Fishery Management Report No. 97-1

Annual Management Report for the Anchorage Area, 1995

by

Barry Stratton

and

Paul Cyr

March 1997

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

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

General

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

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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

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AREA DESCRIPTION

The Anchorage sport fish management area consists of all waters flowing into Knik and Turnagain arms from the Eklutna River drainage in the north to Ingram Creek in the south (Figure 1). Local communities include Anchorage, Eagle River, Chugiak, Birchwood, Peters Creek, Eklutna, Indian, Bird, Girdwood, and Portage; and two military reservations, Elmendorf Air Force Base, and Fort Richardson Army Base. Of Alaska's 545,774 residents (April 1990 national census figures), 42% reside in the Anchorage area. Access to area sport fisheries is primarily by road. Anchorage area land managers include private individuals, Municipality of Anchorage (MOA), Alaska Railroad (ARR), Alaska Department of Natural Resources (DNR), U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), U.S. military, and native organizations.

Management and research functions for Anchorage area sport fisheries are conducted by Alaska Department of Fish and Game (ADF&G), Division of Sport Fish staff from the Anchorage regional office. Division of Sport Fish staff involved in 1995 Anchorage area programs included Regional Supervisor Doug McBride, Regional Management Coordinator Kelly Hepler, Area Management Biologist Barry Stratton, Assistant Area Management Biologist Paul Cyr, Fish and Wildlife Technicians Mike Seine and Don Perrin, and staff from Elmendorf and Fort Richardson hatcheries.

Codified regulations for Anchorage area sport fisheries are found in the Susitna-West Cook Inlet Section under Chapter 61 of the Alaska Administrative Code (AAC). For the purposes of effort and harvest reporting, the Statewide Harvest Survey (SWHS) by Mills (1979-1994) and Howe et al. (1995) are used. Anchorage area fisheries are summarized under Area L in these reports.

FISHERIES RESOURCES

The Anchorage area offers unique and diverse recreational fishing opportunities in an urban environment. Major area sport fisheries occur in fresh water and target three species of salmon (chinook or king *Oncorhynchus tshawytscha*, coho or silver *O. kisutch*, and pink or humpy *O. gorbuscha*), rainbow trout *O. mykiss*, landlocked (chinook and coho) salmon, and Dolly Varden *Salvelinus malma*. Wild stock salmon sport fisheries occur in several Turnagain Arm streams including Bird Creek (pink salmon) and Twentymile River (coho salmon). Sport fisheries have been established in Ship Creek with stocked chinook and coho salmon. Eagle River was stocked with chinook salmon from 1990-1994 in an attempt to develop another urban king salmon sport fishery. This program was canceled in spring 1995. Stocked coho salmon fisheries have been established in Campbell and Bird creeks. Turnagain Arm supports a large personal use eulachon *Thaleichthys pacificus* (hooligan or smelt) fishery. The Anchorage area stocked lake program includes over 25 lakes stocked with rainbow trout; some of these lakes are also stocked with landlocked salmon, Arctic char *Salvelinus alpinus*, and Arctic grayling *Thymallus arcticus*. Two streams, Campbell and Chester creeks, are stocked with rainbow trout. Two lakes, Sand and Lower Fire, have established populations of northern pike *Esox lucius* from illegal introductions. Alaska blackfish *Dallia pectoralis* are also found in most Anchorage area lakes.

figure 1 full page

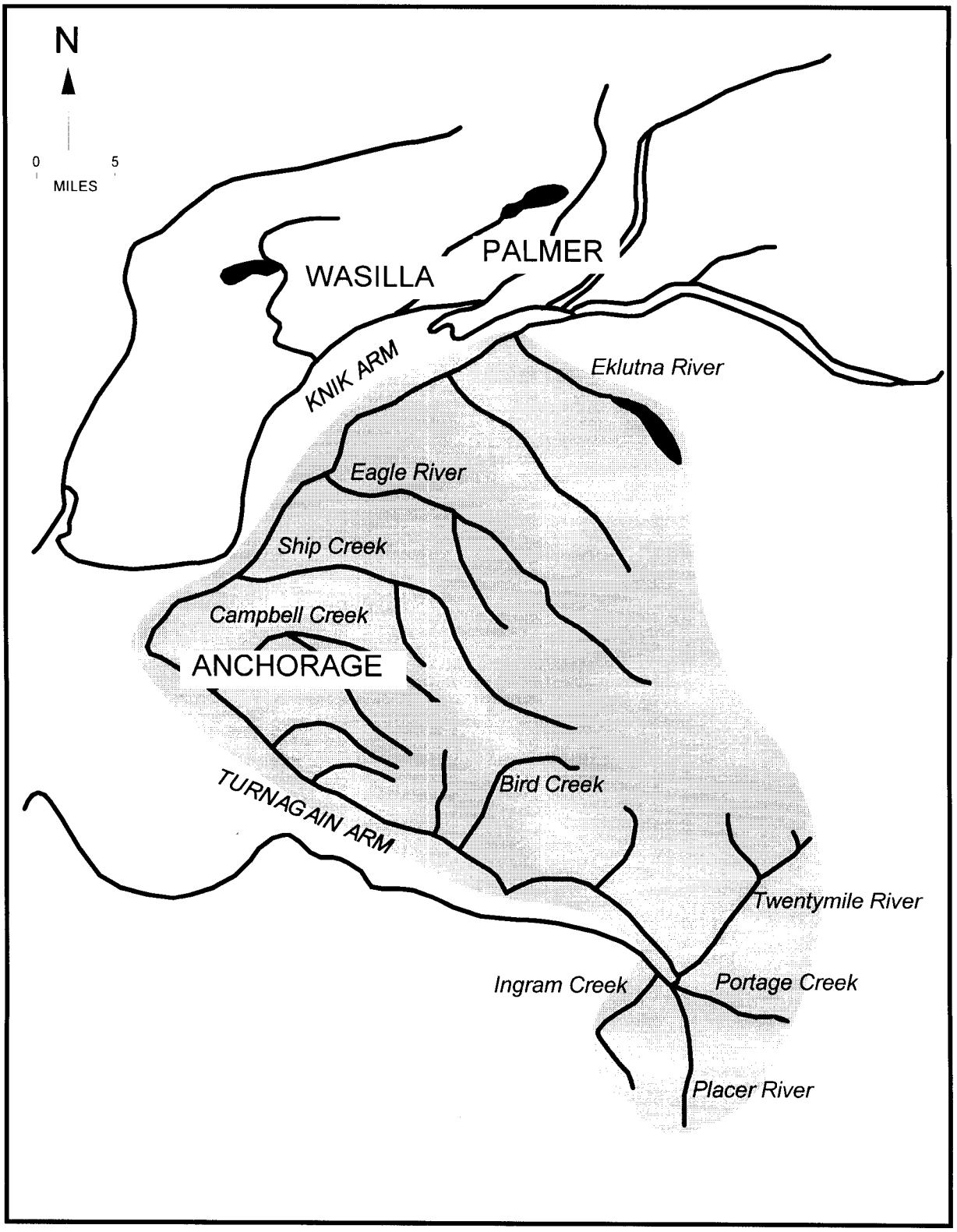

Figure 1.-Map of the Anchorage Management Area.

ALASKA BOARD OF FISHERIES ACTIVITIES

The development of fishing regulations for Anchorage Management Area sport fisheries occurs within the established Alaska Board of Fisheries (BOF) process. This process provides for public input concerning regulatory changes and allocation issues through local fish and game advisory committee participation and testimony to BOF. Local advisory committees have been established throughout Alaska to assist BOF with assessing fisheries and wildlife issues. Active committees usually meet in the fall before BOF meetings. ADF&G staff from all divisions are often invited to the advisory committee meetings. In this way, advisory committee meetings allow for direct public interaction with staff involved with local resource issues. The Anchorage Fish and Game Advisory Committee serves the Anchorage area. Under the current operating schedule, BOF meets on a 3-year cycle. Proposals regarding Anchorage area fisheries were last discussed during the 1992/1993 BOF meetings. Detailed summaries of BOF actions in 1992 can be found in Hoffmann et al. (1993). Proposals for Anchorage area sport fisheries will be discussed by BOF at their February 17-March 2, 1996 meeting.

Historic regulation summaries for Campbell Creek, Eagle River, and Ship Creek are presented in Appendix A.

RECREATIONAL ANGLER EFFORT

In 1994, angler effort in the Anchorage area was estimated at 142,277 angler days (Table 1, Figure 2), about 5% of the total statewide sport fishing effort and 7% of the total southcentral Alaska effort.

Anchorage streams accounted for 52% of the total 1994 Anchorage area effort, lakes accounted for 46%, and saltwater angling represented about 3% (Table 2, Figure 3). Effort expended in Anchorage area streams has almost doubled since 1990 as a direct result of our urban coho salmon stocking program (Table 3, Figure 4). The Ship Creek salmon sport fishery has grown rapidly in recent years. In 1994, Ship Creek accounted for 55% of the Anchorage area stream effort, up from 19% in 1985 before stocked fish became available in the fishery. Other Anchorage area streams that receive substantial effort are Bird Creek (17% of 1994 total stream effort), Campbell Creek (11%), Twentymile River (6%), and Eagle River (4%).

Effort expended in Anchorage area lakes peaked in 1984 at almost 89,000 angler-days (Table 4, Figure 5). Effort appears to have stabilized around 65,000 angler-days from 1991-1994. This decrease of effort in area lakes coincides with the increase of effort in Anchorage area streams. We think some anglers are targeting the more desirable anadromous salmon that are stocked in several area streams. The most popular area lakes in 1994 were Otter (14% of total lake effort), Cheney (11%), Sixmile (9%), Jewel (8%), Clunie (8%), and Mirror (8%) lakes.

Coho salmon comprised the largest anadromous catch by area anglers in 1994 (22,542; Table 5), followed by pink (8,480), chinook (5,504), sockeye (4,276), and chum (1,546). Rainbow trout (100,373) dominated the freshwater species catch followed by landlocked salmon (28,648), Dolly Varden/Arctic char (8,729), and Arctic grayling (2,283; Table 6). In 1994, fishers released most of their chum (89%), pink (77%), and sockeye (63%) salmon catches and their rainbow trout (76%), Arctic grayling (72%), and Dolly Varden/Arctic char (71%) catches (Table 7 and Figure 6). Only 38% of the coho salmon caught in 1994 were released, while anglers released roughly one-half of their chinook and landlocked salmon catches.

Table 1.-Number of angler-days expended in the Anchorage area compared to Southcentral and Statewide, 1977-1994.

Year	Statewide Effort	Southcentral Effort	Anchorage Effort	Anchorage % of Statewide	Anchorage % of S. Central
1977	1,198,486	828,351	55,060	5%	7%
1978	1,285,063	913,417	31,147	2%	3%
1979	1,364,739	1,014,018	65,425	5%	6%
1980	1,488,962	1,072,384	79,665	5%	7%
1981	1,420,172	1,016,731	67,618	5%	7%
1982	1,623,090	1,131,358	82,007	5%	7%
1983	1,732,528	1,212,916	75,596	4%	6%
1984	1,866,837	1,341,658	120,206	6%	9%
1985	1,943,069	1,406,419	96,985	5%	7%
1986	2,071,412	1,518,712	103,672	5%	7%
1987	2,152,886	1,556,050	115,652	5%	7%
1988	2,311,291	1,679,939	115,999	5%	7%
1989	2,264,079	1,583,547	108,593	5%	7%
1990	2,453,284	1,745,110	126,722	5%	7%
1991	2,456,328	1,782,055	118,517	5%	7%
1992	2,540,374	1,889,930	142,830	6%	8%
1993	2,559,408	1,867,233	144,823	6%	8%
1994	2,719,911	1,966,985	142,277	5%	7%

Source: Mills 1979-1994, Howe et al. 1995.

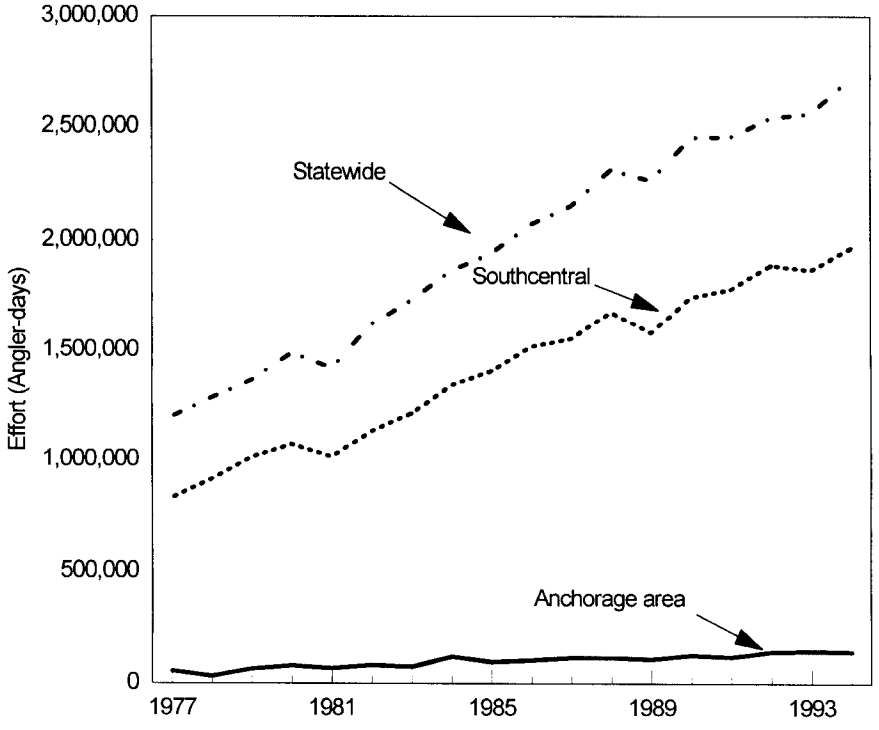

Figure 2.-Number of angler-days expended in the Anchorage area compared to Southcentral and Statewide, 1977-1994.

Table 2.-Components of Anchorage area sport fish effort, 1977-1994.

	Anchorage	Saltwater		Lake		Stream	
Year	Effort	Effort	Percent	Effort	Percent	Effort	Percent
1977	55,060	a		38,784	70%	16,276	30%
1978	31,147	a		24,318	78%	6,829	22%
1979	65,425	a		51,702	79%	13,723	21%
1980	79,665	a		60,630	76%	19,035	24%
1981	67,618	a		52,890	78%	14,728	22%
1982	82,007	a		66,705	81%	15,302	19%
1983	75,596	3,308	4%	56,554	75%	15,734	21%
1984	120,206	5,755	5%	88,887	74%	25,564	21%
1985	96,985	3,103	3%	68,495	71%	25,387	26%
1986	103,672	1,721	2%	70,517	68%	31,434	30%
1987	115,652	1,587	1%	84,444	73%	29,621	26%
1988	115,999	1,190	1%	75,314	65%	39,495	34%
1989	108,593	1,163	1%	74,118	68%	33,312	31%
1990	126,722	2,186	2%	85,715	68%	38,821	31%
1991	118,517	2,828	2%	66,596	56%	49,093	41%
1992	142,830	3,271	2%	71,194	50%	68,365	48%
1993	144,823	5,413	4%	64,997	45%	74,413	51%
1994	142,277	3,602	3%	65,115	46%	73,560	52%

[a] Data not broken out by site but included in total.

Source: Mills 1979-1994, Howe et al. 1995.

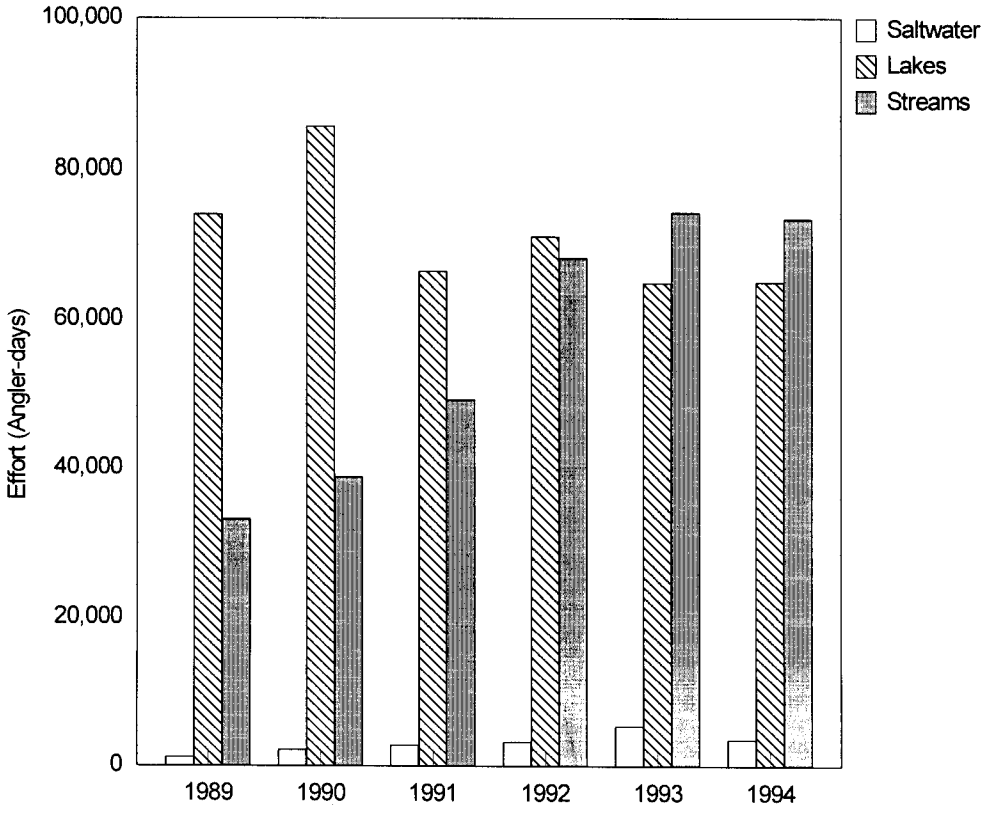

Figure 3.-Components of Anchorage area sport fish effort, 1989-1994.

Table 3.-Angler effort in Anchorage area streams, 1977-1994.

Year	Total Stream Effort	Ship Creek Effort	Ship Creek Percent	Bird Creek Effort	Bird Creek Percent	Campbell Creek Effort	Campbell Creek Percent	Twentymile River Effort	Twentymile River Percent	Eagle River Effort	Eagle River Percent	Other[a] Effort	Other[a] Percent
1977	16,276	1,156	7%	7,389	45%	b	b	6,403	39%	1,328	8%	b	b
1978	6,829	1,551	23%	1,896	28%	b	b	2,736	40%	646	9%	b	b
1979	13,723	4,150	30%	2,971	22%	b	b	3,899	28%	2,703	20%	b	b
1980	19,035	4,441	23%	3,927	21%	b	b	8,582	45%	2,085	11%	b	b
1981	14,728	2,293	16%	2,946	20%	b	b	7,429	50%	2,060	14%	b	b
1982	15,302	2,695	18%	2,081	14%	b	b	7,489	49%	3,037	20%	b	b
1983	15,734	1,844	12%	3,325	21%	1,017	6%	4,790	30%	2,205	14%	1,929	12%
1984	25,564	3,647	14%	6,843	27%	1,824	7%	6,207	24%	5,387	21%	1,422	6%
1985	25,387	4,890	19%	8,497	33%	2,272	9%	6,676	26%	1,838	7%	989	4%
1986	31,434	4,618	15%	12,507	40%	2,217	7%	6,452	21%	2,645	8%	2,475	8%
1987	29,621	11,989	40%	5,614	19%	1,485	5%	5,505	19%	1,684	6%	2,837	10%
1988	39,495	14,115	36%	9,532	24%	4,729	12%	4,820	12%	1,273	3%	3,850	10%
1989	33,312	16,424	49%	5,844	18%	1,942	6%	4,043	12%	2,017	6%	2,062	6%
1990	38,821	15,112	39%	9,138	24%	3,983	10%	4,537	12%	2,002	5%	3,176	8%
1991	49,093	29,768	61%	7,551	15%	1,977	4%	4,178	9%	1,106	2%	3,776	8%
1992	68,365	40,513	59%	11,352	17%	1,515	2%	4,257	6%	4,908	7%	4,561	7%
1993	74,413	40,815	55%	12,852	17%	9,073	12%	3,480	5%	3,396	5%	3,466	5%
1994	73,560	40,727	55%	12,357	17%	8,036	11%	4,772	6%	2,937	4%	4,731	6%

[a] Includes saltwater effort from 1977-1982.

[b] Data not broken out by site but included in total.

Source: Mills 1979-1994, Howe et al. 1995.

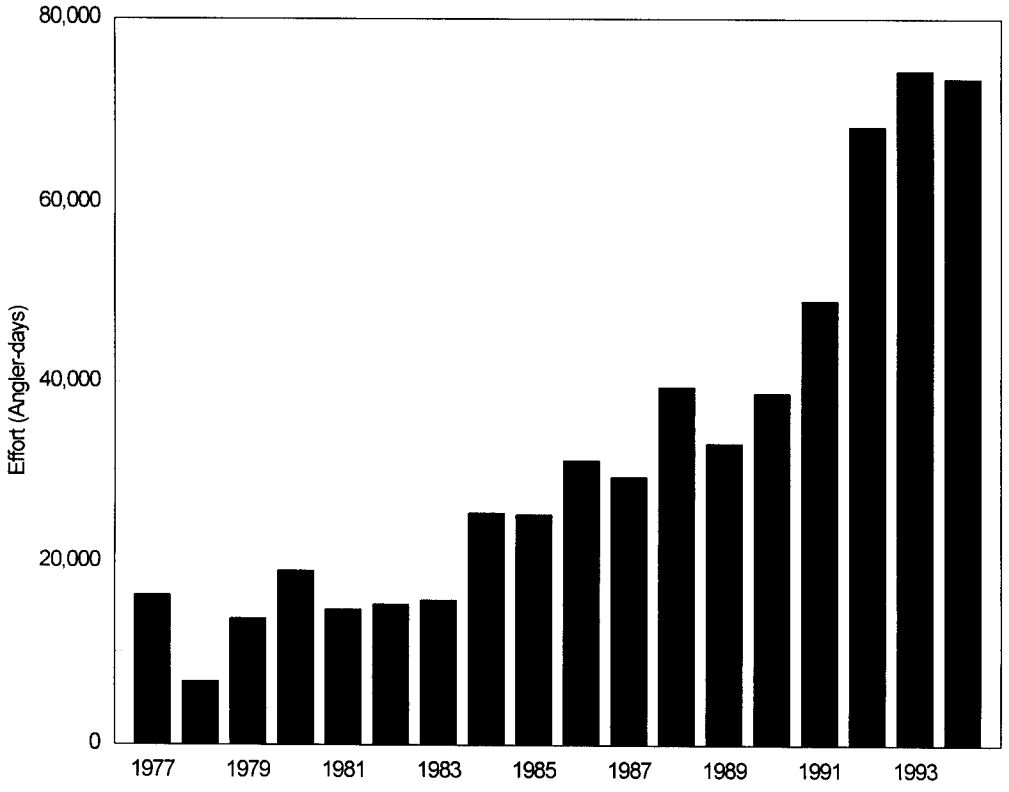

Figure 4.-Angler effort in Anchorage area streams, 1977-1994.

Table 4.-Angler effort in Anchorage area lakes, 1977-1994.

	Lake	Otter Lake		Jewel Lake		Sixmile Lake		Cheney Lake		Clunie Lake		Mirror Lake	
Year	Effort	Effort	Percent	Effort	Percent	Effort	Percent	Effort	Percent	Effort	Percent	Effort	Percent
1977	38,784	5,197	13%	5,908	15%	1473	4%	a		2,977	8%	1808	5%
1978	24,318	2,046	8%	4,157	17%	969	4%	a		1,809	7%	495	2%
1979	51,702	7,687	15%	7,923	15%	2688	5%	a		3,460	7%	1053	2%
1980	60,630	7,040	12%	8,182	13%	4241	7%	a		4,498	7%	1414	2%
1981	52,890	5,543	10%	5,819	11%	3468	7%	1,480	3%	4,034	8%	2206	4%
1982	66,705	7,421	11%	9,076	14%	5016	8%	1,706	3%	5,254	8%	2167	3%
1983	56,554	5,445	10%	9,339	17%	6,341	11%	3,446	6%	4,032	7%	4,118	7%
1984	88,887	13,375	15%	10,289	12%	11,075	12%	6,558	7%	6,659	7%	4,183	5%
1985	68,495	5,150	8%	7,179	10%	9,069	13%	9,104	13%	3,000	4%	1,717	3%
1986	70,517	9,036	13%	4,587	7%	12,278	17%	1,468	2%	5,076	7%	2,920	4%
1987	84,444	13,275	16%	4,908	6%	12,677	15%	5,089	6%	6,574	8%	5,505	7%
1988	75,314	5,402	7%	7,785	10%	8,822	12%	6,676	9%	7,185	10%	4,002	5%
1989	74,118	7,570	10%	9,099	12%	5,046	7%	7,523	10%	5,384	7%	3,255	4%
1990	85,715	9,542	11%	10,235	12%	6,539	8%	6,326	7%	6,592	8%	5,740	7%
1991	66,596	8,076	12%	7,294	11%	4,446	7%	4,189	6%	4,379	7%	4,993	7%
1992	71,194	6,423	9%	8,290	12%	6,765	10%	6,594	9%	4,108	6%	5,249	7%
1993	64,997	7,619	12%	7,412	11%	5,295	8%	5,013	8%	4,980	8%	4,007	6%
1994	65,115	9,365	14%	5,339	8%	5,675	9%	7,032	11%	5,169	8%	5,294	8%

[a] Effort not estimated due to insufficient survey responses.

Source: Mills 1979-1994, Howe et al. 1995.

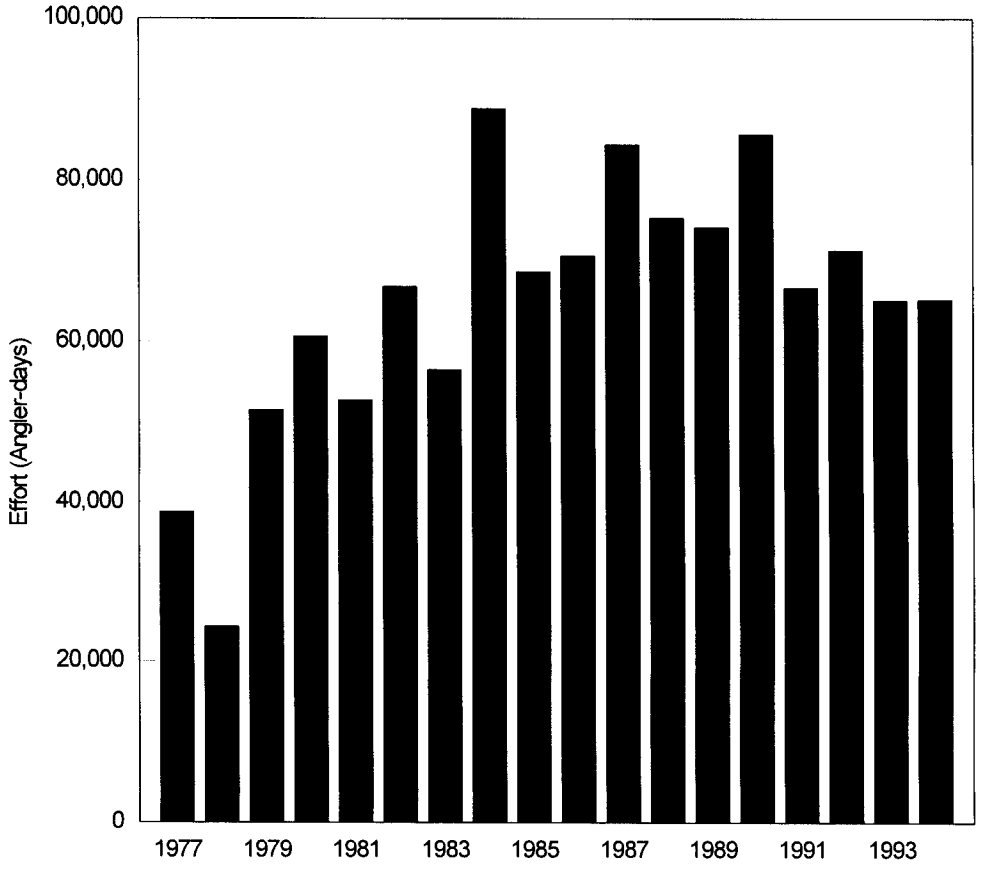

Figure 5.-Angler effort in Anchorage area lakes, 1977-1994.

Table 5.-Anchorage area sport catch (1990-1994) and sport harvest (1977-1994) of anadromous salmon.

	Chinook		Sockeye		Coho		Pink		Chum		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		52		25		1,127		2,953		0		4,157
1978		0		14		792		1,176		20		2,002
1979		0		204		974		781		0		1,959
1980		0		146		1,222		2,601		86		4,055
1981		0		383		1,474		1,293		29		3,179
1982		0		272		1,571		1,178		10		3,031
1983		2		603		1,905		1,122		0		3,632
1984		74		598		2,843		3,992		162		7,669
1985		61		721		2,052		1,866		634		5,334
1986		33		609		3,458		11,664		960		16,724
1987		485		1,507		3,096		2,282		579		7,949
1988		663		472		6,730		5,330		691		13,886
1989		950		564		4,940		1,631		1,015		9,100
1990	1,192	457	624	254	3,967	2,488	13,362	4,932	1,530	315	20,675	8,446
1991	1,996	1,169	933	749	5,926	4,393	5,623	1,986	1,281	360	15,759	8,657
1992	4,308	2,448	3,395	1,315	9,665	5,698	27,287	8,901	1,664	297	46,319	18,659
1993	7,824	3,041	6,052	3,085	23,462	16,387	11,124	2,767	1,359	383	49,821	25,663
1994	5,504	2,708	4,276	1,594	22,542	13,948	8,480	1,979	1,546	174	42,348	20,403
90-94 Avg	4,165	1,965	3,056	1,399	13,112	8,583	13,175	4,113	1,476	306	34,984	16,366

Source: Mills 1979-1994, Howe et al. 1995.

Table 6.-Anchorage area sport catch (1990-1994) and sport harvest (1977-1994) of resident species, and 1977-1994 personal use eulachon harvest.

	Landlocked Salmon		Dolly Varden/Arctic char		Rainbow Trout		Arctic Grayling		Eulachon
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Harvest
1977		129		4,040		17,733		187	201,209
1978		18		4,264		30,463		0	112,352
1979		209		3,763		39,259		18	107,132
1980		15,574		3,607		33,141		77	81,624
1981		7,167		5,002		30,914		115	150,329
1982		2,557		2,893		49,242		210	116,617
1983		524		3,020		44,678		0	95,606
1984		997		6,981		49,592		262	302,793
1985		399		2,512		43,020		0	268,135
1986		749		2,563		39,864		168	123,954
1987		2,263		2,101		35,259		18	131,584
1988		4,364		3,745		59,864		1,001	139,508
1989		14,483		2,705		53,197		66	103,881
1990	27,767	6,775	9,246	2,257	169,250	58,435	1,449	576	133,027
1991	15,578	10,817	5,127	2,558	122,646	49,303	1,550	238	69,257
1992	28,990	13,985	7,048	3,351	109,208	33,317	3,554	413	42,964
1993	36,072	17,489	7,661	1,793	107,465	29,112	1,362	233	29,865
1994	28,648	13,280	8,729	2,500	100,373	23,631	2,283	634	49,279
90-94 Avg	27,411	12,469	7,562	2,492	121,788	38,760	2,040	419	64,878

Source: Mills 1979-1994, Howe et al. 1995.

Table 7.-Sport fish catch, harvest, and number released by species, Anchorage area, 1994.

Species	Catch	Harvest	Released	
			Number	Percent
Chinook Salmon	5,504	2,708	2,796	51
Coho Salmon	22,542	13,948	8,594	38
Sockeye Salmon	4,276	1,594	2,682	63
Chum Salmon	1,546	174	1,372	89
Pink Salmon	8,480	1,979	6,501	77
Landlocked Salmon	28,648	13,280	15,368	54
Dolly Varden/Arctic Char	8,729	2,500	6,229	71
Rainbow Trout	100,373	23,631	76,742	76
Arctic Grayling	2,283	634	1,649	72

Source: Howe et al. 1995.

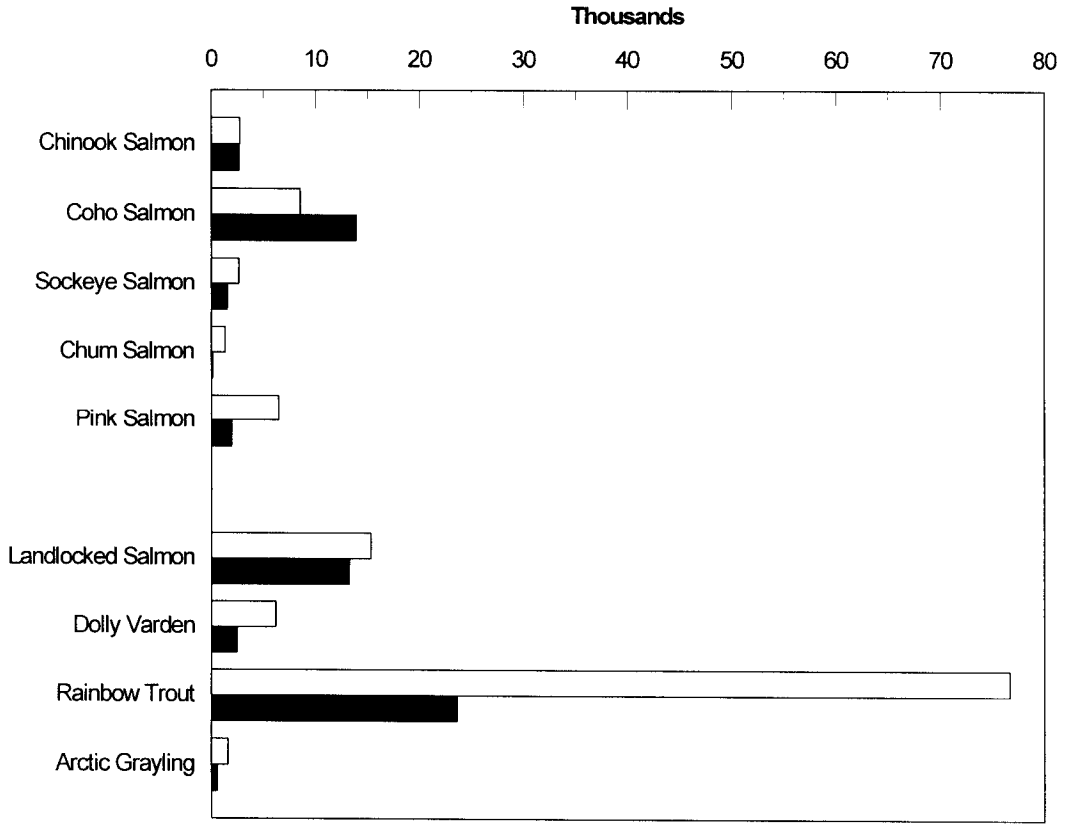

Figure 6.-Sport fish harvest and number released by species, Anchorage area, 1994.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1-B20.

OTHER USER GROUPS

Anchorage area commercial, subsistence, recreational, and personal use salmon fisheries are prosecuted under guidelines described in 5 AAC 21.363. *Upper Cook Inlet Salmon Management Plan*. The only Anchorage area commercial fishery is the Northern District set gillnet salmon fishery. This fishery is open the first three Mondays in June with a 12,000 chinook salmon quota. The Northern District fishery reopens 25 June and targets sockeye salmon. There are two weekly openings, Monday and Friday, from 7:00 a.m. to 7:00 p.m. Additional openings are possible with emergency orders and generally occur on Wednesdays.

ECONOMIC VALUE OF SPORT FISHERIES

Evaluation of an activity from an economical standpoint is useful for comparing that value to other resource uses and/or community activities. These comparisons provide a cost/benefit basis for evaluating resource management and research activities. Unfortunately, assigning a dollar value to recreational activities is an extremely complex and subjective endeavor. Jones and Stokes Associates (1987) of Sacramento, California completed the first sport fishing economic study of southcentral Alaska for ADF&G. This study was conducted using fishery and economic data from 1986. The purpose of the study was to assess the economic importance of sport fisheries in southcentral Alaska by estimating (1) sport fishing expenditures, (2) economic impacts of angler spending, and (3) nonmarket values. The study found that, in 1986, anglers spent more than $127 million to participate in southcentral Alaska sport fishing activities. Of this total, $34 million was spent outside Alaska on transportation costs, $44 million was spent in the Anchorage area, $32 million was spent in the Kenai Peninsula area, and the remaining $17 million was spent in other areas of the state (primarily Fairbanks). Money spent in the Anchorage area was for purchases used at sport fishing sites all over the state. They do not represent the value of fishing in the Anchorage area alone. The Anchorage area received a major portion of the money spent in southcentral Alaska because it is the transportation hub of Alaska. In 1986, sport fishing related spending accounted for over 750 jobs in the Anchorage area with $7.5 million in direct earnings. Over 65% of the money spent in Anchorage on sport fishing related goods and services were at retail outlets.

MAJOR ISSUES

Issues currently facing Anchorage area management biologists are both biological and social in nature. As the department develops urban area recreational fisheries to keep up with increasing angler demands, potential conflicts with other resource users arise. The central issue is identifying who is responsible for parking, litter, bathroom facilities, and crowd control after fish are stocked and the fishery is in operation. Other concerns include trespass and habitat degradation resulting from increased angler activity.

The Ship Creek chinook and coho salmon fisheries, located in the middle of Anchorage's largest industrial area, are well established and continue to grow in popularity. Development by the primary land manager surrounding the fishery (ARR) is also increasing. Topics of concern at Ship Creek include parking shortages, litter, bathroom facilities, and additional security needs at night due to trespass and poaching.

While the Campbell Creek coho salmon fishery is located primarily within MOA green belt, portions of the stream flow through private residential areas. Some residents are concerned about trespass and increased hazards to area children, along with concerns about bank erosion and litter.

Several areas of concern have been identified in Turnagain Arm. In the Girdwood area, particularly Glacier and California creeks, there are trespass problems in accessing favored fishing spots, as well as high incidences of snagging. Snagging, over-limits, and confirmed cases of gillnetting have occurred in the Twentymile River drainage. Poaching and snagging is also a problem in Lower Explorer and Skookum creeks.

Biological issues for Anchorage area sport fisheries include the debate over wild versus hatchery stock genetics. While this issue is not of much concern in the Anchorage stocked lake program (most are closed systems), it is an important topic with the increased anadromous stockings in Ship, Campbell, and Bird creeks. A final biological concern is the illegal introduction of northern pike into at least two Anchorage area stocked lakes, Sand and Lower Fire lakes. The presence of pike may lead to a reduction in the sport harvest of stocked species.

Biological escapement goals (BEG) have been determined for chinook (250) and coho (200) salmon in Ship Creek, chinook salmon (300) in South Fork Eagle River, and chinook (250) and coho (200) salmon in Campbell Creek. Detailed methods used to determine these BEGs are reported in Fried (1994).

STOCKING PROGRAM INVENTORY

With limitations on the abundance of wild stocks and consistent increases in fishing effort, Anchorage area sport fisheries have become increasingly reliant on hatchery-produced fish. Fish stocked in the area lakes are harvested by the recreational fishery. However, anadromous salmon stocked in area streams become part of the common property fishery and are caught by commercial, subsistence, and personal use fishers as well as sport anglers.

All stocking activities related to state-run hatcheries are conducted under guidelines established in the Statewide Stocking Plan for Recreational Fisheries (ADF&G 1995). The coordination of statewide stocking activities was developed in 1988 to (1) optimize use of hatchery facilities, (2) provide consistency, and (3) establish stocking priorities. The first plan was completed in 1989 after internal and public review and provided statewide stocking locations and schedules for 1989 through 1993 (ADF&G 1989). The current stocking plan provides statewide stocking locations and schedules for 1995-1996.

As outlined in the 1995-1996 stocking plan, 57,000 chinook salmon catchables will be distributed among 14 Anchorage area lakes and 210,000 chinook salmon smolt will be stocked into one area stream. Three Anchorage area streams will receive a share of 450,000 coho salmon smolt. A total of 129,500 rainbow trout catchables will be distributed among 27 area lakes, and two streams will divide an additional 10,000 rainbow trout catchables. About 4,000 catchable rainbow trout are allotted annually for the April Great Alaskan Sportsman's Show fishing pond. Approximately 355,000 rainbow trout fry are planned for release in Eklutna Lake. Arctic grayling (19,000) will be distributed among four Anchorage area lakes, and 5,000 Arctic char will be stocked in three area lakes. The individual locations and numbers per site for 1991-1995 and those proposed for 1996 are listed in Table 8. Historic stocking records for the Anchorage area through 1994 can be found in Stratton and Cyr (1995).

Table 8.-Anchorage area stocking summary from 1991-1995 and proposed stocking for 1996.

	1991	1992	1993	1994	1995	1996
Rainbow Trout						
Alder Pond			8,420	5,118	5,747	5,000
Beach Lake	4,497	4,311	3,249	22,185	4,947	4,000
Campbell Creek	10,856	8,010	6,071	6,634	5,058	5,000
Campbell Point Lake	5,194	5,017	3,299	5,099	6,022	5,000
Cheney Lake	7,503	10,307	11,547	10,998	13,549	10,000
Chester Creek*	4,964	7,970	4,606	4,741	8,135	5,000
Clunie Lake	5,076	8,106	56,285	65,187	100,771	9,000
Delong Lake	8,235	15,649	10,968	10,549	13,090	9,000
Dishno Pond	0	0	0	0	542	500
Edmunds Lake	0	0	0	0	0	1,000
Eklutna Lake (fry)	2,405,416	986,434	608,856	377,044	1,078,942	0
Fish Lake		1,021	822	1,016	1,006	1,000
Green Lake	2,048	2,049	1,600	1,995	46,384	3,000
Gwen Lake	3,316	4,985	3,855	4,688	2,771	5,000
Hillberg Lake	1,557	1,500	1,200	1,502	3,116	3,000
Jewel Lake	12,950	18,671	15,282	13,627	16,380	13,000
Lake Otis	1,566	1,485	1,307	1,510	1,570	1,500
Lower Fire Lake	5,501	5,481	5,329	6,706	8,052	5,000
Mirror Lake	7,841	10,786	8,137	40,429	14,068	10,000
Otter Lake	11,232	106,177	80,348	96,403	65,894	9,000
Portage Valley Lakes	5,570	5,230				
Rabbit Lake	0	0	0	2,000	0	2,500
Sand Lake	5,225	11,413	6,684	7,273	7,380	6,000
Spring Lake	0	1,065	784	1,000	1,026	1,000
Sundi Lake	1,500	1,516	1,283			
Taku Campbell Lake	4,242	4,536	3,382	4,119	5,126	4,000
Tangle Pond			0	0	1,115	3,000
Thompson Lake	2,017	1,982	1,408	0	1,992	2,000
Triangle Lake	984	1,006	674	1,032	1,062	1,000
Upper Sixmile Lake	1,496	1,510	1,272	1,529	3,096	3,000
Waldon Lake	2,016	4,146	3,348	4,000	1,995	2,000
Willow Pond						1,000
* Includes fish stocked in University/APU Lake						
Total (catchables and fry)	2,520,802	1,230,363	850,016	696,384	1,418,836	129,500
Arctic Grayling						
Beach Lake	4,000		7,000	4,000	4,000	4,000
Lower Fire Lake	7,000		7,000	7,000	7,000	7,000
Otter Lake			50	0		
Symphony Lake						4,000
Tangle Pond			2,000	0		
Waldon Lake			4,000	4,000		
Willow Pond						4,000
Total	11,000	0	20,050	15,000	11,000	19,000

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Table 8.-Page 2 of 2.

	1991	1992	1993	1994	1995	1996
Landlocked Salmon						
Beach Lake	3,076	3,037	3,168	3,178	8,115	3,000
Campbell Point Lake	1,617	1,986	1,711	1,552	1,534	1,500
Cheney Lake	5,206	37,927	3,029	5,489	9,905	5,000
Clunie Lake	4,232	3,937	21,920	4,103	4,291	4,000
Delong Lake	13,661	7,626	5,066	7,432	10,146	5,000
Fish Lake			4,000			
Green Lake	1,007	1,043	11,231	989	1,562	1,500
Gwen Lake	0	2,004				
Hillberg Lake	6,624	1,071	9,156	889	1,468	1,500
Jewel Lake	15,620	183,411	12,851	17,995	21,462	12,500
Mirror Lake	4,981	10,263	7,480	5,466	9,227	7,000
Otter Lake	7,314	15,106	5,400	6,954	8,528	6,000
Sand Lake	10,014	15,302	9,968	9,542	6,033	6,000
Spring Lake	4,516	0	8,505	980	1,012	1,000
Taku Campbell Lake	0	0	0	0	1,948	2,000
Tangle Pond						1,000
Triangle Lake	6,268					
Upper Sixmile Lake		423	522			
Waldon Lake			5,000			
Total	84,136	283,136	109,007	64,569	85,231	57,000
Arctic Char						
Campbell Point Lake	2,000	0	0	1,250	0	1,250
Clunie Lake	1,250	2,000	1,000	1,250	0	1,250
Gwen Lake	1,250	1,000				
Mirror Lake	1,250	0	1,000	2,500	2,400	2,500
Total	5,750	3,000	2,000	5,000	2,400	5,000
Chinook Salmon smolt						
Eagle River	102,100	107,695	121,066	109,165		
Ship Creek	211,268	176,380	217,557	216,165	210,000	210,000
Total	313,368	284,075	338,623	325,330	210,000	210,000
Coho Salmon smolt						
Bird Creek		95,377	140,382	84,643	154,753	150,000
Campbell Creek		97,076	140,797	87,686	157,241	75,000
Ship Creek	57,800	66,178	54,764	75,779	158,981	225,000
Total	57,800	258,631	335,943	248,108	470,975	450,000
All Species Total	2,992,856	2,059,205	1,655,639	1,354,391	2,198,442	870,500

SECTION II: FISHERIES OVERVIEW

This section discusses Anchorage area sport fisheries. For each major fishery, a discussion is presented on: (1) background and historical perspective, (2) recent fishery performance, (3) management objectives, (4) recent Board of Fisheries actions, (5) current biological and social issues, (6) ongoing research and management activities, and (7) recommended research and management activities. Discussion of recent fishery performance will center around 1994. The major source of data for area fisheries is SWHS and the most current edition covers the 1994 season. Available observations or data regarding the 1995 fishery are also presented.

STOCKED LAKES

BACKGROUND AND HISTORICAL PERSPECTIVE

Few Anchorage area lakes supported resident fish populations of recreational interest before the initiation of stocking efforts. Most lakes are landlocked and threespine stickleback *Gasterosteus aculeatus* was the only species present. In the 1960s, the department began a rainbow trout stocking program to increase sport fishing opportunities within the Anchorage area. Individual stocking histories for all Anchorage area stocked lakes through 1994 can be found in Stratton and Cyr (1995). Approximate locations of stocked lakes can be found in Figure 7.

A creel survey to evaluate the stocking program was conducted during 1986 on four Anchorage area lakes. Results of this survey indicated that youth and adult males were the primary recreational fishers. The main objective of the survey was to determine if a single annual spring release of a large number of rainbow trout was suitable for the area lakes. Data indicated that catch rates remained high for 2 to 6 weeks after stocking, then dropped to below one fish per angler-hour. It was recommended, and adopted, that initial stocking occur after ice-out and then stocking be repeated in 4 to 6 weeks. Multiple stocking of high use lakes appears to increase fishing success throughout the open water season. The Anchorage Area stocked lakes and streams program has increased sport fishing opportunities for the general public. This increase in opportunity has led to the development of educational fishing classes for youth and adults, the annual ice fishing jamboree for disabled and underprivileged anglers, and the Ship Creek king and coho salmon derbies that benefit the Foster Grandparents and Senior Companion programs.

Daily bag and possession limits in all area lakes open to sport fishing vary by species. For rainbow trout, daily bag and possession limits are five of which only one can be 20 inches or more in length. Anglers must immediately record rainbow trout 20 inches or more in length on the back of their sport fishing license, and in all Cook Inlet waters combined, there is a seasonal limit of two rainbow trout 20 inches or more in length. Dolly Varden/Arctic char and grayling daily bag and possession limits are five each with no size restrictions. Landlocked salmon daily bag and possession limits are 10 each with no size restrictions.

RECENT FISHERY PERFORMANCE

In 1994, 129,028 fish were caught in Anchorage area lakes and 37,906 of these fish were harvested (Table 9, Figure 8). Total catch and harvest in area lakes has generally decreased from 1990-1994. An estimated 96,657 rainbow trout were caught in area lakes in 1994, and 23,108 were retained (Table 9). In 1994, 28,648 landlocked salmon were caught and 13,280 of these fish were harvested (Tables 7 and 9, Figure 6). The sport catch in 1994 of Arctic grayling in

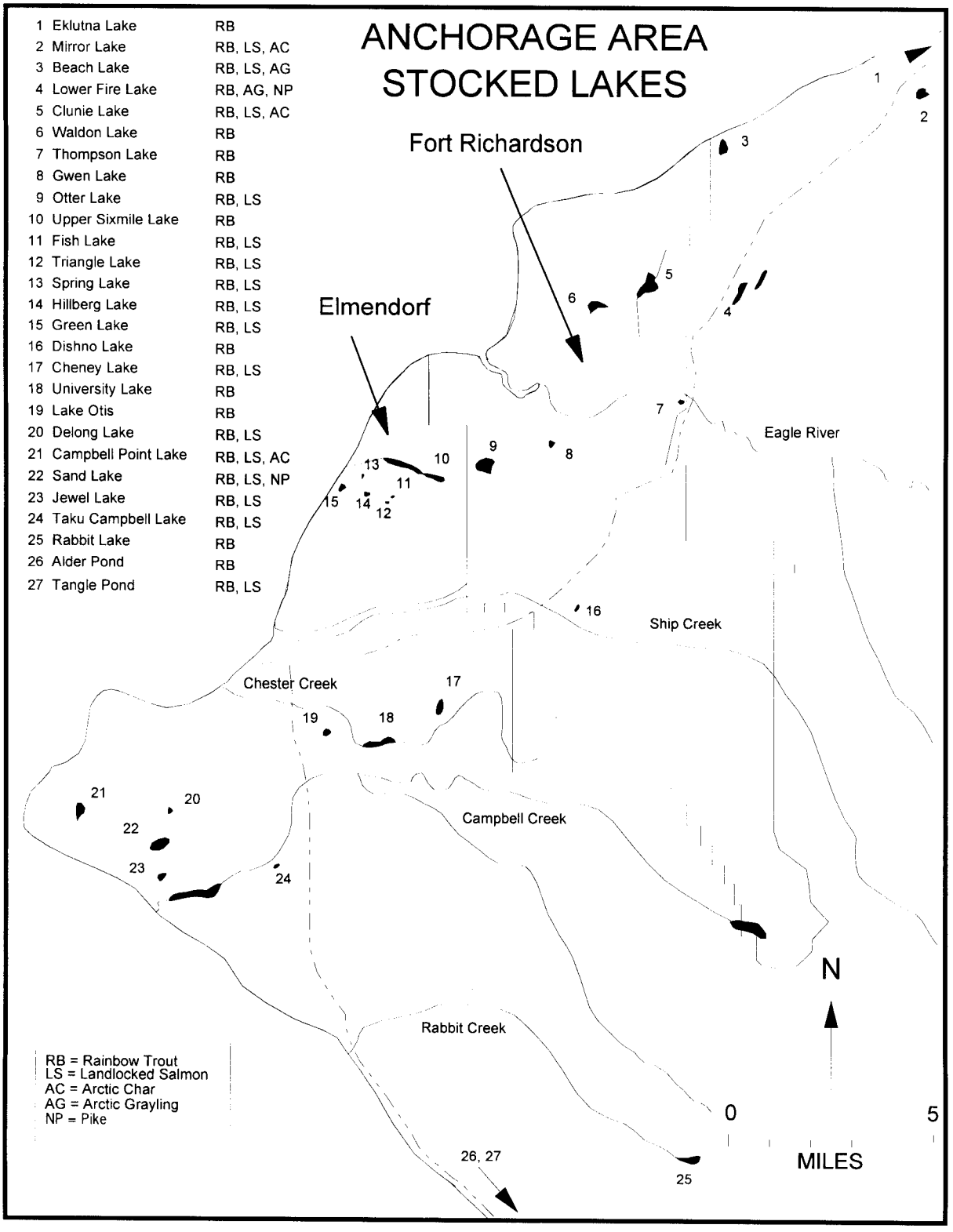

Figure 7.-Map of Anchorage area stocked lakes.

Table 9.-Anchorage area sport fish catch (1990-1994) and harvest (1977-1994) from lakes by species.

	Lake Total		Rainbow Trout		Landlocked Salmon		Arctic Grayling		Arctic Char	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		17,500		17,184		129		187		0
1978		29,813		29,752		18		0		43
1979		38,558		38,295		209		9		45
1980		47,673		31,936		15,574		77		86
1981		37,746		30,531		7,167		48		0
1982		50,426		47,869		2,557		0		0
1983		45,150		44,311		524		0		315
1984		48,256		47,086		997		0		173
1985		41,095		40,627		399		0		69
1986		38,256		37,339		749		0		168
1987		36,848		34,549		2,263		0		36
1988		62,663		57,372		4,364		819		108
1989		67,351		52,071		14,483		66		731
1990	190,952	64,222	160,005	56,277	27,767	6,775	889	527	2,291	643
1991	138,322	60,621	119,668	48,818	15,578	10,817	1,480	188	1,596	798
1992	142,213	48,721	107,324	32,708	28,990	13,985	3,554	413	2,345	1,615
1993	142,885	47,210	103,477	28,621	36,072	17,489	1,362	233	1,974	867
1994	129,028	37,906	96,657	23,108	28,648	13,280	2,224	585	1,499	933

Source: Mills 1979-1994, Howe et al. 1995.

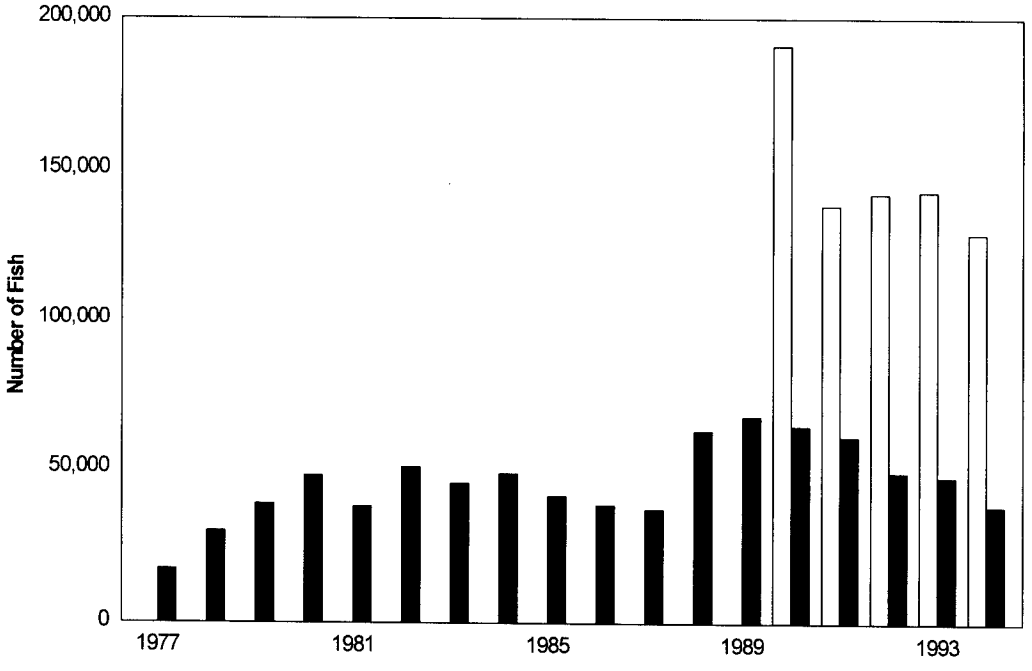

Figure 8.-Anchorage area lakes sport fish catch (1990-1994) and harvest (1977-1994), all species combined.

stocked lakes was estimated at 2,224, of which 585 were harvested (Table 9). The 1994 Arctic char sport catch from stocked lakes was estimated at 1,499 with 933 harvested (Table 9). While effort, catch and harvest has decreased in Anchorage area lakes from 1990-1994, lake stocking efforts still provide significant urban angling opportunities in the Anchorage Area throughout the year and have supported 45%-81% of the annual Anchorage area sport fishing effort from 1977-1994 (Table 2). The most popular Anchorage area lakes include Jewel and Cheney in the Anchorage bowl, Otter and Clunie on Fort Richardson, and Sixmile on Elmendorf (Table 4).

In 1995, 25 area lakes and two creeks were stocked with about 160,000 catchable size rainbow trout and 1,300,000 rainbow trout fry (Table 8). Thirteen lakes were stocked in late fall 1995 with about 65,000 landlocked chinook salmon catchables and 20,000 landlocked coho and chinook fingerling to provide winter ice fishing opportunities. These fish, ranging in size from 4 to 10 inches, are very aggressive and strike readily throughout the year. Three local lakes received a total of 15,000 Arctic grayling fingerlings in 1995. A total of 2,400 Arctic char catchables were stocked into Mirror Lake in 1995.

Eklutna Lake is stocked with rainbow trout fry rather than catchable sized fish. When a reduction in the numbers of rainbow trout fry reared at Fort Richardson Hatchery is required to allow for growth of remaining fish to catchable size, the excess production is stocked into Eklutna Lake. Variable numbers of fish have been stocked, from 377,000 in 1994 to about 2.4 million in 1991 (Table 8). Survival of fry and fingerlings is much lower than that for catchable sized fish, and growth is much slower in this glacier-fed lake. However, sampling of Eklutna Lake has shown that an adequate population of catchable rainbow trout exists to support a sport fishery. Several news releases were issued in 1995 to make the public aware of this opportunity.

Department staff sampled Symphony Lake in the South Fork Eagle River drainage with hook and line, gillnets, hoop traps, and minnow traps in 1995. A bathymetric map was produced and water temperatures collected. Results of this sampling trip indicate that this clear, landlocked, high alpine lake is devoid of fish. Amphipods were noted and an insect hatch was observed. Considering these observations, it was recommended that Symphony Lake be stocked with Arctic grayling beginning in 1996. Presentations regarding Symphony Lake stocking were made to Chugach State Park Citizens Advisory Board, South Fork Community Council, and Alaska Sportfishing Association in late fall 1995. All organizations were in favor of the proposed stocking at that time. In spring 1996, South Fork Community Council pulled its support and is now opposed to stocking Symphony Lake citing problems with parking, sanitation, and bank degradation concerns. As access to Symphony Lake requires a 6-mile hike, we do not foresee a flood of anglers utilizing this resource. Also, based on the stocking level of 4,000 Arctic grayling fingerling every other year, we expect 300 to 400 adults, 8-10 inches in length, to be available to anglers. This stocking will not attract large numbers of anglers and will not be likely to cause parking, sanitation, or bank degradation problems.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1-B20.

MANAGEMENT OBJECTIVES

The management objective for Anchorage Area lakes is to support 75,000 angler-days effort annually. Stocking, public information programs, news releases, and community school classes are aggressively pursued to attain this goal.

RECENT BOARD OF FISHERIES ACTIONS

During the November 1992 BOF meeting, that portion of the Campbell Creek drainage downstream of Dimond Boulevard, including Campbell Lake, was closed to all sport fishing. Most of the land surrounding this area is privately owned and the BOF felt that there was no practical public access.

Several public proposals have been submitted for consideration by BOF during their January 1996 meeting. These include opening lower Campbell Creek and portions of Campbell Lake to sport fishing during coho salmon season, and opening portions of Campbell Lake for ice fishing. The ice fishing proposal was withdrawn.

CURRENT BIOLOGICAL AND SOCIAL ISSUES

Bag and possession limits for stocked rainbow trout in the Anchorage area are higher than those for wild stocks in other areas in the state. As these fish are from hatchery stocking programs, there are no major biological issues regarding the Anchorage area stocked lake fisheries.

Northern pike have been illegally introduced into at least two Anchorage area lakes. Department staff sampled two canals in Sand Lake with gillnets and spears during May 1995. Twelve adult pike were caught, all had one to three stocked rainbow trout in their stomachs. Based on these observations, the number of fish stocked into Sand Lake was reduced. Staff set one variable-mesh gillnet in Lower Fire Lake and captured over 30 adult pike. All pike had Alaska blackfish in their stomachs. Results of northern pike movements and predation studies in Cook Inlet can be found in Rutz 1996. While no Arctic grayling were found in pike stomachs, none were captured or observed. Based on the sampling efforts, the number of rainbow trout stocked into Lower Fire Lake has been reduced and the Arctic grayling stocking will be canceled beginning in 1997. A rumor of northern pike in Delong Lake has not been substantiated. The major concern with northern pike is that additional illegal introductions may occur in other area lakes and reduce the number of stocked fish available to anglers.

Social issues include litter, over limits and snagging due to lack of enforcement activities, trespass, and poor or restricted access to some area lakes.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

No specific research activities are currently being conducted on the Anchorage area lakes. Management activities consist of coordinating stocking schedules with hatcheries, public information programs, news releases, community schools classes, and enforcement.

In 1995, the department access staff installed signs at most area lake public access points. A draft lake stocking manual which includes stocking, catch, and harvest histories as well as bathymetric maps was produced.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

The rainbow trout stocking schedule for area lakes and streams was revised from once to twice annually in 1987. The success, measured in angler effort, of urban lake stocking programs for put-and-take fisheries is primarily dependent on catch rates. High catch rates generally lead to increased angler participation and satisfaction. The 1986 creel survey found that most anglers became dissatisfied when catch rates fell below one fish per hour. In 1992, rainbow trout

stocking schedules of some high use lakes (Jewel, Delong, and Cheney) were changed to three times per year.

The area's most heavily fished lakes should continue on the current stocking schedule. The first stocking should be conducted in May with approximately one-third of the total allocation of fish. The remaining allotment of fish should be incrementally stocked in these lakes every 6 weeks. This schedule should provide an initial pulse of fish for the spring fishery. Additional stockings should maintain angler satisfaction by keeping catch rates over one fish per hour through the season.

Several stocked lakes should be evaluated to determine the value of continued stocking. For example, Lake Otis has been stocked annually since 1990 but does not appear in SWHS results. In 1996, staff from the department's Palmer office will sample five selected lakes in the Anchorage Management Area. Other Anchorage area lakes should be evaluated for potential stocking to increase rainbow trout sport fishing opportunities. Several Portage Valley ponds have been incorporated into the 1995-1996 Stocking Plan (ADF&G 1995) and will provide additional sport fishing opportunities.

A handout describing Anchorage area sport fishing opportunities has been completed. It provides basic information on the waters and species stocked and a general location description of area lakes. While this handout has filled a void in the information available to area anglers, more detailed information is often requested. Preparation of a brochure detailing the specific location of each area lake, access site(s), available facilities, and bottom profiles is recommended.

Arctic grayling and Arctic char from Clear Hatchery are stocked in a few local lakes. While SWHS reports small harvests of Arctic grayling from Lower Fire and Beach lakes (stocked with fingerlings), the harvest is sporadic from year to year. For Arctic char, all stocked lakes have small, sporadic harvests. Test netting of these lakes to determine the success of these stocking efforts should be conducted if the harvest does not stabilize. Other area lakes should be evaluated as potential stocking sites for these species to increase and diversify angling opportunities.

CHINOOK SALMON FISHERIES

AREA-WIDE ASSESSMENT

While several Anchorage area streams support wild chinook salmon stocks, none are large enough to support a freshwater sport fishery. As a result, sport fishing for chinook salmon in streams has been closed with few exceptions. A small catch and harvest of chinook salmon occurs in salt water near the mouths of Ship and Bird creeks (Table 10). Natural chinook salmon runs are found in Campbell, Bird, Indian, Rabbit, California (a tributary to Glacier Creek in Girdwood), Peters, Portage, and Ship creeks and Eagle Glacier, Carmen, Twentymile, and Placer rivers. Only portions of Eagle River and Ship Creek are open to chinook salmon sport fishing. Area-wide catch and harvest were lower in 1994 (Figure 9) than peak catch and harvest observed in 1993.

Recreational chinook salmon fishing in the Anchorage area began in 1987 with the 2-days per week opening of Ship Creek (Appendix A1). This fishery was expanded to 7 days per week in 1991 when over 1,600 chinook salmon were caught with over 1,100 of these harvested. In 1992,

the Ship Creek catch exceeded 4,000 and harvest was almost 2,300. Catch reached an all time high of over 7,100 in 1993 with 2,872 chinook harvested.

Eagle River was first stocked with chinook smolt of Ship Creek origin in 1990 in an attempt to create another urban chinook fishery and opened to king salmon sport fishing in 1992 (Appendix A2). As minimal harvest and participation were documented from 1992-1994 (catch averaged 66 fish, harvest averaged 32; Table 10), the stocking program was dropped in early 1995. All other Anchorage area streams are closed to sport fishing for chinook salmon over 16 inches in length.

Bag and possession limits for king salmon over 16 inches in length in Ship Creek and Eagle River are one and two. Harvests must be immediately recorded on the back of the angler's sport fishing license, and count towards the Cook Inlet seasonal limit of five. A signed king salmon stamp is also required. Bag and possession limits for king salmon 16 inches or less in length are 10. King salmon 16 inches or less in length do not need to be recorded on the back of the sport fishing license and do not count toward the Cook Inlet seasonal limit.

Chinook salmon return to Anchorage area streams from late May through early July. Due to the timing of these returns, commercial catches of chinook salmon bound for Anchorage area streams are assumed to be small; most are harvested in the June Northern District commercial setnet fishery. Small harvests of king salmon bound for Anchorage area streams also occur in Northern District subsistence/personal use fisheries.

SHIP CREEK

Background and Historical Perspective

Before World War II, the Ship Creek wild stock chinook salmon run supported sport, personal use, and subsistence fisheries. However, dams were constructed in the lower 11 miles of the creek during the 1940s and 1950s for power generation and as a water source for both MOA and the military bases. This development substantially reduced Ship Creek wild salmon runs. Attempts to increase Ship Creek salmon runs occurred from 1966 through 1980 when chinook salmon of Alaska and Oregon origin (Miller 1990; Stratton and Cyr 1995) were stocked. During this period, eggs obtained from these stocks were incubated at Fire Lake Hatchery. The resultant fry were reared to smolt in the Fort Richardson Hatchery before release. These releases were generally unsuccessful, as consistent numbers of returning adults could not be established. More consistent returns of chinook salmon to Ship Creek have been established since 1987 using smolt releases from the Elmendorf Hatchery and Ship Creek chinook salmon brood stock.

Ship Creek was open to chinook salmon sport fishing from 1957 through 1959, but was closed from 1960 through 1969 (Appendix A1). Chinook salmon fishing was allowed during selected periods in Ship Creek downstream of the Chugach Power Plant dam from 1970 through 1972. From 1973 through 1986, the creek was closed to chinook salmon sport fishing due, in part, to

Table 10.-Anchorage area anadromous chinook salmon sport fish catch (1990-1994) and harvest (1977-1994).

	Area Total		Ship Creek		Eagle River		Saltwater	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		52		52		0		0
1978		0		0		0		0
1979		0		0		0		0
1980		0		0		0		0
1981		0		0		0		0
1982		0		0		0		0
1983		2		0		0		0
1984		74		0		25		25
1985		61		0		0		37
1986		33		0		0		11
1987		485		437		0		19
1988		663		587		0		0
1989		950		792		28		22
1990	1,192	457	946	445	0	0	89	12
1991	1,996	1,169	1,607	1,127	6	6	30	30
1992	4,308	2,448	4,019	2,282	109	48	125	109
1993	7,824	3,041	7,104	2,872	88	47	172	71
1994	5,504	2,708	4,950	2,445	128	59	330	204
90-94 Avg.	4,165	1,965	3,725	1,834	66	32	149	85

Source: Mills 1979-1994, Howe et al. 1995.

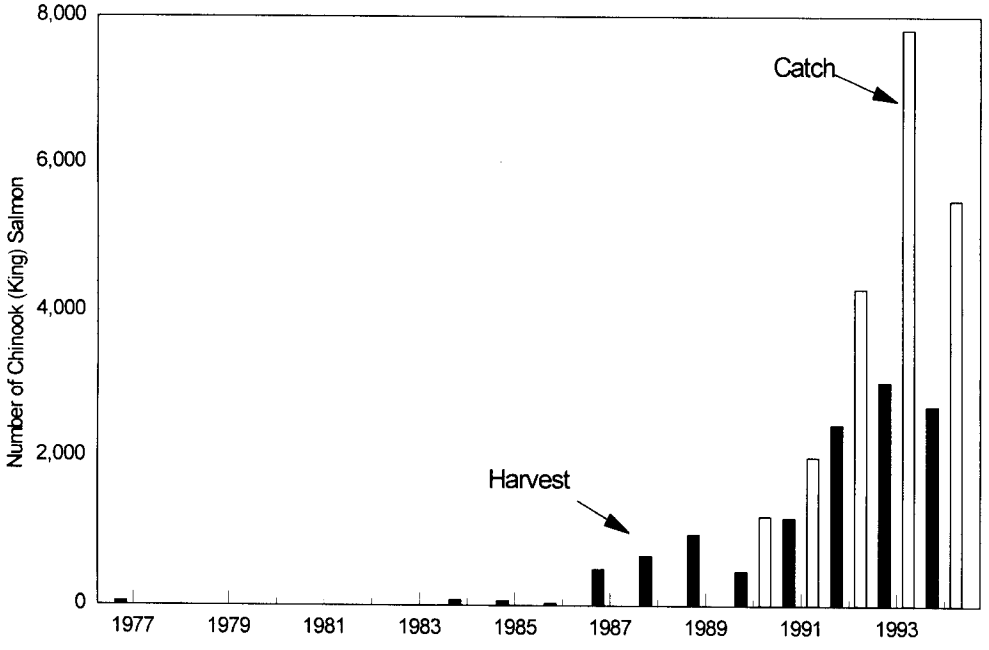

Figure 9.-Total Anchorage area anadromous chinook salmon sport fish catch (1990-1994) and harvest (1977-1994).

low chinook salmon abundance throughout Northern Cook Inlet in the early and mid-1970s. Beginning in 1987, through increased returns resulting from annual stocking efforts, the lower portion of Ship Creek downstream of the Chugach Power Plant dam was reopened to chinook salmon sport fishing 2 days per week for 5 consecutive weeks in June and July.

In recent years, hatchery-produced chinook salmon runs in Ship Creek have provided a unique opportunity for sport anglers to fish in an urban setting. The chinook salmon run is a result of an annual release of approximately 210,000 smolt raised at Elmendorf Hatchery. The periods open to fishing were initially limited to 2 days per week to allow for an orderly fishery and insure that sufficient fish were available for brood stock needs and upstream viewing opportunities. The season was expanded to 7 days a week, 1 January through 13 July, in 1990. The fishery occurs during late May through early July in the lower 1 mile of Ship Creek, downstream of the Chugach Power Plant dam. The shoreline of the area open to chinook salmon fishing is owned and managed by ARR and MOA. The *Ship Creek King Salmon Derby* began in 1993 during June. This derby was well received by the angling public and has become an annual event.

Recent Fishery Performance

Harvest and effort of the Ship Creek sport fishery are estimated in SWHS (Mills 1979-1994, Howe et al. 1995). The sport harvest of chinook salmon in Ship Creek has increased from 437 fish in 1987 to 2,445 fish during 1994 (Table 10). Sport fish catch has ranged from 946 in 1990 to a high of 7,104 in 1993. Catch in 1994 was estimated at 4,950, of which 2,445 were harvested. The 1995 harvest estimate will probably exceed 3,000 fish. Total angling effort in Ship Creek has also increased from 11,989 angler-days in 1987 to 40,727 angler days in 1994 (Table 3). Effort levels continue to increase as the popularity of this fishery grows, in part due to the annual *Ship Creek King Salmon Derby*. Runs to Ship Creek are predicted to average about 4,000 chinook salmon annually.

The 1995 Ship Creek chinook salmon escapement was estimated at 652 fish (Appendix C1). Approximately 200 fish were taken for Elmendorf Hatchery brood stock requirements while the remainder spawned naturally near the hatchery and provided an opportunity for people to view spawning chinook salmon.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B10, and B11.

Management Objectives

The management objectives for the Ship Creek chinook salmon fishery are to maintain or increase current angler effort through smolt stocking, and achieve the 400 chinook salmon escapement goal above the Chugach Power Plant dam. This escapement goal includes 200 chinook salmon needed for brood stock requirements and a minimum of 200 fish necessary to provide natural spawning and viewing opportunities in Ship Creek. Present regulations should achieve these management objectives.

Recent Board of Fisheries Actions

No action was taken during the November 1992 BOF meetings regarding Ship Creek chinook salmon fishery.

A department proposal has been submitted for BOF consideration in January 1996 to close the reach of Ship Creek near the Elmendorf Hatchery. Several hatchery structures exist in Ship

Creek near the Elmendorf Hatchery. This reach, extending from Reeve Boulevard bridge upstream to the hatchery dam, is approximately 1,650 feet in length. Statewide regulation 5 AAC 75.050. WATERS CLOSED TO SPORT FISHING. (a*) The waters within 300 feet of a fish weir or fish ladder are closed to sport fishing unless a lesser distance is indicated by department markers* is commonly interpreted to include all hatchery structures. Because there is more than 600 feet between some of these hatchery structures, small areas of this portion of Ship Creek are open to sport fishing. Only sport fishing for rainbow trout and Dolly Varden are allowed in this reach, however, most anglers in this reach are illegally targeting salmon. Hatchery personnel spend considerable time educating the public about closed waters, fishing seasons, bag and possession limits in this reach. To avoid public confusion, we are recommending that this area be closed to all sport fishing.

Current Biological and Social Issues

Besides the sport harvest, there has been an unknown number of chinook salmon illegally harvested between the Chugach Power Plant dam and Elmendorf Hatchery. It is believed that this illegal harvest does not jeopardize the brood stock and viewing requirements for Ship Creek chinook salmon at this time. However, in years of low instream abundance, this illegal harvest could significantly reduce the Ship Creek chinook salmon escapement. Enforcement activities were increased in this area in 1995. Patrols issued few citations.

Both effort and harvest have increased in the Ship Creek chinook salmon sport fishery. This trend of increased angler participation within such a limited area has created crowding, sanitation, and parking problems along the creek and adjacent ARR and MOA property. As this fishery occurs in a highly industrialized area of the city, potential conflicts exist between land managers and sport anglers.

Increased opportunity through liberalization of the season in 1990 helped reduce peak crowding problems. In addition, improvements along lower Ship Creek for access, parking, and trails have been made by ARR and MOA. These improvements have addressed some of the social issues caused by this fishery.

With an annual sport fishing derby now in place, a combat type fishery with a carnival atmosphere exists around the clock for 10 days during mid June. While only about 500 king salmon were officially weighed-in for the 1994 derby, observations of the fishery from 1993 through 1995 found high success rates, and therefore, large catches and harvests of kings. We will continue to closely monitor the sport fishery and daily escapement rates in 1996.

There has been public concern over water quality and the suitability of Ship Creek fish for human consumption. Water quality in Ship Creek has been monitored by MOA in recent years. Sampling by MOA has shown that Ship Creek water periodically contains high levels of fecal coliform bacteria. Proper cooking of salmon harvested from Ship Creek eliminates any potential health risks from bacterial pollution. While water quality has improved, pollution from urban activities and development still affects Ship Creek. Most Ship Creek salmon are raised to smolt stage at Elmendorf Hatchery before emigrating to Cook Inlet marine waters. Upon entering Ship Creek as adults, they have ceased feeding. Therefore, ingestion of pollutants does not occur.

Ongoing Research and Management Activities

No research activities are planned for the Ship Creek chinook salmon fishery.

Management activities include a variety of tasks necessary to maintain the fishery. Chinook salmon escapements are monitored by management staff and hatchery personnel passing fish through a live box located on the upstream end of the Chugach Power Plant dam, as well as by foot surveys. Live-box operations have begun around 12 June in past years. Beginning in 1996, the live box will not be operated and foot surveys will be used to estimate instream escapement. Also, Elmendorf Hatchery will collect brood stock directly from the creek near their facility.

Continued coordination with the primary land manager, ARR, is essential to keep the program operating smoothly. This coordination consists of determining facilities (parking, bathrooms, and trash receptacles) and sign needs necessary to control angler activities in a manner consistent with ARR operations. Enforcement activities are conducted during the Ship Creek chinook salmon fishery. Management staff participation in the annual derby includes educating derby officials about sport fishing regulations, and loaning the derby officials a Floy tag gun and tags after they receive a collector's permit to catch and mark fish with prize tags.

Recommended Research and Management Activities

The following activities are recommended for Ship Creek:

1. Continue to monitor escapement levels. Coordinate with Elmendorf Hatchery staff to insure that brood stock goals are met.
2. During peak periods of the sport fishery, efforts should be directed at minimizing potential conflicts between industrial activities in lower Ship Creek and sport anglers by assisting area land managers in signing, enforcement, and angler education.
3. Efforts should be continued to insure that adequate access, parking, and sanitation facilities are available. The department should take an active role as planning and development of the port area continues.
4. Continue low level participation in the *Ship Creek King Salmon Derby* and promote catch and release.
5. Access staff should coordinate the installation of permanent rest rooms, garbage cans, and an informational kiosk on ARR land with MOA.

EAGLE RIVER

Background and Historical Perspective

The Eagle River drainage (Figure 10) originates in the Chugach Mountains with most flow contributed by Eagle Glacier. The lower portion of the river flows through flats on Fort Richardson Army Base that were historically used as a large weapon test firing range and impact area. All access to Eagle River from the mouth upstream to Bravo Bridge, approximately 2 miles, is restricted due to the presence of unexploded ordinance. That portion of Eagle River upstream from Bailey Bridge to the Glenn Highway bridge is accessed through Fort Richardson. Upstream of Glenn Highway, the river meanders through dedicated greenbelt as part of Chugach State Park. Developed access points on Eagle River are limited. These access sites include: (1) Glenn Highway campground located immediately upstream of Glenn Highway, (2) day use area

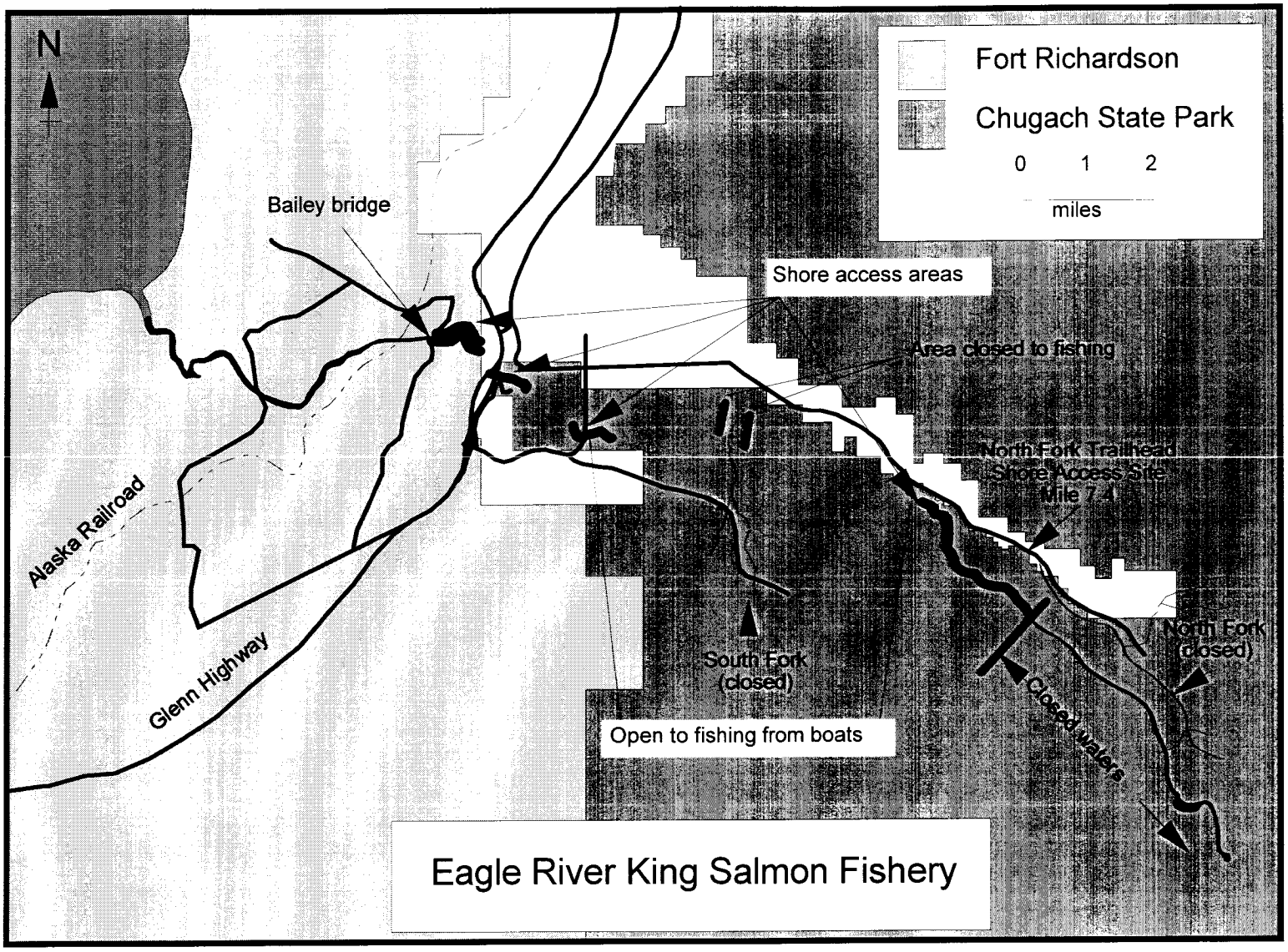

Figure 10.-Map of Eagle River with areas open and closed to king salmon sport fishing.

upstream of Briggs Bridge, and (3) a parking area and unimproved small boat launch site located at Mile 7.4 of Eagle River Road. The current nonangling use pattern for Eagle River drainage includes hiking and whitewater float trips.

The Eagle River drainage was closed to chinook salmon fishing from 1964-1991 (Appendix A2). Wild stock chinook salmon return to the Eagle River drainage during June and early July. Most chinook salmon spawn in South Fork Eagle River downstream of the barrier falls. Foot surveys of chinook salmon escapement in Eagle River have documented from 28 to 513 fish annually since 1963 (Appendix C2).

The drainage is relatively unproductive, and due to the population growth in the surrounding area, the department sought to address the problem of limited sport fishing opportunities in the Eagle River area by creating a hatchery chinook run. The Eagle River chinook salmon stocking program was designed to generate 6,000 angler-days of effort directed at chinook salmon annually in Eagle River. In 1990, an annual stocking program was initiated in Eagle River with approximately 105,000 chinook salmon smolt of Ship Creek origin (Stratton and Cyr 1995). While some fish from these stocking efforts returned in 1991, full returns composed of all age classes were expected to total 3,000 fish annually beginning in 1994.

Recent Fishery Performance

Before the chinook salmon fishery opening in 1992, angler effort in Eagle River averaged about 2,300 angler-days from 1982-1991 (Table 3). In 1992, the first year of the chinook fishery, effort was estimated at about 4,900 angler-days; chinook catch was estimated at 109, and harvest was estimated at 48 (Table 10). Approximately 300 wild stock chinook salmon and 1,000 hatchery chinook salmon were projected to be available to sport anglers. Observations during an informal creel survey, part of the 1992 cooperative DNR/ADF&G Eagle River access study, indicated low angler participation and harvest. Three locations were surveyed: (1) Eagle River campground, (2) Briggs Bridge, and (3) North Fork access trail. Boat anglers were also interviewed. Most angler effort occurred at the Eagle River campground site and all fish harvested were observed at this site. Most fish were fairly large, indicating that this harvest was primarily from the wild stock as those expected to return from the stocking efforts would have been small 1- and 2-ocean fish. Effort was estimated at about 3,400 angler-days in 1993 (Table 3), catch was estimated at 88, and harvest was estimated at 47 (Table 10). The low harvest in 1993 was surprising as over 2,300 hatchery chinook were expected to be available. In 1994, effort was estimated at about 2,900 angler-days (Table 3), catch was 128, and harvest was 59 fish (Table 10). While harvest and effort estimates are not yet available for 1995, we would be surprised if more than 100 kings were harvested and expect effort to be similar to that expended in 1994. Anglers have used the Eagle River campground site and the Hiland Road access points to enter the fishery. Practically no effort was noted once water levels increased in mid-June. Float trips by department staff in 1994 (June, July, and August) found no evidence of chinook salmon in Eagle River except the natural spawning run in South Fork. Of the 24 chinook observed harvested in 1995, most were large, 35 pound plus fish, probably of South Fork Eagle River origin. For some reason, the hatchery run has not materialized. Virtually no effort has been expended near the Mile 7.4 Eagle River Road access site and a drift fishery has not developed.

Observations during 1990 and 1992 indicated that a significant illegal harvest occurs in the clear water of South Fork. The South Fork chinook salmon escapement count in 1995 was 447 fish

(Appendix C2), exceeding the 300 fish escapement goal. Therefore, in spite of legal and illegal harvests, adequate returns made it to the spawning grounds.

Expected run strength for 1995 was estimated using average smolt survival observed in other hatchery runs. While it is anticipated that 3,000 stocked chinook salmon will return in 1995, the poor returns from hatchery stockings observed from 1992-1994 suggest that few fish will actually return. As the hatchery run has failed to materialize and the management objective of increased angler-days of effort is now almost at prestocking levels, the stocking program was dropped in 1995.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B10, and B11.

Management Objectives

The Eagle River chinook salmon fishery was established to provide quality chinook salmon fishing close to Anchorage. A goal of increasing angler effort by approximately 6,000 angler days as measured by SWHS was set to achieve the objective of generating a sufficient increase in angler effort to make the stocking program cost effective. In addition, the fishery is managed to maintain historical escapement levels, continue natural production, and provide viewing opportunities. An escapement goal of 300 king salmon was established for South Fork Eagle River based on historic escapement counts from foot surveys.

Recent Board of Fisheries Actions

During the 1992 November BOF meeting, action was taken to expand the Eagle River chinook salmon sport fishing season and reduce the area opened to fishing. The new regulations opened the season 24 hours per day for a 30-day period starting on the Saturday before Memorial Day, an increase from the 3-days per week opening in 1992. The area opened to chinook salmon fishing was from Bailey Bridge on Fort Richardson upstream to a department marker placed on the mainstem river bank near Mile 7.4 of Eagle River Road. In addition, some areas that were open in 1992 were closed in 1993. The area located 100 yards on both sides of the confluence of South Fork and Eagle River was closed to all fishing from 1 June to 14 August, the North Fork was closed to all fishing during the chinook salmon season (Figure 10), and Eagle River mainstem upstream of a department marker placed on the river bank near Mile 7.4 of Eagle River Road was closed to all fishing (Appendix A2).

A department proposal has been submitted for BOF consideration in January 1996 to modify the current season from 30 consecutive days beginning Memorial Day weekend to four, 3-day "weekend only" openers. The department proposal also recommends closing the entire area currently open to chinook salmon sport fishing except that portion in the Chugach State Park Eagle River Campground.

Current Biological and Social Issues

Chinook salmon returning to Eagle River are the result of annual stocking efforts and, to a lesser extent, natural production. The original intent was to review the stocking program after the 1995 season. However, poor hatchery returns to Eagle River combined with a shortage of chinook smolt at the Elmendorf Hatchery forced an internal review in the winter of 1994. As a result of the internal review, the smolt stocking program was canceled beginning in 1995.

Most of the sport fishing effort occurs within the Eagle River greenbelt. Concerns about the Eagle River chinook salmon sport fishery include trespass, crowding, habitat degradation, and sanitation. DNR has constructed new access sites, parking areas, and litter and sanitation facilities. These facilities have improved access to the area for all Chugach State Park users.

DNR has identified specific guidelines for fishing activities in Eagle River. Three shore angling sites have been developed. These areas are: (1) the Glenn Highway campground upstream from the Glenn Highway bridge, (2) the Briggs Bridge access point, and (3) mainstem Eagle River near Mile 7.4 Eagle River Road. In the remainder of the park, fishing is allowed in all areas (sand and gravel bars, from nonmotorized boats) except from vegetated shorelines. Fishing on Fort Richardson Army Base is allowed from Bailey Bridge upstream to a department marker at the base boundary. A pass, available at entrance guard stations, is required to fish on base.

A drift fishery was expected to develop in Eagle River. DNR completed a parking and unimproved boat launch area during 1990 at approximately Mile 7.4 of Eagle River Road and this site is used as a starting point for float trips. Unfortunately, boats must be carried approximately one-quarter mile to the river. Therefore, trailered drift boats are unable to launch. Most boats using the river are not equipped to handle the whitewater conditions that exist downstream of Briggs Bridge. DNR constructed a pullout site near Briggs Bridge in 1993 that allows smaller rafts and canoes to leave the river without having to travel through the rapids. Takeout points also are in place at the Glenn Highway campground, and Fort Richardson completed a new pullout site just upstream of Bravo Bridge in late 1994.

Ongoing Research and Management Activities

No specific research projects are planned for Eagle River.

Management activities for the Eagle River chinook salmon fishery include conducting chinook salmon escapement counts in South Fork to assure achievement of the 300 fish escapement goal. In addition, area staff will visit the fishery to evaluate participation, harvest trends, and enforce Fish and Game regulations as time allows.

Recommended Research and Management Activities

There are no recommended research or management activities.

OTHER CHINOOK SALMON STREAMS

Chinook salmon return to several other Anchorage area streams. Foot escapement surveys have been conducted periodically in Campbell and Bird creeks. Small numbers of chinook salmon have also been reported in Rabbit, Indian, California (a tributary to Glacier Creek in Girdwood), Peters, and Portage creeks, and Glacier, Carmen, Twentymile, and Placer rivers. All of these streams are closed to chinook salmon sport fishing as the runs cannot support a sport fishery. In most streams, illegal harvests of chinook salmon occur. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B10, and B11.

Campbell Creek

Campbell Creek, the largest free flowing stream in the Anchorage metropolitan area, supports a small chinook salmon run. While this run has averaged 324 fish annually from 1958-1995, 734 chinook salmon were observed during foot surveys in 1995 (Appendix Table C4). Although chinook salmon sport fishing has not been permitted in Campbell Creek since statehood

(Appendix A3), a department BOF proposal to allow a limited, weekend only chinook salmon sport fishery may be submitted if runs continue to increase.

The upper reach of Campbell Creek is composed of two tributaries, North and South Forks, which drain Chugach Mountains east of Anchorage. Both forks flow through canyons in their upper reaches that are impassable to upstream fish migration. Downstream of the canyons, these tributary streams flow approximately 10 miles through undeveloped forests and wetlands before converging upstream of Lake Otis Parkway. Campbell Creek flows through MOA greenbelt and private property from the confluence of the forks downstream to Cook Inlet. It is in this reach of Campbell Creek that the greatest impacts from urbanization have occurred.

Campbell Creek once supported large runs of chinook salmon. However, byproducts of extensive urbanization including reduced water quality, siltation, rechannelization, and poaching have reduced chinook salmon production in the drainage. MOA has made an effort to obtain and preserve the riparian habitat of Campbell Creek from Lake Otis Parkway downstream to Campbell Lake and improve water quality. In 1981, BLM transferred title to the 4,000 acre Campbell Tract (Bicentennial Park) to MOA. This area comprises the primary salmon spawning and rearing habitat. Recent run sizes suggest that Campbell Creek chinook salmon runs are rebounding.

Bird Creek

Foot survey counts of chinook salmon returning to Bird Creek and its tributary, Penguin Creek, in recent years indicate an annual run of about 125 chinook salmon. A series of falls in Bird Creek approximately one-half mile above the Penguin Creek confluence present a complete barrier to upstream migration. Most chinook salmon are observed within one quarter mile of the first waterfall in Bird Creek and the lower mile of Penguin Creek. This area comprises the primary spawning and rearing habitat for chinook salmon. In 1995, a total of 145 chinook salmon were counted in the Bird Creek drainage (Appendix C3).

Significant illegal king salmon harvests have occurred in the intertidal portion of Bird Creek. Staff should coordinate enforcement with Alaska Department of Public Safety, Fish and Wildlife Protection (FWP) staff, and maintain signs.

Bird Creek is a good candidate for hatchery enhancement. Extensive parking and public access have been developed in response to the large natural pink salmon and hatchery enhanced coho salmon sport fisheries. However, as Bird Creek flows through Chugach State Park, there is a vocal minority that opposes any attempt to stock chinook salmon into Bird Creek. The primary reason cited in opposition to developing a hatchery enhanced chinook salmon run is the demise of the wild Bird Creek chinook run. Approval to stock Bird Creek with chinook salmon of Bird Creek origin was given by the Chugach State Park Citizens Advisory Board in fall 1995 meetings. The group was adamant that they would not support any stocking of Bird Creek with king salmon unless the smolt were of Bird Creek origin. Department staff will attempt to test the feasibility of using Bird Creek chinook for egg takes during the 1996 field season.

Other

Small, wild stock chinook salmon runs are found in Indian, Rabbit, California (a tributary to Glacier Creek in Girdwood), Peters, and Portage creeks, and Glacier (tributary to Twentymile River), Carmen, Twentymile, and Placer rivers.

Each of these streams supports annual chinook salmon runs of less than 100 fish, and all are closed to chinook salmon fishing. The Rabbit Creek chinook salmon run provides viewing opportunities for Potter Marsh visitors in June and July.

Several requests to open the glacial Twentymile River drainage (Twentymile, Glacier, and Carmen rivers) to chinook salmon sport fishing were received during June and July of 1994. Management staff chartered a local guide on 14 July and surveyed the drainage. While visibility was poor throughout most of the drainage, 32 chinook salmon were observed in the lower mile of Carmen River immediately upstream of the confluence with Glacier River. In addition, six chinook salmon were landed by hook and line. Given the relatively easy accessibility of this area via jet boat, and the small number of chinook salmon observed, we feel that this chinook salmon run cannot support a viable sport fishery.

Recommended Research and Management Activities

Staff should continue participating in the development of the Potter Marsh Coastal Wildlife area. Enforcement activities along streams by department personnel should continue as time allows. Regulations currently allow anglers to catch and harvest chinook salmon less than 16 inches in length in these systems. Although few, if any chinook salmon less than 16 inches have been observed during escapement surveys of area streams, anglers are using this regulation to fish for larger chinook salmon. We recommend that a proposal to close all area streams, except Ship Creek and Eagle River, to all chinook salmon sport fishing be prepared for consideration by BOF.

As development and urbanization affect area streams, efforts should continue to maintain and improve water quality and fish habitat. Evaluation of Bird Creek as a site for chinook salmon enhancement through annual smolt stocking is recommended.

COHO SALMON FISHERIES

AREA-WIDE ASSESSMENT

While wild stock coho salmon are present in several Anchorage area streams, few native populations are large enough to support significant sport fisheries. As a result, Anchorage area sport fishing opportunities for this species have been limited. Streams supporting annual runs of coho salmon include Campbell, Rabbit, Bird, Ship, Peters, Glacier, California, and Portage creeks and Eagle, Eklutna, Twentymile, and Placer rivers. According to SWHS, the largest Anchorage area coho salmon sport fisheries occur in Bird, Campbell, and Ship creeks and Twentymile River (Table 11). Twentymile River supports wild coho salmon, Bird and Campbell creek runs are a combination of wild stock and hatchery production, and Ship Creek coho salmon are primarily hatchery produced. Bag and possession limits for salmon, other than king salmon, greater than 16 inches in length are three. Bag and possession limits for salmon less than 16 inches in length are 10. Potter and Sixmile creeks are totally closed to all sport fishing, and portions of Rabbit, Campbell, and Ship creeks are also closed.

Stocking efforts using coho salmon fingerlings were conducted in Ingram Creek from 1985-1990 in an attempt to establish a coho salmon sport fishery, but poor returns caused this program to be discontinued. An urban coho project was initiated in 1991 to provide additional recreational fishing opportunities by stocking coho salmon smolt in several other urban area streams. This program identified seven streams to receive stocked anadromous coho salmon in the Northern

Cook Inlet (NCI) area (Hoffmann and Hasbrouck 1994). Three of these streams, Ship, Bird and Campbell creeks, are in the Anchorage area; the other four, Fish, Wasilla, and Cottonwood creeks, and Little Susitna River are in the Palmer/Wasilla urban areas. The Big Lake Hatchery was closed in 1993, reducing the Palmer/Wasilla urban stocking program to Little Susitna River. Of the Anchorage area streams, Ship Creek already received stocked fish, but the numbers were increased to provide additional angling opportunities. Bird Creek, which had a limited wild coho salmon fishery, was augmented through stocking to provide additional opportunities. Finally, Campbell Creek was stocked to provide a new fishery that opened in 1993.

Prior to the Urban Coho stocking program, the highest coho salmon harvest occurred in 1988 (6,730; Table 11, Figure 11). In 1994, 22,542 coho salmon were caught in area sport fisheries and 13,948 of these fish were harvested. While 1995 estimates are not yet available, we expect harvest to exceed that estimated for 1994. The recent increase in Anchorage area coho salmon sport harvest is directly related to increased sport fishing effort on Ship, Campbell, and Bird creeks due to hatchery stocking, and on natural stocks in Twentymile River. Coho salmon return to area streams from mid-July through mid-October. Stocked stream runs peak in mid to late August, while Turnagain Arm runs peak in mid-September. Detailed estimates of stocked coho salmon caught in selected UCI commercial fisheries can be found in Hoffmann and Hasbrouck (1994), Stratton et al. (1996), and Cyr et al. (1997*)*.

SHIP CREEK

Background and Historical Perspective

Ship Creek's wild coho salmon run supported sport, personal use, and subsistence fisheries before World War II. The dams constructed in the lower 11 miles of creek for power generation and as a water source for MOA and military during the 1940s and 1950s significantly reduced Ship Creek salmon runs. To rebuild these runs, the creek was stocked annually with coho salmon smolt from 1968-1977. These efforts proved unsuccessful in providing consistent numbers of returning adults. Nine different brood stocks from Ship Creek, Bear Lake (near Seward), Kodiak, Washington, and Oregon were used (Miller 1990). Eggs obtained from these stocks were incubated at Fire Lake Hatchery and the resultant fry were reared to smolt at Fort Richardson Hatchery. No coho salmon smolt were released in Ship Creek from 1978-1986. From 1987-1994, the department stocked coho salmon smolt in Ship Creek using fish of Ship Creek origin reared at Elmendorf Hatchery. While these efforts have provided consistent coho salmon runs, these runs tend to enter the system slowly throughout the fall. Ideally, coho runs that appeal to sport anglers exhibit a compressed run timing with large numbers of fish available in a relatively short time period. The decision was made to change brood stock for Ship Creek to Little Susitna River origin fish which exhibit the preferred condensed run timing. The first release of Little Susitna River origin coho salmon smolt occurred in 1995; these fish will return as adults in 1996.

Ship Creek was open to coho salmon sport fishing from 1957-1959, and again from 1964 to present (Appendix A1). Currently, only the reach downstream of the Chugach Power Plant dam is open to salmon fishing. Hatchery-supported coho salmon returns to Ship Creek in recent years

Table 11.-Anchorage area anadromous coho salmon sport fish catch (1990-1994) and harvest (1977-1994).

	Ship Creek		Bird Creek		Campbell Creek		Twentymile River		Area Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		125		0		0		996		1,127
1978		151		151		0		289		792
1979		512		0		0		362		974
1980		301		26		0		439		1,222
1981		220		38		0		737		1,474
1982		168		31		0		618		1,571
1983		94		94		0		712		1,905
1984		312		324		0		1,297		2,843
1985		236		373		0		709		2,052
1986		89		994		0		1,765		3,458
1987		779		761		0		1,050		3,096
1988		2,128		1,710		0		2,055		6,730
1989		1,467		899		28		1,715		4,940
1990	1,220	818	811	535	0	0	1,283	787	3,967	2,488
1991	1,384	1,168	1,372	1,099	89	25	2,032	1,308	5,926	4,393
1992	3,142	1,911	1,279	785	24	8	2,559	1,684	9,665	5,698
1993	3,876	2,579	7,799	6,195	6,894	3,942	2,636	1,986	23,462	16,387
1994	4,239	3,011	7,169	5,425	4,725	1,256	3,882	2,846	22,542	13,948
90-94 Avg.	2,772	1,897	3,686	2,808	2,346	1,046	2,478	1,722	13,112	8,583

Source: Mills 1979-1994, Howe et al. 1995.

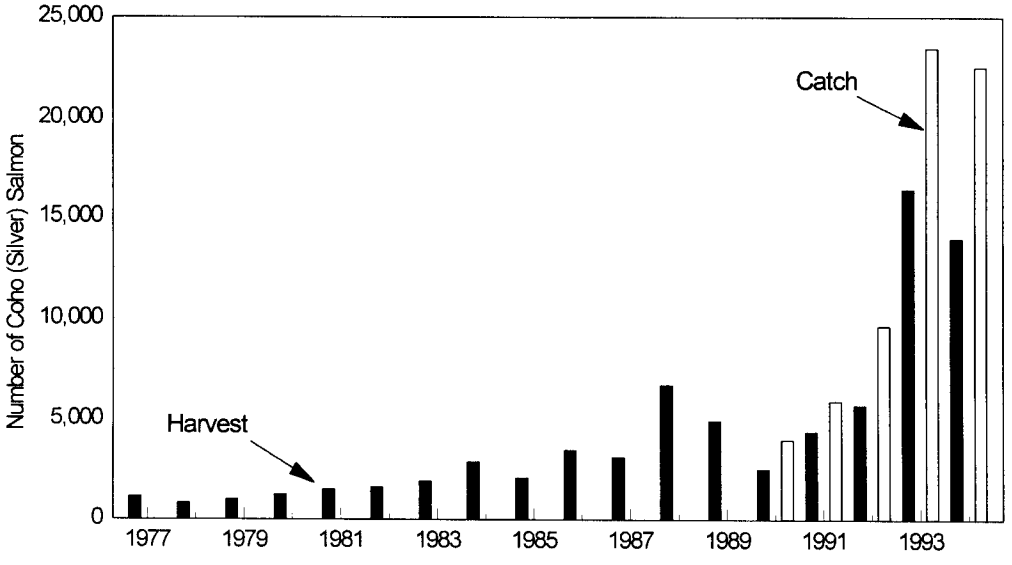

Figure 11.-Total Anchorage area coho salmon sport fish catch (1990-1994) and harvest (1977-1994).

have provided a unique opportunity for anglers to fish for and harvest coho salmon in an urban setting.

Recent Fishery Performance

Performance of the Ship Creek sport fishery has been estimated in SWHS (Mills 1979-1994, Howe et al. 1995) since 1977. The Ship Creek coho salmon sport harvest has ranged from less than 100 fish (1983 and 1986) to 3,011 fish in 1994 (Table 11). We expect the 1995 harvest estimate to approach 3,000. The *Ship Creek Silver Salmon Derby* began in 1995 during August. This derby was well received by the angling public and will become an annual event. Effort levels will continue to increase as the popularity of this fishery grows, in part due to the Derby.

In 1995, 1,003 coho salmon were captured above the sport fishery boundary in the Ship Creek fish pass. Of these fish, 492 were missing their adipose fin, which identifies a coded wire tagged fish. One hundred and forty-five coho salmon missing their adipose fin were killed and their heads collected as part of the Urban Coho project to test for straying. Results of this study can be found in Cyr et al. (1997). The remaining 858 fish were allowed to swim upstream and spawn naturally (Appendix C1). No fish were collected for brood stock.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B12, and B13.

Management Objectives

The Ship Creek coho salmon fishery management objectives are to maintain or increase current angler effort through annual smolt stocking and achieve the 200 fish escapement goal above the Chugach Power Plant dam. Coho salmon are no longer needed for brood stock requirements. Present regulations provide for the harvest of coho salmon in excess of spawning and viewing requirements and allow optimum utilization of Ship Creek coho salmon.

Recent Board of Fisheries Actions

No action was taken by BOF in the November 1992 meeting.

A department proposal has been submitted for BOF consideration in January 1996 to close the reach of Ship Creek near the Elmendorf Hatchery. Several hatchery structures exist in Ship Creek near the Elmendorf Hatchery. This reach, extending from Reeve Boulevard bridge upstream to the hatchery dam, is approximately 1,650 feet in length. Statewide regulation 5 AAC 75.050. WATERS CLOSED TO SPORT FISHING. (a) *The waters within 300 feet of a fish weir or fish ladder are closed to sport fishing unless a lesser distance is indicated by department markers* is commonly interpreted to include all hatchery structures. Because there is more than 600 feet between some of these hatchery structures, small areas of this portion of Ship Creek are open to sport fishing. Only sport fishing for rainbow trout and Dolly Varden are allowed in this reach, however, most anglers in this reach are illegally targeting salmon. Hatchery personnel spend considerable time educating the public about closed waters, fishing seasons, bag and possession limits in this reach. To avoid public confusion, we are recommending that this area be closed to all sport fishing.

Current Biological and Social Issues

The escapement goal of 200 fish was exceeded four fold in 1995. An emergency order (2-SS-2-42-95), effective at noon, 25 August, was issued that increased the coho salmon bag limit to five daily and in possession. Daily bag and possession limits will continue to be liberalized in the

future once the escapement goal is attained to allow anglers the opportunity to harvest surplus hatchery fish. The fishery should continue to be monitored to assure adequate escapement.

The Ship Creek coho salmon sport fishery has evolved in recent years. Effort has increased and anglers have become more effective at harvesting returning fish. This trend of increasing angler participation within a limited area creates crowding, sanitation, and parking problems along the creek and adjacent ARR and MOA property. The coho salmon sport fishery takes place in a highly industrialized area of the city. The potential for conflict exists between sport anglers and land managers including ARR and MOA. Sanitation and parking facilities in place for the chinook salmon fishery remain in place for the coho salmon fishery. Development proposed for lower Ship Creek includes access improvements, parking, and trails.

There has been public concern over water quality and the suitability of Ship Creek fish for human consumption. Water quality in Ship Creek has been monitored by MOA in recent years. Sampling by MOA has shown that Ship Creek water periodically contains high levels of fecal coliform bacteria. Proper cooking of salmon harvested from Ship Creek eliminates any potential health risks from bacterial pollution. While water quality has improved, pollution from urban activities and development still affects Ship Creek. Most Ship Creek salmon are raised to smolt stage at Elmendorf Hatchery before emigrating to Cook Inlet marine waters. Upon entering Ship Creek as adults, they have ceased feeding. Therefore, ingestion of pollutants does not occur.

Ongoing Research and Management Activities

Management activities consist of a variety of tasks necessary to maintain the fishery. Escapement counts are conducted annually to assure achievement of the 200 fish biological escapement goal (BEG). Coordination with ARR occurs to keep the program operating smoothly and includes determination of necessary facilities (parking, bathrooms, and trash receptacles) and signs needed to control angler activities in a manner consistent with ARR operations. Enforcement activities are also conducted during the Ship Creek fisheries as time allows.

Coho salmon escapements are monitored by department personnel passing fish through a holding box located on a fish pass at the upstream end of the Chugach Power Plant dam. Foot surveys will not be conducted.

Recommended Research and Management Activities

The following activities are recommended for Ship Creek:

1. Continue to monitor daily escapement levels through the fish pass.
2. During peak periods of the sport fishery, effort should be directed at minimizing potential conflicts between industrial activities in lower Ship Creek and sport anglers by assisting area land managers in posting signs, enforcement, and angler education.
3. Efforts should be continued to insure that adequate access, parking, and sanitation facilities are available. The department should be active in the planning and development of the port area.
4. Access staff should coordinate the installation of permanent rest rooms, garbage cans, and an informational kiosk on ARR land with MOA.

CAMPBELL CREEK

Background and Historical Perspective

While wild coho salmon return to Campbell Creek during August and September, the number of returning adults is insufficient to support a viable sport fishery. Most fish migrate upstream of Lake Otis Parkway, and spawn in both North and South Forks. Campbell Creek coho salmon escapement surveys averaged 159 fish annually from 1986 to 1992, before returns of hatchery fish (Appendix C4). Campbell Creek historically supported annual coho salmon runs greater than observed in recent years. The reduction of Campbell Creek coho salmon runs were a result of urbanization and development along the creek which reduced the number and size of wetlands and associated rearing habitat, an influx of pollutants and silt from storm drain runoffs, and poaching.

The annual stocking of 150,000 coho smolt of Little Susitna River origin was initiated in 1992 to increase coho salmon runs to Campbell Creek. This stocking is part of the urban coho salmon project aimed at increasing coho salmon angling opportunities in the Anchorage area. Campbell Creek was opened to coho salmon fishing in 1993 for the first time since 1971 (Appendix A3). The Campbell Creek greenbelt includes a major segment of the MOA bike trail system and provides excellent public access to the creek from the confluence of North and South Forks downstream to Campbell Lake.

Recent Fishery Performance

Campbell Creek was closed to salmon fishing for a number of years. Small, illegal coho salmon fisheries occurred at the mouth of Campbell Creek and between Campbell Lake and Lake Otis Parkway. The fishery opened in 1993. A BEG of 200 fish was set for Campbell Creek coho salmon, and a weir was operated on Campbell Creek from 1993-1994 to count returning adult salmon. An escapement of 2,312 fish was observed during 1993 weir operations (Appendix C3), catch was estimated at 6,894, and harvest was estimated at 3,942 (Table 11). In 1994, 3,054 coho salmon passed the weir, catch was estimated at 4,725, and 1,256 of these fish were harvested. In 1995, foot surveys estimated 1,256 coho salmon escaped the fishery. Formal harvest estimates are not yet available for 1995, however, we feel that anglers probably caught about 4,000 coho salmon and harvested about 2,000.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B12, and B13.

Management Objectives

The Campbell Creek coho salmon fishery was established to provide additional angler opportunities in Anchorage. The main objective is to generate sufficient increases in angler effort to make the stocking program cost effective. An increase of approximately 3,000 angler days effort, as measured by SWHS, was established to achieve this objective. In addition, the fishery will be managed to maintain historic escapement levels, and provide continued natural production and viewing opportunities. An escapement goal of 200 coho salmon has been established.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting, two proposals were submitted to open portions of Campbell Creek to coho salmon sport fishing in 1993. One proposal recommended opening the entire reach from Dimond Boulevard to a department marker near Folker Street. An alternative

proposal suggested closing the stretch of Campbell Creek that flows through Wickersham Subdivision (Figure 12). After deliberation, BOF opened Campbell Creek from Dimond Boulevard upstream to a department marker near Folker Street. The sport fishing season was set from 25 July through 15 October with a daily bag and possession limit of three coho salmon. A proposal for closing the area downstream of Dimond Boulevard, including Campbell Lake, to all sport fishing was passed.

Several proposals have been submitted for consideration by BOF during their January 1996 meeting. A department proposal incorporates time and area opening dates as well as extending the area open to sport fishing to include that portion of Campbell Creek upstream of Folker Street. Several public proposals have also been submitted. These include: (1) closing that portion of Campbell Creek that flows through Wickersham Subdivision during coho salmon season, (2) opening lower Campbell Creek and portions of Campbell Lake to sport fishing during coho salmon season, and (3) opening portions of Campbell Lake for ice fishing. The ice fishing proposal was withdrawn.

Current Biological and Social Issues

Little Susitna River coho salmon brood stock is being used to develop the Campbell Creek fishery. Attempts to collect wild Campbell Creek coho salmon in 1990 for brood stock were unsuccessful due to low numbers of spawning adults. The introduction of Little Susitna origin coho salmon compromises the genetic makeup of naturally-spawning Campbell Creek coho salmon. However, the projected increase in angler opportunity was viewed as more beneficial.

Social issues dominate the Campbell Creek coho salmon fishery. Various concerns have been voiced, particularly by Wickersham subdivision residents, and include trespass, public safety, suitability of fish to eat, habitat and bank degradation, and other potential problems associated with increased fishing activity in a residential area.

Efforts were made before the 1992 BOF meeting to encourage creekside residents to participate in the board process. Two residents testified and at least two letters were sent by FAX to the board. Public testimony recommended restricting or not opening the fishery, and the letters included one opposed to the fishery and one in favor. Several calls from area residents were received by staff before the meeting. As a result of concerns expressed in these calls an alternate staff proposal was submitted to keep the Wickersham Subdivision area closed to fishing. However, BOF opened Campbell Creek to coho fishing from the Dimond Boulevard Bridge to Folker Street, including Wickersham Park. In response to continued concern from Wickersham Park residents, a subcommittee of the Campbell Park Community Council was established to monitor and respond to these concerns. These efforts were repeated prior to the 1996 BOF meeting.

Issues that developed in 1995 included: (1) fishing in closed waters near Dimond Boulevard, (2) public and political pressure to open Campbell Lake and lower Campbell Creek to sport fishing, (3) trespass and habitat degradation complaints in Wickersham Park, and (4) snagging complaints throughout the creek. The department responded by installing a barrier fence at Dimond Boulevard and increasing enforcement patrols. A great deal of time was spent discussing the lack of practical public access to Campbell Lake and lower Campbell Creek. Staff

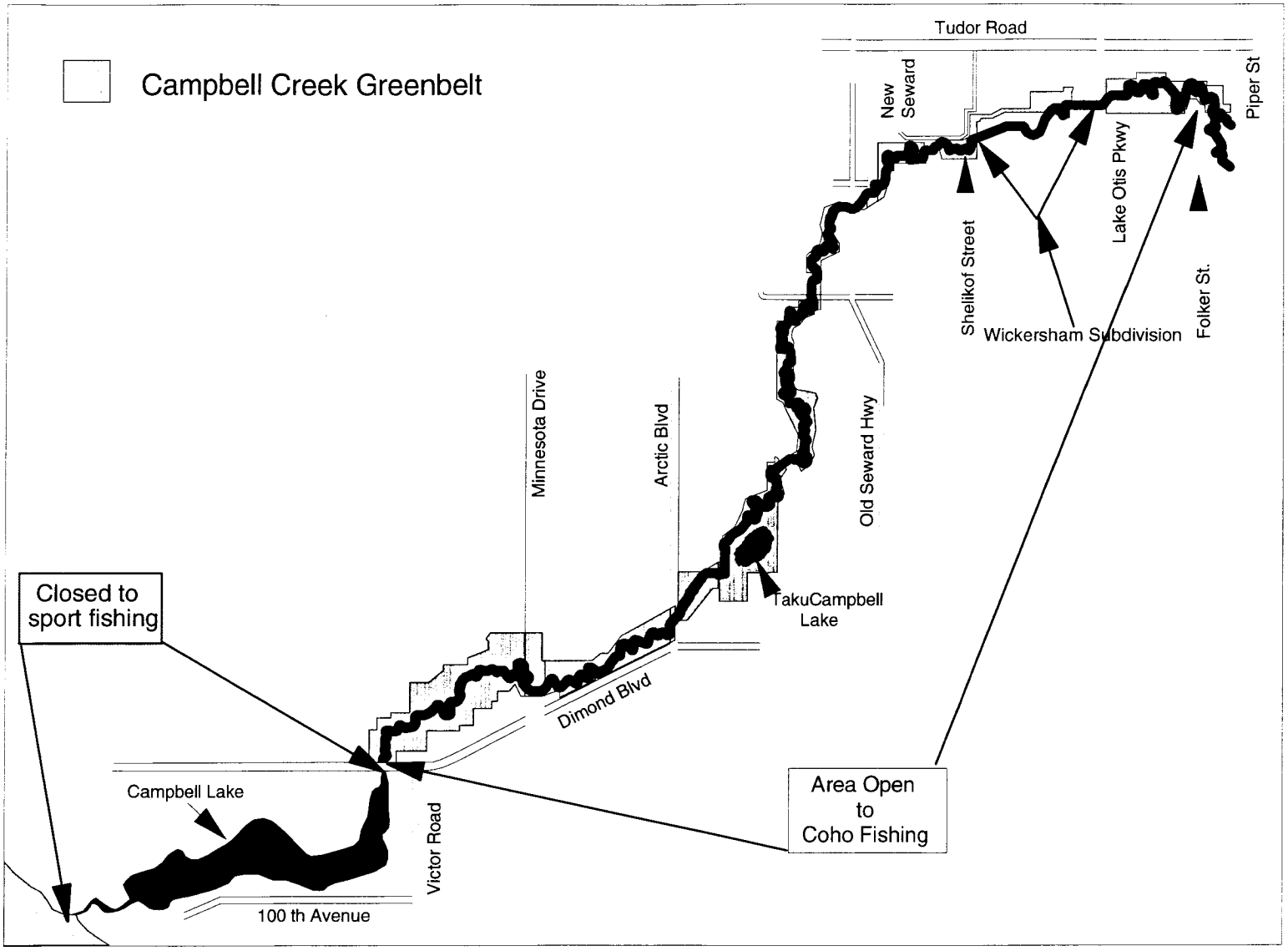

Figure 12.-Map of lower Campbell Creek drainage and area open to coho salmon sport fishing in 1995.

attended several meetings regarding the Campbell Creek coho fishery, and assisted the public in drafting BOF proposals. Staff also attended and assisted the Campbell Park Community Council draft a BOF proposal to close Wickersham subdivision reach to sport fishing due to habitat and trespass concerns.

NCI commercial setnetters were contacted to discuss results of the Urban Coho program.

Ongoing Research and Management Activities

The Campbell Creek coho salmon escapement will be estimated via foot surveys as part of the NCI urban coho salmon project

Recommended Research and Management Activities

As the Campbell Creek coho salmon sport fishery develops, it is necessary to work with MOA Parks and Recreation, area Advisory Committees, Community Councils, and property owners along the Campbell Creek greenbelt to monitor the fishery and address potential problems as they arise. Coordination with MOA Parks and Recreation and the Anchorage ADF&G Fish and Game Advisory Committee will continue. A group has been formed through the Campbell Park Community Council to coordinate fishery monitoring with ADF&G.

Coho salmon escapement surveys should be continued to provide baseline data necessary for evaluation of the stocking program.

Access staff should coordinate the installation of barrier free access on MOA land near Dimond Boulevard as well as permanent rest rooms, garbage cans, and an informational kiosk.

Enforcement activities by area staff will continue as time permits.

BIRD CREEK

Background and Historical Perspective

Little historic information is available for Bird Creek coho salmon. The first foot surveys were made in 1986 with three coho salmon observed; foot surveys were also conducted from 1990 through 1992 with escapements ranging from nine to 101 (Appendix C3). Bird Creek is open to sport fishing from department markers approximately 500 yards above the Seward Highway Bridge downstream to the mouth of the creek. The open area was expanded in 1993 by approximately 100 yards as a result of a pending land exchange between ADF&G and private landowners. To date, this land exchange has not occurred. Bird Creek, upstream of this reach, is closed to all salmon fishing. The area open to sport fishing in Bird Creek is the intertidal reach, and coho salmon are harvested from late July through mid-September. Harvest information is available and, from 1977 through 1992, ranged from 0 to 1,710 (Table 11). Given the low observed escapements, it was assumed that most of the Bird Creek coho salmon harvest was fish bound for other Turnagain Arm streams that milled in the intertidal portion of Bird Creek. Bird Creek is a very popular pink salmon fishing spot and DNR, the primary land manager, has developed parking, camping, barrier free access, and sanitation facilities.

The well developed access, proximity to Anchorage, and lack of natural coho salmon production made Bird Creek an ideal candidate for enhancement. The annual stocking of 150,000 coho smolt of Little Susitna River origin was initiated in 1992 to increase the number of coho salmon for sport anglers. This stocking is part of the urban coho salmon project aimed at increasing

coho salmon angling opportunities in the Anchorage area. The first return of adult coho salmon from stocking efforts occurred in 1993.

Recent Fishery Performance

The first returns from hatchery stockings resulted in a 1993 catch of 7,799 and harvest of 6,195 coho salmon (Table 11). In 1994, catch was estimated at 7,169 of which and 5,425 were harvested. While harvest estimates for 1995 are not yet available, observations during the coho sport fishery indicate a catch and harvest similar to or slightly less than the 1993 harvest. Escapement counts from foot surveys totaled 593 in 1993, 277 in 1994, and 169 in 1995 (Appendix C3). This indicates that most stocked coho salmon are harvested in the sport fishery.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B12, and B13.

Management Objectives

The Bird Creek coho salmon fishery was established to provide additional angler opportunities in Anchorage. The specific objective is to generate sufficient increases in angler effort to make the stocking program cost effective. An increase of approximately 3,000 angler days effort, as measured by SWHS, was established to achieve this objective. The limited information available for natural coho salmon production in Bird Creek suggests that few coho salmon spawn in the system, therefore no escapement goal has been established for Bird Creek. The sport fishery is managed to fully utilize returns from hatchery stockings.

Recent Board of Fisheries Actions

At the November 1992 BOF meeting, an additional 100 yards of Bird Creek, upstream from the old boundary, was opened to sport fishing as a result of a pending land exchange between Chugach State Park and private landowners. This land swap has not yet taken place. About 500 yards of the intertidal reach in Bird Creek is now open to sport fishing.

No BOF proposals have been submitted for the January 1996 meetings.

Current Biological and Social Issues

Little Susitna River coho salmon brood stock is used to develop the Bird Creek fishery. No attempts were made to collect wild Bird Creek coho salmon for brood stock as natural production is very low. As Bird Creek historically produced few coho salmon, there are no genetic concerns.

A substantial amount of parking and sanitation facilities already existed prior to stocking, and as the fishery occurs in the intertidal reach, there are no habitat concerns. Reports of snagging, over-limits, and trespass incidents are occasionally received.

Ongoing Research and Management Activities

The Bird Creek drainage coho salmon escapement will be estimated via foot surveys as part of the NCI urban coho salmon project.

Recommended Research and Management Activities

As the Bird Creek coho salmon sport fishery develops, it will be necessary to work with DNR, Chugach State Park, Advisory Committees, Community Councils, and property owners along the creek to monitor the fishery and address potential problems as they arise. Coho salmon foot

escapement surveys should be continued to provide baseline data necessary for evaluation of the stocking program.

Enforcement activities by area staff will continue as time permits.

TURNAGAIN ARM

Background and Historical Perspective

Upper Turnagain Arm is unique in that it supports diverse sport and personal use activities in close proximity to Anchorage, primarily targeting eulachon, Dolly Varden, and coho salmon. Some fisheries are accessible by highway vehicle while others are limited to jet boat access. Angler activities on these streams ranges from high to low use. While Turnagain Arm produces the largest wild stock coho salmon runs in the Anchorage Management Area, only anecdotal information is available on run timing and abundance of these stocks. Wild coho salmon return to several Turnagain Arm streams from late July through mid-September and fresh fish are often available into October. The Twentymile River drainage supports the largest and most popular recreational coho salmon fishery in the Turnagain Arm area. Harvest and angler participation have increased in recent years to the point that we are concerned about this stock.

In the Placer River drainage, Skookum and Lower Explorer creeks, we have the opposite situation. Sport fishing effort is minimal at this time and the entire drainage is open to recreational angling. The limited available escapement information suggests that while these systems can support small sport fisheries, they cannot support harvests of more than 400-500 coho salmon.

Ingram Creek in Turnagain Arm supports a small natural coho salmon run. In the mid-1980s, a channel connecting the large pond between Placer River and Ingram Creek was dug, and a water control structure installed. ADF&G and USFS, Glacier Ranger District in Girdwood, stocked this pond with 72,000-160,000 coho salmon fingerlings (reared at Crooked Creek Hatchery) annually between 1985-1990 in an effort to create a coho salmon sport fishery. The stocked coho salmon fingerlings reared and overwintered in the pond and emigrated the following spring as smolt into Turnagain Arm. While outmigrant weirs operated by the USFS found that the growth and survival of the fingerlings to the smolt stage were good, adult returns were very low. Ingram Creek coho salmon fingerling stocking efforts were canceled in 1991.

Coho salmon have also been harvested in California, Glacier, Ingram, Peterson, and Placer creeks and several Portage Valley streams. No escapement information has been collected from these streams by the department and limited information has been collected by USFS.

Recent Fishery Performance

Coho salmon harvests in Twentymile River peaked in 1994 (2,846), almost a four-fold increase from harvests in 1990 (787; Table 11), while Placer River coho salmon harvest was estimated at about 550 fish (Appendix B12). The targeted effort and harvest of these “late run” stocks have markedly increased the past 5 years, particularly in Twentymile River. This increased harvest and effort, coupled with no information on spawning escapements, prompted public concerns about overharvest of Twentymile River stocks. Harvest estimates are not yet available for 1995 but we expect harvest to be equal to or greater than that in 1994. Department aerial surveys estimated 986 coho salmon spawning in Twentymile River drainage in 1994 (Table 12) and 987 in 1995. In 1994, department aerial surveys counted 805 coho salmon in Placer River and its

Table 12.-Salmon escapement counts from aerial surveys in selected Turnagain Arm streams, 1994 and 1995.

Stream	1994		1995	
	Coho	Chum	Coho	Chum
Twentymile River Drainage				
Ahjo Creek	75	0	65	0
NE Fork	75	0	210	0
Mainstem	780	0	592	0
Beaver Pond	[a]	[a]	120	0
Glacier River	50	20	0	26
Upper Carmen River	0	0	0	0
South Fork Carmen River	6	0	0	0
Total	986	20	987	26
Portage Creek Drainage				
Mainstem	[a]	[a]	[a]	[a]
Upper Railroad Slough	0	0	210	0
Lower Railroad Slough	0	0	40	0
Placer Creek	0	0	57	0
Total	0	0	307	0
Placer River Drainage				
Sloughs and Mainstem	55	0	90	9
Skookum Creek	750	0	720	0
Total	805	0	810	9

[a] No count

tributary streams and sloughs, most (750) in Skookum Creek (Table 12). In 1995, 810 coho salmon were counted in Placer River and its tributary streams and sloughs, most (720) in Skookum Creek. USFS personnel estimated the Explorer Creek coho salmon escapement at 350 (Table 13). As this area grows in popularity, we expect to see increasing numbers of anglers targeting coho salmon throughout these streams.

Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B12, and B13.

Table 13.-Salmon escapement counts from foot surveys performed by U.S. Forest Service personnel in selected Turnagain Arm streams, 1995.

	Salmon Species					
Stream	Chinook	Sockeye	Pink	Chum	Coho	Total
Twentymile River Drainage	0	150	700	335	65	1,250
Portage Creek Drainage						
Williwaw Creek	0	762	0	611	35	1,408
Explorer Creek	0	300	0	0	350	650
Upper Railroad Slough	0	500	12	350	335	1,197
Lower Railroad Slough	0	50	0	50	450	550
Portage Creek	0	0	0	0	10	10
Placer Creek, Bear Valley	0	151	0	2	0	153
Total	0	1,763	12	1,013	1,180	3,968
Ingram Creek	0	0	5	0	0	5

Management Objectives

The management objective for Turnagain Arm coho salmon fisheries is to provide angler opportunities while ensuring adequate spawning escapement. No escapement goals have been set.

Recent Board of Fisheries Actions

No proposals were submitted for BOF deliberation during the 1992 meeting.

The department has submitted a proposal package for BOF consideration during its January 1996 meeting. This proposal would create sustainable Turnagain Arm coho salmon sport fisheries that provide continued opportunity and diversity. Angler opportunity and participation in Upper Turnagain Arm streams will not be significantly impacted by adoption of this plan that would allow fish to migrate through existing sport fisheries onto spawning grounds. This concept of "pass through fisheries" is similar to the management philosophy currently used in Parks

Highway coho salmon fisheries. If the proposal is adopted, the following waters will be closed to sport fishing from July 14 through December 31:

(A) Mainstem Twentymile River upstream of department markers located approximately 10 miles upstream of the Seward Highway bridge;

(B) Upper Carmen River, South Fork Carmen River, Carmen Lake, and the Carmen Lake outlet downstream to department markers located near its confluence with Glacier River;

(C) Glacier River upstream from department markers located near its confluence with Carmen Lake outlet stream;

(D) Unnamed slough entering Portage Creek from the north approximately 2 miles upstream from the northern Seward Highway bridge upstream of department markers located near its confluence with Portage Creek;

(E) Lower Explorer Creek upstream of department markers located near its confluence with Lower Explorer Pond; and

(F) Skookum Creek upstream of the Alaska Railroad bridge.

Current Biological and Social Issues

Turnagain Arm streams are growing in popularity. The main biological issue is to provide angler opportunity while ensuring an adequate number of fish reach the spawning grounds. While the amount of effort targeting Twentymile River coho salmon stocks is growing, other Turnagain Arm streams are underutilized. Staff has addressed these concerns through the BOF process.

Significant access and parking area improvements have been made at Ingram Creek. The Twentymile and Placer River parking sites are small and provide limited access. Access to both of these rivers is primarily by jet or air boat. Most sport fishing activity takes place at the confluence of clearwater streams and sloughs flowing into the glacial turbid rivers. While a few shore anglers fish Twentymile and Placer rivers and their tributaries, they must trespass across ARR property to access fishing areas.

Ongoing Research and Management Activities

The Twentymile and Placer river drainages and Portage Valley drainages were incorporated into the Urban Coho project in 1995. Seven aerial surveys were flown to index coho salmon abundance (Table 12). Department technicians made two to three trips per week into the area and documented angler use and areas fished as well as enforced sport fishing regulations. USFS, the primary land manager, conducted foot surveys to obtain adult salmon escapement counts on eight Portage area streams: Twentymile River and Williwaw, Explorer, Upper Railroad, Lower Railroad, Ingram, Placer (Bear Valley), and Portage creeks (Table 13).

Recommended Research and Management Activities

Several Turnagain Arm streams were incorporated into the Urban Coho research project in 1995. Escapements were assessed with aerial surveys performed by department staff and foot surveys performed by department and USFS staff. These streams include Twentymile River drainage (mainstem, tributaries, sloughs, and both Carmen River forks), Portage Creek drainage (Upper and Lower Railroad sloughs, Williwaw, and Placer creeks), Placer River drainage (Lower

Explorer and Skookum creeks, and sloughs), and Ingram Creek. Recreational effort and harvest will be estimated by SWHS.

Turnagain Arm is the next logical place to consider for developing new fisheries through a combination of publicizing existing, underutilized wild runs and hatchery enhancement. Ingram Creek appears to be an ideal candidate for smolt stocking. The ponds east of Ingram Creek were stocked with coho fry in the late 1980s, survival to smolt was good, but adults failed to return. DOT constructed several pull-outs along Seward Highway in anticipation of a fishery that did not develop. The department has had excellent success with coho salmon smolt plants in recent years. It is recommended that another attempt be made to create a viable Ingram Creek coho fishery using a Turnagain Arm brood source and smolt releases.

Staff explored the feasibility of collecting brood stock from road accessible Lower Explorer Creek in Portage Valley in 1995. Ovarian fluids (40) and kidney samples (39) were collected for disease screening. About 20 samples of each type will be collected in 1996 to finish the disease history of this stock. Use of a Turnagain Arm coho brood stock for Turnagain Arm releases should alleviate most genetic concerns associated with hatchery releases. If Lower Explorer Creek coho salmon are determined to be a dependable Turnagain Arm brood stock, Ingram Creek and Bird Creek could be stocked with this brood source. The stream selected for brood stock collection should also be supplemented with hatchery-reared fish.

From early August through late September, staff will travel Twentymile and Placer rivers and Portage Creek drainages twice weekly and begin documenting baseline angler-use information. Enforcement activities will also be conducted.

OTHER COHO SALMON STREAMS

Chester Creek was stocked with coho salmon in 1971. In early August 1995, several calls were received reporting coho salmon catches at the confluence of Chester Creek and Westchester Lagoon. Staff traveled to the area on two occasions and observed happy anglers (mostly kids) and a total of five harvested coho salmon. Coho salmon were also observed finning the water. All fish visually observed had their adipose fin. Reports came in from three other successful anglers over the next week. While some coho obviously migrated through the Westchester Lagoon water control structure, it is still assumed to be a migration barrier. MOA studied the possibility of removing the barrier to allow upstream passage of returning adult salmon, but recommended that the money be spent on creek rehabilitation and pollution control. Chester Creek supports a native Dolly Varden population and is stocked annually with rainbow trout catchables. Stocking salmon in Chester Creek is not recommended until the water control structure is modified to allow relatively easy fish passage.

Several other Anchorage area streams support small runs of coho salmon. Rabbit and Sixmile creeks are closed to all sport fishing for salmon, while portions of Peters, Glacier, California, and Portage creeks and Eagle and Eklutna rivers are open to salmon fishing. Harvests from these streams is low, and escapement surveys are not conducted. We recommend that surveys of these area streams be conducted as time and budget allow to determine coho salmon distribution and relative abundance, evaluate the capability of these streams to support sport fishing, and identify potential sites for future stocking efforts. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B12, and B13.

PINK SALMON FISHERIES

AREA-WIDE ASSESSMENT

While pink salmon return annually to Anchorage area streams in July and August, the largest runs occur in even-numbered years. In 1994, 8,480 pink salmon were caught in the Anchorage area and 1,979 of these fish were harvested (Table 14, Figure 13). Bird and Ship creeks support the largest pink salmon sport fishery in the Anchorage area. Other area streams with reported pink salmon harvests include California, Campbell, Fish, Glacier, Indian, Ingram, Peters, Rabbit, and Ship creeks, Eagle, and Eklutna, Placer, and Twentymile rivers, and Sixmile Lake. Rabbit and Sixmile creeks are closed to all salmon fishing and Campbell Creek is closed to pink salmon fishing. Therefore, all reported harvests from these three streams were illegal.

BIRD CREEK

Background and Historical Perspective

Bird Creek flows into Turnagain Arm approximately 25 miles south of Anchorage and supports the primary Anchorage area pink salmon sport fishery. Recent improvements in parking areas and access trails have increased Bird Creek's popularity as a fishing destination for both local and nonresident anglers. Pink salmon return to Bird Creek in July and early August each year; however, the number of returns during even-numbered years are significantly higher than the number of returns during odd-numbered years. These differences in relative abundance significantly influence annual angler effort and pink salmon harvest levels in Bird Creek. Bird Creek is open to sport fishing from department markers approximately 500 yards above the Seward Highway Bridge downstream to the mouth of the creek. The open area was expanded in 1993 by approximately 100 yards as a result of a pending land exchange between ADF&G and private landowners. To date, this land exchange has not occurred. Bird Creek, upstream of this reach is closed to all salmon fishing.

Recent Fishery Performance

A total of 3,460 pink salmon were caught and 1,101 harvested in Bird Creek in 1994, a very low catch and harvest for a high cycle year (Table 14). Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B14, and B15.

Management Objectives

No specific management objectives have been established for the Bird Creek pink salmon fishery.

Recent Board of Fisheries Actions

At the November 1992 BOF meeting, an additional 100 yards of Bird Creek, upstream from the old boundary, was opened to sport fishing as a result of a pending land exchange between ADF&G and private landowners. This land swap has not yet taken place. About 500 yards of the intertidal reach in Bird Creek is open to sport fishing.

No proposals specific to Bird Creek fisheries were submitted to BOF for consideration in January 1996.

Table 14.-Anchorage area pink salmon sport fish catch (1990-1994) and harvest (1977-1994).

	Bird Creek		Ship Creek		Twentymile River		Area Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		2,797		93		0		2,953
1978		913		93		31		1,176
1979		654		91		36		781
1980		2,127		405		43		2,601
1981		795		230		48		1,293
1982		1,006		0		73		1,178
1983		692		42		31		1,122
1984		2,669		162		350		3,992
1985		1,717		25		0		1,866
1986		9,159		849		491		11,664
1987		1,684		145		145		2,282
1988		3,256		564		218		5,330
1989		1,155		291		17		1,631
1990	9,327	3,815	686	81	500	81	13,362	4,932
1991	3,953	1,513	742	353	585	46	5,623	1,986
1992	16,845	5,899	5,881	1,346	870	73	27,287	8,901
1993	6,206	1,745	747	163	173	0	11,124	2,767
1994	3,460	1,101	1,185	119	762	9	8,480	1,979
90-94 Avg	7,958	2,815	1,848	412	578	42	13,175	4,113

Source: Mills 1979-1994, Howe et al. 1995.

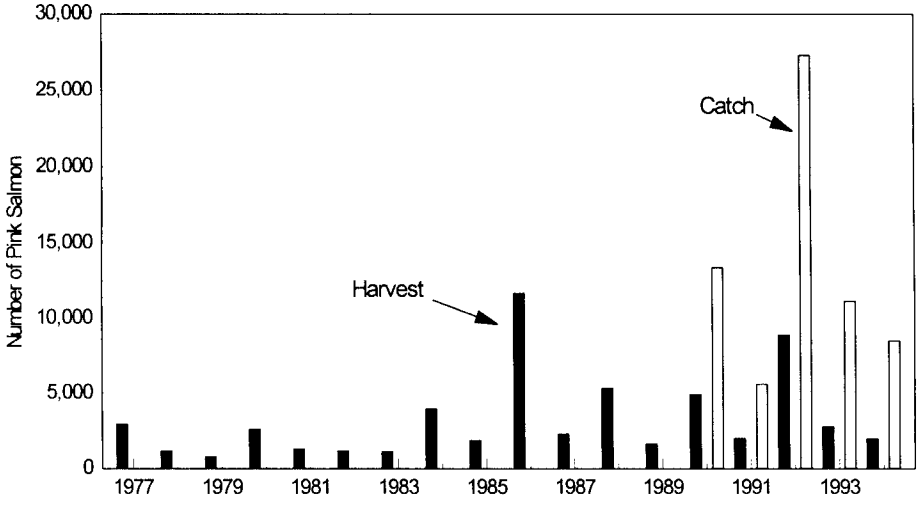

Figure 13.-Total Anchorage area pink salmon sport fish catch (1990-1994) and harvest (1977-1994).

Current Biological and Social Issues

There are presently no significant biological or social issues pertaining to the Bird Creek pink salmon sport fishery. Sufficient escapement reaches the spawning grounds to perpetuate the run and basic infrastructure such as parking, trails, barrier free access, and sanitation facilities are in place to allow access to the sport fishery.

Ongoing Research and Management Activities

No specific research or management activities are currently being conducted for the Bird Creek pink salmon fishery. Enforcement activities will be conducted as time allows.

Recommended Research and Management Activities

At present, the annual even-year pink salmon runs to Bird Creek are sufficient to support increased sport fishing participation. Stocking to increase the odd-year return was suggested in the late 1980s to reduce the annual variability in run magnitude and increase angling opportunities during low (odd year) cycles. Bird Creek was listed as a proposed site for annual pink salmon enhancement in the Statewide Stocking Plan for Recreational Fisheries (ADF&G 1989), but was dropped from future stocking plans as hatchery space is unavailable. With the success of the Urban Coho salmon project, it is unlikely that hatchery space will be made available for pink salmon. There are no future plans to stock Bird Creek with pink salmon.

OTHER PINK SALMON STREAMS

Ingram Creek was stocked annually with approximately 285,000 pink salmon fry from 1987 to 1990 in an effort to increase pink salmon abundance and provide an additional Anchorage area pink salmon sport fishing site. Returns of adult fish from these stocking efforts were sporadic and did not prove to be cost-effective. As a significant sport fishery was not developed, stocking of pink salmon fry was discontinued in 1991.

Most other Anchorage area streams support annual pink salmon runs but harvest levels are low. Other area streams with reported pink salmon harvests include California, Campbell, Fish, Glacier, Indian, Ingram, Peters, and Ship creeks, Eagle, Eklutna, Placer, and Twentymile rivers, and Sixmile Lake. Rabbit and Sixmile creeks are closed to all salmon fishing and Campbell Creek is closed to pink salmon fishing. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B14, and B15. Pink salmon escapement surveys are not conducted in Anchorage area streams by ADF&G staff. Research activities in Turnagain Arm were conducted by USFS, the primary land manager, in 1995. Adult salmon escapement counts were tallied on eight Portage area streams: Twentymile River and Williwaw, Explorer, Upper Railroad, Lower Railroad, Ingram, Placer (Bear Valley), and Portage creeks (Table 13). Pink salmon were observed in Twentymile River and Upper Railroad Slough.

Military personnel from Elmendorf have operated a weir on Sixmile Creek from 1988-1995 (Appendix C5). In 1995, 2,116 pink salmon were counted.

OTHER FISHERIES

SOCKEYE SALMON

The primary Anchorage area streams that support sockeye salmon runs are Sixmile Creek, and Twentymile and Placer rivers. The 1994 Anchorage area estimated sockeye salmon sport catch was 4,276 fish of which 1,594 were harvested (Table 15, Figure 14). Other Anchorage area

streams with reported sockeye salmon catches and harvests include Campbell, Ingram, Ship, and Portage Valley streams, and Eagle River. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B16, and B17.

In Campbell Creek, most sockeye salmon spawn in North Fork and little is documented on their life history. Campbell Creek has no natural lake system, only the man-made lake near the creek mouth. Sockeye salmon were counted at the Campbell Creek weir in 1993 and 1994 as part of the Urban Coho salmon project. However, the weir was not operational until most sockeye salmon had passed the site. Therefore, foot survey counts are used to estimate Campbell Creek sockeye salmon escapement. The average escapement from 1986 to 1995 was 546 fish (Appendix C4). Campbell Creek is closed to sockeye salmon sport fishing.

A weir has been operated by Elmendorf Air Force Base personnel in Sixmile Creek since 1988 (Appendix C5). Annual counts of returning sockeye salmon from 1988 through 1995 have averaged 2,297 fish. While Sixmile Creek is presently closed to sport fishing, fishing is allowed in the intertidal area below the high tide mark near the creek mouth and in Sixmile and Upper Sixmile lakes. The intertidal site, marked with a steel cable across the stream and department markers, is growing in popularity and contributes most of the area saltwater harvest.

Research activities in Turnagain Arm were conducted by USFS, the primary land manager, in 1995. Adult salmon escapement counts were tallied on eight Portage area streams: Twentymile River and Williwaw, Explorer, Upper Railroad, Lower Railroad, Ingram, Placer (Bear Valley), and Portage creeks (Table 13). Sockeye salmon were observed in seven of the eight surveyed streams. While Carmen Lake and its inlet tributaries are the primary sockeye salmon spawning areas in the Twentymile River drainage, mainstem spawning has been documented (Stratton et al. 1994). Sockeye salmon returning to Placer River spawn in Luebner Lake. Sockeye returning to Portage Creek primarily spawn in the artificially created channel in Williwaw Creek where a viewing platform and information kiosk were installed and are maintained by USFS.

CHUM SALMON

Chum salmon do not return in significant numbers to any Anchorage area stream. Most chum salmon are harvested by anglers targeting pink and coho salmon. The 1994 Anchorage area estimated chum salmon sport catch was 1,546 fish of which 174 were harvested (Table 16, Figure 15). Most of the catch (744) and harvest (102) were from Bird Creek. Chum salmon have also been harvested in California, Fish, Glacier, Indian, Peters, and Ship creeks, and Eagle, Eklutna, Placer, and Twentymile rivers (Appendix B19). Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B18, and B19. Chum salmon are occasionally observed during chinook salmon escapement surveys although no directed chum salmon counts are conducted by department staff. In 1995, 92 chums were counted through the Ship Creek fish pass, 18 were passed through the Sixmile Creek weir, and 9 chum salmon were counted during Bird and Penguin Creek chinook salmon foot surveys (Appendices C1, C3, C5). Aerial survey counts conducted by department staff in Turnagain Arm can be found in Table 12. These surveys were timed for peak coho salmon abundance and only 35 chum salmon were observed. Research activities in Turnagain Arm were conducted by USFS, the primary land manager, in 1995. Adult salmon escapement counts were tallied on eight Portage area streams: Twentymile River and Williwaw, Explorer, Upper Railroad, Lower

Table 15.-Anchorage area sockeye salmon sport fish catch (1990-1994) and harvest (1977-1994).

	Saltwater		Sixmile Creek		Twentymile River		Bird Creek		Area Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		0		0		0		0		25
1978		0		0		14		0		14
1979		0		0		204		0		204
1980		0		0		146		0		146
1981		0		0		335		0		383
1982		0		0		178		0		272
1983		178		0		123		0		603
1984		62		0		62		249		598
1985		124		37		62		261		721
1986		0		0		346		190		609
1987		0		36		435		163		1,507
1988		0		36		200		236		472
1989		60		111		145		128		564
1990	98	49	78	10	49	19	233	97	624	254
1991	244	174	44	44	401	331	87	78	933	749
1992	938	542	1,192	230	296	214	353	173	3,395	1,315
1993	4,147	1,849	963	597	164	125	157	109	6,052	3,085
1994	642	291	616	161	596	299	479	130	4,276	1,594
90-94 Avg	1,214	581	579	208	301	198	262	117	3,056	1,399

Source: Mills 1979-1994, Howe et al. 1995.

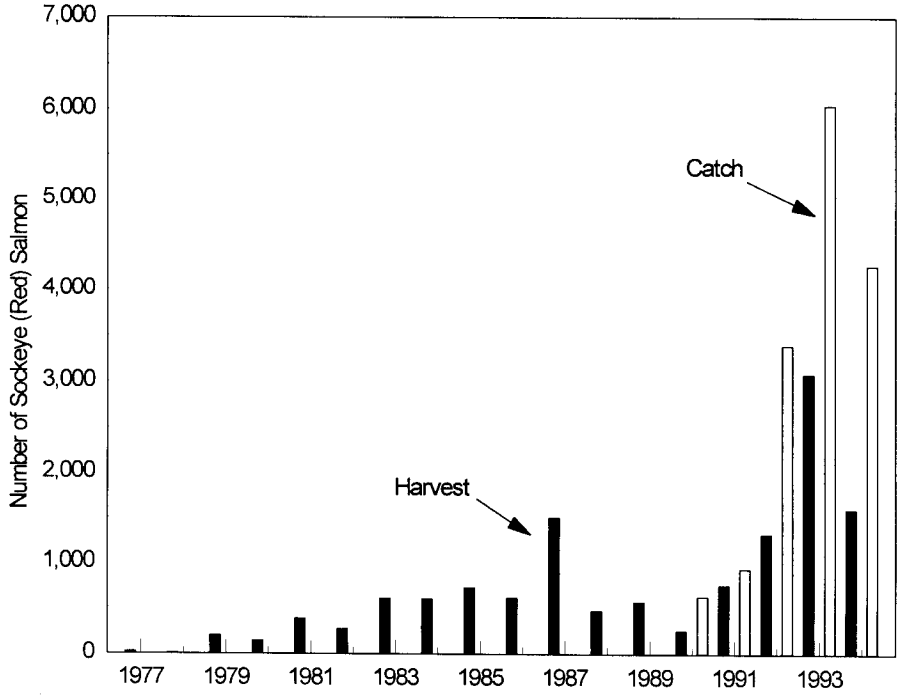

Figure 14.-Total Anchorage area sockeye salmon sport fish catch (1990-1994) and harvest (1977-1994).

Table 16.-Anchorage area chum salmon sport fish catch (1990-1994) and harvest (1977-1994).

	Bird Creek		Ship Creek		Twentymile River		Area Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		0		0		0		0
1978		0		0		20		20
1979		0		0		0		0
1980		34		9		43		86
1981		0		0		10		29
1982		0		0		10		10
1983		0		0		0		0
1984		125		0		25		162
1985		448		25		0		634
1986		681		89		112		960
1987		290		54		181		579
1988		364		182		91		691
1989		613		44		44		1,015
1990	442	136	238	11	352	102	1,530	315
1991	304	120	160	16	633	120	1,281	360
1992	478	129	243	61	562	38	1,664	297
1993	1,013	283	129	28	65	9	1,359	383
1994	744	102	334	22	153	7	1,546	174
90-94 Avg	596	154	221	28	353	55	1,476	306

Source: Mills 1979-1994, Howe et al. 1995.

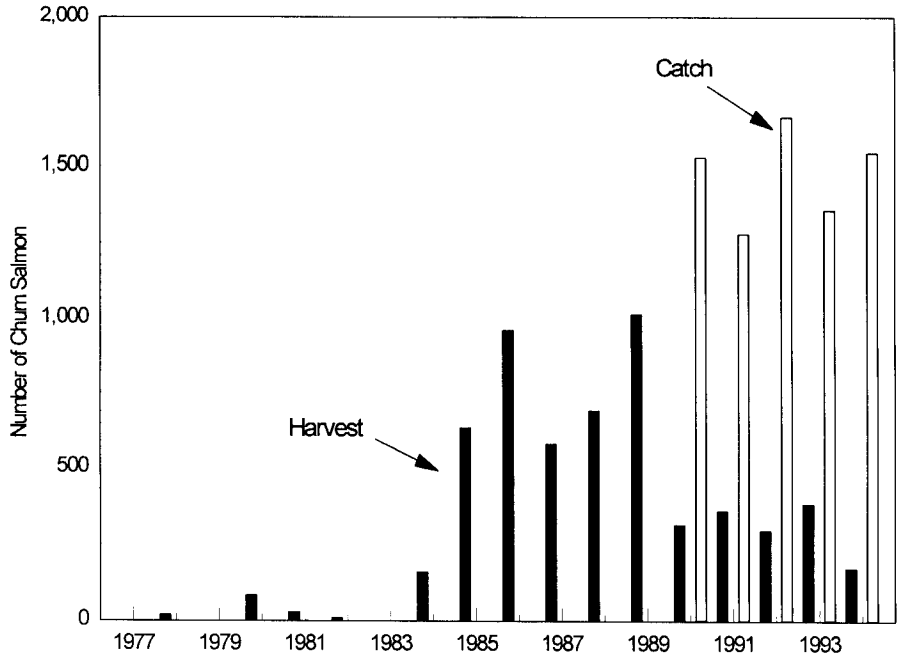

Figure 15.-Total Anchorage area chum salmon sport fish catch (1990-1994) and harvest (1977-1994).

Railroad, Ingram, Placer (Bear Valley) and Portage creeks (Table 13). Chum salmon were observed in six of the eight streams surveyed. No specific management activities are recommended for chum salmon in the Anchorage area.

STEELHEAD TROUT

Although steelhead trout are not indigenous to the Anchorage area, there has been public interest in developing a steelhead run in one or more area stream. In 1956, 50,000 eyed steelhead trout eggs from Kodiak were placed in egg trays and planted in Campbell Creek. There was no reported harvest from this release. In 1985 and 1986, steelhead smolt of Anchor River origin, hatched and reared at Elmendorf Hatchery, were stocked in Campbell Creek in an effort to establish an Anchorage area steelhead trout run. A weir was operated at the Campbell Lake outlet in 1986 and 1987 during August and September. No steelhead trout were observed in 1986 and only three steelhead trout were captured during 1987. One steelhead trout from the Campbell Creek release was caught in the high seas drift net fishery. The stocking program was discontinued in 1987 due to the poor return.

Although no steelhead have been observed during occasional spring surveys of selected stream reaches, steelhead have reportedly been caught by anglers fishing Campbell and Chester creeks in April. In 1990, 10 steelhead were observed downstream of the Elmendorf Hatchery raceway outfall in Ship Creek. There are no steelhead trout stocking programs planned.

STOCKED RAINBOW TROUT STREAMS

Two Anchorage area streams, Campbell and Chester creeks, are stocked with rainbow trout. Rainbow trout were first stocked in Campbell Creek in 1983 and are released annually between Lake Otis Parkway and the confluence of North and South Forks. Stocking of Chester Creek began in 1971.

At the fall 1986 meetings, BOF created a trophy rainbow trout area in the upper reaches of Campbell Creek (Appendix A3). Both the North and South Forks were restricted to single hook, artificial lure fishing only, and the retention of rainbow trout was prohibited. Although the North and South Forks of Campbell Creek are currently managed as trophy areas for rainbow trout, no large rainbow trout have been observed in these Campbell Creek reaches during chinook and coho salmon escapement surveys. Evaluation of rainbow trout size in the North and South Forks of Campbell Creek is recommended to determine if current regulations regarding catch and release are appropriate. If these Campbell Creek reaches do not produce large rainbow trout, a staff proposal should be developed for consideration by BOF to allow sport harvests of these hatchery-produced fish. Daily bag and possession limits for other waters open to rainbow trout sport fishing are five, only one of which may be 20 inches or more in length. Rainbow trout 20 inches or more in length must be immediately recorded on the back of the sport fishing license, and the Cook Inlet seasonal limit for rainbow trout 20 inches or more in length is two.

Both Campbell and Chester creeks are open systems. SWHS estimates a 1994 catch of 3,716 rainbow trout from Anchorage area streams (Table 17, Figure 16) and a harvest of 523 fish; most of this catch (1,809) and harvest (271) were taken from Campbell Creek. No estimate is generated for Chester Creek in SWHS due to no reported harvest. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B2, and B3.

Table 17.-Anchorage area streams rainbow trout sport fish catch (1990-1994) and harvest (1977-1994).

	Campbell Creek		Ship Creek		Other Creeks		Area Stream Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		[a]		257		292		549
1978		[a]		711		0		711
1979		[a]		482		482		964
1980		[a]		620		585		1,205
1981		[a]		182		201		383
1982		[a]		639		734		1,373
1983		0		63		304		367
1984		374		399		1,733		2,506
1985		1,613		277		503		2,393
1986		815		1,307		403		2,525
1987		408		39		263		710
1988		1,637		200		655		2,492
1989		732		9		385		1,126
1990	5,801	1,697	132	0	3,312	461	9,245	2,158
1991	2,417	199	162	62	399	224	2,978	485
1992	982	277	87	47	815	285	1,884	609
1993	1,673	267	146	47	2,169	177	3,988	491
1994	1,809	271	38	14	1,869	238	3,716	523

[a] Data not broken out by site but included in total.

Source: Mills 1979-1994, Howe et al. 1995.

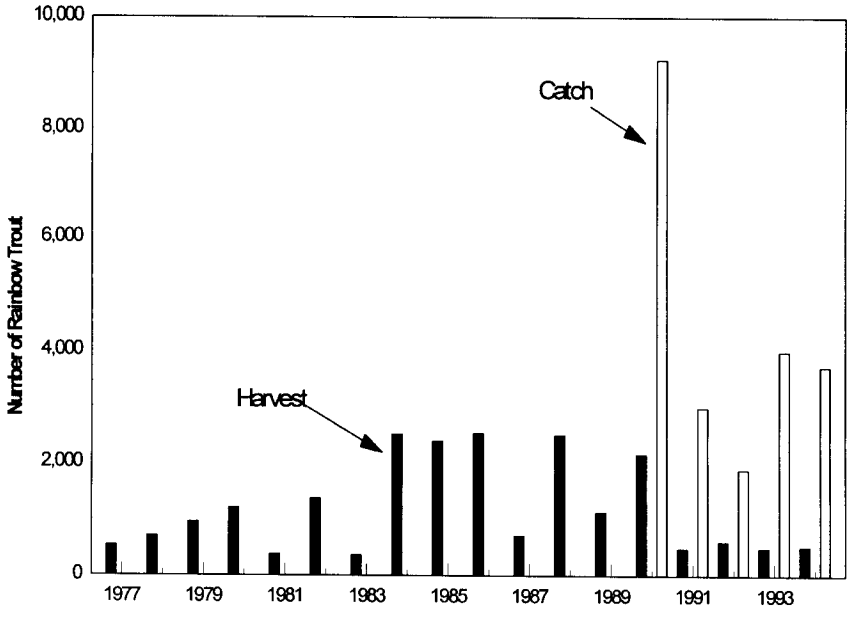

Figure 16.-Total Anchorage area streams rainbow trout sport fish catch (1990-1994) and harvest (1977-1994).

DOLLY VARDEN STREAMS

Several area streams support small populations of resident Dolly Varden. Harvests have decreased in recent years, most likely as a result of increased effort for stocked species. The 1994 estimated catch was 7,203 of which 1,567 were harvested (Table 18, Figure 17). Campbell Creek supported the largest catch in 1994 (1,975) while Eagle River had the highest harvest (521). Dolly Varden have been reported harvested from Bird, Campbell, Ingram, and Ship creeks, and Placer and Twentymile rivers. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B4, and B5. Daily bag and possession limits for Dolly Varden are five, with no size restrictions.

ARCTIC GRAYLING

Arctic grayling are not known to naturally occur in the Anchorage area. However, grayling are occasionally reported harvested in Eagle River. A catch of 2,283 Arctic grayling was estimated in 1994 of which 634 were harvested (Table 19, Figure 18). Most Arctic grayling were caught (2,224) and harvested (585) from stocked area lakes. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1, B6, and B7. Daily bag and possession limits for Arctic grayling are five, with no size restrictions.

Arctic grayling fry of Tolsona Lake origin were released in Campbell Creek during 1968. No grayling have been reported caught from Campbell Creek since the 1977 inception of SWHS.

NORTHERN PIKE

Northern pike do not occur naturally in Anchorage area waters and have not been stocked as part of any ADF&G program. However, reports of northern pike harvested in Sand, Lower Fire, and Delong lakes have been made to the department. Juvenile and adult northern pike caught in Sand and Lower Fire lakes have been brought into the Anchorage ADF&G office indicating that spawning populations have been established through illegal introductions. It is thought that these illegal introductions were made by float plane anglers returning from trips to one of the Susitna basin lakes that support northern pike populations. The success of stocking programs for other species may decline as the northern pike populations grow.

Area management staff made a trip to Sand Lake in mid-May 1995 in an attempt to capture northern pike. Spears and variable mesh gillnets were used and 12 northern pike were captured. All captured pike were measured, weighed, sampled for age, and frozen whole. All data and the frozen carcasses were transported to the Palmer area office for analysis. All pike had one to three stocked rainbow trout and/or landlocked salmon in their stomachs. As a result of this information, stocking levels for these two species in Sand Lake were reduced.

Lower Fire Lake was also sampled with variable mesh gillnets, resulting in the capture of over 30 northern pike. Stomach content analysis found Alaska blackfish as the main food source. Given the time of sampling, late-June, we recommend that the lake be sampled again in 1996 during mid-May. Detailed information on northern pike movements and predation in Cook Inlet can be found in Rutz (1996).

A canoe was used to cruise the shoreline of Delong Lake in late-May in an attempt to visually confirm the presence of pike. No pike were observed. We recommend that Delong Lake be

Table 18.-Anchorage area streams Dolly Varden sport fish catch (1990-1994) and harvest (1977-1994).

	Eagle River		Campbell Creek		Ship Creek		Bird Creek		Twentymile River		Other Streams		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		868				249		676		945		1,302		4,040
1978		1,357				689		689		1,055		431		4,221
1979		1,300				754		300		473		891		3,718
1980		818				275		207		413		1,808		3,521
1981		1,245				441		125		1,610		1,581		5,002
1982		1,247				210		105		472		859		2,893
1983		1,269		31		168		220		294		723		2,695
1984		5,674		150		100		449		187		248		6,709
1985		225		1,127		52		121		607		311		2,426
1986		983		302		145		134		458		373		2,395
1987		543		181		163		109		254		815		2,065
1988		637		1,564		146		127		327		836		3,564
1989		732		291		75		188		300		388		1,974
1990	2,192	330	1,516	445	297	82	165	33	1,038	396	1,731	328	6,939	1,598
1991	788	584	788	107	428	350	19	10	837	185	632	524	3,492	1,741
1992	1,704	573	246	49	303	33	213	147	803	311	1,000	623	4,269	1,556
1993	2,091	492	1,382	195	427	58	302	28	644	78	796	75	5,642	916
1994	1,302	521	1,975	283	568	161	662	108	637	99	2,059	76	7,203	1,567

Source: Mills 1979-1994, Howe et al. 1995.

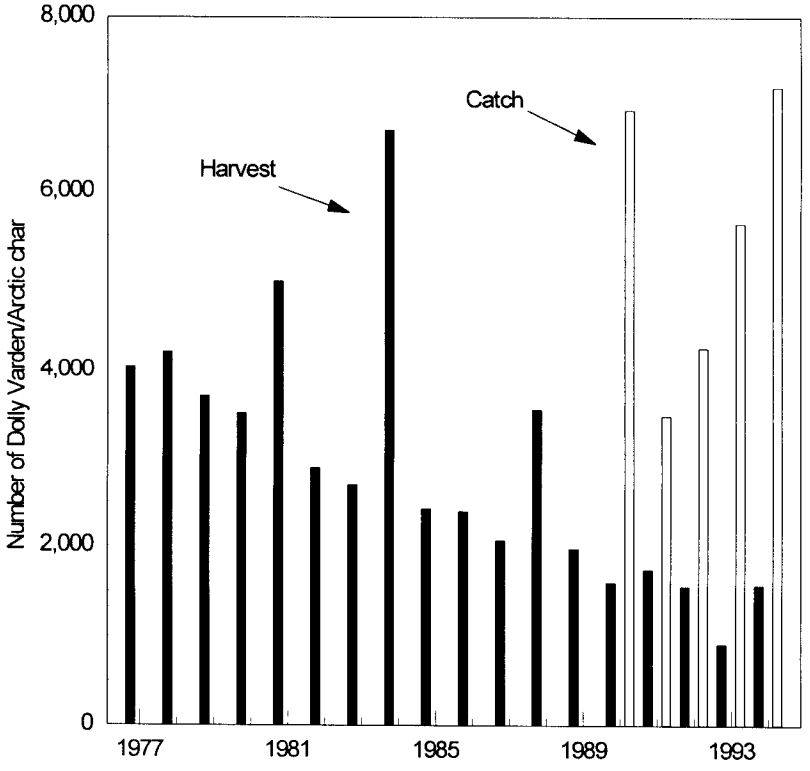

Figure 17.-Total Anchorage area streams Dolly Varden/Arctic char sport fish catch (1990-1994) and harvest (1977-1994).

Table 19.-Anchorage area Arctic grayling sport fish catch (1990-1994) and harvest (1977-1994).

	Lakes		Streams		Area Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977		187		0		187
1978		0		0		0
1979		9		9		18
1980		77		0		77
1981		48		67		115
1982		0		210		210
1983		0		0		0
1984		0		262		262
1985		0		0		0
1986		0		168		168
1987		0		18		18
1988		819		182		1,001
1989		66		0		66
1990	889	527	560	49	1,449	576
1991	1,480	188	70	50	1,550	238
1992	3,554	413	0	0	3,554	413
1993	1,362	233	0	0	1,362	233
1994	2,224	585	59	49	2,283	634
90-94 Avg	1,902	389	138	30	2,040	419

Source: Mills 1979-1994, Howe et al. 1995.

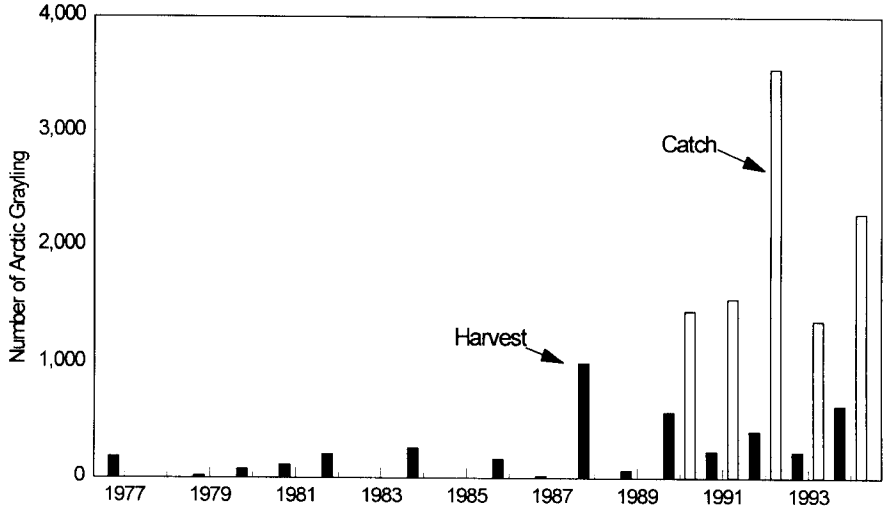

Figure 18.-Total Anchorage area Arctic grayling sport fish catch (1990-1994) and harvest (1977-1994).

sampled with variable mesh gillnets in early May prior to stocking of rainbow trout to determine of pike are in fact present.

The availability of northern pike in Sand and Lower Fire lakes was included in most weekly fishing reports as well as the focus of television news programs and newspaper articles.

Confusion exists over the daily bag and possession limits for northern pike in the Anchorage area. Regulation summaries available to the public in 1995 did not list northern pike, so it is assumed by the public that they fall under the other category with no daily or possession limit. However, Anchorage is part of the Susitna-West Cook Inlet regulatory area. Northern pike limits set forth in 5 AAC 61.020 are 10 daily and in possession, with no size restrictions. There are no regulations concerning the use of spears for northern pike in Chapter 61 of the codified regulations so Chapter 75, Statewide Provisions, 5 AAC 75.034, allowing the use of spears, applies. This should be clarified in 1996 regulation summaries.

EULACHON

Turnagain Arm supports a large eulachon (hooligan or candlefish) personal use dip net fishery. By regulation, this fishery is limited to residents only, and a valid sport fishing license must be in possession. Dipnetting is allowed in salt water from January 1 through May 31, and in fresh water from January 1 through June 15. The primary fishing sites are in Twentymile River and from rocky beaches along the north side of Turnagain Arm. The fishery occurs from mid-May through June 15. Eulachon have also been reported harvested in Bird Creek, Placer River, and Portage Valley streams (Appendix B20). Experienced dippers maintain that a 25-foot tide as measured in Anchorage is the minimum required to bring water, and eulachon, into the east end of Turnagain Arm. The extreme tides and muddy substrate in Turnagain Arm limit the number of sites available to anglers. The reported 1994 harvest was 49,279 (Table 20, Figure 19) most of which were taken out of Twentymile River. Harvest peaked in 1985 (268,135 fish) and has steadily dropped since. Detailed estimates of historic effort and harvest (1977-1994) and catch (1990-1994) can be found in Appendices B1 and B20. As no run-size data are available, the status of Turnagain Arm eulachon stocks is unknown. In SWHS, personal use effort is combined with sport fish effort, so, at this time, it is not possible to determine if the stocks are declining or if effort has decreased. In 1995, management staff requested that personal use dipnetting effort be separated from sport fishing effort in SWHS for as many years back as possible. The result of these analyses will prove valuable in future management of this fishery.

Table 20.-Anchorage area personal use eulachon harvest, 1977-1994.

Year	Saltwater Total	Freshwater			Area Total
		Twentymile River	Other	Total	
1977	[a]	189,077	12,132	201,209	201,209
1978	[a]	76,380	35,972	112,352	112,352
1979	[a]	91,349	15,783	107,132	107,132
1980	[a]	75,623	6,001	81,624	81,624
1981	[a]	136,869	13,460	150,329	150,329
1982	[a]	106,850	9,767	116,617	116,617
1983	35,362	60,160	84	60,244	95,606
1984	103,143	190,418	9,232	199,650	302,793
1985	42,595	225,540	0	225,540	268,135
1986	22,980	100,974	0	100,974	123,954
1987	26,932	101,574	3,078	104,652	131,584
1988	35,952	103,556	0	103,556	139,508
1989	13,923	88,411	1,547	89,958	103,881
1990	7,663	125,100	264	125,364	133,027
1991	4,229	63,365	1,663	65,028	69,257
1992	7,290	35,674	0	35,674	42,964
1993	5,479	24,386	0	24,386	29,865
1994	4,562	44,037	680	44,717	49,279

[a] No specific saltwater estimate. Saltwater harvest included in total.

Source: Mills 1979-1994, Howe et al. 1995.

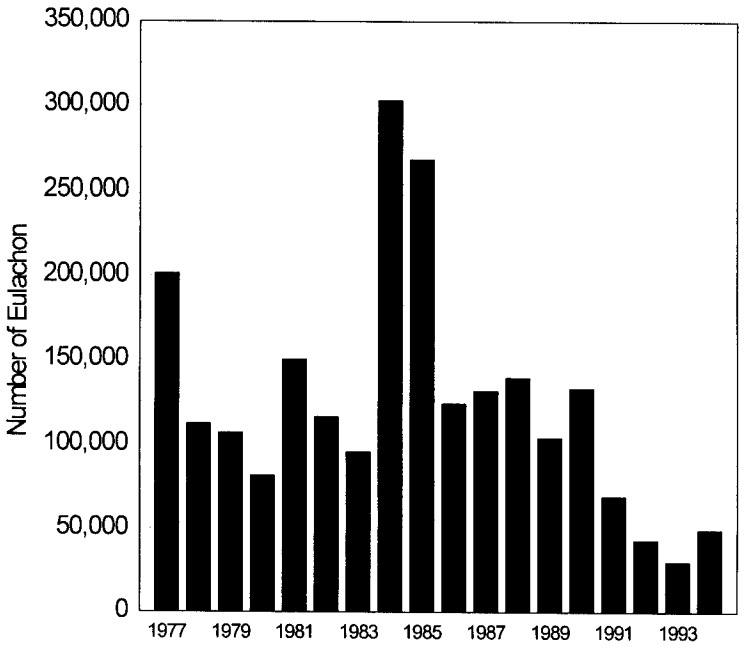

Figure 19.-Anchorage area personal use eulachon harvest, 1977-1994.

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APPENDIX A. REGULATION SUMMARIES

Appendix A1.-Sport fishing regulations for Ship Creek, 1957-1996.

Year	Sport Fishing Regulations
1957-1959	Closed to sport fishing from 4/01-5/27. Bag limit of 10 trout daily or in possession, only two 20 inches or more in length. No salmon fishing regulations.
1960	Closed to all sport fishing.
1961-1962	Closed to salmon fishing. Closed to sport fishing from 4/01-5/27. Bag limit of 10 trout daily or in possession, only two 20 inches or more in length. Anglers were allowed up to 20 resident fish if the excess were Dolly Varden.
1963	Same as 1961-1962 except closed to sport fishing from 4/01-5/25.
1964-1965	Closed to sport fishing from 4/01 through third Friday in May. Open to salmon fishing (except king salmon) downstream of a marker located 300 feet below the Chugach Power Plant Dam. Bag limit was three chum, sockeye, or pink with an additional three coho salmon allowed.
1966-1967	Same as 1964-1965 except legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.
1968	Closed to all fishing from 1/01-8/31. Anglers were allowed three salmon. Closed to king salmon fishing. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.
1969	Closed to all fishing from 1/01-8/31. From 9/01-12/31, anglers were allowed three salmon. Closed to king salmon fishing. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less. Removed excess Dolly Varden from resident fish bag limit.
1970	Closed to all fishing from 1/01-8/31 except for a king salmon opening from 7/04-7/19. Bag limit of one king salmon per day and two per season. From 9/01-12/31, anglers were allowed three salmon. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.
1971	Closed to all fishing from 1/01-8/31 except for king salmon openings on 6/10-6/11 and 6/17-6/18. A king salmon punch card was required and bag limit was one king salmon per day and two per season. From 9/01-12/31, anglers were allowed three salmon. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.
1972	Closed to all fishing from 1/01-7/31 except for king salmon openings on 6/10-6/11 and 6/17-6/18. A king salmon punch card was required and bag limit was one king salmon per day and two per season. From 9/01-12/31, anglers were allowed three salmon. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.

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Year	Sport Fishing Regulations
1973-1981	Closed to all fishing from 1/01-8/17. Closed to king salmon fishing. From 8/18-12/31, anglers were allowed three salmon. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less.
1982-1984	Closed to all fishing from 1/01-8/17. Closed to king salmon fishing. From 8/18-12/31, anglers were allowed three salmon. Legal gear was single-hook-only with a gap between point and shank of 1/2 inch or less. The rainbow trout limit was reduced to five fish, only one 20 inches or more in length.
1985-1986	Closed to all fishing from 1/01-7/31. Single-hook-only restriction lifted. Anglers were allowed three salmon from 8/01-12/31.
1987-1990	The area opened to salmon fishing was downstream of a marker located 100 feet below the Chugach Power Plant Dam. In addition, the creek was open to all fishing (including kings) on Tuesdays and Wednesdays for 5 consecutive weeks commencing the second Tuesday in June. King salmon bag and possession limits were one and two with no seasonal limit.
1991-1992	The area opened to salmon fishing was downstream of a marker located 100 feet below the Chugach Power Plant Dam. King salmon fishing was allowed from 1/01-7/13, daily bag and possession limit were one and two, and no seasonal limit. Fishing for other salmon was allowed year-round with a bag and possession limit of three and three. In addition, fishing for Dolly Varden, rainbow trout, and other species was allowed year-round.
1993	Regulations were the same as those for 1990-1992, with the addition of a seasonal limit of five king salmon in Cook Inlet waters.
1994	Regulations were the same as those for 1993, with the exception of Emergency Order No. 2-KS-2-21-94 which closed all waters of the Ship Creek drainage to all sport fishing from 12:01 a.m. 7/07 through 11:59 p.m. 7/13.
1995	Regulations were the same as those for 1993, with the exception of Emergency Order No. 2-SS-2-42-95 which increased the daily coho salmon bag and possession limit from three (3) to five (5) in that portion open to coho salmon sport fishing from noon 8/25 through midnight 12/31.
1996	Regulations were the same as those for 1993, with the exception of Emergency Order No. 2-SS-2-35-96 which increased the daily coho salmon bag and possession limit from three (3) to six (6) in that portion open to coho salmon sport fishing from 12:01 a.m. 8/04 through midnight 12/31.

Appendix A2.-Sport fishing regulations for Eagle River, 1957-1995.

Year	Sport Fishing Regulations
1957-1959	Closed to sport fishing from 4/01-5/27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. No salmon regulations.
1960	Closed to sport fishing from 4/01-5/27. Closed to salmon fishing upstream of 1/4 mile above Glenn Highway bridge. Bag limits were 10 salmon or trout daily, three could be salmon greater than 16 inches in length, two could be king salmon.
1961-1962	Same as 1960. In addition, anglers were allowed up to 20 resident fish if the excess were Dolly Varden.
1963	Closed season was from 4/01-5/25. Closed to salmon fishing upstream of 1/4 mile above Glenn Highway bridge. Bag limit was six coho salmon; three pink, chum or red salmon; one king salmon. Resident fish bag limits were 10 trout daily, only two over 20 inches. Anglers were allowed up to 20 resident fish if the excess were Dolly Varden.
1964-1967	Closed season was from 4/01 through third Friday in May. Closed to salmon fishing upstream of 1/4 mile above Glenn Highway bridge. Bag limit was six coho, three chum, sockeye, or pink salmon. Closed to king salmon fishing. Resident fish bag limits were the same as in 1963.
1968	No closed season. Closed to salmon fishing upstream of 1/4 mile above Glenn Highway bridge. Bag limit was three salmon 16 inches or greater in length. Closed to king salmon fishing. Resident fish bag limits were the same as in 1963-1967.
1969-1981	Same as 1968 except excess Dolly Varden in bag limit was removed in 1969.
1982-1986	Same as 1969-1981. In addition, rainbow trout bag limit was reduced to five per day, only one 20 inches or greater in length in 1982. Bag limits were 10 for other resident fish.
1987-1991	Same as 1982-1986. In addition, South Fork Eagle River below the falls was closed to all fishing from 6/01-8/14.
1992	Rules and regulations regarding king salmon fishing were defined by emergency order in mid-May. The river was open to king salmon fishing at various sites on Sundays, Tuesdays, and Thursdays from 6:00 a.m. to 10:00 p.m., 5/26-7/12. Bag and possession limit for king salmon were 1 and 1. Sites shore anglers were allowed to fish were noted by department markers at: (1) North Fork trailhead shore angler site: from approximately 100 yards downstream of the confluence of North Fork Eagle River and mainstem Eagle River to approximately 1 mile upstream in both North Fork and mainstem Eagle River. Angling was allowed

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Year	Sport Fishing Regulations
1992 (cont.)	along both shores of this North Fork portion and north shore only of this mainstem Eagle River portion. (2) Eagle River Briggs Bridge shore angler site: south shore of Eagle River from approximately 250 yards below Briggs Bridge upstream to a department marker adjacent to the downstream edge of the bridge. (3) Eagle River Campground shore angler site: south shore of Eagle River from the downstream edge of the south bound Glenn Highway bridge upstream to a department marker located approximately 500 yards upstream of the north bound Glenn Highway bridge. Anglers could fish from boats only in waters downstream from and including the North Fork trailhead shore angler site to the Briggs Bridge boat haul-out site. Fishing for other salmon was allowed downstream of the south bound Glenn Highway bridge.
1993-1995	Regulations established by BOF restricted king salmon fishing to a 30 day period commencing the Saturday before Memorial Day. Fishing was restricted to that portion of Eagle River upstream of Bailey Bridge on Fort Richardson to a department marker located approximately adjacent to Mile 7.4 of Eagle River Road. The area located approximately 100 yards on either side of the confluence of South Fork Eagle River was closed to fishing from 6/01-8/14. North Fork Eagle River upstream from a department marker located near its confluence with Eagle River was closed to all fishing during the king salmon season. Passes were required to fish on Fort Richardson.

Appendix A3.-Sport fishing regulations for Campbell Creek, 1957-1995.

Year	Sport Fishing Regulations
1957-1959	Closed to sport fishing from 4/01-5/27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. No salmon fishing regulations.
1960	Creek was open to salmon fishing, except king salmon, from 8/22-9/23. Bag limits were 10 salmon or trout daily, only three could be salmon greater than 16 inches in length and only two trout over 20 inches in length.
1961-1962	Same as 1960. In addition, anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1963	Closed to sport fishing 4/01-5/25. Bag limit was six coho salmon; three pink, chum or red salmon. Resident fish bag limits were 10, only two over 20 inches. Anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1964-1967	Closed to sport fishing from 4/01 through the third Friday in May. Open to salmon fishing (except king salmon) from 8/01-9/30. Closed to salmon fishing above Seward Highway. Bag limit was six coho, and three chum, sockeye, or pink salmon. Resident fish bag limits were 10 fish, only two over 20 inches. Anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1968	Open to salmon fishing (except king salmon) from 8/01-9/30. Closed to salmon fishing above Seward Highway. Bag limit was three salmon 16 inches or greater in length. No closed season for resident fish. Resident fish bag limits were 10 fish, only two over 20 inches. Anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1969-1970	Same as 1968 except excess Dolly Varden removed from bag limit in 1969.
1971-1981	Closed to fishing above Seward Highway and closed to salmon fishing throughout the drainage. No closed season for resident fish. Resident fish bag limit was 10, only two over 20 inches.
1982-1984	Same as 1971-1981. In addition, rainbow trout bag limit was reduced to five per day, only one 20 inches or greater in length in 1982.
1985	Closed to all fishing above the Forks, and closed to salmon fishing below the Forks. Resident fish bag limit was 10, only two over 20 inches, except rainbow trout bag limit was five per day, only one 20 inches or greater in length.
1986	Entire drainage open to fishing but closed to salmon fishing. Resident fish bag limit was the same as 1985.

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Year	Sport Fishing Regulations
1987-1992	Same as 1986. In addition, only unbaited, artificial lures could be used upstream of the Forks, and rainbow trout could not be kept.
1993-1994	Open to coho salmon fishing from 7/25-10/15, with fishing limited to that portion of Campbell Creek upstream from Dimond Boulevard to a department marker located in the vicinity of Folker Street. Bag and possession limits for coho salmon were 3 and 3. Fishing for all other salmon was closed. Campbell Lake closed to all fishing in 1993. Resident fish bag limits and regulations the same as 1987-1992.
1995	Regulations were the same as those for 1993-1994, with the exception of Emergency Order No. 2-SS-2-45-95 which increased the daily coho salmon bag and possession limit from three (3) to five (5) in that portion open to coho salmon sport fishing and extended the coho salmon sport fishing season through December 31. This emergency order was effective on 9/11 at 12:01 a.m.

APPENDIX B. HISTORICAL EFFORT, HARVEST, AND CATCH DATA

Appendix B1.-Anchorage area sport fishing effort (angler-days), 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	a	a	a	a	a	a	86	1,422	329	146	980	155	159	321	711	676	452	779
Shoreline	a	a	a	a	a	a	3,222	4,333	2,774	1,575	607	1,035	1,004	1,865	2,117	2,595	4,961	2,823
Saltwater Total	a	a	a	a	a	a	3,308	5,755	3,103	1,721	1,587	1,190	1,163	2,186	2,828	3,271	5,413	3,602
FRESHWATER																		
Beach Lake	*	*	*	1,028	1,001	768	913	1,506	381	847	3,857	1,083	3,067	2,407	2,256	4,780	2,650	2,678
Campbell Point Lake	3,099	1,077	2,814	2,142	2,902	921	913	1,757	798	1,177	688	2,037	769	2,439	1,854	1,878	1,347	982
Cheney Lake	*	*	*	b	1,480	1,706	3,446	6,558	9,104	1,468	5,089	6,676	7,523	6,326	4,189	6,594	5,013	7,032
Clunie Lake	2,977	1,809	3,490	4,498	4,034	5,254	4,032	6,659	3,000	5,076	6,574	7,185	5,384	6,592	4,379	4,108	4,980	5,169
Delong Lake	*	*	*	*	*	*	1,176	1,740	1,231	1,590	2,228	3,583	3,527	3,845	4,300	5,474	3,759	2,742
Fish Lake	*	*	*	1,842	2,177	1,365	741	2,175	1,457	4,847	4,890	3,911	3,489	3,440	1,352	1,985	2,569	1,209
Green Lake	3,278	1,766	7,136	7,868	4,890	8,223	4,790	7,428	9,572	5,168	5,542	3,220	2,973	3,781	1,899	1,803	2,328	2,755
Gwen Lake	837	302	1,588	914	2,336	3,924	3,963	3,998	1,734	3,027	3,785	4,638	3,255	3,120	5,027	2,433	3,407	3,418
Hillberg Lake	2,487	1,680	2,814	4,369	4,498	4,828	4,773	6,926	4,474	3,715	2,879	2,874	3,349	2,801	2,580	2,070	1,880	2,091
Jewel Lake	5,908	4,157	7,923	8,182	5,819	9,076	9,339	10,289	7,179	4,587	4,908	7,785	9,099	10,235	7,294	8,290	7,412	5,339
Lower Fire Lake	3,132	1,508	5,109	4,955	2,118	2,218	3,015	2,995	3,381	2,783	3,531	4,056	3,771	6,326	3,507	3,702	3,446	2,671
Mirror Lake	1,808	495	1,053	1,414	2,206	2,167	4,118	4,183	1,717	2,920	5,505	4,002	3,255	5,740	4,993	5,249	4,007	5,294
Otter Lake	5,197	2,046	7,687	7,040	5,543	7,421	5,445	13,735	5,150	9,036	13,275	5,402	7,570	9,542	8,076	6,423	7,619	9,365
Sand Lake	2,099	1,702	2,295	2,113	2,278	4,043	1,482	2,309	5,237	3,975	2,065	3,693	4,728	4,814	3,697	3,542	2,676	3,578
Sixmile Lake	1,473	969	2,688	4,241	3,468	5,016	6,341	11,075	9,069	12,278	12,677	8,822	5,046	6,539	4,446	6,765	5,295	5,675
Taku Campbell Lake	*	*	*	1,899	1,059	2,167	465	2,208	1,526	917	869	3,365	3,283	4,196	2,446	1,611	1,023	1,138
Triangle Lake	*	*	*	2,199	1,785	1,535	534	1,489	2,653	5,673	4,473	1,330	1,979	2,130	1,709	2,230	2,058	1,090
Other Lakes	6,489	6,807	7,105	5,926	5,296	6,073	1,068	1,857	832	1,433	1,609	1,652	2,051	1,442	2,592	2,257	3,528	2,889
Lake Total	38,784	24,318	51,702	60,630	52,890	66,705	56,554	88,887	68,495	70,517	84,444	75,314	74,118	85,715	66,596	71,194	64,997	65,115
Bird Creek	7,389	1,896	2,971	3,927	2,946	2,081	3,325	6,843	8,497	12,507	5,614	9,532	5,844	9,138	7,551	11,352	12,852	12,357
Campbell Creek	*	*	*	*	*	*	1,017	1,824	2,272	2,217	1,485	4,729	1,942	3,983	1,977	1,515	9,073	8,036
Eagle River	1,328	646	2,703	2,085	2,060	3,037	2,205	5,387	1,838	2,645	1,684	1,273	2,017	2,002	1,106	4,908	3,396	2,937
Ingram Creek	*	*	*	*	*	*	*	*	*	382	181	1,083	647	639	290	373	643	893
Placer River	*	*	*	*	*	*	624	234	225	138	326	93	333	234	447	886	688	547
Ship Creek	1,156	1,551	4,150	4,441	2,293	2,695	1,844	3,647	4,890	4,618	11,989	14,115	16,424	15,112	29,768	40,513	40,815	40,727
Twentymile River	6,403	2,736	3,899	8,582	7,429	7,489	4,790	6,207	6,676	6,452	5,505	4,820	4,043	4,537	4,178	4,257	3,480	4,772
Other Streams	a	a	a	a	a	a	1,929	1,422	989	2,475	2,837	3,850	2,062	2,303	3,039	3,302	2,135	3,291
Stream Total	16,276	6,829	13,723	19,035	14,728	15,302	15,734	25,564	25,387	31,434	29,621	39,495	33,312	37,948	48,356	67,106	73,082	73,560
Freshwater Total	55,060	31,147	65,425	79,665	67,618	82,007	72,288	114,451	93,882	101,951	114,065	114,809	107,430	123,663	114,952	138,300	138,079	138,675
AREA TOTAL	55,060	31,147	65,425	79,665	67,618	82,007	75,596	120,206	96,985	103,672	115,652	115,999	108,593	125,849	117,780	141,571	143,492	142,277

[a] Other streams and saltwater combined with other lakes for 1977 to 1982.

[b] Cheney Lake combined with Fish Lake in 1980.

* Data not site specific but included in totals.

Appendix B2.-Anchorage area rainbow trout sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
FRESHWATER					
Beach Lake	6,378	6,791	6,372	4,217	4,464
Campbell Point Lake	6,262	2,978	3,103	1,905	1,107
Cheney Lake	8,174	6,566	9,523	6,291	5,635
Clunie Lake	17,502	10,741	6,847	8,674	9,356
Delong Lake	6,526	6,542	7,963	8,023	4,102
Fish Lake	5,158	1,396	2,699	3,326	1,049
Green Lake	6,164	4,261	1,433	4,273	3,969
Gwen Lake	7,647	7,675	5,201	6,974	7,817
Hillberg Lake	3,708	3,788	2,660	2,572	2,338
Jewel Lake	16,595	14,591	14,858	8,517	10,285
Lower Fire Lake	8,075	5,296	5,763	4,946	6,044
Mirror Lake	7,630	5,196	7,528	7,797	8,997
Otter Lake	24,044	18,914	11,700	15,658	16,248
Sand Lake	11,866	5,582	3,744	4,838	3,599
Sixmile Lake	8,537	6,703	8,969	4,785	4,568
Taku Campbell Lake	4,895	4,772	3,618	1,175	1,774
Triangle Lake	2,736	1,458	1,559	1,516	448
Other Lakes	8,108	6,418	3,784	7,990	4,857
Lake Total	160,005	119,668	107,324	103,477	96,657
Bird Creek	16	50	47	19	819
Campbell Creek	5,801	2,417	982	1,673	1,809
Eagle River	1,154	0	317	1,186	238
Ship Creek	132	162	87	146	38
Twentymile River	0	187	174	75	0
Other Streams	2,142	162	277	889	812
Stream Total	9,245	2,978	1,884	3,988	3,716
AREA TOTAL	169,250	122,646	109,208	107,465	100,373

Appendix B3.-Anchorage area rainbow trout sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FRESHWATER																		
Beach Lake	*	*	*	0	1,619	1,142	1,238	1,035	312	882	1,884	637	2,148	2,456	2,430	1,599	1,345	1,134
Campbell Point Lake	1,483	1,034	1,618	2,213	4,167	1,320	525	960	347	793	320	1,746	497	1,796	1,520	1,393	576	343
Cheney Lake	*	*	*	0	0	635	2,413	4,015	2,341	1,028	1,146	4,529	5,919	2,340	2,579	2,367	1,394	1,554
Clunie Lake	1,915	4,696	5,118	6,346	4,167	7,074	5,099	4,402	1,855	3,865	4,146	5,566	5,628	7,960	5,968	2,248	3,480	2,672
Delong Lake	*	*	*	*	*	*	0	511	902	369	1,068	2,365	4,193	1,829	2,143	2,375	1,608	916
Fish Lake	*	*	*	0	0	814	451	1,309	642	1,865	2,408	2,638	1,398	972	274	792	864	91
Green Lake	1,418	2,348	3,981	3,866	1,935	4,747	3,598	3,255	4,803	2,155	1,049	1,401	2,411	1,846	984	443	1,044	159
Gwen Lake	512	452	2,109	0	3,363	4,328	3,860	2,082	832	2,513	1,651	2,528	2,326	2,208	4,648	1,789	1,344	1,857
Hillberg Lake	1,194	1,486	1,991	0	2,759	2,162	3,860	2,457	1,838	1,239	1,107	1,382	1,323	1,763	685	475	425	446
Jewel Lake	1,547	4,523	4,081	5,209	3,305	7,525	8,654	4,951	6,086	3,429	1,845	6,676	6,754	5,257	4,747	3,863	2,856	2,234
Lower Fire Lake	1,618	2,111	5,535	4,073	1,456	1,352	2,192	1,097	2,324	1,687	1,602	4,675	1,989	1,780	1,919	2,224	1,441	1,149
Mirror Lake	176	215	164	0	0	0	3,797	3,217	1,196	1,620	2,554	3,038	2,748	3,164	3,053	2,628	2,443	2,767
Otter Lake	3,250	5,385	6,072	5,063	4,474	6,445	2,539	9,689	6,017	6,858	6,117	4,056	6,810	11,964	10,118	4,148	4,900	3,285
Sand Lake	653	1,960	1,036	2,066	1,638	3,689	692	2,307	4,352	3,608	505	3,820	2,542	3,312	2,143	1,148	1,393	901
Sixmile Lake	470	344	1,245	0	0	1,499	2,948	2,332	3,485	3,507	3,991	5,366	2,458	2,291	2,405	2,121	1,324	1,206
Taku Campbell Lake	*	*	*	0	0	1,735	493	1,023	1,613	592	660	3,838	1,154	1,615	635	1,203	297	542
Triangle Lake	*	*	*	0	0	1,054	168	599	555	905	1,058	182	1,201	511	237	301	554	56
Other Lakes	2,948	5,198	5,345	3,100	1,648	2,348	1,784	1,845	1,127	424	1,438	2,929	572	3,213	2,330	1,591	1,333	1,796
Lake Total	17,184	29,752	38,295	31,936	30,531	47,869	44,311	47,086	40,627	37,339	34,549	57,372	52,071	56,277	48,818	32,708	28,621	23,108
Bird Creek	0	0	0	0	0	0	0	0	87	101	10	36	9	16	12	24	19	135
Campbell Creek	*	*	*	*	*	*	0	374	1,613	815	408	1,637	732	1,697	199	277	267	271
Eagle River	292	0	482	585	201	734	283	1,546	260	235	39	0	113	132	0	142	79	63
Ship Creek	257	711	482	620	182	639	63	399	277	1,307	39	200	9	0	62	47	47	14
Twentymile River	0	0	0	0	0	0	0	0	52	67	10	0	19	0	187	8	0	0
Other Streams	a	a	a	a	a	a	21	187	104	0	204	619	244	313	25	111	79	40
Stream Total	549	711	964	1,205	383	1,373	367	2,506	2,393	2,525	710	2,492	1,126	2,158	485	609	491	523
AREA TOTAL	17,733	30,463	39,259	33,141	30,914	49,242	44,678	49,592	43,020	39,864	35,259	59,864	53,197	58,435	49,303	33,317	29,112	23,631

[a] Other streams combined with other lakes for 1977 to 1982.

* Data not site specific but included in totals.

Appendix B4.-Anchorage area Dolly Varden/Arctic char sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	0	0	0	0	0
Shoreline	16	39	434	45	27
Saltwater Total	16	39	434	45	27
FRESHWATER					
Campbell Point Lake	198	107	107	445	36
Cheney Lake	0	0	0	0	0
Clunie Lake	1,137	701	877	604	950
Gwen Lake	280	58	107	107	45
Lower Fire Lake	0	0	0	0	0
Mirror Lake	0	496	918	302	377
Otter Lake	0	0	0	0	0
Sixmile Lake	82	78	336	312	18
Other Lakes	594	156	0	204	73
Lake Total	2,291	1,596	2,345	1,974	1,499
Bird Creek	165	19	213	302	662
Campbell Creek	1,516	788	246	1,382	1,975
Eagle River	2,192	788	1,704	2,091	1,302
Ingram Creek	0	78	8	78	63
Placer River	148	0	500	0	1,022
Ship Creek	297	428	303	427	568
Twentymile River	1,038	837	803	644	637
Other Streams	1,583	554	492	718	974
Stream Total	6,939	3,492	4,269	5,642	7,203
Freshwater Total	9,230	5,088	6,614	7,616	8,702
AREA TOTAL	9,246	5,127	7,048	7,661	8,729

Appendix B5.-Anchorage area Dolly Varden/Arctic char sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	0	37	0	0	0	0	0	0	0	0	0	0
Shoreline	*	*	*	*	*	*	10	62	17	0	0	73	0	16	19	180	10	0
Saltwater Total	*	*	*	*	*	*	10	99	17	0	0	73	0	16	19	180	10	0
FRESHWATER																		
Campbell Point Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	66	49	107	244	36
Cheney Lake	*	*	*	0	0	0	0	62	0	45	36	36	0	0	0	0	0	0
Clunie Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	363	418	705	409	556
Gwen Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	132	39	90	29	0
Lower Fire Lake	0	0	0	0	0	0	0	12	0	67	0	36	281	0	0	0	0	0
Mirror Lake	0	0	0	0	0	0	0	0	0	0	0	0	281	0	282	500	156	296
Otter Lake	0	43	45	86	0	0	315	37	0	56	0	0	122	0	0	0	0	0
Sixmile Lake	0	0	0	0	0	0	0	62	69	0	0	36	9	49	0	213	0	0
Other Lakes	0	0	0	0	0	0	0	0	0	0	0	0	38	33	10	0	29	45
Lake Total	0	43	45	86	0	0	315	173	69	168	36	108	731	643	798	1,615	867	933
Bird Creek	676	689	300	207	125	105	220	449	121	134	109	127	188	33	10	147	28	108
Campbell Creek	*	*	*	*	*	*	31	150	1,127	302	181	1,564	291	445	107	49	195	283
Eagle River	868	1,357	1,300	818	1,245	1,247	1,269	5,674	225	983	543	637	732	330	584	573	492	521
Ingram Creek	*	*	*	*	*	*	*	*	*	138	0	109	39	0	19	0	0	54
Placer River	*	*	*	*	*	*	136	0	173	0	290	0	20	49	0	82	0	242
Ship Creek	249	689	754	275	441	210	168	100	52	145	163	146	75	82	350	33	58	161
Twentymile River	945	1,055	473	413	1,610	472	294	187	607	458	254	327	300	396	185	311	78	99
Other Streams	1,302	431	891	1,808	1,581	859	577	149	121	235	525	654	329	263	486	361	65	99
Stream Total	4,040	4,221	3,718	3,521	5,002	2,893	2,695	6,709	2,426	2,395	2,065	3,564	1,974	1,598	1,741	1,556	916	1,567
Freshwater Total	4,040	4,264	3,763	3,607	5,002	2,893	3,010	6,882	2,495	2,563	2,101	3,672	2,705	2,241	2,539	3,171	1,783	2,500
AREA TOTAL	4,040	4,264	3,763	3,607	5,002	2,893	3,020	6,981	2,512	2,563	2,101	3,745	2,705	2,257	2,558	3,351	1,793	2,500

* Data not site specific but included in totals.

Appendix B6.-Anchorage area Arctic grayling sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
FRESHWATER					
Beach Lake	0	1,043	3,096	1,027	724
Lower Fire Lake	840	70	428	176	122
Mirror Lake	0	0	0	0	612
Other Lakes	49	367	30	159	766
Lake Total	889	1,480	3,554	1,362	2,224
Eagle River	560	30	0	0	10
Other Streams	0	40	0	0	49
Stream Total	560	70	0	0	59
AREA TOTAL	1,449	1,550	3,554	1,362	2,283

Appendix B7.-Anchorage area Arctic grayling sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FRESHWATER																		
Beach Lake	*	*	*	0	0	0	0	0	0	0	0	0	0	0	89	270	233	90
Lower Fire Lake	0	0	0	0	0	0	0	0	0	0	0	819	66	511	20	135	0	0
Mirror Lake	187	0	9	77	48	0	0	0	0	0	0	0	0	0	0	0	0	387
Other Lakes	0	0	0	0	0	0	0	0	0	0	0	0	0	16	79	8	0	108
Lake Total	187	0	9	77	48	0	0	0	0	0	0	819	66	527	188	413	233	585
Eagle River	0	0	0	0	0	0	0	75	0	34	0	0	0	49	30	0	0	0
Other Streams	0	0	9	0	67	210	0	187	0	134	18	182	0	0	20	0	0	49
Stream Total	0	0	9	0	67	210	0	262	0	168	18	182	0	49	50	0	0	49
AREA TOTAL	187	0	18	77	115	210	0	262	0	168	18	1,001	66	576	238	413	233	634

* Data not site specific but included in totals.

Appendix B8.-Anchorage area landlocked salmon (chinook and coho) sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
FRESHWATER					
Beach Lake	148	664	1,828	2,303	2,597
Campbell Point Lake	1,038	116	790	221	1,254
Cheney Lake	2,538	2,339	2,542	7,279	2,433
Clunie Lake	1,895	896	2,055	1,331	3,532
Delong Lake	1,285	929	2,910	2,102	771
Fish Lake	0	0	184	1,219	76
Green Lake	1,879	0	335	123	1,026
Gwen Lake	2,554	166	541	67	835
Hillberg Lake	49	0	1,579	1,185	1,027
Jewel Lake	5,026	4,031	5,906	5,590	4,702
Lower Fire Lake	0	0	0	0	0
Mirror Lake	956	282	3,440	2,191	4,058
Otter Lake	2,653	2,754	2,131	8,755	3,305
Sand Lake	7,301	3,301	2,607	1,955	2,451
Sixmile Lake	445	0	1,709	1,471	472
Taku Campbell Lake	0	0	0	0	0
Triangle Lake	0	100	0	0	73
Other Lakes	0	0	433	280	36
AREA TOTAL	27,767	15,578	28,990	36,072	28,648

Appendix B9.-Anchorage area landlocked salmon (chinook and coho) sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FRESHWATER																		
Beach Lake	*	*	*	370	115	31	0	0	0	0	0	124	159	33	332	1,385	783	926
Campbell Point Lake	0	0	0	0	0	0	0	0	0	0	0	186	141	231	83	162	221	764
Cheney Lake	*	*	*	a	604	220	136	848	0	0	0	309	2,195	428	2,041	1,071	2,426	1,661
Clunie Lake	0	0	0	0	0	0	0	0	399	201	380	155	516	511	697	638	783	1,071
Delong Lake	*	*	*	*	*	*	0	0	0	22	54	557	1,726	412	630	1,709	1,800	571
Fish Lake	*	*	*	1,825	1,399	21	0	0	0	0	0	248	188	0	0	54	414	0
Green Lake	0	0	0	0	0	0	0	0	0	0	0	1,114	206	165	0	281	0	272
Gwen Lake	0	0	0	1,248	0	0	0	0	0	0	0	0	0	181	133	346	0	291
Hillberg Lake	0	0	0	5,028	0	0	0	0	0	0	0	0	291	33	0	281	570	227
Jewel Lake	0	0	0	0	0	0	0	0	0	134	362	62	3,311	1,154	2,688	2,574	3,611	2,977
Lower Fire Lake	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	0	0	0
Mirror Lake	*	0	0	1,266	1,092	1,593	304	62	0	0	0	0	0	231	265	1,828	1,554	1,960
Otter Lake	0	0	0	0	0	0	0	25	0	235	362	681	938	330	1,360	930	3,019	754
Sand Lake	0	0	0	0	0	0	0	0	0	123	1,105	588	4,690	2,868	2,588	2,153	1,234	1,761
Sixmile Lake	19	18	209	2,127	1,390	136	21	0	0	34	0	340	122	198	0	357	794	45
Taku Campbell Lake	*	*	*	1,765	383	409	63	0	0	0	0	0	0	0	0	0	0	0
Triangle Lake	*	*	*	1,231	1,542	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Lakes	110	0	0	714	642	147	0	0	0	0	0	0	0	0	0	216	280	0
AREA TOTAL	129	18	209	15,574	7,167	2,557	524	997	399	749	2,263	4,364	14,483	6,775	10,817	13,985	17,489	13,280

[a] Cheney Lake combined with Fish Lake in 1980.

* Data not site specific but included in totals.

Appendix B10.-Anchorage area anadromous chinook salmon sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	6	12	31	60	237
Shoreline	83	18	94	112	93
Saltwater Total	89	30	125	172	330
FRESHWATER					
Bird Creek	95	92	47	239	0
California Creek	0	0	0	0	10
Campbell Creek	44	226	0	212	0
Eagle River	0	6	109	88	128
Glacier Creek	6	0	8	0	10
Peters Creek	0	0	0	0	0
Ship Creek	946	1,607	4,019	7,104	4,950
Twentymile River	6	12	0	0	0
Other Lakes and Streams	6	23	0	9	76
Stream Total	1,103	1,966	4,183	7,652	5,174
AREA TOTAL	1,192	1,996	4,308	7,824	5,504

Appendix B11.-Anchorage area anadromous chinook salmon sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	0	0	0	11	19	0	11	6	12	31	43	178
Shoreline	*	*	*	*	*	*	0	25	37	0	0	0	11	6	18	78	28	26
Saltwater Total	*	*	*	*	*	*	0	25	37	11	19	0	22	12	30	109	71	204
FRESHWATER																		
Bird Creek	0	0	0	0	0	0	0	12	12	22	29	0	23	0	0	9	10	0
California Creek	*	*	*	*	*	*	0	0	0	0	0	0	6	0	0	0	0	0
Campbell Creek	*	*	*	*	*	*	0	12	12	0	0	19	11	0	0	0	41	0
Eagle River	0	0	0	0	0	0	0	25	0	0	0	0	28	0	6	48	47	59
Glacier Creek	*	*	*	*	*	*	0	0	0	0	0	0	6	0	0	0	0	0
Peters Creek	*	*	*	*	*	*	0	0	0	0	0	0	62	0	0	0	0	0
Ship Creek	52	0	0	0	0	0	0	0	0	0	437	587	792	445	1,127	2,282	2,872	2,445
Twentymile River	0	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	0
Other Lakes and Streams	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0	0
Stream Total	52	0	0	0	0	0	2	49	24	22	466	663	928	445	1,139	2,339	2,970	2,504
AREA TOTAL	52	0	0	0	0	0	2	74	61	33	485	663	950	457	1,169	2,448	3,041	2,708

* Data not site specific but included in totals.

Appendix B12.-Anchorage area anadromous coho salmon sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	0	121	40	17	326
Shoreline	110	13	121	320	144
Saltwater Total	110	134	161	337	470
FRESHWATER					
Bird Creek	811	1,372	1,279	7,799	7,169
California Creek	0	0	16	0	36
Campbell Creek	0	89	24	6,894	4,725
Eagle River	8	32	8	201	30
Eklutna River	0	57	*	29	0
Fish Creek	0	0	0	*	0
Glacier Creek	47	146	178	363	190
Ingram Creek	228	0	40	76	54
Peters Creek	79	216	259	0	0
Peterson Creek	16	0	24	0	*
Placer Creek	31	*	8	143	*
Placer River	55	191	599	716	552
Portage Valley Streams	63	229	24	29	652
Rabbit Creek	*	0	*	0	0
Ship Creek	1,220	1,384	3,142	3,876	4,239
Twentymile River[a]	1,283	2,032	2,559	2,636	3,882
Other Streams	16	44	931	334	443
Other Lakes	0	0	413	29	100
Freshwater Total	3,857	5,792	9,504	23,125	22,072
AREA TOTAL	3,967	5,926	9,665	23,462	22,542

* Data not site specific but included in totals.

[a] Includes Glacier River.

Appendix B13.-Anchorage area anadromous coho salmon sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	0	187	0	0	54	0	0	0	121	40	17	280
Shoreline	*	*	*	*	*	*	314	150	535	135	18	0	82	79	13	88	206	72
Saltwater Total	*	*	*	*	*	*	314	337	535	135	72	0	82	79	134	128	223	352
FRESHWATER																		
Bird Creek	0	151	0	26	38	31	94	324	373	994	761	1,710	899	535	1,099	785	6,195	5,425
California Creek	*	*	*	*	*	*	10	0	0	34	18	0	37	0	0	0	0	27
Campbell Creek	*	*	*	*	*	*	0	0	0	0	0	0	28	0	25	8	3,942	1,256
Eagle River	6	0	0	0	0	10	74	12	0	0	0	73	37	0	0	8	96	20
Eklutna River	*	*	*	*	*	*	0	0	12	0	0	36	28	0	57	*	29	0
Fish Creek	*	*	*	*	*	*	0	0	0	0	0	0	28	0	0	0	*	0
Glacier Creek	*	*	*	*	*	*	0	125	0	11	0	200	147	24	114	130	353	100
Ingram Creek	*	*	*	*	*	*	0	0	0	0	0	55	64	118	0	24	76	27
Peters Creek	*	*	*	*	*	*	0	0	0	78	0	0	0	0	216	219	0	0
Peterson Creek	*	*	*	*	*	*	0	112	0	0	0	0	0	16	0	24	0	*
Placer Creek	*	*	*	*	*	*	84	*	*	11	54	273	101	24	*	8	143	*
Placer River	*	*	*	*	*	*	367	75	50	39	181	36	142	47	152	300	650	380
Portage Valley Streams	*	*	*	*	*	*	156	0	62	257	91	55	55	24	76	24	0	217
Rabbit Creek	*	*	*	*	*	*	0	0	0	0	18	91	37	0	0	*	0	0
Ship Creek	125	151	512	301	220	168	94	312	236	89	779	2,128	1,467	818	1,168	1,911	2,579	3,011
Twentymile River[a]	996	289	362	439	737	618	712	1,297	709	1,765	1,050	2,055	1,715	787	1,308	1,684	1,986	2,846
Other Streams	0	201	100	456	383	744	0	249	75	45	72	18	0	16	44	356	86	287
Other Lakes	*	*	*	*	96	*	0	0	0	0	0	0	73	0	0	89	29	0
Freshwater Total	1,127	792	974	1,222	1,474	1,571	1,591	2,506	1,517	3,323	3,024	6,730	4,858	2,409	4,259	5,570	16,164	13,596
AREA TOTAL	1,127	792	974	1,222	1,474	1,571	1,905	2,843	2,052	3,458	3,096	6,730	4,940	2,488	4,393	5,698	16,387	13,948

* Data not site specific but included in totals.

[a] Includes Glacier River.

Appendix B14.-Anchorage area pink salmon sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	0	0	9	28	51
Shoreline	511	74	1,136	1,784	392
Saltwater Total	511	74	1,145	1,812	443
FRESHWATER					
Sixmile Creek and Lake	105	19	128	173	128
Bird Creek	9,327	3,953	16,845	6,206	3,460
California Creek	12	0	46	77	358
Campbell Creek	23	139	0	153	90
Eagle River	0	0	9	29	49
Eklutna River	35	0	*	0	0
Fish Creek	0	0	0	*	0
Glacier Creek	1,640	65	1,136	1,198	435
Indian Creek	23	0	55	115	*
Ingram Creek	488	0	522	316	1,168
Peters Creek	12	46	27	0	0
Placer River	0	0	110	0	0
Ship Creek	686	742	5,881	747	1,185
Twentymile River	500	585	870	173	762
Other Streams & Lakes	0	0	513	125	402
Freshwater Total	12,851	5,549	26,142	9,312	8,037
AREA TOTAL	13,362	5,623	27,287	11,124	8,480

* Data not site specific but included in totals.

Appendix B15.-Anchorage area pink salmon sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	42	125	12	0	0	0	0	35	0	9	19	0
Shoreline	*	*	*	*	*	*	0	362	0	189	0	0	17	105	9	448	284	222
Saltwater Total	*	*	*	*	*	*	42	487	12	189	0	0	17	140	9	457	303	222
FRESHWATER																		
Sixmile Lake	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	46	105	68
Bird Creek	2,797	913	654	2,127	795	1,006	692	2,669	1,717	9,159	1,684	3,256	1,155	3,815	1,513	5,899	1,745	1,101
California Creek	*	*	*	*	*	*	0	0	0	34	0	491	50	0	0	0	10	94
Campbell Creek	*	*	*	*	*	*	0	0	25	0	0	0	0	0	0	0	19	14
Eagle River	0	0	0	0	0	0	0	0	0	11	0	0	42	0	0	0	0	49
Eklutna River	*	*	*	*	*	*	0	0	0	45	0	55	0	0	0	*	0	0
Fish Creek	*	*	*	*	*	*	0	0	0	0	0	0	42	0	0	0	*	0
Glacier Creek	*	*	*	*	*	*	315	312	25	402	0	36	0	512	46	137	115	17
Indian Creek	*	*	*	*	*	*	0	0	0	34	127	346	0	0	0	55	115	*
Ingram Creek	*	*	*	*	*	*	0	0	0	123	0	255	0	291	0	192	192	209
Peters Creek	*	*	*	*	*	*	0	0	0	0	0	0	0	12	0	9	0	0
Placer River	*	*	*	*	*	*	0	0	0	13	0	0	0	0	0	18	0	0
Ship Creek	93	93	91	405	230	0	42	162	25	849	145	564	291	81	353	1,346	163	119
Twentymile River	0	31	36	43	48	73	31	350	0	491	145	218	17	81	46	73	0	9
Other Streams & Lakes	63	139	0	26	220	99	0	12	62	314	181	109	17	0	19	669	0	77
Freshwater Total	2,953	1,176	781	2,601	1,293	1,178	1,080	3,505	1,854	11,475	2,282	5,330	1,614	4,792	1,977	8,444	2,464	1,757
AREA TOTAL	2,953	1,176	781	2,601	1,293	1,178	1,122	3,992	1,866	11,664	2,282	5,330	1,631	4,932	1,986	8,901	2,767	1,979

* Data not site specific but included in totals.

Appendix B16.-Anchorage area sockeye salmon sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	0	0	58	45	28
Shoreline	98	244	880	4,102	614
Saltwater Total	98	244	938	4,147	642
FRESHWATER					
Bird Creek	233	87	353	157	479
Campbell Creek	87	35	16	135	305
Eagle River	10	0	66	9	0
Ingram Creek	29	0	411	29	199
Placer River	10	113	99	48	0
Portage Valley Streams	10	9	16	96	9
Ship Creek	0	0	0	0	0
Sixmile Creek and Lake	78	44	1,192	963	616
Twentymile River	49	401	296	164	596
Other Lakes and Streams	20	0	8	304	1,430
Freshwater Total	526	689	2,457	1,905	3,634
AREA TOTAL	624	933	3,395	6,052	4,276

Appendix B17.-Anchorage area sockeye salmon sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	55	37	12	0	0	0	0	0	148	41	19	28
Shoreline	*	*	*	*	*	*	123	25	112	0	0	0	60	49	26	501	1,830	263
Saltwater Total	*	*	*	*	*	*	178	62	124	0	0	0	60	49	174	542	1,849	291
FRESHWATER																		
Bird Creek	0	0	0	0	0	0	0	249	261	190	163	236	128	97	78	173	109	130
Campbell Creek	*	*	*	*	*	*	0	0	0	11	0	0	51	19	0	0	19	71
Eagle River	0	0	0	0	0	0	0	0	0	0	435	0	0	0	0	16	9	0
Ingram Creek	*	*	*	*	*	*	*	*	*	0	38	0	0	10	0	33	19	38
Placer River	*	*	*	*	*	*	14	0	100	6	38	0	0	10	113	99	48	0
Portage Valley Streams	*	*	*	*	*	*	247	25	12	45	308	0	9	10	9	8	96	0
Ship Creek	0	0	0	0	0	0	0	100	25	0	0	0	0	0	0	0	0	0
Sixmile Creek and Lake	0	0	0	0	0	0	0	0	37	0	36	36	111	10	44	230	597	161
Twentymile River	0	14	204	146	335	178	123	62	62	346	435	200	145	19	331	214	125	299
Other Lakes and Streams	25	0	0	0	48	94	41	100	100	11	54	0	60	30	0	0	214	604
Freshwater Total	25	14	204	146	383	272	425	536	597	609	1,507	472	504	205	575	773	1,236	1,303
AREA TOTAL	25	14	204	146	383	272	603	598	721	609	1,507	472	564	254	749	1,315	3,085	1,594

* Data not site specific but included in totals.

Appendix B18.-Anchorage area chum salmon sport fish catch, 1990-1994.

Area	1990	1991	1992	1993	1994
SALTWATER					
Boat	0	8	0	0	0
Shoreline	34	8	31	33	88
Saltwater Total	34	16	31	33	88
FRESHWATER					
Bird Creek	442	304	478	1,013	744
California Creek	0	0	0	37	7
Eagle River	68	0	0	18	15
Eklutna River	11	24	0	0	0
Fish Creek	0	*	0	*	0
Glacier Creek	261	0	23	55	37
Indian Creek	0	0	0	0	*
Peters Creek	11	64	76	0	0
Placer River	113	64	167	0	22
Portage Valley Streams	0	16	8	0	131
Ship Creek	238	160	243	129	334
Twentymile River[a]	352	633	562	65	153
Other Lakes and Streams	0	0	76	9	15
Freshwater Total	1,496	1,265	1,633	1,326	1,458
AREA TOTAL	1,530	1,281	1,664	1,359	1,546

* Data not site specific but included in totals.

[a] Includes Glacier River.

Appendix B19.-Anchorage area chum salmon sport fish harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	0	0	12	0	0	0	0	11	16	0	0	0
Shoreline	*	*	*	*	*	*	0	0	0	22	0	0	18	0	0	8	8	7
Saltwater Total	*	*	*	*	*	*	0	0	12	22	0	0	18	11	16	8	8	7
FRESHWATER																		
Bird Creek	0	0	0	34	0	0	0	125	448	681	290	364	613	136	120	129	283	102
California Creek	*	*	*	*	*	*	0	0	0	0	54	0	89	0	0	0	0	7
Eagle River	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	15
Eklutna River	*	*	*	*	*	*	0	0	0	0	0	0	62	11	24	0	0	0
Fish Creek	*	*	*	*	*	*	0	0	0	0	0	0	27	0	0	0	*	0
Glacier Creek	*	*	*	*	*	*	0	0	0	0	0	18	44	11	0	0	46	0
Indian Creek	*	*	*	*	*	*	0	0	0	22	0	0	0	0	0	0	0	*
Peters Creek	*	*	*	*	*	*	0	0	0	34	0	0	0	11	40	38	0	0
Placer River	*	*	*	*	*	*	0	0	0	0	0	0	30	11	24	0	0	7
Portage Valley Streams	*	*	*	*	*	*	0	0	0	0	0	36	0	0	0	8	0	0
Ship Creek	0	0	0	9	0	0	0	0	25	89	54	182	44	11	16	61	28	22
Twentymile River	0	20	0	43	10	10	0	25	0	112	181	91	44	102	120	38	9	7
Other Lakes and Streams	0	0	0	0	19	0	0	12	149	0	0	0	44	0	0	15	9	7
Freshwater Total	0	20	0	86	29	10	0	162	622	938	579	691	997	304	344	289	375	167
AREA TOTAL	0	20	0	86	29	10	0	162	634	960	579	691	1,015	315	360	297	383	174

* Data not site specific but included in totals.

Appendix B20.-Anchorage area personal use eulachon harvest, 1977-1994.

Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALTWATER																		
Boat	*	*	*	*	*	*	0	0	0	0	0	0	0	989	0	0	0	0
Shoreline	*	*	*	*	*	*	35,362	103,143	42,595	22,980	26,932	35,952	13,923	6,674	4,229	7,290	5,479	4,562
Saltwater Total	*	*	*	*	*	*	35,362	103,143	42,595	22,980	26,932	35,952	13,923	7,663	4,229	7,290	5,479	4,562
FRESHWATER																		
Bird Creek	0	0	0	0	0	0	63	2,495	0	0	0	0	0	0	0	0	0	0
Placer River	*	*	*	*	*	*	0	1,248	0	0	0	0	0	0	0	0	0	0
Twentymile River	189,077	76,380	91,349	75,623	136,869	106,850	60,160	190,418	225,540	100,974	101,574	103,556	88,411	125,100	63,365	35,674	24,386	44,037
Other Streams	12,132	35,972	15,783	6,001	13,460	9,767	21	0	0	0	3,078	0	1,547	264	1,663	0	0	680
Other Lakes	0	0	0	0	0	0	0	5,489	0	0	0	0	0	0	0	0	0	0
Freshwater Total	201,209	112,352	107,132	81,624	150,329	116,617	60,244	199,650	225,540	100,974	104,652	103,556	89,958	125,364	65,028	35,674	24,386	44,717
AREA TOTAL	201,209	112,352	107,132	81,624	150,329	116,617	95,606	302,793	268,135	123,954	131,584	139,508	103,881	133,027	69,257	42,964	29,865	49,279

* Data not site specific but included in totals.

APPENDIX C. ESCAPEMENT COUNTS

Appendix C1.-Salmon escapement counts, Ship Creek, 1960-1995.

Year	Chinook	Coho	Sockeye	Pink	Chum
1960	58				
1961	80				
1962	58				
1963	119				
1964	94				
1965	207				
1966	50				
1967	200				
1968	500				
1969	710	142		211	200
1970	1,746	2,234		448	39
1971	221	1,206			41
1972	121	85		147	165
1973	165	64		14	93
1974	146	250			
1975	120	85			
1976	806				
1977	1,011	436	3	584	472
1978	867	381	3	613	155
1979	124				
1980	256	90	1	99	116
1981	1,000				
1982	665				
1983	[a]				
1984	[a]				
1985	[a]				
1986	1,433				
1987	1,030				
1988	[a]				
1989	238				
1990	761	71			5
1991	318	412			6
1992	789	55	2		
1993	706	338	2	22	
1994	424	654	13	631	89
1995	652	858	5	890	92
Average	490	460	4	366	123

[a] No count conducted.

Appendix C2.-Salmon escapement counts, Eagle River, 1963-1995.

Year	Chinook	Coho	Sockeye	Pink	Chum
1963	135	200			
1964	123				
1965	159				
1966	49				
1967	50				
1968	28				
1969	[a]				
1970	81				
1971	[a]				
1972	[a]				
1973	61				
1974	[a]				
1975	[a]				
1976	81				
1977	313				
1978	[a]				
1979	[a]				
1980	[a]				
1981	[a]				
1982	[a]				
1983	[a]				
1984	[a]				
1985	[a]				
1986	222				
1987	[a]				
1988	[a]				
1989	37				
1990	326	2			1
1991	513	3			
1992	336				
1993	378				
1994	440				
1995	447	9			
Average	210	54			1

[a] No count conducted.

Appendix C3.-Salmon escapement counts, Bird Creek drainage, 1984-1995.

Year	Chinook	Coho	Sockeye	Pink	Chum
1984	21			420	
1985 [a]					
1986		3		500	100
1987 [a]					
1988 [a]					
1989	70			615	184
1990	109	9		[b]	[b]
1991	156	50		[b]	
1992	142	101		[b]	
1993	72	593			60
1994	289	277		401	30
1995	145	169	2	4,491	9
Average	126	172	2	1,285	77

[a] No count conducted.

[b] Observed but not counted.

Appendix C4.-Salmon escapement counts, Campbell Creek, 1958-1995.

Year	Chinook	Coho	Sockeye	Pink	Chum
1958	6			1,000	
1959 [a]					
1960 [a]					
1961	70				
1962	40				
1963	187	22			
1964	116			142	20
1965	119				
1966	15				
1967	300				
1968	125				
1969 [a]					
1970	63				
1971	102				
1972	37				
1973	201				
1974	79				
1975					
1976	210				
1977	349				
1978 [a]					
1979 [a]					
1980 [a]					
1981 [a]					
1982	68				
1983 [a]					
1984	423				
1985 [a]					
1986	733	99	877		
1987	571	132	545		
1988 [a]					
1989	218		51		
1990	458	126	317		2
1991	590	282	844		
1992	931	157	575		
1993	937	2,312 [b]	493	13 [b]	3 [b]
1994	1,076	3,054 [b]	756	6 [b]	15 [b]
1995	734	1,256	460		
Average	324	827	546	290	10

[a] No count conducted.

[b] Weir count.

Appendix C5.-Salmon escapement counts, Sixmile Creek, 1988-1995.

Year	Chinook	Coho	Sockeye	Pink	Chum
1988			2,190	958	
1989			1,321	377	
1990			1,415	1,678	
1991			1,845	597	
1992		2	711	199	
1993		101	5,021	1,013	5
1994			1,407	243	
1995		14	4,462	2,116	18
Average			2,297	898	