

STATE OF ALASKA

Jay S. Hammond, Governor



Annual Performance Report for

EVALUATION OF CHINOOK SALMON
FISHERIES OF THE KENAI PENINSULA

by

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 Fisheries of the Kenai Peninsula
 By: Stephen Hammarstrom

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RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations
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Job No.: G-II-L Job Title: Evaluation of Chinook
Salmon Fisheries of the
Kenai Peninsula

Period Covered: July 1, 1978 to June 30, 1979

ABSTRACT

The 4-weekend fishery for chinook salmon, *Oncorhynchus tshawytscha* (Walbaum), on Anchor River, Deep Creek and Ninilchik River is discussed. Total angler effort, 45,540 man-days, was estimated by vehicle counts on location. Total harvest, 3,400 fish longer than 51 centimeters (20 inches), was derived by creel census. Punch cards were not required this year as they had been since 1966. Harvest estimates were, Anchor River, 1,680, Deep Creek, 585; and Ninilchik River, 1,135.

Age structure as determined by analysis of scale samples collected from the recreational fishery is discussed. The predominant age class was 1.4 (brood year 1972).

Chinook salmon escapement surveys, resulted in the following minimum estimates: Anchor River, 2,409; Deep Creek, 1,007; Ninilchik River, 990; and Stariski Creek, 795. A survey conducted by helicopter during the season on the Anchor River revealed that enough fish had moved through the fishery to warrant an additional 4 days of fishing.

The 1978 saltwater chinook salmon fishery in Cook Inlet south of Deep Creek was monitored by creel census. Harvest was the second largest since the project's inception in 1972. Harvest from both early and late runs were nearly equal, 2,669 and 2,693. Angler effort, 23,815 man-days, was also the second largest. Estimates were calculated on the basis of 3,807 angler interviews, 838 creel checked fish, and 171 instantaneous boat counts. Historical data for this fishery are presented.

Age composition of fish taken in the recreational harvest in salt water was based on 216 readable scales collected during the fishery. Both early and late runs showed a domination by age class 1.4, 55.8 and 87.8 percent, respectively. Late run harvest averaged 23.4 kilograms (51.5 pounds) per fish.

For the fifth year the Kenai River chinook salmon fishery was monitored by creel census. In 1978, 11,101 angler interviews, 837 creel checked fish, 172 instantaneous angler counts and 13 aerial surveys resulted in an estimated effort of 80,202 man-days and a harvest of 7,120 fish over 508 millimeters (20 inches), 1,542 from the early run and 5,578 from the late run. In addition, 1,095 fish less than 508 millimeters (jacks) were harvested.

Sampling of the Kenai River recreational fishery produced 244 readable chinook salmon scales for age analysis. The predominant age class was 1.4 for both runs.

A creel census conducted on the Kasilof River, open to chinook salmon fishing for the first time since statehood, resulted in an estimated harvest of 270 chinook salmon over 508 millimeters and 330 under 508 millimeters by 1,750 man-days of effort.

BACKGROUND

Chinook salmon *Oncorhynchus tshawytscha* (Walbaum), have become the most sought after species on the Kenai Peninsula. Initially, effort was directed towards the southern streams, Anchor River, Deep Creek and Ninilchik River (Figure 1). Management of these fisheries have ranged from virtually unregulated to complete closure. From 1966 to 1977 various of quotas and punch cards were used. In 1978 the punch card requirement was removed and a one fish bag limit, daily or in possession, during four consecutive three-day weekends prevailed.

Pertinent historical data are presented in Reports of Progress by Dunn (1961), Logan (1962, 1963, 1964), Engel (1965, 1966, 1967), Redick (1968), McHenry (1969), Watsjold (1970), Nelson (1971, 1972a, 1972b) and Hammarstrom (1974, 1975, 1976, 1977, 1978).

In 1972, anglers discovered chinook salmon were susceptible to harvest in Cook Inlet in the vicinity of Deep Creek. The runs of chinook salmon moving through this area, originate in many streams in the Cook Inlet Basin. Annual harvest and effort have been monitored by creel census since 1972. Fluctuations in angling effort and success are primarily due to prevailing local weather conditions. Historical data regarding this fishery are presented by Hammarstrom (1974, 1975, 1976, 1977, 1978).

The Kenai River (Figure 2) has been one of the more popular fishing locations on the Kenai Peninsula. This vast river system and two large accompanying lakes are productive contributing heavily to the Cook Inlet commercial harvest of all salmon species except chum salmon. Recreational anglers have utilized the Kenai River for salmon, trout and char but only since 1973 have chinook salmon contributed heavily to the creel.

For the past three years angling effort for chinook salmon has made the Kenai River the largest fishery in Alaska.

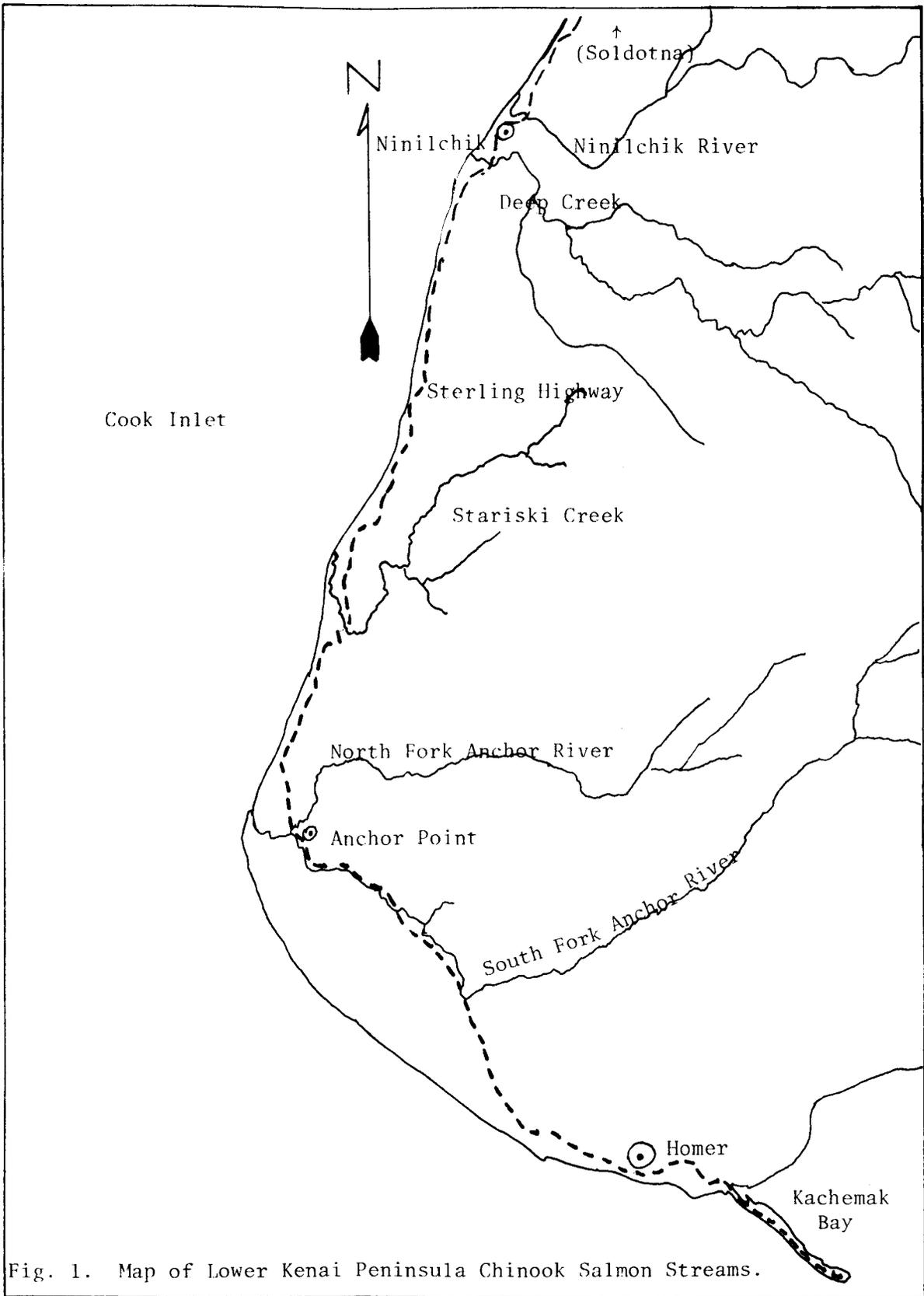


Fig. 1. Map of Lower Kenai Peninsula Chinook Salmon Streams.

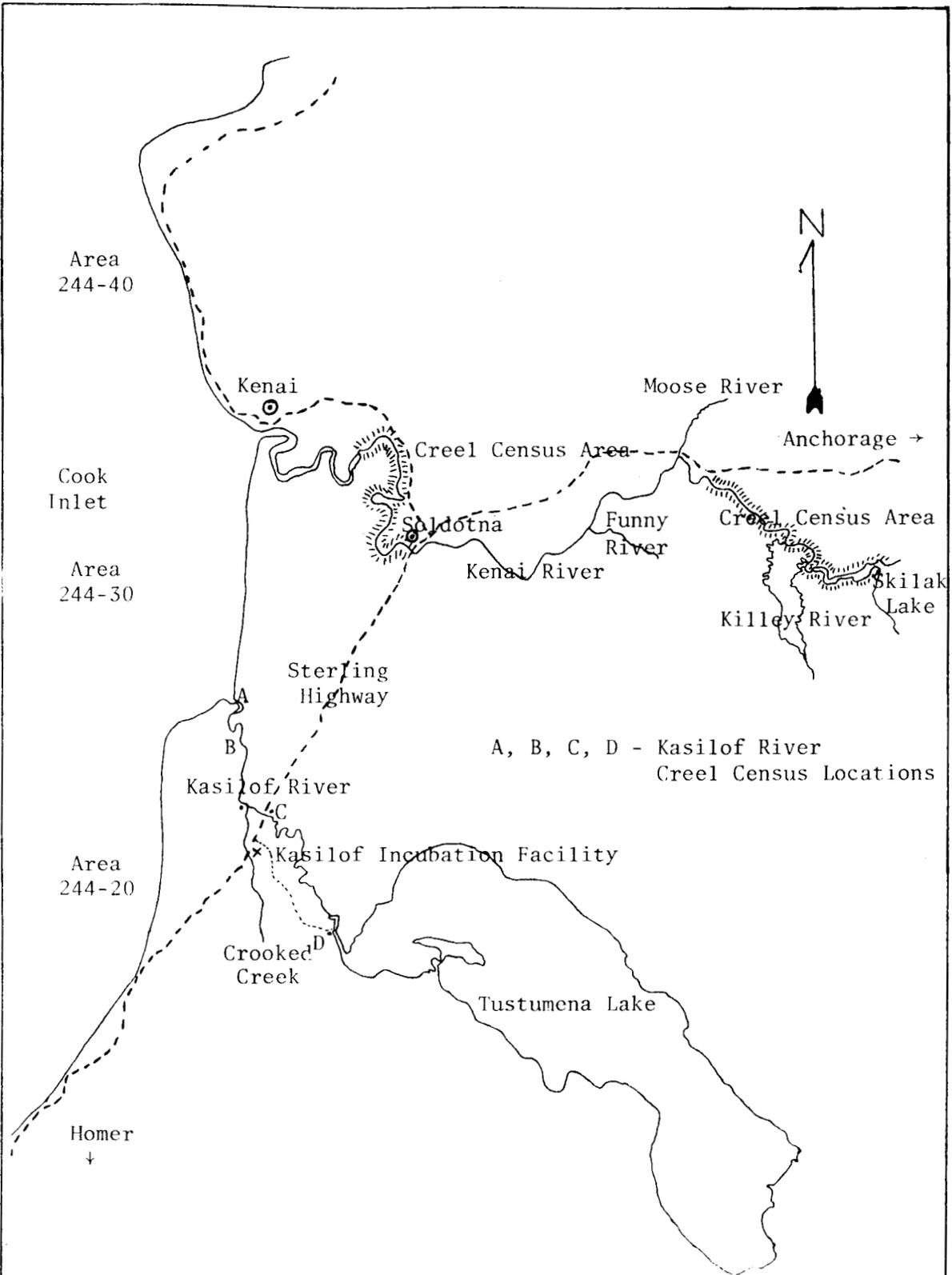


Fig. 2. Map of Kenai River and Kasilof River Chinook Salmon Fishing Areas.

Historical data are presented in reports by Nelson (1972) and Hammarstrom (1975, 1976, 1977, 1978).

The Kasilof River (Figure 2) was opened in 1978 to chinook salmon fishing for the first time since statehood.

RECOMMENDATIONS

1. The possibilities of determining escapement of chinook salmon into the Kenai River should be explored.
2. The possibilities of determining racial separation of early run chinook salmon harvested in salt water should be examined.

OBJECTIVES

1. To determine the sport harvest of chinook salmon and evaluate angler pressure in the Kenai Peninsula area.
2. To determine spawning escapement into the major chinook salmon producing streams in the area.
3. To determine chinook salmon population trends in the major recreational waters of the Kenai Peninsula.
4. To determine and develop plans for the enhancement of chinook salmon stocks, to provide recommendations for their management and to direct the course of future studies.

TECHNIQUES USED

Harvest, Effort and Escapement Estimation

Because punch cards were eliminated in 1978, harvest on the three lower streams, Anchor River, Deep Creek, and Ninilchik River were estimated by creel census. Although an informal creel census has been used since 1966 for inseason estimates necessary for management decisions, the punch card had been the tool for determining total harvest. Intensive coverage by Department personnel was the primary method of harvest during 1978. Applied statistics, provided results comparable to those obtained from punch card analysis. Over the years, creel census estimates averaged 4.4% less than the punch card estimate. Effort and escapement estimates were arrived at by the techniques described by Hammarstrom (1978).

Techniques on the Kenai River creel census in 1978 were the same as those described by Hammarstrom (1977).

Kasilof River Fishery

The Kasilof River is a large, glacially turbid stream which flows from Tustumena Lake into Cook Inlet. The stream is 28.6 km (17.8 mi) long and has an average gradient of 1.2 m per km (6.2 ft per mi).

There are only three developed public access sites and one walk-in trail across private land to the Kasilof River. The creel census was set up to utilize these four access sites as monitoring areas in addition to surveys to determine the percentage of effort occurring at other locations.

The fishing day commenced at 0400 and terminated at 2400. The day was divided into four consecutive hourly count periods selected randomly. Counts were conducted at one of the four locations during each time period. Travel time between locations was allowed for to make the work day 7.5 hours.

At the beginning and end of each count period, anglers present at the particular location were enumerated. The time between counts was spent interviewing anglers who had completed fishing. After the count was completed, the census taker moved to one of the other randomly selected locations. No location was sampled more than once in any given day. All weekend-holidays were sampled and three of the five weekdays were sampled.

During the interview period the following information was solicited from each completed angler: length of time fished, the number of fish caught, and whether fishing was from boat or shore. In addition, scale were taken and length, weight, sex and finclips were recorded from all chinook salmon reported.

Harvest and effort were estimated for weekend/holidays and weekdays separately, then summed for total estimates. Each location was treated as a separate entity. Effort in man-hours at each location was determined by the following:

$$E = (\bar{c}) (20) (n)$$

where: E = effort in man hours
 \bar{c} = mean hourly count = $\frac{\text{total anglers enumerated}}{\text{total counts made}}$
 n = number of days in the season
20 = number of hours in the fishing day

Harvest at each location was estimated by the following:

$$H = E \bar{r}$$

where: H = harvest
 \bar{r} = mean catch per hour = $\frac{\text{total fish reported}}{\text{total hours reported}}$

Effort in man-hours was then converted to man-days by dividing the man-hours by the average hour per man-day for weekends and weekdays then summed.

Total harvest and effort estimates were achieved by summing the weekend and weekday estimates from each location.

FINDINGS

Lower Stream Fishery

The chinook salmon fishery on the three streams, Anchor River, Deep Creek and Ninilchik River, was expanded from four consecutive two-day weekends to four consecutive three-day weekends, except on the Ninilchik River, on which the last weekend was eliminated. Effort was estimated at 45,540 man-days. A man-day was approximately 4.0 hours. Harvest was estimated at 3,400 chinook salmon over 508 mm (20 in).

In 1978, the fishery was open for four consecutive three-day weekends; Saturday, Sunday and Monday, with Mondays being the added day over previous years. These four added days accounted for 7,415 man-days, while the emergency opening (June 13 - June 16) accounted for another 1,902 man-days (Table 1). Effort in 1977, over an 8-day season was 24,520 man-days. Effort during a comparable season in 1978 was 36,223, an increase of 11,703 man-days (47.7%). Effort expended during Mondays and the four added days represented 20.5% of the 1978 effort.

Because of the relatively strong harvest noted on the Anchor River during the first two weekends and the high harvest on the opening day of the third weekend on that stream, it seemed apparent that the return was greater than average; water conditions were unusually low and quite clear so it was felt an escapement survey by helicopter should be attempted. Although fish could be seen from the air, they were not nearly as visible as later in the season when they attain spawning coloration and take up positions in the shallower riffles. Most fish were observed in the deeper pools. Slightly less than 2,000 adults were observed during this flight. Most fish were in the first 5 miles of stream above the portion open to fishing. It was felt this figure was minimal at best, and adequate escapement would be achieved if the area open to fishing were to remain open from June 13 through June 19, when it would close by regulation. This relaxation was possible in 1978 where it had not been possible in previous years because of the preprinted punch card requirement.

Escapement surveys were conducted in early August by helicopter. Results are depicted in Table 2. Individual stream escapement estimates are as follows: Anchor River, 2,409; Deep Creek, 1,007; Ninilchik River, 990. High turbid water condition prevented early surveys. Over 50% of the fish seen during the surveys were carcasses, thus escapement has to be considered minimal at best. Harvest and escapement exceeded the 1966-1977 mean on all streams (Table 3).

Table 1. Effort (man-days) and Harvest of Chinook Salmon During the Open Season on Three Lower Kenai Peninsula Streams by Date, 1978.

Date	Anchor River		Deep Creek		Ninilchik River		Total	
	Harvest	Effort	Harvest	Effort	Harvest	Effort	Harvest	Effort
5/27	225	2,560	15	1,105	200	2,706	440	6,371
5/28	100	2,856	25	1,222	100	2,469	225	6,547
5/29	100	1,097	10	666	60	1,355	170	3,118
Total 1st Weekend	425	6,513	50	2,993	360	6,530	835	16,036
6/ 3	250	2,499	10	550	225	1,079	485	4,128
6/ 4	100	2,565	75	703	125	1,050	300	4,318
6/ 5	90	877	50	268	100	403	240	1,548
Total 2nd Weekend	440	5,941	135	1,521	450	2,532	1,025	9,994
6/10	300	2,310	150	1,091	250	1,335	700	4,736
6/11	50	1,729	50	1,159	50	1,600	150	4,488
6/12	85	600	25	363	25	680	135	1,643
Total 3rd Weekend	435	4,639	225	2,613	325	3,615	985	10,867
6/13	50	367					50	367
6/14	35	413					35	413
6/15	15	444					15	444
6/16	100	678					100	678
Total Additional 4 days	200	1,902					200	1,902
6/17	95	2,433	100	900			195	3,333
6/18	50	1,540	40	762			90	2,302
6/9	35	780	35	326			70	1,106
Total 4th Weekend	180	4,753	175	1,988			355	6,741
Season Total	1,680	23,748	585	9,115	1,135	12,677	3,400	45,540

Table 2. Results of Escapement Surveys Conducted on Four Lower Peninsula Chinook Salmon Streams, 1978.

Stream		Index Area			Remainder of Stream		
		Ground Count	Aerial Count	Percent Aerial	Aerial Count	Expanded Count	Total Escapement Estimated
Anchor River	Live	377	461	122.2	623	623	1,084
	Dead	468	407	87.0	746	857	1,325
	Total	845	868	102.7	1,369	1,480	2,409
Deep Creek	Live	101	59	57.3	290	506	609
	Dead	77	48	62.3	200	321	398
	Total	178	107	59.4	490	827	1,007
Ninilchik River	Live	136	116	85.3	110	129	265
	Dead	341	243	71.3	274	384	725
	Total	477	359	75.3	384	513	990
Stariski Creek	Live	75	52	69.3	152	219	294
	Dead	127	72	56.7	212	374	501
	Total	202	124	61.4	364	593	795

Table 3. Historical Harvest and Escapement Data for the Three Lower Kenai Peninsula Chinook Salmon Streams from 1966-1978*.

Year	Anchor River			Deep Creek			Ninilchik River			Total		
	Harvest	Escapement	% Harvested	Harvest	Escapement	% Harvested	Harvest	Escapement	% Harvested	Harvest	Escapement	Run
1966	290	1,330	18	50	540	9	220	670	25	560	2,540	3,100
1967	240	1,200	17	180	270	40	120	360	25	540	1,830	2,370
1968	250	530	32	160	200	44	210	450	32	620	1,180	1,800
1969	80	1,800	4	40	960	4	130	760	15	250	3,520	3,770
1970	170	1,850	8	60	***	***	280	***	***	510	1,850+	2,360+
1971	60	1,220	5	40	***	***	140	***	***	240	1,220+	1,460+
1972	180	1,890	9	140	530	21	170	1,360	11	490	3,780	4,270
1973	330	1,660	17	140	220	39	300	640	32	770	2,520	3,290
1974	440	1,000	31	290	740	28	350	510	41	1,080	2,250	3,330
1975	210	1,290	14	100	610	14	540	830	39	850	2,730	3,580
1976	830	3,080	21	220	1,680	12	630	1,180	35	1,680	5,940	7,620
1977	1,020	4,170	16	240	990	20	910	1,400	39	2,170	6,560	8,730
Mean**												
1966-77	390	1,800	18	160	670	19	360	820	31	900	3,290	4,190
1978	1,680	2,410	41	590	1,010	37	1,130	990	53	3,400	4,410	7,810

* Figures rounded to nearest 10.

** Excludes all 1970 and 1971 data.

*** No survey.

An escapement survey was also conducted in Stariski Creek, a small stream located between Anchor River and Deep Creek which produces chinook salmon but is not open to sport fishing, although it does contribute to the harvest in salt water. Escapement was estimated at 795 chinook salmon. It should be noted that aerial observations averaged 75.1% of what was reported from ground observations.

Readable scales were collected from 651 fish harvested by recreational anglers from Anchor River, Ninilchik River and Deep Creek, which represent 19.1% of the harvest and 8.3% of the total run. The predominant age class was 1.4 (brood year 1972) which represented 56.4% of the harvest (Table 4). Both 1.2 (brood year 1974) and 1.3 (brood year 1973) were well represented. The overall male to female ratio was 0.9 to 1.0; thus the estimated female harvest was 1,812 chinook salmon. Summarized length data for the major age classes are presented in Table 5. A historical summary of the fishery is presented in Table 6.

Deep Creek Marine Fishery:

Sport effort in 1978 for chinook salmon in the marine waters off Deep Creek decreased by 7.5% from 1977, 25,741 man-days to 23,815 man-days. The decline can be attributed to a higher number of poor weather days recorded in 1978. The majority of effort was directed towards early run fish, May 15 through June 19; this was also the case in 1976 and 1977.

The creel census commenced May 15 and was continuous through July 31. During this period 171 instantaneous boat counts were conducted, 838 chinook salmon creel checked and 3,807 anglers contacted. These data led to an estimated harvest of 5,362 chinook salmon, with 2,669 and 2,693 from the early and late runs, respectively. Early run effort was estimated at 14,413 man-days while the late run accounted for 9,402 man-days. A man-day averaged 3.1 man-hours during the early run and 3.6 during the late run. Catch per hour was .059 during the early run and .081 during the late runs. Summarized historical data for years 1972-1978 are presented in Table 7. Run timing is presented in Figure 3.

The 171 boat counts conducted resulted in a total boat count of 4,726, for an average of 27.6 boats per count. Ten of the 50 days sampled were reported as poor weather days with an average boat count of 1.5 boats per count. Expansion indicates a total of 16 days or 21% of available fishing time was limited by weather. Nearly 16% of the estimated fishermen were interviewed and 15.6% of the harvest was creel checked. The fishery was sampled on 65% of the days when chinook salmon were available and effort was substantial enough to effectively harvest fish.

Readable scales were collected from 216 sport caught chinook salmon during the season. The early run had a more equal distribution among age classes than did the late run (Table 8). Nearly 88% of the recreational harvest during the late run were from brood year 1972 (age class 1.4) which accounts for the extremely large average size, 23.4 kg (51.5 lbs). Fish of the same age class were substantially smaller during the early

Table 4. Age Composition of the Recreational Harvest of Chinook Salmon from Three Lower Peninsula Streams, 1978.

	Age Class						Total
	1,1	1,2	1,3	1,4	1,5	Other	
n	2	100	177	367	0	5	651
%	0.3	15.3	27.2	56.4	0	0.8	100.0
	Brood Year					Total	
	1975	1974	1973	1972	1971		
n	2	100	179	370	0	651	
%	0.3	15.3	27.6	56.8	0	100.0	

Table 5. Summarized Length Data (mid-eye to fork of tail) for Chinook Salmon Taken from Three Lower Peninsula Streams, 1978.

	Age Class		
	1.2	1.3	1.4
	Anchor River		
Number	33	84	185
Range (mm)	495-680	610-905	730-1076
Mean (mm)	603.8	759.8	899.5
Standard Deviation	37.8	57.4	80.1
	Deep Creek		
Number	25	19	45
Range (mm)	510-650	650-890	710-1040
Mean (mm)	600.1	788.3	891.8
Standard Deviation	41.1	57.3	55.0
	Ninilchik River		
Number	37	70	133
Range (mm)	535-673	645-860	750-1025
Mean (mm)	603.8	755.3	890.3
Standard Deviation	30.7	53.6	55.3
	Total		
Number	95	173	363
Range	495-680	610-905	710-1076
Mean	599.0	761.1	895.2
Standard Deviation	36.1	56.4	69.0

Table 6. Historical Chinook Salmon Harvest and Effort Data from Lower Three Kenai Peninsula Streams, 1971-1978.

Year	Effort (Man-Days)	Harvest	Length of Season Days	Average Effort/Day	Average Harvest/Day	Man - Days/Fish
1971	15,900	240	6	2,650	40	66
1972	13,520	490	4	3,380	123	28
1973	24,100	770	6	4,017	128	31
1974	21,000	1,080	6	3,500	180	19
1975	19,600	850	6	3,267	142	23
1976	36,920	1,680	8	4,615	210	22
1977	24,520	2,170	8	3,065	271	11
1978	45,540	3,400	16*	2,846	213	13
Mean	25,138	1,335	7.5	3,352	178	19

* Season was extended by emergency order for four additional days on Anchor River only.

Table 7. Historical Summary of the Chinook Salmon Sport Fishery off Deep Creek, 1972-1978.

Year	Early Run			Late Run			Total		
	Harvest	Effort Man-Days	Catch/ Hour	Harvest	Effort Man-Days	Catch/ Hour	Harvest	Effort Man-Days	Catch/ Hour
1972	1,000	2,357	0.119	1,250	1,253	0.272	2,250	3,610	0.173
1973	519	5,245	0.028	491	2,795	0.050	1,010	8,040	0.034
1974	500	3,810	0.037	100	1,280	0.034	600	5,090	0.036
1975	540	3,370	0.061	345	4,680	0.031	885	8,050	0.044
1976	5,495	12,268	0.101	1,382	6,365	0.057	6,877	18,635	0.088
1977	4,617	18,803	0.069	366	6,938	0.017	4,983	25,741	0.056
Mean 1972- 1977	2,112	7,642	0.069	656	3,885	0.077	2,768	11,528	0.072
1978	2,669	14,413	0.059	2,693	9,402	0.081	5,362	23,815	0.068

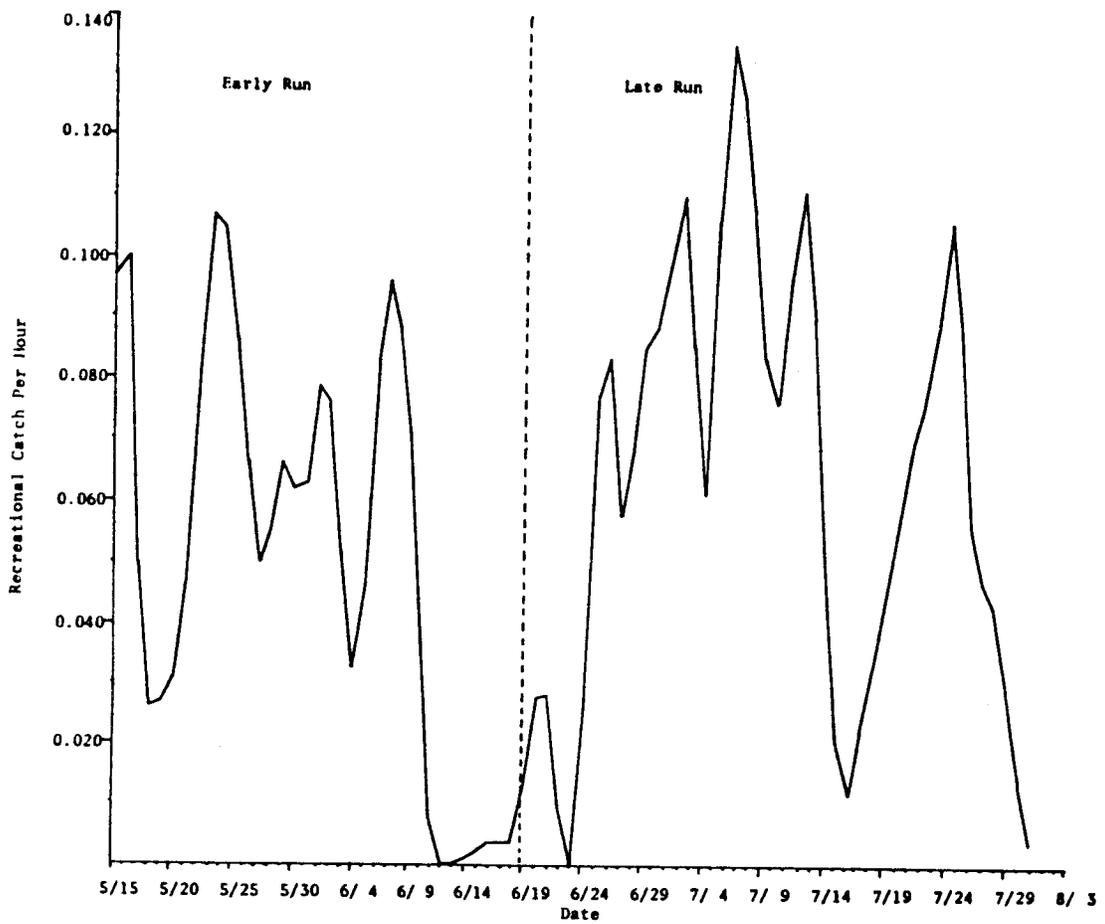


Fig. 3. Recreational Catch Per Hour by Date for Chinook Salmon in the Deep Creek Marine Fishery, 1978.

Table 8. Summarized Data from Readable Scales Collected from Chinook Salmon Harvested in Deep Creek Marine Fishery, 1978.

Age Class Brood Year	Early Run				Total
	1.2 1974	1.3 1973	1.4 1972	1.5 1971	
Number	8	43	67	2	120
Percent	6.7	35.8	55.8	1.7	100.0
Length Range* (mm)	535-670	558-870	720-1170	925-1040	535-1170
Mean* (mm)	585	759	927	983	830
Weight Range (Kg)	3.0-7.2	5.5-16.8	6.5-26.0	13.3-17.8	3.0-26.0
Mean (Kg)	5.0	8.8	14.3	15.5	11.6
Age Class Brood Year	Late Run				Total
	1.2 1974	1.3 1973	1.4 1972	1.5 1971	
Number	2	5	79	4	90
Percent	2.2	5.6	87.8	4.4	100.0
Length Range* (mm)	620-660	750-1015	960-1230	1060-1250	622-1250
Mean* (mm)	641	856	1100	1149	1078
Weight Range (Kg)	5.4-6.3	7.2-20.0	16.0-32.6	20.2-34.7	5.4-34.7
Mean (Kg)	5.9	12.0	24.4	27.2	23.4

* Mid-eye to fork of tail.

run. For example early run age class 1.4 had an average weight of 14.3 kg (31.4 lbs) while 1.4 fish from the late run averaged 24.4 kg (53.7 lbs). Mid-eye to fork of tail length comparisons demonstrate similar differences.

The sex ratio during the early run 0.8:1 males to females resulting in a projected harvest of 1,476 females. The sex ratio for late run fish was 1.7:1 males to females resulting in a projected harvest of 1,018 females. Total harvest is estimated at 2,783 males and 2,579 females.

Kenai River Fishery

The creel census on the Kenai River for chinook salmon commenced June 1 and was continuous through July 31. During that time 172 instantaneous angler counts, 13 aerial boat counts and 11,101 angler interviews were conducted. In addition 837 chinook salmon over 508 mm (20 inches) total length were creel checked.

The run into the river is comprised of two segments, early and late. Because of the distance traveled and the characteristic behavior of the migrating populations, timing in each segment of stream surveyed (Figure 4) differs.

During the 1978 return, early run fish were present in the downstream section (Beaver Creek to Soldotna Bridge) from June 1 through June 25, a total of 25 days, while late run fish were present from June 26 through July 31, a total of 36 days. In the upstream section (Naptowne Rapids to Skilak Lake), early run fish were considered present from June 1 through July 9, a total of 39 days while the late run from July 10 through July 31, a total of 22 days. Timing dates were assigned by analyzing catch rates then adjusting to the nearest weekly period, in this case a Sunday. Since there is some overlap between runs, the assigning of a date is for convenience purposes in meeting the requirements prescribed by the Board of Fisheries in managing the late run.

Harvest during the early run was estimated at 1,542 adults and 230 "jacks" (age 1.1). The harvest was quite evenly distributed between the upstream and downstream sections (Table 9) although the fish were present in the upstream section for two weeks longer than in the downstream section. Effort during the early run was estimated at 19,569 man-days. Effort was also fairly evenly distributed between the two major sections (Table 10).

Harvest estimates for the late run are 4,429 adults and 290 "jacks" downstream and 278 adults upstream. This large disparity can be explained by migrational timing, the late run peaked in the downstream section approximately July 18, yet did not peak until July 28 in the upstream section, only 3 days prior to the season closure. Most of the fish in the upstream area were captured during the last week of the season. The total effort for the late run was estimated at 60,633 man-days with 39,177 occurring in the downstream area.

Catch per hour for adult early run chinook salmon averaged 0.018 and a man-day averaged 4.4 hours. The catch rate is approximately equal to the 1977 catch rate (Hammarstrom 1978). Effort during the early run was 45% lower in 1978 than 1977.

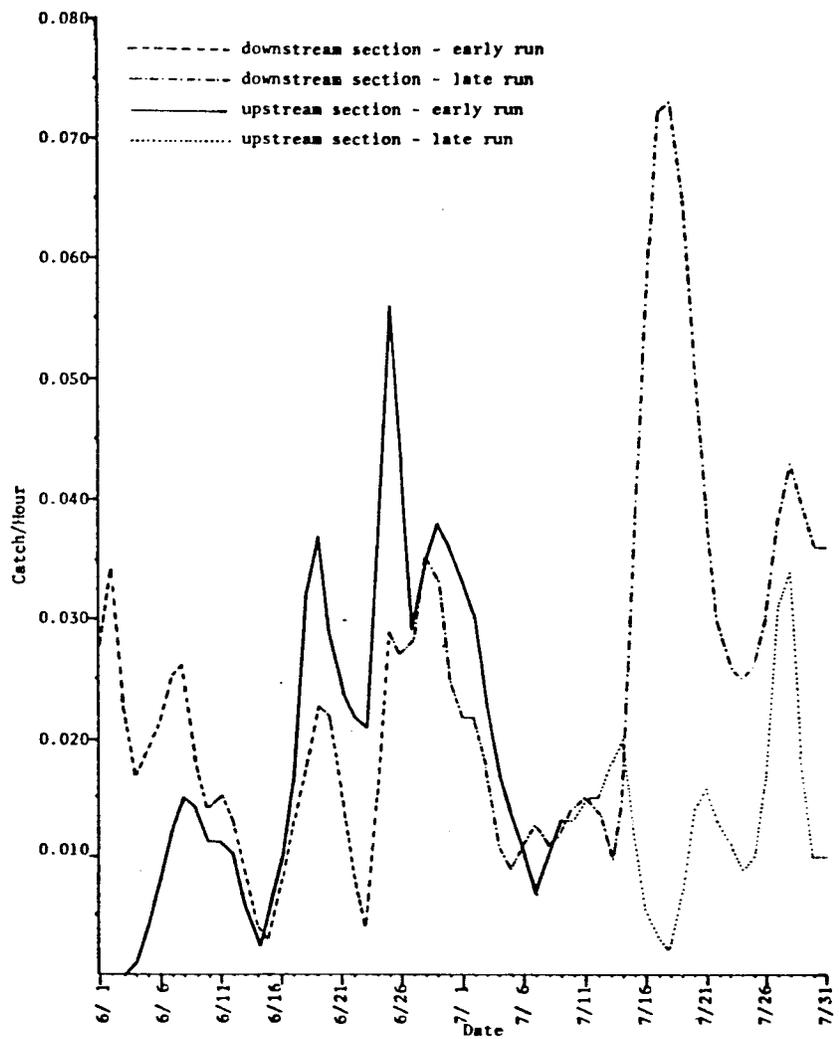


Fig. 4. Catch Per Hour for Chinook Salmon Harvested in the Recreational Fishery of the Kenai River by Date, 1978.

Table 9. Summary of Chinook Salmon Harvest on the Kenai River, 1978.

	<u>Downstream</u>	<u>Midstream</u>	<u>Upstream</u>	<u>Shore Anglers</u>	<u>Total</u>
	Early Run				
Adults	646	102	673	121	1,542
Jacks	55	6	10	159	230
Total	701	108	683	280	1,772
	Late Run				
Adults	4,429	439	278	432	5,578
Jacks	290	26	0	549	865
Total	4,719	465	278	981	6,443
	Both Runs				
Adults	5,075	541	951	553	7,120
Jacks	345	32	10	708	1,095
Total	5,420	573	961	1,261	8,215

Table 10. Summary of Effort (man-days) on Kenai River Chinook Salmon, 1978.

	<u>Downstream</u>	<u>Midstream</u>	<u>Upstream</u>	<u>Shore Anglers</u>	<u>Total</u>
Early Run	7,321	1,199	7,761	3,288	19,569
Late Run	39,177	4,334	7,046	10,076	60,633
Total	46,498	5,533	14,807	13,364	80,202
Percent Total	58.0	6.9	18.5	16.6	100

Catch per hour during the late run averaged .026, .010 lower than in 1977. Effort increased by 27.5% over 1977 estimates, to 60,633 man-days. A man-day averaged 3.5 man-hours during the late run.

Total harvest was reduced by 201 fish (2.7%) from 1977 estimates, from 7,321 to 7,120 and total effort was reduced by 2,879 man-days 3.5% from 1977 estimates, from 83,081 to 80,202 man-days.

Readable scales were collected from 69 fish during the early run and 175 during the late run. The predominant age class during both early and late runs was 1.4 (brood year 1972), 65.3% and 77.7%, respectively. There was a stronger showing of age class 1.2 (brood year 1974) and 1.3 (brood year 1973) during the early run than late run (Table 11). Length and weight data are also presented in Table 11.

The requirements of a policy adopted by the Board of Fisheries in 1975 (Hammarstrom 1977) were complied with in 1978 and no closure was necessary as in 1977. Basically the policy requires that the recreational harvest from Deep Creek Marine and Kenai River late run chinook salmon will not exceed the commercial set net harvest from area 244-20,30,40 by more than 10% based on the regularly scheduled two 12-hour periods per week.

The combined sport harvest from Deep Creek and the Kenai River totaled 8,271. The commercial harvest during the regularly scheduled periods was 8,511. The commercial set nets from the area in question harvested 2,275 chinook salmon during additional fishing time which brought the total for 1978 to 10,786 (Table 12).

Because of the approximate one-week timing delay between the commercial fishery and sport fishery, it is felt that fish still in Cook Inlet after July 24 are not harvested by recreational anglers since the season closes July 31. In 1978, 7,802 late run chinook salmon were captured before July 24 and 2,984 were harvested after July 24 (Table 13). This represents 25.6% of the total commercial chinook salmon set net harvest from the east side beaches. An additional 858 were harvested prior to July 1.

In mid-September a carcass survey was performed utilizing a small fixed-wing airplane (Super-cub). The shoreline was flown upstream along the south bank from Cook Inlet to Skilak Lake then downstream along the north bank. During that flight 934 adult chinook salmon carcasses were identified. A similar survey in 1976 yielded 700 carcasses. At this point, not enough data are available to make any speculations as to what these carcass counts represent, other than minimum escapement values.

A point was made last year and is more evident this year: the value of accurate escapement estimates. As the angling effort continues to grow, the need for accurate escapement estimates becomes more vital. A program has been proposed (Hammarstrom 1977) but has yet to be funded, although monies were appropriated to conduct a feasibility study.

Table 11. Summarized Data from Readable Scales Taken from Chinook Salmon Harvested by Recreational Anglers in the Kenai River, 1978.

Age Class Brood Year	Early Run				Total
	1.2 1974	1.3 1973	1.4 1972	1.5 1971	
Number	11	13	45	0	69
Percent	15.9	18.8	65.3	0	100.0
Length Range* (mm)	400-645	710-835	850-1170		400-1170
Mean* (mm)	587	770	981		873
Weight Range (Kg)	1.3-5.0	5.0-10.5	9.0-29.5		1.3-29.5
Mean (Kg)	3.9	8.1	17.1		13.1
Age Class Brood Year	Late Run				Total
	1.2 1974	1.3 1973	1.4 1972	1.5 1971	
Number	22	14	136	3	175
Percent	12.6	8.0	77.7	1.7	100.0
Length Range* (mm)	495-680	790-915	875-1185	1060-1180	495-1185
Mean* (mm)	611	850	1033	1120	966
Weight Range (Kg)	2.3-6.8	8.3-15.0	8.3-33.0	25.0-27.5	2.3-33.0
Mean (Kg)	4.5	11.4	20.7	26.6	17.9

* Mid-eye to fork of tail.

Table 12. Commercial Chinook Salmon Harvest Data from Cook Inlet East
Side Set Net Beaches (Statistical Area 244-20,30,40) 1974-1978.

Year	Early Run	Late Run	Total
1974	167	5,404	5,571
1975	181	3,497	3,678
1976	876	7,361	8,237
1977	1,058	7,613	8,671
Mean	571	5,969	6,540
1978	858	10,786	11,644

Table 13. Summary of Cook Inlet Chinook Salmon Commercial Set Net Harvest by Time Period from Area 244, 1966-1978.

Year	Opening Date	Early Run (Prior to July 1)			Percent of Total	After July 24	Percent of Total	Total Catch
		Number	Percent of Total Catch	July 1-24				
1966	June 23	724	9.9	4,006	54.8	2,582	35.3	7,312
1967	June 22	799	12.0	4,427	66.7	1,412	21.3	6,638
1968	June 20	533	16.1	1,833	55.4	942	28.5	3,308
1969	June 18	2,900	49.9	1,880	32.4	1,025	17.7	5,805
1970	June 17	699	13.0	3,209	59.8	1,458	27.2	5,366
1971	June 18	3,989	56.6	*			43.5	7,055
1972	June 19	3,455	40.2	4,217	49.1	923	10.7	8,595
1973	June 25	352	8.0	2,204	50.0	1,855	42.0	4,411
1974	June 28	167	3.0	3,206	57.5	2,198	39.5	5,571
1975	June 27	181	4.9	2,156	58.6	1,341	36.5	3,678
1976	June 25	876	10.6	5,864	71.2	1,497	18.2	8,237
1977	June 27	1,058	12.2	6,125	70.6	1,488	17.2	8,671
1978	June 26	858	7.4	7,802	67.0	2,984	25.6	11,644
Mean	-	1,276		3,911		1,642		6,638

* Data not applicable due to numerous closures.

Kasilof River Fishery

The Board of Fisheries opened the Kasilof River to chinook salmon fishing in 1978 for the first time since statehood. It has been known for many years that a run of chinook salmon enters the Kasilof River with about the same timing pattern as the early run into the Kenai River. No quantitative work has been done with regard to chinook salmon, and the size of the run is not known. The stream is glacially turbid, much more so than the Kenai River and receives little angling pressure.

The monitoring program commenced May 15 and continued until the season closed June 30. Initially four access sites were sampled, but within two weeks through aerial surveys it was apparent that only one area was receiving significant effort--the area below the confluence with Crooked Creek.

Effort was estimated at 1,750 man-days (man-day averaged 4.1 man-hours), much lower than anticipated considering the extremely crowded conditions in nearby chinook salmon fisheries. Harvest was estimated at 270 adults and 330 "jacks". Average catch per hour was 0.040.

Harvest and effort estimates were based on 134 instantaneous counts (average of 33.5 counts at each of four locations), 150 anglers interviewed, 19 adult chinook creel checked and 25 "jacks" creel checked.

The Kasilof Incubation Facility, operated by the Fisheries Rehabilitation, Enhancement and Development Division of the Department of Fish and Game, is located on Crooked Creek approximately 5 stream miles above the fishery. Although chinook salmon smolts were released from this facility in 1976 and 1977 with fin clip marks and coded wire tags, none were creel checked nor reported during the fishery. Crooked Creek did receive larger than normal returns of chinook salmon, most of which were wild fish.

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