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STATE OF ALASKA

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ANNUAL REPORT OF PROGRESS, 1959-1960

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-1

SPORT FISH INVESTIGATIONS OF ALASKA

ARLIS

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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-1.

In 1959 the Alaska Department of Fish and Game, as an agency of the new state, became eligible for participation in the program. Prior to this time the Federal Aid in Fish Restoration activity in Alaska had been a function of the Fish and Wildlife Service. During territorial status the federally conducted operation was appreciably less than the program now possible as a state.

The new state program under the Dingell-Johnson Act was activated July 1, 1959. Eleven separate studies made up the "Sport Fish Investigations of Alaska" project. Eight of the eleven were designed to reconnoiter the state's recreational fisheries resource and to provide background for the development of specific investigations as the need became apparent. Three problems of immediate concern appeared sufficiently defined and full scale investigations were mounted to explore their management implications. These included studies of Arctic grayling, Southeastern king salmon and recreational fishing access.

All of the investigations pose problems unique to Alaska in some respects and all provide ample scope for original work in the fisheries field. The recreational fishing access study is an example. Most of Alaska's fishing waters are still in the public domain and unfettered by private holdings-- a unique situation. Successful prosecution of this activity now and in the immediate future can forestall many of the serious recreational use problems currently facing other states.

The various studies were staffed as personnel were recruited. Field work began as the supplies and equipment were procured. Initial progress was slowed somewhat by this and the necessary period of personnel indoctrination. A "cutoff" date for each job from one to three months before July, 1960 shortened the period covered. As a result, these first reports encompass an effective working period of considerably less than one year.

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

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1959-1960 SEGMENT

State: ALASKA

Project No.: F-5-R-1 Name: Sport Fish Investigations
of Alaska

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

Period Covered: October 1, 1959 to June 10, 1960.

Abstract:

Review of the past work conducted on the Tanana River arctic grayling by another agency provided the background for the current investigation. A survey of the Tanana River System by air and road initiated the study. In addition to orientation, this determined the population sampling and creel census patterns as related to the spring breakup. Samples of grayling, examined for morphometric and meristic characteristics, will provide the data for the racial determinations of the study. Four of the five types of streams in the Tanana system were examined and preparations completed to obtain 100 unit samples from each of these ecological niches. The fifth type will be sampled later if it proves desirable. One thousand specimen samples have been collected to date.

Preparations were completed for investigation of the grayling migratory patterns, using a subcutaneous tag developed by the early workers. Two tributaries, the Chatanika and the Delta Clearwater, were selected as the tagging sites. Sixteen hundred grayling have been tagged to date in a joint effort with FWS River Basins.

A random sampling creel census was designed for execution during the coming season on the Delta Clearwater River. FWS River Basins is participating in the concurrent Chatanika River phase of the census as a continuation of their 1959 work.

The data obtained in the study to date are negligible and no evaluation is attempted.

Objectives:

To continue and to expand previous studies of the Tanana River system grayling populations.

To provide a continuing measure of grayling population trends and angling success.

To determine the racial inter-relationship and migratory patterns of grayling inhabiting the system and to investigate the principal types of waters as related to the separation of the grayling races.

To provide recommendations for further management measures and to direct the course of future studies.

Introduction:

From 1952 through 1958 the United States Fish and Wildlife Service has undertaken an ecological study of the Arctic Grayling, Thymallus arcticus signifer (Richardson), in the various tributaries of the Tanana River. Field personnel have reported their findings and have made recommendations concerning this important sport fish in Progress Reports during the seven years of study. The data presented in the Progress Reports provided the background for the formulation of the experimental design in the current grayling investigation. The physical descriptions of the major tributaries of the Tanana River were helpful in the selection of sampling areas. Past marking and tagging difficulties encountered by FWS personnel were evaluated when planning the current tagging-migration study. In addition, the data collected before 1959 will be compared with the information presently being compiled.

Survey Methods:

The present Arctic Grayling Investigation began early in the month of October, 1959.

During the fall of 1959 aerial observations and road checks were made of the major tributaries of the Tanana River. The area encompassed in these surveys ranged from the Deadman Lake region above Tok, Alaska to Nenana on the lower portion of the Tanana River.

In the spring of 1960 the complete Tanana River drainage was checked via aircraft for prevailing ice conditions. This survey included the Fielding and Tangle Lakes area. From the aerial observations it was determined which tributaries could be sampled early in the breakup.

Several attempts were made to sample grayling from the Tanana River near Big Delta in order to obtain specimens for preliminary meristic counts and morphometric measurements.

Racial Determination:

Before any management program can be established for the Arctic Grayling of the Tanana River drainage one must first determine whether the catch is coming from one racial stock or several. The primary objective of this current grayling study is the determination of possible races of grayling in the Tanana River drainage.

Tributary waters of the Tanana River were first classified into three ecological niches in the ADFG annual report of 1951. This rather generalized classification recognized the glacier-fed, spring-fed and rapid run-off tributaries as possessing different environmental factors that were utilized by the arctic grayling during at least a portion of their life-time.

In the present grayling investigation the ecological niche concept was enlarged upon to include those water areas that are bog-fed and lake tributaries.

Each ecological niche selected for this study has features which set them apart from all others. For example, the glacier-fed streams are silt laden and freeze up during the winter months. Grayling utilization of such waters to any great extent is debatable. A typical spring-fed stream in the Tanana River watershed is crystal clear, rich in aquatic plant and insect life and have limited fluctuation in their water level and temperature. These streams remain open year round. A rapid run-off stream can be recognized by the marked fluctuation in both water level and water temperatures. Insect life has a difficult time maintaining itself in this particular niche. This type of stream is subjected to heavy ice conditions during the winter.

Bog-fed streams in the interior are slightly discolored and also show fluctuations in their water temperatures and water level. However, this fluctuation is not as extreme as the rapid run-off areas. These streams vary in abundance of insect life and freeze during the winter. Finally, the lake tributaries are utilized by grayling as spawning sites for the most part and serve as a sheltering and feeding area for immature fish. Their water level and temperature fluctuation is slight and they also freeze during the winter.

The following streams were selected for this study and those sampled to date indicated by an asterisk:

Rapid run-off

*Chatanika River
*Salcha River
*Goodpaster River

Spring fed

*Delta Clearwater River
*Richardson Clearwater River
*Chena Clearwater

Bog streams

*Shaw Creek
*Little Salcha River
Tolovana River

Lake streams

*Fielding Lake Tributaries
*Tangle Lake Tributaries
Mansfield Lake Tributaries

It was felt that the glacier fed streams could be examined this year and sampled next year if it seemed feasible. The difficulties of sampling streams of this type could retard the project unless additional information could be gathered beforehand.

The 1000 specimen samples collected thus far have been placed in 10% formalin and there has been no attempt to record any data from them. The specimens will eventually be subjected to examination of various meristic counts and morphometric measurements and these data will be treated by statistical methods as suggested by Rounsfell and Everhart (1953).

Migration Study:

The need for information about the grayling migratory patterns was recognized early by investigators on the Tanana River watershed. Alaska Department of Fish and Game workers reported on the various ramifications of the arctic grayling fishery in the interior (ADFG Annual

Report, 1951). The Fish and Wildlife Service tagging program on the Goodpaster and Delta Clearwater and Fielding Lake tributaries for example established at least some trends in the grayling migration behaviour. However, the most useful data obtained from these studies can be considered in the realm of tagging materials and techniques. Many difficulties were encountered by the early workers in their choice of tags used and the tagging technique. Based on this information a subcutaneous plastic tag was selected for the current grayling study.

Two tributaries of the Tanana River are being used as a combination creel census and tagging site; Chatanika River and the Delta Clearwater. The Chatanika was selected since the River Basins Division of FWS had tagged approximately 1500 grayling in this watershed during the summer of 1959. Both the creel census and tagging operation in this area is being handled jointly by the Alaska Department of Fish and Game and the River Basin Division of FWS. To date 1600 grayling have been tagged in this river and 40 tags returned from the creel census.

Tagging operations on the Delta Clearwater River began shortly after the camp site was established on June 1, 1960. The information collected so far in this phase of the study is so fragmentary that it will not be included in this report.

Creel Census:

In the setting up of a creel census program certain factors limit the scope of the operation including the physical nature of the study area, time committed for the census, expense and the objectives of the study. Lagler (1952), Rounsfell and Everhart (1953) give a detailed account of the problems associated with creel census programs. In the current grayling investigation two areas have been selected for creel census: Chatanika and Delta Clearwater Rivers. Since the objectives and the methods being employed differ somewhat for the two water areas, they should be discussed separately to assure continuity.

The creel census on the Delta Clearwater is a modification of the random method described by Best and Boles (1956). This watershed is being covered on two week days at twelve hour periods per day. A 24 hour coverage is in effect on one of the weekend days. This method meets the standard

set by Tait (1953) where he felt that three half-days of creel census per week would be adequate for estimating the mean catch per hour. The Clearwater census has been in operation since May 29, 1960 and the data collected has not been tabulated.

The Chatanika River creel census is a continuation of a program started by River Basins in 1959. A joint effort by both River Basins and the Alaska Department of Fish and Game is underway on the Chatanika River to study grayling migratory behavior, fishing pressure and success. The basic aims differed slightly but the joint program seemed the logical way to solve the mutual problems concerning the grayling fishery. The creel census method employed during the summer of 1959 by River Basins is being carried out in this present investigation. Two days a week are being set aside for creel census. One 12 hour coverage during the week and one 24 hour coverage on a weekend day. This meets the standard set by Tait (1953). Since River Basins tagged 1500 grayling during the 1959 operation on the Chatanika, keen interest is taken of tagged grayling picked up during the creel census coverage. To date, 40 tagged grayling have been caught by anglers fishing the Chatanika and its tributaries and 25 captured during sampling attempts. Since this census has been operating only a few weeks, the data collected is relatively slight and will not be included in this report.

Recommendations:

To continue collecting grayling specimens from the various ecological niches within the Tanana River drainage and make additional collections whenever possible from other drainages in Alaska.

To evaluate meristic and morphometric data obtained from these ecological niches and/or other drainages in an attempt to determine a possible racial breakdown of this species.

To sample, tag and recapture grayling in the Chatanika, Delta Clearwater, and the Goodpaster rivers in an attempt to follow their migratory patterns and to estimate their population size.

To maintain a random creel census on the Chatanika and Delta Clearwater Rivers in order to obtain information about grayling migration and fishing success in these areas.

To evaluate the grayling fishery in the Tangle and Fielding Lakes area which have apparently declined during recent years.

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