MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-3 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER LAKES

JOB NO.: II-a, Segment 2 JOB TITLE: NORTHWEST MONTANA COLDWATER LAKES INVESTIGATIONS, NOXON RAPIDS AND CABINET GORGE RESERVOIRS SEGMENT

PROJECT PERIOD: JULY 1, 1989 THROUGH JUNE 30, 1990

ABSTRACT

Cabinet Gorge and Noxon Rapids Reservoir are heel-to-toe run-of-the-river hydroelectric impoundments on the lower Clark Fork River extending from Thompson Falls, Montana, downstream 56 miles. Annual drawdown of Noxon Rapids averaged 35 feet prior to 1986 but has been limited to 10 feet since then. Game fish ensities notably largemouth (Micropterus salmoides) and smallmouth bass (Micropterus dolomieui), have increased following reservoir stabilization. Growth rates of both bass species are excellent for northern latitudes. Most catchable largemouth bass present in Noxon Rapids in 1989 were from the 1985 and 1986 year classes. Late fall and early winter floods "washed out" brown trout (Salmo trutta) redd enumeration in reservoir tributaries.

BACKGROUND

Cabinet Gorge Reservoir, completed in 1953, and Noxon Rapids Reservoir, completed in 1958, are owned and operated by The Washington Water Power Company (WWP), Spokane, Washington. The reservoirs are adjacent run-of-the-river hydroelectric impoundments with Noxon Rapids extending 38 miles downstream from Thompson Falls to near Noxon, Montana, and Cabinet Gorge 18 miles long with the dam located near Cabinet Gorge, Idaho, about one-fourth mile into Idaho. Cabinet Gorge has a surface area of 3,400 acres at full pool elevation of 2,175 feet msl while Noxon Rapids' surface area is 8,600 acres at 2,331 feet msl.

Cabinet Gorge Reservoir fluctuations of water levels seldom exceed 5-6 feet, but fluctuations of 2-3 feet occur almost daily. Prior to 1986, annual drawdown of Noxon Rapids averaged about 35 feet and ranged from 6 to 54 feet. Starting July 1, 1986 and for an indefinite time annual fluctuations are now limited to a maximum of 10 feet.

Fishery management activities on Cabinet Gorge Reservoir from the mid-1960's through the present were very limited since it was known that what was planted in Noxon Rapids Reservoir would invade the lower reservoir. Management activities on Noxon Rapids from 1958 through 1985 stressed planting of hatchery fish including rainbow (Oncorhynchus mykiss), westslope cutthroat (Oncorhynchus clarki), brown trout, and smallmouth bass. The plantings of trout did not result in an acceptable fishery, although brown trout became established in small numbers. Plantings of smallmouth bass in 1982 and 1983 have resulted in a fishable, self-reproducing population. A complete description of management activities in Noxon Rapids and Cabinet Gorge reservoirs prior to 1985 is given by Huston[1].

OBJECTIVES AND DEGREE OF ATTAINMENT

Objectives included three from the Northwest Montana Coldwater Lakes Investigations (F-46-R-2, II-a) and five from the Northwest Montana Warmwater Lake Investigations (F-46-R-2,III-a). These objectives were:

Northwest Montana Coldwater Lakes Investigations

1. Manage lake and reservoir water levels to minimize impacts on fish populations. Objective was attained using state funding. WWP was able to limit drafting of Noxon Rapids Reservoir to 10 feet.

5. Provide lake fisheries to sustain an increase of 32,600 angler days by 1992 through natural reproduction and hatchery plants. Provide kokanee fisheries for 12-14" fish at a catch rate of 1 fish/hour. This objective was substantially met. Kokanee portion of this objective is applicable to other lakes covered by Coldwater Lakes Investigations.

12. Attempt to acquire sites and provide facilities on all lakes and reservoirs capable of sustaining more than 300 mandays of fishing per year on a priority basis at the rate of one lake per year. This objective was met using state funding. New boat ramps and attendant day-use facilities were constructed at Eddy Creek (Cabinet Gorge Reservoir) andMarten Bay (Noxon Rapids Reservoir) sites. A $50,000 Challenge Grant to fund these projects was supported by the U. S. Forest Service, WWP, area residents, area fishing clubs and the Department.

Northwest Montana Warmwater Lake Investigations

1. Establish and maintain fishable populations (catch rate = 0.25 fish/hour) of smallmouth bass and burbot (Lota lota) in Noxon and Cabinet Gorge reservoirs. Objective was partially met.

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[1]Huston, Joe E. . 1985. Thirty-two years of fish management, Noxon Rapids and Cabinet Gorge reservoirs. MT Dept. Fish, Wildlife and Parks, Helena, MT 59620.

3. Attempt to acquire and develop access sites on all lakes and reservoirs with the potential for more than 500 mandays of fishing annually. First priority should be given Lake Blaine and those lakes with adjoining Champion International or Plum Creek Timberlands property. Objective was met using state funding. The Department installed a boat ramp at the Thompson Falls State Park Recreation Area at the head of Noxon Rapids Reservoir.

7. Enhance fish populations through the placement of artificial habitat. This objective was met. The Department, area bass clubs, and WWP cooperated in placing tree reefs in the Robinson Rock area of Noxon Rapids Reservoir in late May, 1990.

8. Define the mechanisms of predator/prey relationships in area lakes. Reduce competition with game fish and reduce overabundant populations of nongame fish. This objective was met.

9. Encourage increased public knowledge and participation in resource decisions. This objective was met. Department personnel and the WWP fisheries technician attended meetings of area service and sports clubs.

PROCEDURES

Two stations in both Noxon Rapids and Cabinet Gorge were sampled using gill nets in October 1989 and May 1990. Per recommendations presented by Huston[2] 10 gill nets 150 feet long comprised of 50-foot long sections of 1 1/4", 1 1/2", and 2" bar measure mesh and 2 nets 50-feet long comprised of 25 foot-long sections of 3/4" and 1" bar measure mesh were purchased. Five of these new nets were fished along with five old nets (100-feet long with 25-foot sections of 1", 1 1/4", 1 1/2" and 2" bar measure mesh) in the May 1990 sampling to determine differences in catch characteristics. The two small mesh nets were fished to collect small fish.

Data recorded from each net set included lengths and weights of all game fish and lengths and weights of about 50 percent of the nongame fish caught. Scales for age and growth determinations were taken from all game fish and from a sample of yellow perch (Perca flavescens). Department personnel analyzed the game fish scales while students attending the University of Idaho analyzed the perch scales for a fisheries techniques course.

Age and growth of largemouth and smallmouth bass were determined from scales collected during gill net sampling and from scales collected by tournament bass fishermen.

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[2]Huston, Joe E. 1989 Northwest Montana coldwater lakes investigations, Noxon Rapids and Cabinet Gorge reservoirs. Segment, Job II-1, Project No. F-46-R-2, MT Dept. of Fish, Wildlife and Parks, Helena, MT 59620, mimeo 8pp.

Growth, survival and confirmation of time of annulus formation by young-of-the-year largemouth was determined by shoreline seining of selected areas of Noxon Rapids and Cabinet Gorge reservoirs in October, 1989, and June, 1990. The seine used was 50-foot long, 4-feet deep 1/4" bar mesh. Fish caught, other than bass, were enumerated and released. Bass were measured, some scales taken and then released.

Sections of three noxon Rapids Reservoir tributaries and one Cabinet Gorge tributary were to be checked for brown trout spawning activity. All trapping and redd surveys had to be cancelled due to three late fall and early winter floods making work conditions very hazardous to both personnel and equipment. Mid-winter reservoir sampling through the ice also had to be cancelled due to unsafe conditions.

The WWP technician continued quarterly benthic sampling at three stations in Noxon Rapids Reservoir. He also conducted a recreational user survey for the Company which also produced some information on angler satisfaction. These data will be published in a WWP annual report.

STATUS OF FISH POPULATIONS

Catch per net night by species has shown little change from 1987 to 1989 in either reservoir with the exception of yellow perch in Noxon Rapids Reservoir (Table 1). Catch of perch increased about 250 percent from 1987 to 1988 and 1989. It must be noted here that catches expressed in Table 1 are from the same size nets; 100-feet long with 25-foot long sections of 1", 1 1/4", 1 1/2", and 2" bar measure mesh.

Anticipated cutbacks in manpower available for gill netting in Noxon Rapids and Cabinet Gorge reservoirs prompted this project to obtain new gill nets. Average catch per net night for the three types of nets is shown in Table 1 for the five most frequently caught fish species.

Average catch per net night data listed in Table 2 show that the new sinking nets caught less total fish than the old nets but that catch in new floating nets was slightly more than the old nets. Catch by species between the "old" versus "new" nets showed both increases and decreases. In general the objective was to reduce catch of small yellow perch and the new nets appeared to accomplish this objective.

Table 1. Average catch per net night in bottom gill nets set in Cabinet Gorge and Noxon Rapids reservoirs, spring and fall of 1987, 1988, and 1989.

	Average Catch Per Net Night by Species					
	Noxon Rapids			Cabinet Gorge		
Species	1987 (23)*	1988 (24)	1989 (13)	1987 (4)	1988 (4)	1989 (9)
Rainbow trout	0.2	0.0	0.0	0.0	0.0	0.1
Bull trout	0.4	0.1	0.3	0.0	0.3	0.2
Brown trout	0.8	0.5	1.0	2.5	3.3	1.3
Mountain whitefish	0.2	0.1	0.4	0.0	1.0	0.1
Lake whitefish	0.3	0.5	0.8	3.0	2.8	0.8
Largemouth bass	0.1	0.3	0.1	0.3	0.0	0.1
Smallmouth bass	0.3	0.3	0.3	0.0	0.0	0.0
Northern pike	0.1	0.0	0.0	0.0	0.0	0.0
Longnose sucker	0.2	0.7	0.3	0.0	0.5	0.4
Largescale sucker	4.6	3.9	3.0	2.0	1.8	1.6
Northern squawfish	4.6	8.2	6.5	3.8	6.0	4.3
Black bullhead	1.9	2.7	4.0	0.0	0.3	0.0
Peamouth	19.3	12.3	14.0	11.8	8.3	5.3
Yellow perch	19.0	49.8	39.6	4.5	7.8	3.0
TOTAL	52.0	79.4	70.3	27.9	32.1	27.2

*Number in parenthesis is number of net sets.

LEGEND: Bull trout = Salvelinus confluentus
Northern pike = Esox lucius
Longnose sucker = Catostomus catostomus
Northern squawfish = Ptychocheilus oregonensis
Mountain whitefish = Prosopium williamsoni
Largescale sucker = Catostomus macrocheilus
Black bullhead = Ictalurus melas
Peamouth = Mylocheilus caurinus

Table 2. Average catch per net, "old" net versus "new" net and small mesh nets, Noxon Rapids Reservoir, May, 1990, for the five most common species caught in 1989.

	Floating Nets		Sinking Nets	
	Old Net(4)*	New Net(4)	Old Net(6)	New Net (6)
Species	Catch	Catch	Catch	Catch
Squawfish	2.3	5.0	9.3	14.6
Peamouth	10.3	7.5	21.3	5.2
Largescale sucker	0.2	0.5	3.5	2.0
Bullhead	0.0	1.5	2.0	10.2
Yellow perch	2.0	5.7	25.5	4.4
TOTAL	14.8	19.2	61.6	36.4

	Small Mesh Floating Net (2)	Small Mesh Sinking Net (2)
	Catch	Catch
Squawfish	4.0	1.5
Peamouth	12.5	14.0
Largescale sucker	0.0	0.0
Bullhead	0.0	0.0
Yellow perch	58.0	131.0
TOTAL	74.5	146.5

*Number in parenthesis is number of net sets.

Comparative data will be recorded on numbers of fish caught by species and lengths of individual fish for the old and new nets for about two years before the conversion to only new nets is completed. The small mesh nets will also be fished spring and fall each year to build a data base for future sampling. If sufficient crew is available, the gill net sampling scheme should be to set about five each sinking and floating old and new nets per night at two netting stations in Noxon Rapids and one in Cabinet Gorge. One each floating and sinking small mesh net would also be set at each of the three stations.

Brown Trout - From fall 1985 through fall 1989 a total of 412,000 eyed brown trout eggs were planted in five Noxon Rapids and two Cabinet Gorge tributaries. A total of 700,000 brown trout fingerlings were also planted in Noxon Rapids Reservoir from spring 1986 through fall 1989. It is anticipated that fish from 1985 egg plants and fingerlings planted in 1986 will start spawning in fall 1990. Brown trout work planned for fall 1989 included continuation of redd counting and trapping of two streams to determine size of fish in the spawning run prior to an infusion of hatchery fish.

Heavy amounts of precipitation in fall 1989 and early January 1990 caused stream flows considerably above normal in October 1989 through January 1990 and stream trapping had to be cancelled. Bank full floods in the reservoir tributaries occurred in mid-November, mid-December, and mid-January obliterating brown trout redds and negating accurate redd counts.

Scales from brown trout caught by net sampling in 1988 and 1989 from Noxon Rapids and Cabinet Gorge reservoirs were analyzed and these data are presented in Table 3.

Table 3. Age and growth of brown trout from Noxon Rapids and Cabinet Gorge reservoirs caught in 1988 and 1989.

Reservoir	I	II	III	IV	V	VI	VII
Noxon Rapids	3.3(33)*	7.5(31)	11.6(28)	15.3(24)	19.6(13)	22.0(7)	25.3(3)
Cabinet Gorge	3.5(9)	8.2(9)	13.2(7)	15.8(5)	20.8(3)	25.0(1)	

*Number in parenthesis is size of sample.

The limited data presented above indicates that growth rates of brown trout in Cabinet Gorge Reservoir is somewhat higher than Noxon Rapids. Huston[3] shows that brown trout from Noxon Rapids during the period of 1966-1976 reached an average size of 17.2 inches at annulus V; considerably less than the 19.6 inches reported here. The major environmental factor influencing increased growth rates

[3]Huston, Joe E. 1985. Ibid.

has been reduction of reservoir drawdown after 1980. Prior to 1980, the average annual spring drawdown of Noxon Rapids Reservoir averaged about 35 feet. During the 1980's annual drawdown has averaged about 10 feet except for a 28-foot draft in spring 1985.

Largemouth Bass - Largemouth bass were planted in the lower Clark Fork River 70 to 80 years ago. Largemouth bass have been present in Noxon Rapids Reservoir since it was first filled in 1959, but the effects of reservoir drawdown coupled with time of spawning appears to have severely limited population size through at least the mid-1980's. Reduction of reservoir drafting starting in 1985 coupled with several years of below average runoff and earlier-than-normal spawning have resulted in a noticeably increased largemouth bass population. Observed spawning of largemouth bass prior to the mid-1980's occurred in late June to early July. Observed spawning in 1985 through 1989 occurred in late May and early June.

It is theorized that the earlier spawning resulted in a larger young-of-the-year fish which had a better chance of survival to the next spring. Young-of-the-year largemouth bass caught October 14, 1989, averaged 2.1 inches long and ranged from 1.2 to 3.4 inches. Of the 104 fish measured, 66 percent were two inches long or longer.

Spawning of largemouth bass in Cabinet Gorge Reservoir occurs later in the year than in Noxon Rapids. Cabinet Gorge's water temperatures are controlled by low level discharges from Noxon Rapids Dam and temperatures suitable for largemouth bass spawning are generally two to three weeks later. Largemouth young-of-the-year captured October 13, 1989, averaged 1.8 inches long and ranged from 1.1 inches to 2.7 inches. Only 33 percent of the 48 fish measured were two inches long or longer.

Scale samples from 130 largemouth bass 12 inches long or longer were collected from anglers fishing a bass tournament on Noxon Rapids Reservoir August 12, 1989. Age, growth, and year-class of these bass are listed in Table 4.

Table 4. Age, growth, and year classes of largemouth bass, Noxon Rapids Reservoir, August 12, 1989.

Length in Inches at Annulus						
I	II	III	IV	V	VI	VII
3.1(130)*	7.1(130)	10.7(129)	12.8(58)	14.0(9)	15.7(7)	17.4(4)

Number of Fish in Year Class					
1987 - 1	1986 - 71	1985 - 49	1984 - 2	1983 - 3	1982 - 4

*Number in parenthesis is sample size.

Growth rates of largemouth bass in Noxon Rapids Reservoir have shown marked improvements in recent years. Data presented by Huston[4] also indicates that of 26 bass collected in 1987, 18 were from the 1985 and 1986 year classes while 8 were from the 1982 through 1984 year classes.

Numbers of fish by year indicate strong year classes occurring in both 1985 and 1986. It is also suspected that good year classes have been produced in 1987, 1988, and 1989. Future sampling will determine the truthfulness of this later statement. It is predicted that the 1990 year class will be weak due to a later than normal spawning. Reservoir water temperatures were in the 51-53°F range through late June, 1990. Largemouth bass had started to pair up the last week of June and most spawning should occur in early to mid-July, 1990.

Smallmouth Bass - Fingerlings were planted into Noxon Rapids Reservoir in 1982 and 1983. The first observed spawning occurred in 1987 but ageing of scale samples of fish collected in 1988 and 1989 shows that spawning took place in 1987, 1986, and 1985. Age, growth, and year classes are shown in Table 5.

Table 5. Age, growth, and year classes of smallmouth bass caught in Noxon Rapids Reservoir in 1988 and 1989.

Length in Inches at Annulus						
I	II	III	IV	V	VI	VII
3.0(33)*	6.4(33)	9.7(22)	12.4(14)	14.5(10)	16.5(3)	17.9(1)

Number of Fish in Year Class					
1982 - 1	1983 - 12	1984 - 0	1985 - 1	1986 - 10	1987 - 9

*Number in parenthesis is size of sample.

CREEL CENSUS

Angler catch information on Noxon Rapids Reservoir was obtained from two sources: 1) a bass tournament held August 12-13, 1989, and 2) an informal creel census secondary to a user attitude survey done by WWP technician during summer

[4]Huston, Joe E. 1988. Northwest Montana coldwater lakes Investigations: Noxon Rapids and Cabinet Gorge reservoirs segment, Proj. No. F-46-R-1, Job II-a. MT Dept. of Fish, Wildlife and Parks, Helena, MT 59620, 33pp mimeo.

1989. During the bass tournament 36 anglers fished 612 hours and caught 166 largemouth and 1 smallmouth bass over 12 inches total length. No record was kept of bass caught that were less than 12 inches long.

The WWP user attitude survey was designed primarily to measure recreationists' attitudes about the quality and quantity of recreational facilities on the reservoir. Data collected in 1989 will be compared to a similar survey done in 1983. These data are in the process of being compiled but, in general, numbers of people using recreation facilities increased markedly and satisfaction with the physical facilities and fishing was higher.

RECOMMENDATIONS

Objectives for fiscal year 1991 are listed below:

1. Conduct spring and fall gill net sampling to determine population trends. Correlate catch differences between the "old" and "new" gill nets.

2. Determine relative strengths of 1985-1988 year classes of largemouth and smallmouth bass through analysis of scale samples.

3. Determine strength of the 1989 and 1990 largemouth bass year-classes by shoreline seining.

4. Count brown trout redds in selected streams and stream reaches.

5. Sample brown trout spawning populations to determine if fish planted in 1985 and 1986 are entering the spawning populations.

6. Determine if burbot are reproducing in either or both reservoirs.

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Key Words: brown trout, largemouth bass, smallmouth bass

Waters referred to: Noxon Rapids Reservoir 05-9328
Cabinet Gorge Reservoir 05-8512

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