Progress Report
Contract No. 53-0343-0-305
Inventory of Instream Flow Needs for Fish and Wildlife Resources

Prepared By:

Montana Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, Montana 59620

December 19, 1980

UPPER MISSOURI TRIBUTARIES

Cross-Sectional Measurements

The collection of the cross-sectional data needed for calibrating the WETP computer model was completed for 32 of the 34 contract streams of the upper Missouri River drainage. The cross-sectional work on Antelope Creek (Madison drainage) and Warm Springs Creek (Ruby drainage) was not completed due to the stable flow conditions of these spring fed streams. An attempt will be made to complete this work in the spring of 1981.

The WETP model for Deep Creek (Big Hole drainage) will be run using data collected at only two calibration flows since relatively stable flow conditions precluded the collection of data at a third flow. For the remaining 31 streams, calibration data were collected at three or more calibration flows.

Under the terms of the contract, the Montana Department of Fish, Wildlife and Parks will also provide instream flow recommendations based on the wetted perimeter/inflection point concept for 23 additional streams of the Big Hole (20) and mainstem Missouri (3) drainages. Cross-sectional work has been completed for all 23 of these streams.

Fish Population Information

Fish population information was collected for 50 of the 51 contract streams. Population information was not collected for Rock Creek (Shields River drainage) because a private landowner would not allow access through his property to Forest Service lands.

Trout standing crop estimates will be provided for 40 of the 50 streams. For the remaining 10 streams, trout populations were too sparse to reliably estimate and only survey data will be provided.

Under the terms of the contract, the Montana Department of Fish, Wildlife and Parks will also be providing fish population information for an additional 24 streams of the Big Hole (20), mainstem Missouri (3) and Madison (1) drainages. Trout standing crop estimates will be provided for 16 of these streams and survey data for the remaining eight streams.

The fish population data to be provided for all streams are briefly summarized in Table 1.

SMITH RIVER TRIBUTARIES

The measurement of weekly flows on the Smith River and its tributaries was concluded in early November. Flows in a total of 10 tributaries were measured between July 15 and November 1, 1980. Flows were also measured on the Smith River a few miles below the North and South Forks. General location of the measuring sites is shown on Figure 1. Flow data were collected with a Price type AA current meter employing standard USGS gaging techniques. Datawere recorded on department field forms patterned after forms in use by the USGS. Discharge was computed on each card and preliminary results are tabulated in Table 2. A hydrograph (Figure 2) developed from data collected on Sheep Creek is also enclosed. Sheep Creek is the largest tributary of the Smith River.

In September, fish populations were estimated for two sections of the Smith River in conjunction with an ongoing investigation begun in 1975 to determine the relationship between the magnitude of the summer flows and the standing crops of trout. One river section is located below the confluence of Camas Creek (State section) and the other below the confluence of Eagle Creek (Zieg section). Low summer flow in the Zieg section appears

about 33 percent higher than in the State section. Correlation of fish populations to flow will be useful in determining the importance of accretions from tributary streams in these areas.

The field data needed to derive instream flow recommendations based on trout standing crop and flow relationships and the wetted perimeter/inflection point concept are presently being analyzed for the Smith River. Once the instream flow needs are quantified, the importance of the various tributaries in providing the quantity of water that is needed to maintain these recommended flows within the mainstem Smith River will be determined.

FLATHEAD RIVER

Cross-Sectional Measurements

The collection of the cross-sectional data needed for calibrating the WETP computer model was completed for the South Fork near Spotted Bear and the Middle Fork above Bear Creek. At the Polebridge site on the North Fork, a small island developed at low flow at two of the cross-sections, causing calibration problems that invalidated the WETP model. Two new cross-sections were established in the same general area. High and medium flow measurements will be completed in spring of 1981.

Fish Population Information

Fish population data were gathered at the three study sites. The fish population information provided in the final report will be expanded over that required under the contract due to the migratory nature of the game fish populations.

REMAINING TASKS

At present, cross-sectional data for the majority of streams have been analyzed using the WETP computer program and plots of wetted perimeter versus discharge completed. The fish population data are still undergoing computer analyses. Much of the background information, including water availability records, has been compiled for the contract streams. A tentative format for the final report was presented by Fred Nelson to Ron Russell, Bob Russell and Tom Dietrich of the U.S. Forest Service on December 16, 1980. Final approval of the format by the U.S. Forest Service is pending. Much of the remaining effort will involve the preparation of a draft final report to be submitted to the U.S. Forest Service on April 15, 1981.

The two remaining tasks of the contract (the quantification of instream flow needs for selected streams of the Kootenai National Forest and the preparation of an additional instream flow write-up) are scheduled to begin in spring of 1981.

Table 1. Summary of fish population data obtained for contract streams of the upper Missouri drainage.

		Fish Population Information	
Gallatin R. Tributaries	Section Length (Ft)	Estimates Obtained	Data Survey Only
S. F. Spanish Cr.	1,000	x	
Hellroaring Cr.	1,000	x	
Squaw Cr.	1,000	x	
West Fork	1,000	x	
Porcupine Cr.	1,000	x	
Taylor Fork	1,000	x	
S. F. Cottonwood Cr.	1,000	x	
Hyalite Cr.	1,000	x	
Big Bear Cr.	1,000		x
Bozeman Cr.	1,000	x	
Madison R. Tributaries			
S. F. Madison R.	7,920	x	
Watkins Cr.	513		x
W. F. Denny Cr.	1,000	x	
Grayling Cr.	1,000		x
	1,000	x	
Cabin Cr.	1,000		x
Beaver Cr.	1,000		x
Standard Cr.	1,000	x	
Antelope Cr.	1,000	x	
W. F. Madison R.	18,480	x	
Jack Cr.	1,000	x	
Indian Cr.	1,000	x	
Squaw Cr.	1,000	x	
N. Meadow Cr.	1,000	x	
S. Meadow Cr.	1,000		x
Ruby Cr.	1,000	x	
Ruby R. & Tributaries			
Ruby R.	4,100	x	
Warm Springs Cr.	1,000		x
East fork	3,566	x	
West Fork	4,125	x	
Middle Fork	2,643	x	
Cottonwood Cr.	1,000		x
Beaverhead R. Tributaries			
E. Fork Blacktail Cr.	4,860	x	
West Cr. [a]	3,000	x	
	-		x
Bloody Dick Cr.	3,540	x	
Deadman Cr.	1,000	x	
E. Clover Cr.	1,000	x	

Table 1 continued. Summary of fish population data obtained for contract streams of the upper Missouri drainage.

		Fish Population Information	
Big Hole R. Tributaries	Section Length (Ft)	Estimates Obtained	Data Survey Only
Pattengail Cr.	1,000		x
Warm Springs Cr.	1,000		x
Trail Cr.	1,000		x
Pintlar Cr.	1,000	x	
Wise River	5,000	x	
Swamp Cr.	1,000		x
La Marche Cr.	1,000	x	
Birch Cr.	1,000		x
Miner Cr.	1,000		x
Governor Cr.	1,000	x	
Johnson Cr.	1,000		x
S. F. Big Hole R.	1,800	x	
Deep Cr.	1,000	x	
French Cr.	1,000		x
Willow Cr.	1,000	x	
Trapper Cr.	1,000	x	
Canyon Cr.	1,000	x	
Fishtrap Cr.	1,000	x	
Mussigbrod Cr.	1,000	x	
Ruby Cr.	1,000	x	
Steel Cr.	1,000	x	
Francis Cr.	1,000	x	
Jefferson R. Tributaries			
South Willow Cr.	1,000	x	
North Willow Cr.	1,000	x	
S. Boulder R.	1,000	x	
Upper Boulder R.	1,050	x	
Whitetail Cr.	1,000	x	
Little Boulder R.	440	x	
Missouri R. Tributaries			
Crow Cr.	1,000	x	
Deep Cr.	1,000	x	
Beaver Cr.	1,000	x	
Hellgate Gulch[b]	1,000		x
Avalanche Cr.	1,000	x	
Yellowstone R. Tributaries			
Rock Cr. (Crazy Mts.)[c]	-		

Table 1 continued. Summary of fish population data obtained for contract streams of the upper Missouri drainage.

Yellowstone R. Tributaries	Section Length (Ft)	Fish Population Information: Estimates Obtained	Fish Population Information: Data Survey Only
	1,000	x	
	2,915	x	
Brackett Cr.	2,000	x	
	500		x
Rock Cr. (Yellowstone)	4,000	x	
Big Cr.	1,000	x	
E. Boulder R.	1,000	x	
Big Timber Cr.	1,000		x

a/ No fish captured at 4 sites.
b/ No fish captured.
c/ Not completed, direct access problems.

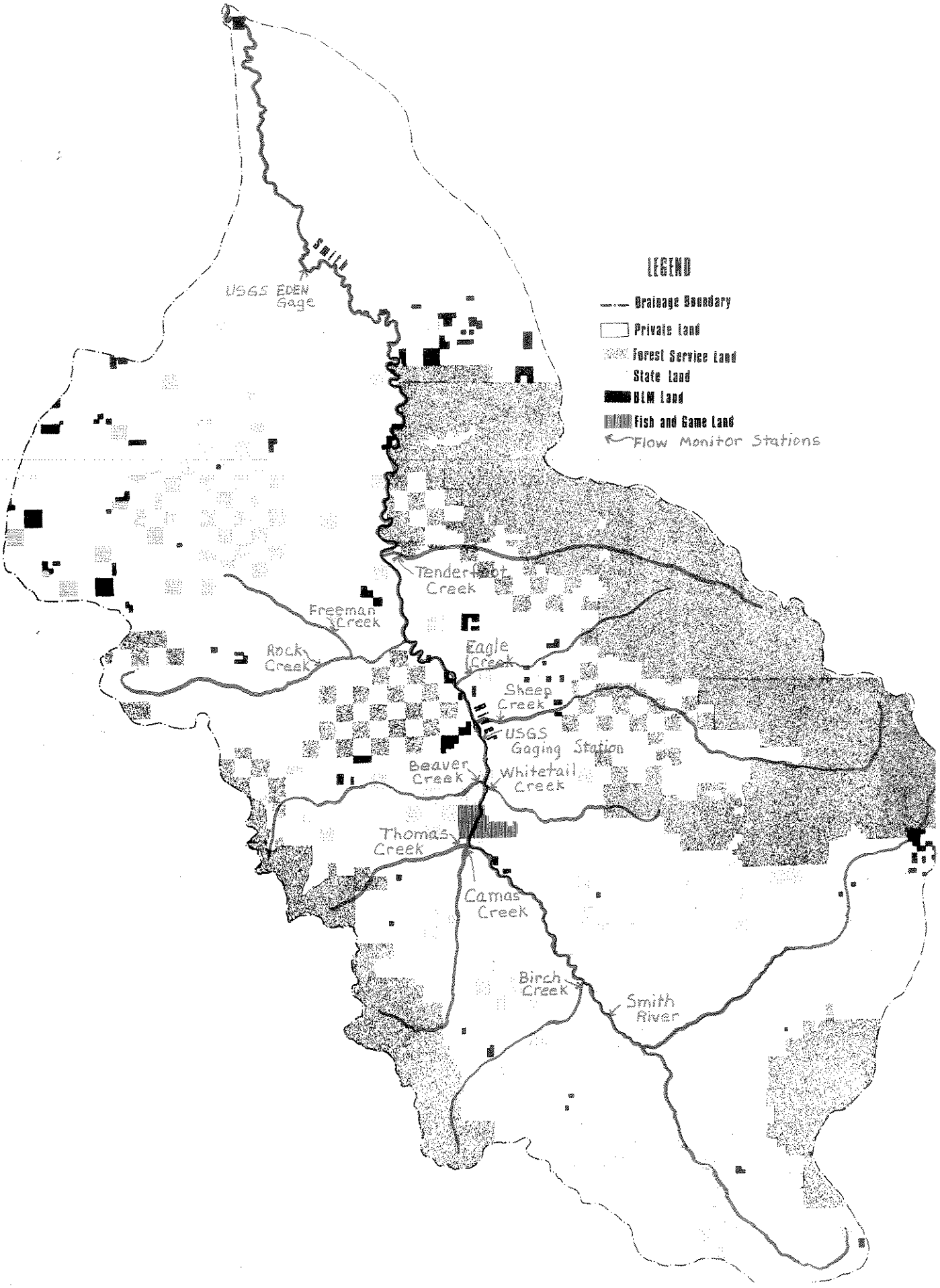


Figure 1. Flow measuring stations in the Smith River drainage.

Table 2. Discharge data for the Smith River drainage in cubic feet per second.

Dates; The week of:	Smith River at Buck Crk.	Birch Crk.	Camus Crk.	Thomas Crk.	Rock Crk.	Freeman Crk.
July 13-19	50.01	21.69	38.70	16.82	26.85	6.92
July 20-26						
July 27 - August 2	28.06	9.34	11.92	9.55	18.45	4.86
August 3-9	29.25	10.26	8.90	no measurement	21.85	5.35
August 10-16	23.08	4.79	11.52	no measurement	19.79	4.56
August 17-23	25.48	2.21	approx. 11.52	8.72	17.01	4.52
August 24-30	26.70	2.41	9.06	8.44	15.59	approx. 4.52
August 31 - Sept. 6	25.41	2.41	approx. 9.06	7.86	14.68	4.05
September 7-13	29.39	2.95	8.66	8.12	19.29	approx. 4.05
September 14-20	38.98	5.62	10.36	8.41	approx. 14.29	approx 4.05
September 21-27	41.72	4.19	9.39	7.41	13.65	approx. 4.05
September 28 - Oct. 4	38.53	7.04	7.8	7.5	12.48	3.66
Oct 5 - 11	47.04	8.98	8.06	7.32	12.38	approx. 3.66
October 12-18	49.47	19.16	14.1	7.77	15.26	4.85
October 19-25	60.06	13.49	13.27	7.24	15.19	3.83
October 26 - Nov 1	53.12	11.23	11.49	7.19	13.87	3.90

Table 2. (Cont.)

Dates; The week of:	Beaver Crk.	Whitetail Crk.	Sheep Crk.	Eagle Crk.	Tenderfoot Crk.	Sum. Total discharge of streams measured
July 13-19			82.19	9.49		
July 20-26	4.69	1.58			37.91	
July 27- August 2	1.89	.71	44.97	3.48	27.89	159.1
August 3-9	1.87	approx. 1.50	39.54	3.74	27.64	157.7
August 10-16	1.80	approx. 1.50	46.45	4.99	22.76	149.74
August 17-23	1.53	approx. 1.50	36.06	1.53	approx. 22.76	132.82
August 24-30	1.58	approx. 1.50	30.05	approx. 1.53	18.78	120.61
August 31- Sept. 6	approx. 1.58	approx. 1.50	33.54	1.65	16.40	118.14
September 7-13	2.16	approx. 650	24.06	2.11	NO measurement	114.24
September. 14-20	approx. 2.16	approx. 1.50	36.71	NO measurement	17.86	143.39
September 21-27	1.94	approx. 1.50	35.39	2.09	14.27	134.95
September 28- Oct 4	1.50	approx. 1.50	31.50	NO measurement	15.11	128.73
October 5-11	approx. 1.50	approx. 1.50	31.39	2.26	13.20	137.29
October 12-18	3.68	1.82	38.24	4.30	17.52	175.97
October 19-25	3.98	1.55	35.83	NO measurement	NO measurement	175.99
October 26- Nov 1	4.57	2.14	29.06	4.16	18.03	158.66

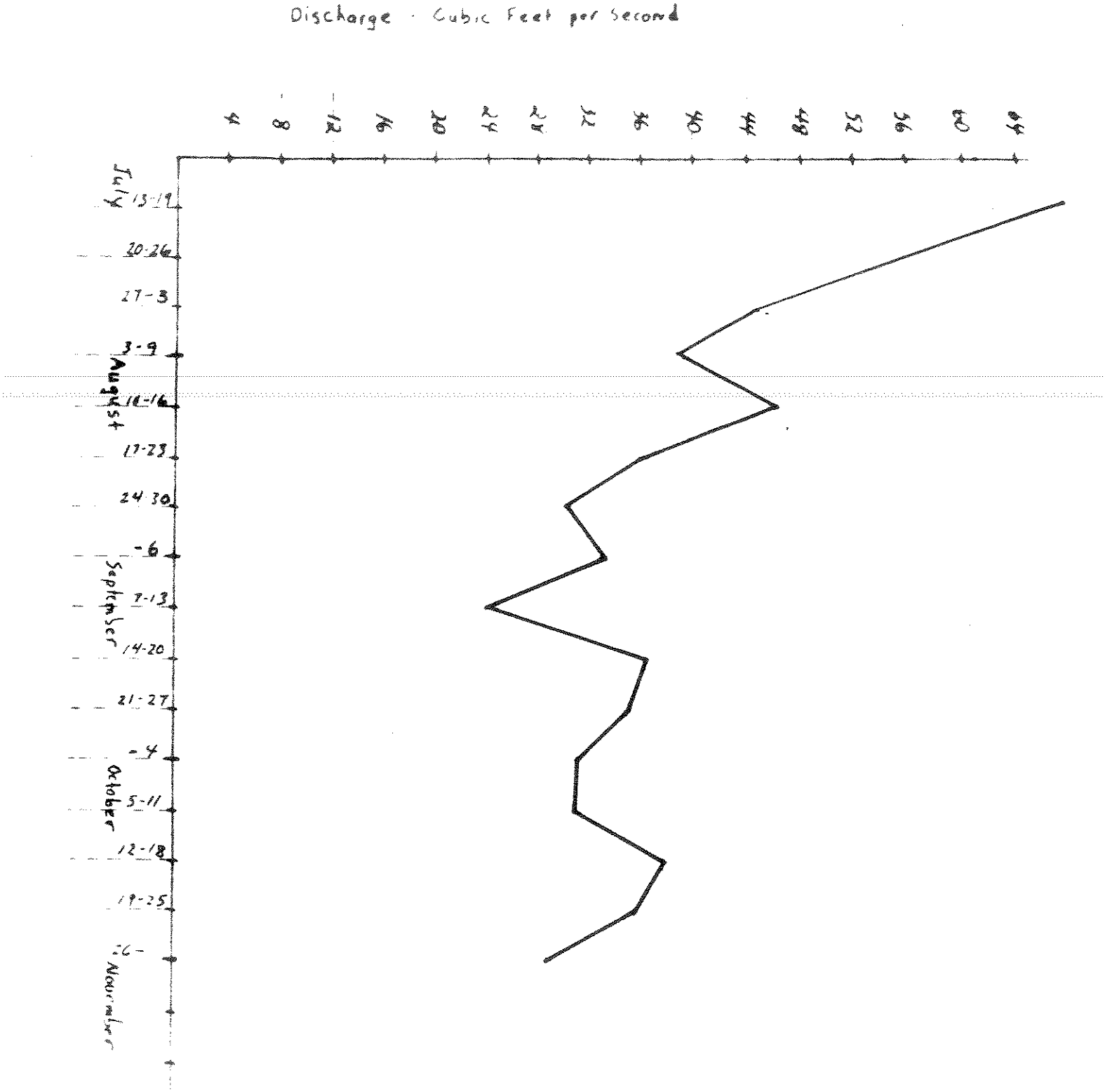
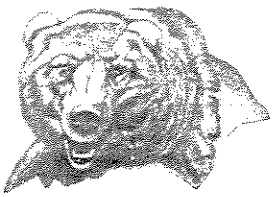


Figure 2. Discharge of Sheep Creek near its confluence with the Smith River.

STATE OF MONTANA



DEPARTMENT OF

FISH AND GAME
1420 East Sixth Avenue
Helena, Montana 59620
December 22, 1980

Mr. Ron Russell
U.S. Forest Service
PO Box 7669
Missoula, MT 59801

Dear Ron:

Enclosed is a brief summary of the progress to date of the Montana Department of Fish, Wildlife and Parks in completing Contract #53-0343-0-305, Inventory of Instream Flow Needs for Fish and Wildlife Resources. If there are any questions or problems, please contact Fred Nelson at 586-5419 or 5410.

Sincerely,

Larry G. Peterman

Larry G. Peterman
Water Resources Supervisor
Ecological Services Division

LGP/mac