MONTANA FISH, WILDLIFE & PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE:	MONTANA	PROJECT TITLE:	STATEWIDE FISHERIES INVESTIGATIONS
PROJECT NO.:	F-46-R-7	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, 1993 THROUGH JUNE 30, 1994

ABSTRACT

Washington Water Power Company (WWP) was able to operate Noxon Rapids Reservoir within the confines of the 1985 operation agreement during the report period. The WWP, U.S. Forest Service (USFS) and Montana Department of Fish, Wildlife and Parks (DFWP) continued a cost-share agreement to do biological and physical survey of all tributaries of Noxon Rapids and Cabinet Gorge reservoirs. This agreement started in 1992 should continue through about 1996. Hankin-Reeves surveys were completed on the Bull River Drainage, Rock Creek Drainage and Blue Creek Drainage, all tributary to Cabinet Gorge Reservoir. Fishery surveys were also completed on the same streams while preliminary surveys were completed on all Cabinet Gorge tributaries. Samples of suspected westslope cutthroat trout (*Onchorynchus clarki lewisi*) for genetic analysis were collected from nine streams. Of these, five streams did contain pure westslope cutthroat trout.

Reservoir work included oversight on the fish collecting activities of Northrup, Devine and Tarball (NDT), a consulting firm under contract with WWP and WWP fisheries personnel. Field work done by DFWP personnel included monitoring a bass tournament on Noxon Rapids Reservoir May 18-20, 1994, beach seining for largemouth bass (*Micropterus salmoides*) young-of-the-year in October 1993 and checking all tributaries for bull trout (*Salvelinus confluentus*) and brown trout (*Salmo trutta*) redds in fall, early winter 1993.

Laboratory work included age and growth analysis of fish scales collected from stream fish and largemouth and smallmouth bass (*Micropterus dolumieui*) scales collected from fish taken in Noxon Rapids Reservoir.

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 8,600 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 than 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-regulating reservoir for Noxon Rapids, fluctuating 2 to 4 feet almost daily except when inflow exceeds generating capacity of the Cabinet Gorge and Noxon Rapids powerhouse.

Fisheries management emphasis has shifted from trout to a combination of brown trout, largemouth and smallmouth bass. Smallmouth bass were planted in 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 ATTACHMENT

Objectives included two from the Northwest Montana Coldwater Streams Investigations (F-46-R-5, I-a), three from the Northwest Montana Coldwater Lakes Investigations (F-46-R-5, II-a and five from the Northwest Montana Warmwater Lakes Investigations (F-46-R-5, III-a). These objectives were:

Northwest Montana Coldwater Streams Investigations

5. To maintain fish populations and harvest at acceptable levels to provide 163,300 angler days of use by 1992 and a catch rate of 0.5 fish/hour or greater. Objective was attained.

7. To maintain or expand populations of species of special concern (westslope cutthroat trout, bull trout and inland rainbow trout). Objective was accomplished. Five streams of a total of fourteen samples contained pure westslope cutthroat trout.

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 ten feet.

2. 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.

3. Attempt to acquire sites and provide facilities on all lakes and reservoirs capable of sustaining more than 300 man days of fishing per year on a priority basis at the rate of one lake per year. This objective was met. Complete renovation of the Flatiron Ridge Fishing Access Site was started in April 1993 and was completed in 1993. WWP added handicapped person access facilities to two boat ramps.

Northwest Montana Warmwater Lake Investigations

1. Establish and maintain fishable populations (catch rate = 0.25 fish/hour) of smallmouth bass and burbot in Noxon and Cabinet Gorge reservoirs. Objective was partially met. Smallmouth bass planted in Noxon Rapids Reservoir have established a fishable population and population structure includes year-classes of fish from 1986 through 1994. Small numbers of smallmouth bass are now present in Cabinet Gorge Reservoir and anglers do catch them. Burbot have not been caught in Noxon Rapids Reservoir but have been caught in Cabinet Gorge Reservoir.

2. Attempt to acquire and develop access sites on all lakes and reservoirs with the potential for more than 500 man days 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.

3. Enhance fish populations through the placement of artificial habitat. This objective was met. The USFS, WWP, DFWP and local fishing clubs cooperated in constructing and placing commercially made habitat in a 15 acre Noxon Rapids Reservoir bay located near Larchwood.

4. 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.

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

PROCEDURES

Stream Survey - Fish population numbers were estimated using a Coffelt BP2 backpack electrofishing gear and doing two or three pass removal estimates. Fish for genetic analysis and species composition were collected by electrofishing, percussion sampling, hook and line and visual observation. Physical habitat and habitat types related to fish numbers were measured using the Hankin-Reeves methodology, snorkeling and some electrofishing.

Fish sampling for species composition and genetic analysis is detailed in the F-46-R-7, Job Ia, IIa report (Huston 1994, in prep.) report. Hankin-Reeves surveys and related fish numbers will be detailed in Washington Water Power Reports.

Reservoir Sampling - Methods used to sample fish populations in both reservoirs included intensive trap netting, some gill netting with standard experimental nets, snorkeling, limited boat-mounted electrofishing and beach seining. Most of the findings will be presented in WWP or Northup, Devine and Tarbell, Inc. reports.

Bull and Brown Trout Spawning - All streams tributary to both reservoirs known to have or potentially have spawning runs of either or both bull trout and brown trout were checked for redds. Bull trout redd counts were started in late September and extended through early November while brown trout redd counts started in mid-November and lasted through late December.

STATUS OF RESERVOIR GAMEFISH POPULATIONS

This section will detail work done by joint DFWP-WWP crews but only give a brief overview of work done by WWP or NDT personnel.

Burbot - No burbot were caught by any method in Noxon Rapids Reservoir while two were caught in Cabinet Gorge Reservoir. Fate of the burbot planted into the two reservoirs is still undecided. However, local anglers reported catching reasonable numbers of burbot out of Triangle Pond that ranged in size from 6-30 inches long that would indicate reproduction has taken place at that location. Triangle Pond is an eight-acre gravel pit adjacent to Cabinet Gorge Reservoir.

Largemouth Bass - Shoreline seining to capture young-of-the-year bass was done October 16, 1993 at the standard Marten Bay seining areas. This area has been seined in mid-October annually since 1989. Number of young-of-year bass caught per seine haul in 1993 was only 0.8 fish compared to a low of 5.0 in 1990 and a high of 25 in 1989. Average size of the four fish caught in 1993 was 1.9 inches compared to the previous low of 2.1 inches in 1989. The low catch of young-of-the-year largemouth reinforces the opinions, based on visual observations, that largemouth bass spawning in 1993 was very poor. Causative factor was thought to be the very variable weather during late spring and early summer of 1993.

The 1994 BASS Western Division bass tournament was held on Noxon Rapids Reservoir May 25-17, 1994. During this three day tournament the 127 entrants fished about 3,400 hours and caught 1,090 bass over 12 inches long that were entered in the tournament. The tournament was scored on weight and the 1,090 fish weighted 1,892 pounds. The largest bass, a largemouth, weighted 5.44 pounds. The ratio of largemouth bass to smallmouth bass was approximately four largemouth to one smallmouth.

Scale samples collected from largemouth bass in 1993 were aged and growth rates calculated. These data were combined with age-growth data collected since 1987 and are presented in Table 1 as growth increments by growth year for each year-class of fish present in the samples. The growth increments highlighted in the table as those that are significantly greater or lesser than the average for that growth year.

Aging of largemouth bass collected in April through September in most years since 1987 shows that largemouth form their annulus between June 15 and July 15 most years. The younger, non-spawning fish appear to lay down their annulus earlier than the older spawning fish. The growth year for largemouth bass in Noxon Rapids Reservoir was arbitrarily set as starting in July and ending in June the following year.

The data in Table 1 appears to indicate that largemouth bass growth rates by growth year were variable except in 1992-93 when fish younger than five years old all grew at an above average rate. Reasons for this upsurge in growth rates should be researched by the WWP fisheries personnel and possibly compared to growth years 1988-89 or 1990-91 when growth rates were average to slightly below average. It must be pointed out that the Table 1 data was derived from only 484 fish and could be biased by this low number of samples.

The NDT personnel observed very few largemouth bass spawning nests in 1993 and most of those observed were in mid to late July. The WWP personnel observed largemouth bass starting to build nests about June 20, 1994, but a sudden change in weather June 25-26, 1994 stopped nesting activities. Largemouth bass started spawning activities again a day or two later.

Smallmouth Bass - Age-growth data from 164 scales analyzed since 1988 are presented in Table 2. Analysis of scales collected from April through September indicate that most smallmouth bass form their annular mark from May 15 through June 15 with the younger, non-spawning fish laying down the mark earlier than older, spawning fish. The limited data indicate that, like largemouth bass, smallmouth growth rates were above average for most year-classes for the 1992-93 growth year and somewhat below average for 1990-91.

Smallmouth bass were first planted in Noxon Rapids Reservoir in 1982 and 1983 and the first reproduction was observed in 1986. Aging of scales indicates some successful spawning did occur in 1985. The NDT personnel did not observe smallmouth bass spawning in 1993. The WWP observed that smallmouth spawning had commenced by late May, 1994, was stopped by weather in mid-June, restarted about June 20, was stopped by weather June 25-26, and restarted 2-3 days afterwards. Some smallmouth eggs had hatched and schools of fry dispersed by mid-June, 1993.

Table 1. Annual increment in inches by growth-year (July-June) of largemouth bass from Noxon Rapids Reservoir.

Year Class	Growth Year											
	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991	1991-1992	1992-1993
1981	2.7	2.7	3.8	3.2	2.0	2.0						
1982		3.0	3.0	3.4	2.7	2.1	1.6	1.7				
1983			2.6	2.6	3.5	2.9	1.9	2.1	1.9	1.4		
1984				3.3	4.2	2.8	2.5	2.0	1.7	1.4	1.2	0.8
1985					3.0	2.5	4.4	3.1	1.7	1.2	1.1	1.0
1986						3.2	3.8	3.7	1.8	2.3	1.0	1.5
1987							3.1	3.1	3.2	2.9	1.8	2.0
1988								2.9	3.3	3.4	2.8	2.7
1989									2.9	3.6	3.4	3.3
1990										2.9	3.6	4.4
1991											2.7	4.8

Above Average @ 95% C.L.

Below Average @ 95% C.L.

Table 2. Annual growth increment in inches by growth year (June-May) of smallmouth bass from Noxon Rapids Reservoir.

Year Class	Growth Year 1983-1984	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991	1991-1992	1992-1993
1983	2.9	3.3	3.2	2.7	2.4	2.2				
1985			2.3	4.9	2.5	2.8				
1986				3.1	3.3	1.7	4.2	1.7	1.0	
1987					2.9	3.2	4.1	2.7	1.5	1.3
1988						2.6	3.5	3.6	2.2	
1989							2.7	3.5	3.3	2.7
1990								3.0	3.3	4.3
1991									2.7	5.1
1992										3.4

Above Average @ 95% C.L.

Below Average @ 95% C.L.

Bull Trout and Brown Trout Redd Surveys - Bull trout were petitioned to be added to the threatened or endangered list under the Federal Endangered Species Act in 1993. This action prompted a redd survey of all streams tributary to both reservoirs in fall 1993 timed to differentiate between brown trout and bull trout redds. Previous redd surveys of Noxon Rapids and Cabinet Gorge reservoir tributaries indicated that brown trout start redd construction when stream temperatures fall into the lower 40° F and upper 30° F temperature range. These temperatures generally occur in late November to mid-December in reservoir tributaries. Bull trout usually start redd construction when stream temperatures fall to the low 50° F range and are finished when temperatures fall to the high 40° F range. These temperatures occur in reservoir tributaries from late September through late October.

Some highlights of the redd counting are described below:
Bull River from the mouth of the East Fork downstream to the McDowell Bridge was floated four times between mid-September and November 10, 1993. No spawning activity was noted through the third float made October 16, 1993, although a few bull trout were observed in deep pools. The fourth trip made November 10, 1993, found 16 bull trout redds all of which were old in appearance and numerous brown trout redds that were very fresh. No bull trout were observed while brown trout were numerous in pools and runs. The bull trout redds were marked the next day using rebar and flagging. Bull River was again floated December 16, 1993 and 94 brown trout reeds were counted. One brown trout redd was superimposed on top of a bull trout redd, while two brown trout redds were immediately adjacent to bull trout redds but with no apparent overlap.

Graves Creek was counted in mid-October 1993 and one very large redd was found near the base of Graves Creek Falls. This redd was about eight feet long and three feet wide and might represent one or more pairs of fish. The lower one-half mile of Graves Creek had been dry since about the first of September meaning that the bull trout had entered the creek prior to that time. Swamp Creek was walked from the road end downstream to the mouth December 15, 1993, looking for brown trout redds. It was discovered that the lowest one and one-half miles were dry and had been for some time. Four very old redds, probably bull trout, were found in the wetted section. A previous survey done in mid-October located three fresh redds in the creek about a mile upstream from the road end and above a 200-300 yard section of dry streambed.

Prospect Creek was first checked October 27, 1993 and nine bull trout redds were found. A pair of bulls about 18-20 inches long were observed over one redd. The creek was next checked December 14; the same nine redds were barely discernable, but six brown trout redds were very fresh.

Only the lower four miles of Vermilion River were thought accessible to spawning brown trout while historical information indicated that bull trout had access to the lower nine miles or so to the base of Vermilion Falls. The blockage for brown trout was thought to be the "China Gorge" which is a narrow box canyon with by a 6 foot high falls, followed by a 15-20 foot long chute. Vermilion River above the gorge had been checked for brown trout redds in 1987 and 1988 and none were found.

In 1993 bull trout redd counts were first done in mid-October and again in early November. Redds counted included 25 from Vermilion Falls to the gorge and 2 below the gorge. On December 15, 1993 the river downstream from the falls was checked for brown trout redds and 6 were found above the gorge and 57 below the gorge. The brown trout redd count was probably not complete since brown trout were still in the stream and actively spawning.

Elk Creek, a Cabinet Gorge tributary, was walked one time December 16, 1993. The lowest three-quarter mile of creek was completely dry but 22 redds, thought to be brown trout, were located in the next two miles of channel. Eyed brown trout eggs had been planted about three miles above the mouth in 1986 and 1987 and electrofishing done in summer 1993 caught mostly brown trout with very few cutthroat and brook trout. Sampling done in the 1960s and 1970s in the same general areas indicated a population of brook trout and cutthroat trout. Elk Creek, five to ten miles above its mouth, is almost entirely brook trout.

Final tally by species of the redd counts is listed in Table 3 below.

Table 3. Redd counts, Noxon Rapids and Cabinet Gorge tributaries, 1993.

	Number of Redds by Species	
Reservoir and Tributary	Bull Trout	Brown Trout
Cabinet Gorge Reservoir		
Rock Creek	?[1]	None[2]
E.F. Rock Creek	3	None
W.F. Rock Creek	?	None
Pilgrim Creek	0[3]	0
Bull River	16	94
E.F. Bull River	?	3
Elk Creek	0	22
Noxon Rapids Reservoir		
Prospect Creek	9	6
Graves Creek	1	None
Vermilion River, above gorge	25	6
Vermilion River, below gorge	2	57
Marten Creek	3	12
S.F. Marten Creek	0	16
Swamp Creek	7	0

[1]? indicates bull trout have access into the stream, are known to be present, but redds were not found.
[2]None indicates that brown trout could not enter stream due to no water.
[3]0 indicates that fish may have access into stream but no redds observed.

The 1993 redd count data for brown trout indicates a marked change from previous years' data for most streams tributary to Noxon Rapids Reservoir. The Marten Creek, South Fork Marten Creek and Vermilion River counts in 1993 are more than double the average of the previous five years. One reason for this change may be the use of relatively inexperienced counters from the WWP crew. More likely the increase may be the result of planting of Noxon Rapids Reservoir with five to seven inch-long brown trout in 1988. Brown trout redd counts in Prospect Creek in 1993 were only about one-half of the five year average. Suspected reason for this apparent decline is the early final count date of December 14; normally final count is mid-January.

Brown trout redd count in Bull River was within the norm of the previous three to four years. Elk Creek was checked for redds for the first time in 1993 and, very unexpectedly, 22 redds thought to be from brown trout were located. It had been previously thought that three falls-chutes located near the creek mouth were barriers to brown trout.

Bull River downstream from the East Fork Bull River was checked for bull trout redds in 1993 and 1993. The respective counts were 12 in 1993 and 16 in 1993. A complete survey of all streams for bull trout had never been done until 1993, so this years' data will become the baseline for future year's work.

RECOMMENDATIONS

The Washington Water Power Company has hired their own personnel to collect biological, chemical and physical data on Noxon Rapids and Cabinet Gorge Reservoirs as part of a comprehensive pre-relicensing program. The Company has also contracted with MDFWP to provide 18 months of Department personnel to assist in fieldwork, data analysis, report writing and for collector permit purposes each year for two years starting July 1, 1994.

The WWP, USFS and DFWP are continuing the cooperative survey of all reservoir tributaries and should finish all Cabinet Gorge Reservoir tributaries and several Noxon Rapids tributaries in FY95. Counting of both bull and brown trout redds in all tributaries will be continued. Collection and genetic analysis of suspected westslope cutthroat trout populations from the remaining Noxon Rapids Reservoir tributaries is scheduled for FY95.

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Key Words: Brown trout, bull trout, largemouth and smallmouth bass

Waters Referred to:		
	Noxon Rapids Reservoir	05-9328
	Cabinet Gorge Reservoir	05-8512
	Triangle Pond	05-9685
	Bull River	05-0864
	E.F. Bull River	05-2272
	Elk Creek	05-2560
	Graves Creek	05-3184
	Marten Creek	05-4432

S.F. Marten Creek	05-6688
Prospect Creek	05-5648
Rock Creek	05-5920
E.F. Rock Creek	05-2400
W.F. Rock Creek	05-8048
Swamp Creek	05-7088
Vermilion River	05-7712