MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: Montana PROJECT NO. F-46-R-3
PROJECT TITLE: Statewide Fisheries Investigations JOB NO. I-G
STUDY TITLE: Survey and Inventory of Coldwater Streams
JOB TITLE: Northcentral Montana Coldwater Streams
PERIOD COVERED: July 1, 1989 through June 30, 1990

ABSTRACT

Data for population estimates were gathered on 3 sections of both the Missouri River and the Smith River during fall 1989. Brown trout population estimates were obtained in the Craig and Cascade sections of the Missouri River during May 1990. A section on Tenderfoot Creek was electrofished in August 1988 and produced a rainbow, cutthroat, and rainbow-cutthroat hybrid trout population of 172 ±6 per 500 feet. Trout populations were sampled in waters of the Sun River drainage above Gibson Dam in July and August 1989. Results from the 1987 voluntary creel card survey and fishing-related questions from a 1988 Parks Division survey on the Smith River is presented. Eighty-four projects under the Natural Streambed and Land Preservation Act were reviewed along with 55 projects under the Stream Protection Act.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To establish viable trout fisheries in Marias River below Tiber Dam and in the Sun River below Diversion Dam for recreational fishing.

2. To ensure within hydrologic constraints, that flows in streams supporting trout populations do not fall below 1976-86 averages.

3. To maintain summer survival flow of at least 50 cfs in the Smith River at Camp Baker.

4. To maintain streambanks and channels in as natural a condition as possible. **(State funded).**

5. To maintain undisturbed riparian zones where they currently exist on Smith and Missouri Rivers. **(State funded).**

6. To maintain water quality at or above 1975-85 average levels as monitored at USGS stations.

7. To maintain habitat and species of special concern at present levels or better in streams affected by resource development activities. **(State funded).**

8. To ensure that mid-Missouri reservoir operations maintain a minimum flow of 4100 cfs 8 years out 10 in the Missouri River from Holter Dam to Ulm.

9. To evaluate contribution and influence of hatchery rainbow trout flushed from upstream reservoirs on wild trout fishery in Missouri River downstream of Holter Dam.

10. To increase rainbow and brown trout spawning habitat in three tributaries to the Missouri River from Holter Dam to Cascade. **(State funded).**

11. To maintain trout populations at or above 1984 levels in Tresch Section and 1978 levels in Burleigh Section of Big Spring Creek near Lewistown.

12. To provide 80,000 angler-days annually and average catch rate of 0.4 trout/hour in Missouri River between Holter Dam and Cascade.

13. To evaluate special slot-limit for trout on Smith River and modify regulations to balance angler harvest with population structure if warranted.

14. To maintain trout populations in Regional streams at present levels or higher.

15. To allow harvest of one trout over 12" in USFS streams along Rocky Mountain Front if compatible with stream fishery resources. **(State funded).**

16. To obtain at least two fishing access sites on the Sun River between the towns of Augusta and Sun River, and one each on the lower Dearborn River and upper Smith River. **(State funded).**

Progress was made on all federally funded objectives during the report period and is summarized in this report. Data for some state objectives is included to provide current information for regional streams.

PROCEDURES

An advisory board consisting of personnel from the Bureau of

Reclamation, sportsman's clubs, County Commissioners, landowners and Department of Fish, Wildlife and Parks evaluated plans for water manipulation in the Marias River below Tiber Dam. Trout populations in Big Spring Creek were surveyed using a fiberglass drift boat equipped with a mobile electrode powered by a 120 volt generator with a rated capacity of 2000 watts. A Fisher Shocker (Model FS 101) was used to rectify AC to straight DC. The Missouri River was electrofished at night using an 18-foot aluminum jet boat and a fiberglass drift boat powered by a small outboard motor. Both boats were equipped with headlights and fixed booms with stainless steel droppers suspended in front of the bow. Electricity from 240 volt portable generators was converted to pulsed or straight DC using Coffelt VVP-15 rectifying units. Rainbow and brown trout populations from Big Spring Creek, the Smith River, and the Missouri River were estimated using Chapman's modification of the Petersen mark-recapture method described by Vincent (1971) and Ricker (1975). We analyzed mark-recapture data with a MDFWP computer program on an IBM-PC compatible microcomputer. Trout populations in other regional streams were surveyed by electrofishing with a backpack shocker, snorkeling and tagging, and hook and line. A two-pass population estimate was performed on Tenderfoot Creek in 1988. The sections sampled on the upper Sun River included Ray Creek to Gates Creek packbridge and from Glenn Creek to Bars on North Fork and from Windfall to Bear creeks on the South Fork. Recommendations and alternatives for projects involving stream banks and channels were made through participation in the Stream Protection Act (SPA) and Natural Streambed and Land Preservation Act (SB310).

FINDINGS

Stream Surveys

Sun River drainage

Elk Creek, southwest of Augusta, was survey electrofished on June 1, 1989, to determine species composition and relative abundance following the forest fires of 1988. Brook trout were most abundant followed by brown and rainbow trout. Mottled sculpin were also present. Young-of-the-year trout were observed throughout the 730 foot section.

An 800 foot snorkel survey of Rock Creek on July 31, 1989, revealed no fish. Arctic Grayling were introduced in 1983 into this tributary of the North Fork of Sun River within the Bob Marshall Wilderness.

Trout populations in the North and South Forks of the Sun River were sampled by hook and line during July and August 1989 (Table 1). In addition, 95 trout (rainbow and cutthroat trout) were

Table 1. Catch statistics from hook and line sampling on the North and South Forks of the Sun River during 1989.

Water	Date sampled	Species	Number	Length (inches) Range	Mean
North Fork Sun River	7/30,8/1	Rb	59	6.0-13.0	10.3
		Ct	26	5.0-16.3	9.6
		RbxCt	16	6.2-12.5	9.7
		Eb	4	6.5-9.0	7.6
South Fork Sun River	7/27-28	Rb	97	6.0-16.0	10.9
		Ct	1	-	10.5
		RbxCt	5	8.8-12.2	10.9
		Eb	2	8.4-13.5	11.0

tagged in the South Fork. A snorkel survey was conducted on August 11 and the population was estimated at 856 trout $\geq$ 8 inches per mile. Due to turbid water conditions from heavy rainfall, snorkel estimates were not possible in the North Fork.

Smith River drainage

Tenderfoot Creek

A two-pass population estimate was performed in a 500 foot section of Tenderfoot Creek about 1 mile above the falls in late August 1988. A combined estimate of rainbow, cutthroat, and rainbow-cutthroat hybrid trout 3.0-12.4 inches in length was 172 $\pm$6 per 500 feet, which is equivalent to 1816 $\pm$63 fish per mile. The calculated biomass estimate was 24 lbs per 500 feet. Mottled sculpin were also abundant.

Smith River

Rainbow and brown trout numbers in the Eagle Creek section were substantially higher than in the two downstream sections in 1989 (Figures 1 and 2 and Tables 2-4). Numbers of both species decreased in a downstream direction. Biomass also tended to decrease in the downstream sections; however, rainbow trout biomass remained about the same in the two lower sections. No consistent trend was observed in mean lengths and weights among either species between sections.

Data analysis of the 1987 population estimates has not been completed for inclusion in this report. The 1987 and 1990

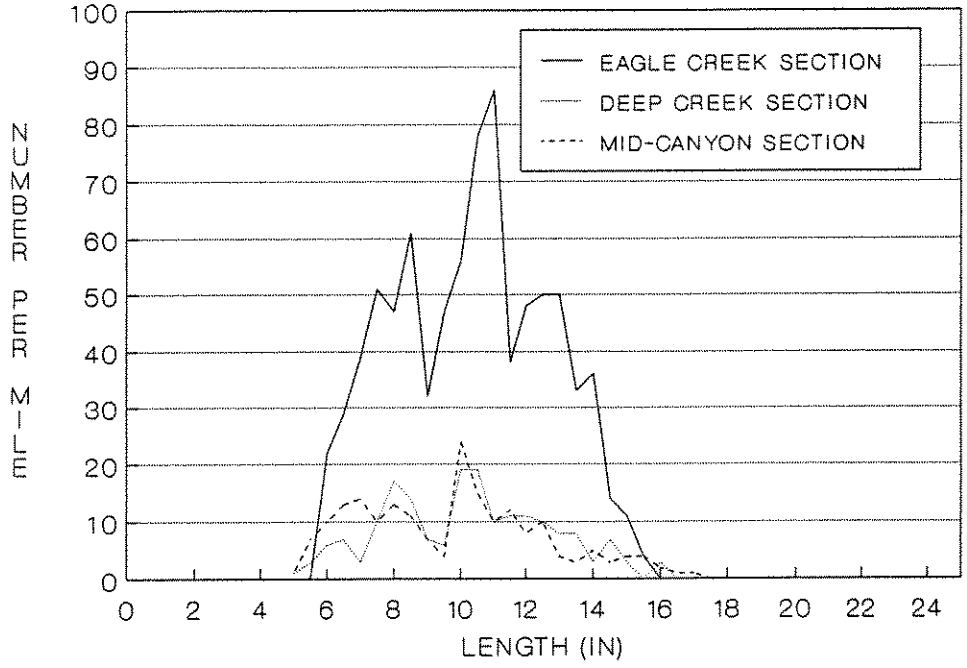


Figure 1. Rainbow trout population estimates by length from three sections on the Smith River in 1989.

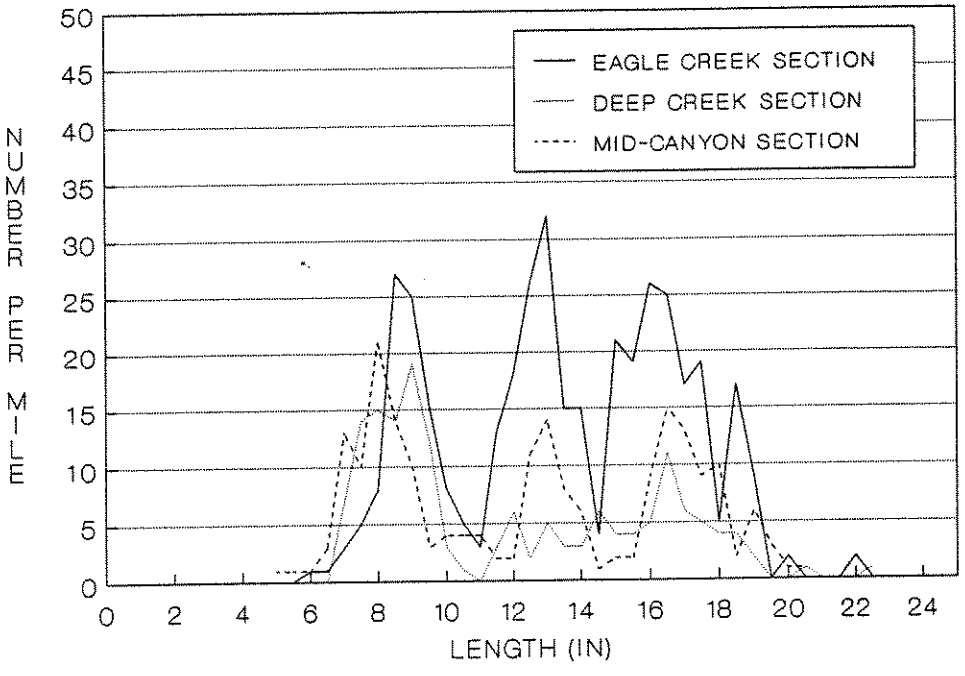


Figure 2. Brown trout population estimates by length from three sections on the Smith River in 1989.

Table 2. Rainbow and brown trout population estimates by age group in the Eagle Creek section of the Smith River, Montana during September 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.4	0.19	215	41.3
II	10.1	0.43	328	142.4
III	12.9	0.76	234	178.1
IV	14.4	1.02	52	53.0
V	15.5	1.40	1	2.0
VI & older	14.7	1.12	2	1.9
Total			832	418.7
		Brown trout		
I	8.9	0.30	93	27.9
II	13.3	1.02	144	147.4
III	16.4	1.76	106	186.4
IV	17.7	2.05	31	64.2
V & older	17.5	2.02	5	10.6
Total			379	436.5

Table 3. Rainbow and brown trout population estimates by age group in the mid-canyon section of the Smith River, Montana during September 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.4	0.18	76	13.3
II	10.6	0.47	71	32.9
III	12.5	0.74	23	16.9
IV	14.3	1.07	17	17.7
V & older	16.3	1.42	5	7.2
Total			192	88.0
		Brown trout		
I	8.3	0.24	83	19.6
II	13.9	1.16	67	77.2
III	16.8	1.79	26	46.0
IV	18.1	2.15	20	44.0
V & older	19.3	2.51	5	11.6
Total			201	198.4

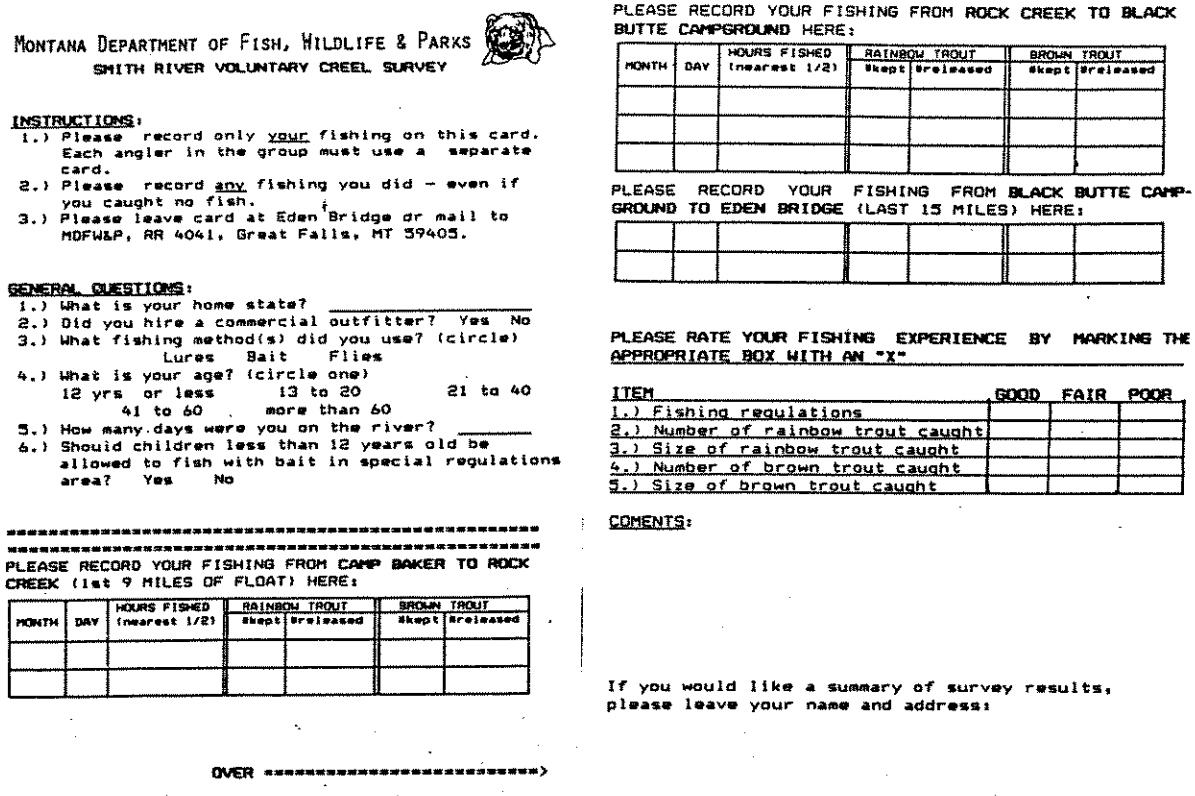
Table 4. Rainbow and brown trout population estimates by age group in the Deep Creek section of the Smith River, Montana during September 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.0	0.22	68	15.1
II	10.6	0.50	63	31.4
III	12.9	0.84	49	41.4
IV & older	14.8	1.15	5	5.5
Total			185	93.4
		Brown trout		
I	8.6	0.26	85	22.3
II	13.6	1.09	32	35.0
III	16.6	1.82	16	28.7
IV	17.7	2.10	17	35.7
V & older	18.8	2.42	5	13.0
Total			155	134.7

estimates will be presented in the next annual report. We plan to utilize this data along with discharge and river use information to assess the effectiveness of the special regulations section established in 1985 that extends from Rock Creek to Eden Bridge.

Smith River Creel Survey

The voluntary creel card survey of floaters initiated in 1986 was continued in 1987. The survey form was simplified in an attempt to improve the poor response rate of 1986 (Figure 3). This approach was unsuccessful as only 50 anglers completed and returned the cards in 1987. A Parks Division survey (Baxter 1987) estimated that at least 913 anglers floated the river between April and the end of August 1987, hence response to the voluntary creel survey was less than six percent. This was lower than response to the 1986 survey (9%, Leathe and Hill 1987) and suggests that the 1987 survey results should be used with caution. Due to poor success, the voluntary census was discontinued after the 1987 float season. In its place, a few general questions concerning fishing success were added to the Parks Division questionnaire that was given to floaters at the end of their trip at Eden Bridge in 1988 and 1989. In addition, several questions concerning angler satisfaction were added to a



MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS
SMITH RIVER VOLUNTARY CREEL SURVEY

INSTRUCTIONS:
1.) Please record only your fishing on this card. Each angler in the group must use a separate card.
2.) Please record any fishing you did – even if you caught no fish.
3.) Please leave card at Eden Bridge or mail to MDFW&P, RR 4041, Great Falls, MT 59405.

GENERAL QUESTIONS:
1.) What is your home state? _____
2.) Did you hire a commercial outfitter? Yes No
3.) What fishing method(s) did you use? (circle)
Lures Bait Flies
4.) What is your age? (circle one)
12 yrs or less 13 to 20 21 to 40
41 to 60 more than 60
5.) How many days were you on the river? _____
6.) Should children less than 12 years old be allowed to fish with bait in special regulations area? Yes No

PLEASE RECORD YOUR FISHING FROM CAMP BAKER TO ROCK CREEK (1st 9 MILES OF FLOAT) HERE:

MONTH	DAY	HOURS FISHED (nearest 1/2)	RAINBOW TROUT #kept	RAINBOW TROUT #released	BROWN TROUT #kept	BROWN TROUT #released

OVER ==========>

PLEASE RECORD YOUR FISHING FROM ROCK CREEK TO BLACK BUTTE CAMPGROUND HERE:

MONTH	DAY	HOURS FISHED (nearest 1/2)	RAINBOW TROUT #kept	RAINBOW TROUT #released	BROWN TROUT #kept	BROWN TROUT #released

PLEASE RECORD YOUR FISHING FROM BLACK BUTTE CAMPGROUND TO EDEN BRIDGE (LAST 15 MILES) HERE:

PLEASE RATE YOUR FISHING EXPERIENCE BY MARKING THE APPROPRIATE BOX WITH AN "X"

ITEM	GOOD	FAIR	POOR
1.) Fishing regulations			
2.) Number of rainbow trout caught			
3.) Size of rainbow trout caught			
4.) Number of brown trout caught			
5.) Size of brown trout caught			

COMENTS:

If you would like a summary of survey results, please leave your name and address:

Figure 3. Smith River voluntary creel survey form used in 1987.

mail survey of floaters conducted during 1988 as part of a Parks Division graduate study.

Almost 81% of the respondents to the 1987 voluntary creel survey were Montana residents. Colorado residents represented the majority (10.6%) of out of state users, followed by Californians (6.4%), and Minnesota (2.1%). Only 6.5% of the respondents hired a commercial outfitter to float the river. The majority (63.0%) of the anglers that completed the survey form were 21-40 years old. Anglers aged 41-60 accounted for an additional 23.9% of the respondents. The duration of each trip varied from 2-7 days; most people took 4 days to complete the trip. Most (82.6%) of the anglers used flies at some time during the trip while 37.0% and 43.0% had used lures and bait, respectively, during the trip. All respondents floated the river in May and June.

The respondents who fished averaged 6.2 hours/angler day and 2.3 days/trip in 1987. Catch rates for rainbow trout decreased in a downstream direction while for brown trout, the peak was observed between Rock Creek and Black Butte (Table 5). The average

Table 5. Angler days, total hours fished, catch rates and the percentage of rainbow and brown trout released in three sections of the Smith River, Montana as reported by respondents on voluntary creel survey cards in May and June 1987.

Section	River[1] miles	Angler days	Total hours fished	Catch/hour[2] Rb	Catch/hour[2] LL	% Released[2] Rb	% Released[2] LL
Camp Baker-Rock Creek	0-9	39	203	1.42	0.34	92.4	92.8
Rock Creek-Black Butte	9-46	47	409	1.19	0.63	85.8	92.6
Black Butte-Eden Bridge	46-61	31	108	0.56	0.54	86.9	79.3
All sections	0-61	117	720	1.16	0.53	90.9	88.1

1 River miles downstream from Camp Baker.
2 Species code: Rb = rainbow trout, LL = brown trout

rainbow and brown trout catch rates over the entire 61 mile reach was 1.16 and 0.53 fish/hour, respectively. Also, 90.9% of rainbow trout and 88.1% of the brown trout caught by anglers were reported released.

Anglers were also requested to express their satisfaction regarding fishing regulations as well as the number and size of fish caught. Most (85.1%) respondents rated the current fishing regulation fair (Table 6). A majority of the anglers thought that the number of rainbow and brown trout caught as well as the size of brown trout caught was fair. However, most respondents felt the size of the rainbow trout caught was good. The greatest dissatisfaction was found in brown trout angling, where 11.4% and 9.1% of the people felt the number and size of fish, respectively was poor. Also, 55.8% of the respondents felt children under 12 years of age should not be allowed to fish with bait in special regulations areas while the remaining 44.2% voiced no opposition to the current regulation.

The general questions included in the 1988 Parks Division questionnaire provided a much larger sample size than we had obtained through the voluntary creel survey. In 1988, 72% of the floaters fished from 1-7 days on the Smith River. Two-thirds of the floaters identified the opportunity to fish as a reason for visiting the river, and 59% of the floaters reported fishing as a very or extremely important reason for the trip. Sixty-eight percent of the floaters reported that the number and size of fish caught was satisfying. Fourteen percent of the people felt the number of fish caught was dissatisfying and 9% thought the size was dissatisfying.

Table 6. Results of Smith River voluntary creel satisfaction survey in 1987.

Satisfaction with:	Response categories (%)		
	good	fair	poor
Current fishing regulations	12.8	85.1	2.1
Number of rainbow trout caught	33.3	60.0	6.7
Size of rainbow trout caught	57.8	37.8	4.4
Number of brown trout caught	43.2	45.4	11.4
Size of brown trout caught	25.0	65.9	9.1

When questioned as to how they feel in regard to more restrictive fishing regulations, the response was evenly distributed; 37% felt more restrictions were undesirable, 32% thought it was desireable, while 27% had no opinion. Another question asked if they supported less restrictive fishing regulations. Only 8% of the respondents supported less restrictive regulations, while 63% found this to be undesireable, and 27% of the people who filled out the questionnaires had no opinion.

Big Spring Creek

Mark-recapture population estimates were made by electrofishing two sections of Big Spring Creek as scheduled in fall 1986 and 1988. Ageing of trout scales collected in 1986 was not completed in time for inclusion in this report.

Rainbow trout numbers were substantially greater than the brown trout populations in both sections of Big Spring Creek electrofished in 1988 (Figures 4-7 and Tables 7 and 8). Total rainbow trout numbers were 1180/mile in the Burleigh section and increased to 3226/mile downstream in the Tresch section. Brown trout numbers in the Tresch section were more than four times greater than in the Burleigh Section (Tables 7 and 8). Although numbers for both species were lower in the upper (Burleigh) section, the average length and weight was always greater for both rainbow and brown trout than in the Tresch section.

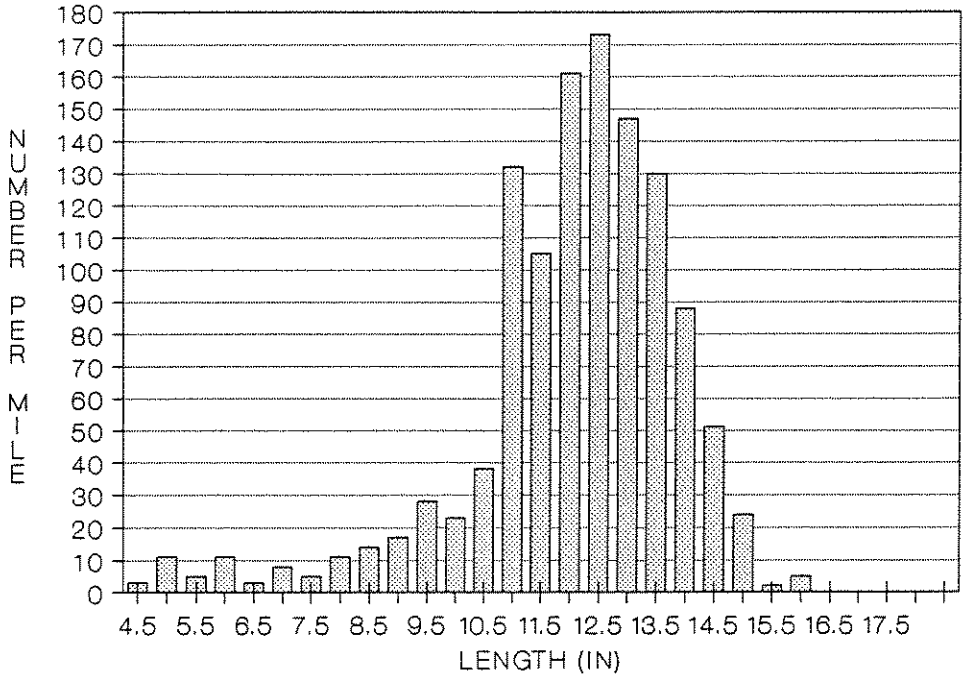


Figure 4. Rainbow trout population estimates by length from the Burleigh section of Big Spring Creek in 1988.

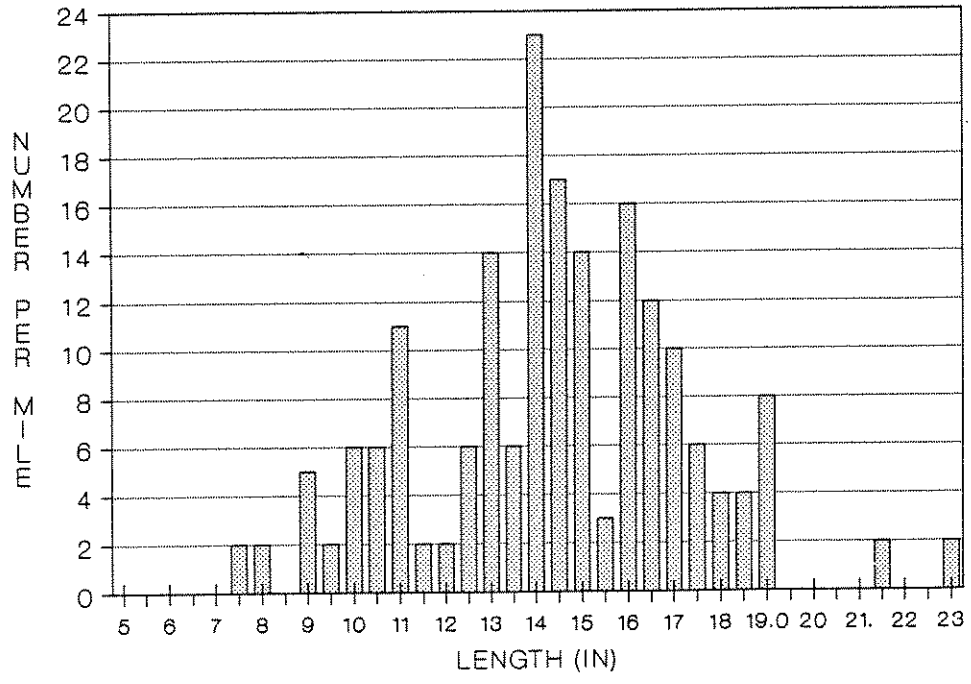


Figure 5. Brown trout population estimates by length from the Burleigh section of Big Spring Creek in 1988.

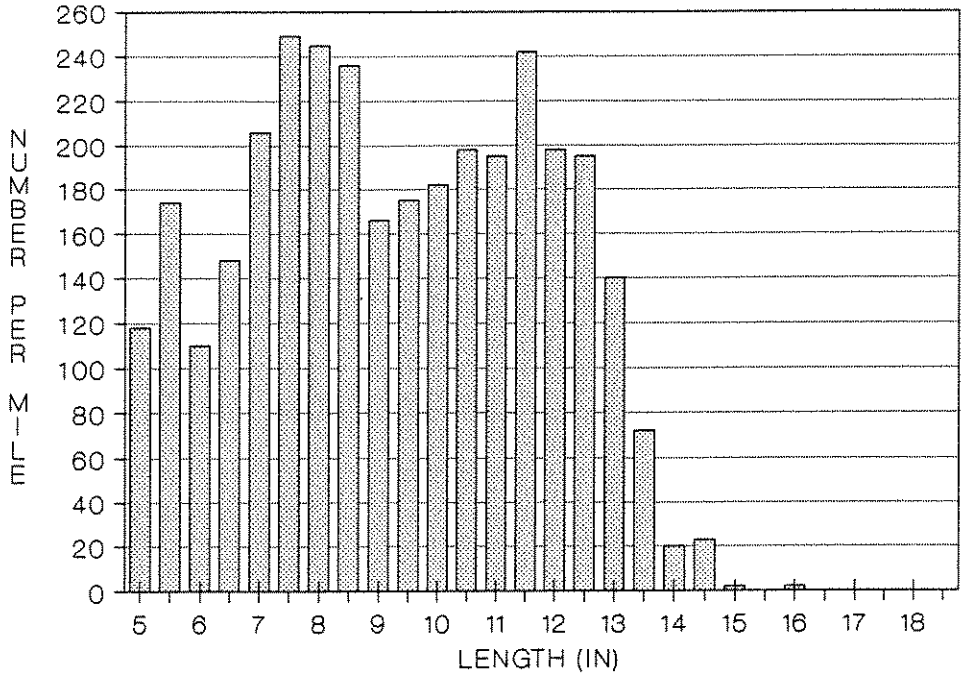


Figure 6. Rainbow trout population estimates by length from the Tresch section of Big Spring Creek in 1988.

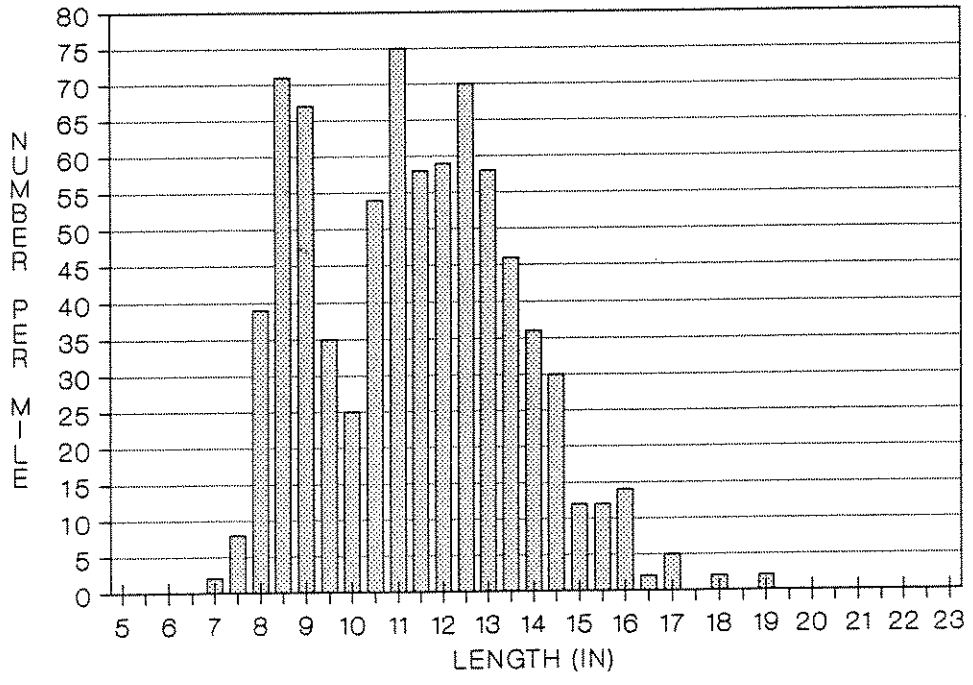


Figure 7. Brown trout population estimates by length from the Tresch section of Big Spring Creek in 1988.

Table 7. Preliminary rainbow and brown trout population estimates by age group in the Burleigh section of Big Spring Creek, Montana during August 1988.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.5	0.30	149	43.6
II	11.7	0.70	646	450.1
III	14.0	0.92	293	267.8
IV & older	14.8	1.02	92	93.5
Total			1180	855.0
		Brown trout		
I	9.2	0.32	11	3.6
II	12.3	0.77	58	44.3
III	15.0	1.31	62	80.4
IV	17.2	1.79	39	69.0
V & older	19.3	2.30	9	19.4
Total			179	216.7

Table 8. Preliminary rainbow and brown trout population estimates by age group in the Tresch section of Big Spring Creek, Montana during August 1988.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.7	0.22	1751	376.5
II	11.4	0.55	827	455.3
III	12.9	0.74	617	456.4
IV & older	14.5	0.94	31	29.4
Total			3226	1317.6
		Brown trout		
I	8.7	0.27	140	37.6
II	11.0	0.62	337	208.7
III	13.3	0.88	254	223.0
IV	15.1	1.22	37	45.3
V & older	17.3	1.57	5	7.5
Total			773	522.1

Missouri River

Complete data analysis and ageing of trout scales for population estimates in the Craig, Hardy, and Cascade sections from 1986-1989 was not completed in time for inclusion in this report; results and a discussion of population trends will appear in the next annual report.

Two separate peaks were observed in rainbow trout population estimates from all three sections on the Missouri River in 1989 (Figure 8). Although the peaks around 9 inches were similar in each section, the second peak in the Craig Section was more substantial, both in number and average size, than the downstream sections. Like rainbow trout, the brown trout population estimate in 1989 from the Craig section was also higher than in any other section (Figure 9). However, unlike for rainbow, both peaks decreased at each downstream section.

Habitat Protection

During the report period, a total of 84 proposed projects that would alter streambeds or banks were processed under the 1975 Natural Streambed and Preservation Act (310). The field office in Choteau processed 12 regular applications, 6 annual plan of operations and 2 violations. Thirty seven (44%) of the 310 projects were in Cascade County, the greatest number in any single county; Meagher County had 13 projects which constituted 15.5% of the total. Also, 55 projects under the Stream Preservation Act of 1963 (SPA) were reviewed. Site inspections were made on most but not all of the "310" and SPA projects. No significant water discharge permit applications or renewals were received and no significant pollution complaints were received during the report period.

One of the SPA projects was initiated by the Department of Fish, Wildlife and Parks on Spring Creek flowing through Choteau. Habitat improvements were made consisting of rock deflectors, rock clusters, undercut banks and deepening of holes.

RECOMMENDATIONS

Management recommendations for the major coldwater streams and rivers will be included in the next annual report after additional data analysis has occurred.

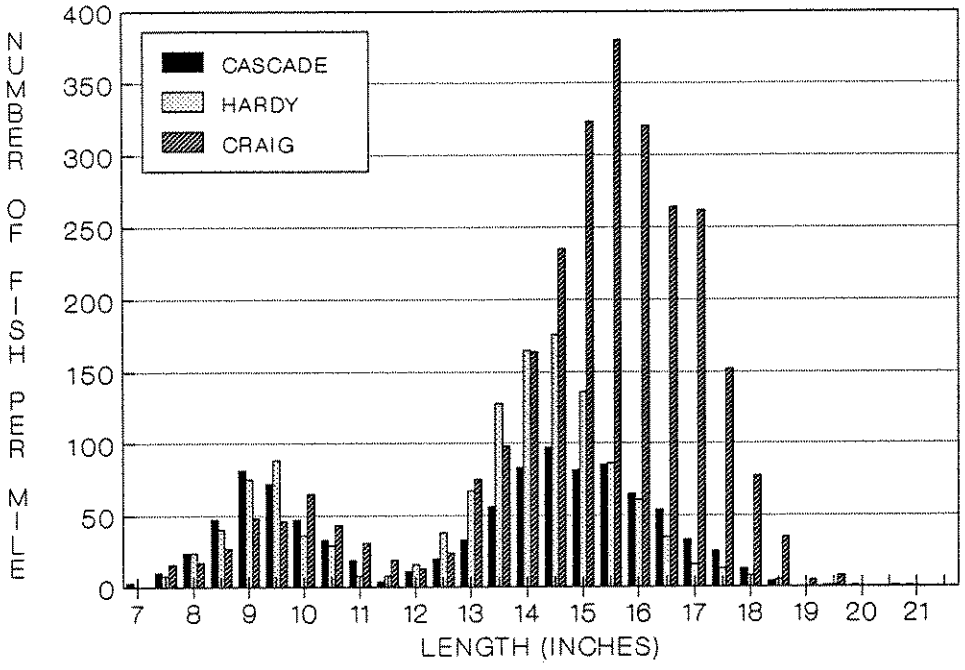


Figure 8. Rainbow trout population estimates by length for three sections on the Missouri River during fall 1989.

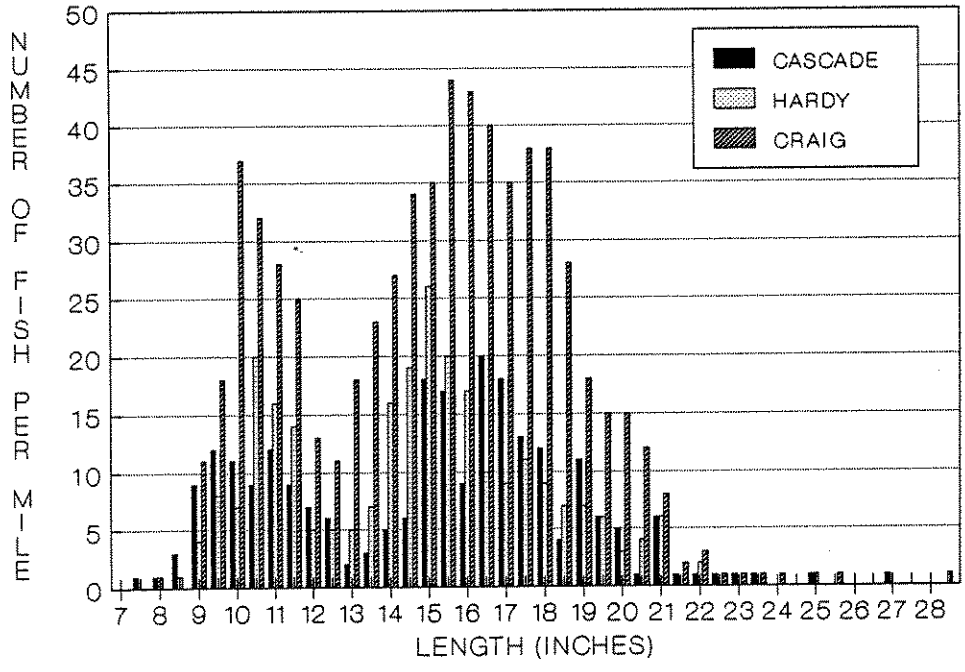


Figure 9. Brown trout population estimates by length for three sections on the Missouri River during fall 1989.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of several individuals in completing field and office work on this project. Paul Hamlin, and Ken Sinay were fisheries fieldworkers who conducted or assisted on nearly all of the field activities conducted for this project during the report period. They also assisted in compiling and summarizing data presented and their dedicated efforts are appreciated. We also need to thank Jose Serrano-Piche, Bob Snyder, Jim Sturdivant, Steve Giannini, Kelley Smith, and Rich Kummer as well as City of Choteau personnel and U. S. Forest Service personnel and volunteers Seth Diamond, Jeff Kinnman, and Greg Rodman for their assistance.

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Prepared By: George A. Liknes, William J. Hill, and Stephen A. Leathe

Date: August 1990

Principal Fish Species Involved:

Rainbow trout, cutthroat trout, brown trout, arctic grayling, brook trout, mottled sculpin.

Code Numbers Of Waters Referred To In Report:

14-5760 Spring Creek
16-0310 Big Spring Creek, Sec. 2
17-4896 Missouri River Sec 09
17-6832 Smith River Sec 02
17-7532 Tenderfoot Creek

20-2000	Elk Creek
20-4400	No. Fork Sun River
20-5100	Rock Creek
20-5600	So. Fork Sun River