MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-2 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER STREAMS

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

PROJECT PERIOD: JULY 1, 1988 THROUGH JUNE 30, 1989

ABSTRACT

Fish population sampling was done in Lake Creek and Kootenai River. Population estimates were different in Kootenai River and Lake Creek from previous years' work and thought related to low water conditions. Population sampling was cancelled in Swan and Thompson rivers because of low water and high temperatures. Fish population data and angler use information is presented on the Bob Marshall Wilderness Complex. Bull trout (Salvelinus confluentus) redd counts were made in tributaries of Swan River. About one mile of riparian zone was fenced on Ashley and Freeland creeks to exclude livestock grazing.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To maintain, within legal limits, instream flows sufficient to maintain or enhance fish populations at existing levels. Objective accomplished utilizing state funding.

2. To maintain streambanks and channels in present or improved conditions. Objective met utilizing state funding. During FY1989 a total of 144 stream alteration projects and 38 Corps of Engineers 404 permit applications were reviewed by project personnel.

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.

4. Maintain aquatic habitat and associated fish populations at or above present levels. This objective was attained. In spring 1989 about 1/2 of Freeland Creek, tributary to Lake Mary Ronan, was fenced to exclude livestock from the riparian zone. The Department, Department of State Lands, Plum Creek Timber Inc., and area sportsmen also planted 1,300 shrubs and trees to promote soil stabilization and overhead cover. About 3/8 mile of the south bank of Ashley Creek extending from the Rogers Lake Road to the first upstream private landowner was fenced to exclude livestock. The north bank of Ashley Creek consists of subdivided land little used by cattle. Three tributaries of Swan River above Swan lake were chemically treated to remove the existing fish populations and were replanted with pure westslope cutthroat trout (Oncorhynchus clarki lewisi).

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 only partially met. Continued drought conditions through fall 1988 may have had moderate to substantial detrimental effects upon stream fish populations.

6. To maintain a population of 1,300 rainbow trout (Oncorhynchus mykiss) per mile with 5 percent larger than 14 inches in the Kootenai River. This objective may not be obtainable since it appears that Corps of Engineers and Bonneville Power Administration have significantly reduced the minimum releases from Libby Dam to 3,000 cfs from 4,000 cfs.

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 for this objective has been submitted (Huston, 1989).

8. To secure public access on currently used sites on private ground. Provide floating accesses 4-6 hours apart on major streams. Objective was accomplished using state funding. Negotiations have been started to secure an access area into the Clark Fork River near the town of Plains. U. S. Forest Service intends to install a boat access into the Yaak River near the town of Yaak.

9. To communicate and coordinate management strategies and problems with the public and other resource agencies to maintain fish populations at or above present levels. This objective was accomplished. The Swan River Management Plan was finalized. A plan for Kootenai River long-range management was started. Coordination meetings were held with the Lolo, Kootenai, and Flathead forests. Project personnel attended meetings of most sportsmen clubs in the northwest Montana region.

10. To increase angler compliance with existing laws. Objective accomplished using state funding.

PROCEDURES

Fish Sampling Techniques

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

1. Lake Creek Sculpin (Cottus spp) 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 and the two-pass electrofishing method used to estimate sculpin numbers. Population estimates from the two areas were combined and expanded to number of sculpins per 1,000 square feet of riffle.

In past years three areas were sampled in each of the two riffles. Very low stream flows in September 1988 from drought conditions necessitated that only two areas be sampled in each riffle.

2. Kootenai River Rainbow Trout Sampling

The 11,000 foot-long Alley Springs-Pipe Creek section and the 14,000 foot-long Jennings section were sampled using jet boat mounted electrofishing gear. Peterson mark and recapture estimates (Vincent 1971) were made with mark and recapture efforts being one week apart. Other data collected included lengths, weights, and scale samples for age and growth analysis. Rainbow trout redd counts were made in an area of the Kootenai River between Alexander Creek and Fisher River.

3. Bob Marshall Wilderness Complex Fish Sampling

Fish populations within the Bob Marshall Wilderness complex were sampled using three methods. These were: a) hook and line, b) post card creel census collected from guides, outfitters, and private parties, and c) age and growth data.

Hook and line trend information and scales for age and growth determination was collected from the South Fork Flathead River in an area upstream from Gordon Creek. Creel census information was collected from parties fishing the South Fork and Middle Fork Flathead River, Blackfoot River, and Sun River drainages.

4. Bull Trout Redd Counts

Bull trout spawning starts when maximum stream temperature drops to about 50°F, usually in early October. One or two person teams walk standard stream sections counting only those redds that can be positively identified. Streams surveyed included Lion, Squeezer, Elk, and Goat creeks, all tributary to Swan River above Swan Lake.

5. Age and Growth

Fish scale impressions were made on strips of acetate and read using a microfiche reader. Magnification used varied with species and size of scale but was uniform for individual scale collections. A straight line relationship between fish body length and scale length was assumed.

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 which is 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 preferences, 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, and 1988. 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, 1977, 1986, 1987, and 1988.

Year	Area	No. Sculpins Per 1,000 Ft.^{2}	Average Length (inches)	Range (inches)
1977	Above pond	92	2.0	1.2 - 3.3
1986	Above pond	237	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
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

Kootenai River

A population estimate was attempted on rainbow trout inhabiting the Jennings Rapids section of Kootenai River. Jennings Rapids section, 14,000 feet long, lies between Alexander Creek and Jennings Rapids two to five miles below Libby Dam. This section is characterized by four deep pools connected by long flat water runs. The pools are too deep to electrofish effectively. Only 78 rainbow trout were captured on the marking run and almost all these fish were captured on the periphery of the deep pools. Largescale suckers (Catastomus macrocheilus) and mountain whitefish (Prosopium williamsoni) were abundant in the runs. During the recapture effort, 80 rainbow trout were captured of which none were recaptures. Effort to obtain an estimate was terminated.

A population estimate was made on rainbow trout in the Alley Springs Pipe Creek section. This section, 11,000 feet long extends from the Alley Springs rapids to about 1,000 feet below Pipe Creek. The September, 1988, estimate is compared to the 1986 estimate in Table 2.

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

	Number of Trout/1,000 Ft. by Age Class				
Year	I	II	III	IV and older	Total
1985	--	--	--	--	364*
1986	36	161	83	18	308
1988	132	47	10	3	192

*Age class estimates not completed.

Data collected since 1985 indicate declining numbers of rainbow trout in the Alley Springs-Pipe Creek section. The 1985 data is in the process of being broken down into numbers by age class, but the point estimate of total numbers per 1,000 feet of river was 364 fish. The apparent decline from 364 fish in 1985 to 192 per 1,000 feet in 1988 is believed to be real and probably related to drought conditions during the 1985-1988 time period. 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 then be cut to 3,000 cfs.

During 1977 and 1978 releases from Libby Dam were below 4,000 cfs portions or all of 161 days. During the 1985-1988 period releases were below 4,000 cfs portions of or all of 437 days. During 1988 alone, flows were below 4,000 cfs 168 days. Expected influences of long-term flows of 3,000 cfs include a reduced wetted perimeter which reduces living space for fish and aquatic insects and reduced water velocities. Rainbow trout, largescale suckers and mountain whitefish are the major species present in Kootenai River. It is believed that reduced velocities would have a negative influence on rainbow trout and a positive influence on suckers and whitefish. Reduced water velocities may have impacts on the aquatic insect populations.

Lower than normal flows in rainbow trout spawning and rearing tributaries could also have a major effect upon river populations. Less living space in tributaries could materially reduce smolt production since most juveniles live at least one year in tributaries before emigrating into the river.

Almost all of the rainbow trout in Kootenai River in the Alley Springs-Pipe Creek section spawn in tributaries. Age at smolting has averaged 84 percent one year old and 16 percent two years old from 1981 through 1987. Age at smolting for the 1988 sample include 79 percent as one- year old fish and 21 percent as two-year old fish.

Analysis of scales collected from rainbow trout in the Jennings Rapids section in 1988 indicated major differences between age of smolting for the two sections. Thirty percent of the fish from Jennings Rapids had no evidence of natal stream growth and therefore were likely from spawning in Kootenai River. One-year old smolts made up 56 percent and two-year old smolts contributed the remaining 14 percent.

Growth of rainbow trout from the Alley Springs-Pipe Creek section for the years of 1985, 1987, and 1988 and from the Jennings Rapids section for 1988 are shown in Table 3. These data are limited to one-year old smolts for the Alley Spring-Pipe Creek section and fry and one-year old smolts for Jennings Rapids section.

Table 3. Growth of rainbow trout entering Kootenai River as fry and one-year old smolts.

			Length in Inches at Annulus				
Year	Section	Smolting	I	II	III	IV	V
1985	Alley	1 year	2.9(64)*	9.0(42)	12.5(19)	15.1(3)	
1987	Alley	1 year	3.0(162)	8.4(66)	11.6(23)	13.5(5)	
1988	Alley	1 year	2.9(116)	8.9(53)	12.2(21)	13.7(3)	
1988	Jennings	1 year	3.0 (37)	8.5(20)	12.7 (4)	16.4(3)	19.1(2)
1988	Jennings	fry	4.5(20)	10.6(7)	13.5(2)		

*Number in parenthesis is size of sample

Growth of rainbow trout in tributary streams for the first year of life is very similar between the two river sections. Growth of fry in the Jennings section during the first year of life is much more rapid than tributary fish indicating much better growing conditions in the Kootenai River. Growth of one-year old smolts their first two years in the river is similar between the years and between the two sections. Growth of one-year old smolts in Jennings section after three years of life appears to increase while those found in Alley Springs section slows down. Growth of fry after the first year of life appears to be similar to one-year old smolts, but the fry retain the length advantage gained during the first year.

The larger length of the four and five-year old one-year smolts found in Jennings Rapids section is thought related to food availability. These larger rainbow first entered the angler catch in about 1985 coincident to large numbers of kokanee salmon escaping from Lake Koocanusa through turbine discharge. It would seem reasonable that some rainbow trout are keying in on kokanee for a food source providing additional growth potential not found prior to kokanee escapement.

Rainbow trout were first observed spawning in Kootenai River near the Blackwell Flats recreation area in 1981 and survey resulted in location of 14 redds. Survey of the same area in 1982, 1987, and 1989 resulted in locating 37, 61, 51 redds respectively. 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.

Swan River Drainage Bull Trout Redd Counts

Redd counts were made in four Swan River tributaries: Elk, Goat, Squeezer, and Lion creeks. Number of bull trout redds found in each creek compared to the average for the years of 1982-1987 is listed in Table 4.

Table 4. Number of bull trout redds found in four tributaries of Swan River, 1988 and average of 1982-1987.

Stream	Average (Range) 1982-1987	1988
Elk Creek	79 (19-162)	201
Goat Creek	38 (31-56)	46
Squeezer Creek	54 (24-83)	*
Lion	51 (26-88)	65

*High stream flow obliterated most redds

Prior to 1984 only a portion of Elk Creek was closed to angling while in 1984 through 1989 all streams throughout their entire length was closed to fishing. Effects of stream closures on bull trout spawning cannot yet be termed beneficial or detrimental. In Elk Creek both the high redd count (201 in 1988) and low count (19 in 1985) occurred after the entire stream was closed. For the other streams both high and low counts occurred during the period of total stream closure. Low stream flows may account for much of the variation in counts.

Bob Marshall Wilderness Complex

The Bob Marshall Wilderness Complex consists of the Bob Marshall Wilderness, the Scapegoat Wilderness and the Great Bear Wilderness. Major drainages flowing out of these wildernesses include the Middle and South forks of Flathead River, Sun River tributary to the Missouri River, and the Blackfoot River tributary to the upper Clark Fork River. Fish population information was collected from a section of the South Fork Flathead River near Gordon Creek, from a complex-wide creel census and from analysis of westslope cutthroat trout scales collected in the South Fork Flathead River from 1985-1988.

Trend information has been collected from the headwaters area of the South Fork Flathead River since 1985. This area includes the lower mile of Youngs and Danaher creeks, and the upper 1.5 miles of the South Fork Flathead River below the junction of these two creeks. One person has expended 14-18 angler hours capturing westslope cutthroat trout by hook and line, recording length of fish and collecting scales. The hook and line trend information is presented in Table 5.

Table 5. Population trends of westslope cutthroat trout caught by hook and line, South Fork Flathead River near Gordon Creek, August 1985-1988.

Year	Catch per Angler Hour	Avg.Lgth. (Inches)	Percent of Total Catch in Inches >10.0	>12.0	>14.0	Total Catch
1988	6.0	9.6	30	15	9	106
1987	7.7	10.4	58	21	6	137
1986	8.8	10.6	59	27	10	149
1985	7.7	10.0	50	24	5	111

The age and growth analysis data in Table 6 and are compared to age and growth data from four streams in Montana and Idaho.

Creel census information collected from anglers fishing in the Bob Marshall Wilderness Complex is listed in Table 7. Additional information collected by this census is attached in Appendix A.

Table 6. Age and growth of westslope cutthroat trout from the headwaters section of South Fork Flathead River compared to age and growth of westslope cutthroat trout from the North and Middle forks Flathead River in Montana and Salmon River and St. Joe River in Idaho.

Scale Collection River	Year	No. of Fish Aged	Length in Inches at Annulus I	II	III	IV	V	VI
So. Fork Flathead	1985-1988	251	2.1	4.3	6.7	9.9	12.6	13.5
Mid. Fork Flathead	1980	183	2.4	4.3	6.5	8.8	10.8	
No. Fork Flathead	1977-1980	197	2.1	3.8	5.4	6.5	8.4	
Salmon River, ID	1963	474	2.4	3.9	6.0	10.0	12.7	14.6
St. Joe River, ID		347	2.6	4.0	6.0	8.3	9.9	12.0

Table 7. Catch data for westslope cutthroat trout, rainbow trout, bull trout, brook trout (Salvelinus fontinalis), and mountain whitefish from South Fork and Middle Fork, Sun River and Blackfoot River drainages within the Bob Marshall Wilderness Complex.

Drainage	Catch per Angler Hour	Number Caught	Percent Kept	Percent >12"
		Westslope Cutthroat Trout		
South Fork	4.1	4156	7	26
Middle Fork	1.2	296	20	16
Sun River	0.3	91	21	39
Blackfoot	0.6	46	52	0
		Rainbow		
Sun River	1.2	336	18	15
		Bull Trout		
South Fork	0.02	18	39	89
Middle Fork	0.07	7	14	14
Blackfoot	0.01	1	0	100
		Brook Trout		
Sun River	0.03	69	3	0
		Mountain Whitefish		
South Fork	0.04	42	33	24
Middle Fork	0.03	52	21	50
Blackfoot	0.03	2	0	0

RECOMMENDATIONS

It is recommended that the following fish population sampling be done in the 1989-1990 work period:

1. Kootenai River

Sampling should be done in two sections of the Kootenai River during August and September 1989. Numbers of rainbow trout should be estimated in the Elkhorn section. The Elkhorn section, 4.3 miles long was first sampled in 1971 and last sampled in 1980. Personnel and equipment restrictions may require shortening the section, but the revised section should include river area above and below the proposed Libby Re-regulation dam site. The Alley Springs-Pipe Creek section should also be sampled with effort made to estimate numbers of both rainbow trout and mountain whitefish. Rainbow trout redd counts should be made in spring 1990 in the Alexander Creek-Blackwell Flats area of the Kootenai River.

2. Thompson River

Thompson River in an area between Indian and Meadow creeks should be sampled to determine success of brown trout planted in spring 1988.

3. Swan River Drainage

Mainstem Swan River upstream from Swan Lake to Condon Bridge was changed to a catch-and-release area for rainbow and cutthroat trout in 1987. Two sections, one above the Condon Bridge and one below, should be sampled to collect trend information relative to standing crops of the two species. Bull trout redd counts should be made in the following Swan River tributaries: Elk, Goat, Squeezer, and Lion creeks.

4. South Fork Flathead River

Population estimates should be made in two sections of the South Fork Flathead River. One section, Harrison, lies just outside the Bob Marshall Wilderness and angling for trout has been restricted to catch-and-release for several years. The other section, Black Bear, is within the wilderness and angler harvest of trout has been limited to three fish with none over 12 inches total length for several years.

5. Clark Fork River

The Clark Fork River upstream from Thompson Falls, Montana, to its junction with the Flathead River has never been sampled by the Department. Survey sampling should be done in summer 1988 to locate sections suitable for intensive electrofish sampling. Survey sampling will concentrate on an area around the mouth of Weeksville Creek and upstream from the town of Plains, Montana.

LITERATURE CITED

Huston, Joe E. 1989. Northwest Montana Coldwater Stream Investigations (Species of Special Concern Segment), F-46-R-2, I-a, II-a, Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT USA.

Vincent, R. E. 1971. Electrofishing and fish population estimates. The Prog. Fish Cult., 33(3): 163-169.

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Waters referred to:

Blackfoot River	Elk Creek 07-1340-01
Goat Creek 07-1720-01	Indian Creek 11-3200
Kootenai River 11-3500-01	Lake Creek 11-3540-01
Lion Creek 07-2420-01	Pipe Creek 11-5160
S.F. Flathead Rv 08-6660	Sun River (no code)
Squeezer Creek 07-4340-01	Swan River 07-4560
Thompson River 05-7248-01	Yaak River 11-7760-01

Key words: fish population estimates, rainbow trout, sculpins, cutthroat trout

Appendix A. Various types of information collected on fishing and fishermen angling within the Bob Marshall Wilderness complex.

Table 1. Point of entry of anglers commercially packed into the wilderness for fishing.

Access Point	Percent of Anglers
Meadow Creek	21
Benchmark	19
Holland Lake	12
Schafer Meadows	6
Pyramid Pass	5
Gibson Dam	4
Monture Creek	3
Other entry points (15 total)	19
Unknown	11

Table 2. Percent of anglers commercially packed into the wilderness for fishing by drainage.

Drainage	Percent Commercially Packed
South Fork	8
Middle Fork	20
Sun River	23
Blackfoot River	Unknown

Table 3. Place of residence of anglers.

Geographic Location	Percent
Western Montana	32
Eastern Montana	28
Western USA (excluding Montana)	26
Eastern USA (excluding Montana)	14

Table 4. Water type fished by anglers by major drainage.

Drainage	River	Tributaries	Lakes
South Fork	72	19	9
Middle Fork	75	25	0
Sun River	93	0	8
Blackfoot River	11	4	85

Table 5. Average number of fish caught by angler per trip by drainage.

	Average Number Caught by Species				
Drainage	Westslope Cutthroat	Rainbow	Mountain Whitefish	Brook Trout	Bull Trout
South Fork	66.0	0.0	0.7	0.0	0.3
Middle Fork	18.7	0.0	4.7	0.0	0.6
Sun River	3.2	2.0	0.0	2.5	0.0
Blackfoot River	6.6	0.0	0.3	0.0	0.1