

STATE OF ALASKA

*Jay S. Hammond, Governor*

Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT FISH AND  
SPORT FISH WATERS OF THE LOWER SUSITNA RIVER  
AND CENTRAL COOK INLET DRAINAGES

by

*Stanley W. Kubik*

ALASKA DEPARTMENT OF FISH AND GAME

*Ronald O. Skoog, Commissioner*

SPORT FISH DIVISION

*Rupert E. Andrews, Director*

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## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations  
of Alaska

Project No.: F-9-13

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-H Job Title: Inventory and Cataloging  
of Sport Fish and Sport Fish  
Waters of the Lower Susitna  
River and Central Cook Inlet  
Drainages

Cooperator: Stanley W. Kubik

Period Covered: July 1, 1980 to June 30, 1981

## ABSTRACT

Creel census data obtained from three west side Susitna River streams disclosed that anglers fished an estimated 15,045 man-days to harvest 7,348 chinook salmon, Oncorhynchus tshawytscha (Walbaum).

Although total escapement counts are not available for 1980, indications are that the chinook salmon escapement in west side Susitna streams was equal to the high escapements recorded during the 1976-1979 period.

A creel census conducted at Whittier in Prince William Sound indicated that 1,575 angler-days (6,966 angler-hours) were expended to harvest 1,791 coho salmon, Oncorhynchus kisutch (Walbaum).

Rainbow trout, Salmo gairdneri (Richardson), were experimentally stocked in seven Anchorage area lakes and coho salmon planted in 12 lakes.

## BACKGROUND

Whittier, located on Passage Canal in Western Prince William Sound, was the site of a creel census program in 1979 and 1980 to assess the success of Fisheries Rehabilitation, Enhancement and Development Division (F.R.E.D.) coho salmon smolt releases and establish sport fish effort and harvest levels. The creation of a coho salmon sport fishery is part of an overall program to enhance sport salmon fishing in the Whittier area. In theory, when these salmon return from their seaward migrations they will gather at

the release site and mill around for some time making them available to the sport angler.

For the second consecutive year, three streams on the west side of the Susitna River were open during the special chinook salmon season. The quota set for the three streams was 11,000 chinook salmon 508 millimeters and over in length. Other pertinent historical data are presented in Reports of Progress by Kubik (1976-1979) and stock status of Upper Cook Inlet Chinook Salmon (Sport Fish Division, Alaska Department of Fish and Game).

The program of restocking Anchorage area lakes was continued in 1980. In recent years, stocking programs in this area have relied heavily on plants of catchable size rainbow trout.

The study area is shown in Figure 1, and a list of common and scientific names of all species mentioned in this report is presented in Table 1.

#### RECOMMENDATIONS

1. Creel censuses should be continued on the Deshka River and Alexander and Lake Creeks to monitor angling effort and obtain estimates of the total chinook harvest.
2. Chinook salmon escapement counts should be continued on west side Upper Cook Inlet streams.
3. Coho salmon sport fish effort and harvest data should continue to be collected in selected west side Cook Inlet drainages.
4. Coho salmon sport fish effort and harvest data should continue to be collected at Whittier.
5. Experimental stocking evaluations on Anchorage area lakes should be continued.

#### OBJECTIVES

1. To determine the environmental characteristics of the existing and potential recreational fishing waters of the job area and, where practical, obtain estimates of the sport fish harvest and angler participation rates.
2. To evaluate the impact of water use and urban development projects on fisheries, aquatic life and water quality of lakes and streams in the area.
3. To determine stocking measures, formulate management practices and direct the course of future studies on area waters.

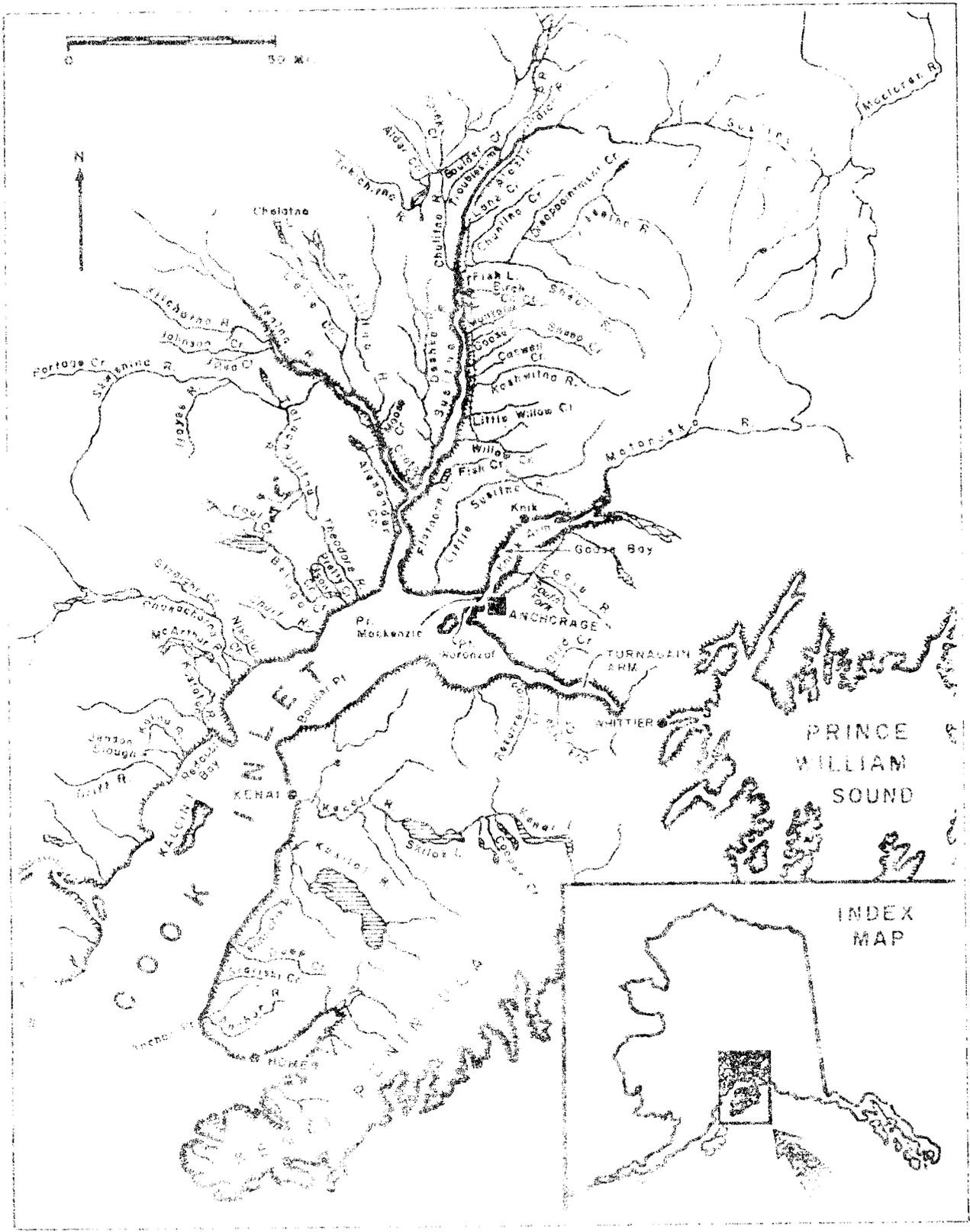


Figure 1. Location of the study area in Alaska. The study area is the area where king salmon are harvested.

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

Common Name	Scientific Names & Author	Abbreviation
Coho salmon	<u>Oncorhynchus</u> <u>kisutch</u> (Walbaum)	SS
Chinook salmon	<u>Oncorhynchus</u> <u>tshawytscha</u> (Walbaum)	KS
Rainbow trout	<u>Salmo</u> <u>gairdnari</u> Richardson	RT
Threespine stickleback	<u>Gasterosteus</u> <u>aculeatus</u> (Linnaeus)	TST

4. To investigate, evaluate and develop plans for the enhancement of salmon stocks.

## TECHNIQUES USED

The Whittier coho salmon creel census was designed to obtain effort and harvest data and evaluate the success of the 1979 F.R.E.D. coho salmon smolt release. The period from August 1 through September 30 was stratified by weekday and weekend/holiday. The schedule called for interviewing anglers during a randomly chosen 8-hour period on all weekends, holidays and three randomly chosen weekdays each week. Interviews of all anglers who had completed the day's fishing were attempted. The statistical design is similar to that used in the 1978-79 Deshka River coho salmon creel census. In addition to recording hours fished and the catch, length and weight data along with scale samples were collected. The fish were each checked for the adipose clip and the heads were retained from a number of clipped fish for examination purposes.

During the 1980 chinook salmon fishery, effort and harvest were evaluated by a creel census. The period of May 24 through July 6 was stratified by week, weekday and weekend/holiday. Interviews of anglers who had finished fishing were conducted through the period from 4:00 am to 10:00 pm on weekends and holidays. All 5 days of the week were sampled. The weekday schedule was divided into six 3-hour interview periods. Two 3-hour periods were randomly chosen for sampling each day. Interview procedures consisted of contacting anglers having completed their fishing, recording the number of hours fished and chinook salmon kept for each angler. Total length (tip of snout to tip of tail), and scale samples were obtained from departing anglers' catches whenever possible.

Fish population sampling on four Fort Richardson Military Reservation lakes was accomplished with 125-ft variable mesh gill nets. Measurements on fish collected included total lengths to the nearest millimeter (mm) and weight to the nearest gram (g). Two nets were fished for a period of 24 hours in each lake.

## FINDINGS

### Whittier Coho Salmon Creel Census

A creel census program to evaluate total coho salmon harvest and effort levels was conducted in Whittier. Data indicate that 1,575 angler-days (6,966 angler-hours) were expended to harvest 1,791 coho salmon between August 14, when the first coho salmon was taken, and September 24, when the census was terminated.

Sixty percent of the coho salmon taken were harvested by boat anglers in contrast to 1979 when 95% were harvested by shore anglers.

Approximately 85% of the total coho catch in 1980 was taken in the vicinity of Cove Creek Lagoon (Figure 2). Ten percent of the harvest came from the Divide Creek area and the remaining 5% scattered throughout Passage Canal. The 1979 catch was almost entirely taken by anglers fishing in the Whittier boat harbor.

Of the 708 creel checked coho salmon, 81 (11.4%) were adipose clipped. Male coho salmon with an adipose clip averaged 698 mm in length at an average weight of 9.1 lbs, while the unclipped males averaged 681 mm at a weight of 8.5 lbs. Female coho salmon with an adipose clip averaged 698 mm at a weight of 9.1 lbs, while unclipped females averaged 673 mm and a weight of 9.4 lbs (Table 2).

In 1980, the catch estimate combined with personal observations by ADF&G personnel produced a total run size estimate of approximately 4,000 coho salmon, or a return rate of 5% from the original release of 81,241 smolts.

#### West Side Susitna River Chinook Salmon Fishery

In 1979 eight streams in Upper Cook Inlet were opened to the taking of chinook salmon 508 mm and over in length. Three streams on the west side of the Susitna River and five streams on the east side were open during the special chinook salmon season.

A seasonal quota of 11,000 chinook salmon over 508 mm in length was established for the three west side streams. This quota was allocated by stream as follows: Deshka River 7,000; Alexander Creek 2,000; and Lake Creek 2,000. The daily bag and possession limit was one chinook salmon 508 mm and over in length with a yearly bag limit of five over 508 mm.

In 1980 the open stream and season catch quotas were the same as 1979. Additional areas on the Deshka River, Alexander and Lake Creeks were opened in 1980. In 1980 the daily bag and possession limit was two chinook salmon over 508 mm in length, one of which could exceed 711 mm. All streams were opened to fishing from May 24 through July 6 inclusive; in 1980 these fisheries remained open throughout the scheduled season. A summary of 1979-80 catches and angling effort is shown in Table 3.

As in 1979, the fishery was monitored closely on a day-to-day basis for both enforcement purposes and to collect biological data such as angler participation, harvest and age class breakdown of the harvest. A punch card was required for the taking of chinook salmon.

Table 4 shows the percentage of different size groups of chinook salmon harvested in 1979 and 1980 from west side Susitna River streams. The 508 to 711 mm chinook salmon harvested in 1980 are 4-year-old fish which returned from the 1976 brood year and were virtually all males. It should be noted in Table 4 that in 1979 only 14.9% of the harvest was comprised of 508 to 711 mm chinook salmon, while in 1980, 45.8% was in this size group. The first of the large escapements occurred in 1976 and the strong showing of Age IV chinook salmon in the 1980 fishery indicates that the survival of

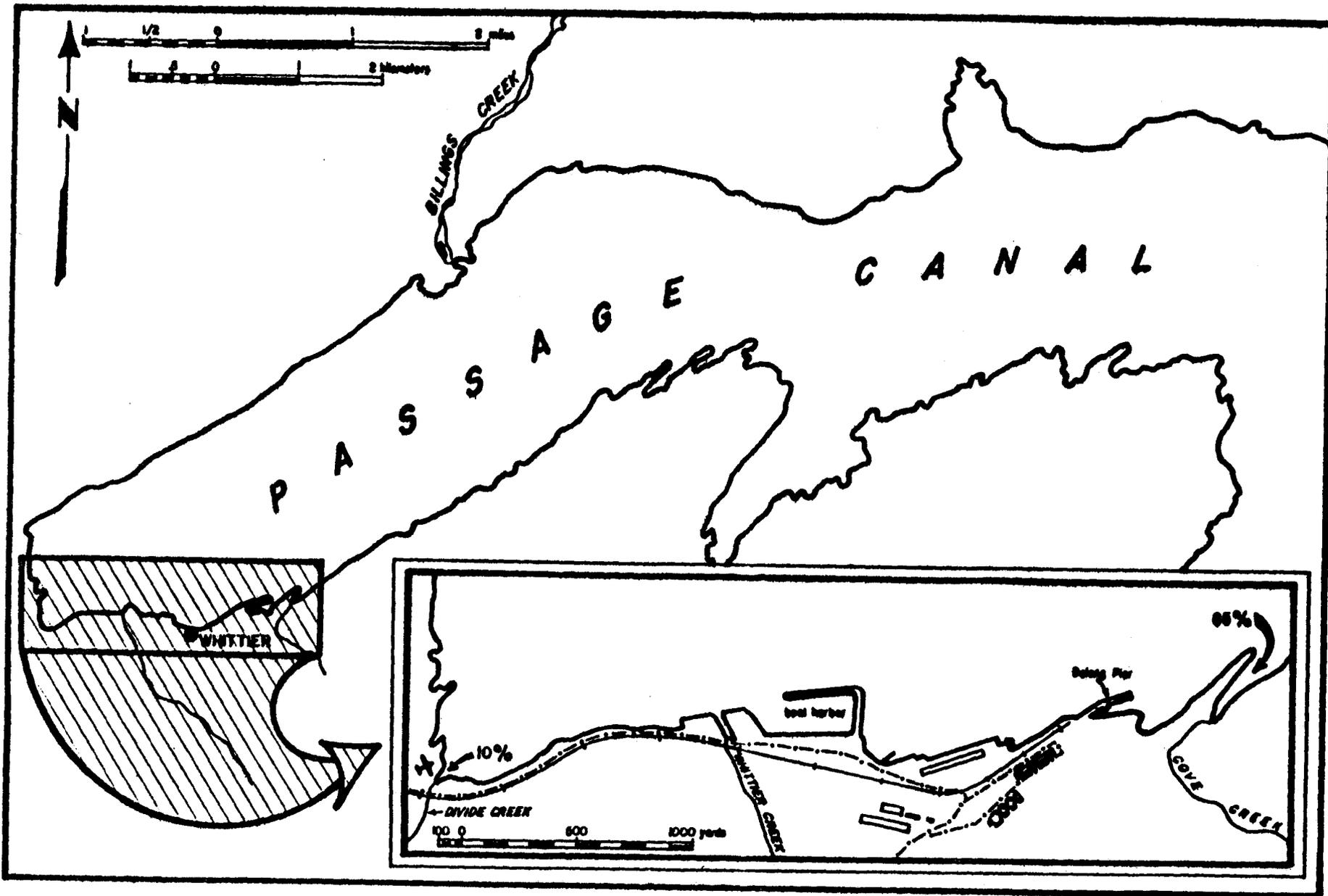


Figure 2. Passage Canal, Whittier area.

Table 2. Whittier Coho Salmon Creel Census Summary, 1979-1980.

	Boat Anglers		Shore Anglers		Total	
	1979	1980	1979	1980	1979	1980
Angler-hours	1,732	4,713	2,796	2,253	4,528	6,966
Angler-days	197	917	986	658	1,183	1,575
Coho harvest	41	1,075	772	716	813	1,791
Coho per Angler-day	0.21	1.17	0.78	1.09	0.69	1.14
Coho per Angler-hour	0.02	0.23	0.28	0.32	0.18	0.26

Mean Coho Weights in Pounds

	Adipose Clipped		Unclipped		Total	
	1979	1980	1979	1980	1979	1980
Males	6.7	9.1	8.2	8.5	7.8	8.6
Females	8.4	9.1	8.3	9.4	8.3	9.3
Total	7.6	9.1	8.3	9.0	8.1*	9.0*

Mean Coho Lengths in Millimeters

	Adipose Clipped		Unclipped		Total	
	1979	1980	1979	1980	1979	1980
Males	558	698	597	681	587	686
Females	617	698	610	673	612	678
Total	589	698	604	676	602**	681**

\* Average Weight

\*\* Average Length

Table 3. Effort and Harvest Data of the Chinook Salmon Sport Fishery on West Side Susitna River Tributaries, 1979-1980.

	Quota	Harvest		Angler-Days		Harvest Per Angler-Day	
		1979	1980	1979	1980	1979	1980
Alexander Creek	2,000	1,277	2,281	2,778	4,411	0.46	0.52
Deshka River	7,000	2,954	4,023	6,451	8,397	0.46	0.48
Lake Creek	<u>2,000</u>	<u>2,045</u>	<u>1,044</u>	<u>3,954</u>	<u>2,237</u>	<u>0.52</u>	<u>0.47</u>
Total	11,000	6,276	7,348	13,183	15,045	0.48	0.49

Table 4. Percentage of Size Group of Chinook Salmon Harvested in West Side Streams 1979-1980.

	1979 Harvest		1980 Harvest	
	20-28 in.	28 in. & over	20-28 in.	28 in. & over
	Percentage			
Caswell Creek	12.4	87.6	39.5	60.5
Alexander Creek	29.8	70.2	54.6	45.4
Lake Creek	<u>13.5</u>	<u>86.5</u>	<u>51.1</u>	<u>48.9</u>
	14.9	85.1	45.8	54.2

offspring from the 1976 escapement was extremely good. In 1981, chinook salmon from the 1976 brood year will be returning as 5-year-olds. If returns of this age group are as strong as this year's Age IV chinook salmon, then west side streams should experience an excellent run of chinook salmon over 711 mm in 1981. In addition to the potentially strong return of 5-year-old chinook salmon, it is expected there will again be a strong showing of Age IV fish returning from the 1977 brood year originally of 101,592, which was the highest recorded in recent times.

Since 1973, when reliable comparisons could be made in the spawning populations, total stock estimates have ranged from 6,100 to 101,592 chinook salmon (Table 5).

Repeated efforts to determine 1980 chinook salmon escapements in Upper Cook Inlet streams met with dismal results. Streams remained at extremely high levels throughout the spawning period as they did during the fishery. The final result was that no escapement estimates were obtained in 1980. The persistent rainfalls resulted in the second wettest summer since recordings were initiated in 1916; more than 8.06 inches of rain fell during the three summer months.

Although escapement counts are not available, it is felt that the 1980 Upper Cook Inlet chinook salmon escapement was equal to the high escapements recorded during the 1976-1979 period. This assumption is primarily based on personal observations by Department personnel monitoring the fishery and on the sport fish harvest in 1980, which were similar to 1979 harvest levels. The harvest increased from 6,276 in 1979 to 7,348 in 1980, while the effort remained nearly the same (Table 3), indicating the 1980 run strength was similar to 1979 levels. This harvest level would not have occurred if the run had been substantially below 1976-79 levels.

#### Deshka River:

The Deshka River has historically been the most important producer of chinook salmon in Upper Cook Inlet. During the 1980 season, 55% (4,023) of the total harvest was from the Deshka River. Chinook salmon were taken the first day of the season, May 24, and the catch rate gradually increased until the fourth week when the peak catches were recorded, thereafter catches gradually declined. Harvest and effort estimates for 1980 by weekly sampling periods from May 24 through July 6 are presented in Table 6. The 1980 catch of 4,023 chinook salmon was considerably higher than the 2,954 caught in 1979.

A sample of 555 sport caught chinook salmon 508 mm and over were measured for size and sex composition. The salmon ranged in length from 539 mm to 1397 mm with an average of 806 mm. Males average 744 mm and females 914 mm. Sex ratio of males to females in the sport fishery was 1.9:1. The 1980 catch was composed predominately of 4-year-old fish (1.2) ranging in length from 539 mm to 711 mm.

Table 5. Upper Cook Inlet-West Side Chinook Salmon Escapement Counts and Population Estimates, 1973-1980.

Year	Observed Counts*	Estimated Counts
1980	**	**
1979	42,216	54,719
1978	47,875	65,811
1977	77,303	101,592
1976	39,435	51,300
1975	7,962	10,000
1974	9,208	11,700
1973	5,454	6,100

\* Includes Anchorage area streams.

\*\* No count available.

Table 6. Deshka River Chinook Salmon Sport Catch and Effort by Week, 1980.

Week	Angler-Days	508-711 mm	Greater than 711 mm	Total	% of <u>1</u> / Total	Cum % of <u>2</u> / Total
5/24-5/30	1,325	188	339	527	13.1	(13.1)
5/31-6/6	1,905	225	463	688	17.1	(30.2)
6/7-6/13	1,214	285	320	605	15.0	(45.2)
6/14-6/20	2,033	442	835	1,277	31.7	(76.9)
6/21-6/27	1,042	246	257	503	12.5	(89.4)
6/28-7/3	626	144	167	311	7.8	(97.2)
7/4-7/6	252	58	54	112	2.8	(100.0)
Total	8,397	1,588	2,435	4,023		
Percent		39%	61%			

1/ Expanded estimate

2/ Cumulative total

A total of 347 chinook salmon carcasses from the Deshka River were also examined for size and sex composition. The sampled fish ranged in length from 465 mm to 1218 mm, with a mean of 926 mm. Males averaged 917 mm and females 943 mm. Five-year-old fish were the predominant age group of the carcass population. Sex ratio of male to females was 1.7:1.

#### Lake Creek:

The first recorded chinook salmon was caught June 7. However, it was not until the fourth week of the season that the catch rates increased enough to indicate Lake Creek was experiencing a strong run (Table 7). Unfortunately, high water conditions persisted through most of the season, and the 1980 harvest of 1,044 was down considerably from the 1979 level of 2,045 (Table 3). The catch rate dropped from 0.52 in 1979 to 0.47 in 1980.

Two hundred sixty five sport caught chinook salmon sampled on Lake Creek varied in size from 520 mm to 1346 mm. Males averaged 763 mm and females 963 mm. Approximately 51% of the sport catch were 4-year-old fish. The male to female sex ratio was 2.8:1.

#### Alexander Creek:

The first recorded chinook salmon was caught May 24, after which the catch rate gradually increased through the third and fourth week of the season (Table 8). The largest number of fish, 760, were recorded taken during the third week, June 7-13. Almost 60% of the chinook salmon taken during this period were comprised of 508 to 711 mm, Age IV fish. Alexander Creek topped all other Upper Cook Inlet streams with 54.6% of the total harvest falling in the 508 to 711 mm range. The 1980 harvest of 2,281 chinook salmon was nearly double that of 1979; the catch rate increased from 0.46 in 1979 to 0.52 in 1980.

Four hundred and forty four chinook salmon sampled from the Alexander Creek recreational fishery measured from 514 mm to 1232 mm in length with a mean of 750 mm. The strongest age group represented in the sport catch was 4-year-old fish. Males averaged 707 mm and females 886 mm. Sex ratio of males to females was 3.5:1.

In general chinook salmon stocks appear to be in a healthy state. While stock levels appear to be currently stable, it should be recognized the balance of the cycle has not yet been completed. The showing of 4-year-old fish in 1980 from the 1976 brood year is only the first successful adult return from the peak years 1976-80. Not until 1982 when adult returns from the high escapement years are evaluated can a trend be established that might indicate Upper Cook Inlet chinook salmon stocks have recovered to their historic levels.

#### Experimental Lake Stocking

Nineteen lakes in the Anchorage management area were experimentally stocked with game fish in 1980. The location of each lake, species and number of fish released is shown in Table 9.

Table 7. Lake Creek Chinook Salmon Sport Catch and Effort by Week, 1980.

Week	Angler-Days	508-711 mm	Greater than 711 mm	Total	% of <u>1</u> / Total	Cum. % of <u>2</u> / Total
5/24-5/30	4	0	0	0	0	(0)
5/31-6/6	161	0	0	0	0	(0)
6/7-6/13	215	3	3	6	0.6	(0.6)
6/14-6/20	784	241	179	420	40.2	(40.8)
6/21-6/27	559	195	169	364	34.9	(75.7)
6/28-7/3	342	61	82	143	13.7	(89.4)
7/4-7/6	172	34	77	111	10.6	(100.0)
Total	2,237	534	510	1,044		
Percent		51%	49%			

1/ Expanded estimate

2/ Cumulative total

Table 8. Alexander Creek Chinook Salmon Sport Catch and Effort by Week, 1980.

Week	Angler-Days	508-711 mm	Greater than 711 mm	Total	% of <u>1/</u> Total	Cum. % of <u>2/</u> Total
5/24-5/30	471	185	168	353	15.5	(15.5)
5/31-6/6	920	201	132	333	14.6	(30.1)
6/7-6/13	1,239	455	305	760	33.3	(63.4)
6/14-6/20	904	166	203	369	16.2	(79.6)
6/21-6/27	473	156	137	293	12.8	(92.4)
6/28-7/3	302	49	67	116	5.1	(97.5)
7/4-7/6	102	33	24	57	2.5	(100.0)
Total	4,411	1,245	1,036	2,281		
Percent		55%	45%			

1/ Expanded estimate

2/ Cumulative total

Table 9. Fish Stocked in Anchorage Area Lakes, 1980.

Lake	Location	Species Stocked	No. Stocked
Sand	Anchorage	RT catchables	5,011
Campbell Point	Anchorage	" "	4,987
Jewel	Anchorage	" "	5,681
Lower Fire	Eagle River	" "	5,011
Mirror	Peters Creek	SS catchables	5,897
DeLong	Anchorage	" "	5,000
C Street	Anchorage	" "	5,014
Cheny	Anchorage	" "	5,014
Beach	Birchwood	" "	4,921
Otter	Ft. Richardson	RT catchables	10,931
Clunie	" "	" "	10,275
Gwen	" "	SS catchables	7,943
Thompson	" "	" "	2,537
Derby Pond	" "	" "	1,018
Hillberg	Elmendorf	" "	7,973
Triangle	Elmendorf	" "	2,348
Six Mile	Elmendorf	" "	5,747
Fish	Elmendorf	" "	2,980
Green	Elmendorf	RT catchables	5,013

Total Stocked:

RT - 46,909

SS - 56,392

RT = Rainbow trout

SS = Coho salmon

## Test Netting

From October 6 through October 10, Thompson, Gwen, Otter and Clunie Lakes were test-netted by Fort Richardson Wildlife personnel to evaluate fish growth since stocking, fall feeding habits, effects of parasites, and to develop sound recommendations for stocking in the spring of 1981.

Lengths and weights of fish populations from the four lakes sampled are summarized in Table 10.

Sampling of the fish population revealed that:

1. Food items have not changed significantly over the years. The primary food of rainbow trout in Otter and Clunie Lakes was Gasterosteus aculeatus (threespine stickleback). Trout in Otter Lake also consumed Physa gyrina Sax., (a snail). Coho salmon at Gwen Lake fed on Gammarus limneaus Smith (an amphipod) and at Thompson Lake, Ishnura (damselfly) nymphs were heavily used by the cohos.
2. The rainbow trout at Otter Lake contained a moderate infestation of a broad (8-10 mm) tapeworm (Cestoid), 40-60 mm long. The rainbows at Clunie Lake were heavily infested with a different Cestoid, 1-2 mm broad and 20-80 mm long. Personal communication with the Alaska Department of Fish and Game (ADF&G) fish pathologist revealed that these Cestoids will stunt fish growth. Also there is no effective method of controlling these pathogens.
3. There was a high overwinter survival rate (1979) of rainbow trout at Otter Lake as evidenced by the larger fish captured in the test nets. These older fish were stocked in 1979.
4. The coho salmon at Gwen Lake were significantly smaller than rainbow trout stocked in previous years. Rainbow trout sampled during October, 1979 average 373 mm as compared to 268 mm for the coho salmon in 1980. Wildlife personnel theorized that the smaller growth rate for the coho salmon may be attributed to a depletion of the freshwater shrimp which seemed to be the predominant food organism of the coho salmon. Rainbow trout, however, in the past supplemented their diet by feeding on surface insects.

## DISCUSSION

The chinook salmon sport fishery was considered a success despite the high stream conditions which persisted throughout the season. Total estimated harvest for the three west side streams was 7,348 chinook salmon in 1980, as compared to 6,276 harvested during 1979.

The F.R.E.D. Division of ADF&G released 50,057 coho salmon smolts in Cove Creek Lagoon on June 30, 1980, to produce an adult return in 1981. Thirty percent of the smolts released were marked with coded wire tags and adipose

Table 10. Test Netting Results, Fort Richardson Lakes, 1980.

Lake	Species	Sample Size	Length (mm)		Weight (grams)	
			Range	Mean	Range	Mean
Otter	Rainbow trout	15	241-508	425	168.2-1886.0	1190.5
Clunie	Rainbow trout	17	211-318	265	92.4-333.3	205.4
Gwen	Coho salmon	54	206-318	268	105.9-352.4	208.4
Thompson	Coho salmon	17	155-259	231	48.5-168.9	129.1

fin clips. Plans call for maintenance of this sport fishery through continued planting of coho salmon smolts. Encouraged by the Department of Fish and Game coho salmon stocking program in the area, Whittier city officials and representatives of the Department have met to discuss the practicablity of starting a fishing derby similar to the one held each year in Seward.

As in previous years, the program for restocking Anchorage area lakes continued. A total of 19 lakes received 56,392 coho salmon and 46,909 rainbow trout in 1980. During 1981, 18 lakes in the local area are scheduled to receive 32,500 coho salmon and 72,500 catchable rainbow trout.

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Prepared by:

Approved by:

Stanley W. Kubik  
Fishery Biologist

Rupert E. Andrews, Director  
Division of Sport Fish

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