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

STATE: Montana PROJECT NO.: F-46-R-5
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, 1991 through June 30, 1992

ABSTRACT

Snorkel surveys used as the recapture of trout marked by hook and line produced estimates of 658 fish per mile in the North Fork and 715 fish per mile in the South Fork of the Sun River. Badger Creek and South Fork Badger Creek were found to contain genetically pure westslope cutthroat trout. Population estimates of rainbow trout in the Smith River increased in 1991 in the mid-canyon and Deep Creek sections, and declined in the Eagle Creek section. Substantial numbers of brown trout from the 1990 age class were found in all three monitoring section on the Smith River. Rainbow trout numbers in both sections of the Missouri River declined from 1990-1991. The decline resulted from age I and age III fish in the Craig section. Spring brown trout estimates were similar to previous years. Approximately 119 projects under the Natural Streambed and Land Preservation Act and 84 projects under the Stream Preservation Act were reviewed.

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

Trout populations in the Smith River were surveyed using a fiberglass drift boat equipped with a mobile electrode powered by a 120 or 240 volt generator. A Fisher Shocker (Model FS 101) or Coffelt VVP-15 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 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 and age data with a MDFWP computer program on an IBM-PC compatible microcomputer.

Trout populations in the western portion of Region 4 were surveyed by backpack shocker, snorkeling, or hook and line. Trout populations in the North and South Forks of the Sun River were estimated by the Petersen mark-recapture method (Ricker 1975). Trout caught by hook and line were marked with Floy tags and recapture information were obtained by snorkeling. Cutthroat trout in a number of streams were collected in cooperation with the U.S. Forest Service for electrophoretic analysis by Dr. Rob Leary at the University of Montana.

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

Sun River drainage

Trout populations in the North and South Forks of the Sun River were estimated by mark-recapture methods during early August of 1991. Each fork was snorkeled twice, approximately three hours apart. The final estimated is a mean of the two runs. Table 1 compares various statistics of the fishery for these streams. The population of rainbow and cutthroat trout over eight inches was estimated at 658 fish per mile in the North Fork. This compares to 976 fish per mile in 1990. The 1991 estimate for the South Fork was 715 fish per mile which compares to 674 and 856 fish per mile, respectively, for 1990 and 1989.

Table 1. Various parameters of the fishery in the North and Fork of the Sun River, August 1991.

		North Fork	South Fork
Section length (feet)		7180	5600
Total trout caught (species combined)		188	126
Total hours fished		58.3	64.8
Catch rate (fish/hour)		3.2	1.9
Species composition	Rb	83.5	94.4
	Ct	4.3	2.4
	Rb x Ct	6.9	3.2
	Eb	5.3	0
Population estimate (Rainbow & Cutthroat trout only)			
Mean length		11.3	12.1
No. fish tagged > 8"		125	114
Snorkel counts:	1st Run	261	389
	2nd Run	221	419
Efficiency R/C:	1st Run	14.9%	14.9%
	2nd Run	12.7%	15.0%
Population estimate:	1st Run	607	717
(number per mile)	2nd Run	710	712
	Mean	658	715

Special regulations in effect since 1975 were intended to increase the size of trout in these streams. Examination of Table 2 shows that the mean length has fluctuated between 11 and 12 inches and that at least one-third of the population is over 12 inches long. It appears that trout populations in the forks fluctuate regardless of regulations in effect. Beginning with the 1992 season, anglers will be allowed to keep one rainbow or cutthroat over 12 inches. Scale analysis indicates trout growth is comparable in the two streams with slightly better growth found in the South Fork (Table 3).

Table 2. Trends of the trout fishery (under special regulations*) in the forks of the Sun River from 1975 - 1991.

Year	North Fork		South Fork	
	Mean Length	% over 12"	Mean Length	% over 12"
1975	10.9	29.4	11.4	40.7
1976	11.3	41.7	11.8	50.0
1977	11.5	51.2	12.7	78.6
1978	12.2	68.3	11.8	49.5
1979	10.7	37.0	11.6	44.1
1981	11.0	34.2	12.0	47.4
1983	11.3	38.7	11.8	46.3
1985	11.6	42.5	12.2	47.5
1987	-	-	12.0	52.5
1989	10.8	35.5	10.9	26.8
1990	10.9	32.7	11.2	38.5
1991	11.3	39.7	12.1	62.1

*Special regulations:
1975-1982: Two rainbow and/or cutthroat, any size.
1983: Three rainbow and/or cutthroat, one over 18".
1984-1991: Three rainbow and/or cutthroat, none over 12"

Table 3. Age Composition of rainbow trout in the forks of the Sun River, 1991.

Age	North Fork			South Fork		
	Number of fish	Mean length	(range)	Number of fish	Mean length	(range)
II	7	7.6	(6.8-8.5)			
III	66	11.0	(9.0-12.5)	59	11.4	(8.5-13.0)
IV	31	12.6	(11.5-14.5)	37	12.9	(10.5-15.0)
V & older	9	14.4	(13.0-17.3)	11	14.0	(13.0-16.6)

Cutthroat Testing

Cutthroat trout were collected from a number of streams in cooperation with the Forest Service. Electrophoresis indicated genetically pure westslope cutthroat were collected in Badger Creek and South Fork Badger Creek. Rainbow trout and/or Yellowstone cutthroat trout influence was detected in fish from Lonesome Creek, Limestone Creek and North Fork Little Badger (in the Badger Creek Drainage), South Fork Dupuyer Creek (Teton River drainage) and Little Willow Creek (Sun River drainage).

Smith River

Rainbow trout numbers in the Eagle Creek section remained higher than in the two downstream sections in both 1991 (Tables 4-6). However, rainbow trout numbers in the Eagle Creek section during 1991 are approximately 40% of the numbers estimated in 1990. Most of the change was observed among yearling fish. Rainbow trout numbers in 1991 increased in both the Mid-canyon section and the Deep Creek sections over 1990 levels.

Brown trout estimates increased dramatically in both the Mid-Canyon and Deep Creek sections. Both sections had estimates greater than 500 brown trout per mile (Tables 5 and 6). Although the brown trout population estimate in the Eagle Creek section also increased, population densities in recent years have been at similar levels. Favorable spawning, incubating, and rearing conditions appear to have been present throughout a large portion of the Smith River for the 1990 age class, which was responsible for the large increase in population levels.

As soon as possible, We plan to analyze population 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.

Missouri River

The estimated number of rainbow trout by age group was 2,630 and 948 per mile in the Craig and Cascade sections, respectively, during September 1991 (Tables 7 and 8). This represents a decrease in both sections from the 1990 estimated population densities of 3,419 and 1,924 rainbow trout per mile in the Craig and Cascade sections, respectively (Table 9). The decrease in the Craig section occurred in the age I and III fish; all other age classes showed increases in numbers. However, in the Cascade section, we observed an increasing densities of only age II rainbow trout.

Table 4. Rainbow and brown trout population estimates by age group in the Eagle Creek section of the Smith River, Montana during September 1991.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.7	0.22	326	70.6
II	10.7	0.45	144	64.4
III	13.1	0.82	39	31.9
IV	14.8	1.12	23	25.5
V	14.3	1.07	6	6.3
VI & older	14.5	1.10	2	2.3
Total			540	201.0
		Brown trout		
I	8.4	0.27	228	60.7
II	12.7	0.89	56	50.2
III	16.2	1.73	42	73.0
IV	17.8	2.22	35	78.9
V	18.4	2.28	16	35.7
VI & older	19.5	2.58	1	3.6
Total			378	302.1

Table 5. Rainbow and brown trout population estimates by age group in the mid-canyon section of the Smith River, Montana during September 1991.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.3	0.24	204	49.2
II	11.8	0.61	148	90.2
III	13.9	1.01	21	21.7
IV	15.3	1.34	6	7.7
Total			379	168.8
		Brown trout		
I	8.1	0.22	385	85.6
II	12.7	0.88	51	44.8
III	16.3	1.74	58	100.7
IV	18.5	2.40	28	68.2
V & older	19.2	2.73	8	20.7
Total			530	320.0

Table 6. Rainbow and brown trout population estimates by age group in the Deep Creek section of the Smith River, Montana during September 1991.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.2	0.23	195	44.4
II	11.4	0.60	54	32.3
III	14.0	1.04	22	22.7
IV & older	16.5	1.39	1	1.1
Total			272	100.5
		Brown trout		
I	8.2	0.21	444	92.7
II	12.9	0.84	54	45.1
III	15.3	1.39	32	44.7
IV	17.6	2.16	11	23.2
V	18.8	2.29	5	11.4
VI & older	19.3	2.51	2	5.7
Total			548	222.8

Table 7. Rainbow trout population estimates by age group in the Craig section of the Missouri River, Montana during September 1991.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	9.8	0.46	927	426.0
II	13.3	1.00	742	742.4
III	16.2	1.51	699	1051.7
IV	18.0	1.81	232	419.0
V & older	18.6	2.16	30	64.6
Total			2630	2703.7

Table 8. Rainbow trout population estimates by age group in the Cascade section of the Missouri River, Montana during September 1991.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	10.3	0.45	506	227.6
II	13.3	0.91	308	279.0
III	15.9	1.31	111	145.6
IV & older	17.4	1.73	23	39.0
Total			948	691.2

Table 9. Rainbow trout population estimates by age group in the Craig and Cascade sections of the Missouri River, Montana during September 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Craig Section		
I	9.3	0.36	1470	530.6
II	13.3	1.04	508	527.8
III	16.5	1.54	1222	1879.2
IV	18.2	1.66	215	356.4
V & older	19.0	2.35	4	9.1
Total			3419	3303.1
		Cascade Section		
I	9.3	0.29	1389	402.4
II	12.4	0.63	134	84.7
III	15.4	1.32	291	384.1
IV	16.9	1.56	95	148.7
V & older	17.8	1.65	15	24.5
Total			1924	1044.4

Brown trout population estimates in the Craig and Cascade sections from spring and fall suggest upstream movement may occur during the fall. Fall estimates of 827 and 192 per mile in the Craig and Cascade sections, respectively, were obtained for brown trout during 1991 (Table 10). However, during spring work, we found densities were much similar in the two sections; 435 per mile were estimated in the Craig section while the Cascade section was estimated to contain 294 brown trout per mile. The spring brown trout estimate is similar to number observed in previous years.

Habitat Protection

Prolonged high water during May and June of 1991 caused damage to roads, bridges and irrigation diversions on several streams draining the Rocky Mountain Front. Numerous repair projects were initiated and they required many man-hours for on-site inspections and follow-up paperwork. A total of 53 projects under the Natural Streambed and Land Preservation Act were processed by the field office in Choteau; the majority of these were in Teton County. An additional 66 projects that would alter streambeds or banks were processed under the 1975 Natural Streambed and Preservation Act (310) out of the Great Falls office for a total of 119. Forty of these projects were in Cascade County. A total of 84 projects were reviewed on coldwater streams under the Stream Preservation Act of 1963 (SPA). Thirty-one of the projects were handled through the Choteau office under the Stream Preservation Act, with one-half of these again occurring in Teton County. The majority of the projects were on the Teton River. 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.

Table 10. Brown trout population estimates by total size range in the Craig and Cascade sections of the Missouri River, Montana during fall 1991 and spring 1992.

Section	Date marked	size range (inches)	Number per mile	Pounds per mile	Ave.condition factor
Craig	9/25/91	6.0-25.4	827	1262	39.23
Cascade	9/27/91	6.0-24.4	192	208	39.41
Craig	4/30/92	5.0-25.9	435	497	40.37
Cascade	5/01/92	5.0-22.5	294	247	41.63

DISCUSSION AND RECOMMENDATIONS

Population estimates of trout over eight inches in the forks of the Sun River indicate that numbers fluctuate from year to year. Likewise, the mean length of the fish sampled also fluctuates. It is recommended to continue sampling efforts on both forks to monitor any changes that may occur in the fishery.

Cutthroat trout from several streams along the Rocky Mountain Front were collected for testing of genetic purity. This project, done in cooperation with the Forest Service, should continue until all possible streams have been evaluated as to presence of pure westslope cutthroat trout.

During the report period, considerable effort was directed at habitat protection through the stream preservation laws. The majority of the projects involved repairs caused by prolonged high spring flows. Stream preservation activities should continue to be processed as they occur.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of several individuals in completing field and office work on this project. Paul Hamlin, Anne Tews, Kelly Smith, Dave Yerk, Rick Bryant, Mark Lere and Bill Gardner conducted or assisted with field activities for this project during the report period. Anne Tews typed much of the report. We also need to thank U. S. Forest Service personnel Seth Diamond, Ken Sinay, and Greg Rodman for their assistance in collecting cutthroat specimens, as well as Dr. Robb Leary (U of M) for labwork involved in the testing for genetic purity of westslope cutthroat trout.

LITERATURE CITED

Vincent, E.R. 1971. River electrofishing and fish population estimates. Progressive Fish Culturist 33(3):163-169.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191.

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

Date: September 1992

Principal Fish Species Involved:

Rainbow trout, cutthroat trout, brown trout, brook trout.

Code Numbers Of Waters Referred To In Report:

14-0240	Birch Creek
14-1000	Cow Creek
14-1080	Cut Bank Creek
14-1640	Dupuyer Creek
14-3240	Marias River Section 01
14-3600	Muddy Creek
14-3840	N. Fk. Dupuyer Creek
14-4000	N. Fk. Teton River
14-4040	N. Fk. Willow Creek
14-5640	S. Fk. Teton River
14-5680	S. Fk. Two Medicine River
14-5960	Summit Creek
14-6040	Teton River
14-6720	Willow Creek
17-4896	Missouri River Section 09
17-6832	Smith River Section 02
19-	Divide Creek
20-0350	Barr Creek
20-1450	Cutreef Creek
20-2000	Elk Creek
20-4400	N. Fork Sun River
20-5150	Rose Creek
20-5500	Smith Creek
20-5600	S. Fork Sun River
20-6100	Sun River
20-6550	Willow Creek