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

STATE: Montana PROJECT NO.: F-46-R-6
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, 1992 through June 30, 1993

ABSTRACT

Pure westslope cutthroat trout were documented in Lost Shirt, Red Poacher, Waldron and Whiterock Creeks. Nine other streams surveyed contained cutthroat with rainbow and or yellowstone cutthroat influence. The self-sustaining population of grayling in the Sunny Slope Canal was sampled. Trout populations in the forks of the Sun River were estimated using snorkel surveys. The estimate for the North Fork is comparable to 1991 but the South Fork estimate is lower. We did not obtain a valid rainbow trout estimate in the Eagle Creek section during 1992. Rainbow trout numbers decreased in a downriver direction in the lower two sections on the Smith River in 1992. Brown trout numbers were highest in the Mid-Canyon section, but closely followed by the Eagle Creek section. Although the number of brown trout in the Deep Creek section was the lowest of the three sections, the estimate was the second highest ever observed. Rainbow trout population levels in fall 1992 decreased slightly in the Cascade section and increased in the Craig section from the 1991 population estimates. The fall 1992 rainbow trout estimate represents the highest population levels estimate ever observed in the Hardy Section. The number of trophy rainbow trout in the Missouri River appears to be at near record levels. The spring brown trout estimates in the Craig and Cascade sections are almost identical to the numbers observed in spring 1992. Approximately six times more trout were estimated in the Tresch section than in the Burleigh section; the estimated number of total trout per mile was almost 3,300. Sixty-five projects under the Natural Streambed and Land Preservation Act and 36 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

Fish populations along the Rocky Mountain Front in Region Four were sampled by backpack shocker, hook and line, and snorkeling. Trout population estimates for the forks of the Sun River were made using the Petersen mark-recapture method (Ricker 1975). Floy tags were used to mark the trout and snorkelers obtained the recapture data. Cutthroat trout were collected from a number of streams and grayling from an irrigation canal for electrophoretic analysis. Specimens were analyzed by Dr. Robb Leary of the University of Montana. Scale samples were collected from a representative sample of fish for age and growth purposes.

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 unit 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 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.

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

Cutthroat Trout

Cutthroat trout were collected from thirteen streams along the Rocky Mountain Front. These fish were cooperatively collected with the U.S. Forest Service and tested electrophoretically. Results indicate genetically pure westslope cutthroat trout occur in Waldron Creek, Whiterock Creek, Red Poacher Creek and Lost Shirt Creek. Hybridization with rainbow and/or Yellowstone cutthroat trout was observed in South Fork Waldron Creek, Green Gulch,

Rierdon Gulch, Summit Creek, Sidney Creek, Badger Cabin Creek, Main Badger Creek, Hungry Man Creek and Middle Fork Teton River. A previous report (Liknes et al. 1992) listed pure westslope cutthroat in Main Badger Creek.

Grayling

The Sunny Slope Canal originates at the outlet of Pishkun Reservoir and supplies irrigation water to the Fairfield Bench. Grayling were stocked in Pishkun Reservoir from 1937-1943. Some of these fish escaped through the outlet works and have maintained a reproducing population in the canal ever since. Approximately 120 feet of canal immediately below the outlet gates was electrofished on March 29,1993. A portion of the fish collected will be tested electrophoretically and results will be reported at a later date.

Miscellaneous Streams

In addition to the streams listed above, a number of other waters were electrofished to update regional files. Results of these surveys appear in Table 1.

Sun River Drainage

Surveys on the North and South Forks of the Sun River were conducted from July 13-15, 1992. A total of 99 rainbow and or cutthroat trout over eight inches were tagged in the North Fork. These fish ranged in length from 8.0-16.3 inches with a mean length of 11.5 inches. In the South Fork, 98 rainbow and or cutthroat trout were tagged. Their mean length was 12.2 inches (range 8.3-15.3). Population estimates were made by mark-recapture methods with snorkelers observing tagged vs. untagged fish. The trout populations were estimated at 696 and 492 fish per mile, respectively, for the North and South Fork.

All fish sampled were taken by hook and line. Catch rates varied from 1.9 fish per hour for the South Fork to 4.9 fish per hour for the North Fork. At the present time, trout populations appear to be in good condition with over 45 percent of the fish in the North Fork and over 67 percent of the fish in the South Fork being twelve inches or greater.

As noted in earlier reports (Liknes et al. 1992), various special regulations have been placed on these streams since 1975. The report stated that fluctuations occurred in the average length and proportion of fish over twelve inches regardless of what regulation was in effect. Examination of Figures 1 and 2 show these fluctuations. It is interesting to note that both forks have similar patterns although the North Fork shows lesser values.

Table 1. Streams surveyed by electrofishing.

Stream (date sampled)	Shocking distance	Species*	Number	Length range	Weight range
Deep Creek (9-9-92)	700'	LL	2	13.6-14.4	0.82-1.10
		MSc			
		LNDace			
		WSu			
Dupuyer Creek (9-10-92)	1500'	Rb	10	2.8-14.8	0.01-1.20
		Eb	3	6.5- 8.1	0.10-0.20
		WSu	11	3.7-12.2	
		MtSu	1	4.7	
		MSc			
		LNDace			
Green Gulch (7-1-92)	400'	Ct	17	4.4- 7.5	
		MSc			
Mid.Fk.Teton (9-11-92)	200'	Ct	11	3.2- 4.5	
		Eb	6	2.5- 4.1	
		MSc			
Rierdon Gulch (9-11-92)	100'	Ct	25	3.2- 4.5	
		Eb	2	3.1- 7.2	
Smith Creek (6-5-92)	750'	LL	17	5.2-19.8	0.10-2.79
		Rb	2	3.5-15.9	0.02-1.60
		Eb	5	5.3- 6.9	0.06-0.13
		MSc			
So.Fk.Teton (9-11-92)	250'	Ct	20	4.5-10.9	
		Eb	18	4.0-10.6	
		MSc			
So.Fk.WaldronCk. (6-26-92)	450'	Ct	16	3.4- 6.2	
Spring Coulee (9-9-92)	450'	LL	9	9.8-21.0	
		WSu			
		MtSu			
		LNDace			
		LChub			
Summit Creek (6-30-92)	200'	Ct	32	1.8- 9.9	
		Eb	8	4.0- 8.6	
		MSc			
Sunny Slope Canal (3-29-93)	120'	Gr	2	7.0- 8.5	0.10-0.14
			84	9.4-12.8	0.26-0.65
		Rb	6	3.3- 9.8	
			3	10.7-11.8	
			1	21.5	
		Eb	1	12.2	
		YP	21		
		WSu	25		
Waldron Creek (7-1-92)	650'	Ct	21	2.3- 4.8	

*Species abbreviations: LL-brown trout; MSc-mottled sculpin; LNDace-longnose dace; WSu-white sucker; Rb-rainbow trout; Eb-brook trout; MtSu-mountain sucker; Ct-cutthroat trout; LChub-lake chub; GR-grayling; YP-yellow perch.

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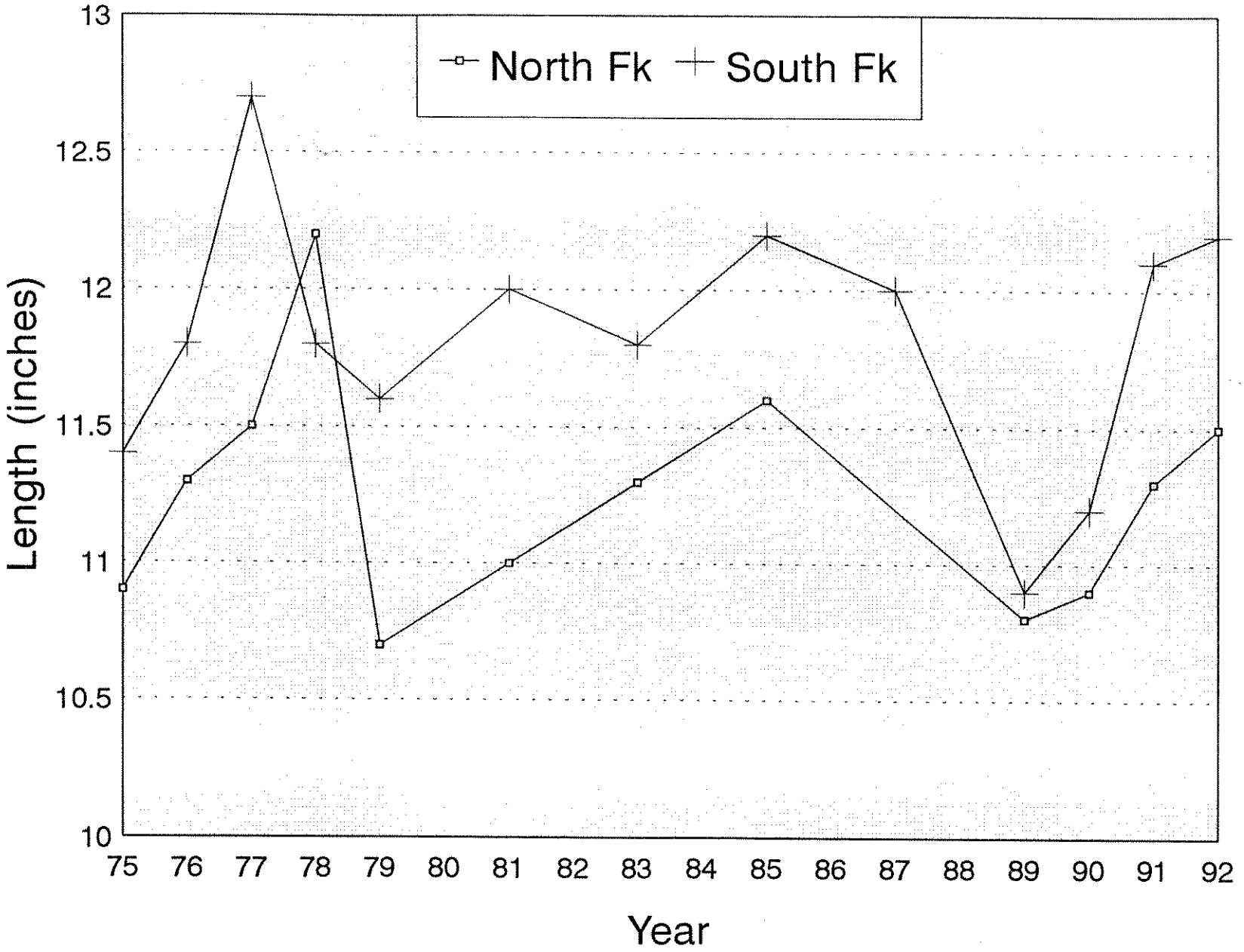

Fig. 1. Average length of rainbow trout in the forks of the Sun River.

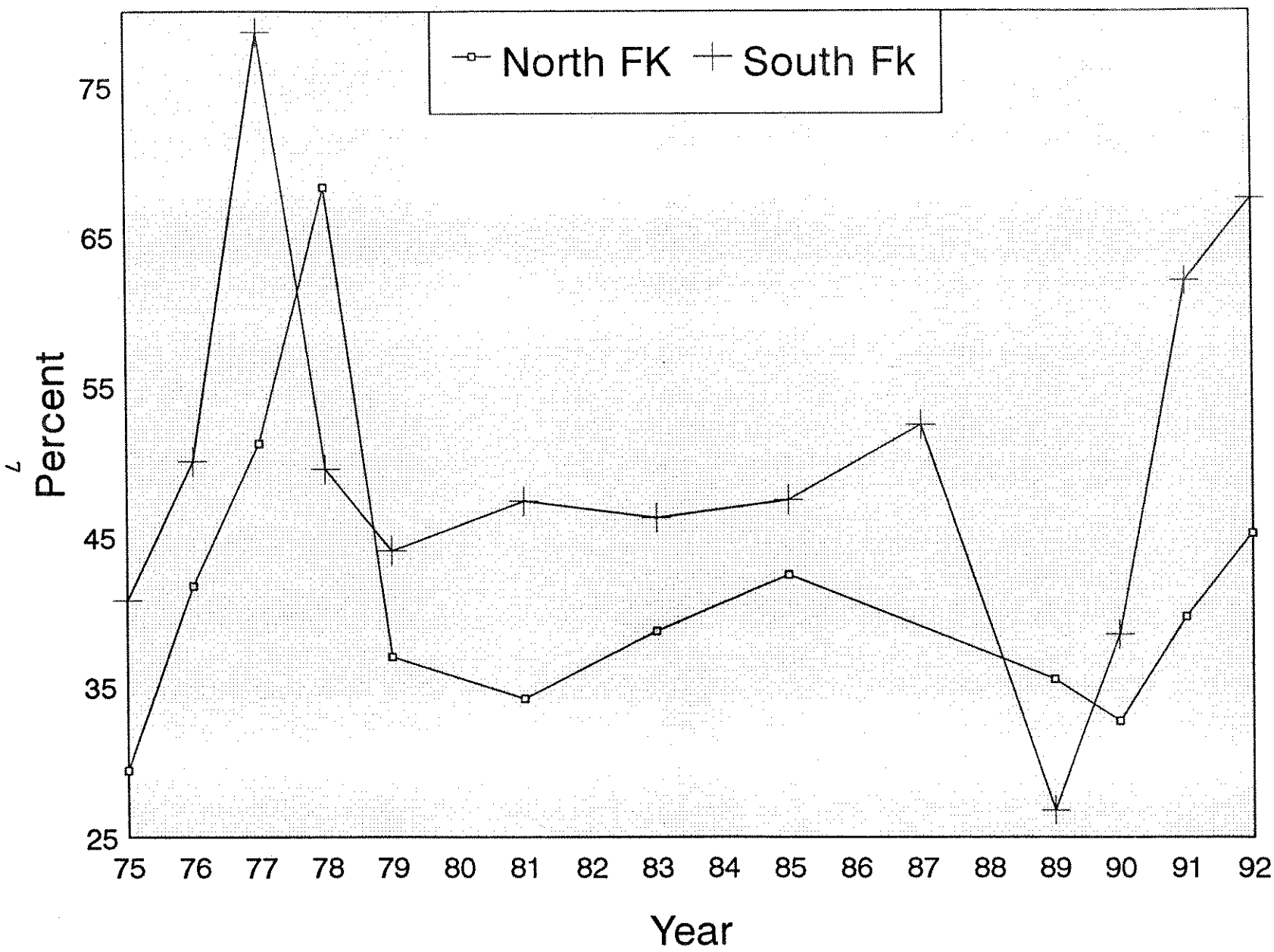

Figure 2. Percent of trout population over 12" (forks of Sun River).

A total of 340 fish have been tagged in the North Fork since 1990 whereas 391 have been tagged since 1989 in the South Fork. The majority of the fish seem to reside in the same general area as in which they were tagged as several tagged fish have been taken two years after tagging. Of 28 reported tagged fish from the South Fork, 21 were caught in the general tagging area while 6 moved downstream to the confluence or into Gibson Reservoir. The remaining tagged fish was one that moved out of the South Fork and upstream several miles into the North Fork. Fourteen of 18 tagged fish from the North Fork were reported from near the tagging location while 4 moved downstream to the confluence or into Gibson Reservoir.

Based on tag returns, few fish are apparently harvested in this backcountry setting. Annual kill or harvest rates vary from zero in 1992 to 4.3 percent in 1990 in the North Fork. Likewise, the South Fork varies from zero harvest in 1989 to 5.7 percent in 1990.

Smith River

We did not obtain a rainbow trout estimate in the Eagle Creek section during 1992 apparently due to a large scale emigration of fish. The total population estimates in both the Mid-Canyon and Deep Creek sections were both lower than estimates obtained in 1991 (Table 2). This decrease is due to fluctuations in smaller sized fish since the number of rainbow trout 13-18 in long were the highest ever observed (93/mile) in the Mid-canyon section and the second highest obtained in the Deep Creek section. We estimated the number of rainbow trout 13-18 in long in the Deep Creek section at 40/mile. Rainbow trout biomass was higher in the Mid-Canyon than in the Deep Creek section (Table 2). Condition factors decreased in a downriver direction.

Brown trout estimates in the Eagle Creek and Mid-Canyon sections were similar, while the estimate obtained in the Deep Creek section was lower (Table 2). Although overall brown trout numbers in the Mid-Canyon and Deep Creek sections were lower than in 1991, population levels remain near the highest ever observed in these sections. The 1992 estimate in the Eagle Creek section was the highest brown trout estimate ever obtained from that section. The largest brown trout was also captured in the Eagle Creek section. Biomass estimates decreased in a downstream direction (Table 2). The 1990 age class of brown trout still appeared to be a strong age class in all three monitoring sections.

Age data from the Smith River was not obtained or analyzed soon enough to be included in this report.

Table 2. Rainbow and brown trout population estimates by total size range in the Eagle Creek, Mid-Canyon, and Deep Creek sections of the Smith River, Montana during September 1992.

Section	Date marked	size range (inches)	Number per mile	Pounds per mile	Ave. condition factor
		Rainbow trout			
Eagle Creek	9/24/92	5.5-17.4	-[1]	-	43.47
Mid-Canyon	9/22/92	5.0-17.4	287	197	42.05
Deep Creek	9/09/92	5.0-15.9	162	113	41.76
		Brown trout			
Eagle Creek	9/24/92	5.0-26.4	452	514	43.38
Mid-Canyon	9/22/92	6.0-20.9	465	379	43.62
Deep Creek	9/09/92	6.5-20.4	308	233	42.99

1 - estimate obtained was biased due to emigration from the section.

Missouri River

The estimated number of rainbow trout by length was 2,937, 2,032 and 1,495 per mile in the Craig, Hardy, and Cascade sections, respectively, during October 1992 (Table 3). This represents a slight decrease in the Cascade section and an increase in the Craig section from the 1991 population estimates; this also represents the highest estimate ever obtained in the Hardy Section. The number of trophy rainbow trout in the Missouri River appears to be at near record levels. Both estimates from the Craig and Hardy sections contained more fish 18 in or greater than in any other year. In the Cascade section, only 1987 have more rainbows greater than or equal to 18 in. While the average condition factor of rainbow in the two lower sections (Cascade and Hardy) were very similar, it was higher in the Craig section (Table 3).

Brown trout population estimates obtained during the reporting period in the Craig, Hardy, and Cascade sections from spring and fall again suggested upstream movement may occur during the fall (Table 3). Fall estimates of 1,119, 318, and 245 per mile in the Craig, Hardy, and Cascade sections, respectively, were obtained for brown trout during 1992 (Table 3). However, during spring 1993 work, we found similar densities in the sections; 435 per mile were estimated in the Craig section, 294 per mile in the Hardy section, and 283 brown trout per mile in the Cascade section. The spring brown trout estimates in the Craig and Cascade sections are almost identical to the numbers observed in

Table 3. Rainbow and brown trout population estimates by total size range in the Craig, Hardy, and Cascade sections of the Missouri River, Montana during fall 1992 and spring 1993.

Section	Date marked	size range (inches)	Number per mile	Pounds per mile	Ave.condition factor
		Rainbow trout			
Craig	10/7/92	5.0-21.4	2937	3577	40.49
Hardy	10/9/92	5.0-19.9	2032	1807	38.64
Cascade	10/20/92	5.5-20.9	1495	1563	38.67
		Brown trout			
Craig	10/7/92	5.0-26.4	1119	1095	39.29
Hardy	10/9/92	8.5-25.4	318	337	36.74
Cascade	10/20/92	7.0-23.4	245	269	36.54
		Brown trout			
Craig	4/28/93	6.5-23.9	435	561	37.26
Hardy	5/04/93	9.5-29.9	294	425	35.12
Cascade	4/29/93	8.0-25.9	283	385	35.07

spring 1992. This was the first spring brown trout estimate in the Hardy section.

Age data from the Missouri River was not obtained or analyzed soon enough to be included in this report.

Big Spring Creek

Substantially larger populations of both brown and rainbow trout were found in the Tresch section of Big Spring Creek during fall 1992 (Table 4). Six times more fish and biomass were estimated in the Tresch section than in the Burleigh section. The estimated number of total trout per mile was almost 3,300 in the Tresch section compared to approximately 500 in the Burleigh section. The highest frequency of rainbow trout in both sections were those 13 in in length (Figure 3). Brown trout were more evenly distributed. The average condition factors of brown trout in both sections were very similar; however, for rainbow trout the condition factor was greater in the Tresch section (Table 4).

The total estimated number of rainbow trout in the Burleigh section was lower than in 1990, but similar to the lower limits of fluctuation of population levels which were observed in 1980

Table 4. Rainbow and brown trout population estimates by total size range in the Tresch and Burleigh sections of Big Spring Creek, Montana during fall 1992.

Section	Date marked	size range (inches)	Number per mile	Pounds per mile	Ave.condition factor
		Rainbow trout			
Burleigh	9/03/92	5.0-16.4	433±50	352	41.93
Tresch	9/04/92	5.0-17.9	2454±196	2158	44.83
		Brown trout			
Burleigh	9/03/92	7.5-20.4	72±21	114	41.68
Tresch	9/04/92	5.0-19.9	833±127	665	41.88

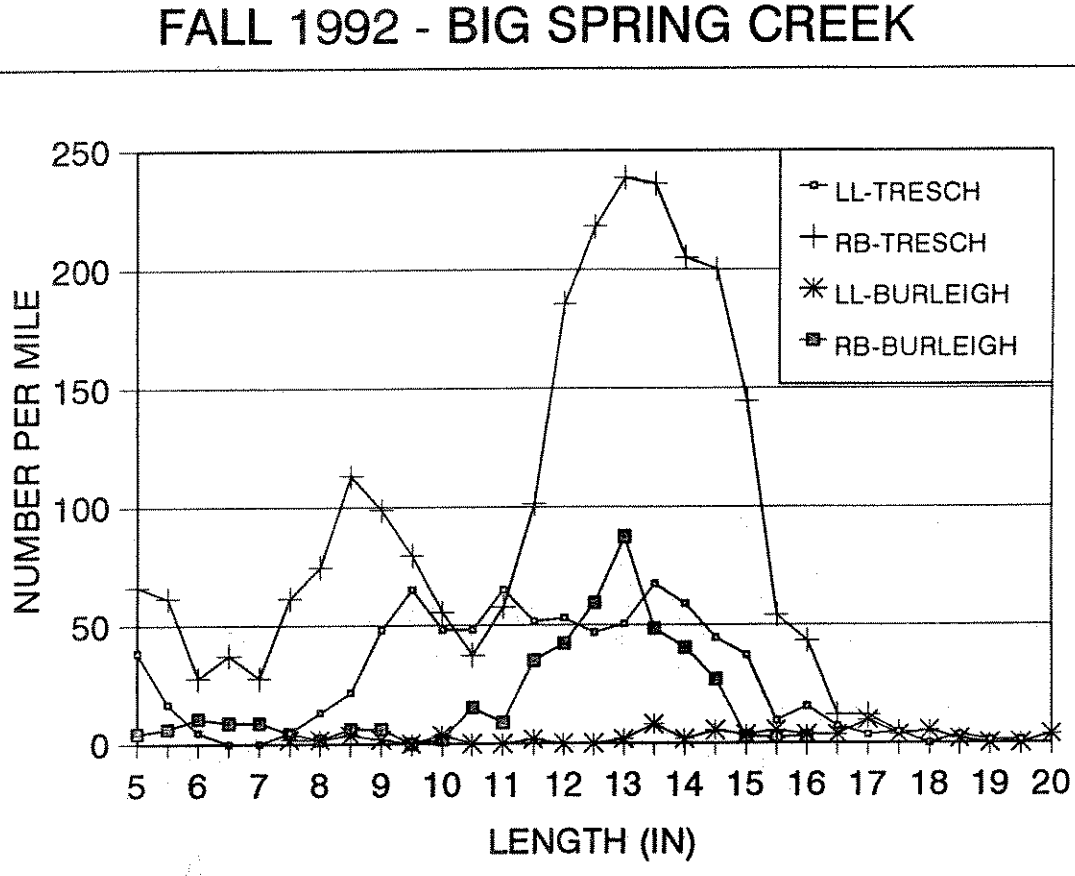

Figure 3. Rainbow and brown trout population estimates by length from the Tresch and Burleigh sections of Big Spring Creek in 1992.

and 1983. Brown and rainbow trout in the Burleigh and Tresch sections, respectively, were similar to 1990 levels. The brown trout population estimate in the Tresch section was the highest obtained since at least 1980.

Habitat Protection

A total of 48 projects that would alter streambeds or banks in coldwater streams were processed under the 1975 Natural Streambed and Land Preservation Act (310) out of the Great Falls office, which combined with the 17 projects processed in the Choteau field office, totals 65. Twenty-one of these projects were in Cascade County. A total of 36 projects were reviewed on coldwater streams under the Stream Preservation Act of 1963 (SPA). 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.

DISCUSSION AND RECOMMENDATIONS

Streams along the Rocky Mountain Front that are suspected to contain westslope cutthroat trout should continue to be inventoried and tested for genetic purity. Cooperative collections with the Forest Service have documented ten streams with pure westslope. Several other streams with 97-98% purity will be managed as pure westslope streams.

It is recommended to continue monitoring trout populations in the forks of the Sun River. Previous investigations have shown that trout numbers and the mean length fluctuate, somewhat cyclic. Any other pattern should be closely monitored.

Population levels in both sections of Big Spring Creek should be continued to be monitored on at least an every other year basis. Monitoring of sections on the Smith River should continue. In addition, monitoring of water temperatures and other physical parameters should be implemented if cheap, low maintenance equipment can be obtained. All three sections on the Missouri River will be electrofished again this fall in order to obtain population estimates which will allow the calculations of mortality rates to be used in conjunction with the ongoing creel census to determine natural mortality and harvest rates of trout in order to determine if anglers affect trout populations in The Missouri River.

Stream preservation activities should continue to be processed as they occur.

ACKNOWLEDGEMENTS

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Prepared by: George A. Liknes and William J. Hill

Date: September 1993

Principal Fish Species Involved: Rainbow trout, cutthroat trout, grayling, brown trout, brook trout.

Code Numbers of Waters Referred to in Report:

14-0065	Badger Cabin Creek
14-0200	Badger Creek
14-0240	Birch Creek
14-1280	Deep Creek
14-1640	Dupuyer Creek
14-2240	Green Gulch
14-2480	Hungry Man Creek
14-3200	Lost Shirt Creek
14-3520	Middle Fork Teton River
14-4560	Red Poacher Creek
14-4600	Rierdon Gulch
14-5080	Sidney Creek
14-5440	So. Fork Cut Bank Creek
14-5640	So. Fork Teton River
14-	So. Fork Waldron Creek
14-5960	Summit Creek

14-6360	Waldron Creek
14-6600	Whiterock Creek
16-0310	Big Spring Creek, Sec. 2
17-2064	Dearborn River
17-4896	Missouri River Section 09
17-6832	Smith River Section 02
20-0950	Blubber Creek
20-4400	No. Fork Sun River
20-5500	Smith Creek
20-5600	So. Fork Sun River
20-5790	Spring Coulee
20-6100	Sun River
20-6110	Sunny Slope Canal