Volume 27 Study S-32

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for

COOK INLET CHINOOK SALMON STUDIES

by

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RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations of Alaska

Project: F-10-1

Study: S-32 Study Title: COOK INLET CHINOOK SALMON STUDIES

Job: S-32-7 Job Title: East Susitna Chinook Salmon

S-32-8 West Susitna Chinook Salmon

Cooperators: Kelly R. Hepler and Robert W. Bentz, Jr.

Period Covered: July 1, 1985 to June 30, 1986

ABSTRACT

In 1985 for the seventh consecutive year, selected northern Cook Inlet streams were opened to sport fishing for chinook salmon, *Oncorhynchus tshawytscha* (Walbaum). The 1985 chinook salmon harvest estimate was the second highest recorded and effort estimates were the highest since the fisheries were reopened in 1979. The total chinook salmon escapement count for northern Cook Inlet was the second highest since 1979.

KEY WORDS

Northern Cook Inlet, chinook salmon, creel census, escapement counts.

BACKGROUND

For the seventh consecutive year, selected northern Cook Inlet streams were open to the taking of chinook salmon 20-inches or over in length. From the fourth Saturday in May through July 6 (1979-1982) chinook salmon fishing was permitted on three streams on the west side of the Susitna River and two eastside streams. Commencing on the second Saturday in June, three eastside streams, Willow, Caswell and Montana Creeks, were open on Saturdays and Sundays only for 4 consecutive weekends. In 1983 the Board of Fisheries expanded the fishing areas to include the Chuitna River near Tyonek and the entire Yentna and Talkeetna River drainages (Figure 1). The opening date of the season was also changed to January 1. The following year (1984) the Board opened the remaining coastal streams of west Cook Inlet north of the West Forelands and all waters draining into the west side of the Susitna River downstream of the Deshka River.

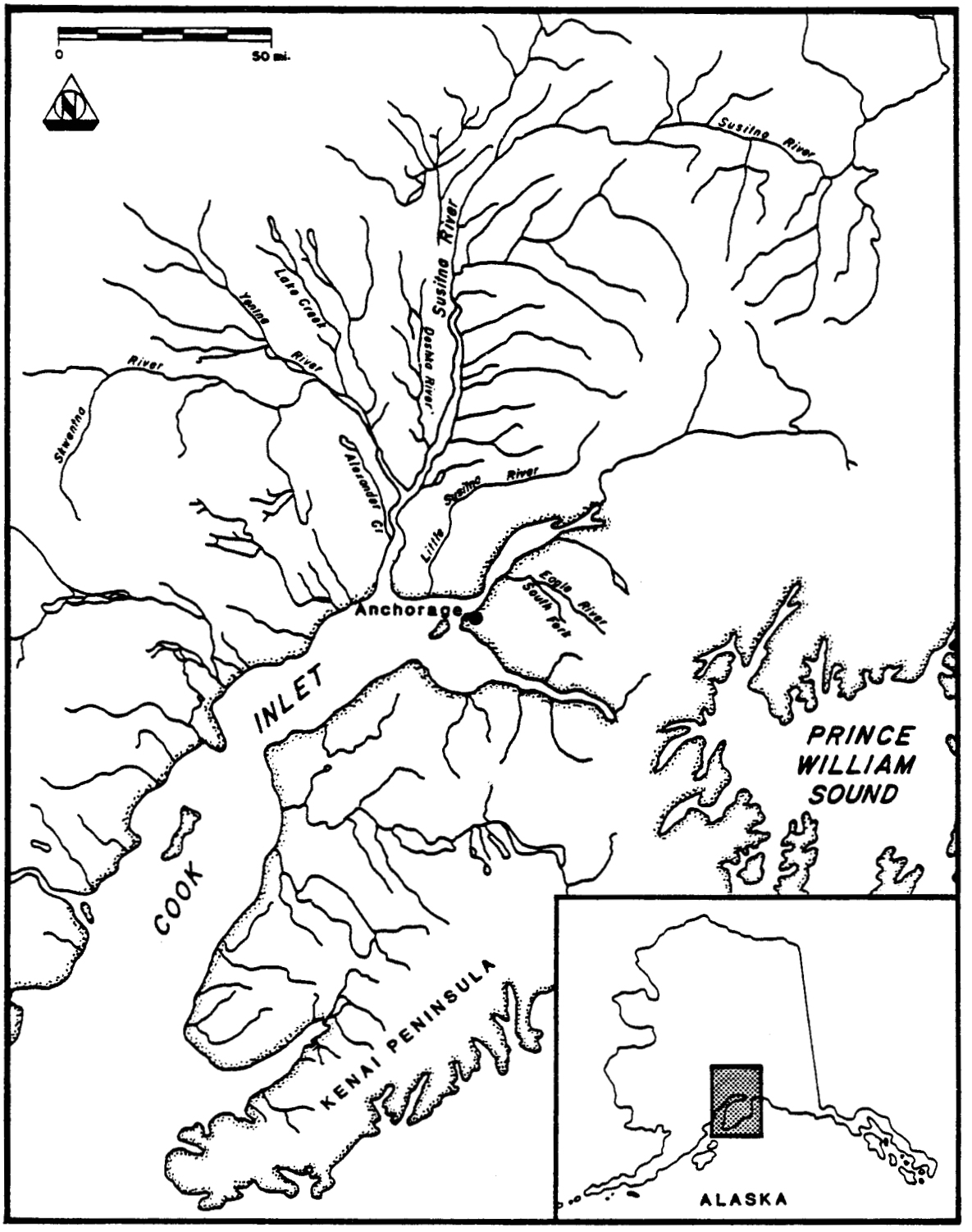

Figure 1. Northern Cook Inlet.

In 1979 the Cook Inlet daily bag and possession limit was one chinook 20-inches or over in length. The following year the daily bag and possession limit was changed to two chinook salmon over 20-inches in length, one of which could exceed 28-inches. In 1981 the daily limit was changed to one chinook 20-inches or more in length and two in possession. This regulation has remained in effect through 1985. A 5 fish (20-inches or over in length) yearly bag limit has governed the annual take from all Cook Inlet chinook salmon fisheries since 1979.

A chinook salmon/steelhead permit was required from 1980 through 1982. A nontransferable harvest-record sticker, or card, was a mandatory requirement for participation in these fisheries from 1979 through 1985.

The 1985 fisheries were monitored closely for enforcement purposes and data collection such as angling effort, harvest, sex and age composition. Table 1 includes a list of common and scientific names of all species included in this report. Other pertinent historical data are presented in the annual performance reports (Kubik 1980, 1981; Hepler and Kubik 1982; Delaney and Hepler 1983; Watsjold 1980, 1981; Bentz 1982, 1983; Hepler and Bentz 1984, 1985)

RECOMMENDATIONS

1. A creel census should be continued on selected northern Cook Inlet streams to estimate sport-angling effort, obtain harvest estimates and collect biological data from chinook salmon fisheries.

2. Chinook salmon enumerations should be continued on selected northern Cook Inlet streams to ascertain the relative abundance, timing and distribution of chinook salmon escapement.

3. Chinook salmon carcass surveys should be conducted to provide a comparative source of biological data, including age, length and sex composition.

4. The number of hatchery reared adult chinook salmon returning to Susitna River tributary streams should be estimated by inspection of sport harvested fish at all creel census locations.

OBJECTIVES

1. To estimate sport fishing effort for and harvest of chinook salmon on 8 northern Cook Inlet streams from late May through early July.

2. To determine peak escapement levels of chinook salmon stocks in 21 northern Cook Inlet streams between July 15 and August 15.

Table 1. List of Common Names, Scientific Names and Abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Chinook salmon	*Oncorhynchus tshawytscha* (Walbaum)	KS

TECHNIQUES USED

Creel census programs located on eastside Susitna River tributary streams and the Little Susitna River were statistically designed to estimate chinook salmon harvest and effort.

Since the area opened to chinook salmon fishing on the Little Susitna River encompasses 70 miles, it was necessary to conduct a creel census at both major access sites, which are 42 river miles apart. These access points are referred to as the Burma Road and Parks Highway; these sites provide access to the lower and upper river, respectively. The number of creel census sites for the Little Susitna River was expanded in 1985 to include the launch site at the mouth of Ship Creek in Anchorage. Anglers that boated across the marine waters of Knik Arm during high tide to fish in the lower reaches of the Little Susitna River were interviewed when they returned to Ship Creek. Catch and effort estimates were calculated separately for each census location and then summed.

At the Burma Road and Parks Highway access sites, the sampling day was divided into five 4-hour periods between the hours of 4:00 a.m. and 12:00 midnight. Two periods randomly selected without replacement were sampled each weekday. On weekend days and holidays, four periods randomly selected without replacement were sampled each day. Randomly scheduled angler counts were conducted during sampling periods at the Parks Highway on those stream areas that received the greatest fishing intensity. Angler count information was necessary to estimate total fishing effort and harvest.

The sampling day at the Ship Creek access site was limited to the two daily periods of high tide. This was the only time anglers could launch or return to Ship Creek because of extreme tidal fluctuations in Knik Arm. Each 4-hour sample period began 2 hours prior to the time of high slack tide and continued until 2 hours past this point. Both high tide periods were sampled on all weekend days and holidays. Three high tide periods randomly selected without replacement were sampled on weekdays each week.

The Talkeetna River chinook salmon creel census was conducted at the Municipal boat launch and campground at Talkeetna. The sampling day was divided into five 4-hour periods between the hours of 4:00 a.m. and 12:00 midnight. All five periods were sampled each weekend day and holidays. Two periods randomly selected without replacement were sampled on each of 4 weekdays during each weekly period. One randomly selected weekday was not sampled each week.

At Montana and Willow Creeks, which were open to fishing on weekends only, the entire 24-hour period was sampled each day. Budget limitations precluded a complete census at Caswell Creek, a weekend-only fishing stream; harvest and effort estimates for this stream were derived through periodic inspections of the fishery several times a day throughout the fishing season. Biological data were not obtained from chinook salmon harvested at Caswell Creek.

During sampling periods, only completed anglers were interviewed. Information collected from anglers included number of hours fished, number and species of fish caught, whether they were boat or shore anglers, whether each angler had been previously interviewed that day, and whether they were guided or unguided anglers.

Creel census techniques utilized on west Susitna River locations were also modified in 1985. Some of the techniques utilized are described by Delaney and Hepler (1983) and Hepler and Bentz (1984, 1985).

Creel Census Study Areas:

Approximately 31 miles of the Deshka River are open to chinook salmon fishing. The open area was stratified into two sampling areas; the first area encompassed the lower 1.5 miles from the mouth upstream to the point where the Deshka River braids through three islands, and the second included the remaining open area from the three islands to the confluence of Moose and Kroto Creeks.

The entire length of Alexander Creek was open to chinook salmon fishing. The open area was stratified into two sampling areas; the first encompassed the lower mile from the mouth upstream to Gabbert's fish camp, and the second area included the remaining open area from Gabbert's fish camp upstream to Alexander Lake.

The entire length of Lake Creek is open to chinook salmon fishing, but physical barriers restrict the majority of the harvest and effort to the lower 2 miles. Because of this, the creel census only concentrated on this lower reach.

Overview of Creel Census Modification Techniques:

The fishing day for creel census purposes was from 4:00 a.m. to 10:00 p.m. and was divided into three 6-hour sampling periods. The census was conducted every weekend day and holiday, and 3 out of 5 weekdays were randomly selected without replacement for sampling. One 6-hour census period was randomly selected without replacement for each sampling day. Three angler counts were conducted from riverboats in the lower sampling strata for each sampling day. Counting times were randomly selected without replacement from each of the three census periods per sampling day. One aerial count was conducted in the upstream strata for each sampling day on Alexander Creek and the Deshka River. The aerial counts were conducted during the selected census periods and started at the same time as the boat counts.

During the census periods, census takers recorded the time anglers had fished, the time involved in harvesting one or two chinook salmon, the number and species of fish released, and whether or not anglers had completed fishing or had been previously interviewed that same day.

Chinook salmon 20-inches or over in length were weighed to the nearest 0.1 pound and measured from the tip of snout to fork-of-tail and from mid-eye to fork. Both measurements were recorded to the nearest 0.5 cm.

Scales were collected from chinook salmon 20-inches or over in length and placed in coin envelopes with appropriate biological data recorded on each envelope. The scales were mounted on gum paper and then pressed onto plastic acetate. Age determinations were accomplished using a Bruning Model-200 microfiche reader. The European method was used to denote anadromous salmon age classes.

Chinook salmon spawning populations were enumerated by aerial, boat and stream-bank surveys in established index streams within the northern Cook Inlet area. Ease of access determined the survey type for the index streams. Surveys were conducted during the peak spawning period. This period was identified through frequent inspections of chinook spawning activity in index streams that are easily accessible.

FINDINGS

Northern Cook Inlet Chinook Salmon Sport Fishery

An estimated 12,324 chinook salmon (20-inches or over in length) were harvested from northern Cook Inlet drainages in 1985. Eastside streams contributed 3,411 chinook to this area wide harvest; whereas, an estimated 8,913 chinook salmon were taken from westside Susitna River tributaries. This was the second highest area wide harvest recorded since the chinook salmon sport season reopened in 1979 (Table 2). The accumulative effort estimate of 53,512 angler-days was the highest recorded: 23% higher than the previous accumulative record of 43,350 angler-days in 1984 (Table 3).

The chinook salmon season was extended by an emergency order in 1985. This order allowed 1 additional weekend of fishing (July 6 and 7) on Willow, Caswell and Montana Creeks and 1 additional day of fishing (July 7) on all other waters open to chinook salmon fishing. The emergency order was issued because the normal entry pattern of chinook salmon into the Susitna River sport fisheries was 7 to 10 days later than normal. The weekend-only fisheries experienced the earliest opening date since 1979 and, consequently, the earliest closing date. These early openings, compounded by the late arrival of chinook, contributed to very low harvests throughout most of the regular season. Upon completion of the regular season, sufficient numbers of chinook salmon were present at all weekend-only fishing streams to warrant the extension.

Eastside Tributary Harvest and Effort:

The 1985 chinook salmon sport fisheries at eastside Susitna River streams and the Little Susitna River experienced the highest effort and second highest harvest estimates since 1979. While the combined 1985 effort of 31,241 angler-days increased 7% over the effort in 1984, the combined harvest of 3,411 chinook decreased 30% from the 1984 harvest estimate. Harvest per angler-day dropped to 0.11, which is the lowest harvest-per-unit effort since 1979 (Table 4). This decrease in harvest was caused by the lack of fish available early in the season and adverse water conditions at most fisheries during the latter half of the season.

Table 2. Chinook Salmon Sport Harvest Estimates for Northern Cook Inlet, 1979-1985.

	Harvest						
	1979	1980	1981	1982	1983	1984	1985
Eastside							
Caswell Creek	155	255	185	220	215	378	404
Talkeetna R.	358	161	340	441	1,048	1,323	551
Little Susitna R.	728	337	945	792	813	1,476	1,115
Montana Creek	125	375	360	85	311	886	578
Willow Creek	285	292	345	390	393	805	763
Total	1,651	1,420	2,175	1,928	2,780	4,868	3,411
Westside							
Alexander Creek	1,277	2,281	630	2,252	1,830	1,830	2,913
Deshka River	2,954	4,023	1,895	4,000	2,802	4,652	5,000
Lake Creek	2,045	1,044	641	1,474	2,141	2,148	1,000
Total	6,276	7,348	3,166	7,726	6,773	8,630	8,913
Combined Totals	7,927	8,768	5,341	9,654	9,553	13,498	12,324

Table 3. Chinook Salmon Sport Effort Estimates for Northern Cook Inlet, 1979-1985.

	Angler-Days						
	1979	1980	1981	1982	1983	1984	1985
Eastside							
Caswell Creek	1,070	1,038	1,320	1,335	1,802	2,487	3,109
Talkeetna R.	1,160	801	1,300	1,764	2,799	5,181	3,444
Little Susitna R.	3,857	2,877	6,660	7,185	9,137	16,192	17,756
Montana Creek	2,470	1,901	4,845	897	1,433	3,317	4,594
Willow Creek	975	612	540	504	1,811	1,939	2,338
Total	9,532	7,229	14,665	11,685	16,982	29,116	31,241
Westside							
Alexander Creek	2,778	4,411	1,714	4,735	5,440	3,674	4,663
Deshka River	6,451	8,397	5,086	7,843	5,462	7,426	12,471
Lake Creek	3,954	2,237	1,180	3,657	4,203	3,134	5,137
Total	13,183	15,045	7,980	16,235	15,105	14,234	22,271
Combined Totals	22,715	22,274	22,645	27,920	32,087	43,350	53,512

Little Susitna River. Total chinook salmon harvest was estimated at 1,115, with 17,756 angler-days of effort and an average harvest per hour and angler-day of 0.02 and 0.06 chinook, respectively. Effort in 1985 increased nearly 10% over chinook fishing effort in 1984 and represents the highest effort since the river was reopened to fishing in 1979 (Table 3). The chinook harvest decreased nearly 25% from 1984 (Table 2), and the harvest per angler-day of 0.06 chinook is the lowest since 1979 (Table 4). Boat anglers harvested 65% of the chinook with 36% of the total effort and a harvest per hour of 0.02, while shore anglers harvested 35% of the chinook with 64% of the effort and a harvest per hour of 0.01.

Anglers that launched at Ship Creek during high tide to fish in the lower reaches of Little Susitna River harvested 59 chinook salmon during 502 angler-days. This represents 5.0% and 3.0% of the respective total harvest and effort. Harvest per hour and angler-day was 0.02 and 0.12 chinook, respectively. Fishing effort by this group of anglers has increased 50% since 1983, while the chinook harvest has increased 40% (Hepler and Bentz 1984, 1985).

Anglers exiting the Burma Road access site harvested 868 chinook salmon in 12,281 angler-days, which represents 78% and 69% of the respective total harvest and effort. Harvest per hour and angler-day was 0.02 and 0.07 chinook, respectively. Shore anglers harvested 331 chinook in 8,034 angler-days, while anglers in boats fished 4,247 days and harvested 537 chinook. Included in these estimates are anglers that boated from the Parks Highway to the Burma Road. These anglers harvested 35 chinook in 683 angler-days, which represents 3.1% and 3.9% of the river's respective harvest and effort totals. Thirty-five percent of these anglers utilized an outboard motor on their boat, while the remainder used nonmotorized canoes or inflatable rafts. The percentage of anglers utilizing motors increased 11% from 1984 estimates (Hepler and Bentz 1985).

Anglers exiting the upriver fishery at the Parks Highway harvested 188 chinook with 4,973 angler-days of effort. These figures represent 17% and 28% of the respective harvest and effort totals for the entire river. Boat anglers harvested 130 chinook in 1,531 angler-days, while shore anglers fished 3,442 days and harvested 58 chinook salmon.

In 1985 anglers utilizing charter boat services based at the Parks Highway access site comprised 5% and 11% of the respective harvest and effort estimates for all boat anglers in the upper river. These estimates represent a substantial decrease from 1984 when chartered anglers accounted for 28% of the effort and 45% of the harvest taken by upper-river boat anglers (Hepler and Bentz 1985). These anglers were usually transported to a downstream fishing area, dropped off, and picked up again later in the day; although charter operators would occasionally remain with their clients and guide them to different areas. Chinook harvest per hour by chartered boat anglers was 0.01 and harvest per angler-day was 0.04.

Private boat anglers accounted for 89% of the effort and 95% of the harvest by boat anglers in the upper river. Their harvest per hour was

Table 4. Chinook Salmon Sport Harvest Per Angler-Day Estimates for Northern Cook Inlet, 1979-1985.

	Harvest Per Angler-Day						
	1979	1980	1981	1982	1983	1984	1985
Eastside							
Caswell Creek	0.14	0.25	0.14	0.18	0.12	0.15	0.13
Talkeetna R.	0.31	0.20	0.26	0.25	0.37	0.36	0.16
Little Susitna R.	0.19	0.12	0.14	0.11	0.10	0.09	0.06
Montana Creek	0.05	0.20	0.07	0.09	0.22	0.27	0.13
Willow Creek	0.29	0.48	0.64	0.77	0.22	0.42	0.33
Total	0.17	0.20	0.15	0.17	0.17	0.18	0.11
Westside							
Alexander Creek	0.46	0.52	0.48	0.37	0.34	0.50	0.62
Deshka River	0.46	0.48	0.37	0.51	0.51	0.63	0.40
Lake Creek	0.52	0.47	0.35	0.40	0.51	0.69	0.19
Total	0.48	0.49	0.37	0.47	0.45	0.61	0.40
Combined Totals	0.35	0.39	0.24	0.35	0.30	0.31	0.23

0.02 chinook, which was twice the harvest rate experienced by chartered anglers. Chinook harvest per angler-day for private boat anglers was 0.09.

Talkeetna River. Total chinook salmon harvest on the Talkeetna River was estimated at 551, with 3,444 angler-days of effort and an average harvest per hour and angler-day of 0.03 and 0.16, respectively. These estimates represent a 58% decrease in harvest and an 8% drop in effort from 1984 estimates. The harvest per angler-day is the lowest since 1979. This decrease in chinook salmon harvest was the result of the late arrival of chinook observed throughout the Susitna River drainage. Most of the chinook did not enter the traditional fishing areas in the Talkeetna River until the final 3 days of the season.

In 1983 the entire Talkeetna River drainage was opened to sport fishing for chinook salmon. During previous years, only Chunilna (Clear) Creek, a tributary stream of the Talkeetna River, was open to chinook fishing. Over 95% of both the chinook harvest and effort took place within Chunilna Creek or at the stream's confluence with the Talkeetna River during 1983 and 1984 (Hepler and Bentz 1984, 1985). In 1985 more anglers began to seek other fishing locations within the Talkeetna River drainage. Eighty percent of the effort and 82% of the chinook harvest took place within Chunilna Creek or its confluence area.

Anglers that chartered boats from Talkeetna comprised 57% of the total fishing effort and harvested 61% of all chinook salmon in 1985. This represents an increase from 1984, when charter anglers accounted for 49% and 40% of the respective effort and harvest totals (Hepler and Bentz 1985). Chinook harvest rates for charter anglers in 1985 were 0.03 fish per hour and 0.17 fish per angler-day. Eighty percent of these anglers were transported upstream to Chunilna Creek, dropped off, and picked up again later that day.

Anglers fishing from private boats totaled 43% and 39% of the respective chinook effort and harvest on the Talkeetna River in 1985. Their harvest rates were 0.03 fish per hour and 0.15 fish per angler-day, which is almost identical to the harvest rates of charter anglers. Eight-two percent of all private anglers fished at Chunilna Creek.

Willow Creek. The total chinook salmon harvest in 1985 at Willow Creek, a weekend-fishing-only stream, was estimated at 763, with 2,338 angler-days of effort and an average harvest per hour and angler-day of 0.11 and 0.33 fish, respectively. Anglers fishing at the Parks Highway area harvested 98 chinook during 980 angler-days, which represents 13% and 42%, respectively, of the total harvest and effort. Harvest per hour was 0.05 fish. Harvest and effort estimates at the mouth of Willow Creek were 665 chinook and 1,358 angler-days, respectively. These anglers accounted for 87% of the total harvest and 58% of the total effort. Their harvest rate was 0.14 chinook per hour. At the mouth, fishing effort increased 85% from the 1984 estimates.

Prior to 1984, only anglers using boats could reach the mouth of Willow Creek. Nearly all of these anglers actually fished from shore, rather than from their boat. New road construction enabled anglers to walk to

this fishery for the first time during the 1984 chinook season, when these anglers comprised 12% of the effort and harvested 13% of the chinook taken at the mouth (Hepler and Bentz 1985). In 1985 walk-in anglers accounted for 36% and 41% of the respective effort and harvest estimates at the mouth.

Eighty-nine percent of all boat anglers that fished at the mouth of Willow Creek utilized the Willow Creek highway bridge launch site. The remaining 11% used Susitna Landing and Little Willow Creek highway bridge access points. Anglers that chartered to the mouth comprised 57% of the boat-angler effort and harvested 51% of the chinook salmon taken by boat anglers. All of these anglers were taken down Willow Creek from the highway bridge, dropped off, and picked up again later in the day or at the end of the weekend.

Private boat anglers accounted for 43% of the chinook harvested and 49% of the effort expended by boat anglers at the mouth of Willow Creek. Seventy-five percent of these anglers used the Willow Creek bridge access site, while 21% utilized Susitna Landing. The remaining 4% launched near the Little Willow Creek highway bridge.

Chartered anglers experienced a harvest rate of 0.09 chinook salmon per hour, while private boat anglers achieved a slightly higher harvest rate of 0.15 chinook per hour. The harvest rate of walk-in anglers at the mouth was 0.21 chinook per hour.

Montana Creek. The total chinook salmon harvest at Montana Creek, a weekend-only stream, was estimated at 578, with 4,594 angler-days of effort in 1985. Harvest per hour and angler-day averaged 0.04 and 0.13 chinook, respectively.

Caswell Creek. The total chinook salmon harvest at Caswell Creek, a weekend-only stream, was estimated at 404, with 3,109 angler-days of effort in 1985. These figures represent the highest harvest and effort estimates since the creek was reopened to fishing in 1979. Chinook salmon harvest per hour and angler-day averaged 0.04 and 0.13, respectively.

Westside Tributary Harvest and Effort:

The 1985 chinook salmon sport fisheries at westside Susitna River streams experienced the highest harvest and effort estimates since 1979. The combined 1985 harvest only increased 3% over the previous record in 1984; whereas, the 1985 effort total increased over 37% from the previous record. The harvest per angler-day dropped to 0.40 chinook, which is the second lowest harvest rate since 1979. The overall decrease in the harvest rate for westside streams was influenced substantially by the record low harvest rate for Lake Creek and most of the other smaller mountain-fed tributary streams. The low harvest rate for the westside streams can be attributed to the same factors that influenced the eastside streams: lack of fish early in the season and adverse water conditions.

of angler effort. The 1985 estimates represent a 7% increase in harvest and a 68% increase in effort from the 1984 estimates and were the highest since the fishery reopened in 1979 (Tables 2 and 3). The harvest rate of 0.40 chinook per angler-day was the second lowest since 1979 (Table 4).

In 1985 over 76% of the harvest occurred in the second and third weeks of June; whereas, in 1983 and 1984 over 70% of the harvest occurred prior to this time. The late breakup was the major influencing factor for this difference. Over 70% of the total harvest occurred in the lower 1.5 miles of the Deshka River. Approximately 3,500 chinook were hooked and released throughout the course of the season. The majority of the 3,500 chinook were released in the upper reaches of the river. Upriver anglers released 36% more fish than they harvested. This differs drastically from the lower 1.5 miles where anglers retained 70% more chinook than they released. The difference between the harvested and released ratio for the two reaches of stream can be partially attributed to the difference in types of anglers that fish each reach. Many anglers who fish the upper reaches are either owners of riverboats who fish the Deshka River frequently and are selective in the size of fish they retain or are floaters who do not have the capabilities to preserve fish properly. In the lower reach, a large proportion of the anglers are either chartered in for 1 or 2 days or do not have the proper riverboat and/or knowledge to travel through the shallow upper reaches of the river.

Alexander Creek. Alexander Creek was open to chinook fishing from its mouth upstream to Alexander Lake. An estimated 2,913 chinook were harvested in 4,663 days of angler effort. The harvest increased 60% from the 1984 estimate and was the highest recorded since 1979. Effort increased by 27% from the 1984 estimate. The harvest rate of 0.62 chinook per angler-day was the highest recorded for Alexander Creek since 1979 and for all the northern Cook Inlet chinook salmon sport fisheries in 1985.

The 1985 fishery developed in a manner similar to previous years. Large numbers of fish were available for anglers in the lower reaches of the river early in the season, and by mid-June the majority of chinook had migrated to the upper reaches of Alexander Creek. Alexander Lake ameliorated the impacts of the late runoff that affected other northern Cook Inlet streams. Approximately 45% of the total harvest occurred in the lower reach during the first 3 weeks of the season. The remaining 55% of the harvest occurred in the upper reach from mid-June through the close of the season; the peak occurred the last week of June.

Lake Creek. The entire length of Lake Creek was once again open to chinook salmon fishing. Anglers harvested approximately 1,000 chinook salmon in 5,137 days of angler effort. The harvest decreased 53% from the 1984 harvest estimate and was the lowest recorded since 1981. Conversely, effort increased 64% over the 1984 effort estimate and was the highest recorded since the fishery reopened. The harvest rate of 0.19 fish per angler-day was the lowest recorded for the western part of northern Cook Inlet stream and represents a drastic decline from the record harvest rate of 0.69 fish that anglers enjoyed in 1984. The late

highest recorded since the fishery reopened. The harvest rate of 0.19 fish per angler-day was the lowest recorded for the western part of northern Cook Inlet stream and represents a drastic decline from the record harvest rate of 0.69 fish that anglers enjoyed in 1984. The late break-up and the resulting adverse water conditions were the major factors that affected the Lake Creek fishery. A majority of the Lake Creek drainage lies in the foothills of the Alaska Range, and that area remained covered by snow and ice until June.

Population Structure:

Scales were collected from chinook salmon 20-inches or over in length, and ages determined by scale analysis (Table 5). Age 1.4 fish, which comprised 47% of the northern Cook Inlet sport fish harvest, was the dominant age class in 1985. The strong showing of Age 1.2 fish in 1983, Age 1.3 fish in 1984 and Age 1.4 in 1985 indicates good survival of the 1979 parent year. The 1976 parent year exhibited a similar pattern with strong Age 1.2, 1.3 and 1.4 survivals in 1980, 1981, and 1982, respectively.

The difference in chinook salmon age structure for westside and eastside Susitna streams and the Little Susitna from 1979 to 1985 are listed in Tables 6 and 7, respectively. The westside Susitna River streams' age class structure was similar to previous years. Age 1.3 chinook were dominant, followed by Age 1.4 and 1.2 chinook. Age 1.4 chinook were once again the dominant age for east Susitna River streams. Age 1.2 chinook represented the second lowest recorded percentage since the fishery was reopened in 1979.

It is important to note that a small percentage of Age 0.3, 0.4 and 1.5 chinook are collected each year. These age groups are not included in the tables because they comprise less than 2% of the total.

Table 8 indicates the overall sex ratio for aged chinook salmon from the sport fish harvest was 1.1 males to 1.0 females. This figure is consistent with sex ratios recorded during previous years.

Escapements:

Results of chinook salmon escapement surveys on eastside and westside Susitna River streams revealed excellent spawning populations (Table 9). Six streams experienced record counts since 1979. The total observed escapement of 65,337 chinook is the second highest recorded for northern Cook Inlet since 1979.

Table 5. Chinook Salmon Age-Class Frequency From the Sport Fish Harvest for Northern Cook Inlet, 1979-1985.

Year	Sample Size	Age Group by Percent		
		1.2	1.3	1.4
1979	1,146	13	36	51
1980	991	30	33	37
1981	739	20	44	36
1982	1,408	16	32	52
1983	2,225	25	40	35
1984	2,551	15	44	41
1985	1,201	18	35	47
Combined	10,261	20	38	42

Table 6. Chinook Salmon Age-Class Frequency From the Sport Fish Harvest for Deshka River, Alexander Creek, Lake Creek, Chuitna River*, Peters Creek* and Talachulitna River**, 1979-1985.

Year	Sample Size	Age Group by Percent		
		1.2	1.3	1.4
1979	516	9	56	35
1980	293	13	55	32
1981	300	13	57	30
1982	722	17	40	43
1983	1,329	21	46	33
1984	1,463	17	47	36
1985	753	20	41	39

* Age-class data available only for 1983 and 1984.
** Age-class data available only for 1983.

Table 7. Chinook Salmon Age-Class Frequency From the Sport Fish Harvest for Caswell Creek*, Chunilna Creek**, Little Susitna River, Montana Creek and Willow Creek, 1979-1985.

Year	Sample Size	Age Group by Percent		
		1.2	1.3	1.4
1979	630	16	20	64
1980	698	38	24	38
1981	439	25	35	40
1982	686	16	23	61
1983	896	30	30	40
1984	1,113	13	40	47
1985	448	14	24	62

* Age-class data not available for 1982-1983.
** Includes age-class data from Talkeetna River drainage for 1983.

Table 8. Chinook Salmon Mean Fork Lengths and Sex Ratios by Age-Class From the Sport Fish Harvest for Northern Cook Inlet, 1985.

Age-Class	Sample Size	Mean Fork Length*			Sex Ratio Male:Female
		Male	Female	Sexes Combined	
1.2	216	590	0	590	All Male
1.3	416	760	799	780	1.0:1.1
1.4	569	983	927	948	1.0:1.6
Combined	1,201			826	1.1:1.0

* Fork length measured from mid-eye to fork-of-tail in millimeters.

Table 9. Chinook Salmon Observed Escapements for Northern Cook Inlet, 1979-1985.

Stream	1979	1980	1981	1982	1983	1984	1985
Westside							
Alexander Creek	6,215	nc	nc	2,546	3,755	4,620	6,241
Deshka River	27,385	nc	nc	16,000	19,237	16,892	18,151
Lake Creek	4,196	nc	nc	3,577	7,075	nc	5,803
Chuitna River	1,246	nc	nc	3,438	4,043	2,845	1,600
Theodore River	512	nc	535	1,368	1,519	1,251	1,458
Lewis Creek	546	nc	560	606	nc	947	861
Talachulitna River	1,648	nc	2,025	3,101	10,014	6,138	5,145
Peters Creek	nc	nc	nc	nc	2,272	324	2,901
Other Streams	225	nc	2,776	1,728	857	nc	1,391
Totals	41,973	nc	5,896	32,364	48,772	33,017	43,551
Eastside							
Willow Creek	848	nc	991	592	777	2,789	1,856
Deception Creek	239	nc	366	229	121	675	1,044
Montana Creek	1,094	nc	814	887	1,641	2,309	1,767
Little Willow Creek	327	nc	459	316	1,042	nc	1,305
Sheep Creek	778	nc	1,013	527	975	1,028	1,634
Goose Creek	nc	nc	262	140	477	258	401
Chunilna Creek	864	nc	nc	982	938	1,520	2,430
Prairie Creek	nc	nc	nc	3,844	3,200	9,000	6,500
Chulitna River	nc	nc	nc	644	3,845	4,191	783
Other Streams	1,286	nc	1,877	2,943	5,295	4,449	4,066
Totals	5,436	nc	5,782	11,104	18,311	26,219	21,786
Combined Totals	47,409	nc	11,678	43,468	67,083	59,236	65,337

nc - No count was conducted.

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