

Fishery Management Report No. 94-6

**1993 Area Management Report for the Recreational
Fisheries of Northern Cook Inlet**

by

**Craig Whitmore,
Dana Sweet,
Larry Bartlett,
Alan Havens,
and
Lori Restad**

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Alaska Department of Fish and Game

Division of Sport Fish



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PREFACE

This report is divided into two sections. Section I presents an introductory overview of the Northern Cook Inlet Management Area. Included in this section are a general geographic and organizational description of the management area; an inventory of the available fishery resources of the management area; an overview of the Alaska Board of Fisheries processes; an historical perspective of recreational angler effort, catch and harvest within management area waters; and an approximation of the economic value of the recreational fisheries of the management area. A general description of research and management activities being conducted and a summary of the major fishery and social issues that presently occur in the Northern Cook Inlet Management Area are also presented. Section II provides a more detailed summary of the major fisheries that occur in the Northern Cook Inlet Management Area. Included in this section are a description and historical perspective of each fishery which includes: the objective governing the management, description of the recent performance, a description of recent Board of Fisheries actions, a description of any social or biological issues, and a description of any ongoing or recommended research or management activities.

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SECTION I: MANAGEMENT AREA OVERVIEW

Management Area Description

The Northern Cook Inlet sport fish management area (NCIMA) includes all freshwater drainages and adjacent marine waters of Upper Cook Inlet between the West Forelands and the Eklutna River, excluding the upper Susitna River drainage above the Oshetna River confluence (Figure 1). The management area encompasses approximately 23,000 square miles and is dominated by the Susitna River drainage which originates in glaciers of the Alaska and Talkeetna mountain ranges and flows about 200 miles in a southerly direction before entering Cook Inlet near Anchorage. Virtually all sport fisheries in the NCIMA, with the exception of the remote West Cook Inlet unit waters which are accessible only by boat or aircraft, are relatively easy to access by road or jet-boat.

For the purposes of management and harvest reporting, the NCIMA is segregated into four major units (Figure 1):

1. Knik Arm Unit: This unit includes all waters of the Matanuska and Knik River drainages, the Little Susitna River drainage, and all waters draining into Knik Arm excluding those entering south and west of the Eklutna River, all adjacent marine waters of Cook Inlet, and the waters of the Nancy Lake Recreation Area.
2. Eastside Susitna Unit: This unit includes all drainages of the upper Susitna River above the Chulitna River to and including the Oshetna River drainage, all eastside drainages of the Chulitna River, and all eastside drainages of the Susitna River below its confluence with the Chulitna River to and including Willow and Deception creeks to the south. This management unit has no marine waters.
3. Westside Susitna Unit: This unit includes all westside drainages of the Chulitna River and all westside drainages of the Susitna River below its confluence with the Chulitna River. This management area has no marine waters.
4. West Cook Inlet Unit: This unit includes all freshwater drainages entering Cook Inlet between the Susitna River and the West Foreland and all adjacent marine waters of Cook Inlet.

The NCIMA is comprised of two complete and a portion of a third statewide harvest survey (SWHS) reporting areas (Mills 1993). These areas include: (1) the Knik Arm Drainage Area reporting unit (Area K), the East-Side Susitna Drainage Area reporting unit (Area M), and the West-Side Cook Inlet-West-Side Susitna Drainage Area reporting unit (Area N). The West-Side Cook Inlet-West-Side Susitna Drainage Area (Mills 1993) includes fresh and marine waters between the West Forelands and Cape Douglas, an area outside of the NCIMA, and fisheries of this area are not included in this report.

In terms of political geography, the management area is very similar to the boundaries of the Matanuska-Susitna Borough. About 50% of the state's population resides within or immediately adjacent to the management area. Major

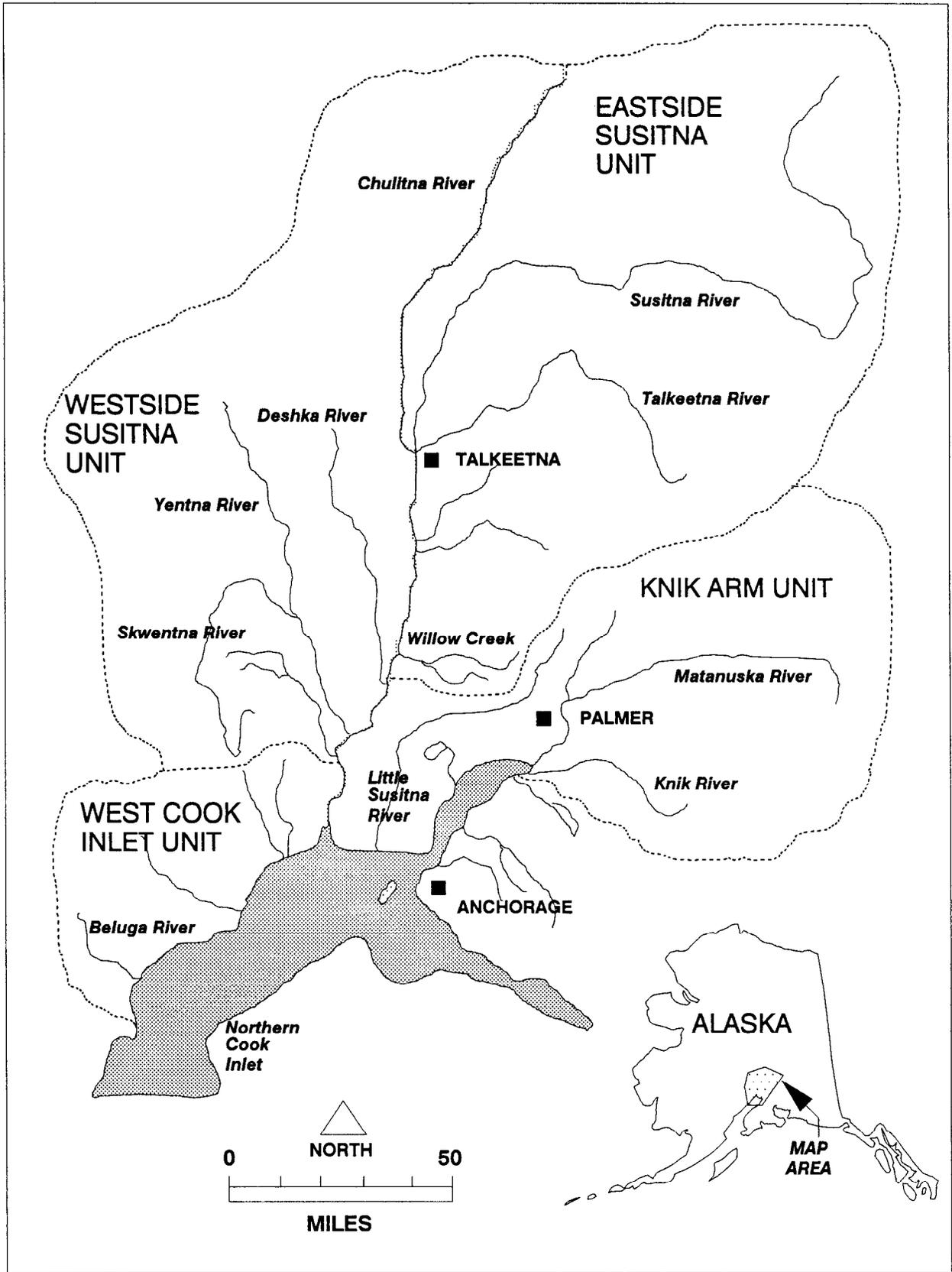


Figure 1. Map of the Northern Cook Inlet sport fish management area.

communities within the management area include Wasilla, Palmer, Talkeetna, Willow, and Houston. Smaller communities that occur in the management area include Tyonek, Chickaloon, and Skwentna. The Municipality of Anchorage, Alaska's largest community, borders the management area. Although much of Alaska's population resides in or near the NCIMA, it is important to note that much of the management area is either sparsely populated or uninhabited because of a limited transportation system. The State of Alaska is the principal land manager in the NCIMA. Other significant land managers in the NCIMA include the Matanuska-Susitna (Mat-Su) Borough, various native corporations and villages, and the federal government.

Management and research functions for the NCIMA are conducted from the Palmer area office. The Division of Sport Fish staff stationed in Palmer include a permanent full-time Fisheries Biologist III Area Management Biologist (Craig Whitmore), a permanent full-time Fisheries Biologist III Area Research Biologist (Al Havens), a permanent full-time Fisheries Biologist II Assistant Area Management Biologist (Larry Bartlett), a permanent full-time Fisheries Biologist II Research Biologist (Robert Lafferty), and one permanent full-time clerical position Field Office Assistant (Rena Hite) which is shared with the Division of Wildlife Conservation staff. These positions are assisted by numerous permanent seasonal Fisheries Biologist and Fish and Wildlife Technician positions who act as crew leaders and staff for area research and management projects. The most notable is Dana Sweet, a Fisheries Biologist I, who participates in management and research programs. Significant support is also provided to the area staff from the Sport Fish Division's Southcentral region Research and Technical Services (RTS) staff. A regional maintenance worker (James Whitt, Jr.) performs maintenance services for the Southcentral region from a shop located in Palmer.

Fisheries Resource Inventory

Sport anglers fishing NCIMA waters can target all five species of North Pacific salmon (pink *Oncorhynchus gorbusha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*) in both fresh and salt water. In addition, there are major fisheries for rainbow trout (*O. mykiss*), Dolly Varden (*Salvelinus malma*)/Arctic char (*Salvelinus alpinus*), and Arctic grayling (*Thymallus arcticus*) as well as for lake trout (*Salvelinus namaycush*), northern pike (*Esox lucius*), burbot (*Lota lota*), whitefish (*Coregonus* and *Prosopium*), landlocked salmon (*Oncorhynchus*), and smelt (Osmeridae).

Alaska Board of Fisheries Activities

The waters of the NCIMA fall within two regulatory areas: the Susitna/West Cook Inlet Regulatory Area and the Cook Inlet/Resurrection Bay Salt Water Regulatory Area. Regulations governing the sport fisheries of the Susitna/West Cook Inlet and the Cook Inlet/Resurrection Bay Salt Water Regulatory Areas are established in Chapters 61 and 58, respectively, of Title 5 of the Alaska Administrative Code.

The process of developing fishing regulations appropriate for fisheries in the NCIMA occurs within the established Alaska Board of Fisheries (BOF) process. Public input concerning regulation changes and allocation issues is provided for in this process through various means including submission of proposals,

direct testimony to the BOF, and/or participation in local fish and game advisory committees. Advisory committees have been established throughout Alaska to assist the Boards of Fisheries and Game in assessing fisheries and wildlife issues and proposed regulations. Most active committees meet at least once each year, usually in the fall prior to the BOF meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow for direct public interaction with staff involved with resource issues of local concern. Within the NCIMA there are four Fish and Game Advisory Committees which include: Denali, Matanuska, Tyonek and Mt. Yenlo. Staff also have significant interaction with the Anchorage Advisory Committee which is outside, but bordering, the NCIMA. Under the current operating schedule the BOF meets on a 3-year cycle. Proposals regarding the NCIMA were addressed in November of 1992. Appendix F provides a summary of BOF regulatory changes made during this meeting. The next BOF meeting for this area is not scheduled until the fall/winter of 1995.

Existing Management Plans

Upper Cook Inlet fisheries have been the focus of intensive allocation battles for many years. These conflicts have lead the BOF to establish numerous management plans and policies to guide the area's fisheries. These plans attempt to assure for sustained yield of the area's fish resources as well as establishing allocations and management actions and guidelines for department fisheries.

There are six management plans and policies which the BOF has adopted that impact NCIMA fisheries. These include:

1. Upper Cook Inlet Salmon Management Plan (5 AAC 21.363);
2. Northern District Chinook Salmon Management Plan (5 AAC 21.366);
3. Fish Creek Sockeye Salmon Management Plan (5 AAC 21.364);
4. Big River Sockeye Salmon Management Plan (5 AAC 21.368);
5. Little Susitna River Coho Salmon Management Plan (5 AAC 61.060); and
6. Cook Inlet & Copper River Basin Rainbow/Steelhead Trout Management Policy (ADF&G 1986).

The Upper Cook Inlet Salmon Management Plan provides the department direction towards managing the sport and commercial harvests of Cook Inlet salmon. This plan, which was adopted by the BOF as a formal regulation in 1981 and amended in 1992 can be broken into the following allocative components:

1. provide for a subsistence priority;
2. manage the northern chinook salmon, early Russian River sockeye salmon, and early Kenai River chinook salmon returns, which normally move through Upper Cook Inlet prior to June 30, primarily for recreational use;
3. manage those stocks moving through upper Cook Inlet between July 1 and August 15 primarily for commercial uses;
4. after August 15, manage stocks moving to Kenai Peninsula drainages primarily for recreational use;
5. manage stocks other than those spawning in Kenai Peninsula drainages primarily for commercial uses; and

6. minimize the incidental commercial harvest of northern coho salmon, late Kenai River chinook salmon, and early Kenai River coho salmon.

This plan states that chinook salmon bound for the NCIMA will be managed primarily for recreational uses because these fish stocks move through upper Cook Inlet prior to June 30. From July 1 to August 15, NCIMA salmon are managed primarily for commercial uses as they pass through upper Cook Inlet. After August 15, the department is to minimize the incidental commercial harvest of northern district coho salmon stocks. Action taken during the 1992 BOF meeting directed towards accomplishing this goal established that northern district set gill net periods after August 15 would be limited to regularly scheduled periods. The BOF clarified that they did not want to see further expansion of the commercial harvest of coho salmon in the Northern District after August 15.

The Tyonek subsistence fishery (5 AAC 01.560) is an important component of the Upper Cook Inlet Salmon Management Plan. This fishery provides for subsistence fishing opportunity primarily to residents of the village of Tyonek. Fish harvested in this fishery are bound for NCIMA. Specific fishing periods occur from May 15 through October 15. This fishery has been regulated by a 4,200 chinook salmon harvest quota since 1980.

The Northern District Chinook Salmon Management Plan was adopted in 1985 by the Alaska BOF. This plan provides for 6-hour commercial fishing periods, with gill nets 35 fathoms in length with a maximum mesh size of 6 inches, on Mondays between June 1 and June 24. The season is closed prior to June 24 if 12,500 chinook salmon are harvested.

The Big River Sockeye Salmon Management Plan authorizes a harvest of Big River salmon by set gill nets in the Kustatan subdistrict of the Central district. Sockeye salmon are the targeted species. This fishery extends from May 25 through June 24, but is subject to emergency closure when the incidental harvest of chinook salmon exceeds 1,000 fish.

The Fish Creek Sockeye Salmon Management Plan (5 AAC 21.364) was adopted by the Alaska BOF in 1986. This plan governs the harvest of Fish Creek sockeye salmon in excess of the system's 50,000 escapement goal. This plan provides for a terminal set gill net fishery in Knik Arm near the mouth of Fish Creek through July 29. Beginning July 23, provided a return of 50,000 sockeye salmon is reached, a personal use dip net fishery is initiated in Fish Creek (5 AAC 77.545). This fishery closes the second Friday in August or earlier if interception of coho salmon becomes a conservation concern.

The Little Susitna River Coho Salmon Management Plan (5 AAC 61.060) was adopted by the BOF in 1990 and modified in 1992. This plan provides the department management guidelines to ensure that:

1. a spawning escapement of 7,500 nonhatchery coho salmon into the Little Susitna River upstream of the George Parks Highway is achieved, and
2. the harvest of hatchery-produced coho salmon returning to the Little Susitna River is maximized.

The Rainbow/Steelhead Trout Management Policy for Cook Inlet waters was adopted by the BOF in 1986. This policy provides future Fisheries Boards, ADF&G managers, and the sport fishing public with the following:

1. management policies and implementation directives for Cook Inlet rainbow and steelhead trout;
2. a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for such special management as catch-and-release, trophy areas and high yield fisheries; and
3. recommended research objectives.

Fisheries for other species not covered by the above management plans or policies are managed to assure for sustained yield of the targeted fish stock while assuring for the continued, and where possible, the expanded opportunity to participate in the fishery.

Recreational Angler Effort

Beginning in 1977, recreational angler effort in the NCIMA has been estimated using a mail survey (Mills 1979-1993). This survey estimates the number of angler-days of sport fishing effort expended by recreational anglers fishing Alaskan waters as well as the harvest of important sport species. The survey is designated to provide estimates of effort and harvest on a site by site basis and, unfortunately, is not designed to provide estimates of effort directed towards a single species. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site by site basis. Additionally, creel surveys have been selectively used in conjunction with the mail survey for choice fisheries of interest or for fisheries that require more detailed information or inseason management. The following summary of recreational angler effort in the NCIMA is based on the mail survey data.

From 1977 through 1992, an average of 286,442 angler-days have been spent by anglers fishing NCIMA waters (Table 1). Historically, the effort expended by anglers fishing NCIMA waters has represented an average of 15% and 21% of the total statewide and Southcentral region angling effort, respectively. Angler-effort generally increased annually from 1977 through 1988 (Figure 2), when 392,875 angler-days were documented. Since 1988, effort has ranged from 346,590 angler-days (1990) to record effort level in 1992 of 401,780 angler-days. The Kenai Peninsula sport fish management area is currently the only management area in Alaska which receives greater use by recreational anglers (Mills 1992).

During 1992, anglers spent an estimated 401,780 angler-days fishing NCIMA waters. This was record effort for the area and was approximately 44% above the historical average effort. The effort in 1992 represented 16% and 21% of the total statewide and Southcentral region angling effort, respectively (Table 1).

Forty-three percent of the total effort from the NCIMA has historically occurred in the Knik Arm Management Unit (Table 1). From 1977 through 1992, these waters have supported an average of 122,498 angler-days of fishing effort. A record number of angler-days (183,029) were expended during 1988.

Table 1. Number of angler-days of sport fishing effort expended by recreational anglers fishing Northern Cook Inlet Management Area waters, 1977-1992.

Year	Knik Arm		East Susitna R.		West UCI & West Susitna R.		NCIMA Total	Alaska Total	% by NCIMA	Region II Total	% by NCIMA
	Effort	% NCIMA	Effort	% NCIMA	Effort ^a	% NCIMA					
1977	81,949	48.1	56,651	33.2	31,946	18.7	170,546	1,198,486	14.2	828,351	20.6
1978	75,540	37.9	86,010	43.1	37,971	19.0	199,521	1,285,063	15.5	913,417	21.8
1979	78,411	37.9	78,222	37.8	50,374	24.3	207,007	1,364,739	15.2	1,014,018	20.4
1980	102,530	42.4	91,304	37.7	48,125	19.9	241,959	1,488,962	16.3	1,072,384	22.6
1981	105,052	51.9	59,854	29.6	37,335	18.5	202,241	1,420,172	14.2	1,016,731	19.9
1982	91,713	40.8	80,745	35.9	52,222	23.2	224,680	1,623,090	13.8	1,131,358	19.9
1983	138,389	50.4	67,471	24.6	68,657	25.0	274,517	1,732,528	15.8	1,212,680	22.6
1984	130,727	46.8	81,758	29.2	67,102	24.0	279,587	1,866,837	15.0	1,341,658	20.8
1985	122,626	44.2	67,764	24.4	87,097	31.4	277,487	1,943,069	14.3	1,406,419	19.7
1986	131,546	41.1	92,289	28.9	96,054	30.0	319,889	2,071,412	15.4	1,518,712	21.1
1987	140,167	44.8	77,817	24.9	95,042	30.4	313,026	2,152,886	14.5	1,556,050	20.1
1988	183,029	46.6	107,977	27.5	101,869	25.9	392,875	2,311,291	17.0	1,679,939	23.4
1989	146,912	42.0	96,864	27.7	106,305	30.4	350,081	2,264,079	15.5	1,583,381	22.1
1990	142,884	41.2	101,917	29.4	101,789	29.4	346,590	2,453,284	14.1	1,745,110	19.9
1991	146,605	38.4	113,178	29.7	121,505	31.9	381,288	2,456,328	15.5	1,782,055	21.4
1992	141,825	35.3	149,484	37.2	110,471	27.5	401,780	2,540,374	15.8	1,889,930	21.3
MEAN	122,494	43.1	88,082	31.3	75,867	25.6	286,442	1,885,788	15.1	1,320,151	21.1

^a 1977-1992 data include saltwater effort from outside the NCIMA.

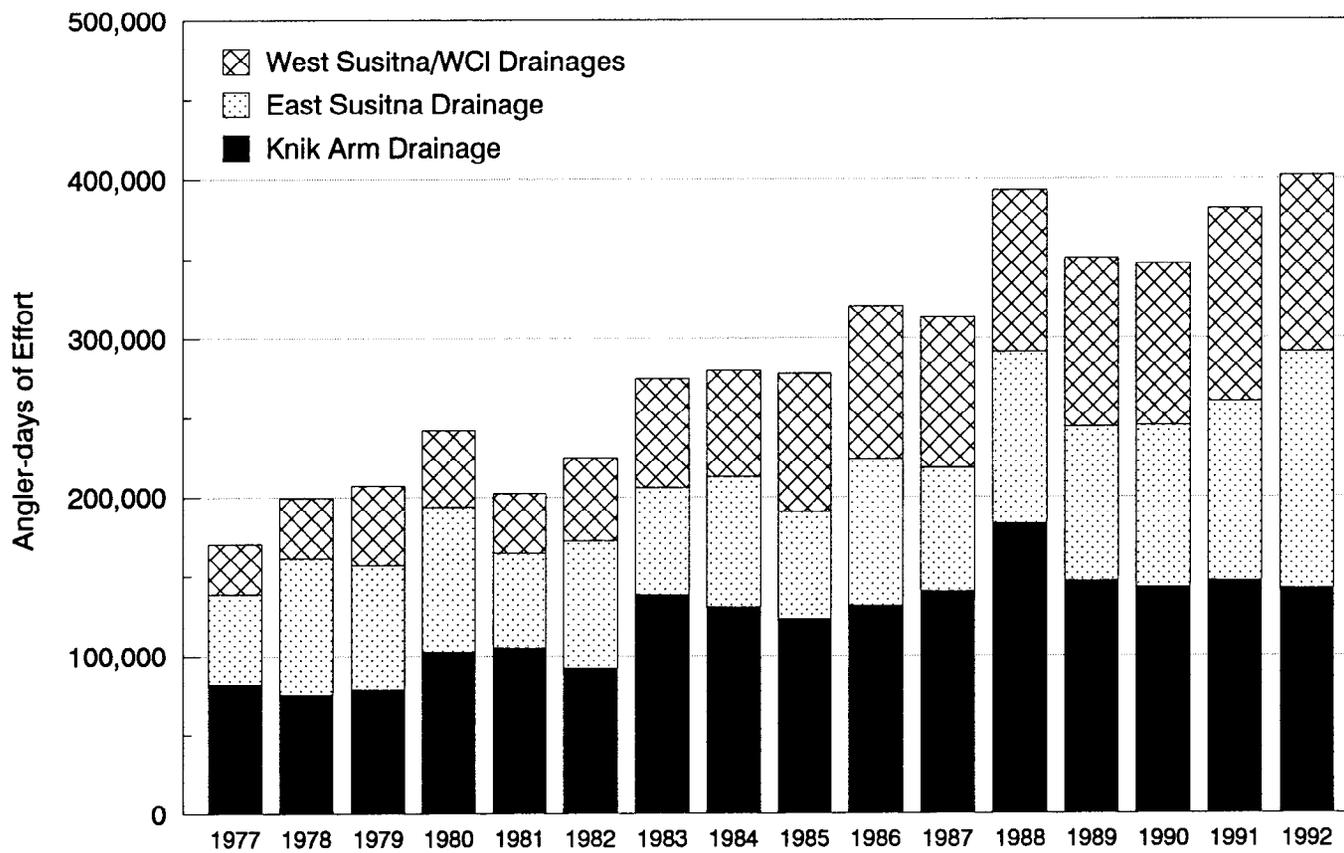


Figure 2. Angler-days of sport fishing effort expended by recreational anglers fishing Northern Cook Inlet Management Area waters, 1977-1992.

Nearly all of the effort over this period has been expended in fresh water (Table 2). The Little Susitna River is the most heavily fished stream in the Knik Arm Management Unit, averaging about 35,562 angler-days of effort annually (Table 2, Figure 3). Other major fisheries occur in the many stocked lakes in the basin (notably in Big, Wasilla, Finger, Kepler Complex lakes) and at various road accessible streams including the Knik River and its tributaries, the Eklutna Power Plant tailrace, Big Lake drainage streams, and Cottonwood and Wasilla creeks (Table 2, Figure 3). A limited saltwater fishery also occurs off the mouth of Fish Creek in Knik Arm (Table 2).

Anglers fishing the East Susitna River Unit from 1977 through 1992 have expended an average of 88,082 angler-days (Table 1). This expenditure of effort has represented an average of 31% of the total sport effort from all NCIMA waters from 1977 through 1992. A record number of angler-days (149,484) occurred during 1992. All of the effort in this area takes place in fresh water. Major fisheries occur in Willow, Montana, Sheep, and Little Willow creeks, and the Talkeetna River and its various tributaries (Table 3, Figure 4).

Anglers fishing the Westside Susitna Management Unit from 1977 through 1992 expended an average of 69,807 angler-days (Table 4). This expenditure of effort has represented an average of 24% of the total effort from all NCIMA waters from 1977 through 1992 (Table 1). A record number of angler-days (104,072) occurred during 1991. All of the annual effort in this area has historically been expended in fresh water (Table 4). Major fisheries occur in the Deshka River, Lake and Alexander creeks; and the Yentna River and its tributaries (Table 4, Figure 5). Other fisheries occur in various remote lakes in the area (notably in Judd, Shell, Whiskey, and Hewitt lakes) (Table 4, Figure 5).

From 1977 through 1992 anglers fishing West Cook Inlet Management Unit waters expended an average of 5,521 angler-days (Table 5). This expenditure of effort represents an average of 2% of the total effort from all NCIMA waters from 1977 through 1992. A record number of angler-days (10,594) occurred in 1987. All the annual effort has been expended in fresh water. Major fisheries include the Chuitna, Lewis, Theodore, and Beluga river drainages (Figure 6).

Recreational Fish Harvest

From 1977 through 1992, an average of 210,375 fish have been caught and kept (harvested) by anglers fishing NCIMA waters (Tables 6 and 7, Figures 7 and 8). Coho salmon, rainbow trout and chinook salmon accounted for 53% of this average harvest.

The average harvest of fish from the Knik Management Unit accounted for 46% of fish caught and kept within the NCIMA (Table 6). The harvest was dominated by rainbow trout and landlocked salmon (Table 8). The Eastside Susitna and Westside Susitna units accounted for 28% and 24% of the NCIMA harvest during this time period, respectively, with chinook salmon, coho salmon, rainbow trout and Arctic grayling dominating harvests (Tables 9 and 10). The West Cook Inlet unit accounted for only 2% of the harvest with chinook and coho salmon accounting for 60% of the harvest (Table 11).

Table 2. Angler-days of sport fishing effort for the Knik Arm drainage by fishery, 1977-1992.

Year	Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Finger Lake	Kepler Lk Complex	Big Lake	Nancy Lk Complex	Other Lakes ^c	Other Streams	Total
1977		11,063			2,805			14,864	7,962	11,869	7,259	26,127		81,949
1978		12,127			3,446			11,502	5,730	9,865	7,647	25,223		75,540
1979		21,301			4,024	5,345		4,433	5,439	8,300	7,011	22,558		78,411
1980		22,420			5,726	9,268		6,483	8,597	12,195	9,153	28,688		102,530
1981		26,162	4,904		4,019	8,663		5,267	8,227	14,568	8,488	24,754		105,052
1982		24,020	6,653		6,261	5,186		3,514	6,943	15,371	8,615	15,150		91,713
1983	17,127	35,477	9,183		3,239	5,944		8,512	9,149	15,989	10,907	19,571	3,291	138,389
1984	4,316	48,517	9,369	3,413	3,547	7,144		6,843	9,770	12,916	7,194	15,892	1,806	130,727
1985	692	41,643	8,970	2,995	3,115	4,560	903	4,259	9,226	16,299	5,960	22,243	1,761	122,626
1986	983	45,770	13,015	8,549	3,387	5,653	2,641	5,589	9,544	14,559	6,520	13,147	2,249	131,606
1987	1,974	35,659	6,990	11,663	2,173	2,934	2,898	10,830	14,379	17,693	15,125	16,187	1,662	140,167
1988	1,239	49,731	23,229	13,188	2,228	4,056	3,110	8,240	18,245	10,077	12,099	35,159	2,428	183,029
1989	2,352	54,798	11,141	10,342	2,406	3,069	4,204	4,840	12,821	12,748	8,349	19,024	818	146,912
1990	2,494	40,159	17,878	7,618	2,679	3,056	3,936	6,737	13,644	11,798	9,973	19,949	2,963	142,884
1991	3,147	50,838	13,736	5,892	2,893	1,623	3,693	5,998	11,337	13,759	10,239	20,043	3,407	146,605
1992	1,540	49,304	8,856	4,279	1,110	1,974	4,534	5,506	15,556	11,545	12,299	24,723	599	141,825
Mean	3,586	35,562	11,160	7,549	3,316	4,891	3,240	7,089	10,411	13,097	9,177	21,777	2,098	122,498

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes effort for lakes and streams, 1977-1982.

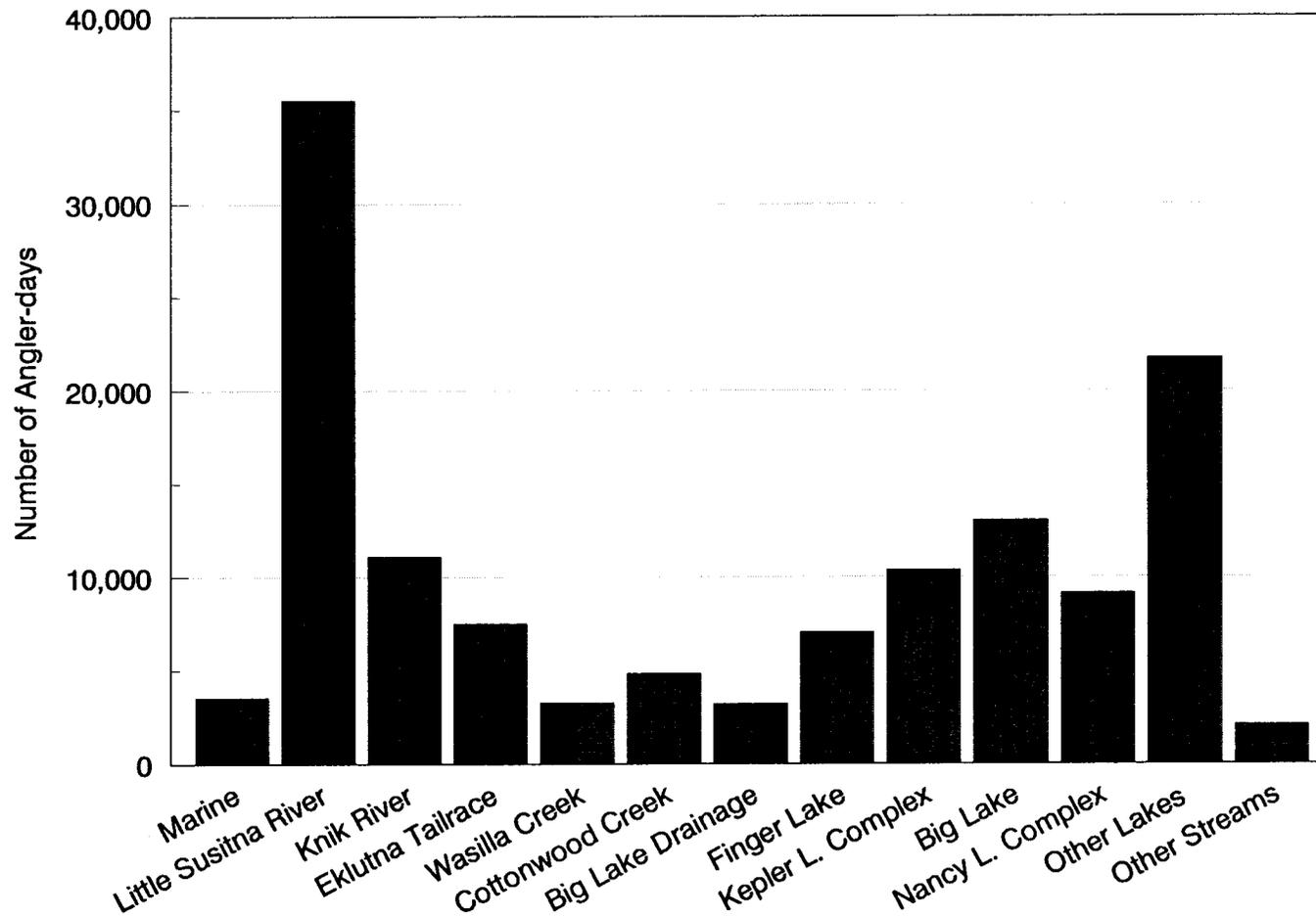


Figure 3. Mean number of angler-days per year of sport fishing effort expended in Knik Arm waters, 1977-1992.

Table 3. Angler-days of sport fishing effort for the eastside Susitna River drainage by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams	Lakes ^b	Total
1977	14,024	4,583			8,112		14,268			3,163		12,501	56,651
1978	22,682	5,687			11,869		25,762			5,040		14,970	86,010
1979	18,911	5,171		3,710	6,728		22,621		3,317	5,125		12,639	78,222
1980	29,011	8,190		4,963	8,041		19,287		5,208	4,388		12,216	91,304
1981	14,060	3,845		3,860	6,936		16,657		3,062	3,584		7,850	59,854
1982	19,704	5,579		5,101	9,093		23,645		3,787	3,856		9,980	80,745
1983	13,405	2,791	1,344	5,048	6,237		17,109		3,429	7,564	5,460	5,084	67,471
1984	21,649	5,872	2,995	4,952	6,106	1,305	19,239		3,229	9,252	4,417	2,742	81,758
1985	16,282	5,705		5,289	2,844		20,028		4,144	7,213	4,162	2,097	67,764
1986	10,733	4,490	2,908	4,362	10,091	1,993	20,268	2,010	8,124	8,638	10,566	8,106	92,289
1987	13,583	5,850	2,717	3,332	9,019	1,865	13,745	2,046	3,912	17,096	2,101	2,551	77,817
1988	27,758	10,768	1,454	4,529	18,699	2,947	16,498	2,074	4,129	12,733	3,648	2,740	107,977
1989	23,811	5,285	6,320	4,029	13,010	3,058	16,179	767	4,592	15,218	1,907	2,688	96,864
1990	32,200	6,505	2,313	6,103	11,392	3,714	11,284		4,485	18,299	3,287	2,335	101,917
1991	32,520	7,792	1,981	7,816	14,872	2,811	10,745	1,056	5,788	18,466	6,172	3,159	113,178
1992	50,958	9,240	2,177	6,391	17,509	4,908	18,437	1,366	4,833	21,478	6,347	5,840	149,484
Mean	22,581	6,085	2,690	4,963	10,035	2,825	17,861	1,553	4,431	10,070	4,807	6,719	88,082

^a Talkeetna River and tributaries including Clear Creek.

^b Includes effort for lakes and streams, 1977-1982.

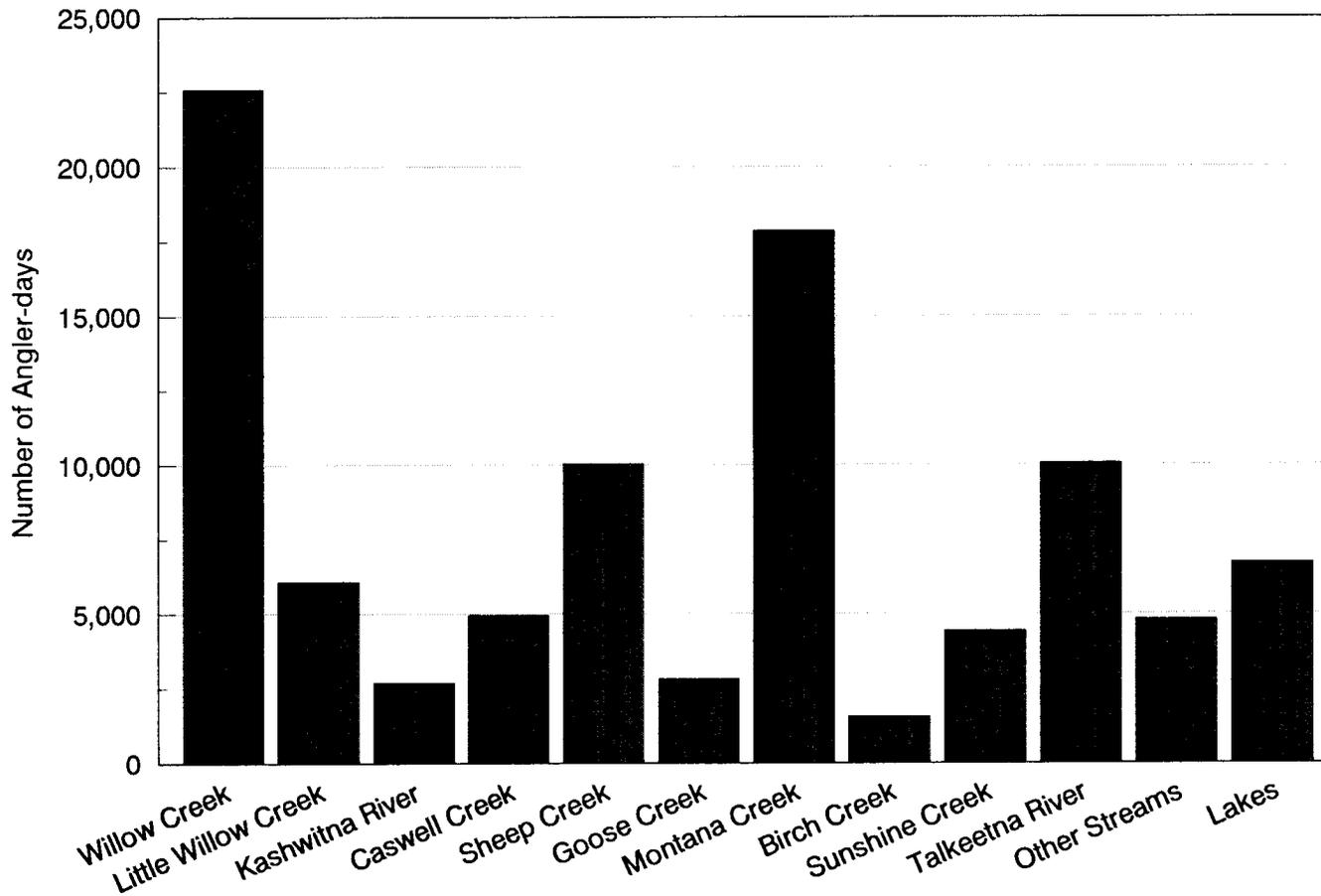


Figure 4. Mean number of angler-days per year of sport fishing effort expended in the eastside Susitna River drainage, 1977-1992.

Table 4. Angler-days of sport fishing effort for the westside Susitna River drainage by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Shell Lake	Whiskey Lake	Hewitt Lake	Other Streams ^b	Other Lakes ^b	Total
1977	5,991	6,852					6,949		1,342	317	566	287	317	7,269	2,205	32,095
1978	6,914	9,111					8,767		732	151	302	129	151	6,011	3,420	35,688
1979	8,284	13,236					13,881		2,185	519	263	189	519	7,577	1,615	48,268
1980	6,812	19,364					8,325		2,542	814	424	29	814	1,998	2,999	44,121
1981	6,892	13,248					6,471		1,378					4,963	2,120	35,072
1982	10,748	18,391					8,649		1,911		444	171		7,012	3,412	50,738
1983	9,425	23,174					14,749		4,566	913	155		913	6,284	4,653	64,832
1984	7,261	20,561				786	14,739		3,848	1,255			1,255	9,652	3,161	62,518
1985	12,884	29,322					14,323		1,682					13,159	5,722	77,092
1986	19,113	29,739		1,193			15,626	3,838	2,186	963			963	13,753	1,325	88,699
1987	13,220	30,008					16,842	6,918	3,242	2,698			2,698	9,571	1,949	87,146
1988	19,591	32,160				2,001	16,007	5,784	8,040	588			588	8,047	3,121	95,927
1989	14,651	39,432	550	345	656	914	14,061	8,035	8,698	400			400	5,565	3,001	96,708
1990	19,863	32,082	1,024		849	1,318	17,914	4,857	5,184					5,430	3,914	92,435
1991	26,235	38,011	459		1,003	2,466	14,726	3,820	6,589	544				6,560	3,659	104,072
1992	18,085	37,056	992		1,985	2,198	16,869	3,873	5,153				800	9,586	4,899	101,496
Mean	12,873	23,484	756	769	1,123	1,614	13,056	5,304	3,705	833	359	161	856	7,652	3,198	69,807

^a Fish Lake drainage (Yentna River drainage).

^b May include effort from West Cook Inlet drainage waters.

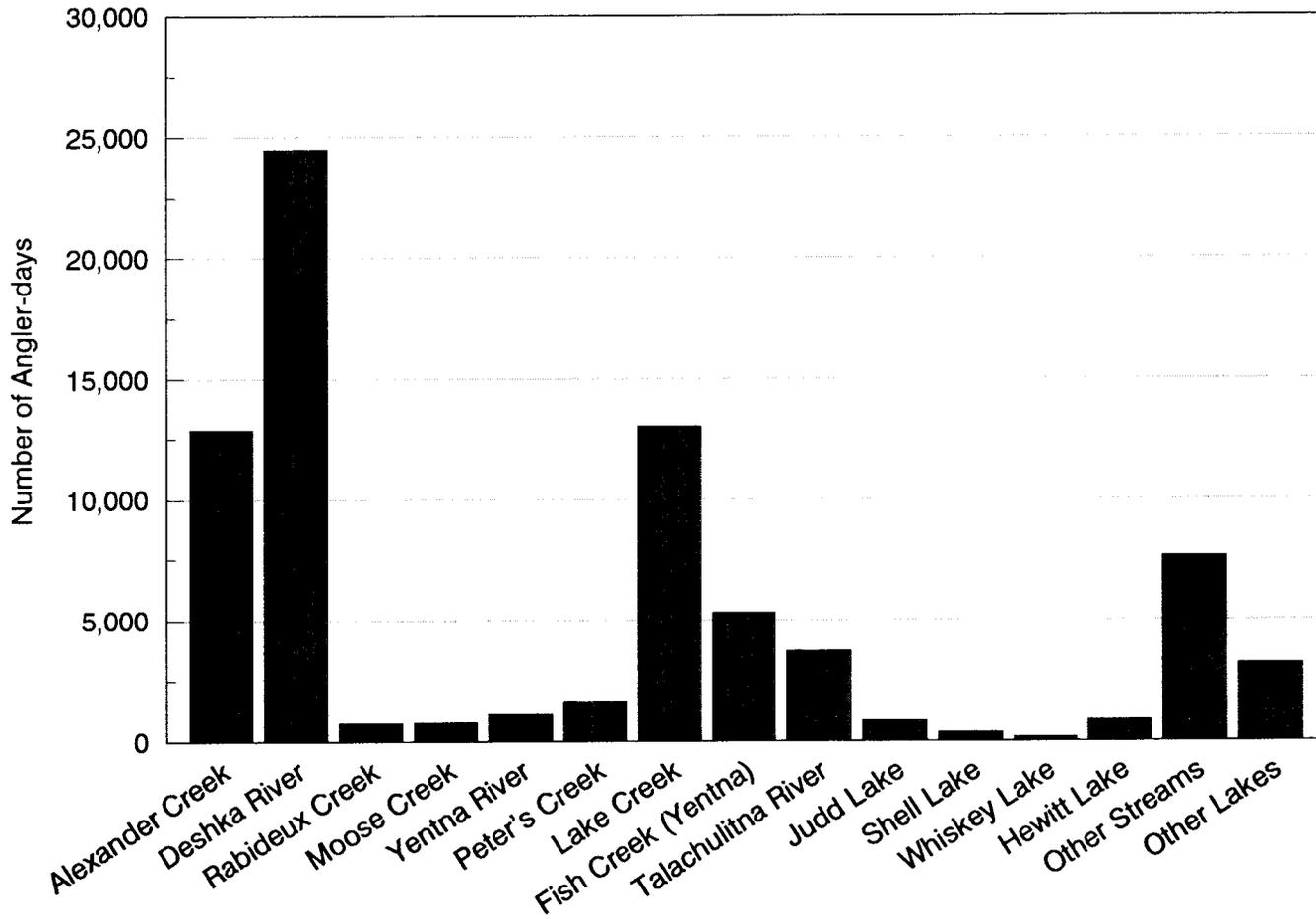


Figure 5. Mean number of angler-days per year of sport fishing effort expended in the westside Susitna River drainage, 1977-1992.

Table 5. Angler-days of sport fishing effort for the West Cook Inlet drainage by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Other	Total
1977	1,355		1,037	343		2,735
1978	1,185		905	172		2,262
1979	1,069		912	31		2,012
1980	614		700	43		1,357
1981	1,364		899			2,263
1982	751		375			1,126
1983	4,290		448			4,738
1984	2,342		3,497			5,839
1985	3,381		5,601	1,023		10,005
1986	3,532		4,786			8,318
1987	3,169		6,194	1,231		10,594
1988	1,637		4,056	837		6,530
1989	2,666	866	4,113	1,114	1,238	9,997
1990	4,443		3,626	1,285		9,354
1991	2,454		2,841	496		5,791
1992	2,817	512	2,091			5,420
Mean	2,317	689	2,630	658	1,238	5,521

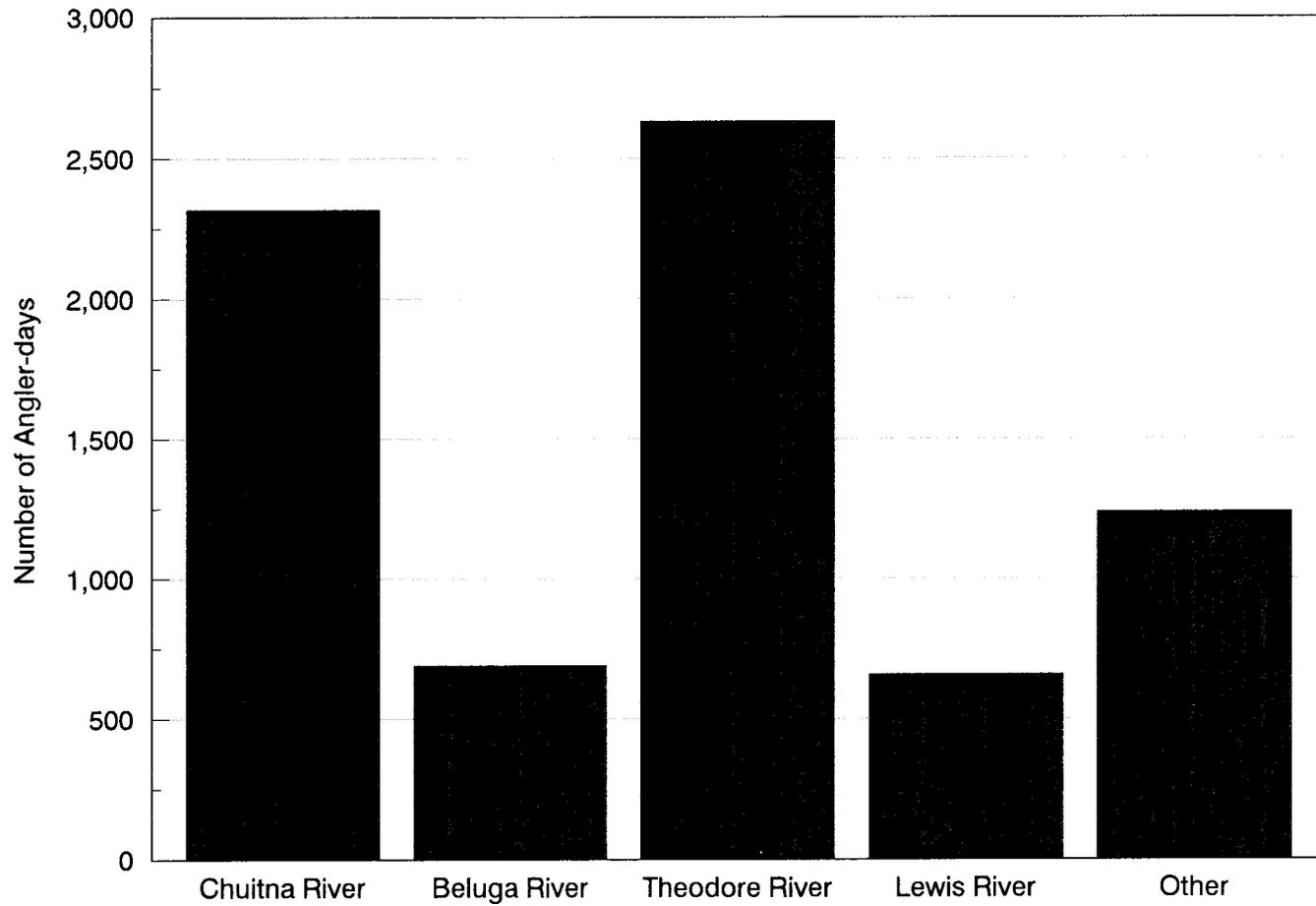


Figure 6. Mean number of angler-days per year of sport fishing effort expended in the West Cook Inlet drainage, 1977-1992.

Table 6. Northern Cook Inlet Management Area recreational harvest by management unit, 1977-1992.

Year	Knik Arm		East Susitna R.		West UCI & West Susitna R.		NCIMA Total	Alaska Total	% by NCIMA	Region II Total	% by NCIMA
	Harvest	% NCIMA	Harvest	% NCIMA	Harvest	% NCIMA					
1977	67,979	43.3	49,274	31.4	39,606	25.2	156,859	2,300,332	6.8	1,929,407	8.1
1978	66,420	31.5	96,469	45.7	48,287	22.9	211,176	2,399,472	8.8	1,992,212	10.6
1979	68,658	40.7	50,476	30.0	49,392	29.3	168,526	2,502,213	6.7	2,044,813	8.2
1980	102,015	41.2	93,271	37.7	52,272	21.1	247,558	2,627,312	9.4	2,118,543	11.7
1981	109,824	57.1	46,558	24.2	36,110	18.8	192,492	2,528,056	7.6	2,052,719	9.4
1982	82,976	43.6	58,998	31.0	48,199	25.3	190,173	2,828,706	6.7	2,222,354	8.6
1983	92,690	50.6	45,330	24.7	45,333	24.7	183,353	3,086,280	5.9	2,409,876	7.6
1984	94,974	45.3	62,071	29.6	52,823	25.2	209,868	3,115,966	6.7	2,517,185	8.3
1985	104,136	52.8	39,684	20.1	53,514	27.1	197,334	3,096,044	6.4	2,469,836	8.0
1986	90,264	39.7	73,083	32.2	63,768	28.1	227,115	3,163,433	7.2	2,609,304	8.7
1987	98,373	47.2	47,548	22.8	62,640	30.0	208,561	3,207,138	6.5	2,584,420	8.1
1988	156,784	53.8	62,693	21.5	71,772	24.6	291,249	3,483,306	8.4	2,841,033	10.3
1989	115,315	50.6	51,426	22.6	61,039	26.8	227,780	3,213,867	7.1	2,519,404	9.0
1990	90,035	46.9	44,360	23.1	57,509	30.0	191,904	3,033,301	6.3	2,428,172	7.9
1991	103,584	44.0	51,068	21.7	80,637	34.3	235,289	3,311,513	7.1	2,633,148	8.9
1992	88,267	38.9	76,569	33.8	61,920	27.3	226,756	3,234,048	7.0	2,675,940	8.5
MEAN	95,768	45.5	59,305	28.3	55,301	26.3	210,375	2,945,687	7.2	2,378,023	8.9

Table 7. Northern Cook Inlet Management Area sport fish harvest by species, 1977-1992.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Landlocked Salmon	Rainbow Trout	Dolly Varden	Arctic Grayling	Lake Trout	Burbot	Northern Pike	White Fish	Smelt	Other	Total
1977	4,674	17,206	7,962	30,136	2,062	27,429	32,270	13,365	15,799	3,231	1,024	132	0	0	1,569	156,859
1978	3,543	27,028	3,140	58,808	17,970	21,252	42,087	17,130	15,728	1,980	876	316	0	0	1,318	211,176
1979	7,964	24,076	6,193	13,925	5,599	12,144	47,924	17,718	27,949	1,789	1,172	382	0	0	1,691	168,526
1980	8,198	39,167	7,658	61,985	5,577	21,163	49,428	18,255	29,720	2,833	1,383	232	0	0	1,959	247,558
1981	8,602	23,870	8,369	9,627	4,897	24,533	63,592	20,310	24,506	2,375	518	125	0	0	1,168	192,492
1982	12,449	35,246	9,067	19,054	8,267	11,841	49,948	19,754	19,196	1,560	1,656	607	0	0	1,528	190,173
1983	14,860	15,637	21,423	5,686	6,033	23,854	46,184	20,299	21,227	3,532	2,305	944	0	0	1,369	183,353
1984	20,424	47,517	15,422	14,763	8,115	15,428	42,851	14,428	21,148	2,843	2,778	1,821	1,058	0	1,272	209,868
1985	21,904	34,082	9,678	4,018	3,053	15,345	63,319	18,539	18,485	622	1,855	1,404	2,477	2,240	313	197,334
1986	25,873	42,338	14,203	15,992	9,354	16,405	42,631	20,268	20,109	2,286	2,899	1,977	2,105	10,651	24	227,115
1987	25,906	48,187	13,530	4,634	6,304	15,032	39,909	16,385	16,405	2,046	5,140	2,464	2,861	9,265	493	208,561
1988	29,720	76,947	14,555	8,693	13,408	17,207	74,907	17,627	18,662	2,529	1,835	3,182	3,128	8,849	0	291,249
1989	35,792	61,203	14,238	5,191	9,097	11,804	54,952	12,715	12,238	2,397	978	3,120	1,716	2,324	15	227,780
1990	30,967	45,600	11,829	6,005	2,557	16,101	40,122	13,590	8,170	1,656	3,141	2,842	3,516	5,591	217	191,904
1991	33,965	70,939	11,713	3,517	3,240	15,924	52,544	13,973	10,114	1,527	981	6,640	2,057	6,132	80	233,346
1992	40,913	77,644	11,790	8,225	2,858	11,961	34,121	7,185	6,272	1,698	1,412	5,382	862	15,523	910	226,756
Mean	20,360	42,918	11,298	16,891	6,774	17,339	48,549	16,346	17,858	2,182	1,872	1,973	1,236	3,786	870	210,253
Percent of Mean	9.7%	20.4%	5.4%	8.0%	3.2%	8.2%	23.1%	7.8%	8.5%	1.0%	0.9%	0.9%	0.6%	1.8%	0.4%	

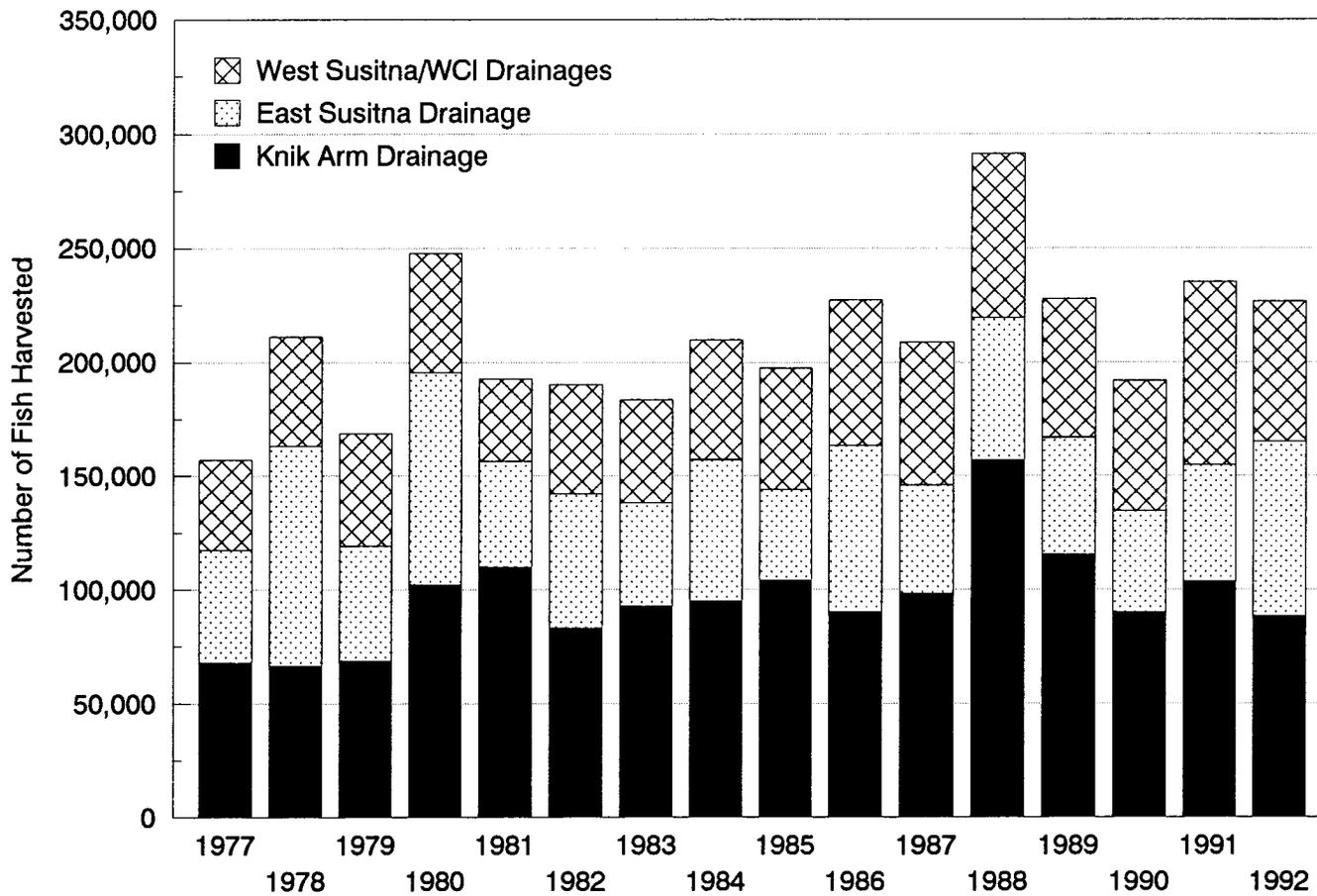


Figure 7. Northern Cook Inlet Management Area recreational harvest, 1977-1992.

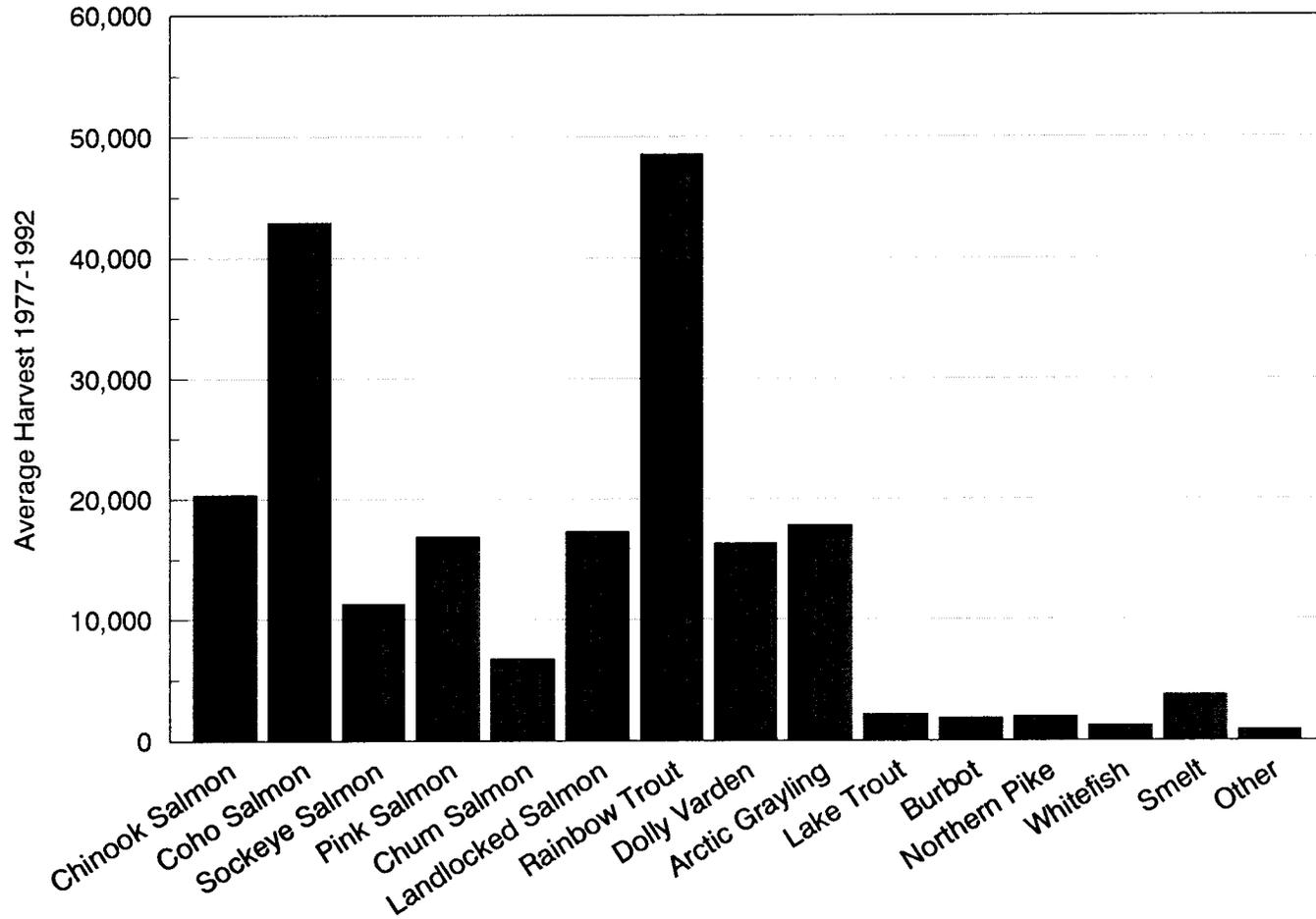


Figure 8. Northern Cook Inlet Management Area mean recreational harvest by species, 1977-1992.

Table 8. Knik Arm drainage sport fish harvest by species, 1977-1992.

Year	Rainbow Trout	Landlocked Salmon	Coho Salmon	Dolly Varden	Sockeye Salmon	Arctic Grayling	Chum Salmon	Pink Salmon	Chinook Salmon	Lake Trout	Smelt	White Fish	Northern Pike	Other	Burbot	Total
1977	18,615	26,917	4,366	7,541	1,576	3,916	250	1,661	207	2,260				380	290	67,979
1978	23,139	18,884	7,895	7,982	1,239	2,413	1,132	1,842	140	507				795	452	66,420
1979	24,843	11,853	7,139	8,582	3,616	8,371	654	818	800	1,254				437	291	68,658
1980	29,368	19,500	16,030	12,484	5,674	9,514	534	4,701	646	2,118			1,136	310	102,015	
1981	41,749	24,255	10,484	14,475	6,080	7,396	431	834	1,466	1,791				776	87	109,824
1982	30,549	10,845	13,676	13,540	4,621	2,924	1,174	1,425	1,666	1,058				817	681	82,976
1983	26,421	22,805	6,139	13,391	14,297	4,425	643	1,009	1,255	1,279				429	597	92,690
1984	26,418	14,768	23,429	9,103	9,240	2,480	2,032	2,743	2,057	1,919				449	336	94,974
1985	46,431	14,461	14,339	13,336	5,612	4,768	514	787	1,889	277	560	587	156	209	210	104,136
1986	27,690	14,299	12,361	13,048	6,009	4,233	3,770	1,800	1,524	313	3,351	580	458	24	804	90,264
1987	24,663	14,887	25,787	11,425	8,785	3,893	2,574	886	2,476	906	0	380	924	462	325	98,373
1988	58,609	16,588	40,037	11,314	8,076	8,367	5,221	1,927	2,916	1,911	0	1,163	364	0	291	156,784
1989	44,518	11,268	23,846	8,161	9,040	5,429	4,477	1,321	4,341	835	0	844	863	0	372	115,315
1990	30,699	15,950	18,762	8,746	6,588	3,068	746	650	2,022	1,067	0	622	754	99	262	90,035
1991	39,636	15,910	22,186	9,138	4,968	2,846	1,099	926	2,277	512	0	900	2,709	0	477	103,584
1992	27,995	11,875	25,814	4,186	5,349	2,511	510	1,044	3,969	840	0	257	2,605	812	500	88,267
Mean	32,584	16,567	17,018	10,403	6,298	4,785	1,610	1,853	1,853	1,178	489	667	1,104	427	393	95,768
Percent of Mean	34.0%	17.3%	17.8%	10.9%	6.6%	5.0%	1.7%	1.6%	1.9%	1.2%	0.5%	0.7%	1.2%	0.4%	0.4%	

Table 9. Eastside Susitna River drainage sport fish harvest by species, 1977-1992.

Year	Pink Salmon	Coho Salmon	Arctic Grayling	Rainbow Trout	Chum Salmon	Chinook Salmon	Dolly Varden	Sockeye Salmon	Land-		Lake			Total
									locked Salmon	White Fish	Burbot	Trout	Other	
1977	19,663	5,709	7,469	5,225	1,382	1,056	2,726	3,594	512		619	693	626	49,274
1978	50,711	8,573	6,590	5,930	14,203	886	5,640	267	2,368		271	877	153	96,469
1979	11,189	7,564	10,489	9,463	3,791	1,298	3,699	1,020	291		427	472	773	50,476
1980	52,746	10,368	10,959	6,715	4,552	1,370	2,671	873	1,663		367	267	720	93,271
1981	8,143	6,593	11,860	8,813	4,149	2,202	2,874	833	278		220	287	306	46,558
1982	15,345	10,167	9,747	7,536	6,644	2,063	4,066	1,555	996		199	335	345	58,998
1983	3,954	5,176	7,478	9,639	4,982	2,852	4,205	3,221	1,049		901	1,404	469	45,330
1984	9,491	13,916	11,222	7,656	5,211	4,428	4,004	2,705	660	1,058	1,133	362	225	62,071
1985	2,510	7,042	7,822	7,872	2,142	4,342	3,138	1,465	884	1,365	1,085	17	0	39,684
1986	10,527	16,190	10,346	8,061	4,756	8,569	4,213	4,029	2,106	1,090	1,380	1,816	0	73,083
1987	2,209	11,028	7,568	6,647	3,042	8,603	3,946	2,046	145	796	1,175	343	0	47,548
1988	4,129	19,518	6,020	7,622	6,604	9,139	4,748	2,857	619	546	600	291	0	62,693
1989	2,715	17,078	4,562	4,972	4,151	9,783	3,040	2,527	536	442	395	1,210	15	51,426
1990	4,093	11,743	2,910	5,008	1,565	9,423	3,613	2,677	151	1,378	1,345	387	67	44,360
1991	2,001	19,479	3,875	7,854	1,950	9,083	2,140	2,897	14	626	407	726	16	51,068
1992	5,899	33,790	2,189	3,948	2,044	21,307	2,394	3,468	86	265	608	495	76	76,569
Mean	12,833	12,746	7,569	7,060	4,448	6,025	3,570	2,252	772	841	696	624	237	59,305
Percent of Mean	21.6%	21.5%	12.8%	11.9%	7.5%	10.2%	6.0%	3.8%	1.3%	1.4%	1.2%	1.1%	0.4%	

Table 10. Westside Susitna River drainage sport fish harvest by species, 1977-1992.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Lake Trout	Dolly Varden	Rainbow Trout	Arctic Grayling	North-			Smelt	Other Fish	Total
										White- Fish	ern Pike	Burbot			
1977	2,938	6,599	2,786	8,142	423	278	2,246	7,472	4,414		132	115		563	36,108
1978	2,039	10,182	1,634	5,605	2,635	596	2,667	12,295	6,725		316	153		370	45,217
1979	5,768	9,036	1,557	1,854	1,154	63	4,591	12,555	9,089		382	454		481	46,984
1980	6,148	12,141	1,111	4,237	491	448	2,825	12,785	9,247		232	706		103	50,474
1981	4,742	5,940	1,408	555	240	297	2,003	11,296	5,250		125	211		86	32,153
1982	8,572	10,658	2,881	2,074	293	167	1,813	11,465	6,525		607	776		366	46,197
1983	9,568	3,570	3,549	712	398	849	2,400	9,253	9,314		944	807		471	41,835
1984	12,106	9,137	3,415	2,467	872	562	798	8,054	7,409		1,821	1,309		598	48,548
1985	13,644	11,270	2,302	584	671	328	1,267	8,114	5,895	525	1,248	560	1,681	104	48,193
1986	13,366	12,804	4,076	3,385	615	157	2,470	6,668	5,441	435	1,519	715	7,300	0	58,951
1987	13,350	14,976	2,397	1,467	688	797	688	7,984	4,908	1,685	1,540	3,640	9,265	31	63,416
1988	17,665	16,210	3,167	2,582	1,474	327	1,401	8,058	4,275	1,419	2,818	944	8,849	0	69,189
1989	19,343	18,009	2,307	1,045	415	352	1,486	4,928	2,104	382	2,257	192	2,324	0	55,144
1990	17,425	13,663	1,938	1,238	234	202	1,214	3,960	2,158	1,381	2,088	1,534	5,591	51	52,677
1991	21,812	19,901	3,083	524	191	289	1,436	4,526	3,367	531	3,931	97	6,132	64	65,884
1992	14,424	15,829	2,916	1,264	304	363	400	2,028	1,572	340	2,777	304	15,523	22	58,066
Mean	11,432	11,870	2,533	2,358	694	380	1,857	8,215	5,481	837	1,421	782	7,083	207	51,190
Percent of															
Mean	22.3%	23.2%	4.9%	4.6%	1.4%	0.7%	3.6%	16.0%	10.7%	1.6%	2.8%	1.5%	13.8%	0.4%	

Table 11. West Cook Inlet drainage sport fish harvest by species, 1977-1992.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Dolly Varden	Rainbow Trout	Arctic Grayling	White- Fish	Burbot	Other Fish	Total
1977	743	532	6	670	7	852	958	0		0	0	3,768
1978	478	378	0	650	0	841	723	0		0	0	3,070
1979	98	337	0	64	0	846	1,063	0		0	0	2,408
1980	34	628	0	301	0	275	560	0		0	0	1,798
1981	192	604	48	95	0	958	1,734	0		0	0	3,631
1982	147	335	10	210	0	304	398	0		0	0	1,404
1983	1,185	564	356	21	10	230	871	10		0	0	3,247
1984	1,833	1,035	62	62	0	523	698	37		0	0	4,250
1985	2,029	1,431	299	137	50	798	902	0	0	0	0	5,646
1986	2,378	983	89	280	213	537	212	89	0	0	0	4,781
1987	1,477	2,825	272	72	0	326	579	36	0	0	0	5,587
1988	1,695	1,182	455	55	109	164	618	0	0	0	0	4,278
1989	2,325	2,270	364	110	54	29	534	143	48	19	0	5,896
1990	2,097	1,344	189	24	12	51	438	34	135	0	0	4,324
1991	762	2,485	562	44	0	295	404	26	0	0	0	4,578
1992	1,213	2,211	57	18	0	205	150	0	0	0	0	3,854
Mean	1,168	1,197	173	176	28	452	678	23	23	1	0	3,908
Percent of Mean	29.9%	30.6%	4.4%	4.5%	0.7%	11.6%	17.3%	0.6%	0.6%	0.0%	0.0%	

The 1977-1992 harvests by fishery of all species from the NCIMA are listed in Appendix A.

Recreational Fish Catch and Release

Estimates of the number of fish caught and released by anglers fishing NCIMA waters became available for the first time during 1990 (Mills 1991-1993). From 1990 to 1992 an average of 539,650 fish were caught with approximately 59% released (Table 12).

Variability existed within and between management units in the proportion and type of fish released by anglers (Mills 1991-1993) (Tables 13 and 14). Arctic grayling, rainbow trout, northern pike, chum salmon and pink salmon were the most frequently released fish species during these years. In all units during each year the information was available, the number of fish caught and released was greater than the number of fish caught and harvested except during 1991 in the Knik unit (Figure 9).

Other User Groups Affecting Fisheries

Salmon returning to the NCIMA are also harvested by various commercial set and drift gill net fisheries located throughout Upper Cook Inlet (Appendix B1). In nearly all cases, harvests in the commercial fisheries are much larger than in NCIMA sport fisheries (Figure 10). The average commercial harvest from 1977 through 1992 was 5.7 million salmon by the various commercial fisheries of Upper Cook Inlet, whereas during this same period just less than 100,000 salmon were harvested on average by recreational anglers (Table 7 and Appendix B2). Chinook salmon are the exception, where about equal numbers on average have been taken in each fishery since 1977. Since 1990 the harvest of chinook salmon in the recreational harvest has been more than double the commercial harvest.

It is generally believed that not all commercial fisheries in Upper Cook Inlet intercept the same proportion of NCIMA salmon stocks. For purposes of management, it has generally been assumed that NCIMA salmon stocks are intercepted to a larger extent in the drift net and Western District set net fisheries of the Central District (Appendices B3 and B4) and in the set net fisheries of the Northern District (Appendices B5-B9) than in other commercial fishing districts. Although quantifiable estimates of contribution to these commercial fisheries by specific stock units are not available for many of the species, a high proportion of the harvests in the Northern District set net fisheries is assumed to be composed of NCIMA stocks whereas the proportional harvests of NCIMA salmon stocks in the Central District drift and set net fisheries are assumed to be dependent on both time and area fished.

Fish stocks of the NCIMA are also harvested in various subsistence, personal use and educational fisheries. Fisheries that are currently in effect include the Fish Creek personal use salmon fishery, the Tyonek subsistence salmon fishery and the Eklutna and Knik educational fisheries. Harvests in the Tyonek subsistence fishery and the Eklutna and Knik educational fisheries are small in comparison to the commercial and sport salmon harvests. The harvest of sockeye salmon in the Fish Creek personal use fishery is significant when compared to the recreational harvest in NCIMA but not significant when compared to the Cook Inlet commercial harvest.

Table 12. Percent of fish released by recreational anglers in the Northern Cook Inlet Management Area for 1990-1992.

	1990		1991		1992		Average Percent Released
	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	
Chinook Salmon	80,485	61.5%	59,961	43.4%	86,500	47.8%	50.9%
Coho Salmon	75,568	39.7%	105,424	32.7%	118,972	34.7%	35.7%
Sockeye Salmon	23,124	48.8%	18,626	37.1%	19,739	40.3%	42.1%
Pink Salmon	40,631	85.2%	17,461	79.9%	51,786	84.1%	83.1%
Chum Salmon	15,239	83.2%	12,989	75.1%	20,761	86.2%	81.5%
Landlocked Salmon	28,017	42.5%	24,174	34.1%	26,489	54.8%	43.8%
Lake Trout	5,052	67.2%	3,932	61.2%	6,373	73.4%	67.3%
Dolly Varden	40,620	66.5%	34,670	59.7%	21,285	66.2%	64.1%
Rainbow Trout	156,460	74.4%	163,694	67.9%	129,627	73.7%	72.0%
Arctic Grayling	46,490	82.4%	38,218	73.5%	38,385	83.7%	79.9%
Whitefish	5,247	33.0%	4,486	54.1%	3,253	73.5%	53.5%
Northern Pike	17,058	83.3%	18,214	63.5%	20,925	74.3%	73.7%
Burbot	4,078	23.0%	2,023	51.5%	2,612	45.9%	40.1%
Smelt	5,591	0.0%	6,151	0.3%	15,523	0.0%	0.1%
Other	837	74.1%	825	90.3%	1,377	33.9%	66.1%
All	544,497	64.8%	510,848	54.3%	563,607	59.0%	59.4%

Table 13. Percent of fish released by recreational anglers in the Knik Arm and Eastside Susitna River areas, 1990-1992.

Species	Knik Area						East Susitna Area					
	1990		1991		1992		1990		1991		1992	
	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released
Chinook Salmon	3,240	37.6%	3,311	31.2%	6,590	39.8%	22,077	57.3%	16,574	45.2%	30,521	30.2%
Coho Salmon	29,958	37.4%	28,808	23.0%	36,317	28.9%	18,174	35.4%	27,942	30.3%	51,981	35.0%
Sockeye Salmon	12,966	49.2%	6,992	28.9%	8,257	35.2%	4,499	40.5%	4,609	37.1%	6,707	48.3%
Pink Salmon	3,560	81.7%	1,581	41.4%	5,706	81.7%	24,264	83.1%	9,400	78.7%	37,170	84.1%
Chum Salmon	3,880	80.8%	1,864	41.0%	2,393	78.7%	8,711	82.0%	9,263	78.9%	15,891	87.1%
Landlocked Salmon	27,765	42.6%	23,915	33.5%	25,743	53.9%	252	40.1%	259	94.6%	746	88.5%
Lake Trout	2,380	55.2%	738	30.6%	2,662	68.4%	2,033	81.0%	2,723	73.3%	3,070	83.9%
Dolly Varden	21,316	59.0%	16,699	45.3%	10,364	59.6%	12,331	70.7%	5,356	60.0%	7,194	66.7%
Rainbow Trout	98,720	68.9%	88,645	55.3%	85,331	67.2%	21,806	77.0%	26,329	70.2%	19,915	80.2%
Arctic Grayling	10,188	69.9%	8,620	67.0%	10,206	75.4%	16,834	82.7%	12,321	68.5%	16,018	86.3%
Whitefish	737	15.6%	1,337	32.7%	578	55.5%	2,388	42.3%	1,316	52.4%	1,002	73.6%
Northern Pike	2,593	70.9%	7,021	61.4%	7,097	63.3%	0	0.0%	0	0.0%	0	0.0%
Burbot	344	23.8%	863	44.7%	770	35.1%	1,864	27.8%	957	57.5%	1,132	46.3%
Smelt	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	181	45.3%	0	0.0%	1,116	27.2%	521	87.1%	32	50.0%	152	50.0%
Total	217,828	58.7%	190,394	45.6%	203,130	56.5%	135,754	67.3%	117,081	56.4%	191,499	60.0%

Table 14. Percent of fish released by recreational anglers in the Westside Susitna River and West Cook Inlet areas, 1990-1992.

Species	West Susitna Area						West Cook Inlet Area					
	1990		1991		1992		1990		1991		1992	
	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released
Chinook Salmon	49,370	64.7%	38,353	43.1%	44,389	67.5%	5,798	63.8%	1,542	50.6%	5,000	75.7%
Coho Salmon	24,494	44.2%	32,974	39.6%	26,722	40.8%	2,611	48.5%	5,254	52.7%	3,952	44.1%
Sockeye Salmon	4,346	55.4%	5,988	48.5%	4,660	37.4%	269	29.7%	798	29.6%	115	50.4%
Pink Salmon	12,213	89.9%	5,945	91.2%	8,846	85.7%	594	96.0%	404	89.1%	64	71.9%
Chum Salmon	2,636	91.1%	1,644	88.4%	2,462	87.7%	12	0.0%	218	100.0%	15	100.0%
Landlocked Salmon	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lake Trout	639	68.4%	471	38.6%	641	43.4%	0	0.0%	0	0.0%	0	0.0%
Dolly Varden	6,468	81.2%	10,228	86.0%	2,973	86.5%	471	89.2%	540	45.4%	754	72.8%
Rainbow Trout	33,510	88.2%	46,870	90.3%	23,621	91.4%	2,340	81.3%	1,290	68.7%	762	80.3%
Arctic Grayling	19,131	88.7%	17,184	80.4%	11,875	86.8%	337	89.9%	93	72.0%	286	100.0%
Whitefish	1,987	30.5%	1,833	71.0%	1,673	79.7%	135	0.0%	0	0.0%	0	0.0%
Northern Pike	14,465	85.6%	11,193	64.9%	13,828	79.9%	0	0.0%	0	0.0%	0	0.0%
Burbot	1,870	18.0%	203	52.2%	709	57.1%	0	0.0%	0	0.0%	0	0.0%
Smelt	5,591	0.0%	6,132	0.3%	15,523	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	135	62.2%	793	91.9%	109	79.8%	0	0.0%	0	0.0%	0	0.0%
Total	176,855	70.2%	179,830	63.4%	158,031	63.3%	12,567	65.6%	10,139	54.8%	10,948	64.8%

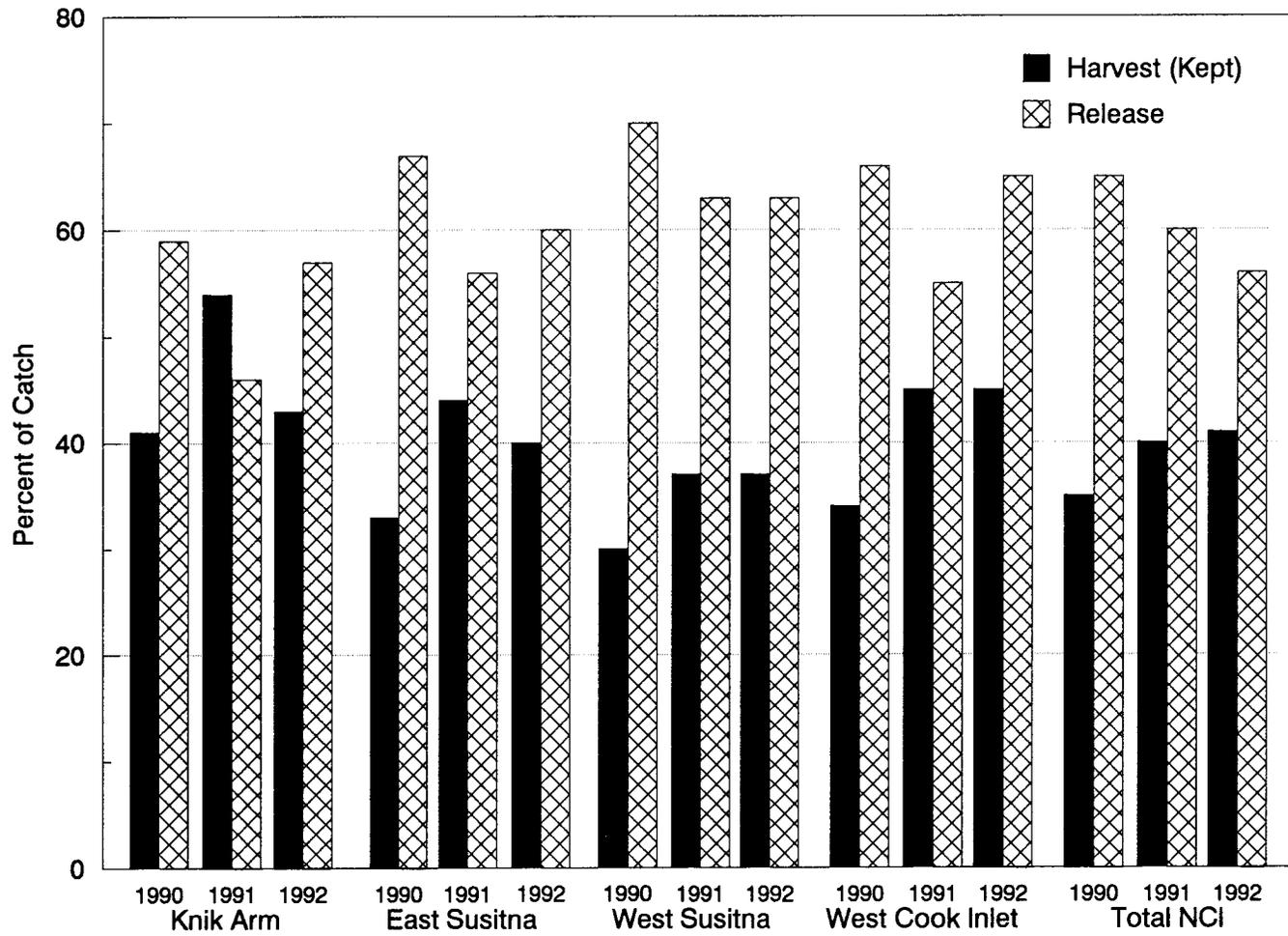


Figure 9. Percent of the recreational catch of all species from the Northern Cook Inlet Management Area harvested (kept) and released in 1990-1992, by management unit.

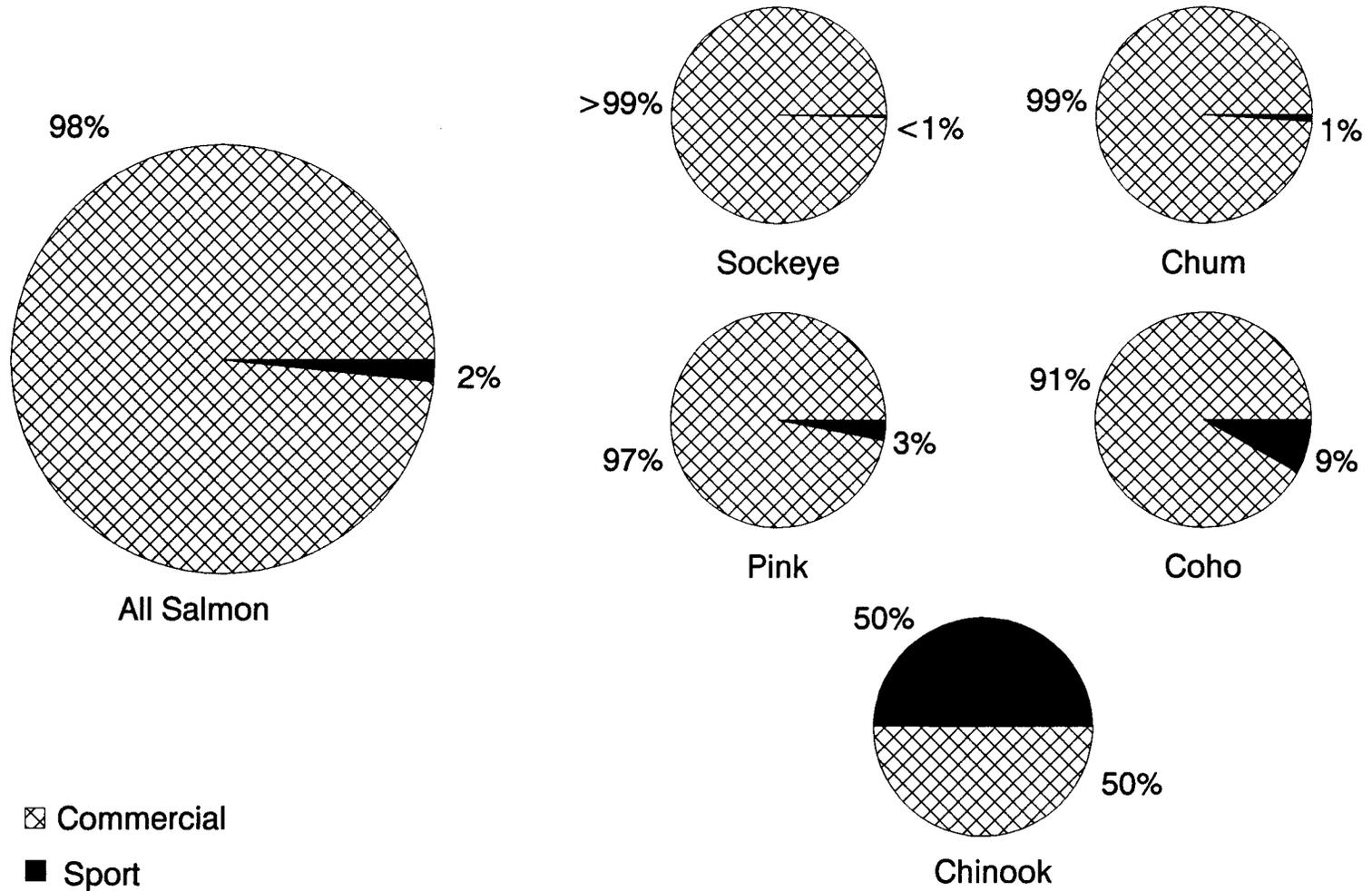


Figure 10. Composition of the Northern Cook Inlet salmon harvest, 1977-1992.

Educational fisheries were conducted by the Native Village of Eklutna and the Knik Tribal Council during the 1993 season. The fisheries were implemented by permit and occurred in two specific areas within Knik Arm with specific gear restrictions under a harvest quota. Less than 300 salmon were harvested.

The Upper Cook Inlet Subsistence Salmon Management plan was created by the BOF in December of 1990 as a result of the Alaska Supreme Court's decision to eliminate the rural residency requirement for participation in subsistence fisheries. During 1991 only 5 days of subsistence fishing were allowed, however, during the 1992 season 35 days of fishing were allowed (Fox and Ruesch 1992). In December of 1992 the BOF found that most of Cook Inlet was a non-subsistence zone and repealed the Upper Cook Inlet Subsistence Management Plan. A court ruling in November of 1992 found this action by the BOF to be unconstitutional. At this time it is not known whether the Upper Cook Inlet Subsistence Management Plan will be in effect during the 1994 season.

Economic Value of Sport Fisheries

Direct estimates are available to assess the economic value of the NCIMA recreational fisheries (Jones and Stokes 1987). During 1986, the economic value of the sport fisheries of the NCIMA was estimated to be approximately 29 million dollars (Table 15). This compares to an estimated value of 127 million dollars for Southcentral Alaska sport fisheries during 1986 (Jones and Stokes 1987). Resident anglers expended about 18.5 million dollars whereas nonresident anglers expended about 10.5 million dollars.

The Jones and Stokes survey also provided estimates of the direct expenditures for selected NCIMA fisheries (Table 16). These data suggest that considerable variability exists in amount of money expended by anglers depending upon the species and location fished. Generally, anglers spent more money fishing for chinook and coho salmon than for hatchery-reared fish stocked into lakes. Also, anglers expended more money fishing remote locations than road-accessible locations.

Ongoing Research and Management Activities

There are seven major research programs presently ongoing in the NCIMA. These include:

1. creel and escapement studies to assess returns of chinook and coho salmon in Northern Cook Inlet;
2. stocking, creel and escapement studies to assess returns of wild and hatchery chinook salmon to the Willow Creek;
3. assessment of the return of chinook salmon to the Little Susitna River including estimates of the marine harvests, inriver return, inriver sport harvest and spawning escapement to the Little Susitna River, and estimation of the contribution of selected chinook salmon stocks to early-run marine fisheries in Cook Inlet;
4. creel and escapement studies to assess returns of nonhatchery and hatchery coho salmon to the Little Susitna River;
5. escapement studies of coho salmon and sockeye salmon in the Jim Creek drainage;

Table 15. Estimated economic value of NCIMA sport fisheries during 1986^a.

Angler Type	Southcentral Alaska			NCI Management Area		
	Angler-Days	Expenditures	S/Ang-Day	Angler-Days	S/Ang-Day	Expenditures
Resident	1,153,660	74,163,000	64.29	288,613	64.29	18,555,000
Non-Resident	201,488	52,892,000	262.51	40,380	262.51	10,600,000
Both	1,355,148	127,055,000	--- ^b	328,993	--- ^b	29,155,000

^a Data from Jones and Stokes 1987.

^b Value not computed.

Table 16. Economic value for selected NCIMA sport fisheries during 1986^a.

Fishery	Resident Anglers (dollars)	Non-Resident Anglers (dollars)	Total (dollars)
Little Susitna River			
Chinook Salmon Fishing	794,000	666,000	1,460,000
Coho Salmon Fishing	312,000	397,000	709,000
<u>Combined</u>	<u>1,106,000</u>	<u>1,063,000</u>	<u>2,169,000</u>
West Susitna River/WCI			
Chinook Salmon Fishing	2,480,000	2,569,000	5,049,000
Coho Salmon Fishing	278,000	363,000	641,000
<u>Combined</u>	<u>2,758,000</u>	<u>2,932,000</u>	<u>5,690,000</u>
East Susitna River			
Chinook Salmon Fishing	435,000	507,000	942,000
Coho Salmon Fishing	161,000	195,000	356,000
<u>Combined</u>	<u>596,000</u>	<u>702,000</u>	<u>1,298,000</u>
Lake Creek (all species)	541,000	322,000	863,000
Kepler Lake Complex			
Rainbow Trout Fishing	162,000	2,000	164,000
Big Lake			
Rainbow Trout Fishing	214,000	40,000	244,000
=====	=====	=====	=====
All Sites	5,377,000	5,061,000	10,438,000

^a Data from Jones and Stokes 1987.

6. evaluation of the differences in survival and growth between stocked diploid and triploid all female rainbow trout in Mat-Su and Anchorage area lakes; and
7. distribution, abundance, and age composition studies of northern pike in the Susitna River drainage.

It is anticipated that emphasis among these programs will change over time with programs being reduced or curtailed as findings are obtained and as new priorities are established.

Routine management activities that occur in the NCIMA include:

1. participation in the BOF process;
2. fishery monitoring and inseason fishery management;
3. involvement with the public;
4. enforcement of fishing regulations;
5. habitat monitoring and permit review; and
6. assisting with annual fish stockings.

Major Biological and Social Issues for NCIMA

There are several major biological and social issues associated with the NCIMA which affect area fisheries. Issues of importance which were discussed in the 1993 Area Management Report (AMR) for Recreational Fisheries of Northern Cook Inlet (Whitmore et al. 1993) in which the status has not changed and will not be discussed in this report include:

1. Willow Creek State Recreational Area;
2. Timber Development;
3. Improved or expanded access;
4. Development of coal reserves;
5. Allocation;
6. Little Susitna River; and
7. Chinook salmon escapement enumeration.

Additional biological or social issues which affect these fisheries include:

1. Northern Cook Inlet chinook salmon. Since 1990, observed escapement of chinook salmon to some Northern Cook Inlet streams has fallen below established escapement goals. In order to increase escapements, regulations were implemented prior to the 1993 season aimed at reducing recreational chinook salmon harvests. These regulations appeared successful in that escapement levels were achieved in most monitored drainages during 1993.

Chinook salmon escapements in the Deshka River, however, continue to show a trend of declining abundance. The escapement goal for the Deshka River is 11,200 fish and has not been achieved during any of the last three seasons. The 1993 escapement was only 5,769 fish. This declining chinook salmon escapement trend in the Deshka River must be reversed for the continued long-term productivity and viability of this stock.

To increase spawning escapements in the Deshka River, managers are recommending that the harvest of Deshka River chinook salmon be reduced by half. After considering a range of options, managers selected to issue an

emergency order (EO) prior to the 1994 season which will: (1) prohibit the use of bait throughout the Deshka River drainage, and (2) reduce the possession limit for chinook salmon greater than 16 inches in length to 1 fish. In combination with current regulations, managers believe these actions should be sufficient to assure the escapement goal in the Deshka River is achieved. This issue will be discussed in greater detail in Section II of this report.

2. Enforcement. Increasing recreational participation in NCIMA waters is leading to more numerous and more complex fishing regulations in order to maintain sustainable levels of fish. Without adequate enforcement of the regulations they receive limited compliance and are noneffective. Increased funding levels for the Department of Public Safety, Division of Fish and Wildlife Protection, would be appropriate; however, funding levels have undergone recent reductions as have those of many state agencies. Thus, the Department of Fish and Game, Division of Sport Fish, dedicated funding to enforcement related activities beginning in FY93.

3. Susitna Basin Recreation Rivers Management Plan. In the spring of 1988, the Alaska legislature passed the Recreation Rivers Act and assigned oversight responsibilities related to this act to the Alaska Department of Natural Resources (ADNR). This act established six recreation rivers: Little Susitna River, Deshka River (including Moose and Kroto creeks), Talkeetna River, Lake Creek, Talachulitna River, and Alexander Creek. The legislation was enacted to insure that all state lands and waters within the six river corridors are maintained and enhanced for recreation and wildlife purposes. A 2-year planning process has been completed, which included input from affected individuals, groups, agencies and officials throughout the area. The plan (ADNR 1991) was adopted as ADNR policy in the spring of 1991 following legislative review of the document. Public review of regulations associated with the plan were available for public comment through January 7, 1994. Under the anticipated schedule, the regulations will be in effect during the 1994 season.

Temporal and spatial zoning of the Little Susitna River for motorized and nonmotorized boating is among the most controversial aspects of the plan. The plan recommends alternating weekends for the use of motorized and nonmotorized boats in the lower portion of the river. The alternating weekend concept only applies from May 15 through August 20. Motorized boat users are firmly opposed to the zoning requirement whereas nonmotorized users strongly support the concept. On average 95% of the boat fishing effort that exited the fishery during 1989 through 1992 from the Burma Road site was motorized craft (Bartlett and Sonnichsen 1990, Bartlett and Bingham 1991, Bartlett 1992 and 1993). The nonmotorized aspect of the plan for other Recreation Rivers is also a controversial issue.

Other controversial aspects of the Recreation Rivers Management Plan include a permit fee for commercial users and a maximum 4-day camping limit per site.

4. Susitna River sockeye salmon. Sockeye salmon returns to the Susitna River, as evaluated by a sonar unit in the Yentna River, have been below desired objective levels during 5 of the last 8 years. Susitna River sockeye salmon are harvested in the mixed stock commercial fishery of Cook Inlet primarily in the drift gill net fishery in the Central District as well as in inriver recreational fisheries. Commercial fishery managers implement

fisheries in efforts to meet escapement goals of the Susitna River without exceeding the escapement range in the Kenai River. Recreational anglers would like more sockeye salmon allocated to the Susitna and Kenai rivers for inriver fisheries. The BOF during their 1992 meeting elected to not address this allocation issue. A bill has been introduced to the legislature for the 1994 session to require 15% of the harvestable surplus of sockeye salmon be allocated to the recreational fisheries. If this bill is passed, significantly more sockeye salmon will become available to recreational anglers.

5. Access Development. Efforts by the department to improve parking and development of trails and boat launches to area lakes are being resisted by adjacent home owners.

SECTION II: MAJOR FISHERIES OVERVIEW

Chinook Salmon Fisheries

Chinook salmon runs to the NCIMA collectively comprise the largest stock of this species within the entire Cook Inlet drainage. Within the management area, the Susitna River supports the largest stock of chinook salmon which is considered to be the fourth largest in Alaska, smaller only than the Yukon, Kuskokwim and Nushagak River stocks (Delaney and Vincent-Lang 1992). Harvests of NCI chinook salmon varied from 11,000 to 70,000 from 1893 through the early 1940s, averaging about 38,500 fish (Table 17). This harvest level of Northern Cook Inlet chinook salmon appears to be sustainable considering that this level was maintained for over a half century. However, when harvest levels increased to an average of 84,200 chinook salmon annually during the 1940s, a steady decline in harvests occurred until fisheries were closed to allow stocks to rebuild (Figure 11). This harvest history suggests that the maximum sustainable harvest range for NCI chinook salmon is between 38,500 and 84,200 fish. Therefore, a management objective for NCIMA chinook salmon is to maintain harvests by all user groups between 45,000 and 55,000 fish, similar to recent harvest levels. Although estimates of total return are unavailable for Northern Cook Inlet chinook salmon, largely due to our inability to accurately estimate spawning escapement, the collective annual return is believed to number from 100,000 to 200,000 fish (Delaney and Vincent-Lang 1992). The Northern Cook Inlet chinook salmon stock, as a whole, is presently considered to be in a relatively stable condition.

The abundance of Northern Cook Inlet chinook salmon increased in 1976, the year that the Magnuson Fishery Conservation and Management Act was enacted. This act, sometimes known as the 200-mile limit law, extended federal fishery management authority into waters from 3 to 200 miles from the United States coast. The effects of this law on Cook Inlet chinook salmon are not fully understood, however, it seems likely that the act and its associated fishery management plans increased chinook salmon returns to NCI.

The chinook salmon returns to the NCIMA have historically been harvested by a variety of users including recreational, commercial, and subsistence/personal use fishermen (Table 18). However, harvest strategies for NCI chinook salmon have changed substantially since the 1890s. The fishery has slowly evolved from a mixed stock commercial harvest to a recreationally dominated harvest that targets a multitude of discrete substocks. A detailed user history is documented in the previous AMR (Whitmore et al. 1993).

Since 1986, under the Northern District King Salmon Management Plan (5 AAC 21.366), a directed commercial chinook salmon fishery has occurred under a 12,500 fish quota system. Additionally, up to 1,000 chinook salmon of NCIMA origin are incidentally captured in commercial fisheries taking place along the western shores of the Central District of Cook Inlet. Mean and peak harvest from the Northern District commercial fisheries, which harvest chinook salmon bound for NCIMA streams, during 1987 through 1992 have been 9,881 and 12,836 fish, respectively (Appendix B5).

Cautious incremental expansion of fishing opportunity has characterized the recreational chinook fisheries since 1979. The emergency orders which modified regulations for these fisheries since 1991 are outlined in

Table 17. Estimated harvests of chinook salmon of Northern Cook Inlet origin, 1893-1992.

Year	Harvest ^a	Year	Harvest ^a	Year	Harvest ^a
1893	24,000	1935	60,060	1977	5,893
1894	12,400	1936	64,850	1978	4,681
1895	20,159	1937	68,786	1979	10,394
1896	14,461	1938	46,130	1980	11,863
1897	11,266	1939	42,181	1981	12,042
1898	13,111	1940	50,413	1982	19,332
1899	13,682	1941	83,858	1983	20,284
1900	21,346	1942	76,144	1984	26,503
1901	27,455	1943	89,105	1985	30,849
1902	39,210	1944	68,168	1986	46,785
1903	52,818	1945	55,362	1987	44,049
1904	24,058	1946	51,425	1988	48,406
1905	14,134	1947	85,443	1989	55,958
1906	17,936	1948	84,797	1990	46,746
1907	50,355	1949	89,025	1991	48,667
1908	27,019	1950	130,274	1992	56,175
1909	47,699	1951	150,010		
1910	39,222	1952	59,600		
1911	44,676	1953	71,544		
1912	38,293	1954	52,260		
1913	50,922	1955	37,199		
1914	38,043	1956	52,248		
1915	67,034	1957	34,214		
1916	50,316	1958	18,278		
1917	52,399	1959	26,226		
1918	27,909	1960	22,031		
1919	19,041	1961	15,822		
1920	31,650	1962	16,216		
1921	11,157	1963	14,106		
1922	24,824	1964	3,698		
1923	23,929	1965	7,801		
1924	21,610	1966	815		
1925	40,826	1967	623		
1926	60,496	1968	1,163		
1927	69,923	1969	4,290		
1928	55,908	1970	2,793		
1929	54,155	1971	10,977		
1930	57,854	1972	5,916		
1931	41,122	1973	246		
1932	56,745	1974	238		
1933	47,425	1975	301		
1934	57,903	1976	692		

^a May include a portion of recreational and commercial harvests from outside NCIMA waters.

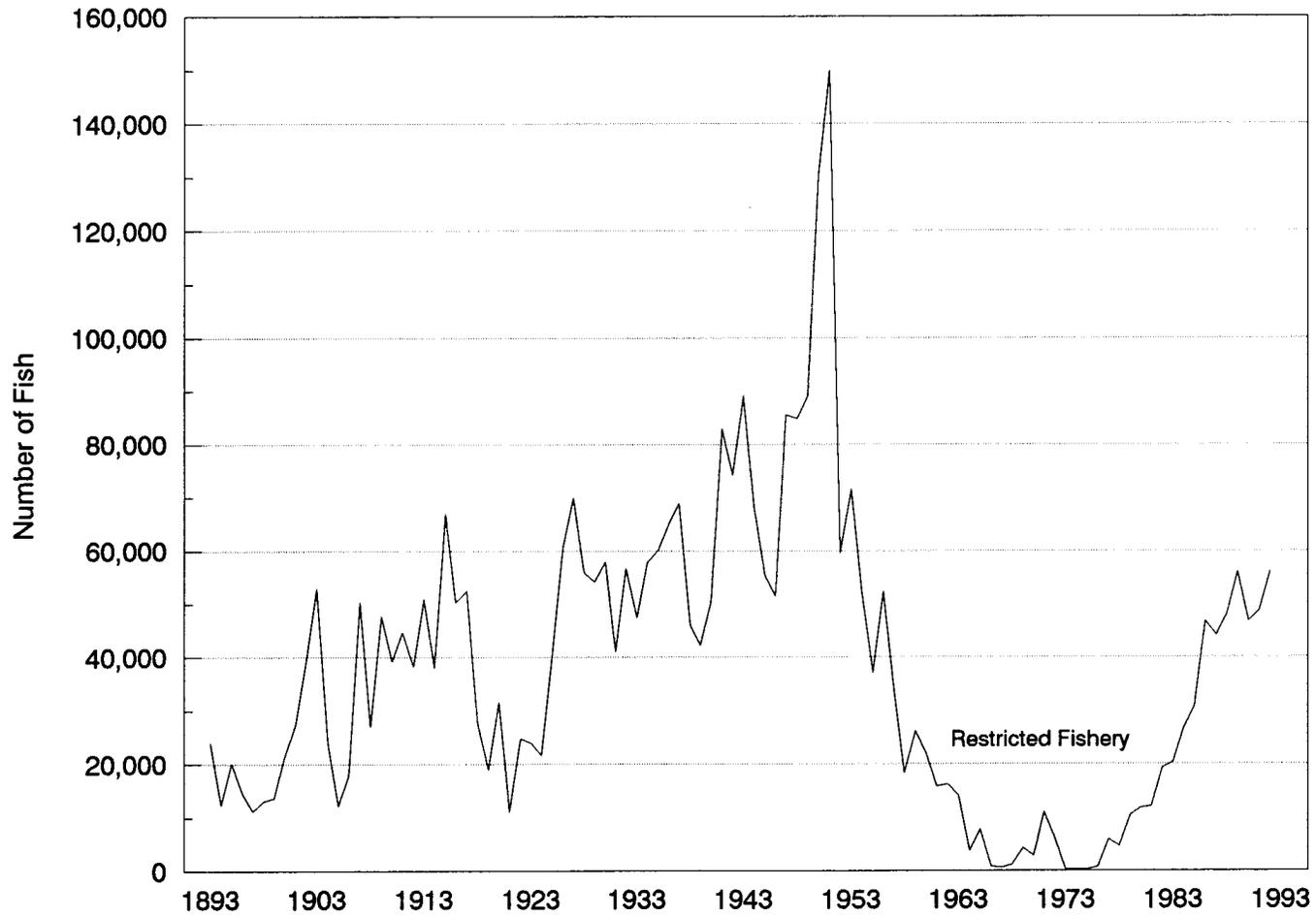


Figure 11. Estimated harvest of chinook salmon of Northern Cook Inlet origin, 1893-1993.

Table 18. Northern Cook Inlet Management Area chinook salmon estimated harvests, 1977-1993.

Year	Recreational						Total	Subsistence	Total	
	Commercial	Knik Arm Drainages	Eastside Susitna	Westside Susitna	West Cook Inlet	Deep Creek				
1977	565	207	1,056	2,938	473		5,239		5,239	
1978	669	140	886	2,039	478		4,212		4,212	
1979	1,714	800	1,298	5,768	98		9,678		9,678	
1980	990	646	1,370	6,148	34		9,188	1,936	11,124	
1981	725	1,466	2,202	4,724	192		9,309	2,002	11,311	
1982	2,716	1,666	2,063	8,573	147	1,249	16,414	1,565	17,979	
1983	933	1,255	2,852	9,568	1,185	500	16,293	2,750	19,043	
1984	885	2,057	4,428	12,106	1,833	1,193	22,502	2,354	24,856	
1985	1,863	1,889	4,342	13,644	2,029	2,544	26,311	1,720	28,031	
1986	15,488	1,524	8,569	13,402	2,378	1,553	42,914	1,523	44,437	
1987	12,701	2,476	8,603	13,350	1,477	1,303	39,910	1,552	41,462	
1988	12,836	2,916	9,139	15,970	1,695	1,436	44,992	1,474	46,466	
1989	12,731	4,341	9,783	19,343	2,290	1,518	50,006	1,314	51,320	
1990	9,582	2,022	9,423	17,425	2,097	1,577	42,126	797	42,923	
1991	6,859	2,277	9,083	21,807	762	1,800	42,588	2,100	44,688	
1992	4,577	3,969	21,252	18,622	1,213	8,458	53,514	2,218	55,732	
1993	3,277	No data available for recreational harvest							1,247 ^a	

^a Preliminary data.

Appendix D. The regulation history of chinook salmon in Northern Cook Inlet waters is outlined in Appendix E. Mean and peak harvest of NCIMA recreational chinook salmon fisheries from 1987 through 1992 have been 32,877 and 40,913 fish, respectively (Table 7) (Mills 1988-1993).

A marine recreational fishery has developed in recent years along the eastside beaches of the Kenai Peninsula (Deep Creek) which targets mixed stocks of early run chinook salmon. Stock specific origins of these mixed stock harvests are unknown, however, it is assumed that about half of these harvests is made up of fish bound for NCIMA waters (Nelson 1992).

Regulations providing for subsistence fisheries and personal use fisheries have changed in recent years as a result of BOF and court actions. Currently there is only one subsistence fishery and one personal use fishery authorized in the NCIMA. Beginning in 1980 a subsistence set gill net fishery was authorized at the village of Tyonek. This fishery is presently regulated to a 4,200 chinook salmon harvest quota, however, the annual harvest has never exceeded 2,800 fish (Table 19). The Fish Creek Personal Use Fishery administered under the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan (5 AAC 77.545) is the only personal use fishery currently authorized in the NCIMA. The harvest of chinook salmon is prohibited in this fishery.

Recent Board of Fisheries Action

During the November 1992 BOF meeting, several regulations regarding NCIMA chinook salmon were implemented. Through implementation of a harvest record system a seasonal limit of 5 chinook salmon was established for all waters of Cook Inlet. It is believed implementation of this regulation will have only a small effect on the total harvest of chinook salmon in that the majority of anglers do not harvest 5 king salmon in a season. The regulation will, however, provide a tool to help enforce daily bag and possession limits and address a social concern that a few select anglers are harvesting a significant portion of the catch.

Another regulation that the BOF adopted, affecting all waters of NCIMA, prohibits an individual or company engaged in freshwater sport fish guiding from participating in chinook salmon sport fishing while clients are present except when guiding a client subject to the American Disabilities Act.

In addition to BOF action, during the first legislative session in June of 1992, legislators passed House Bill 596. This bill included provisions that prohibited anglers over 16 years of age from fishing for chinook salmon in Alaskan waters unless they have purchased the current year's king salmon tag and have it in possession. Anglers must stick the tag on the back of their sport fishing license and validate it by signing their name across the tag.

The BOF also took action during 1992 to reduce recreational chinook salmon harvests in Susitna River drainage streams below, but including, the Deshka River. Recreational harvests in these fisheries have increased significantly over the past decade while observed spawning escapements have decreased. To stabilize harvests in these fisheries, the BOF reduced bag and possession limits for chinook salmon to 1 and 2 fish, respectively.

Table 19. Tyonek subsistence salmon harvests, 1980-1993.

Year	Number of Permits ^a	Chinook	Sockeye	Coho	Pink	Chum
1980	67	1,936	262	0	0	0
1981	70	2,002	269	64	32	15
1982	69	1,565	209	0	0	0
1983	75	2,750	185	40	0	2
1984	75	2,354	nd ^b	nd ^b	nd ^b	nd ^b
1985	76	1,720	44	8	0	nd ^b
1986	65	1,523	198	210	45	44
1987	61/64	1,552	161	149	5	24
1988	42/47	1,474	52	185	6	9
1989	47/49	1,314	67	175	0	1
1990	37/42	797	92	366	124	10
1991	54/57	1,105	25	80	0	0
1992	44/57	905	74	234	7	19
1993 ^c	53/12	1,247	43	36	11	9
Mean		1,589	120	111	16	10

^a Number of permits returned. 1987-1992 presented as the number of early season/late season permits.

^b No data available.

^c Preliminary data.

The BOF also took action to reduce harvests in select West Cook Inlet drainage streams. These streams have depressed chinook salmon stocks caused by flood events during the mid and late 1980s. To allow these stocks to rebuild, the BOF implemented the following actions:

1. Shortened the fishing season for chinook salmon by 13 days for West Cook Inlet drainage streams (the current season runs from January 1 through June 30).
2. Reduced the bag and possession limit for chinook salmon to 1 fish over 16 inches.
3. Created waters closed to the retention of chinook salmon in the Chuitna, Theodore, and Lewis rivers and eliminated bait from the fisheries in these waters.

A summary of November 1992 BOF action is included in Appendix F.

Little Susitna River Chinook Salmon Fishery

Background and Historical Perspective

The Little Susitna River (Figure 12), is the only Knik Arm Management Unit stream open to the harvest of chinook salmon. It supports a major chinook salmon fishery as well as the largest coho fishery in the NCIMA. Collectively, these two salmon fisheries are the largest in terms of effort in NCIMA. Chinook salmon bound for the Little Susitna River are also harvested in the Tyonek subsistence fishery, in the Northern District commercial fishery and possibly saltwater sport fisheries adjacent to the Kenai Peninsula.

Access to the Little Susitna River occurs at three primary locations; (1) intertidal waters of the river are accessed by boats crossing the marine waters of Knik Arm from the Port of Anchorage public boat launch, (2) road accessible Little Susitna Public Use Facility which includes a launch and campground, and (3) private and public launches near the Parks Highway which provide access to the upper reaches of the river. The Little Susitna Public Use Facility is by far the most heavily used access to the river. Power boats can travel from the mouth of the river to the Parks Highway during periods of moderate to high stream discharge. However, during low flows travel is restricted to smaller jet boats between River Mile 28 and the Parks Highway at River Mile 70.

Chinook salmon return to the Little Susitna River from late May through early July with the peak immigration occurring about mid-June. Chinook salmon spawn from the Burma road area upstream to Hatcher's Pass. Few chinook salmon use tributaries for spawning. Peak spawning occurs during the last week of July.

Chinook salmon fishing is permitted from the river's mouth upstream to the Parks Highway, a distance of about 70 miles. The chinook salmon fishing season extends from January 1 through July 13 and the bag limit is 1 chinook salmon 16 inches or more in length per day and 2 in possession.

Inseason harvest and fishing effort for chinook salmon were estimated by onsite creel survey from 1979 through 1990. Findings from the creel survey indicated harvest estimates from the SWHS accurately represented the fishery,

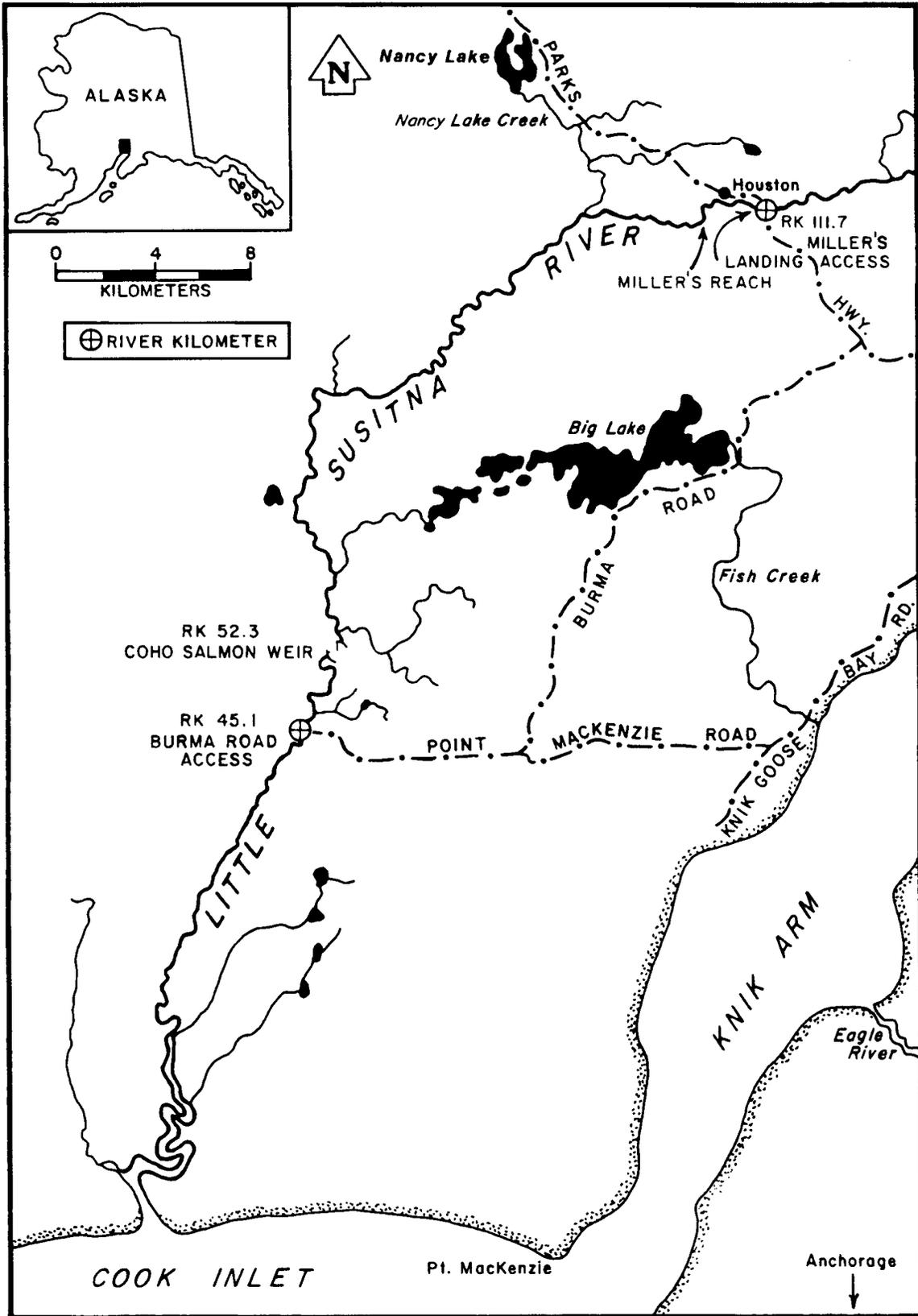


Figure 12. Map of the Little Susitna River.

therefore the creel survey was discontinued in 1991. The average estimated annual harvest of chinook salmon from the Little Susitna River for the 10-year period 1983-1992 was 2,367 (Table 20, Figure 13, Appendix A3) (Mills 1979-1992).

Due to the semiglacial characteristics of the Little Susitna River, aerial survey enumeration of chinook salmon spawning areas only provide a partial count of the spawning escapement. Chinook salmon aerial escapement surveys were conducted during 7 of the years from 1983 through 1993. The average chinook salmon escapement index during these years, based on aerial surveys, was 1,475 fish with a peak escapement count of 3,197 fish in 1988 (Table 21). During 1988 and 1989 a weir was operated and a weir count was obtained. In 1988 both an aerial and weir count were conducted. The aerial count result was 43% of the weir count (Table 21).

Recent Fishery Performance

The 1993 Little Susitna chinook salmon fishery occurred without additional fishery restrictions being implemented through emergency order authority. Reports from guides and the angling public suggest the harvest during the 1993 season was at least average in magnitude. Aerial survey evaluation of the chinook salmon spawning escapement in 1993 was not possible. Exceptionally warm weather during the period of escapement surveys created glacial melt and turbid water conditions making it impossible to count fish.

The 1992 sport harvest of chinook salmon from the Little Susitna River was 3,920 fish (Mills 1993). The 1992 harvest was the second largest on record, approximately 32% above the previous 5-year (1987-1991) average (Table 20). This harvest accounted for approximately 9% of the total chinook salmon harvest from NCIMA waters during 1992 (Table 20). The 1992 aerial survey escapement index estimate was 1,441 fish (Table 21).

Management Objectives

The estimated escapement which produces the greatest yield, the Biological Escapement Goal (BEG), has recently been proposed at 850 fish for the Little Susitna River (Table 22). The BEG is based on the average of historical aerial survey index counts of spawning chinook salmon. The management objective, therefore, is to maximize fishing opportunity while insuring a spawning population of 850 chinook salmon. In 1988 and 1989, years in which a weir program was conducted, inriver exploitation rates were estimated at approximately 35% and 50%, respectively. This rate of harvest appears to be within an acceptable range to maintain present levels of chinook salmon abundance.

Recent Board of Fisheries Action

During the November 1992 BOF meeting no specific action was taken regarding the Little Susitna River chinook salmon fishery, however, the areawide regulations described in the NCIMA chinook salmon fishery overview section apply to the Little Susitna River. These include: (1) 5 chinook salmon seasonal limit for all waters of Cook Inlet, and (2) guides may not participate or engage in sport fishing while clients are present. Additionally, due to legislative action, a king salmon stamp is required to be in the possession of chinook

Table 20. Harvest of chinook salmon by size category from eastside Susitna River, westside Susitna River, West Cook Inlet and Knik Arm drainages, 1979-1992.

Year	Eastside Susitna River			Westside Susitna River			West Cook Inlet			Knik Arm (Little Susitna River)		
	>16 Inches	<16 Inches ^a	Total	>16 Inches	<16 Inches ^a	Total	>16 Inches	<16 Inches ^a	Total	>16 Inches	<16 Inches ^a	Total
1979	1,298 ^b	---	1,298	5,768 ^b	---	5,768	0	98	98	800 ^b	---	800
1980	1,370 ^b	---	1,370	6,148 ^b	---	6,148	0	34	34	646 ^b	---	646
1981	1,322	880	2,202	3,506	1,236	4,742	0	192	192	920	498	1,418
1982	1,215	848	2,063	6,279	2,294	8,573	0	147	147	933	534	1,467
1983	1,689	1,163	2,852	7,292	2,277	9,569	797	388	1,185	847	340	1,187
1984	3,417	1,011	4,428	9,707	3,695	13,402	1,596	237	1,833	1,671	212	1,883
1985	2,291	2,051	4,342	9,552	2,554	12,106	1,581	448	2,029	1,365	480	1,845
1986	6,898	1,671	8,569	10,424	3,220	13,644	2,007	301	2,378	1,049	408	1,457
1987	7,094	1,509	8,603	11,360	1,990	13,350	1,399	78	1,477	1,864	418	2,282
1988	8,098	1,041	9,139	14,248	1,722	15,970	1,515	180	1,695	2,481	341	2,822
1989	8,510	1,273	9,783	16,875	2,468	19,343	2,111	214	2,325	3,661	543	4,204
1990	8,759	664	9,423	16,022	1,403	17,425	1,850	247	2,097	1,813	152	1,965
1991	7,742	1,341	9,083	19,746	2,090	21,836	683	79	762	1,883	219	2,102
1992	18,441	2,866	21,307	15,471	3,266	18,737	1,054	159	1,213	3,223	697	3,920

^a Chinook salmon less than 20 inches 1981-1986, and less than 16 inches 1987-1992.

^b Includes both small and large chinook salmon.

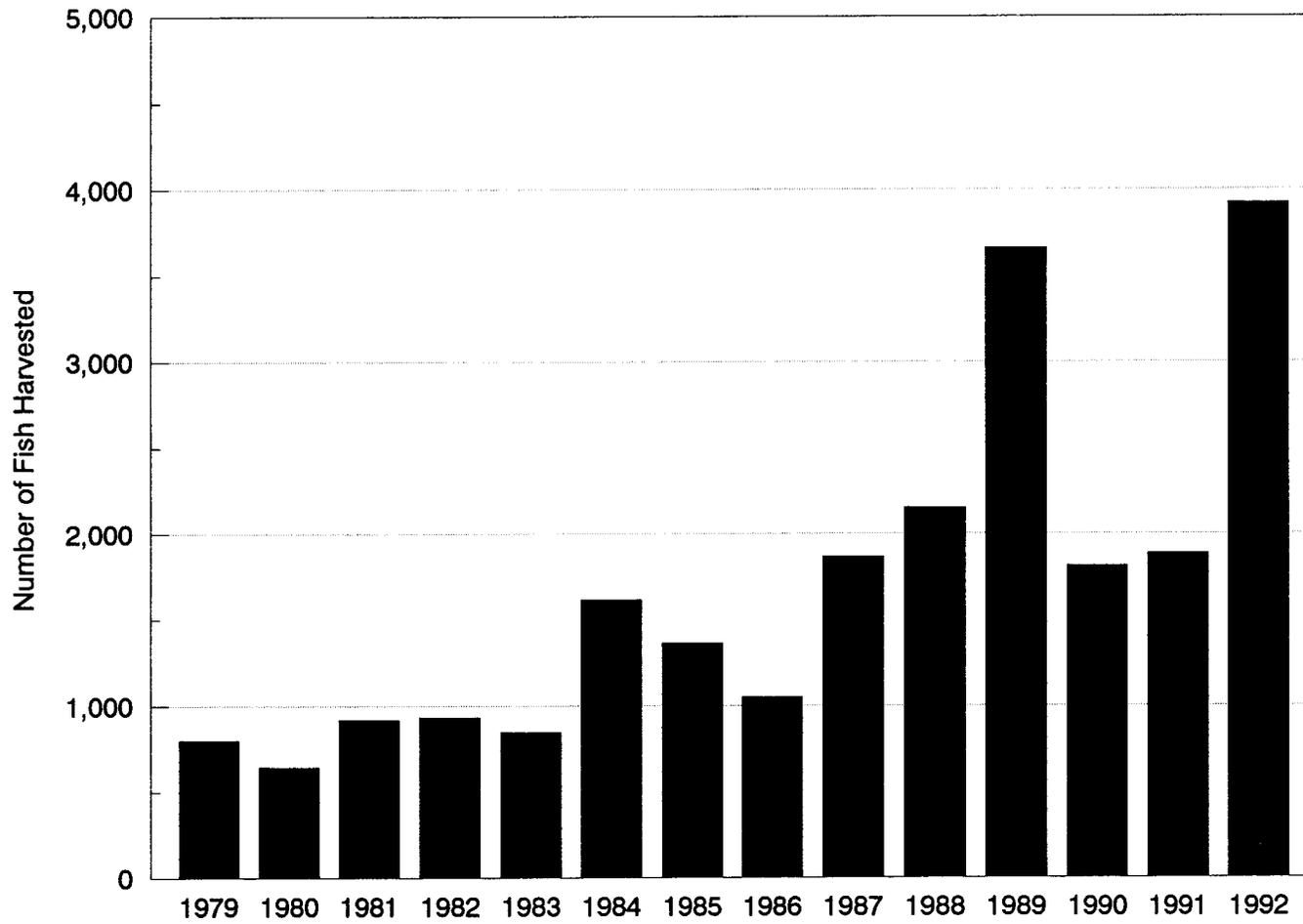


Figure 13. Little Susitna River chinook salmon harvest, 1979-1992.

Table 21. West Cook Inlet and Knik Arm management units chinook salmon escapement index counts, 1979-1993.

Year	West Cook Inlet ^a				Total WCI	Knik Arm ^a	
	Chuitna River	Theodore River	Lewis River	Other Streams ^c		Little River	Susitna River
1979	1,246	512	546	236	2,540		nc ^b
1980 ^b							nc ^b
1981	1,362	535	560	1,144	3,601		nc ^b
1982	3,438	1,368	606	1,972	7,384		nc ^b
1983	4,043	1,519	nc ^a	nc ^b	5,562		929
1984	2,845	1,251	947	nc ^b	5,043		558
1985	1,600	1,458	861	700	4,619		1,005
1986	3,946	1,281	722	165	6,114		nc ^b
1987	nc ^b	1,548	875	nc ^b	2,423		1,386
1988	3,024	1,906	616	nc ^b	5,546	(7,400 ^d)	3,197
1989	990	1,026	452	nc ^b	2,468		(4,367 ^d)
1990	480	642	207	nc ^b	1,329		922
1991	537	508	303	nc ^b	1,348		892
1992	1,337	1,053	445	nc ^b	2,835		1,441
1993	2,085	1,110	531	156	3,882		nc ^b

^a Aerial count unless otherwise indicated.

^b No count conducted, turbid water.

^c May include Olsen, Nikoli, Coal, Red, Straight, Bishop, Drill, and Scarp creeks.

^d Weir count.

Table 22. Preliminary chinook salmon biological escapement goals (BEG) for Northern Cook Inlet Management Area waters.

Drainage	BEG	Method of Survey
<u>Knik Arm Management Unit</u>		
Little Susitna River	850	Aerial
<u>Eastside Susitna River Management Unit</u>		
Chulitna River	2,000	Aerial
Clear Creek	1,300	Aerial
Goose Creek	350	Aerial
Little Willow Creek	650	Aerial
Montana Creek	1,100	Aerial
Prairie Creek	4,700	Aerial
Sheep Creek	650	Aerial
Willow Creek	1,750	Aerial
<u>Westside Susitna River Management Unit</u>		
Alexander Creek	2,700	Aerial
Deshka River	11,200	Aerial
Lake Creek	2,900	Aerial
Peter's Creek	1,300	Aerial
Talachulitna River	2,700	Aerial
<u>West Cook Inlet Management Unit</u>		
Chuitna River	1,400	Aerial
Lewis River	400	Aerial
Theodore River	750	Aerial

salmon anglers. The next BOF meeting concerning the Little Susitna River is scheduled for 1995.

Current Issues

There are several issues confronting the fishery resources of the Little Susitna River and the users of these resources. Issues applicable to the Little Susitna River include: (1) inclusion of the Little Susitna River as one of six rivers in the Recreational River Act, (2) extension of the South Big Lake Road to the Little Susitna River at River Mile 39.5, and (3) fee increases for the Little Susitna Public Use Facility.

A discussion of the Recreation Rivers Act is included in Section I of this report. A discussion of the South Big Lake Road extension is provided in Whitmore et al. (1993).

A proposal has been made to amend the regulations establishing user fees in the Little Susitna Public Use Facility. The proposed regulation changes are based upon suggestions developed during the course of several public meetings held during the summer and fall of 1993 and with the assistance of a citizens advisory group. The changes were proposed because of the need to recover the cost of maintaining the facility through user fees. New fees would be charged for parking, use of the dump station and commercial use of the facility. A seasonal camping pass would be added and the daily camping fee would be increased from \$6 to \$10 per day. The seasonal launch and parking pass would increase from \$50 to \$75 and the daily launch and park fee would remain unchanged at \$5. The increase will be in effect for the 1994 season.

Ongoing Research and Management Activities

The following research and management project is currently in the planning stage. During the spring of 1994 a weir will be placed in the Little Susitna River to collect biological information and count returning adult chinook salmon. A juvenile chinook salmon coded wire tagging (CWT) project will also be initiated in the spring of 1994. Tag recoveries will occur as these fish return to Cook Inlet waters and are intercepted in commercial, subsistence and recreational fisheries. The weir will be used to evaluate the return of tagged fish to the Little Susitna River. Commercial and marine recreational catch sampling will be conducted to determine the contribution of Little Susitna River fish to these fisheries. Long-term collection of these data will provide information to determine the sustainable yield of chinook salmon in the Little Susitna River and will also provide information for adjustments to the BEG. Currently, only aerial surveys are conducted annually to index numbers of spawning chinook salmon. The addition of a weir will increase understanding of the relationship between aerial surveys and total run size.

Recommended Research and Management Activities

Managers are concerned with the status of Little Susitna River chinook salmon. Turbid water conditions often preclude aerial survey enumerations, therefore, expansion of the current program is appropriate. Continuation of the chinook salmon CWT project and placement of the weir for chinook salmon enumeration will greatly enhance understanding of this system.

It is recommended that aerial surveys continue to index numbers of spawning chinook salmon. The relationship between the number of chinook documented in aerial surveys and counted through the weir will provide a means to estimate abundance if the weir program is not continued. It will also give an indication of the relationship of past aerial chinook surveys to the actual run size.

Increased enforcement is recommended to ensure compliance of daily and seasonal chinook salmon harvest limits.

Eastside Susitna Management Unit Chinook Salmon Fisheries

Background and Historical Perspective

The Eastside Susitna Management Unit includes all drainages of the Susitna River downstream of the Oshetna River to the confluence of the Chulitna River and drainages which flow into the Chulitna River from the east and those drainages which flow into the Susitna River from the east between the Talkeetna and Deshka rivers (Figure 14). The Eastside Susitna Management Unit is composed of three distinct geographical areas in which different regulatory restrictions are in effect. These areas include: (1) the eastside Susitna River tributaries between the Deshka and Talkeetna rivers, (2) the Talkeetna River, and (3) the upper Susitna area which includes the Susitna River and all tributaries upstream of the confluence with the Talkeetna River to the Oshetna River.

Many clearwater tributaries enter the Susitna River from the east between its junction with the Deshka River upstream to the Talkeetna River. This portion of the management unit is accessible by paved road. The George Parks Highway (Alaska Route 1) parallels the Susitna River on the east en route to connecting Anchorage and Fairbanks. The Alaska Railroad, to a large extent, also parallels the east side of the Susitna River. Both transportation systems provide angler access to numerous tributaries. Waters of this area within one-quarter mile of the Susitna River are open to chinook salmon fishing each Saturday, Sunday and Monday for 4 consecutive weeks beginning the second Saturday in June. Major fisheries occur in Little Willow, Caswell, Sheep, Goose and Montana creeks (Figure 15). Each of these fisheries extend from the Susitna River upstream to the George Parks Highway. Willow Creek is open to chinook salmon fishing from January 1 through the third Monday in June and then reopens on a Saturday through Monday basis for 2 consecutive weeks beginning the fourth Saturday in June. In addition, waters within a one-quarter mile radius of the Susitna River and the mouths of Sunshine and Birch Creek plus numerous small sloughs and creeks are open to chinook salmon fishing on a Saturday through Monday basis for 4 consecutive weeks starting the second Saturday in June.

The Talkeetna River joins the Susitna River about 98 miles upstream from Cook Inlet. This glacial system contains two major and numerous minor clearwater tributaries that support chinook salmon (Figure 16). Clear Creek is the most prominent chinook fishery within the Talkeetna River drainage. The Talkeetna Spur Road provides access to the Talkeetna River, however, a boat is required to reach virtually all chinook salmon fisheries within the drainage. This area is primarily accessed from the Talkeetna boat launch.

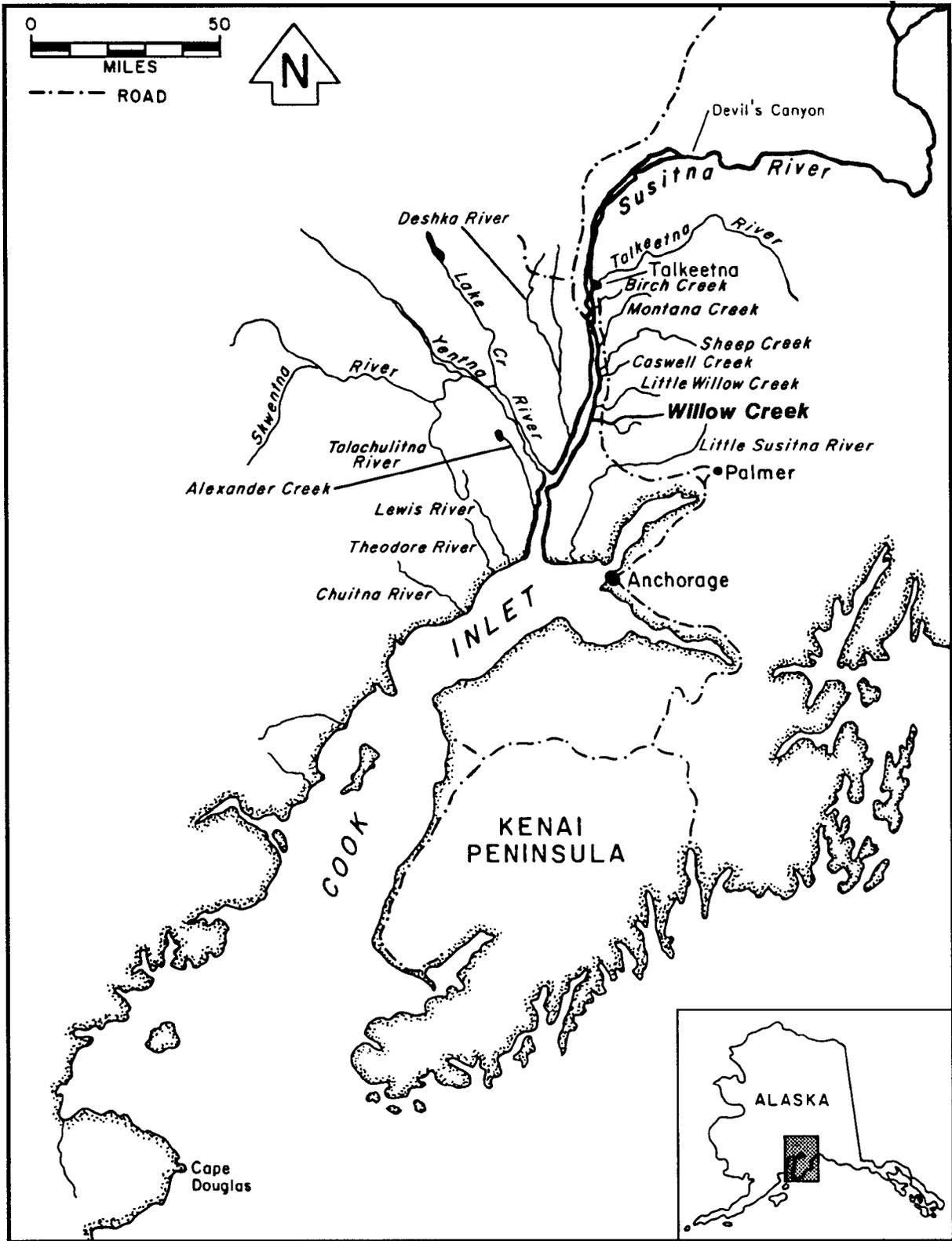


Figure 14. Map of Northern Cook Inlet area.

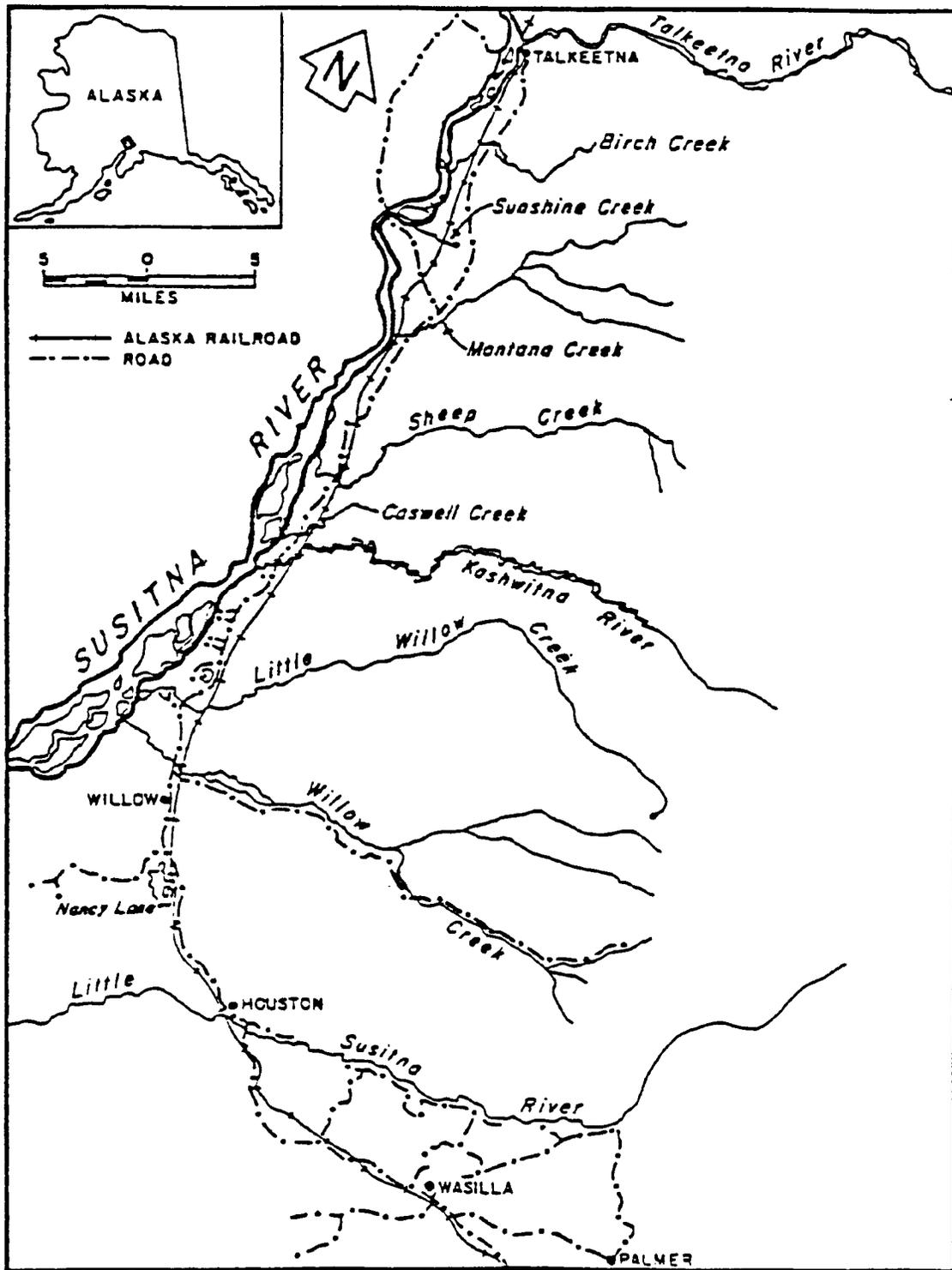


Figure 15. Map of eastside tributaries of the Susitna River.

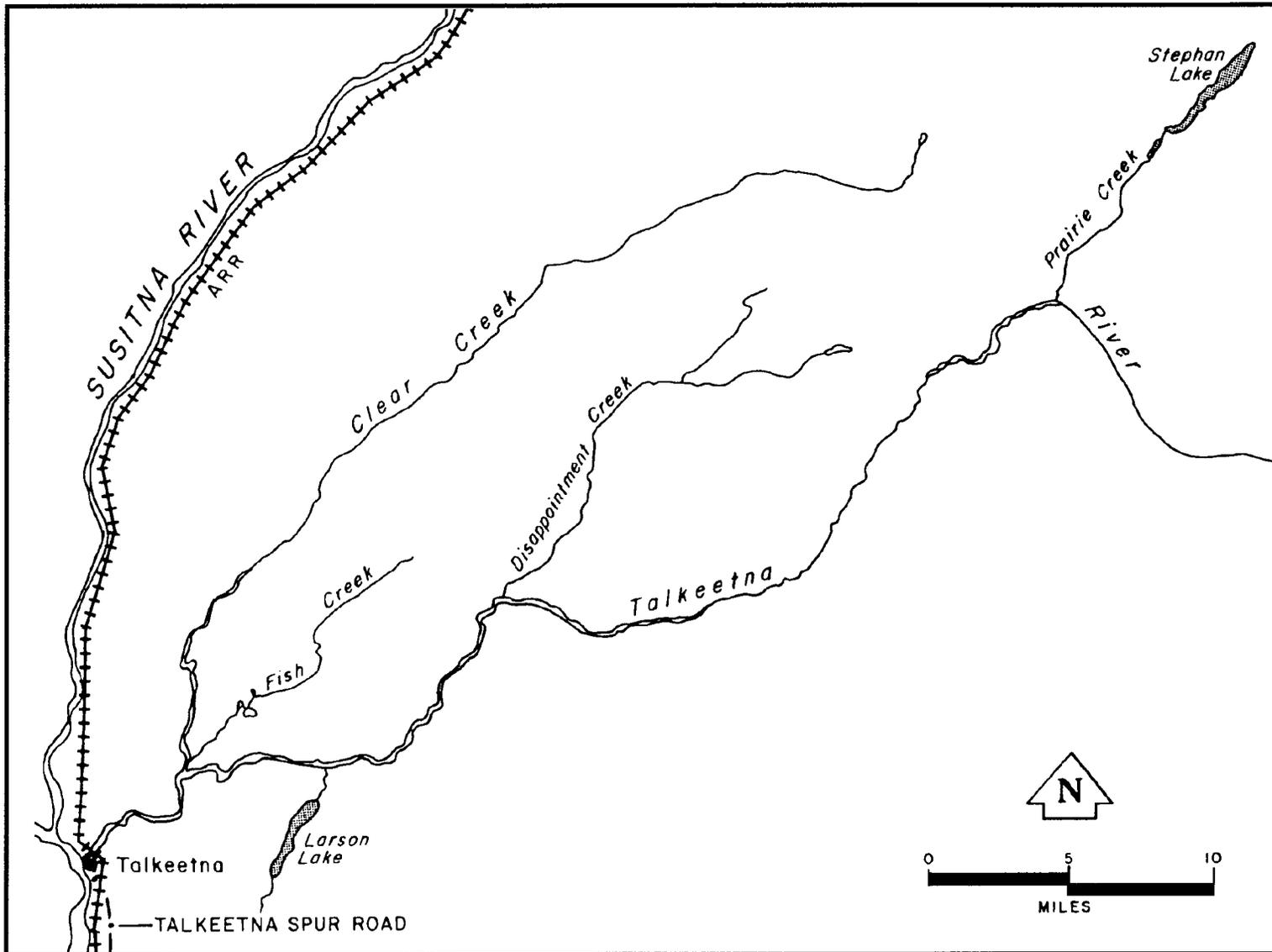


Figure 16. Map of the Talkeetna River area.

The entire Talkeetna River drainage is open to chinook salmon fishing from January 1 through July 13. The upper Susitna River Area (Talkeetna to Devil's Canyon) has a similar season. This portion of the Susitna River is, however, designated as a trophy fishery for rainbow trout, therefore only unbaited, single-hook artificial lures are permitted as terminal gear.

The mainstem of the Susitna River upstream from its junction with the Talkeetna River, the upper Susitna area, is accessible only by boat or railroad. A public boat launch adjacent to the community of Talkeetna provides access to the area. Boat travel is relatively safe from the Talkeetna River upstream to the entrance of Devil's Canyon, a distance of about 55 miles. Boat travel beyond the entrance to Devil's Canyon is extremely hazardous and few boat operators ever venture past this location. Indian River and Portage Creek are the most prominent chinook salmon fisheries within the Upper Susitna River Area. Salmon can not migrate through the turbulent waters of Devil's Canyon. The entrance to Devil's Canyon is about 150 miles upstream from Cook Inlet.

The bag and possession limits for chinook salmon in all Eastside Susitna Management Unit fisheries are 1 chinook salmon per day and 2 in possession, 16 inches or more in length. The bag and possession limit for chinook salmon under 16 inches in length is 10 per day and in possession. Regulations governing eastside Susitna River fisheries since chinook salmon fishing re-opened in 1979 are described in Appendix E.

During 1986 to 1992, the Eastside Susitna Management Unit fisheries have collectively provided 27%-47% of the chinook salmon harvest from the NCIMA (Table 20). The harvest has ranged from 8,569 to 21,307 during the period 1986-1992. An average 14% of the harvest was composed of chinook salmon less than 16 inches in length from 1986 through 1992.

Aerial survey escapement counts of Eastside Susitna Management Unit chinook salmon stocks suggest that these substocks comprise from 35% to 50% of the Susitna River chinook salmon escapement (Tables 23 and 24). Prairie Creek, a headwater tributary of the Talkeetna River, consistently receives the largest escapement which has ranged between 3,023 and 9,463 from 1986 through 1993 (Table 23).

Willow Creek, Talkeetna River and Sheep Creek traditionally produce the largest harvest of chinook salmon in the Eastside Susitna Management Unit. Between 1986 and 1992 the average annual harvest for these fisheries was 3,361, 2,057 and 1,724, respectively (Appendix A4).

Few chinook salmon arrive at the mouths of Eastside Susitna Management Unit tributaries between the Doshka and Talkeetna rivers prior to mid-June. The third and fourth "weekends" in June generally provide the majority of the harvest. Tagging studies have shown that these chinook salmon substocks are subject to harvest at stream mouths other than their natal stream (Peltz and Sweet 1992). The magnitude of nonnatal stream harvest has, however, not been defined.

Very few chinook salmon arrive at the Talkeetna River prior to June 20. The Talkeetna River harvest peaks the last few days of June and during the first

Table 23. Eastside Susitna River Management Unit chinook salmon escapement index counts, 1979-1993.

Year	Willow Creek	Deception Creek	Little Willow Creek	Sheep Creek	Goose Creek	Montana Creek	Clear Creek	Prairie Creek	Chulitna River	Portage Creek	Indian River	Kashwitna River	Other Streams ^b	Total
1979	848	239	327	778	nc ^a	1,094	864	nc ^a	nc ^a	190	285	457	nc ^a	5,082
1980 ^a														
1981	991	366	459	1,013	262	814	nc ^a	1,875	nc ^a	659	422	558	nc ^a	7,419
1982	592	229	316	527	140	887	982	3,844	863	1,111	1,053	156	268	10,986
1983	777	121	1,042	975	477	1,641	938	3,200	4,058	3,140	1,193	297	nc ^a	17,859
1984	2,789	675	nc ^a	1,028	258	2,309	1,520	9,000	4,191	2,341	1,456	111	nc ^a	25,678
1985	1,856	1,044	1,305	1,634	401	1,767	2,430	6,500	783	— ^c	— ^c	457	4,066	22,243
1986	2,059	521	2,133	1,285	nc ^a	nc ^a	nc ^a	8,500	nc ^a	nc ^a	nc ^a	700	nc ^a	15,198
1987	2,768	692	1,320	895	416	1,320	nc ^a	9,138	5,252	2,616	1,246	872	nc ^a	26,535
1988	2,496	790	1,515	1,215	1,076	2,016	4,850	9,280	nc ^a	1,402	456	1,159	nc ^a	26,255
1989	5,060	800	1,325	610	835	2,701	nc ^a	9,463	nc ^a	1,309	659	355	nc ^a	23,117
1990	2,365	700	1,115	634	552	1,576	2,380	9,113	2,681	1,886	1,473	872	nc ^a	25,347
1991	2,006	747	498	154 ^d	968	1,605	1,974	6,770	4,410	1,223	1,468	340	nc ^a	22,163
1992	1,660	983	673	nc ^a	369	1,560	1,530	4,453	2,527	1,078	479	470	nc ^a	15,782
1993	2,227	1,221	705	nc ^a	347	1,218	886	3,023	2,070	629	362	525	nc ^a	13,213

^a No counts conducted.

^b May include Honolulu, Byers, Troublesome, Bunco, Birch, Sunshine, Larson creeks.

^c Included with other streams.

^d Poor count due to timing, poor visibility or weather conditions.

Table 24. Westside Susitna River Management Unit chinook salmon escapement index counts, 1979-1993.

Year	Alexander Creek	Deshka River	Peter's Creek	Lake Creek	Talachulitna River	Cache Creek	Other Streams ^b	Total
1979	6,215	27,385	108	4,196	1,648	nc ^a	nc ^a	39,552
1980 ^a								
1981	nc ^a	nc ^a	nc ^a	nc ^a	2,025	nc ^a	nc ^a	2,025
1982	2,546	16,000	nc ^a	3,577	3,101	nc ^a	nc ^a	25,224
1983	3,755	19,237	2,272	7,075	10,014	497	nc ^a	42,850
1984	4,620	16,892	324	nc ^a	6,138	nc ^a	nc ^a	27,974
1985	6,241	18,151	2,901	5,803	5,145	206	485	38,932
1986	5,225	21,080	1,915	nc ^a	3,686	424	nc ^a	32,330
1987	2,152	15,028	1,302	4,898	nc ^a	556	nc ^a	23,936
1988	6,273	19,200	3,927	6,633	4,112	818	nc ^a	40,963
1989	3,497	nc ^a	959	nc ^a	nc ^a	362	nc ^a	4,818
1990	2,596	18,166	2,027	2,075	2,694	484	nc ^a	28,042
1991	2,727	8,112 ^c	2,458	3,011	2,457	499	161	19,425
1992	3,710	7,736	996	2,322	3,648	487	nc ^a	18,899
1993	2,763	5,769	1,668	2,869	3,269	1,690	nc ^a	18,028

^a No count conducted.

^b May include Donkey Creek and other miscellaneous creeks.

^c Low count due to timing, poor visibility or weather conditions.

week in July. The Upper Susitna River fishery has a run timing similar to that of the Talkeetna River.

Creel surveys were employed from 1979-1989 to monitor the effort for and harvest of chinook salmon at Willow Creek, Montana Creek and the Talkeetna River. Creel surveys were continued annually on Willow Creek and in 1991 and 1992 for the Talkeetna River. Creel surveys have also been intermittently conducted at Sheep, Goose, Caswell, Little Willow, Sunshine, and Birch creeks and within the upper Susitna River area. Findings from these surveys have been documented in the Department of Fish and Game's annual Federal Aid in Fish Restoration reports (Watsjold 1980, 1981; Bentz 1982, 1983; Hepler and Bentz 1984-1987, Hepler et al. 1988 and 1989, Sweet and Webster 1990, Sweet et al. 1991, Peltz and Sweet 1992 and 1993).

Willow Creek was identified in 1981 as a candidate for chinook salmon stocking in the Cook Inlet Regional Salmon Enhancement Plan. A chinook salmon smolt stocking program was initiated in 1985, and with the exception of 1987, the program was continued annually (Table 25). The goals of this program have been achieved as follows: (1) maintain the present quality and quantity of natural chinook salmon production, (2) produce through supplemental hatchery production an additional 6,000 returning chinook salmon of which 4,000 would be available for harvest at Willow Creek on an annual basis by 1994, and (3) provide 10,000 additional angler-days of chinook salmon fishing opportunity annually at Willow Creek during weekdays by 1994 (Sweet and Peltz *In prep*).

Recent Fishery Performance

In total 30,521 chinook salmon were caught in the Eastside Susitna Management Unit during 1992 of which 30% were released (Table 13). The 1992 harvest from the Eastside Susitna Management Unit was 21,307 fish (Mills 1993), the largest harvest on record, representing approximately 47% of the entire chinook salmon harvest from the NCIMA (Table 20 and Appendix A4). The harvest has ranged from 4,342 to 9,783 during the period 1985-1991. There was also a corresponding increase in angler effort in 1992 (150,000 angler-days) versus the previous 4 years (97,000-113,000 angler-days) (Table 1).

During 1992 the harvest of chinook salmon from Willow Creek, Talkeetna River, and Montana Creek was 8,884, 3,338 and 3,078 fish, respectively (Appendix A4). The harvest from these three drainages accounted for 72% of the chinook salmon harvest from the Eastside Susitna Management Unit during 1992.

A creel survey to estimate inseason harvest and effort was conducted at Willow Creek in 1993 (Sweet and Peltz *In prep*). Anglers expended 53,542 angler-hours to catch and harvest 8,998 and 5,619 chinook salmon, respectively. This harvest estimate is the second largest on record and approximately twice that of all years except 1992. The fishery at the confluence area of Willow Creek and the Susitna River resulted in 15,298 angler-days of effort which was also second largest only exceeded in 1992. During 1992 and 1993, effort increased approximately 10,000 angler days above 1988 estimates, when hatchery fish were first recorded in the harvest. Hatchery fish accounted for 46% of the harvest in 1993. The 1989-1992 hatchery contributions were 38%, 37%, 26%, and 51% respectively. Escapement index counts and weir counts in 1993 indicated a minimum of 3,449 spawners in Willow and Deception creeks combined (Table 23). Carcass surveys in the mainstem of Willow Creek and Deception Creek revealed a

Table 25. Number of chinook salmon smolt stocked into the Willow Creek drainage from 1985-1993.

Brood Year	Release Location	Total Smolt Release	Number Coded-wire Tagged	Mean Size	Release Date
1983	Deception	101,256	8,152	18.0	6/13/85
1984	Deception	214,384	11,038	13.8	6/11-12/85
	Deception	218,743	10,708	14.0	6/20/85
1985	Deception	49,668	9,933	16.7	5/01/86
	Deception	127,904	18,400	12.2	5/10/86
	Deception	147,877		11.4	5/10/86
		275,781	18,400		
1987	Deception	201,091	20,936	10.9	7/12/88
1988	Deception	240,885	19,851	13.0	5/31/89
1989	Deception	219,362	41,570	14.4	5/24/90
	Deception	219,432	40,575	13.4	5/24/90
	Deception	216,697	40,438	13.9	5/24/90
		655,491	122,583		
1990	Deception	168,777		11.2	5/21/91
	Deception	70,258	31,167	12.3	5/31/91
	Willow	73,756		12.3	5/28/91
	Willow	78,878	31,167	12.3	5/30/91
		391,669	62,334		
1991	Deception	179,724	33,464	13.5	5/29/92
	Deception	35,752		14.5	6/09/92
		215,476	33,464		
1992	Deception	160,194	39,626	14.9	6/01/93

13% and 59% hatchery contribution, respectively, to the spawning escapement. In association with this project the age, sex and size composition of the harvest was determined (Table 26). In total 419 samples were collected with males accounting for about 56% of the harvest. Approximately 16% of the harvest was composed of 1- and 2-ocean jacks, and age 5, 6, and 7 fish composed 44%, 39%, and 1% of the harvest, respectively.

No additional fishing time was allowed at Willow Creek by emergency order in 1993. In 1992, 4 additional fishing days were allowed by emergency order.

During the 1993 season, a biological survey was conducted of the Clear Creek chinook salmon fishery, the primary chinook salmon sport fishing stream in the Talkeetna River drainage. This survey occurred in conjunction with the peak of the fishery for a 9-day period during the last week of June and first week of July. Age, sex, and size data were collected from the chinook salmon harvest. In total, 162 samples were collected and males accounted for approximately 48% of the sample. Age 5 and 6 fish accounted for 15% and 78% of the catch, respectively (Table 26).

The 1993 escapement indices for Eastside Susitna Management Unit chinook salmon were approximately 41% below the previous 10-year (1983-1992) average (Table 23). Excluding Willow, Deception and Little Willow creeks, all eastside Susitna River escapement indices were below the previous 2 years. The largest decreases in 1993 were seen in Prairie Creek and Clear Creek, both Talkeetna River tributaries (Table 23). No estimates were obtained for Sheep Creek chinook salmon during 1993 due to turbid water conditions.

Management Objectives

Preliminary biological escapement goals for eight Eastside Susitna Management Unit systems have been established (Table 22). These escapement goals were based on historic escapement index counts. The management objective for these eight systems is to obtain the escapement goal within each system. In the weekend only fisheries, those which cross the George Parks Highway, management strategies provide maximum levels of sustained chinook salmon fishing opportunity while attaining escapement objectives. Management objectives specific to Willow Creek relative to the chinook salmon enhancement program are to increase participation by 10,000 angler-days of participation and provide opportunity to harvest an additional 4,000 chinook salmon.

In the upper Susitna River, area management strategies are in place to allow for sustained yield of trophy sized rainbow trout. Full utilization of chinook salmon within this area is not a primary objective.

The management objective for the Talkeetna River drainage is to achieve preliminary biological escapement goals within Prairie and Clear creeks.

Recent Board of Fisheries Action

During the November 1992 BOF meeting no actions other than those which affect all areawide fisheries were taken regarding Eastside Susitna Management Unit chinook salmon fisheries.

Table 26. Sex and age composition and length-at-age of chinook salmon sampled from Willow Creek, Clear Creek, Deshka River, Alexander Creek and Lake Creek sport harvests, 1993.

	Willow Creek				Clear Creek				Deshka River				Alexander Creek				Lake Creek			
	1.2	1.3	1.4	1.5	1.2	1.3	1.4	2.4	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5
<u>Male</u>																				
Percent	15.8	23.0	17.2	0.2	5.6	11.7	30.2	0.6	21.1	19.1	12.5	0.7	25.1	17.0	12.9	0.6	3.6	7.8	26.9	2.4
SE	1.7	2.1	1.9	0.1	1.8	2.5	3.6	0.6	3.3	3.2	2.7	0.7	3.3	2.9	2.6	0.6	1.4	2.1	3.4	1.2
Mean Length (mm)	611	798	966	1,170	649	773	950	850	577	762	880	940	584	764	904	910	614	779	960	1,019
SE	5.3	5.7	9.7		11.9	12.5	9.8		9.2	10.4	13.4		8.0	12.2	17.0		19.7	16.3	10.7	35.5
Sample Size	76	100	70	1	9	19	49	1	32	29	19	1	43	29	22	1	6	13	45	4
<u>Female</u>																				
Percent	0.7	20.1	22.2	0.5	0	3.7	48.1	0	0	27.0	19.7	0	0	21.6	22.8	0	0	5.4	51.5	2.4
SE	0.5	2.0	2.1	0.3		1.5	3.9			3.6	3.2			3.2	3.2			1.8	3.9	1.2
Mean Length (mm)	595	811	925	975		803	918			766	850			764	861			820	922	973
SE	5.0	4.8	7.5	45.0		20.7	5.1			8.9	11.5			8.3	7.5			12.3	4.9	22.0
Sample Size	2	87	81	2		6	78			41	30			37	39			9	86	4
<u>Combined</u>																				
Percent	16.4	43.5	39.5	0.6	5.6	15.4	78.4	0.6	21.1	46.1	32.2	0.7	25.1	38.6	35.7	0.6	3.6	13.2	78.4	4.8
SE	1.8	2.4	2.4	0.3	1.8	2.9	3.2	0.6	3.3	4.1	3.8	0.7	3.3	3.7	3.7	0.6	1.4	2.6	3.2	1.7
Mean Length (mm)	611	804	944	1,040	649	780	930	850	577	764	861	940	584	764	877	910	614	796	935	996
SE	5.2	3.8	6.2	70.0	11.1	10.9	5.1		9.2	6.7	9.0		8.0	7.0	8.1		19.7	11.5	5.1	21.2
Sample Size	78	187	151	3	9	25	127	1	32	70	49	1	43	66	61	1	6	22	131	8
Total Percent Male (SE)	56.1 (2.5)				48.1 (3.9)				53.3 (4.1)				55.6 (3.8)				40.7 (3.8)			
Total Percent Female (SE)	43.9 (2.5)				51.9 (3.9)				46.7 (4.1)				44.4 (3.8)				59.3 (3.8)			
Total Sample Size	419				162				152				171				167			

Area regulation changes implemented in November of 1992 which were addressed in the overview include: (1) the seasonal 5 king salmon limit for all waters of Cook Inlet, (2) the prohibition of sport fishing guides from participating or engaging in fishing during the king salmon season while clients are present or within the guide's control, and (3) legislative action which prohibits anglers from fishing for king salmon without a king salmon stamp.

The next BOF meeting to include Eastside Susitna Management Unit chinook will take place in 1995.

Current Issues

Primary social issues in the Eastside Susitna Management Unit chinook salmon fisheries are associated with crowding, regulation violations, the Recreation Rivers Act, and the Willow Creek State Recreational Area (WCSRA) Master Plan. The WCSRA was established in 1987 following several years of cooperative effort between the State of Alaska and the Matanuska-Susitna Borough. The recreation area encompasses 3,583 acres, with 2,748 owned by the borough and the remainder under state ownership. The Department of Natural Resources, Division of Parks and Outdoor recreation is the agency responsible for management of this recreation area.

Ongoing Research and Management Activities

Research and management activities are currently being directed at development of a responsible chinook salmon stocking program at Willow Creek. Inseason assessment of the biological characteristics of the harvest and hatchery contribution to the harvest and escapement are important components of this investigation. Annual assessment of escapement is an ongoing activity associated with the Eastside Susitna Management Unit fisheries. Results from escapement indices in conjunction with harvest data from the SWHS are the primary elements used to manage these fisheries.

The Division of Sport Fish is involved with the development of recreation support facilities at the mouth of Willow Creek. Federal Aid In Fish Restoration funds have been used to improve trails, parking and camping facilities at the mouths of Willow and Sheep creeks. Additionally, a draft environmental assessment is in process for a new double lane boat launch facility with parking for 96 vehicles and 50 boat trailers adjacent to the current Talkeetna boat launch.

With the implementation of the 5 chinook salmon seasonal bag limit and chinook salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. During the 1993 season, department personnel actively inspected anglers' fishing licenses for compliance with the newly instituted regulations.

Recommended Research and Management Activities

Continuation of the ongoing research and management programs is recommended.

Biological escapement goals for chinook salmon were not achieved for Clear Creek during 1993 or for Prairie Creek in 1992 or 1993. If escapement goals

are not achieved in these two creeks in 1994 and 1995 it is recommended that action be taken to reduce the recreational harvest in these systems.

Enforcement activities should continue to insure compliance with existing regulations.

Westside Susitna Management Unit Chinook Salmon Fisheries

Background and Historical Perspective

Tributaries that drain into the Susitna River from the west support the largest chinook salmon fisheries within the NCIMA (Figure 14). Access to the relatively remote fisheries in this area is primarily by boat or aircraft. Susitna Landing, located at the mouth of the Kashwitna River, and Deshka Landing, located about 4 miles upstream from the Deshka River, are the principal boat access sites on the Susitna River. A few anglers also gain access to Westside Susitna Management Unit fisheries by traversing Cook Inlet from the Port of Anchorage. The Petersville Road provides the only vehicular access to this portion of the Susitna River drainage. This road allows access to the upper reaches of the Deshka River and Peters Creek.

The Yentna River is the largest tributary of the Susitna River in this management unit. This glacial river joins the Susitna River about 30 miles (River Mile 30) upstream from Cook Inlet.

The westside Susitna River chinook salmon fisheries supported the greatest harvest of chinook salmon within the NCIMA until the 1992 season when the eastside Susitna River harvest surpassed it (Table 20). This eastside increase was primarily a result of the Willow Creek enhancement program. Harvest and participation in the westside Susitna River fisheries has steadily increased since 1979 (Table 20 and Appendix A5). The harvest of chinook salmon in westside Susitna River fisheries has ranged from 13,350 to 21,836 and averaged 17,186 during the period 1986-1992 (Table 20). Approximately 13% of this harvest has been made up of chinook salmon less than 16 inches in length. Westside Susitna River tributaries averaged 58% of the annual chinook salmon harvest from the NCIMA during 1986-1992 (Table 20).

The Deshka River, Alexander Creek and Lake Creek support the largest chinook salmon fisheries in this management unit. The collective harvest from these three fisheries represents 87% of the annual chinook salmon harvest from the Westside Susitna Management Unit fisheries (Appendix A5). The Deshka River consistently provides the largest chinook salmon harvest within the NCIMA. During the period 1986-1992, the annual Deshka River harvest has ranged from 5,474 to 9,306 and averaged 6,911 chinook salmon.

The peak harvest at the mouth of Alexander Creek (River Mile 10) normally occurs during the first week in June. The harvest at the mouth of the Deshka River (River Mile 40) peaks during mid-June whereas at Lake Creek (River Mile 64) the peak harvest usually takes place during the third week in June.

Harvest levels at major westside Susitna River fisheries have increased substantially since 1979. Improved access (as described in Whitmore et al. 1993) has undoubtedly increased both participation and harvest. However, it

is important to recognize that liberalized regulations through 1986, when the chinook salmon bag limit in this area was increased to 2 daily over 16 inches in length and 4 in possession, have also contributed to expanded use of the area's chinook salmon resources. Regulations governing westside Susitna River fisheries since chinook salmon fishing reopened in 1979 are described in Appendix E.

The chinook salmon fishing season at all westside Susitna River fisheries extends from January 1 through July 13. Bag and possession limits through the 1992 season were 2 chinook salmon (16 inches or more in length) per day and 4 in possession of which only 1 daily and 2 in possession could be over 28 inches in length. In 1993 the bag and possession limits (chinook 16 inches or more in length) were reduced to 1 per day and 2 in possession. With the exception of the Deshka and Chulitna rivers, all westside Susitna River tributaries are open to chinook salmon fishing in their entirety. The Deshka River drainage is closed to chinook salmon fishing upstream from the Moose/Kroto Creek fork and the Chulitna River is closed with the exception of the East Fork drainage which is within the Eastside Susitna Management Unit. Unbaited, single-hook artificial lures are mandatory within the Talachulitna River and in a large portion of the Lake Creek drainage. Unbaited, single-hook artificial lures are also required in the Deshka River upstream from the Moose/Kroto Creek fork.

The Deshka River, Alexander Creek, Lake Creek and the Talachulitna River are included in the Recreation River Act.

Commercial services play an important support role at some Westside Susitna Management Unit fisheries. Creel surveys in 1989, for example, revealed that 64% of the chinook salmon fishing effort at Lake Creek was supported by some form of commercial service, e.g. fishing guides, lodges, air charter, etc. (Engel and Vincent-Lang 1992). In contrast, commercial services were used by only 14% and 6% of the participants, respectively, at Alexander Creek and the Deshka River.

Aerial surveys during the 1990 chinook fishery revealed very light fishing pressure scattered throughout the vast reaches of the Yentna River drainage (Sweet et al. 1991). The distribution and magnitude of this effort did not suggest that any surveyed water was in danger of overharvest because of heavy fishing pressure.

Although chinook salmon spawning abundance in westside Susitna River tributaries has been below record high levels during the late 1980s, abundance levels during recent years have been above the long-term average with the exception of the Deshka River (Table 24). Chinook salmon escapements to the Deshka River have shown a trend of declining abundance beginning in 1991. The average recreational harvest of chinook salmon in the Deshka River during 1990 through 1992 was 42% greater than the average harvest during the previous 10 years (Appendix A5). The preliminary escapement goal for the Deshka River is 11,200 fish which has not been achieved during the last three seasons (Tables 22 and 24).

Recent Fishery Performance

The 1992 Westside Susitna Management Unit chinook salmon fishery resulted in a harvest of 18,737 chinook salmon, a decrease from 1991 but 9% above the 1986-1992 average (Table 20) (Mills 1992). The harvest of chinook salmon during the 1992 season from Alexander Creek, Lake Creek and Deshka River accounted for 80% of the harvest within the Westside Susitna Management Unit (Appendix A5).

During the 1992 season a creel survey to collect biological samples from the harvest was conducted at the confluences of Alexander Creek and the Deshka River with the Susitna River, and the confluence of Lake Creek with the Yentna River. These surveys were designed to bracket the peak of each of these fisheries for a 9-day time period. Age, sex and size samples were collected from the chinook salmon harvest (Table 26). Male chinook salmon accounted for 41%-56% of the harvest and age 5 and 6 chinook salmon dominated the harvest at all sites.

Aerial survey evaluation of chinook salmon escapements during 1991 and 1992 show an approximately 50% reduction in the average escapement when compared to the 4 most recent years (1983, 1985, 1988 and 1990) in which surveys were completed in all index streams (Table 24).

Concern for the Susitna River chinook salmon grew during 1992 when harvest rates of commercial and sport fisheries that intercept these stocks reflected that fish abundance was less than desired. An emergency order effective June 22, 1992, reduced the daily bag and possession limit for chinook salmon 16 inches or more in length to 1 fish in all waters of the Susitna and Little Susitna River drainages. It also required the release of all chinook salmon 16 inches or more in length, and the use of unbaited, artificial lures in all waters of the Deshka River drainage between the Deshka River's confluence with Trapper Creek and the confluence of Moose and Kroto creeks (the Forks); and in all waters of the Alexander Creek drainage upstream from Alexander Creek's confluence with Trail Creek (Appendix D).

Aerial survey evaluation of streams in the Westside Susitna Management Unit during 1993 resulted in a third consecutive year of reduced chinook salmon abundance. The majority of this decrease can be accounted for by the low Deshka River spawning escapement. This decrease in escapement has not been accompanied by a decrease in harvest for these fisheries. Chinook salmon harvests from the Westside Susitna Management Unit since 1989 have all been above the 1986-1992 average of 17,186 (Table 20). It is anticipated that the reduced bag and possession limit and the prohibition of guides fishing while guiding during the 1993 season have resulted in a reduced harvest.

Management Objectives

Preliminary biological escapement goals for five Westside Susitna Management Unit systems have been established (Table 22). These escapement goals were based on historic escapement index counts. The management objective for these five systems is to obtain the escapement goals while providing maximum levels of sustained chinook salmon fishing opportunity. In the Talachulitna River, only single-hook artificial lures may be used to allow for the sustained

yields of trophy sized rainbow trout. Full utilization of chinook salmon within this drainage is not a primary objective.

Recent Board of Fisheries Actions

In addition to those area regulations addressed in the overview, the bag and possession limits for chinook salmon over 16 inches in length were reduced to 1 daily and 2 in possession during the November 1992 BOF meeting. Area regulation changes implemented in November of 1992 addressed in the overview include: (1) the seasonal 5 king salmon limit for all waters of Cook Inlet, (2) the prohibition of sport fishing guides from participating or engaging in fishing during the king salmon season while clients are present or within the guide's control, and (3) legislative action which prohibits anglers from fishing for king salmon without a king salmon stamp.

The next BOF meeting concerning westside Susitna River fisheries will take place in 1995.

Current Issues

Managers are concerned about increasing harvests and declining spawning escapements in the Deshka River and Alexander and Lake creeks over the past decade. To address this concern the Board of Fisheries, during the 1992 BOF meeting, reduced the bag and possession limit for chinook salmon in westside Susitna River drainage streams and prohibited guides from fishing while with clients. Despite this conservation measure, the Deshka River spawning escapement index count decreased again in 1993. This has prompted managers to initiate by emergency order regulatory action which will prohibit the use of bait and reduce the possession limit to 1 fish.

As previously noted, the Deshka River, Alexander Creek, Lake Creek and the Talachulitna River have been classified by the Alaska Legislature as recreation rivers. Motorized/nonmotorized restrictions and commercial use permits are the most controversial issues associated with this planning process.

Improved or expanded access to the western drainages of the Susitna River is yet another issue confronting the fisheries and fishery users of this area. Numerous recreational support industries that service the area as well as residents of the area favor retention of the region's wilderness (roadless) features. Many other interests support an expanded road system within the area which would promote development of mineral, forest, agriculture and recreation resources as well as enhance private settlement of the area. The issue of transportation corridors is addressed in Whitmore et al. (1993).

Ongoing Research and Management Activities

Escapement index counts by aerial survey have been performed annually on major westside Susitna River chinook salmon populations since the mid 1970s. Harvest trends for most Westside Susitna Management Unit stocks have also been assessed by the SWHS since chinook salmon fishing reopened in 1979. SWHS estimates of harvest and participation generally agree with inseason creel harvest estimates. Inseason surveys have also documented age, length, and sex features of major chinook salmon stocks.

With the implementation of the 5 chinook salmon seasonal bag limit and chinook salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. During the 1993 season department personnel actively inspected angler's fishing licenses and harvest records for compliance with the newly instituted regulations.

Recommended Research and Management Activities

To increase spawning escapement in the Deshka River, managers are recommending that the harvest of Deshka River chinook salmon be reduced by half. After considering a range of options, managers selected to issue an emergency order prior to the 1994 season which will: (1) prohibit the use of bait throughout the Deshka River drainage, and (2) reduce the possession limit for chinook salmon greater than 16 inches in length to 1 fish. In combination with current regulations, managers believe these actions should be sufficient to assure the escapement goal in the Deshka River is achieved.

However, additional measures may be enacted inseason depending upon harvest levels in the Northern District directed commercial chinook salmon fishery. Data show that if over 4,000 chinook salmon are harvested by the end of the second commercial fishing period, the escapement goal in the Deshka River is likely to be achieved, regardless of recreational fishing effort. However, if less than 3,000 chinook salmon are harvested, the data indicate that the escapement goal will not be achieved, even if the recreational fishery is restricted through the proposed actions.

Based on this, the preseason emergency order will be rescinded (i.e., bait will be allowed and the possession limit will be re-established at 2 chinook salmon) if the Northern District commercial harvest through the second period is greater than 4,000 chinook salmon. Conversely, if less than 3,000 chinook salmon are harvested through the second commercial fishing period, the Deshka River will be closed to fishing for chinook salmon for the remainder of the season and the remaining periods of the commercial fishery will be closed. Some latitude will be taken in evaluating the commercial harvest to account for differences between years, in the number of nets being fished, or adverse weather conditions.

Chinook salmon escapement monitoring similar to past levels of assessment should be continued. Harvest trends should likewise be evaluated annually through the SWHS. Inseason creel surveys to obtain biological information at Alexander Creek, Deshka River and Lake Creek during the peak of the chinook salmon fishery were conducted in 1993 and should be continued in the future. Age, sex and size information from these fisheries are necessary for development of brood tables with the goal of refining BEG's and developing forecast techniques for these stocks.

The distribution of chinook salmon fishing effort within the Yentna River drainage was estimated only during 1990. To detect any trends in fishing pressure brought about by the increasing mobility of anglers this survey should again be conducted by 1995.

Enforcement activities by department staff should continue in support of Fish and Wildlife Protection to insure compliance with existing regulations.

West Cook Inlet Management Unit Chinook Salmon Fisheries

Fishery Description and Historical Perspective

The West Cook Inlet Management Unit extends south from the mouth of the Susitna River to the west Foreland of Cook Inlet (Figure 17). Streams of this area, with the exception of the Chakachatna-McArthur and the Beluga River drainages, are relatively small clearwater coastal drainages that originate in the Alaska Range or from slopes of Mount Susitna. The Chakachatna-McArthur and Beluga River drainages are largely glacial and receive minor use by chinook salmon fishermen. Access to the coastal fisheries within the West Cook Inlet Management Unit is by air or water because there is no road link to the southcentral Alaskan highway system. A road network, built to facilitate oil and gas exploration and the timber industry does exist in the Tyonek/Beluga area. Several gravel aircraft landing strips are present and a few roads also serve as runways. The village of Tyonek, with a population of nearly 300 people, is the area's primary population center.

From 1985 through 1991 participation in these fisheries reached all-time record levels (Table 5). During the 1991 and 1992 seasons participation in these fisheries dropped in response to reduced bag and possession limits and reduced season length. Access to this area is by helicopter in the upper reaches of these streams and by airplane and vehicle to the lower reaches. Since these fisheries are in close proximity by air to Kenai, restrictions to the Kenai River chinook salmon fishery have resulted in Kenai-based air taxi operators transporting anglers to this management unit. It is anticipated that the participation level during 1993 was greater than 1991 and 1992 seasons.

The Theodore, Chuitna and Lewis rivers are the area's most prominent chinook salmon fisheries. The collective annual harvest of chinook salmon from these three streams from 1986 through 1992 has ranged from 762 to 2,378 fish and averaged 1,707 fish (Appendix A6). Approximately 11% of this harvest was made up of chinook salmon less than 16 inches in length (Table 20).

In recent years, observed spawning escapements in West Cook Inlet Management Unit streams have declined (Table 21). Observed escapements from 1989 through 1992 averaged 2,000 fish, less than half the average observed spawning escapement from 1981 through 1988. The reduced abundance of spawning chinook salmon in the West Cook Inlet Management Unit can not be attributed solely to elevated participation and harvest in streams. Weak returns were also caused by flood-related mortality of eggs and juveniles that occurred in 1986. Inspection of the coastal streams after the October 1986 flood revealed substantial streambed scouring and rechannelization. In association with the flooding were severe erosion, landslides and subsequent deposition of earth and debris into the streams.

The bag and possession limits for chinook salmon 16 inches and greater during the 1993 season were 1 per day and 1 in possession. The 1993 season ran from January 1 through June 30. Chinook salmon begin to arrive in the area during late May with the peak of most fisheries occurring during mid to late June. The stock is also harvested in the Northern District set gill net fishery and the Tyonek subsistence fishery. Commercial fishing is permitted within 500 yards of the mouths of several streams.

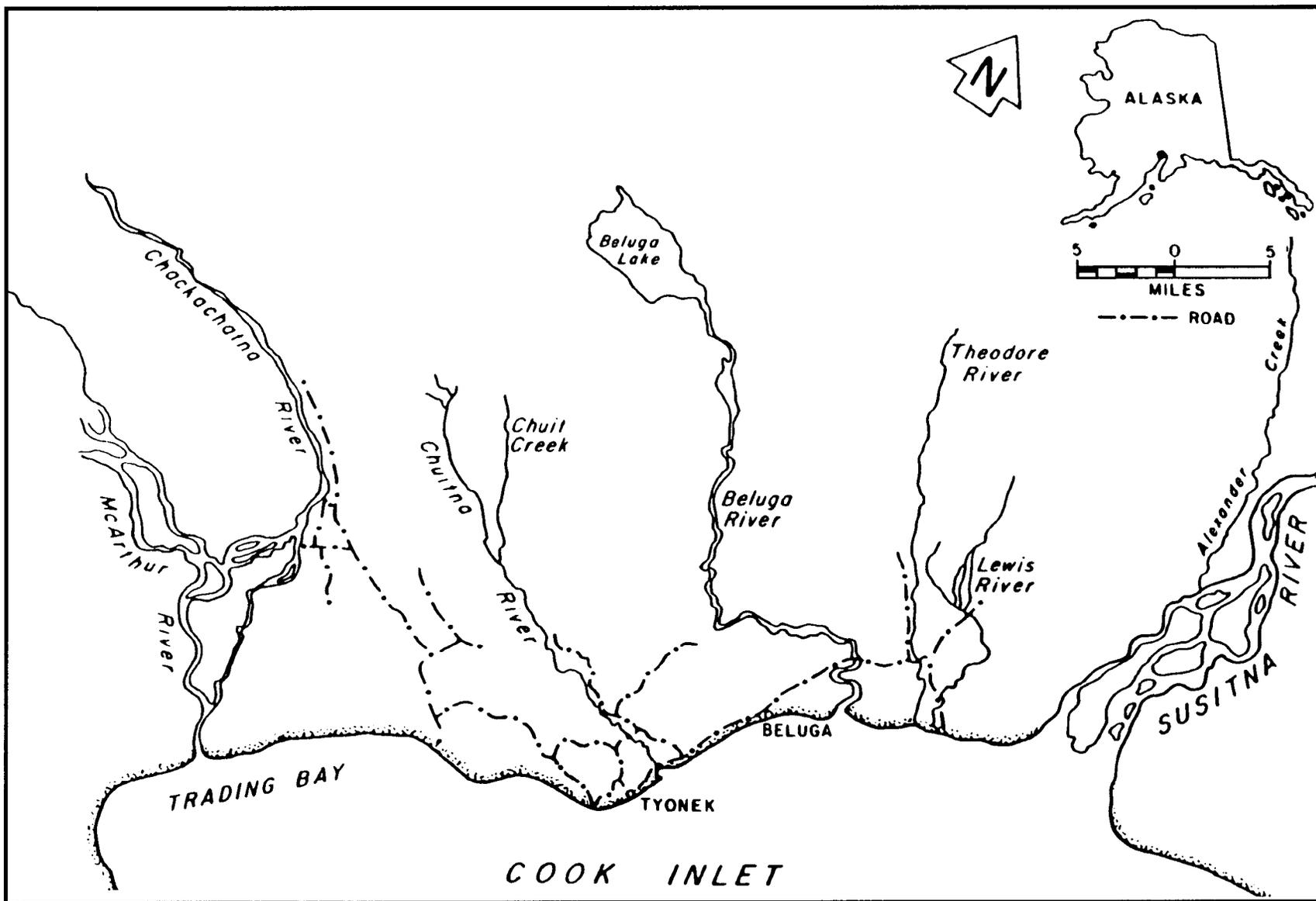


Figure 17. Map of West Cook Inlet coastal streams.

Recent Fishery Performance

Concern for Western Cook Inlet Management Unit chinook salmon stocks escalated during 1991 and 1992. Low catch rates in the commercial, subsistence, and recreational fisheries coupled with low observed spawning escapements warranted restriction, by emergency order, of select recreational fisheries (Appendix D).

Emergency order action taken during the 1991 season resulted in a harvest of 762 chinook salmon from the Chuitna, Lewis and Theodore rivers which was about 49% of the 1984-1990 average harvest (Appendix A6). Even with these regulatory restrictions and subsequently reduced harvest levels, escapement abundances were similar to the depressed 1990 return and only a third of the 1985-1989 average (Table 21).

To provide for increased chinook salmon spawning escapement, an emergency order was issued prior to the 1992 season (Appendix D). This action resulted in a spawning escapement of 2,835 chinook salmon, about double the 1990 and 1991 escapement levels, and approximately 70% of the 1985-1989 average. The chinook salmon harvest during 1992 was 1,213.

Prior to the 1993 season, daily bag and possession limits were set at 1 fish, the season was shortened by 13 days and upstream portions of the Chuitna, Theodore and Lewis rivers were designated unbaited artificial lure areas with no retention of chinook salmon. The escapement counts for the Chuitna, Theodore and Lewis rivers increased in 1993, combining for a total of 3,726 fish, 92% of the 1985-1989 average. Most of this increase is a result of the Chuitna River escapement. In conjunction with these restrictions, chinook salmon production appears to be recovering from the effects of the 1986 flooding.

Management Objectives

Preliminary biological escapement goals for three West Cook Inlet Management Unit streams have been established (Table 22). These escapement goals were based on historic escapement index counts. The management objective for these three streams is to obtain the escapement goal while providing maximum levels of sustained chinook salmon fishing opportunity.

Recent Board of Fisheries Actions

Board of Fisheries action taken in November of 1992 and recent legislative actions that apply to all waters of the NCIMA including West Cook Inlet chinook salmon fisheries, as described in the overview section, include: (1) the 5 chinook salmon seasonal limit, (2) prohibition of an individual or company engaged in freshwater sport fish guiding to participate or engage in sport fishing while clients are present or within their control, and (3) the requirement of a king salmon stamp to participate in the fishery.

Additional regulations specific to this area adopted by the BOF in November of 1992 include: (1) reduction in length of the chinook salmon season by 13 days to end on June 30; (2) in areas open to the retention of chinook salmon, reduction in the bag and possession limit to 1 daily 16 inches or more in length; and (3) the requirement that in specific areas only unbaited,

artificial lures may be used and king salmon 16 inches or more in length may not be possessed or retained; all chinook salmon caught must immediately be released. Specific areas where chinook salmon may not be retained include: (1) Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing, (2) Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high-voltage power lines; and (3) Lewis River Drainage: upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

The next BOF meeting concerning the West Cook Inlet Management Unit fisheries will be in 1995.

Current Issues

Declining chinook salmon spawning abundance has become a major concern facing these fisheries during the past 3 years. Managers believe these reduced abundances are primarily related to flood events during the 1980s. However, some fishermen, particularly those that reside within the Tyonek/Beluga area, believe that increased use of the area by helicopter fishermen is at least partially responsible for declining spawning abundance.

Ongoing Research and Management Activities

Research and management activities directed at these fisheries have consisted of periodic onsite creel observation, annual assessment of chinook salmon escapement by helicopter, and estimation of annual harvest by the SWHS.

During 1993 a study was undertaken on the Theodore River to determine the feasibility of tagging juvenile chinook salmon with coded wire tags for recovery in commercial, subsistence and recreational fisheries of Cook Inlet. Investigations during 4 days each in July, August and September revealed that it will be difficult to capture the required numbers of juveniles for tagging to achieve program goals. Therefore, investigations were moved to the Little Susitna River to determine if it would be a better site for the program.

With the implementation of the 5 chinook salmon seasonal bag limit and chinook salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. During the 1993 season department personnel actively inspected angler's fishing licenses and harvest records for compliance with the newly instituted regulations.

Recommended Research and Management Activities

Chinook salmon monitoring similar to past levels of assessment should be continued. Harvest trends should likewise be evaluated annually through the SWHS.

Enforcement activities should be continued to insure compliance with existing regulations.

Coho Salmon Fisheries

Recreational harvests of coho salmon in the NCIMA have ranged from 15,825 to 77,644 fish during 1977 through 1992, and averaged 42,808 fish during this time period (Mills 1979-1993) (Table 27). These harvests have accounted for 27% of the coho salmon harvests in the region and 19% of the statewide harvests during these years. Within the NCIMA the Knik Management Unit accounts for the largest harvest of coho salmon. The Eastside Susitna Unit is second followed closely by the Westside Susitna Unit. West Cook Inlet Management Unit, with fewer accessible streams, is a distant fourth in average harvest. Harvests of coho salmon in the Knik Management Unit are dominated by harvests from the Little Susitna River while harvests from other management units have been spread across several systems (Appendices A7-A11).

In addition to recreational harvests, NCIMA area coho salmon stocks contribute to Cook Inlet commercial harvests. Commercial harvests of coho salmon in Upper Cook Inlet commercial fishing districts averaged 447,592 fish during 1977 to 1993 (Appendix B2). The Central District drift gill net fishery accounted for approximately one-half of the average harvest (Appendix B3). Significant harvests of NCIMA bound coho salmon are harvested in the western subdistrict of the Central District and in the general and eastern districts of the Northern District (Appendices B4-B7 and B9). The remaining commercial harvests of coho salmon are from several smaller subdistricts within the Central District (Ruesch and Fox 1993).

Management strategies for NCIMA coho salmon begin to develop as the stocks enter Cook Inlet and are intercepted by the commercial fishery. The magnitude, catch per unit effort, and distribution of the commercial harvest often become the first indicators of general run strength. As coho salmon enter fresh water, the department currently has very limited abilities to gauge overall run size. Fish wheels and sonar at the Yentna River and counting weirs at the Little Susitna River, Fish Creek, and Jim Creek provide the only quantitative measure of coho abundance in the many drainages of Northern Cook Inlet. Foot and aerial counts also provide an understanding of relative abundance for a few select systems.

A creel survey to estimate coho salmon harvest and fishing effort has been conducted at the Little Susitna River since 1982. Intermittent or partial creel survey data have also been collected from additional fisheries.

Knik Arm Management Unit: Little Susitna River Coho Salmon Fishery

Background and Historical Perspective

The harvest of Little Susitna coho salmon has ranged from 3,415 to 20,033 during 1977 to 1992 (Table 28) (Mills 1993). This level of harvest has consistently been second only to the Kenai River as the largest freshwater harvest in Alaska (Mills 1979-1993).

Evaluation of coho salmon escapements to the Little Susitna River were measured by weir in 1986 and from 1988 through 1993. Escapement from 1988 through 1993 averaged approximately 24,000 coho salmon (Table 29). Prior to

Table 27. Northern Cook Inlet Management Area recreational harvest of coho salmon by management unit, 1977-1992.

Year	Northern Cook Inlet Management Area					Region II		Statewide	
	Knik Arm Unit	Eastside Susitna Unit	Westside Susitna Unit	West Cook Inlet Unit	Total	Number	% of NCIMA	Number	% of NCIMA
1977	4,366	5,709	6,599	532	17,206	67,866	25.3	105,004	16.4
1978	7,895	8,573	10,223	378	27,069	81,990	33.0	131,945	20.5
1979	7,139	7,564	9,086	337	24,126	93,234	25.9	119,329	20.2
1980	16,030	10,368	12,356	628	39,382	127,958	30.8	164,302	24.0
1981	10,484	6,593	6,313	604	23,994	95,376	25.2	125,666	19.1
1982	13,676	10,167	12,871	335	37,049	136,153	27.2	195,644	18.9
1983	6,139	5,176	3,946	564	15,825	87,935	18.0	149,270	10.6
1984	23,429	13,916	9,486	1,035	47,866	166,688	28.7	238,536	20.1
1985	14,339	7,042	11,394	1,431	34,188	137,671	24.8	200,773	17.0
1986	12,361	16,190	13,776	983	43,310	188,872	22.9	255,887	16.9
1987	25,787	11,028	8,728	2,825	48,368	176,710	27.4	235,435	20.5
1988	40,037	19,518	16,337	1,182	77,074	225,812	34.1	281,450	27.4
1989	23,846	17,078	18,514	2,270	61,708	237,155	26.0	338,195	18.2
1990	18,762	11,743	13,971	1,344	45,820	214,114	21.4	325,936	14.1
1991	22,186	19,479	20,145	2,485	64,295	254,961	25.2	389,569	16.5
1992	25,814	33,790	15,829	2,211	77,644	237,204	32.7	345,513	22.5
Mean	17,018	12,746	11,848	1,197	42,808	158,106	27.1	225,153	19.0
Mean % of NCIMA	39.7	29.8	27.7	2.8	100				

Table 28. Harvest and effort for Little Susitna River coho salmon, 1977-1992.

Year	Harvest	Annual Effort in Angler-days ^a
1977	3,415	11,063
1978	4,865	12,127
1979	3,382	21,301
1980	6,302	22,420
1981	5,940	26,162
1982	7,116	24,020
1983	2,835	35,477
1984	14,253	48,517
1985	7,764	37,498
1986	6,039	45,776
1987	13,003	35,659
1988	19,009	49,731
1989	14,129	54,708
1990	7,497	40,159
1991	16,450	50,838
1992	20,033	49,304
Mean	9,502	35,562

^a Participation directed at coho salmon represents only a portion of the annual effort.

Table 29. Knik Arm drainage coho salmon escapement index counts, 1981-1993.

Drainage ^a	Little Susitna River ^b			Fish Creek ^c	Cotton-wood Ck.	Wasilla Creek Drainage			Mataruska River	Knik River Drainage			Grand Total
	Hatchery	Nonhatchery	Total			Wasilla Creek	Spring Ck. (Wasilla)	Spring Ck. (Flats)		Yellow Creek	McRoberts Creek	Upper Jim Creek	
1981			6,750	2,330	423	238	ns ^d	64	ns ^d	ns ^d	ns ^d	ns ^d	9,805
1982			6,800	5,201	737	171	ns ^d	105	ns ^d	ns ^d	ns ^d	ns ^d	13,014
1983			2,666	2,342	506	4	ns ^d	28	ns ^d	ns ^d	ns ^d	ns ^d	5,546
1984			20,991	4,510	935	876	ns ^d	90	ns ^d	ns ^d	ns ^d	ns ^d	27,402
1985			3,540	5,089	334	16	150	81	65	662	ns ^d	266	10,203
1986			7,511 ^e	2,166	121	ns ^d	141	147	20	439	ns ^d	403	10,948
1987			4,865	3,871	360	251	110	42	58	667	ns ^d	1,587	11,811
1988	4,428	16,063	20,491	2,162	293	ns ^d	82	30	110	1,911	ns ^d	1,848	26,927
1989	6,862	8,370	15,232	3,479	147	ns ^d	67	39	226	597	ns ^d	253	20,040
1990	3,370	10,940	14,310	2,673	167	34	38	12	146	599	589	668	19,236
1991	8,322	29,279	38,249	1,297	158	118	16	5	136	484	418	286	41,172
1992	2,690	19,492	21,182	1,705	6	3	11	0	57	11	59	39	23,073
1993	9,189	25,633	34,822	2,078	265	ns ^d	67	69	490	503	535	496	39,325

^a Aerial or foot surveys unless otherwise noted.

^b Aerial or foot surveys 1981-1985 and 1987. Weir counts 1986, 1988-1993.

^c 1982-1991 weir count plus stream survey, 1992, 1993 weir count only.

^d No survey conducted.

^e Weir washed out in flood from July 21-July 29, 1986.

1986, coho salmon escapement was indexed for abundance by ground and/or aerial methods when water conditions permitted.

Access to this fishery is described in the section addressing the river's chinook salmon fishery.

Coho salmon return to the Little Susitna River primarily from mid-July through early September. Approximately 50% of the return has passed the department's weir located at River Mile 34.5 between August 12 and 16. Tagging studies indicate that coho salmon migrate slowly up the Little Susitna River and remain available to the fishery for about 4 weeks, after which they pass the George Parks highway bridge into waters closed to recreational fishing for salmon. Spawning takes place from late September through mid-October. Spawning primarily occurs upstream from the George Parks Highway in the mainstem of the river, however, some spawning occurs in tributary streams.

Supplemental coho salmon stocking has occurred at the Little Susitna River since 1982 (Table 30). Fingerling plants dominated the initial years of stocking but these releases generally yielded low returns. Beginning in 1987 returns from smolt releases started to make significant contributions to the sport harvest. The contribution of hatchery fish to the sport harvest has ranged from 17% to 75% and averaged 39% during 1987 through 1993 (Bartlett and Conrad 1988, Bartlett and Vincent-Lang 1989, Bartlett and Sonnichsen 1990, Bartlett and Bingham 1991 and 1993, Bartlett 1992 and *In prep*).

Coho salmon smolt were initially released into Nancy Lake which drains by Nancy Lake Creek into the Little Susitna River about 6 miles downstream from the George Parks Highway (Figure 12). Nancy Lake did not support a return of adult coho salmon before stocking occurred. Rearing juvenile coho salmon utilized Nancy Lake by ascending Lake Creek from the Little Susitna River. Adults of hatchery origin now return to Nancy Lake where some spawn in tributaries to the lake. All eggs for the Little Susitna River stocking program, as well as for Bird, Campbell, and Ship creeks in the Anchorage Management Unit, are taken from the return to Nancy Lake.

The Little Susitna River coho salmon sport fishery has been managed in accordance with the Little Susitna River Coho Salmon Management Plan since 1991 and as modified following the 1992 season. Currently the bag and possession limits are set by the management plan at 3 coho salmon 16 inches or more in length.

Only unbaited, artificial lures are to be used in the Little Susitna River between July 15 and August 6. This requirement is designed to reduce the catch rate of the early arriving nonhatchery stock thereby reducing the hook and release mortality. During the 1993 season this requirement resulted in an increase of nonhatchery fish to the escapement thus preserving the natural run timing. The hook-and-release mortality of bait-caught, ocean-fresh coho salmon has been documented to be approximately 70% (Vincent-Lang et al. 1993). The management plan allows the use of bait from August 6 through July 14; a period when hatchery fish dominate the fishery.

The management plan also directs liberalization of the bag and possession by emergency order to 5 coho salmon downstream of the counting weir and within a one-quarter mile radius of the confluence of Lake Creek and the Little Susitna

Table 30. Coho salmon stocking history for the Little Susitna River, 1982-1993.

Year Stocked	Fry Release			Smolt Release			Total Number Released
	Size (gms)	Number Released	Number Marked	Size (gms)	Number Released	Number Marked	
1982	0.57	2,950					2,950
1983	0.57	216,508	20,835				216,508
1984	0.91	426,216	10,000				426,216
1985	0.30	1,225,000	10,004	17.1	54,394	12,151	1,279,394
1986	1.00	316,270		17.2	580,065	24,401	580,065
1987				19.2	302,055	23,955	302,055
1988	1.00	3,374,126	3,126	20.1	438,374	24,628	3,812,500
1989				19.8	358,478	25,631	358,478
1990	1.1-2.0	473,327	72,327	20.8	308,356	45,220	781,683
1991				22.2	277,762	46,358	277,762
1992				23.8	312,925	43,482	312,925
1993				19.0	279,873	40,747	279,873

River when the escapement goal of 7,500 nonhatchery coho salmon is projected upstream of the Parks Highway. Downstream of the Burma Road access site anglers are required to quit fishing when the bag limit of Little Susitna coho salmon is harvested. Coho salmon intended to be released cannot be removed from the water of the Little Susitna River. This requirement reduces hook-and-release mortality.

Creel and escapement observations have shown that coho salmon abundance at the Little Susitna River fluctuates widely. Inriver returns have ranged from 13,000 to almost 55,000 during 1986 through 1993 (Tables 28 and 29).

Recent Fishery Performance

The Little Susitna River coho salmon fishery was monitored in 1993 by creel survey at the Little Susitna River Public Use Facility launch to estimate fishing effort, harvest and the contribution of hatchery coho salmon to the harvest.

A total harvest of 11,052 coho salmon during 26,613 angler-hours of effort was estimated (Table 31) (Bartlett *In prep*). Approximately 95% of this harvest was taken downstream from the counting weir. An additional 1,260 coho salmon were caught and released with release mortality estimated at 870 fish. Coho salmon were harvested at a rate of 0.42 fish per hour. This was a reduction in hooking mortality of 65% and 59% from 1991 and 1992, respectively. It is anticipated that the harvest and catch estimates will be lower than the SWHS estimate because shore anglers and anglers accessing the fishery from sites other than the Little Susitna River Public Use Facility were not interviewed. Coho salmon of hatchery origin comprised about 26% of the 1993 harvest measured at the Public Use Facility access.

In 1993 a total of 34,822 coho salmon were counted through the weir (Table 29). An estimated 503 were harvested upstream of the weir by anglers exiting through the Little Susitna River Public Use Facility launch (Table 31). An additional 500 to 700 coho salmon were potentially harvested by unsurveyed anglers near Houston. The spawning escapement was approximately 34,000 coho salmon. The hatchery contribution of coho salmon to this spawning escapement was estimated to be approximately 9,000 coho salmon (Table 29). The total return to the Little Susitna River which comprised the harvest, hook-and-release mortality, and spawning escapement was about 47,000 coho salmon. An estimated 24% of the 1993 inriver return was harvested.

During the 1993 season the Central and Northern district harvests of the Cook Inlet commercial fishery were sampled to estimate the contribution of hatchery fish (Hoffmann and Hasbrouck *In prep*). Approximately 100,000 coho salmon were examined from the commercial harvest for a missing adipose fin. The contribution of Little Susitna River hatchery stocks to the commercial harvests will be estimated from the CWT returns in early 1994.

Management Objectives

The management objectives for the Little Susitna River are: (1) to maintain 7,500 naturally spawning coho salmon upstream of the George Parks highway, (2) to ensure that historical age and sex composition of naturally spawning fish as well as run timing are not altered by supplemental coho salmon production,

Table 31. Estimated coho salmon harvest, catch and effort by boat anglers on the Little Susitna River, 1991-1993.

Location	Harvest	Harvest Rate	Catch	Catch Rate	Effort Angler-Hrs
<u>1991</u>					
Little Susitna River, Burma Rd.					
Above weir	427	0.262	672	0.412	1,633
Below weir	13,091	0.408	16,928	0.528	32,076
Total ^a	13,514	0.400	17,580	0.521	33,769
Little Susitna River, Houston					
Miller's Landing	417	0.242	476	0.276	1,722
Miller's Reach	148	0.161	188	0.204	920
Total	565	0.214	644	0.244	2,642
Grand Total	14,079	0.387	18,224	0.500	36,411
<u>1992</u>					
Little Susitna River, Burma Rd. ^b					
Above weir	338	0.260	470	0.362	1,300
Below weir	8,401	0.202	11,317	0.272	41,645
Total	8,739	0.204	11,787	0.275	42,945
<u>1993</u>					
Little Susitna River, Burma Rd. ^b					
Above weir	503	0.416	651	0.538	1,210
Below weir	10,549	0.415	11,661	0.459	25,403
Total	11,052	0.415	12,312	0.463	26,613

^a The 1991 total estimates may differ slightly from the sum of the above and below weir estimates.

^b A Houston creel survey was not conducted in 1992 or 1993.

(3) to annually supplement the natural stock with hatchery coho salmon, and (4) to provide coho salmon fishing opportunity from the George Parks Highway downstream to tidewater without emergency restrictions (ADF&G *Unpublished*).

Recent Board of Fisheries Actions

During the November 1992 meeting the BOF amended the Little Susitna River Coho Salmon Management Plan. Under the amended plan beginning with the 1993 season, only unbaited artificial lures can be used in the Little Susitna River from July 15 through August 5. Additionally, the bag and possession limit for coho salmon 16 inches or more was established at 3 daily and 3 in possession for the entire season.

In 1993 a significant reduction in hooking mortality resulted from prohibiting bait and allowing a 3 fish bag limit during May 15 to August 6. During this time period in 1991 and 1992 bait was allowed and a 1 fish bag limit was in effect.

Current Issues

Natural spawning coho salmon return 10-14 days earlier than hatchery coho salmon. The overall trend of increasing angler participation in response to improved access and increased abundance of fish raises the concern of achieving the objectives of maintenance of run timing and age and size composition of the natural return. The current management plan which restricts the early portion of the fishery addresses this issue.

There are three primary controversial issues associated with Little Susitna River fisheries which include: (1) management of the area under the Recreation Rivers Act, (2) South Big Lake extension to the Little Susitna River (Whitmore et al. 1993), (3) damage to riparian vegetation and accelerated stream bank erosion in areas heavily utilized by the public, and 4) fee increases at the Little Susitna River Public Use Facility. These issues have been previously addressed in Section I, in the chinook salmon section of this document, or in Whitmore et al. (1993).

Ongoing Research and Management Activities

In 1993 the Little Susitna River coho salmon program consisted of a creel survey on boat anglers exiting the fishery through the Little Susitna River Public Use Facility boat launch and the counting weir approximately 4 river miles upstream of the boat landing. In 1994 the creel survey will emphasize inspection of the sport harvest for hatchery marked fish and enforcement of Fish and Game regulations. Findings from the 1994 survey will provide an estimate of the contribution of hatchery fish to the sport harvest. Total harvest and catch estimates will be acquired through the statewide harvest survey. The weir will be used to enumerate daily fish passage and provide a means for sampling the escapement. Information to estimate run timing, contribution of enhanced and natural fish to the escapement and the age, size and sex composition of the escapement will be collected.

The Division of Sport Fish also funds the operation and maintenance of the Little Susitna River Public Use Facility. Day to day operation is performed

by the ADNR Division of Parks and Outdoor Recreation under terms of a contract with ADF&G.

Recommended Research and Management Activities

It is recommended that the coho salmon research program on the Little Susitna River be continued to ensure that objectives of the management plan are achieved.

An aerial survey index to enumerate spawning coho salmon should be conducted annually when water conditions allow. The relationship of the number of coho salmon documented during aerial surveys and the number of fish passing the weir will provide a means to estimate the abundance of spawning coho salmon if the weir program is discontinued.

Releases of hatchery reared coho salmon smolt to the Little Susitna River should be restricted to Nancy Lake. Releases into the mainstem Little Susitna River adjacent to the Parks Highway Bridge should be stopped. This will provide an additional level of protection to the genetic integrity and run timing of the naturally spawning fish.

Future management planning must recognize that increased angling participation is likely to occur. Increased fishing demands should not be entirely addressed through expanded stocking to increase fish abundance. Inriver returns and the escapement goal of natural spawning stock should be maximized in part through the enforcement of fishery regulations designed to reduce harvest efficiency during critical periods and through habitat protection measures. The location, type, and number of public recreation facilities, such as campgrounds, launches, and trails, that are ultimately constructed along the river should become a component in the long-term planning of management goals to provide diverse fishing opportunities.

Knik Arm Management Unit: Other Coho Salmon Fisheries

Background and Historical Perspective

In addition to the Little Susitna River, the Knik Arm Management Unit supports five significant recreational coho salmon fisheries and two educational permit fisheries (Figure 18). Fish Creek, Cottonwood Creek, and Wasilla Creek are restricted to primarily intertidal fisheries that provide weekend-only salmon fishing. Weekend-only fishing has been mandatory on these streams since 1971 because harvestable stock surpluses cannot normally accommodate continuous daily exploitation. Motor boats are not permitted on Wasilla Creek during weekends from July 15 through August 15.

The Eklutna Hydroelectric Power plant tailrace (Figure 19) is a fishery that is largely supported by coho salmon returning to the Cook Inlet Aquaculture Association's hatchery located at the head of the tailrace. The nonprofit Eklutna hatchery began operation in 1982. Current production goals are 2.0 million sockeye salmon eggs of Big Lake brood and 100,000 coho salmon eggs taken from returning Eklutna stock (CIAA 1993). Coho salmon are released into the tailrace as smolt. A fish ladder links the hatchery with the tailrace which in turn drains into the Knik River.

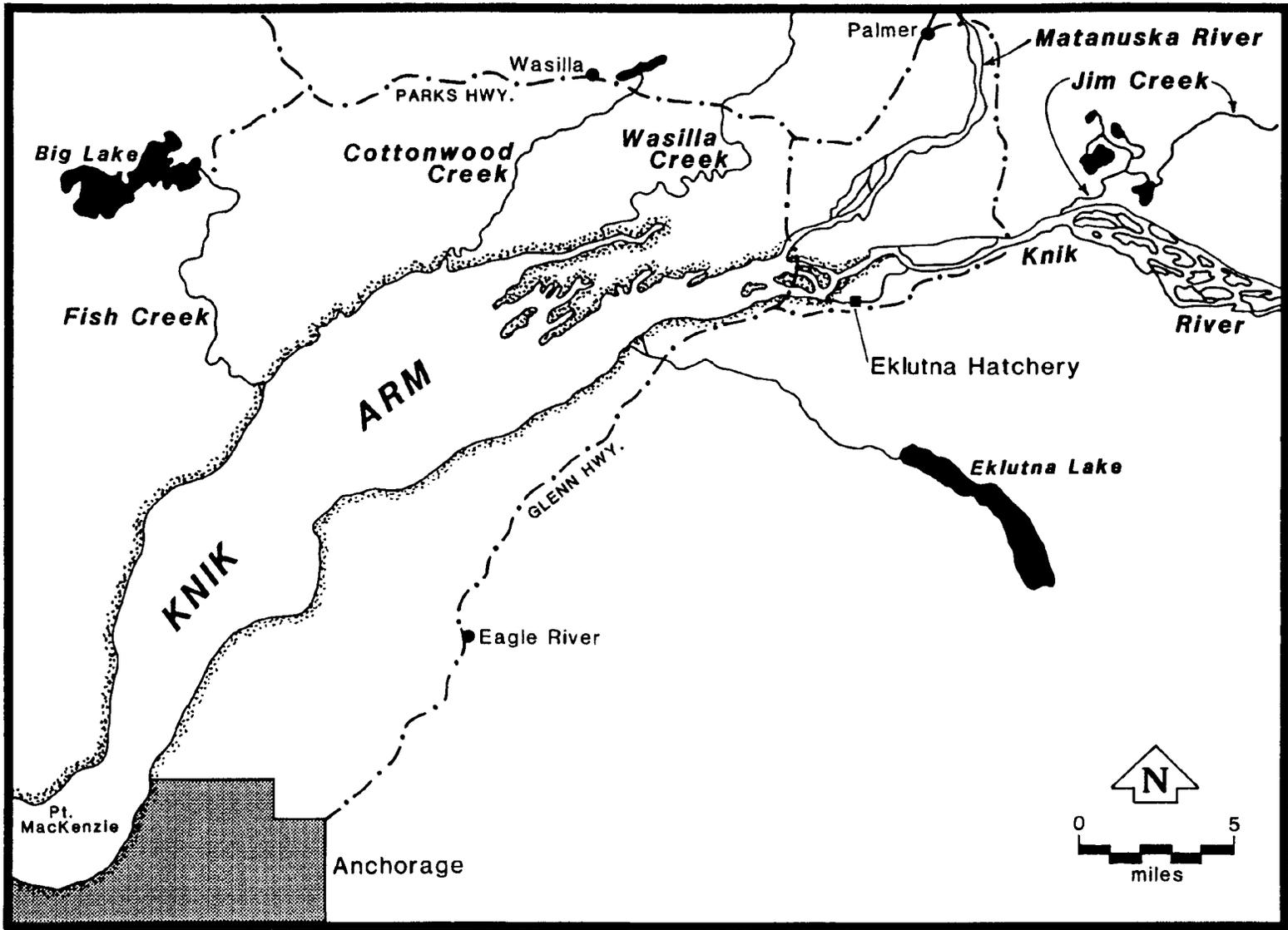


Figure 18. Map of the Knik Arm drainage.

The sport fishery is confined to the one-half-mile long tailrace. Coho, chum, and a few sockeye salmon are harvested by sport fishery anglers within the tailrace. All but the terminal 100 yards of the tailrace are subject to preferential harvest rights by the aquaculture association. Salmon of Knik River drainage origin are also harvested at the confluence of the tailrace and the Knik River.

Jim Creek is traditionally the largest Knik Arm fishery in terms of both participation and coho salmon harvest. This stream enters the glacial Knik River about 10 river miles from salt water. The entire Jim Creek drainage is open to coho salmon fishing throughout the year. The greatest fishing effort occurs at the confluence in an area locally known as the Jim Creek Flats. Fishing effort and harvest rates at the confluence are sharply influenced by the Knik River discharge. Jim Creek Flats are very difficult to fish during periods of high Knik River discharge because the entire area becomes inundated by glacial waters. Upstream reaches of Jim Creek can be accessed by power and nonpower boats.

The villages of Eklutna and Knik were granted educational permits in 1993 for set net fishing for salmon at one site near each village. The Eklutna Village harvested 96 fish of which 14 were coho salmon. The Knik Village harvested a total of 200 fish of which an unknown portion were coho salmon. Both villages were allowed a total of 1,000 salmon. The fisheries ran from July 8 to September 30, 1993.

Coho salmon return to the Knik Arm fisheries from late-July through August. Spawning occurs from late September through mid-October. The average weight of Knik Arm coho salmon is less than 6 pounds. Bag and possession limits for all Knik Arm fisheries are 3 coho salmon 16 inches or more in length. The collective annual harvest for these five fisheries averaged 9,184 coho salmon during the period 1987 through 1992 (Mills 1988-1993) (Table 32, Appendix A8). Jim Creek averaged 5,248 coho salmon during this period whereas the three weekend-only fisheries each averaged from about 600 to 1,600 fish annually.

Coho salmon have been stocked into each of these systems (Table 33). Stocking of Fish and Cottonwood creeks was initiated during the late 1970s, Eklutna Tailrace in 1981 and Jim and Wasilla creeks in the late 1980s. Coho salmon in systems except the Eklutna Tailrace were fingerlings with smolt released during recent years. The Eklutna Facility, operated by Cook Inlet Aquaculture Association, has annually released smolt. Contribution of hatchery fish to the catch and harvest in these recreational fisheries has not been evaluated.

Knik Arm coho salmon are harvested commercially in the Central and Northern districts of Cook Inlet (Appendices B1-B7 and B9). The stocks are also harvested within Knik Arm by a special set gill net fishery that operates near the mouth of Fish Creek. The Knik Arm gill net fishery has been conducted annually since 1987. Coho salmon harvests from this fishery have ranged from 831 to 11,604 and averaged 4,244 coho salmon annually during the period 1987 through 1993 (Table 34). The Knik Arm commercial set net fishery is discussed further in the Fish Creek Sockeye Salmon Fishery section of this report.

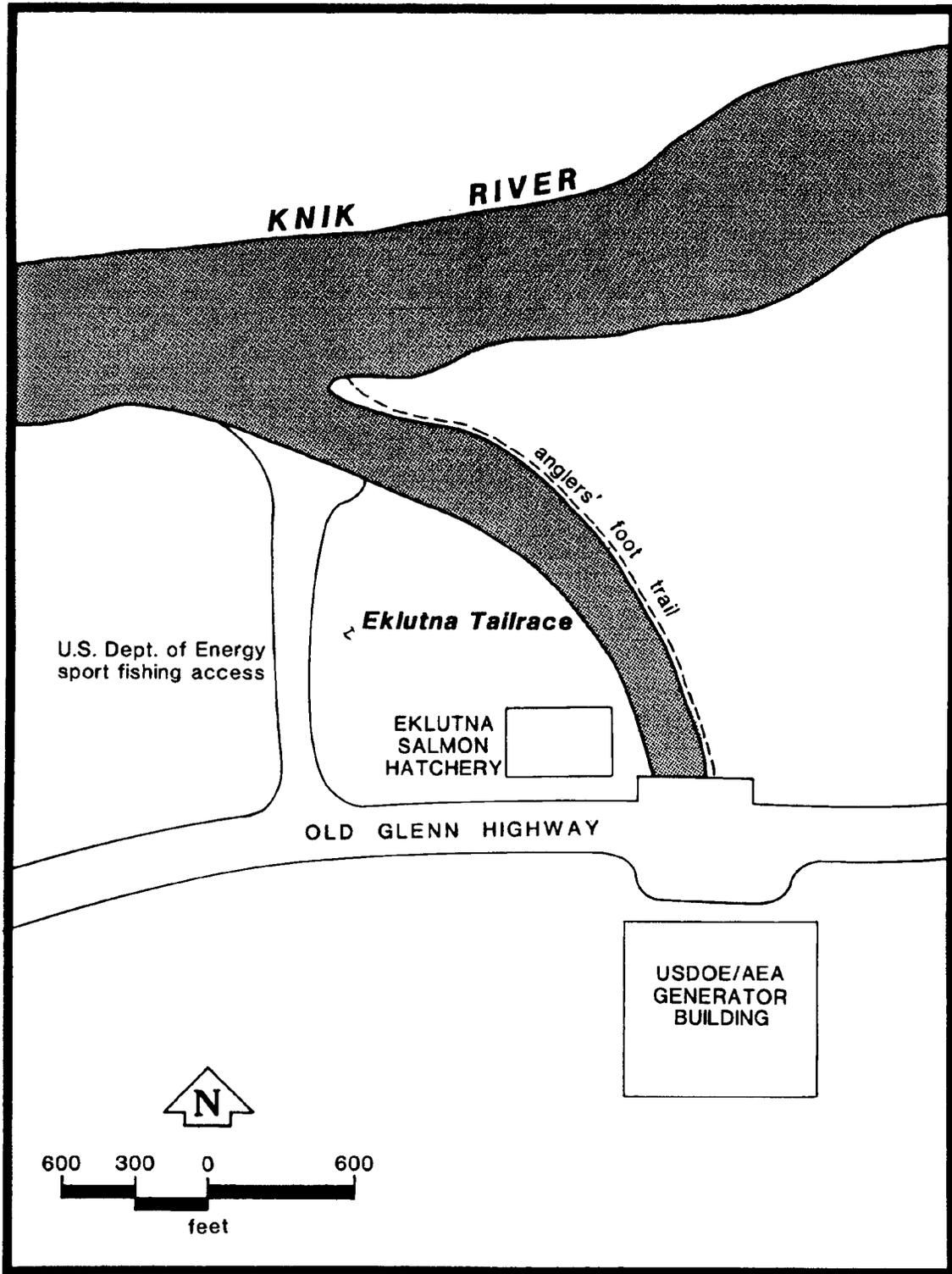


Figure 19. Map of the Eklutna hatchery and Eklutna powerplant tailrace.

Table 32. Fishing effort and coho salmon harvest from Knik Arm fisheries, 1977-1992.

Year	Wasilla Creek		Cottonwood Creek		Fish Creek		Eklutna Tailrace		Jim Creek		Total	
	Harvest	Angler-days ^a	Harvest	Angler-days ^a	Harvest	Angler-days ^a	Harvest	Angler-days ^a	Harvest	Angler-days ^a	Harvest	Angler-days ^a
1977	472	2,805									472	2,805
1978	2,112	3,446									2,112	3,446
1979	1,211	4,024	1,198	5,345							2,409	3,446
1980	3,555	5,726	3,375	9,268							6,930	14,994
1981	814	4,019	1,373	8,663					1,801	4,904	3,988	17,586
1982	1,624	6,261	1,886	5,186					2,306	6,653	5,816	18,100
1983	345	3,239	518	5,944					774	9,183	1,637	18,366
1984	1,920	3,547	1,895	7,144			561	3,413	3,429	9,369	7,805	23,473
1985	1,900	3,115	1,005	4,560	284	903	557	2,995	2,523	8,970	6,269	20,545
1986	944	3,387	690	5,653	364	2,641	502	8,549	2,948	13,015	5,448	33,245
1987	1,195	2,173	1,159	2,934	833	2,898	2,318	11,663	3,676	6,990	9,181	26,658
1988	1,273	2,228	746	4,056	1,637	3,110	3,329	13,188	11,078	23,229	18,063	45,811
1989	975	2,406	876	3,069	784	3,314	1,666	10,342	4,220	11,141	8,521	30,272
1990	1,012	2,679	286	3,056	398	3,936	1,012	7,618	6,184	17,878	8,892	35,167
1991	874	2,893	176	1,623	486	3,693	631	5,892	2,920	13,736	5,087	27,837
1992	413	1,110	348	1,974	526	3,638	664	4,279	3,409	8,856	5,360	19,857

^a In some cases, participation includes effort directed at species other than coho salmon.

Table 33. Summary of coho salmon stocked in Cottonwood, Wasilla, Jim, and Fish creeks and the Eklutna tailrace, 1977-1993.

Brood Year	Brood Stock	Release		Average Size(g)	Number Released	Number Marked
		Year	Drainage			
Big Lake Hatchery						
1977	Big Lake	1978	Cottonwood Creek	0.80	317,694	32,064
1978	Big Lake	1979	Cottonwood Creek	0.54	246,762	19,992
1979	Big Lake	1980	Cottonwood Creek	0.63	154,991	15,000
1979	Big Lake	1980	Cottonwood Creek	0.49	155,004	15,000
1980	Big Lake	1981	Cottonwood Creek	0.59	299,742	30,528
1981	Big Lake	1982	Cottonwood Creek	0.45	364,911	89,389
1982	Cottonwood Lk & Big Lake	1983	Cottonwood Creek	0.45	368,022	23,465
1983	Cottonwood Lk & Big Lake	1984	Cottonwood Creek	0.91	372,318	10,373
1984	Cottonwood Lk & Big Lake	1985	Cottonwood Creek	0.30	317,000	10,000
1985	Big Lake	1986	Cottonwood Creek	0.85	315,881	13,092
1986	Big Lake	1987	Cottonwood Creek	1.4	315,916	15,600
1987	Big Lake	1988	Cottonwood Creek	1.1	597,000	0
1987	Big Lake	1989	Cottonwood Creek	16.4	16,900	0
1989	Big Lake	1990	Cottonwood Creek	1.1	202,000	0
1989	Big Lake	1991	Cottonwood Creek	25.3	72,000	0
1990	Big Lake	1992	Cottonwood Creek	11.0	53,900	35,341
1991	Big Lake	1993	Cottonwood Creek	12.1	74,198	40,875
1986	Big Lake	1988	Wasilla Creek	17.0	12,850	0
1987	Big Lake	1989	Wasilla Creek	15.7	21,600	0
1989	Big Lake	1990	Wasilla Creek	1.1	152,000	0
1989	Big Lake	1991	Wasilla Creek	25.0	69,500	0
1990	Big Lake	1992	Wasilla Creek	10.9	76,315	44,148
1991	Big Lake	1993	Wasilla Creek	11.4	77,174	41,711
1986	Big Lake	1988	Jim Creek	17.0	7,550	0
1987	Big Lake	1989	Jim Creek	16.4	20,100	0
1989	Big Lake	1990	Jim Creek	1.1	163,000	0
1976	Big Lake	1977	Fish Creek	0.28	40,673	0
1977	Big Lake	1978	Fish Creek	0.70	101,081	40,959
1978	Big Lake	1979	Fish Creek	0.49	383,295	30,218
1979	Big Lake	1980	Fish Creek	0.58	450,827	22,337
1980	Big Lake	1981	Fish Creek	0.64	118,071	13,072
1981	Big Lake	1982	Fish Creek	0.45	596,975	23,735
1982	Big Lake	1983	Fish Creek	0.45	1,379,179	24,329
1983	Big Lake	1984	Fish Creek	0.76	987,166	11,166
1984	Big Lake	1985	Fish Creek	0.30	1,641,600	10,000
1985	Big Lake	1986	Fish Creek	1.0	2,354,725	13,497

-continued-

Table 33. (Page 2 of 2).

Brood Year	Brood Stock	Release		Average Size(g)	Number Released	Number Marked
		Year	Drainage			
1986	Big Lake	1987	Fish Creek	1.2	1,906,945	15,632
1986	Big Lake	1987	Fish Creek	7.8	445,310	20,010
1986	Big Lake	1988	Fish Creek	17.0	20,400	20,400
1987	Big Lake	1988	Fish Creek	1.2	1,562,850	14,050
1987	Big Lake	1988	Fish Creek	7.6	366,226	21,384
1987	Big Lake	1989	Fish Creek	15.7	10,644	9,644
1988	Big Lake	1990	Fish Creek	19.0	21,671	5,671
1989	Big Lake	1990	Fish Creek	1.2	504,077	20,077
1989	Big Lake	1991	Fish Creek	25.3	82,988	9,488
1990	Big Lake	1992	Fish Creek	10.9	74,953	45,538
1991	Big Lake	1993	Fish Creek	10.8	67,934	43,257
Eklutna Hatchery						
1981	Cottonwood Lk & Big Lake	1983	Tailrace	15.4	>> 633 ^a	452
1982	Cottonwood Lk & Big Lake	1984	Cottonwood Creek	18.7	16,244	15,757
1982	Cottonwood Lk & Big Lake	1984	Tailrace	18.7	>> 28,150 ^a	27,306
1984	Cottonwood Lk & Big Lake	1986	Tailrace	22.0	101,326	101,326
1985	Eklutna	1987	Tailrace	25.0	147,715	14,772
1986	Eklutna	1988	Tailrace	16.0	72,881	7,300
1987	Eklutna	1988	Jim Creek	1.4	68,000	0
1987	Eklutna	1989	Tailrace	19.0	50,787	2,052
1988	Eklutna	1990	Tailrace	21.6	54,278	2,916
1989	Eklutna	1991	Tailrace	22.0	21,285	1,381
1990	Eklutna	1992	Tailrace	16.7	131,829	0
1991	Eklutna	1993	Tailrace	15.9	108,000	0

^a Some fingerlings escaped into tailrace due to vandalism.

Table 34. Harvest of coho salmon in the Knik Arm commercial set net fishery, 1987 through 1993.

Year	Coho Salmon	Dates
1987	2,043	Jul 27 - Jul 29
1988	11,604	Jul 23 - Jul 29
1989	6,075	Jul 24 - Jul 29
1990	5,708	Jul 27 - Jul 29
1991	1,630	Jul 21 - Jul 23
1992	1,817	Jul 19 - Jul 26
1993	831	Jul 18 - Jul 25
Mean	4,244	Range Jul 18 - Jul 29

Recent Fishery Performance

During the 1992 season the combined harvest for these streams was 46% below the 1987 to 1991 average combined harvest. The angler days of participation from these fisheries during 1992 was 40% below the combined averages for the 1987 to 1991 period. It is believed that the reduced participation is a function of reduced catch rates.

During the 1992 season the Upper Cook Inlet Subsistence Management Plan provided for a set gill net fishery in Northern Cook Inlet waters. In total, 17 fishing periods occurred of which 10 were scheduled after July 14. In total 9,688 coho salmon were reported to have been harvested in Northern Cook Inlet waters (Ruesch and Fox 1993). Coho salmon bound for Knik Arm streams were intercepted in this fishery. Additionally, Knik Arm bound fish were intercepted in the Knik Arm personal use fishery as later described within this report. The harvest of coho salmon in all fisheries combined resulted in the lowest recorded spawning escapement on record for Knik Arm streams (Table 29).

During the 1993 season the Upper Cook Inlet Subsistence Management Plan was not in effect and the Fish Creek dip net fishery was not permitted in marine waters. The spawning escapement to these streams showed a marked increase from the 1992 season (Table 29)

In 1993 a weir was operated on Jim Creek for the first time. A total of 5,532 coho salmon passed through the weir between August 3 and September 12 (Bartlett *In prep*). The mid-point (50%) of the run occurred on August 20. A total of 1,518 coho salmon (27% of the escapement) was examined for a hatchery mark to detect any straying of marked fish from hatchery enhanced streams. No hatchery marks were found. A total of 1,038 coho salmon from this escapement was counted within the two index areas, McRoberts and upper Jim creeks, of the Jim Creek drainage (Table 29). This represents 19% of the escapement censused at the weir.

The age and sex composition and the average length of the Jim Creek stock were estimated. A total of 405 fish was sampled. Seventy-three percent (73%) of the sampled fish were age-2 fresh water and age-1 ocean (age 2.1). The remaining fish were age 1.1 (25%), age 1.2 (1%) and 3.1 (1%). The average length of 1993 Jim Creek coho salmon was 538 millimeters (21 inches) measured from the center of the eye to the fork of the tail. Jim Creek coho salmon are shorter in length than Little Susitna River stock but are similar in length to other Knik Arm stocks. There were 1.4 males for every female in the 408 fish sample.

The Knik Arm commercial set net fishery was executed under the Fish Creek Sockeye Salmon Management Plan during the 1993 season. The coho salmon harvest was 831 fish which was 83% below the 1987 to 1992 average (Table 34).

Management Objectives

Preliminary biological escapement goals have been established for Fish, Wasilla, Cottonwood, and Jim creeks (Table 35). These escapement goals are based on historic escapement index counts. The management objective for these

Table 35. Preliminary coho salmon biological escapement goals (BEG) for Knik Arm Management Unit streams.

Stream	BEG ^a
Cottonwood Creek	300
Wasilla Creek	300
Fish Creek	2,700
Jim Creek drainage	1,000

^a Biological escapement goal.

three systems is to obtain the escapement goal while providing a maximum level of sustained coho salmon fishing opportunity.

Closure of the Big Lake Hatchery will result in curtailment of stocking coho salmon in Wasilla, Cottonwood, and Fish creeks in 1994 (Table 33). Previous management objectives to evaluate the hatchery contribution of these fisheries have been terminated.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting no action was taken regarding Knik Arm Management Unit fisheries except the Little Susitna River as previously discussed. However, BOF actions directed toward subsistence, personal use, and commercial fisheries are expected to provide an increase in instream coho salmon abundance, therefore affecting recreational fisheries.

The Upper Cook Inlet Subsistence Management Plan was repealed based on BOF findings the waters of Cook Inlet were in a nonsubsistence zone.

Three modifications to commercial fishing regulations implemented by the BOF included: (1) district regulations for Cook Inlet set net fishermen, (2) restricting Northern District set net fishermen to regularly scheduled periods after August 15, and (3) restricting the Central District drift fishing fleet to the Western, Kustatan, Chinitna Bay, and that portion of the lower sub-district within 1 nautical mile of the western shore (Whitmore et al. 1993).

The BOF additionally amended the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan as it pertains to the Fish Creek dip net personal use fishery. This fishery is addressed as a major fishery in this section. The dip net fishery allowed for harvest of fish in marine waters 500 yards on both sides of the terminus of Fish Creek up through the 1992 season. Beginning with the 1993 season this fishery was allowed only within the waters of Fish Creek. A regulation prohibiting the taking of sport caught salmon in addition to the personal use bag limit was also established.

Current Issues

A primary management concern is the declining trend in coho salmon returns to the Knik Arm Management Unit, excluding the Little Susitna River stocks. Returns of these stocks are declining despite increased escapement in 1993 and relatively strong returns of coho salmon to other management units within the NCIMA.

Spawning streams which support fisheries in the Knik Arm Management Unit, excluding the Little Susitna River, are small in size and have easy public access. Several of the streams flow through residential areas. Habitat degradation to these streams and spawning areas due to urbanization remains a concern. Additionally, available information and enforcement action suggests that a substantial amount of salmon poaching occurs in these drainages by the use of hook and line, dip nets, and gill nets. Considering the recent and long-term declining trends in abundance of stocks, the need to address these infractions of fishing violations continues.

The educational set net fishery involving the Eklutna and Knik native villages existed for the first time in 1993. Each permit holder was allowed a maximum of 1,000 salmon (any combination of species), however, the resulting harvest totaled only 300 fish. The majority of the harvest was composed of sockeye salmon. The impact of these fisheries on Knik Arm coho salmon was minimal in 1993 but could increase in the future as the village educational programs become more developed.

Ongoing Research and Management

Annual harvest and effort information pertaining to these fisheries is obtained from the SWHS. Spawning escapement is assessed by means of weirs on Fish Creek and Jim Creek, and through ground surveys within established index areas. These programs will continue during the 1994 season.

Recommended Research and Management Activities

Preliminary biological escapement goals have not been achieved in Fish Creek since 1989 or in Cottonwood Creek since 1987. The Wasilla Creek escapement goal has not been documented since 1987 due to incomplete surveys caused by turbid water conditions. These systems have all been stocked with coho salmon during recent years. The stocking program has been terminated as previously discussed.

Fishery managers recommend that Cottonwood Creek be closed until returns reach escapement goal levels for at least 2 consecutive years. Additionally, fishery managers are considering closure of Wasilla and Fish creeks. Turbid water conditions in Wasilla Creek and removal of the weir on Fish Creek prior to the end of the coho salmon return makes the escapement information associated with these systems incomplete. However, the enumerated portions of these returns indicate that the escapement goals are consistently not being achieved. If closure of these recreational fisheries does not result in achievement of the escapement goals, stocking should again be considered for these systems.

In association with these closures, educational and enforcement activities should be conducted to ensure successful spawning of the return.

Eastside Susitna, Westside Susitna, and West Cook Inlet Management Units Coho Salmon Fisheries

Fishery Description and Historical Perspective

Coho salmon harvests in these three management units have averaged 25,790 fish during 1977 through 1992 (Mills 1979-1993) (Table 27). The Susitna River drainage supports the largest coho salmon stock within the NCIMA and the contribution of the harvest from the Eastside Susitna and Westside Susitna Management Units has been approximately 58% each of the total NCIMA coho salmon harvest during this time period. The West Cook Inlet Management Unit contribution to the total NCIMA has been 3% during this time period.

A description of these management units, including access to these areas, has previously been discussed in the chinook salmon section of this report. Coho

salmon returning to these units are early-run stocks which begin to enter these drainages about mid-July. The migration into the Yentna River (Susitna River Mile 28, Westside Susitna Management Unit) drainage normally peaks the last week in July whereas the peak passage into the Talkeetna River (Susitna River Mile 99, Eastside Susitna Management Unit) takes place 7 to 10 days later. Few coho salmon enter the Susitna River after early September. Most spawning occurs between mid-September and mid-October. Little information is available regarding West Cook Inlet Management Unit coho salmon run timing, however, it is assumed to be similar to that of the Susitna River.

Total coho abundance in the Susitna River drainage has not been estimated. Abundance in portions of this vast drainage have been measured by sonar, fish wheels and mark and recapture methods. During the period 1981 through 1983, coho salmon abundance averaged 47,000 fish in the Susitna River excluding all systems below River Mile 80, except the Yentna River drainage (Table 36). It is important to recognize that significant coho salmon returns occur in tributaries that enter the Susitna River downstream from River Mile 80. Coho salmon abundance in such systems as the Deshka River, Alexander Creek, and Willow Creek, as well as many other important coho salmon sport fisheries, were not measured during the 1981-1983 studies.

Coho salmon abundance in the Yentna River has been estimated by side-scan sonar and fish wheels since 1981. Estimates made during 1981-1984 encompassed the entire coho salmon migration. Yentna River sonar enumerations of coho salmon entering the Yentna River drainage have ranged from 6,279 to 57,275 fish and averaged 22,939 fish during 1981 to 1993 (Table 36). The number of coho salmon passing River Mile 80 on the Susitna River exceeded the number of coho salmon entering the Yentna River each year during the period 1981 to 1983. Side-scan sonar to enumerate salmon and fish wheels to apportion fish by species may not be an adequate tool to enumerate coho salmon. Coho salmon may migrate up the Yentna River distributed across the entire river with the sonar only enumerating fish swimming along river banks.

Very little information is available regarding coho salmon spawning abundance in the West Cook Inlet Management Unit. Other than a survey of Three-mile Creek near Beluga in 1992, no coho salmon escapement information has been collected during recent years from this management unit.

The Deshka River, Alexander Creek and Lake Creek are the major Westside Susitna Management Unit coho salmon fisheries. Coho salmon harvest from these three streams averaged 7,396 fish during the period of 1977 to 1992 during which time this harvest accounted for 64% of the Westside Susitna Management Unit coho salmon harvest (Appendix A10).

Numerous Eastside Susitna Management Unit tributaries provide fishing opportunities for coho salmon. During recent years Willow Creek, Montana Creek and the Talkeetna River have produced the largest coho salmon harvests in this management unit; averaging 6,541 fish between 1977 and 1992 and accounting for 51% of the harvest (Appendix A9).

In the West Cook Inlet Management Unit the Chuitna River is the primary producer of coho salmon. The average harvest in this stream between 1977 and 1992 is estimated at 841 fish which accounts for approximately 70% of the harvest within this management unit (Appendix A11).

Table 36. Eastside and westside Susitna River drainage coho salmon escapement index counts, 1981-1993.

Year	Westside Susitna River Drainage			Eastside Susitna River Drainage ^a				Susitna River ^b	Grand Total
	Yentna River ^c	Rabideux Ck.	Total	Birch Ck.	Question Ck.	Answer Ck.	Total		
1981	17,017	ns ^d	17,017	ns ^d	ns ^d	ns ^d	ns ^d	37,000	54,017
1982	34,089	ns ^d	34,089	ns ^d	ns ^d	ns ^d	ns ^d	80,000	114,089
1983	8,867	ns ^d	8,867	ns ^d	ns ^d	ns ^d	ns ^d	24,000	32,867
1984	16,007	480	16,487	236	60	57	353	ns ^d	16,840
1985	9,181	82	9,263	30	89	9	128	ns ^d	9,391
1986	23,457	ns ^d	23,457	25	ns ^d	ns ^d	25	ns ^d	23,482
1987	6,279	50 ^e	6,329	46	149	10	205	ns ^d	6,534
1988	12,173	230	12,403	63	337	160	560	ns ^d	12,963
1989	25,695	20	25,715	180	31	66	277	ns ^d	25,992
1990	21,346	20	21,366	36	41	6	83	ns ^d	21,449
1991	57,275	185	57,460	300	492	51	843	ns ^d	58,303
1992	29,073	ns ^d	29,073	167	227	181	575	ns ^d	29,648
1993	37,752	ns ^d	37,752	178	370	34	582	ns ^d	38,344

^a Survey conducted by walking portions of the creek.

^b Sonar counts upstream of river mile 80.

^c Sonar counts, dates of assessment may vary.

^d No survey conducted.

^e Poor survey conditions.

Coho salmon sport fishing is permitted throughout the year at most fisheries. However, portions of several Eastside Susitna Management Unit fisheries are closed to salmon fishing to protect spawning fish. Closures usually include upper reaches of tributaries that are road accessible.

Major tributaries or portions of tributaries within the Susitna River drainage are restricted to unbaited, single-hook artificial lures throughout the year. These regulations are implemented as part of special management regulations for rainbow trout under the Cook Inlet Rainbow Trout Management Policy. Additionally, under this policy, only unbaited artificial lures may be used in all flowing waters of the Susitna River drainage from September 1 through May 15 except in specific areas when legal burbot fishing gear is utilized.

In the Eastside Susitna Management Unit, the bag and possession limits for coho salmon are 3 salmon 16 inches or more in length. In the Westside Susitna and West Cook Inlet Management units the bag and possession limits are 3 coho salmon daily and 6 in possession.

Susitna River coho salmon are harvested in commercial fisheries located in the Northern and Central Districts of Cook Inlet. In the Northern District, commercial fishing is permitted within 500 yards of the terminus of the Susitna River and several of the West Cook Inlet Management Unit streams. Commercial fishing is not permitted within 1 statute mile of the terminus of several other West Cook Inlet Management Unit streams including Three Mile Creek, Chuitna River, Nikolai Creek and the McArthur River. Significant numbers of Susitna River and West Cook Inlet drainage coho salmon are harvested in the mixed stock drift net fisheries which occur in the Central District during July and early August.

Recent Fishery Performance

The 1992 recreational coho salmon harvest from the Eastside Susitna, Westside Susitna and West Cook Inlet units was estimated at 51,830 fish (Table 27). This is the largest harvest on record, twice the 1977 to 1992 average. This harvest represented about 60% of the total coho salmon harvested from the NCIMA. Of these three units the Eastside unit was the highest producer of coho salmon in 1992.

Sonar enumeration of coho salmon at river mile 4 of the Yentna River estimated an above average return of 37,752 coho salmon to the Yentna River drainage in 1993 (Table 36). In 1993 operation of the sonar counters ceased on August 7. Managers estimate that approximately 90% of the run had passed by that date. The 1993 estimate is a 70% increase above the 1981-1992 average of 21,705 fish.

Recent Board of Fisheries Actions

The BOF has taken no specific actions with respect to Susitna River coho salmon sport fisheries during recent years. However, BOF action as previously described under Other Knik Arm Management Unit Coho Salmon fisheries will continue to have an effect on coho salmon returns to these management units.

Current Issues

Allocation of coho salmon between commercial and recreational fisheries remains an issue of controversy.

Issues relating to large scale timber development, recreational river management and road and boat launch construction are of importance in developing future uses and management strategies for coho salmon in these management units.

The index stream Answer Creek has had a perched culvert at the Talkeetna Spur Road crossing since 1986. This culvert blocks up to an estimated 99% of the coho salmon spawning migration from accessing the majority of spawning habitat. Action needs be taken by area staff in 1994 to correct this situation and allow coho salmon returning to Answer Creek to reclaim their full spawning and rearing potential.

Ongoing Research and Management

There are no major research activities currently being conducted by the Division of Sport Fish with respect to these fisheries. Sonar and fish wheel enumeration of Yentna River coho salmon is performed by the Division of Commercial Fisheries. This enumeration project is directed primarily toward sockeye salmon and is terminated prior to the end of the coho salmon run.

In the Eastside and Westside Susitna Management Unit four small Susitna River tributaries continue to be included in the annual coho salmon escapement indices (Table 36). These are Question Creek, Answer Creek, Birch Creek and Rabideux Creek. These road-accessible tributaries enter the Susitna River between River Mile 80 and River Mile 85 and are relatively convenient to survey. It is not known if returns to these system reflect abundance trends of the drainage.

The Susitna River coho salmon sport harvest and catch is estimated annually by the SWHS. Effort is not estimated specific to a species but across all species for a specific drainage or group of drainages.

Recommended Research and Management Activities

Methods should be established to estimate returns of spawning coho salmon to the Susitna River and West Cook Inlet coho salmon streams. Coho salmon stocks of greatest concern are road accessible Eastside Susitna Management Unit streams including Willow, Sheep, Montana, and Birch creeks and the Kashwitna River. Each of these streams experienced a doubling in harvest from recent years (Appendix A9).

Expansion of the existing program associated with the stocking programs to determine the contribution of wild NCIMA coho salmon in mixed stock commercial fisheries should be considered.

Fish Creek Personal Use Salmon Fisheries

Background and Historical Perspective

The Fish Creek personal use sockeye salmon fishery was initiated by direction of the BOF in 1986.

The escapement of sockeye salmon into the Fish Creek drainage has been documented since 1936 (Chlupach and Kyle 1990). Recorded escapement of these late-run sockeye salmon ranged from 2,700 fish in 1973 to 307,000 fish in 1940. Since 1968 the escapement of sockeye salmon has ranged from the 1973 low of 2,700 fish to a 1984 high of 192,000 fish (Table 37, Figure 20). Due to declining abundance during the early 1970s, enhancement of Fish Creek sockeye salmon has been conducted since 1975. Hatchery fish are estimated to comprise more than 90% of most returns. The Big Lake state fish hatchery supported the sockeye salmon enhancement program through 1992 using Fish Creek stock as brood (Table 38). This hatchery ceased operation in June 1993. Future enhancement of Fish Creek sockeye salmon, using Fish Creek stock as brood, will be through the Eklutna fish hatchery; a private hatchery operated by Cook Inlet Aquaculture Association located on the Knik River in the Eklutna powerplant tailrace.

Run timing for Fish Creek sockeye salmon is such that the peak of the return occurs as coho salmon are starting to move into the drainage.

Fish Creek sockeye salmon have long been utilized in commercial and subsistence fisheries (Engel and Vincent-Lang 1992). A subsistence fishery was operational through 1970. In 1971 the Knik Arm subsistence fishery was closed because of declining sockeye salmon escapements into Fish Creek. It was reopened in 1984 and 1985 and closed again in 1986. It did not reopen until 1991 and was closed again in 1993.

Sockeye salmon also supported a sport fishery in Fish Creek and the nearby marine waters of Knik Arm. In 1971 the increek sport fishery was restricted to weekend only fishing starting with the second Saturday in August. This precipitated increased effort in the adjacent marine waters of Knik Arm. Snagging was the principle method of harvest in the marine fishery. In 1985, snagging became illegal within all marine waters of Cook Inlet north of Anchor Point. Prohibition of snagging substantially reduced this popular marine sockeye salmon fishery.

In 1986 both a commercial set gill net and personal use dip net fishery along the northwest shore of Knik Arm were approved to utilize sockeye salmon surplus to spawning and egg take needs. These fisheries continue annually, contingent upon a projected escapement of 50,000 Fish Creek sockeye salmon. Closure of the commercial fishery after July 29 was mandatory to prevent an excessive interception of coho salmon.

In 1989 the period these fisheries were open to harvest sockeye salmon was modified to reduce conflict between the two user groups. On projection of a 50,000 sockeye salmon escapement to Fish Creek the commercial fishery is allowed from July 15 through July 26. Fishing periods are Tuesdays and Sundays from 7:00 a.m. to 7:00 p.m. The dip net fishery was established to open July 30. During the 1992 BOF meeting no action was taken regarding the

Table 37. Fish Creek weir sockeye and coho salmon escapements, 1968-1993.

Year	Coho ^a	Sockeye ^b	Dates of Operation
1968	2,088	19,616 ^c	1 Jul-31 Jul
1969	4,253	12,456	4 Jul-2 Sep
1970	1,048	25,000	19 Jul-8 Aug
1971	583	31,470	8 Jul-7 Aug
1972	716	6,981	24 Jul-10 Sep
1973	210	2,705	18 Jul-6 Sep
1974	1,154	16,225	8 Jul-6 Sep
1975	1,601	29,882	3 Jul-8 Sep
1976	765	14,032	5 Jul-10 Sep
1977	970	5,183	7 Jul-15 Aug
1978	3,184	3,555	7 Jul-30 Sep
1979	2,511	68,739 ^d	9 Jul-29 Aug
1980	8,924	62,828 ^d	4 Jul-1 Sep
1981	2,330	50,479 ^d	9 Jul-7 Sep
1982	5,201	28,164	12 Jul-8 Sep
1983	2,342	118,797 ^d	12 Jul-30 Aug
1984	4,510	192,352 ^d	1 Jul-19 Sep
1985	5,089	68,577 ^d	8 Jul-29 Aug
1986	2,166	29,800 ^d	14 Jul-26 Aug
1987	3,871	91,215 ^d	8 Jul-27 Aug
1988	2,162	71,603 ^d	7 Jul-9 Sep
1989	3,478	67,224 ^d	6 Jul-8 Sep
1990	2,673	48,717 ^d	5 Jul-14 Sep
1991	1,297	50,500 ^d	9 Jul-12 Sep
1992	1,705	72,108 ^d	10 Jul-10 Sep
1993	2,378	117,619 ^d	7 Jul-20 Aug
Mean ^e		50,224	

^a Measured by weir (1968 excepted). Years 1980-1993 include downstream foot surveys upon removing weir.

^b Weir count.

^c A counting screen was used instead of a weir.

^d Years hatchery sockeye salmon contributed to the escapement.

^e The mean coho salmon escapement is not estimated because in many years of record the weir was removed before the run was complete.

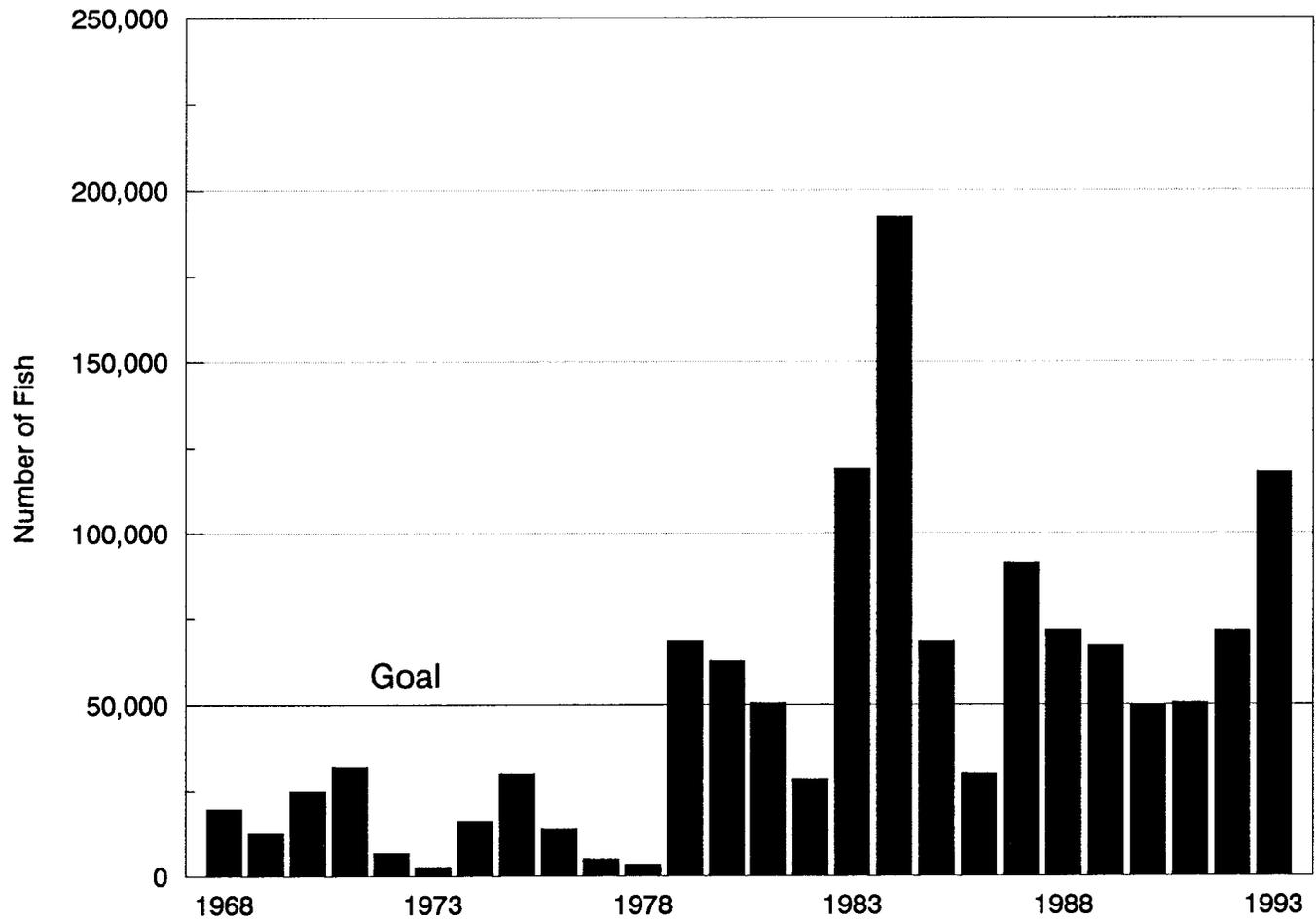


Figure 20. Fish Creek sockeye salmon escapement, 1968-1993.

Table 38. Big Lake hatchery sockeye salmon fry releases into the Big Lake drainage, 1975-1992.

Brood Year	Eggs Incubated	Fry Released	Egg/Fry Survival	Number Marked	Size (gm) At Release
1975	180,300	71,168	39.5%	0	0.15
1976	10,034,013	7,686,382	76.6%	72,673	0.15
1977	8,748,867	5,739,010	65.6%	66,153	0.13
1978	9,832,726	0	0.0%	0	
1979	5,053,808	806,047	15.9%	0	0.15
1980	4,699,733	3,967,941	84.4%	0	0.14
1981	5,662,004	4,263,356	75.3%	0	0.17
1982	8,624,662	6,601,409	76.5%	0	0.16
1983	9,294,426	7,362,000	79.2%	0	0.15
1984	16,210,000	12,430,000	76.7%	18,835	0.15
1985	21,550,000	15,000,000	69.6%	18,120	0.20
1986	17,500,000	11,866,000	67.8%	19,613	0.20
1987	20,300,000	14,492,000	71.4%	20,085	0.15
1988	19,700,000	13,205,848	67.0%	24,848	0.15
1989	14,835,000	10,815,319	72.9%	24,319	0.20
1990	14,734,000	10,037,290	68.1%	22,290	0.24
1991	7,357,000	3,111,000	56.4%	0	0.25
1992	10,330,000	4,586,000	59.2% ^a	0	0.22

^a Includes 1,534,000 fry transferred to Eklutna hatchery.

commercial fishery, however, modifications were made to the dip net fishery. The dip net fishery may now open as early as July 23.

Recent Fishing Performance

Since most waters of Cook Inlet were determined by the BOF to be in the nonsubsistence zone, subsistence fishing in Knik Arm was prohibited during the 1993 season. The commercial fishery harvested 47,751 sockeye salmon and 831 coho salmon over three openings between Sunday July 18 and Sunday July 25. The 1993 commercial harvest of 47,751 sockeye salmon was a 344% increase over the 10,748 sockeye salmon harvested in 1992, and closely approximates the harvest of 47,925 sockeye salmon in 1989 (Table 39).

In 1993 the personal use fishery was restricted to the waters of Fish Creek. Therefore, water within 500 yards of the outlet of the stream to Knik Arm, which was open to dipnetting in prior years, was closed during the 1993 season. Fishing commenced at 9:00 a.m. July 24 and ended at 12 midnight on August 6. During this period the fishery was closed on July 26 and 30 and August 3 to allow for escapement into the creek upstream of the area open to dipnetting. This action allowed for spawning escapement from all segments of the return. A preliminary estimate of 70,346 sockeye salmon were harvested during the 1993 dip net season (L. Peltz, Alaska Department of Fish and Game, Palmer, personal communication). The 1993 harvest estimate is a 270% increase over the 19,002 sockeye salmon harvest in 1992 (Table 39)(Mills 1993).

Retention of coho salmon was allowed in the 1993 dip net fishery. A harvest estimate for coho salmon will be available, with a final estimate for sockeye salmon, in the fall of 1994 when the results of the 1993 SWHS are published.

During the 1993 season 117,619 sockeye salmon entered Fish Creek to spawn. The sockeye salmon escapement goal of 50,000 fish was attained on July 22. A portion of the sockeye salmon harvested in the Knik Arm commercial fishery is from other Knik Arm drainages such as Cottonwood and Jim creeks, the large majority of the sockeye salmon harvested is bound for Fish Creek.

Management Objectives

The management objective of the Fish Creek personal use fishery is to allow sockeye salmon from the early, middle, and late portions of the return to be included in the spawning escapement while harvesting fish in excess of the 50,000 fish escapement goal.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting most waters of Cook Inlet were found to be in a nonsubsistence zone and the Upper Cook Inlet subsistence fishery was terminated. Additionally, the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan pertaining to the Fish Creek dip net fishery was modified as follows:

1. the fishery will open by emergency order after July 23 on Saturdays, Sundays, and Wednesdays to the taking of salmon, other than king salmon, provided the spawning escapement of sockeye salmon into Big Lake drainage is projected to exceed 50,000 fish;

Table 39. Fish Creek salmon harvests, by commercial set gill net and personal use dip net, 1987-1993.

Year	Gill Net						Personal Use
	Sockeye	Coho	Chum	Pink	Chinook	Total	Sockeye
1987	24,090	2,043	403	264	0	26,800	2,200
1988	38,251	11,604	325	591	9	50,780	3,000
1989	47,925	6,075	4,979	545	4	59,528	5,000
1990	23,450	5,708	5,308	696	4	35,166	6,500
1991	10,459	1,630	961	21	0	13,071	14,369
1992	10,748	1,817	1,289	573	0	14,427	19,002
1993	47,751	831	990	29	0	49,601	na ^a
Total	202,674	29,708	14,255	2,719	17	249,373	50,071

^a Data not available.

2. additional fishing time can be established by emergency order provided that no more than 3 consecutive days of fishing time is allowed without a minimum of 1 day closure if escapement into Fish Creek warrants such action;
3. the area to be open to harvesting salmon by dip net includes waters upstream from a department marker located at the mouth of Fish Creek to a department marker located approximately one-quarter mile upstream of the Knik-Goose Bay Road (dipnetting is no longer allowed in the marine waters of Knik Arm),
4. the daily bag and possession limits are 6 salmon, other than king salmon, not in addition to the daily sport fish bag and possession limit; and
5. the fishery shall close the second Friday in August, or earlier by emergency order if the harvest of coho salmon becomes excessive in department opinion.

No action was taken regarding the sport and commercial fisheries.

Current Issues

Changes made by the BOF in November of 1992 regarding the Fish Creek Personal Use Fishery regulations addressed three primary issues associated with this fishery. The regulations effective for the 1993 season allowed for passage of fish into the Fish Creek drainage throughout the return reducing concern that the fishery may alter run timing of both sockeye and coho salmon. Dip net fishing along the beach adjacent to Fish Creek was prohibited. The fishery occurred within Fish Creek thereby greatly reducing the interception of salmon bound for other Knik Arm drainages. Allowing for the harvest of coho salmon in the fishery: (1) eliminated waste previously associated with coho salmon mortality resulting from repeated dipping, inspecting and removing fish from the water, and (2) provided a way to estimate the harvest (mortality) of coho salmon associated with this fishery through the SWHS.

The regulation adopted by the BOF in 1992 prohibiting dipnetting in the marine waters of Knik Arm was not well accepted by the participating public in 1993. An unprecedented number of infractions for dipnetting in closed waters were arraigned into District Court.

Much of the land adjacent to the fishery is under private ownership. There is annual conflict between fishery participants and two of the land owners. Posting of land owned by the third major land owner could effectively curtail the personal use fishery as it now exists and require managers to restructure public participation in the fishery.

Substantial short-term but unsightly habitat damage to the marsh area near the mouth of Fish Creek and litter accumulation annually occurs due to the large number of people participating in the personal use fishery. This environmental damage and litter accumulation is the source of increasing public and land owner comment.

In 1993 the Alaska Supreme Court ruled that a previous court decision declaring Cook Inlet, including Knik Arm, to be a nonsubsistence area was incorrect and that the area should be considered a subsistence area. In that

this issue probably will not be resolved prior to the 1994 season, a subsistence fishery will not likely occur.

Renewed angler interest in fishing for sockeye salmon using artificial lures in the marine waters of Knik Arm was noted during the 1993 season.

Ongoing Research and Management Activities

Salmon escapement is monitored by a weir located approximately 3 miles from the outlet of Fish Creek into Knik Arm. This sockeye and coho salmon escapement evaluation program is conducted by the Commercial Fisheries Management and Development Division. The personal use fishery harvest is estimated by the SWHS. Coho salmon, previously illegal to retain and therefore not reported by participants receiving the SWHS questionnaire, will be estimated starting with the 1993 SWHS. The Fish Creek drainage is scheduled to be stocked during the 1994 season with sockeye salmon from the Eklutna fish hatchery.

Recommended Research and Management

The program planned for the 1994 season addresses the primary concerns associated with this fishery. The department marker at the mouth of the fishery will be moved approximately 50 yards upstream from the 1993 location reducing the confusion with fishery participants that occurred during the 1993 season. As with most fisheries in the management area, increased enforcement would provide for a more orderly fishery. Placement of signs to inform participants of fishery regulations and fish identification techniques may result in better regulation compliance and more accurate results in the SWHS regarding species composition of the harvest.

Cooperation with adjacent landowners by placing signs directing participants away from private property could help reduce land owner/participant conflicts. Signs designed to inform the public about the potential of habitat damage along stream banks through careless use and signs to encourage participants to pack out their litter would also be helpful in creating a better public image of the fishery.

Stocked Lake Fisheries

Background and Historical Perspective

Currently 77 lakes in the NCIMA are stocked on an annual, biennial, or triennial basis, including one research lake that is closed to fishing. The 77 stocked lakes range in size from 1 to 362 surface acres (Appendix C).

The area stocking program began in 1952 when two lakes received 22,000 rainbow trout fry. Although eight species of salmonids have been planted since 1952, rainbow trout, coho salmon and Arctic grayling have become the primary species used in the stocking program. Steelhead/rainbow trout from the Karluk River (Kodiak) and four strains of Alaska rainbow trout (Naknek River, Talarik Creek, Swanson River and Big Lake) as well as rainbow trout from federal and private hatcheries located in the states of Idaho, Montana, Oregon and Washington have been stocked. Landlocked salmon fisheries have been supported

by coho salmon from Washington State and at least nine Alaskan egg-take sources and chinook salmon from three Alaskan sources. However, since 1979 only native Alaskan fish have been stocked in the NCIMA. Arctic grayling egg take sources have been Junction Lake, Tolsona Lake and Moose Creek. Arctic char, originating from egg takes at Aleknagik Lake and lake trout from Paxson Lake were first stocked in 1988.

The final egg take from Big Lake strain rainbow trout brood stock at Ft. Richardson Hatchery took place in 1993; all resulting fingerling were stocked in Big Lake drainage lakes and all remaining brood stock were stocked in Anchorage area landlocked lakes and in Big Lake. Swanson River strain rainbow trout are the sole rainbow trout brood stock source remaining at Ft. Richardson Hatchery. Beginning in 1994, Big Lake drainage system lakes having intermittent outlets will, upon issuance of a Fish Transport Permit, be stocked with triploid all-female Swanson River strain rainbow trout.

In most cases stocked landlocked lakes represent "new" fisheries because game fish were not present before stocking occurred. Stocked lakes benefit anglers and recreational support industries by providing diverse, year-round fishing opportunities and by diverting angling pressure from natural stocks. The majority of the stocking is directed toward road accessible lakes that tend to draw entire family groups for some combination of fishing, camping, picnicking, boating, and ice skating.

Rainbow trout appear to be the species preferred by most anglers. A survey of anglers fishing stocked lakes in the NCIMA in 1977, for example, revealed that 70% preferred to fish for rainbow trout, 19% desired landlocked coho salmon and 11% listed Arctic grayling as their choice. Rainbow trout comprised 54% of all fish stocked in landlocked lakes within the NCIMA during the period 1989 through 1993. Annual releases during these 5 years ranged from 1,026,274 to 1,210,746 game fish and altogether 5.5 million fish of all species were stocked in lakes within the NCIMA.

Ninety-five percent of the rainbow trout released into NCIMA waters during the period 1989-1992 were fingerlings. Most fingerlings weighed between 1 and 2 grams and were released during July. By June of the year following introduction, fingerlings at age 1 will typically range from 3 to 6 inches in length, at age 2 from 6 to 11 inches, at age 3 from 11 to 16 inches, and at age 4 from 16 to 20 inches in length. Approximately 70% to 80% of the rainbow trout harvested from stocked lakes are age 2 and about 15% to 20% are age 3. Few stocked rainbow trout exceed age 4 and relatively few rainbow trout achieve harvestable size prior to age 2.

Catchable rainbow trout, weighing about 100 grams, are also stocked to a limited extent to supplement rainbow trout production resulting from fingerling plants. Usually less than 6% of the rainbow trout stocked in the NCIMA are catchable size at introduction. Catchable rainbow trout are stocked primarily in the most heavily fished lakes.

Coho salmon are normally stocked in May at about 3 to 5 grams each. These fish achieve a harvestable size (6 to 11 inches) at age 1 the year following introduction. Most coho salmon are either harvested or die after becoming sexually mature by age 3. Stocked salmon support important winter fishing opportunities within the NCIMA.

Arctic grayling are stocked both as fry and fingerlings. Fingerlings weighing 3 to 5 grams are usually stocked during August whereas the much smaller fry (0.02 gram each) are released during early June. Arctic grayling normally recruit into the harvest by age 2.

Although the contributions from the landlocked lake stocking program have been significant to date, it is important to recognize that poor survival of stocked fish has also been documented. A research investigation has accompanied development of the area's stocking program since the early 1970s. The primary objective of this research has been to develop cost-effective stocking practices that provide both expanded and diverse fishing opportunities. Lake stocking research has been directed toward but not limited to the following: evaluation and selection of rainbow trout brood stock; development of effective stocking densities and size of stocked fish for various lake environments; establishment of optimal time and frequency of stockings in various landlocked lake environments; and currently, evaluation of sterile rainbow trout for stocking lakes that have open or intermittent linkages with drainages that support wild rainbow trout.

Recent Fishery Performance

A total of 69 lakes were stocked with 1,054,371 game fish in 1993. Sixty-one of these lakes were located in the Knik Arm Management Unit whereas the balance of the stocking occurred in lakes within the East Side Susitna Unit. Releases in 1993 included 577,203 rainbow trout, 181,817 coho salmon, 36,141 chinook salmon, 188,810 Arctic grayling, and 70,400 Arctic char. Twenty-six lakes were stocked with more than one species of fish in 1993. Stocking locations, species, numbers of fish and fish size are listed in Table 40.

The SWHS (Mills 1992) indicates that 40,266 angler-days of participation resulted from the area's landlocked stocking program in 1992. Fishing effort associated with lakes having both stocked and indigenous game fish is excluded from participation associated with lake stocking. The 1992 catch from stocked landlocked lakes included an estimated 56,367 rainbow trout of which 24% were harvested, 21,607 landlocked salmon (30% were harvested), and 8,980 Arctic grayling (18% were harvested). Rainbow trout from stocked lakes represented 43% of all rainbow trout caught and 53% of the entire harvest of this species from the NCIMA.

The Kepler Lake Complex, consisting of nine stocked lakes, supported 15,556 angler-days of effort whereas Finger Lake supported 5,506 angler-days of effort in 1992. Collectively, these two stocking sites yielded 52% of the effort associated with stocked landlocked lakes within the NCIMA.

The cost associated with each angler-day of participation created by landlocked lake stocking was estimated to be \$3.10 in 1992. Cost per fish caught in 1992 was estimated at \$1.41, while the cost for each fish harvested was \$4.17. Costs related to producing and delivering fish to stocked lakes within the NCIMA in 1992 were approximately \$1.50 for each catchable rainbow trout, \$0.06 for each rainbow trout fingerling, \$0.09 for each Arctic grayling fingerling, \$0.0015 for each Arctic grayling fry, and \$0.06 for each salmon fingerling.

Table 40. Northern Cook Inlet Management Area lake stocking summary for nonanadromous fish, 1993.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN ¹ MARK	BROODSTOCK ² (TREATMENT)	HATCHERY	STOCKING SIZE	STOCKING ^a METHOD
<u>RAINBOW TROUT</u>								
Barley	18.6	07/15/93	1,860		93 Swanson R	Ft. Richardson	1.30g	T/BU
Bear Paw	45	07/26/93	4,500		93 Swanson R	Ft. Richardson	1.36g	T/BU
Bench ²	34	10/04/93	3,440		93 Swanson R(TAF)	Ft. Richardson	7.50g	A
Big	2,495	09/10/93	612		90 Big Lake	Ft. Richardson	738.00g	T
Big Beaver	161	07/19/93	16,100		93 Big Lake	Ft. Richardson	0.85g	T
Big No Luck ²	67.9	10/04/93	6,807		93 Swanson R(TAF)	Ft. Richardson	7.50g	A
Carpenter	176.4	07/15/93	17,651		93 Swanson R	Ft. Richardson	1.25g	T
Christiansen	179	07/26/93	17,900		93 Swanson R	Ft. Richardson	1.36g	T
Coyote ²	1	06/23/93	323		92 Swanson R(TAF)	Ft. Richardson	101.50g	T
Crystal ²	131.7	07/28/93	13,170		93 Swanson R(TAF)	Ft. Richardson	1.42g	T
Dawn ²	11.8	07/28/93	2,360		93 Swanson R(TAF)	Ft. Richardson	1.10g	T/BU
Diamond	139	07/20/93	11,900		93 Swanson R	Ft. Richardson	1.70g	T
Dollar	5.8	07/19/93	1,388		93 Big Lake	Ft. Richardson	0.85g	T/BU
Echo ²	23	06/22/93	1,816		92 Swanson R (AF)	Ft. Richardson	112.00g	T
Farmer	21	07/15/93	1,100		93 Swanson R	Ft. Richardson	1.30g	T/BU
Finger	362	07/16/93	36,200		93 Swanson R	Ft. Richardson	1.30g	T
Florence	54.6	07/20/93	5,460		93 Swanson R	Ft. Richardson	1.70g	T/BU
Homestead	17	07/19/93	3,588		93 Big Lake	Ft. Richardson	0.85g	T/BU
Honeybee	58	07/20/93	5,800		93 Swanson R	Ft. Richardson	1.70g	T/BU
Irene ²	18	06/18/93	1,473		92 Swanson R (AF)	Ft. Richardson	105.00g	T/BU
Johnson ^{1&2}	40.3	07/20/93	3,931	RV	93 Swanson R (AF)	Ft. Richardson	1.11g	T
		07/20/93	3,938	LV	93 Swanson R	Ft. Richardson	1.11g	T
Kalmbach	125	07/19/93	12,500		93 Swanson R	Ft. Richardson	1.77g	T
Kashwitna ²	160	07/26/93	16,000		93 Swanson R(TAF)	Ft. Richardson	1.14g	T
Kepler-Bradley ²	58	05/25/93	2,514		92 Swanson R (AF)	Ft. Richardson	95.20g	T
		06/22/93	2,105		92 Swanson R (AF)	Ft. Richardson	112.00g	T
		07/16/93	5,800		93 Swanson R	Ft. Richardson	1.30g	T
Knik ²	50.4	05/27/93	1,998		92 Swanson R(TAF)	Ft. Richardson	92.00g	T
		07/15/93	2,500		93 Swanson R	Ft. Richardson	1.30	T
Lalen	91.9	07/19/93	4,500		93 Big Lake	Ft. Richardson	0.85g	T
Lazy	22.5	07/19/93	2,529		93 Big Lake	Ft. Richardson	0.85g	T
Little Lonely	56	07/26/93	5,600		93 Swanson R	Ft. Richardson	1.36g	T/BU
Loberg ²	10.9	07/13/93	880		92 Swanson R(TAF)	Ft. Richardson	97.00g	T
Long [Big Lake]	44.4	07/19/93	4,658		93 Big lake	Ft. Richardson	0.85g	T
Long [K/B] ^{1&2}	74.4	07/23/93	7,383	RV	93 Swanson R(TAF)	Ft. Richardson	1.01g	T
		07/23/93	7,355	LV	93 Swanson R	Ft. Richardson	1.15g	T
Long (Mi.86)	106	07/16/93	10,600		93 Swanson R	Ft. Richardson	1.30g	T
Loon	108	07/19/93	10,800		93 Big Lake	Ft. Richardson	0.85g	T
Lorraine	132	07/15/93	13,200		93 Swanson R	Ft. Richardson	1.30g	A
Lucille	362	07/13/93	55,496		93 Big Lake	Ft. Richardson	0.90g	T
		07/20/93	16,304		93 Big Lake	Ft. Richardson	0.90g	T
Lynda	11.2	07/19/93	1,241		93 Big Lake	Ft. Richardson	0.85g	T/BU
Lynne	70	07/20/93	7,000		93 Swanson R	Ft. Richardson	1.70g	T

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Table 40. (Page 2 of 5).

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN ¹ MARK	BROODSTOCK ²	HATCHERY	STOCKING SIZE	STOCKING ^a METHOD
Marion	113	07/20/93	11,300	93	Swanson R	Ft. Richardson	1.70g	T/BU
Matanuska ²	61.5	05/25/93	2,464	92	Swanson R(TAF)	Ft. Richardson	95.70g	T
		06/22/93	4,885	92	Swanson R (AF)	Ft. Richardson	112.00g	T
		07/16/93	3,100	93	Swanson R	Ft. Richardson	1.30g	T
Memory	83	07/16/93	8,300	93	Swanson R	Ft. Richardson	1.25g	T
Morvro	86.6	07/19/93	8,676	93	Big Lake	Ft. Richardson	0.85g	T/BU
North Friend ²	81.4	07/26/93	8,140	93	Swanson R(TAF)	Ft. Richardson	1.14g	T
Prator	98	07/26/93	9,800	93	Swanson R	Ft. Richardson	1.36g	T
Ravine	12.3	07/16/93	2,500	93	Swanson R	Ft. Richardson	1.30g	T/BU
Reed	19.5	07/16/93	1,950	93	Swanson R	Ft. Richardson	1.30g	T/BU
Rocky	58.7	07/20/93	5,870	93	Swanson R	Ft. Richardson	1.70g	T
Ruby ²	24	10/04/93	4,945	93	Swanson R(TAF)	Ft. Richardson	7.30g	A
Seventeenmile	100	07/16/93	10,000	92	Swanson R	Ft. Richardson	1.30g	T
Seymour	229	07/19/93	11,500	93	Big Lake	Ft. Richardson	0.85g	T
Slipper (Eska) ²	9.1	06/23/93	726	92	Swanson R(TAF)	Ft. Richardson	101.50g	T
South Friend ²	55.7	07/26/93	5,570	93	Swanson R(TAF)	Ft. Richardson	1.14g	T/BU
South Rolly ²	107.7	07/28/93	21,596	93	Swanson R(TAF)	Ft. Richardson	1.26g	T
Stepan	59.9	07/19/93	5,694	93	Big Lake	Ft. Richardson	0.85g	T
Tigger	18.9	07/26/93	1,890	93	Swanson R	Ft. Richardson	1.36	T/BU(02)
Twin	62.5	07/19/93	6,094	93	Big Lake	Ft. Richardson	0.85g	T
Vera ²	110.5	07/28/93	11,050	93	Swanson R(TAF)	Ft. Richardson	1.10g	T/BU
Visnaw	130.7	07/19/93	6,559	93	Big Lake	Ft. Richardson	0.85g	T
Walby ²	53.9	07/12/93	2,083	92	Swanson R(TAF)	Ft. Richardson	97.00g	T
		07/28/93	10,780	93	Swanson R(TAF)	Ft. Richardson	1.10g	T
West Beaver	102.5	07/19/93	11,500	93	Big Lake	Ft. Richardson	0.85g	T
West Sunshine ²	22.3	07/26/93	4,460	93	Swanson R(TAF)	Ft. Richardson	1.14g	T/BU
Willow ²	143.3	07/26/93	14,300	93	Swanson R(TAF)	Ft. Richardson	1.14g	T
Wishbone ²	52.7	10/04/93	5,271	93	Swanson R(TAF)	Ft. Richardson	7.50g	A
"X" ^{1&2}	101.4	07/29/93	9,932	RV	93 Swanson R (AF)	Ft. Richardson	1.01g	T/BU(02)
		07/29/93	10,017	LV	93 Swanson R	Ft. Richardson	1.15g	T/BU(02)
"Y"	39.7	07/26/93	3,970	93	Swanson R	Ft. Richardson	1.36g	T/BU

Rainbow trout totals

Number of lakes: 64

Number of surface acres: 7,580.6

Swanson River

	Diploid Mixed-Sex	Diploid All-Female	Triploid All-Female	Swanson TOTAL	Big Lake	TOTAL STOCKED
Catchables	0	12,793	8,474	21,267	0	21,267
Fingerling	239,562	21,246	127,888	388,697	166,627	555,324
Total Rainbow Stocked:	239,562	34,039	136,362	409,964	166,627	576,590

¹ FIN MARK: LV = diploid mixed-sex; RV = diploid all-female.

² TREATMENT: (AF) = diploid all-female; (TAF) = triploid all-female.

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Table 40. (Page 3 of 5).

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN MARK	BROODSTOCK	HATCHERY	STOCKING SIZE	STOCKING ^a METHOD
<u>COHO SALMON</u>								
Barley	18.6	05/14/93	1,860	92 Bear	Lake	Elmendorf	5.50g	T/BU
Bear Paw	45	05/13/93	9,000	92 Bear	Lake	Elmendorf	4.88g	T/BU
Benka	123	06/14/93	12,230	92 Bear	Lake	Elmendorf	9.44g	T
Carpenter	176.4	05/14/93	17,560	92 Bear	Lake	Elmendorf	5.50g	T
Christiansen	179	05/18/93	35,804	92 Bear	Lake	Elmendorf	5.53g	T
Diamond	139	05/13/93	13,900	92 Bear	Lake	Elmendorf	4.88g	T
Echo	23	05/03/93	4,600	92 Bear	Lake	Elmendorf	4.20g	T
Finger	362	05/03/93	12,938	92 Bear	Lake	Elmendorf	4.20g	T
Kalmbach	125	05/12/93	12,492	92 Bear	Lake	Elmendorf	5.44g	T
Klaire	9	05/03/93	1,800	92 Bear	Lake	Elmendorf	4.20g	T
Knik	50	05/14/93	5,000	92 Bear	Lake	Elmendorf	5.50g	T
Loberg	10.9	05/03/93	1,100	92 Bear	Lake	Elmendorf	4.20g	T
Matanuska	61.5	05/03/93	6,200	92 Bear	Lake	Elmendorf	4.20g	T
Memory	83	05/12/93	15,966	92 Bear	Lake	Elmendorf	5.44g	T
Prator	98	05/13/93	19,905	92 Bear	Lake	Elmendorf	4.88g	T
Rocky	58.7	05/12/93	6,062	92 Bear	Lake	Elmendorf	5.44g	T
Victor	13.5	05/03/93	5,400	92 Bear	Lake	Elmendorf	4.20g	T/BU

Coho salmon totals

Number of lakes: 17

Number of surface acres: 1,575.6

	Bear Lake
Fingerling	181,817

Total Coho Stocked:	181,817

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Table 40. (Page 4 of 5).

LAKE	SURFACE	DATE	NUMBER	FIN		STOCKING	STOCKING ^a	
STOCKED	ACRES	STOCKED	STOCKED	MARK	BROODSTOCK	HATCHERY	SIZE	METHOD
<u>ARCTIC GRAYLING</u>								
Canoe	21.2	06/02/93	21,200	93 Moose L.		Clear	0.02g	CA/BG(02)
		09/20/93	4,200	93 Moose L.		Clear	4.74g	T/BU
Farmer	21	09/13/93	1,100	93 Moose L.		Clear	4.15g	T
Finger	362	09/21/93	18,100	93 Moose L.		Clear	4.73g	T
Florence	54.6	09/20/93	5,460	93 Moose L.		Clear	4.74g	T
Kepler-Bradley	58	09/21/93	5,800	93 Moose L.		Clear	4.74g	T
Knik	50.4	09/13/93	5,000	93 Moose L.		Clear	4.15g	T
Loberg	10.9	09/09/93	1,100	93 Moose L.		Clear	3.98g	T
Long [Mi.86]	106	06/02/93	64,000	93 Moose L.		Clear	0.02g	CA/BG(02)
		09/09/93	10,600	93 Moose L.		Clear	3.98g	T
Lorraine	132	09/13/93	13,200	93 Moose L.		Clear	4.15g	T
Matanuska	61.5	09/21/93	3,100	93 Moose L.		Clear	4.74g	T
Meirs	16.8	06/02/93	16,700	93 Moose L.		Clear	0.02g	CA/BG(02)
		09/20/93	3,400	93 Moose L.		Clear	4.74g	T/BU
Reed	19.5	09/20/93	1,950	93 Moose L.		Clear	4.74g	T
Seventeenmile	100	09/13/93	10,000	93 Moose L.		Clear	4.15g	T
"Y"	39.7	09/20/93	3,900	93 Moose L.		Clear	4.74g	T

Arctic grayling totals

Number of lakes: 14

Number of surface acres: 1,053.6

	Moose Lake
Fry	101,900
Fingerling	<u>86,910</u>
Total Grayling Stocked:	188,810

ARCTIC CHAR

Benka	123	06/17/93	12,300	1992 domestic	Clear	7.79g	T
Finger	362	06/16/93	36,200	1992 domestic	Clear	7.35g	T
Irene	18	06/23/93	3,600	1992 domestic	Clear	11.70g	T/BU
Lynne	70	06/23/93	7,000	1992 domestic	Clear	11.70g	T/BU
Marion	113	06/23/93	11,300	1992 domestic	Clear	11.70g	T/BU

Arctic char totals

Number of lakes: 5

Number of surface acres: 686

	1992 domestic
Fingerling	<u>70,400</u>
Total Arctic Char Stocked:	70,400

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Table 40. (Page 5 of 5).

LAKE	SURFACE	DATE	NUMBER	FIN		STOCKING	STOCKING ^a	
STOCKED	ACRES	STOCKED	STOCKED	MARK	BROODSTOCK	HATCHERY	SIZE	METHOD

CHINOOK SALMON

Finger	362	11/03/93	12,183	1992 Willow Ck.	Ft. Richardson		82.00g	T
		11/04/93	11,378	1992 Willow Ck.	Ft. Richardson		84.00g	T
		11/05/93	9,868	1992 Willow Ck.	Ft. Richardson		85.00g	T
		12/15/93	2,712	1992 Willow Ck.	Ft. Richardson		88.90g	T

			36,141					

Chinook salmon totals

Number of lakes: 1

Number of surface acres: 362

	1992 Willow Ck.	
Catchables	36,141	

Total Chinook Stocked:	36,141	

ALL SPECIES

Number of lakes: 69

Number of surface acres: 7,764.1

Rainbow Trout	=	576,590
Coho Salmon (non-anadromous)	=	181,817
Chinook Salmon (non-anadromous)	=	36,141
Arctic Grayling	=	188,810
Arctic Char	=	70,400

Total fish stocked	=	1,053,758

^a Stocking Method: A = airdrop; T = tank truck; T/BU = carried in buckets to lake; T/BG(02) = carried to lake in sealed bags with oxygen or in aerated coolers; CA/BG(02) = flown on commercial airlines from Fairbanks to Anchorage in sealed bags, with oxygen, on ice.

Management Objectives

The primary objective of this program is to provide additional fishing opportunities in a cost effective manner on a sustainable basis by stocking lakes with game fish that are indigenous to Alaska. An additional objective of the program is to insure that stocking does not negatively impact wild stocks or other fisheries. All stocking is conducted in accordance to guidelines set forth in the Statewide Stocking Plan for Recreational Fisheries.

Recent Board of Fisheries Actions

During the fall of 1988 the BOF designated three lakes stocked with rainbow trout as catch-and-release waters. The three lakes included Long Lake, located near Palmer, "X" Lake located near Talkeetna, and Wishbone Lake located near the community of Sutton. All rainbow trout must be released immediately from the three lakes and only unbaited, single-hook artificial lures can be used in these waters. The catch-and-release regulations, the first for stocked lakes in Alaska, became effective in 1989. During the fall of 1992 the BOF further restricted the three lakes to allow fishing only during the open-water season, May 1 through October 30; the new regulations took effect in 1993. BOF action in 1992 also resulted in a reduction of the rainbow trout bag limit in Big Lake to 2 fish per day, only 1 of which may be 20 inches or more in length.

Current Issues

The cost associated with providing an angler-day of stocked lake fishing averaged \$3.28 over the last 5 years. Since 1990 an average 87,025 stocked fish have been caught annually and 41% of that catch has been harvested. Increased stocking levels have not produced parallel increases in participation. Lake stocking research indicates the area's stocking program is making more harvestable fish available than ever before but anglers are not taking full advantage of these fish.

Why has increased stocking not produced proportionate increases in participation? Has the current level of stocking exceeded demand for stocked lake fishing? Are anglers unaware of stocked lake fishing opportunities? Is participation hindered because of poor access, or lack of support facilities at many stocked lakes? Does the SWHS adequately reflect year-round participation of anglers fishing Matanuska-Susitna Valley stocked lakes? Finding answers and solutions to these issues will be essential if stocking in the NCIMA is to function in a cost-effective manner.

Ongoing Research and Management Activities

Landlocked lake research in 1993 was directed at comparing survival, growth, and longevity of diploid (normal) mixed-sex and triploid (sterile) all-female rainbow trout fingerling. Preliminary data indicate through 2 years after stocking triploid all-female rainbow trout average survival was approximately two-thirds the average survival of diploid mixed-sex rainbow trout; mean length of triploid fish after 2 years was 10% less than mean length of diploid fish. If triploid all-female rainbow trout can be developed in a cost-effective manner, the fish could be stocked in lakes that have open or intermittent linkages with drainages that support wild rainbow trout.

Three lakes were stocked in 1993 with equal numbers of diploid (normal) mixed-sex and diploid all-female rainbow trout fingerlings for comparison of survival and growth. If the all-female trout have survival and growth through age 2 better than or equivalent to mixed-sex trout, the Ft. Richardson Brood Stock Development Center may change both rainbow trout brood stock and catchable and fingerling production for all-female releases. As a significant portion of rainbow trout males mature and die at age 2 and age 3, fewer fish would need to be maintained with an all-female brood stock.

Recommended Research and Management Activities

Current levels of stocking within the NCIMA should not increase during the next several years. Substantial effort should be directed toward increasing angler participation at stocked lakes by improving the public's awareness of available fishing opportunities. Annual updating of the area's stocked lake brochure and expanded distribution of this popular pamphlet may help improve the public's awareness of fishing opportunities afforded by stocked lakes. Providing the brochure to visitor centers, sporting good outlets and license vendors should become an annual objective of the stocked lakes program. An additional objective of the program should be to improve and maintain public access, parking, and signing at stocked lakes.

The areawide stocking program should continue to be evaluated annually in terms of the cost per angler-day of participation, cost per fish caught, and cost per harvested fish. When coupled with public input, these data should provide the basis for modifying stocking strategies. Evaluation of all-female rainbow trout should be continued in 1994. Evaluation of triploid (sterile) coho salmon for use in lakes that have intermittent linkages with drainages that support wild salmon should be initiated in 1994.

Evaluation of the stocked lakes program depends heavily on harvest and effort data from the SWHS. In fact, assessment of the cost effectiveness of various stocking strategies depends almost totally upon the SWHS because onsite creel surveys to estimate seasonal effort and harvest have not been performed.

Rainbow Trout Fisheries

Background and Historical Perspective

NCIMA rainbow trout harvests have ranged from 32,000 to 75,000 and averaged 48,537 fish during the years 1977 through 1992 (Mills 1979-1993) (Table 41). This harvest accounts for 38.9% and 29.2% of the average harvest within Region II and the state respectively. The Knik Arm Management Unit harvest, of which a large percentage is a result of the stocked lake program, accounts for approximately 67% of the total NCIMA harvest. The Westside Susitna and the Eastside Susitna Management units have accounted for 17% and 15% of this harvest, respectively, with the West Cook Inlet Management Unit accounting for less than 2%. Since 1990 the SWHS has also estimated the catch of rainbow trout. From 1990-1992 the catch averaged approximately 150,000 rainbow trout (Mills 1991, 1992 and 1993) (Table 41). The Knik Management Unit has also dominated the catch (61%), with Westside Susitna (23%) and Eastside Susitna (15%) accounting for the majority of the remainder.

Table 41. Northern Cook Inlet Management Area recreational catch and harvest of rainbow trout by management unit, 1977-1992.

Year	Northern Cook Inlet Management Area										Region II		Statewide	
	Knik Arm Unit		Eastside Susitna Unit		Westside Susitna Unit		West Cook Inlet Unit		Total		Harvest		Harvest	
	Catch ^a	Harvest	Catch ^a	Harvest	Catch ^a	Harvest	Catch ^a	Harvest	Catch ^a	Harvest	Number	% NCIMA	Number	% NCIMA
1977		18,615		5,225		7,472		958		32,270	80,345	39.8	94,307	33.9
1978		23,139		5,930		12,295		723		42,087	107,243	39.1	120,231	34.9
1979		24,843		9,463		12,555		1,063		47,924	129,815	36.7	139,390	34.2
1980		29,368		6,715		12,785		560		49,428	126,686	38.9	153,476	32.1
1981		41,749		8,813		11,296		1,734		63,592	149,460	41.2	178,613	34.5
1982		30,549		7,536		11,465		398		49,948	142,579	34.8	173,242	28.6
1983		26,421		9,639		9,253		871		46,184	141,705	32.5	168,677	27.3
1984		26,418		7,656		8,029		698		42,801	128,649	33.3	170,117	25.2
1985		46,431		7,872		8,114		902		63,319	142,316	44.5	181,991	34.8
1986		27,690		8,061		6,668		212		42,631	114,873	37.1	152,855	27.9
1987		24,663		6,647		8,020		579		39,909	101,397	39.4	138,698	28.8
1988		58,609		7,622		8,058		618		74,907	155,960	48.0	241,831	40.0
1989		44,518		4,972		4,928		534		54,952	127,444	43.1	209,961	26.2
1990	98,720	30,699	21,806	5,008	33,511	3,960	2,340	438	156,377	40,105	122,987	32.6	191,809	20.9
1991	88,645	39,636	26,329	7,854	46,839	4,526	1,290	404	163,103	52,420	127,492	40.7	205,642	25.2
1992	85,331	27,995	19,915	3,948	23,850	2,028	760	150	129,856	34,121	97,730	34.9	139,973	24.4
Mean	90,899	32,584	22,683	7,060	34,733	8,216	1,463	678	149,779	48,537	124,793	38.9	166,301	29.2
Mean % of NCIMA	60.7	67.1	15.1	14.5	23.2	16.9	1.0	1.4	100	100				

^a Catch estimates available beginning in 1990.

The Alaska BOF attempted for several years to accommodate a wide array of individual requests for regulatory reform to provide for conservative rainbow trout management. In 1984 they determined that a comprehensive trout policy was needed. A 13-member citizen planning team working with the department and the angling community developed a draft management policy over a 2-year period.

During the fall of 1986 the BOF officially adopted this plan as a management policy for Cook Inlet and Copper River rainbow trout. The policy provides a systematic approach for selecting fishery regulations as well as a process for rational identification of waters for special management (ADF&G 1986). The BOF has used the policy since 1986 to implement regulations for rainbow trout within the NCIMA (Engel and Vincent Lang 1992).

Even before the policy was developed, the management of Susitna River trout was becoming conservative. Bag and possession limits, for example, were 10 rainbow trout prior to 1982. Beginning in 1982 the bag and possession limits dropped to 5 rainbow trout of which only 2 could be 20 inches or more in length. In 1983 the limit was further reduced to allow just 1 fish 20 inches or more in length. Starting in 1987 and continuing to the present, nearly all streams within the Susitna River drainage have been regulated according to the Conservative Yield concept of the rainbow trout plan. This management concept strives to maintain historical size and age compositions and abundance levels for wild trout. Bag and possession limits under this concept are 2 trout, of which only 1 may be 20 inches or more in length. This management strategy also requires the use of unbaited artificial lures in all flowing waters from September 1 through May 15, to enhance survival of released fish at the time when trout are often a targeted species. This regulatory scheme attempts to allow a modest portion of the annual trout production to be removed from most populations while the rest are recycled.

All Cook Inlet rainbow trout fisheries are additionally managed under a seasonal limit of 2 rainbow trout over 20 inches. To assure compliance with this regulation, anglers must, immediately upon harvesting a trout over 20 inches, record that harvest on the back of their license or on a harvest record.

A major portion of the Eastside Susitna Management Unit has been managed for trophy-size trout (trout over 20 inches) since 1987. This fishery encompasses all drainages of the Susitna River upstream from the junction of the Susitna and Talkeetna rivers to Devil's Canyon. Under this concept, only 1 trout 20 inches or more in length is allowed daily. Small trout must be released immediately. An unbaited, single-hook lure requirement complements this strategy.

Major portions of three of the Susitna River drainage's best trout streams joined the Talachulitna River as catch-and-release waters starting in 1987. The Talachulitna River had previously become Alaska's first catch-and-release trout fishery in 1977. No-kill strategies govern most of the Lake Creek drainage, much of the Deshka River and the Fish Creek drainage located within the Talkeetna River drainage. Unbaited, single-hook lures are mandatory in all catch-and-release waters. Catch-and-release strategies were adopted to perpetuate quality fishing rather than protect or rebuild depressed stocks (Engel and Vincent-Lang 1992).

Stocked landlocked lakes are the only waters within the drainage that fall under the maximum sustained yield management concept. Bag and possession limits under this management concept are 5 trout. Although stocked lakes are primarily managed for put and take fisheries, three stocked lakes have been established for catch-and-release fishing through utilization of unbaited artificial lures and closures November 1 to April 30 to prohibit ice fishing.

Wild trout are not supplemented with hatchery trout in the Susitna River drainage. Public testimony during the development of the rainbow trout plan suggested little interest in the use of hatchery fish to augment wild stocks. In fact, many participants in the planning process expressed strong opposition to any hatchery assistance for wild Susitna River trout.

A description of the Susitna River drainage as well as a discussion of access routes within the area have previously been discussed in overviews pertaining to Susitna River chinook salmon fisheries.

According to the SWHS, the harvest of Susitna River (Eastside and Westside Susitna management units) rainbow trout has ranged from 5,976 to 22,018 fish and averaged 15,276 fish annually during the period 1977 through 1992. Approximately 54% of the average trout harvest from the Susitna River has been from Westside Susitna Management Unit tributaries (Table 41).

The Dëshka River, Lake Creek and Alexander Creek generally provide the largest harvests among Westside Susitna Management Unit fisheries. Willow Creek, Montana Creek and the Talkeetna River drainage are the major rainbow trout fisheries in the Eastside Susitna Management Unit (Appendices A31, A33 and A35).

Studies have been directed on rainbow trout stocks of the Dëshka River, Lake Creek and Talachulitna River since 1989 (Bradley 1990 and 1991), including the Kashwitna River since 1991 and Peters Creek since 1992 (Rutz 1992 and 1993). Assessment of the age and length characteristics of these stocks has been the primary focus of these investigations, also, onsite creel surveys were conducted at Lake Creek during 1988 and 1989 (Hepler and Vincent Lang 1988). Significant differences in age composition and mean length-at-age statistics occurred for select Susitna River tributaries sampled during 1989-1992 (Rutz 1992 and 1993). Rainbow trout tagged during 1991 and 1992 indicated a low occurrence of trout over 510 mm in length, the size limit defined in the Cook Inlet Rainbow Trout Management plan for trophy trout. This lack of adequately sized fish combined with the relatively slow growth rate of Susitna River basin trout in comparison to other Alaskan waters containing trophy trout suggests that these Susitna River rainbow trout stocks are not viable candidates for management as trophy fisheries under the Cook Inlet Rainbow Trout Management Plan (Rutz 1992).

Recent Fishery Performance

A harvest of 5,976 rainbow trout in 1992 was the lowest on record for the Eastside and Westside Susitna management units and represents less than half of the historical mean harvest for this stock (Table 41). Since 1989 there has been a trend of reduced harvests for Susitna River rainbow trout. This trend is not totally understood but the increasingly conservative regulations that govern major rainbow trout populations within the drainage as well as a

growing desire among anglers to release the majority of their trout catch is at least partially responsible.

The catch during the period 1990 through 1992 for the Eastside Susitna Management Unit ranged from 20,000 to 26,000 and averaged 22,700 fish. The Westside Susitna Management Unit catch ranged from 24,000 to 47,000 and averaged 35,000. The percentage of the total catch harvested in Eastside and Westside management units ranged from 20%-30% (average 25%) and 9%-12% (average 10%), respectively (Table 41).

During 1992 Willow Creek in the Eastside Susitna Management Unit produced the largest rainbow trout harvest from the Susitna River drainage (Appendix A33). An estimated 712 fish were harvested from Willow Creek's catch of 3,206 rainbow trout. The second largest harvest occurred at the Talkeetna River where 665 fish were kept from a catch of 5,581 (Mills 1993).

During 1992 Lake Creek, a Westside Susitna Management Unit fishery, produced an estimated 214 fish harvest from a catch of 5,399 (Appendix A34). The Deshka River, also a Westside Susitna tributary, yielded a rainbow trout harvest and catch of 459 and 3,396 fish, respectively. The Talachulitna River drainage, which is a catch-and-release fishery, produced a catch of 7,892 rainbow trout (Mills 1992). In 1992 the rainbow trout harvest in all major Susitna River fisheries was well below their long-term average.

The vast majority of the rainbow trout harvest in the Knik Arm Unit resulted from stocked lake fisheries (Appendix A32). These fisheries have been discussed previously in the Stocked Lake Fisheries section of this report.

Management Objectives

Past and current management of Susitna basin rainbow trout followed the guidelines set forth in the Cook Inlet and Copper River Basins Rainbow/Steelhead Trout Management Policy.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting, the rainbow trout bag and possession limit in Big Lake was reduced to 2 daily and in possession. Long, X, and Wishbone lakes were closed to sport fishing from November 1 through April 30. The north fork of the Kashwitna River was established as a special management unit for rainbow trout. Only single-hook, unbaited artificial lures may be used in the north fork of the Kashwitna River and rainbow trout may not be possessed or retained.

A regulation was also established which requires that only unbaited artificial lures may be used in all flowing waters of the Susitna West-Cook Inlet area (except when fishing for burbot using legal burbot gear). This regulation is effective from September 1 through May 15 except in areas with special regulations in effect. Areas with regulations for catch-and-release and trophy fish management require the use of unbaited artificial lures year round and rainbow trout may not be possessed or retained.

The rainbow trout regulations in Lake Creek were modified requiring that in all flowing waters of the Lake Creek drainage upstream from its confluence

with the Yentna River to a department marker located one-quarter mile upstream from Bulchitna Lake rainbow trout may not be possessed or retained from August 15 through May 15. Only single-hook unbaited artificial lures may be used in this area during this time period.

Current Issues

The public's desire for conservative yet diversified wild trout management has been clearly evident during recent years in the NCIMA. Special regulations that have been implemented following the guidelines set forth in the rainbow trout management policy have generally been well received by the angling community and no significant problems or confusion regarding these regulations have been apparent. Proposals to establish additional special management areas within the NCIMA are expected to be offered to the BOF on a continuing basis. The rainbow trout management policy must remain the "tool" by which these recommendations are gauged. In order to responsibly evaluate candidate waters for special trout management the department should continue research on Susitna River rainbow trout. A comprehensive evaluation of the effectiveness of special regulations requires assessment of both the fishery and fish population before and after application of special regulations (Engel and Vincent-Lang 1992).

Harvest and catch of rainbow trout in the Susitna River drainage dropped dramatically in 1992 continuing a trend that began in 1989. The 1992 harvest was at its lowest level since the SWHS has been in existence. Some of this decline can be attributed to increasingly conservative regulations but it seems unlikely regulation is totally responsible. To effectively manage these fisheries the department needs to develop an understanding of the pressures on and the dynamics of these fisheries.

Other issues confronting Susitna River wild rainbow trout have previously been discussed in various fishery overviews pertaining to the drainage's salmon fisheries.

Ongoing Research and Management Activities

Studies to define migration patterns and baseline age and length features of trout populations at the Talachulitna River, Deshka River, Peters Creek and Lake Creek are ongoing but include a very low level of involvement by the department. Harvest trends for rainbow trout are measured by the SWHS.

Recommended Research and Management Activities

Age and length assessment of primary rainbow trout fisheries including but not limited to the Talachulitna River, Lake Creek, the Deshka River, Willow Creek and Clear Creek (Talkeetna River) should be collected over a period of years in efforts to determine if a trend in annual variation in age and size composition exists. Methods need to be developed to measure the abundance of rainbow trout in key fisheries to determine if a conservation problem exists.

Management staff should continue to participate in land and water use planning within the Susitna River drainage.

Northern Pike Fisheries

Background and Historical Perspective

Northern pike are not indigenous to the NCIMA and were thought to have been introduced into Bulchitna Lake of the Susitna River drainage during the late 1960s or early 1970s. Since then, northern pike have been reported in over 46 lakes and more than a dozen tributaries of the Susitna River (Appendix G) (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication). Several of these lakes consistently produce fish in the trophy class range (greater than 42.5 inches or 1,080 mm). Weights in excess of 20 pounds with reports of 30 pound fish are being made (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication).

The harvest of northern pike in the NCIMA numbered less than 200 fish which barely accounted for 1% of the statewide harvest of northern pike when the SWHS was initiated in 1977 (Mills 1979) (Table 42). Northern pike harvests slowly increased annually through 1983 when the harvest remained less than 1,000 fish. Since 1984 the harvest of northern pike has increased exponentially. The average harvest during 1984 through 1987 averaged 1,916 fish and from 1988 through 1991 averaged 3,946 fish (Figure 21) (Mills 1979-1992). The harvest of northern pike increased at an annual rate of about 23% from 1977 through 1991. The highest reported harvest of 6,640 fish occurred in 1991.

Recent Fishery Performance

The NCIMA harvest of northern pike during the 1992 season was 5,382 fish. The Westside Susitna Management Unit accounted for about 52% of this harvest and the Knik Management Unit the remainder. The SWHS has not documented any harvest of northern pike from the Eastside Susitna Management Unit or the West Cook Inlet Management Unit.

The NCIMA catch of northern pike during 1992 was 20,925 fish with 66% of this catch being reported from the Westside Susitna Management Unit. Only 26% of the total catch was harvested. While the total catch increased in 1992 the harvest showed a decrease, most of which can be attributed to Westside Susitna Management Unit fisheries (Appendices A36-A38)

Management Objectives

There are no objectives established governing the management of this fishery.

Recent Board of Fisheries Actions

During the 1988 BOF meeting a bag limit of 10 daily and in possession was established for northern pike in all waters of the NCIMA. Prior to that time there was no bag or possession limit.

During the 1992 BOF meeting no action was taken concerning northern pike in the NCIMA.

Table 42. Northern Cook Inlet Management Area recreational catch and harvest of northern pike by management unit, 1977-1992.

Year	Northern Cook Inlet Management Area ^a						Region II		Statewide	
	Knik Arm Unit ^b		Westside Susitna Unit		Total		Harvest		Harvest	
	Catch ^c	Harvest	Catch ^c	Harvest	Catch ^c	Harvest	Number	% NCIMA	Number	% NCIMA
1977		0		132		132	321	41.1	11,982	1.1
1978		0		316		316	767	41.2	12,520	2.5
1979		0		382		382	762	50.1	12,741	3.0
1980		0		232		232	1,358	17.1	17,000	1.4
1981		0		125		125	1,411	8.8	16,536	0.7
1982		0		607		607	1,707	35.5	18,964	3.2
1983		0		944		944	2,642	35.7	21,476	4.4
1984		0		1,821		1,821	4,424	41.2	18,641	9.8
1985		156		1,248		1,404	2,240	62.7	17,943	7.8
1986		458		1,519		1,977	2,894	68.3	21,890	9.0
1987		924		1,540		2,464	4,839	50.9	19,079	12.9
1988		364		2,818		3,182	3,598	88.4	23,440	13.6
1989		863		2,257		3,120	4,434	70.4	21,659	14.4
1990	2,593	754	14,465	2,088	17,058	2,842	3,655	77.7	15,985	17.3
1991	7,021	2,709	11,193	3,931	18,214	6,640	8,704	76.3	29,611	22.4
1992	7,097	2,605	13,828	2,777	20,925	5,382	7,314	73.6	18,616	28.9
Mean	5,570	1,104	13,162	1,421	18,732	1,973	3,192	61.8	18,630	10.6
Mean % of NCIMA	29.7	28.0	70.3	78.0	100	100				

^a No reported catch or harvest from Eastside Susitna or West Cook Inlet management units.

^b Harvest of northern pike prior to 1985 may have been included in other fish species category.

^c Catch estimates available beginning in 1990.

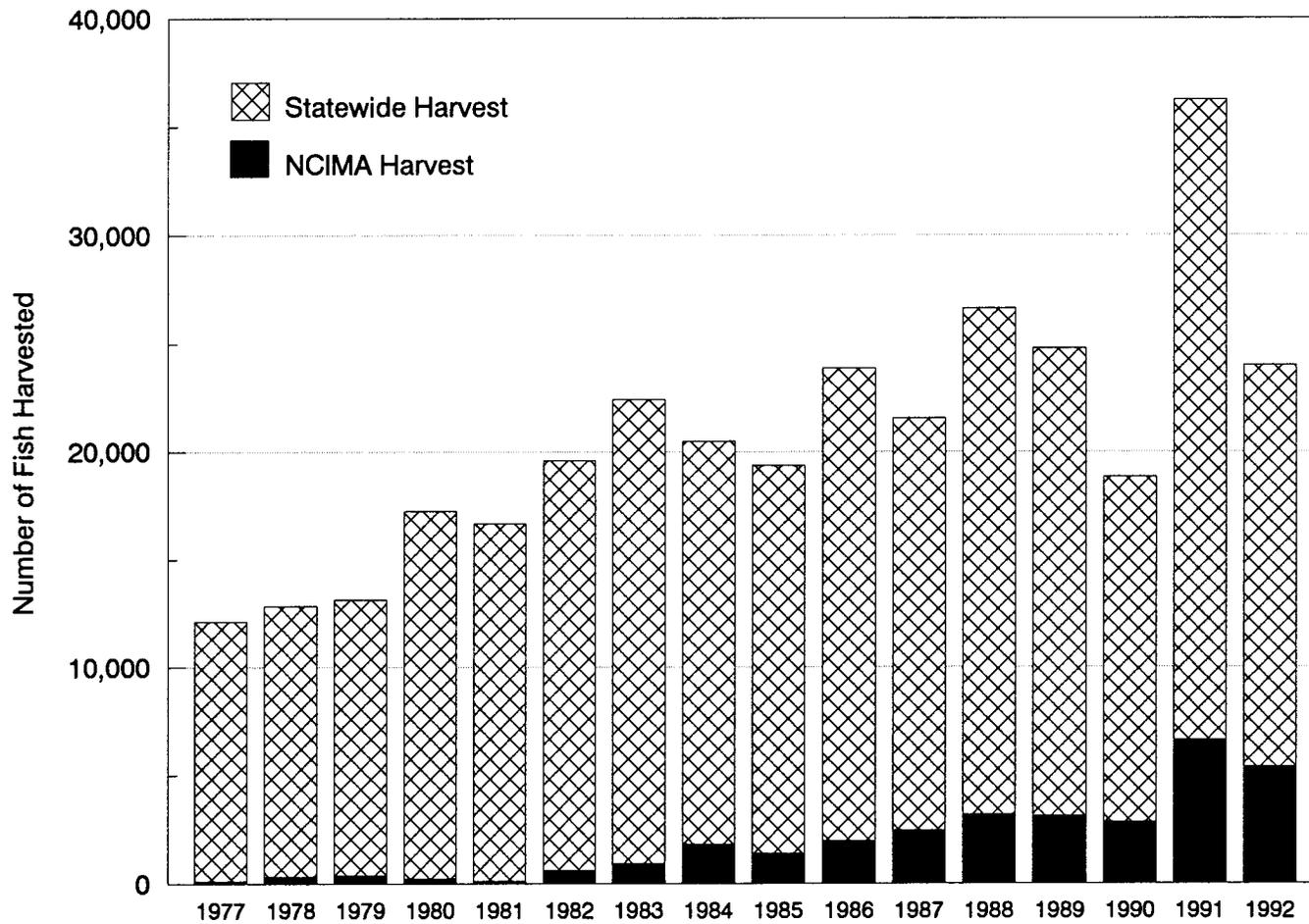


Figure 21. Estimated northern pike harvest from Northern Cook Inlet Management Area and statewide, 1977-1992.

Current Issues

Northern pike are well known for their voracious appetites. Several states including Wyoming, Idaho, Maine, and Michigan have addressed northern pike predation on salmonids as a major management concern (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication). Other state agencies rely on stocking northern pike to control populations of rough fish or other undesirable species. There is a growing concern by commercial fishermen, recreational anglers, and staff that northern pike predation on chinook, coho and sockeye salmon as well as rainbow trout may put additional pressures on these stocks during a period of increasing use and increased harvest levels. Many people may prefer to see overexploitation of northern pike rather than to see impacts created by northern pike on other fish species which are indigenous to the area.

Although many people share concerns regarding stocks which may be impacted by a growing northern pike population, many recreational anglers welcome a large and healthy population for increased recreational opportunities. Current exploitation rates are not believed to present a particular problem, however, literature shows a strong history of overexploitation of this species due to sport harvest (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication).

Ongoing Research and Management Activities

Currently the only source of information regarding this species is catch and harvest information from the SWHS. Age, size and sex samples were collected from a limited number of northern pike during the winter of 1992-1993, however, this information has not yet been summarized.

Recommended Research and Management Activities

A northern pike research program is scheduled to begin in 1994. It will focus on select lakes of the Susitna River drainage which support major fisheries for this species in the NCIMA. The objectives of the study will be: (1) to estimate the age composition, mean length and mean length-at-age of northern pike; (2) to estimate the distribution of northern pike in the Susitna River drainage; and (3) to estimate the abundance of northern pike (>449 mm) in Trapper Lake. Information collected during this study is needed to maintain a fishery that provides approximately 10,000 angler-days of effort and a harvest of 7,000 northern pike.

A literature search should be conducted and a Technical Data Series report written documenting the findings as they apply to the NCIMA.

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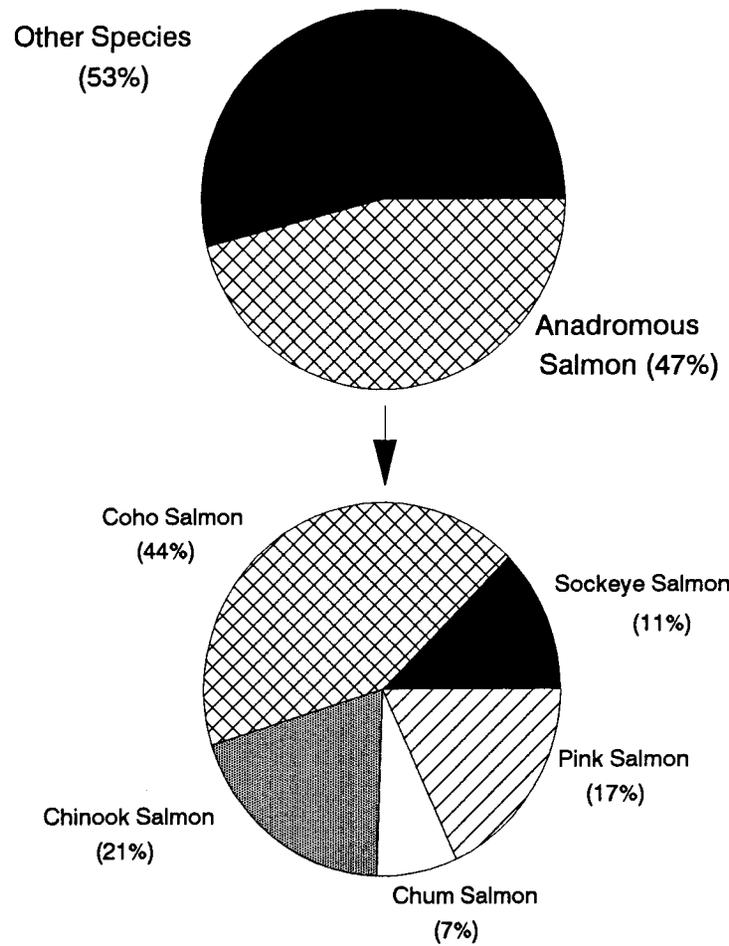
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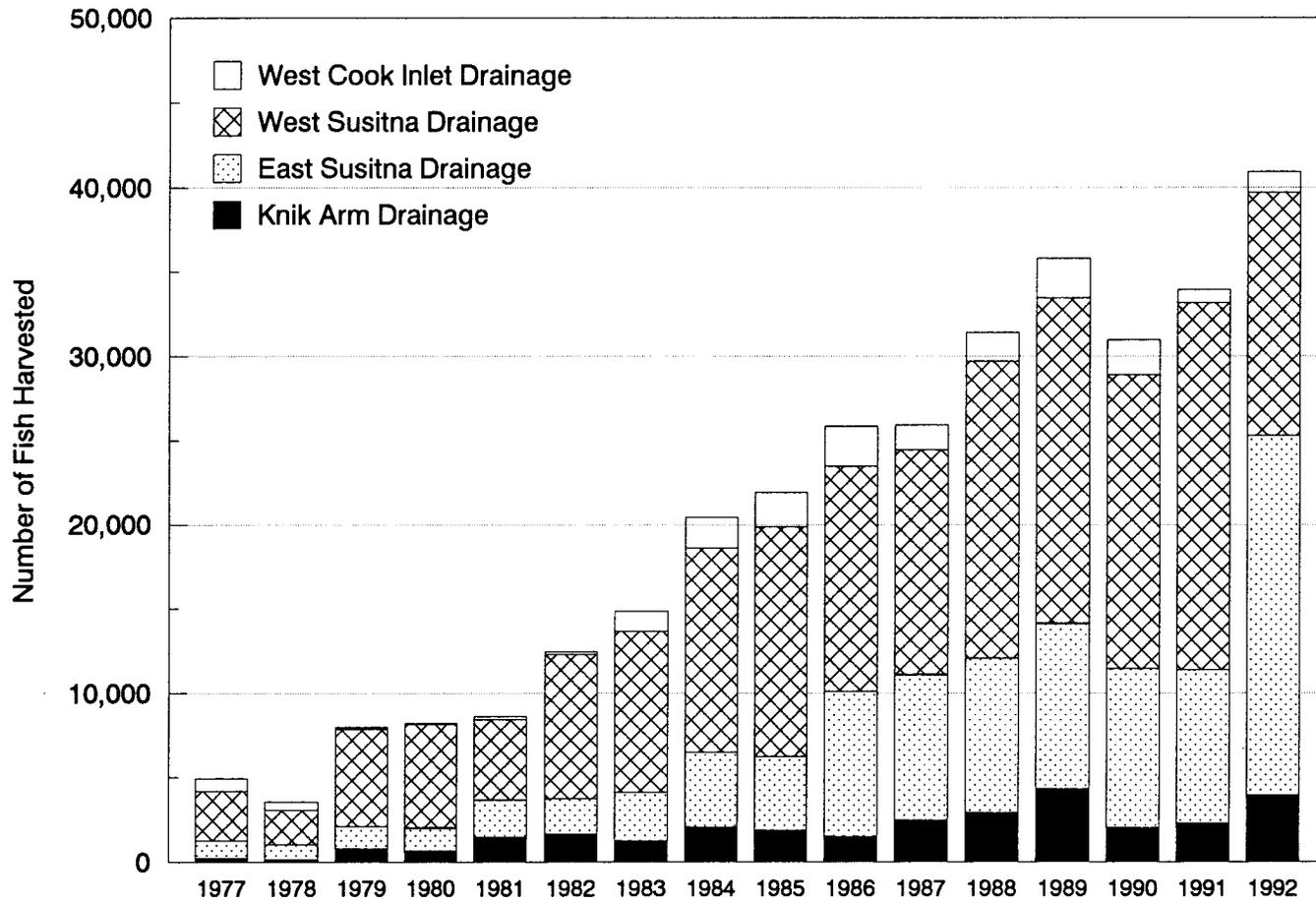
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APPENDIX A



Appendix A1. Northern Cook Inlet Management Area sport fish harvest anadromous salmon composition, 1977-1992.



Appendix A2. Northern Cook Inlet Management Area recreational chinook salmon harvest, 1977-1992.

Appendix A3. Knik Arm drainage chinook salmon harvest by fishery, 1977-1992.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Other ^c	Total
1977			191			0			16	207
1978			93			47			0	140
1979			800			0	0		0	800
1980			646			0	0		0	646
1981			1,418	0		0	0		48	1,466
1982			1,467	0		0	0		199	1,666
1983	16	47	1,187	5		0	0		0	1,255
1984	125	24	1,883	0	0	0	0		25	2,057
1985			1,845	0	0	0	0	44	0	1,889
1986		50	1,457	0	0	0	0	0	17	1,524
1987	117	58	2,282	0	0	0	0	19	0	2,476
1988	0	0	2,822	0	0	66	0	0	28	2,916
1989	77	44	4,204	0	0	16	0	0	0	4,341
1990	28	23	1,965	0	0	6	0	0	0	2,022
1991	129	23	2,102	0	0	17	0	6	0	2,277
1992	16	8	3,920	0	0	9	0	0	16	3,969
Mean	64	31	1,768	0	0	10	0	9	22	1,853

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes lakes and streams.

Appendix A4. Eastside Susitna River drainage chinook salmon harvest by fishery, 1977-1992.

Year	Willow Creek	Lt.Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna ^a River	Other ^b	Total
1977	137	16			259		415			25	204	1,056
1978	47	0			256		408			12	163	886
1979	459	0		156	10		312		10	312	39	1,298
1980	289	32		215	45		559		13	172	45	1,370
1981	585	0		249	0		661		57	373	277	2,202
1982	629	0		471	0		241		52	450	220	2,063
1983	534	0	231	272	0		504		105	934	272	2,852
1984	774	37	0	586	0	0	1,522		125	1,272	112	4,428
1985	1,063	25		527	0		979		771	871	106	4,342
1986	1,017	872	73	327	1,778	145	2,796	290	327	908	36	8,569
1987	1,987	711	116	88	1,610	334	1,726	44	319	1,639	29	8,603
1988	2,349	937	0	578	1,847	218	1,070	28	303	1,762	47	9,139
1989	2,846	507	11	357	1,116	385	1,708	28	368	2,372	85	9,783
1990	3,237	387	6	330	1,537	504	478		465	2,358	121	9,423
1991	3,208	684	41	305	1,519	288	575	47	230	2,025	161	9,083
1992	8,884	1,023	16	592	2,663	1,033	3,078	101	365	3,338	214	21,307
Mean	1,753	327	55	361	790	363	1,065	90	251	1,176	133	6,025

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams.

Appendix A5. Westside Susitna River drainage chinook salmon harvest by fishery, 1977-1992.

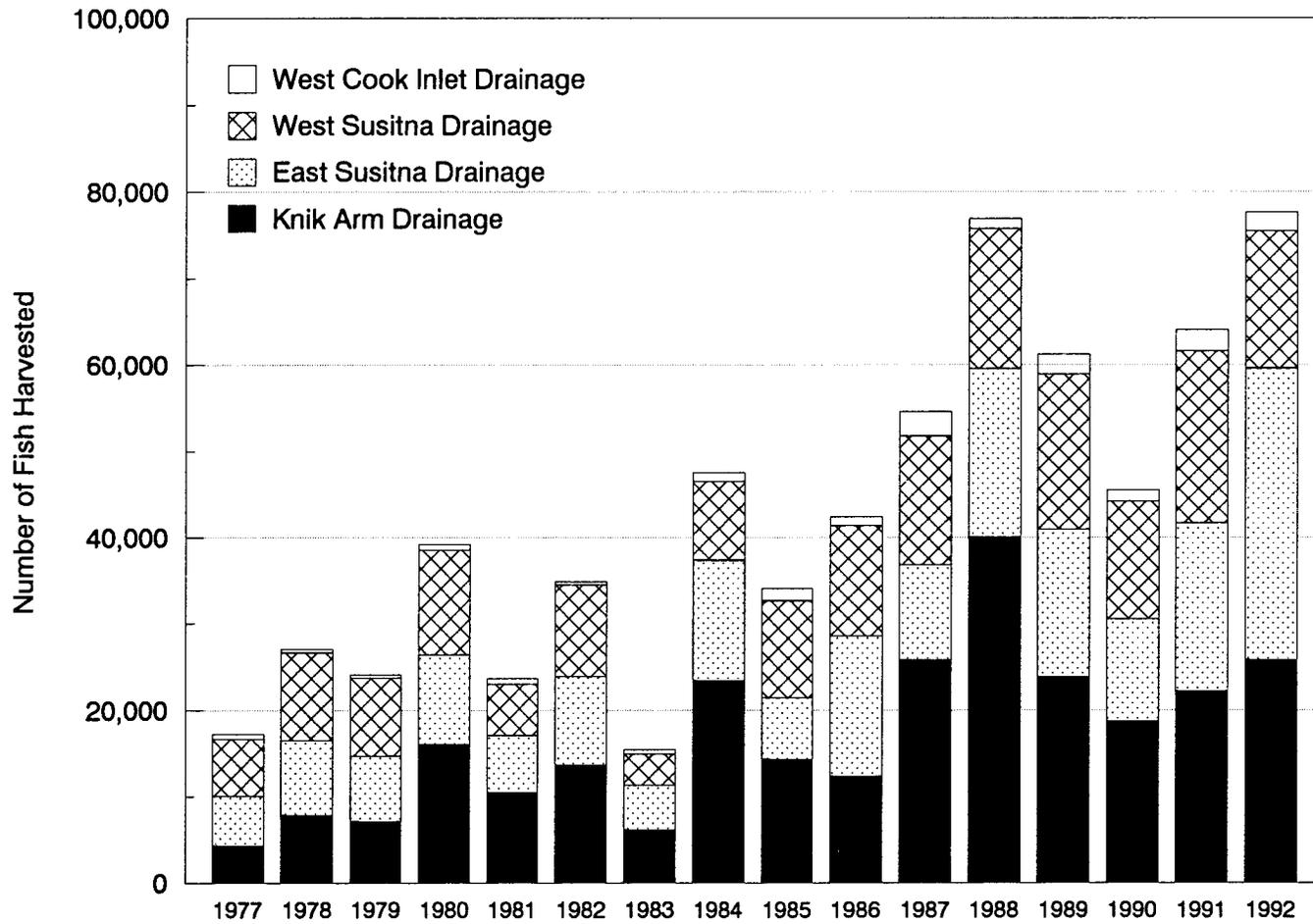
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	820	1,017					464		224	0	413	0	2,938
1978	769	850					326		12	0	82	0	2,039
1979	712	2,811					1,796		293	0	156	0	5,768
1980	1,438	3,685					775		121	0	129	0	6,148
1981	1,121	2,769					795		57		0	0	4,742
1982	2,506	4,307					1,645		0		115	0	8,573
1983	1,711	4,889					2,423		336	0	209	0	9,568
1984	2,107	5,699				112	2,881		424	0	709	174	12,106
1985	2,761	6,407					2,575		224		1,677	0	13,644
1986	2,937	6,490		44			2,134	647	201	0	904	45	13,402
1987	2,224	5,632					3,282	834	116	0	1,252	10	13,350
1988	4,687	5,474				549	2,784	729	909	0	829	9	15,970
1989	4,882	8,062	12	81	215	339	3,554	1,202	403	6	575	12	19,343
1990	5,119	6,161	55		178	385	3,423	740	709		631	24	17,425
1991	6,548	9,306			301	495	2,712	660	848		942	24	21,836
1992	4,124	7,256	23		652	655	3,668	879	445		867	168	18,737
Mean	2,779	5,051	30	63	337	423	2,202	813	333	1	593	28	11,599

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A6. West Cook Inlet drainage chinook salmon harvest by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Total
1977	227		237	9	473
1978	408		58	12	478
1979	78		20	0	98
1980	17		17	0	34
1981	115		77		192
1982	105		42		147
1983	1,185		0		1,185
1984	723		1,110		1,833
1985	734		1,195	100	2,029
1986	960		1,418		2,378
1987	146		1,146	185	1,477
1988	312		1,137	246	1,695
1989	581	237	1,317	190	2,325
1990	1,064		748	285	2,097
1991	377		369	16	762
1992	516	175	522		1,213
Mean	472	206	588	104	1,151



Appendix A7. Northern Cook Inlet Management Area recreational coho salmon harvest, 1977-1992.

Appendix A8. Knik Arm drainage coho salmon harvest by fishery, 1977-1992.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Other ^c	Total
1977			3,415			472			479	4,366
1978			4,865			2,112			918	7,895
1979			3,382			1,211	1,198		1,348	7,139
1980			6,302			3,555	3,375		2,798	16,030
1981			5,940	1,801		814	1,373		556	10,484
1982			7,116	2,306		1,624	1,886		744	13,676
1983	983	513	2,835	774		345	518		171	6,139
1984	1,060	12	14,253	3,429	561	1,920	1,895		299	23,429
1985		120	7,764	2,523	557	1,900	1,005	284	186	14,229
1986		106	6,039	2,948	502	944	690	364	768	12,361
1987	181	453	13,003	3,676	2,318	1,195	1,159	833	2,969	25,787
1988	200	73	19,009	11,078	3,329	1,273	746	1,637	2,692	40,037
1989	142	204	14,129	4,220	1,666	975	876	784	850	23,846
1990	251	35	7,497	6,184	1,012	1,012	286	398	2,087	18,762
1991	255	182	16,450	2,920	631	844	176	486	242	22,186
1992	130	0	20,033	3,409	664	413	348	526	291	25,814
Mean	400	170	9,502	3,772	1,249	1,288	1,109	664	545	16,476

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes lakes and streams.

Appendix A9. Eastside Susitna River drainage coho salmon harvest by fishery, 1977-1992.

Year	Willow Creek	Lt. Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna ^a River	Other ^b	Total
1977	679	225			438		1,415			1,070	1,882	5,709
1978	905	151			478		2,451			2,200	2,388	8,573
1979	462	262		624	462		1,735		774	1,248	1,997	7,564
1980	1,207	494		1,124	430		2,684		1,634	661	2,234	10,468
1981	747	29		901	326		2,261		968	422	939	6,593
1982	1,069	398		776	367		3,060		1,719	996	1,782	10,167
1983	576	52	52	408	596		1,402		722	836	532	5,176
1984	1,846	1,147	162	1,247	661	449	4,502		1,733	1,509	660	13,916
1985	1,026	528		608	478		1,972		1,205	747	478	7,042
1986	944	363	871	472	1,343	363	1,488	980	4,029	3,376	1,961	16,190
1987	2,898	561	36	453	1,068	145	1,394	163	1,612	2,608	90	11,028
1988	4,875	1,237	327	1,455	3,165	291	2,219	691	2,146	2,929	183	19,518
1989	4,218	1,388	336	834	2,231	190	2,295	281	2,159	2,775	371	17,078
1990	2,711	639	197	2,596	991	180	778		704	2,539	408	11,743
1991	4,154	1,308	167	3,819	1,544	657	1,612	322	1,761	3,435	700	19,479
1992	8,591	1,830	713	5,393	4,049	502	3,595	858	2,259	5,531	469	33,790
Mean	2,307	663	318	1,479	1,164	347	2,179	549	1,673	2,055	1,067	12,752

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams.

Appendix A10. Westside Susitna River drainage coho salmon harvest by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Peter's Creek	Yentna River	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other ^b	Total
1977	1,562	559					1,203		346	0	2,929	6,599
1978	2,401	1,789					2,212		88	0	3,683	10,173
1979	1,560	973					2,671		125	0	3,707	9,036
1980	999	2,290					2,351		491	0	6,010	12,141
1981	891	632					1,035		240		3,391	6,189
1982	1,907	2,463					1,603		524		4,571	11,068
1983	408	1,036					1,392		84	0	838	3,758
1984	1,509	1,646			12		2,432		486	62	2,990	9,137
1985	1,455	2,637					4,105		224		2,849	11,270
1986	1,352	4,256		34			1,575	324	402	268	4,593	12,804
1987	1,539	2,789					1,358	362	235	199	2,065	8,547
1988	1,965	7,458			18		2,110	400	418	73	3,768	16,210
1989	2,207	8,974	409	177	47	103	1,907	549	688	9	3,146	18,216
1990	1,973	4,959	540		33	353	2,986	793	276		1,838	13,751
1991	2,296	8,111	32		221	718	4,221	1,081	828		2,393	19,901
1992	834	7,110	543		300	275	2,632	575	405		3,155	15,829
Mean	1,554	3,605	381	106	105	362	2,237	583	366	61	3,143	11,539

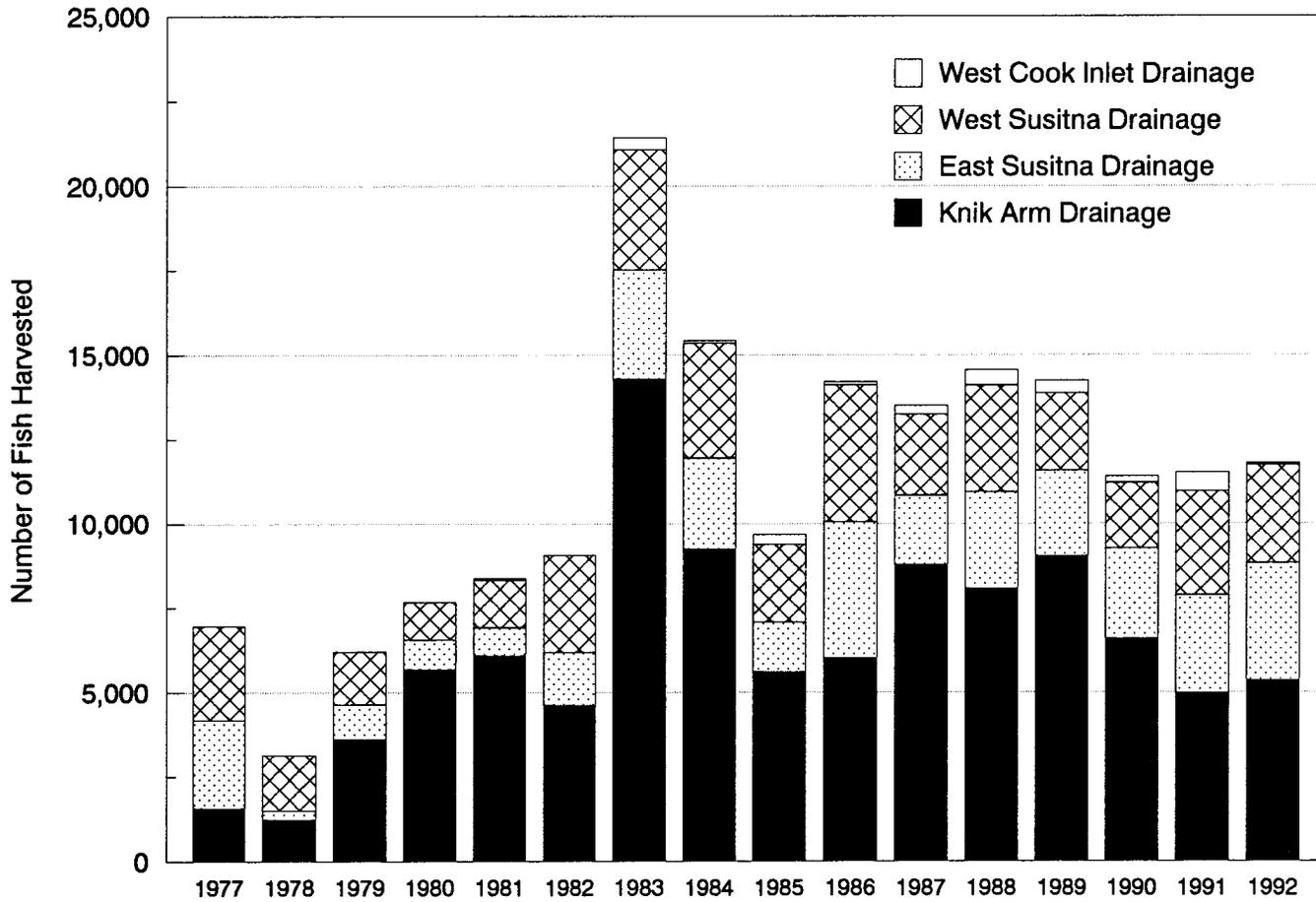
^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet Management Unit lakes and streams.

Appendix All. West Cook Inlet drainage coho salmon harvest by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Other ^a	Total
1977	316		113	103		532
1978	277		101	0		378
1979	287		50	0		337
1980	258		370	0		628
1981	594		10			604
1982	220		115			335
1983	554		10			564
1984	898		137			1,035
1985	1,095		261	75		1,431
1986	815		168			983
1987	1,684		996	145		2,825
1988	782		400	0		1,182
1989	1,228	419	502	112	9	2,270
1990	1,113		198	33		1,344
1991	1,791		513	181		2,485
1992	1,547	243	421			2,211
Mean	841	331	273	65	9	1,197

^a Includes lakes and streams.



Appendix A12. Northern Cook Inlet Management Area recreational sockeye salmon harvest, 1977-1992.

Appendix A13. Knik Arm drainage sockeye salmon harvest by fishery, 1977-1992.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Big Lake	Nancy Lake ^c	Other ^d	Total
1977			888			274			37	56	321	1,576
1978			859			0			0	14	366	1,239
1979			1,478			0	1,525		157	0	456	3,616
1980			2,127			0	2,660		43	69	775	5,674
1981			1,619	450		0	3,245		134	316	316	6,080
1982			1,865	880		0	608		126	618	524	4,621
1983	6,013	1,748	2,787	1,277		0	1,632		89	587	164	14,297
1984	499	237	6,385	823	187	200	661		175	12	61	9,240
1985		76	2,894	1,037	142	120	1,179	109	22	33	0	5,612
1986		50	3,616	905	28	61	789	39	0	99	422	6,009
1987	417	435	3,513	1,105	254	18	869	1,087	0	670	417	8,785
1988	437	36	2,310	1,928	200	36	346	2,037	0	109	637	8,076
1989	789	364	2,315	1,322	204	98	683	2,900	0	169	196	9,040
1990	174	87	891	2,219	29	19	271	2,238	0	107	553	6,588
1991	395	320	1,722	1,459	19	56	47	565	0	207	178	4,968
1992	8	148	1,274	1,471	173	8	633	1,241	0	263	130	5,349
Mean	1,092	350	2,284	1,240	137	56	1,082	1,277	49	208	345	6,298

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Nancy Lake complex lakes.

^d Includes lakes and streams.

Appendix A14. Eastside Susitna River drainage sockeye salmon harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Other Lakes	Total
1977	831	305			450		978			334	696		3,594
1978	56	28			14		85			28	56		267
1979	94	141		0	31		346		157	31	220		1,020
1980	83	77		77	0		257		116	6	257		873
1981	77	67		38	105		182		220	29	115		833
1982	94	105		52	88		514		189	115	398		1,555
1983	425	110	0	151	370		534		685	534	343	69	3,221
1984	249	337	0	87	62	0	561		100	636	636	37	2,705
1985	139	80		110	30		279		249	508	70	0	1,465
1986	290	0	109	0	0	0	363	182	290	1,597	1,198	0	4,029
1987	254	72	54	0	163	0	163	72	181	580	507	0	2,046
1988	564	55	18	164	273	36	364	255	18	1,110	0	0	2,857
1989	414	51	59	110	169	17	296	76	363	617	25	330	2,527
1990	208	149	99	69	149	50	149	0	119	1,506	179	0	2,677
1991	397	71	62	230	168	0	44	97	88	1,280	460	0	2,897
1992	526	164	33	123	189	58	340	140	394	1,356	115	0	3,468
Mean	294	113	48	87	141	20	343	117	226	642	330	44	2,252

^a Talkeetna River and tributaries including Clear Creek.

^b Other includes lakes and streams for 1977-1982.

Appendix A15. Westside Susitna River drainage sockeye salmon harvest by fishery, 1977-1992.

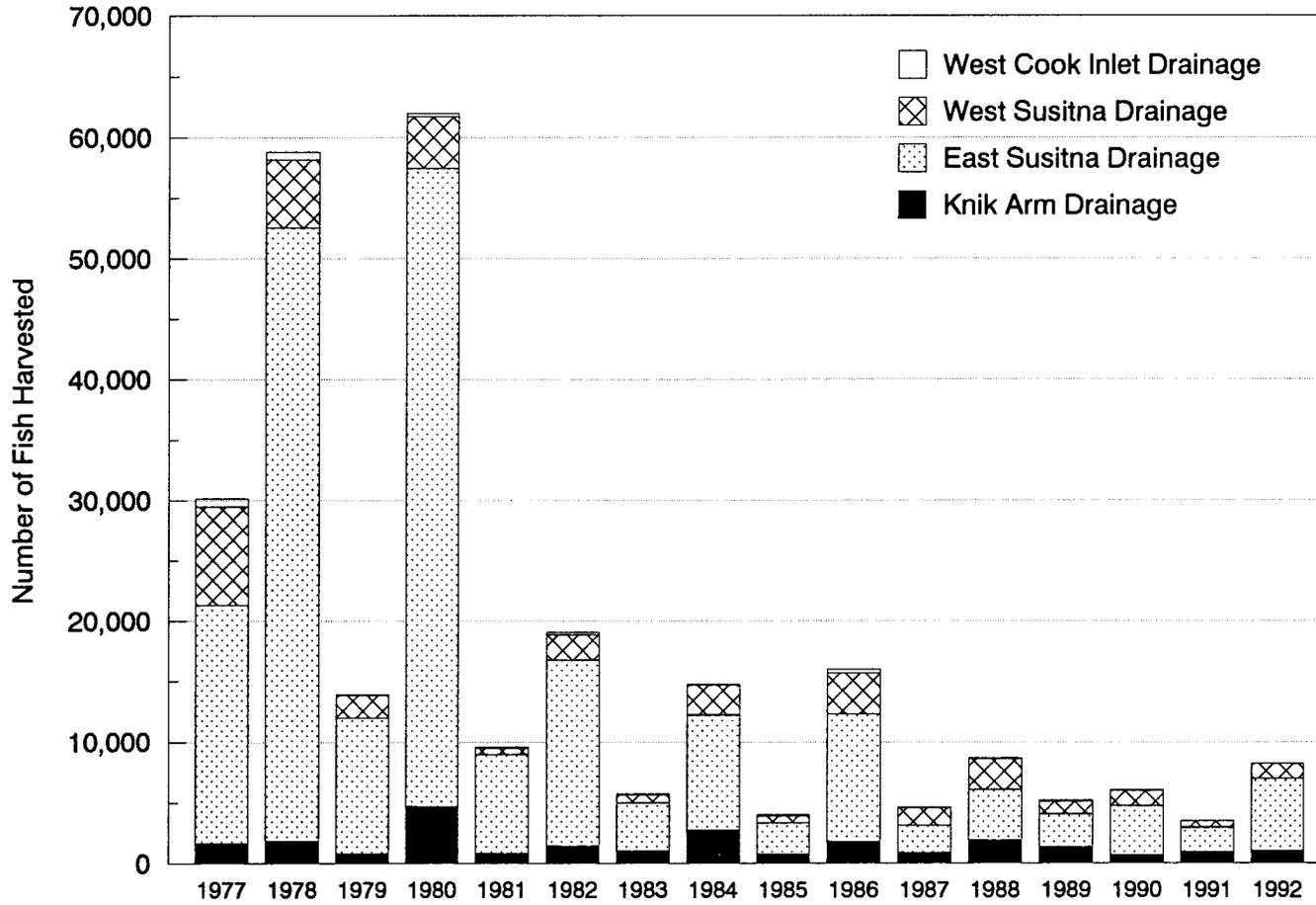
Year	Alexander Creek	Deshka River	Rabideux Creek	Yentna River	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	349	0			658		457	24	842	262	2,592
1978	183	0			254		141	70	662	268	1,578
1979	79	0			440		47	220	362	63	1,211
1980	52	0			267		112	267	34	181	913
1981	67	0			211		172		594	364	1,408
1982	335	0			252		63		1,320	471	2,441
1983	69	0			726		41	0	1,370	1028	3,234
1984	87	125			374		262	312	1,395	860	3,415
1985	261	50			137		50		772	1032	2,302
1986	0	11			547	1,273	242	514	1,173	134	3,894
1987	72	272			435	398	290	580	163	217	2,427
1988	55	146			291	146	800	182	1,038	509	3,167
1989	260	217	9	139	121	165	251	130	547	468	2,307
1990	30	189	0	20	358	89	189		646	854	2,375
1991	136	262	155	0	262	475	78	233	968	514	3,083
1992	123	82	0	107	115	189	205		1,331	764	2,916
Mean	135	85	41	67	341	391	213	230	826	499	2,454

^a Yentna River drainage.

^b May include harvest from West Cook Inlet waters.

Appendix A16. West Cook Inlet drainage sockeye salmon harvest by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Beluga Lake	Total
1977	6		0	0		6
1978	0		0	0		0
1979	0		0	0		0
1980	0		0	0		0
1981	48		0			48
1982	10		0			10
1983	356		0			356
1984	62		0			62
1985	274		25	0		299
1986	22		67			89
1987	272		0	0		272
1988	437		18	0		455
1989	43	9	52	0	260	364
1990	139		50	0		189
1991	552		10	0		562
1992	8	0	49			57
Mean	139	5	17	0	260	173



Appendix A17. Northern Cook Inlet Management Area recreational pink salmon harvest, 1977-1992.

Appendix A18. Knik Arm drainage pink salmon harvest by fishery, 1977-1992.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Other ^c	Total
1977			1,208			217		236	1,661	
1978			1,517			279		46	1,842	
1979			618			136	0	64	818	
1980			3,918			310	0	473	4,701	
1981			709	0		96	0	29	834	
1982			1,163	31		147	0	84	1,425	
1983	361	209	251	47		10	0	131	1,009	
1984	312	0	2,045	287	0	62	0	37	2,743	
1985		0	590	175	0	0	0	22	787	
1986		39	696	138	160	66	0	646	1,800	
1987	0	18	217	18	217	199	0	217	886	
1988	36	36	1,146	127	327	0	0	255	1,927	
1989	60	69	518	164	225	69	17	199	1,321	
1990	81	0	325	35	35	23	0	127	650	
1991	210	149	419	9	17	0	0	122	926	
1992	9	46	870	0	9	0	0	55	1,044	
Mean	134	57	1,013	86	110	101	1	205	77	1,523

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes lakes and streams.

Appendix A19. Eastside Susitna River drainage pink salmon harvest by fishery, 1977-1992.

	Willow Creek	Lt. Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna ^a River	Other ^b	Total
1977	7,140	1,261			4,291		3,568			1,314	2,089	19,663
1978	18,901	3,142			6,981		15,619			2,074	3,994	50,711
1979	3,445	745		100	2,418		2,472		700	645	664	11,189
1980	23,638	6,420		1,663	6,362		8,230		2,408	622	3,403	52,746
1981	2,797	604		335	1,236		1,782		958	19	412	8,143
1982	4,789	1,520		1,092	2,599		3,595		1,132	220	398	15,345
1983	1,647	157	0	126	682		902		241	73	126	3,954
1984	3,155	524	0	337	948	50	3,030		611	636	200	9,491
1985	697	169		10	10		807		468	120	229	2,510
1986	1,561	799	36	254	3,049	145	2,033	290	944	399	1,017	10,527
1987	815	109	54	36	344	18	507	0	54	272	0	2,209
1988	1,510	491	36	55	891	164	709	18	73	182	0	4,129
1989	1,045	115	0	41	288	107	288	16	436	379	0	2,715
1990	1,554	463	0	142	486	154	712		273	130	179	4,093
1991	890	203	0	19	309	58	251	0	97	135	39	2,001
1992	1,951	467	9	128	1,466	339	586	46	385	394	128	5,899
Mean	4,721	1,074	15	310	2,023	129	2,818	62	627	476	805	12,833

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams.

Appendix A20. Westside Susitna River drainage pink salmon harvest by fishery, 1977-1992.

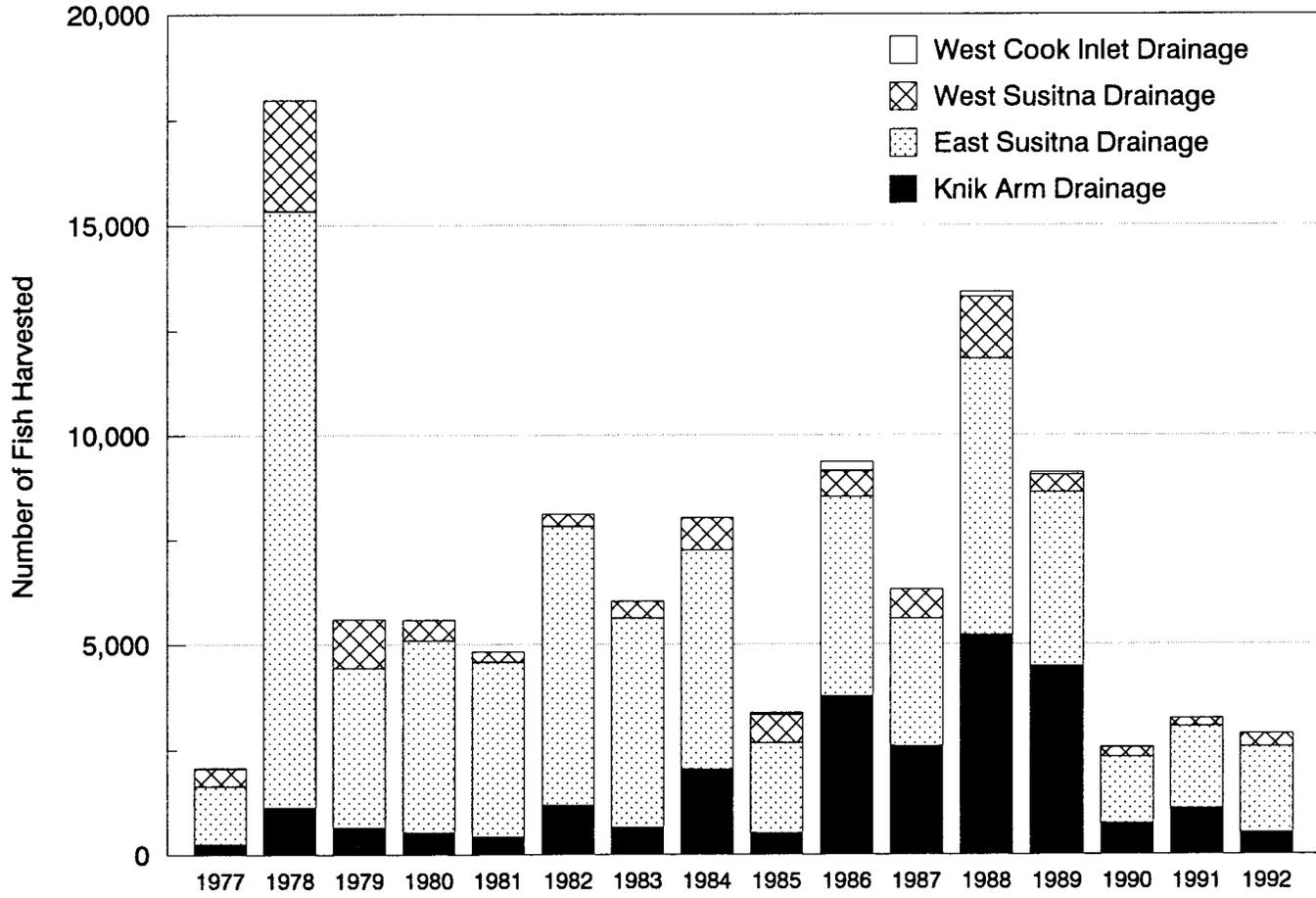
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	1,263	391					4,927		539	0	1,022	0	8,142
1978	1,146	697					2,833		31	0	898	0	5,605
1979	236	109					882		100	0	527	0	1,854
1980	809	689					2,101		276	0	362	0	4,237
1981	57	19					412		29		38	0	555
1982	482	377					389		220		597	0	2,065
1983	126	21					430		0	0	125	0	702
1984	62	748				0	636		87	12	922	0	2,467
1985	112	87					137		0		248	0	584
1986	413	882		0			670	313	235	0	872	0	3,385
1987	91	652					670	18	0	36	0	0	1,467
1988	400	800				0	491	255	18	0	582	36	2,582
1989	8	152	0	0	0	0	177	177	8	0	523	0	1,045
1990	273	297	0		0	0	262	48	250		108	0	1,238
1991	55	98	0		11	0	131	22	0	0	207	0	524
1992	458	513	9		0	0	220	37	0		27	0	1,264
Mean	374	408	2	0	3	0	961	124	112	4	441	2	2,357

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A21. West Cook Inlet drainage pink salmon harvest by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Total
1977	245		363	62	670
1978	155		449	46	650
1979	55		9	0	64
1980	69		232	0	301
1981	38		57		95
1982	147		63		210
1983	21		0		21
1984	0		62		62
1985	62		75	0	137
1986	235		45		280
1987	0		72	0	72
1988	0		55	0	55
1989	34	68	0	8	110
1990	12		12	0	24
1991	404		0	0	404
1992	18	0	0		18
Mean	93	34	93		198



Appendix A22. Northern Cook Inlet Management Area recreational chum salmon harvest, 1977-1992.

Appendix A23. Knik Arm drainage chum salmon harvest by fishery, 1977-1992.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake ^b	Other ^c	Total
1977			131			17			102	250
1978			956			58			117	1,131
1979			364			45	0		245	654
1980			465			9	0		60	534
1981			278	0		58	0		96	432
1982			943	468		0	0		63	1,474
1983	84	26	450	10		0	0		73	643
1984	62	0	1,708	125	25	0	0		112	2,032
1985		66	382	11	55	0	0	0	0	514
1986		72	822	1,021	1,750	0	0	66	39	3,770
1987	0	0	534	233	1,641	146	10	10	0	2,574
1988	18	55	673	291	3,438	0	0	564	182	5,221
1989	93	92	712	435	3,043	0	0	19	83	4,477
1990	11	11	170	45	464	11	0	34	0	746
1991	8	31	425	31	379	0	155	70	0	1,099
1992	23	0	319	8	152	0	0	0	8	510
Mean	37	35	583	223	1,216	22	12	95	74	1,629

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes lakes and streams.

Appendix A24. Eastside Susitna River drainage chum salmon harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other ^b	Total
1977	343	175			202		326			146	190	1,382
1978	2,458	1,015			1,697		4,429			1,912	2,692	14,203
1979	582	118		9	682		745		55	355	1,245	3,791
1980	989	270		19	648		571		225	385	1,445	4,552
1981	1,533	192		0	987		805		125	57	450	4,149
1982	2,086	199		0	1,750		1,708		231	31	639	6,644
1983	1,490	147	0	0	902		1,311		42	650	440	4,982
1984	2,095	224	0	112	586	125	1,447		37	337	248	5,211
1985	926	10		0	159		508		50	329	160	2,142
1986	508	109	36	218	1,307	36	871	254	545	799	73	4,756
1987	851	217	0	0	616	91	217	18	0	1,032	0	3,042
1988	1,419	546	18	18	1,892	255	928	146	36	1,255	91	6,604
1989	1,454	115	62	44	890	273	379	26	176	626	106	4,151
1990	336	197	0	35	382	278	69		12	197	59	1,565
1991	712	77	0	15	364	124	116		70	356	116	1,950
1992	471	137	0	23	342	152	182	129	23	562	23	2,044
Mean	1,141	234	13	35	838	167	913	115	116	564	499	4,448

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams.

Appendix A25. Westside Susitna River drainage chum salmon harvest by fishery, 1977-1992.

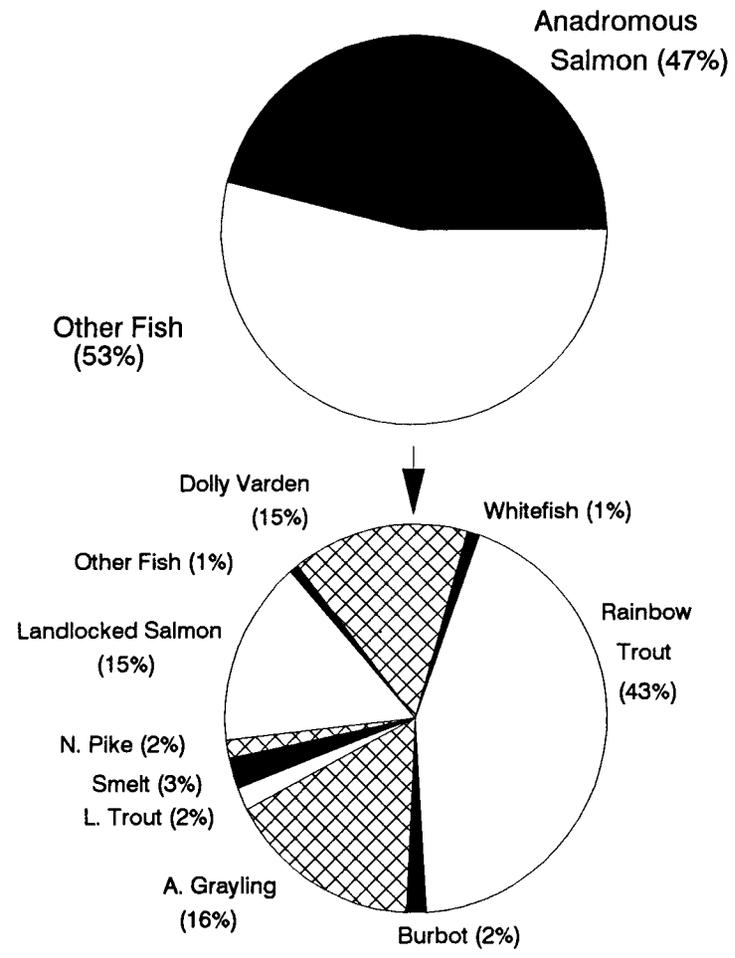
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Other Streams ^b	Other Lakes ^b	Total
1977	30	0					162		37	194	0	423
1978	215	0					1,015		234	1,171	0	2,635
1979	45	0					136		55	918	0	1,154
1980	121	0					69		17	284	0	491
1981	10	0					48		0	259	0	317
1982	0	0					199		0	250	0	449
1983	0	0					52		0	346	0	398
1984	37	87				0	249		75	424	0	872
1985	12	25					124		0	186	0	347
1986	22	34		0			212	0	45	302	0	615
1987	127	54					36	0	0	471	0	688
1988	18	164				0	346	0	91	855	0	1,474
1989	45	0	0	0	18	9	163	0	72	81	27	415
1990	12	12	0		0	0	70	0	12	128	0	234
1991	61	17	0		0	0	44	17	52	0	0	191
1992	23	46	0		0	0	121	38	0	76	0	304
Mean	49	27	0	0	5	2	190	8	43	372	2	688

^a Fish Lake drainage (Yentna drainage).

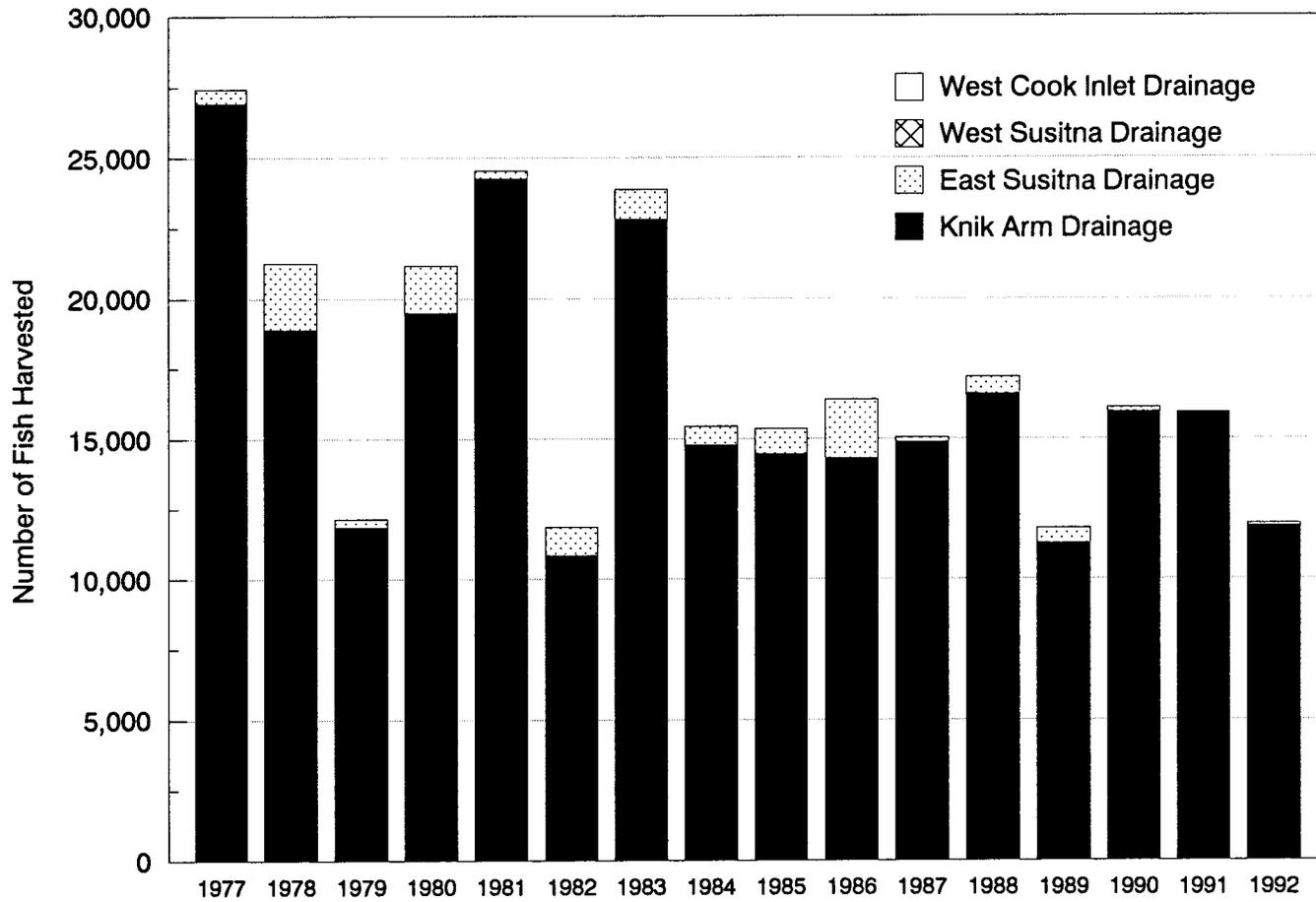
^b May include harvest from West Cook Inlet waters.

Appendix A26. West Cook Inlet drainage chum salmon harvest by fishery, 1977-1992.

Year	Chuitna River	Theodore River	Lewis River	Total
1977	7	0	0	7
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0		0
1982	0	0		0
1983	10	0		10
1984	0	0		0
1985	50	0	0	50
1986	179	34		213
1987	0	0	0	0
1988	109	0	0	109
1989	0	0	0	0
1990	0	12	0	12
1991	0	0	0	0
1992	0	0		0
Mean	22	3	0	25



Appendix A27. Northern Cook Inlet Management Area sport fish harvest resident fish composition, 1977-1992.



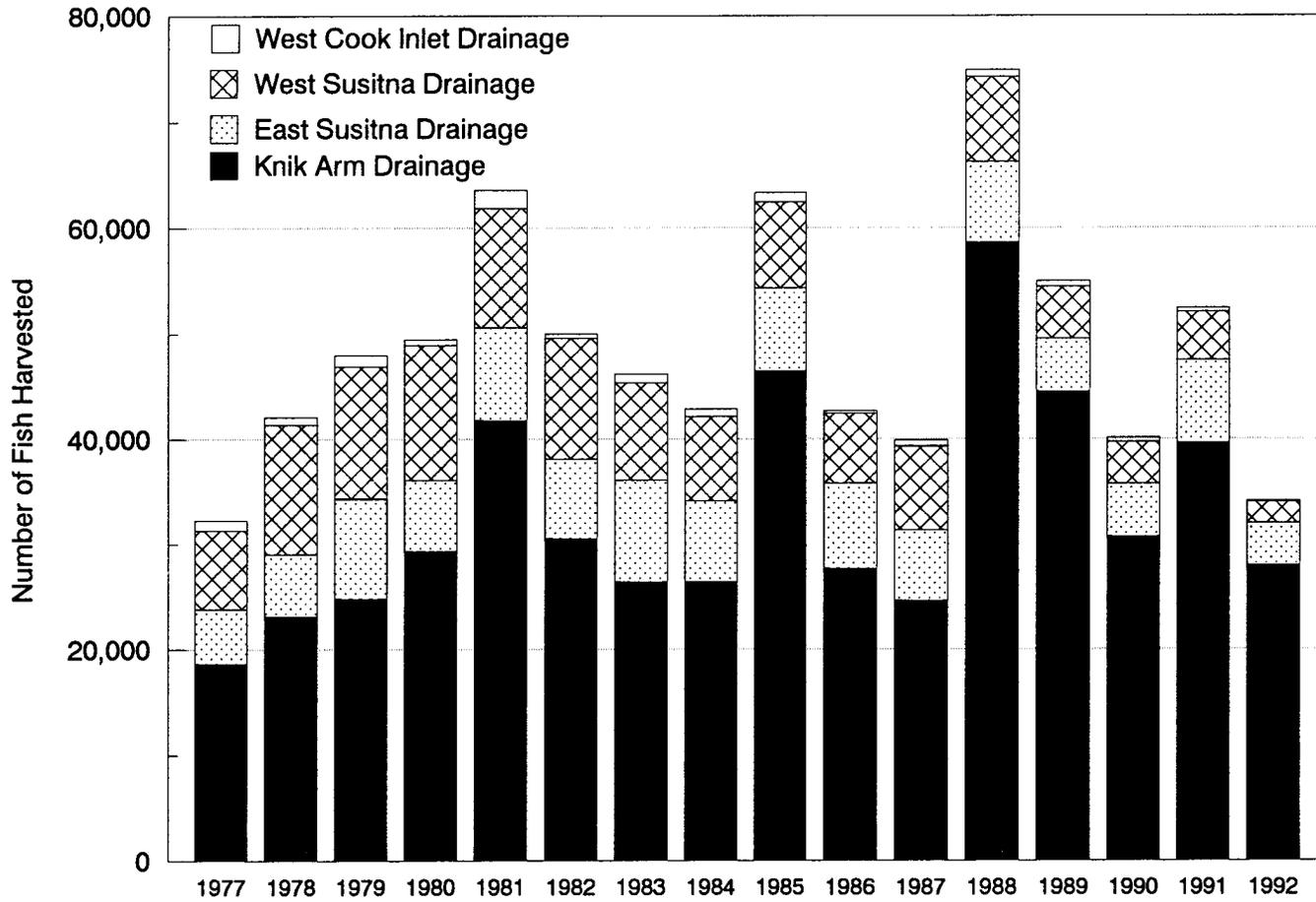
Appendix A28. Northern Cook Inlet Management Area recreational landlocked salmon harvest, 1977-1992.

Appendix A29. Knik Arm waters landlocked salmon harvest by fishery, 1977-1992.

Year	Memory Lake	Lucille Lake	Kepler L. Complex	Finger Lake	Wasilla Lake	Big Lake	Nancy L. Complex	Other Lakes	Total
1977		8,952	528	14,739		721	76	1,901	26,917
1978		4,963	298	8,588		226	262	4,547	18,884
1979		4,272	64	5,209	1,054	145	227	882	11,853
1980		3,633	2,807	10,685	43	189	146	1,997	19,500
1981		7,549	2,577	9,321	182	651	354	3,621	24,255
1982		3,312	681	4,506	42	324	126	1,854	10,845
1983		2,245	2,224	12,714	31	462	231	4,898	22,805
1984	1,663	2,681	773	7,282	100	1,384	50	835	14,768
1985		1,491	4,803	5,618	69	659	0	1,821	14,461
1986		246	2,580	6,244	168	0	34	5,027	14,299
1987		1,521	3,550	8,439	0	0	199	1,178	14,887
1988		618	2,183	11,896	0	0	18	1,873	16,588
1989	1,734	663	1,462	3,805	0	0	1,108	2,269	11,041
1990		279	2,314	10,453	0	0	295	2,609	15,950
1991	1,628	899	2,188	6,818	0	2,493	119	1,595	15,740
1992	1,525	173	1,222	4,965	0	1,979	162	1,849	11,875
Mean	1,638	2,719	1,891	8,205	106	577	213	2,422	16,542

Appendix A30. Eastside Susitna River drainage
landlocked salmon harvest, 1977-
1992.

Year	Lakes Total
1977	512
1978	2,368
1979	291
1980	1,663
1981	278
1982	996
1983	1,049
1984	660
1985	884
1986	2,106
1987	145
1988	619
1989	536
1990	151
1991	259
1992	86
Mean	788



Appendix A31. Northern Cook Inlet Management Area recreational rainbow trout harvest, 1977-1992.

Appendix A32. Knik Arm drainage rainbow trout harvest by fishery, 1977-1992.

Year	Little Susitna	Knik River ^a	Wasilla Creek	Cottonwood Ck	Big Lake ^b	Wasilla Lake	Finger Lake	Kepler Complex	Big Lake	Lucille Lake	Kalmbach Lake	Carpen-ter Lk.	Knik Lake	Memory Lake	Seymour Lake	Bonnie Lakes	Nancy L. Complex	Other Streams ^c	Other Lakes	Total
1977	843		252				0	1,822	3,906	0							2,642	9,150		18,615
1978	886		45				0	5,180	4,845	0							1,853	10,330		23,139
1979	1,391		500	1,736		2,782	0	3,372	2,882	0							2,909	9,271		24,843
1980	852		121	1,085		2,084	0	5,906	5,398	0							2,540	11,382		29,368
1981	2,692	0	38	824		2,261	0	8,200	9,810	0							4,723	13,201		41,749
1982	1,551	0	63	786		2,423	0	7,325	9,369	0							2,840	6,372		30,549
1983	1,290	0	84	556		1,804	0	3,986	4,102	0							4,846	1,490	8,263	26,421
1984	860	549	312	748		848	0	9,128	4,938	0			382				1,771	1,222	5,635	26,418
1985	1,294	780	260	590	347	1,231	3,381	14,011	6,953	35							2,514	1,197	13,838	46,431
1986	1,407	235	11	145	391	1,653	3,172	7,249	5,105	168				726		736	2,200	815	3,677	27,690
1987	447	58	126	301	204	680	2,476	7,758	2,476	3,379							2,728	427	3,603	24,663
1988	1,273	382	582	782	309	891	5,421	16,462	4,220	8,495						910	5,439	964	12,497	58,609
1989	599	0	91	163	1,063	972	2,788	18,233	5,402	972	1,625		872	590	445	945	3,696	117	5,945	44,518
1990	673	0	131	410	361	443	2,544	10,223	3,282	246						738	2,182	1,131	8,335	30,699
1991	781	0	28	628	209	1,953	2,539	8,496	4,883	600			600	1,046		363	2,818	545	14,147	39,636
1992	720	0	24	404	791	483	1,860	6,839	2,090	309	610	1,116	887	364	459	1,045	2,945	8	7,041	27,995
Mean	1,097	167	167	654	459	1,465	1,511	8,387	4,979	888	1,118	1,116	786	596	543	790	3,040	4,226	8,298	32,584

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage streams.

^c Includes lakes and streams, 1977-1982.

Appendix A33. Eastside Susitna River drainage rainbow trout harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Other Lakes	Total
1977	1,055	224			368		727			450	2,401		5,225
1978	913	334			470		1,193			1,501	1,519		5,930
1979	1,500	345		282	573		1,536		382	1,373	3,472		9,463
1980	1,168	353		154	385		854		193	950	2,658		6,715
1981	1,475	374		326	201		1,111		249	1,226	3,851		8,813
1982	891	335		189	325		2,243		545	608	2,400		7,536
1983	1,689	514	357	231	409		1,332		178	1,836	1,656	1,437	9,639
1984	1,359	1,047	449	175	349	125	1,197		374	910	598	1,073	7,656
1985	2,046	746		139	191		1,248		416	832	1,266	988	7,872
1986	545	218	436	0	218	145	399	73	581	1,234	1,126	3,086	8,061
1987	1,141	1,213	471	308	507	272	417	36	72	869	471	870	6,647
1988	1,128	400	255	73	236	291	1,492	73	55	1,110	636	1,873	7,622
1989	906	277	675	37	240	240	407	37	259	822	443	629	4,972
1990	1,008	286	352	101	286	353	487		168	1,109	320	538	5,008
1991	2,044	430	261	384	569	354	615	231	0	1,076	999	891	7,854
1992	712	293	87	47	55	79	467	16	79	665	404	1,044	3,948
Mean	1,224	462	371	175	356	232	983	78	254	1,036	1,514	1,243	7,060

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams, 1977-1982.

Appendix A34. Westside Susitna River drainage rainbow trout harvest by fishery, 1977-1992.

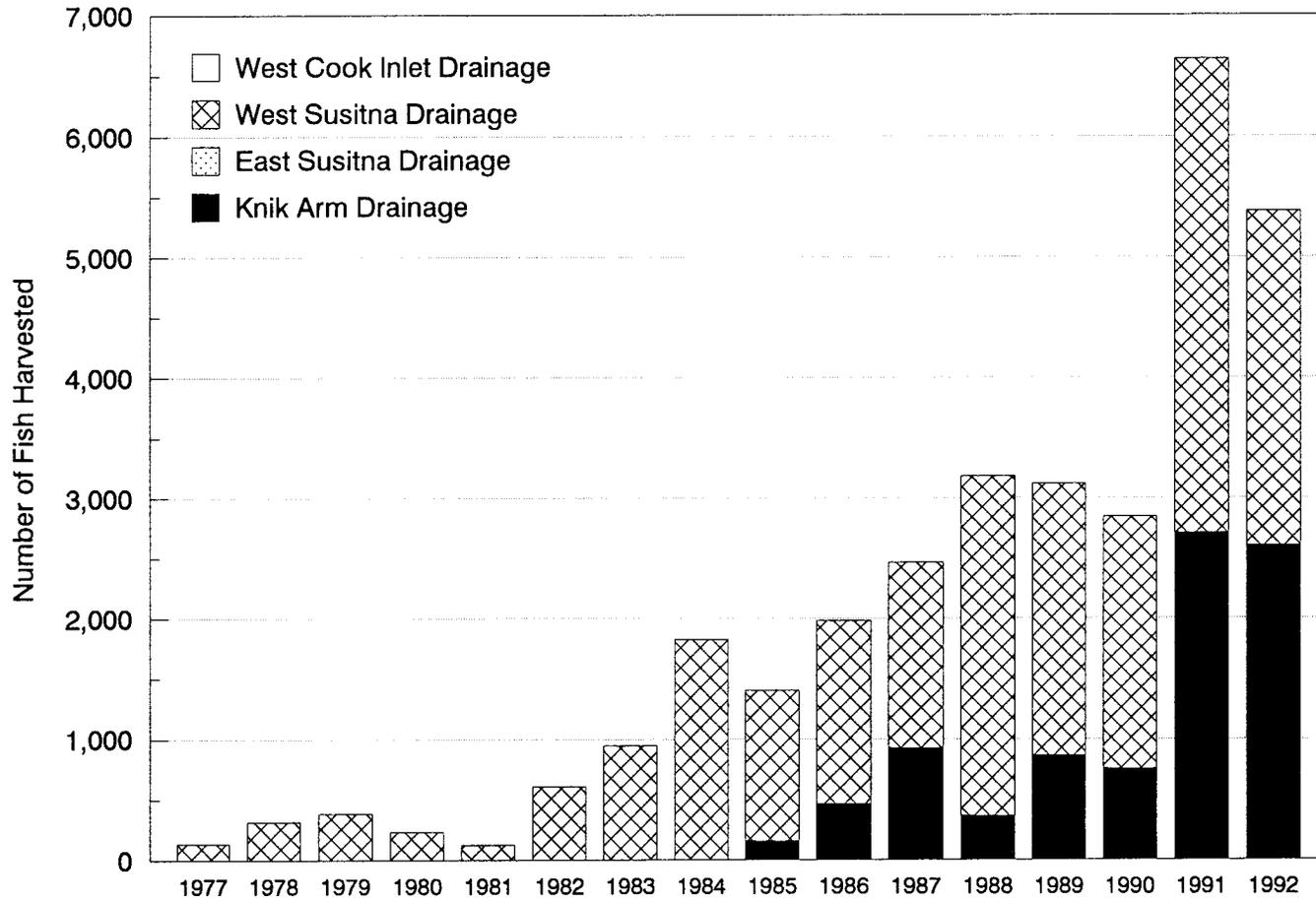
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	1,251	1,556					1,853		0	68	1,677	1,067	7,472
1978	2,640	3,634					2,721		0	0	1,528	1,772	12,295
1979	1,182	3,182					4,527		0	100	2,709	855	12,555
1980	1,945	4,305					2,144		379	86	1,722	2,204	12,785
1981	2,290	3,631					2,874		0		872	1,629	11,296
1982	2,505	3,804					3,134		0		597	1,425	11,465
1983	608	2,434					2,287		0	0	2,917	1,007	9,253
1984	785	2,120				611	3,080		0	0	1,134	399	8,129
1985	1,318	3,104					1,439		0		1,387	866	8,114
1986	1,553	2,513		525			961	45	0	0	614	457	6,668
1987	978	3,006					1,902	398	0	0	1,357	379	8,020
1988	1,419	4,075				73	1,146	109	0	18	672	546	8,058
1989	486	1,676	0	0	38	162	676	428	0	105	576	781	4,928
1990	640	707	17		0	303	808	135	0		810	540	3,960
1991	917	1,275	0		140	295	498	358	0	0	810	233	4,526
1992	198	459	24		127	214	214	79	0		349	364	2,028
Mean	1,295	2,593	10	263	76	276	1,892	222	24	34	1,233	908	8,222

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest form West Cook Inlet waters.

Appendix A35. West Cook Inlet drainage rainbow trout harvest by fishery, 1977-1992.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Total
1977	509		415	34	958
1978	443		226	54	723
1979	336		609	118	1,063
1980	301		250	9	560
1981	642		1,092		1,734
1982	199		199		398
1983	441		430		871
1984	424		274		698
1985	590		225	87	902
1986	67		145		212
1987	344		199	36	579
1988	218		382	18	618
1989	162	48	305	19	534
1990	286		135	17	438
1991	171		109	124	404
1992	79	8	63		150
Mean	326	28	316	52	678



Appendix A36. Northern Cook Inlet Management Area recreational northern pike harvest, 1977-1992.

Appendix A37. Knik Arm drainage northern pike harvest by fishery, 1985-1992 (grouped with other fish prior to 1985).

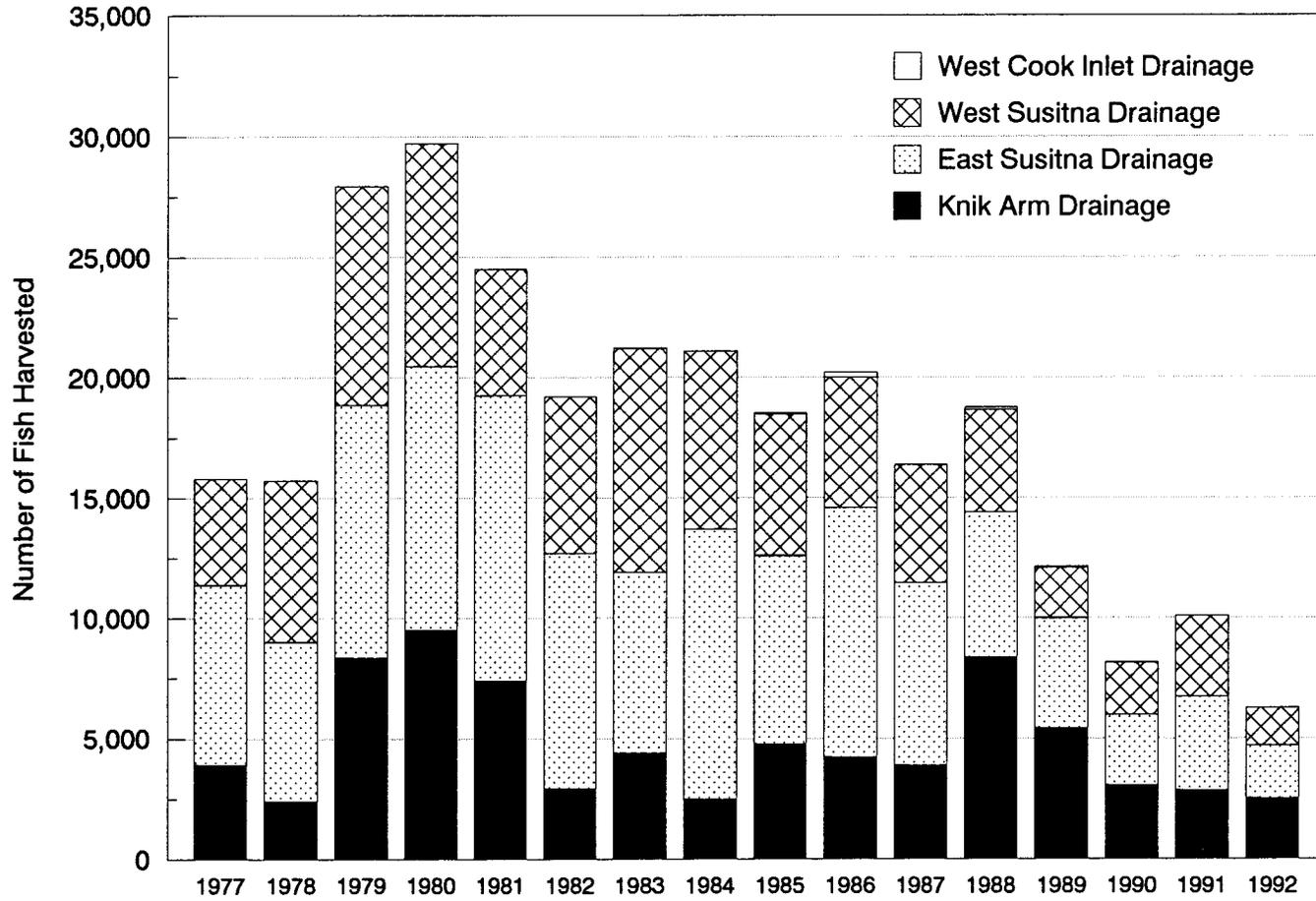
FISHERY	1985	1986	1987	1988	1989	1990	1991	1992	Mean
Little Susitna River	0	0	0	0	0	0	0	0	0
Knik River & Tributaries (incl. Jim Ck.)	0	0	0	0	0	0	0	0	0
Wasilla Ck.	0	0	0	0	0	0	0	0	0
Cottonwood Ck.	0	0	0	0	0	0	0	0	0
Big Lake Drainage streams	0	0	0	0	0	0	0	0	0
Eklutna Tailrace	0	0	0	0	0	0	0	0	0
Nancy Lake Complex Lakes	156	458	924	364	863	754	2,406	2,101	1,003
Other Lakes	0	0	0	0	0	0	303	504	101
Area Total	156	458	924	364	863	754	2,709	2,605	1,104

Appendix A38. Westside Susitna River drainage northern pike harvest by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Moose Creek	Peter's Creek	Lake Creek	Fish Creek ^a	Trapper Lake	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	0	0			42			0	0	90	132
1978	0	0			9			0	0	307	316
1979	0	0			209			0	0	173	382
1980	0	0			103			0	0	129	232
1981	0	0			0				0	125	125
1982	0	0			52				0	555	607
1983	0	0			52			0	105	787	944
1984	0	0		0	50			0	1,136	635	1,821
1985	17	0			52				156	1,023	1,248
1986	514	0	0		0	491		0	45	469	1,519
1987	254	0			0	326		0	0	960	1,540
1988	800	0		0	36	1,455		0	346	181	2,818
1989	819	0	0	0	0	676		0	381	381	2,257
1990	404	0		0	320	370			152	842	2,088
1991	700	0		0	104	921	506	0	13	1,687	3,931
1992	641	0		0	85	359	410		146	1,136	2,777
Mean	259	0	0	0	70	287	458	0	149	593	1,421

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.



Appendix A39. Northern Cook Inlet Management Area recreational Arctic grayling harvest, 1977-1992.

Appendix A40. Knik Arm drainage Arctic grayling harvest by fishery, 1977-1992.

Year	Little Susitna R.	Finger Lake	Kepler L. Complex	Bonnie Lakes	Nancy L. Complex	Other Streams ^a	Other Lakes	Total
1977	190	0	72		0	3,654		3,916
1978	54	0	985		0	1,374		2,413
1979	36	0	2,372		0	5,963		8,371
1980	181	0	1,016		0	8,317		9,514
1981	153	0	671		0	6,572		7,396
1982	388	0	1,027		0	1,509		2,924
1983	199	0	514		0	398	3,314	4,425
1984	100	0	486		12	125	1,757	2,480
1985	191	0	277		0	260	4,040	4,768
1986	223	0	860	1,396	67	89	1,598	4,233
1987	217	54	942		307	0	2,355	3,875
1988	0	0	5,366	473	273	273	1,982	8,367
1989	73	0	3,351	436	90	227	998	5,175
1990	115	82	837	263	131	705	935	3,068
1991	60	111	1,338	433	40	30	754	2,766
1992	15	23	1,187	451	68	15	752	2,511
Mean	137	17	1,331	575	62	1,844	1,849	4,763

^a Includes lakes, 1977-1982.

Appendix A41. Eastside Susitna River drainage Arctic grayling harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Other Lakes	Total
1977	1,483	934			317		379			486	3,870		7,469
1978	208	334			461		958			859	3,770		6,590
1979	2,654	1,091		345	645		791		0	1,045	4,918		11,489
1980	1,868	1,156		353	725		655		0	1,348	4,854		10,959
1981	1,188	623		144	872		891		58	996	7,089		11,861
1982	1,520	377		252	723		849		42	943	5,041		9,747
1983	1,794	84	514	315	839		336		31	1,553	1,625	387	7,478
1984	2,157	1,259	1,397	162	761	125	786		287	1,784	2,042	462	11,222
1985	1,630	1,231		104	815		503		0	1,665	1,527	347	7,822
1986	218	581	436	0	218	73	472		363	3,049	4,355	581	10,346
1987	743	761	851	72	924	163	254	0	18	2,481	868	433	7,568
1988	1,692	455	418	109	400	127	418	0	36	1,000	1,092	273	6,020
1989	721	286	517	148	286	74	92	0	9	1,063	831	535	4,562
1990	1,378	50	202	17	118	34	17		0	605	304	185	2,910
1991	720	503	149	46	274	206	423	0	0	617	743	171	3,852
1992	406	240	53	23	143	75	60	0	0	383	587	219	2,189
Mean	1,274	623	504	149	533	110	493	0	60	1,242	2,720	359	7,630

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams, 1977-1982.

Appendix A42. Westside Susitna River drainage Arctic grayling harvest by fishery, 1977-1992.

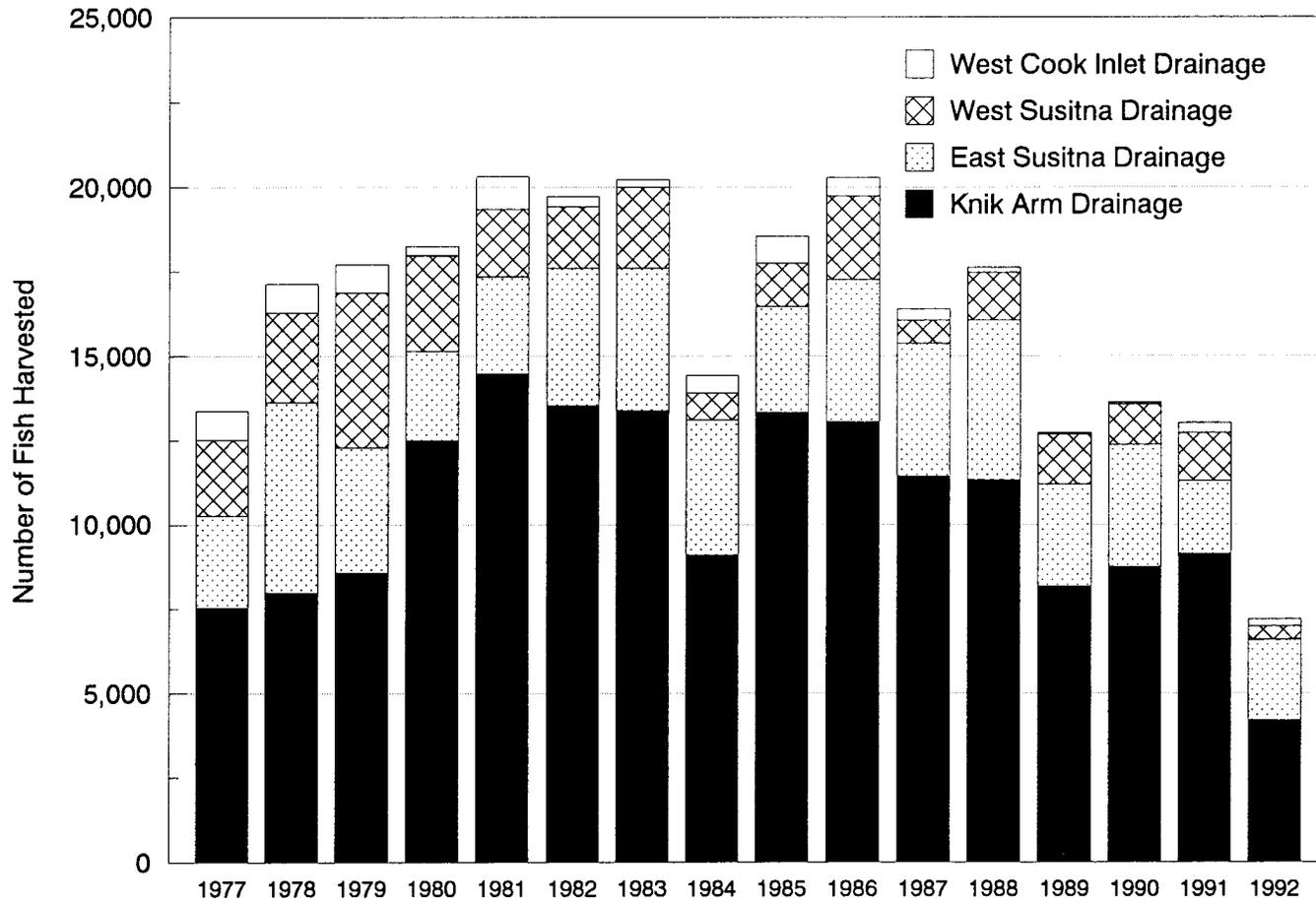
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	280	631					1,599		832	45	619	408	4,414
1978	1,871	579					2,115		99	0	1,953	108	6,725
1979	745	1,463					1,963		664	45	3,691	518	9,089
1980	1,145	1,817					1,972		1,713	232	1,808	560	9,247
1981	1,130	1,255					1,600		479		546	240	5,250
1982	1,582	1,457					1,955		587		734	210	6,525
1983	483	1,280					2,224		3,178	21	1,782	346	9,314
1984	362	1,110				150	2,257		898	75	2,395	162	7,409
1985	988	1,335					1,266		434		1,664	208	5,895
1986	1,273	938		771			983	112	290	0	1,040	34	5,441
1987	1,050	942					1,322	91	272	36	1,141	54	4,908
1988	891	1,164				164	637	0	1,128	0	291	0	4,275
1989	267	457	0	67	76	114	314	38	466	19	76	210	2,104
1990	118	152	0		0	303	825	0	337		389	34	2,158
1991	346	333	0		0	213	705	466	1,051	0	253	0	3,367
1992	60	105	45		0	293	301	8	225		497	38	1,572
Mean	787	939	11	419	19	206	1,377	102	791	43	1,180	196	5,481

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A43. West Cook Inlet drainage Arctic grayling harvest by fishery, 1977-1992.

Year	Chuitna River	Theodore River	Lewis River	Total
1977	0	0	0	0
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0		0
1982	0	0		0
1983	0	10		10
1984	0	37		37
1985	0	0	0	0
1986	89	0		89
1987	36	0	0	36
1988	0	0	0	0
1989	57	86	0	143
1990	17	17	0	34
1991	13	13	0	26
1992	0	0		0
Mean	13	10	0	23



Appendix A44. Northern Cook Inlet Management Area recreational Dolly Varden/ Arctic char harvest, 1977-1992.

Appendix A45. Knik Arm drainage Dolly Varden/Arctic char harvest by fishery, 1977-1992.

Year	Marine Susitna	Little River ^a	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Fish Creek ^b	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams ^c	Other Lakes	Total
1977		645			328				4,953	277	1,338		7,541
1978		570			325				5,433	18	1,636		7,982
1979		1,191			364	191		264	4,227	118	2,227		8,582
1980		1,748			189	439		181	7,585	327	2,015		12,484
1981		2,529	1,130		690	67		38	7,741	345	1,935		14,475
1982		1,331	1,279		1,289	10		63	8,793	272	503		13,540
1983	21	1,227	1,310		1,290	157		167	6,126	1,154	1,531	408	13,391
1984	112	1,272	1,509	50	25	0		50	3,866	150	1,696	373	9,103
1985	17	1,791	2,011	104	0	0	104	225	8,096	17	711	260	13,336
1986	0	838	3,094	56	246	45	168	11	7,406	168	625	391	13,048
1987	126	380	127	869	869	0	36	36	8,638	163	145	36	11,425
1988	401	564	2,237	309	0	36	36	273	5,930	1,055	146	327	11,314
1989	63	763	1,507	118	18	191	517	0	4,467	155	181	163	8,143
1990	147	821	1,822	98	0	164	16	0	4,907	66	147	558	8,746
1991	427	747	934	187	1,841	213	0	0	4,162	80	361	186	9,138
1992	8	524	541	25	16	0	16	57	2,597	33	953	301	10,402
Mean	83	1,059	1,094	114	468	95	56	85	5,933	275	953	301	10,402

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage.

^c Includes lakes and streams, 1977-1982.

Appendix A46. Eastside Susitna River drainage Dolly Varden/Arctic char harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Lakes	Total
1977	863	139			94		300			379	951		2,726
1978	280	63			108		633			1,817	2,739		5,640
1979	618	336		91	127		527		264	827	909		3,699
1980	636	122		83	83		167		39	751	790		2,671
1981	249	48		38	57		240		10	1,418	814		2,874
1982	262	189		73	409		356		42	1,069	1,666		4,066
1983	336	73	304	157	52		325		84	1,962	789	126	4,208
1984	424	100	212	25	125	0	661		125	2,020	187	125	4,004
1985	538	520		35	104		17		0	1,352	572	0	3,138
1986	71	0	327	0	182	0	327	0	508	2,396	182	218	4,211
1987	308	54	380	109	72	36	235	18	0	2,680	18	36	3,946
1988	728	200	218	73	182	0	291	0	0	2,146	910	0	4,748
1989	370	28	268	0	120	18	185	0	0	1,719	64	268	3,040
1990	538	67	386	17	50	34	84		0	2,369	68	0	3,613
1991	227	60	72	0	263	60	167	24	0	1,171	36	60	2,140
1992	320	107	25	8	25	90	41	41	0	1,647	0	90	2,394
Mean	423	132	137	44	128	15	285	5	67	1,608	668	92	3,570

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams, 1977-1982.

Appendix A47. Westside Susitna River drainage Dolly Varden/Arctic char harvest by fishery, 1977-1992.

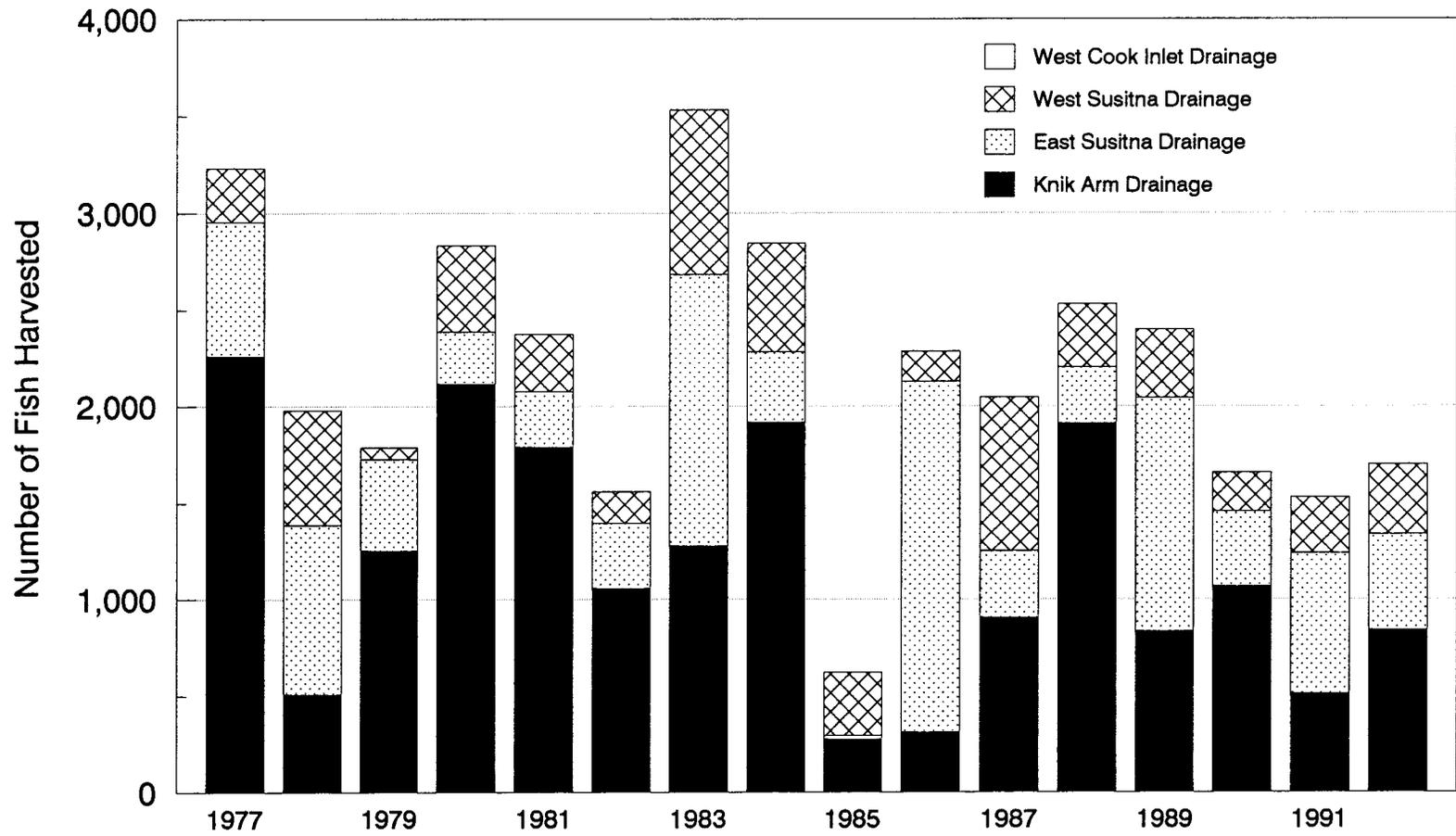
Year	Alexander Creek	Deshka River	Moose Creek	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	53	0			122		252	195	1,279	345	2,246
1978	136	0			154		235	371	1,220	551	2,667
1979	182	0			164		155	573	2,872	645	4,591
1980	353	0			121		982	723	603	43	2,825
1981	287	10			67		10		1,130	499	2,003
1982	42	0			482		31		471	818	1,844
1983	136	0			262		105	252	669	1049	2,473
1984	75	25		12	125		50	262	212	37	798
1985	0	139			87		87		642	312	1,267
1986	34	78	56		0	78	101	514	1,609	0	2,470
1987	0	72			36	36	0	254	163	127	688
1988	236	273		0	91	0	382	0	401	18	1,401
1989	171	86	0	0	124	38	10	19	257	780	1,485
1990	0	84		269	101	0	84		372	270	1,180
1991	0	0		0	65	327	261	33	440	310	1,436
1992	0	8		0	8	41	66		40	237	400
Mean	107	48	4	18	126	33	176	213	774	378	1,861

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A48. West Cook Inlet drainage Dolly Varden/Arctic char harvest by fishery, 1977-1992.

Year	Chuitna River	Theodore River	Lewis River	Total
1977	671	181	0	852
1978	461	353	27	841
1979	664	173	9	846
1980	146	129	0	275
1981	843	115		958
1982	304	0		304
1983	209	21		230
1984	511	12		523
1985	260	538	0	798
1986	235	302		537
1987	18	199	109	326
1988	164	0	0	164
1989	10	0	19	29
1990	34	17	0	51
1991	229	33	33	295
1992	131	74		205
Mean	306	134	20	452



Appendix A49. Northern Cook Inlet Management Area recreational lake trout harvest, 1977-1992.

Appendix A50. Knik Arm drainage lake trout harvest by fishery,
1977-1992.

Year	Little Susitna R.	Big Lake Drainage ^a	Big Lake ^b	Nancy L. Complex	Other Lakes ^c	Other Streams	Total
1977	0		665	336	1,259		2,260
1978	0		0	127	680		807
1979	0		455	145	654		1,254
1980	0		594	749	775		2,118
1981	0		623	354	814		1,791
1982	0		440	356	363		1,159
1983	31		441	304	503	0	1,279
1984	0		798	549	572	0	1,919
1985	0	0	156	104	0	17	277
1986	0	34	0	201	78	0	313
1987	91	0	0	562	253	0	906
1988	91	0	0	691	1,129	0	1,911
1989	0	0	0	472	363	0	835
1990	0	0	0	558	509	0	1,067
1991	0	0	0	211	271	30	512
1992	0	0	0	377	401	62	840
Mean	13	4	261	381	539	7	1,203

^a Big Lake drainage streams.

^b Big Lake proper, not including drainage streams.

^c Includes lakes and streams, 1977-1982.

Appendix A51. Eastside Susitna River lake trout harvest, 1977-1992.

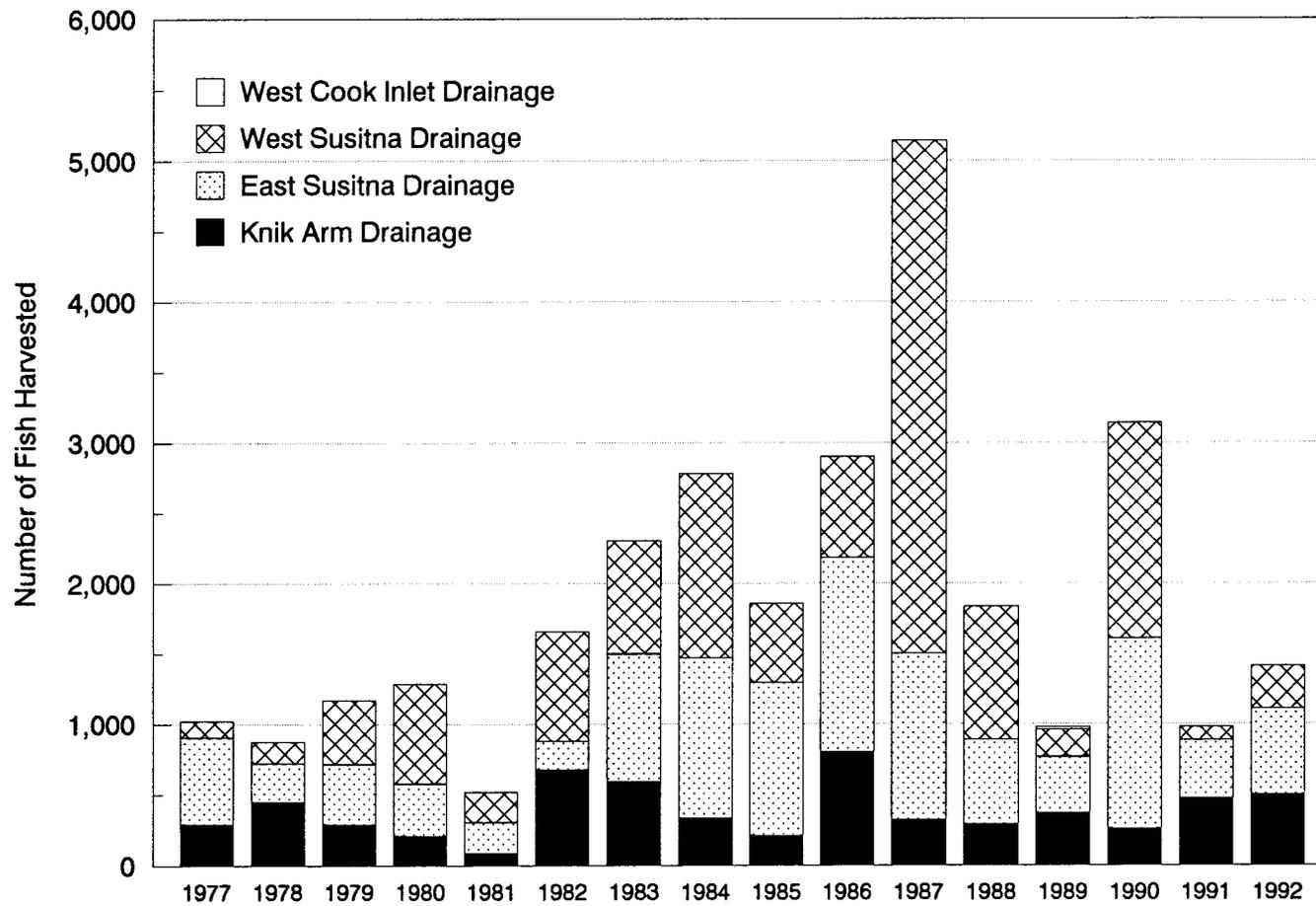
Year	Streams	Lakes	Total
1977		693	693
1978		877	877
1979		472	472
1980		267	267
1981		287	287
1982		335	335
1983	63	1,341	1,404
1984	25	337	362
1985	0	17	17
1986	218	1,598	1,816
1987	0	343	343
1988	0	291	291
1989	83	1,127	1,210
1990	17	370	387
1991	81	645	726
1992	39	456	495
Mean	53	591	624

Appendix A52. Westside Susitna River drainage lake trout harvest by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Moose Creek	Yentna River	Lake Creek	Fish Lakes ^a	Shell Lake	Judd Lake	Other Streams ^b	Other Lakes ^b	Total
1977	0	0			116		23	8	23	108	278
1978	0	0			36		45	0	0	515	596
1979	0	0			9		18	0	36	0	63
1980	0	0			0		69	0	181	198	448
1981	0	0			19				0	278	297
1982	0	0			0		52		0	115	167
1983	0	0			0		409	0	10	430	849
1984	0	0			0			0	125	437	562
1985	0	0			121				0	207	328
1986	0	0	56		0	0		0	0	101	157
1987	0	36			0	18		0	109	634	797
1988	0	0			36	0		18	0	273	327
1989	0	0	0	38	0	0		0	0	314	352
1990	0	17		0	84	0			0	101	202
1991	0	0		0	61	0		0	46	182	289
1992	0	39		0	0	0			77	247	363
Mean	0	6	28	10	24	3	103	2	38	259	380

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.



Appendix A53. Northern Cook Inlet Management Area recreational burbot harvest, 1977-1992.

Appendix A54. Knik Arm drainage burbot harvest by fishery, 1977-1992.

Year	Little Susitna River ^a	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Ck.	Fish Creek ^b	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams ^c	Other Lakes	Total
1977	6			0				73	148	63		290
1978	9			0				18	145	280		452
1979	55			0	0		0	0	9	227		291
1980	9			0	0		0	43	34	224		310
1981	29	0		0	0		0	0	29	29		87
1982	10	0		0	0		0	461	210	0		681
1983	52	0		0	0		0	94	357	31	63	597
1984	25	0	0	0	0		0	75	62	37	137	336
1985	35	0	0	0	0	0	0	70	105	0	0	210
1986	22	0	0	0	0	0	0	335	34	0	413	804
1987	54	0	0	0	0	18	0	36	217	0	0	325
1988	36	0	0	0	0	0	0	55	127	0	73	291
1989	27	0	0	0	0	0	0	163	82	0	100	372
1990	82	0	0	0	0	0	0	82	98	0	0	262
1991	40	13	0	0	0	0	0	66	358	0	0	477
1992	102	0	0	0	0	0	0	110	118	0	170	500
Mean	37	1	0	0	0	1	0	105	133	56	96	393

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage.

^c Includes lakes and streams, 1977-1982.

Appendix A55. Eastside Susitna River drainage burbot harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Lakes	Total
1977	26	0			45		110			0	438		619
1978	9	0			18		9			27	208		271
1979	18	0		0	64		9		45	9	282		427
1980	0	0		26	45		13		39	32	212		367
1981	48	0		0	0		0		115	0	57		220
1982	63	0		0	0		0		73	0	63		199
1983	21	0	0	31	10		0		367	84	126	262	901
1984	0	0	12	87	648	37	75		100	62	112	0	1,133
1985	105	175		70	0		0		0	420	315	0	1,085
1986	0	0	109	0	0	0	0	73	835	0	290	73	1,380
1987	0	54	18	127	18	72	72	72	344	145	253	0	1,175
1988	18	0	18	309	18	0	0	0	73	55	0	109	600
1989	9	18	46	18	0	9	0	65	185	9	18	18	395
1990	84	0	34	185	34	269	0		638	67	34	0	1,345
1991	0	55	22	66	11	44	22	77	0	88	22	0	407
1992	0	0	0	110	0	51	0	144	68	211	16	8	608
Mean	25	19	16	64	57	30	19	27	180	76	153	47	696

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams, 1977-1982.

Appendix A56. Westside Susitna River drainage burbot harvest by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Moose Creek	Yentna River	Lake Creek	Fish Lakes ^a	Talachulitna River	Rabideux Creek	Shell Lake	Other Streams ^b	Other Lakes ^b	Total
1977	0	3			42		0		0	51	19	115
1978	0	0			0		45		0	72	36	153
1979	36	309			64		0		0	45	0	454
1980	0	224			0		0		0	448	34	706
1981	29	96			29		0			57	0	211
1982	84	252			0		0		0	10	430	776
1983	0	126			283		0		63	125	210	807
1984	12	237			100		0			199	761	1,309
1985	0	140			140		0			105	175	560
1986	0	257	0		67	89	0			302	0	715
1987	18	1,123			507	145	0			1,738	109	3,640
1988	36	36			327	218	0			127	200	944
1989	0	86	10	19	0	19	0			58	0	192
1990	51	118		34	556	438	0			84	253	1,534
1991	9	35		0	0	9	0	35		9	0	97
1992	0	42		0	0	76	0	76		76	34	304
Mean	17	193	5	13	138	142	3	56	11	219	141	782

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A57. Knik Arm drainage smelt harvest by fishery, 1985-1992 (grouped with other fish prior to 1985).

FISHERY	1985	1986	1987	1988	1989	1990	1991	1992	Mean
Marine									
Fish Ck.	0	0	0	0	0	0	0	0	0
Other	560	3,351	0	0	0	0	0	0	489
Freshwater	0	0	0	0	0	0	0	0	0
Total	560	3,351	0	0	0	0	0	0	489

Appendix A58. Westside Susitna River drainage smelt harvest by fishery, 1985-1992 (grouped with other fish prior to 1985).

Year	Alexander Creek	Deshka River	Moose Creek	Yentna River	Lake Creek	Fish Lakes ^a	Other Streams ^b	Total
1985	0	0			0		1,680	1,680
1986	0	7,300	0		0	0	0	7,300
1987	0	0			0	0	9,265	9,265
1988	1,547	0			1,083	0	6,219	8,849
1989	0	0	0	0	785	0	1,539	2,324
1990	707	842		3,368	674	0	0	5,591
1991	3,774	245		0	0	0	2,113	6,132
1992	379	0		1,082	0	0	14,062	15,523
Mean	801	1,048	0	1,113	318	0	4,360	7,083

^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A59. Knik Arm drainage whitefish harvest by fishery, 1985-1992
 (grouped with other fish prior to 1985).

FISHERY	1985	1986	1987	1988	1989	1990	1991	1992	Mean
Little Susitna River	587	134	199	673	599	443	732	138	438
Knik River & Tributaries (incl. Jim Ck.)	0	424	18	327	118	98	42	18	138
Eklutna Powerplant Tailrace	0	0	0	18	9	0	0	0	3
Wasilla Ck.	0	0	0	0	0	0	0	0	0
Cottonwood Ck.	0	0	0	0	0	0	0	0	0
Big Lake Drainage streams	0	0	0	18	100	0	0	0	15
Wasilla Lake	0	11	36	0	0	0	84	0	16
Big Lake	0	0	0	18	9	16	0	0	5
Nancy Lake Complex Lakes	0	11	127	91	9	65	42	101	56
Other Streams	0	0	0	18	0	0	0	0	2
Other Lakes	0	0	0	0	0	0	0	0	0
Total	587	580	380	1,163	844	622	900	257	667

Appendix A60. Eastside Susitna River drainage whitefish harvest by fishery, 1984-1992 (grouped with other fish prior to 1984).

FISHERY	1984	1985	1986	1987	1988	1989	1990	1991	1992	Mean
Little Willow Creek	62	350	0	0	18	0	0	235	28	77
Willow Creek	349	245	73	72	218	111	403	188	64	191
Kashwitna River	150		0	36	0	83	101	0	9	47
Caswell Creek	12	0	0	109	18	0	34	31	18	25
Sheep Creek	37	105	0	18	55	102	101	94	9	58
Goose Creek	0		0	0	0	18	0	0	28	6
Montana Creek	175	0	0	72	91	18	0	0	18	42
Sunshine Creek	175	560	581	109	0	0	50	0	9	165
Birch Creek			73	36	0	0		0	9	20
Talkeetna River & Tributaries (including Clear Ck)	49	105	363	272	146	46	319	78	55	159
Other Streams	49	0	0	72	0	64	34	0	0	24
Lakes	0	0	0	0	0	0	336	0	18	39
Total	1,058	1,365	1,090	796	546	442	1,378	626	265	841

Appendix A61. Westside Susitna River drainage whitefish harvest by fishery, 1985-1992 (grouped with other fish prior to 1985).

Year	Alexander Creek	Deshka River	Moose Creek	Yentna River	Lake Creek	Fish Lakes ^a	Talachulitna River	Other Streams ^b	Other Lakes ^b	Total
1985	0	175			315	0	0	0	35	525
1986	112	134	22		145	11	0	11	0	435
1987	127	163			851	272	0	163	109	1,685
1988	637	564			91	91	0	36	0	1,419
1989	95	86	0	0	10	10	38	143	0	382
1990	152	488		0	623	67	0	51	0	1,381
1991	120	199		27	106	0	0	67	0	519
1992	0	193		18	0	28	0	45	56	340
Mean	155	250	11	11	268	60	5	65	25	836

^a Fish Lake drainage (Yentna drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A62. West Cook Inlet drainage whitefish harvest by fishery, 1985-1992 (grouped with other fish prior to 1985).

Year	Chuitna River	Theodore River	Lewis River	Total
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	48	0	48
1990	0	135	0	135
1991	0	0	0	0
1992	0	23	0	23
Mean	0	23	0	23

Appendix A63. Knik Arm drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1992.

Year	Marine	Little Susitna River	Knik River ^a	Eklutna Tailrace	Wasilla Creek	Cottonwood Ck	Fish Creek ^b	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams ^c	Other Lakes	Total
1977		77			0				17	57	229		380
1978		759			0				0	0	36		795
1979		291			0	55		27	55	9	0		437
1980		1,059			0	0		0	0	43	34		1,136
1981		690	0		0	0		38	10	19	19		776
1982		713	0		0	0		0	0	73	31		817
1983	52	136	0		0	0		0	0	241	0	0	377
1984	0	87	0	0	0	0		75	12	125	0	150	449
1985	0	0	0	0	0	0	35	87	0	0	0	35	157
1986	0	0	0	0	0	0	0	0	24	0	0	0	24
1987	0	0	0	0	0	0	0	0	0	462	0	0	462
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	227	227
1990	0	0	0	0	0	0	0	0	0	0	99	0	99
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	389	141	0	0	260	0	0	0	0	0	22	812
Mean	5	263	9	0	0	20	2	14	7	64	28	43	434

^a Knik River and tributaries including Jim Creek.

^b Big Lake drainage.

^c Includes lakes and streams, 1977-1982.

Appendix A64. Eastside Susitna River drainage other fish (includes smelt, whitefish, and northern pike prior to 1984) harvest by fishery, 1977-1992.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River ^a	Other Streams ^b	Lakes	Total
1977	218	57			0		133			23	195		626
1978	27	0			9		27			0	90		153
1979	45	0		36	191		91		273	64	73		773
1980	116	13		26	0		13		0	32	520		720
1981	38	0		96	86		19		0	38	29		306
1982	63	0		0	21		10		42	10	199		345
1983	52	0	157	10	0		52		0	126	51	21	469
1984	125	0	0	0	0	0	25		0	0	0	75	225
1985	0	0		0	0		0		0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	15	0	0	0	0	0	0	0	0	0	0	0	15
1990	0	0	0	0	0	0	0		0	0	0	67	67
1991	16	0	0	0	0	0	0	0	0	0	0	0	16
1992	54	0	0	0	0	0	0	0	0	0	0	22	76
Mean	48	4	10	11	19	0	23	0	20	18	72	19	248

^a Talkeetna River and tributaries including Clear Creek.

^b Includes lakes and streams, 1977-1982.

Appendix A65. Westside Susitna River drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1992.

Year	Alexander Creek	Deshka River	Moose Creek	Peter's Creek	Lake Creek	Fish Creek ^a	Talachulitna River	Other Streams ^b	Lakes ^b	Total
1977	59	68			14			342	68	551
1978	181	72			18			63	36	370
1979	145	82			109			55	0	391
1980	0	69			0			0	34	103
1981	0	19			19			48	0	86
1982	178	115			63			10	0	366
1983	21	430			10			0	0	461
1984	187	212		0	137			50	12	598
1985	35	0			69			0	0	104
1986	0	0	0		0	0		0	0	0
1987	31	0			0	0		0	0	31
1988	0	0		0	0	0		0	0	0
1989	0	0	0	0	0	0		0	0	0
1990	17	0		0	34	0		0	0	51
1991	21	0		0	0	0	0	43	0	64
1992	0	22		0	0	0	0	0	0	22
Mean	55	68	0	0	30	0	0	38	9	200

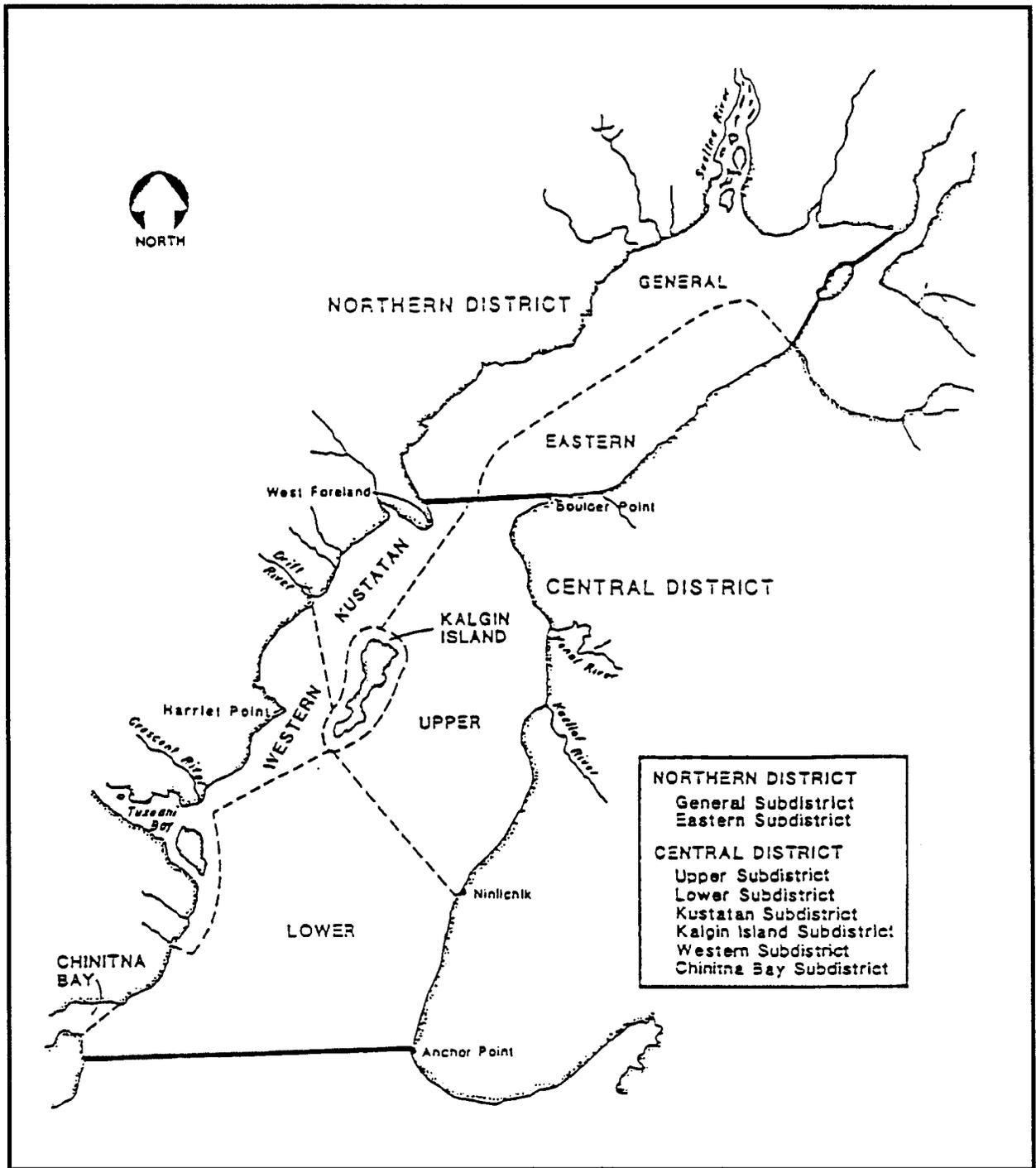
^a Fish Lake drainage (Yentna River drainage).

^b May include harvest from West Cook Inlet waters.

Appendix A66. West Cook Inlet drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1992.

Year	Chuitna River	Theodore River	Lewis River	Total
1977	12	0	0	12
1978	0	0	0	0
1979	45	0	0	45
1980	0	0	0	0
1981	0	0		0
1982	0	0		0
1983	10	0		10
1984	0	0		0
1985	0	0	0	0
1986	0	0		0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
Mean	4	0	0	4

APPENDIX B



Appendix B1. Map of Upper Cook Inlet commercial salmon fishing districts.

Appendix B2. Commercial salmon catch from all Upper Cook Inlet districts, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	14,792	2,052,511	192,599	553,855	1,233,722	4,047,479
1978	17,302	2,621,667	219,360	1,689,098	571,959	5,119,386
1979	13,738	924,415	265,166	72,982	650,357	1,926,658
1980	13,795	1,573,637	271,378	1,786,430	390,810	4,036,050
1981	12,240	1,439,235	485,148	127,169	833,549	2,897,341
1982	20,870	3,259,864	793,937	790,648	1,433,866	6,299,185
1983	20,634	5,049,733	516,322	70,327	1,114,858	6,771,874
1984	8,819	2,102,767	442,619	622,510	684,124	3,860,839
1985	23,297	3,852,141	619,924	83,538	714,140	5,293,040
1986	39,240	4,787,982	756,830	1,299,360	1,134,173	8,017,585
1987	39,661	9,500,186	451,404	109,801	349,132	10,450,184
1988	29,060	6,834,342	560,022	469,972	708,573	8,601,969
1989	26,742	5,010,698	339,201	67,430	122,027	5,566,098
1990	16,105	3,604,064	500,026	603,630	351,197	5,075,022
1991	13,535	2,177,576	425,724	14,663	280,223	2,911,721
1992	16,722	8,901,566	462,565	677,346	350,914	10,409,113
1993	18,841	4,754,846	306,845	100,934	122,767	5,304,233
Mean	20,317	4,026,308	447,592	537,629	649,788	5,681,634

Appendix B3. Commercial salmon catch from the Central District drift net fishery, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	3,381	1,072,066	106,284	285,943	1,118,861	2,586,535
1978	2,009	1,801,600	67,775	933,049	474,633	3,279,066
1979	1,032	453,692	106,696	19,379	601,404	1,182,203
1980	837	769,078	88,792	963,133	327,506	2,149,346
1981	2,317	632,756	221,923	53,795	752,764	1,663,555
1982	1,232	2,102,307	398,958	270,122	1,340,789	4,113,408
1983	1,115	3,221,783	318,208	26,603	1,040,170	4,607,879
1984	505	1,228,252	195,230	279,608	563,187	2,266,782
1985	1,912	1,890,388	314,795	33,986	643,425	2,884,506
1986	1,826	2,834,170	501,059	614,384	1,009,591	4,961,030
1987	4,551	5,631,691	195,937	38,587	208,014	6,078,780
1988	2,216	4,129,686	263,701	226,456	575,441	5,197,500
1990	620	2,305,707	245,223	323,936	289,302	3,164,788
1991	241	1,117,514	175,504	5,791	215,469	1,514,519
1992	662	5,942,970	263,888	413,588	310,963	6,932,071
1993	769	2,561,451	122,155	46,510	88,994	2,819,879
Mean	1,484	2,217,359	210,949	266,757	562,383	3,258,932

Appendix B4. Commercial salmon catch from the Central District western set net fishery, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	727	200,175	18,721	22,076	96,460	338,159
1978	1,368	164,975	33,881	20,619	50,758	271,601
1979	1,799	111,124	36,329	1,665	72,877	223,794
1980	1,463	143,118	27,600	33,750	34,349	240,280
1981	748	93,036	46,478	4,636	89,676	234,574
1982	1,852	235,208	102,716	8,255	98,459	446,490
1983	1,938	215,566	50,797	1,050	56,161	325,512
1984	1,108	556,300	93,962	55,293	145,645	852,308
1985	2,040	595,122	134,770	9,122	130,096	871,150
1986	1,417	396,175	87,755	51,323	115,800	652,470
1987	424	651,037	51,017	7,640	42,146	752,264
1988	664	298,252	39,626	14,086	45,656	398,284
1989	1,272	55,856	23,342	1,899	17,797	100,166
1990	620	137,425	37,368	16,549	26,596	218,558
1991	552	17,195	19,361	168	4,455	40,731
1992	217	23,143	15,767	612	5,209	44,948
1993	223	23,930	9,195	941	3,433	37,722
Mean	1,084	230,449	48,746	14,687	60,916	355,824

Appendix B5. Commercial salmon catch from all Northern Cook Inlet districts, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	565	123,780	20,623	116,518	23,861	285,347
1978	669	51,624	47,256	327,270	37,331	464,150
1979	1,714	112,449	52,635	26,332	9,270	202,400
1980	990	105,647	90,098	474,488	16,728	687,951
1981	725	249,662	134,362	53,325	46,208	484,282
1982	2,716	118,060	85,352	73,307	43,006	322,441
1983	933	184,219	53,867	21,604	29,321	289,944
1984	885	210,947	110,218	103,941	75,846	501,837
1985	1,863	163,012	79,245	26,511	31,213	301,844
1986	15,488	141,830	88,108	139,002	76,040	460,468
1987	12,701	164,602	98,920	18,205	67,180	361,608
1988	12,836	129,713	149,742	54,210	75,728	422,229
1989	12,731	280,801	175,710	23,878	81,948	575,068
1990	9,582	96,398	139,401	43,944	35,710	325,035
1991	6,859	116,201	132,270	5,153	39,393	299,876
1992	4,577	69,257	85,486	23,712	24,329	207,361
1993	3,277	146,319	106,258	10,468	25,401	291,723
Mean	5,242	144,972	97,032	90,698	43,442	381,386

Appendix B6. Commercial salmon catch from the Northern Cook Inlet general district, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	511	88,729	15,892	102,679	22,252	230,063
1978	388	33,326	35,313	302,529	35,835	407,391
1979	1,418	51,537	34,943	22,627	8,717	119,242
1980	741	60,799	78,345	446,388	14,183	600,456
1981	634	148,806	118,792	45,951	41,789	355,972
1982	2,003	66,940	63,712	66,112	31,850	230,617
1983	841	117,015	42,089	20,749	26,556	207,250
1984	784	136,596	86,813	83,112	67,054	374,359
1985	1,461	95,412	56,751	23,847	27,221	204,692
1986	13,462	94,849	68,994	118,537	67,426	363,268
1987	10,775	97,089	64,082	13,215	53,159	238,320
1988	11,592	98,289	123,356	46,441	70,136	349,814
1989	10,333	201,268	133,952	20,731	64,042	430,326
1990	7,094	69,386	107,300	35,491	31,833	251,104
1991	5,750	81,909	104,896	4,223	34,862	231,640
1992	3,792	54,625	65,434	17,005	23,423	164,279
1993	2,774	119,718	87,191	9,164	23,873	242,720
Mean	4,374	95,076	75,756	81,106	37,895	294,207

Appendix B7. Commercial salmon catch from Northern Cook Inlet eastern district, 1977-1993.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	54	35,051	4,731	13,839	1,609	55,284
1978	278	18,293	11,943	24,741	1,493	56,748
1979	296	60,912	17,692	3,705	553	83,158
1980	245	44,077	11,110	26,609	2,397	84,438
1981	91	100,856	15,570	7,374	4,419	128,310
1982	713	51,120	21,640	7,195	11,156	91,824
1983	92	67,204	11,778	855	2,765	82,694
1984	101	74,351	23,405	20,829	8,792	127,478
1985	402	67,600	22,494	2,664	3,992	97,152
1986	2,026	46,981	19,114	20,465	8,614	97,200
1987	1,926	67,513	34,838	4,990	14,021	123,288
1988	1,244	31,424	26,386	7,769	5,592	72,415
1989	2,398	79,533	41,758	3,147	17,906	144,742
1990	2,488	27,012	32,101	8,453	3,877	73,931
1991	1,109	34,292	27,374	930	4,531	68,236
1992	785	14,632	20,052	6,707	906	43,082
1993	503	26,601	19,067	1,304	1,528	49,003
Mean	868	49,850	21,238	9,504	5,538	86,999

Appendix B8. Northern District commercial chinook salmon harvest by period, Cook Inlet, 1986-1993.

Year	Period				Directed Chinook Salmon Total	NCI Season Total	Upper Cook Inlet Season Total
	1	2	3	4			
1986	3,842	5,218	4,711	---	13,771	15,488	39,240
1987	3,365	3,397	3,754	1,025	11,541	12,701	39,661
1988	3,511	3,676	3,935	---	11,122	12,836	29,060
1989	4,148	4,935	1,985	---	11,068	12,731	26,742
1990	2,928	3,041	2,103	---	8,072	9,585	16,105
1991	2,854	1,688	1,431	322	6,305	6,859	13,535
1992	911	2,191	816	---	3,918	4,554	16,722
1993	1,191	1,735	116	---	3,042	3,277	18,841
Mean	2,844	3,235	2,356	678	8,605	9,754	24,988

^a Fishing periods established by Northern District King Salmon Management Plan (5 AAC 21.366). The season occurs on Mondays 1-24 June, 7:00 a.m. to 1:00 p.m. and is closed when the 12,500 king salmon quota is achieved.

Appendix B9. Knik Arm commercial set gill net harvest, 1987-1993.

Year	Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Total
1987	a	24,090	2,043	264	403	26,800
1988	9	38,251	11,604	591	2,733	53,188
1989	4	47,925	6,075	545	4,979	59,528
1990	4	23,450	5,708	696	5,308	35,166
1991	a	10,459	1,630	21	961	13,071
1992	a	10,748	1,817	573	1,289	14,427
1993	a	47,751	831	29	990	49,601
Mean		28,953	4,244	388	2,380	35,969

^a Not reported.

APPENDIX C

Appendix C. Number of fish (actual and planned) stocked into Northern Cook Inlet Management Area waters, 1992-1994.

Species/Life Stage/Site	1992 (Actual)	1993 (Actual)	1994 (Planned)
Chinook Salmon Anadromous Smolt			
Willow Creek	215,416	160,094	200,000
Total	215,416	160,094	200,000
Coho Salmon Anadromous Smolt			
Wasilla Creek Drainage	76,315	77,174	76,000
Cottonwood Creek Drainage	53,900	74,198	76,000
Little Susitna River Drainage	312,925	279,873	300,000
Big Lake Drainage	74,953	67,934	76,000
Eklutna Tailrace (Knik River)	131,829	108,000	100,000
Total	649,922	607,179	628,000
Coho Salmon Landlocked Fingerlings			
Loon Lake	32,650	0	0
Victor Lake	6,700	5,400	5,400
Bear Paw Lake	22,250	9,000	9,000
Echo Lake	4,600	4,600	4,600
Christiansen Lake	35,417	35,804	35,800
Loberg (Junction) Lake	1,100	1,100	1,100
Finger Lake	23,856	12,938	18,100
Memory Lake	16,598	15,966	16,600
Rocky Lake	11,700	6,062	5,900
Prator Lake	49,840	19,905	19,600
Matanuska Lake	12,287	6,200	6,200
Knik Lake	5,000	5,000	5,000
Wolf Lake	18,360	0	0
Benka Lake	0	12,230	12,300
Barley Lake	0	1,860	1,860
Carpenter Lake	0	17,560	17,600
Klaire Lake	0	1,800	1,800
Diamond Lake	0	13,900	13,900
Kalmbach Lake	0	12,492	12,500
Total	240,358	181,817	187,260
Chinook Salmon Landlocked Subcatchables			
Finger Lake	40,686	36,141	36,000
Total	40,686	36,141	36,000

-continued-

Appendix C. (Page 2 of 4).

Species/Life Stage/Site	1992 (Actual)	1993 (Actual)	1994 (Planned)
Rainbow Trout Landlocked Catchables			
Kepler/Bradley Lake	7,997	4,619	5,800
Matanuska Lake	8,357	7,349	9,200
Irene Lake	1,996	1,473	1,800
Walby Lake	1,992	2,083	2,700
Knik Lake	2,048	1,998	2,500
Coyote Lake	559	323	300
Loberg (Junction) Lake	1,106	880	1,100
Slipper (Eska) Lake	477	726	900
Echo Lake	1,999	1,816	2,300
Total	26,511	21,267	26,600
Rainbow Trout Landlocked Fingerlings			
B-J Lake	3,671	0	0
Barley Lake	1,860	1,860	1,860
Bear Paw Lake	0	4,500	0
Bench Lake	0	3,440	0
Beverly Lake	2,100	0	4,200
Big Beaver Lake	16,100	0	16,100
Big Lake	299,121	0	0
Big No Luck Lake	6,819	6,807	6,800
Blodgett Lake	5,760	0	6,700
Carpenter Lake	17,696	17,651	17,640
Christiansen Lake	0	17,900	0
Crystal Lake	14,195	13,170	13,170
Dawn Lake	2,293	2,360	2,360
Diamond Lake	13,900	11,900	13,900
Dollar Lake	0	1,388	0
East Twin Lake	4,155	0	0
Farmer Lake	0	1,100	1,100
Finger Lake	37,034	36,200	36,200
Florence Lake	5,460	5,460	5,460
Homestead Lake	0	3,588	0
Honeybee Lake	5,800	5,800	5,800
Ida Lake	4,640	0	4,640
Johnson Lake	0	7,869	8,000
Kalmbach Lake	12,905	12,500	12,500
Kashwitna Lake	8,000	16,000	16,000
Kepler/Bradley Lake	5,800	5,800	5,800
Knik Lake	5,000	2,500	5,000
Lalen Lake	9,196	4,500	9,190
Lazy Lake	2,250	2,529	2,250
Little Lonely Lake	5,600	5,600	5,600
Little No Luck Lake	12,964	0	3,410
Long Lake (K/B)	0	14,738	7,440

-continued-

Appendix C. (Page 3 of 4).

Species/Life Stage/Site	1992 (Actual)	1993 (Actual)	1994 (Planned)
Rainbow Trout Landlocked Fingerlings, cont.			
Long Lake (Big Lake)	4,400	4,658	4,440
Long Lake (Mi. 86 Glenn)	0	10,600	10,600
Loon Lake	0	10,800	10,800
Lorraine Lake	13,206	13,200	13,200
Lucille Lake	72,408	71,800	72,400
Lynda Lake	1,120	1,241	1,120
Lynne Lake	7,968	7,000	7,000
Marion Lake	11,300	11,300	11,300
Matanuska Lake	0	3,100	3,100
Memory Lake	0	8,300	0
Morvro Lake	17,320	8,676	8,660
North Friend Lake	8,140	8,140	8,140
Prator Lake	0	9,800	0
Ravine Lake	2,391	2,500	2,500
Reed Lake	3,900	1,950	1,950
Rocky Lake	0	5,870	5,870
Ruby Lake	0	4,945	0
Seventeenmile Lake	10,000	10,000	10,000
Seymour Lake	22,925	11,500	22,900
South Friend Lake	5,570	5,570	5,570
South Rolly Lake	10,770	21,596	21,540
Stepan Lake	5,990	5,694	5,990
Tigger Lake	3,049	1,890	1,890
Twin Lake	6,250	6,094	6,250
Twin Island Lake	15,102	0	15,100
Vera Lake	11,050	11,050	11,050
Visnaw Lake	13,154	6,559	13,070
Walby Lake	5,390	10,780	10,780
Weiner Lake	4,140	0	4,140
West Beaver Lake	11,538	11,500	11,500
West Sunshine Lake	0	4,460	0
Willow Lake	0	14,300	14,300
Wishbone Lake	0	5,271	5,270
Wolf Lake	0	0	12,400
"X" Lake	0	19,949	10,140
"Y" Lake	3,970	3,970	3,970
Total	767,120	555,323	544,920
Arctic Grayling Landlocked Fingerlings			
Kepler/Bradley Lake	5,800	5,800	5,800
Meirs Lake	3,400	3,400	3,400
Mile 180 Parks Hwy Lake	1,000	0	1,000

-continued-

Appendix C. (Page 4 of 4).

Species/Life Stage/Site	1992 (Actual)	1993 (Actual)	1994 (Planned)
Arctic Grayling Landlocked Fingerlings, cont.			
Seventeenmile Lake	10,000	10,000	10,000
Willow Lake	14,300	0	0
Canoe Lake	4,200	4,200	4,200
Matanuska Lake	6,100	3,100	3,100
Long [Mile 86] Lake	10,600	10,600	10,600
Walby Lake	5,400	0	0
Reed Lake	0	1,950	1,950
Loberg (Junction) Lake	1,100	1,100	1,100
Lorraine Lake	0	13,200	13,200
Knik Lake	5,000	5,000	5,000
Finger Lake	36,600	18,100	18,100
Florence Lake	0	5,460	5,460
"Y" Lake	3,900	3,900	3,900
Farmer Lake	0	1,100	1,100
Bruce Lake	0	0	2,700
Total	107,400	86,910	90,610
Arctic Grayling Landlocked Fry			
Long Lake (Mile 86)	64,000	64,000	64,000
Meirs Lake	16,700	16,700	16,700
Canoe Lake	21,200	21,200	21,200
Total	131,900	101,900	101,900
Arctic Char Landlocked Fingerlings			
Irene Lake	3,600	3,600	3,600
Benka Lake	12,300	12,300	12,300
Finger Lake	0	36,200	36,200
Lynne Lake	7,000	7,000	7,000
Marion Lake	11,300	11,300	11,300
Total	34,200	70,400	70,400
Lake Trout Landlocked Fingerlings			
Long Lake (Mile 86)	0	0	10,600
Total	0	0	10,600
Total Anadromous Stockings	865,338	767,373	828,000
Total Landlocked Stockings	1,318,176	1,053,758	1,068,290
Total Stockings	2,183,514	1,821,131	1,896,290

APPENDIX D

Appendix D. Emergency Orders issued for NCIMA waters during 1991-1993.

Emergency Orders issued in 1991:

1. E.O. No. 2-KS-2-03-91 reduced bag and possession limits within the Chuitna (Chuit), Theodore, Lewis, and Beluga River drainages to 1 king salmon 16 inches or more in length. Effective from May 25 through July 13, 1991.
2. E.O. No. 2-KS-2-16-91 closed the Lewis and Theodore drainages to king salmon fishing; and additionally closed the Chuit River drainage upstream from the Tyonek Road crossing to king salmon fishing. Effective June 25 through July 13, 1991.
3. E.O. No. 2-KS-2-21-91 superseded E.O. 2-KS-2-16-91 and closed Lewis, Theodore and Chuit rivers in their entirety to king salmon fishing. Effective July 4 through July 13, 1991.
4. E.O. No. 2-KS-2-22-91 opened all waters within one-fourth mile radius of Willow Creek's confluence with the Susitna River to fishing for king salmon. Effective July 6 and July 7, 1991.
5. E.O. No. 2-SS-2-27-91 closed that portion of the Little Susitna River to fishing from the fish counting weir located at River Mile 32.5 downstream for a distance of 1,500 feet. Effective July 27 through September 14, 1991.
6. E.O. No. 2-RS-1-29-91 closed sockeye salmon fishing in all waters north of the latitude of Anchor Point. Effective 7:00 a.m. July 26 through December 31, 1991.
7. E.O. No. 2-RS-2-33-91 opened the Fish Creek personal use dip net fishery. Effective July 30 through August 9, 1991.
8. E.O. No. 2-RS-2-34-91 re-opened the Little Susitna River drainage and all freshwater drainages of Knik Arm to fishing for sockeye salmon. Effective noon, July 29 through December 31, 1991.
9. E.O. No. 2-RS-2-36-91 rescinded E.O. No. 2-RS-1-29-91 thereby re-opening recreational fisheries within waters of the Kenai Peninsula and Susitna-West Cook Inlet regulatory areas and marine waters of Cook Inlet north of Anchor Point. Effective 7:00 a.m. August 2 through December 31, 1991.
10. E.O. No. 2-CS-2-38-91 closed the Eklutna Power Plant tailrace to sport fishing from the Old Glenn Highway downstream to department markers placed approximately 100 yards upstream of the confluence of the tailrace and the Knik River. Effective noon, August 6 through December 31, 1991.
11. E.O. No. 2-SS-2-42-91 increased bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's salmon counting weir at River Mile 32.5. Effective noon, August 14 through December 31, 1991.

12. E.O. No. 2-BB-2-52-91 reduced the bag and possession limits for burbot from 15 per day and in possession to 5 per day and in possession and reduced gear to two closely attended lines while fishing through ice in the Big Lake drainage (Houston area). Effective December 1, 1991 until superseded by regulation or subsequent Emergency Order.
13. E.O. No. 2-BB-2-53-91 closed Nancy Lake (Mile 64 Parks Highway) to burbot fishing. Effective December 1, 1991 until superseded by regulation or subsequent Emergency Order.

Emergency Orders issued in 1992:

1. E.O. No. 2-KS-2-08-92 reduced the length of the king salmon season and reduced the daily bag and possession limit for king salmon to 1 fish greater than 16 inches in length in all waters draining into Cook Inlet between Cape Douglas and the Susitna River, excluding the Susitna River. Additionally this E.O. required the release of all king salmon 16 inches or more in length and the use of unbaited, artificial lures in all waters of the Chuitna River drainage upstream of a department marker located at the old cable crossing, all waters of the Theodore River drainage upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge. Effective May 26 through July 13, 1992.
2. E.O. No. 2-KS-2-12-92 clarified that Willow Creek is open to king salmon on Saturday, Sunday and Monday for 3 consecutive weeks. Effective June 20 through June 22, 1992.
3. E.O. No. 20-KS-2-14-92 opened Willow Creek from its mouth upstream to the Parks Highway bridge and all waters within a one-quarter mile radius of Willow Creek's confluence with the Susitna River to king salmon fishing. Effective June 23 through June 26, 1992.
4. E.O. No. 2-KS-2-15-92 reduced the daily bag limit for king salmon, 16 inches or more in length, to 1 fish in all waters of the Susitna and Little Susitna River drainages. It further required the release of all king salmon, 16 inches or more in length, and the use of unbaited artificial lures in all waters of the Doshka River drainage between the Doshka River's confluence with Trapper Creek and the confluence of Moose and Kroto creeks (The Forks); and in all waters of the Alexander Creek drainage upstream from Alexander Creek's confluence with Trail Creek. Effective June 22 through July 13, 1992.
5. E.O. No. 2-RS-2-21-92 opened the Fish Creek personal use dip net fishery. Dip net fishing was allowed for 3 consecutive days followed by a 1 day closure on a continuing basis. Effective 6:00 a.m. July 23 through August 6, 1992.
6. E.O. No. 2-SS-2-22-92 closed that portion of the Little Susitna River to fishing from the fish counting weir located at River Mile 33 downstream for a distance of 1,500 feet. Effective July 25 through September 14, 1992.

7. E.O. No. 2-RS-2-28-92 closed the Susitna River drainage to sockeye salmon fishing. Effective July 31 through December 31, 1992.
8. E.O. No. 2-SS-2-29-92 increased bag and possession limits to 5 coho salmon 16 inches or more in length downstream from the department's counting weir at River Mile 32.5. Effective August 15 through December 31, 1992

Emergency Orders issued in 1993:

1. E.O. No. 2-RS-2-23-93 opened the Fish Creek personal use fishery. The dip net fishery opened 9:00 a.m. July 24 and closed midnight August 6, with the fishery being closed July 26, July 30, and August 3, 1993.
2. E.O. No. 2-SS-2-25-93 closed that portion of the Little Susitna River to fishing from the fish counting weir located at River Mile 33 downstream for a distance of 1,500 feet. Effective July 23 through September 15, 1993.
3. E.O. No. 2-SS-2-32-93 increased the bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's counting weir at River Mile 32.5. Effective August 11 through December 31, 1993.
4. E.O. No. 2-SS-2-33-93 closed that portion of Jim Creek to fishing from the fish counting weir located at River Mile 1 downstream for a distance of 500 feet. Effective August 12 through November 1, 1993.

APPENDIX E

Appendix E. Chinook salmon regulatory history for NCIMA waters.

Chinook salmon fishing in NCIMA waters was open from statehood through 1963. During 1964 through 1966 chinook salmon fishing in fresh water was closed. During 1967 through 1970 Alexander Creek, Clear Creek, Deshka River and Lake Creek were open in their entirety. This fishery operated under a 15 day season during the middle of June on a 250 fish, over 20 inches in length, harvest quota system. Achievement of the quota may have resulted in early season closure. A 1 fish per day 2 per season bag limit for fish over 20 inches in length was in place and a punch card was a requirement of participation in the fishery. In 1971 the harvest quota was eliminated. During 1971 and 1972, in addition to the 15 day season in Alexander Creek, Deshka River, and Lake Creek, a more restrictive fishery was allowed (few days) in Clear Creek and portions of the Little Susitna River, Ship Creek (Anchorage) and Willow Creek, however a punch card was still required. In 1973, the area chinook salmon fishery was closed to the harvest of king salmon 20 inches or larger in length and remained so through 1978.

Selected Susitna River streams were reopened to chinook salmon fishing in 1979 after being closed for several years because of low stock abundance. Cautious incremental expansion has characterized the area's chinook salmon fisheries since they reopened. From 1979 through 1982 chinook salmon fishing was permitted at Alexander Creek, Lake Creek and at the Deshka River from the fourth Saturday in May through July 6. These streams drain into the Susitna River from the west. Clear Creek, a tributary of the Talkeetna River, also had a similar chinook salmon season. In addition, three eastside tributaries of the Susitna River, Willow, Caswell and Montana creeks, were open on Saturdays and Sundays only for 4 consecutive weekends commencing on the second Saturday in June. Harvest quotas, ranging from 200 to 7,000 chinook salmon, governed these respective fisheries from 1979 through 1982. The Chuitna River, a coastal stream near Beluga, and the entire Yentna and Talkeetna River drainages were opened to chinook salmon fishing in 1983. The opening date for chinook salmon fisheries that provided continuous daily fishing was also changed to January 1.

The following year, 1984, the remaining coastal streams near Beluga and all waters draining into the westside of the Susitna River downstream from the Deshka River were opened to chinook salmon fishing. In 1986, portions of five road accessible streams on the east side of the Susitna River opened to weekend only fishing. These streams included Little Willow, Goose, Sunshine, Sheep and Birch creeks.

Expanded chinook salmon fishing opportunity continued in 1987 when Monday fishing was added to all former weekend-only fisheries that drain into the Susitna River from the east. Saturday through Monday fishing was also allowed on the Susitna River and all flowing waters within one-quarter mile of the Susitna River (excluding the Kashwitna River) between the Deshka and Talkeetna rivers. These "corridor" fisheries were open for 4 continuous "weekends" similar to the previously mentioned Saturday through Monday fisheries. Chinook salmon fishing was permitted for the first time on the Susitna River drainage upstream from the Susitna River's confluence with the Talkeetna River to Devil's Canyon but excluding the Chulitna River drainage. Unbaited, single-hook, artificial lures were mandatory in this area. The season

extended from January 1 through July 13. The season for all Susitna River and coastal fisheries that formerly closed on July 6 was extended to July 13 in 1987.

In 1989, chinook salmon fishing was allowed within a one-quarter mile radius of the mouth of the Kashwitna River. That same year fishing was permitted daily at Willow Creek between January 1 and the third Monday in June and on Saturday through Monday for 2 consecutive weeks starting the fourth Saturday in June.

Bag and possession limits were 1 chinook salmon 20 inches or over in length in 1979. The following year bag and possession limits changed to 2 chinook salmon 20 inches or over in length but only 1 chinook salmon could be over 28 inches in length. In 1981 the bag limit was reduced to 1 chinook salmon 20 inches or more in length and in possession. This limit remained in effect through 1985. A 5 fish (20 inches or more in length) per year limit governed all Cook Inlet chinook salmon fisheries from 1979 through 1985. This limit applied collectively to Northern Cook Inlet fresh water, Cook Inlet salt water and the Kenai Peninsula.

In 1986, bag and possession limits for the western drainages of the Susitna River were changed to 2 chinook salmon, 16 inches or more in length daily and 4 in possession and remained so through 1992. Only 1 fish daily and 2 in possession could be over 28 inches. Similar limits also applied to the West Cook Inlet coastal fisheries. Bag and possession limits for eastern drainages of the Susitna River in 1986 were 1 chinook salmon, 16 inches or more in length, and 2 in possession. The seasonal limit was 5 chinook salmon 16 inches or more in length. Anglers were required to list their chinook salmon harvest on nontransferable harvest records from 1979 through 1988. The date and location of harvested chinook salmon were recorded. A \$5 permit stamp was mandatory for chinook salmon fishing from 1980 through 1982. The harvest record and yearly limit was eliminated for all NCI chinook salmon fisheries in 1989.

During the November 1992 BOF meeting several regulations were changed in the Susitna West-Cook Inlet Management Area to be in effect for the 1993 season. A seasonal limit of 5 king salmon was established for all waters of Cook Inlet. Individuals or companies engaged in freshwater sport fish guiding were prohibited from participating or engaging in sport fishing while clients are present or within his or her control or responsibility during the king salmon season except when guiding a client subject to the American Disabilities Act.

In effect for the 1993 season in the West Cook Inlet area the king salmon fishing season was reduced in length to end on June 30. The bag and possession limit was reduced in areas open to the retention of king salmon 16 inches or more in length to 1 daily and 1 in possession.

Additionally, in the following areas of West Cook Inlet only unbaited, artificial lures may be used and king salmon 16 inches or more in length may not be possessed or retained; all king salmon caught must be released immediately: (1) Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing; (2) Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high voltage power lines; and (3) Lewis River Drainage:

upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

Action during the November 1992 meeting also reduced the king salmon bag and possession limit in the Susitna River drainage including all flowing waters draining into the west side of the Susitna River downstream of and including the Dershka River. The bag and possession limit for king salmon over 16 inches was reduced to 1 daily and 2 in possession.

In addition to BOF action, legislative action during June of 1992 established provisions that prohibited resident or nonresident anglers from fishing in Alaska without a king salmon stamp beginning in 1993.

APPENDIX F

Appendix F. Board of Fisheries regulatory changes made during the November 1992 meeting.

PARTIAL SUMMARY OF NEW SPORT, PERSONAL USE, AND SUBSISTENCE FISHING
REGULATIONS ADOPTED BY THE BOARD OF FISHERIES FOR NCIMA
1993

King Salmon - Entire Area

A seasonal limit of 5 king salmon was established for all waters of Cook Inlet. Anglers harvesting a king salmon must immediately enter in ink on the back of their sport fishing license in the appropriate location, the waters fished, species harvested, and date the fish was harvested. Anglers without an annual sport fishing license (anglers younger than 16 years of age and Alaska residents at least 60 years of age) must obtain a king salmon harvest record card prior to king salmon fishing. On harvesting a king salmon they must mark the harvest card accordingly.

The Board also adopted as regulation a proposal which stated that an individual or company engaged in freshwater sport fish guiding may not participate or engage in sport fishing while clients are present or within his or her control or responsibility during the king salmon season except when guiding a client subject to the American Disabilities Act.

In addition to BOF action, during the first legislative session in June of 1992, legislators passed House Bill 596. This bill included provisions that prohibited resident or nonresident anglers from fishing for king salmon in Alaskan waters unless they have purchased the current year's king salmon tag and have it in possession. King salmon tags are valid from January 1 through December 31. Anglers must stick the tag on the back of their sport fishing license and validate it by signing their name across the tag. Anglers can purchase king salmon tags at the same time they buy their 1993 sport fishing license from their local vendor. There are five groups of resident anglers who are not required to purchase a king salmon tag: (1) blind anglers who qualify for a 25-cent license; (2) anglers under the age of 16; (3) anglers 60 years of age or older who have been a resident of the state for at least 1 year; (4) disabled veterans who are eligible for a free sport fishing license; and (5) anglers who qualify for a \$5 sport fishing license. All nonresident anglers are required to purchase a tag if they are fishing for king salmon in Alaska.

King Salmon - West Cook Inlet Area

The king salmon fishing season was reduced in length to end on June 30. The bag and possession limit was reduced in areas open to the retention of king salmon 16 inches or more in length to 1 daily and 1 in possession.

In the following areas only unbaited, artificial lures may be used and king salmon 16 inches or more in length may not be possessed or retained; all king salmon caught must be released immediately:

1. Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing;
2. Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high voltage power lines; and
3. Lewis River Drainage: upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

King Salmon - Susitna River Drainage

(including all flowing waters draining into the west side of the Susitna River downstream of and including the Deshka River)

The bag and possession limit for king salmon over 16 inches was reduced to 1 daily and 2 in possession.

Coho Salmon - Little Susitna River

The management plan for the Little Susitna River was modified. Only unbaited artificial lures may be used in the Little Susitna River from July 15 through August 5. The bag and possession limit for coho salmon 16 inches or more in length during this time period was increased to 3 daily and in possession.

Rainbow Trout

In Big Lake the rainbow trout bag limit was reduced to 2 daily and in possession. In the upper Cook Inlet area only 1 rainbow trout per day and 2 per season may be over 20 inches in length.

Long, X, and Wishbone lakes are closed to sport fishing from November 1 through April 30.

The North Fork of the Kashwitna River was established as a special management area for rainbow trout. Only single-hook, unbaited, artificial lures may be used in the North Fork of the Kashwitna River and rainbow trout may not be possessed or retained; all rainbow trout caught must be released immediately.

Only unbaited artificial lures may be used in all flowing waters of the Susitna-West Cook Inlet area (except when fishing for burbot when using legal gear for burbot as described under burbot in the section) from September 1 through May 15 except in areas in which special regulations are in effect. Areas with special regulations in effect generally require the use of unbaited artificial lures year round and further stipulate that rainbow trout may not be possessed or retained.

In the Lake Creek drainage, rainbow trout may not be possessed or retained in all flowing waters from August 15 through May 15, upstream from a department

marker located approximately 100 yards upstream from its confluence with the Yentna River to a department marker located approximately one-quarter mile upstream from Bulchitna Lake. Only single-hook unbaited artificial lures may be used in this area during this time period. The Lake Creek drainage upstream from the Bulchitna Lake marker continues to be managed as a catch-and-release area for rainbow trout.

Burbot

In the Susitna-West Cook Inlet area set lines are prohibited. Burbot may be taken with more than one line and hook if: (1) the total number of aggregate hooks does not exceed the daily bag limit for waters being fished; (2) the hooks are single hooks with a gap between point and shank larger than three-quarters of an inch; (3) each hook is set to sit on the bottom of the lake or stream; and (4) the burbot gear is closely attended.

The daily bag and possession limit for burbot is 5 daily and in possession in all waters of Susitna-West Cook Inlet Area.

Nancy Lake is closed to the harvest of burbot.

Lake Trout

The bag and possession limit for lake trout is 2 daily and in possession in all waters of Susitna-West Cook Inlet.

Three Mile Creek

Three Mile Creek in the West Cook Inlet area-that portion of Three Mile Creek from the road crossing upstream to Three Mile Lake and including that portion of Three Mile lake within a 300 foot radius of the outlet is closed to all fishing.

Fish Creek Personal Use

Changes in the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan pertaining to the Fish Creek dip net fishery are as follows:

1. the fishery will be opened by EO after July 23 on Saturdays, Sundays, and Wednesdays to the taking of sockeye and coho salmon provided the spawning escapement of sockeye salmon into Big Lake drainage is projected to exceed 50,000 fish;
2. additional fishing time can be established by EO provided that no more than 3 consecutive days of fishing is allowed without a minimum of 1 day of closure if escapement into Fish Creek warrants such action;

3. the area to be open to harvesting salmon by dip net includes waters upstream from a department marker located at the mouth of Fish Creek to a department marker located approximately one-quarter mile upstream of the Knik-Goose Bay Road;
4. the daily bag and possession limit is 6 salmon not in addition to the daily sport fish bag and possession limit;
5. the fishery shall close the second Friday in August, or earlier by EO if the harvest of coho becomes excessive in department opinion.

Subsistence

The Upper Cook Inlet subsistence salmon fishery as established under the Upper Cook Inlet Subsistence Management Plan beginning in 1991 was eliminated. The only area that remains open to subsistence fishing in the Upper Cook Inlet area is the Tyonek subdistrict on the west side of Cook Inlet in the Northern District.

APPENDIX G

Appendix G. Confirmed and reported northern pike waters in the Northern Cook Inlet Management Area.

Alexander Creek

- 1) Alexander Lake*
- 2) Sucker Lake*

Lower Susitna

- 3) Flathorn Lake*

Mid Susitna

- 4) Whistle Lake
- 5) Lockwood Lake*
- 6) Lady Slipper*
- 7) Unnamed*
- 8) Unnamed*
- 9) Unnamed*
- 10) Unnamed*
- 11) Ding Dong*

Yentna River

- 12) Whiskey Lake*
- 13) Bulchitna Lake*
- 14) Fish Creek Lake 1*
- 15) Fish Creek Lake 2*
- 16) Fish Creek Lake 3*
- 17) Fish Creek Lake 4*
- 18) Donkey Lake*
- 19) Hewitt Lake*

Skwentna River

- 20) Eight Mile Lake*
- 21) Seven Mile Lake

Deshka River

- 22) Parker Lake
- 23) Trapper Lake*
- 24) No Name Lake
- 25) Ambler Lake

Upper Susitna

- 26) Kashwitna Lake
- 27) Caswell Lake
- 28) Fish Lake
- 29) Rocky Lake
- 30) Sawmill Lake

Nancy Lake Area

- 31) Redshirt Lake*
- 32) Lynx Lake*
- 33) Cow Lake*
- 34) Little Chicken Lake
- 35) South Rolly Lake
- 36) North Rolly Lake
- 37) Tanaina Lake
- 38) Milo Lake
- 39) Frazer Lake
- 40) Little Frazer Lake
- 41) James Lake
- 42) Owl Lake
- 43) Char Lake
- 44) Ardaw Lake
- 45) Phoebe Lake
- 46) Chicken Lake
- 47) Echo Ponds

Susitna Tributaries

- 1) Deshka River*
- 2) Fish Creek (Flathorn)*
- 3) Fish Creek (Kroto Slough)*
- 4) Lake Creek*
- 5) Fish Lake Creek*
- 6) Alexander Creek*
- 7) Trappers Creek*
- 8) Sucker Creek*
- 9) Montana Creek*
- 10) Rolly Creek*
- 11) Moose Creek*
- 12) Bottle Creek*
- 13) Hewitt Creek*
- 14) Donkey Creek

* Confirmed Northern Pike Populations

(D. Rutz, Alaska Department of Fish and Game, Palmer, Personal Communication)