STATE OF ALASKA

William A. Egan, Governor

Annual Progress Reports for

SPORT FISH STUDIES

ALASKA DEPARTMENT OF FISH AND GAME

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RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-4 *Name:* Sport Fish Investigations of Alaska.

Study No.: G-II *Study Title:* Sport Fish Studies.

Job No.: G-II-B *Job Title:* Anadromous Fish Population Studies - Upper Cook Inlet Drainage.

Period Covered: July 1, 1971 to June 30, 1972.

ABSTRACT

Creel census data obtained during the 1971 king salmon, Oncorhynchus tshawytscha, punch-card fishery disclosed that 2,000 anglers fished an estimated 16,000 hours to catch 451 king salmon over 508 mm in length, a season success rate of 0.23 fish per angler.

Of the 23,419 king salmon punch cards issued, 44% were voluntarily returned to the Department of Fish and Game. A total of 3,497 anglers indicated they had fished for king salmon.

The 1971 king salmon run appears to be one of the lowest on record.

Creel census data obtained from the Deshka River, Lake and Alexander Creeks disclosed that 296 anglers caught 129 adult silver salmon, O. kisutch, a seasonal rate of success of 0.44 fish per angler.

RECOMMENDATIONS

Retain the present objectives of the studies.

OBJECTIVES

1. To obtain and analyze biological data concerning the distribution, abundance, timing, lengths, weights, age, and sex composition of adult salmon returning to selected freshwater streams of upper Cook Inlet.

2. To determine the sport fish catch of king salmon in selected fresh waters of upper Cook Inlet, and to evaluate trends in angling efforts.

3. To conduct sport fish harvest studies of silver and pink salmon in selected fresh waters of upper Cook Inlet.

4. To provide recommendations for the management of king, silver and pink salmon in the fresh waters of upper Cook Inlet.

TECHNIQUES USED

A creel census was conducted during the king and silver salmon season to accumulate data on angling harvest. The catch per unit of effort was obtained from angler interviews. Lengths, sex composition, and scales from king and silver salmon were obtained by sampling the angler's catch.

Aerial, river boat, and ground surveys were made to observe distribution, numbers, and time of arrival of adult king and silver salmon in upper Cook Inlet streams.

Attempts were made to enumerate adult king and silver salmon in the Deshka River with a Bendix salmon counter.

FINDINGS

A description of the upper Cook Inlet streams and past information collected on this project are presented in Dingell-Johnson project reports by Stefanich (1962) and Kubik (1963 through 1971).

King Salmon

Punch-Card Harvest Data:

Anglers fishing for king salmon, Oncorhynchus tshawytscha, in selected freshwater areas (Deshka River, and Alexander and Lake creeks) were required for the sixth consecutive year to record their catches by streams and dates on king salmon punch cards.

During 1971, there was no area quota on king salmon over 508 mm as previously established during the 1966-70 seasons. The daily bag limit was set at one king salmon per day, and two kings over 508 mm per year.

King salmon under 508 mm in length were considered part of the daily bag limit, which was "ten fish total of salmon under 16 inches long (king salmon under 20 inches), trout, grayling, and char; however, bag may not contain more than two trout, lake trout, or grayling more than 20 inches long."

A total of 23,419 king salmon punch cards were issued to anglers for the entire Cook Inlet area during the 1971 season. After the close of the season 44.2% were voluntarily returned to the Department of Fish and Game. Of the 10,345 punch cards voluntarily returned, 3,497 anglers (33.8%) indicated fishing for king salmon.

Punch cards indicated that an estimated 2,000 anglers fished the Deshka River, Alexander and Lake creeks for a harvest of 451 king salmon over 508 mm in length. For the sixth consecutive year, the most productive stream was the Deshka River with 96% (434) of the total harvest (451) being caught. The annual harvest by stream for 1966 through 1971 is presented in Table 1.

Extrapolation of the punch card data provided an estimated sport fish harvest of 495 king salmon over 508 mm in length for the Deshka River.

A sample of 192 Deshka River sport-caught king salmon over 508 mm in length were measured for size composition. The salmon ranged in length from 508 - 1,178 mm with a mean of 681 mm. Males averaged 798 mm and females averaged 909 mm. Sex ratio of males to females was 0.8:1 (Figure 1).

Age composition of the angler harvested king salmon (192) indicated 56% were five years old; 30% were four years old; and 14% were six-year-old fish.

Escapement:

The 1971 king salmon escapement counts were determined by aerial and ground survey techniques. High water and turbid conditions hindered observations during the peak of spawning, but the data obtained from the sport fish harvest, observations, and subsequent enumeration surveys, indicate the 1971 escapement into the west side Susitna River tributaries was considerably less than the 1970 run.

TABLE 1 Summary of King Salmon Punch Card Harvest for Upper Cook Inlet for the Years 1966 - 1971.

UPPER COOK INLET	1971	1970	1969	1968	1967	1966
King salmon cards issued (entire Cook Inlet)	23,419	16,687	6,688	9,524	5,977	8,853
King salmon cards returned (entire Cook Inlet)	44%	75%	70%	70%	82%	77%
Punch card catch (over 508 mm)	451	871	339	398	315	263
Punch card catch (under 508 mm)	*	262	81	416	167	163
STREAM BREAKDOWN (KS over 508 mm)						
Deshka River	434	579	310	324	234	205
Alexander Creek	15	286	21	71	20	28
Lake Creek	2	1	8	3	60	26
Chunilna Creek	**	5	---	---	1	4
Avg. length-kings (both sexes - mm)	861	803	673	742	752	724
Avg. length - females (mm)	909	894	881	869	922	864
Avg. length - males (mm)	798	734	622	658	698	671
% kings between 508 - 635 mm	18% (192)	25% (591)	54% (249)	39% (278)	33% (186)	52% (122)
% kings under 508 mm	*	23% (1,133)	19% (420)	51% (814)	34% (482)	38% (426)

*Punch cards did not request jack salmon data.
**Not included in 1971 season.

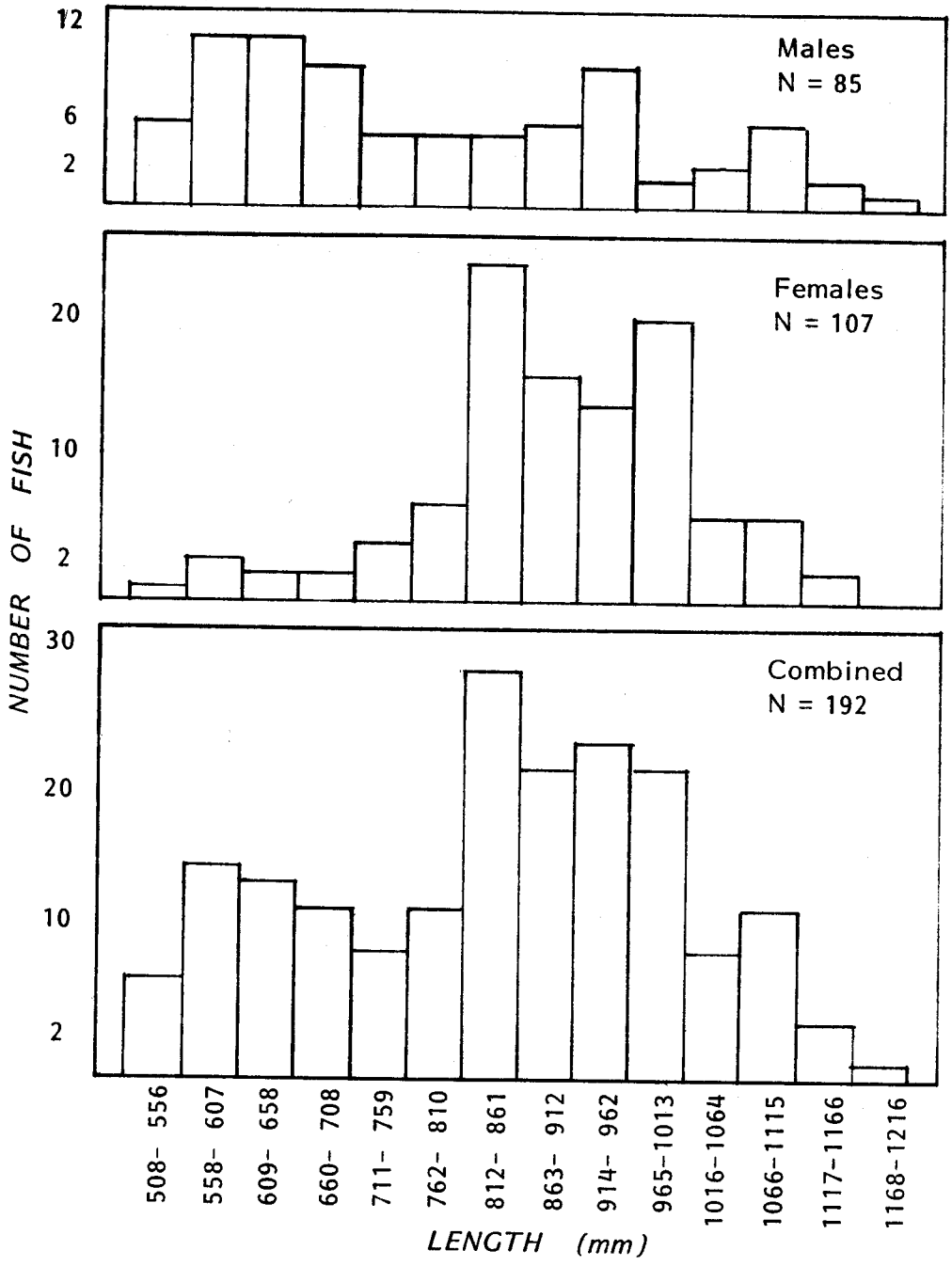


FIGURE 1 LENGTH FREQUENCIES OF SPORT-CAUGHT KING SALMON 508 MM AND OVER, DESHKA RIVER, 1971.

Escapement counts during 1971 were limited to the East Fork of the Deshka River and two tributaries to Lake Creek. The counts obtained (Table 2) are minimal and due to the limited coverage of the spawning population in the Deshka River and Lake Creek, the 1971 counts are not comparable to previous year's estimates.

Enumeration of salmon in the Susitna River drainage is confined to the clear water tributaries. The magnitude of the king salmon run into upper Cook Inlet cannot be evaluated because the salmon cannot be detected visually in the many turbid glacial streams. Salmon utilization of glacial waters for purposes other than migration has not been determined. Total escapement counts are not practical on these large streams, so index areas comprising only a fraction of the spawning area, provide only relative escapement value information. Clear streams are counted annually. Surveys are made during late July and August when the streams are low and clear and the salmon are on the spawning grounds.

In the past, attempts were made to obtain total counts of king and silver salmon, O. kisutch, in the Deshka River by means of a counting weir and sonar counter, but these attempts were unsuccessful because of high water and malfunction of the electronic counter.

The two survey methods most commonly used to obtain escapement estimates are ground and aerial counts. Sometimes the use of these two methods is limited because of visual restrictions due to poor weather conditions, turbid water and areas inaccessible to observers. There is also considerable variation between aerial and float survey counts in the same stream. Aerial surveys are a fast and economical means of covering a large number of streams in a short period of time; float or ground surveys are more reliable on streams that offer poor visibility from the air.

In addition to the west side Susitna streams, Ship and Campbell creeks, located in the Anchorage area, were surveyed. A ground survey made on August 5 revealed 102 king salmon in Campbell Creek and a total of 221 kings in Ship Creek. Additional information on Ship Creek is presented in Volume 13, Job G-II-D.

Commercial Fishery:

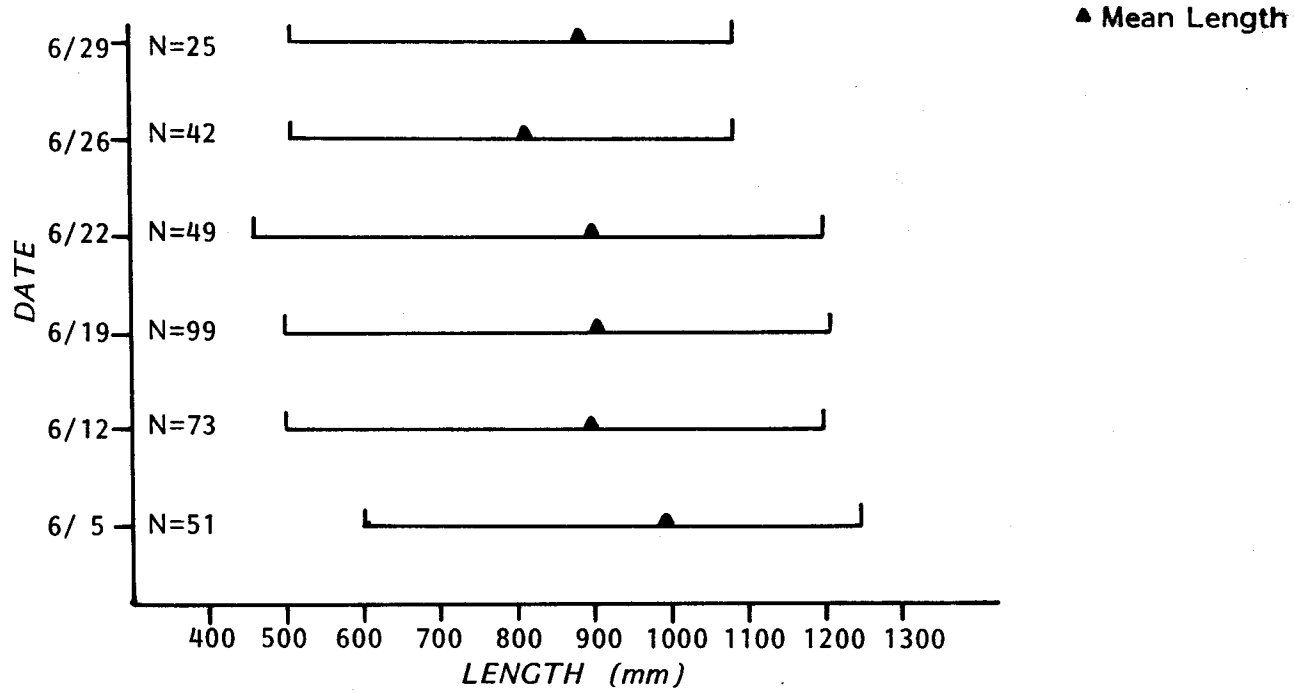
The Cook Inlet commercial king salmon harvest totaled 19,806 of which 9,598 (48.5%) were taken in the northern district. Salmon harvested from the northern area are bound for upper Cook Inlet tributaries and the Susitna River drainage.

Lengths and scales were obtained from 339 commercially caught king salmon at a local cannery. The sampled fish ranged in length from 457 - 1,237 mm with a mean of 900 mm. Average lengths of fish from fishing period to fishing period were analyzed. No significant differences appeared in the samples (Figure 2).

TABLE 2 King Salmon Escapement Counts for Upper Cook Inlet Streams, 1964 - 1971.

Stream	1971	1970	1969	1968	1967	1966	1965	1964
Deshka River	161*	5,286	5,652	4,863	2,500	2,000	2,749	2,422
Alexander Creek	**	562	735	727	500	300	400	205
Lake Creek	119***	189***	1,540	1,300	1,000	300	172	290
Ship Creek	221	1,746	710	500	200	50	207	94
Campbell Creek	102	63	**	125	300	15	119	116
S. F. Eagle River	**	81	**	28	50	49	159	123

*Count made on East Fork, Deshka River only.
**No count available.
***Count made on Sunflower and Camp creeks, tributaries to Lake Creek.



Age composition determined by scale analysis and length frequencies, indicates the sample (339) consisted of 56% 5-year (1.3) old fish; 27% six-year (1.4); 14% four-year (1.2); and 3% three-year (1.1) old fish.

FIGURE 2 LENGTH RANGE OF KING SALMON SALMON IN THE COOK INLET COMMERCIAL CATCH BY FISHING PERIOD, 1971.

Sonar Counter:

A sonar counter manufactured by the Bendix Corporation was installed in the Deshka River on June 3, 1971, to enumerate spawning populations of king and silver salmon. Results of the field operations were very disappointing with no useful data obtained.

Within the first week of operation there was considerable variation in counting accuracy. One of the factors considered a possible cause of the variation was lack of adequate water over the transducers. Remedial measures were taken and those transducers in less than three feet of water were disconnected so as to eliminate any further "false counts." Within 24 hours after the shallow end transducers were "pulled," considerable variations occurred between the cumulative total on the counter and the storage printer (tape). False counts were accelerated and large numbers of false counts were recorded. Factors attributable may have been:

1. Defective transducers causing continuous or intermittent (clicking) false counts.

2. Debris trapped above transducers, which create the same effect.

3. The array resting on a log, rock or other objects which cause the array to undulate, thus causing "false counts."

On August 11, flood damage to the electronics portion of the salmon counter made the counter inoperable and the program was discontinued.

Silver Salmon

Silver salmon in Upper Cook Inlet tend to have much stronger runs during even years. The 1971 sport fish harvest on the west side of the Susitna River was considered poor as a result of low cycle year abundance. During even years, there is also a high commercial fishing effort on silver salmon.

Creel census was confined to three streams on the west side: Deshka River, Lake and Alexander creeks. Information received disclosed that 296 anglers contacted fished 1,159 hours to catch 129 silver salmon, for a seasonal rate of success of 0.11 fish per hour. Harvest data for these streams is presented in Table 3.

The age compositon of Upper Cook Inlet adult silver salmon is composed of three- (1.1) and four-year-old (2.1) fish.

Ninety-nine silver salmon measured ranged from 457 - 660 mm, with a mean of 569 mm.

TABLE 3 Silver Salmon Sport Fish Harvest for Three West Side Susitna Streams, 1971.

Streams	Tot. Anglers	Angler Hrs.	Tot. SS	Fish/ Angler	Fish/ Angler Hr.
Alexander Creek	41	158	21	0.51	0.13
Deshka River	205	767	68	0.33	0.09
Lake Creek	50	234	40	0.80	0.17
Totals	296	1,159	129	0.44	0.11

Escapement:

Due to high water conditions during 1971, no reliable estimates were made on silver salmon populations on the west side Susitna River streams.

Pink Salmon

Pink salmon, O. gorbuscha, are more abundant during even numbered years in Cook Inlet. They are relatively unimportant in the sport fishery but are caught incidentally while the angler is fishing for silver salmon.

A total of 41 pink salmon were creel checked on the three west side streams: 3 - Deshka River; 19 - Alexander Creek; 19 - Lake Creek.

Pink salmon caught averaged 495 mm in length with a range from 408 - 584 mm.

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