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

PROJECT NO. F-46-R-4
STATE: Montana
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, 1990 through June 30, 1991

ABSTRACT

Snorkel surveys were used in conjunction with hook and line sampling to estimate trout populations of 976 fish per mile in the North Fork and 674 fish per mile in the South Fork of the Sun River in August 1990. Westslope cutthroat trout in three streams along the Rocky Mountain Front were analyzed electrophoretically and found to be genetically pure. Rainbow and brown trout numbers were lower during 1990 than in 1988 in both monitoring sections on Big Spring Creek. Rainbow trout numbers increased in 1990 while brown trout numbers were similar to 1987 levels in the Eagle Creek section on the Smith River. Rainbow and brown trout numbers have declined or remained stable in the Deep Creek and Mid-Canyon sections of the Smith since 1987. Brown trout population estimates of 360 and 198 per mile were obtained in the Craig and Cascade sections, respectively, of the Missouri River during May 1991. Seventy-seven projects under the Natural Streambed and Land Preservation Act and twenty 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 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 and age 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, or hook and line.

The section sampled on the North Fork Sun River extended from Freezeout Creek to Glen Creek while the South Fork Sun River section began at Windfall Creek and ended at Bear Creek. Fish were captured by angling and marked with Floy tags. Electrophoretic analysis of cutthroat was performed by Dr. Robb Leary from 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

Rainbow trout populations in the forks of the Sun River were estimated during August 1990. Snorkel surveys estimated trout populations of 674 and 976 fish per mile (over 8 inches), respectively, for the South and North Forks of the Sun River. Table 1 compares a variety of parameters for these streams.

Cutthroat trout were collected from three streams along the Rocky Mountain Front: Cow Creek, North Fork Waldron Creek, and N. F. Willow Creek. Electrophoretic analysis indicates these fish to be genetically pure westslope cutthroat. Sample sizes varied from 15-23 and the mean length of fish varied from 5.9-7.4 inches (Table 2).

Table 1. Statistics on the fishery of the forks of the Sun River, 1990.

	North Fork	South Fork
Section length (feet)	7180	5600
Number of Rainbow trout marked > 8" (30 Jul-1 Aug)	116	88
Number of Rainbow trout observed snorkeling (1&2 Aug)	453	408
Rainbow trout population estimate (No./mile)	976	674

Area	Species	Number	Range	Mean
North Fork Sun River	Rb	105	6.8-16.5	10.9
	Ct	24	6.5-16.0	10.6
	RbxCt	10	5.5-16.7	10.9
	Eb	6	5.3-10.0	8.1
South Fork Sun River	Rb	91	6.8-15.0	11.2
	Ct	3	9.8-13.0	11.1
	RbxCt	2	10.7-12.2	11.5
	Eb	1	-	6.7

Table 2. Cutthroat trout sampled by electrofishing, 1990.

Stream	No. of Fish	Length Range	(Mean)
Cow Creek	15	4.4-10.6	(7.4)
No.Fk. Waldron Cr.	23	2.8-8.7	(5.9)
No.Fk. Willow Cr.	16	5.2-7.3	(6.3)

Big Spring Creek

Mark-recapture population estimates were made by electrofishing two sections of Big Spring Creek in fall 1990. Aging of trout scales collected in both 1990 and 1986 has been completed and is included in this report (Tables 3-6).

As observed in the past, rainbow trout significantly outnumber brown trout in both sections of Big Spring Creek. The estimated total number of rainbow trout in the Burleigh section during 1990 was lower than in 1986 or 1988 (Liknes et al. 1990). Brown trout numbers were higher in 1988 (Liknes et al. 1990) than in either

Table 3. Rainbow and brown trout population estimates by age group in the Burleigh section of Big Spring Creek, Montana during August 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	9.0	0.32	328	103.9
II	12.2	0.70	362	252.4
III	13.7	0.87	122	106.2
IV & older	14.4	1.02	14	14.0
Total			826	476.5
		Brown trout		
I	10.6	0.53	6	3.3
II	13.5	1.06	16	16.6
III	16.2	1.70	23	39.7
IV	17.7	2.18	10	21.8
V & older	17.8	1.97	5	9.6
Total			60	91.0

Table 4. Rainbow and brown trout population estimates by age group in the Tresch section of Big Spring Creek, Montana during August 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.7	0.26	1094	281.9
II	11.6	0.65	548	353.5
III	13.8	0.94	449	423.7
IV & older	14.6	1.09	22	24.1
V & older	14.6	1.12	17	18.6
Total			2130	1101.8
		Brown trout		
I	10.5	0.51	261	131.5
II	13.0	0.88	228	200.0
III & older	15.3	1.37	43	59.2
Total			532	390.7

Table 5. Rainbow and brown trout population estimates by age group in the Burleigh section of Big Spring Creek, Montana during September 1986.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	11.0	0.61	147	88.8
II	12.2	0.74	1081	798.0
III	14.3	0.92	187	171.0
IV & older	14.7	1.17	7	8.4
Total			1422	1066.2
		Brown trout		
I	9.9	0.39	7	2.7
II	14.9	1.34	22	30.0
III	16.6	1.77	37	64.9
IV	18.5	2.36	14	33.5
VI & older	20.7	3.27	2	7.7
Total			82	138.8

Table 6. Rainbow and brown trout population estimates by age group in the Tresch section of Big Spring Creek, Montana during August 1986.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.8	0.21	1410	298.7
II	11.2	0.56	929	519.9
III	13.3	0.79	620	490.6
IV	15.0	1.09	150	164.1
V & older	16.8	1.62	4	6.1
Total			3113	1479.4
		Brown trout		
I	9.3	0.32	301	97.0
II	12.0	0.67	225	151.2
III	15.1	1.23	58	71.6
IV	16.2	1.46	16	22.7
V & older	18.9	2.49	7	16.6
Total			607	359.1

1990 or 1986. Rainbow trout numbers were relatively constant between 1986 and 1988 (Liknes et al. 1990) in the Tresch section but decreased by about a third in 1990. Brown trout numbers rose from 607/mile in 1986 to 773/mile in 1988, but then dropped to 532/mile in 1990.

Smith River

Analysis of the 1987 and 1990 population estimate data was completed and is presented in Tables 7-12. Population estimates for 1989 were reported in Liknes et al. (1990). As in past years, rainbow trout numbers in the Eagle Creek section remained substantially higher than in the two downstream sections in both 1989 and 1990. Rainbow trout numbers in the Eagle Creek section increased approximately 400/mile from 1987-1989 and again from 1989-1990. Brown trout estimates increased from 281/mile in 1987 to 379/mile in 1989, but then dropped back down to 250/mile in 1990. Rainbow and brown trout populations in the mid-canyon section and brown trout in the Deep Creek section have declined since 1987. Although numbers of rainbow trout in the Deep Creek section increased slightly between 1989 and 1990, this represents only 47% of the 1987 population estimate.

The 1990 mean annual discharge of the Smith River at Camp Baker near Fort Logan was 109 cfs. The maximum and minimum discharge was 367 and 55 cfs, respectively (Figure 1). Although discharge dropped below the recommended instream flow of 90 cfs, on 185 days in 1990, there was no time when flows dropped below 50 cfs. Flows in 1991 peaked near 550 cfs, which was much higher than in 1990. However, discharge after 1 July 1991 dropped to critically low levels below 50 cfs.

As soon as possible, We plan 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

Only one peak, which was in the 16 inch area, was observed for brown trout population estimates from the Craig and Cascade sections of the Missouri River during spring 1991 (Figure 2). The estimated number of brown trout was 360 and 198 per mile in the Craig and Cascade sections, respectively.

Table 7. Rainbow and brown trout population estimates by age group in the Eagle Creek section of the Smith River, Montana during September 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	7.6	0.17	938	159.0
II	10.4	0.38	183	70.5
III	12.5	0.67	115	77.7
IV	14.2	1.01	41	41.4
V	13.9	0.92	9	8.3
VI & older	15.5	1.38	2	2.7
Total			1288	359.6
		Brown trout		
I	8.8	0.30	64	19.0
II	13.2	0.94	32	30.1
III	16.5	1.87	107	200.7
IV	18.5	2.47	44	108.9
V & older	17.0	1.94	3	5.3
Total			250	364.0

Table 8. Rainbow and brown trout population estimates by age group in the mid-canyon section of the Smith River, Montana during September 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.6	0.22	79	17.7
II	11.6	0.62	59	37.1
III	13.2	0.84	34	28.7
IV	14.6	1.11	6	6.5
Total			178	90.0
		Brown trout		
I	8.3	0.23	70	16.3
II	13.7	1.04	21	21.6
III	16.8	1.95	42	81.9
IV	18.2	2.28	22	49.3
V & older	18.3	2.25	5	12.3
Total			160	181.4

Table 9. Rainbow and brown trout population estimates by age group in the Deep Creek section of the Smith River, Montana during September 1990.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.3	0.23	135	30.8
II	11.4	0.57	46	26.0
III	14.1	1.07	23	25.1
IV & older	14.8	1.22	1	1.6
Total			205	83.5
		Brown trout		
I	8.6	0.26	63	16.5
II	13.2	0.93	27	25.1
III	16.9	1.93	21	40.3
VI & older	18.4	2.38	11	25.3
Total			122	107.2

Table 10. Rainbow and brown trout population estimates by age group in the Eagle Creek section of the Smith River, Montana during September 1987.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.3	0.23	498	112.2
II	10.2	0.39	476	184.7
III	12.1	0.65	313	202.8
IV	13.0	0.74	209	154.5
V & older	14.1	0.86	20	17.3
Total			1516	671.5
		Brown trout		
II	14.6	1.32	50	65.8
III	16.7	1.91	95	181.5
IV	17.8	2.13	20	42.6
VI & older	20.1	2.63	2	6.4
Total			167	296.3

Table 11. Rainbow and brown trout population estimates by age group in the mid-canyon section of the Smith River, Montana during September 1987.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.4	0.22	244	52.8
II	10.7	0.46	49	22.8
III	12.4	0.70	109	75.9
IV	14.4	0.95	33	31.1
V & older	14.9	1.08	9	9.5
Total			444	192.1
		Brown trout		
I	9.6	0.34	128	43.1
II	13.5	1.10	38	41.7
III	16.1	1.65	78	128.3
IV	17.6	1.96	36	71.2
V & older	20.5	3.10	1	3.8
Total			281	288.1

Table 12. Rainbow and brown trout population estimates by age group in the Deep Creek section of the Smith River, Montana during September 1987.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.9	0.29	286	81.9
II	11.3	0.48	51	24.6
III	13.1	0.83	55	45.7
IV	14.4	1.04	42	43.8
V & older	16.2	1.41	3	3.8
Total			437	199.8
		Brown trout		
I	9.8	0.36	107	38.3
II	13.8	1.04	45	47.5
III	16.7	1.82	61	112.1
IV & older	18.6	2.36	17	39.3
Total			230	237.2

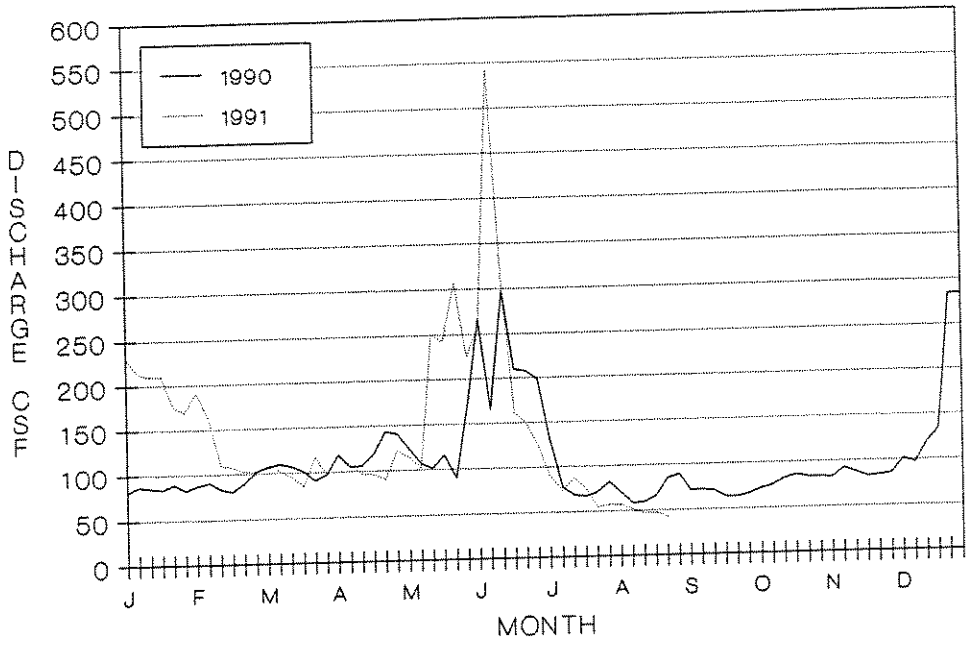

Figure 1. Mean discharge of the Smith River near Fort Logan, Montana, 1990-91.

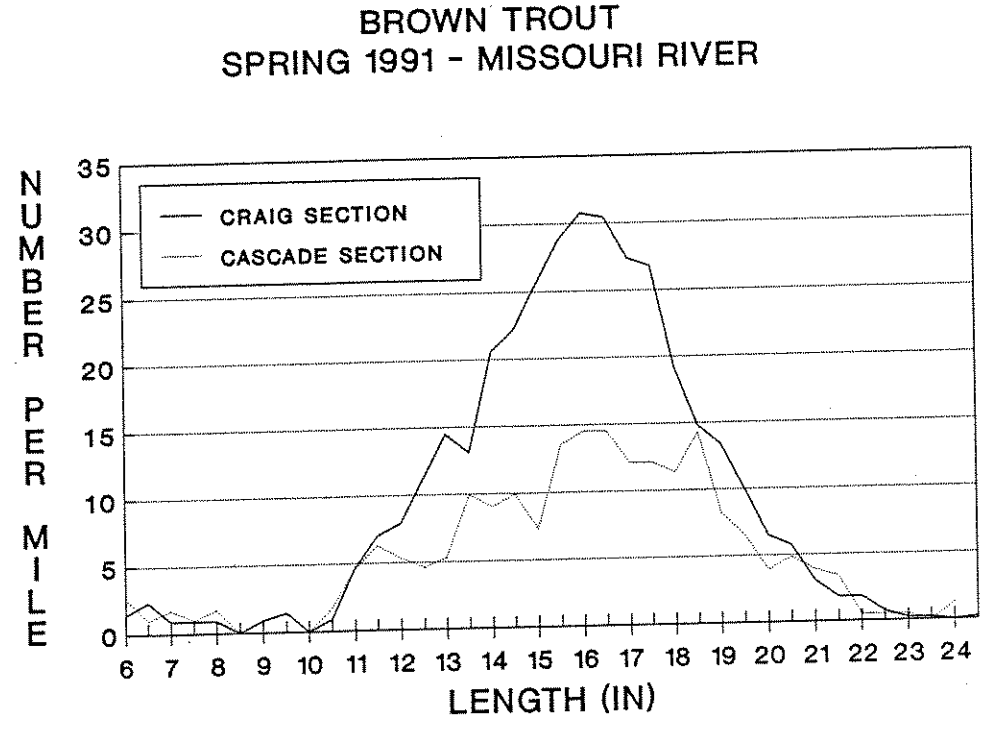

Figure 2. Brown trout population estimates by length for the Craig and Cascade sections of the Missouri River during spring 1991.

Table 13. Rainbow and brown trout population estimates by age group in the Holter section of the Missouri River, Montana during September 1987.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	8.8	0.44	789	346.0
II	10.9	0.65	798	516.6
III	14.8	1.24	943	1173.0
IV	16.9	1.53	634	973.0
V	15.9	1.39	116	160.7
VI & older	18.2	2.11	5	9.8
Total			3285	3179.1
		Brown trout		
I	11.1	0.57	24	13.6
II	13.1	1.02	87	88.7
III	15.9	1.76	106	187.0
IV	17.9	2.53	61	153.8
V	18.8	2.66	17	46.4
VI	24.2	4.87	4	19.1
VII & older	23.0	4.75	2	9.3
Total			301	517.9

Table 14. Rainbow and brown trout population estimates by age group in the Craig section of the Missouri River, Montana during September 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Rainbow trout		
I	10.9	0.49	251	123.4
II	13.9	1.31	800	1044.6
III	16.7	1.62	1417	2292.5
IV	17.9	1.71	210	359.0
V	19.9	2.74	1	3.8
VI & older	18.7	2.28	5	11.6
Total			2684	3834.9
		Brown trout		
I	10.8	0.55	165	90.2
II	15.2	1.63	310	504.8
III	18.6	2.30	141	324.7
IV	21.0	2.90	31	90.9
V & older	20.9	3.13	9	26.9
Total			656	1037.5

Table 15. Brown trout population estimates by age group in the Craig section of the Missouri River, Montana during May, 1988.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Brown trout		
II	12.5	0.82	78	64.4
III	14.0	1.13	155	175.5
IV	16.7	1.56	105	164.3
V	19.1	2.37	27	64.3
VI & older	20.4	2.75	9	24.4
Total			374	492.9

Table 16. Brown trout population estimates by age group in the Craig section of the Missouri River, Montana during May, 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Brown trout		
I	7.0	0.15	25	3.7
II	11.2	0.71	124	87.6
III	15.7	1.43	209	300.9
IV	18.4	2.00	75	151.0
V	19.6	2.33	15	34.7
VI & older	22.0	3.53	2	5.7
Total			450	583.6

Table 17. Brown trout population estimates by age group in the Cascade section of the Missouri River, Montana during June, 1989.

Age	Mean length(in)	Mean weight(lbs)	Number per mile	lbs per mile
		Brown trout		
I	11.6	0.57	1	0.7
II	13.4	0.93	38	35.2
III	15.5	1.44	51	73.9
IV	17.5	1.90	54	103.5
V	18.9	2.27	11	25.2
VI & older	21.4	3.01	2	5.8
Total			157	244.3

Data analysis and ageing of trout scales for population estimates in the Holter (fall 1987), Craig (fall 1989, spring 1989, spring 1988), and Cascade (spring 1989) sections on the Missouri River was completed in time for inclusion in this report (Tables 13-17). Rainbow and brown trout numbers were estimated at 3,285 and 301 per mile, respectively, on the Holter section in fall 1987 (Table 13). Only 3.5% of the 1,246 rainbow trout checked during the estimate originated from Holter Lake plants. Fall 1989 rainbow trout numbers in the Craig section were estimated at 2,684 per mile (Table 14); the brown trout point estimate was 656 per mile. Spring brown trout population estimates in the Craig section were 374 and 450 per mile in 1988 and 1989, respectively (Tables 16 and 17). The June 1989 brown trout

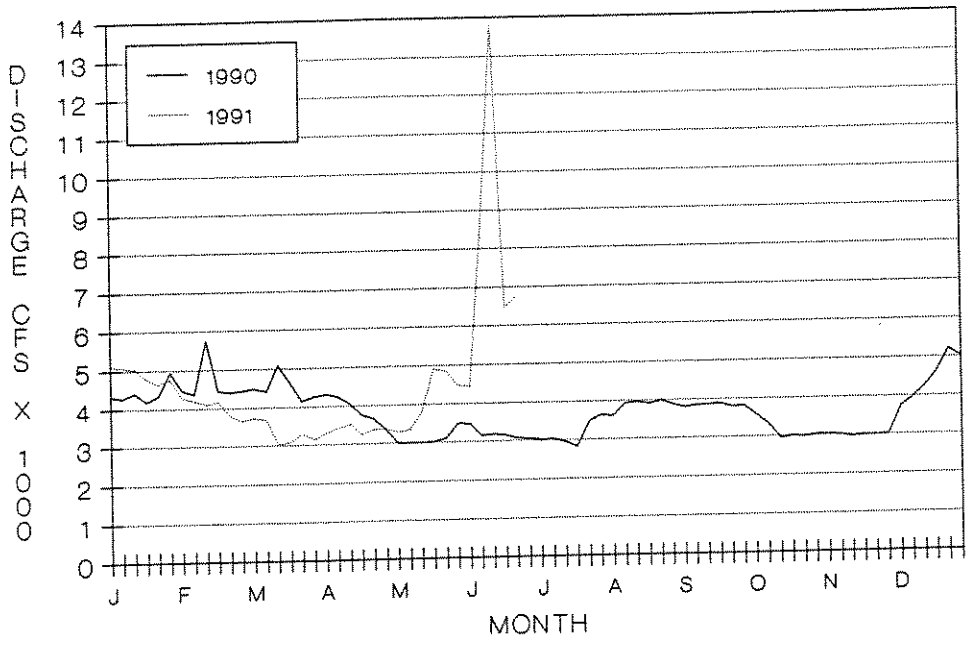

Figure 3. Mean discharge of the Missouri River below Holter Dam, Montana, 1990-91.

estimate in the Cascade section was 157 per mile (Table 17).

The mean annual discharge of the Missouri River was 3,777 cfs in 1990. No peak associated with spring runoff occurred during 1990 (Figure 3); however, brief high flows were observed in 1991. Mean monthly discharge was greater than the recommended minimum flow of 4100 cfs during January, February, March, and December in 1990 as well as January 1991.

Habitat Protection

During the report period, a total of 77 proposed projects that would alter streambeds or banks were processed under the 1975 Natural Streambed and Preservation Act (SB310). The field office in Choteau processed 14 regular applications. Thirty six percent of the 310 projects were in Cascade County, the greatest number in any single county. Also, 20 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.

RECOMMENDATIONS

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

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of several individuals in completing field and office work on this project. Paul Hamlin, Rich Kummer, Kelly Smith, and Rick Bryant conducted or assisted field activities conducted for this project during the report period. We also thank U. S. Forest Service personnel Seth Diamond, Ken Sinay, and Greg Rodman for their assistance. Anne Tews typed the report.

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Date: August 1991

Principal Fish Species Involved:

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

Code Numbers Of Waters Referred To In Report:

14-0240	Birch Creek
14-1000	Cow Creek
14-4040	N. Fk. Willow Creek
14-5680	S. Fk. Two Medicine River
14-5760	Spring Creek
14-6040	Teton River

14-6360	N. Fk. Waldron Creek
16-0310	Big Spring Creek, Sec. 2
17-4656	M. Fk. Dearborn River
17-4896	Missouri River Sec 09
17-6832	Smith River Sec 02
20-0450	Beaver Creek
20-1900	E. Fk. Cyanide Creek
20-4400	No. Fork Sun River
20-5600	So. Fork Sun River
20-6100	Sun River
20-6550	Willow Creek