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STATE OF ALASKA

Walter J. Hickel, Governor

ANNUAL REPORT OF PROGRESS, 1966 - 1967

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-8

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME
Urban C. Nelson, Commissioner

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INTRODUCTION

This report of progress consists of findings and work accomplished under the State of Alaska Federal Aid In Fish Restoration Project F-5-R-8, "Sport Fish Investigations of Alaska."

The project during this report period is composed of 20 separate studies. Some are specific to certain areas, species or fisheries, while others deal with a common need for information. Each job has been developed to meet the needs of various aspects of the State's recreational fishery resource. Seven jobs are designed to pursue the cataloging and inventory of the numerous State waters. These are divided into logical utilization areas and are jobs of a continuing nature. It will be many years before an index of the potential recreational fishing waters is completed. Six jobs are directed toward specific sport fish studies. These include special efforts toward the anadromous Dolly Varden of Southeastern Alaska, silver salmon in Resurrection Bay, king salmon stocks on the lower Kenai Peninsula, king and other salmon stocks in Upper Cook Inlet, and Arctic grayling and sheefish in Interior Alaska. Special reports have been prepared on specific phases of the Dolly Varden life history and appear in the Department's special "Research Report" series.

The Statewide access evaluation remains one of the most important jobs conducted under this Federal Aid Program. It provides the Department with a tool to recommend withdrawal of suitable access sites on potential recreational fisheries throughout the State.

The remaining jobs include creel census efforts on specific fisheries in high use areas of the State, an egg-take program directed toward locating suitable indigenous stocks, perfecting advanced techniques in taking, handling and rearing species that are not normally associated with standard fish cultural practices, and continuation of the evaluation of the Fire Lake System.

The material contained in this report is often fragmentary in nature. The findings, evaluations and interpretations contained herein are subject to re-evaluation as the work progresses and additional data are collected.

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.

Project No: F-5-R-8 Title: Egg Take Investigation in Cook Inlet
Drainage and Prince William Sound.

Job No: 7-F

Period Covered: July 1, 1966 to June 30, 1967.

ABSTRACT

The Swanson River on the Kenai National Moose Range was again investigated as an experimental silver salmon egg take source. A total of 553 silver salmon Oncorhynchus kisutch, was enumerated at a temporary weir that operated from August 26 through October 20. An estimated 492,000 eggs were collected from 132 females. Information is presented on sex composition, distribution and timing of silver salmon migrations in the upper Swanson River drainage.

RECOMMENDATIONS

It is recommended that other streams on the Kenai Peninsula without existing sport fisheries be investigated for possible sources of silver salmon eggs.

It is recommended that an egg take again be conducted at the Swanson River to evaluate the effect of the 1963 egg take on returning adults.

OBJECTIVES

To locate economical and readily accessible sources for procuring salmonoid eggs from Cook Inlet and Prince William Sound drainages.

To assess potential egg take stocks for the following characteristics:

- a. A race with a lake rearing background in the life cycle since a majority of the stocking, whether for a resident (land-locked) or anadromous purpose, will utilize lake rearing.
- b. Racial characteristics of rapid growth, good condition factor and sporting qualities.
- c. Fish from waters of a type common throughout large portions of the State are also advisable to broaden the field of potential use.

TECHNIQUES

A temporary weir was erected across the Swanson River approximately 20 miles upstream from Cook Inlet. The barrier consisted of a picket fence held in place by six tripods. The tripods of 4-inch square timbers were assembled with bolts and weighted in place with rocks. The pickets were 5 feet long and made of 1 x 2-inch lumber space 1-1/8 inches apart. The picket sections were fastened to the upstream face of the tripods by 2 x 4-inch stringers. A 3 x 3 x 8-foot trap with a manually operated sliding gate was located in the center of the weir. Three 4 x 4 x 8-foot holding pens were placed in the stream adjacent to the trapping installation. A detailed description of the pens has been presented by Engel (1964).

The procedure for taking eggs was as follows: The dorsal artery of the female was severed to permit bleeding, eggs were removed by incision and fertilized by the standard dry method, one male was used for each female. Fertilized eggs were water hardened about one hour in five-gallon cans before shipment to the Fire Lake Hatchery.

FINDINGS

The Swanson River weir was operational on August 26 and was maintained daily until dismantled on October 20 because of icing conditions. The first silver salmon was counted through on August 29 and the last on October 17. Observation of upstream spawning areas indicated that the run was in progress prior to weir installation.

The total count at the weir was 553 silver salmon, of which 14 were precocious "jack" males. The migration cannot be compared to the parent year because the weir operated only 34 days in 1962. However, the 1966 run was appreciably smaller than all escapements since 1963 (Table 1).

TABLE 1 - Swanson River Silver Salmon Weir Counts by Sex, 1962-1966

<u>Year</u>	<u>Total</u>	<u>Males</u>	<u>Females</u>	<u>Period of Weir Operation</u>
1962	239	74	165	9/22 to 10/25
1963	1,198	570	628	8/29 to 10/27
1964	1,185*	470	587	8/21 to 10/18
1965	2,043	1,022	1,021	8/19 to 10/12**
1966	553	264	289	8/26 to 10/20

* Total includes 128 unsexed fish.

** The stream exceeded the height of the weir on 9/19 and remained at that level until the structure was removed.

The major upstream migration occurred from September 12 through September 18 at which time 64 percent of the run was enumerated. The daily weir count and disposition of the catch are shown in Table 2.

The sex ratio, as determined by external features, was 1 male to 1.1 females. This was consistent with past male to female ratios which have ranged from 1:1.0 to 1:1.2. These data may not be indicative of the entire spawning population because the early portion of the run has never been enumerated and males have shown a slight tendency to arrive earlier.

Nearly all females were held at the site for two to three weeks before they ripened. Early arrivals generally required the greatest holding time. The 2.6 percent holding loss was well below those of past years which have ranged from 5.9 to 27.0 percent.

An estimated 492,000 eggs were obtained from 132 females between October 2 and October 20. Average fecundity was 3,727. Table 3 summarizes fecundities for past Swanson River egg takes.

Fork lengths of spawned females ranged from 55.0 to 69.0 cm with a mean of 62.9 cm. This size structure is comparable to 1964 and 1965 when females averaged 62.4 and 61.6 cm, respectively. The length-frequency distributions for past years are presented in Figure 1.

Water temperatures at the weir ranged from 56° to 33°F. The stream began to freeze over on October 20. Thermal patterns from 1963 through 1966 and the dates of the first spawn-take are graphed in Figure 2. Spawning has commenced at temperatures ranging from 49° to 41°F, and has usually continued until freeze-up.

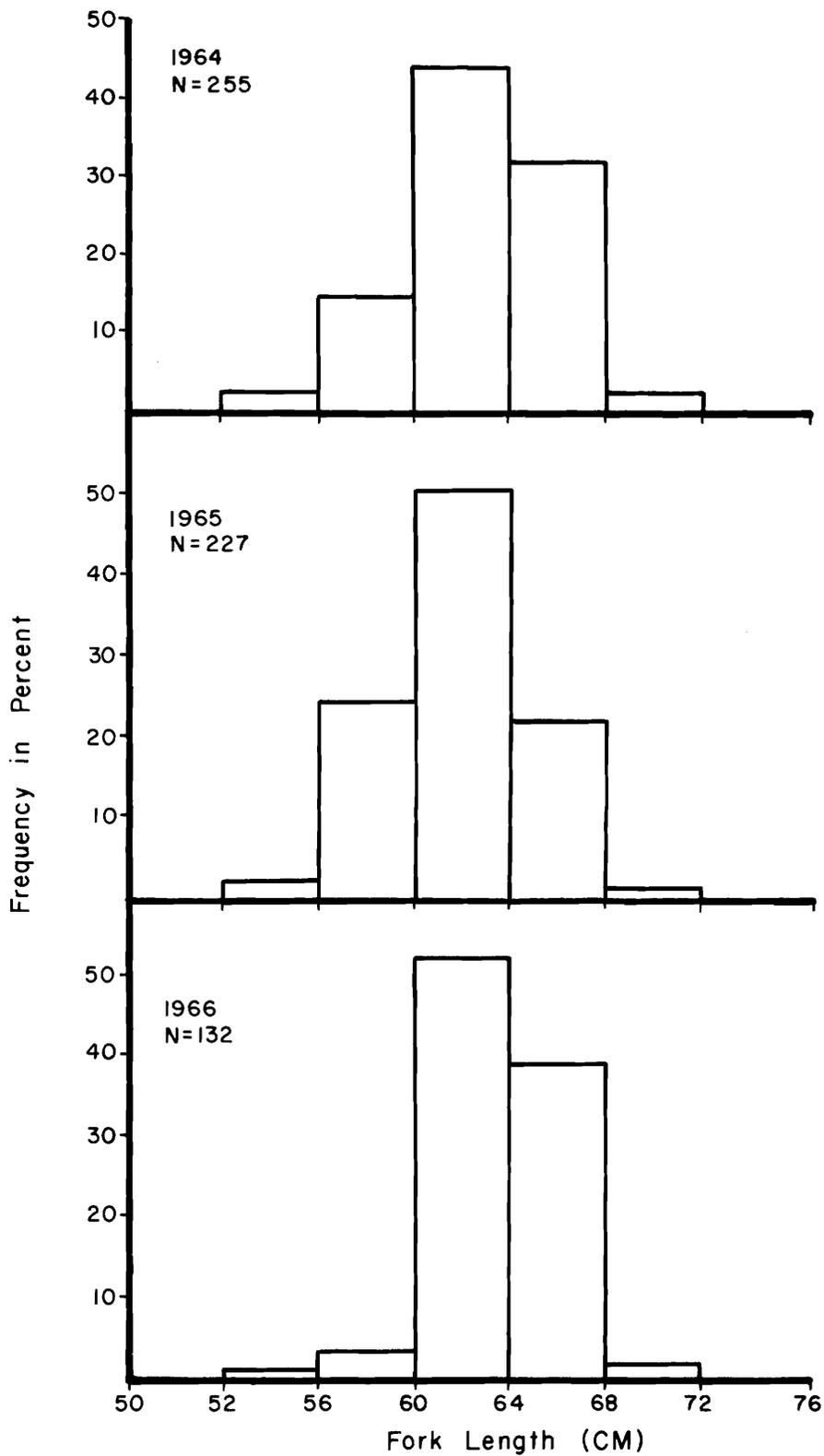


Figure 1. Length Frequencies of Female Silver Salmon Spawned at the Swanson River, 1964-1966.

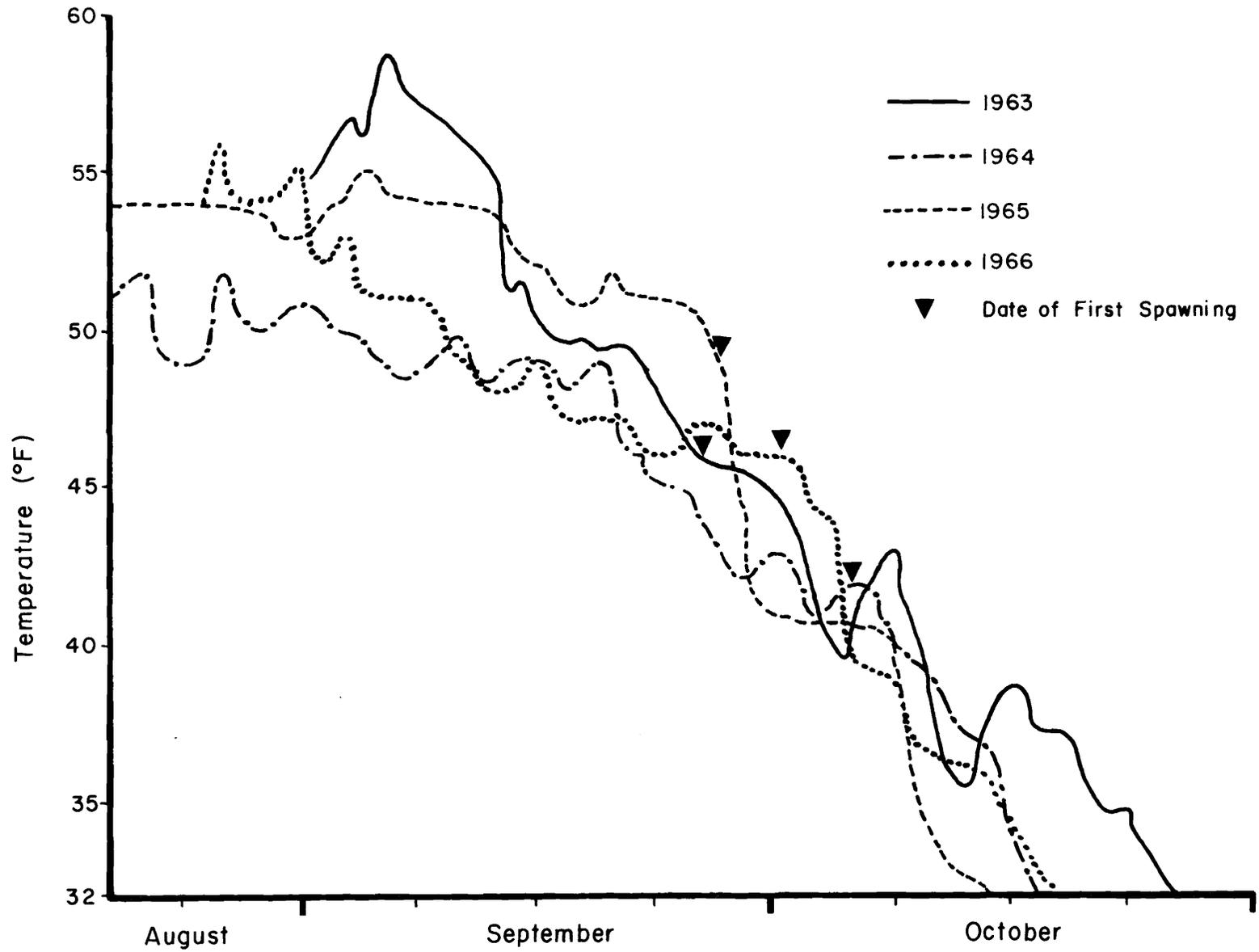


Figure 2. Daily Water Temperatures at the Swanson River Weir and Dates of First Spawn Take, 1963-1966.

TABLE 2 - Daily Disposition of Silver Salmon Captured at the Swanson River Weir, 1966

Date	Daily Weir Catch	Released Above Weir		Hold for Spawn	
		Male	Female	Males	Females
Aug. 26 - 28	-0-	-0-	-0-	-0-	-0-
29	2	1	1	-0-	-0-
30	2	-0-	2	-0-	-0-
31	7	1	6	-0-	-0-
Sept. 1	3	-0-	3	-0-	-0-
2	73	39	34	-0-	-0-
3	4	4	-0-	-0-	-0-
4	-0-	-0-	-0-	-0-	-0-
5	20	11	9	-0-	-0-
6 - 8	-0-	-0-	-0-	-0-	-0-
9	5	3	-0-	-0-	2
10	-0-	-0-	-0-	-0-	-0-
11	4	4	-0-	-0-	-0-
12	23	14	1	-0-	8
13	181	76	40	-0-	65
14	79	43	18	-0-	18
15	46	25	8	-0-	13
16	5	1	1	-0-	3
17	4	2	2	-0-	-0-
18	18	8	5	1	4
19 - 20	-0-	-0-	-0-	-0-	-0-
21	34	4	11	9	10
22	27	2	9	7	9
23	13	6	2	2	3
24	-0-	-0-	-0-	-0-	-0-
25	2	-0-	1	-0-	1
26 - Oct. 16	-0-	-0-	-0-	-0-	-0-
17	1	-0-	-0-	1	-0-
18 - 20	-0-	-0-	-0-	-0-	-0-
TOTAL	553	244	153	20	136

TABLE 3 - Average Fecundities of Silver Salmon, Swanson River Weir, 1962-66

Year	Females Spawned	Estimated Eggs Taken	Average Fecundities*
1962	97	305,900	3,154
1963	308	970,000	3,149
1964	255	812,300	3,186
1965	227	913,330	4,023
1966	132	492,000	3,727

* Determined by dividing the number of eggs taken by the number of females spawned.

To establish index areas that reflect the abundance of silver salmon in the upper Swanson River watershed, foot surveys were conducted on Airport and Canoe Creeks. Both tributaries lie above the weir and have been briefly described by Engel (1964).

Surveys on Airport Creek resulted in a high count of only 46 silver salmon. Surveys in 1964 and 1965 revealed peak counts of 279 and 200 fish, respectively. Lawler (1962) reported that a minimum of 100 fish utilized the stream during the fall of 1962. Early spawning activity suggests that the bulk of this run passes upstream prior to erection of the Swanson River weir. Spawning fish are generally present by mid-September, but have been observed as early as September 6.

Canoe Creek, which drains a chain of lakes before entering the Swanson River, had an escapement of approximately 200 silver salmon. A few fish were observed still ripening in the lakes during the surveys. A 1964 weir count of 1,185 silver salmon resulted in a high count of 416 spawners in this tributary. The 1966 weir total of 553 fish produced a proportional decrease in Canoe Creek spawners. Stream counts were not obtained in 1965 because of turbid water conditions.

LITERATURE CITED

Engel, Larry J. 1964. Egg Take Investigations in Cook Inlet Drainage and Prince William Sound. Alaska Department of Fish and Game, Annual Report of Progress, 1964-65, Vol. 6, pp. 155-163.

Lawler, Robert E. 1962. Silver Salmon Egg Taking Investigations in Cook Inlet Drainage. Alaska Department of Fish and Game, Annual Report of Progress, 1962-1963, Vol. 4, pp. 163-173.

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