MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA

PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-4

STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER LAKES

JOB NO.: II-a

JOB TITLE: NORTHWEST MONTANA COLDWATER LAKES INVESTIGATIONS, NOXON RAPIDS AND CABINET GORGE RESERVOIRS SEGMENT

PROJECT PERIOD: JULY 1, 1990 THROUGH JUNE 30, 1991

ABSTRACT

Limiting of annual drawdown of Noxon Rapids Reservoir to 10 feet since 1985 has markedly increased fish populations. Smallmouth bass (Micropterus dolomieui) planted in 1982 and 1983 spawned in succeeding years and appear to be increasing. Largemouth bass (Micropterus salmoides) present in the reservoir since it first filled in 1958 have significantly increased and is the major angler-sought game fish. It now appears that planting brown (Salmo trutta) fingerlings into Noxon Rapids Reservoir and its tributaries have not substantially increased numbers of this species. Whether or not burbot (lota lota) planted in 1985 through 1988 have successfully reproduced has not yet been determined.

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 heel-to-toe, run-of-the-river hydroelectric impoundments with Noxon Rapids extending 38 miles downstream from Thompson Falls, Montana, to near Noxon, Montana. Cabinet Gorge Reservoir is 18 miles long and the dam structure is located about 1/4 mile inside the state of 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.

The Clark Fork River between Thompson Falls and Noxon Rapids Dam was chemically treated to reduce fish populations just prior to closure of Noxon Rapids Dam and immediately planted with large numbers of rainbow trout (Oncorhynchus mykiss). Heavy planting of rainbow trout continued through 1961. Angler harvest rates were excellent from late 1958 through 1961, but declined to very low levels in spring 1962.

Angler use, angler harvest and game fish populations continued to be low in the reservoir through the mid 1980s in spite of being planted with large numbers of rainbow trout, cutthroat trout (O. clarki), brown trout and kokanee (O. nerka), and a small plant of burbot adults. Smallmouth bass planted in the reservoir in 1982 and 1983 survived, have reproduced yearly starting in 1985 and have supported a small but growing angler harvest. Largemouth bass present in the Clark Fork River drainage since the early 1900s have flourished in recent years and are supporting a growing sports fishery.

For the years of 1962 through 1985 the spring draft of Noxon Rapids averaged about 35 feet and lasted 3 to 6 weeks. Starting in 1986 through the present, WWP has limited maximum drafts to about 10 feet, generally during the winter and generally only a maximum to 1 to 2 weeks.

Fishery management activities on Cabinet Gorge Reservoir from the mid-1960s through the present have been very limited since fish from the upper reservoir invade the lower reservoir very rapidly. In recent years Cabinet Gorge has been used as a re-regulating reservoir for Noxon Rapids fluctuating 2 to 4 feet almost daily except when inflow exceeds generating capacity of the Cabinet Gorge powerhouse.

A complete description of management activities in Noxon Rapids and Cabinet Gorge reservoirs prior to 1985 is given in a report entitled "Thirty-two years of fish management, Noxon Rapids and Cabinet Gorge reservoirs, Montana Dept. Fish, Wildlife and Parks, Helena, MT, 1985, by Joe E. Huston.

OBJECTIVES AND DEGREE OF ATTAINMENT

Objectives included three from the Northwest Montana Coldwater Lakes Investigations (F-46-R-3, II-a) and five from the Northwest Montana Warmwater Lake Investigations (F-46-R-3,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. The angler use 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) and Marten 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.

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

Since about 1959 gill net sampling has been the chief method to collect trend information about the fish populations inhabiting Noxon Rapids and Cabinet Gorge reservoirs. At the present time both reservoirs are being managed as primarily largemouth and smallmouth bass fisheries but with attempts to increase brown trout and establish burbot. None of these four fish species are readily taken by gill nets.

Limited beach seining using a 50' x 5' x 1/4" mesh seine was done in fall 1989 and 1990 to capture young-of-the-year bass. Some largemouth bass were caught each year from heavily vegetated shallow areas. Similar efforts in the spring have been futile primarily due to lack of shoreline vegetation resulting from winter drawdown of the reservoirs. WWP purchased a 100' x 10' x 1/2" x 1/4" bag seine for beach sampling which should allow sampling of deeper vegetated areas in the spring.

Net sampling in 1990-1991 included trend gill netting and beach seining as part of a WWP - University of Idaho field exercise in mid-October 1990, gill and trap netting in late February, 1991, gill and trap netting in early May, 1991 and trap netting and beach seining in mid-June, 1991. Data recorded from each netting included lengths and weights of all game fish caught, and lengths and weights of about 50 percent of nongame fish caught. Scales for age and growth analysis were taken from all game fish and from a random sample of yellow perch (Perca flavescens). Department personnel have or will analyze game fish scales while students attending University of Idaho analyzed perch scales for a fisheries techniques course.

Age and growth of largemouth bass were determined from scales from fish collected during net sampling, from anglers and from fish caught by Department personnel for genetic analysis.

Sections of three Noxon Rapids and one Cabinet Gorge reservoir tributaries were to be checked for brown trout spawning activities. As in fall 1989 the 1990 redd counts had to be canceled due to "rain-on snow" flood events. This localized flooding obliterated redds making them impossible to identify with any certainty.

STATUS OF FISH POPULATIONS

Changes in the netting schedule and gear used precludes comparing the 1990-91 catches with previous years' work except in a general sense. The five most abundant species in gill net catches from Noxon Rapids in 1987-89 included yellow perch, black bullhead (Ictalurus melas), largescale sucker (Catastomus macrocheilus), peamouth (Mylocheilus caurinus) and northern squawfish

(Ptychocheilus oregonensis). These same species were the most abundant in gill net catches in 1990-91 irregardless of time of year or location in reservoir. The same species with the exception of black bullheads were the most commonly caught fish from Cabinet Gorge in 1989 as well as 1990-91. Black bullheads were not caught either year.

Trap nets were fished in three areas of Noxon Rapids in early May 1991 and catch varied considerably from site to site. Average catch per net night in the Finley flat area was 19 fish of which 14 were yellow perch. Finley Flat is considered upper-reservoir. Catch at the mid-reservoir area, Trout Creek, was 31 fish of which 26 were yellow perch. Catch in the lower reservoir site, Tuscor Creek, was 126 fish of which 124 were yellow perch. The increasing catch from upper reservoir to lower reservoir is probably related to biomass in each area. Increasing proportion of yellow perch to total catch is probably related to state of spawning activity. Perch at Finley Flat were in a pre-spawning state, water temperature was 49° F. Perch at Trout Creek were starting to spawn and water temperature was 51° F while perch at Tuscor Creek wee well advanced into spawning and temperature was 54° F.

Good numbers of black bullheads were caught in gill nets in both the Trout Creek and Tuscor Creek areas but none were caught in trap nets. Suckers and squawfish were common in gill net catches but rare in trap nets. Both bullheads and suckers are usually easily captured by trap nets. In this case it is proposed that high numbers of perch in and around the trap nets precluded other fish from entering.

This proposition is somewhat supported by the fact that 12 trap nets fished in the Tuscor Creek area June 20, 21, 1991 caught an average of 26 fish of which 24 were perch. Water temperature was 54° F. The remaining fish included brown trout, suckers, bullheads, pumpkinseeds, squawfish and peamouth. Perch were through spawning.

In the May, 1991 sampling nets were set from the shoreline out (traditional method) and 100 yards to 300 yards out into the lake. Catch from the near-shore nets averaged about 10 times the number of fish as the off-shore nets and included about all the fish species living in the reservoir. Catch in the off-shore nets was almost entirely peamouth with an occasional squawfish.

Burbot

Four trap nets and four gill nets were fished overnight in the Finley Flat area February 27, 1991. Purpose of this netting was an attempt to capture burbot. Catch did include four large burbot ranging from 23 to 26 inches total length. Three were released alive and one killed for internal examination. This fish, a female, had not yet spawned. Eggs were fully developed and semi-loose in the egg skein. It was calculated that the other three fish were also females based upon body shape.

Largemouth Bass - Genetic Analysis

Starch gel electrophoresis was performed on a 50-fish sample collected from Noxon Rapids Reservoir and compared to samples collected from Ninepipe Reservoir (Flathead Indian Reservoir), Lee Metcalf Wildlife Refuge near Stevensville, Montana, and Echo Lake near Kalispell, Montana. The University of Montana Population Genetics Laboratory performed the electrophoresis analysis. Comparison of the four samples showed no genetic variation in the Metcalf, Noxon Rapids and Ninepipes samples. The Echo Lake sample had a very small amount of genetic variation.

A University of Montana graduate student has researched and documented the probable source of bass transplanted into western Montana and their method of spreading throughout the Flathead River and Clark Fork River drainages. This information will be submitted to an appropriate journal for publication. Briefly, the first bass planted in western Montana was in Lake Blaine near Kalispell in 1902 and their origin was Mississippi River sloughs in northern Illinois. From Lake Blaine fish escaped into Flathead River and Flathead Lake, then down the Flathead River into the lower Clark Fork River; and thus the present Noxon Rapids Reservoir population. Bass presently found in Ninepipes and the Lee Metcalf Refuge originated from fish seined out of Flathead River sloughs.

Largemouth Bass - Growth

A small number of scales for analysis were collected in 1990 by Department personnel from fish taken by angling, netting and electrofishing. The growth rates of these fish are presented in Table 1 and compared to data collected from bass caught by tournament anglers in 1989.

Table 1. Age and growth rates by year-class of largemouth bass caught by tournament anglers in 1989 compared to bass caught by Department personnel in 1990.

Year Collected	Year-class	Number	I	II	III	IV	V
1989	1985	49	2.9	6.5	9.9	13.0	
1990	1985	5	3.4	7.1	10.7	13.6	14.9
1989	1986	71	3.1	7.6	11.4		
1990	1986	21	3.2	5.9	9.3	11.4	
1989	1987	1	4.0	9.0			
1990	1987	11	2.8	5.3	8.2		

The limited data presented above appears to indicate that growth rates of bass of the same year class were different depending upon year caught. If true, several factors may have influenced this phenomena including incorrect aging and growth calculations, differences in locations of fish capture, sample size, capture method and lastly sex differences. Aging and growth calculation methods were uniform between the two years and were done by the same person. Location of fish capture for 1990 in known but not for the 1989 sample. Potentially tournament bass anglers collected scales from more aggressive bass than did Department personnel in 1989. Sex ratios of tournament caught bass is not known but most bass caught in 1990 were pre-spawning males.

Largemouth Bass - Tournament Angling

At the present time the best evaluation of fishing success has been records from bass tournaments. In 1990, two tournaments were held on Noxon Rapids Reservoir; one June 16-17, 1990 and the other August 11-12, 1990. Catch records for these two tournaments are shown in Table 2 below. Data presented includes fish 12 inches long or longer.

Table 2. Bass tournament catches, Noxon Rapids Reservoir, 1990.

	June 16-17	August 11-12
Number of anglers	60	41
Total hours fished	960	615
Number bass caught	364	240
Catcher per hour	0.38	0.39
Catch by size group		
12.0 - 13.9 inches	49%	44%
14.0 - 15.9 inches	44%	43%
16.0 inches and longer	7%	13%

Largemouth Bass - Young-of-the-Year

Beach seining was done October 20, 1990, in both Noxon Rapids and Cabinet Gorge reservoirs at the same places seined October 14, 1989. The seine used was 50 feet long, 5 feet deep and 1/4 inch bar measure mesh. No largemouth bass were captured from Cabinet Gorge Reservoir. Only 26 largemouth bass were captured in Noxon Rapids Reservoir compared to 104 in 1989. Fish in the 1990 sample varied from 1.6 inches to 3.3 inches and averaged 2.6 inches. The average size of bass in 1989 was 2.1 inches and ranged from 1.2 to 3.4 inches.

Beach seining done May 3, 1991, using the above described seine caught no bass in Noxon Rapids Reservoir. Lack of success was primarily related to not being able to reach into the vegetated substrate. Seining was done June 20, 1991 using a 100 feet long, 10 feet deep, 1/4 inch square mesh bag seine. Catch of largemouth bass include 1 young-of-the-year (1990 year-class) and 3 yearling (1989 year-class) bass.

Largemouth bass had started spawning a few days before the June 16-17, 1990 tournament. Department personnel acting as scorers recorded several ripe male and female bass being caught. Cool temperatures immediately following the tournament appeared to stop spawning activities and they did not resume until late June. Observations by project personnel indicated that the bulk of largemouth bass spawning occurred in the first half of July 1990. In 1991 spawning had not started June 21, but did start July 6, 1991. Some largemouth were still spawning July 23, 1991.

Brown Trout

About one million brown trout eggs and fingerlings were planted in Noxon Rapids Reservoir and four tributaries between 1985 and 1989. Capture of brown trout in gill nets has always been scant but only 13 brown trout were caught in the fall, 1989 and spring 1990 gill and trap netting. Brown trout redd counts scheduled in reservoir tributaries in fall-winter 1990 had to be canceled because of fall-winter floods from rain-on-snow events.

Beach seining done in the Vermillion bay area June 20, 1991 caught five brown trout ranging in size from 4 to 6 inches long.

PROGNOSIS ON RESERVOIR FISHERIES

Cabinet Gorge Reservoir

It is the author's opinion that operation of Cabinet Gorge Reservoir has decreased the sports fishery potential more than any other factor. Daily fluctuations of up to four feet is considered the major reservoir operation having a deleterious action. Almost daily fluctuations throughout the year dewater largemouth bass spawning areas and limit aquatic insect production.

Cabinet Gorge has the potential of supporting a larger brown trout population than Noxon Rapids due mostly to better spawning tributaries. The Bull River drainage contains as much or more brown trout spawning area than all Noxon Rapids Reservoir tributaries combined. Elk Creek, tributary to Cabinet Gorge contains significant spawning potential also but natural barriers near the mouth currently block upstream passage by fall spawning fish. Department and WWP biologists feel that passage through or around these chutes could be established.

The WWP is currently reviewing operation of the Cabinet Gorge powerhouse which could result in changing the current reservoir operation.

Noxon Rapids Reservoir

Sampling of the fish population of Noxon Rapids Reservoir since the late 1950s shows that the sports fishery potential has been increased by limiting drawdown starting in 1986. Management objectives have also changed from trying to establish a coldwater fishery to a mix of mostly warmwater species (bass) and more tolerant coldwater species (brown trout and burbot).

Effects of planting burbot and brown trout have not been determined. The author suspects that burbot will become established in Noxon Rapids at a low yet a reproducing population. It is also thought that planting large numbers of brown trout will not result in a substantial increase in numbers. It is anticipated that redd counts in the next few years will double or triple over that found in 1988. Still, increases from 10-15 redds to 30-45 is not a real increase after planting of almost a million fish and eggs.

No effort was made to sample smallmouth bass populations in 1990-91. Anglers reported good to excellent catches of smallmouth in the upper ten miles of the reservoir in spring 1991. The greatest bulk of the angler catch was reported to be 11 to 13 inches long and has to be reproduction from fish planted in 1982 or 1983. It is likely smallmouth bass will continue to thrive in the upper 15 miles of Noxon Rapids and, in addition, establish themselves as a reproducing population in the upper 3 miles of Cabinet Gorge Reservoir. In the event smallmouth bass do not sustain themselves a good possibility exists that a viable fishery can be maintained by planting hatchery fish.

Largemouth bass have always been present in Noxon Rapids Reservoir, but in insignificant numbers until 1986 and later. It appears that the present population which has been supporting a good fishery may be largely dependent upon the 1986 and 1987 year classes. Subsequent year classes are thought to be weaker and possibly not able to sustain the current level of fishing success. Year class strengths subsequent to 1986-87 may be in the range normal to a long standing population but anglers may not accept this as the normal expected population structure. It is also a good likelihood that some future year classes may be very weak or absent. A combination of a cold spring and cold fall could delay bass spawning and cause a short growing season resulting in poor to nil reproductive success.

Another unknown factor is that the present population has no genetic diversity. Would the bass population perform better or withstand adverse conditions better if it had more genetic variability?

Largemouth and smallmouth bass are most abundant predator game fish species in the reservoir at the present time. Small numbers of northern pike (Esox lucius) have been present in the reservoir since the mid-1960s, but the few pike caught have all been large mature fish which were thought to be drift from upstream sources above Thompson Falls Dam. The 1990-91 catch did include two fish about 15 inches long which may represent successful reproduction within the reservoir since spring drawdowns were minimized.

Increasing numbers of pike competing with and possibly preying on bass could have long-term deleterious effects upon bass populations. Control of northern pike numbers could be done through manipulation of reservoir elevations. Pike spawn in late April - early May in shallow shoreline areas well within reach of a 5 to 10-foot drawdown. Surveys should be made of potential pike spawning areas to better define time of year, water temperature, depths, duration and areas of spawning. WWP could then be asked to schedule its normal reservoir manipulation to dewater the eggs.

In the past year three lake trout have been caught by anglers in Noxon Rapids. Likely these fish were pioneering downstream out of Flathead Lake. Addition of lake trout to the reservoir's fish population would add another efficient predator to the system. It is the author's opinion that lake trout will remain rare based on a lack of reservoir substrate suitable for successful reproduction.

RECOMMENDATIONS

1. Reservoir fish sampling

Trend sampling using gill nets in the spring and fall is ineffective to measure game fish present in either Noxon Rapids or Cabinet Gorge reservoir. A new sampling scheme should be geared toward individual species and should include:

A. Burbot - Sampling to determine extent of natural reproduction should be all that is done. Burbot appear to be most susceptible to capture at water temperatures between 38° to 55° F. They do enter trap nets readily and gill nets. Burbot sampling should be done using trap nets as the primary gear and gill nets as the secondary tool. Sampling will have to be done in late fall, winter and early spring to meet the temperature criteria. Sampling should not be done at temperatures above 50° F to avoid capturing large numbers of spawning yellow perch.

B. Brown trout - Redd counts should be made, water conditions allowing, annually in Prospect Creek, Graves Creek, Marten Creek and Vermilion River, all tributaries of Noxon Rapids Reservoir and Bull River tributary to Cabinet Gorge Reservoir. Elk Creek, tributary to Cabinet Gorge Reservoir, should be visually checked between the reservoir and the first barrier to determine if brown trout are attempting upstream passage.

C. Smallmouth bass - Sampling to determine status of smallmouth bass populations will be difficult. Smallmouth are most numerous in Noxon Rapids from Thompson Falls Dam downstream to Finley Flat, a distance of about 10 miles. The reservoir here is characterized by steep banks, narrow channel and visible current throughout the year. Effective netting and seining is very limited due to the water current and steep banks. Electrofishing is likely the most efficient method but it is limited by deep water and steep slopes. Water clarity even during the summer is poor, limiting visibility to about 4 to 6 feet. It is

recommended that electrofishing transects be set up and worked during the spring in clear water at night and in the late spring in muddy water during daylight hours.

D. Largemouth bass - Sampling to determine status of largemouth bass will be difficult but not as difficult as for smallmouth bass. Largemouth bass are most numerous from about Vermilion Bay downstream to Noxon Rapids Dam in Noxon Rapids Reservoir and from the Noxon bridge to Bull River Bay in Cabinet Gorge Reservoir. Suggested sampling scheme is presented by reservoir;

Cabinet Gorge Reservoir - Until such time as fluctuations of Cabinet Gorge are reduced very little fisheries effort should be directed at Cabinet Gorge largemouth bass. It is recommended that visual observations be made on bass spawning in the following known spawning areas: Hereford and Bachman sloughs and Noxon Bay between the goose islands and abandoned railroad grade. If time permits, beach seining should be done in these areas during the fall University of Idaho fisheries techniques class.

Noxon Rapids Reservoir - The largemouth bass area of Noxon Rapids Reservoir is about 22 miles in length and encompasses about 6,500 surface acres. Most of the area is characterized by steep shorelines dropping off to flats ranging from 15 to 35 feet deep extending to the banks of the original Clark Fork River channel. Shallow shoreline benches less than 10 feet deep are scarce and generally less than 1 acre in size. Reservoir topography makes effective sampling difficult.

Sampling should consist of the following items:

Beach seining should be done spring and fall in at least four areas including the two areas seined in fall 1989 and 1990. These latter areas are Marten Creek Bay between the Marten Creek Bay road fill and the Marten Creek boat landing, and Vermilion River Bay along the east shoreline on the reservoir side of the Vermilion Bay roadfill. The two new areas should be located near Tuscor Creek and between Swamp Creek and McKay Creek. Equal efforts should be made at each area between years so that some measure of year-class strength of young bass is obtained.

Bass nest counts could be made in and around the seining sites each year following completion of spawning. Dates and water temperatures spawning starts and stops would be recorded.

Sampling of older age bass will likely best be done by electrofishing throughout the year. Summertime boat electrofishing is often difficult because of dense submerged and emergent vegetation so work would best be done in late spring and early summer. Bass will enter trap and gill nets when water is discolored to muddy. Noxon Rapids usually gets off color to muddy most springs and it is recommended that some netting be done at that time.

E. Other fish species - Gill net sampling using established netting areas should be continued in October each year as long as the University of Idaho fisheries techniques class is held on the reservoirs. Number of nets set per station will depend upon number of net pickers but should range between 8 and 16 nets per station. Students will also become involved in fall beach seining and other sampling techniques.

F. Specialized sampling - Considerable amounts of commercially-made habitat structure will be placed in Tuscor Creek area of Noxon Rapids Reservoir in September 1991. Effects of this "habitat improvement" project will be determined using available techniques including seining, trap and gill netting, electrofishing and underwater observations.

2. Northern largemouth bass having good genetic diversity should be planted in Noxon Rapids Reservoir. These fish must be certified northern largemouth and genetic patterns must be recorded.

Prepared by: Joe E. Huston

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

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