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Annual Performance Report for

EVALUATION OF CHINOOK SALMON  
FISHERIES OF THE KENAI PENINSULA

by

Stephen Hammarstrom

ALASKA DEPARTMENT OF FISH AND GAME  
Ronald O. Skoog, Commissioner

SPORT FISH DIVISION  
Rupert E. Andrews, Director

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By: Stephen Hammarstrom

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## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska  
Project No.: F-9-12  
Study No.: G-II Study Title: SPORT FISH STUDIES  
Job No.: G-II-L Job Title: Evaluation of Chinook Salmon Fisheries of the Kenai Peninsula

Period Covered: July 1, 1979 to June 30, 1980

## ABSTRACT

The four-weekend fishery for chinook salmon, Oncorhynchus tshawytscha (Walbaum), on Anchor River, Deep Creek and Ninilchik River is discussed. Total angler effort, 36,640 man-days, was estimated by vehicle counts on location. Total harvest, 2,100 fish longer than 51 centimeters (20 inches), was derived by creel census. Punch cards were required this year, but were not required to be returned until December 31. Harvest estimates as determined by creel census were: Anchor River, 1,030; Deep Creek, 370; and Ninilchik River, 700.

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 1973).

The 1979 saltwater chinook salmon fishery in Cook Inlet, south of Deep Creek, was monitored by creel census. Harvests from early and late runs were 3,088 and 1,164 respectively. Angler effort was 22,080 man-days. Estimates were calculated on the basis of 3,426 angler interviews, 431 creel checked fish and 172 instantaneous boat counts. Historical data for this fishery are presented.

Age composition of fish taken in the saltwater fishery was based on 145 readable scales collected during the fishery. Both early and late runs showed a domination by age class 1.4, 63.4 and 71.6 percent, respectively. Fish from the late run averaged 24.3 kilograms (53.5 pounds) each.

For the sixth year, the Kenai River chinook salmon fishery was monitored by creel census. In 1979, data from 11,762 angler interviews, 673 creel checked fish, 177 instantaneous angler counts and 14 aerial surveys provided the basis for an estimated effort of 98,560 man-days and a harvest of 8,295 fish over 508 millimeters (20 inches)--3,661 from the early run and 4,634 from the late run. In addition, 1,878 fish less than 508 millimeters (jacks) were harvested.

Sampling of the Kenai River recreational fishery produced 177 readable chinook salmon scales for age analysis. The predominant age class was 1.4 for both runs. The results of the first year of a tagging study to determine the total escapement of chinook salmon into the Kenai River were very encouraging. Although no estimates were achieved, this program will be continued in the future, as many of the logistical and technical problems were solved during 1979.

## BACKGROUND

Chinook salmon are the most popular species for sport anglers on the Kenai Peninsula. Initially, harvest was concentrated on the southern streams of Anchor River, Deep Creek and Ninilchik River (Figure 1). Management on these streams has ranged from unregulated to complete closure, and from 1966 until 1979 (except 1978), a punch card was utilized as a management tool. During 1978, only a daily bag and possession limit were required.

Pertinent historical data regarding this fishery are presented in Report 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, 1979).

In 1972, anglers discovered chinook salmon could be harvested in the marine waters of Cook Inlet in the vicinity of Deep Creek. Fish moving through this area are bound for many streams in the Cook Inlet basin. Harvest and effort have been monitored by creel census since 1972. Fluctuations in harvest and effort can primarily be attributed to local weather conditions. Historical data pertaining to this fishery are presented by Hammarstrom (1974, 1975, 1976, 1977, 1978, 1979).

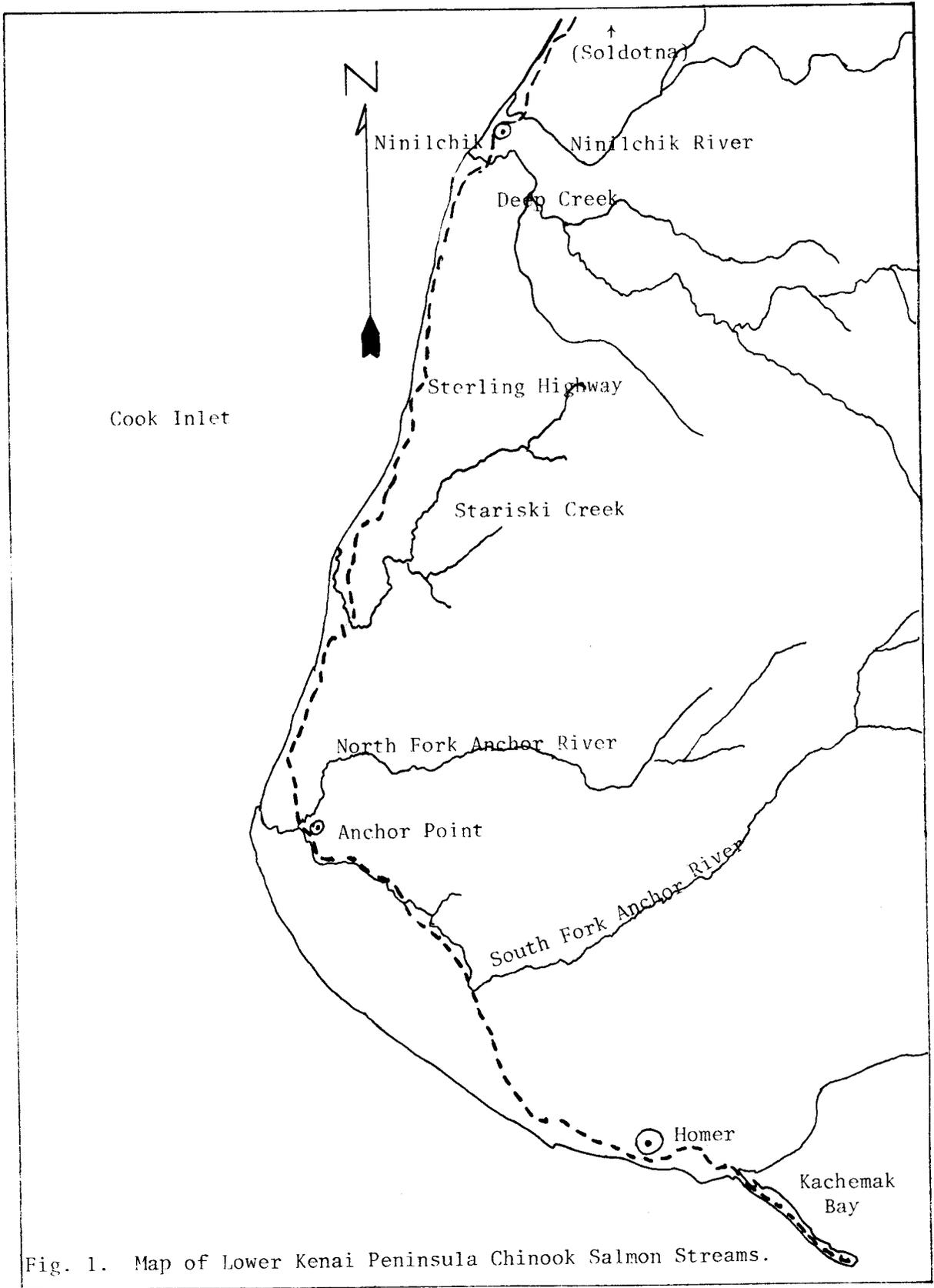
The Kenai River (Figure 2) became popular for chinook salmon in 1973. In 1974, the Department of Fish and Game initiated a creel census to monitor harvest and effort. That census was expanded in 1975 and has been continuous each summer since. For the past 4 years, angling effort for chinook salmon on the Kenai River has made this the largest fishery in Alaska. Historical data are presented in reports by Hammarstrom (1975, 1976, 1977, 1978, 1979).

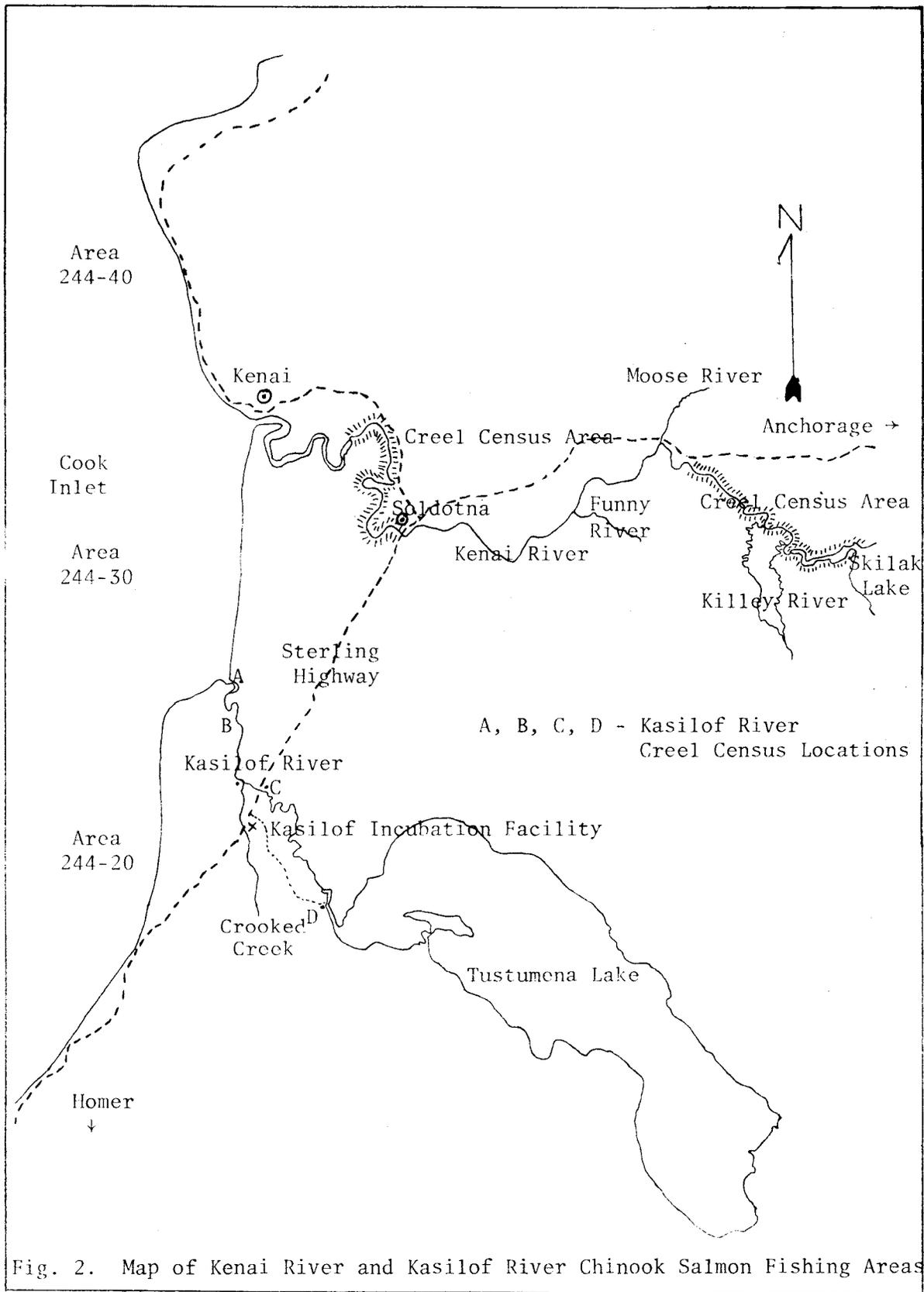
## RECOMMENDATIONS

1. Escapement of chinook salmon into the Kenai River system should be assessed.
2. Possibilities of determining racial separation of early run chinook salmon harvested in salt water should be explored.

## 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

During 1979, a punch card was required for all salmon species in the Cook Inlet area. Because these cards were not required to be returned until December 31, 1979, only limited information was available at this writing. As of December 1, 1979, only 6.4% of the 118,000+ cards issued were returned.

Harvest and effort and escapement estimates on the three streams, Anchor River, Deep Creek and Ninilchik River, were compiled using the same methods as those described by Hammarstrom (1978, 1979).

Techniques utilized on the Kenai River and the Deep Creek marine fisheries were as described by Hammarstrom (1977).

A cooperative project with the United States Fish and Wildlife Service attempted to tag and release returning chinook salmon in the Kenai River. Adult chinook salmon were captured by a variety of methods in the lower 10 miles of the Kenai River, usually in intertidal waters downstream from the very active sport fishery.

Initially, fish were captured with electrofishing gear. Two sampling boats, each of differing capabilities, were used. Fish were readily captured but even very low current settings resulted in serious damage to the fish. This method was abandoned in favor of a large custom-made seine designed to be fished entirely from shore. The seine proved too cumbersome and could only be fished effectively during high, slack tide. The most effective method proved to be a short length of commercial gill net 8 m (25 ft) in length of 13.6 cm (5-3/8 in) stretched mesh. This section of gill net was drifted perpendicular to the current from the stern of a 16 ft riverboat. Immediately upon noticing a fish in the net, it was retrieved and the fish were put into a holding tank.

Both radio transmitters and numbered Peterson disc tags were used. The telemetry gear was provided by the U.S. Fish and Wildlife Service and was to be used to determine migrational timing and behavior. The disc tags were used for a population estimate.

#### FINDINGS

##### Lower Stream Fishery

The 1979 spring fishery for chinook salmon on Anchor River, Deep Creek and Ninilchik River was conducted under similar regulations as in 1978. Each

stream was open the last weekend in May and the first three of June, except Ninilchik River, which was closed after the second weekend of June. Each weekend was Saturday, Sunday and Monday. Harvest for this entire fishery was estimated at 2,100 chinook salmon over 508 mm (20 in) and effort was estimated at 36,640 man-days. A man-day was approximately 4.0 hours.

As in 1978, by the third weekend it appeared the run into the Anchor River was quite strong and, due to unseasonably clear water conditions, an aerial escapement count by helicopter was attempted. Two observers, counting independently, estimated between 1,900 and 2,000 chinook salmon in the first 5 miles above the fishery. It was considered adequate escapement and the Anchor River was opened by emergency order allowing continuous fishing from June 9 through June 18, adding 4 days to the season.

Once again, the first day of the weekend (Saturday) produced the most fish, followed by Sunday and Monday. The four additional days accounted for a 105 fish harvest and angler effort of 2,100 man-days; 5.0% of the harvest and 5.8% of the effort, respectively. A historical summary of the fishery is presented in Table 1 and a summary of the 1979 fishery is presented in Table 2.

Escapement surveys were conducted in early August by helicopter and the results are presented in Table 3. Lack of funds precluded an escapement survey on Stariski Creek. This stream is a producer of chinook salmon but not open to fishing, although some fish are probably harvested in the marine waters of Cook Inlet. Escapement in all three streams was felt to be adequate. Historical harvest and escapement data are presented in Table 4.

A total of 466 readable scale samples were taken from fish caught in the recreational fishery. The age class 1.4 (brood year 1973) was the largest contributor (49.2%), followed closely by age class 1.3 (brood year 1974) which contributed 42.9%. Age class data is presented in Tables 5 and 6.

#### Deep Creek Marine Fishery:

In 1979, the creel census was operated to measure angler harvest and effort for chinook salmon in the marine waters off Deep Creek. The fishery commenced May 14 and was continuous through July 31.

The season ran for 79 days and during that time, creel census activities were conducted on 56 (71%) days. During those creel census days, 11 days (20%) were regarded as weather days when the water was rough enough to preclude fishing. Therefore, applying the same percentage to the total season days, it is estimated that anglers were only effective on 63 days.

During 1979, 172 instantaneous boat counts were conducted, 5,404 boats were present, 3,426 anglers were interviewed in a total of 1,356 boats, 431 chinook salmon were creel checked and 13,599 hours were reported. These figures were used to arrive at the following estimates: effort - 22,080 man-days; harvest - 4,252 chinook salmon.

Since 1973, the early run (mid-May through late June has attracted the majority of anglers and produced the majority of the harvest. This year,

Table 1. Historical Chinook Salmon Harvest and Effort Data from the Lower Three Kenai Peninsula Streams (Anchor River, Deep Creek, Ninilchik River), 1971-1979.

Year	Effort (man-days)	Harvest	Length of Season (days)	Average Effort/Day	Average Harvest/Day	Man-Days Per 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	283	13
1979	36,640	2,100	16*	2,290	175	17
Mean	26,416	1,420	8.4	3,292	188	19

\* Anchor River only was open for 4 additional days

Table 2. Harvest and Effort Summary for the Chinook Salmon Fishery on the Lower Three Kenai Peninsula Streams, 1979.

Date	Anchor River		Deep Creek		Ninilchik River		Total	
	Harvest	Effort	Harvest	Effort	Harvest	Effort	Harvest	Effort
5/26	130	2,380	15	655	200	2,110	345	5,145
5/27	60	2,350	10	1,170	80	2,020	150	5,540
5/28	30	1,605	5	870	20	705	55	3,180
Subtotal	220	6,335	30	2,695	300	4,835	550	13,865
6/02	200	1,630	85	505	135	1,415	420	3,550
6/03	60	1,340	50	1,240	40	1,165	150	3,745
6/04	70	580	40	250	35	330	145	1,160
Subtotal	330	3,550	175	1,995	210	2,910	715	8,455
6/09	220	1,740	30	1,040	120	1,335	370	4,115
6/10	25	1,050	25	1,075	45	890	95	3,015
6/11	45	555	15	365	30	310	90	1,230
Subtotal	290	3,345	70	2,480	195	2,535	55	8,360
6/16	40	1,155	55	660			95	1,815
6/17	25	800	25	485			50	1,285
6/18	15	420	15	335			30	755
Subtotal	80	2,375	95	1,480			175	3,855
6/12	15	345					15	345
6/13	5	445					5	445
6/14	45	540					45	540
6/15	40	780					40	780
Subtotal	105	2,110					105	2,110
GRAND TOTAL	1,025	17,715	370	8,650	705	10,280	2,100	36,645

Table 3. Results of Escapement Surveys Conducted on Three Lower Kenai Peninsula Chinook Salmon Streams, 1979.

Stream		Index Area			Remainder of Stream		
		Ground Count	Aerial Count	Percent Aerial	Aerial Count	Expanded Count	Total Escapement Estimates
Anchor River	Live	699	500	71.5	608	850	1,549
	Dead	241	107	44.4	120	270	511
	Total	940	607	64.6	728	1,120	2,002-58 jacks
Deep Creek	Live	108	37	34.3	578	1,685	1,793
	Dead	9	10	111.1	101	101	110
	Total	117	47	40.2	679	1,786	1,753-150 jacks
Ninilchik River	Live	139	89	64.0	546	853	992
	Dead	44	24	54.5	195	358	402
	Total	183	113	61.8	741	1,211	1,328-66 jacks

Table 4. Historical Harvest and Escapement for the Three Lower Kenai Peninsula Chinook Salmon Streams from 1966-1979.

Year	Anchor River			Deep Creek			Ninilchik River			Total		
	Harvest	Escapement	% Harvest*	Harvest	Escapement	% Harvest*	Harvest	Escapement	% Harvest*	Harvest	Escapement	Run
1966	200	1,330	18	50	540	9	200	670	25	560	2,540	3,100
1967	240	1,220	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	21	910	1,400	40	2,170	6,560	8,703
1978	1,680	2,410	41	590	1,010	40	1,130	990	53	3,400	4,410	7,810
Mean (excludes fall 1970 and 1971 data)												
1966-78	500	1,860	20	200	700	21	430	840	32	1,130	3,390	4,520
1979	1,030	2,000	34	370	1,750	17	700	1,390	34	2,100	5,140	7,240

Figures rounded to nearest 10.

\* % of total run harvested.

Table 5. Age Composition of Chinook Salmon Taken in the Recreational Harvest from Anchor River, Deep Creek, and Ninilchik River, 1979.

	Age Class					Total
	1.2	1.3	1.4	1.5	Other	
Number	30	200	229	4	3	466
Percent	6.4	42.9	49.2	0.9	0.6	100.0

	Brood Year				Total
	1975	1974	1973	1972	
Number	30	200	229	7	466
Percent	6.4	42.9	49.2	1.5	100.0

Table 6. Length Data (mid-eye to fork of tail) for Chinook Salmon Taken in the Recreational Fishery on Three Lower Kenai Peninsula Streams, 1979.

	Age Class		
	1.2	1.3	1.4
<u>Anchor River</u>			
Number	10	85	131
Range (mm)	560-690	635-950	370-1025
Mean (mm)	609.3	807.0	889.6
S.D.*	39.8	47.0	54.3
<u>Ninilchik River</u>			
Number	8	62	46
Range (mm)	485-595	675-900	750-1020
Mean (mm)	531.0	791.0	881.3
S.D.*	37.4	44.1	51.1
<u>Deep Creek</u>			
Number	8	34	21
Range (mm)	550-640	693-869	823-1185
Mean (mm)	592.8	775.9	886.3
S.D.*	37.5	39.9	81.1
<u>Total</u>			
Number	26	181	198
Range (mm)	485-690	635-950	730-1185
Mean (mm)	580.1	795.6	887.3
S.D.*	50.2	47.0	57.4

\* Standard Deviation

1979, was no exception. Early run effort was estimated at 13,352 man-days (60.5%), and early run harvest was 3,088 chinook salmon (72.6%). Corresponding figures for the late run are 8,728 man-days (39.5%) and 1,164 fish (27.4%). Catch per hour during the early run was .053 and .034 during the late run.

Table 7 presents a historical summary of harvest and effort off Deep Creek for the years 1972-1979. A man-day averaged 4.3 hours during the early run and 4.0 hours during the late run. A curve depicting the timing of the 1979 return, as determined by sport harvest rate, is presented in Figure 3.

During the 1979 season, 145 readable scales were collected from the sport harvest. The majority, in both early and late runs, was age class 1.4 (brood year 1973). This age class represented 63.4% of the early run and 71.6% of the late run. Summarized age and length data are presented in Table 8.

Sex ratio during the early run was 0.7:1 males to females, while the late run sex ratio was 1.2:1 males to females. Early run projected harvest was 1,306 males and 1,782 females. Corresponding figures for the late run were 630 males and 534 females.

#### Kenai River Fishery

The creel census of chinook salmon anglers on the Kenai River commenced June 1, 1979 and was continuous through July 31. During that time, 177 instantaneous angler counts were made; 22,732 anglers were enumerated; 11,762 anglers were interviewed; 14 aerial surveys were conducted; and 673 chinook salmon over 508 mm (20 in) total length were creel checked.

The run into the Kenai River is comprised of two segments, early and late. Because of the distance traveled and the characteristic behavior of the migration, timing in each segment of the river differs.

During 1979, early run fish were considered available in the lower section of the river (Beaver Creek to Soldotna Bridge) from June 1 through July 1, and in the upstream section (Naptowne Rapids to Skilak Lake) from June 1 through July 8. Late run fish were considered available in each section from the end of the early run through July 31 when the season closed by regulation. Timing dates were assigned by analyzing catch rates then adjusting to the nearest weekly period--in this case, Monday. Since the two runs overlap, assigning a date for separation is for convenience purposes in meeting the requirements prescribed by the Board of Fisheries in managing the late run.

Total early run harvest was estimated at 3,661 adult chinook salmon and 370 "jacks" (age class 1.1). Most of the harvest was from the downstream section (Table 9), although it is unknown why this occurred. Speculation tends to suggest a more efficient fishery occurs in the lower river section but this has not been the case in past years, and reports from the census taker and other fishermen on the upstream section stated fish were there but appeared to be moving through rapidly and not striking. Further investigation is necessary to determine if this situation was unique to 1979 or the beginning of a trend. Effort during the early run was estimated at 39,665 man-days with a man-day approximately 3.5 hours (Table 10). This

Table 7. Historical Summary of Chinook Salmon Sport Fishery off Deep Creek, 1972-1979.

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
1978	2,669	14,413	0.059	2,693	9,402	0.081	5,362	23,815	0.068
Mean 1972-1978	2,912	8,609	0.068	947	4,673	0.078	3,139	13,283	0.071
1979	3,088	13,352	0.053	1,164	8,728	0.034	4,252	22,080	0.046

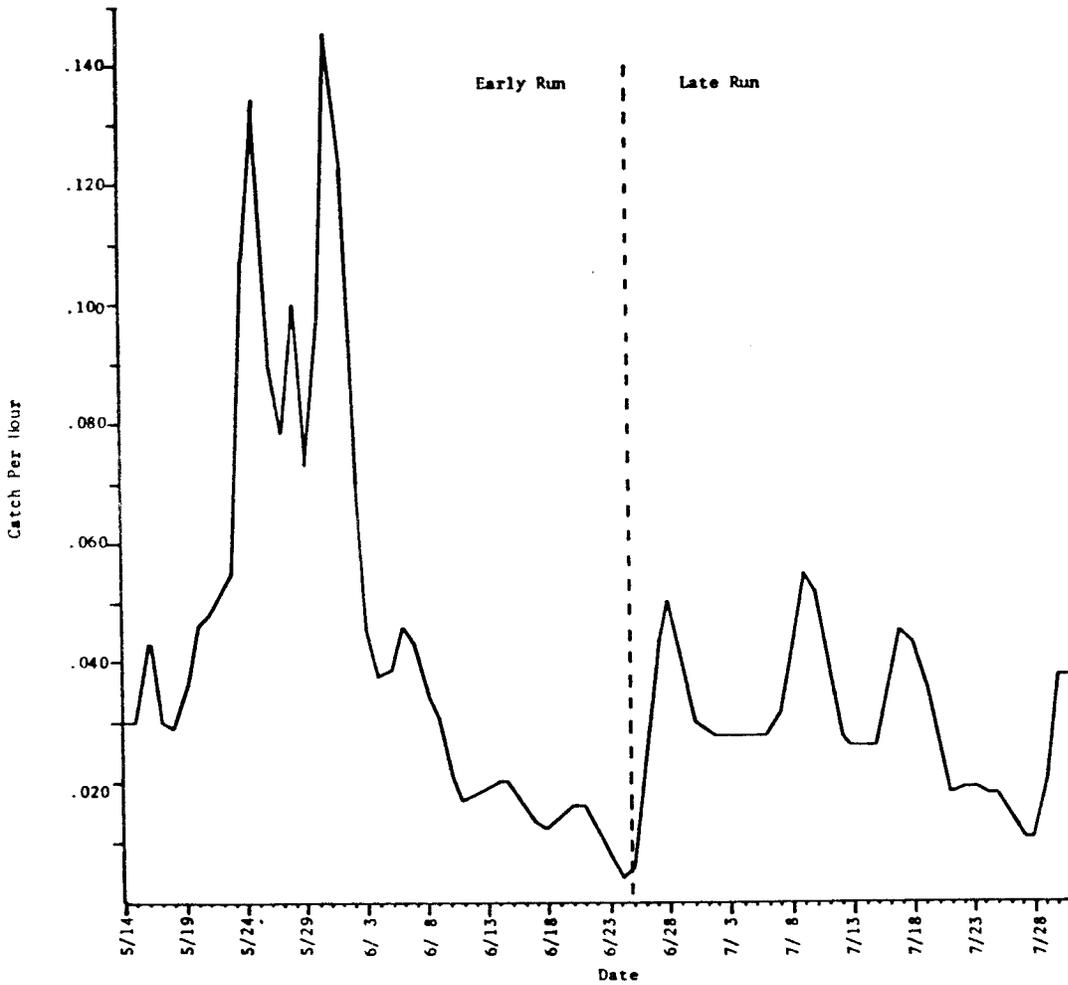


Fig. 3. Recreational Catch Per Hour by Date for the Chinook Salmon Fishery in Cook Inlet in the Vicinity of Deep Creek, 1979. (graph smoothed by  $\frac{a+2b+c}{4}$ )

Table 8. Data from Readable Scales Collected from Chinook Salmon Harvested in the Deep Creek Marine Fishery, 1979.

Age Class Brood Year	Early Run				Total
	1.2 1975	1.3 1974	1.4 1973	1.5 1972	
Number	3	20	45	3	71
Percent	4.2	28.2	63.4	4.2	100.0
Length Range* (mm)	510-590	740-980	820-1175	1035-1255	510-1255
Mean* (mm)	558	849	995	1163	919
Mean Weight (kg)	3.3	9.2	14.4	14.5	12.6

Age Class Brood Year	Late Run				Total
	1.2 1975	1.3 1974	1.4 1973	1.5 1974	
Number	1	7	53	13	74
Percent	1.4	9.5	71.6	17.5	100.0
Length Range* (mm)	680	725-990	785-1170	935-1190	680-1190
Mean* (mm)	680	865	1054	1082	1036
Mean Weight (kg)	-	13.4	24.1	25.9	24.3

\* Mid eye-fork of tail

Table 9. Summary of the Chinook Salmon Harvest on the Kenai River, 1979.

	Downstream Section	Midstream Section	Upstream Section	Shore Anglers	Total
<u>Early Run</u>					
Adults	3,156	290	103	112	2,661
Jacks	139	14	17	200	370
Total	3,295	304	120	312	4,031
<u>Late Run</u>					
Adults	3,819	364	226	225	4,634
Jacks	1,002	91	15	400	1,508
Total	4,821	455	241	625	6,142
<u>Both Runs</u>					
Adults	6,975	654	329	337	8,295
Jacks	1,141	105	32	600	1,878
Total	8,116	759	361	937	10,173

Table 10. Summary of Angler Effort (man-days) on Kenai River Chinook Salmon, 1979.

	Downstream Section	Midstream Section	Upstream Section	Shore Anglers	Total
Early Run	26,320	2,992	7,280	3,073	39,665
Late Run	40,930	4,413	7,565	5,987	58,895
Total	67,250	7,405	14,845	9,060	98,560
Percent Total	68.2	7.5	15.1	9.2	100.0

represents an increase in harvest of 137%, and an increase in effort of 103% over 1978 estimates.

Harvest and effort estimates for the late run are 4,634 adult chinook salmon and 58,895 man-days, respectively. These figures reflect a 17% reduction in harvest and a 3% reduction in effort from 1978 estimates. Most of the harvest again came from the lower river. And again, the primary reason is run timing. By the time the run peaks in the upper river, there are only a few days left in the season. This year, in the upstream section, the best catch per hour for that section was recorded on the last day of the season (Figure 4).

Catch per hour during the early run averaged .034 in the downstream section and .004 in the upstream section. Corresponding figures for the late run are .027 and .009, respectively. Historical data for this fishery are presented in Table 11.

The commercial set net fishery which is thought to harvest primarily Kenai River chinook salmon (statistical area 244-20, 30 and 40) exhibited a strong early run also. Thirteen percent of their annual chinook salmon harvest came during the two periods prior to July 1. (This compares to an average of 7.8% for the years 1973-1978, 1973 being the first year the opening date was established at June 25 or the nearest following Monday or Friday, thus only two periods prior to July 1.) Table 12 presents a historical summary of the commercial set net fishery on the east side beaches. Table 13 is a comparison between sport and commercial harvest from 1974-1979.

The requirements of a policy adopted by the Board of Fisheries in 1975 (Hammarstrom, 1977) were complied with this year, and thus no closures resulted. Basically, the policy requires that the recreational fisheries off Deep Creek and in the Kenai River share the late run chinook salmon with the east side set nets on a one-to-one basis, not to exceed 10% more, based on the regularly scheduled two 12-hour periods per week. The combined recreational harvest was 5,245, while the commercial harvest during the regular period was 6,776.

During June and July, readable scales were collected from 177 chinook salmon; 104 during the early run and 73 during the late run. The predominant age class during both runs was 1.4 (brood year 1973), 51.9% and 54.8% early and late runs, respectively. It is interesting to note that the strong showing of age class 1.5 (brood year 1972) accounted for 11.5% and 12.3% of the early and late runs, respectively. The fact these two age classes made up 65.0% of the chinook salmon return to the Kenai River accounts for the large number (156) of trophy certificates issued for Kenai River fish over 60 lbs (27.3 kg). Table 14 presents age composition data. Most fish harvested were males and the sex ratio was 1.3:1 males to females. Thus the projected harvest was 4,637 males and 3,658 females. Historical age composition is described in Table 15.

It appears a method of determining the escapement of chinook salmon into the Kenai River may finally become a reality. A program proposed in 1975 (Hammarstrom, 1977), received feasibility monies last year. This resulted in a floating trap design which is felt to be capable of sampling a large enough portion of the population to conduct a statistically valid tagging

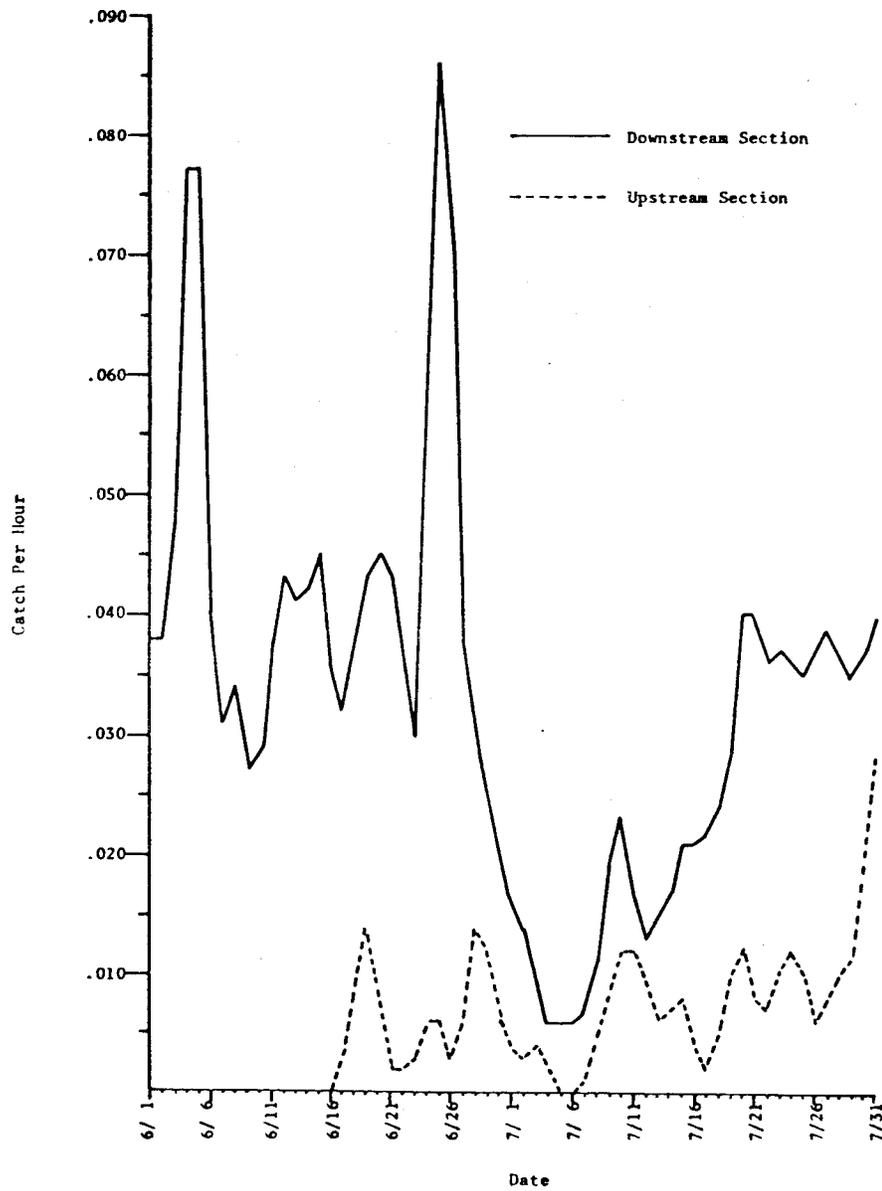


Fig. 4. Recreational Catch per Hour by Date in the Kenai River Chinook Salmon Fishery, 1979. (graph smoothed by  $\frac{a+2b+c}{4}$ )

Table 11. Historical Summary of Kenai River Chinook Salmon Fishery, 1974-1979.

Year	Sport Fishing Kenai River								
	Early Run			Late Run			Total		
	Harvest	Effort	Catch/ Hour	Harvest	Effort	Catch/ Hour	Harvest	Effort	Catch/ Hour
1974	1,685	11,275	0.041	3,225	12,335	0.037	4,910	23,610	0.058
1975	615	15,047	0.011	2,355	14,943	0.044	2,970	29,990	0.024
1976	1,554	16,430	0.024	4,477	28,030	0.039	6,031	44,460	0.033
1977	2,173	35,479	0.019	5,148	47,539	0.036	7,321	83,018	0.029
1978	1,542	19,569	0.018	5,578	60,663	0.026	7,120	80,232	0.024
Mean	1,514	19,560	0.023	4,156	32,702	0.044	5,670	52,262	0.034
1979	3,661	39,665	0.022	4,634	58,895	0.022	8,295	98,560	0.022

Table 12. 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)		July 1-24	Percent of Total	After July 24	Percent of Total	Total Catch
		Number	Percent of Total Catch					
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	3,309
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	862	7.4	7,802	67.0	2,984	25.6	11,648
1979	June 25	1,073	13.0	5,509	66.7	1,679	20.3	8,261
Mean		1,262	15.4	4,034	58.4	1,645	26.2	6,754

\* Data not applicable due to numerous closures during July

Table 13. Historical Summary of Sport and Commercial Chinook Salmon Harvest on Fish Bound Principally for the Kenai River, 1974-1979 (Sport Fisheries at Kenai River and Deep Creek Marine and Commercial Set Net Fisheries in Statistical Areas 244-20,30,40).

	Early Run Harvest			Late Run Harvest			Total Harvest		
	Sport	Commercial	Total	Sport*	Commercial	Total	Sport	Commercial	Total
1974	1,685	167	1,852	3,325	5,404	8,729	5,010	5,571	10,581
1975	615	181	796	2,700	3,497	6,197	3,315	3,678	6,993
1976	1,554	876	2,430	5,859	7,361	13,220	7,413	8,237	15,650
1977	2,173	1,058	3,231	5,514	7,613	13,127	7,687	8,671	16,358
1978	1,542	858	2,400	8,271	10,786	19,057	9,813	11,644	21,457
1979	3,661	1,073	4,734	5,798	7,188	12,986	9,459	8,261	17,720
Mean	1,872	702	2,574	5,245	6,975	12,220	7,117	7,677	14,794

\* Includes the Deep Creek marine harvest

Table 14. Age Composition of the Recreational Harvest of Chinook Salmon from the Kenai River, 1979.

Age Class Brood Year	1.2 1975	1.3 1974	1.4 1973	1.5 1972	Total
<u>Early Run</u>					
Number	6	32	54	12	104
Percent	5.8	30.8	51.9	11.5	100.0
Mean Length (mm)	626	810	936	1,043	890
Length Range (mm)	570-730	660-920	700-1130	910-1165	570-1165
Mean Length (kg)	4.2	10.1	15.7	20.7	13.8
Weight Range (kg)	3.0-5.0	5.0-15.0	7.0-29.3	12.0-27.0	3.0-29.3
<u>Late Run</u>					
Number	11	13	40	9	73
Percent	15.1	17.8	54.8	13.2	100.0
Mean Length (mm)	600	835	1,071	1,122	958
Length Range (mm)	470-700	635-990	865-1320	980-1420	470-1420
Mean Weight (kg)	4.4	9.2	20.6	25.3	16.7
Weight Range (kg)	3.0-6.8	4.4-14.0	10.0-29.4	18.1-32.2	3.0-32.2

Table 15. Historical Age Composition, in Percent, of Chinook Salmon Harvested from the Kenai River, 1974-1979.

Harvest Year	Age Class			
	1.2	1.3	1.4	1.5
<u>Early Run</u>				
1976	27.8	25.3	44.3	2.6
1977	14.4	30.3	53.7	1.5
1978	15.9	18.8	65.3	0
1979	5.8	30.8	51.9	11.5
Mean	16.0	26.3	53.8	3.9
<u>Late Run</u>				
1976	30.4	20.5	45.1	4.0
1977	11.6	41.6	45.0	1.7
1978	12.6	8.0	77.7	1.7
1979	15.1	17.8	54.8	12.3
Mean	17.4	22.0	55.7	4.9
<u>Total Both Runs</u>				
1974	5.9	4.7	83.5	5.9
1975	44.5	32.5	20.0	3.0
1976	29.3	22.5	44.8	3.4
1977	12.9	35.0	48.9	1.6
1978	13.5	11.1	74.2	1.2
1979	9.6	25.4	53.1	11.9
Mean	19.3	22.0	54.2	4.5

study to determine total population of returning adults. The project has also received the necessary priorities within the Department to make funding by the Legislature a real possibility.

#### Kenai River Tagging Project:

Beginning June 1, a chinook salmon tag and release project was activated. The first two weeks were spent preparing gear, especially an electroshocking boat similar in design and construction as that described by Hammarstrom (1975). Also a large seine was rigged and prepared to be operated entirely from shore. This project was conducted in conjunction with the U.S. Fish and Wildlife Service, Fisheries Research Section. They also had a specially built electroshocking boat for use on the project.

The Department of Fish and Game boat used only alternating current. Voltage ranged from 100 to 300 volts, and resulting amperage was determined by water conductivity. The U.S.F.W.S boat had the capability of using either AC or DC voltage.

The first fish was captured on June 20. Several fish were captured on the succeeding days and placed in a mesh holding pen approximately 1 m x 1 m x 2 m. Of the five fish being held, two died within the first 24 hours. All fish exhibited a loss of equilibrium. One large female (approximately 32 kg) remained alive for 4 days, but was constantly inverted and would return to the inverted position after being righted. Many voltage settings and either AC or DC combinations were tried, but only the very small fish (under 3 kg) seemed to survive unharmed. Some fish were tagged and released even though obvious damage had been done but apparent recovery was indicated. A total of 20 electroshocked fish were released, of which one was recaptured. The one recaptured was a carcass found near the mouth of the Kenai River which had been partially eaten by scavengers.

At this point, the electroshocking boats were dismantled and a seine was tried. This net proved to be difficult to handle and impossible to fish at any other time except at high slack tide. No fish were captured with the seine.

The most effective method of capture was use of a short length (approximately 8 m) of 13.6 cm mesh gill net in the main current of the river. This was standard sockeye salmon gear, 45 meshes deep. The net was drifted perpendicular to the current behind a small boat. Immediately upon indication of a fish in the net, the net was retrieved and the fish removed and put into a live tank in the boat. The fish was tagged, measured and released as quickly as possible. If the fish was to receive a telemetry tag, it was anesthetized with ms-222 for handling.

From June 20 through July 31, a total of 177 tagged fish were released; 137 with only "Peterson disc" tags and 39 with both a radio transmitter and "Peterson disc" tag. The results of the telemetry project will be presented in a report to be released by the U.S.F.W.S. Of these tags, only six were returned, two of which were from commercial nets in Cook Inlet. Only four were recovered in the sport fishery.

It is considered too few fish were tagged and that few, if any, of the early run fish were tagged. The program will be continued next year and now that a capturing and tagging technique has been established, more

valuable data will result. This first year was considered experimental and would have to be determined very successful. Many of the physical and logistical problems were resolved, thus making for a more efficient operation next year.

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Prepared by:

Approved by:

Stephen Hammarstrom  
Fishery Biologist

Rupert E. Andrews, Director  
Division of Sport Fish

Mark C. Warner, Ph.d.  
Sport Fish Research Chief