MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-6 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, 1992 THROUGH JUNE 30, 1993

ABSTRACT

Washington Water Power Company was able to operate Noxon Rapids Reservoir within the confines of the 1985 operation agreement. West coast power companies did request power from WWP which could have resulted in a deep (20-30 foot) drawdown of Noxon Rapids Reservoirs in spring 1993 but this drawdown was avoided.

The WWP, U.S. Forest Service (USFS) and Montana Department of Fish, Wildlife and Parks (DFWP) entered into a cost-share agreement to start biological and physical survey of all tributaries of Noxon Rapids and Cabinet Gorge reservoirs. Surveys accomplished in summer 1992 and spring 1993 were limited to the Bull River Drainage but this entailed making fish surveys at 12 sites, collection and genetic analysis of suspected westslope cutthroat (Oncorhynchus clarki lewisi) samples from eight streams and doing the Hankin-Reeves physical survey on about 41 miles of river and creeks.

Reservoir work included monitoring two bass fishing tournaments, gill and trap net surveys of both reservoirs in October 1992 and May 1993, beach seining for largemouth bass (Micropterus salmoides) young-of-the-year in October, 1992, and genetic analysis of 85 largemouth bass young-of-the-year. Tributary fishery surveys in addition to the Bull River work described above included making bull trout (Salvelinus confluentus) spawning redd counts in Bull River and brown trout (Salmo trutta) redd counts in Bull River, Marten Creek, Vermilion River and Prospect Creek.

BACKGROUND

Cabinet Gorge Reservoir, completed in 1951 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.

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 pro-rata 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 powerhouse.

Fisheries management emphasis has shifted from trout to a combination of brown trout, burbot (Lota lota), largemouth bass and smallmouth bass (Micropterus dolomieui). Smallmouth bass were planted in Noxon Rapids in 1982 and 1983 and burbot were planted in 1985-87. Brown trout 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. Joint USFS, WWP and DFWP crews did physical and biological surveys of the Bull River Drainage.

7. To maintain or expand populations or species of special concern (westslope cutthroat trout, bull trout and inland rainbow trout). Objective was accomplished. Analysis of eight samples from Bull River Drainage showed six were pure westslope cutthroat while two were very slightly hybridized with other Oncorhynchus species.

Northwest Montana Coldwater Lakes Investigation

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. These drawdowns occurred while the reservoir was snow and ice covered so no effort was expended to count stranded fish.

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 should be completed in 1993. Washington Water Power replaced rip rap along the sides of two boat ramps on Noxon Rapids Reservoir.

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. It has not yet been ascertained if burbot are reproducing in Noxon Rapids Reservoir. Rumors persist of an occasional burbot being caught by anglers. Anglers do catch good numbers of smallmouth bass, mostly 9 to 14 inches long, indicating good reproduction from the fish planted in 1982 and 1983.

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 about 250 pieces of 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 personnel and the WWP fisheries technician attended meetings of area service and sports clubs.

PROCEDURES

Stream Survey - Measurement of fish populations within the Bull River Drainage were made using three methods; two- or three-pass removal estimates using backpack electrofishers, survey electrofishing and visual observations. The Hankin-Reeves methodology was used to measure habitat types in main stem Bull River and its major tributaries starting at the Cabinet Wilderness boundary and terminating at stream mouths. Suspected westslope cutthroat samples for genetic analysis were collected by hook and line or electrofishing. University of Montana Wild Trout and Salmon Genetic Population Laboratory did the laboratory analysis using starch gel electrophoretic techniques. Weaver and Associates, Kalispell, Montana was contracted by WWP to collect, analyze and report on sediments in East Fork Bull River and Bull River.

This report will include description of the fish population work, genetic analysis of suspected westslope cutthroat samples and a brief resume of the sediment sampling. The Washington Water Power Company will report on the Hankin-Reeves habitat survey in a company publication.

Reservoir Sampling - Methods used to measure fish populations in Noxon Rapids and Cabinet Gorge reservoirs included general fish sampling using "Noxon" gill nets and trap nets. Noxon gill nets are 150 feet long by 6 feet deep containing three 50 foot long sections of 1 1/4 inch, 1 1/2 inch and 2 inch bar measure mesh. Abundance and lengths of largemouth bass young-of-the-year was measured by beach seining in the Marten Bay area in October 1992. Department and/or WWP personnel assisted BASS club members on scoring two bass tournaments held on Noxon Rapids Reservoir in August, 1992 and May, 1993. Lengths of fish caught were recorded and scale samples for age-growth analysis collected from some of the fish.

Spawning populations of brown trout of both reservoirs were estimated by making redd counts in selected tributaries. Bull trout redd counts were made in Bull River tributary to Cabinet Gorge Reservoirs.

STATUS OF RESERVOIR GAMEFISH POPULATIONS

Burbot - No burbot were caught by any method in Noxon Rapids Reservoir. One burbot 18 inches long was taken in the May 1993 gill netting of Cabinet Gorge Reservoir. Fate of the burbot transplants into both Noxon Rapids and Cabinet Gorge reservoirs is still undecided.

In April 1985, 23 adult burbot ranging in size from 2 to 3 feet in length were released in Triangle Pond located west of Noxon, Montana. Triangle Pond is a gravel pit dug during construction of Cabinet Gorge Reservoir. It is about 8

surface acres with a maximum depth of 35 feet. Water source is underground exchange with Cabinet Gorge Reservoir and the pond fluctuates with Cabinet Gorge Reservoir.

In January-February 1993 local Noxon anglers caught about a dozen burbot from Triangle Pond. Three of the fish measured 32, 28 and 18 inches long and several were 12 inches or less and were released. This size range would indicate natural reproduction occurred in several of the past years.

Brown Trout - Brown trout redd counts were made in Prospect and Marten creeks, Noxon Rapids tributaries, December 8, 1992. Fish were not through spawning in Prospect Creek so efforts were terminated for the year. Fish appeared to have finished spawning in Marten Creek so the 14 redds found are considered the yearly total. In past years Marten Creek has averaged 12-14 redds so this year's count was considered normal. Fall spawning trout are limited to about the lower one-half mile of Marten Creek by stair-step beaver dams. These beaver dams are relatively new, about 10 years old, and probably impossible to remove.

Brown trout redd counts were made in sections of the Bull River December 17, 1992. Generally Bull River remains open and the entire section from East Fork to the McDowell Bridge (Figure 1) can be floated; however, cold temperatures combined with little snowpack created ice bridges over sections of the river below the East Fork, precluding floating the entire length. Instead the major spawning areas were walked and redds counted. Areas walked were from the East Fork downstream about one-half mile to the end of the G.B. area and from the mouth of Copper Creek to the McDowell Bridge. These two areas have accounted for about 70 percent of the redds in previous years. The 1992, the walked areas contained 70 brown trout redds which was considered near average for the last five years.

Bull Trout - Bull River between the East Fork Bull River and McDowell Bridge was floated October 28, 1992 and bull trout redds located. Ten to twelve bull trout redds were counted. Brown trout were seen during this float and a few were observed starting redds. Brown and bull redds can easily be separated by the age of the redd tailout. Bull trout redds were most commonly found in areas that are utilized by brown trout. A real potential exists for superimposition of brown trout redds over bull trout redds.

Bass - Two areas of Noxon Rapids Reservoir were gill net sampled in May 1992 and May 1993. Average catch per net night for May 1992 was 0.05 largemouth and 0.2 smallmouth bass. Average catch for May 1993 was 0.6 largemouth and 2.0 smallmouth per net. The 10 largemouth bass caught in 1993 averaged 10.9 inches long and ranged from 8.5 to 15.5 inches total length. The 34 smallmouth bass averaged 11.4 inches long and ranged from 8.1 to 17.3 inches total length. Although the sampling between the two years was within the same two week calendar period with similar water clarity, major differences between phrenetic time probably accounts for much of the markedly higher catch in 1993. During the May 1992 sampling it was noted that yellow perch (Perca flavescens) were at least two-thirds through spawning. In May 1993 yellow perch had just begun to spawn.

Two BASS bass fishing tournaments were held on Noxon Rapids Reservoir during the report period. The total catch of bass 12.0 inches long or longer and the catch per hour of effort is shown in Table 1 below.

Table 1. Bass tournament catches, Noxon Rapids Reservoir, August 1992 and May 1993.

	August 1992	May 1993
Number of Anglers	45	52
Total Hours Fished	720	988
Number Bass Greater than 12 Inches	122	289
Largemouth Bass	---	250
Smallmouth Bass	---	39
Catch Per Hour	0.17	0.29

Scales collected from 93 largemouth bass ranging in size from 2.7 inches to 18.5 inches total length and scales from 44 smallmouth bass ranging in size from 5.7 to 16.1 inches total length were analyzed for age and growth. All the smallmouth bass scales and 79 of the largemouth scales were from fish caught during the August 29-30, 1992 fishing tournament. The remaining largemouth scales were taken from fish killed during the April 1992 reservoir 10-foot drawdown.

The age and growth information for both species is presented in Table 2 below.

Table 2. Age growth of largemouth and smallmouth bass, Noxon Rapids Reservoir, 1992.

	Length in Inches at Annulus						
Species	I	II	III	IV	V	VI	VII
Largemouth Bass	2.9(93)*	6.2(86)	9.4(66)	12.0(50)	14.0(36)	15.5(18)	17.0(6)
Smallmouth Bass	2.7(44)	6.1(37)	9.7(24)	11.9(12)	13.8(4)	15.0(2)	

*Number in parenthesis is size of sample.

Beach seining for largemouth bass young-of-the-year, done in mid-October 1992 in the Marten Creek area is compared to similar efforts in 1989, 1990 and 1991. The same shoreline length was seined each year. The 1991-92 data is not completely comparable to prior years' information since the 1989-1990 seine was 50 feet long by 5 feet deep and the seine used since 1991 was 100 feet long by 10 feet deep. Also the number caught by haul in 1992 was lost.

Table 3. Average catch per seine haul and size of young-of-the-year largemouth bass, Marten Creek area of Noxon Rapids Reservoir, mid October 1989, 1990, 1991 and 1992.

Parameter	1989	1990	1991	1992
Number per haul	25	5	20	NA
Average size (inches)	2.1	2.6	2.7	2.5
Range of size	1.2 - 3.4	1.6 - 3.3	1.0-3.6	1.7-3.9

In August 1992 about 65,000 young-of-the-year largemouth bass from the Department's Miles City Hatchery were planted in two areas of Noxon Rapids Reservoir. These hatchery largemouth bass have good genetic diversity while the "native" Noxon Rapids bass have no genetic diversity. One of the two areas planted included the Marten Creek Bay shoreline while the other was the Trout Creek slough area. During October 1992, 50 young-of-the-year bass from Marten

Creek slough area. During October 1992, 50 young-of-the-year bass from Marten Creek and 35 from the Trout Creek area were captured and sent to the University of Montana Wild Trout and Salmon Genetics Laboratory for genetic analysis. Only one of the eighty-five fish tested could be positively identified as a Miles City largemouth bass.

Bull River Survey

Bull River is a tributary of Cabinet Gorge Reservoir entering the latter about five miles east of the town of Noxon in western Sanders County, Montana. Bull River arises in the southwestern slopes of the Cabinet Wilderness Area flowing in a southerly direction about 25 miles to its confluence with the reservoir (Figure 1).

Physical Characteristics

Bull River Drainage covers about 140 square miles of land. Maximum discharge is about 4,000 cfs, minimum is about 100 cfs and average about 400 cfs. Major streams in the drainage include Bull River and the east, North, Middle and South forks. Minor tributaries include Basin, Copper, Dry and Beray creeks and five gulches.

The Bull River system is subject to rain-on-snow flood events occurring in late fall and winter and discharge is estimated to be at least equal to or more than spring high water. A large spring area upstream from Beray Creek (Point A on Figure 1) influences both stream discharge and water temperatures in Bull River most of the year. It has been estimated that this spring area provides about 25-50 percent of flow of Bull River during average or lower flow periods and water temperature of this spring has been measured as 50° F during spring, summer and fall. Water temperatures measured at a USGS gauge station 20 miles downstream in the mid 1970s seldom exceeded 60-65° F during the summer months while December-January temperatures were in the high 30° range.

Stream gradient within various reaches of the Bull River Drainage determines stream morphology to a great extent. Average elevation drop for the Bull River tributaries is about 200 feet per mile or greater. Elevation loss for main stem Bull River varies within the stream length. From the junction of the South Fork and North Fork to the spring area, the average drop is about 18 feet per mile; from the spring area to the mouth of the East fork Bull River the drop is about 6 feet per mile; and from the East Fork downstream to Cabinet Gorge Reservoir about 13 feet per mile.

Streams tributary to Bull River within the project area have physical problems casting considerable doubt on their value as spawning-rearing areas for fish from Bull River. Napoleon, Star and Hamilton gulches and Dry and Beray creeks are all dry during most of the year from their mouths upstream several hundred feet to several hundred yards.

Main stem Bull River upstream from the spring area to the forks contains many beaver dams; several capable of blocking upstream fish passage. Quality and quantity of spawning habitat within the North and Middle forks Bull River is judged to be poor. Both streams have rubble-boulder substrate with little deposition of suitable size spawning gravels. South Fork Bull River does appear to have abundant spawning area but the quality may be low due to high sediment loads originating from extensive logging and a massive earth slide.

Most of the land bordering Bull River within the project area is in private ownership. Bull River is floatable using small boats, rafts or canoes. Access into the stream over public lands is available at four sites including an unimproved road at milepost 15 (state highway 56), the two highway bridges and immediately upstream and downstream of Napoleon Gulch.

Fish Populations

Prior to completion of Cabinet Gorge Dam in 1951 the Bull River Drainage was reputed to have been an excellent spawning area for migratory fish from Lake Pend Oreille, Idaho. Game fish species reportedly spawning and rearing included bull trout, westslope cutthroat trout, kokanee (Onchorynchus nerka) and mountain whitefish (Prosopium willaimsoni). These species, with the exception of kokanee, are native to western Montana and the Lake Pend Oreille system.

Cabinet Gorge Dam blocked all access by migratory fish into the Clark Fork River Drainage upstream of the dam.

Past major fish management activity in the Bull River area, including Cabinet Gorge Reservoir has been planting fish. A brief summary of numbers and species of fish planted into Cabinet Gorge Reservoir, main stem Bull River and its tributaries is shown in Table 4. Not shown are plantings made into headwaters lakes (3) of Bull River tributaries. These lakes have and are being planted on a four to five year rotation with westslope cutthroat trout.

Table 4. Fish planting history, Bull River Drainage and Cabinet Gorge Reservoir.

Waterbody	Species Planted	Years Planted	Approximate Numbers
Bull River	Yellowstone Cutthroat Trout	1932-59	530,000
	Eastern Brook Trout	1935-44	440,000
	Rainbow Trout	1942-45	20,000
E. Fork Bull River	Yellowstone Cutthroat Trout	1944-51	9,000
N. Fork Bull River	Yellowstone Cutthroat Trout	1943-51	12,000
	Eastern Brook Trout	1942-46	42,000
	Rainbow Trout	1966	52,000
Cabinet Gorge Reservoir	Kokanee Salmon	1953-56	1,690,000
	Coho Salmon	1953-56	100,000
	Yellowstone Cutthroat Trout	1953-56	1,295,000
	Rainbow Trout	1959-80	1,065,000

Since 1980, no fish have been planted into Bull River and its tributaries and only largemouth bass and burbot have been planted into Cabinet Gorge Reservoir.

The large numbers of fish planted into the reservoir was an attempt to create acceptable levels of fishing and create spawning runs of game fish into suitable tributaries, notably Bull River. Spawning surveys have shown that only brown trout and bull trout from the reservoir have successfully spawned in Bull River. Spawning by these two species is limited to the East Fork Bull River and the Bull River downstream of the East Fork. Brown trout had been planted in the Clark Fork River upstream from Thompson Falls, Montana in the late 1940s. Redd count surveys done in 1992 indicated about a dozen bull trout redds in Bull River and an increase from 10 brown trout redds in 1978 to about 90 in 1992.

In 1992 the Department, U.S. Forest Service and Washington Water Power Company jointly did a physical and biological survey of most of the Bull River Drainage. Fishery work included making population estimates on electrofishable tributaries,

visual counts, electrofishing on main stem Bull River and collecting cutthroat trout for genetic analysis from almost all tributaries, but not main stem Bull River. The meadow sections of Bull River are not electrofishable while two sections electrofished contained too few fish to make estimates or kill for genetic analysis.

Genetic analysis was done on cutthroat collected from Copper Creek, Napoleon, Star and Hamilton gulches, Dry Creek, Beray Creek and North Fork, South Fork and Middle Fork Bull River. Cutthroat trout from East Fork Bull River had been analyzed in 1985.

Samples from all streams except North Fork Bull River and Copper Creek were analyzed as pure westslope cutthroat trout. Fish from the North Fork were analyzed as 99 percent westslope cutthroat and 1 percent Yellowstone cutthroat trout. Fish from Copper Creek were analyzed as 98.5 percent westslope cutthroat and 1.5 percent rainbow trout. It is strongly expected that cutthroat in main stem Bull River would also be pure or nearly pure westslope cutthroat trout.

Essentially the Bull River Drainage can be considered to be populated by either pure or "pure for management purposes" westslope cutthroat trout. Other species do live in the drainage but are incapable of breeding with the cutthroat. The existence of pure or essentially pure westslope populations in the face of planting about 3,000,000 Yellowstone cutthroat and rainbow trout in the system is remarkable.

Fish population estimates were made in East Fork, North Fork, South Fork and Middle Fork Bull River. Two sections of Bull River within the project boundaries and Copper Creek were survey electrofished while one section of Bull River was floated and visual counts of fish recorded. The entire project area was floated twice and observation on fish made. The sample sites are shown on Figure 1 as numbers starting with Copper Creek moving upstream.

Data presented in Table 5 do show that brook trout (Salvelinus fontinalis) planted in the 1930s and early 1940s did establish themselves in most of Bull River and the lower portions of the North, Middle and South forks. These brook trout populations are characterized by a small maximum size and slow growth rates. Westslope cutthroat trout populations are also slow growing with a maximum size somewhat larger than the brook trout. None of the Bull River tributaries carry a significant fish populations containing older, larger individuals desirable to most of the angling public.

Bull and brown trout taken from Copper Creek may well be a resident population. Copper Creek does not have surface flow into Bull River during the time of year brown and bull trout from Cabinet Gorge Reservoir are in Bull River for spawning. Bull trout and brown trout taken in East Fork Bull River were most likely young fish that had not yet smolted back into Cabinet Gorge Reservoir. The two brown trout taken in East Fork (3) section were both adult fish sexually mature and would have spawned in fall 1992. It is very likely brown trout will or already have established a resident population in the East Fork. Westslope cutthroat found in East Fork are mostly resident fish.

Main stem Bull River from the junction of the North and South forks downstream to the spring area contains a small population of brook trout and maybe a few cutthroat trout. The stream also goes dry occasionally within this section. Electrofishing above and below the mouth of Dry Creek (section 6) yielded only 6 fish from the 950 feet sampled. A 4,000 foot long section upstream from the first highway bridge (section 5) was floated and fish visually identified as either trout, whitefish or suckers. Three separate counting trips were made September 9 and 10 and the data in Table 2 is the average of the three counts. Counts of whitefish varied from 120 to 137 while counts of trout varied from 4 to 11 fish; all cutthroat trout or brown trout. Size of whitefish ranged from about 6 inches to 16 inches while size of trout ranged from about 8 to 18 inches. Presence or absence of suckers was noted and suckers were found during each of the counts. They were much more numerous during the third count and were primarily noted in two deep pools near the lower end of the section.

The project area from milepost 15 downstream to the mouth of the East Fork was floated in July and August, 1992 and general observations made of fish present. This same area had been floated for fish and beaver activity observation in the late 1970s and early 1980s. General observations were similar between the years and all personnel have noted a general lack of fish throughout the entire area. Most common are mountain whitefish followed by suckers, with trout the least abundant. Very few fish have been observed from milepost 15 downstream to Dry Creek. Downstream from Dry Creek to the East Fork fish are most commonly observed in the section 5 area and from Hamilton to Napoleon Gulch area.

The low population of trout in the project area is the result of very poor recruitment of young fish. Gravel substrate suitable for salmonid spawning is very limited within the area and tributaries suitable for spawning are very small and largely inaccessible. The trout that are present in main stem Bull River likely moved out of tributary streams or moved into the area from downstream sources.

Table 5. Fish population estimates, numbers caught in section and visual counts, Bull River Drainage, summer 1992.

Stream (Section)[1/]	Species	Pop. Est. #/300'	Aver. Lgth. @ 2 Yrs.	Max. Size (inches)	No. Caught or Counted & Section Length
Copper (1)	Westslope Cutthroat Trout	--	--	9"	21 (800')
	Bull Trout	--	--	10"	3 (800')
	Brown Trout	--	--	7"	5 (800')
	Eastern Brook Trout	--	--	10"	6 (800')
East Fork (2)	Westslope Cutthroat Trout	9	--	4.1"	
	Bull Trout	6	4.4"	8.5"	
	Brown Trout	8	4.5"	6.9"	
East Fork (3)	Westslope Cutthroat Trout	20	4.7"	10.2"	
	Bull Trout	5		7.3"	
	Brown Trout	2		13.2"	
East Fork (4)	Westslope Cutthroat Trout	18		7.7"	
	Bull Trout	8		7.6"	
South Fork (8)	Westslope Cutthroat Trout	20	4.5"	9.1"	
	Eastern Brook Trout	14	4.3"	8.2"	
South Fork (9)	Westslope Cutthroat Trout	39	4.7"	7.0"	
Middle Fork (10)	Westslope Cutthroat Trout	13	4.3"	10.2"	
	Eastern Brook Trout	36	4.6"	6.9"	
North Fork (11)	Westslope Cutthroat Trout	29	4.0"	7.7"	
	Eastern Brook Trout	36	3.5"	6.7"	
North Fork (12)	Westslope Cutthroat Trout	83	4.3"	7.6"	
Bull River (7)	Eastern Brook Trout		4.2"	7.7"	10 (1,500')

Stream (Section)[1]	Species	Pop. Est. #/300'	Aver. Lgth. @ 2 Yrs.	Max. Size (inches)	No. Caught or Counted & Section Length
Bull River (6)	Westslope Cutthroat Trout			10.6"	1 (950')
	Mountain Whitefish			3.2"	1 (950')
	Eastern Brook Trout			4.0"	4 (950')
Bull River (5)	Mountain Whitefish				131 (4,000')
	Trout[2]				7 (4,000')
	Suckers[2]				numerous (4,000')

[1]Refer to Figure 1 for section locations.

[2]Trout = salmonids, Suckers = largescale and longnose suckers.

Sediment Survey - Timber harvest has been the major land management activity in the Bull River Drainage since the early 1900s. In recent years (1960s to the present) much of the timber harvest has been concentrated in the South Fork Bull River and Snake Creek drainages. Several land failures have occurred in these two drainages in the 1980s which have added considerable sediment to the Bull River System. The most recent land slump occurred in the Snake Creek Drainage in 1989 causing Snake Creek, the East Fork Bull River and the Bull River to run muddy for several days.

The Washington Water Power Company had done extensive sediment sampling in the East Fork and Bull River to determine condition of known brown trout spawning areas. As part of the same effort the USFS collected sediment samples from the East Fork Bull River above Snake Creek. The following description and table is excerpted from a report under preparation by this contractor. Locations of sampling sites in Bull River are noted on Figure 1 using Roman numerals starting at the uppermost site (Scotts crossing) descending downstream to the Solid Rock Church.

Spawning Area Substrate Composition

"Core sampling results show the influence of Snake Creek on spawning habitat quality in the East Fork Drainage (Table 6). It appears that lower Snake Creek still holds extremely high levels of fine sediment which could be flushed into the East Fork during future high flow events. Predicted embryo survival to emergence is currently at acceptable levels throughout the East Fork Drainage with the exception of lower Snake Creek (Table 6)."

"Results from core sampling in main Bull River spawning areas shows that conditions are best at the upper site (Scott's crossing) and the lower site (Solid Rock Church) (Table 6). Predicted embryo survival to emergence is poor for the old county bridge and GB areas. At the present time, these spawning areas are principally utilized by brown trout. No predictive equation is currently available for brown trout. Since both bull trout and brown trout are fall spawners and the incubation period is similar, estimates for bull trout should be similar to brown trout. However, we urge cautious application of predicted survival values for bull trout to brown trout and furthermore, using these predictors outside the Flathead Drainage where they were developed may not be valid. If future efforts are to involve embryo survival to emergence prediction for brown trout based on fine sediment levels, we recommend field testing using brown trout embryos for model development."

"Fine sediment levels (% <6.35 mm) in spawning areas in undisturbed drainages in the Flathead System averaged approximately 30 percent (Weaver and Fraley 1991). Results from these efforts in the Bull River Drainage appear similar. Recommendations to land managers in the Flathead Drainage include limiting ground disturbing activities where coring results show 35% <6.35 mm and no additional sediment input once spawning gravels contain more than 40% <6.35 mm."

Table 6. Results of streambed substrate sampling in spawning habitat in the Bull River Drainage during summer, 1992. Samples were collected using a standard 15.2 cm hollow core sampler.

Sampling Area	n	Median % <6.35 mm	Predicted Embryo Survival (%)	
			WCT	DV
East Fork Bull River				
Wilderness boundary	3	15.3[1]	51	57
Above Snake Creek	3	31.0[1]	31	35
Snake Creek	3	44.5[2]	13	16
Below Snake Creek	3	34.4[1]	26	30
Mouth	12	24.5	39	44
Main Bull River				
Scott's crossing	12	30.1	32	36
Old county bridge	6	46.4	10	13
GB area	12	43.1	15	18
Solid Rock Church	12	36.5	24	27

[1]These samples collected by KNF personnel. Values are means instead of medians due to small number of samples collected.

[2]Value is a mean instead of a median due to small number of samples collected.

RECOMMENDATIONS

The Washington Water Power Company has hired Northrup, Devine and Tarbell, Inc., an environmental and engineering firm with expertise in hydro relicensing requirements to collect biological and physical data about all aspects of Noxon Rapids and Cabinet Gorge reservoirs. Department personnel familiar with the two reservoirs will provide their knowledge of the system, oversee the fisheries data collection and provide the scientific collectors permit for handling fish as required by state law. It is anticipated that NDT personnel will be working on the reservoirs for at least three years.

Washington Water Power, the U.S. Forest Service and Montana Department of Fish, Wildlife and Parks are continuing the cooperative survey of all reservoirs tributary streams. Added impetus for this effort is the potential listing of bull trout to the threatened and endangered list under the Endangered Species Act. Bull trout presence-absence surveys should be done on all tributaries suspected to contain bull trout. Streams scheduled for complete biological and physical survey include Blue, Elk, Pilgrim, Rock, Deadhorse, Blacktail and Eddy creeks, all tributaries of Cabinet Gorge Reservoirs.

Other reservoir and tributary activities that should be continued include: counting of bull and brown trout redds in all suitable reservoir tributaries, continuing monitoring of fishing tournaments, spring and fall net sampling at three stations in Noxon Rapids and three in Cabinet Gorge reservoirs and seining for largemouth bass young-of-the-year in October 1993.

It is recommended that fall sampling in 1993 and spring sampling in 1994 be done using standard experimental gill nets. This change is recommended so that a better comparison can be made between present net catches and net catches made prior to 1986. It is realized that net catches in 1993 and 1994 may easily average 250-400 fish per net and will require a large fish working crew. Needed crew may be available between NDT, WWP, USFS, DFWP, University of Idaho students and other volunteers.

Bull trout spawning activity in Bull River occurs in mid-September through early October while brown trout spawning takes place in November-December. Bull trout and brown trout spawn in the same areas and it is believed that there is an extremely high possibility of superimposition of brown trout over bull trout redds. At minimum this potential problem must be documented in 1993 and at maximum this problem must be considered a fact and actions taken to prevent superimposition. It is suggested that bull trout redds could be fenced to prevent brown trout redd building.

Bull trout do spawn in areas sampled for sediment in 1992. Two areas, the old county bridge and the G.B. area, were laden with high concentrations of silt expected to be very detrimental to egg and alevin survival. The uppermost area, Scotts crossing, has much lower silt concentrations but bull trout or brown trout have never been observed spawning in the area. The Scotts crossing is well downstream from the historical upstream limit of bull trout in the Bull River Drainage.

It is recommended that bull trout spawning in the Old County Bridge or the G.B. area be trapped and eggs from one or two pair transplanted into the Scott crossing site. If required an Environmental Analysis will be prepared for this action.

An Environmental Analysis will be prepared proposing planting of Bull River with westslope cutthroat trout.

Prepared by: Joe Huston
Date: June 15, 1993

Key Words: Brown trout, bull trout, largemouth and smallmouth bass, sediment sampling, westslope cutthroat trout genetics

Waters Referred to:		
	Noxon Rapids Reservoir	05-9328
	Cabinet Gorge Reservoir	05-8512
	Triangle Pond	05-9685
	Prospect Creek	05-5648
	Marten Creek	05-4432
	Bull River	05-0864
	E.F. Bull River	05-2272
	N.F. Bull River	05-5200
	M.F. Bull River	05-4736
	S.F. Bull River	05-6640
	Copper Creek	05-1632
	Dry Creek	05-2144
	Beray Creek	05-0432
	Star Gulch	05-6928
	Napoleon Gulch	05-5144
	Snake Creek	05-6512