MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB PROGRESS REPORT
RESEARCH PROJECT SEGMENT

State Montana

Cooperators Washington Water Power Company

Project No. F-34-R-4 Title Reservoir Investigations

Job No. I-a Title Noxon Rapids-Cabinet Gorge Reservoirs

Period Covered July 1, 1969 - June 30, 1970

ABSTRACT

The fish populations of Noxon Rapids and Cabinet Gorge Reservoirs were sampled with gill nets. Game fish made up less than 5 percent of the catch from either reservoir. Northern squawfish (Ptychochelius oregonensis) and peamouth (Mylocheilus caurinus) were the most abundant fish taken in both reservoirs. An upstream fish trap was placed in Prospect Creek, a tributary of Noxon Rapids Reservoir, on October 2, 1969. Only two precocious male brown trout were caught during the time spawning brown trout (Salmo trutta) should have been moving into the drainage. The Prospect Creek incubation channel was not operated because neither brown or cutthroat trout (Salmo clarki) eggs were available.

BACKGROUND

Noxon Rapids (impounded 1958) and Cabinet Gorge Reservoirs (impounded 1952) are "run-of-the-river" hydroelectric impoundments owned and operated by Washington Water Power Company. The Company and Montana Fish and Game Department have cooperated in fishery studies on the two impoundments since 1956. Planting of these reservoirs with hatchery-reared rainbow trout has not produced a long-term fishery probably because of movement of the planted fish out of the two-reservoir system. The downstream movement of rainbow trout is correlated with reservoir inflow and outflow patterns. Brown trout, cutthroat trout and Dolly Varden (Salvelinus malma) differ from rainbow trout and are not affected to the same degree in regards to downstream movement. Large numbers of brown trout and cutthroat trout fry have been released into Noxon Rapids Reservoir from an incubation channel since 1965 to increase the supply of these species in the reservoir.

OBJECTIVES

The objectives of this job were: (1) plant, hatch and release large numbers of cutthroat and brown trout fry from an incubation channel into Prospect Creek, a tributary of Noxon Rapids Reservoir; (2) trap and enumerate brown trout entering Prospect Creek for spawning and; (3) sample Noxon Rapids and Cabinet Reservoirs by gill netting to determine trends in the fish populations.

PROCEDURES

State of Montana Law (1969 Statute) requires that fish and fish eggs shipped into the state be certified free of certain diseases. California Fish and Game Department has supplied brown trout eggs in past years but could not meet the disease-free certification required by the statute. Cutthroat trout eggs from Montana's hatchery system were not available this year and Prospect Creek incubation channel was not operated.

A trap designed to collect brown trout entering Prospect Creek drainage was installed October 2, 1969 and operated through November 14, 1969. The catch was identified by species, and data on length and sex were taken from all brown trout. All fish were released upstream from the trap.

Fish populations of Noxon Rapids and Cabinet Gorge were sampled by gill nets to determine trends. Overnight gill net sets were made at three stations in each reservoir during the months of May and October 1969. These stations have been sampled throughout the life of this reservoir project dating back to 1956.

FINDINGS

Upstream Trap Operations

The upstream trap was installed in Prospect Creek on October 2, 1969 and fished continuously through November 14, 1969. Two brown trout males averaging about 10 inches total length were caught. These males were precocious and were likely from the fry released from the Prospect Creek incubation channel in winter 1966.

The absence of spawning brown trout in Prospect Creek in 1969 supports findings (1965 through 1968) that this spawning run has been declining and may have ceased to exist by 1969. The first brown fry were released from the incubation channel in early 1966 and these fish should return to spawn for the first time in 1970.

Small numbers of ripe or spent Dolly Varden have been taken going upstream or downstream in previous years trapping. No Dolly Varden were seen this year and the continued presence of Dolly Varden in Noxon Rapids Reservoir may be questionable.

Fish Population Sampling

The fish populations of both reservoirs were sampled in May and October 1969. Three areas of each reservoir were fished with three or more overnight gill net sets during each sampling period. Sampling methods, areas sampled and time of sampling have been uniform since 1956.

The catch from the 1969 gill net series is presented in Table 1 for Noxon Rapids Reservoir and in Table 2 for Cabinet Gorge Reservoir. The 1969 data are compared to data collected in 1960. The 1960 data represent the catch while both reservoirs were being heavily planted with rainbow trout and reservoir draw-down was minimal. Draw-down of both reservoirs was less than 10 feet per year.

For the years of 1961 through 1969 spring draw-down of Noxon Rapids has ranged between 33 and 55 feet and this reservoir has not been planted with rainbow trout since 1965. Cabinet Gorge Reservoir serves as a reregulating impoundment for Noxon Rapids and its annual draw-down has not exceeded 15 feet since 1959. Since 1965 planting of rainbow trout has been limited to small plants in one small bay.

Data presented in Tables 1 and 2 include only species of importance. Species present but not included in the tables are redside shiner (Richardsonius balteatus), black bullhead (Ictalurus melas), pumpkinseed (Lepomis gibbosus), kokanee (Oncorhynchus nerka), and brook trout (Salvelinus fontinalis). These are found in both reservoirs but combined make up less than 1 percent of gill net catch.

TABLE 1. Average catch-per-net-night in numbers and percent of total catch, Noxon Rapids Reservoir, 1960 and 1969.

Year	Species 1/ Rb	LL	DV	Wf	Ct	Sq	CRC	Su	YP	Total Catch	Number of nets
1960											
Number	6.6	0.6	1.0	6.7	0.0	1.0	0.0	10.6	3.5	30.0	28
Percent	22.0	2.0	3.3	22.3	0.0	3.3	0.0	35.4	11.7		
1969											
Number	0.2	0.5	0.4	0.4	0.1	11.3	18.1	4.1	6.3	41.4	27
Percent	0.5	1.2	0.9	1.0	0.2	27.4	43.7	9.9	15.2		

1/ Species abbreviations are: Rb - rainbow trout, LL- brown trout DV - Dolly Varden, Wf - lake and mountain whitefish, Ct - cutthroat trout, Sq - northern squawfish, CRC - peamouth, Su - largescale and longnose suckers, YP - yellow perch

Management of Noxon Rapids Reservoir has been geared toward increasing stocks of cutthroat and brown trout since 1965, by releasing large numbers of fry into the reservoir from an incubation channel. The small numbers of these two species taken by gill nets would indicate that this method of management has not been successful. The catch of cutthroat trout has increased slightly while that of brown trout has declined markedly. Average individual size of these two species would indicate that very few would have been from fry released from the incubation channel. Size of brown trout netted ranged from 10.0 to 26.8 inches and averaged 20.1 inches total length. Based on previous age-growth work 85 percent of the brown trout would have been five years old or older. Cutthroat trout ranged from 11.1 to 12.9 inches total length, much larger than expected from the first fry released in summer 1967.

Mountain whitefish made up 84 percent of the total whitefish catch in 1960. Lake whitefish contributed 100 percent of the catch of whitefish in 1969. The few rainbow trout taken in 1969 must have been spawned in one of Noxon Rapids Reservoir's tributary streams. Rainbow trout planted in the reservoir in 1963 through 1965 were all jaw-tagged and none of the fish caught in 1969 wore jaw-tags or bore scars.

Noxon Rapids Reservoir was chemically treated to reduce rough fish populations prior to filling in 1958. Evaluation of this poisoning indicated that a good kill of fish older than two years of age but many suckers, squawfish and peamouth survived. The low catch per nets of squawfish and peamouth in 1960 would indicate a low population, while the large catch of these two species in 1969 would indicate that these fish are successfully occupying the reservoir. Reservoir draw-down likely has created an environment unsuited to game fish and a more suitable habitat for squawfish and peamouth. The catch of suckers in 1960 was about 50 percent longnose and 50 percent largescale suckers. It appears that the largescale sucker (Catostomus macrocheilus), is more suited to the reservoir environment than the longnose sucker (Catostomus catustomus). Squawfish and peamouth populations increased indicating they are also better suited to lakes and reservoirs.

Numbers of yellow perch (Perca flavescens) appear to have remained fairly stable throughout the ten-year period. Small numbers of perch, 10 to 12 inches in length, were taken in 1969 but not in 1960. Growth of perch is slow in Noxon Rapids 1/; about 2 inches per year, and probably older, larger fish were not present in 1960 due to recent impoundment.

Cabinet Gorge Reservoir presents a picture of a more stable environment. Fluctuations of water levels have been small since 1959. Water exchange rate is probably more a factor in influencing fish populations in this impoundment. Theoretical rate of exchange for the whole reservoir is about 15 days under normal summer operations as compared to 75 days for Noxon Rapids Reservoir.

1/ Huston, Joe E., Investigation of Two Clark Fork River Hydroelectrical Impoundments, Proceedings of Mont. Acad. Sci., Vol. 25, pp. 20-40, 1965.

TABLE 2. Average catch-per-net-night in numbers and percent of total catch, Cabinet Gorge Reservoir, 1960 and 1969.

Year	Species 2/ Rb	LL	DV	Wf	Ct	Sq	CRC	Su	YP	Total Catch	Number of nets
1960											
Number	4.6	0.1	0.7	1.6	0.1	3.7	3.1	6.9	2.9	23.7	34
Percent	19.5	0.4	3.0	6.8	0.3	15.6	13.0	29.1	12.3		
1969											
Number	0.0	0.7	0.5	1.0	0.2	11.8	12.6	2.3	2.4	31.5	18
Percent	0.0	2.2	1.6	3.2	0.6	37.5	40.0	7.3	7.6		

2/ Species abbreviations are: Rb - rainbow trout, LL - brown trout, DV - Dolly Varden, Wf - lake and mountain whitefish, Ct - cutthroat trout, Sq - northern squawfish, CRC - peamouth Su - largescale and longnose suckers, Yp - yellow perch

The data in Table 2 show that much the same changes have occurred in the fish population of Cabinet Gorge as in Noxon Rapids Reservoir. Game fish populations have declined, suckers have declined, yellow perch have remained constant and the numbers of squawfish and peamouth have increased markedly.

Net catches of brown trout have increased from 1960 to 1969. Fish drifting out of Noxon Rapids Reservoir and the Prospect Creek incubation channel may be cause for this increased catch. One brown trout was 10.7 inches long while the rest were 19.2 inches long or longer. Cutthroat trout were caught near the mouth of Bull River only in both 1960 and 1969. Likely these fish had migrated into the reservoir from Bull River. Catch of whitefish in 1960 was primarily lake whitefish and catch of whitefish in 1969 was all lake whitefish. Catch of suckers from Cabinet Gorge in both years was mostly largescale suckers.

RECOMMENDATIONS

Data collected from gill net sampling and the Prospect Creek fish trap indicate that releasing brown and cutthroat fry into Noxon Rapids Reservoir has not increased the supply of these fish. Operation of the incubation channel should be suspended until some benefit can be shown. Fish trapping in Prospect Creek to delineate spawning runs of brown trout should be continued for at least two more years.

Efforts should be made to select and introduce a suitable game or food fish that can survive "run-of-the-river" impoundment habitat. The selection should be one which is not dependent upon extensive tributary systems for

reproduction and that can utilize or compete with squawfish and peamouth for its food supply. Any species contemplated for introduction into either reservoir should be evaluated and determined to be non-detrimental to existing game fish species in waters of the Columbia River system below Cabinet Gorge Dam. Species under consideration at this time are kokanee and burbot (Lota lota).

Prepared by Joe Huston

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Waters referred to:
5-8512-5
5-9328-5
5-5698-1