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MONTANA STATE DEPARTMENT OF FISH AND GAME
FEDERAL AID IN FISH RESTORATION SECTION
HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. F-12-R-3 Name Western Montana Fishery Study

Job No. III Title Life History Study of the Squawfish (Ptychocheilus Oregonensis) and Columbia River Chub (Mylocheilus Caurinus) in the Blackfoot River Drainage.

Period Covered June 1, 1956 to November 15, 1956

Abstract:

The Oregon Squawfish and Columbia River chub are being studied in the Big Blackfoot drainage. The chub is largely restricted to the Clearwater drainage and its lakes. The squawfish is largely restricted to the Clearwater drainage, and the main fork of the Big Blackfoot river. Collection was begun too late in 1956 to determine the time of spawning. Data was collected for the determination of age and growth, age of maturity and fecundity. Difficulty was encountered in collecting individuals under 7 inches in length. Recommendations for continuation of the study are given.

Objectives:

The construction of a proposed dam at Ninemile Prairie would inundate a considerable portion of the Big Blackfoot river and would create an impoundment which, if it follows the pattern of such impoundments in the past, will provide a habitat more suited for rough fish than for game species. Therefore, it is desirable to consider the removal of rough fish in the drainage in the event that such a dam is constructed. The purpose of this study is to gather information on the life history and distribution of the two most important rough fish species of the drainage in order to determine the feasibility of such an eradication and to implement its planning.

Techniques and Findings:

Distribution:

Distribution was investigated by gill netting, seining, shocking and concussion sampling.

Columbia River chubs were found in all lakes of the Clearwater drainage which have been sampled, except in lakes Summit, Clearwater and Marshall. These three lakes are all near various headwater portions of the drainage. Chubs were found in the Clearwater river between Salmon lake and the mouth of this river, but no chubs were found in the Big Blackfoot river where it was sampled or in any of the other tributaries above the proposed dam site. The area of the Blackfoot samples extends from a point about 2 miles upstream from a bridge known as Scotty Brown's bridge, located between Ovando and Clearwater junction, to a point about 2 miles below Lincoln.

Squawfish were collected in all lakes of the Clearwater chain. None were collected in Marshall lake. Squawfish were collected in the Clearwater river between Salmon lake and the mouth of this river and in the Big Blackfoot up to a point about 3 miles upstream from the mouth of Arrastra creek. Most of the tributaries between this point and the proposed dam site were checked by shocking and no squawfish were taken. No squawfish were collected in four overnight gill net sets in Nevada creek reservoir. Although dead squawfish were found on the shore of Cooper's lake, the outlet of which is a tributary of the North Fork of the Blackfoot, no squawfish were collected in the North Fork.

Reproduction:

All fish collected were classified according to sex, maturity, and gonad condition. This data was recorded on the envelopes in which the scale samples were placed.

Age of maturity will be determined when the scales are read for age and growth determination.

Time of spawning was not determined in 1956, since collection did not begin until after the spawning season of both species was in progress.

On June 14, the first day of collection, 8 Or 9 mature female chubs collected in Placid lake were spent. On June 18, all of the 28 mature female chubs collected in this lake were spent, as were all of those collected after this date.

Although difficulty was encountered in interpreting the ovary condition of squawfish, the spawning season was evidently in progress when collection began on June 14. About 32 overnight gill net sets were made on Seeley lake in late March, 1957. Female squawfish collected at this time exhibited a wide variation in ovary development. The largest specimen collected was among the group showing the least amount of development. This condition suggests that mature individuals may not all spawn in any one year.

Fecundity of females will be determined by making egg counts on ovaries collected from 17 squawfish and 8 chubs collected in March, 1957.

Location of spawning and spawning habits were not determined. No observations of spawning were made and no concentrations of young of the year were found.

Age and Growth:

In addition to data from Job II, collections were made through the summer of 1956 by gill netting, seining and angling. Thirty-two overnight sets, with 125 foot experimental gill nets, were made in Placid lake; 32 in Alva lake and 18 in Seeley lake. Gill netting was also carried out in Marshall and Summit lakes. Scale samples with data on sexual condition, length and weight were retained on 564 squawfish and 500 chubs collected by gill netting. Nearly all these specimens were over 7 inches long. Attempts to collect fish under this size in the lakes were unsuccessful. Seining was attempted in Alva, Seeley and Placid lakes on several occasions and a 25 foot section of 5/16 inch square mesh gill net was set in these lakes. Few small fish were taken. A concentration of small squawfish was found in a diversion pond on the Clearwater river below Salmon lake and several hundred specimens ranging from yearlings to approximately 8 inches in total length were collected. These were preserved and scale samples will be taken from them.

Gum arabic mounts have been made of scales from 313 chubs from Placid lake. These will be read when smaller individuals have been obtained for interpretation of scale formation and development.

A similar series of scales of squawfish from Seeley lake will be mounted and smaller groups of both species from other parts of the drainage will be mounted and read for comparing growth rates within the drainage.

Considerable time was spent searching for young of the year by wading shorelines and streams. No concentrations were found and few were collected.

Recommendations:

It is suggested that the study be continued for another year.

Collection should begin by June 1 in order to determine the spawning period. Maximum-minimum temperature stations should be set up in the water at the following places in order to correlate water temperature with spawning: at the bridge over Owl creek at the outlet of Placid lake, at the bridge of the lakeshore road over the Clearwater river at the outlet of Seeley lake, and at the bridge of the Harper place driveway over the Clearwater river just above state highway No.20. These temperature stations should be established by May 15, 1957 and temporary local help should be hired, if necessary, to read the thermometers at least on alternate days until the student assistant is able to resume work on or about June 1.

Ripe individuals taken in collections should be spawned and the eggs retained in Mason jars with cheesecloth covers. These jars should be placed in the water where they are not apt to be disturbed and the development of the eggs observed.

Attempts to observe spawning fish should be continued.

More intense efforts should be made to collect young of the year fish and fish of smaller size groups. The latter will be aided by additional equipment which is in preparation. A pirate trap of 1/4 inch square mesh is being made and gill nets with mesh sizes of 3/8 inch to 5/8 inch have been ordered.

Data collected during the summers of 1956 and 1957 should be analyzed during the winter of 1957-58.

Summary:

1. The purpose of this study is to gather information on the life history and distribution of the Oregon squawfish and Columbia River chub in the Big Blackfoot drainage above the proposed Ninemile Prairie damsite. This is deemed necessary in order to determine the feasibility of a rehabilitation project designed to eliminate these species from the drainage above the damsite, and to implement the planning of such a project.

2. Columbia River chubs were found in all lakes of the Clearwater drainage which have been sampled, except in lakes Summit, Clearwater and Marshall. These three lakes are all near various headwater portions of the drainage. Chubs were also taken from the Clearwater River below Salmon Lake. They were not taken from the Big Blackfoot River, nor from any of its tributaries which were sampled above the proposed damsite.

3. Squawfish were taken from all the lakes which have been sampled in the Clearwater drainage except lakes Marshall and Clearwater. They were also taken from the Big Blackfoot River as far as a point about 65 miles above the proposed damsite. Squawfish were not taken from any of the tributary streams along this section of the Blackfoot. They were taken from Cooper's Lake, but not from the North Fork of the Blackfoot River, into which the outlet of Cooper's Lake drains.

4. Sex, maturity, and gonad condition were recorded for all squawfish and chubs which were collected. Age of maturity will be determined when age and growth analysis of scale samples has been completed.

5. The time of spawning was not determined because the 1956 collections did not begin until after the spawning periods of both species were in progress. Wide variations in gonad condition of female squawfish collected in March, 1957 suggests that the mature individuals of this species may not all spawn in any one year.

6. No concentrations of spawning adults, or of young of the year were found for either squawfish or chubs.

7. Scale samples were taken from 564 squawfish and 500 chubs. These fish were collected both during Job No. II, and by repeated netting throughout the summer. Nearly all specimens from which scale samples have been taken were over 7 inches total length. Attempts to collect fish under this size from the lakes have been unsuccessful. Several hundred small squawfish (from yearling to about 8 inches in size) were collected from a diversion pond on the Clearwater River below Salmon Lake.

8. The age and growth analysis of scale samples has not been completed.

9. Recommendations are as follows:
   a. The study should be continued for another year.
   b. Collections should begin at least by June 1, 1957.
   c. Maximum-minimum thermometer stations should be established in several of Clearwater Lakes' outlets by mid-May.
   d. Eggs from ripe squawfish and chubs should be collected and fertilized. These should be retained in jars in protected areas and checked for development.
   e. More intense efforts should be made to observe spawning fish and to collect young of the year and other small fish groups.
   f. 1956 and 1957 data should be analyzed during the winter of 1958-59.

Prepared by Cliff W. Hill, Jr.

Date March 31, 1957

Approved George D. Halton