MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-34-R-1 Name Reservoir Investigations

Job No. 1 Title Noxon Rapids - Cabinet Gorge Reservoirs

Period Covered: March 1, 1967 - June 30, 1967

ABSTRACT:

This report covers work done under the this project and its predecessor, state project 2262. The Prospect Creek incubation channel was operated in 1966 and in 1967. Six hundred thousand brown trout (Salmo trutta) eyed eggs were planted in the channel in 1966 and 302,000 in 1967. In late June, 1967 approximately 500,000 eyed cutthroat trout eggs (Salmo clarki supsp.) will be planted in the channel. Feasibility was determined and plans drawn to reconstruct a small natural spawning area to increase spawning potential.

Gill net population sampling of the two reservoirs in spring 1967 was cancelled due to reservoir drawdown. A report on the data of rainbow trout movement study in Noxon Rapids Reservoir in 1962-1965 was started.

RECOMMENDATIONS:

The incubation channel should be desilted, algal growths controlled, and hold-over fish from preceding egg-plants removed. The downstream fry trap should be modified to withstand large flows. Flow, temperature and weather data should be collected during times of fry out-migration.

OBJECTIVES:

Montana Fish and Game Department, in cooperation with the Washington Water Power Company, has been conducting fisheries management and research on Noxon Rapids and Cabinet Gorge Reservoirs since 1952. These studies have shown that management for game fish in these two run-of-the-river impoundments is extremely difficult (Huston, 1965). Application of standard inland salmonid management techniques has not provided a sustaining fishery. The current effort at management seeks to apply techniques found to be effective in slamon and steelhead production, but which are very much in the experimental stage in inland fishery management.

Investigation gave indications that fall spawning salmonids are more successful in maintaining populations in the two reservoirs than most spring spawning salmonids. Brown trout spawning runs observed first in 1960 in several tributary streams, increased through 1962, but have declined since. Brown trout of this area spawn in late October and November. It generally takes about 160 days for the eggs to hatch and fry to emerge. Mortality rates during this incubation period may be a major factor governing brown trout abundance. Investigations have also shown that westslope cutthroat

trout are present in small numbers in localized parts of the reservoirs. Westslope cutthroat trout spawn in streams before spring run-off, but hatching and fry emergence coincide with peak spring flows. Timing of fry emergence may also be a controlling factor in survival of young-of-the-year for this species.

The objectives of the Noxon Rapids-Cabinet Gorge investigations are the establishment of larger reservoir and spawning populations of westslope cutthroat trout and brown trout through use of an incubation channel. Current work has been limited to Noxon Rapids Reservoir.

TECHNIQUES:

Montana Fish and Game Department and Washington Water Power Company have developed an incubation channel connected to Prospect Creek, a tributary to Noxon Rapids Reservoir. Prospect Creek does support a small spawning run of westslope cutthroat trout and brown trout from the reservoirs.

The channel utilizes a series of seven small spring-fed ponds. These ponds lie heel to toe with a two-foot drop between the ponds. Yearly water temperatures range from 38° F. to 60° F. Summer water flows range from 1.5 to 1.7 cfs. Spring peak flows measured in 1967 were 3.5 to 3.7 cfs.

The upper area of the two lower ponds was desilted and graded gravel beds installed in 1965. The upper part of the third pond was also reconstructed in a like manner in 1966. Gravel used ranged from 3/8 inch to 2 inches in diameter, and gravel bed depth averaged 8 inches. Gravel beds available for use were 360 square feet in 1966 and 1,160 square feet in 1967.

A downstream fry trap similar to a Wolfe trap was constructed and installed in the outlet of the lowest pond. Fish collected in the trap were measured volumetrically, sample counts taken, and total numbers calculated. Fish were counted and the trap cleaned at least twice each day. Some difficulties were encountered in trap operation during spring run-off. April flows each year were larger than the capacity for the trap and modifications to correct this difficulty are continuing.

The California Fish and Game Department supplied the brown trout eyed eggs from the Mt. Whitney strain for planting in the incubation channel in 1966 and 1967. The eggs were buried in the gravel beds at a depth of about four inches. The density was 1,660 eggs per square foot of gravel in 1966 and it was 260 eggs per square foot of gravel in 1967. Periodic checks were made to determine egg survival and hatching success. Crowded conditions of the eggs in the gravel in 1966 brought about heavy mortalities from widespread fungus infections and a hatching rate estimated at only 40-45 percent. Plans for 1967 included methods to control water inflow rates so eggs could be treated to control fungus infections. Fungus did not develop in 1967.

FINDINGS:

1966 Operations

The California Fish and Game Department supplied the project with 600,000 eyed brown trout eggs which were planted in the channel in late January. Hatching started in late February and was completed by early March. A low hatching success, estimated at 40-45 percent, was thought

to be caused by high egg densities and widespread fungus infections.

Downstream movement of young-of-the-year fish started March 22nd and was estimated to have ended about May 30th. Operations of the downstream trap stopped April 22nd when the daily catch dropped to 100 fry or less and a small number of fry remained in the channel. Total escapment of young-of-the-year brown trout was estimated at 195,000.

Fish leaving the channel March 22-27 averaged 230 fry per ounce. Fry leaving in late April averaged 170 per ounce. Movement of fish out of the channel was almost entirely limited to nighttime. As an example, 52,380 fry were counted leaving March 30-31 and only 156 of these were caught between the hours of 6 A.M. and 6 P.M. The numbers moving out of the channel peaked between the 8th and 11th day of out-migration when 89,936 fry were counted through the trap. A secondary peak occurred between the 15th and 17th day of out-migration when 32,980 fry were released.

1967 Operations

The California Fish and Game Department supplied the project with 302,000 brown trout eyed eggs. These eggs were planted in the incubation channel in late January. Hatching started in mid-February and was completed by late February. Hatching success, estimated at 90-95 percent, was considered to be good.

Downstream movement of fry started March 2nd and was estimated to have ended about May 15th. The operation of the downstream trap ended May 3rd when numbers of fish left in the channel were low and the daily trap catch dropped to 50 fry or less. Total escapment of young-of-the-year fish was estimated to be 144,000. Fishing leaving the channel followed the same pattern and were essentially the same size as those in 1966. An estimated 214,000 fry left the channel between March 2nd and March 10th, another 110,000 between March 11th and March 20th, and the remainder between March 21st and May 15th.

About 100 brown trout from the 1966 egg plants remained in the ponds through the year and left the channel in 1967. These fish ranged from 4 to 7 inches in length and were actively feeding upon the 1967 egg plants and fry. It is estimated that several hundred of the 1967 plant will remain in the ponds to become predators upon the 1968 plant. These fish should be removed from the ponds before the 1968 operation starts.

Investigation of the feasibility and desirability of improving a small spring area for brown trout spawning in Graves Creek Bay (Noxon Rapids Reservoir) was completed. Observations in past years has shown that this area provided room for one or two spawning pairs. One man-day spent reconstructing and improving gravel beds should increase spawning potential by 3 or 4 times.

The gill net sampling of both reservoirs scheduled for the spring of 1967 was cancelled because of difficulty of launching a boat during the spring drawdown. Preparation of a report on rainbow trout movement

within and out of Noxon Rapids Reservoir was started. Mr. Tim Vaughan, Wildlife Biologist, Washington Water Power Company, will co-author this paper with the project leader.

Westslope cutthroat trout egg production from the Montana hatchery system appears to be greater than hatchery needs and it is planned to plant about 500,000 eyed eggs in the Prospect Creek channel in late June, 1967.

Bibliography

Huston, Joe E., 1965. Investigation of Two Clark Fork River Hydroelectrical Impoundments. Proc. Mont. Acad. Sci., 25:20-40, 1965

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Approved by George D. Holton

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