MONTANA DEPARTMENT OF FISH, WILDLIFE, AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

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

JOB NO.: I-a JOB TITLE: NORTHWEST MONTANA COLDWATER STREAM INVESTIGATIONS

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

ABSTRACT

Estimated fish populations in Lake Creek for sculpins (Cottus spp), Kootenai River for rainbow trout (Oncorhynchus mykiss) and mountain whitefish (Prosopium williamsoni), South Fork Flathead River for westslope cutthroat trout (Oncorhynchus clarki lewisi), and Swan River, Thompson River, and McGregor Creek for trout. Sampled about ten miles of the Clark Fork River to determine feasibility of estimating populations of game fish. Counted bull trout (Salvelinus confluentus) redds in four Swan River tributaries. Preliminary evaluation was done of effectiveness of a stream rehabilitation project to replace brook trout (Salvelinus fontinalis) with westslope cutthroat trout. Extensively sampled streambed sediment in Jim Creek, tributary to Swan River, above and below a logging unit before and after runoff.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To determine and maintain, within legal limits, the flows necessary to maintain or enhance existing fish populations. This objective accomplished utilizing state funding. We released water stored in Ashley Lake into Ashley Creek in a manner to sustain existing fish life during the final stages of the 1986-1989 drought.

2. To maintain streambanks and channels in present or improved condition. Objective met utilizing state funding. During FY1990 project personnel reviewed a total of 151 stream alternation projects and 10 Corps of Engineers 404 permit applications. Two project personnel were team members on "best management practices" (BMP's) timber harvest audits.

3. To maintain water quality at or above present levels as measured by the state Water Quality Bureau and the U.S. Geological Service. Objective accomplished using state funding. Considerable amounts of soil entered

quality measurements and streambed core sampling done above and below the logging unit before and after timber harvest showed detectable increases in fine sediments within the creeks' substrate. The data will not be described in this report since arbitration between State of Montana and the timber company over restoration of Jim Creek and/or the logging unit is in progress.

4. To maintain aquatic habitat and associated fish populations at or above present level. This objective was met although it is surmised that drought conditions in northwest Montana did negatively affect some fish populations. These same populations will quickly rebound following return to normal and above normal precipitation starting in October, 1989.

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. This objective partially met. Drought conditions through fall 1989 were expected to reduce size of lotic fish populations. Near or above average precipitation starting in fall 1989 extending through early summer 1990 should enable most stream populations to rebound rapidly. Fishing success was expected to decline slightly with below normal stream flows and higher than normal water temperatures. These latter two factors will be alleviated with normal stream flows.

6. To maintain a population of 1,300 rainbow trout per mile with five percent being larger than 14 inches in the Kootenai River. Objective accomplished. Fish population samples in September 1989 indicate a marked increase in total numbers of rainbow trout per mile in 1989 compared to 1988. Number of rainbow trout 14 inches long or longer did not increase.

7. To maintain or expand populations of species of special concern (westslope cutthroat trout, bull trout and inland rainbow trout). Objective was accomplished. A special segment report has been submitted (Huston, 1990). Three Swan River tributaries chemically treated in summer 1988 to remove resident fish populations were imprint planted with westslope cutthroat trout eyed eggs in spring 1989 and 1990 and fingerlings in fall 1988 and 1989. Hatching of eyed eggs has averaged about 80 percent and survival of resultant fry and planted fingerlings appears to have been good. Electrofishing of Soup Creek in fall 1989 indicated that chemical treatment done in 1988 did not kill all resident fish. A few large adults and numerous young-of-the-year brook trout were caught.

8. Secure public access on currently used sites on private ground. Provide floating accesses 4-6 hours apart on major streams. Objective obtained using state funding. The U.S. Forest Service filed construction permit applications for one boat landing on each of Kootenai River and Yaak River. Lincoln County improved a boat landing on Kootenai River.

PROCEDURES

Fish Sampling Techniques

Methods used to estimate fish populations varied by stream and included the following:

1. Lake Creek Sculpin Sampling

   Two 272 square foot areas of a riffle above and below the ASARCO Troy Mine tailing pond were encircled with 1/4-inch bar mesh netting. We conducted a two-pass electrofishing estimate using a Coffelt BP-1C backpack shocker to estimate sculpin numbers. Estimates from the two areas were combined and expanded to number of sculpins per 1,000 square feet of riffle.

2. Kootenai River Sampling

   Numbers of rainbow trout and mountain whitefish were estimated in the 11,000 foot long Alley Springs-Pipe Creek section. Fish were captured with a jet boat with a boom mounted electrode powered by a Coffelt 2-C electrofishing box. All captured fish were fin clipped. Peterson mark and recapture estimates were made with the mark and recapture efforts being one week apart. Other data collected included lengths, weights, and scale samples for age and growth analysis. We counted rainbow trout redds in an area of the Kootenai River between Alexander Creek and Fisher River.

   Corps of Engineers provided a regulated flow in Kootenai River of 6,000 cfs during the Alley Springs-Pipe Creek sampling. Electrofishing was attempted on a section about 10 miles upstream from Alley Springs-Pipe Creek at a regulated flow of 10,000 cfs but was totally unsuccessful due, primarily, to too great of depths. Electrofishing done in the 1970s was successful at flows up to 6,000 cfs.

3. McGregor Creek Sampling

   We electrofished a 500-foot long section of McGregor Creek using a backpack shocker and made a two-pass estimate of brook and rainbow trout. Collected lengths, weights, and scale samples for age and growth analysis.

4. Swan and Thompson Rivers

   Electrofished one 10,000-foot long section in Thompson River and one 3.7-mile long section in Swan River using a drift boat with a fixed boom electrode and a Coffelt 2-C electrofishing box. Made mark and recapture estimates for rainbow trout in both streams. Also captured bull trout and brown trout (Salmo trutta) in Thompson River and bull, cutthroat, and brook trout in Swan River.

5. South Fork Flathead River

   Estimated number of westslope cutthroat trout in one section of the South

Fork Flathead River using marked fish and a snorkel-Peterson estimate. This section (Black Bear) is within the Bob Marshall Wilderness lying about 7-9 miles upstream from the wilderness boundary. Attempted to estimate number of cutthroat in the area immediately below the wilderness boundary (Harrison Creek), but could not mark sufficient numbers of fish. Collected fish length data from cutthroat caught at this area.

6. Bull Trout Redd Counts

Bull trout spawning starts when maximum stream temperatures drop to about 50°F, usually in late September. Biologists walk standard stream sections in mid- to late October counting only those redds that can be positively identified. Streams surveyed included Lion, Squeezer, Elk and Goat Creeks all tributary to Swan River.

7. Age and Growth

Fish scale impressions were made on heated strips of acetate in a scale press and read using a microfiche reader. Magnification used varied with species and size of scale but was uniform for individual scale collections.

FINDINGS AND DISCUSSION

Lake Creek

A major hard rock mining operation in the Stanley Creek drainage tributary to Lake Creek, Lincoln County, Montana, has caused considerable concern about potential effects upon the biota of Lake Creek. The mine's waste rock slurry pipeline traverses Stanley Creek, crosses Lake Creek, and terminates in a settling pond in close proximity to Lake Creek. There are concerns about pipeline breaks (which have occurred) and leaking of settling pond material into Lake Creek.

Lake Creek in the vicinity of the settling pond and downstream for at least six miles supports a small trout population. Trout numbers are difficult to estimate using electrofishing techniques because of deep pools with good log jam cover and low water conductivity. Good populations of sculpins do exist above and below the tailings ponds. Sculpins, because of their habitat preference for riffle areas and clean, cold water, are sensitive to habitat deterioration, especially silt deposition and water quality changes. Sculpin populations were estimated in two riffle areas, one above the tailings and pipeline crossing and the other below the tailings pond. The same riffle areas were sampled in 1977, 1986, 1987, 1988, and 1989. Table 1 shows the number of sculpins per 1,000 square feet of creek bottom by year.

Table 1. Numbers of sculpins per 1,000 square feet of riffle area, Lake Creek above and below mine tailings pond, August, 12977, 1986, 1987, 1988, and 1989.

Year	Area	No. Sculpins/ 1,000 Sq. Ft.	Average Length (inches)	Range (inches)
1977	Above pond	92	2.0	1.2 - 3.3
1986	Above pond	137	1.7	0.9 - 3.0
1987	Above pond	197	1.9	1.0 - 2.8
1988	Above pond	125	2.0	1.2 - 3.0
1989	Above pond	108	1.8	1.2 - 2.6
1977	Below pond	206	2.1	1.2 - 3.6
1986	Below pond	274	1.8	0.8 - 3.8
1987	Below pond	155	1.8	0.7 - 2.9
1988	Below pond	255	1.8	1.0 - 3.5
1989	Below pond	129	2.2	1.2 - 2.7

Kootenai River

Estimated populations of rainbow trout and mountain whitefish in the Alley Springs-Pipe Creek section. This 11,000 foot-long section extends from Alley Springs rapids to about 1,000 feet below Pipe Creek. Computer analysis of the 1989 estimate has not been completed at this writing, but analysis using a hand-held calculator of number of fish per 1,000 feet of river is included in Tables 2 (rainbow trout) and 3 (mountain whitefish) and compared to previous years' estimates.

Table 2. Number of rainbow trout over six inches total length per 1,000 feet in the Alley Springs-Pipe Creek section of Kootenai River, September, 1985, 1986, 1988, and 1989.

	Number of Trout per 1,000 foot by Age Class				
Year	I	II	III	IV and Older	Total
1985	218	156	36	3	413
1986	36	161	83	18	298
1988	132	47	10	3	192
1989	324	80	13	3	420

Table 3. Number of mountain whitefish over six inches total length per 1,000 feet in the Alley Springs-Pipe Creek section of Kootenai River, September 1989 compared to March, 1981 (May and Huston, 1983).

	Number of Mountain Whitefish per 1,000 by Age Class					
Year	I	II	III	IV	V and Older	Total
March 1981	--	334	91	307	63	795
September 1989	43	953	790	296	111	2193

Total numbers of rainbow trout were 413/1,000 feet in 1985 dropping to 192 in 1988 and increasing to 420 in 1989. It is theorized that much of the drop in trout numbers between 1985 and 1988 can be attributed to low water yields in the Kootenai River system to Libby Reservoir and subsequent lower volume releases through Libby Dam. Minimum releases from Libby Dam are supposed to be 4,000 cfs except when chances of refilling Libby Reservoir are not good and flows can be cut to 3,000 cfs. During 1988 releases from Libby Dam were less than 4,000 cfs 168 days.

The dramatic increase from 192 fish in 1988 to 420 in 1989 is thought related to two major factors, one of which is higher discharges from Libby Dam. The other is reconstruction of U. S. Highway 2 between the towns of Libby and Troy, Montana. This highway parallels the Kootenai River for about 12 miles and included numerous pull-offs and parking areas for anglers fishing the river. Highway reconstruction starting in late winter 1989 eliminated all access to Kootenai River by shore fisherman from the highway side. It is not known what proportion of anglers fishing Kootenai River enter from U. S. Highway 2, but a good estimate would be over 50 percent. Access into the river from the side opposite the highway is restricted since most shoreline is in private ownership or controlled access public land. Boat access into the river is limited to one landing near Libby.

Major shifts have occurred in the age class structure of the rainbow trout population. The high number of one year old fish in September 1989 compared to previous years is thought to be a function of reduced angler mortality while lower numbers of two year old and older fish is a function of low population numbers in previous years.

Numbers of mountain whitefish appear to have markedly increased since the last estimate made in March 1981. Most of the increase was comprised of fish two and three years old or of the 1986 and 1987 year classes. Previous work (DosSantos and Huston, 1983) suggests that mountain whitefish prefer slower water velocities than rainbow trout. Reduced discharges from Libby Dam during the 1985-1988 period would have reduced velocities which may have been a factor in

the increased numbers of whitefish, especially those year classes occurring in 1986 through 1988.

During calendar year 1988 discharge from Libby Dam was less than 4,000 cfs (generally 3,000 cfs) all or a portion of 168 days. During the period of 1 July 1989 through 30 June 1990 discharge was less than 4,000 cfs 17 days, 4,000 cfs 87 days and above 4,000 cfs the remainder of the year. Fish sampling scheduled for August and September 1990 should detect changes in populations following a year of generally high discharges and velocities.

Almost all of the rainbow trout in Kootenai River in the Alley Springs-Pipe Creek section spawn in tributaries and small fish smolt into the river after one or two years of tributary residence. Age at smolting has averaged 83 percent one year old and 17 percent two years old from 1982 through 1988. Age at smolting for the 1989 sample included 87 percent as one year old fish and 13 percent as two year old fish.

Growth of rainbow trout and mountain whitefish from the Alley Springs-Pipe Creek section for 1989 is compared to data from 1977-79 (May and Huston, 1983) in Table 4. The rainbow trout data are limited to one year old smolts.

Table 4. Growth of rainbow trout and mountain whitefish, 1989 versus 1977-79 captured in Alley Springs-Pipe Creek section of Kootenai River.

Species	Year	I	II	III	IV	V	VII	VII	VIII
Mountain Whitefish	1989	4.4 (95)*	9.2 (78)	11.3 (58)	13.0 (37)	14.3 (20)	15.7 (7)	16.8 (3)	17.6 (3)
	1977-1979	5.5 (91)	9.9 (151)	12.0 (165)	13.7 (150)	15.3 (89)	16.5 (209)		
Rainbow Trout	1989	3.0 (103)	8.5 (42)	11.4 (11)	14.0 (2)				
	1977-1979	3.8 (337)	10.3 (386)	13.9 (188)	16.0 (22)				

*Number in parenthesis is size of sample.

The growth data indicates that growth rates of both rainbow trout and mountain whitefish have declined in recent years. Decreased growth rates of both whitefish and rainbow trout may be a function of increased populations. In 1981 population estimates for rainbow trout was 215/1,000 feet versus 420/1,000 feet in 1989. Mountain whitefish numbers were 795/1,000 feet in 1981 versus 2,193/1,000 in 1989.

Rainbow trout were first observed spawning in Kootenai River near the Blackwell Flats recreation area in 1981 and surveys located 14 redds. Survey of the

same area in 1982, 1987, and 1989 located 37, 61, 51 redds respectively. In 1990, 28 redds were located. Many of the redds in 1990 were old and difficult to discern, raising the possibility that some unknown number of redds were not counted due to their age. Most redds were found along the shoreline from the mouth of Dunn Creek upstream about 300 yards and along the shoreline adjacent to the Blackwell Flats area.

McGregor Creek

McGregor Creek, the outlet of McGregor Lake, enters the Thompson River about two miles downstream from Lower Thompson Lake. Thompson River, below the Thompson lakes, was planted with brown trout in 1988 and 1989. McGregor Creek has the potential to become a spawning area for brown trout from Thompson River. A 500-foot long section of McGregor Creek lying immediately above the Flathead county road bridge was sampled for species composition and numbers. Species of fish found included rainbow trout, brook trout, and sculpins. Population estimates were 62$\pm$ 9.1 brook trout and 17$\pm$ 6.8 rainbow trout. No estimate was made of sculpins.

Thompson River

The 10,000 foot-long Bighole Section of the Thompson River was electrofished and rainbow trout numbers estimated. Other species caught during this effort included bull trout and brown trout but in too low of numbers to make population estimates. In previous years' sampling brook trout were caught but not brown trout. Estimated numbers of rainbow trout per 1,000 feet of stream was 94 fish longer than four inches total length. Fourteen percent of these fish were 12 inches long or longer. The Bighole Section lies about mid-point in a 6.8 mile long catch-and-release section. This catch-and-release section was abandoned effective March 1, 1990 because of lack of public support.

Swan River Drainage

A 3.7 mile-long section of Swan River between the Salmon Prairie bridge and the Piper Creek bridge was electrofished, and a population estimate calculated for rainbow trout. Other species caught in too low of numbers to make a population estimate included cutthroat, brook, and bull trout. About 60-80 adult bull trout, probably migrants from Swan Lake, were observed concentrated near the mouth of Jim Creek. Jim Creek is used by migrant bull trout for spawning.

The population estimate for rainbow trout was 80 fish 4.5 inches long or longer per 1,000 feet of river. Of the 248 rainbow trout caught on mark and recapture efforts, 52 (21%) were 12 inches long or longer.

Bull trout redd counts were made in four Swan River tributaries: Elk, Goat, Squeezer, and Lion creeks. Number of redds found in each creek compared to the average for the years of 1982-1988 as listed in Table 5.

Table 5. Number of bull trout redds found in four tributaries of Swan River, 1989 and average of 1982-1988.

Stream	Average (Range) 1982-1988	1989
Elk Creek	96 (19-201)	186
Goat Creek	39 (31-56)	34
Squeezer Creek	54 (24-83)	67
Lion Creek	53 (26-88)	84

The mile-long aqueduct leading from Pacific Power's Bigfork Dam diversion structure to their powerhouse was electrofished during a powerhouse shutdown to determine potential turbine fish entrainment and mortality. A total of 505 fish were collected including 365 mountain whitefish, 95 rainbow trout, 24 cutthroat trout, 1 bull trout, 1 brook trout, 2 kokanee, and 17 nongame fish. Many of the cutthroat appeared to be westslope cutthroat trout of hatchery origin due to eroded fins. The remaining fish captured included bull and brook trout, kokanee (Oncorhynchus nerka), squawfish (Ptychocheilus oregonensis), largescale sucker (Catastomus macrocheilus), and longnose sucker (Catastomus).

Clark Fork River

The Clark Fork River upstream from Thompson Falls Reservoir to its junction with the Flathead River near Paradise, Montana, has a reputation as being a mediocre fishery for trout and fair for mountain whitefish. Prior to 1989 the Department had never sampled this stretch of river. In September, 1989 the river between Paradise and Plains was surveyed (one-pass night electrofishing) to determine potential for extensive electrofishing effort. Catch of gamefish, other than mountain whitefish, from this five-mile long section of river included two rainbow trout, one brown trout, and one largemouth bass (Micropterus salmoides). Two rainbow trout were observed but not captured. Mountain whitefish were numerous in shallow (less than two feet deep) riffles. Largescale suckers, squawfish, and peamouth (Mylocheilus caurinus) were abundant throughout the section. Redside shiners (Richardsonius balteatus) up to six inches total length were very abundant along the shoreline of pools and runs.

South Fork Flathead River Drainage

Fisheries data collected from the South Fork Flathead River immediately below and within the Bob Marshall Wilderness included a population estimate of westslope cutthroat trout in the Black Bear section, limited creel census information, and angler catch data from the Harrison section and Headwaters section. These data are presented below.

The Harrison section lies downstream about two miles from the Bob Marshall Wilderness boundary. A population estimate using the snorkel-Peterson method was attempted but not enough cutthroat could be marked to warrant the snorkeling effort.

Ninety cutthroat were caught and these fish averaged 7.8 inches long and ranged from 4.8 to 15.6 inches total length. Ten percent of the fish were 10 inches long or longer.

The Headwaters section includes the lower ends of Danaher and Youngs Creek and the first two miles of South Fork Flathead River. One person fished 15 hours and caught 145 cutthroat. These fish averaged 9.6 inches long and ranged from 6.3 inches to 17.4 inches total length. Thirty-eight percent of the fish caught were 10 inches long or longer.

The Black Bear section is within the wilderness lying about 10 miles above the Harrison section and about 25 miles downstream from the Headwaters section. The snorkel-peterson estimate was 126 cutthroat trout per 1,000 feet of stream of which 20 percent were 10 inches long or longer. During marking, anglers fished 110 hours and caught 456 trout.

A voluntary postal card creel census by fishermen angling the South Fork Flathead within the wilderness showed they fished 599 hours, caught an average 35 cutthroat per 3 to 4 day angling trip at a catch rate of 2.6 fish per hour and kept about 7 percent of the cutthroat caught. Total number of fish caught included 1,723 cutthroat trout, 87 mountain whitefish, and 7 bull trout.

RECOMMENDATIONS

1. Clark Fork River - The Clark Fork River downstream from Plains, Montana, to the headwaters of Thompson Falls reservoir should be survey electrofished to determine area(s) suitable for intensive fish sampling efforts in future years. Fingerling brown trout are being planted in the lower Clark Fork River and an EIS is being prepared that will address the potential of planting smallmouth bass (Micropterus dolomieu).

2. Kootenai River - Population estimates of rainbow trout and mountain whitefish will be made in two sections of Kootenai River. This work will be performed in conjunction with Bonneville Power Administration funded Kootenai River fisheries investigations. The two sections will include the Alley Springs-Pipe Creek section and one downstream from the town of Troy.

3. Thompson River should be electrofished to determine effects of planting brown trout.

4. Swan River - At least two sections of Swan River between Holland Lake and Swan Lake should be sampled to determine fish population status and to gather information needed to evaluate a catch-and-release fishery on rainbow and cutthroat trout. Evaluation of the effectiveness of tributary rehabilitation should be continued.

5. South Fork Flathead River - Fisheries data should continue to be collected as time permits. Work to be done in 1990 should include sampling in the Headwaters section and Harrison section.

6. Yaak River - Limited fish sampling and fish genetics work has been done in tributaries of the Yaak River but never in the mainstem Yaak River downstream to Yaak Falls. Survey should be done in the Yaak River to determine sections in the upper, middle, and lower river reaches suitable for intensive fish sampling.

7. North Fork Flathead River - A slot limit on cutthroat trout was imposed on the North Fork Flathead River upstream form the Polebridge bridge. Sampling should be done in a section to collect base line data to evaluate this regulation in future years.

LITERATURE CITED

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DosSantos, Joseph and Joe Huston. 1983. Kootenai River fisheries investigations final completion report, 1972-1982. Section B, food habits of rainbow trout and mountain whitefish. MT Dept. of Fish, Wildlife and Parks, Helena, MT 59620.

May, Bruce and Joe Huston. 1983. Kootenai River fisheries investigations final completion report, 1972-1982. Section C, food habits of rainbow trout and mountain whitefish. MT Dept. of Fish, Wildlife and Parks, Helena, MT 59620.

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Waters referred to:

Ashley Creek 07-0140	Clark Fork River 05-1440
Elk Creek 07-1340-01	Goat Creek 07-1720-01
Indian Creek 11-3200	Jim Creek 07-2240
Kootenai River 11-3500	Lake Creek 11-3540
Lion Creek 07-2420-01	McGregor Creek 05-4608
S.F. Flathead Rv 08-6660	Soup Creek 07-4020
Squeezer Creek 07-4340-01	Swan River 07-4560
Thompson River 05-7248-01	Yaak River 11-7760-01

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