F-78-R-1 IIa
Region 1

MONTANA FISH, WILDLIFE & PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE:	MONTANA	PROJECT TITLE:	STATEWIDE FISHERIES INVESTIGATIONS
PROJECT NO.:	F-78-R-1	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, 1994 THROUGH JUNE 30, 1995

ABSTRACT

Water yield in the Clark Fork River basin for 1994 was one of the lowest since Noxon Rapids Reservoir was built in 1958. Washington Water Power Company (Company) was able to operate Noxon Rapids Reservoir within the ten foot drawdown limit per a 1985 operation agreement. The Company and Department collected and had genetically analyzed fish from six streams tributary to Noxon Rapids Reservoir and all six were found to be pure westslope cutthroat trout (*Onchorynchus clarki lewisi*). These six samples completed the genetic survey of reservoir tributaries. Reservoir work included oversight on fish collection activities of Company crews throughout the report period. Company personnel performed extensive surveys of fish populations to collect baseline information prior to relicensing of both Noxon Rapids and Cabinet Gorge hydroelectric facilities.

Information presented in this report is limited to age and growth data from reservoir dwelling game fish, trend beach seining for largemouth bass (*Micropterus salmoides*) young-of-the-year in October 1994 and spawning surveys of bull trout (*Salvelinus confluentus*) and brown trout, (*Salmo trutta*). Reports containing other information on reservoir fishes, limnology and aquatic entomology and tributary habitat surveys and fish are available from Washington Water Power Company, Spokane, Washington.

BACKGROUND

Cabinet Gorge Reservoir, completed in 1951 and Noxon Rapids Reservoir, completed in 1958, are owned and operated by the Washington Water Power Company, 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 7,900 acres at 2,331 feet msl.

In 1985 WWP entered into a new Noxon Rapids Reservoir operating agreement with the Bonneville Power Administration. Briefly, this agreement stated that the maximum annual draft under normal circumstances would be no more than ten feet, daily fluctuations would not be more that two feet, and that during the period of May 15-September 30 maximum drawdown would be limited to 4 feet. Non-normal circumstances that could result in a drawdown of more than ten feet include that in the second and succeeding years of a critical water year the reservoir may be drafted but on a proportional basis with other reservoirs within the region. In recent years, Cabinet Gorge has been used as a re-regulation reservoir for Noxon Rapids, fluctuating 2 to 4 feet almost daily except when inflow exceeds generating capacity of the Cabinet Gorge and Noxon Rapids powerhouses.

Fisheries management emphasis has shifted from trout to a combination of brown trout, largemouth and smallmouth bass. Smallmouth bass were introduced into Noxon Rapids in 1982 and 1983. Brown trout and largemouth bass were present in the Clark Fork River prior to impoundment, existed in small numbers prior to 1985 and have increased since 1985.

OBJECTIVES AND DEGREE OF ATTAINMENT

Activity 1 - Survey and Inventory

Objective: To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters.

This objective was attained. Department personnel had oversight of Company fishery survey activities on Noxon Rapids and Cabinet Gorge reservoirs and their tributary streams. Company reports detail results of these surveys. This report lists results of three activities and includes age and growth of most gamefish, survey trend sampling of young-of-the-year largemouth bass and trend counting of bull and brown trout redds in selected tributaries.

Activity 2 - Fish Population Management

Objective: To implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors.

This objective was partially attained. About 3,000 burbot (*Lota lota*) were planted in Noxon Rapids Reservoir in the mid 1980s. Another 300 were planted in Cabinet Gorge Reservoir and 23 were placed in Triangle Pond in 1987. No burbot have been caught by either the Company or Department since 1990 in Noxon Rapids Reservoir, while two a year have been caught in each of 1993 and 1994 in Cabinet Gorge Reservoir. Transplants into these reservoirs should be considered a failure. Fishermen have reported catching burbot ranging from 6-8 inches long up to 30 inches in length from Triangle Pond for at least the last three years. Size distribution strongly implies natural reproduction since fish planted in 1987 were all adults ranging upwards of 24 inches in length. Triangle Pond is a seven acre lake alongside Cabinet Gorge Reservoir created during construction of the above-named impoundment.

About 65,000 young-of-the-year bass were planted in Noxon Rapids and 25,000 in Cabinet Gorge Reservoir in August, 1994. Purpose of this planting is two-fold: (1) in Noxon Rapids Reservoir to increase genetic diversity of the bass; and (2) in Cabinet Gorge to increase genetic diversity and to supplement annual reproduction which is limited by reservoir operations.

Genetic analysis of largemouth bass collected from Noxon Rapids Reservoir clearly indicated that the residual fish had no genetic diversity. Reasons for this very low to non-existent diversity may be published in an appropriate journal.

Activity 3 - Technical Guidance
Objective: To review projects by government agencies and private parties which have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources.

This objective was attained. Department biologists consulted with Company personnel on organization and content of the Company's pre-relicensing fishery surveys. The Department also provided the Company with survey equipment and age-growth analysis of reservoir gamefish.

Activity 4 - Aquatic Education
Objective: To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment.

This objective was attained. Department personnel attended area sportsmen groups meetings. They also participated in a "kids fishing clinic."

PROCEDURES

1. Genetic Sampling - Fish for genetic analysis were collected using a backpack electrofisher, by hook and line or by percussion sampling. Genetic analysis was done by the University of Montana Wild Trout and Salmon Genetics Laboratory.

2. Largemouth Bass - Beach seining was done October 16, 1994 between the Martin Bay Boat Launch and the county road to capture young-of-the-year largemouth bass. This area has been seined yearly in October starting in 1989. Fish captured were enumerated, measured, scales taken from some fish, and then released.

3. Bull and Brown Trout Spawning - Bull trout and brown trout redd counts were made in key reservoir tributaries of both Cabinet Gorge and Noxon Rapids reservoirs. Bull trout redds were counted in October 1994 while brown trout redds were counted in late December 1994, early January 1995.

4. Age-Growth - Fish scales collected by Company personnel were read and analyzed assuming a straight line relationship between scale length and fish length and a zero intercept. These assumptions were used to maintain continuity between the 1994 analysis and previous years' data going back to 1958.

FINDINGS

Genetic Sampling - Twenty-five fish samples were collected from six streams in the Noxon Rapids Reservoir drainage. Three samples from the Prospect Creek drainage were all pure westslope cutthroat trout. However the sample from the creek draining the Blossom lakes did contain a pure rainbow trout (*O. mykiss*). This one fish had to have been a migrant out of Lower Blossom Lake in which rainbow trout had been planted on top of stunted brook trout (*Salvelinus fontinalis*) in 1988 and 1989. The other two samples were from Evans Gulch and main Prospect Creek at Twenty-three Mile Creek. Evans Gulch is the outlet of Evans Lake which also contains a stunted brook trout population. Brook trout were scarce in Evans Gulch, the Blossom Lake outlet and Prospect Creek at Twenty-three Mile Creek.

Another sample determined to be pure westslope cutthroat trout was collected from Swamp Creek about three to four miles upstream from the road-end and about five miles downstream from Wanless Lake. Wanless Lake within the Cabinet Wilderness area is populated by a hybrid swarm of westslope and Yellowstone cutthroat (*O. clarki bouvieri*) that originated from one or two plantings of the latter species in the early 1930s. Fish collected in East Fork Trout Creek and from Little Beaver Creek were also analyzed as pure westslope cutthroat.

Largemouth Bass - Shoreline seining to capture young-of-the-year largemouth bass was done October 16, 1994 at the standard Marten Bay seining areas. This area has been seined in mid-October annually since 1989. Average catch per seine haul in 1994 was 34 fish which averaged 3.0 inches long and ranged from 2.1 inches to 4.6 inches total length. Average catch per seine haul in 1993 was only 0.8 fish that averaged 1.9 inches long.

Successful largemouth bass spawning in 1993 was almost non-existent primarily related to very variable spring weather delaying spawning until mid July or later. Largemouth bass spawning in 1994 was very successful and related to an early spring, mild temperatures, little weather variation and very low reservoir inflows and outflows. Most largemouth bass spawning in 1994 was completed by early July.

Twenty-seven seine hauls were made in Cabinet Gorge Reservoir in fall 1994 that caught 10 young-of-the-year largemouth bass that averaged 2.6 inches long. Largemouth bass spawning and spawning success in Cabinet Gorge Reservoir is largely controlled by operation of Noxon Rapids and Cabinet Gorge Reservoirs. Water released from Noxon Rapids Reservoir into Cabinet Gorge is taken at penstock depth of 56 feet and is colder than surface temperatures of Noxon Rapids. Cabinet Gorge Reservoir also fluctuates up to four feet daily which dewaters most of the historic bass spawning sites.

Largemouth bass spawning in 1995 is very likely to be delayed due to weather conditions and high reservoir inflows. Very little spawning had occurred by early July, 1995; therefore it is predicted that spawning success as measured by fall beach seining will be poor and probably as poor as 1993.

Bull and Brown Trout Spawning - Bull and brown trout redd counts were only made in key spawning tributaries of both reservoirs; Bull River for Cabinet Gorge Reservoir and Vermillion River and Prospect Creek for Noxon Rapids Reservoir. Redd counts for both species were adversely affected by natural events; i.e., a fall flood in mid-October, 1994 that was thought to have obliterated some bull trout redds and a very warm winter that delayed brown trout spawning about a month into January 1995.

Number of bull trout redds located in Bull River was 23, in Vermillion River, 9, and in Prospect Creek, 10. Number of redds located in Bull River was higher than the previous two years while redd counts in Prospect Creek was about the same and much lower in Vermillion River. These redd counts were made November 2 and 3, 1994.

Brown trout redd counts were made December 15 and 16, 1994 and none were found in Prospect Creek, 17 in Vermillion River and 53 in Bull River. A spot check of selected areas of Prospect Creek and Bull River was made January 5, 1995 and redds found in Prospect Creek had increased to three. The area of Bull River rechecked had increased from 10 redds in December to 30 in January. This area has averaged 40-45 redds in past years. No additional redd counts were made after January 5, 1995.

Age and Growth - Scales for age and growth analysis were collected from largemouth and smallmouth bass, brown trout, bull trout, rainbow trout and cutthroat trout from both reservoirs and from northern pike (*Esox lucius*), and six walleye (*Stizostedium vitusum*) in Noxon Rapids Reservoir. The walleye were from an illegal plant made by person(s) unknown. Age and growth data for salmonids is listed in Table 1.

The small number of salmonids aged precludes statistical comparisons of growth rates. However a generalization is that growth of salmonids in Cabinet Gorge Reservoir is somewhat better than fish from Noxon Rapids Reservoir.

Age and growth for largemouth and smallmouth bass from Noxon Rapids Reservoir and Cabinet Gorge Reservoir and for walleye from Noxon Rapids is presented in Table 2. It is known that natural reproduction of largemouth bass in Cabinet Gorge is minimal and that smallmouth reproduction is probably non-existent. Therefore, most of the largemouth bass caught in Cabinet Gorge were the result of a 1993 hatchery plant or escapement out of Noxon Rapids. Likely all of the smallmouth were escapement from Noxon Rapids or transported by person(s) unknown from Noxon Rapids. Growth rates and longevity appear to be better in Noxon Rapids than Cabinet Gorge for both species of bass.

Table 1. Age and growth of salmonids collected from Noxon Rapids and Cabinet Gorge reservoirs in 1994.

		Length in Inches at Annulus						
Reservoir	Species	I	II	III	IV	V	VI	VII
Noxon Rapids	Cutthroat Trout	3.0(3)*	5.2(3)	9.4(1)	11.2(1)	13.7(1)		
Cabinet Gorge	Cutthroat Trout	3.2(2)	5.9(2)	10.7(2)	13.6(2)			
Noxon Rapids	Rainbow Trout	2.8(10)	6.0(7)	7.5(1)				
Cabinet Gorge	Rainbow Trout	2.9(29)	6.4(19)	12.4(6)	15.1(4)	18.3(3)		
Noxon Rapids	Bull Trout	3.8(7)	7.3(7)	10.8(6)	16.2(4)	22.3(1)	26.5(1)	
Cabinet Gorge	Bull Trout	3.7(4)	7.1(4)	11.0(4)	16.5(2)			
Noxon Rapids YOY smolts	Brown Trout	3.6(8)	8.2(6)	13.5(6)	16.3(5)	18.5(1)		
Cabinet Gorge YOY smolts	Brown Trout	3.7(6)	8.4(6)	13.9(5)	17.6(4)	21.2(2)		
Noxon Rapids 1 year smolts	Brown Trout	2.8(21)	6.9(21)	10.5(17)	16.0(14)	22.6(8)	23.2(2)	26.0(1)
Cabinet Gorge 1 year smolts	Brown Trout	2.8(41)	7.4(22)	12.7(15)	16.7(14)	20.0(9)	22.6(3)	
Noxon Rapids 2 year smolts	Brown Trout	2.4(11)	4.6(11)	9.0(9)	12.3(8)	17.8(3)		
Cabinet Gorge 2 year smolts	Brown Trout	2.5(12)	4.8(12)	10.6(6)	15.0(5)	17.5(1)		

*Number in parenthesis is sample size.

Table 2. Age and growth of largemouth and smallmouth bass and walleye pike, Noxon Rapids and Cabinet Gorge reservoirs, 1994.

		Length in Inches at Annulus											
Reservoir	Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Cabinet Gorge	Largemouth Bass	2.2 (12)*	5.0 (12)	8.9 (6)	11.0 (3)	12.8 (3)	14.5 (3)	15.5 (2)	16.4 (1)				
Cabinet Gorge	Smallmouth Bass	2.2 (15)	4.7 (15)	8.5 (8)	10.8 (8)	13.8 (2)	14.9 (1)	15.9 (1)					
Noxon Rapids	Largemouth Bass	2.9 (189)	6.2 (183)	9.9 (182)	12.4 (166)	14.5 (101)	16.0 (68)	17.3 (35)	18.4 (11)	19.4 (6)	20.1 (2)	20.8 (1)	
Noxon Rapids	Smallmouth Bass	2.7 (224)	5.7 (206)	9.1 (137)	11.5 (94)	13.0 (54)	14.6 (23)	15.9 (14)	16.7 (6)	18.9 (1)			
Noxon Rapids	Walleye	3.5 (6)	7.5 (6)	11.1 (6)	14.4 (5)	17.2 (5)	22.4 (1)						

*Number in parenthesis is sample size.

Rumors around the towns of Trout Creek and Noxon indicate that walleye were illegally planted in the lower part of Noxon Rapids Reservoir in the early spring 1994 and that they originated from Lake Roosevelt (Grand Coulee Reservoir) in the state of Washington. Walleye growth rates presented here, although indicative of where the fish originated, may give some background information if the illegal plant(s) do succeed in establishing a walleye population.

RECOMMENDATIONS

Washington Water Power's original study plan for pre-licensing fishery studies called for effort starting in April 1994 and ending in June 1996. However that has been shortened 12 months with major fish sampling efforts terminated June 1995. Additional major studies may be undertaken starting in spring 1996 following scoping meetings with state and federal fisheries and wildlife agencies and other interested groups such as water quality specialists, Trout Unlimited, Clark Fork Coalition and individual people.

In the interim the Montana Department of Fish, Wildlife and Parks will continue to collect, with WWP cooperation, data on bass spawning success, age and growth of game fish in the reservoirs and bull and brown trout spawning utilizing redd counts.

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Date: July 19, 1995

Key Words: Brown trout, largemouth bass, smallmouth bass, age and growth.

Waters referred to:

Noxon Rapids Reservoir	05-9328
Cabinet Gorge Reservoir	05-8512
Bull River	05-0864
Vermillion River	05-7712
Prospect Creek	05-5648
Evans Gulch	05-2656
Little Beaver Creek	05-4016
Swamp Creek	05-7088
E.F. Trout Creek	05-2448