawning time period and these conditions may have affected spawning success. The department does not have a formal forecast for the pink salmon return to the road system for 2002, but based on the below average parent-year escapement and extreme drought conditions, the return is expected to be below average.

### **Inseason Management Approach**

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

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

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 on the Buskin River from 1990-1999 averaged approximately 1,900 pink salmon (Table 21). Escapements averaged 64,850 pink salmon during the same time period (Table 22). Even if spawning escapements were slightly below average or below the minimum spawning goal of 60,000 fish, the sport removal of less than 2,000 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 be significantly below the escapement goal.

### **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 ZONE DOLLY VARDEN FISHERY**

### **Fishery Description and Historical Perspective**

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

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

From 1990 through 1999, the waters of the Kodiak road zone accounted for an average harvest of 6,190 Dolly Varden (Table 23). This harvest 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 zone include Buskin, Pasagshak, American, and Olds rivers. Since 1990, these four river systems have accounted for an average of 57% of the total road zone Dolly Varden harvest. Of these systems, the Buskin River has supported the largest fishery for Dolly Varden. From 1990 through 1999, the average harvest of Dolly Varden from the Buskin River was 2,250 fish (Table 24), making this river the largest in terms of numbers of Dolly Varden harvested in the KMA.

A research project to assess the structure and status of the Buskin River Dolly Varden stocks was conducted during 1981 through 1993. As part of this work, fishery and migration statistics were estimated (Table 25). From 1984 through 1990, creel surveys documented that anglers fishing the Buskin River during the spring Dolly Varden emigration expended an average of 4,390 angler-days of effort to harvest 5,530 Dolly Varden. From 1988 through 1990, these surveys also collected information on released fish and documented that anglers fishing during the spring emigration caught and released an average of 4,880 Dolly Varden (Table 25). From 1985 through 1989, an average of 28,530 Dolly Varden were counted immigrating into the Buskin River. Complete weir counts of emigrating and immigrating Dolly Varden are not available after 1992.

**Table 23.-Harvest and release of Dolly Varden from Kodiak Road Zone waters of the Kodiak Management Area, 1986-2000.**

Year	KMA Harvest	Kodiak Road Zone <sup>a</sup>		
		Harvest	Release	% of KMA Harvest
1986	26,214	17,568		67
1987	15,380	7,859		51
1988	22,484	12,532		56
1989	18,379	10,619		58
1990	21,085	10,473	23,616	50
1991	21,158	9,638	12,511	46
1992	12,238	5,850	20,948	48
1993	10,512	4,378	22,747	42
1994	7,348	4,204	14,275	57
1995	9,274	5,015	11,463	54
1996	13,270	6,973	27,445	53
1997	10,255	5,337	27,928	52
1998	9,856	5,164	24,396	52
1999	9,191	4,876	19,126	53
2000	13,411	7,470	39,532	56
1990-1999				
Average	12,419	6,191	20,446	51

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> The Kodiak Road Zone totals were calculated by adding numbers from the SWHS database listed for the Buskin, American, Olds, and Pasagshak rivers; Saltery Cove fresh water, other roadside lakes; other roadside streams; Chiniak Bay boat; Ugak Bay boat; other roadside boat; and roadside shore. Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

**Table 24.-Harvest and release of Dolly Varden from selected Kodiak Road Zone streams, 1977-2000.**

Year	Buskin River and Lake		Pasagshak River and Lake Rose Tead		American River <sup>a</sup>		Olds River <sup>b</sup>		Total	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	10,353		617						10,970	
1978	8,003		443						8,446	
1979	15,150		982						16,132	
1980	9,376		1,162						10,538	
1981	9,159		475						9,634	
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	10,489		152		46		91		10,778	
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		588		448		259		8,387	
1990	4,830	12,489	190	2,449	845	1,380	293	1,087	6,158	17,405
1991	4,769	7,623	1,124	1,398	375	245	288	260	6,556	9,526
1992	2,360	8,422	352	1,172	360	3,605	360	893	3,432	14,092
1993	1,179	4,346	194	1,511	115	6,261	468	2,094	1,956	14,212
1994	1,208	3,481	205	726	671	5,144	358	1,142	2,442	10,493
1995	2,187	5,822	294	414	631	1,111	392	567	3,504	7,914
1996	2,039	10,663	195	1,521	1,105	4,218	425	1,348	3,764	17,750
1997	1,462	7,191	230	516	848	8,958	354	945	2,894	17,610
1998	1,812	9,138	208	800	200	2,668	604	1,770	2,824	14,376
1999	688	5,230	201	211	607	3,673	605	2,232	2,101	11,346
2000	2,067	18,182	204	1,410	951	6,762	529	1,477	3,751	27,831
1990-99										
Average	2,253	7,441	319	1,072	576	3,726	415	1,234	3,563	13,472

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> American River includes unidentified Middle Bay streams.

<sup>b</sup> Olds River includes unidentified Kalsin Bay streams.

**Table 25.-Fishery and migration statistics for the Buskin River Dolly Varden resource, 1981-1993.**

Year	Reference	Creel Survey April 15-June 15 <sup>a</sup>			Entire Year <sup>b</sup>		Weir Counts	
		Effort (Ang-Days)	Harvest	Release	Harvest	Release	Emigration	Immigration <sup>c</sup>
1981	Murray 1982		8,437		9,159			
1982					10,167			
1983	Murray 1984		6,668		8,454			
1984	Murray 1985	3,410	5,460		9,477			
1985	Murray 1986		8,712		10,489		21,797	20,545
1986	Murray 1987	4,284	4,065		10,367		40,773	24,110
1987	Murray 1988a	4,619	4,766		4,238		29,919	32,848
1988	Murray 1989	4,523	3,569	5,067	5,293		31,260	34,306
1989	Murray 1990	5,204	5,761	5,567	7,092		35,605	30,851
1990	Whalen 1991	4,268	2,362	3,993	4,830	12,489	91,107 <sup>d</sup>	6,416 <sup>e</sup>
1991	Whalen 1992				4,769	7,623	30,725 <sup>d</sup>	<sup>f</sup>
1992	Whalen 1993				2,360	8,422	74,451 <sup>d</sup>	<sup>f</sup>
1993					1,179	4,346	<sup>f</sup>	<sup>f</sup>
Mean		4,385	5,533	4,876	6,760	8,220		28,532

<sup>a</sup> Data from creel survey conducted during the emigration period only.

<sup>b</sup> Information from Statewide Harvest Survey (Mills 1982-1994).

<sup>c</sup> Immigration counts stopped when weir operation stopped on approximately October 1. Fish continue to migrate through October and November, so the counts listed here are partial counts of the total immigration.

<sup>d</sup> Vexar mesh was placed over the weir during emigration 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.

<sup>e</sup> Partial count due to weir washout, not included in mean.

<sup>f</sup> The weir was not operated during the peak immigration period.

### **Recent Fishery Performance**

The sport harvest of Dolly Varden from Kodiak road zone waters during 2000 was 7,470 fish, slightly above the recent 10-year mean harvest for the area of 6,190 fish (Table 23). This was the highest harvest on record since 1991 and the release of 39,530 was the highest on record, nearly double the recent 10-year average (Table 23). The Buskin River again supported the largest harvest of Dolly Varden on the road system (Table 24).

### **Management Objectives**

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

### **Recent Board of Fisheries Actions**

During the 1987 Alaska Board of Fisheries meeting, the Board reduced the bag and possession limits for Dolly Varden from 20 to 10 fish daily and in possession. This change was adopted to prevent overharvest of Dolly Varden stocks that are found within the Kodiak road zone.

During the 1999 Board of Fisheries meeting, the Board adopted a proposal that established criteria to follow when designating or dealing with special management areas that would diversify sport fishing opportunity for populations of wild Dolly Varden, such as catch-and-release, fly-fishing only, or trophy designation (5 AAC 64.014).

### **Current Issues**

Emigration counts from the Buskin River drainage were 91,110, 30,730 and 74,450 Dolly Varden in 1990, 1991 and 1992, respectively (Table 25). We do not know if the decrease of 60,000 fish in 1991 was due to a large decrease in population size or if the population overwintered outside the Buskin drainage during the winter of 1990-1991. 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 was conducted from 1986 to 1992 (Murray 1986, 1987, Sonnichsen 1990, Whalen 1991, 1992, 1993) to assess the stock structure and sustainable yield 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 showed that Chiniak Bay Dolly Varden exhibit a similar life history to that documented for anadromous Dolly Varden in southeastern Alaska. Buskin Lake appears to provide the major overwintering site for Chiniak Bay Dolly Varden stocks. Dolly Varden migrate out of Buskin Lake during the spring and reside primarily in marine waters during the summer. During late summer and fall, they enter streams in the Chiniak Bay area to feed and/or spawn. While the Buskin drainage is the major overwintering site, it is not the only spawning system. Other major spawning locations for Dolly Varden that overwinter in Buskin Lake include the American and Olds rivers, both of which are tributaries of Chiniak Bay. Throughout late summer and fall, Dolly Varden return to Buskin Lake to overwinter. Because of these life history characteristics, the Dolly Varden of Chiniak Bay can be considered one stock for purposes of fisheries management.

The population estimate of 5,880 spawning fish in 1993 was the highest ever recorded for the American River, although its 95% confidence limits overlap with past estimates (Table 26). The dramatic population drop observed at the Buskin River weir in 1991 (Table 25) does not appear to have resulted in a noticeable reduction in the 1993 American River spawning population.

The point estimate of 8,450 spawning Dolly Varden in the Olds River in 1993 is by far the highest ever recorded, although its 95% confidence limits overlap with past estimates (Table 26). We did not detect a drop in the Olds River spawning population linked to the low 1991 weir count.

**Table 26.-American and Olds rivers Dolly Varden population abundance estimates, 1988-1993.**

American River				
Year	Abundance	SE	95% Confidence Interval	
			Lower limit	Upper limit
1988 <sup>a</sup>	3,048	419	2,227	3,869
1989 <sup>b</sup>	4,125	805	2,547	5,703
1990 <sup>c</sup>	3,947	540	2,889	5,005
1991 <sup>d</sup>	3,375	469	2,456	4,294
1993 <sup>e</sup>	5,881	1,352	3,232	8,530
Olds River				
Year	Abundance	SE	95% Confidence Interval	
			Lower limit	Upper limit
1989 <sup>b</sup>	3,856	545	2,789	4,925
1991 <sup>f</sup>	2,669	197	2,456	4,294
1993	8,454	2,715	3,132	13,775

<sup>a</sup> S. Sonnichsen, Alaska Department of Fish and Game, Anchorage, personal communication.

<sup>b</sup> Sonnichsen 1990.

<sup>c</sup> Whalen 1991.

<sup>d</sup> Whalen 1992.

<sup>e</sup> The length distribution shifted between events in 1993, indicating that this estimate may be biased.

<sup>f</sup> Whalen 1992. This estimate is biased due to unequal capture probabilities between sublocations and among size groups.

In summary, the dramatic decrease in the size of the overwintering population in Buskin Lake that was observed at the weir in the spring of 1991 did not result in a reduction in the number of spawning fish in the Olds and American rivers in 1993. The overwintering population is very large (ranging from 30,000 to 90,000 fish) in comparison to the number of spawners in the Olds and American rivers (fewer than 15,000 fish). The Buskin River and Lake population can fluctuate dramatically from year to year, but not suffer a decline in stock reproductive potential as long as the abundance of spawning fish is not reduced. Sport harvest of Dolly Varden from the Buskin River, which now averages less than 3,000 fish annually, is not significant in comparison to the fluctuations we have observed, and is not likely to affect the population size. However, sport harvest of the spawning populations should be monitored to assure that the spawning stock is not significantly reduced.

### **Recommended Research and Management Activities**

The last population abundance research was conducted in the spring of 1992 and fall of 1993. The large emigration count of 74,450 Dolly Varden from Buskin Lake, and the large spawning population estimates on the American and Olds rivers in the fall of 1993, both indicated that the Dolly Varden population was above average in abundance when compared to other years. Since continued population monitoring is not scheduled, sport catches will be used as an indicator of population abundance.

It is important to focus on catches and not harvests when using the sport fishery as an indicator of population size. Since 1992 there has been a trend for anglers to release Dolly Varden, and road zone harvests averaged only 5,960 fish from 1996-2000, half of the 1986-1990 average of 11,810 (Table 23). But catches on the road zone have remained high, averaging over 27,000 Dolly Varden from 1996-2000. Anglers are choosing to release a higher percentage of their catch. In 2000 the road zone catch (harvest plus release) was 47,000 Dolly Varden; anglers chose to release 84% of the fish they caught.

A problem associated with using the sport fish catch as a tool to gauge Dolly Varden population size is that an unknown portion of the Dolly Varden catch is made incidentally while anglers are fishing for sockeye, pink and coho salmon. The total Dolly Varden catch is influenced by the amount of fishing effort that occurs during these salmon fisheries, which may vary from year to year based on weather conditions and run strength. Therefore, the Dolly Varden catch from year to year may reflect changes in effort in other fisheries, rather than changes in the Dolly Varden population.

Keeping these limitations in mind, sport fish catches will be used as a general indicator of Dolly Varden population abundance. If Dolly Varden catches drop far below average, spawning population abundance estimates can be made on the American and Olds rivers to determine if the population has declined and if fisheries restrictions should be implemented. The record catch made in 2000 indicates that Dolly Varden were very abundant.

## **KODIAK ROAD ZONE LANDLOCKED LAKES STOCKED FISHERIES**

### **Historical Perspective**

Stocking is currently being used to increase and diversify the opportunities for sport anglers fishing Kodiak road zone landlocked lakes. Several species of fish at various life stages have been stocked including rainbow trout fingerlings, Arctic grayling fry, and coho salmon fingerling. Rainbow trout have been stocked annually since the early 1950s. Arctic grayling stocking was terminated in 1995 because

survival was very poor and anglers were not having success catching adult fish. Coho salmon are currently stocked in two landlocked lakes.

Regulations governing the stocked lakes vary by species. Within the Kodiak road zone, with the exception of the Saltery River and Buskin Lake drainages, populations of rainbow trout are limited to hatchery-produced fish planted into landlocked lakes. The bag and possession limits for rainbow trout are 10 fish, only 1 of which may be 20 inches or more in length. Bag and possession limits for coho salmon under 20 inches in length are 10 per day, 10 in possession.

From 1990 through 1999, an average of 1,460 angler-days has been expended by recreational anglers fishing landlocked lakes along the Kodiak road zone (Table 27). This effort has represented about 1% of the total sport fishing effort expended by recreational anglers fishing KMA waters over this period. The average annual harvest of rainbow trout from stocked lakes from 1990 through 1999 was 520 fish (Table 27). The effort that occurs in the two lakes stocked with landlocked coho is so small that estimates made through the Statewide Harvest Survey are not possible. Road zone harvests have represented about 60% of the total KMA harvests of rainbow trout (Table 27).

In 2001, approximately 55,960 rainbow fingerlings were stocked along the Kodiak road zone (Table 8). A total of 3,000 coho fry were stocked in 2001 in Southern Lake on Long Island in the Kodiak road zone. Pony Lake (also called Sawmill Lake) was stocked with 2,100 finger-lings in 2000. Factors that determine frequency of stocking include: availability of fish, weather conditions that affect travel to Southern Lake, and the small size of the lakes which can produce small, stunted fish if too many fish are stocked.

## **MANAGEMENT OBJECTIVES**

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

## **RECENT BOARD OF FISHERIES ACTIONS**

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

## **CURRENT ISSUES**

Effort directed towards these stocked fish and harvest of the stocked fish has remained relatively low (Table 27). The cost of these projects is also relatively low, averaging less than \$4,000 per year for all species combined. There are no major management issues regarding this fishery at present.

## **ONGOING RESEARCH AND MANAGEMENT ACTIVITIES**

There are no ongoing research activities concerning Kodiak lake stocking.

## **RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES**

Greater education of the sport fishing public is recommended to increase use of these stocked fish. A map of stocked lakes with pictures of successful anglers fishing through the ice and in open waters

should be developed and displayed at the Kodiak Fish and Game office to help make anglers aware of fishing opportunities in stocked lakes.

**Table 27.-Number of angler-days of sport fishing effort and number of rainbow trout harvested by anglers fishing roadside lakes along Kodiak Road Zone, 1990-2000.**

Year	Effort (Angler-Days)			Rainbow Trout Harvest		
	Road Zone Lakes <sup>a</sup>	KMA	% of KMA	Road Zone Lakes <sup>a</sup>	KMA	% of KMA
1990	2,374	115,698	2	1,313	1,550	85
1991	1,541	136,486	1	472	1,461	32
1992	2,304	108,586	2	1,020	1,179	87
1993	1,245	112,826	1	98	335	29
1994	1,312	113,498	1	470	739	64
1995	1,203	97,082	1	151	321	47
1996	2,373	87,866	3	345	538	64
1997	630	90,891	1	275	588	47
1998	509	89,457	1	211	461	46
1999	1,063	129,419	1	828	1,057	78
2000	1,522	139,927	1	896	955	94
1990-99						
<u>Average</u>	<u>1,455</u>	<u>108,181</u>	<u>1</u>	<u>518</u>	<u>823</u>	<u>58</u>

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Includes Buskin Lake, Lake Rose Tead, Saltery Cove Lakes, and other roadside lakes.

## **KARLUK AND AYAKULIK (RED) RIVERS FISHERIES**

The Karluk and Ayakulik (also known as Red) rivers are located on the southwest end of Kodiak Island (Figure 10). 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 10). Others fly into Karluk Lake and float the Karluk River downstream either to the portage or all the way downstream to Karluk Lagoon. The river mileage from Karluk Lake to the lagoon is approximately 22 miles. 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 10) 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. Anglers may also gain access to the lower river by landing on the beach or in the Ayakulik Lagoon. It is very difficult, and sometimes impossible depending on conditions, to land either on the beach or in the lagoon. From 1997 through 1999 it was impossible to land in the lagoon because winter storms had deposited beach gravel in the lagoon, making it very shallow.

The Karluk and Ayakulik rivers support native stocks of steelhead trout and all five species of North American Pacific salmon. Chinook and coho salmon are the preferred salmon species, but both rivers have large runs of sockeye and pink salmon, which are also harvested by anglers. Steelhead are also targeted by anglers, but effort is smaller than salmon fisheries because the fishery takes place in the late fall/early winter when weather conditions are often poor.

### **KARLUK RIVER 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 weirs located in the lower rivers by June 15. Chinook salmon in the Karluk River spawn from the outlet of Karluk Lake downstream to just above the lagoon. Few, if any, chinook salmon enter Karluk Lake or the tributaries to the lake. Spawning occurs from August through mid-September. There is currently a spawning ground closure from July 25–December 31. The bag and possession limits are 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 Harvest Survey (Mills 1979-1994, Howe et al. 1995 and 1996, 2001 a-d, Walker et al. *In prep*) provides estimates of harvest for the recreational fisheries in these waters. Creel surveys were also conducted during 1993 and 1994 (Schwarz 1996). The estimated annual sport harvest of chinook salmon from the Karluk River from 1990 through 1999 averaged 1,370 fish (Table 28). The largest estimated chinook salmon harvest on the Karluk River occurred in 2000 and was 2,580. Chinook salmon bound for the Karluk River are also harvested in commercial and subsistence fisheries.

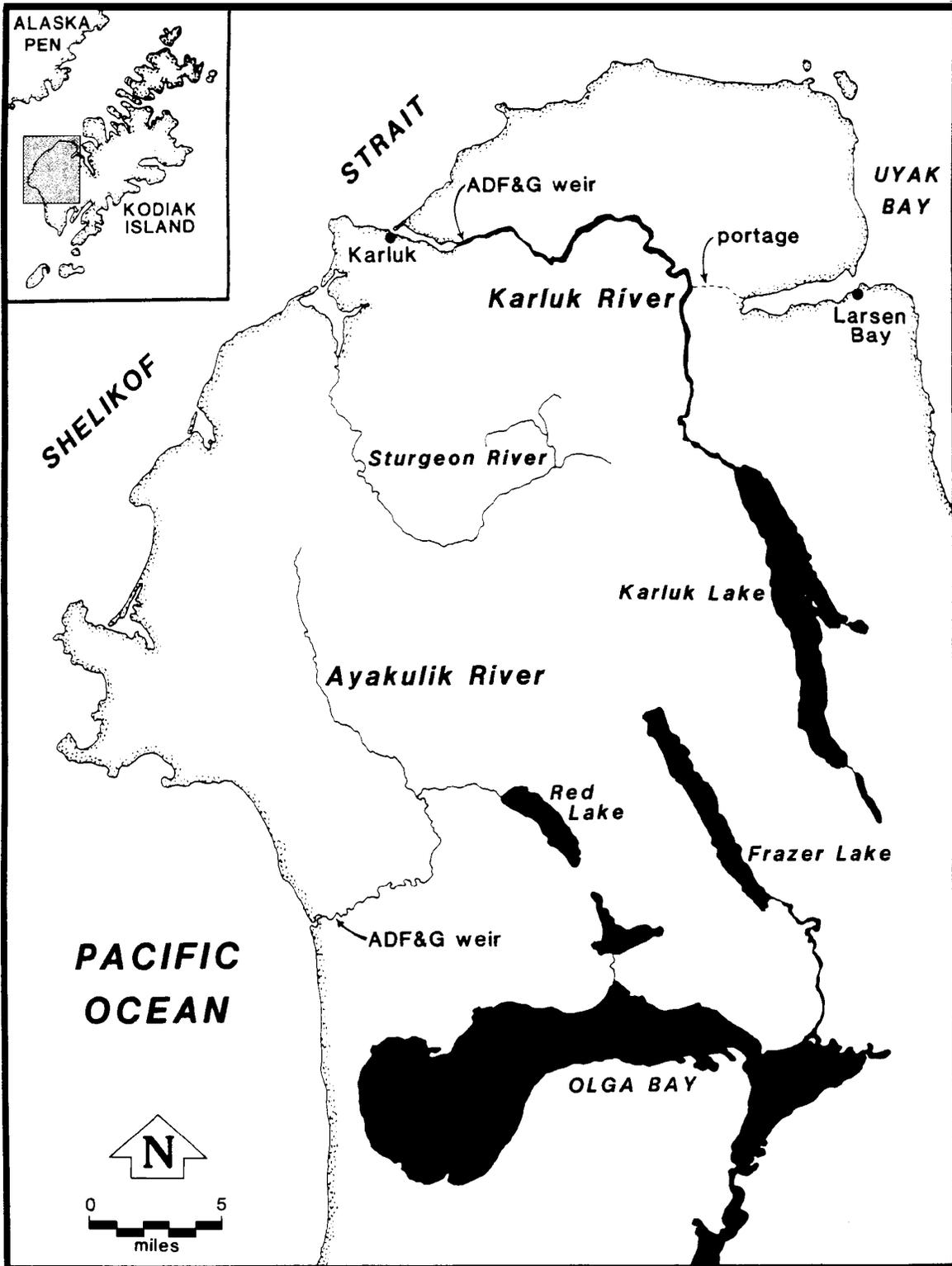


Figure 10.-The Karluk and Ayakulik rivers.

Escapement of chinook salmon into the Karluk River is enumerated through a weir located near the terminus of the river. Weir counts of chinook salmon in the Karluk River have averaged approximately 10,590 fish from 1976–2001, with counts ranging from 4,430 to 14,440 (Table 29).

**Table 28.-Sport effort and harvest of chinook salmon from the Karluk and Ayakulik (Red) river drainages, 1990-2000.**

Year	Karluk River System			Ayakulik River System		
	Effort (Angler Days)	Harvest	Number Released	Effort (Angler Days)	Harvest	Catch
1990	3,326	678	2,306	815	252	2,558
1991	4,632	1,599	3,119	1,780	563	2,754
1992	5,430	856	2,754	3,404	776	3,975
1993 <sup>a,b</sup>	6,916	1,634	6,735	4,625	1,004	5,426
1994 <sup>c</sup>	10,948	1,483	2,174	5,473	948	1,968
1995	6,928	1,284	2,613	1,382	200	1,083
1996	4,679	1,695	8,641	1,524	419	2,391
1997	5,043	1,574	9,119	3,374	1,190	7,179
1998	4,223	1,173	6,150	1,314	259	3,504
1999	6,239	1,766	5,957	2,165	609	3,434
2000	8,301	2,581	8,166	1,853	805	8,381
1990-99						
Average	5,836	1,374	4,957	2,586	622	3,427

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

Note: Reported effort is for all species on these rivers; but the primary fishery is for chinook salmon.

<sup>a</sup> In 1993 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 that was conducted at the Portage (Schwarz 1996).

<sup>b</sup> The USF&WS conducted a complete creel census on the Ayakulik River in 1993. Harvest and catch were documented at 808 and 2,878 chinook salmon, respectively (Schwarz 1996).

<sup>c</sup> In 1994 a creel census above the Karluk weir documented a harvest of 896 chinook salmon. A creel census in the Ayakulik River documented a harvest of 739 chinook salmon (Schwarz 1996).

Sport harvest (Table 29) has been a minor component of the chinook salmon resource exploitation. The minimum spawning escapement goal for chinook salmon on the Karluk River is 4,500 fish. Returning chinook salmon in excess of 4,500 constitute the inriver harvestable surplus. The sport fishery, through direct harvest and catch-and-release mortality, took an average of only 28% of the harvestable surplus each year from 1982 through 2000. Typically, weir counts significantly exceed the upper end of the escapement range (4,500–8,000). However, when small escapements occur, sport harvests can significantly affect achievement of the escapement goal.

Prior to the 2001 return, the last poor Karluk return occurred in 1986, when the Karluk weir count was 4,429 chinook. The sport fishery was just beginning in 1986, and the estimated sport removal above the weir was only 90 fish. The spawning escapement in 1986 on the Karluk river was 4,337 chinook, 163 fish below the escapement goal. Returns that approximate the lower end of the escapement goal range are relatively rare but when they do occur they are usually immediately followed by another weak return. The reason for this is that returns are dominated by two age classes, fish that have spent 3 and 4 years at sea before returning. If a parent year has poor survival, it will not contribute significantly to the returns 5 and 6 years after the spawning year.

### **Recent Fishery Performance**

The Karluk chinook fishery in 2000 occurred during a year with average abundance. The weir count of 10,460 chinook was slightly below the average count of 10,591. However, the harvest of 2,580 chinook (Table 28) was the highest on record and significantly above the recent 10-year average of 1,370 (1990-1999). Even after the record removal by the sport fishery, the spawning escapement was estimated to be 8,095, slightly above the upper end of the 4,500-8,000 spawning goal range.

The 2001 Karluk river chinook salmon fishery occurred on the second lowest return on record. The Karluk weir count for chinook salmon in 2001 was 4,540 fish (Table 29). The inseason management approach for the Karluk River chinook fishery was, to manage the fishery so that minimum escapement levels (4,500 chinook salmon) are met. Time-of-entry data have been compiled so that it is possible to project how many fish should be through the weir on any specific date to achieve a minimum escapement objective. To achieve minimum spawning escapements, weir counts must total the minimum spawning objective plus the recent 3-year average sport harvest so that after the sport fishing removal occurs, the minimum spawning escapement will still be present. The final weir count on the Karluk River should total 6,000 chinook (4,500 minimum spawning goal + 1,200 sport fish harvest above weir + 300 hooking mortality). An average of 50.3% of the final weir count has passed the weir by June 17. To achieve the minimum spawning objective a weir count of 3,000 ( $6,000 \times .503$ ) should be obtained by June 17. On June 17, 2001 the weir count on the Karluk River was 3,343 chinook salmon, and it appeared that the minimum escapement objective would be met. However, as the season progressed, weir counts began to lag and it became apparent that without fisheries restrictions the minimum escapement objective would not be met. On June 21 a reduction in the sport fish bag limit was announced. Effective June 23, the bag limit was reduced from 3 chinook salmon per day, only 2 of which could be greater than 28 inches in length to 1 per day over 20 inches in length. The justification for the emergency order was "...the sport fishery harvests approximately 1,500 king salmon above the weir during an average year. The current weir count as of June 20, 2001 (3,628 fish),

**Table 29.-Inriver returns and harvest of chinook salmon in the Karluk river, 197 6-2001.**

Year	Weir Count	Sport Harvest	Sport Harvest Above Weir <sup>a</sup>	Number Released Above Weir <sup>a</sup>	Hook & Release Mortality <sup>b</sup>	Spawning Escape-ment
1976	6,897					6,897
1977	8,434					8,434
1978	9,795					9,795
1979	9,555					9,555
1980	4,810					4,810
1981	7,575					7,575
1982	7,489	796	597			6,892
1983	11,746	304	228			11,518
1984	7,747	187	140			7,607
1985	5,362	484	363			4,999
1986	4,429	122	92			4,337
1987	7,930	199	149			7,781
1988	13,337	819	614			12,723
1989	10,484	559	419			10,065
1990	14,442	678	509	1,729	121	13,812
1991	14,022	1,599	1,199	2,340	164	12,659
1992	9,601	856	642	2,066	145	8,814
1993	13,944	1,634	1,226	5,051	354	12,364
1994	12,049	1,483	1,112	1,631	114	10,823
1995	12,657	1,284	963	1,960	137	11,557
1996	10,051	1,695	1,271	6,481	454	8,326
1997	13,443	1,574	1,181	6,839	479	11,783
1998 <sup>c</sup>	10,239	1,173	880	4,612	323	9,036
1999	13,063	1,766	1,325	4,467	313	11,425
2000	10,460	2,581	1,936	6,124	429	8,095
2001 <sup>d</sup>	4,542	1,240	930	3,161	221	3,391
Average	10,591		871	3,872	271	9,529

<sup>a</sup> Seventy-five percent of the total chinook salmon sport harvest and release from the Karluk River system is estimated to be taken above the weir. Total harvest estimates were taken from SWHS database, Sport Fish Division, RTS, Anchorage. There was no harvest reported to the SWHS prior to 1982.

<sup>b</sup> Estimated mortality of 7% (Bendock 1991).

<sup>c</sup> Weir washed out. Count is estimated based on partial weir counts and sockeye salmon to chinook salmon ratios in the commercial catches.

<sup>d</sup> Harvest and release estimated using information from rafters passing through the weir as an index. These estimates will be revised when the Statewide Harvest Survey estimates are available in June of 2002.

and the 10-year average time-of-entry for this date (62.4% of the return) allows us to project that approximately 5,700 king salmon will enter the Karluk River this year. If an average sport fish harvest occurs, the minimum spawning goal will not be achieved. In order to reduce the sport fish harvest so that the minimum king salmon escapement goal can be achieved, the bag and possession limit must be reduced..." This was the first inseason restriction on a Kodiak chinook salmon sport fishery.

As the season continued, it became apparent that the Karluk chinook salmon return was early and weak. Weir counts continued to lag, and on July 6 an emergency order was made to close the Karluk River to sport fishing for chinook and to the use of bait, effective July 9. The final weir count was 4,542 chinook salmon. The Statewide Harvest Survey will not generate estimates of sport harvest until June 2002; however, anglers censused at the weir provide an index of sport effort and harvest. The 2001 weir census (Table 30) documented the lowest harvest and second lowest number released on record. Using these figures as an index of the chinook removal by the sport fishery above the weir, the spawning escapement was estimated at 3,391 fish, below the minimum goal of 4,500 fish (Table 29). This estimate of sport fish removal will change once Statewide Harvest Survey estimates are available.

In early June it appeared that minimum escapement objectives would be met. The Karluk weir count of chinook salmon usually reaches the 50% mark by June 16, but the 2001 return reached the 50% mark by June 11 and therefore was not as strong as projected. In order to meet minimum spawning objectives with a weir count of 4,542, virtually no sport fishery should have been allowed above the weir in 2001.

### **Management Objectives**

The primary management objective is to ensure that minimum spawning escapement goals (4,500 chinook salmon) are met. Management objectives also include providing angling opportunities at a level that the fishery resource can support. To maintain angling opportunities, public access is an important issue. Land status is complicated and dynamic along the Karluk River drainage. Staff involvement in land management plans as they are developed, and informing anglers of their effect, are also management objectives.

### **Recent Board of Fisheries Actions**

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

Annual chinook harvest limits would affect the sport fishery in the Karluk River. Annual limits are still under consideration by the Board as described in the saltwater chinook salmon chapter. Two additional proposals were considered at the January 15, 1999 Board of Fisheries meeting: spawning ground season closures on both the Karluk and Ayakulik rivers for chinook salmon from July 25 through December 31, and gear limitation to artificial lures with single hook on the Karluk River. The spawning ground closures were adopted in both the Karluk and Ayakulik rivers. The gear limitation proposal was not adopted.

**Table 30.-Comparison of chinook salmon harvest and effort information obtained at weir sites with total river estimates obtained through the Statewide Harvest Survey and creel surveys, Karluk and Ayakulik rivers, 1991-2001.**

<b>Karluk River System</b>								
Year	SWHS <sup>a</sup>		Creel Survey <sup>b</sup>		Interviewed at Weir <sup>d</sup>			
	Harvest	Release	Harvest	Release	Number of Anglers	Angler-days	Harvest	Release
1991	1,599	3,119			162	Not available		
1992	856	2,754			235	807	340	840
1993	1,634	6,765	569 <sup>c</sup>	3,135 <sup>c</sup>	244	1,088	369	2,484
1994	1,483	2,174	896	4,347	506	1,650	493	3,385
1995	1,284	2,613			380	1,677	492	2,411
1996	1,695	8,641			329	1,727	406	2,996
1997	1,574	9,119			322	1,632	399	2,221
1998	1,173	6,150			283	1,719	376	1,453
1999	1,766	5,957			373	1,765	347	1,153
2000	2,581	8,166			286	1,917	497	1,972
2001	Not available				478	1,697	309	1,144

<b>Ayakulik River System</b>								
Year	SWHS <sup>a</sup>		Creel Survey <sup>b</sup>		Interviewed at Weir and Lodge			
	Harvest	Release	Harvest	Release	Number of Anglers	Angler-days	Harvest	Release
1993	1,004	4,422	808	2,878	150	598	433	1,961
1994	948	1,020	739	2,733	203	926	477	1,898
1995	200	883			126	606	296	2,445
1996	419	1,972			135	446	292	1,299
1997	1,190	5,989			89	537	251	1,799
1998	259	3,245			66	431	195	2,060
1999	609	2,825			73	343	237	971
2000	805	7,576			152	966	404	3,114
2001	Not available				135	980	303	4,148

<sup>a</sup> Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>b</sup> Schwarz 1996.

<sup>c</sup> Incomplete survey, Karluk portage not surveyed.

<sup>d</sup> Clapsadl *In prep.*

## **Current Issues**

The Board of Fisheries has spent considerable time dealing with the issue of annual limits for chinook salmon in the Kodiak area. This topic continues to be an issue. For a complete discussion on the issue of annual limits, please refer to Recent Board of Fisheries Actions in the Kodiak Marine Chinook Salmon Fisheries chapter.

Another major issue in these fisheries is public access. Two Native Corporations own much of Karluk Lake, the banks along the river, and much of Karluk Lagoon. A very small percentage of the drainage is owned by private individuals, contains public easements, or consists of small tracts purchased by the State of Alaska. This land ownership pattern has led to confusion among anglers wishing to use these lands and avoid trespassing. The Alaska Department of Natural Resources, in cooperation with the Alaska Department of Fish and Game, published a brochure in 1997 titled Karluk River, Access and Use Information. This brochure showed the location of private land and public easements. It was designed to clearly delineate land ownership so that people could plan trips, contact appropriate landowners, and avoid trespass.

A new land management plan will be implemented on the uplands surrounding the upper Karluk River and Karluk Lake in October 2002. As this plan (the Master Agreement For Protection of Certain Lands and Resources between Koniag, Inc., The United States of America, and the State of Alaska; [the Karluk River Conservation Easement]) goes into effect, it will be important to inform anglers what access and uses will be allowed. For instance, the Karluk River Conservation Easement will limit the number of anglers allowed to use the uplands during peak times. To inform anglers, the land status brochure will need to be rewritten. Issues covered in this brochure will include use of 17b public easements, state-owned land in Karluk Lagoon, as well as uses of a navigable river to which the state claims ownership of the river bottom.

The Comprehensive Conservation Plan (CCP) is being updated by the Kodiak National Wildlife Refuge, and could also affect access for anglers. Changes in land status from Refuge to Wilderness and Wild and Scenic Rivers are being considered. Managing the refuge for “quality of experience” is also being considered in the CCP update. Managing for quality of experience is usually associated with a reduction in the number of people using the resource at one time.

## **Ongoing Research and Management Activities**

Setting escapement objectives at effective levels ensures that the resource is conserved and fishing opportunity for the public is maximized. The current escapement goal range of 4,500-8,000 chinook salmon on the Karluk has not been fully evaluated. Beginning in June 1993, a major research project was initiated on the Karluk and Ayakulik rivers to collect age, size, and sex information from the escapement and harvest. These data will be used to construct brood tables, which will be used to refine escapement objectives. The project also monitors and documents the recreational harvest and effort from anglers rafting the river. Complete results of the work conducted in 1993 through 1998 are presented in Schwarz (1996), Motis (1997), and Clapsadl (*In prep*).

## **Recommended Research and Management Activities**

Establishing biological escapement goals using brood tables and a Ricker model requires variations in escapement levels. This variation is often not seen in populations that are being managed so that escapement falls within a narrow escapement goal range. However, in 1999 Karluk spawning

escapement was high at 11,430 and in 2001 it was at a record low of 3,390. We need to follow the results from this high return and the record low return through the next generations to examine the link between the parent-year escapement and the size of the subsequent returns. Age, length and sex data should continue to be sampled from inriver returns at the Karluk weir. These data will allow brood tables to be constructed so that the escapement goal can be refined.

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

The Karluk River access brochure should be updated by the spring of 2003 to explain how the Karluk River Conservation Easement will affect access.

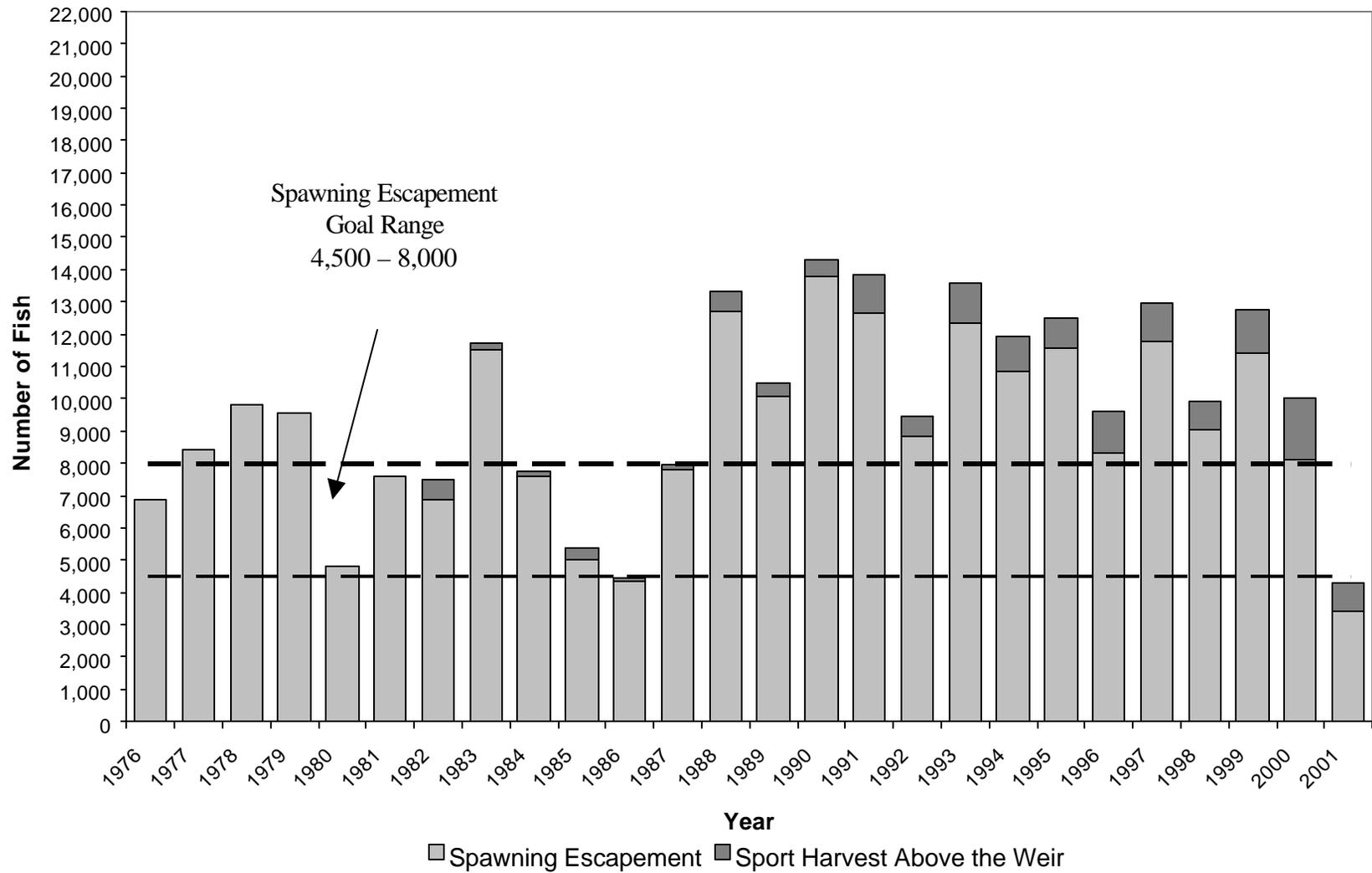
### **Inseason Management Approach**

The Karluk River will be managed so that minimum escapement levels are met (4,500 chinook salmon). Time-of-entry data have been compiled so that it is possible to project how many fish should be through the weir on any specific date to achieve a minimum escapement objective. To achieve minimum spawning escapements, weir counts must total the minimum spawning objective plus the sport removal above the weir. To project the sport harvest above the weir, the three most recent annual sport harvests will be averaged. Since the harvest in 2001 had a bag limit reduction and closure imposed, it will not be used in the average. In addition, an average hook-and-release mortality will be estimated during the same years by assuming that 7% of released fish die. Finally, it is estimated that 75% of the sport fish removal occurs above the weir.

If it does not appear that the final weir count on the Karluk River will total 6,250 chinook (4,500 minimum spawning goal + 1,750 sport fish removal above weir), then restrictions will be placed on the sport fishery to reduce the sport fish removal. An average of 25% of the weir count has occurred by June 8 and 50% by June 16. This means that for the sport fishery to precede without inseason restrictions, a weir count of 1,560 must be obtained through June 8 and a count of 3,125 through June 16. It should be noted that the 2001 return was very early. Through June 8, 37% of the return had actually passed the weir and 70% of the return had passed the weir through June 16. It is impossible to gauge the timing of a return until the season is over. With this in mind, restrictions will be implemented as soon as possible if interim goals are not being achieved.

Based on the relatively small abundance of 2- and 3-ocean fish observed in the age class sampling at the weir in 2001, a weak return is again expected in 2002. Since almost 80% of a return is composed of fish that have spent 3 or 4 years at sea, it is not uncommon to observe a poor return one year followed by another poor return the next year, as the weak year class moves through return years (for example 1980–1981, and 1985-1986) (Table 29, Figure 11).

If the weir count is below the desired midpoint, the sport fishery will be restricted so that minimum objectives can be reached. Restrictions may be imposed earlier than the midpoint of the run 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 bait, or complete closures. Meetings will be held with guides and sport fishermen to determine the least disruptive way to restrict the sport fishery and still achieve minimum escapement levels. The restriction chosen will be the one that impacts the fishery the least but still allows the minimum escapement objective to be achieved.



Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

**Figure 11.-Karluk River chinook salmon spawning escapement and sport harvest, 1976-2001.**

## **AYAKULIK RIVER CHINOOK SALMON FISHERY**

### **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 weirs located in the lower rivers by June 15. 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 the east fork of the Ayakulik upriver from the Red River. Few fish, if any, enter Red Lake. Spawning occurs from late July through late August. There is currently a spawning ground closure from July 25–December 31. The bag and possession limits are 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 Harvest Survey (Mills 1979-1994, Howe et al. 1995 and 1996, 2001 a-d, Walker et al. *In prep*) provides estimates of harvest for the recreational fisheries in these waters. Creel surveys were also conducted during 1993 and 1994 (Schwarz 1996). The estimated annual sport harvest of chinook salmon from the Ayakulik River from 1990 through 1999 was 620 fish (Table 28). The record chinook salmon harvest occurred in 1997 and was 1,190 fish. Chinook salmon bound for the Ayakulik River are also harvested in commercial and subsistence fisheries.

Escapement of chinook salmon into Ayakulik River is enumerated through a weir located near the terminus of the river. Weir counts of chinook salmon in the Ayakulik River have averaged 13,040 fish from 1985-2001, with individual year's totals ranging from 970 to 21,370 (Table 31, Figure 12).

Sport harvest (Table 31) has been a minor component of the chinook salmon resource exploitation. The minimum spawning escapement goal for chinook salmon on the Ayakulik River is 6,500 fish. Returning chinook salmon in excess of 6,500 constitute the inriver harvestable surplus. The sport fishery, through direct harvest and catch-and-release mortality, took an average of only 22% of the harvestable surplus each year from 1982 through 2000 (Table 31). Typically, weir counts significantly exceed the upper end of the escapement range (6,500–10,000). However, when small escapements occur, sport harvests can significantly affect achievement of the escapement goal. The last time this happened on the Ayakulik River was in 1993 and 1994. In 1993 the weir count was 7,819 fish with an estimated sport removal (harvest and hook-and-release mortality) of 1,314 fish. This left 6,505 fish to spawn, only five fish over the minimum escapement level. In 1994, the Ayakulik River weir count was 9,138 chinook salmon, with an estimated sport removal of 1,020 fish. The spawning escapement was estimated at 8,119; only 1,621 fish above the minimum escapement goal. The commercial fishery adjacent to the Ayakulik River did not open in 1994 due to a weak sockeye return. The commercial fishery adjacent to the Ayakulik River (Statistical Areas 256-25, -20, and -10) had averaged a harvest of 2,710 chinook salmon over the 10-year period of 1987–1996 (Appendix A of Motis 1997). Had a commercial fishery with an average harvest of chinook occurred in 1994, the minimum escapement objectives would not have been met.

**Table 31.-Inriver returns and harvest of chinook salmon in the Ayakulik (Red) River, 1976-2001.**

Year	Weir Count	Harvestable Surplus <sup>a</sup>	Sport Harvest <sup>b</sup>	Number Released	Hook & Release Mortality <sup>c</sup>	% Surplus Harvested	Spawning Escapement
1976	1,493	0					1,493
1977	5,163	0					5,163
1978	4,739	0					4,739
1979	4,833	0					4,833
1980 <sup>d</sup>	974	0					974
1981	8,018	1,518					8,018
1982 <sup>e</sup>	3,230	0					3,230
1983	15,511	9,011	145			2	15,366
1984	6,502	2	437			100	6,065
1985	8,151	1,651	76			5	8,075
1986	6,371	0	76			100	6,295
1987	15,636	9,136	126			1	15,510
1988	21,370	14,870	600			4	20,770
1989	15,432	8,932	390			4	15,042
1990	11,251	4,751	252	2,306	161	9	10,838
1991	12,988	6,488	563	2,191	153	11	12,272
1992	9,135	2,635	776	3,199	224	38	8,135
1993	7,819	1,319	1,004	4,422	310	100	6,505
1994	9,138	2,638	948	1,020	71	39	8,119
1995	17,701	11,201	200	883	62	2	17,439
1996	10,344	3,844	419	1,972	138	14	9,787
1997	14,357	7,857	1,190	5,989	419	20	12,748
1998	14,038	7,538	259	3,245	227	6	13,552
1999	13,503	7,003	609	2,825	198	12	12,696
2000	20,527	14,027	805	7,576	530	10	19,192
2001	13,929	7,429				0	13,929
Average							
1985-	13,041	6,548	518	3,239	227	22	12,406

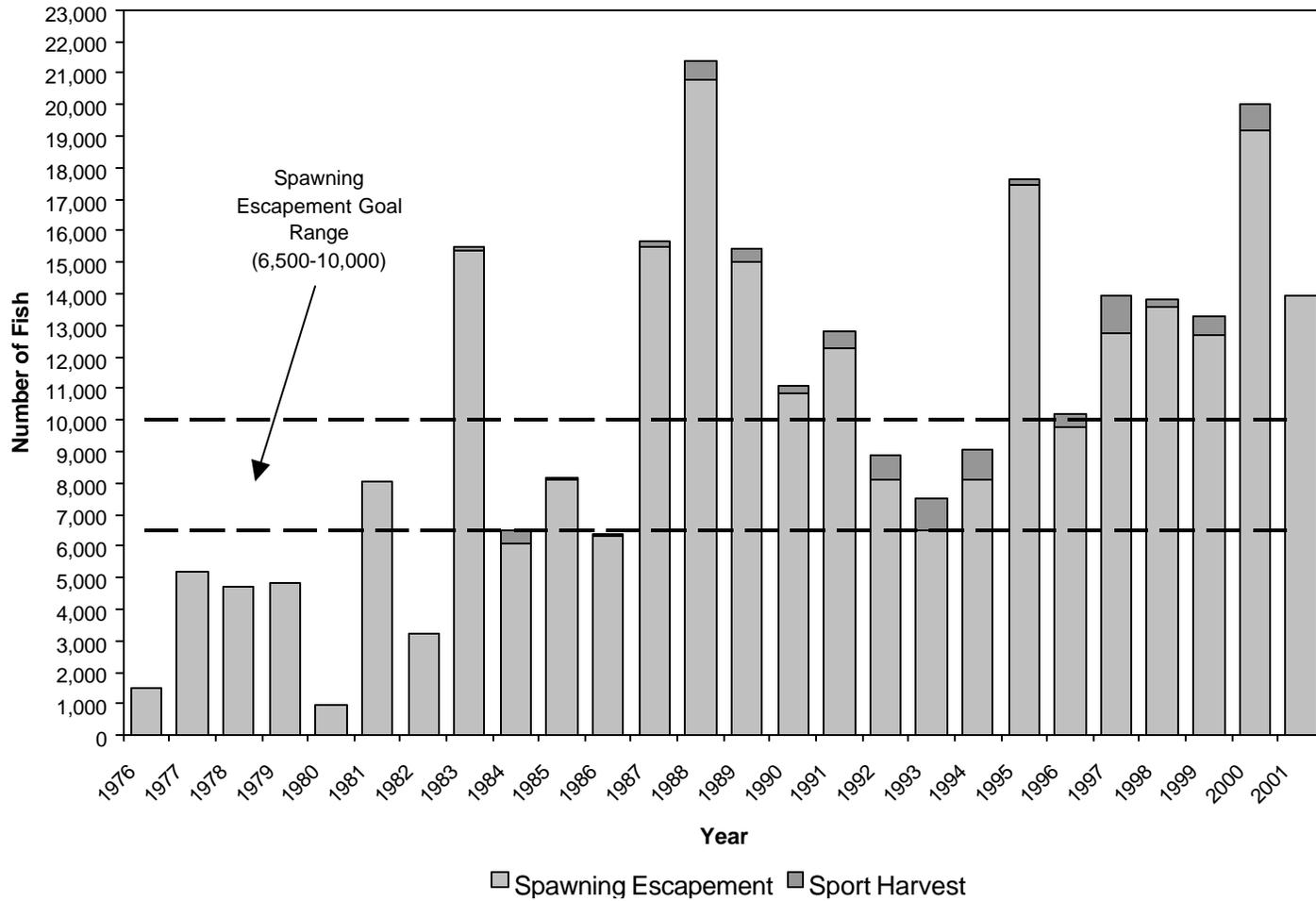
<sup>a</sup> Weir counts minus minimum spawning goal of 6,500.

<sup>b</sup> Harvest estimates from Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage. There was no harvest reported to the SWHS prior to 1983.

<sup>c</sup> Estimated mortality of 7% (Bendock 1991).

<sup>d</sup> Weir was not operational until June 10, 1980.

<sup>e</sup> Weir operational June 1. Washed out between June 4 and 23, 1982.



Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

**Figure 12.-Ayakulik River chinook salmon spawning escapement and sport harvest, 1976-2001.**

Returns that approximate the lower end of the escapement goal range are relatively rare but when they do occur they are usually immediately followed by another weak return. The reason for this is that returns are dominated by two age classes, fish that have spent 3 and 4 years at sea before returning. If a parent year has poor survival, it will not contribute significantly to the returns 5 and 6 years after the spawning year.

### **Recent Fishery Performance**

The Ayakulik chinook salmon fishery in 2000 occurred during a year with very high abundance, which resulted in a record catch. The weir count of 20,530 was the second highest on record. The harvest of 810 chinook salmon was the fourth highest on record; the release of 7,580 was the highest on record. The Ayakulik Lagoon was very shallow from 1997 through the 1999 season, making it very difficult for rafters to exit the fishery. As a result, fishing effort from rafters was low during these years. Beginning in 2000, the lagoon was accessible to float planes so anglers rafting the river could exit the fishery from the lagoon. After the sport fish removal the spawning escapement was estimated to be 19,190; significantly above the upper end of the escapement goal range of 6,500–10,000.

During the 2001 fishery, the abundance of chinook was slightly above average, with a weir count of 13,930 fish. The return occurred early. The chinook return usually reaches the 50% mark at the weir by June 13, but in 2001 half of the chinook had been counted through the weir by June 6. Fishing was very good for those that came early, but by June 23 fish began to turn red and catch rates declined. Fishing effort dropped off sharply after this date and the fishery ended 2 weeks earlier than in most years. The total sport harvest for 2001 will not be estimated by the Statewide Harvest Survey until June 2002, but we anticipate that the upper end of the spawning escapement range will again be exceeded. Even though a harvest estimate for the entire Ayakulik River is not yet available, all anglers walking or floating past the Ayakulik weir are censused. The results of these censuses are listed in Table 30. During the 2001 season, 980 angler-days were fished and a harvest of 303 fish was documented. In addition, 4,148 chinook salmon were released by anglers. This effort and harvest does not reflect the effort from anglers who exited the fishery 6 miles upriver at the confluence of Bare Creek and the Ayakulik River.

### **Management Objectives**

The primary management objective is to ensure that minimum spawning escapement goals (6,500 chinook salmon) are met. Management objectives also include providing angling opportunities at a level that the fishery resource can support. To maintain angling opportunities, public access is an important issue. Land status is complicated and dynamic along the Ayakulik River drainage. Staff involvement in land management plans as they are developed, and informing anglers of their effect, are also management objectives.

### **Recent Board of Fisheries Actions**

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

Annual chinook harvest limits would affect the sport fishery in the Ayakulik River. Annual limits are still under consideration by the Board as described in the saltwater chinook salmon chapter. Two additional proposals were considered at the January 15, 1999 Board of fisheries meeting: spawning ground season closures on both the Karluk and Ayakulik rivers for chinook salmon from July 25 through December 31, and gear limitation to artificial flies on the Ayakulik River. The spawning ground closures were adopted in both the Karluk and Ayakulik rivers. The gear limitation proposals were adopted.

### **Current Issues**

The Board of Fisheries has spent considerable time dealing with the issue of annual limits for chinook salmon in the Kodiak area. This topic continues to be an issue. For a complete discussion on the issue of annual limits please refer to the saltwater chinook chapter, in the section on recent Board of Fisheries actions.

Another major issue in these fisheries is public access. Most of the land in the Ayakulik drainage is in the Kodiak National Wildlife Refuge; however, the land around the lagoon and ocean beach is primarily owned by a Native Corporation and private individuals. There are also public easements in this area.

The Comprehensive Conservation Plan (CCP) is being updated by the Kodiak National Wildlife Refuge, and could also affect access for anglers. Changes in land status from Refuge to Wilderness and Wild and Scenic Rivers are being considered. Managing the refuge for “quality of experience” is also being considered in the CCP update. Managing for quality of experience is usually associated with a reduction in the number of people using the resource at one time.

The portion of river located within the refuge boundary will be subject to provisions delineated in the CCP. Managing the use of the uplands for quality of experience is an issue that will directly affect the Ayakulik chinook sport fishery. Determining if the public wants this fishery managed for quality of experience, what methods should be implemented to achieve the desired experience, and the process/authority to implement land management decisions will all be issues for this sport fishery.

### **Ongoing Research and Management Activities**

Setting escapement objectives at effective levels ensures that the resource is conserved and fishing opportunity for the public is maximized. The current escapement goal ranges of 6,500-10,000 on the Ayakulik have not been fully evaluated. Beginning in June 1993, a major research project was initiated on the Karluk and Ayakulik rivers to collect age, size, and sex information from the escapement and harvest. These data will be used to construct brood tables which will be used to refine escapement objectives. The project also monitors and documents the recreational harvest and effort from anglers rafting the river. Complete results of the work conducted in 1993 through 1998 are presented in Schwarz (1996), Motis (1997), and (Clapsadl *In prep*).

### **Recommended Research and Management Activities**

Establishing biological escapement goals using brood tables and a Ricker model requires variations in escapement levels. This variation is often not seen in populations that are being managed so that escapement falls within a narrow escapement goal range. However, in 1999 the Ayakulik River escapement was a record high of 19,190. We need to follow the results from this record high return through the next generation to examine the link between the parent-year escapement and the size of the subsequent returns. Age, length and sex data should continue to be sampled from inriver returns at the

Ayakulik weir. These data will allow brood tables to be constructed so that escapement goals can be refined.

Angler effort and catch information from anglers passing through the weir should continue to be collected and used as an inseason indicator of angler success. An attempt should be made to collect effort and catch data at the upriver exit location (the confluence of Bare Creek and the Ayakulik River) so that a complete census could be made of the river. USF&WS maintains an enforcement camp at the upriver location which has been used in the past to collect angler data.

### **Inseason Management Approach**

The Ayakulik River will be managed so that minimum escapement levels are met (6,500 chinook salmon). Time-of-entry data have been compiled so that it is possible to project how many fish should be through the weir on any specific date to achieve a minimum escapement objective. To achieve minimum spawning escapements, weir counts must total the minimum spawning objective plus the sport removal above the weir. Virtually all the sport harvest occurs above the weir on the Ayakulik. In order to project the sport harvest above the weir, the three most recent annual sport harvests will be averaged. In addition, an average hook-and-release mortality will be estimated during the same years by assuming that 7% of the released fish die.

The Ayakulik River final weir count should total 7,375 (6,500 minimum spawning objective + 875 sport fish removal). Time-of-entry data for the Ayakulik River indicate that an average of 49% of the total count has passed the weir through June 13. Therefore, to achieve the minimum spawning escapement, a weir count of approximately 3,610 chinook salmon should have occurred through June 13.

If the weir count is below the desired midpoint, the sport fishery will be restricted so that minimum objectives can be reached. Restrictions may be imposed earlier than the midpoint of the run 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 bait, 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.

## **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 13), of which the Karluk and Ayakulik rivers support the largest populations. Steelhead trout returning to the Karluk and Ayakulik rivers are fall-run fish which begin entering the lagoon and lower river in mid August and may continue immigration through the winter months. The peak of the run occurs in late October. The majority of spawning takes place from April through early June.

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

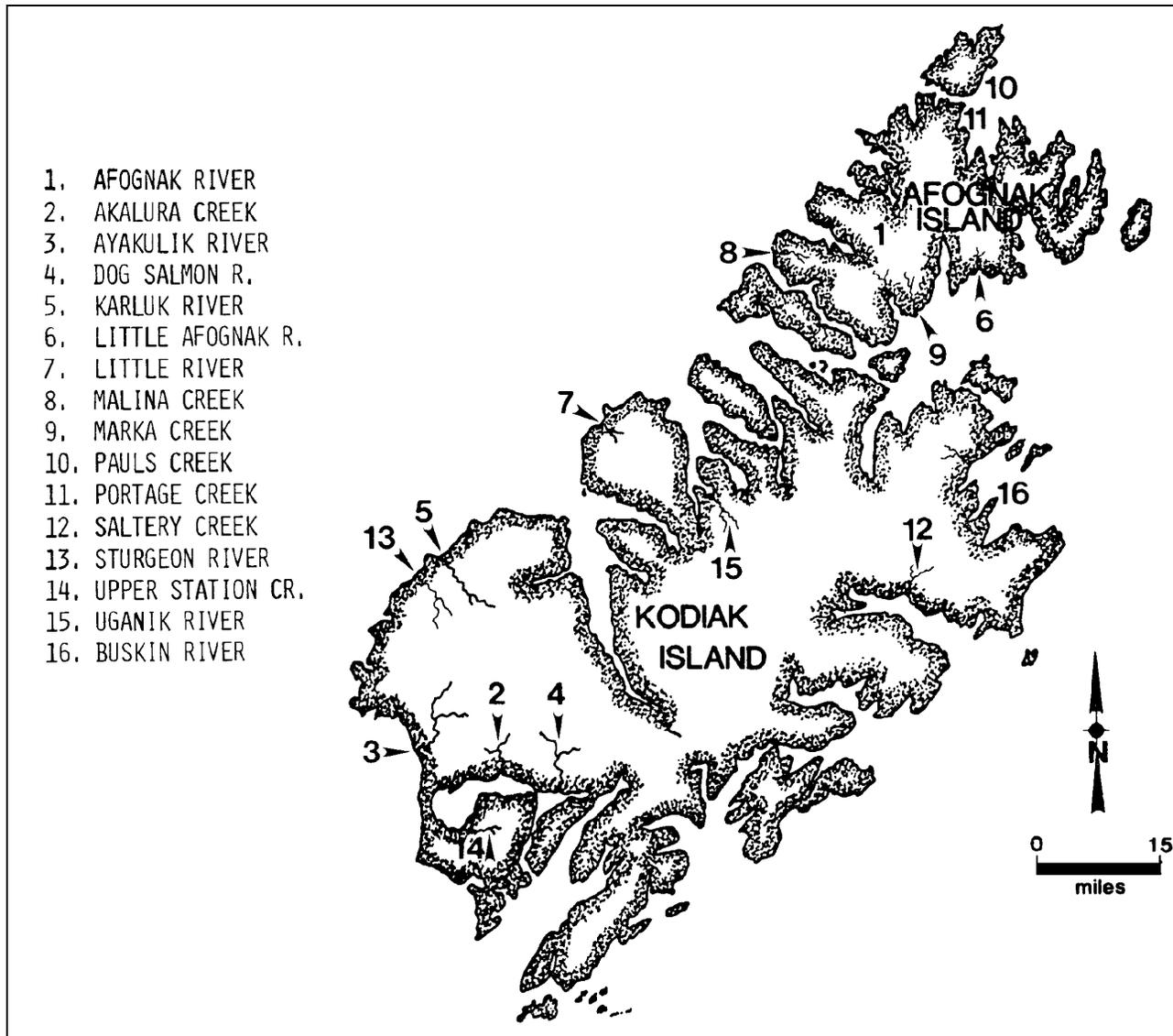


Figure 13.-Locations of steelhead trout stocks on Afognak and Kodiak islands.

From 1991 through 1997, the Division of Sport Fish conducted a comprehensive research project on the Karluk River steelhead population. These studies documented sport effort and harvest, investigated the magnitude of the incidental commercial harvest of steelhead from marine waters near the Karluk River, documented subsistence harvest, and estimated the number of spawning adult steelhead in the Karluk for the 1992 through 1996 spring spawning populations. The complete results of this study are presented in Begich (1992, 1993, 1995a, 1995b, 1997) and in a thesis presented by Begich entitled "Population Ecology of Adult Steelhead Trout of the Karluk River, Alaska" (Begich 1999).

From 1990 through 1999, SWHS estimates of sport harvest averaged 80 and 30 steelhead trout from Karluk and Ayakulik drainage waters, respectively (Table 32). Harvests from these two rivers have accounted for 31% of the steelhead harvest in the Kodiak Regulatory Area. The Karluk River supports the largest fishery, but effort on the Ayakulik River has increased in recent years.

Sport harvest of steelhead at the Karluk River is low. An average of 95% of all steelhead caught each year from 1990 through 2000 have been released. Angler participation in the Karluk increased during the early 1990s. 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, 538 angler-days were expended to harvest 21 steelhead with a release of 2,598 (Begich 1995b). Five steelhead were caught per angler-day.

The creel survey at the portage was repeated in 1995. From September 29 through November 5, 612 angler-days were expended to harvest 32 steelhead and release 2,466.

This fall census did not include the June catch of steelhead kelts that occurs incidentally during the chinook salmon fishery. In 1994 a creel census for chinook salmon was conducted at the Karluk Portage and weir. During the chinook census anglers were also asked if they caught any steelhead. A harvest of five steelhead and a release of 268 were documented, indicating that steelhead kelts caught in June make up a very small portion of the total steelhead catch.

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

**Table 32.-Harvest of steelhead trout from the Karluk and Ayakulik (Red) rivers drainages, 1990-2000.**

Year	Karluk River System		Ayakulik River System		Total KRA Harvest
	Harvest	Release	Harvest	Release	
1990	86	1,053	17	760	1,120
1991	148	1,000	96	228	672
1992	40	898	24	418	128
1993	189	3,446	0	2,000	480
1994 <sup>a</sup>	80	1,387	46	869	277
1995 <sup>b</sup>	47	1,040	0	521	94
1996	34	6,707	12	1,112	145
1997	14	2,527	66	706	110
1998	75	2,013	0	332	172
1999	94	2,498	8	1,451	276
2000	57	2,450	12	649	142
1990-1999					
Average	81	2,257	27	840	347

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

Note: Reported catches of rainbow trout from the Ayakulik and Karluk drainages are assumed to be steelhead. The rainbow trout populations in these drainages are so small, relative to the steelhead populations, that reported rainbows are probably misidentified steelhead. Reported steelhead harvests from road system lakes are assumed to be rainbow trout.

<sup>a</sup> In 1994 a creel census was conducted on the Karluk River during the chinook salmon and steelhead return. A total of 5 and 268 steelhead were harvested and released, respectively, during the June chinook fishery. From September 25 through November 11, a total of 21 steelhead were harvested and 2,598 were released.

<sup>b</sup> In 1995 a creel census camp on the Karluk documented a harvest of 32 steelhead and a release of 2,466 fish from October 3 through November 5.

Other sources of mortality for steelhead trout returning to these two rivers include incidental harvest in the commercial salmon fisheries along the Alaska Peninsula and southwest side of Kodiak Island, and the subsistence fisheries conducted by the residents of Karluk and Larsen Bay villages (Begich 1992, 1993, 1995a, 1995b, and 1997).

In 1991-1995, from August 15 through September 30, commercial purse seine and set gillnet catches from selected waters along the southwest portion of Kodiak Island were sampled for the bycatch of steelhead trout. The total estimated harvest of steelhead trout in these fisheries was 705, 417, 41, 293 and 71 in 1991, 1992, 1993, 1994, and 1995, respectively (Begich 1992, 1993, 1995a, 1995b, 1997). It is probable that the steelhead harvest is composed of mixed stocks due to the proximity of other steelhead systems near the Karluk drainage (Figure 13).

Between 1982 and 1998, eight subsistence surveys were conducted in Larsen Bay and seven in Karluk. A complete summary is provided in Appendices B1 and B2 of Begich 1997. Harvest ranged from 0 to 233 in Karluk, averaging 60 steelhead. Harvest ranged from 0 to 614 in Larsen Bay, averaging 200 steelhead.

The annual return of steelhead trout entering the Karluk and Ayakulik 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 post-spawn steelhead trout (kelts) emigrate downstream and pass through weirs located near the mouths of both rivers (Table 33). Kelt counts on the Karluk River ranged from 210 to 7,091 from 1981 through 2001.

Four years of low kelt counts beginning in 1986 indicated a declining population at the Karluk River (Figure 14). However, in recent years the number of emigrating kelts has increased, with the 1995 and 1997 counts being the highest on record. On the Ayakulik River, kelt counts have been stable, with a 1991-2000 average of 1,020 fish. From 1991-2000 kelt counts ranged from 701 to 1,517, with a 2001 count of 1,090 kelts (Table 33, Figure 14).

### **Recent Fishery Performance**

The Statewide Harvest Survey estimated the harvest and release of steelhead in the Karluk River in 2000 to be 60 and 2,450 fish, respectively. The Ayakulik River harvest and release was estimated to be 10 and 650 steelhead, respectively. These estimates should be considered minimums; actual catches are probably much larger for reasons explained above. Steelhead trout fisheries on the Karluk and Ayakulik rivers are primarily catch-and-release. From 1990 through 2000, 95% of all steelhead trout caught on both rivers was released. The current bag and possession limits for steelhead trout over 20 inches are 1 fish. This regulation, coupled with the remote location of the rivers and a lack of public facilities for freezing fish, dictates a low retention rate.

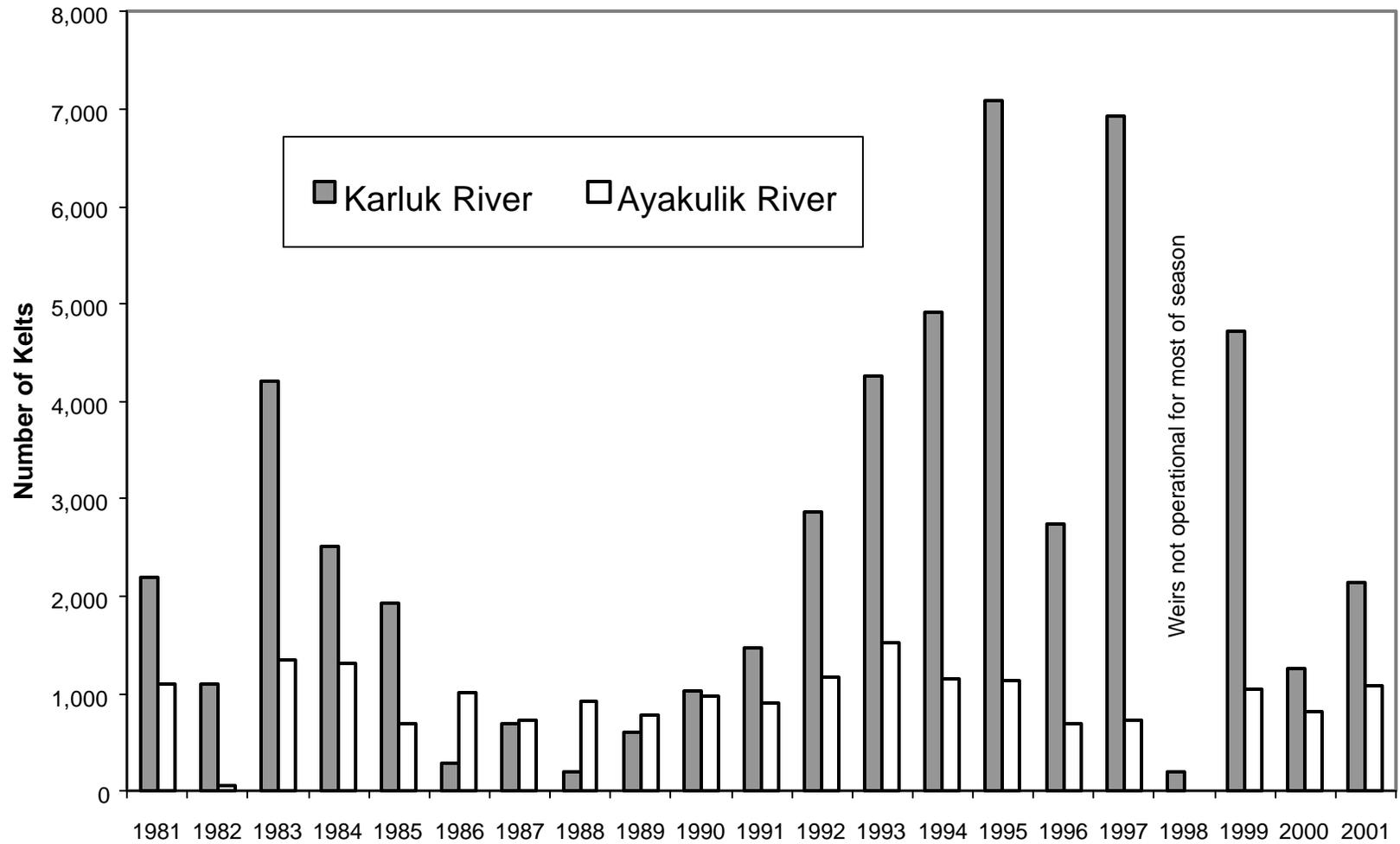
Effort and catch estimates for 2001 are not available from the Statewide Harvest Survey at this time; however, anglers reported fishing was fair to poor. High water levels in October hampered anglers from catching steelhead, and catch estimates are expected to be below average in 2001. The Karluk and Ayakulik rivers currently have the potential to generate some of the highest steelhead catches in the state of Alaska. Figure 11 and Table 29 in Schwarz 1997 show that the Karluk and Ayakulik rivers produced the fourth and fifth largest catches of steelhead in the state in 1993 and 1994. Future trends

**Table 33.-Counts of steelhead trout kelts from the Karluk and Ayakulik (Red) rivers drainages, 1981-2001.**

Year	Karluk River	Ayakulik River
1981	2,194	1,108
1982	1,096	54
1983	4,203	1,351
1984	2,512	1,306
1985	1,924	693
1986	296	1,016
1987	687	727
1988	210	918
1989	611	789
1990	1,029	970
1991	1,475	910
1992	2,862	1,174
1993	4,260	1,517
1994	4,913	1,150
1995	7,091	1,134
1996	2,749	701
1997	6,928	733
1998 <sup>a</sup>	204	no count
1999	4,711	1,052
2000	1,265	827
2001	2,147	1,090
<hr/>		
1991-2000		
Average	3,646	1,022

Source: Brodie *In prep.*

<sup>a</sup> Incomplete count. Weirs were not operational during most of the emigration on both the Karluk and Ayakulik rivers.



Source: Brodie *In prep.*

**Figure 14.-Counts of steelhead kelts from the Karluk and Ayakulik (Red) river drainages, 1981-2001.**

in sport catch and effort will depend upon several factors, including maintenance of current steelhead abundance levels, public access, and public awareness of the quality of these steelhead trout fisheries. The Karluk and Ayakulik steelhead fisheries are examples of level III fisheries, with a high cost of participation and a low yield in terms of harvested fish. In order for this fishery to continue to grow, there must be anglers willing to pay the price of getting to these fisheries and braving what is typically poor weather conditions with very limited camping facilities, especially on the Ayakulik River. Even if effort in these fisheries does not grow, these fisheries provide diversity in the KMA, offering anglers an uncrowded, remote experience with excellent fishing for steelhead trout.

### **Management Objectives**

Specific fishery objectives have not been formally established for Karluk and Ayakulik rivers steelhead trout fisheries to date. However, an assumption of past and current fisheries management 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 special management such as catch-and-release, trophy areas, and high yield fisheries; and
3. Recommended research objectives.

### **Recent Board of Fisheries Actions**

During the December 1995 Board of Fisheries meeting in Kodiak, the Board rejected a public proposal that would have prohibited the use of bait in fresh water of the Kodiak remote zone. The Department's position on this proposal was that it was too broad and applied to too many species. The Department stated that although we were opposed to the proposal, we were not opposed to prohibiting the use of bait in specific streams for specific species, as identified through a planning process used to develop special use areas. Steelhead stocks on Kodiak Island are the most likely candidates for special use plans.

During the January 1999 Board of Fisheries meeting, the Board rejected two public proposals that affected methods and means on the Karluk and Ayakulik rivers. One proposal requested that artificial lures with single hooks be the only legal sport fishing gear in the Karluk River. The second proposal requested that only artificial flies be allowed on the Ayakulik River. The local advisory committee was opposed to these proposals because the fish stocks were abundant in these two rivers and the proposals were viewed as unnecessarily restrictive. The Department's comments were that the current levels of sport harvest were not threatening the sustainability of the fish resources in these rivers, and eliminating bait and multiple hooks was not needed as a conservation measure. The proposals spoke to changing the quality and nature of the fishery, which falls under the jurisdiction of the Board of Fisheries. The department was neutral in this aspect of the proposal.

### **Current Issues**

Kelt counts declined in the late 1980s on the Karluk River (Table 33). In response to this decline, the Division of Sport Fish initiated a research project on the Karluk River. The abundance of steelhead, as

indicated by kelt counts, began to increase in 1990, and the 1995 and 1997 counts of 7,090 and 6,930, respectively, were the highest on record. The kelt counts of 1,270 documented in 2000 and 2,150 in 2001 are below average when compared to the record counts achieved in the mid nineties, but the low retention rate during the sport fishery does not warrant additional restrictions to the sport fishery at this time.

Maintaining effective kelt emigration through salmon counting weirs is essential. Repeat and multi-repeat spawners add significantly to future years' fishery and spawning populations (Table 34). In addition, repeat spawners are larger fish which are a desirable component of the sport fishery (Begich 1995a and 1995b). Delayed downstream passage due to weirs results in increased mortality to kelts. Downriver passages or traps at weirs have proven effective. Aluminum traps have been built and incorporated into the weirs on the Karluk River since 1992 and since 1993 on the Ayakulik River. These traps provide an opening in the weir for fish moving downstream. Once the steelhead enter the trap they can be sampled and released downstream.

A spawning ground closure from April 1 through June 15 is in effect on all flowing waters within the Kodiak Archipelago for steelhead/rainbow trout. This closure was designed to protect spawning fish. The department will have a proposal before the Board of Fisheries in January 2002 to establish a fishery for steelhead in portions of the Karluk and Ayakulik rivers during the current spawning ground closure. It is the department's view that a fishery is warranted due to the relatively high populations observed in recent years. The fishery can be prosecuted on prespawning fish by opening areas where spawning does not occur to a large extent. The fishery would be catch-and-release with unbaited, artificial lures.

A paramount concern involves maintaining adequate angler access to these recreational fisheries as the Karluk Conservation easement goes into effect in October 2002 and the Kodiak National Wildlife Refuge develops land management strategies for the Ayakulik River in their Comprehensive Conservation Plan, which is currently under review.

### **Ongoing Research and Management Activities**

All steelhead kelts emigrating downstream through the weir on the Karluk River are counted. Kelts are sampled for sex and length so that, by using spawning survival by sex and length group from a logistic regression model (Begich 1999), the abundance of the spawning population can be estimated. Population estimates from kelt sex and size are listed in Table 34. Scales are collected from some kelts and archived so that age composition can be determined.

### **Biological Data**

Population estimates of spawning steelhead in the Karluk River using the mark-and-recapture method were made from 1992 to 1997 (Table 34). These estimates ranged from 4,110–10,800, averaging 8,110 steelhead. The majority of the population were composed of initial spawners, ranging from 78% to 87%, and averaging 82% since 1992. Repeat spawners have accounted for less than 20% of the population. Sampling at the Ayakulik began in 1993. The Ayakulik kelt emigration averaged 68% initial spawners (74%, 66% and 64% initial spawners in 1993, 1994, and 1995, respectively).

**Table 34.-Karluk River steelhead spawning population research summary, 1992-2001.**

Year	Spawning Population Size <sup>a</sup>	Mark and Recapture Estimates					Spawning Survival	
		Sex Composition		Initial Spawners	Repeat Spawners	Multi Repeat Spawners	Number	%
		Male	Female					
1992	4,107 (±134)	NA <sup>b</sup>	NA	3,203	739	165	2,752	67%
1993	7,026 (±308)	2,339 (±302)	4,687 (± 461)	6,113	843	70	4,075	58%
1994	9,116 (±522)	4,928 (±680)	4,188 (±629)	7,384	1,641	91	4,649	51%
1995	10,801 (±437)	4,174 (±641)	6,629 (±760)	8,965	1,620	217	6,697	62%
1996	7,252 (± 674)	4,070	3,128	5,972	1,109	171	2,605	36%
1997	10,377 (±329)	NA	NA	NA	NA	NA	6,849	66%
Logistic Regression Model								
2000 <sup>c</sup>	2,176 (±156) <sup>d</sup>	1,022 (±77) <sup>d</sup>	1,154 (±74) <sup>d</sup>	NA	NA	NA	NA	NA
2001 <sup>c</sup>	3,767 (±269) <sup>d</sup>	2,375 (±79) <sup>d</sup>	1,392 (±96) <sup>d</sup>	NA	NA	NA	NA	NA

Source: Begich 1992, 1993, 1995a, 1995b, 1997, 1999; James Hasbrouck, Division of Sport Fish, Anchorage, personal communication.,

<sup>a</sup> (±) is the standard error.

<sup>b</sup> Not available.

<sup>c</sup> Population estimate based on spawning survival from a logistic regression model (Begich 1999) using sex and length composition of emigrating kelts.

<sup>d</sup> Does not include covariance terms so is a minimal estimate of variance.

Spawning survival ranged from 36% to 67%, averaging 57%. The Karluk steelhead population had fish present from 15 age groups. The dominant age groups for the spawning population are 2.3, 2.3s2, and 2.2<sup>2</sup>. A 2.3-aged fish is a fish that has spent 2 years in fresh water and 3 years in salt water. Unlike salmon, steelhead only spend a few months in gravel before they emerge as fry (May and June). A 2.3-aged steelhead is 5 years old. The Ayakulik steelhead population has the same dominant age classes.

The spawning population estimate could not be calculated in 1998 because the weir washed out for most of the kelt emigration. In 1999 a representative sample of kelts for estimating age and size composition was not obtained, so the size of the spawning population could not be estimated. Spawning population estimates for 2000 and 2001 using spawning survival from a logistic regression model (Begich 1999) were 2, 180 and 3,770 (Table 34).

### **Recommended Research and Management Activities**

The directed fall Karluk steelhead fishery has not been monitored since the 1995 creel survey. This fishery should be visited to make general observations on effort levels, gear use, and harvest practices. The Statewide Harvest Survey is not reliable in estimating effort and catch figures in this fishery for reasons stated in Historical Perspective.

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

A sport fishery for steelhead on a portion of the Karluk and Ayakulik rivers during the current closed season of April 1–June 15 is being proposed.

## **KODIAK MARINE CHINOOK SALMON FISHERIES**

### **HISTORICAL PERSPECTIVE**

Over the past 10 years, marine fisheries for both coho and chinook salmon have continued to develop in the Kodiak Regulatory Area (KRA). Kodiak Island waters are a feeding area for chinook salmon as they grow and mature at sea. Random sampling of the sport harvest, conducted between 1994 and 1999, checked a total of 1,084 sport-caught chinook salmon for the presence of coded wire tags (CWT). Of the 13 tags found, 8 were from British Columbia, 3 from Washington, 1 from Alaska, and 1 from Oregon (Table 35). From this information, it is apparent that the fishery harvests stocks of mixed origin. No local stocks are tagged, so it is impossible to estimate the local stock contribution to this fishery.

Chinook salmon have been harvested in small numbers in the past, often incidentally when anglers were fishing for halibut or rockfish (Table 36). Saltwater harvest of chinook salmon in the Kodiak Regulatory Area averaged 125 fish from 1977 through 1991. In 1992 anglers began to target on these chinook salmon by trolling. Although harvests occur throughout the marine waters of Kodiak, harvest and effort have concentrated in Chiniak Bay, which is adjacent to the town of Kodiak. The Chiniak Bay harvest

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

estimate for the 1992 season was 320 chinook salmon, but increased to 1,600 in 1993 (Table 36). The large harvest in 1993 was probably due to the high abundance of chinook salmon in the area, and large harvests were also reflected in the incidental commercial harvests in Kodiak and in the marine sport harvest of chinook salmon in Cook Inlet. The success experienced in 1993 encouraged anglers, and the fishery continued to develop in terms of angler effort and harvest. Island-wide saltwater sport harvest of chinook fluctuates annually, but the trend is for increasing harvests. The 1999 and 2000 harvests of 4,100 and 6,170 chinook salmon were both record harvests.

**Table 35.-Chiniak Bay chinook salmon coded wire tag recoveries, 1994-1999.**

Year	# Kings Randomly Sampled	Number Tags Recovered	Release Location	Chiniak Bay Sport Harvest
1994	112	3	(B.C.) Masset (B.C.) Kitimat (B.C.) Snootli	446
1995	201	1	(AK) Sitka Medvejie	759
1996	134	0		1,642
1997 <sup>a</sup>	183	1	(B.C.) Terrace	1,904
1998 <sup>b</sup>	295	6	(B.C.) Terrace (B.C.) Snootli (B.C.) Robinson Cr. (B.C.) Shuswap (WA) Turtle Rock (WA) Quinalat	1,642
1999 <sup>c</sup>	159	2	(WA) Salmon River (OR) Santiam River	2,470
<b>Total sampled</b>	<b>1,084</b>	<b>13</b>	<b>1(AK), 8 (B.C.), 3 (WA), 1(OR)</b>	<b>8,863</b>

<sup>a</sup> 1997 In addition, one Voluntary Recovery not found during random sampling: (1) (B.C.) Tahsis.

<sup>b</sup> 1998 In addition, two Voluntary Recoveries not found during random sampling: (2) (B.C.) Both from Tofino.

<sup>c</sup> 1999 In addition, one Voluntary Recovery not found during random sampling: (1) (B.C.) Masset.

## **RECENT FISHERY PERFORMANCE**

The saltwater harvest of chinook salmon from the Kodiak Regulatory Area during 2000 was 6,170 fish; the highest on record and significantly above the recent 10 year average (1990-1999) of 1,700 fish (Table 36). Fishing effort in marine waters in 2000 also increased to record levels. During the 2000 season, angler-days on boats were estimated to be 42,740, significantly above the recent 10-year average of 26,630 angler-days (Table 37). This angling effort is not species specific and may have been directed at halibut, but there was probably more effort directed at salmon than in past years. The 2001 estimate for the saltwater sport harvest of chinook salmon will not be available until June 2002, but the 2001 charter boat harvest can be used as an index of success (Figure 15). From 1998 through 2001, the chinook salmon harvest documented in log-books accounted for an average of 45% of the total KRA harvest, as estimated through the SWHS (Figure 15). The 2001 charter boat harvest of 2,185 indicates that the total KRA marine chinook salmon harvest should be about 5,000 fish; less than the 6,000 fish harvest estimated in 2000 (Table 36).

## **RECENT BOARD OF FISHERIES ACTIONS**

The Alaska Board of Fisheries made a special call for proposals with a deadline of April 10, 1997. Proposals were to address seasonal non-commercial harvest limits for nonresident fishers. Over the years, the Board had received numerous proposals to establish export limits for nonresident fishers. The Board heard reports from ADF&G, Department of Law, and Fish and Wildlife Protection that enforcement in the field and defending export limits in court would be very difficult. The most manageable and defensible regulations would be seasonal harvest limits for nonresident anglers. Proposals were to be considered at the February 4, 1998 Statewide Finfish regulation meeting in Anchorage.

Proposal 313, submitted at the February 1998 meeting, proposed annual limits for chinook, coho, and sockeye salmon for both resident and nonresident anglers. The proposal was very controversial and received much attention from the Kodiak community. The local advisory committee appointed a 10-member study group to consider the issue and see if they could reach a consensus on a recommended action. The study group met three times and reviewed the issue. Twenty pages of minutes were taken during these meetings and were presented at the February 4, 1998 Board of Fisheries meeting as Record Control (RC) #22. The study group reached a consensus that an annual limit for the Kodiak Area of 6 chinook salmon for nonresident anglers should be recommended as a regulation to the Board of Fisheries. This recommendation was amended by the Kodiak Advisory Committee to include a limit of 15 coho salmon for nonresident anglers, and was then forwarded to the Board of Fisheries.

The Board of Fisheries appointed a study group at their February 4, 1998 statewide meeting in Anchorage to discuss and provide recommendations on Proposal 313. The minutes and recommendations of the subcommittee were presented into the Board record as RC #75. The Board struggled with the question of whether to bring the issue up at the statewide meeting or to wait 11 months until the Board was scheduled to meet in Kodiak. A Kodiak meeting would provide a better opportunity for participation by the users in Kodiak, and there was no conservation problem pressing for urgent action. However, the Board decided to act at the statewide meeting in order to prevent attracting excessive effort to Kodiak because it would have been the only area without a seasonal limit. If, after a year, people were dissatisfied with annual limits they would be able to bring it up

**Table 36.-Sport harvest of chinook salmon from the marine waters of Chiniak Bay and the Kodiak Regulatory Area, 1977-2000.**

Year	Chiniak Bay	Other Kodiak Regulatory Area Saltwater	Total Kodiak Regulatory Area Saltwater
1977		34	34
1978		12	12
1979		98	98
1980		60	60
1981		194	194
1982		167	167
1983		198	198
1984	0	210	210
1985	0	162	162
1986	0	168	168
1987	0	54	54
1988	73	72	145
1989	60	48	108
1990	22	44	66
1991	168	30	198
1992 <sup>a</sup>	449	127	576
1993	1,595	841	2,436
1994	446	212	658
1995	759	370	1,129
1996	1,642	758	2,400
1997	1,904	1,003	2,907
1998	1,642	877	2,519
1999	2,470	1,627	4,097
2000	4,221	1,948	6,169
1990-1999 Average	1,110	589	1,699

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> In 1992, 126 chinook salmon were harvested in Mill Bay from a department stocking project that occurred from 1989-1994. In 1993, 47 chinook were harvested and 48 were harvested in 1994.

**Table 37.-Kodiak Regulatory Area marine angling effort, 1990-2000.**

Year	Road System	Afognak	Other	Kodiak Regulatory Area Total
1990	11,633	5,591	3,231	20,455
1991	13,604	5,105	4,607	23,316
1992	14,503	5,676	4,423	24,602
1993	16,056	6,283	5,675	28,014
1994	16,532	6,332	6,868	29,732
1995	16,533	6,070	3,589	26,192
1996	12,807	5,964	4,823	23,594
1997	16,448	5,554	7,143	29,145
1998	13,998	5,371	6,532	25,901
1999	19,003	7,475	8,855	35,333
2000	23,341	9,219	10,182	42,742
1990-1999				
Average	15,112	5,942	5,575	26,628

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

when the Board met in Kodiak in January 1999. The Board adopted substitute language for Proposal #313, which established an annual chinook salmon limit of 5 fish for both residents and nonresidents.

At the February 1998 meeting, the Board also adopted a regulation allowing the department to require guides to record the effort and harvest of their clients.

The Board's decision to apply the annual chinook salmon limit to both residents and nonresidents was not well received in the community of Kodiak and, as a result, a committee of the Board agreed to hold a public hearing in Kodiak on April 9, 1998. At the public hearing the Board heard stock status reports for the Kodiak chinook salmon sport fishery. The general consensus was that the community had spent a great deal of time on this issue through the advisory committee process and supported the recommendation of the advisory committee to apply annual limits to nonresidents only.

The 10-member study group that was originally appointed by the Kodiak Advisory committee to study Proposal #313 and forwarded a recommendation to establish an annual limit of 6 chinook for nonresidents only, petitioned the Board to rescind the action it took in February 1998. The study group maintained that pursuant to 5 AAC 96.625 (f) there was a "...biologically allowable resource harvest which would be precluded by delayed regulatory action and such delay would be significantly

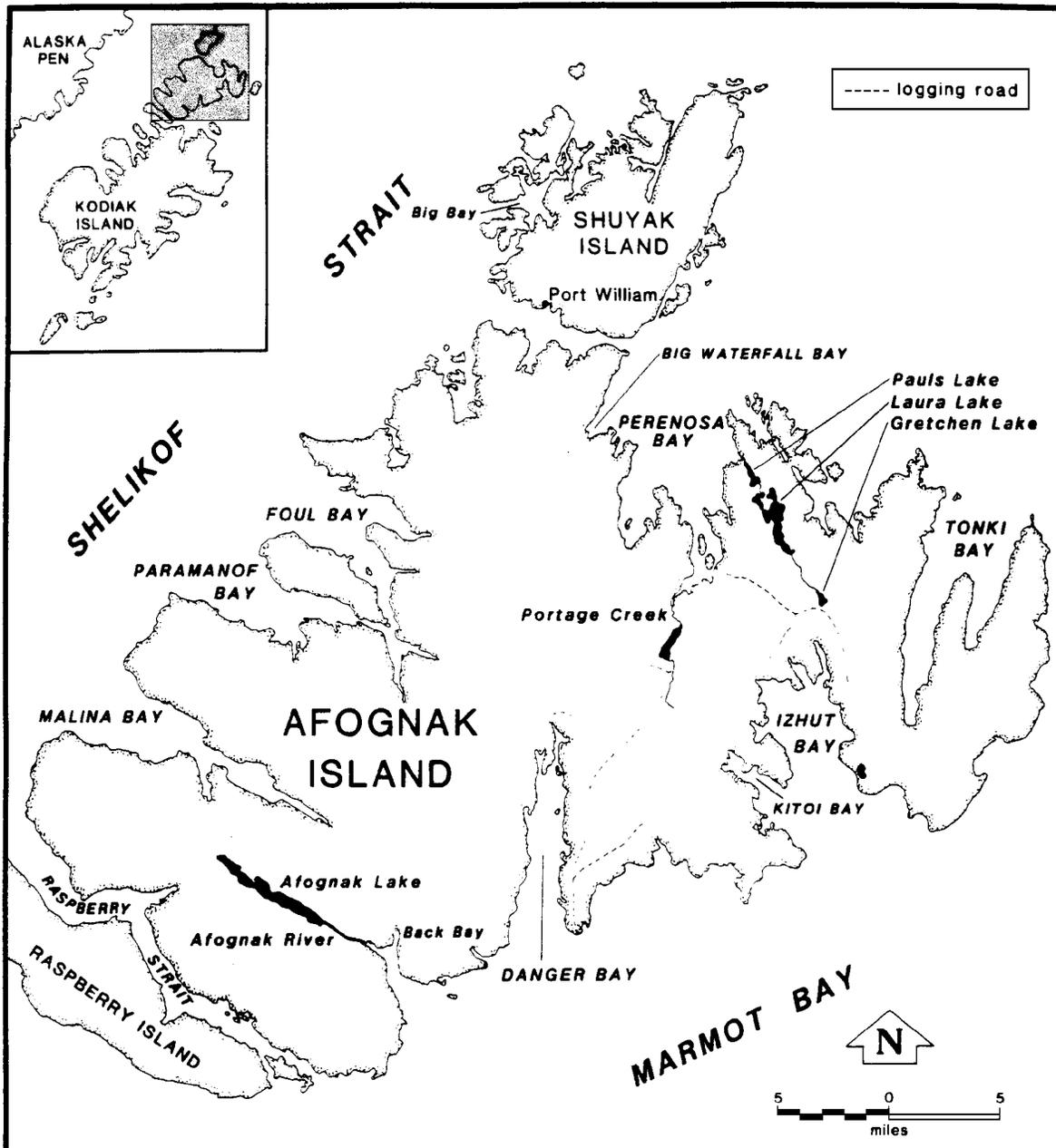


Figure 15.-Afognak/Shuyak islands and surrounding waters.

burdensome to the petitioners because the resource would be unavailable in the future.” The petitioners asked the Board to adopt the amended Proposal 313 as submitted by the Kodiak Advisory Committee. The Board of Fisheries responded to this petition by re-considering the Kodiak Area chinook salmon sport fishery on May 9, 1998. In deliberations the Board found Kodiak chinook salmon stocks to be at historically high levels, with sport harvests fairly small and stable. They also found that if the annual limit was removed immediately before the June freshwater fishery, it was unlikely a large influx of nonresident effort would occur during the June fishery. Considering this, the Board found that a regulation causing anglers to forgo a biologically available harvest was not necessary and was burdensome. An emergency regulation was adopted which removed the chinook salmon annual limit for all anglers.

The Board directed a committee be formed that would investigate under what conditions nonresident anglers could be regulated differently than resident anglers. The committee consists of members from the Kodiak advisory committee, Board of Fisheries, Sport Fish Division, and Department of Law. The committee met on October 8, 1998 and on December 2, 1998. The committee brought its finding and recommendation back to the Board when it met in Kodiak on January 15, 1999.

At the January 1999 meeting in Kodiak the Board considered Proposal 73, which proposed to establish an annual limit of 6 chinook salmon per year for nonresident anglers in Kodiak. The Board deferred Proposal 73 in favor of forming a Northern Gulf of Alaska Chinook Salmon Task Force. The task force was eliminated in the fall of 2000 due to the lack of funding. The proposal was given a new number (21) and will be considered at the January 2002 Board of Fisheries meeting.

## **MANAGEMENT OBJECTIVES**

No management objectives have been established for the Kodiak saltwater chinook sport fishery. The fishery targets mixed stocks of unknown origin, although it is known from coded wire tag recoveries that hatchery stocks originating in Washington, Oregon, British Columbia, and Southeast Alaska are present in the fishery (Table 35). Harvests of chinook salmon in marine waters have received increasing attention throughout the Pacific Northwest. 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 that are developing regarding this fishery.

## **ONGOING RESEARCH AND MANAGEMENT ACTIVITIES**

Sampling the sport harvest of chinook for coded wire tags has ended and the results of those efforts are summarized in Table 35.

The Kodiak office will continue to participate in the charter boat logbook program. Logbooks are issued to the charter boat operators from the Kodiak office and filled out sheets are returned to the Kodiak office, where they are edited and forwarded to Anchorage for entry into the statewide database.

The Sport Fish Division is also involved in cooperative stocking programs with the Kodiak Regional Aquaculture Association and various sport fishing organizations. A chinook salmon enhancement

program is underway. Approximately 75,000 chinook salmon smolt will be released in Monashka Creek in the spring of 2002. This will be the first release in an ongoing program designed to develop a chinook salmon sport fishery along the Kodiak road system. The sport fishery for these chinook salmon will occur in both salt and fresh water.

## **OUTLOOK**

The saltwater chinook salmon harvest in 2002 is difficult to predict because success is partly based on the abundance of chinook salmon in waters that are generally fished by anglers. The chinook salmon are of mixed stocks, including a hatchery component. Past years have indicated that abundance is variable. Another component of the magnitude of harvest is the effort put into the fishery. Table 37 shows that the saltwater fishing effort from boats from the KRA set records in 1999 and 2000. The fishing effort in 2000 of 42,740 angler-days was 1.6 times greater than the 1990-1999 average. Increased effort usually results in larger harvests, but it is difficult to determine if effort will continue to increase. If implementation of Individual Fishing Quotas for charter boats occurs, charter boat effort may stabilize.

## **RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES**

The current management program (the charter boat logbook program, and chinook stocking program) should be continued. No new programs or projects are recommended at this time.

# **KODIAK MARINE COHO SALMON FISHERIES**

## **HISTORICAL PERSPECTIVE**

The marine harvest of coho salmon from boats (Table 38) has increased in recent years. The Kodiak Regulatory Area harvest increased from an average of 3,540 coho salmon during 1990-1995 to 12,250 during 1996-2000, an increase of 250%. The saltwater harvest of coho from the shore during this same time period did not increase. Marine harvests of coho salmon are concentrated in Chiniak Bay and in specific locations around Afognak Island (Figure 16). The marine harvest of coho salmon on Afognak is concentrated in Perenosa and Afognak bays. These fisheries target coho salmon bound for Afognak, Pauls, and Portage lakes. Coho salmon Afognak Island tend to school in lagoons prior to entering fresh water. The Afognak/Shuyak islands marine fishery targets these fish when they are in the lagoon areas. Afognak/Shuyak islands harvests were fairly stable from 1990 through 1999, averaging 2,080 fish, but the record harvest in 2000 of 6,370 coho salmon was a significant increase (Table 38).

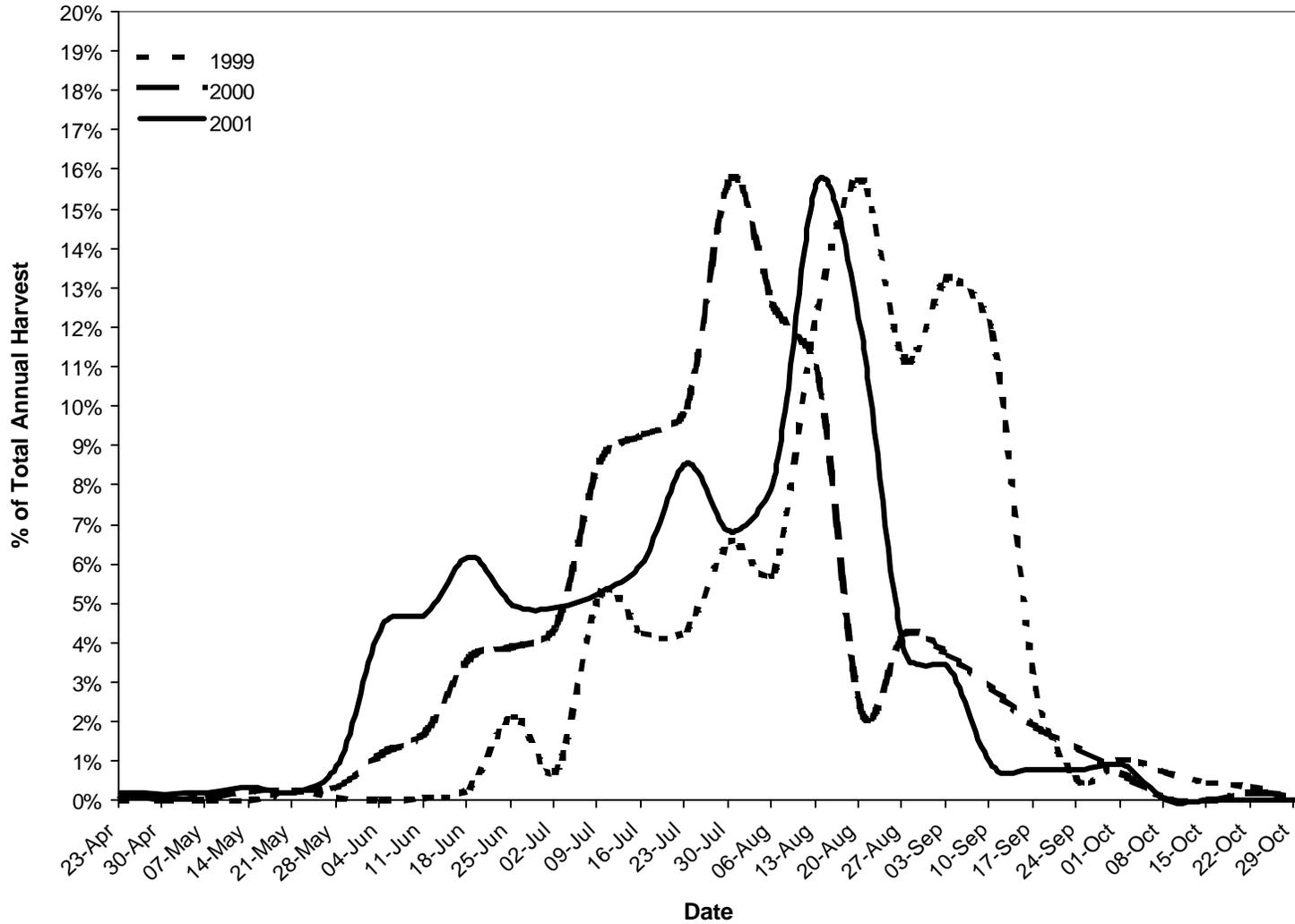
The marine harvest of coho salmon from the Road Zone, unlike the chinook salmon fishery, did not experience large increases until 1997 (Table 38). The large increase in harvest coincided with the year when the Kitoi Bay hatchery came online with full-scale returns of coho salmon. The 1996 release of 895,000 23.5-gram smolt from Kitoi Bay Hatchery resulted in a total return in 1997 of 109,000 adult coho salmon to the three commercial statistical areas managed for hatchery returns. From 1996 to 1999, coho smolt releases from the hatchery averaged 895,000 21.6-gram smolt annually. Subsequent indexed returns from 1997 to 2000 averaged 133,000 adult coho annually (McCullough and Aro 2001). The 2000 release of 872,000 16.9-gram smolt, yielded a preliminary indexed return of 177,000 adult coho salmon in 2001 (McCullough and Aro 2001). The Kitoi Bay hatchery is 25 miles to the north of some favorite trolling areas for coho salmon in Chiniak Bay. Although no tagging studies have

**Table 38.-Kodiak Regulatory Area marine harvest of coho salmon, 1990-2000.**

Year	Road Zone Boat <sup>a</sup>	Afognak/ Shuyak Boat	Other Boat	Total Kodiak Regulatory Area Boat Harvest	Total Kodiak Regulatory Area Shore Harvest	Total Kodiak Regulatory Area Saltwater Coho Harvest
1990	1,025	1,962	451	3,438	2,478	5,916
1991	1,056	2,251	94	3,401	3,204	6,605
1992	1,108	1,207	598	2,913	2,719	5,632
1993	2,352	1,671	955	4,978	2,871	7,849
1994	1,596	1,546	228	3,370	1,807	5,177
1995	2,309	786	55	3,150	2,864	6,014
1996	2,226	2,354	1,012	5,592	2,367	7959
1997	5,073	2,521	1,916	9,510	1,973	11,483
1998	7,023	3,470	4,136	14,629	2,073	16,702
1999	8,743	3,037	3,216	14,996	2,220	17,216
2000	6,315	6,373	3,816	16,504	3,874	20,378
1990-1999						
Average	3,018	2,082	1,490	6,630	2,523	9,065

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Kodiak Road Zone boat totals were calculated by adding numbers from the SWHS database listed for Chiniak Bay boat, Ugak Bay boat, and other roadside boat.



Source: Harvest figures documented through ADF&G saltwater charter vessel logbook program; 2001 data results preliminary.

**Figure 16.-Saltwater sport charter vessel chinook salmon harvest by week in the Chiniak Bay portion of the Kodiak Management Area, 1999-2001.**

been done to verify the stocks harvested in the Chiniak Bay sport fishery, it is likely that Kitoi Bay hatchery returns are contributing. Chiniak Bay streams (Monashka Creek, Pillar Creek, Buskin River, Sargent Creek, Russian Creek, Salonie Creek, American River, Olds River, Roslyn Creek, and Chiniak Creek) are also probably contributing to the saltwater vessel harvest of coho salmon.

The timing of the coho salmon fishery is different than the chinook fishery. Chinook salmon are available all year long, although the fishery is concentrated from May through October. The coho salmon fishery occurs from late July through early September.

Along with the increase in the marine harvest of chinook and coho salmon, a charter boat fleet has developed in the Kodiak Regulatory Area. Prior to 1998, when a logbook program was implemented in conjunction with business registration requirements, there was not good documentation of the number of charter boats operating in the KRA. Observations from department personnel conducting dockside sampling of groundfish estimated the number of active boats to be less than 20. Table 39 shows the number of active boats since the logbook program was implemented. The number of boats has increased from 87 in 1999 to 432 in 2001. Summaries of logbook data for 1998, 1999, 2000, and 2001 are presented in Table 40. Information collected in the logbooks provides information on the timing of the catch, which is not available through the Statewide Harvest Survey. The chinook salmon harvest by charter boats takes place from mid June through mid September, with peak harvest around early August (Figure 17). Coho salmon harvest by charter boats takes place from mid July through mid September, with peak harvest near the end of August (Figure 18).

## **RECENT FISHERY PERFORMANCE**

The 2000 total saltwater coho salmon harvest was 20,380; significantly above the recent 10-year average of 9,070. The coho harvest from boats was 16,500; over four times larger than the coho harvest from shore (Table 38). Coho salmon harvest figures for 2001 are still being collected, but coho salmon returns to KRA were very strong, and marine catches of coho salmon are expected to be similar to the record harvests experienced in 2000. 2001 charter boat harvest of coho salmon can be used as an index for the entire KRA marine coho salmon harvest. From 1998 through 2000 the coho salmon harvest documented in logbooks (Figure 19) accounted for an average of 42% of the total KRA marine harvest as estimated through the SWHS. The charter boat harvest in 2001 of 11,570 coho salmon indicates that the total KRA marine harvest could be about 27,000.

The department maintains weirs at several locations that are near to areas where large marine harvests occur: Pauls Bay, Afognak (Litnik) River, and Buskin River (Table 41). The 2001 coho salmon count at the Pauls Bay weir was 25,020, which was the highest count on record and far above the upper escapement goal level of 9,000 fish. Pauls Bay weir counts averaged 12,130 coho salmon from 1991-2000. The 2001 coho salmon count at the Afognak River weir was 12,980 coho salmon, above the upper escapement goal level of 8,000 fish. Afognak River weir counts averaged 11,120 coho salmon from 1991-2000. These 2001 counts indicate very strong coho salmon returns to Afognak Island, and sport harvests are expected to be at record levels. Past coho salmon harvests from charter boats on Afognak Island are presented in Table 42.

**Table 39.-Number of charter boats fishing in the Kodiak Regulatory Area by home port, 1999-2001.**

Year	Home Port							Number of Active Charter Boats in KRA <sup>a</sup>
	Kodiak	Port Lions	Larsen Bay	Old Harbor	Homer	Remote Lodges	Unknown	
1999	46	9	7	5	10	16	3	96
2000	46	8	8	6	19	25	18	130
2001 <sup>b</sup>	48	12	10	4	24	19	9	126

Source: Sport Fish Division, RTS, Anchorage.

<sup>a</sup> Includes charter boats operated for one or more trips during the calendar year as indicated by completed logbook sheets submitted to ADF&G.

<sup>b</sup> Data for 2001 are preliminary.

The 2001 coho salmon count at the Buskin River weir was 13,490 coho, the highest count on record and above the upper escapement goal level of 8,300 (Table 41). Buskin River weir counts averaged 8,540 coho salmon from 1991-2000. Foot surveys on the road system indicate that returns were mostly strong, with a few exceptions. Counts on Monashka, Pillar, Russian, Sargent, Salonie, Olds, Roslyn, Chiniak and Pasagshak creeks were all excellent. The only poor returns occurred in the American River (Appendix E1). Charter boat catches in the road zone for 2001 were good (3,980) (Table 42). Both the strength of the 2001 escapement and the charter boat harvests indicated that sport harvest in 2001 in saltwater along the road zone will also be very good.

## RECENT BOARD OF FISHERIES ACTIONS

The Alaska Board of Fisheries adopted a public proposal at its December 1995 meeting that allows anglers in the remote area to have 2 daily bag limits of salmon other than chinook salmon in their possession. In the past, anglers were limited to 5 salmon other than chinook salmon in their possession. Beginning in 1996, anglers were allowed 10 in their possession.

At its January 1999 meeting, the Board closed waters around the Kitoi Bay Hatchery net pen as well as waters outside the net pen area to sport fishing. This was done to help ensure that the hatchery could collect brood stock and to ensure that the sport fishery and hatchery egg collection could take place in an orderly manner. All waters seaward of the terminus of Big Kitoi Creek to a straight line extending northwesterly from 58° 11.43' N latitude, 152° 22.00' W longitude to 58° 11.52' N latitude, 152° 22.07' W longitude are closed to sport fishing year-round. All waters seaward of that same line to a line running northwesterly from 58° 11.34' N latitude, 152° 21.66' W longitude to 58° 11.45' N latitude, 152° 21.84' W longitude are closed to sport fishing from August 15-September 30. "No Fishing" markers were erected at these locations. In addition, a diagram of the closed water areas and dates were provided in the 1999 regulation book.

**Table 40.-Charter boat effort and harvest of salmon and groundfish in the Kodiak Regulatory Area, 1998-2001.**

Year	Number of Boats Fishing	Number of Angler Days Salmon	Number of Angler Days Bottomfish	Kings Harvested	Coho Harvested	Sockeye Harvested	Pinks Harvested	Chum Harvested	Halibut Harvested	Rockfish Harvested	Lingcod Harvested
<b>Total of Kodiak Regulatory Area</b>											
1998	77	na	na	1,183	9,139	234	507	53	7,271	1,886	347
1999	96	5,210	9,251	1,668	9,028	637	845	18	11,786	2,822	525
2000	130	5,596	12,082	2,806	6,981	1,099	462	66	16,117	4,479	1,349
2001 <sup>e</sup>	126	5,549	11,562	2,207	11,561	782	609	42	15,519	4,474	816
<b>Kodiak Road System<sup>a</sup></b>											
1998	42 <sup>b</sup>	na	na	na	na	na	na	na	5,029	1,305	244
1999	50	2,504	5,443	1,175	4,917	9	463	3	7,593	1,951	327
2000	51	2,118	5,733	1,952	1,590	7	198	15	7,731	2,424	598
2001 <sup>e</sup>	50	1,995	5,018	1,321	4,161	12	359	32	6,900	2,114	416
<b>Afognak/Shuyak Islands<sup>c</sup></b>											
1998	32 <sup>b</sup>	na	na	na	na	na	na	na	1,219	319	59
1999	44	1,653	1,585	164	2,651	615	259	1	1,612	450	97
2000	33	1,775	1,851	130	3,532	1,059	84	5	2,450	571	353
2001 <sup>e</sup>	54	1,677	2,467	103	3,827	470	83	1	2,875	518	267
<b>Remainder of KRA<sup>d</sup></b>											
1998	15 <sup>b</sup>	na	na	na	na	na	na	na	1,023	262	44
1999	80	1,053	2,223	329	1,460	13	123	14	2,581	421	101
2000	62	1,703	4,498	724	2,305	33	180	46	5,936	1,484	398
2001 <sup>e</sup>	77	1,877	4,077	783	3,452	71	160	6	5,744	1,842	133

Source: Charter boat logbook database, Division of Sport Fish, RTS, Anchorage.

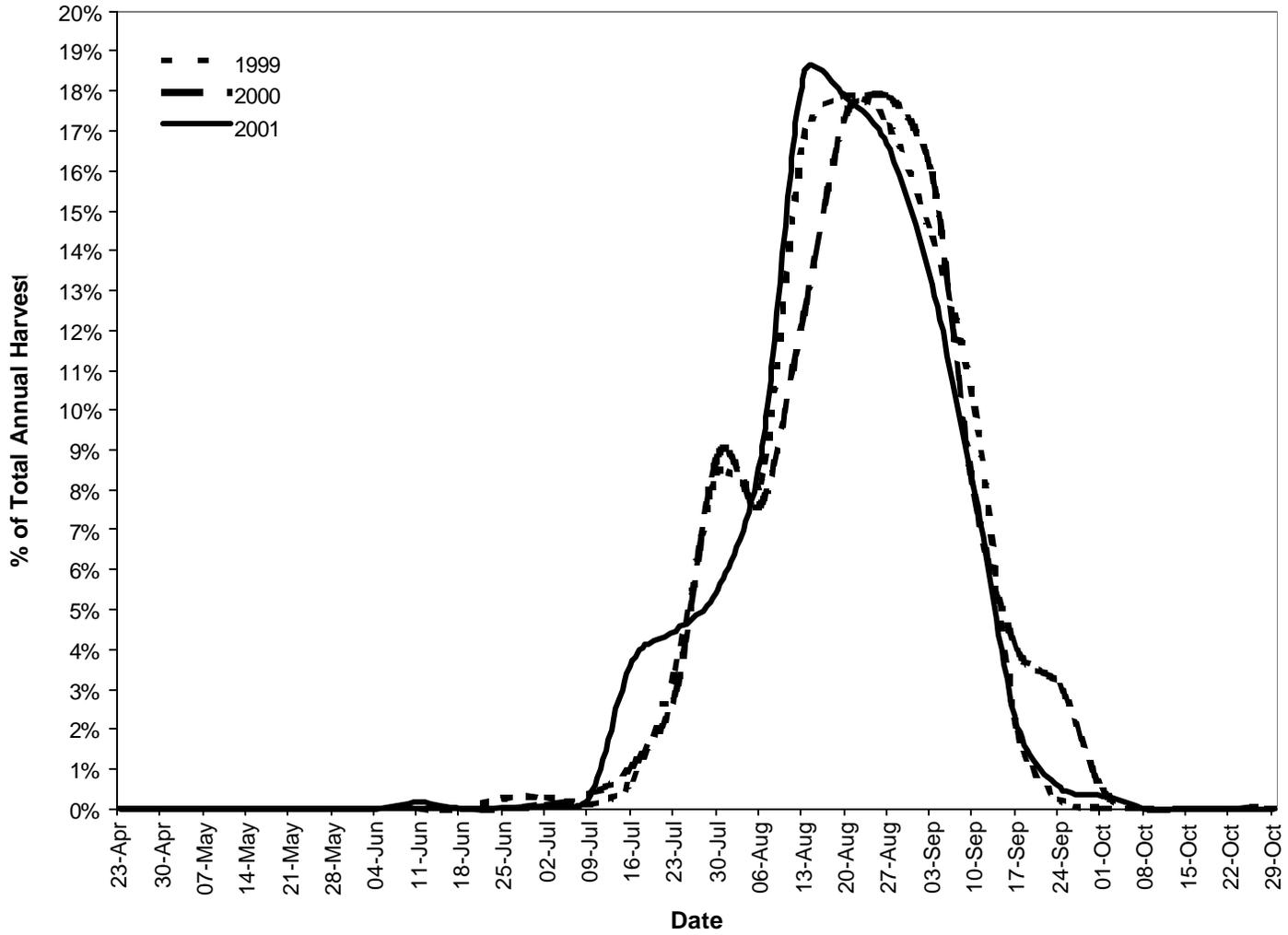
<sup>a</sup> Number of unique log book numbers fishing and harvest in the following statistical areas: Salmon: 259-10, 21, 22, 23, 24, 25, 38, 39, 40, or 41. Groundfish: 525701, 525731, 525733.

<sup>b</sup> Number of boats is vessels bottomfishing only.

<sup>c</sup> Number of unique logbook numbers fishing in one of the following statistical areas: Salmon: 251-10, 11, 20, 30, 40, 41, 50, 60, 70, 81, 82, 83, 84, 90; 252-10, 20, 30, 31, 32, 33, 34, 35. Groundfish: 515801, 525802, 525803, 525805, 525806, 525834, 535803.

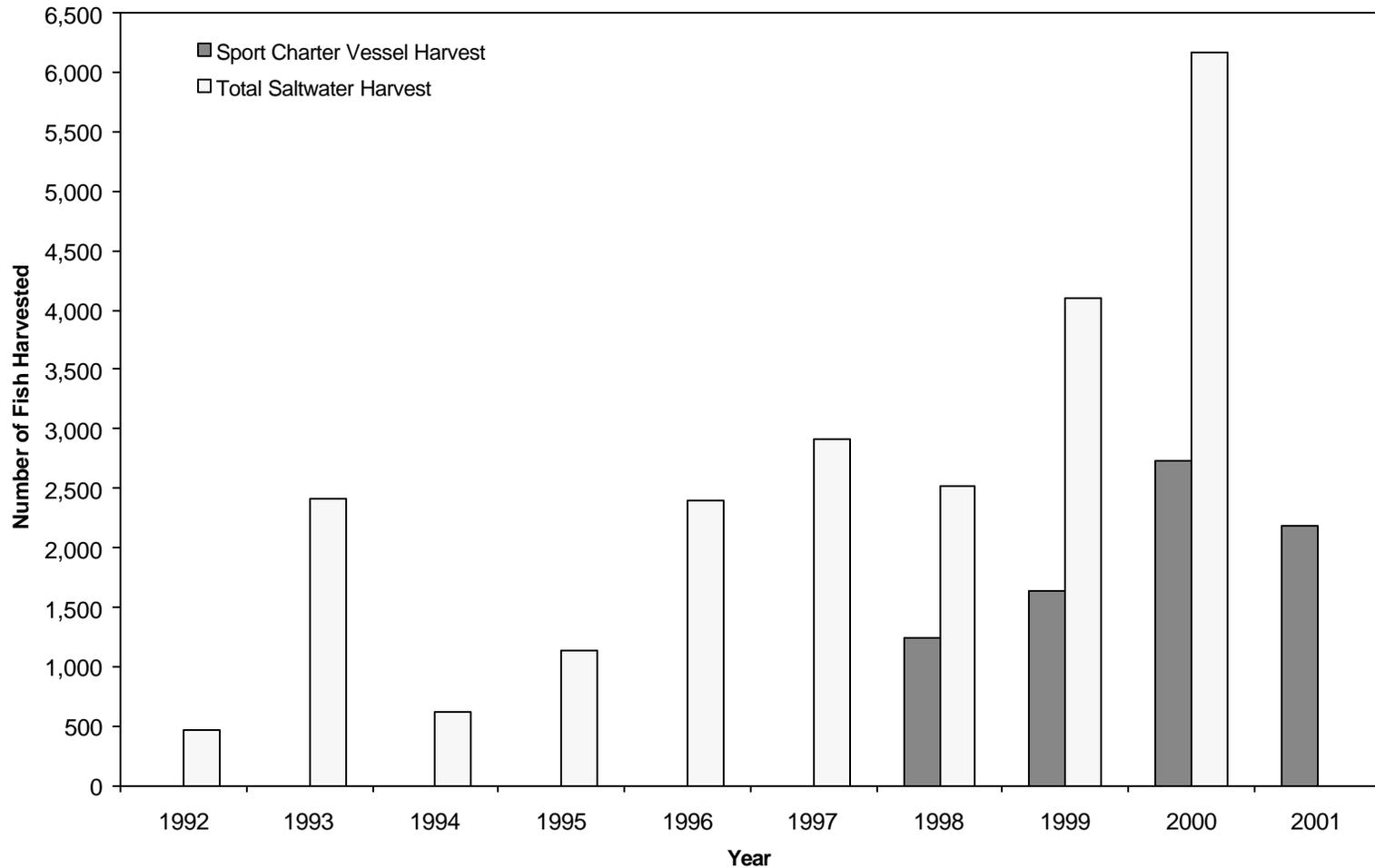
<sup>d</sup> Number of unique logbook numbers fishing in one of the following statistical areas: Salmon (253-11, 12, 13, 14, 31, 32, 33, 35 or 254-10, 20, 30, 40, 50 or 259-36; 255-10, 20; 256-10, 15, 20, 25, 30, 40; 257-10, 20, 30, 40, 41, 50, 60, 70; 258-10, 20, 30, 40, 51, 52, 53, 54, 55, 60, 70, 80, 83, 85, 90; 259-42. Groundfish: 505600, 505630, 505700, 505730, 505800, 505832, 515600, 515630, 515700, 515730, 515802, 515833, 525600, 525630, 525702, 525703, 525732, 525801, 525804, 525807, 525832, 525833, 535601, 535602, 535631, 535632, 535633, 535634, 535635, 535701, 535702, 535703, 535704, 535705, 535706, 535707, 535731, 535732, 535733, 535734, 535802, 535831, 545601, 545602, 545631, 545632, 545633, 545702, 545703, 545704, 545732, 545733, 545734, 555600, 555630, 555701, 555733, 565604, 565635, 565702.

<sup>e</sup> Preliminary data.



Source: Harvest figures documented through ADF&G saltwater charter vessel logbook program; 2001 data results preliminary.

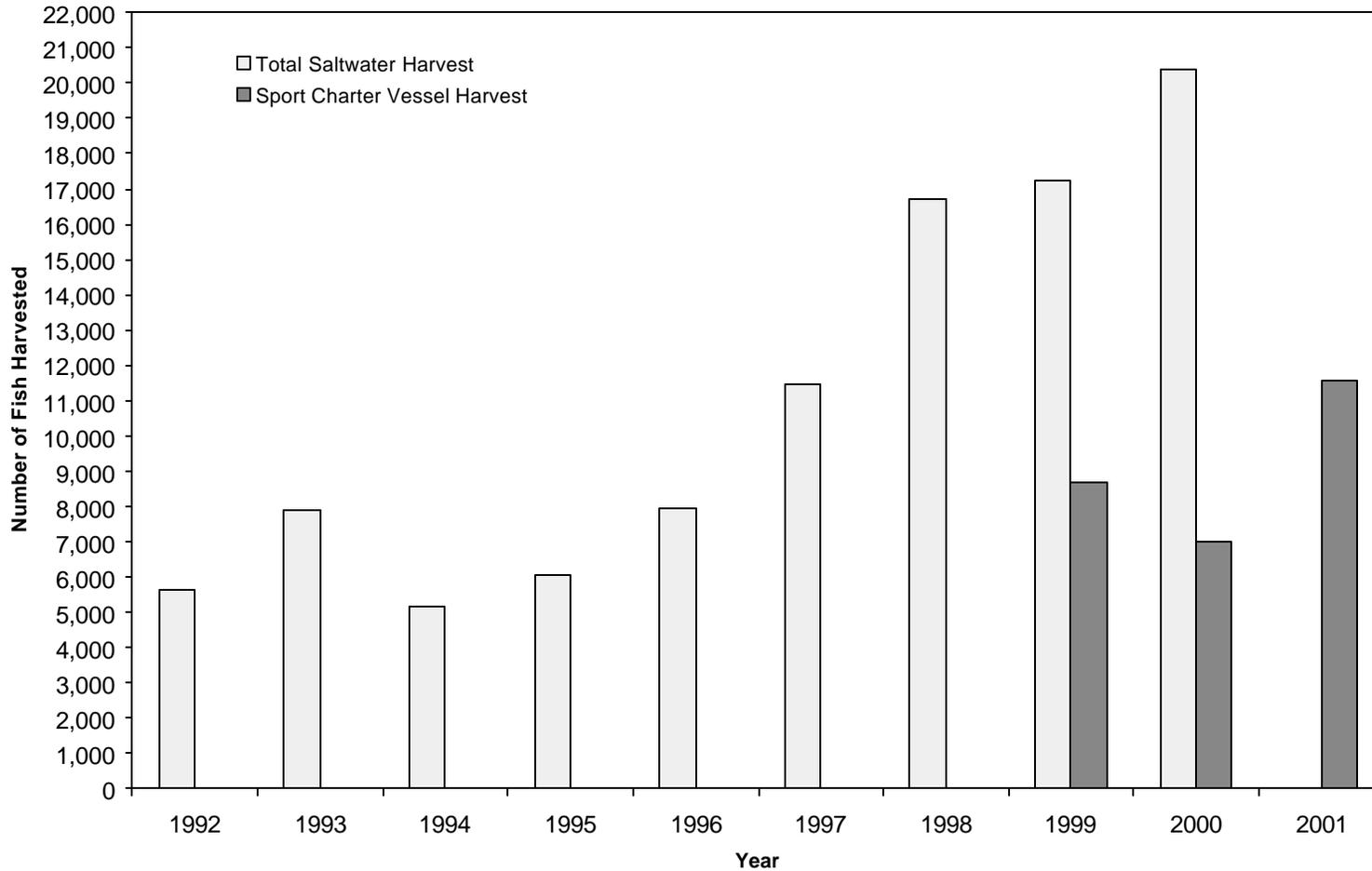
**Figure 17.-Saltwater sport charter vessel coho salmon harvest by week in the Chiniak Bay portion of the Kodiak Management Area, 1999-2001.**



Sources: Charter vessel harvest documented from ADF&G sport fish charter vessel logbook program; 2001 data results preliminary.

Total saltwater harvest estimated from statewide sport fish harvest survey; 2001 estimate not available.

**Figure 18.-Saltwater sport charter vessel chinook salmon harvest versus total saltwater chinook salmon sport fish harvest in the Kodiak Regulatory Area, 1992-2001.**



Sources: Charter vessel harvest documented from ADF&G sport fish charter vessel logbook program; 2001 data results preliminary.

Total saltwater harvest estimated from statewide sport fish harvest survey; 2001 estimate not available.

**Figure 19.-Saltwater sport charter vessel coho salmon harvest versus total saltwater coho salmon sport fish harvest in the Kodiak Regulatory Area, 1992-2001.**

**Table 41.-Coho weir counts at index weirs at Pauls Creek, Afognak and Buskin rivers, 1991-2001.**

Escapement Goal	Pauls Bay (6,500 - 9,000)	Afognak River (3,500 - 8,000)	Buskin River <sup>a</sup> (5,300 - 8,300)
Year			
1991	Not operated	14,409	8,929
1992	Not operated	16,415	6,535
1993	10,664	6,637	6,813
1994	12,538	11,965	8,146
1995	10,663	10,542	8,694
1996	15,491	9,856	8,439
1997	8,280	10,908	10,926
1998	15,514	16,374	9,062
1999	11,206	12,092	9,794
2000	12,676	2,013 <sup>b</sup>	8,048
2001	25,015	12,981	13,494
1991-2000			
Average	12,129	11,121	8,539

Source: Brodie *In prep.*

<sup>a</sup> Some removal occurs upriver of the Buskin River weir. The sport harvest above the Buskin weir must be subtracted from the weir count to calculate the number of spawning fish.

<sup>b</sup> 2000 was a drought year, with only 3.87 inches of rainfall during the months of August and September, average rainfall is 12.14 inches. Afognak River coho escapement is strongly influenced by rain. Weir operations were terminated on September 11, which is probably before the coho escapement occurred.

The Board also took action at their January 1999 meeting to resolve a conflict between commercial and sport fishermen fishing for coho salmon in Pauls Bay. Commercial closed water restrictions were relaxed by regulation (5 AAC 18.350 (a) (6) (D)). On August 1, commercial fishermen are allowed to fish within approximately 550 yards of the stream mouth (east of a line from 58° 23.70' N latitude, 152° 20.80' W longitude, to 58° 23.29' N latitude, 152° 21.09' W longitude). Relaxing closed waters will allow commercial fishermen to harvest a portion of the coho as they arrive. This will help prevent exceeding escapement goals and creating large build-ups of coho in waters closed to commercial fishing directly in front of Pauls Creek. In the past, this situation resulted in commercial stream mouth openings that allowed for the commercial harvest of surplus fish, but denied the sport fishery access to fish after the commercial harvest.

**Table 42.-Sport harvest of coho salmon from charter boats in Afognak, Pauls Bay, Discoverer Bay and Chiniak Bay, 1999-2001.**

Year	Afognak <sup>a</sup>			Pauls Bay <sup>b</sup>			Discoverer Bay <sup>c</sup>			Road Zone <sup>d</sup>		
	Number of Charter Boats	Number of Angler Days	Number Coho	Number of Charter Boats	Number of Angler Days	Number Coho	Number of Charter Boats	Number of Angler Days	Number Coho	Number of Charter Boats	Number of Angler Days	Number Coho
1999	7	108	80	7	350	638	7	174	435	38	2,432	4,772
2000	7	112	100	6	665	1,326	7	326	881	37	2,126	1,554
2001 <sup>e</sup>	5	167	482	15	606	1,452	7	65	97	34	1,962	3,981

Source: Charter boat logbook database, summarized by D. Tracy, ADF&G, Division of Sport Fish, Kodiak.

<sup>a</sup> Afognak's statistical area is 252-34.

<sup>b</sup> Pauls Bay's statistical area is 251-83.

<sup>c</sup> Discoverer Bay's statistical area is 251-82.

<sup>d</sup> Kodiak Road Zone is made up of statistical areas 259-10, 21, 22, 23, 24, 25, 38, 39, 40, and 41.

<sup>e</sup> 2001 data are preliminary.

In addition to changing commercial closed waters, the Board modified the North Afognak/ Shuyak Island Salmon Management Plan (5 AAC 18.368. (c)). The modification states “The department shall manage the Pauls Creek coho salmon escapement based on interim escapement goals, as determined by the department. When interim escapement goals are exceeded, the commissioner may reduce, by emergency order, the closed waters described in 5 AAC 18.350 (a) (6) (D), to east of 152° 20.80’ W longitude.” This provision allows for the commercial harvest of surplus fish on years when escapement goals have been achieved and there are large quantities of fish within the regulatory closed water. However, the existing closed waters are only reduced by approximately one-third, which leaves a closed area near the stream mouth where fish can not be commercially harvested. This provision will help ensure that there will be some fish available to the sport fishery after commercial harvests take place.

There are two proposals for the January 2002 Board of Fisheries meeting which would affect the management of the commercial fishery in Pauls Bay (Proposals #91 and #92). Proposal 91 would prohibit moving the August 1 commercial fisheries closed water boundary line towards the stream terminus. Proposal 92 would stop the commercial fisheries closed water boundary line from automatically being moved on August 1. If Proposal 92 is adopted, the closed water marker would stay one-half mile from the terminus of Pauls Creek, where it is during the sockeye return.

### **MANAGEMENT OBJECTIVES**

Management objectives regarding the marine coho fishery are to ensure that these harvests do not impact achieving escapement objectives. The department maintains weirs at several locations that are near to areas where large marine harvests occur: Pauls Bay, Afognak River (Litnik), and Buskin River. In addition to these weirs, the department also conducts foot surveys of important index streams. (See the chapter on Kodiak Road Zone Coho Salmon Fisheries for more information on management objectives.)

### **ONGOING RESEARCH AND MANAGEMENT ACTIVITIES**

The Kodiak office will continue to participate in the charter boat logbook program. Logbooks are issued to the charter boat operators from the Kodiak office and filled out sheets are returned to the Kodiak office, where they are edited and forwarded to Anchorage for entry into the statewide database.

The Sport Fish Division is also involved in cooperative stocking programs with the Kodiak Regional Aquaculture Association and various sport fishing organizations. Approximately 85,000 coho salmon fingerlings are stocked in six lakes to provide adult returns to Mill Bay, Mission, and Mayflower beaches (Table 8). The main purpose of these releases is to provide for a saltwater coho salmon sport fishery.

### **OUTLOOK**

The marine harvest of coho in 2002 is difficult to predict. Adult returns of coho salmon to Kodiak have been very strong over the past 2 years. Marine harvests are dependent on the abundance of both hatchery and wild returns. Availability of coho salmon to the sport fishery is also dependent on migratory entrance patterns of coho salmon as they approach natal streams.

## **RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES**

The current management program (the charter boat logbook program and coho salmon stocking programs) should be continued. No new programs or projects are recommended at this time.

### **NORTH KODIAK ISLAND ARCHIPELAGO MARINE BOTTOMFISH FISHERIES (HALIBUT, ROCKFISH AND LINGCOD)**

#### **HISTORICAL PERSPECTIVE**

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

From 1990 through 1999 anglers expended an average of 38,430 angler-days fishing in salt water in the Kodiak Regulatory Area (Table 1). Saltwater effort is estimated as well as the saltwater catch for salmon and bottomfish via the Statewide Harvest Survey. However, it is not possible to estimate the saltwater effort directed at salmon versus marine bottomfish from the Statewide Harvest Survey. If the amount of catch is reflective of the amount of effort, half of the saltwater effort is probably directed at bottomfish. About 75% of the bottomfish effort is expended fishing for halibut with the remaining effort being directed towards rockfish (20%) and lingcod (5%) (Vincent-Lang 1995). In general, effort has been relatively stable.

From 1990 through 1999, Kodiak road system and Afognak/Shuyak/Barren islands marine waters supported 62% of the total harvest of halibut and 76% of the historical harvest of rockfish from KMA waters (Table 43). From 1990 through 1999, sport anglers harvested an average of 7,030 halibut and 3,860 rockfish from Kodiak Road System marine fisheries (Table 43). This harvest accounted for an average of 45% and 59% 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 islands group supported average sport harvests of 2,670 halibut and 1,070 rockfish (Table 43). These harvests represented 17% of the total harvest of both halibut and rockfish from KMA waters.

Although not a commonly targeted species, lingcod are also harvested in the KMA. The average harvest in the management area from 1990 through 1999 was 1,440 fish. The Kodiak road zone accounts for an average of 51% of the harvest, while the Afognak islands accounted for 16%.

Bottomfish sport fisheries are managed by sport fish staff from the Anchorage and Homer offices. They have compiled a management report that contains additional information regarding these fisheries (Meyer and Stock *In prep*).

#### **RECENT FISHERY PERFORMANCE**

Fishing effort in marine waters in 2000 totaled 55,580 angler-days in the Kodiak Regulatory area and 10,130 in the Alaska Peninsula/Aleutian Island Regulatory areas (Table 1). This was the highest angler

effort ever recorded in the Kodiak Regulatory Area. The saltwater fishing effort was only average in the Alaska Peninsula/Aleutian Islands area.

The sport harvest of halibut from Kodiak road zone marine fisheries during 2000 (11,280) was the highest on record (Table 43). The 2000 rockfish harvest (4,410) was slightly above average. These harvests accounted for 47% and 52% of the total halibut and rockfish harvests, respectively, from KMA waters during 2000.

The sport harvest of halibut from Afognak/Shuyak/Barren islands marine fisheries during 2000 was 3,840. The sport harvest of rockfish during 2000 was 1,160 (Table 43). These harvests accounted for 16% and 14% of the total halibut and rockfish harvests, respectively, from KMA waters during 2000.

Effort and harvest estimates for marine bottomfish are not yet available for the 2001 season.

## **RECENT BOARD OF FISHERIES ACTIONS**

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

At the February 1998 Statewide Board of Fisheries meeting, a regulation was adopted giving the Department of Fish and Game the authority to require guides to record the catch and effort of their clients in logbooks. During the 1998 fishing season the Department required saltwater charter boat operators to record effort and catch data in logbooks. Logbook summaries from 1998-2001 are presented in Table 40. Logbook summaries in the Dutch Harbor area are presented in Table 44.

During the 1999 Board of Fisheries meeting in Kodiak, this issue of lingcod landing requirements was discussed. The landing restriction, which required lingcod be landed by hand or with a net, was implemented to reduce mortality in undersized lingcod or lingcod caught during the closed season being gaffed and then released. In 1993 the Board adopted the lingcod closed season but never adopted a size limit. Because the Board did not adopt a size restriction, the landing restrictions make sense during the closed season but not during the open season. At its 1999 meeting, the Board remedied this situation by making it illegal to gaff a fish that an angler intended to release. The regulation is stated in the positive, requiring a person to keep any lingcod that they gaff.

## **CURRENT ISSUES**

The current issues associated with sport-caught halibut are very diverse and dynamic. They include: Individual Fishing Quotas (IFQ) for charter boat operators, subsistence regulations affecting local rural residents, and Local Area Management Plans (LAMPs). The North Pacific Fisheries Management Council directly manages halibut so both federal and state governments are involved in these issues. There is a separate report (Meyer and Stock *In prep*) that deals with halibut, rockfish, and lingcod that describes these issues in detail.

**Table 43.-Sport harvest of halibut, rockfish and lingcod from Kodiak Road Zone and Afognak/Shuyak island waters of the Kodiak Management Area, 1990-2000.**

Year	KMA	Kodiak Road Zone		Afognak/Shuyak Is.	
	Harvest	Harvest	% of KMA	Harvest	% of KMA
<b>HALIBUT</b>					
1990	10,350	4,779	46	1,631	16
1991	15,086	6,283	42	1,928	13
1992	11,015	5,463	50	1,671	15
1993	14,806	6,847	46	2,203	15
1994	14,891	6,764	45	2,803	19
1995	14,594	6,590	45	2,894	20
1996	17,169	7,261	42	2,984	17
1997	20,288	8,874	44	3,457	17
1998	18,834	8,104	43	3,471	18
1999	22,260	9,372	42	3,699	17
2000	24,160	11,277	47	3,842	16
1990-1999					
Average	15,929	7,034	45	2,674	17
<b>ROCKFISH</b>					
1990	6,488	3,282	51	336	5
1991	8,753	5,882	67	1,180	13
1992	5,989	4,506	75	741	12
1993	7,996	5,523	69	1,436	18
1994	5,611	3,090	55	994	18
1995	4,695	3,014	64	704	15
1996	7,079	4,597	65	825	12
1997	7,513	3,231	43	1,826	24
1998	4,984	2,623	53	1,250	25
1999	5,618	2,806	50	1,433	26
2000	8,555	4,408	52	1,158	14
1990-1999					
Average	6,473	3,855	59	1,073	17
<b>LINGCOD</b>					
1990 <sup>a</sup>					
1991	2,211	920	42	164	7
1992	1,660	765	46	354	21
1993	1,082	554	51	215	20
1994	1,123	510	45	190	17
1995	961	588	61	130	14
1996	1,074	762	71	165	15
1997	1,704	630	37	275	16
1998	1,367	610	45	309	23
1999	1,753	1,117	64	153	9
2000	2,060	1,111	54	415	20
1990-1999					
Average	1,437	717	51	217	16

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage.

<sup>a</sup> Lingcod harvest not estimated in 1990.

**Table 44.-Unalaska Island marine charter boat catch and effort data, 1999-2001.**

Year	Number of Active vessels	Number of Angler Days	Halibut Harvested	Halibut Released	Rockfish Harvest	Rockfish Released
1999	6	1,260	2,023	2,058	45	92
2000	6	1,521	2,228	1,812	25	63
2001	7	1,281	1,833	1,281	62	205

Source: Charter boat logbook database, summarized by D. Tracy, ADF&G, Division of Sport Fish, Kodiak (1999 and 2000 data).

Charter boat logbook database, Division of Sport Fish, Research and Technical Services, Anchorage (2001 data).

## **ONGOING RESEARCH AND MANAGEMENT ACTIVITIES**

The sport harvest of groundfish is sampled annually at the primary boat harbors in Kodiak. Data collected from various species of rockfish, 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 are available. Halibut age and size data are summarized by the department 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. Staff should provide support to the local advisory committees as they develop LAMPs.

# **UNALASKA SPORT FISHERIES**

## **UNALASKA MARINE FISHERIES**

### **Historical Perspective**

Unalaska Island is located on the Aleutian Island chain (Figure 20). The island is remote, located over 790 air miles from Anchorage, and can be reached only by air or boat. Dutch Harbor and Unalaska are the island's major population centers. Despite its remoteness, Dutch Harbor is the largest fishing port in the Pacific. According to the Department of Community and Economic Development, the population of Dutch Harbor/Unalaska has increased from 3,089 in 1990 to 4,283 in 2001, or a 39% increase over the past 10 years (DCED 2001). In addition to these permanent residents, it is estimated that the town supports an additional population of between 6,000 and 10,000 seasonal residents. These people are mainly associated with the commercial fishing industry and either work in town for less than 6 months per year or spend the majority of their time offshore on vessels. A small road system serves the community of Dutch Harbor (Figure 21).

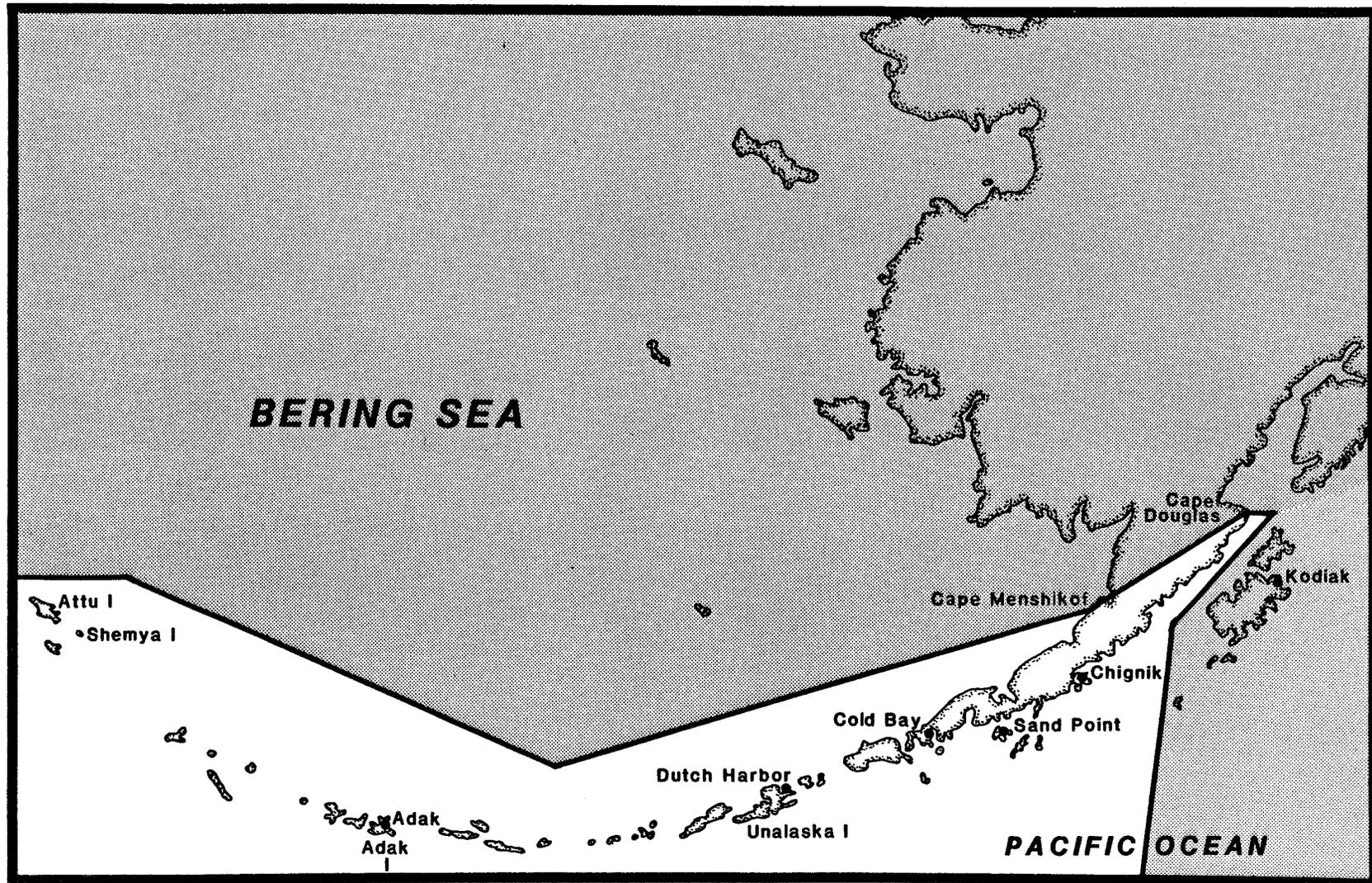


Figure 20.-Location of Unalaska Island, Aleutian Islands chain.

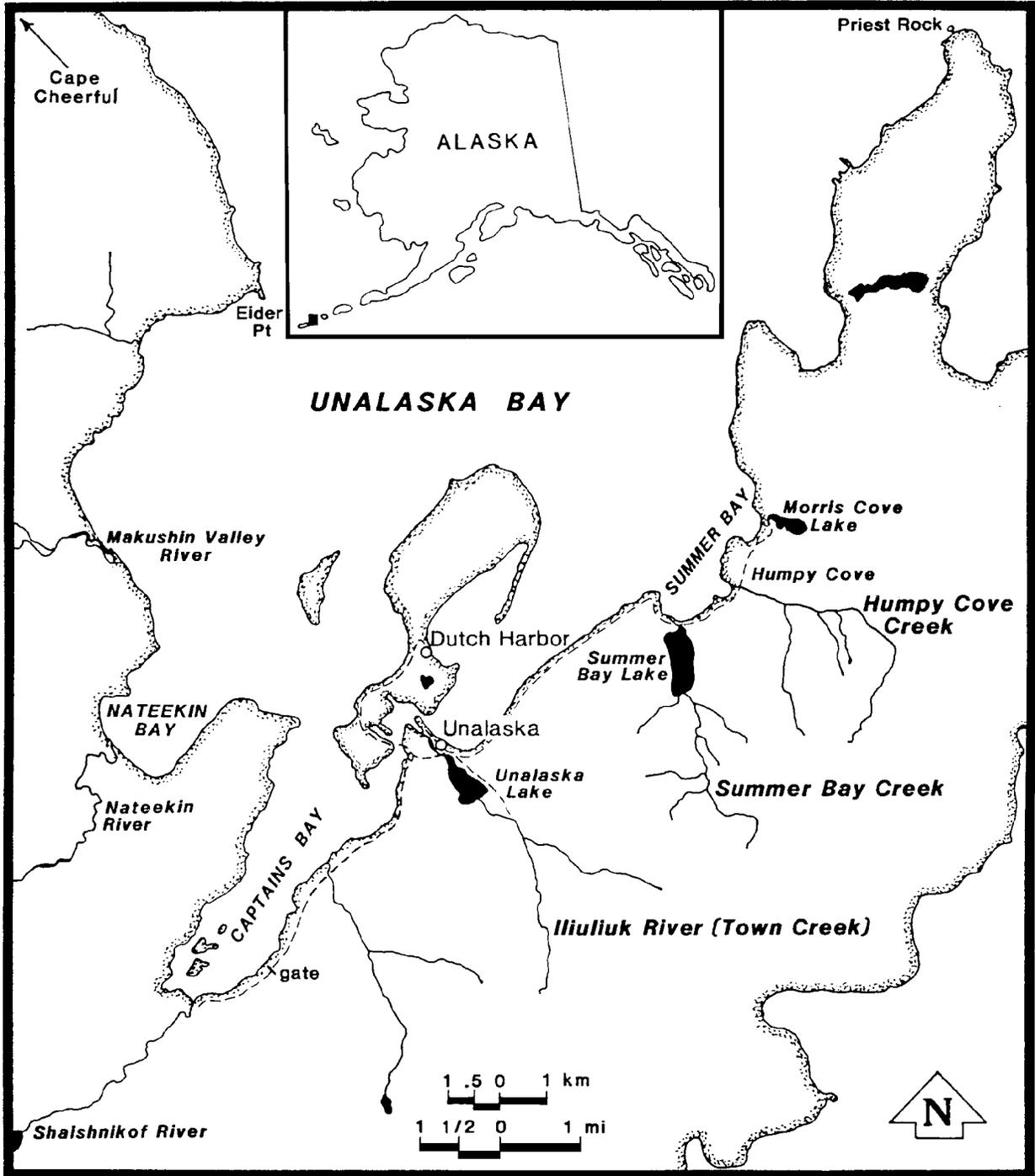


Figure 21.-Map of Unalaska road system

### **Recent Fishery Performance**

Fishing effort and catch are monitored in Unalaska through the Statewide Harvest Survey. Estimates are based on very few responses to the survey, so estimates for each year are ballpark at best. However, taken across many years, a general picture of the fishery can be seen. The 1990-1999 average was 3,020 angler-days with an estimated 4,150 angler-days expended in 2000 (Table 45). Harvest of halibut has been fairly stable, between 1,000 and 2,000 fish. The halibut harvest in 2000 was estimated to be 1,700, with the rockfish harvest estimated to be 850 fish. An Alaska state record for halibut was set in Unalaska Bay in 1996 when Jack Tragis landed a 459-pound halibut.

A small charter boat fleet has become active in Unalaska. A summary of the logbook data from these boats is presented in Table 44. In 2001 there were 7 active vessels. A total of 1,281 angler-days were expended from charter boats and accounted for a harvest of 1,833 halibut.

### **Recent Board of Fisheries Actions**

The Board of Fisheries established bag and possession limits for rockfish and lingcod which became effective during the 1995 season. The limits are identical to the limits they established in Kodiak during 1994. The rockfish limits are 10 fish per day with 20 in possession. The lingcod daily bag limit is 2 fish per day and 4 in possession. A closed season was also established for lingcod from January 1 through June 30.

### **Ongoing Research and Management Activities**

A requirement became effective for the first time during the 1998 season making it mandatory for charter boat operators to record effort and catch data in a logbook. The logbook program is ongoing and will be another method to monitor the marine sport fishery in the area.

### **Recommended Research and Management Activities**

Efforts should be made to ensure that all charter boat operators are aware of the registration and logbook requirements.

## **UNALASKA FRESHWATER SALMON FISHERIES**

### **Historical Perspective**

The drainages flowing into Unalaska Bay produce pink, chum, sockeye, and coho salmon. These species are harvested in commercial, subsistence, and sport fisheries. The commercial fishery targets pink salmon and occurs sporadically, depending on the strength of the return. Over the past 11 years, commercial salmon fisheries in Unalaska Bay have occurred during 2 years. During 1990 and 1994, when fisheries occurred, the harvests were 38,320 and 49,430 pink salmon, respectively (Table 46).

The subsistence fishery is managed by the Commercial Fisheries Division of the Alaska Department of Fish and Game. A permit and harvest record is required to participate in the fishery. Harvest is monitored by compiling data from returned permits. The harvest figures presented in Table 47 are estimated totals and are expanded for unreturned permits. From 1990-1999 an average of 160 permits was issued (Table 47). Harvests averaged 7 chinook, 2,780 sockeye, 780 coho, 950 pink and 60 chum salmon. Information from returned permits indicates that approximately 80% of the sockeye salmon harvest comes from Reese Bay, which is approximately 5 miles to the west of Unalaska Bay. Over 80% of the coho salmon harvest comes from the vicinity of the Nateekin River and Broad Bay, which are both located within Unalaska Bay.

**Table 45.-Sport effort and harvest data for halibut and rockfish from the Unalaska Island boat and shoreline sport fishery, 1986-2000.**

Year	Angler days (all species)	Halibut Harvest	Rockfish Harvest
1986	1,840	217	363
1987	1,569	208	381
1988	129	18	0
1989	572	55	0
1990	1,461	134	234
1991	3,215	517	328
1992	2,093	325	34
1993	880	654	203
1994	3,713	908	29
1995	2,961	1,410	242
1996	3,117	1,964	90
1997	3,652	1,786	0
1998	3,814	2,267	337
1999	5,335	2,674	32
2000	4,148	1,700	853
1990-99 Average	3,024	1,264	153

Source: Statewide Harvest Survey database. Located at: ADF&G, Division of Sport Fish, Research and Technical Services, Anchorage. Reported by S. Sonnichsen, ADF&G, Division of Sport Fish, Anchorage. Includes Unalaska Bay, Captain's Bay, Reese Bay, Summer Bay, and Priest Rock.

**Table 46.-Unalaska Bay commercial salmon harvest in numbers of fish, 1990-2001.**

Year	Chinook	Sockeye	Coho	Pink	Chum
1990	0	81	3	38,323	188
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	0	0	0	0	0
1994	0	41	0	49,428	138
1995	0	0	0	0	0
1996	0	0	0	0	0
1997	0	0	0	0	0
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	0	0	0	0	0
2001	0	0	0	0	0
1991-2000 Average	0	11	0	7,977	30

Source: Shaul and Dinnocenzo *In prep.*

The streams draining into Unalaska Bay produce relatively few salmon, with the exception of pink salmon in certain years. The freshwater fishery within Unalaska Bay is relatively small and as a result the Statewide Harvest Survey is not effective for monitoring effort and catch. Estimates which are based upon data collected from 12 to 30 respondents can only be used to indicate the general order of magnitude or tracking trends within the fishery. As the number of respondents increases, so does the accuracy of the estimate. In Unalaska Bay in 2000, 62 anglers responded to the survey questionnaire and gave information about their saltwater effort and catches, providing a good estimate of effort and catch. However, in 2000, only 20 anglers returned the survey questionnaire stating that they had fished in Unalaska Bay fresh waters. Because of the low response rate we do not have accurate estimates of the sport fishing effort or catch in streams draining into Unalaska Bay. In situations like these, onsite creel surveys are used to collect information and monitor fisheries. A creel survey was conducted in the Nateekin River in 1997. Estimated effort and harvest statistics in Unalaska Bay fresh water in 2000 were 1,865 angler-days with a harvest of 246 pink salmon, 417 coho salmon, 268 Dolly Varden, 38 chum salmon, and 144 sockeye salmon.

**Table 47.-Estimated total subsistence harvest for Unalaska Island, 1990-2000.**

Year	Permits					
	Issued	Chinook	Sockeye	Coho	Pink	Chum
1990	94	4	2,357	681	1,428	100
1991	89	0	1,294	666	1,075	45
1992	144	7	2,739	587	1,723	11
1993	139	17	2,831	697	587	136
1994	150	1	2,759	774	1,053	48
1995	160	23	4,484	484	791	23
1996	189	5	1,107	1,033	492	49
1997	221	8	4,192	864	554	110
1998	206	4	3,317	731	729	26
1999	211	0	2,707	1,327	1,018	13
2000	212	7	3,077	570	325	24
1990-99 Average	160	7	2,779	784	945	56

Source: Shaul and Dinnocenzo 2001, Table 5.

Note: Harvest estimated from average catch from returned permits. Some of this harvest occurs outside of Unalaska Bay. In 1997, 94% of the sockeye salmon harvest came from Reese Bay; in 1998 86% came from Reese Bay, approximately 5 miles west of Unalaska Bay.

### **Management Objectives**

Escapement goals have been developed for several Unalaska Bay streams (Table 48). Managing the freshwater streams of Unalaska Bay presents a challenge because the fisheries resources are relatively small and the population and fishing effort are increasing. Unalaska is also very remote and there are not funds available to intensively monitor this small sport fishery. Management objectives are to allow fishing opportunity without overharvesting the small resource that is present. Stream surveys should be conducted after the fishery to track trends in the fishery and ensure that the regulatory package is sufficient to protect the populations.

### **Recent Board of Fisheries Actions**

Because Unalaska Bay salmon production is relatively small and the population and sport fishing effort is expanding, the Board has adopted regulations to protect the resources. During the 1991 Board of Fisheries meeting, the bag and possession limits for salmon, other than chinook salmon, in the marine waters of Unalaska Bay and its freshwater drainages, were reduced to 5, of which only 2 could be coho salmon and 2 could be sockeye salmon. The Board also took action to close Humpy Cove Creek, Summers Cove Creek, and the portion of Unalaska Creek (also known as Iliuliuk or Town Creek)

between the bridge at the outlet of Unalaska Lake and the Church Hole to sport fishing. These actions were taken to limit illegal fishing (primarily snagging) through closing areas that are very difficult to fish using legal methods due to the physical nature of the streams. In addition, flowing waters draining into Unalaska Lake were closed to fishing from August 1 through December 31.

Regulations were also adopted, which became effective during the 1998 season, that closed sockeye salmon sport fishing in the Iliuliuk River. The sockeye salmon closure was adopted to protect the depressed return of sockeye into Unalaska Lake. The Makushin and Nateekin rivers upstream from an ADF&G marker located about 2 miles upstream from the ocean were also closed to sport fishing. The upriver closures on the Makushin and Nateekin were adopted to provide a sanctuary for coho salmon, creating a pass-through fishery, where fish that reach the upper river are protected and allowed to spawn.

The most recent Board of Fisheries action occurred in January 2001, when the Summer Bay Lake drainage was closed to all sport fishing from August 16 through December 31. This action was taken to protect coho salmon stocks which were very depressed as indicated by weir counts.

**Table 48.-Unalaska sockeye, pink and coho salmon minimum escapement goals as documented on peak surveys.**

River	Sockeye	Pink		Coho <sup>a</sup>
		Odd Year	Even Year	(Average count)
Makushin		16,000	28,000	not surveyed
Nateekin		48,000	100,000	800
Shaishnikof		3,600	5,200	not surveyed
Unalaska Lake (Iliuliuk/Town)	500	4,800	6,800	80
Summers Bay	1,000	300	1,600	not surveyed
Humpy Cove		2,800	6,800	not surveyed
Morris Cove	250	200	800	not surveyed

<sup>a</sup> No escapement goal.

## **Current Issues**

The vessel Kiroshima went aground in November 1997, directly in front of Summer Lake. Oil leaked from the vessel onto the beach and was carried into the lake by waves. As a result of the oil spill, funding was secured to operate a weir. The results of the weir project, which operated from 1998 through 2001, are presented in Table 49. Tributary streams are surveyed on foot during October and November in order to help correlate the number of coho salmon counted through the weir and the number of fish seen on foot surveys.

## **Ongoing Research and Management Activities**

Local residents were concerned that the sport harvest of coho salmon from the Nateekin River was damaging the population. The department conducted a creel census in 1997 and documented that 330 anglers harvested 335 coho. In addition to the harvest, 238 coho were released. Eighty-five percent of the anglers were local Unalaska residents. Thirteen percent of the anglers were not state residents (Begich et al. 2000).

A peak count of 580 coho salmon was documented on a foot survey on October 8, 1997 (Table 50). During 1997 no commercial harvest occurred and subsistence harvests near the Nateekin were estimated to be 148 coho. Figures for 1997 show that the exploitation rate was approximately 45% of the known return. A 45% exploitation rate of coho is well within the bounds of acceptable levels. It should also be noted that foot surveys used to index the return do not count all the fish that are within the streams. With this in mind, the spawning escapement in the Nateekin River with a 2 to 1 return per spawner could easily withstand a harvest similar to 1997 while maintaining sufficient spawning escapement to perpetuate abundant returns.

Beginning in 1998 the Sport Fish Division funded a Fish and Wildlife Technician position for 1 month. This person was available to walk streams and document escapement, put up sport fishing regulation signage, and act as a representative of the Sport Fish Division in the community of Unalaska. Results of stream surveys for Unalaska in 2000 and 2001 are located in Tables 51 and 52, respectively.

## **Inseason Management Approach**

Since very little inseason information is available, management efforts consist of monitoring trends in escapement and making regulatory changes when necessary. This approach is exemplified with recent Board of Fisheries actions which reduced bag limits and closed areas to sport fishing.

## **Recommended Research and Management Activities**

The department will continue to monitor stream escapements so that regulations can be adjusted to protect fishing opportunity and the resource. Funding a Fish and Wildlife Technician in Unalaska for at least 1 month a year is critical in accomplishing this objective. The feasibility of using stocking to enhance sport fishing opportunity in Unalaska should be examined.

**Table 49.-Summer Lake weir counts of juvenile and adult sockeye and coho salmon, 1998-2001.**

Year	Dates of weir operation	Weir Counts				Peak foot survey <sup>a</sup>	
		Adult Sockeye	Sockeye smolt	Adult Coho	Coho smolt	Date range of coho	Peak number
1998	5/9-10/3/98	2,641	42,336	101	325	9/17-11/25	1
1999	5/30-9/9/99	3,375	46,268	20	1,980	9/2-11/27	0
2000	6/21-10/7/00	3,205	20,821	439	709	9/7-10/12	22
2001	6/1-9/10/01	5,388	38,112	23	1,190	9/5-11/26	5

Sources: Honnold et al. 1999 and McCullough 2000; Stream Survey Database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Peak foot survey for coho salmon of the inlet stream of Summer Lake.

**Table 50.-Unalaska Bay drainage peak salmon escapement counts.**

Year	Pink Salmon		Coho Salmon		Chum Salmon		Sockeye Salmon	
	Number	Date	Number	Date	Number	Date	Number	Date
<b>Nateekin River</b>								
1990	46,100	19-Aug						
1991								
1992	25,500	15-Aug						
1993	22,000	07-Sep						
1994	63,000	13-Aug						
1995	13,570 <sup>a</sup>	14-Aug	1,421 <sup>a</sup>	16-Oct				
1996	2,500	22-Aug	455 <sup>a</sup>	07-Oct				
1997	34,000	01-Sep	576 <sup>a</sup>	08-Oct				
1998	21,300	11-Sep	414 <sup>a</sup>	12-Nov				
1999	13,500	24-Aug	167 <sup>a</sup>	24-Nov				
2000	55,000	12-Aug	12 <sup>a</sup>	30-Sep				
2001	150,000	11-Aug	50 <sup>a</sup>	18-Oct				
<b>Makushin Valley Stream<sup>b</sup></b>								
1990	5,300	13-Sep						
1992	0	15-Aug						
1994	300	24-Aug						
1995	2	13-Aug						
1996	0	22-Aug						
1997	8,000	18-Aug						
1998	370	11-Sep	211 <sup>a</sup>	14-Oct				
1999	125	24-Aug	249 <sup>a</sup>	20-Oct				
2000								
2001								
<b>Captains Bay Stream</b>								
1990	10,000	19-Aug						
1991	1,200 <sup>a</sup>	30-Aug			26 <sup>a</sup>	30-Aug		
1992	2,350 <sup>a</sup>	08-Sep			37 <sup>a</sup>	08-Sep		
1994	5,400 <sup>a</sup>	19-Aug			8 <sup>a</sup>	19-Aug		
1995	2,793 <sup>a</sup>	03-Sep	1 <sup>a</sup>	03-Sep	45 <sup>a</sup>	03-Sep		
1996	1,506 <sup>a</sup>	21-Aug	103 <sup>a</sup>	13-Oct	79 <sup>a</sup>	21-Aug		
1997	3,600	18-Aug						
1998	3,200	11-Sep	10 <sup>a</sup>	03-Oct				
1999	5,900	24-Aug	7 <sup>a</sup>	19-Oct				
2000	2,000	12-Aug						
2001	3,000	11-Aug						
<b>Iiuliuk</b>								
1990	11,800	19-Aug						
1991	9,000	08-Sep						
1992	9,000	08-Sep						
1993	10,200	24-Aug						
1994	12,762 <sup>a</sup>	07-Sep					226 <sup>a</sup>	07-Sep
1995	9,752 <sup>a</sup>	29-Aug					255 <sup>a</sup>	13-Aug
1996	7,500 <sup>a</sup>	18-Aug					250 <sup>a</sup>	18-Aug
1997	12,300	01-Sep					330	18-Aug
1998	5,600	11-Sep	355 <sup>a</sup>	21-Nov			800	11-Aug
1999	3,936	08-Sep	61 <sup>a</sup>	27-Nov			1,250	24-Aug
2000	24,200	12-Aug					300	12-Aug
2001	3,200	09-Sep					1,000	11-Aug

-continued-

**Table 50.-Page 2 of 2.**

Year	Pink Salmon		Coho Salmon		Chum Salmon		Sockeye Salmon	
	Number	Date	Number	Date	Number	Date	Number	Date
<b>Summers Bay</b>								
1990	3,000	11-Aug						
1992	200	15-Aug						
1994	4,300	28-Aug	50	28-Aug			178 <sup>a</sup>	19-Aug
1995	12	28-Aug	8	08-Sep				
1996	100	22-Aug	8 <sup>a</sup>	12-Oct			400	22-Aug
1997	126	19-Aug					800	18-Aug
1998	7,290 <sup>b</sup>	03-Oct	101 <sup>b</sup>	03-Oct			2,641 <sup>b</sup>	03-Oct
1999	2,250 <sup>b</sup>	09-Sep	20 <sup>b</sup>	09-Sep			3,375 <sup>b</sup>	09-Sep
2000	7,918 <sup>b</sup>	28-Aug	439 <sup>b</sup>	11-Sep			3,205 <sup>b</sup>	11-Sep
2001	4,114 <sup>b</sup>	10-Sep	23 <sup>b</sup>	10-Sep			5,388 <sup>b</sup>	10-Sep
<b>Humpy Cove</b>								
1990	10,000	19-Aug						
1991	543 <sup>a</sup>	30-Aug						
1992	1,860 <sup>a</sup>	28-Aug						
1994	15,400	28-Aug						
1995	3,789 <sup>a</sup>	28-Aug						
1996	6,689 <sup>a</sup>	23-Aug						
1997	3,800	18-Aug						
1998	8,025 <sup>a</sup>	04-Sep						
1999	7,630	25-Aug						
2000	8,000	12-Aug						
2001	12,310	12-Sep						
<b>Morris Cove</b>								
1991							146 <sup>a</sup>	30-Aug
1994	28 <sup>a</sup>	19-Aug					300	28-Aug
1995							131 <sup>a</sup>	07-Aug
1996 <sup>c</sup>	0 <sup>a</sup>		0 <sup>a</sup>		0 <sup>a</sup>		0 <sup>a</sup>	
1997								
1998								
1999								
2000								
2001								

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Foot survey. All numbers not footnoted are aerial surveys.

<sup>b</sup> Weir count.

<sup>c</sup> Morris Cove stream was surveyed on July 24, August 7, and August 23, 1996. No salmon were seen on any of the surveys.

**Table 51.-Unalaska Bay salmon surveys, 2000.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Nateekin River</b>								
	12-Aug	0	0	0	55,000	0	Good	
	30-Sep <sup>a</sup>	0	0	12	0	0	Fair	Less than 100 pink salmon. Water level very low, hundreds of spawning beds
<b>Captain's Bay Stream</b>								
	12-Aug	0	0	0	2,000	0	Good	
<b>Pyramid Creek</b>								
	07-Aug <sup>a</sup>	0	0	0	0	0	Good	No fish counted in creek or creek mouth.
	19-Aug <sup>a</sup>	0	0	0	19	0	Good	Only lower half of creek surveyed.
	30-Aug <sup>a</sup>	0	5	0	140	0	Good	1 Dolly Varden.
	08-Sep <sup>a</sup>	0	0	0	0	0	Good	26 dead pink salmon, 10 Dolly Varden.
	02-Oct <sup>a</sup>	0	0	0	0	0	Good	1 Dolly Varden. Water levels too low for coho salmon passage. 15 dead pink salmon
<b>Unalaska Village Stream</b>								
	12-Aug	0	300	0	24,200	0	Fair	Had to fly high because of houses! Sockeye estimate very rough, 200 pinks schooled at mouth of upper creek.
	16-Aug <sup>a</sup>	0	0	0	1,375	0	Good	No sockeye. Estimated 500 Dolly Varden in creek, 200-400 pinks milling in lake. Significant number of coho juveniles in creek. Surveyed inlet stream only.
	20-Aug <sup>a</sup>	0	0	0	6,000	0	Poor	67 sockeye in lake. 15-20 spawning redds.
	23-Aug	0	0	0	0	0	Fair	150 reds counted in lake.
<b>Summer Bay Stream</b>								
	26-Jul <sup>a</sup>	0	0	0	0	0	Fair	18 sockeye in SW corner of lake. Several Dolly Varden in creek.
Stream	06-Aug <sup>a</sup>	0	22	0	17	0	Fair	258 sockeye in South and midwest region of lake. Dolly Varden in creek and SW corner.

-continued-

**Table 51.-Page 2 of 3.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Summer Bay (continued)</b>								
Stream	14-Aug <sup>a</sup>	1	94	0	299	0	Good	376 sockeye in SW corner. 38 reds present. 300-500 sockeye and 250 pinks at inlet creek mouth. 100+ Dolly Varden in creek, 50+ in SW corner of lake.
Mouth	14-Aug <sup>a</sup>	0	0	0	900	0	Good	
Bay	14-Aug <sup>a</sup>	0	0	0	200	0	Good	
Stream	28-Aug <sup>a</sup>	0	103	0	1,902	0	Good	40 sockeye at north end of lake. 46 sockeye at west side of lake. 7 dead sockeye in creek.
Mouth	28-Aug <sup>a</sup>	0	0	0	0	0	Good	
Bay	28-Aug <sup>a</sup>	0	0	0	0	0	Good	
Stream	31-Aug <sup>a</sup>	0	0	0	0	0	Good	649 sockeye in west side of lake. 6 dead sockeye.
Mouth	31-Aug <sup>a</sup>	0	0	0	0	0	Good	
Bay	31-Aug <sup>a</sup>	0	0	0	0	0	Good	
Stream	7-Sep <sup>a</sup>	0	0	0	0	0	Good	684 sockeye and 31 pinks in lake. 5 dead sockeye and 31 dead pinks in lake.
Mouth	7-Sep <sup>a</sup>	0	0	0	0	0	Good	
Bay	7-Sep <sup>a</sup>	0	0	0	0	0	Good	
Stream	11-Sep <sup>a</sup>	0	173	2	1,305	0	Good	106 reds and 20 pinks in east side of lake. Many hundreds of dead pinks in creek.
Mouth	11-Sep <sup>a</sup>	0	0	0	0	0	Good	
Bay	11-Sep <sup>a</sup>	0	0	0	0	0	Good	

-continued-

**Table 51.-Page 3 of 3.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Summer Bay (continued)</b>								
Stream	19-Sep <sup>a</sup>	0	169	6	256	0	Fair	112 Dolly Varden in creek. Many dead pinks in creek.
Mouth	19-Sep <sup>a</sup>	0	0	0	0	0	Fair	
Bay	19-Sep <sup>a</sup>	0	0	0	0	0	Fair	
Stream	27-Sep <sup>a</sup>	0	49	22	21	0	Good	435 sockeye and 1 coho in the SW quarter of lake. 82 reds in eastside of lake. 200-300 dead fish in creek, 100 in lake, species unknown.
Mouth	27-Sep <sup>a</sup>	0	0	0	0	0	Good	
Bay	27-Sep <sup>a</sup>	0	0	0	0	0	Good	
Stream	12-Oct <sup>a</sup>	0	21	0	0	0	Good	No coho in creek. Estimated 200 Dolly Varden in creek. 12 reds in eastside of lake.
Mouth	12-Oct <sup>a</sup>	0	0	0	0	0	Good	
Bay	12-Oct <sup>a</sup>	0	0	0	0	0	Good	
<b>Humpy Cove (Summer Bay)</b>								
Stream	11-Aug <sup>a</sup>	0	0	0	6,210	0	Good	Counting error of +/- 500 due to high concentration of fish in the first two holes.
Bay	11-Aug <sup>a</sup>	0	0	0	1,500	0	Good	
Stream	12-Aug	0	0	0	8,000	0	Good	
<b>Morris Cove</b>								
Stream	15-Aug <sup>a</sup>	0	0	0	0	0	Fair	8 sockeye in lake on 5 redds. No fish activity in inlet creek.
Mouth	15-Aug <sup>a</sup>	0	1	1	1	0	Fair	

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Foot survey. All other counts not footnoted are aerial surveys.

**Table 52.-Unalaska Bay salmon surveys, 2001.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Humpback Bay #1</b>								
Stream	11-Aug	0	0	0	8,600	0	Excellent	
Mouth	11-Aug	0	0	0	10,000	0	Good	
<b>Humpback Bay #2 Stream</b>								
Stream	11-Aug	0	0	0	9,000	0	Excellent	
Mouth	11-Aug	0	0	0	5,000	0	Good	
<b>Unalaska Village Stream</b>								
	20-Nov		0	143	0	0	Good	
<b>Melees Lake Stream</b>								
	11-Aug	0	34,000	0	0	0	Good	13,000 in tribs. With probably at least another 4,000 above where survey began. 8,000 at trib mouth, and 13,000 along lakeshore
<b>Nateekin River</b>								
Stream	11-Aug	0	0	0	150,000	0	Excellent	
Mouth	11-Aug	0	0	0	100,000	0	Good	
Mouth	16-Sep	0	0	0	6,800	0	Good	23,450 dead pink salmon
Mouth	18-Oct	0	0	50	0	0	Good	
<b>Captain's Bay Stream</b>								
	11-Aug	0	0	0	3,000	0	Good	

-continued-

**Table 52.-Page 2 of 5.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Pyramid Creek</b>								
Stream	18-Aug	0	0	0	294	0	Good	
Mouth	18-Aug	0	0	0	50	0	Good	
Stream	09-Sep	0	0	0	496	0	Good	
<b>Shaishinkof Creek</b>								
Stream	13-Oct	0	0	10	0	0	Good	
<b>Summer Bay</b>								
Lake	14-Jul <sup>a</sup>	0	0	0	0	0	Fair	Many jumpers in NW corner of lake, few to no jumpers elsewhere in lake.
Lake	22-Jul <sup>c</sup>	0	0	0	0	0	Fair	Water too ripply to see any fish.
Stream	29-Jul <sup>a</sup>	0	200	0	1	0	Good	About 200 sockeye salmon visible at the mouth of the inlet stream. 90% were in spawning color.
Lake	29-Jul <sup>c</sup>	0	200	0	0	0	Good	About 100 sockeye salmon immediately visible in NW corner of lake, maybe several hundred jumping/not in sight there. Large school of reds and Dolly Varden at mouth of outlet stream.
Lake	04-Aug <sup>d</sup>	0	400	0	0	0	Excellent	Two circular schools of 100 fish each were swimming in NW corner of lake. One school of about 200 fish was waiting outside the inlet stream.
Stream	05-Aug <sup>a</sup>	0	10	0	0	0	Good	Reds concentrated in first 500 ft of stream, with a single red observed 1,000 ft upstream. 60 DV seen in first 600 ft of stream, with a large school of about 500 visible at stream mouth.

-continued-

**Table 52.-Page 3 of 5.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Summer Bay (continued)</b>								
Stream	10-Aug <sup>a</sup>	0	225	0	10	0	Excellent	About 180 sockeye and 10 pink salmon in first 600 ft of stream. 20 sockeye from 600-1,000 ft upstream and 25 sockeye from 1,000-2,000 ft upstream. About 100 Dolly Varden were also seen in the first 1,000 ft. of the inlet stream.
Lake	11-Aug <sup>c</sup>	0	900	0	0	0	Excellent	About 400 sockeye at the mouth of inlet stream and about 500 individuals scattered along the shallow edges of the lake. Many more were seen splashing in the deep part of lake.
Stream	17-Aug <sup>a</sup>	0	290	0	50	0	Good	About 210 sockeye, 30 pinks, and 150 Dolly Varden were observed in the first 1,000 ft of the stream. 3 dozen redds near the 1st righthand fork of the stream. In the next 1,000 ft, ~80 redds, 50 DV, 20 pinks. Fish didn't appear to be redding, most in deep pools.
Lake	17-Aug <sup>c</sup>	0	3,000	0	0	0	Fair	About 2-3 thousand sockeye were at the entrance to the inlet stream, not redding but waiting to go up. About 500 were redding in various shallow parts of the lake. Less jumpers than before observed in the deep parts of the lake.
Stream	24-Aug <sup>a</sup>	0	420	0	330	0	Good	110+ Dolly Varden present in stream. Redds numbered 10% total # fish present. 30 dead spawned sockeye and 10 dead spawned pinks.
Lake	25-Aug <sup>c</sup>	0	3,000	0	0	0	Good	School of 2,500+ unspawned sockeye waiting at the mouth of the inlet stream. 670+ sockeye and 505+ redds found along SW,S, and E sides of lake. 60 dead spawned sockeye were seen around the lake.

-continued-

**Table 52.-Page 4 of 5.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Summer Bay (continued)</b>								
Stream	29-Aug <sup>a</sup>	0	512	0	687	0	Fair	Pink salmon found in the stream did not appear to be spawning yet, 40 dead sockeye. 120+ Dolly Varden were seen, but likely to be hundreds; they are hard to see.
Lake	29-Aug <sup>c</sup>	0	2,800	0	21	0	Fair	20 + pinks near mouth of inlet stream and on W side of lake.
Stream	04-Sep <sup>a</sup>	0	660	0	860	0	Good	~130+ Dolly Varden seen in stream but likely to be hundreds more. 130+ dead spawned pinks & 70+ dead spawned sockeye.
Lake	05-Sep <sup>c</sup>	0	4,000	0	0	0	Fair	
Stream	10-Sep <sup>a</sup>	0	750	0	755	0	Good	200 Dolly Varden were observed
Lake	10-Sep <sup>a</sup>	0	2,663	0	0	0	Fair	
Stream	06-Nov <sup>a</sup>	0	0	2	0	0	Good	
Stream	26-Nov <sup>a</sup>	0	0	5	0	0	Good	
<b>Humpy Cove (Summer Bay)</b>								
Stream	11-Aug	0	0	0	2,000	0	Good	
Mouth	11-Aug	0	0	0	9,000	0	Good	
Stream	27-Aug	0	0	0	8,000	0	Good	70 Dolly Varden
Mouth	27-Aug	0	0	0	20	0	Poor	

-continued-

**Table 52.-Page 5 of 5.**

Stream	Date	Chinook	Sockeye	Coho	Pink	Chum	Visibility	Comments
<b>Morris Cove</b>								
Stream	27-Aug	0	6	0	0	0	Excellent	1 Dolly Varden in stream
Mouth	27-Aug	0	2	0	1	0	Poor	11 spawning sockeye on E side of lake near inlet
Bay	27-Aug	0	0	0	0	0	Poor	stream, 14 dead spawned sockeye along shore. 7 old redds on S side of lake

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Foot survey. All other counts not footnoted are aerial surveys.

<sup>b</sup> Observing from atop a mountain.

<sup>c</sup> Boat survey.

## **OTHER FISHERIES**

Several smaller fisheries for other species also occur in the KMA. These include fisheries for wild rainbow trout, 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, Uganik River, and Little River. All of these populations are composed of small numbers of fish. The physical size of the fish is also small. Documenting the harvest is difficult because of the small fishing effort that these remote populations receive. Documenting harvest is further complicated because anglers confuse steelhead and rainbow trout. A steelhead is a type of rainbow trout which spends part of its life in salt water. On Kodiak, steelhead attain a larger size due to better growing conditions experienced in salt water. However, the only definite way to distinguish whether some fish are large rainbows or small steelhead is to examine a scale under a microscope for saltwater growth. Appendix A8 lists harvest estimates from the Statewide Harvest Survey for steelhead and rainbow trout. In 2000 an estimated 2,280 wild rainbow trout were caught within the Kodiak Island Archipelago, only 60 of which were harvested.

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

The average sport harvest and catch of wild rainbow trout from the waters of the Kodiak Regulatory Area from 1990 through 1999 was 250 and 3,430 respectively. In addition, approximately 20 roadside lakes are stocked along the Kodiak road system. The harvest and catch of rainbow trout from these lakes in 2000 was estimated by the Statewide Harvest Survey to be 900 and 1,300, respectively (Appendix A8).

### **CHUM SALMON**

Chum salmon have not typically been targeted by recreational anglers in the KMA, but some are taken incidentally to other salmon species. An average of only 1,025 chum salmon were harvested per year by sport anglers from KMA waters from 1977 through 2000 (Appendix A11). Most (81%) of the annual chum salmon harvest occurred in the waters of the Kodiak Regulatory Area.

### **CLAMS**

From 1977 through 2000, the average harvest of razor clams was 3,150, all of which were reported from the Kodiak Regulatory Area (Appendix A7). Kodiak Island has a few 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. The harvest reported in 2000 was 440 clams.

## OTHER FISH

From 1977 through 2000, the average harvest of other fish in the Kodiak management area has been 4,300 (Table 4). This harvest has represented an average of 5% of the total sport 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, 1977-2000**

**Appendix A1.-Number of Dolly Varden/Arctic char harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total	
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total			
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA		
1977						0		1,084	7	13,452	93	14,536	100	14,536
1978						0		2,830	18	12,975	82	15,805	100	15,805
1979						0		5,281	21	20,140	79	25,421	100	25,421
1980						0		2,979	14	17,684	86	20,663	100	20,663
1981	3,402	100	0	0	3,402	15	2,441	13	17,075	87	19,516	85	22,918	
1982	4,695	50	4,717	50	9,412	28	5,931	25	17,840	75	23,771	72	33,183	
1983	2,843	27	7,805	73	10,648	35	3,934	20	15,505	80	19,439	65	30,087	
1984	1,356	32	2,833	68	4,189	15	4,814	21	18,278	79	23,092	85	27,281	
1985	659	13	4,283	87	4,942	22	2,291	13	15,225	87	17,516	78	22,458	
1986	2,069	37	3,488	63	5,557	21	6,375	31	14,282	69	20,657	79	26,214	
1987	2,083	31	4,534	69	6,617	43	2,299	26	6,464	74	8,763	57	15,380	
1988	2,148	56	1,673	44	3,821	17	7,949	43	10,659	57	18,608	83	22,429	
1989	1,392	34	2,721	66	4,113	22	2,771	19	11,495	81	14,266	78	18,379	
1990	2,524	37	4,326	63	6,850	32	6,042	42	8,193	58	14,235	68	21,085	
1991	3,920	47	4,444	53	8,364	40	2,708	21	10,086	79	12,794	60	21,158	
1992	1,810	37	3,039	63	4,849	40	1,540	21	5,849	79	7,389	60	12,238	
1993	1,628	39	2,585	61	4,213	40	1,626	26	4,655	74	6,281	60	10,494	
1994	368	27	999	73	1,367	19	1,281	21	4,700	79	5,981	81	7,348	
1995	867	31	1,938	69	2,805	30	1,338	21	5,131	79	6,469	70	9,274	
1996	623	33	1,291	67	1,914	14	3,813	34	7,543	66	11,356	86	13,270	
1997	1,525	71	614	29	2,139	21	2,151	27	5,965	73	8,116	79	10,255	
1998	1,029	57	779	43	1,808	18	2,400	30	5,648	70	8,048	82	9,856	
1999	378	28	949	72	1,327	14	3,059	39	4,805	61	7,864	86	9,191	
2000	814	36	1,470	64	2,284	17	3,515	32	7,612	68	11,127	83	13,411	
Average	1,807	41	2,724	59	4,531	21	3,352	24	10,886	76	14,238	79	18,014	

**Appendix A2.-Number of pink salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total		
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA	
1977						0	5,074	35	9,445	65	14,519	100	14,519
1978						0	7,693	43	10,046	57	17,739	100	17,739
1979						0	8,853	56	7,018	44	15,871	100	15,871
1980						0	8,223	43	10,746	57	18,969	100	18,969
1981	6,555	100	0	0	6,555	35	4,677	38	7,582	62	12,259	65	18,814
1982	8,583	75	2,872	25	11,455	38	8,153	43	10,697	57	18,850	62	30,305
1983	3,200	81	734	19	3,934	31	2,780	31	6,156	69	8,936	69	12,870
1984	4,011	89	491	11	4,502	26	4,314	34	8,465	66	12,779	74	17,281
1985	672	34	1,331	66	2,003	13	5,739	43	7,684	57	13,423	87	15,426
1986	350	12	2,456	88	2,806	16	4,769	33	9,740	67	14,509	84	17,315
1987	681	36	1,189	64	1,870	14	5,252	45	6,410	55	11,662	86	13,532
1988	681	6	11,540	94	12,221	39	10,040	53	9,004	47	19,044	61	31,265
1989	7,252	65	3,847	35	11,099	38	7,566	43	10,228	57	17,794	62	28,893
1990	12,301	55	10,244	45	22,545	75	2,476	33	4,988	67	7,464	25	30,009
1991	3,923	45	4,846	55	8,769	42	5,088	42	6,974	58	12,062	58	20,831
1992	2,538	43	3,361	57	5,899	50	2,113	36	3,791	64	5,904	50	11,803
1993	1,983	60	1,339	40	3,322	21	5,637	46	6,687	54	12,324	79	15,646
1994	594	49	630	51	1,224	19	2,147	40	3,189	60	5,336	81	6,560
1995	776	62	483	38	1,259	10	5,704	48	6,203	52	11,907	90	13,166
1996	795	78	227	22	1,022	13	2,830	40	4,246	60	7,076	87	8,098
1997	926	68	440	32	1,366	20	1,942	36	3,507	64	5,449	80	6,815
1998	694	54	593	46	1,287	9	5,591	46	6,675	54	12,266	91	13,553
1999	2,067	80	508	20	2,575	17	4,365	34	8,448	66	12,813	83	15,388
2000	1,167	56	911	44	2,078	16	5,631	53	4,968	47	10,599	84	12,677
Average	2,987	57	2,402	43	5,390	23	5,277	41	7,204	59	12,481	77	16,973

**Appendix A3.-Number of coho salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total	
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total			
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA		
1977						0		1,172	25	3,544	75	4,716	100	4,716
1978						0		1,433	29	3,494	71	4,927	100	4,927
1979						0		3,606	31	7,916	69	11,522	100	11,522
1980						0		5,442	43	7,250	57	12,692	100	12,692
1981	475	100	0	0	475	4		4,449	42	6,135	58	10,584	96	11,059
1982	491	54	419	46	910	6		6,612	50	6,717	50	13,329	94	14,239
1983	943	51	891	49	1,834	19		2,025	26	5,798	74	7,823	81	9,657
1984	1,059	90	122	10	1,181	7		6,945	48	7,667	52	14,612	93	15,793
1985	473	36	834	64	1,307	9		6,209	46	7,416	54	13,625	91	14,932
1986	1,062	23	3,492	77	4,554	18		9,220	44	11,653	56	20,873	82	25,427
1987	1,567	70	665	30	2,232	12		8,059	48	8,856	52	16,915	88	19,147
1988	403	16	2,167	84	2,570	12		6,786	36	12,023	64	18,809	88	21,379
1989	2,288	65	1,222	35	3,510	15		5,338	27	14,464	73	19,802	85	23,312
1990	1,360	21	5,057	79	6,417	32		5,916	43	7,812	57	13,728	68	20,145
1991	1,045	28	2,732	72	3,777	18		6,605	38	10,901	62	17,506	82	21,283
1992	953	29	2,330	71	3,283	19		5,632	41	8,028	59	13,660	81	16,943
1993	869	55	703	45	1,572	7		7,849	37	13,364	63	21,213	93	22,785
1994	772	23	2,640	77	3,412	22		5,177	42	7,219	58	12,396	78	15,808
1995	989	51	969	49	1,958	13		6,014	46	7,173	54	13,187	87	15,145
1996	1,031	32	2,165	68	3,196	17		7,959	50	8,074	50	16,033	83	19,229
1997	684	30	1,595	70	2,279	9		11,483	50	11,513	50	22,996	91	25,275
1998	1,257	59	883	41	2,140	8		16,702	67	8,148	33	24,850	92	26,990
1999	776	24	2,446	76	3,222	10		17,216	62	10,565	38	27,781	90	31,003
2000	817	31	1,790	69	2,607	8		20,378	66	10,597	34	30,975	92	33,582
Average	966	44	1,656	56	2,622	11		7,426	43	8,597	57	16,023	89	18,208

**Appendix A4.-Number of halibut harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area		Kodiak Island Regulatory Area		KMA Total
	Harvest	% of KMA	Harvest	% of KMA	
1977		0	994	100	994
1978		0	1,721	100	1,721
1979		0	3,013	100	3,013
1980		0	3,651	100	3,651
1981	853	11	6,858	89	7,711
1982	797	8	9,180	92	9,977
1983	264	3	8,545	97	8,809
1984	969	11	8,179	89	9,148
1985	449	6	7,303	94	7,752
1986	1,000	8	10,960	92	11,960
1987	1,550	14	9,507	86	11,057
1988	1,984	23	6,821	77	8,805
1989	1,368	14	8,525	86	9,893
1990	2,545	24	7,872	76	10,417
1991	5,199	34	10,047	66	15,246
1992	2,645	23	8,813	77	11,458
1993	3,482	23	11,369	77	14,851
1994	2,373	16	12,670	84	15,043
1995	2,796	19	11,847	81	14,643
1996	3,213	18	14,205	82	17,418
1997	3,118	15	17,232	85	20,350
1998	3,173	17	15,668	83	18,841
1999	3,747	17	18,595	83	22,342
2000	2,983	12	21,284	88	24,267
<b>Average</b>	<b>2,225</b>	<b>13</b>	<b>9,786</b>	<b>87</b>	<b>11,640</b>

**Appendix A5.-Number of sockeye salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total		
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA	
1977					0		102	8	1,153	92	1,255	100	1,255
1978					0		479	27	1,297	73	1,776	100	1,776
1979					0		330	14	2,106	86	2,436	100	2,436
1980					0		809	37	1,369	63	2,178	100	2,178
1981	994	100	0	0	994	38	669	41	951	59	1,620	62	2,614
1982	1,058	83	220	17	1,278	29	1,079	35	1,976	65	3,055	71	4,333
1983	534	41	754	59	1,288	29	986	31	2,164	69	3,150	71	4,438
1984	913	95	48	5	961	15	1,272	24	4,113	76	5,385	85	6,346
1985	174	42	236	58	410	5	1,714	23	5,822	77	7,536	95	7,946
1986	174	18	800	82	974	16	1,590	30	3,669	70	5,259	84	6,233
1987	231	67	116	33	347	8	1,106	27	3,059	73	4,165	92	4,512
1988	2,198	87	340	13	2,538	29	1,019	16	5,203	84	6,222	71	8,760
1989	5,017	94	312	6	5,329	44	1,552	23	5,183	77	6,735	56	12,064
1990	1,181	53	1,028	47	2,209	27	1,985	33	4,071	67	6,056	73	8,265
1991	1,287	65	692	35	1,979	29	848	17	4,089	83	4,937	71	6,916
1992	1,265	59	871	41	2,136	26	1,299	21	4,941	79	6,240	74	8,376
1993	1,941	72	759	28	2,700	26	1,968	25	5,881	75	7,849	74	10,549
1994	279	23	935	77	1,214	9	1,825	15	10,677	85	12,502	91	13,716
1995	647	49	671	51	1,318	14	2,228	28	5,766	72	7,994	86	9,312
1996	729	59	502	41	1,231	14	2,241	29	5,607	71	7,848	86	9,079
1997	792	63	472	37	1,264	14	1,276	16	6,662	84	7,938	86	9,202
1998	1,073	82	232	18	1,305	13	2,157	25	6,606	75	8,763	87	10,068
1999	757	76	244	24	1,001	9	2,063	20	8,342	80	10,405	91	11,406
2000	1,278	70	553	30	1,831	10	1,870	11	15,102	89	16,972	90	18,803
Average	1,126	65	489	35	1,615	17	1,353	24	4,825	76	6,178	83	7,524

**Appendix A6.-Number of rockfish harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area		Kodiak Island Regulatory Area		KMA
	Harvest	% of KMA	Harvest	% of KMA	Total
1977		0	2,810	100	2,810
1978		0	1,907	100	1,907
1979		0	3,599	100	3,599
1980		0	1,489	100	1,489
1981	421	6	6,242	94	6,663
1982	178	4	3,992	96	4,170
1983	62	2	3,252	98	3,314
1984	1,116	12	8,231	88	9,347
1985	199	4	4,691	96	4,890
1986	686	13	4,479	87	5,165
1987	2,034	24	6,501	76	8,535
1988	1,875	14	11,369	86	13,244
1989	255	5	5,070	95	5,325
1990	2,677	41	3,811	59	6,488
1991	1,044	12	7,813	88	8,857
1992	914	14	5,592	86	6,506
1993	781	10	7,257	90	8,038
1994	724	13	4,887	87	5,611
1995	550	12	4,145	88	4,695
1996	582	8	6,551	92	7,133
1997	1,689	22	6,164	78	7,853
1998	437	9	4,547	91	4,984
1999	138	2	5,480	98	5,618
2000	1,430	17	7,125	83	8,555
Average	890	10	5,292	90	6,033

**Appendix A7.-Number of clams harvested  
by sport anglers fishing Kodiak Management  
Area waters, 1977-2000.**

Kodiak Island Regulatory Area	
	Harvest
1977	7,474
1978	3,028
1979	8,363
1980	11,826
1981	3,452
1982	1,944
1983	2,000
1984	7,360
1985	4,970
1986	7,064
1987	2,155
1988	4,614
1989	1,477
1990	173
1991	119
1992	973
1993	1,286
1994	4,322
1995	0
1996	1,366
1997	235
1998	178
1999	884
2000	441
Average	3,154

**Appendix A8.-Number of rainbow trout and steelhead caught and harvested by sport anglers fishing in fresh waters of the Kodiak regulatory area, 1986-2000.**

Year	Rainbow Trout Roadside Lakes <sup>a</sup>		Rainbow Trout Wild Populations <sup>b,c</sup>		Steelhead Fresh Water <sup>a,c</sup>	
	Caught	Harvested	Caught	Harvested	Caught	Harvested
1986		352		474		168
1987		1,231		217		72
1988		490		274		308
1989		847		518		708
1990	3,919	1,296	2,988	188	3,384	672
1991	843	472	8,307	765	1,759	244
1992	1,433	1,020	3,205	127	1,543	80
1993	1,038	98	2,750	128	6,517	236
1994	1,062	470	2,751	261	3,400	146
1995	357	151	1,739	132	1,931	64
1996	1,533	417	3,069	121	9,504	46
1997	968	275	4,759	313	4,269	110
1998	420	277	2,441	184	2,975	96
1999	1,471	828	2,275	229	4,552	102
2000	1,296	896	2,275	59	4,205	93

<sup>a</sup> Steelhead reported harvested in roadside lakes are assumed to be rainbow trout.

<sup>b</sup> Catch and harvest from all roadside and remote freshwater sites except roadside lakes.

<sup>c</sup> Rainbow trout reported harvested in the Karluk and Ayakulik (Red) rivers are assumed to be steelhead.

**Appendix A9.-Number of smelt harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area		Kodiak Island Regulatory Area		KMA Total
	Harvest	% of KMA	Harvest	% of KMA	
1977	0	0	5,652	100	5,652
1978	0		0		0
1979	0	0	943	100	943
1980	0	0	2,092	100	2,092
1981	864	29	2,160	71	3,024
1982	0	0	2,620	100	2,620
1983	0		0		0
1984	96	100	0	0	96
1985	0	0	35	100	35
1986	0		0		0
1987	0	0	462	100	462
1988	0		0		0
1989	0		0		0
1990	0		0		0
1991	0		0		0
1992	0	0	140	100	140
1993	1,677	97	45	3	1,722
1994	0		0		0
1995	0		0		0
1996	22	3	727	97	749
1997	81	100	0	0	81
1998	0		0		0
1999	0		0		0
2000	0	0	78	100	78
<b>Average</b>	<b>114</b>	<b>25</b>	<b>623</b>	<b>75</b>	<b>737</b>

**Appendix A10.-Number of chinook salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total		
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA	
1977					0	14	34	7	449	93	483	100	483
1978					0	55	12	3	338	97	350	100	350
1979					0	44	98	13	654	87	752	100	752
1980					0	60	60	18	267	82	327	100	327
1981	129	100	0	0	129	14	194	25	595	75	789	86	918
1982	1,351	100	0	0	1,351	55	167	15	953	85	1,120	45	2,471
1983	493	87	73	13	566	44	198	27	531	73	729	56	1,295
1984	112	73	42	27	154	14	210	23	711	77	921	86	1,075
1985	0	0	199	100	199	21	162	21	600	79	762	79	961
1986	0	0	257	100	257	33	168	32	352	68	520	67	777
1987	21	4	453	96	474	56	54	14	325	86	379	44	853
1988	31	13	217	88	248	14	145	9	1,419	91	1,564	86	1,812
1989	234	24	754	76	988	48	108	10	967	90	1,075	52	2,063
1990	140	19	580	81	720	42	66	7	930	93	996	58	1,716
1991	56	16	301	84	357	12	198	8	2,310	92	2,508	88	2,865
1992	210	33	428	67	638	22	576	26	1,632	74	2,208	78	2,846
1993	104	17	508	83	612	11	2,436	48	2,638	52	5,074	89	5,686
1994	107	13	719	87	826	21	658	21	2,498	79	3,156	79	3,982
1995	0	0	212	100	212	8	1,129	43	1,484	57	2,613	92	2,825
1996	64	13	448	88	512	10	2,400	52	2,231	48	4,631	90	5,143
1997	128	45	154	55	282	5	2,907	51	2,784	49	5,691	95	5,973
1998	104	28	271	72	375	8	2,519	62	1,533	38	4,052	92	4,427
1999	25	17	120	83	145	2	4,097	60	2,694	40	6,791	98	6,936
2000	200	45	243	55	443	4	6,169	64	3,460	36	9,629	96	10,072
Average	175	32	299	68	474	18	1,032	28	1,348	72	2,380	82	2,775

**Appendix A11.-Number of chum salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						KMA Total	
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total			
	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA		
1977						0		633	38	1,012	62	1,645	100	1,645
1978						0		624	48	663	52	1,287	100	1,287
1979						0		382	76	118	24	500	100	500
1980						0		405	77	120	23	525	100	525
1981	335	100	0	0	335	34	151	24	486	76	637	66	972	
1982	472	38	776	62	1,248	49	639	48	685	52	1,324	51	2,572	
1983	0	0	147	100	147	15	462	57	354	43	816	85	963	
1984	126	91	12	9	138	9	799	60	522	40	1,321	91	1,459	
1985	0	0	50	100	50	5	167	19	698	81	865	95	915	
1986	25	12	180	88	205	38	122	36	214	64	336	62	541	
1987	23	12	174	88	197	26	198	35	362	65	560	74	757	
1988	0	0	155	100	155	9	73	5	1,473	95	1,546	91	1,701	
1989	104	50	104	50	208	25	225	36	406	64	631	75	839	
1990	0	0	221	100	221	54	36	19	155	81	191	46	412	
1991	0	0	159	100	159	9	417	27	1,100	73	1,517	91	1,676	
1992	273	90	30	10	303	33	92	15	533	85	625	67	928	
1993	282	72	110	28	392	44	252	50	252	50	504	56	896	
1994	83	92	7	8	90	25	81	30	190	70	271	75	361	
1995	0	0	153	100	153	13	441	45	540	55	981	87	1,134	
1996	0	0	111	100	111	6	232	14	1,384	86	1,616	94	1,727	
1997	18	100	0	0	18	4	150	37	256	63	406	96	424	
1998	17	31	38	69	55	9	356	65	191	35	547	91	602	
1999	188	87	27	13	215	34	301	71	125	29	426	66	641	
2000	52	32	111	68	163	15	138	14	817	86	955	85	1,118	
Average	100	40	128	60	228	19	307	40	527	60	835	81	1,025	

**Appendix A12.-Number of steelhead trout harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

Year	Kodiak Island Regulatory Area <sup>a</sup>				Total
	Salt Water		Fresh Water <sup>b</sup>		
	Harvest	Percent	Harvest	Percent	
1977	3	1	229	99	232
1978	0	0	162	100	162
1979	9	3	309	97	318
1980	17	3	654	97	671
1981	0	0	302	100	302
1982	0	0	232	100	232
1983	10	3	323	97	333
1984	124	13	821	87	945
1985	426	46	501	54	927
1986	168	50	168	50	336
1987	181	72	72	28	253
1988	636	67	308	33	944
1989	249	26	708	74	957
1990	448	40	672	60	1,120
1991	142	37	244	63	386
1992	48	38	80	63	128
1993	244	51	236	49	480
1994	97	40	146	60	243
1995	30	32	64	68	94
1996	99	68	46	32	145
1997	0	0	110	100	110
1998	76	44	96	56	172
1999	174	63	102	37	276
2000	49	35	93	65	142
<b>Average</b>	<b>135</b>	<b>30</b>	<b>278</b>	<b>70</b>	<b>413</b>

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

<sup>b</sup> Steelhead reported harvested in roadside lakes are assumed to be rainbow trout. Rainbow trout reported harvested in the Karluk and Ayakulik (Red) rivers are assumed to be steelhead.

**Appendix A13.-Number of Arctic grayling harvested by sport anglers fishing Kodiak Management Area waters, 1977-2000.**

	Alaska Peninsula/Aleutian Island Regulatory Area Harvest	Kodiak Island Regulatory Area Harvest	KMA Total Harvest
1977	0	54	54
1978	0	325	325
1979	0	127	127
1980	0	465	465
1981	0	119	119
1982	0	225	225
1983	0	126	126
1984	0	286	286
1985	0	820	820
1986	0	15	15
1987	0	72	72
1988	0	182	182
1989	426	189	615
1990	55	86	141
1991	0	98	98
1992	0	120	120
1993	34	16	50
1994	0	41	41
1995	9	0	9
1996	32	0	32
1997	77	0	77
1998	0	0	0
1999	21	0	21
2000	0	0	0
Average	27	140	168

## **APPENDIX B**

**Appendix B1.-Commercial harvests (thousands of fish) of pink salmon from Kodiak Management Area waters, 1979-2001.**

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			
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	29,277
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	16,248
1987	1,209	4	0	1,212	247	5,073	6,532
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	10,205
1991	10,616	4	0	10,620	1,169	16,643	28,432
1992	9,770	194	312	10,276	1,554	3,311	15,141
1993	9,928	5	0	9,933	1,648	34,019	45,600
1994	9,180	225	859	10,265	431	8,163	18,859
1995	16,294	12	0	16,306	2,065	42,831	61,202
1996	2,189	54	0	2,243	184	3,467	5,894
1997	2,304	51	0	2,355	844	11,035	14,234
1998	8,041	35	0	8,075	777	22,062	30,914
1999	8,456	4	0	8,460	1,640	11,898	21,998
2000	3,563	34	256	3,853	3,999	9,927	17,779
2001	3,792	12	0	3,804	1,206	19,567	24,577

**Appendix B2.-Commercial harvests (thousands of fish) of coho salmon from Kodiak Management Area waters, 1979-2001.**

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			
1979	356	113	0	469	93	141	703
1980	274	128	0	402	118	139	659
1981	162	155	0	318	79	122	519
1982	256	238	0	494	300	344	1,138
1983	128	75	0	203	62	158	423
1984	309	199	0	508	110	230	848
1985	173	168	0	341	207	284	832
1986	236	164	0	400	117	168	685
1987	225	172	0	397	150	192	739
1988	506	234	0	740	370	303	1,413
1989	444	228	0	672	67	141	880
1990	307	193	0	500	130	294	924
1991	317	217	0	534	166	325	1,025
1992	418	207	0	625	311	280	1,216
1993	220	64	0	284	229	313	826
1994	256	241	0	497	237	296	1,030
1995	263	136	0	399	282	308	989
1996	279	157	0	436	193	202	831
1997	112	95	0	207	91	381	679
1998	154	135	0	289	130	425	844
1999	192	54	0	246	66	297	609
2000	257	84	0	341	112	333	786
2001	212	22	0	234	121	409	764

**Appendix B3.-Commercial harvests (thousands of fish) of sockeye salmon from Kodiak Management Area waters, 1979-2001.**

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			
1979	1,150	1,980	12	3,142	1,064	632	4,838
1980	3,614	1,397	9	5,020	846	651	6,517
1981	2,255	1,845	5	4,105	1,840	1,289	7,234
1982	2,346	1,435	3	3,784	1,522	1,205	6,511
1983	2,557	2,093	4	4,654	1,823	1,232	7,709
1984	2,318	1,735	67	4,120	2,662	1,951	8,733
1985	2,215	2,601	3	4,819	946	1,843	7,608
1986	1,223	2,437	8	3,668	1,646	3,155	8,469
1987	1,450	1,209	0	2,659	1,899	1,793	6,351
1988	1,473	1,528	4	3,005	796	2,698	6,499
1989	2,661	1,719	8	4,388	1,157	2,629	8,174
1990	2,387	2,416	12	4,815	2,094	5,248	12,157
1991	2,322	2,392	1	4,715	1,896	5,704	12,315
1992	3,446	3,575	3	7,024	1,277	4,168	12,469
1993	3,689	3,867	0	7,556	1,697	4,378	13,631
1994	2,107	2,753	0	4,860	1,619	2,877	9,356
1995	3,039	3,273	0	6,311	1,724	4,485	12,520
1996	1,521	1,911	0	3,432	1,958	4,970	13,792
1997	2,258	2,151	0	4,409	758	2,503	7,671
1998	2,171	1,088	0	3,258	1,042	3,623	7,923
1999	2,992	1,784	0	4,776	760	4,653	10,189
2000	2,006	1,970	0	3,976	448	2,906	7,330
2001	611	1,150	0	1,761	430	2,660	4,851

**Appendix B4.-Commercial harvests (thousands of fish) of chinook salmon from Kodiak Management Area waters, 1979-2001.**

YEAR	ALASKA PENINSULA/ALEUTIAN ISLAND AREA				CHIGNIK	KODIAK	GRAND TOTAL
	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL			
1979	2	17	0	19	1	2	22
1980	5	17	0	22	2	1	25
1981	10	18	0	28	3	1	32
1982	10	30	0	40	5	1	46
1983	27	30	0	57	6	4	67
1984	9	23	0	32	4	5	41
1985	8	24	0	32	2	5	39
1986	6	12	0	18	3	4	25
1987	9	14	0	23	3	5	31
1988	11	17	0	28	7	22	57
1989	7	11	0	18	4	5	27
1990	17	12	0	29	10	19	58
1991	8	9	0	17	3	22	42
1992	8	13	0	21	11	24	56
1993	14	24	0	38	20	42	100
1994	10	19	0	28	4	23	55
1995	17	8	0	25	5	19	49
1996	5	5	0	10	3	13	26
1997	7	10		18	3	19	40
1998	5	6		11	4	17	32
1999	5	5	0	10	1	18	29
2000	5	4	0	9	2	12	23
2001	3	4	0	7	2	24	33

**Appendix B5.-Commercial harvests (thousands of fish) of chum salmon from Kodiak Management Area waters, 1979-2001.**

ALASKA PENINSULA/ALEUTIAN ISLAND AREA							
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1979	483	66	0	549	188	358	1,095
1980	1,351	700	5	2,056	313	1,076	3,445
1981	1,770	707	7	2,484	580	1,345	4,409
1982	2,273	331	6	2,610	390	1,266	4,266
1983	1,707	349	11	2,067	159	1,085	3,311
1984	1,657	797	34	2,487	63	649	3,200
1985	1,393	671	14	2,078	26	431	2,535
1986	1,750	271	39	2,060	177	1,126	3,363
1987	1,376	369	0	1,745	127	682	2,554
1988	1,905	394	1	2,300	267	1,426	3,993
1989	994	157	0	1,151	2	836	1,989
1990	1,238	126	1	1,365	270	577	2,212
1991	1,587	191	0	1,778	261	1,029	3,068
1992	1,317	342	1	1,660	222	680	2,562
1993	1,048	135	0	1,183	122	588	1,893
1994	2,192	84	1	2,276	227	739	3,242
1995	1,723	99	0	1,823	381	1,532	3,736
1996	776	68	0	844	100	544	1,488
1997	606	97	0	704	156	0	860
1998	712	70	0	781	129	520	1,430
1999	840	50	0	890	128	914	1,932
2000	1,067	94	0	1,161	112	1,194	2,467
2001	886	168	0	1,054	187	1,054	2,295

## **APPENDIX C**

**Appendix C1.-Commercial harvest of chinook salmon from statistical areas along the Kodiak road system, 1980-2001.**

Year	Monashka	Womens Bay	Middle Bay	Kalsin Bay	Chiniak Pt	Outer	Chiniak-Monaskha	Pasagshak-Saltery
	259-10	259-22	259-23	259-24	259-25	259-21	Total	259-41
1980	0	4	0	36	0	0	40	2
1981	15	1	0	58	1	0	75	71
1982	4	6	8	51	4	0	73	10
1983	3	29	2	65	90	32	221	140
1984	0	3	0	4	0	10	17	189
1985	1	3	0	9	1	1	15	23
1986	0	3	0	0	0	0	3	0
1987	0	1	1	16	0	1	19	202
1988	6	6	13	61	23	26	135	10
1989 <sup>a</sup>	0	0	0	0	0	0	0	0
1990	0	2	4	11	0	10	27	410
1991	0	2	7	49	218	7	283	180
1992	0	0	0	0	144	15	159	27
1993	0	1	1	5	27	11	45	281
1994	0	0	0	3	263	42	308	78
1995	3	1	2	4	2	2	14	106
1996	0	0	0	0	6	0	6	31
1997	13	0	4	14	520	72	623	57
1998	0	0	0	6	1	12	19	11
1999	13	0	7	24	155	1	200	175
2000	0	0	0	0	38	0	38	38
2001	0	0	0	1	10	11	22	86

<sup>a</sup> No commercial harvest in 1989 due to possible contamination from *Exxon Valdez* oil spill.

**Appendix C2.-Commercial harvest of sockeye salmon from statistical areas along the Kodiak road system, 1980-2001.**

Year	Monashka	Womens Bay	Middle Bay	Kalsin Bay	Chiniak Pt	Outer	Chiniak-Monaskha	Pasagshak-Saltery
	259-10	259-22	259-23	259-24	259-25	259-21	Total	259-41
1980	9	2	4	14	0	1	30	315
1981	59	29	30	116	200	61	495	21,792
1982	370	252	5	45	22	59	753	2,747
1983	292	212	11	238	479	282	1,514	5,727
1984	738	302	153	48	3	491	1,735	16,937
1985	205	75	12	44	1	272	609	3,508
1986	1,522	106	1	3	0	214	1,846	16,203
1987	3,251	256	147	17	1	16	3,688	3,405
1988	244	92	8	89	9	289	731	2,747
1989 <sup>a</sup>	0	0	0	0	0	0	0	0
1990	0	17	3	0	0	494	514	12,595
1991	92	16	1	534	13,153	609	14,405	6,787
1992	1,625	0	0	0	48,228	3,086	52,939	5,900
1993	0	9	1	26	2,864	3,941	6,841	34,638
1994	19	3	0	14	2,718	1,134	3,888	11,903
1995	23	80	79	67	584	153	986	19,591
1996	0	0	0	0	1,070	0	1,070	3,646
1997	60	0	0	2	4,441	3,749	8,252	1,946
1998	17	2	2	10	16	59	106	598
1999	60	1	7	11	3,007	138	3,224	38,806
2000	0	0	0	0	9,139	975	10,114	9,139
2001	0	0	0	0	2,030	1,387	3,417	10,189

<sup>a</sup> No commercial harvest in 1989 due to possible contamination from *Exxon Valdez* oil spill.

**Appendix C3.-Commercial harvest of coho salmon from statistical areas along the Kodiak road system, 1980-2001.**

Year	Monashka	Womens Bay	Middle Bay	Kalsin Bay	Chiniak Pt	Outer	Chiniak-Monaskha	Pasagshak-Saltery
	259-10	259-22	259-23	259-24	259-25	259-21	Total	259-41
1980	275	543	433	6,069	75	837	8,232	1,832
1981	290	1,106	30	1,366	644	1,197	4,633	1,048
1982	495	5,245	121	1,839	700	3,105	11,505	2,787
1983	330	886	73	766	2,068	2,614	6,737	2,316
1984	1,240	5,282	2	4,252	192	3,580	14,548	1,485
1985	86	666	298	332	3	1,523	2,908	1,619
1986	77	1,065	71	447	0	181	1,841	1,189
1987	916	2,334	359	3,310	235	6,330	13,484	9,425
1988	319	254	89	1,773	345	1,349	4,129	2,787
1989 <sup>a</sup>	0	0	0	0	0	0	0	0
1990	0	1	1	7	0	91	100	46
1991	73	15	4	178	5,630	607	6,507	94
1992	97	0	0	0	6,604	369	7,070	222
1993	0	7	73	40	969	544	1,633	714
1994	649	15	0	2	2,317	641	3,624	106
1995	336	224	1,303	3,988	748	420	7,019	927
1996	0	0	0	0	94	0	94	346
1997	1,100	0	31	3,011	4,202	6,995	15,339	41
1998	24	9	129	10	3	193	368	48
1999	70	3,760	29	320	2,547	12	6,738	226
2000	0	0	0	0	626	228	854	626
2001	0	0	0	4,948	1,374	955	7,277	44

<sup>a</sup> No commercial harvest in 1989 due to possible contamination from *Exxon Valdez* oil spill.

**Appendix C4.-Commercial harvest of pink salmon from statistical areas along the Kodiak road system, 1980-2001.**

Year	Monashka	Womens Bay	Middle Bay	Kalsin Bay	Chiniak Pt	Outer	Chiniak-Monaskha	Pasagshak-Saltery
	259-10	259-22	259-23	259-24	259-25	259-21	Total	259-41
1980	15,743	37,055	16,644	211,390	6,536	14,100	301,468	44,674
1981	34,942	60,684	22,204	156,663	98,895	43,532	416,920	220,819
1982	60,272	153,342	10,652	100,775	26,709	71,919	423,669	794
1983	13,878	46,923	8,775	58,957	17,244	48,103	193,880	20,175
1984	9,843	51,510	2,507	18,580	9,097	37,464	129,001	20,169
1985	292	101,537	7,915	18,425	2,741	72,499	203,409	2,465
1986	24,694	48,689	629	15,333	0	12,955	102,300	1,036
1987	30,959	136,068	52,766	36,654	5,665	14,555	276,667	5,962
1988	89,121	118,140	26,493	59,461	38,691	87,339	419,245	794
1989 <sup>a</sup>	0	0	0	0	0	0	0	0
1990	4,311	3,157	7,689	10,847	0	5,436	31,440	5,870
1991	350	21,781	23,261	68,380	86,842	95,824	296,438	20,143
1992	760	138	567	57	32,028	2,021	35,571	1,992
1993	0	2,045	116,360	97,652	168,770	64,055	448,882	107,668
1994	38,793	956	0	19,534	23,332	9,172	91,787	2,530
1995	92,353	152,975	233,051	190,894	165,292	153,512	988,077	187,109
1996	0	0	0	0	4,512	0	4,512	5,139
1997	10,013	0	1,495	2,090	15,498	2,775	31,871	4,484
1998	19,176	14,457	44,934	10,599	167	84,729	174,062	117
1999	13,044	123	12,529	94,001	105,905	6,515	232,117	2,296
2000	0	0	0	0	2,563	3,134	5,697	2,563
2001	0	0	0	81	12,376	2,753	15,210	3,792

<sup>a</sup> No commercial harvest in 1989 due to possible contamination from *Exxon Valdez* oil spill.

**Appendix C5.-Commercial harvest of chum salmon from statistical areas along the Kodiak road system, 1980-2001.**

Year	Monashka 259-10	Womens Bay 259-22	Middle Bay 259-23	Kalsin Bay 259-24	Chiniak Pt 259-25	Outer 259-21	Chiniak- Monaskha Total	Pasagshak- Saltery 259-41
1980	1,798	6,683	4,047	17,076	3,455	2,338	35,397	18,879
1981	1,542	9,847	5,905	19,063	3,408	2,122	41,887	83,607
1982	4,210	9,566	8,094	12,302	1,458	858	36,488	6,802
1983	519	3,940	749	4,542	984	1,071	11,805	24,036
1984	1,313	3,983	115	3,455	81	1,857	10,804	13,748
1985	620	6,513	1,599	6,649	2,469	2,514	20,364	589
1986	1,320	6,463	2,073	1,185	0	182	11,223	3,217
1987	2,492	9,463	9,311	6,183	139	1,822	29,410	5,408
1988	3,616	17,290	19,966	10,148	11,973	8,687	71,680	6,802
1989 <sup>a</sup>	0	0	0	0	0	0	0	0
1990	30	1,242	2,033	556	0	1,822	5,683	2,508
1991	30	1,143	4,391	3,671	14,291	3,691	27,217	5,885
1992	196	17	392	0	15,223	1,184	17,012	3,751
1993	0	22	759	325	1,363	525	2,994	599
1994	141	1,173	0	887	10,054	6,376	18,631	1,940
1995	249	5,116	13,121	5,407	2,801	6,901	33,595	13,574
1996	0	0	0	0	2,333	0	2,333	3,186
1997	30	0	278	705	21,810	6,918	29,741	3,156
1998	27	62	402	21	2	388	902	61
1999	132	3,887	1,956	4,808	6,292	6,515	23,590	4,212
2000	0	0	0	0	9,174	901	10,075	9,174
2001	0	0	5,137	107	496	731	6,471	10,044

<sup>a</sup> No commercial harvest in 1989 due to possible contamination from *Exxon Valdez* oil spill.

## **APPENDIX D**

**Appendix D1.-Subsistence permits returned for locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay											Permits returned island wide	Permits issued island wide
	Buskin Bay	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Chiniak	Roslyn Creek	Mayflower <sup>a</sup>	Total	Saltery	Pasagshak		
1980												756	1,239
1981												733	1,166
1982												993	1,276
1983												1,082	1,307
1984												1,084	1,240
1985 <sup>b</sup>												1,204	1,476
1986	362	12	5	2	15	7	8	1	50	18	14	1,080	1,243
1987	300	16	1	23	18	2	15	1	76	13	10	969	1,124
1988	220	12	7	0	13	2	9	0	43	9	7	663	1,098
1989	206	8	4	0	14	5	10	2	43	8	11	687	<sup>c</sup>
1990	291	15	8	2	20	6	12	1	355	9	35	1,176	
1991	286	9	5	2	18	4	12	2	319	17	62	1,145	
1992	294	19	10	1	16	15	12	3	347	14	70	851	
1993	277	7	3	1	9	4	10	2	313	17	85	914	
1994	507	29	5	2	32	25	0	8	608	30	98	1,464	
1995	437	12	21	2	23	12	8	1	516	21	133	1,194	1,950
1996	423	4	11	1	20	2	9	3	473	15	165	1,389	1,567
1997	329	2	2	5	17	13	5	0	373	12	112	1,637	2,098
1998	302	3	4	0	14	5	1	0	319	12	61	1,128	1,841
1999	376	6	2	0	12	10	3	1	394	17	88	1,388	1,428
2000	363	1	2	2	18	10	3	1	387	15	150	1,628	1,711

Source: Subsistence database, Kodiak

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.

<sup>b</sup> Before 1986, subsistence catch was not entered by area.

<sup>c</sup> Beginning in 1989, 2,900 permits were mailed out to potential subsistence fishermen.

**Appendix D2.-Subsistence chum harvests of salmon from locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay								Total	Saltery	Pasagshak
	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Buskin Bay	Chiniak	Roslyn Creek	Mayflower <sup>a</sup>			
1980	11	2	52	1	94	56	20	11	247	0	0
1981	32	53	19	8	45	16	3	2	178	0	0
1982	3	23	10	24	87	46	0	0	193	0	0
1983	14	36	10	12	66	37	3	0	178	5	
1984	8	21	0	38	10	64	10	0	151	3	0
1985	2	34	0	159	117	46	48	4	410	9	0
1986	9	1	0	35	110	20	24	0	199	0	0
1987	20	7	4	27	75	10	46	2	189	23	15
1988	2	25	0	16	55	0	37	0	135	2	9
1989	1	10	0	7	74	10	42	0	144	0	1
1990	22	9	0	48	91	3	16	0	189	0	15
1991	3	14	6	57	56	0	17	0	153	78	10
1992	0	2	0	2	114	16	13	0	147	14	7
1993	12	10	0	0	51	0	17	6	96	0	15
1994	0	0	0	35	35	3	0	8	81	18	25
1995	6	4	1	57	28	2	14	0	112	24	34
1996	0	0	0	69	14	4	5	3	95	0	7
1997	0	0	0	35	35	3	0	8	81	18	25
1998	0	0	0	3	11	0	0	0	14	6	9
1999	1	2	0	9	43	7	21	0	83	5	8
2000	0	0	0	35	65	7	22	0	129	10	7

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.

**Appendix D3.-Subsistence pink harvests of salmon from locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay								Total	Saltery	Pasagshak
	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Buskin Bay	Chiniak	Roslyn Creek	Mayflower <sup>a</sup>			
1980	138	94	4	18	751	332	45	36	1,418	27	23
1981	95	174	28	142	533	123	15	1	1,111	1	21
1982	31	192	110	180	1,340	168	37	0	2,058	0	18
1983	36	241	77	60	672	154	8	1	1,249		10
1984	156	91	0	445	109	249	100	6	1,156	44	76
1985	62	162	0	153	728	13	22	0	1,140	35	2
1986	58	0	14	23	934	49	5	0	1,083	1	5
1987	109	12	25	50	541	2	78	1	817	35	13
1988	88	9	0	53	313	0	44	0	507	10	11
1989	31	0	0	25	425	3	5	0	489	3	22
1990	22	9	0	61	325	36	6	10	469	3	11
1991	10	19	3	70	208	0	39	0	349	27	60
1992	27	18	0	21	267	57	11	0	401	6	34
1993	3	3	0	17	375	51	4	0	453	17	115
1994	3	0	6	55	414	3	0	3	484	11	73
1995	12	9	4	59	394	8	16	0	502	27	58
1996	0	17	0	61	159	11	0	0	248	0	19
1997	0	0	36	19	339	15	30	0	439	10	48
1998	0	0	0	6	428	0	19	0	453	14	12
1999	33	0	0	12	379	31	27	0	482	10	13
2000	5	0	0	3	289	5	23	0	325	5	10

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.

**Appendix D4.-Subsistence chinook harvests of salmon from locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay								Total	Saltery	Pasagshak
	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Buskin Bay	Chiniak	Roslyn Creek	Mayflower <sup>a</sup>			
1980	0	0	0	2	17	13	0		32	0	0
1981	0	0	0	0	1	3	0		4	0	0
1982	0	0	0	0	22	0	0		22	0	1
1983	0	0	0	1	11	0	0		12		5
1984	0	0	0	1	26	1	0		29	1	13
1985	0	2	0	0	21	0	0		25	1	3
1986	0	0	0	0	7	0	0		7	0	6
1987	0	0	0	0	61	0	2		63	1	9
1988	0	0	0	0	30	0	1		31	3	0
1989	1	0	0	0	5	0	0		6	0	0
1990	0	0	0	1	8	0	0		9	14	3
1991	0	0	0	1	7	0	0		8	2	2
1992	5	5	0	14	0	25	3	7	54	2	5
1993	0	0	0	0	4	56	2	9	71	1	2
1994	0	0	0	0	4	30	40	0	74	2	7
1995	0	0	0	0	1	40	1	0	42	13	14
1996	0	0	0	0	5	67	0	1	73	0	23
1997	0	0	0	0	162	28	0	0	190	1	0
1998	2	0	0	0	146	9	0	0	157	3	5
1999	7	0	0	2	212	12	2	0	235	4	2
2000	0	0	0	0	79	13	0	0	92	1	54

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.

**Appendix D5.-Subsistence coho harvests of salmon from locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay						Roslyn		Total	Saltery	Pasagshak
	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Buskin Bay	Chiniak	Creek	Mayflower <sup>a</sup>			
1980	68	144	8	0	1,239	256	137	50	1,902	0	18
1981	5	20	1	152	860	306	88	0	1,432	1	16
1982	76	115	95	279	1,754	470	245	0	3,034	42	17
1983	11	106	43	64	1,470	427	20	27	2,168	4	20
1984	156	91	0	445	109	249	100	6	1,156	44	76
1985	113	656	15	337	1,898	89	221	41	3,370	82	117
1986	138	33	2	312	2,585	90	188	20	3,368	91	35
1987	133	4	33	379	1,743	25	311	0	2,633	67	
1988	110	81	0	209	1,475	10	299	0	2,184	17	0
1989	83	50	0	143	1,251	70	262	6	1,859	0	28
1990	167	36	14	379	1,785	26	249	0	2,656	7	60
1991	85	24	60	247	1,449	37	160	10	2,072	3	216
1992	202	64	0	276	1,499	169	236	0	2,469	0	118
1993	32	4	3	82	1,719	49	148	25	2,062	33	276
1994	238	26	0	225	2,167	180	0	54	2,890	110	112
1995	58	24	2	116	1,285	41	120	16	1,662	73	65
1996	11	109	15	305	1,263	35	76	6	1,820	0	196
1997	3	34	6	363	1,411	104	85	0	2,006	33	88
1998	67	49	0	269	1,506	54	14	0	1,959	184	140
1999	16	20	0	258	1,481	131	52	5	1,963	44	75
2000	0	32	0	383	2,011	113	36	0	2,575	68	348

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.

**Appendix D6.-Subsistence sockeye harvests of salmon from locations along the Kodiak road system, 1980-2000.**

Year	Chiniak Bay						Roslyn			Total	Saltery	Pasagshak
	Monashka Bay	Womens Bay	Middle Bay	Kalsin Bay	Buskin Bay	Chiniak	Creek	Mayflower <sup>a</sup>				
1980	36	30	0	13	4,279	153	10	8	4,529	68	0	
1981	15	38	4	4	4,742	368	0	28	5,199	3		
1982	36	131	13	66	6,748	25	0	0	7,019	0	83	
1983	37	44	90	27	5,690	40	0		5,928		365	
1984	45	6	0	8	565	0	0	0	624	3		
1985	67	767	1	15	5,326	6	10	3	6,195	62	163	
1986	114	60	0	29	5,303	4	5	0	5,515	199	64	
1987	23	0	144	80	3,375	50	23	28	3,695	87	82	
1988	40	0	0	61	3,099	0	0	0	3,200	145	84	
1989	7	23	0	4	3,312	35	10	0	3,391	179	78	
1990	20	67	0	4	3,448	112	11	0	3,662	303	598	
1991	15	30	0	6	4,301	0	0	0	4,352	406	1,645	
1992	31	28	0	147	3,295	48	1	23	3,550	309	1,499	
1993	12	0	0	0	4,745	0	1	0	4,758	328	2,253	
1994	12	16	0	2	4,899	12	0	0	4,941	392	1,554	
1995	2	16	0	3	5,547	40	1	0	5,609	432	2,099	
1996	0	0	0	5	5,403	0	0	0	5,408	264	2,854	
1997	14	2	1	50	5,890	20	0	0	5,977	348	2,759	
1998	0	0	0	6	6,011	0	0	0	6,017	200	1,089	
1999	0	0	0	25	7,985	7	0	0	8,017	563	2,946	
2000	2	0	0	0	7,281	62	2	0	7,347	311	4,516	

<sup>a</sup> 1980-1982, 1984, 1986-1991 Mayflower's harvest is Isthmus Pt. and Cliff Pt.



## **APPENDIX E**

**Appendix E1.-Coho salmon escapement counts for streams along the Kodiak road system, 1980-2001.**

Year	Monashka		Pillar		Buskin <sup>a</sup>		Sargent		Russian		Salonie	
	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date
1980	72	20-Oct	68	20-Oct	1,021	20-Oct	72	20-Oct	68	20-Oct	1,021	20-Oct
1981	57	28-Oct	33	28-Oct	919	28-Oct	44	26-Oct	47	26-Oct	919	28-Oct
1982					500 <sup>a</sup> 750 <sup>a</sup>	27-Aug 07-Oct	130	04-Nov	87	28-Oct	388	26-Oct
1983	24	20-Oct	15	20-Oct	243	26-Oct	16	24-Oct	23	24-Oct	127	24-Oct
1984					1,905	19-Sep	61	05-Nov	150 <sup>a</sup>	11-Sep	300 <sup>a</sup>	11-Sep
1985	135	11-Sep	140	28-Oct	9,474 <sup>b</sup>	26-Oct	87	28-Oct	358	28-Oct	30 <sup>a</sup> 189 67	12-Sep 31-Oct 25-Oct
1986	172	17-Oct	44	17-Oct	9,939 <sup>b</sup> 1,985 1,493	02-Oct 15-Oct 30-Oct	41	26-Oct	109	26-Oct	29 179 152	03-Sep 12-Sep 25-Sep
1987	12	12-Nov	102	12-Nov	11,103 <sup>b</sup> 559	01-Oct 29-Oct	24	12-Nov	37	21-Nov	154 315 49	15-Oct 18-Oct 19-Nov
1988					6,782 <sup>b</sup> 600	24-Sep 25-Sep	0	23-Aug	0	23-Aug	0	23-Aug
1989	150 <sup>a</sup>	13-Sep	25	30-Aug	9,930 <sup>b</sup>	02-Oct	0	12-Sep	0	12-Sep	0	12-Sep
1990	53	23-Oct	45	23-Oct	6,222 <sup>b</sup> 734 1,604	26-Sep 20-Oct 31-Oct	60	28-Oct	16	21-Oct	142 187	21-Oct 04-Nov
1991	55	18-Sep	70	18-Sep	8,929 <sup>b</sup>	28-Sep						
1992	2		300		6,535 <sup>b</sup>	07-Oct	0 <sup>a</sup>	03-Sep	50 <sup>a</sup>	03-Sep	98	22-Oct
1993	145	05-Oct	69	03-Oct	6,813 <sup>b</sup>	30-Sep	83	12-Oct	133	13-Oct	274 253	18-Oct 31-Oct
1994	1,749	27-Sep	199	28-Sep	8,146 <sup>b</sup>	29-Sep					226	22-Sep
1995					8,694 <sup>b</sup>	01-Oct					521	12-Oct
1996	62	07-Oct	27	07-Oct	8,439 <sup>b</sup>	01-Oct					88	09-Oct
1997	0 <sup>a</sup> 199	12-Aug 01-Oct	0 <sup>a</sup> 83	12-Aug 01-Oct	0 <sup>a</sup> 10,926 <sup>b</sup>	14-Aug 06-Oct	0 <sup>a</sup>	14-Aug	0 <sup>a</sup>	14-Aug	0 <sup>a</sup> 594	14-Aug 22-Oct
1998	0 <sup>a</sup> 0 <sup>a</sup> 170	01-Aug 08-Sep 28-Sep	0 <sup>a</sup> 111	11-Aug 28-Sep	0 <sup>a</sup> 9,062 <sup>b</sup> 1,000	19-Aug 28-Sep 18-Sep	0 <sup>a</sup> 0 <sup>a</sup>	01-Aug 08-Sep	0 <sup>a</sup> 0 <sup>a</sup>	01-Aug 08-Sep	0 <sup>a</sup> 0 <sup>a</sup> 153	01-Aug 08-Sep 13-Oct
1999	71	01-Nov	432	22-Oct	9,794	04-Oct					396	25-Oct
2000	90	12-Oct	27	12-Oct	8,048	04-Oct					142	20-Oct
2001	83	18-Oct	121	09-Oct	13,494	29-Sep	282	11-Oct	183	10-Oct	210 594	22-Oct 30-Oct

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### Appendix E1.-Page 2 of 3.

Year	American		Olds		Roslyn		Chiniak	
	Count	Date	Count	Date	Count	Date	Count	Date
1980	903	30-Oct	780	28-Oct	628	27-Nov	32	08-Nov
1981	1,130 <sup>a</sup>	13-Oct	800 <sup>a</sup>	13-Oct	360 <sup>a</sup>	13-Oct	170	02-Nov
	627	30-Oct	434	29-Oct	314	22-Oct		
1982	360 <sup>a</sup>	07-Oct	645 <sup>a</sup>	07-Oct	240 <sup>a</sup>	07-Oct	155	25-Oct
	266	28-Oct	1,375	27-Oct	525	25-Oct		
1983	420 <sup>a</sup>	22-Sep	800 <sup>a</sup>	22-Sep	49	21-Oct	25	21-Oct
	114	25-Oct	173	25-Oct				
1984	350 <sup>a</sup>	11-Sep	4,500 <sup>a</sup>	22-Aug	76	06-Nov	76	06-Nov
1985	65 <sup>a</sup>	20-Sep	900 <sup>a</sup>	20-Sep	150 <sup>a</sup>	05-Sep	66	24-Sep
	439	30-Oct	1,648	25-Sep	78 <sup>a</sup>	20-Sep	86	28-Oct
					93	24-Sep		
					189	30-Oct		
1986	99	05-Sep	1,178	05-Sep	358	04-Sep	48	20-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	15	09-Nov
	453	14-Nov	683	14-Nov	0	18-Oct		
					47	09-Nov		
1988			0	23-Aug				
1989	2,500 <sup>a</sup>	13-Sep	800 <sup>a</sup>	13-Sep	222	16-Sep		
			769	28-Oct	335	25-Oct		
1990	20	06-Sep	15	06-Sep	40	06-Sep	48	05-Nov
	419	19-Oct	1,706	17-Oct	648	16-Oct		
	290	27-Oct	1,014	03-Nov	676	30-Oct		
	316	06-Nov						
1991			900 <sup>a</sup>	06-Sep	50 <sup>a</sup>	22-Aug		
			570	09-Sep	882	04-Oct		
1992	600 <sup>a</sup>	21-Sep	950 <sup>a</sup>	21-Sep	100 <sup>a</sup>	03-Sep		
	181	20-Oct	320	18-Oct	70	21-Oct		
1993	412	20-Oct	525	05-Oct	148	15-Oct		
			474	31-Oct	137	22-Oct		
1994	194	06-Oct	243	14-Oct	130	21-Oct		
			395	21-Oct				
1995	4,000 <sup>a</sup>	08-Sep	7,500 <sup>a</sup>	08-Sep	322	12-Oct		
	169	10-Oct	2,642	11-Oct				
1996	69	04-Oct	2,200	04-Oct	6	09-Oct		
	62	09-Oct	2,086	14-Oct				
1997	0 <sup>a</sup>	18-Aug	0 <sup>a</sup>	07-Aug	0 <sup>a</sup>	12-Aug	0 <sup>a</sup>	12-Aug
	1,467	01-Oct	0 <sup>a</sup>	12-Aug	1,043	02-Oct	16	22-Oct
	940	09-Oct	0 <sup>a</sup>	14-Aug				
	2,204	24-Oct	3,380	04-Oct				
	2,450 <sup>a</sup>	31-Oct	3,779	10-Oct				
			4,064	22-Oct				
1998	0 <sup>a</sup>	01-Aug	0 <sup>a</sup>	31-Jul	0 <sup>a</sup>	11-Aug	0 <sup>a</sup>	11-Aug
	14	08-Sep	0 <sup>a</sup>	11-Aug	57	20-Oct	31	20-Oct
	33	13-Sep	1,033	08-Sep				
	80	14-Sep	2,296	02-Oct				
	621	02-Oct	1,133	20-Oct				
	534	08-Oct						
	1,360	21-Oct						
	1,627	27-Oct						
1999	30	08-Sep	3,436	08-Oct	537	21-Oct		
	15	15-Sep	1,728	14-Oct				
	284	09-Oct						
	199	18-Oct						
2000			390	09-Oct	203	17-Oct		
			1,097	20-Oct				
2001	300	08-Sep	500	08-Sep	832	12-Oct	500	15-Oct
	233	19-Oct	3,454	16-Oct				

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**Appendix E1.-Page 3 of 3.**

Year	Pasagshak		Saltery		Miam		Hurst	
	Count	Date	Count	Date	Count	Date	Count	Date
1980	850	23-Aug	212 <sup>a</sup>	07-Nov	200 <sup>a</sup>	23-Aug	218	31-Oct
	1,330	20-Oct						
	1,330	20-Nov						
1981	320 <sup>a</sup>	21-Oct	720 <sup>a</sup>	21-Oct	300 <sup>a</sup>	22-Aug		
			959	05-Nov	740 <sup>a</sup>	21-Oct		
1982	175	27-Oct	400 <sup>a</sup>	07-Oct	220	07-Oct	266	02-Nov
			2,176	02-Nov				
1983	1,500 <sup>a</sup>	23-Aug	700 <sup>a</sup>	09-Sep	500 <sup>a</sup>	31-Aug	48	15-Nov
	1,920	28-Oct			20 <sup>a</sup>	07-Sep		
1984	1,540	01-Nov	2,100 <sup>a</sup>	10-Sep	1,000 <sup>a</sup>	10-Sep	50 <sup>a</sup>	10-Sep
			520 <sup>a</sup>	06-Oct	1,050 <sup>a</sup>	16-Oct	339	08-Nov
1985	400 <sup>a</sup>	06-Sep	4,022 <sup>b</sup>	28-Sep	160	06-Sep	55 <sup>a</sup>	20-Sep
	3,000 <sup>a</sup>	29-Oct			1,060 <sup>a</sup>	20-Sep		
					1,500 <sup>a</sup>	04-Oct		
1986	1,998	14-Oct	11,009 <sup>b</sup>	12-Sep			427	28-Oct
	3,524	22-Oct						
	3,571	29-Oct						
1987	1,023	18-Oct	11,376 <sup>b</sup>	01-Oct				
	2,519	13-Nov						
1988	2,000 <sup>a</sup>	23-Aug	4,702 <sup>b</sup>	12-Sep	250 <sup>a</sup>	30-Aug		
1989	800 <sup>a</sup>	12-Sep	5,332 <sup>b</sup>	26-Sep	1,400 <sup>a</sup>	13-Sep	0 <sup>a</sup>	12-Sep
	1,800 <sup>a</sup>	13-Sep						
1990	303	15-Oct	2,847 <sup>b</sup>	17-Sep			372	29-Oct
	908	28-Oct	268	29-Oct				
	2,178	15-Nov						
1991	0	05-Oct	187	04-Nov				
			747 <sup>b</sup>	04-Sep	300 <sup>a</sup>	30-Aug		
1992	3,000 <sup>a</sup>	03-Sep	1,000 <sup>a</sup>	21-Sep	3,500 <sup>a</sup>	06-Sep		
	5	19-Oct			1,300 <sup>a</sup>	21-Sep		
1993	612	25-Oct	3,500 <sup>a</sup>	13-Sep	4,700 <sup>a</sup>	13-Sep		
	1,337	06-Nov						
1994	-		2,173 <sup>b</sup>	22-Sep	-	-		
1995	-		6,500 <sup>a</sup>	08-Sep	2,500 <sup>a</sup>	08-Sep		
1996	48	10-Oct						
	1,973	05-Nov						
	789	18-Nov						
1997	0 <sup>a</sup>	07-Aug	0 <sup>a</sup>	19-Aug	0 <sup>a</sup>	23-Jul	0 <sup>a</sup>	19-Aug
	2,813	12-Nov	1,500 <sup>a</sup>	10-Sep	1,500 <sup>a</sup>	10-Sep		
1998	1,906	05-Nov	67 <sup>b</sup>	31-Aug	0 <sup>a</sup>	31-Jul	0 <sup>a</sup>	08-Sep
	1,917	13-Nov	0 <sup>a</sup>	04-Sep	0 <sup>a</sup>	11-Aug		
			1,200 <sup>a</sup>	08-Sep	200	04-Sep		
1999	2,525	08-Oct	65	09-Sep	1,200	18-Sep		
	683	20-Oct						
	1,540	09-Nov						
2000	51	09-Oct	19	30-Aug				
	375	11-Oct						
	325	13-Oct						
	1,354	16-Oct						
	3,082	23-Oct						
	4,526	31-Oct						
	4,381	08-Nov						
	2,653	14-Nov						
2001	15	24-Oct	131	29-Aug	500	08-Sep		
	311	06-Nov						
	4,424	13-Nov						
	6,209	23-Nov						

Note: All unmarked counts were documented on foot surveys.

<sup>a</sup> Aerial survey counts.

<sup>b</sup> Weir counts.

## **APPENDIX F**

**Appendix F1.-Pink salmon peak escapement counts for streams along the Kodiak road system, 1980-2001.**

Year	Monashka		Pillar		Buskin <sup>a</sup>		Sargent		Russian		Salonie		American	
	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date
1980	3,300	25-Aug	30	25-Aug	95,000	20-Aug	2,800	20-Aug	8,000	20-Aug	3,000	20-Aug	47,000	23-Aug
1981	1,300	26-Aug	400	26-Aug	70,000	28-Aug	1,400	22-Aug	5,600	22-Aug	10,000	22-Aug	45,000	22-Aug
1982	2,800	01-Sep	277	17-Sep	120,000	27-Aug	10,000	27-Aug	8,000	11-Aug	12,000	27-Aug	36,000	27-Aug
1983	1,100	31-Aug	420	31-Aug	53,000	23-Aug	300	11-Aug	2,000	23-Aug	5,500	23-Aug	64,000	07-Sep
1984	4,600	03-Aug	500	31-Jul	100,000	11-Sep	1,800	11-Sep	6,000	10-Aug	2,800	11-Sep	30,000	28-Aug
1985	8,500	05-Sep	5,040	11-Sep	153,026 <sup>b</sup>		4,000	05-Sep	10,400	05-Sep	20,400	05-Sep	140,000	20-Sep
1986	5,500	09-Sep	6,215	09-Sep	98,958 <sup>b</sup>		3,500	18-Aug	14,000	18-Aug	18,000	18-Aug	21,000	18-Aug
1987	225	21-Jul	300	17-Aug	27,892 <sup>b</sup>		300	25-Aug	18,200	25-Aug	1,000	25-Aug	112,000	25-Aug
1988	2,000	15-Aug	1,000	15-Aug	203,648 <sup>b</sup>		19,000	23-Aug	12,000	23-Aug	15,000	23-Aug	500	25-Jul
1989	8,000	30-Aug	42,100	27-Aug	159,123 <sup>b</sup>		22,000	12-Sep	36,500	12-Sep	113,000	12-Sep	126,000	25-Sep
1990	2,700	14-Aug	11,580	20-Aug	42,889 <sup>b</sup>		4,900	18-Aug	4,180	18-Aug	4,140	18-Aug	22,000	21-Aug
1991	7,800	30-Aug	6,000	30-Aug	37,736 <sup>c</sup>		250	02-Aug	900	12-Aug	9,000	22-Aug	49,000	22-Aug
1992	7,700	07-Sep	11,900	07-Sep	25,141 <sup>c</sup>		1,240	03-Sep	2,700	03-Sep			17,900	03-Sep
1993	3,600	17-Aug	6,200	17-Aug	53,484 <sup>c</sup>		14,500	09-Aug	17,500	09-Aug	52,500	09-Aug	52,700	10-Sep
1994	7,000	02-Sep	17,000	02-Sep	89,711 <sup>c</sup>		10,000	05-Aug	8,500	02-Aug	300	22-Sep	95,000	11-Aug
1995	7,000	16-Aug	20,000	16-Aug	72,826 <sup>c</sup>		13,500	18-Aug	140,000	18-Aug	194,500	18-Aug	142,000	08-Sep
1996	4,850	15-Aug	8,000	15-Aug	50,550 <sup>c</sup>		3,000	08-Aug	9,000	08-Aug	17,000	08-Aug	33,000	15-Aug
1997	9,700	12-Aug	2,000	12-Aug	47,396 <sup>c</sup>		10,000	14-Aug	18,000	14-Aug	18,000	14-Aug	85,000	18-Aug
1998	16,800	08-Sep	9,400	08-Sep	134,403 <sup>c</sup>		10,000	11-Aug	10,900	08-Sep	23,900	08-Sep	58,000	08-Sep
1999					94,322 <sup>c</sup>		4,000	25-Aug	5,000	25-Aug	2,000	25-Aug	10,300	25-Aug
2000	5,400	20-Aug			42,377 <sup>c</sup>		200	17-Aug			7,000	17-Aug	21,900	20-Aug
2001	6,000	08-Sep	9,000	08-Sep	61,000 <sup>c</sup>		30,000	08-Sep	75,000	08-Sep	45,000	08-Sep	70,000	08-Sep

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**Appendix F1.-Page 2 of 2.**

Year	Olds		Roslyn		Chiniak		Pasagshak		Saltery		Miam		Hurst	
	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date
1980	67,700	08-Aug	52,000	23-Aug	5,500	20-Aug			38,000	23-Aug	16,000	03-Aug	10,000	08-Aug
1981	40,000	22-Aug	1,500	25-Jul	650	27-Jul	2,000	04-Aug	57,000	04-Aug	12,280	22-Aug	6,000	22-Aug
1982	60,000	27-Aug	30,000	27-Aug	4,500	25-Aug			25,000	27-Aug	20,000	17-Aug	5,000	27-Aug
1983	27,000	23-Aug	2,800	07-Sep	3,000	23-Aug	400	31-Jul	28,000	09-Sep	16,000	31-Aug	3,500	23-Aug
1984	31,500	22-Aug	17,000	31-Aug	11,000	31-Aug	3,500	27-Aug	28,000	28-Aug	21,000	27-Aug	1,000	27-Aug
1985	65,000	05-Sep	7,800	05-Sep	9,700	06-Sep	11,000	06-Aug	26,000	10-Jul	39,800	06-Aug	1,500	27-Aug
1986	52,000	16-Aug	27,000	18-Aug	7,000	18-Aug			23,011 <sup>d</sup>		19,000	18-Aug	9,000	18-Aug
1987	48,100	25-Aug	12,000	25-Aug	9,400	10-Aug	2,000	12-Aug	39,687 <sup>d</sup>		19,800	12-Aug	11,100	25-Aug
1988	90,000	23-Aug	42,000	23-Aug			2,000	23-Aug	7,646 <sup>d</sup>		8,000	30-Aug	5,600	30-Aug
1989	46,000	30-Aug	39,400	30-Aug			2,000	13-Sep	214,541 <sup>d</sup>		40,000	11-Sep	96,000	26-Aug
1990	21,000	13-Aug	39,450	18-Aug	22,550	18-Aug			313 <sup>d</sup>		9,970	14-Aug	6,700	20-Aug
1991	22,500	12-Aug	23,000	22-Aug	10,000	02-Aug	2,000	06-Sep	34,087 <sup>d</sup>		43,000	06-Sep	15,450	22-Aug
1992	24,500	03-Sep	9,400	08-Aug	4,500	03-Sep	500	03-Sep	5,800	16-Aug	4,400	03-Sep	3,800	08-Aug
1993	58,000	05-Aug	21,000	05-Aug	74,000	05-Aug	300	15-Jul	92,078 <sup>d</sup>		25,000	23-Aug		
1994	78,500	11-Aug	24,000	09-Aug	24,000	09-Aug	500	01-Aug	16,664	11-Aug	11,400	11-Aug		
1995	130,000	08-Sep	30,500	18-Aug	28,000	18-Aug	4,600	04-Aug	85,000	08-Sep	60,300	09-Sep	31,500	06-Aug
1996	11,000	15-Aug	15,500	08-Aug	30,000	08-Aug			4,500	08-Aug	1,600	15-Aug		
1997	55,000	10-Sep	6,000	12-Aug	35,000	12-Aug	1,500	07-Aug	31,358	19-Aug	34,000	10-Sep	18,500	19-Aug
1998	24,000	08-Sep	43,500	11-Aug	65,000	11-Aug	7,500	08-Sep	15,500	04-Sep	19,000	04-Sep	3,900	08-Sep
1999	32,000	25-Aug	29,000	25-Aug	46,500	25-Aug	100	25-Aug	18,000	25-Aug	3,600	25-Aug	8,900	07-Sep
2000	14,000	17-Aug	11,100	17-Aug	13,700	17-Aug	300	17-Aug	17,800	17-Aug	8,760	17-Aug	300	22-Aug
2001	35,000	08-Sep	12,000	08-Sep	25,000	08-Sep			19,280	29-Sep	12,000	08-Sep		

Note: Unless otherwise noted, these figures represent the largest aerial survey count of the year, 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.

<sup>a</sup> 1985-1998 are weir counts.

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

<sup>c</sup> The weir was not operated during late July and early August. Pink salmon counts have been supplemented with aerial surveys in order to estimate escapement.

<sup>d</sup> Weir counts.

**Appendix F2.-Sockeye salmon peak escapement counts for streams along the Kodiak road system, 1980-2001.**

Year	Buskin <sup>a</sup>		Pasagshak		Saltery		Miami	
	Count	Date	Count	Date	Count	Date	Count	Date
1980	3,814	15-Aug	3,484	19-Aug	31,600	03-Aug	300	13-Jul
1981	7,846	14-Aug	2,759	26-Aug	43,300	04-Aug		
1982	3,600	27-Aug	5400	27-Aug	28,000	26-Jul	200	27-Aug
1983	4,669	30-Aug	3458	02-Sep	46,400	10-Aug	800	10-Aug
1984	4,875	11-Sep	3,700	13-Aug	120,000	20-Jul	1,500	29-Jul
1985	18,010		1,700	04-Sep	26,000	10-Jul		
1986	8,939		3,200	18-Aug	38,314 <sup>b</sup>			
1987	12,690		14,000	12-Aug	22705 <sup>b</sup>		700	25-Aug
1988	12,144		20,000	23-Aug	25,654 <sup>b</sup>		1,200	30-Aug
1989	17,853		14,300	13-Sep	30,937 <sup>b</sup>		950	12-Sep
1990	10,528		4,680	28-Sep	29,541 <sup>b</sup>		1,900	13-Aug
1991	9,789		25,000	30-Aug	52,577 <sup>b</sup>		2,300	30-Aug
1992	9,782		3,590	03-Sep	44,450	03-Sep	270	05-Aug
1993	9,526		16,000	15-Jul	77,186 <sup>b</sup>		1,200	23-Aug
1994	11,783		2,400	01-Aug	58,975 <sup>b</sup>		800	08-Aug
1995	15,520		12,500	30-Jul	43,859 <sup>b</sup>		2,000	27-Jul
1996	9,661		21,500	26-Jul	35,488 <sup>b</sup>		3,200	31-Jul
1997	9,840		13,200	07-Aug	31,016 <sup>b</sup>		3,000	23-Jul
1998	14,767		1,850	08-Sep	26,263 <sup>b</sup>		650	11-Aug
1999	10,811		9,800	25-Aug	62,821 <sup>b</sup>		5,600	25-Aug
2000	11,233		6,000	17-Aug	45,604 <sup>b</sup>		2,000	17-Aug
2001	20,556		3,600	08-Sep	45,608 <sup>b</sup>		2,100	02-Aug

Note: These figures represent the largest aerial survey count of the year, 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.

<sup>a</sup> 1985-1998 are weir counts. From 1990-1998 the weir was located upriver at the outlet of Buskin Lake during the sockeye immigration. Sockeye entering the tributary lakes of Louise and Genevieve are not counted at the upriver location.

<sup>b</sup> Weir counts.

**Appendix F3.-Chum salmon peak escapement counts for streams along the Kodiak road system, 1980-2001.**

Year	Sargent		Russian		Salonie		American		Olds		Roslyn		Saltery <sup>a</sup>	
	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date	Count	Date
1980			4,000	20-Aug	1,400	20-Aug	4,000	01-Sep	8,500	23-Aug				
1981			500	22-Aug	200	22-Aug	2,500	22-Aug	500	22-Aug			7,000	04-Aug
1982	1,500	27-Aug	2,000	11-Aug	1,000	11-Aug	3,000	11-Aug	2,500	27-Aug			8,000	31-Aug
1983	50	11-Aug	500	23-Aug	2,000	23-Aug	10,000	07-Sep	11,000	07-Sep			5,000	23-Aug
1984	100	11-Sep	4,800	11-Sep	1,100	11-Sep	8,400	11-Sep	15,000	28-Aug			10,000	03-Aug
1985	2,500	05-Sep	7,600	05-Sep	10,000	20-Sep	10,400	05-Sep	8,000	22-Aug			43	
1986			4,000	18-Aug	5,000	18-Aug	4,000	18-Aug	3,000	16-Aug			203	
1987			10,000	15-Sep			800	12-Aug	2,600	12-Aug			121	
1988			8,000	23-Aug	500	23-Aug			15,000	23-Aug			28	
1989			1,800	12-Sep			11,000	25-Sep	1,400	13-Sep	200	30-Aug	14	
1990			200	18-Aug			8,000	13-Aug	1,400	18-Aug			9	
1991							12,000	22-Aug	2,500	02-Aug			18	
1992			2,365	03-Sep			4,500	03-Sep	3,000	08-Aug	123	14-Aug	250	
1993			700	09-Aug			2,000	10-Sep	7,000	17-Aug	700	05-Aug	5,000	13-Sep
1994							5,100	11-Aug	5,000	11-Aug			500	08-Aug
1995					300	18-Aug	8,000	08-Sep	1,500	31-Jul			103	08-Aug
1996							2,500	15-Aug	600	31-Jul				
1997			2,000	14-Aug			15,000	18-Aug	2,000	07-Aug			29	06-Sep
1998					810	08-Sep	1,200	08-Sep	1,000	31-Jul			1,500	04-Sep
1999									2,000	25-Aug			2,500	25-Aug
2000					1,000	17-Aug	1,500	20-Aug	1,500	30-Jul	600	17-Aug	2,500	22-Aug
2001							8,000	08-Sep	5,500	08-Sep			1,000	02-Aug

Note: These figures represent the largest aerial survey count of the year, 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.

<sup>a</sup> 1985-1992 are weir counts. Does not include fish spawning below the weir.



## **APPENDIX G**

**Appendix G1.-Immigration of sockeye salmon through the Buskin River weir, 1992-2001.**

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %	
20-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-May	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-May	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
26-May	4	0	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	56	0	0	0
27-May	7	0	0	0	0	0	34	0	0	0	0	0	0	0	202	2	2	0	133	1	0	0
28-May	7	0	0	0	0	0	34	0	0	0	0	0	0	0	249	2	2	0	311	2	0	0
29-May	7	0	0	0	0	0	34	0	99	1	93	1	0	0	266	2	2	0	467	2	1	1
30-May	7	0	18	0	0	0	34	0	213	2	217	2	154	1	449	4	5	0	939	5	1	1
31-May	7	0	69	1	0	0	34	0	232	2	227	2	506	3	562	5	186	2	1,657	8	2	2
01-Jun	11	0	87	1	0	0	36	0	334	3	280	3	580	4	625	6	202	2	1,955	10	3	3
02-Jun	11	0	297	3	5	0	42	0	596	6	395	4	782	5	754	7	202	2	2,452	12	4	4
03-Jun	12	0	530	6	188	1	283	2	866	8	673	7	1,190	8	857	8	408	4	2,723	13	6	6
04-Jun	12	0	922	11	440	3	1,023	7	1,127	11	1,139	12	1,304	9	1,087	10	862	8	3,323	16	9	9
05-Jun	121	1	1,370	16	595	5	2,085	14	1,393	14	1,260	13	1,606	11	1,277	12	1,296	12	4,824	23	12	12
06-Jun	142	1	1,514	17	750	6	2,782	18	1,642	16	1,531	16	1,981	13	1,479	14	1,296	12	5,440	26	14	14
07-Jun	601	6	1,558	18	1,399	11	3,038	20	2,077	20	2,171	22	3,214	22	1,728	16	2,555	23	5,940	29	19	19
08-Jun	623	6	2,160	25	1,704	13	3,708	24	2,429	24	2,382	24	3,414	23	2,482	23	3,294	29	7,308	36	23	23
09-Jun	760	8	2,394	27	1,822	14	4,526	29	2,615	25	2,622	27	4,094	28	2,939	27	3,910	35	7,827	38	26	26
10-Jun	1,722	18	2,577	29	1,949	15	4,698	30	2,879	28	2,747	28	4,367	30	3,219	30	4,046	36	10,065	49	29	29
11-Jun	1,758	18	2,885	33	2,056	16	5,342	35	3,975	39	2,937	30	5,238	35	3,535	33	4,657	42	11,173	54	33	33
12-Jun	2,002	21	3,377	38	2,406	18	5,848	38	4,446	43	3,174	32	5,625	38	3,959	37	5,897	53	11,815	57	38	38
13-Jun	2,515	26	3,878	44	2,758	21	6,819	44	4,703	46	5,040	51	5,828	39	4,134	38	6,309	56	13,023	63	43	43
14-Jun	2,531	26	3,944	45	3,094	24	7,537	49	4,826	47	5,528	56	6,093	41	4,834	45	6,318	56	14,037	68	46	46
15-Jun	2,876	29	3,965	45	3,366	26	8,590	56	4,909	48	5,867	60	6,270	42	5,622	52	6,779	61	14,316	70	49	49
16-Jun	2,963	30	4,257	49	3,835	29	8,740	57	4,995	49	5,896	60	7,077	48	5,767	53	6,784	61	15,008	73	51	51
17-Jun	2,988	31	4,610	53	3,956	30	9,312	60	5,147	50	6,239	63	7,674	52	6,463	60	7,034	63	15,483	75	54	54
18-Jun	3,251	33	4,809	55	4,343	33	10,013	65	6,001	58	6,333	64	7,979	54	7,099	66	7,103	63	15,629	76	57	57

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	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jun	3,599	37	5,186	59	4,955	38	10,590	69	6,503	63	6,465	66	8,340	56	7,440	69	7,743	69	15,946	78	60
20-Jun	3,891	40	5,344	61	5,745	44	11,843	77	6,602	64	6,515	66	8,729	59	7,763	72	8,471	76	16,502	80	64
21-Jun	4,042	41	5,603	64	6,875	52	12,079	78	6,673	65	7,166	73	8,917	60	8,041	74	8,631	77	16,608	81	67
22-Jun	4,380	45	5,750	66	7,242	55	12,286	80	6,724	66	7,344	75	9,115	62	8,364	77	8,773	78	16,721	81	68
23-Jun	5,230	54	5,828	66	7,599	58	12,398	80	6,781	66	7,440	76	10,258	69	8,834	82	8,772	78	17,346	84	71
24-Jun	5,264	54	6,081	69	8,282	63	12,933	84	7,075	69	7,475	76	10,489	71	8,933	83	9,877	88	17,994	88	74
25-Jun	5,466	56	6,257	71	8,415	64	12,989	84	7,075	69	7,545	77	10,610	72	9,229	85	10,014	89	18,078	88	76
26-Jun	5,595	57	6,350	72	8,643	66	12,989	84	7,126	69	7,656	78	11,126	75	9,284	86	10,300	92	18,602	91	77
27-Jun	5,927	61	6,526	74	8,874	68	13,044	85	7,154	70	7,834	80	11,683	79	9,431	87	10,334	92	18,897	92	79
28-Jun	6,750	69	6,615	75	9,035	69	13,113	85	7,172	70	7,871	80	11,721	79	9,716	90	10,440	93	18,914	92	80
29-Jun	6,841	70	6,633	76	9,164	70	13,322	86	7,310	71	7,884	80	12,097	82	10,016	93	10,458	93	18,976	92	81
30-Jun	6,887	71	6,648	76	9,187	70	13,583	88	8,082	79	7,911	80	12,254	83	10,229	95	10,484	94	18,995	92	83
01-Jul	6,897	71	6,776	77	10,001	76	13,594	88	8,140	79	7,935	81	12,369	84	10,363	96	10,484	94	19,015	93	84
02-Jul	7,014	72	6,814	78	10,037	77	13,629	88	8,145	79	8,011	81	13,250	90	10,612	98	10,582	95	19,065	93	85
03-Jul	7,042	72	6,855	78	10,341	79	13,701	89	8,151	79	8,018	81	13,667	93	10,666	99	10,680	95	19,470	95	86
04-Jul	7,126	73	6,860	78	10,415	79	13,866	90	8,193	80	8,070	82	13,667	93	10,752	99	10,836	97	19,534	95	87
05-Jul	7,168	73	6,952	79	10,547	80	13,879	90	8,472	83	8,070	82	13,677	93	10,770	100	10,876	97	19,865	97	87
06-Jul	7,205	74	6,953	79	10,648	81	14,067	91	8,793	86	8,076	82	13,834	94	10,794	100	10,885	97	19,885	97	88
07-Jul	7,236	74	6,964	79	10,663	81	14,141	92	8,793	86	8,076	82	13,905	94	10,794	100	10,885	97	19,891	97	88
08-Jul	7,248	74	6,996	80	10,680	81	14,167	92	8,893	87	8,123	83	13,920	94	10,794	100	10,887	97	19,928	97	88
09-Jul	7,319	75	7,016	80	10,718	82	14,175	92	8,939	87	8,123	83	13,931	94	10,794	100	10,887	97	19,977	97	89
10-Jul	7,345	75	7,019	80	10,724	82	14,187	92	8,946	87	8,131	83	13,931	94	10,794	100	10,889	97	19,978	97	89
11-Jul	7,374	76	7,084	81	11,044	84	14,202	92	8,948	87	8,145	83	13,971	95	10,794	100	11,066	99	19,994	97	89
12-Jul	7,414	76	7,151	82	11,151	85	14,260	92	8,958	87	8,145	83	13,983	95	10,794	100	11,085	99	20,033	97	90
13-Jul	7,466	77	7,158	82	11,250	86	14,281	93	8,971	87	8,145	83	14,011	95	10,794	100	11,087	99	20,055	98	90
14-Jul	7,527	77	7,203	82	11,275	86	14,283	93	8,973	87	8,145	83	14,031	95	10,794	100	11,089	99	20,104	98	90
15-Jul	7,585	78	7,315	83	11,276	86	14,325	93	8,973	87	8,159	83	14,057	95	10,794	100	11,090	99	20,119	98	90
16-Jul	7,597	78	7,337	84	11,299	86	14,603	95	8,973	87	8,159	83	14,059	95	10,794	100	11,090	99	20,179	98	91
17-Jul	7,598	78	7,583	86	11,405	87	14,634	95	9,016	88	9,084	92	14,062	95	10,794	100	11,092	99	20,179	98	92
18-Jul	7,684	79	7,628	87	11,483	88	14,637	95	9,106	89	9,121	93	14,062	95	10,794	100	11,092	99	20,198	98	92

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	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jul	7,845	80	7,630	87	11,597	88	14,641	95	9,106	89	9,220	94	14,066	95	10,794	100	11,092	99	20,465	100	93
20-Jul	7,874	81	7,630	87	11,599	88	14,641	95	9,144	89	9,226	94	14,447	98	10,794	100	11,092	99	20,472	100	93
21-Jul	7,907	81	7,630	87	11,600	88	14,642	95	9,264	90	9,237	94	14,617	99	10,794	100	11,175	100	20,491	100	93
22-Jul	7,938	81	7,642	87	11,602	89	14,642	95	9,266	90	9,237	94	14,628	99	10,794	100	11,177	100	20,493	100	93
23-Jul	8,019	82	7,653	87	11,605	89	14,642	95	9,270	90	9,240	94	14,632	99	10,794	100	11,177	100	20,521	100	94
24-Jul	8,204	84	7,656	87	11,605	89	14,645	95	9,463	92	9,247	94	14,632	99	10,794	100	11,177	100	20,523	100	94
25-Jul	8,253	85	7,708	88	11,605	89	14,671	95	9,468	92	9,255	94	14,632	99	10,794	100	11,177	100	20,544	100	94
26-Jul	8,268	85	7,720	88	11,605	89	14,673	95	9,475	92	9,269	94	14,638	99	10,794	100	11,179	100	20,544	100	94
27-Jul	8,315 <sup>a</sup>	85	7,721	88	11,606	89	14,674	95	9,476	92	9,290	94	14,640	99	10,794	100	11,180	100	20,544	100	94
28-Jul	8,362	86	7,741	88	11,607	89	14,674	95	9,477	92	9,290	94	14,659	99	10,794	100	11,180	100	20,544	100	94
29-Jul	8,409	86	7,807	89	11,679 <sup>b</sup>	89	14,674	95	9,477	92	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	95
30-Jul	8,456	87	7,848 <sup>c</sup>	89	11,751	90	14,682	95	9,514 <sup>d</sup>	93	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	95
31-Jul	8,503	87	7,889	90	11,823	90	14,687	95	9,551	93	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	95
01-Aug	8,550	88	7,930	90	11,895	91	14,729 <sup>e</sup>	96	9,588	93	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	95
02-Aug	8,597	88	7,971	91	11,967	91	14,771	96	9,625	94	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	96
03-Aug	8,644	89	8,012	91	12,039	92	14,813	96	9,662	94	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	96
04-Aug	8,691	89	8,053	92	12,111	92	14,855	96	9,699	95	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	96
05-Aug	8,738	90	8,094	92	12,183	93	14,897	97	9,736	95	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	96
06-Aug	8,785	90	8,135	93	12,255	93	14,939	97	9,773	95	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	96
07-Aug	8,832	91	8,176	93	12,327	94	14,981	97	9,810	96	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	97
08-Aug	8,879	91	8,217	94	12,399	95	15,023	97	9,847	96	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	97
09-Aug	8,926	91	8,258	94	12,471	95	15,065	98	9,884	96	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	97
10-Aug	8,973	92	8,299	95	12,543	96	15,107	98	9,921	97	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	97
11-Aug	9,020	92	8,340	95	12,615	96	15,149	98	9,958	97	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	97
12-Aug	9,067	93	8,381	96	12,687	97	15,191	98	9,995	97	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	98
13-Aug	9,114	93	8,422	96	12,759	97	15,233	99	10,032	98	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	98
14-Aug	9,161	94	8,463	96	12,831	98	15,273 <sup>e</sup>	99	10,076 <sup>d</sup>	98	9,495	96	14,659	99	10,794	100	11,180	100	20,544	100	98
15-Aug	9,208	94	8,504	97	12,903	98	15,282	99	10,092	98	9,513	97	14,663	99	10,794	100	11,180	100	20,544	100	98
16-Aug	9,255	95	8,545	97	12,970 <sup>b</sup>	99	15,282	99	10,110	99	9,522	97	14,663	99	10,794	100	11,180	100	20,544	100	98
17-Aug	9,302	95	8,586	98	12,970	99	15,292	99	10,114	99	9,563	97	14,665	99	10,794	100	11,180	100	20,544	100	99
18-Aug	9,349	96	8,627	98	12,972	99	15,309	99	10,126	99	9,581	97	14,673	99	10,794	100	11,180	100	20,546	100	99

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	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Aug	9,396	96	8,668	99	12,977	99	15,322	99	10,139	99	9,611	98	14,673	99	10,794	100	11,180	100	20,546	100	99
20-Aug	9,443	97	8,717 <sup>c</sup>	99	12,981	99	15,333	99	10,154	99	9,624	98	14,677	99	10,795	100	11,181	100	20,547	100	99
21-Aug	9,490	97	8,717	99	12,987	99	15,351	100	10,195	99	9,652	98	14,685	99	10,798	100	11,182	100	20,547	100	99
22-Aug	9,537	98	8,718	99	12,988	99	15,366	100	10,217	100	9,698	99	14,685	99	10,799	100	11,182	100	20,549	100	99
23-Aug	9,584	98	8,718	99	12,995	99	15,368	100	10,225	100	9,702	99	14,699	100	10,801	100	11,185	100	20,550	100	99
24-Aug	9,631	99	8,718	99	12,997	99	15,377	100	10,227	100	9,708	99	14,702	100	10,803	100	11,187	100	20,550	100	99
25-Aug	9,688 <sup>a</sup>	99	8,725 <sup>f</sup>	99	13,002	99	15,386	100	10,234	100	9,718	99	14,702	100	10,803	100	11,189	100	20,550	100	100
26-Aug	9,693	99	8,732	100	13,006	99	15,391	100	10,235	100	9,729	99	14,703	100	10,803	100	11,190	100	20,551	100	100
27-Aug	9,694	99	8,739	100	13,009	99	15,395	100	10,236	100	9,774	99	14,703	100	10,804	100	11,192	100	20,551	100	100
28-Aug	9,695	99	8,746	100	13,009	99	15,403	100	10,238	100	9,785	99	14,703	100	10,805	100	11,192	100	20,552	100	100
29-Aug	9,697	99	8,753	100	13,009	99	15,404	100	10,239	100	9,788	99	14,713	100	10,805	100	11,193	100	20,552	100	100
30-Aug	9,701	99	8,760	100	13,014	99	15,407	100	10,245	100	9,789	99	14,739	100	10,809	100	11,193	100	20,552	100	100
31-Aug	9,704	99	8,765 <sup>f</sup>	100	13,018	99	15,408	100	10,247	100	9,798	100	14,746	100	10,809	100	11,194	100	20,552	100	100
Season																					
Total	9,759		8,772		13,109		15,423		10,260		9,840		14,767		10,809		11,194		20,552		
Ending																					
Date	07-Oct		27-Sep		29-Sep		16-Sep		24-Sep		10-Oct		30-Sep		04-Oct		04-Oct		30-Sep		

Note: 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.

- <sup>a</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (27 July-25 August).
- <sup>b</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (29 July-16 August).
- <sup>c</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (30 July-20 August).
- <sup>d</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (30 July-14 August).
- <sup>e</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (1 August-14 August).
- <sup>f</sup> Estimate based on average percent return 1985-1991 divided equally for the days the weir was out (25 August-31 August).

**Appendix G2.-Immigration of pink salmon through the Buskin River weir, 1992-2001.**

Date	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
20-Jul	659	3	27	0	133	0	13	0	8	0	2	0	1	0	0	0	4	0	3	0
21-Jul	790	3	33	0	133	0	25	0	14	0	2	0	6	0	0	0	22	0	3	0
22-Jul	921	4	36	0	133	0	37	0	15	0	2	0	8	0	0	0	23	0	3	0
23-Jul	1,052	4	46	0	133	0	43	0	16	0	2	0	10	0	0	0	25	0	3	0
24-Jul	1,183	5	46	0	133	0	48	0	29	0	2	0	11	0	0	0	27	0	3	0
25-Jul	1,314	5	61	0	133	0	66	0	34	0	12	0	13	0	0	0	31	0	4	0
26-Jul	1,439	6	117	0	133	0	142	0	39	0	12	0	17	0	0	0	33	0	4	0
27-Jul	1,586	6	145	0	133	0	186	0	106	0	13	0	22	0	0	0	36	0	4	0
28-Jul	1,859	7	227	0	133	0	234	0	120	0	13	0	22	0	0	0	36	0	4	0
29-Jul	2,215	9	227	0	133	0	291	0	162	0	349	1	22	0	0	0	36	0	4	0
30-Jul	2,654	11	272	1	133	0	434	1	162	0	349	1	22	0	0	0	36	0	4	0
31-Jul	3,095	12	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
01-Aug	3,596	14	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
02-Aug	4,260	17	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
03-Aug	5,372	21	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
04-Aug	6,378	25	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
05-Aug	7,341	29	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
06-Aug	8,306	33	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
07-Aug	9,416	37	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
08-Aug	10,234	41	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
09-Aug	11,261	45	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
10-Aug	12,161	48	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
11-Aug	13,103	52	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
12-Aug	13,879	55	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
13-Aug	14,413	57	272	1	133	0	756	1	162	0	349	1	22	0	0	0	36	0	4	0
14-Aug	14,852	59	272	1	133	0	756	1	34,000	67	21,600	46	860	1	0	0	36	0	4	0
15-Aug	15,293	61	272	1	133	0	2,659	4	34,412	68	22,665	48	3,552	3	0	0	36	0	4	0
16-Aug	15,711	62	272	1	133	0	3,601	5	34,917	69	22,935	48	6,182	5	0	0	36	0	4	0
17-Aug	16,067	64	272	1	80,000	89	57,000	78	35,196	70	23,624	50	7,198	5	0	0	36	0	1,515	3
18-Aug	16,591	66	272	1	80,122	89	58,408	80	35,405	70	24,007	51	8,285	6	0	0	36	0	3,440	7

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Date	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%									
19-Aug	16,926	67	272	1	80,189	89	58,766	81	36,005	71	24,635	52	85,245	63	45,376	48	19,400	46	5,421	11	
20-Aug	17,114	68	40,494	76	80,287	89	59,041	81	36,174	72	25,101	53	86,743	65	46,101	49	19,439	46	5,520	11	
21-Aug	17,282	69	40,946	77	80,440	90	60,293	83	37,842	75	25,950	55	87,721	65	50,757	54	19,628	46	8,680	17	
22-Aug	17,491	70	41,550	78	80,449	90	62,297	86	38,173	76	27,957	59	88,166	66	52,563	56	19,783	47	9,794	20	
23-Aug	17,617	70	42,275	79	80,598	90	62,805	86	38,581	76	28,504	60	96,246	72	56,163	60	20,259	48	31,982	64	
24-Aug	17,826	71	42,816	80	80,650	90	63,140	87	38,713	77	28,938	61	97,061	72	61,372	65	20,592	49	32,354	65	
25-Aug	17,936	71	43,439	81	80,916	90	63,785	88	38,967	77	29,410	62	97,839	73	64,859	69	20,873	49	33,602	67	
26-Aug	18,329	73	44,062	82	81,141	90	64,194	88	39,233	78	29,749	63	102,894	77	65,297	69	21,185	50	34,359	69	
27-Aug	18,832	75	44,685	84	81,250	91	64,572	89	39,793	79	31,656	67	103,955	77	69,222	73	21,948	52	36,434	73	
28-Aug	19,094	76	45,286	85	81,320	91	65,378	90	40,752	81	32,046	68	105,117	78	69,917	74	23,200	55	39,823	80	
29-Aug	19,352	77	45,887	86	81,379	91	65,641	90	41,374	82	32,719	69	106,280	79	70,544	75	24,060	57	40,626	81	
30-Aug	20,264	81	46,488	87	82,131	92	66,163	91	42,499	84	33,329	70	115,549	86	72,779	77	25,045	59	42,225	84	
31-Aug	20,768	83	47,089	88	82,317	92	67,678	93	43,335	86	36,425	77	116,729	87	73,267	78	25,906	61	43,027	86	
01-Sep	21,272	85	48,041	90	83,033	93	68,062	93	44,190	87	37,021	78	121,490	90	74,117	79	27,538	65	43,604	87	
02-Sep	21,897	87	48,455	91	83,505	93	68,448	94	45,082	89	38,006	80	125,761	94	76,363	81	28,354	67	44,508	89	
03-Sep	22,275	89	48,891	91	83,666	93	68,710	94	45,930	91	39,587	84	127,872	95	76,861	81	29,599	70	44,986	90	
04-Sep	22,901	91	49,659	93	85,051	95	71,802	99	46,636	92	41,014	87	128,886	96	77,722	82	30,599	72	45,801	91	
05-Sep	23,282	93	50,082	94	85,337	95	71,802	99	47,664	94	43,519	92	129,659	96	79,219	84	31,725	75	46,340	93	
06-Sep	23,562	94	50,505	94	85,448	95	71,802	99	50,441	100	45,660	96	131,085	98	80,354	85	34,240	81	46,714	93	
07-Sep	23,761	95	50,928	95	86,110	96	71,802	99	50,441	100	45,660	96	131,899	98	81,888	87	35,722	84	47,119	94	
08-Sep	24,038	96	51,223	96	86,573	97	71,802	99	50,441	100	46,143	97	132,173	98	83,054	88	36,618	86	47,351	95	
09-Sep	24,389	97	51,415	96	87,254	97	71,802	99	50,441	100	46,461	98	132,974	99	84,520	90	37,185	88	47,784	95	
10-Sep	24,497	97	51,560	96	88,151	98	71,925	99	50,472	100	46,655	98	132,974	99	88,030	93	38,466	91	48,669	97	
Season																					
Total	25,141		53,484		89,711		72,826		50,550		47,396		134,403		94,322		42,377		50,070		
Ending																					
Date	30-Sep		06-Oct		30-Sep		04-Oct		04-Oct		04-Oct		30-Sep								

Note: The Buskin River weir was not operated during the peak pink salmon immigration after 1990. An aerial survey is flown in mid August to estimate the number of pink salmon above the weir. The aerial surveys are reflected in this table.

**Appendix G3.-Immigration of coho salmon through the Buskin River weir, 1992-2001.**

	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
01-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
02-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
03-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
04-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
05-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
06-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
07-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
08-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
09-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
10-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
11-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
12-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
13-Aug		0	1	0		0		0	7	0		0		0		0		0		0	0
14-Aug		0	1	0		0		0	7	0		0	13	0		0		0		0	0
15-Aug		0	1	0		0	23	0	44	1	23	0	77	1		0		0		0	0
16-Aug		0	1	0		0	27	0	130	2	60	1	113	1		0		0		0	0
17-Aug		0	1	0	4	0	56	1	234	3	124	1	151	2		0	14	0		0	1
18-Aug		0	1	0	12	0	95	1	273	3	176	2	237	3		0	68	1		0	1
19-Aug		0	1	0	31	0	113	1	370	4	197	2	269	3		0	110	1		0	1
20-Aug		0	134	2	48	1	135	2	425	5	238	2	385	4		0	17	0	131	1	2
21-Aug		0	138	2	68	1	172	2	646	8	357	3	463	5	46	0	60	1	366	3	2
22-Aug		0	224	3	77	1	208	2	811	10	671	6	508	6	67	1	96	1	509	4	3
23-Aug		0	302	4	130	2	236	3	987	12	862	8	633	7	125	1	168	2	627	5	4
24-Aug		0	333	5	144	2	269	3	1,035	12	1,006	9	748	8	176	2	208	3	667	5	5
25-Aug	25	0	400	6	153	2	308	4	1,175	14	1,160	11	761	8	320	3	311	4	892	7	6
26-Aug	132	2	467	7	176	2	341	4	1,264	15	1,228	11	780	9	398	4	432	5	935	7	7
27-Aug	219	3	534	8	185	2	370	4	1,450	17	1,376	13	797	9	522	5	665	8	1,292	10	8
28-Aug	261	4	635	9	191	2	503	6	1,696	20	1,445	13	801	9	590	6	935	12	1,593	12	9

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	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-</u> <u>2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
29-Aug	299	5	736	11	193	2	561	6	1,928	23	1,495	14	807	9	722	7	1,298	16	1,934	14	11
30-Aug	459	7	837	12	198	2	656	8	2,193	26	1,569	14	822	9	985	10	1,505	19	2,144	16	12
31-Aug	618	9	938	14	203	2	1,008	12	2,555	30	1,757	16	1,017	11	1,053	11	1,606	20	2,311	17	14
01-Sep	799	12	1,030	15	214	3	1,128	13	2,767	33	1,932	18	1,565	17	1,228	13	1,719	21	2,413	18	16
02-Sep	870	13	1,123	16	229	3	1,217	14	2,943	35	2,019	18	2,294	25	1,412	14	1,767	22	2,563	19	18
03-Sep	897	14	1,242	18	235	3	1,270	15	3,045	36	2,118	19	2,949	33	1,581	16	1,796	22	2,651	20	20
04-Sep	920	14	1,357	20	295	4	1,819	21	3,117	37	2,246	21	3,117	34	1,668	17	1,814	23	2,798	21	21
05-Sep	942	14	1,472	22	397	5	1,919	22	3,287	39	2,363	22	3,194	35	1,825	19	1,842	23	2,975	22	22
06-Sep	976	15	1,587	23	421	5	2,019	23	4,925	58	2,557	23	3,401	38	1,872	19	1,863	23	3,065	23	25
07-Sep	1,041	16	1,702	25	470	6	2,219	26	5,525	65	2,957	27	3,536	39	1,937	20	1,877	23	3,112	23	27
08-Sep	1,187	18	1,822	27	530	7	2,619	30	5,875	70	3,949	36	3,663	40	2,005	20	1,888	23	3,135	23	29
09-Sep	1,377	21	1,928	28	640	8	3,019	35	6,225	74	4,399	40	3,893	43	2,132	22	1,892	24	3,162	23	32
10-Sep	1,406	22	2,065	30	1,017	12	3,421	39	6,519	77	4,678	43	4,293	47	3,422	35	1,917	24	3,404	25	36
11-Sep	1,442	22	2,161	32	1,635	20	3,895	45	6,980	83	4,895	45	4,693	52	3,925	40	1,961	24	4,313	32	39
12-Sep	1,493	23	2,459	36	1,796	22	4,270	49	7,254	86	5,047	46	5,051	56	4,396	45	1,972	25	5,507	41	43
13-Sep	1,532	23	2,777	41	1,933	24	4,822	55	7,631	90	5,171	47	5,192	57	4,889	50	2,190	27	6,285	47	46
14-Sep	1,638	25	3,062	45	3,526	43	5,198	60	7,831	93	5,274	48	5,233	58	5,281	54	2,459	31	6,714	50	51
15-Sep	1,713	26	3,179	47	4,464	55	5,665	65	7,931	94	5,799	53	5,255	58	5,673	58	2,603	32	7,126	53	54
16-Sep	1,773	27	3,952	58	4,804	59	5,847	67	7,976 <sup>a</sup>	95	6,299	58	5,284	58	6,065	62	2,855	35	7,390	55	57
17-Sep	3,085	47	4,506	66	5,737	70	5,847	67	8,026	95	6,814	62	5,366	59	6,457	66	3,126	39	7,918	59	63
18-Sep	3,268	50	4,555	67	6,090	75	5,847	67	8,076	96	7,550	69	5,468	60	6,849	70	3,262	41	8,554	63	66
19-Sep	3,314	51	4,687	69	6,381	78	5,847	67	8,126	96	8,389	77	6,647	73	7,241	74	3,440	43	9,487	70	70
20-Sep	3,345	51	4,942	73	6,683	82	5,847	67	8,135	96	8,894	81	7,325	81	7,633	78	3,554	44	10,124	75	73
21-Sep	3,378	52	5,157	76	6,985	86	5,847	67	8,211	97	9,544	87	7,854	87	8,025	82	3,949	49	10,830	80	76
22-Sep	3,383	52	5,241	77	7,330	90	5,847	67	8,247	98	9,869	90	8,086	89	8,417	86	4,044	50	11,313	84	78
23-Sep	3,385	52	5,291	78	7,550	93	5,847	67	8,264	98	9,908	91	8,377	92	8,809	90	4,350	54	11,808	88	80
24-Sep	3,390	52	5,413	79	7,731	95	5,847	67	8,289	98	9,947	91	8,581	95	9,201	94	4,591	57	12,308	91	82
25-Sep	3,410	52	5,696	84	7,912	97	5,847	67	8,314	99	9,986	91	8,690	96	9,259	95	4,993	62	12,854	95	84

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	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-</u> <u>2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
26-Sep	3,425	52	6,022	88	7,966	98	5,847	67	8,339	99	10,051	92	8,871	98	9,349	95	5,499	68	13,156	97	86
27-Sep	5,193	79	6,297	92	8,070	99	5,847	67	8,364	99	10,077	92	8,929	99	9,419	96	5,904	73	13,308	99	90
28-Sep	5,513	84	6,469	95	8,088	99	5,847	67	8,389	99	10,104	92	8,977	99	9,529	97	5,983	74	13,392	99	91
29-Sep	5,649	86	6,641	97	8,146	100	5,847	67	8,414	100	10,141	93	9,062	100	9,606	98	6,038	75	13,494	100	92
30-Sep	5,820	89	6,813	100	8,146	100	8,694	100	8,439	100	10,342	95	9,062	100	9,626	98	6,079	76	13,494	100	96
01-Oct	5,935	91									10,599	97			9,705	99	6,132	76			91
02-Oct	6,225	95									10,729	98			9,758	100	6,287	78			
03-Oct	6,297	96									10,836	99			9,783	100	6,615	82			
04-Oct	6,384	98									10,852	99			9,794	100	8,048	100			
05-Oct	6,402	98									10,893	100									
06-Oct	6,416	98									10,926	100									
07-Oct	6,535	100																			
Season																					
Total	6,535		6,813		8,146		8,694		8,439 <sup>a</sup>		10,926		9,062		9,794		8,048		13,494		

Source: Stream survey database, Division of Commercial Fisheries, Kodiak.

<sup>a</sup> Weir was not put back in after September 16, 1996 due to record rainfall. Numbers are estimates based on historical escapement averages.

**Appendix G4.-Immigration of chinook salmon through the Karluk River weir, 1992-2001.**

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %	
20-May	0	0	0	0	33	0	41	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0
21-May	0	0	0	0	45	0	45	0	0	0	51	0	1	0	0	0	0	0	0	0	0	0
22-May	0	0	0	0	65	1	58	0	0	0	144	1	1	0	0	0	0	0	0	0	0	0
23-May	0	0	0	0	128	1	103	1	0	0	209	2	1	0	0	0	0	0	0	0	0	0
24-May	0	0	0	0	142	1	160	1	12	0	237	2	58	1	0	0	0	0	0	0	0	0
25-May	0	0	56	0	223	2	166	1	14	0	298	2	116	1	0	0	8	0	3	0	1	
26-May	0	0	96	1	267	2	238	2	29	0	461	3	230	2	0	0	23	0	9	0	1	
27-May	1	0	212	2	331	3	260	2	49	0	609	5	396	4	27	0	48	0	18	0	2	
28-May	28	0	320	2	405	3	318	3	179	2	848	6	562	5	49	0	118	1	43	1	2	
29-May	63	1	438	3	489	4	328	3	274	3	964	7	595	6	82	1	138	1	141	3	3	
30-May	89	1	714	5	540	4	366	3	399	4	1,105	8	728	7	122	1	179	2	211	5	4	
31-May	183	2	971	7	635	5	405	3	502	5	1,178	9	813	8	189	1	308	3	340	8	5	
01-Jun	270	3	1,517	11	743	6	529	4	679	7	1,421	11	936	9	218	2	464	4	352	8	6	
02-Jun	405	4	1,943	14	855	7	754	6	779	8	1,831	14	1,112	11	377	3	733	7	666	15	9	
03-Jun	529	6	2,233	16	1,204	10	907	7	1,006	10	1,993	15	1,301	13	460	4	886	8	917	21	11	
04-Jun	601	6	2,559	18	1,459	12	1,094	9	1,180	12	2,208	16	1,458	14	651	5	934	9	1,010	23	12	
05-Jun	818	9	3,206	23	1,835	15	1,290	10	1,457	14	2,480	18	1,687	16	840	6	977	9	1,056	24	15	
06-Jun	985	10	3,405	24	2,000	17	1,491	12	1,713	17	2,730	20	1,903	19	1,161	9	1,035	10	1,268	28	17	
07-Jun	1,148	12	3,852	28	2,206	18	1,587	13	1,994	20	3,265	24	2,138	21	1,800	14	1,111	11	1,436	32	19	
08-Jun	1,365	14	4,453	32	2,614	22	1,966	16	2,174	22	3,711	28	2,395	23	2,268	17	2,259	22	1,573	35	23	
09-Jun	1,699	18	4,917	35	2,869	24	2,305	18	2,402	24	3,866	29	2,705	26	3,125	24	2,914	28	1,709	38	26	
10-Jun	1,947	20	5,399	39	3,114	26	2,785	22	2,612	26	4,155	31	2,997	29	4,037	31	3,394	32	1,848	42	30	
11-Jun	2,329	24	5,833	42	3,467	29	3,091	24	2,755	27	4,265	32	3,265	32	4,447	34	3,606	34	2,156	48	33	
12-Jun	2,857	30	6,187	44	4,198	35	3,534	28	2,985	30	4,469	33	3,620	35	4,562	35	3,734	36	2,277	51	36	
13-Jun	3,259	34	6,705	48	4,709	39	4,058	32	3,242	32	5,030	37	4,000	39	5,130	39	4,517	43	2,525	57	40	
14-Jun	3,705	39	7,161	51	5,245	44	4,339	34	4,189	42	5,740	43	4,468	44	5,318	41	4,752	45	2,690	60	44	
15-Jun	4,093	43	7,411	53	5,774	48	4,885	39	4,419	44	6,366	47	4,811	47	5,509	42	5,216	50	2,867	64	48	
16-Jun	4,527	47	7,542	54	6,304	52	5,174	41	4,854	48	6,861	51	5,190	51	5,787	44	5,528	53	3,062	69	51	

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	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jun	4,893	51	7,995	57	6,645	55	5,662	45	5,036	50	7,270	54	5,432	53	6,354	49	6,152	59	3,243	73	55
18-Jun	5,233	55	8,290	59	6,971	58	6,049	48	5,191	52	7,892	59	5,826	57	6,952	53	6,636	63	3,391	76	58
19-Jun	5,609	58	8,935	64	7,143	59	6,495	51	5,465	54	8,510	63	6,030	59	7,388	57	6,813	65	3,434	77	61
20-Jun	5,988	62	9,250	66	7,464	62	6,970	55	5,580	56	9,353	70	6,828	67	7,715	59	7,133	68	3,528	79	64
21-Jun	5,274	55	9,568	69	7,816	65	7,589	60	6,024	60	9,715	72	6,911	67	7,876	60	7,340	70	3,641	82	66
22-Jun	6,542	68	9,965	71	8,194	68	7,859	62	6,565	65	10,027	75	7,275	71	8,508	65	7,429	71	3,725	84	70
23-Jun	6,803	71	10,526	75	8,373	69	8,303	66	7,048	70	10,287	76	7,380	72	8,940	68	7,518	72	3,861	87	73
24-Jun	6,991	73	10,721	77	8,645	72	8,776	69	7,374	73	10,856	81	7,431	73	9,145	70	7,845	75	3,980	89	75
25-Jun	7,184	75	11,008	79	9,014	75	9,105	72	7,651	76	11,309	84	7,838	77	9,498	73	8,220	79	4,060	91	78
26-Jun	7,487	78	11,325	81	9,205	76	9,432	75	7,766	77	11,404	85	8,117	79	9,817	75	8,784	84	4,067	91	80
27-Jun	7,779	81	11,505	83	9,648	80	9,710	77	8,031	80	11,429	85	8,449	83	10,149	78	8,806	84	4,086	92	82
28-Jun	7,968	83	11,668	84	9,835	82	9,875	78	8,160	81	11,505	86	8,795	86	10,491	80	9,069	87	4,086	92	84
29-Jun	8,159	85	11,793	85	10,107	84	10,092	80	8,397	84	11,547	86	8,856	86	10,792	83	9,199	88	4,104	92	85
30-Jun	8,332	87	11,978	86	10,344	86	10,251	81	8,671	86	11,752	87	8,961	88	10,984	84	9,281	89	4,119	92	87
01-Jul	8,475	88	12,184	87	10,427	87	10,672	84	8,696	87	12,189	91	9,094	89	11,169	86	9,435	90	4,124	93	88
02-Jul	8,583	89	12,569	90	10,533	87	10,920	86	8,713	87	12,409	92	9,239	90	11,283	86	9,503	91	4,133	93	89
03-Jul	8,658	90	12,708	91	10,631	88	11,082	88	8,735	87	12,469	93	9,275	91	11,452	88	9,616	92	4,138	93	90
04-Jul	8,744	91	12,845	92	10,767	89	11,265	89	8,791	87	12,531	93	9,337	91	11,602	89	9,673	92	4,142	93	91
05-Jul	8,810	92	12,925	93	10,829	90	11,350	90	8,809	88	12,565	93	9,438	92	11,716	90	9,756	93	4,175	94	91
06-Jul	8,853	92	13,039	94	10,876	90	11,419	90	8,817	88	12,609	94	9,469	92	11,758	90	9,790	94	4,180	94	92
07-Jul	8,929	93	13,146	94	10,923	91	11,509	91	8,818	88	12,844	95	9,490	93	12,101	93	9,862	94	4,211	95	93
08-Jul	8,977	94	13,191	95	11,046	92	11,643	92	8,828	88	12,905	96	9,588	94	12,197	93	9,897	95	4,220	95	93
09-Jul	8,996	94	13,248	95	11,078	92	11,686	92	8,836	88	12,934	96	9,729	95	12,283	94	9,941	95	4,222	95	94
10-Jul	9,023	94	13,302	95	11,138	92	11,839	94	8,842	88	12,962	96	9,853	96	12,341	94	9,957	95	4,231	95	94
11-Jul	9,094	95	13,359	96	11,189	93	11,915	94	8,844	88	13,041	97	9,901	97	12,442	95	9,974	95	4,235	95	94
12-Jul	9,129	95	13,385	96	11,230	93	11,955	94	8,859	88	13,054	97	9,921	97	12,459	95	9,987	95	4,252	95	95
13-Jul	9,141	95	13,408	96	11,276	94	12,006	95	8,860	88	13,058	97	9,933	97	12,471	95	10,008	96	4,262	96	95
14-Jul	9,181	96	13,470	97	11,301	94	12,072	95	8,862	88	13,065	97	9,942	97	12,597	96	10,015	96	4,279	96	95
15-Jul	9,201	96	13,495	97	11,327	94	12,111	96	8,864	88	13,078	97	9,945	97	12,637	97	10,020	96	4,293	96	95
16-Jul	9,215	96	13,532	97	11,347	94	12,144	96	8,880	88	13,108	97	9,951	97	12,657	97	10,061	96	4,296	96	96

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	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		1992-2001
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jul	9,241	96	13,547	97	11,355	94	12,183	96	8,904	89	13,116	98	9,953	97	12,672	97	10,070	96	4,296	96	96
18-Jul	9,275	97	13,589	97	11,357	94	12,204	96	8,930	89	13,123	98	9,955	97	12,700	97	10,074	96	4,297	96	96
19-Jul	9,294	97	13,607	98	11,365	94	12,211	96	8,944	89	13,137	98	9,955	97	12,737	98	10,099	97	4,309	97	96
20-Jul	9,309	97	13,623	98	11,367	94	12,239	97	9,357	93	13,137	98	9,956	97	12,764	98	10,101	97	4,320	97	96
21-Jul	9,318	97	13,648	98	11,420	95	12,266	97	9,383	93	13,151	98	9,984	98	12,786	98	10,107	97	4,321	97	97
22-Jul	9,335	97	13,694	98	11,472	95	12,285	97	9,515	95	13,152	98	10,000	98	12,796	98	10,123	97	4,334	97	97
23-Jul	9,341	97	13,728	98	11,538	96	12,298	97	9,602	96	13,156	98	10,014	98	12,811	98	10,128	97	4,339	97	97
24-Jul	9,350	97	13,736	99	11,623	96	12,314	97	9,608	96	13,233	98	10,044	98	12,835	98	10,136	97	4,361	98	97
25-Jul	9,360	97	13,759	99	11,687	97	12,345	98	9,638	96	13,233	98	10,052	98	12,841	98	10,168	97	4,365	98	98
26-Jul	9,371	98	13,765	99	11,697	97	12,375	98	9,650	96	13,233	98	10,056	98	12,862	98	10,170	97	4,370	98	98
27-Jul	9,394	98	13,768	99	11,728	97	12,393	98	9,656	96	13,234	98	10,059	98	12,892	99	10,172	97	4,372	98	98
28-Jul	9,404	98	13,776	99	11,770	98	12,418	98	9,755	97	13,239	98	10,078	98	12,894	99	10,191	97	4,373	98	98
29-Jul	9,433	98	13,788	99	11,777	98	12,472	99	9,796	97	13,242	98	10,083	98	12,918	99	10,220	98	4,379	98	98
30-Jul	9,450	98	13,789	99	11,797	98	12,481	99	9,801	98	13,243	98	10,094	99	12,929	99	10,226	98	4,385	98	98
31-Jul	9,480	99	13,803	99	11,814	98	12,485	99	9,850	98	13,269	99	10,122	99	12,930	99	10,288	98	4,394	99	99
01-Aug	9,499	99	13,827	99	11,823	98	12,489	99	9,886	98	13,295	99	10,132	99	13,057	100	10,458	100	4,453	100	99
	9,601		13,944		12,049		12,657		10,051		13,450		10,239		13,063		10,460		4,453		

**Appendix G5.-Immigration of chinook salmon through the Ayakulik River weir, 1992-2001.**

	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-May	0	0	0	0	15	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0
22-May	205	2	0	0	39	0	0	0	0	0	0	0	35	0	0	51	0	15	0	0	0
23-May	361	4	21	0	63	1	0	0	0	0	1	0	67	0	0	131	1	44	0	0	1
24-May	800	9	28	0	88	1	0	0	25	0	12	0	148	1	0	131	1	58	0	0	1
25-May	885	10	37	0	100	1	0	0	65	1	24	0	177	1	0	155	1	101	1	0	1
26-May	1,042	11	44	1	129	1	0	0	73	1	34	0	236	2	0	197	1	152	1	0	2
27-May	1,351	15	103	1	158	2	2	0	75	1	56	0	422	3	46	0	210	1	177	1	2
28-May	1,588	17	241	3	204	2	11	0	91	1	68	0	604	4	48	0	215	1	399	3	3
29-May	1,699	19	326	4	210	2	22	0	111	1	70	0	732	5	55	0	216	1	797	6	4
30-May	1,836	20	370	5	265	3	29	0	123	1	123	1	848	6	55	0	262	1	1,079	8	5
31-May	2,012	22	821	11	294	3	41	0	318	3	132	1	1,049	7	55	0	282	1	1,227	9	6
01-Jun	2,045	22	1,927	25	328	4	127	1	622	6	151	1	1,413	10	55	0	437	2	1,476	11	8
02-Jun	2,385	26	3,118	40	568	6	349	2	961	9	215	1	1,858	13	71	1	464	2	1,760	13	11
03-Jun	2,879	32	3,225	41	694	8	532	3	1,642	16	316	2	2,170	15	405	3	581	3	3,277	24	15
04-Jun	2,957	32	3,352	43	1,304	14	2,818	16	1,822	18	483	3	2,536	18	537	4	2,047	10	3,657	26	18
05-Jun	3,030	33	3,585	46	1,565	17	3,602	20	2,020	20	706	5	2,941	21	610	5	3,434	17	5,325	38	22
06-Jun	3,384	37	3,623	46	1,636	18	4,111	23	2,988	29	920	6	3,477	25	634	5	4,810	23	6,952	50	26
07-Jun	4,073	45	3,686	47	1,860	20	4,397	25	3,317	32	1,344	9	3,940	28	1,089	8	5,050	25	8,179	59	30
08-Jun	4,273	47	3,708	47	2,731	30	5,167	29	3,404	33	1,429	10	4,347	31	1,298	10	5,129	25	9,115	65	33
09-Jun	4,414	48	3,861	49	3,257	36	5,466	31	3,413	33	1,741	12	4,825	34	1,857	14	5,312	26	9,605	69	35
10-Jun	4,480	49	4,154	53	3,641	40	5,671	32	3,473	34	3,019	21	5,328	38	2,447	18	6,561	32	9,889	71	39
11-Jun	4,624	51	4,537	58	3,797	42	5,936	34	3,511	34	3,978	28	5,799	41	3,405	25	6,981	34	10,204	73	42
12-Jun	4,848	53	4,807	61	4,293	47	6,245	35	3,585	35	4,553	32	6,147	44	6,148	46	8,204	40	10,450	75	47
13-Jun	5,115	56	5,041	64	4,321	47	7,213	41	3,740	36	4,782	33	6,612	47	8,135	60	9,545	46	10,592	76	51
14-Jun	5,261	58	5,160	66	4,544	50	7,470	42	4,080	39	4,905	34	6,840	49	8,863	66	10,379	51	10,669	77	53
15-Jun	5,435	59	5,255	67	4,825	53	7,800	44	4,773	46	5,547	39	7,150	51	9,190	68	10,994	54	10,721	77	56
16-Jun	5,626	62	5,437	70	4,933	54	8,160	46	5,579	54	6,038	42	7,575	54	9,256	69	13,324	65	10,818	78	59

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	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jun	5,807	64	5,553	71	5,155	56	8,633	49	6,015	58	6,723	47	7,972	57	9,329	69	15,467	75	10,948	79	62
18-Jun	5,901	65	5,664	72	5,347	59	9,021	51	6,113	59	7,095	49	8,225	59	9,586	71	15,913	78	11,003	79	64
19-Jun	6,085	67	5,834	75	5,461	60	9,368	53	6,161	60	7,428	52	8,585	61	9,953	74	16,077	78	11,283	81	66
20-Jun	6,116	67	5,917	76	5,536	61	9,781	55	6,428	62	7,814	54	8,779	63	10,050	74	16,425	80	11,421	82	67
21-Jun	6,520	71	5,936	76	5,771	63	11,126	63	7,144	69	8,213	57	9,327	66	10,113	75	16,663	81	11,504	83	70
22-Jun	6,672	73	6,041	77	5,931	65	11,797	67	7,583	73	8,530	59	9,717	69	10,257	76	17,347	85	11,963	86	73
23-Jun	7,189	79	6,075	78	6,190	68	12,269	69	8,746	85	10,077	70	10,360	74	10,414	77	17,389	85	12,147	87	77
24-Jun	7,430	81	6,118	78	6,789	74	13,292	75	8,819	85	12,048	84	10,938	78	10,460	77	18,189	89	12,335	89	81
25-Jun	7,527	82	6,490	83	7,229	79	14,207	80	8,915	86	12,560	87	11,380	81	10,559	78	18,582	91	12,376	89	84
26-Jun	7,667	84	6,732	86	7,724	85	14,618	83	9,010	87	12,626	88	11,645	83	10,926	81	18,724	91	12,436	89	86
27-Jun	7,800	85	6,778	87	7,906	87	15,177	86	9,083	88	12,778	89	11,984	85	11,438	85	19,087	93	12,553	90	87
28-Jun	7,933	87	6,872	88	7,990	87	15,557	88	9,269	90	12,839	89	12,247	87	11,631	86	19,195	94	12,671	91	89
29-Jun	8,067	88	6,908	88	8,093	89	15,702	89	9,434	91	12,881	90	12,453	89	11,862	88	19,462	95	12,899	93	90
30-Jun	8,153	89	6,947	89	8,261	90	16,291	92	9,557	92	12,964	90	12,664	90	12,000	89	19,583	95	12,971	93	91
01-Jul	8,221	90	6,960	89	8,443	92	16,446	93	9,582	93	13,177	92	12,816	91	12,116	90	19,620	96	13,128	94	92
02-Jul	8,285	91	7,186	92	8,522	93	16,676	94	9,642	93	13,418	93	13,035	93	12,226	91	19,722	96	13,286	95	93
03-Jul	8,395	92	7,234	93	8,619	94	16,771	95	9,750	94	13,577	95	13,212	94	12,230	91	19,772	96	13,325	96	94
04-Jul	8,474	93	7,266	93	8,661	95	16,810	95	9,809	95	13,701	95	13,348	95	12,266	91	19,795	96	13,397	96	94
05-Jul	8,503	93	7,288	93	8,691	95	16,850	95	9,858	95	13,766	96	13,408	96	12,366	92	19,888	97	13,397	96	95
06-Jul	8,581	94	7,368	94	8,740	96	16,914	96	9,988	97	13,852	96	13,511	96	12,392	92	19,990	97	13,496	97	95
07-Jul	8,660	95	7,408	95	8,806	96	17,155	97	10,087	98	13,928	97	13,601	97	12,465	92	19,992	97	13,541	97	96
08-Jul	8,750	96	7,438	95	8,832	97	17,182	97	10,132	98	13,980	97	13,690	98	12,522	93	19,992	97	13,549	97	96
09-Jul	8,755	96	7,471	96	8,873	97	17,220	97	10,153	98	14,035	98	13,731	98	12,757	94	20,046	98	13,598	98	97
10-Jul	8,768	96	7,530	96	8,942	98	17,315	98	10,153	98	14,094	98	13,779	98	12,884	95	20,116	98	13,650	98	97
11-Jul	8,840	97	7,547	97	8,973	98	17,359	98	10,172	98	14,120	98	13,825	98	12,965	96	20,140	98	13,678	98	98
12-Jul	8,891	97	7,573	97	8,990	98	17,376	98	10,194	99	14,153	99	13,862	99	13,089	97	20,200	98	13,700	98	98
13-Jul	8,916	98	7,587	97	9,008	99	17,414	98	10,194	99	14,165	99	13,872	99	13,129	97	20,253	99	13,755	99	98
14-Jul	8,958	98	7,615	97	9,025	99	17,420	98	10,202	99	14,177	99	13,904	99	13,165	97	20,287	99	13,765	99	98

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	<u>1992</u>		<u>1993</u>		<u>1994</u>		<u>1995</u>		<u>1996</u>		<u>1997</u>		<u>1998</u>		<u>1999</u>		<u>2000</u>		<u>2001</u>		<u>1992-2001</u>
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
15-Jul	8,967	98	7,649	98	9,036	99	17,459	99	10,211	99	14,181	99	13,916	99	13,188	98	20,292	99	13,791	99	99
16-Jul	8,984	98	7,659	98	9,054	99	17,490	99	10,227	99	14,191	99	13,924	99	13,188	98	20,325	99	13,803	99	99
17-Jul	9,003	99	7,682	98	9,069	99	17,512	99	10,234	99	14,212	99	13,933	99	13,195	98	20,329	99	13,825	99	99
18-Jul	9,018	99	7,704	99	9,082	99	17,516	99	10,249	99	14,216	99	13,946	99	13,203	98	20,334	99	13,836	99	99
19-Jul	9,020	99	7,704	99	9,088	99	17,549	99	10,256	99	14,248	99	13,969	99	13,203	98	20,365	99	13,843	99	99
20-Jul	9,030	99	7,706	99	9,094	99	17,577	99	10,260	99	14,274	99	13,973	99	13,287	98	20,378	99	13,843	99	99
21-Jul	9,054	99	7,708	99	9,099	99	17,581	99	10,266	99	14,280	99	13,977	99	13,297	98	20,396	99	13,844	99	99
22-Jul	9,060	99	7,713	99	9,104	99	17,585	99	10,289	99	14,293	99	13,978	99	13,347	99	20,407	99	13,846	99	99
23-Jul	9,060	99	7,716	99	9,105	99	17,599	99	10,291	99	14,299	99	13,981	99	13,371	99	20,421	99	13,849	99	99
24-Jul	9,069	99	7,749	99	9,108	99	17,610	99	10,293	99	14,302	99	13,984	99	13,376	99	20,437	100	13,856	99	99
25-Jul	9,076	99	7,749	99	9,111	99	17,618	99	10,298	99	14,303	99	13,986	99	13,386	99	20,445	100	13,877	100	99
26-Jul	9,080	99	7,757	99	9,111	99	17,620	99	10,301	99	14,308	99	13,992	99	13,404	99	20,452	100	13,885	100	99
27-Jul	9,081	99	7,758	99	9,113	99	17,628	99	10,305	99	14,314	99	13,993	99	13,435	99	20,463	100	13,891	100	99
28-Jul	9,086	99	7,771	99	9,115	99	17,637	99	10,307	99	14,322	99	14,004	99	13,446	100	20,477	100	13,892	100	99
29-Jul	9,088	99	7,778	99	9,116	99	17,649	99	10,308	99	14,323	99	14,005	99	13,449	100	20,479	100	13,893	100	99
30-Jul	9,091	99	7,781	99	9,118	99	17,651	99	10,314	99	14,325	99	14,009	99	13,467	100	20,479	100	13,900	100	99
31-Jul	9,094	99	7,781	99	9,118	99	17,659	99	10,316	99	14,325	99	14,013	99	13,474	100	20,483	100	13,901	100	99
01-Aug	9,098	99	7,788	99	9,120	99	17,664	99	10,321	99	14,326	99	14,017	99	13,475	100	20,487	100	13,902	100	99
Season																					
Total	9,135		7,819		9,138		17,701		10,344		14,357		14,038		13,503		20,527		13,929		

**Appendix G6.-Chignik River chinook salmon escapement, time of entry, 1992-2001.**

Date	1992 % Total	1993 % Total	1994 <sup>a</sup> % Total	1995 % Total	1996 % Total	1997 % Total	1998 % Total	1999 % Total	2000 % Total	2001 % Total	1992-2001 % Avg.
20-Jun	1	1	1	1	2	1	2	0	1	0	1
21-Jun	1	1	1	1	2	2	3	0	1	0	1
22-Jun	1	1	1	1	3	3	4	1	1	1	2
23-Jun	1	2	1	1	3	3	4	1	2	1	2
24-Jun	2	4	2	1	4	3	5	2	2	1	3
25-Jun	4	5	2	1	4	4	6	2	3	1	3
26-Jun	4	7	2	1	6	6	7	3	4	1	4
27-Jun	5	9	2	2	9	7	9	3	5	1	5
28-Jun	9	11	4	3	11	9	12	3	7	2	7
29-Jun	11	14	6	3	14	10	14	4	9	3	9
30-Jun	15	16	9	3	16	12	16	5	11	4	11
01-Jul	18	17	10	3	19	14	17	6	13	8	13
02-Jul	21	19	11	3	22	15	18	8	15	16	15
03-Jul	23	23	14	3	24	16	20	9	18	21	17
04-Jul	28	29	19	4	25	18	22	10	21	24	20
05-Jul	34	33	25	5	29	20	25	12	24	26	23
06-Jul	37	38	30	16	31	22	26	13	29	28	27
07-Jul	41	42	32	18	34	26	31	17	32	32	31
08-Jul	48	43	38	23	35	30	36	19	37	36	34
09-Jul	53	44	43	29	37	37	36	20	41	38	38
10-Jul	58	49	49	34	44	40	40	22	46	40	42
11-Jul	64	56	53	36	47	44	42	26	49	42	46
12-Jul	69	61	58	44	51	47	45	30	55	43	50
13-Jul	72	68	61	53	54	49	47	35	59	44	54
14-Jul	75	74	63	58	55	50	49	39	61	47	57
15-Jul	81	77	66	63	58	52	53	46	64	49	61
16-Jul	82	82	73	63	62	56	54	48	66	55	64
17-Jul	84	85	78	65	68	59	58	52	69	60	68
18-Jul	86	88	82	69	72	64	61	53	70	67	71

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Date	1992	1993	1994 <sup>a</sup>	1995	1996	1997	1998	1999	2000	2001	1992-2001	
	% Total	% Total	% Total	% Total	% Total	% Total	% Total	% Total	% Total	% Total	% Total	Avg.
19-Jul	88	93	84	74	74	67	70	59	74	71	75	75
20-Jul	90	95	88	76	77	68	72	61	76	74	78	78
21-Jul	91	95	89	78	78	69	75	64	78	77	79	79
22-Jul	92	95	91	81	80	71	77	66	80	81	81	81
23-Jul	93	96	93	83	82	75	79	69	85	83	84	84
24-Jul	94	97	95	84	84	78	81	73	88	86	86	86
25-Jul	95	97	96	87	86	80	83	74	88	88	87	87
26-Jul	96	98	97	89	87	80	84	78	88	89	89	89
27-Jul	97	98	98	91	89	80	85	80	89	90	90	90
28-Jul	97	99	99	91	90	82	85	81	90	90	90	90
29-Jul	99	99	99	92	91	84	87	88	91	91	92	92
30-Jul	99	99	99	92	92	85	88	90	92	91	93	93
31-Jul	100	100	100	100	100	88	88	91	92	93	95	95
Season												
Total	3,806	1,946	3,016	4,288	3,488	3,824	3,075	3,728	4,285	3,028		

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

<sup>a</sup> 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 salmon and abundance estimates of small chinook were 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, 1989-2001**

**Appendix H1.-1989 KMA emergency orders.**

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

**Appendix H2.-1990 KMA emergency orders.**

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

**Appendix H3.-1991 KMA emergency orders.**

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

**Appendix H4.-1992 KMA emergency orders.**

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

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

**Appendix H5.-1993 KMA emergency orders.**

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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.

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### Appendix H6.-1994 KMA emergency orders.

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

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

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**Appendix H7.-1995 KMA emergency orders.**

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

**Appendix H8.-1996 KMA emergency orders.**

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-42-96	9/9/96	<p>The Department operates a weir on the Buskin River in order to enumerate coho salmon. A weir count of 6,000 coho by October 1 is necessary in order to achieve escapement goals and ensure the reproductive potential of the stock is not jeopardized. Due to the sporadic run timing of the return, the opening date for salmon fishing in the upper Buskin drainage is often adjusted from the established regulation date in order to account for variations in run timing and size.</p> <p>As of September 4, 3,300 coho have been counted through the weir, and it is projected that the final weir count on October 1 will significantly exceed the 6,000 fish goal. Because of the early run timing and strength of the return, the entire Buskin River will open to salmon fishing on September 9, seven days before the regulation opening date.</p>

### Appendix H9.-1998 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-31-98	9/16/98	<p>This emergency order closes the American river to sport fishing for salmon. The American river is now closed to salmon fishing, including waters both upstream and downstream of the highway bridge. The coho escapement goal for the American River is 300 to 400 fish. Stream surveys conducted on September 8, 13 and 14 counted 14, 33 and 80 coho, respectively. Coho returns to road system streams usually reach the halfway mark by mid September. It appears likely that the spawning goal will not be reached. Closing the river to sport fishing for salmon will allow for more fish to spawn and come closer to achieving the escapement goal.</p>
2-SS-4-31-98	10/8/98	<p>This emergency order opens the entire American River to sport fishing for salmon. The coho escapement goal for the American River is 300 to 400 fish. Stream surveys conducted on September 8, 13 and 14 counted 14, 33 and 80 coho, respectively. It appeared likely that the coho escapement goal would not be achieved, so on September 16 the American River was closed to salmon fishing. In early October a survey documented a coho count of over 600 fish. A department research crew, which has been beach seining in the river, has documented that over half the coho are still bright silver, indicating that they have just recently entered the river. Because the coho return has recently increased, spawning goals will still be achieved if sport harvest occurs. For this reason the American River is now open to sport fishing for salmon.</p>

**Appendix H10.-1999 KMA emergency orders.**

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Emergency Order Number	Effective Date	Action/Justification
2-SF-4-23-99	9/22/99	<p>Closes Summer Bay Lake drainage to all sport fishing. The closed area includes the lake, its tributaries and outlet creek.</p> <p>The Alaska Department of Fish and Game operated a weir on Summer Bay Creek in 1998 and 1999 to enumerate salmon smolt and adults. During 1998, 101 adult coho salmon and 296 coho salmon smolt were counted through the weir. During 1998 the department also conducted three foot surveys of the major tributary to Summer Bay Lake and counted only one adult coho salmon. In 1999 the department weir has counted 20 adult salmon through September 9 when the project was terminated. Coho salmon smolt counts in 1999 totaled 1,980 fish.</p> <p>This information indicates that coho salmon abundance in the Summer Bay Lake drainage is very small and that the 1999 coho salmon return is even smaller than the 1998 return. Sport fishing is being closed in order to reduce fishing mortality on this very small coho salmon population. Allowing more coho salmon to spawn in the Summer Bay Lake drainage in 1999 will help to rebuild and/or sustain this small coho population.</p>

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**Appendix H11.-2000 KMA emergency orders.**

Emergency Order Number	Effective Date	Action/Justification
2-SF-4-20-00	8/28/2000	<p>Closes Summer Bay Lake drainage to all sport fishing. The closed area includes the lake, its tributaries and outlet creek.</p> <p>The Alaska Department of Fish and Game has operated a weir on Summer Bay Creek since 1998 to enumerate salmon smolt and adults. Adult coho counts totaled 101 and 20 in 1998 and 1999, respectively. As of August 22, 2000 only 11 adult coho have been counted. Coho smolt enumerated in 1998 and 1999 totaled 296 and 1,980 fish, respectively. As of August 22, 2000 only 505 coho smolt have been counted. This information indicates that coho salmon abundance in the Summer Bay Lake drainage is very small and there is a trend of depressed production. Sport fishing is being closed in order to reduce fishing mortality on this very small coho salmon population. Allowing more coho salmon to spawn in the Summer Bay lake drainage in 2000 will help to rebuild and/or sustain this small coho population.</p>
S-SS-4-21-00	9/16/2000	<p>Extends the current closure which is in effect for streams flowing into Monashka and Chiniak Bays. These streams are closed to salmon fishing upstream of the highway, with the exception of the Buskin River which is closed upstream of Bridge #1. This closure has been in effect since August 1 and will remain in effect until further notice.</p> <p>The coho salmon escapement at the Buskin River weir through Wednesday, September 13 was 2,190 fish. Under average run timing, a count of 3,000</p>

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Emergency Order Number	Effective Date	Action/Justification
		<p>fish should have occurred by this date in order to assure that the minimum escapement goal for the season of 6,000 coho is reached. Extreme low water conditions usually delay coho salmon from entering streams. This has been the case with most Kodiak road system streams this year. Because not enough coho salmon have entered the rivers to ensure escapement goals will be met, the current upriver salmon fishing closure will be extended until further notice.</p>

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**Appendix H12.-2001 KMA emergency orders.**

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-08-01	6/23/2001	<p>Reduces the bag and possession limit for king salmon in the Karluk River drainage (including Karluk Lagoon) to one per day and one in possession, 20 inches or greater in length. The biological escapement goal range for king salmon in the Karluk River drainage is 4,500 to 8,000 fish. The sport fishery harvests approximately 1,500 king salmon above the weir during an average year. The current weir count as of June 20, 2001 (3,628 fish), and the 10-year average time of entry for this date (62.4% of the return) allows us to project that approximately 5,700 king salmon will enter the Karluk River this year. If an average sport fish harvest occurs, the minimum spawning goal will not be achieved. In order to reduce the sport fish harvest so that the minimum king salmon escapement goal can be achieved, the bag and possession limit must be reduced from three king salmon per day and in possession, of which only two may be over 28 inches in length, to one per day and one in possession, of which only two may be over 28 inches in length. This restriction becomes effective in the entire Karluk Drainage, including Karluk Lagoon, at 12:01 a.m., Saturday, June 23, 2001. It is anticipated that this restriction to the recreational fishery will provide an additional 300 to 500 king salmon to the spawning escapement.</p>

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**Appendix H12.-Page 2 of 3.**

Emergency Order Number	Effective Date	Action/Justification
2-RS-4-14-01	6/30/2001	<p>Reduces the bag and possession limits for sockeye salmon in Pauls Bay and the Pauls Bay River Drainage as well as Afognak Bay and the Afognak River Drainage to two sockeye salmon per day and in possession.</p> <p>Sockeye salmon weir counts indicate that the escapement into both the Afognak River drainage and the Pauls Bay drainage are below average and escapement goals may not be achieved. In order to reduce the sport fish harvest, thereby increasing escapement, the bag and possession limits will be reduced in these two areas. The daily bag and possession limits will be reduced from 5 per day and 10 in possession to 2 sockeye per day and 2 in possession.</p>
2-KS-4-16-01	7/9/2001	<p>Closes king salmon fishing in the Karluk River drainage (including Karluk Lagoon). King salmon may not be possessed or retained; all king salmon caught must be released immediately.</p> <p>King salmon escapement through the Karluk weir has continued to decline. Under normal run timing over 90% of the return has entered the river. As of July 2, only 4,250 fish have been counted. The biological escapement goal range for king salmon in the Karluk drainage is 4,500-8,000 fish. The sport fishery harvests approximately 1,500 fish above the weir during an average year. Although inriver removals of king salmon by the sport fishery have been reduced as a result of an earlier restriction in the daily bag and possession limit, current total run projections indicate that further conservation measures are</p>

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**Appendix H12.-Page 3 of 3.**

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-23-01	9/15/2001	<p>warranted. In order to reduce the harvest of king salmon in the Karluk drainage and come closer to the minimum spawning goal of 4,500 fish, the king salmon fishery will be completely closed beginning Monday, July 9. Additionally, in order to reduce the incidental harvest of king salmon during the sockeye salmon sport fishery, the use of bait in the Karluk drainage will be prohibited from July 9 through August 15, 2001.</p> <p>All salt waters included within 250 yards of the terminus of the Summer Bay Creek will be closed to sport fishing.</p> <p>The Alaska Department of Fish and Game has operated a weir on Summer Bay Creek annually since 1998 to enumerate salmon smolt and adults. During 2000, 709 coho salmon smolt were counted through the weir, which produced an estimate of 125 adult coho salmon returning in 2001. As of September 12, 2001, only 23 adult coho salmon have been counted through the department weir on Summer Bay Creek. This information indicates that the current abundance of adult coho salmon returning to the Summer Bay Lake drainage is very small and that additional removals of adult fish by the sport fishery occurring in Summer Bay may jeopardize future sustainability of the stock. Sport fishing is being closed in order to reduce fishing mortality on this very small coho salmon population and to maximize potential adult spawning in the Summer Bay Lake drainage.</p>