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STATE OF ALASKA

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ANNUAL REPORT OF PROGRESS, 1960-1961

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-2

SPORT FISH INVESTIGATIONS OF ALASKA

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Introduction

This report of progress consists of the Job Completion Reports from the State of Alaska's Federal Aid in Fish Restoration Project F-5-R-2, "Sport Fish Investigations of Alaska".

The current Project is composed of eighteen separate studies and were designed to evaluate the various aspects of the State's recreational fisheries resources. The information gathered will provide the necessary background data for the development of future programs. During the current segment continued emphasis was placed on overall inventorying of accessible waters and the evaluation of general catch data.

Several problems of immediate concern appeared sufficiently defined to warrant independent studies. As a result, two independent creel censuses, one experimental silver salmon egg take and a Resurrection Bay area silver salmon population study were instigated. Data accumulated from prior jobs dealing with the Arctic grayling has resulted in the formulation of three separate investigations during the current segment.

The rapid expansion of Alaska's population is being reflected in the ever increasing numbers of "No Trespassing" signs encountered in the vicinity of population centers. Fortunately, much of Alaska's fishing waters are still in the public domain. An aggressive program of acquiring access to fishing waters, instigated in 1959, was continued during the present segment. Increased emphasis is being placed on this job and the successful continuation of this activity, now and in the immediate future, will forestall many of the serious recreational use problems currently facing other states.

The enclosed progress reports are fragmentary in many respects and the interpretations contained therein are subject to re-evaluation as the work progresses.

Volume 2 Report No. 3-C

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960 - 1961 SEGMENT

State: ALASKA

Project No.: F-5-R-2 Name: Sport Fish Investigations of Alaska

Job No.: 3-C Title: Investigation of the Tanana River Grayling Fisheries:

Creel Census - Chatanika and Delta Clearwater

Period Covered: July 1, 1960 to May 1, 1961

Abstract:

A random creel census was established on the Chatanika and Delta Clearwater Rivers during the field season of 1960.

On the Chatanika River there was one 12-hour coverage per week day and one 24-hour coverage per weekend. For the Delta Clearwater the week day coverage remained the same as the Chatanika but the weekends had two 12-hour periods. The Fourth of July and Memorial Day had a 24-hour check in both areas.

Using a standard statistical method the confidence interval at the 95% level was calculated from the creel census data for each river. A range of 1,389 to 1,611 fishermen used the Delta Clearwater River during the 1960 census. These anglers took an estimated 431 to 499 grayling during this period. The catch per unit effort on this stream was .31.

The Chatanika River utilization rate ranged from 2,004 to 3,197 fishermen. With a catch per unit effort of 1.22, these anglers took an estimated 2,445 to 3,900 grayling during the census period.

Early creel census estimates by Fish and Wildlife Service crews for the Chatanika and Delta Clearwater Rivers show the same general trends as established in 1960. The higher figure

for the Chatanika is a direct result of better coverage.

Fishing pressure declined to almost zero after August 20th which is the first day of the moose season for the Fairbanks area.

Objectives:

To determine utilization rates on the grayling fishery in the Chatanika and Delta Clearwater Rivers so that a sound management program can be established for the Tanana River watershed.

Introduction:

Utilization rates upon a fishery are vital data which must be obtained and analyzed correctly before a sound management program can be attempted. To collect this type of data, investigators normally turn to the creel census method. Past attempts at creel censusing frequently left much to be desired when the final data was tabulated. Incomplete coverage during the creel census periods was the basic reason why the data was not reliable. Within recent years, various sound statistical designs for the creel census problem have been developed.

A random creel census was conducted during the field season of 1960 on the Chatanika and Delta Clearwater Rivers. The census on the Chatanika River was a joint effort on the part of the Alaska Department of Fish and Game and the Branch of the Commercial Fisheries, River Basins, of the Fish and Wildlife Service. For River Basins, this 1960 census was a continuation of their 1959 program.

Chatanika River:

The Chatanika River is classified as a rapid run-off type very common to the Interior of Alaska. It is located approximately 30 miles northwest of Fairbanks. The Steese Highway parallels about 40 miles of the river and has opened up many access areas for the fishing public. The grayling fishery in the Chatanika is modest, but it receives a relatively heavy fishing effort from Fairbanks residents and the tourists driving to Circle City. Not only was it advantageous to continue the

creel census program for additional information on utilization but better tag returns from anglers was anticipated while the census was in operation.

Delta Clearwater River:

One hundred and ten miles southwest of Fairbanks is the Delta Clearwater River. It is a rather small (16 miles) spring fed tributary of the Tanana River with an excellent grayling fishery. In terms of aquatic insect life present, it can be considered outstanding.

A public campground, located halfway between the mouth and the forks on the Delta Clearwater, attracts many tourists during the summer months. Nearby Fort Greely personnel sometimes use the river for their recreational trips. The fishery itself is not available to the general public since a river boat is necessary to assure a successful trip. The creel census crews contacted all river boat operators returning from their trips and the general public fishing at, or near the campground. These contacts not only produced an excellent coverage for the creel census but helped increase the number of tag returns.

Materials and Methods:

At both creel census sites, the data was punched by the field crews onto IBM Port-O-Punch cards. Attempts were made to obtain as many completed angler trips as possible.

A trailer was permanently stationed at the Delta Clearwater campground during the summer. With the field crew operating from this campground, the coverage on the census days was complete.

The Fish and Wildlife Service creel census trailer on the Chatanika River was located at Milepost 29 on the Steese Highway. Warning signs were placed on the highway which forewarned the driver that a creel census was in operation. Since all traffic moving into the Fairbanks area must pass this location, the coverage on the Chatanika was also very complete.

Creel census coverage on the Chatanika and the Clearwater differed slightly; one 12-hour period during the week days and a 24-hour period on one week-end day for the Chatanika census, while the Delta Clearwater had a 12-hour coverage on both weekend days

plus the 12-hour week day period.

Originally, the census was set up to run for a fifteen week period on both rivers. However, the racial collections and tagging duties of the crews caused this period to be reduced to thirteen weeks for the Delta Clearwater. Near the close of the field season, the lack of fishing pressure on the Delta Clearwater, resulting from the opening of the moose season, was weighed against the need for a concentrated tagging effort; it was decided to discontinue the census in this area. The Chatanika census ran the complete fifteen week period, May 25 to September 4.

Creel Census Results

The data collected during the 1960 creel census from the Chatanika and Delta Clearwater rivers was subjected to the following analysis to establish the maximum and minimum range of utilization at the 95% confidence level:

Step A. Calculation of the variance (s^2) and the standard deviation (s) as explained in Simpson, Roe and Lewontin (1960) from the following formula:

$$s^2 = \frac{\Sigma fx^2 - \frac{[\Sigma fx]^2}{N}}{N - 1}$$

Where:

x = Value of the variate for that class
f = Frequency of a given class
N = Number of observations

The standard deviation is the positive square root of the variance, thus:

$$s = \sqrt{s^2}$$

Step B. Calculation of Standard error $s_{\bar{x}}$ where

$$s_{\bar{x}} = \frac{s}{\sqrt{N}}$$

Step C. Using the above information to establish the confidence level at the 95% level in this case, where the confidence limits are established by:

$$\bar{x} \pm ts_{\bar{x}}$$

The X has already been determined in Step A and $s_{\bar{x}}$ in Step B. The t represents the value of t taken from a standard t- table for n degrees of freedom at the desired confidence level; in this case 95%.

Step D. Take the confidence interval for the creel census data and multiply it times the total number of possible fishing hours during the 1960 creel census coverage. This will establish the 95% confidence range of fishermen utilization.

Example: (taken from Table 1)

Chatanika River Weekday $\overline{X}$ = .55 or .55 $\pm$ .24

High	.79 x 1968	= 1554
Mean	.55 x 1968	= 1082
Low	.31 x 1968	= 610

Step E. Take the two estmmates of the catch per unit effort determined from the creel census and calculate the catch range.

Example: (from the Table 1 totals)

High	1.22 x 3197	= 3,900
Mean	1.22 x 2600	= 3,172
Low	1.22 x 2004	= 2,445

Week day data analyzed by the outlined steps established a confidence interval at the 95% level as .55$\pm$.24 for the Chatanika River. Likewise, the weekend information broke down into an interval of 1.71 $\pm$ .14. Using these confidence intervals a range of fisherman utilization for the Chatanika grayling fishery during the summer of 1960 was calculated (Table 1). The catch per unit effort was used to determine the estimated catch range (Table 1). The Delta Clearwater week end interval data was 1.57 $\pm$ .02 and the week day interval .23 $\pm$ .06 (Table 2). The catch per unit of effort on the Delta Clearwater, .31, was used to establish the estimated catch range.

In general, the creel census results on these two rivers follow the pattern established by Fish and Wildlife Service workers during the period from 1953 - 1957 (Warner, 1958). The increase shown in the 1960 Chatanika census can be contributed to better field coverage (Table 3).

As previously mentioned, the Chatanika River has many access points along the Steese Highway which results in a higher utilization by the fishing public and, a higher catch ratio as compared to the Delta Clearwater. With approximately 90% of the fishermen forced to fish the relatively small section of the Delta Clearwater River around the campground, the low catch per unit of effort is certainly realistic.

The creel census crew also performed all the fish tagging during the field season of 1960 on the Delta Clearwater. It is interesting to note here, that this crew handled 2,360 grayling for the tagging study; all these fish were taken by "hook and line" with an average catch per unit of effort of 4.1 fish per hour. The grayling fishery in the Delta Clearwater is excellent, but the general public does not utilize it!

Figures 1 and 2 show the weekly fishing pressure for the Chatanika and Delta Clearwater rivers as based upon the creel census data. The two major peaks in the fishing pressure resulted from the Memorial Day and Fourth of July holidays. The rapid drop in mid-August is directly associated with the moose season which opens on August 20th. Little or no fishing takes place in the Tanana River drainage after that date.

Recommendations:

Discontinue the creel census phase of the Arctic Grayling Investigations until a basic need for further data can be justified.

Raise to 15 the present 10 per day bag limit for grayling in the Tanana River watershed.

Bibliography:

Simpson, G. G., Roe, A. and R. C. Lewontin (1960) Quantitative Zoology Revised Edition. Harcourt, Bruce and Company. Burlingame 1-440.

Warner, George (1958) Federal Aid Job Completion Reports, Vol. 7, Report No. 2, Game Fish Investigations -- Grayling Creel Census - Fairbanks Area, pp. 1-6.

Table 1. Creel Census Results for the Chatanika River Showing the Range in Catch and Fishermen Utilization.

	Week-days	Week-ends	Totals	Estimated Catch
High	1,554	1,643	3,197	3,900
Mean	1,082	1,518	2,600	3,172
Low	610	1,394	2,004	2,445

Table 2. Creel Census Results for the Delta Clearwater River Showing the Range in Catch and Fishermen Utilization.

	Week-days	Week-ends	Totals	Estimated Catch
High	446	1,145	1,611	499
Mean	369	1,130	1,500	465
Low	273	1,116	1,389	431

Table 3. Creel Census Resluts on the Chatanika and Delta Clearwater Rivers as Based upon Fish and Wildlife Reports and the 1960 Activity.

Year	Delta Clearwater Catch/Hour	Chatanika River Catch/Hour
1953	.29	.49
1954	.46	.78
1955	.73	.13
1956	.31	.27
1957	.41	.18
1960	.31	1.22

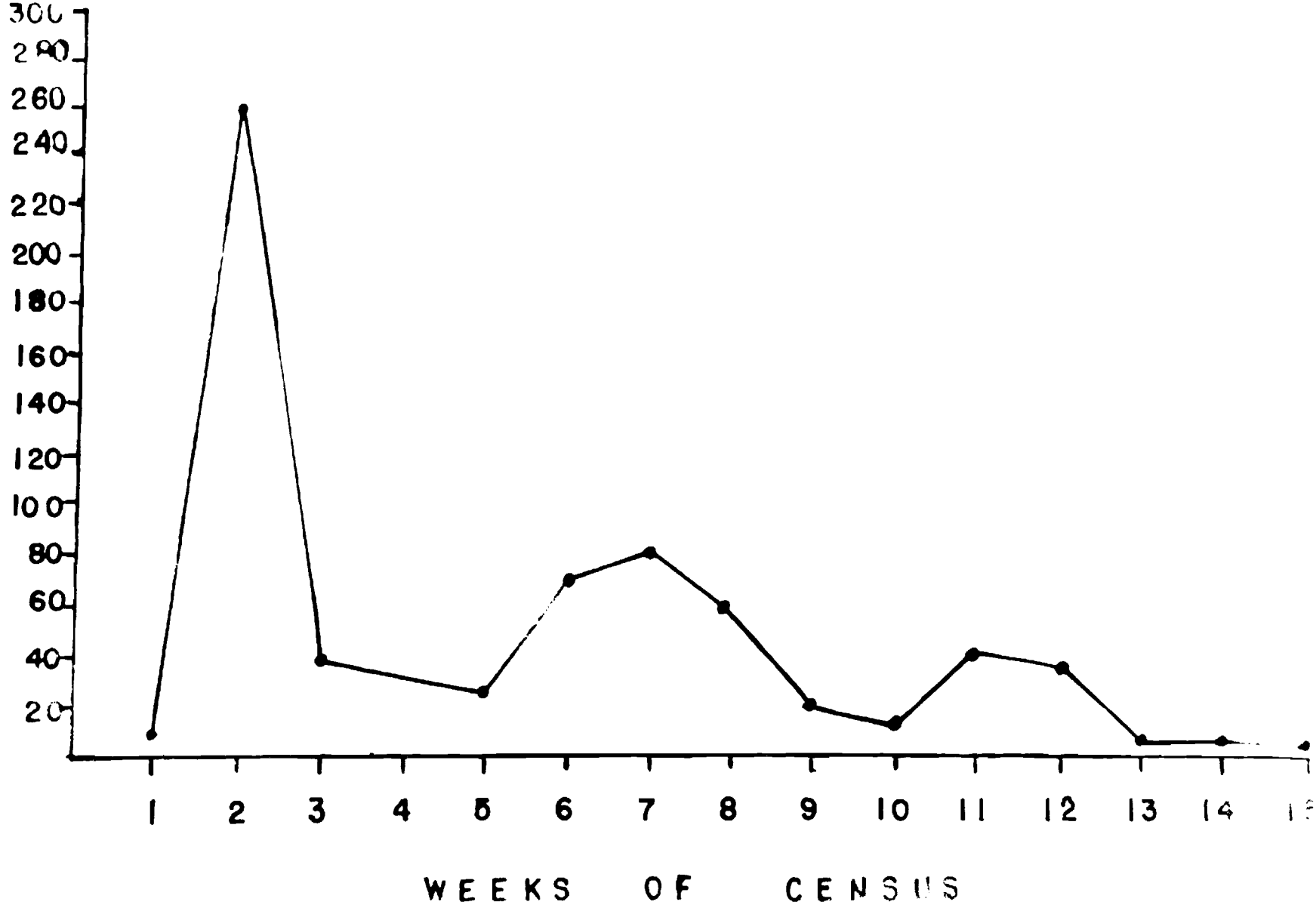

Figure 1. Fishing Pressure on the Chatanika River During the 1960 Creel Census

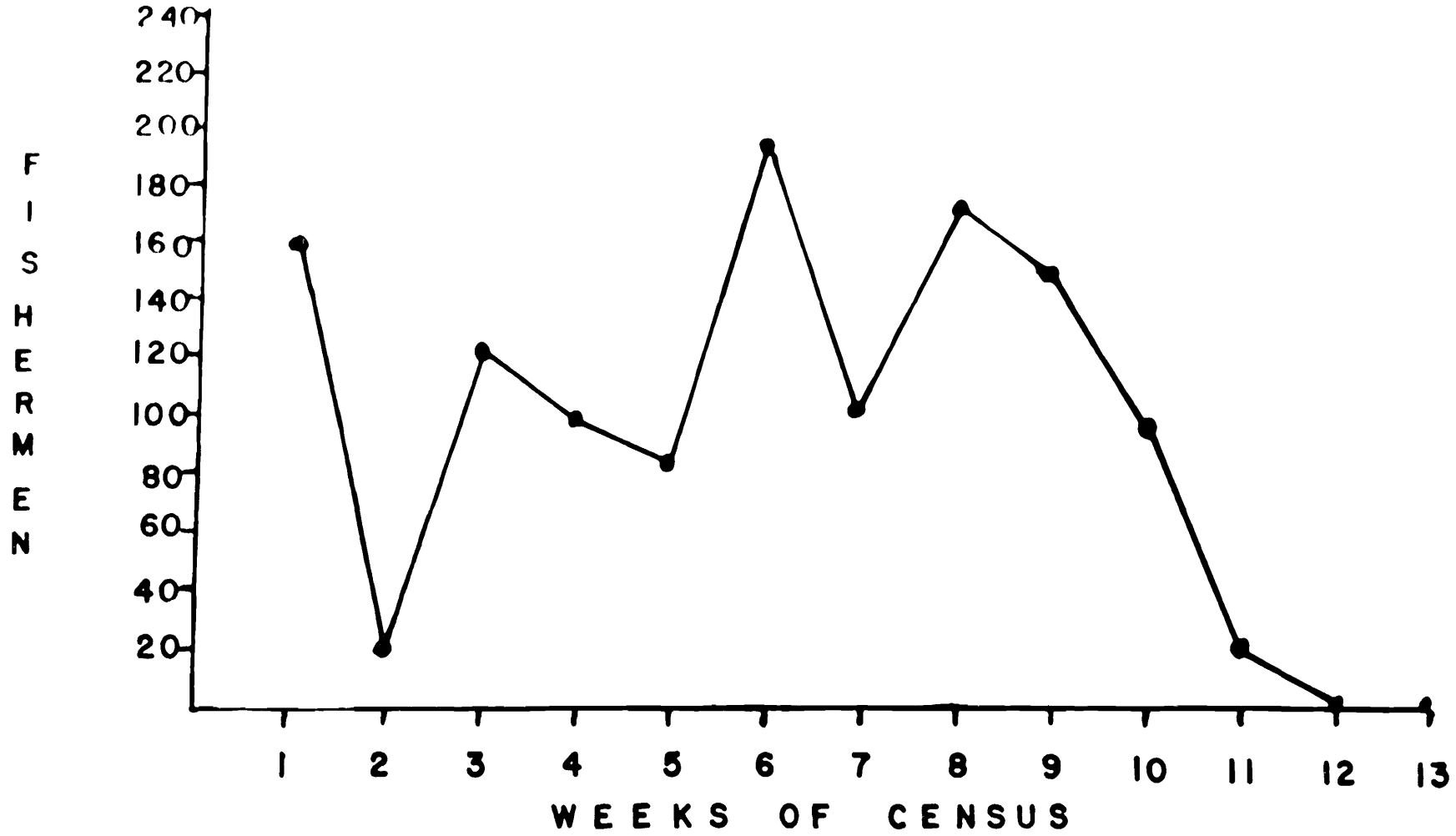

Figure 2. Fishing Pressure on the Delta Clearwater River During the 1960 Creel Census.

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