MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. F-7-R-10 Name Northwest Montana Fishery Study

Job No. I Title Inventory of the Waters of the Project Area

Period Covered: May 1, 1960 - April 30, 1961

ABSTRACT:

Seven lakes and four of the principal tributaries in the Stillwater River Drainage were surveyed. Netting series on the lakes indicated a predominance of pumpkinseeds, largescale suckers, northern squawfish, and redside shiners. Electrical censusing of the tributaries show a predominance of cutthroat trout, brook trout and Dolly Varden. Physical barriers block fish movement up the major tributaries.

Surveys of five lakes in the South Fork of the Flathead River Drainage were conducted during the report period. Data is presented as a record of present fish populations and composition in a remote wilderness area. The majority of cutthroat trout collected and checked in creels from the South Fork River and tributaries were in the III and IV age groups (ave. 9.4 inches). Fish measured on the Middle Fork River and tributaries averaged 1.3 inches smaller than those taken in the South Fork Drainage. Estimated 1960 use of the Bob Marshall Wilderness Area (including both South and Middle Fork Drainages), west of the Continental Divide, was 3,990 people (Summer - 2,190; Fall-1,800). There is a total of 80 established camp sites in the wilderness area. Summer use is primarily (64 percent) non-guided parties.

A survey of the fish populations and physical stream characteristics were continued on Pinkham Creek in order to establish the effects of logging on a fish population. Timber has now been cut on 30 percent of the 39,300 acres within the drainage. Three of the eight sections previously censused were electrically fished. A total of 250 brook trout weighing 9.55 pounds and 170 rainbow trout weighing 10.63 pounds were collected. The number and weight of all fish in 1960 was greater than taken from these three sections in any previous year (1951-56).

OBJECTIVES:

The purpose of this project is to determine the physical, chemical, and biological characteristics of the waters of highest importance for fishing in the project area, and where practicable to obtain estimates of existing or potential fisherman use.

TECHNIQUES USED:

Surveys were conducted as outlined in the Montana Stream and Lake Survey Manual. Sampling of fish population in lakes was accomplished with 125' long graduated mesh nylon gill nets. Physical features of lakes were mapped from aerial photographs. Work maps included lake bottom contours. Bottom contours were determined by the use of the echo sounder except on mountain lakes, small lakes and ponds where soundings were made with a hand line.

Stream populations inventories were carried out with a portable generator (220 V. - 60 cycle - A.C.). Representative sample sections were established. Cresol was used in sampling streams in areas inaccessable to vehicles.

Field survey data collected on this project was transferred to permanent standard file cards.

FINDINGS:

Surveys will be considered in three general areas: Stillwater River, South and Middle Fork Rivers, and Pinkham Creek.

Stillwater River Drainage - This drainage consists of 964 square miles of land under both private and federal ownership. It is flanked by two coniferous covered mountain ranges which rise 4,000 feet above a partially wooded valley floor. The upper one-fourth of the main river drops 2500 feet in gradient; the remainder drops 200 feet to its confluence with the Flathead River above Flathead Lake. Tributary streams flow through precipitous mountain canyons to the valley floor where they enter the river. The gradient in these streams is similar to that of the upper portion of the main river. Logging is the primary industry with numerous small livestock and grain producing interests located at the lower portion of the river. There are approximately 70 lakes, potholes, and ponds; 72 miles of main river; and 120 miles of primary tributary streams.

Survey information was obtained on seven lakes in the area. Surface acreages of these lakes ranged from 15 to 800 acres, with depths ranging from 30 to 150 feet. All lakes surveyed had reputations for poor trout fishing. Netting indicated the following undesirable species predominated: pumpkinseed (Lepomis gibbosus); largescale sucker (Catostomus macrocheilus); northern squawfish (Ptychocheilus oregonensis); and redside shiner (Richardsonius balteatus). Game fish found in the lakes were cutthroat trout (Salmo clarki), rainbow trout (Salmo gairdneri), rainbow X cutthroat trout hybrids and brook trout (Salvelinus fontinalis). It is anticipated that three of these lakes will be rehabilitated during the 1961 work season.

Stream inventories were made on four of the major primary tributaries, Fitzsimmons, Good, Sunday and Logan Creeks. These streams flow between 30 to 50 cfs during the summer months. The volume of flow of the upper portion of the main river is approximately the same as the volume of the tributaries. As the main river reaches the valley floor volumes approach 100 - 150 cfs and increase progressively down river to about 1,000 cfs. Water volumes (over 100 cfs) and depths (6 to 10 feet) prevented electro-fishing, with present equipment, in the lower portion of the river.

Shocking data collected on these tributaries and the upper Stillwater River indicated that the salmonide fishes were predominant. The species present were cutthroat, brook, rainbow, rainbox X cutthroat hybrids, Dolly Varden (Salvelinus malma), and mountain whitefish (Prosopium williamsoni). The upper areas of the Stillwater River and the upper areas of its tributaries were predominantly cutthroat trout waters. Rainbow trout were found in the main river and Logan Creek. All other tributaries had fish barriers (falls, dams, etc.) which blocked the movement of fish from the main river.

Previous surveys on the Stillwater River (1958-59) and limited creel checks showed an abundance of rough fish. The undesirable fish were: yellow perch (Perca flavescens); longnose sucker (Catostomus catostomus); peamouth (Mylocheilus caurinus); northern squawfish, and redside shiner. Game species present were the same as described above. Average size and weight of the game fish collected during 1960 on the upper Stillwater River were as follows:

	Ave. Length (inches)	Size Range (inches)	Ave. Weight (lbs)
Cutthroat trout	9.0	3.6 - 11.3	0.30
Dolly Varden	10.0	9.5 - 11.1	0.50
Brook trout	5.6	2.7 - 9.9	0.09
Mountain whitefish	8.4	7.6 - 9.3	0.25

It is recommended that this survey be continued until the entire drainage is inventoried.

South and Middle Forks of the Flathead River - The South and Middle Forks Rivers are two of the larger tributaries of the Flathead River above Flathead Lake. Normal water volumes range from 1,000 to 4,000 cfs. The headwaters of both rivers (Figure 1) drain the entire Bob Marshall Wilderness Area, west of the Continental Divide. The Wilderness Area encompasses 990,000 acres, which includes approximately 20 river miles (of a total of 85 miles) of the Middle Fork River and 60 river miles (of a total of 80 miles, plus 40 miles of reservoir created by Hungry Horse Dam) of the South Fork River. Most of the waters of these two rivers are inaccessable to vehicles.

These rivers are two of the few remaining in the United States which contain self-sustaining population of native game fishes. These fish are the cutthroat trout, Dolly Varden, and the mountain whitefish.

One hundred and fifty-seven man days (117 on the So. Fk. drainage and 40 on the Mid. Fk. drainage) were spent on lake and stream surveys in these two drainages from July through October. Survey crews varied from 2 to 6 men. Lake surveys in the South Fork drainage provided information on 9 lakes. These lakes ranged in size from 40 to 200 surface acres, with the exception of Big Salmon Lakes which has 1050 surface acres. Maximum depths varied from 35 to 200 feet. Fish sampled from the lakes included cutthroat, Dolly Varden, mountain whitefish and rainbow trout. Historic records and interviews with outfitters in the area show that rainbow trout were planted in lakes of this area in 1928. They were introduced in Lena, Woodward

and Smokey Lakes. Evidences of rainbow trout were found in the outlet of Lena Lake, a tributary to Big Salmon River, which in turn is tributary to the South Fork of the Flathead River. Fish population information for five of the lakes is available from gill netting and creel checks. This information is presented in Table 1.

Table 1. Physical characteristics and fish species, measurements from five lakes surveyed in the Bob Marshall Wilderness Area (South Fork Flathead River Drainage).

Lake	Surface Acreage	Max. Depth (feet)	Species*	Ave. Lgth.	Ave. Wt.	Range in Lgth. (inches)
Koessler	200	154	Ct	13.0	0.69	11.5-15.0
Lena	128	66	Rb	11.3	0.42	8.5-13.6
Lick	35	27	Ct	12.1	0.56	9.7-15.4
Doctor	77	120+	Ct	11.0	0.35	8.4-12.8
			DV	15.5	1.61	12.0-25.8
			Wf	10.8	0.32	7.5-14.7
Big Salmon	1050		Ct	10.9	0.44	7.4-13.5
		•	DV	21.2	2.97	14.8-25.0

*Ct- cutthroat trout; Rb- rainbow trout; DV- Dolly Varden; Wf- mountain whitefish.

All of the lakes surveyed have inlet streams suitable for fish spawning. Growth increments (total length at each annulus) on a sample of 37 cutthroat trout were calculated from microprojection of scales from Big Salmon Lake.

Total length (inches) at each annulus for the cutthroat were as follows:

I	II	III	IV	V
2.4	4.9	7.9	11.1	12.6

Growth increments were also calculated for cutthroat trout (size range 2.0 to 16.0") from the upper South Fork River and three tributaries (Table 2). Growth increments for the stream collections were comparable to those for the sample collected from Big Salmon Lake.

Table 2. Growth increments calculated from cutthroat trout scales from the South Fork of Flathead River and tributaries.

Stream	Sample size	Total length(inches) at each annulus I	II	III	IV	V	VI
South Fork River (Head water & 10 mi. down)	20	2.2	6.9	7.5			
South Fork River (15 mi. below headwaters)	62	2.5	5.2	9.3	11.2	11.4	12.6
Danaher Creek	29	2.4	4.6	7.9	11.8	14.9	
White River	45	2.4	4.9	7.9	10.9	13.8	
Little Salmon River	21	2.3	5.9	8.2	9.6		

It is evident from the calculated increments, that cutthroat trout growth in this area is relatively slow. The majority of fish checked in creels and collections were in the III and IV age groups (Ave. Lgth. 9.4 inches).

Work conducted on the Middle Fork of the Flathead River was confined to general survey of physical characteristics of the waters and surrounding country, a survey of access and fisherman use, and the tagging of Dolly Varden and cutthroat trout. The tagging work is in conjunction with a study evaluating the spawning use of the tributaries to Flathead Lake.

Fish over 7.5 inches were tagged with a colored wrap-around plastic band secured to the mandible. The collections were made by angling. Tricaine methanesulfonate (MS 222) was used as an anesthetic. The marking of fish over 12 inches required a slit-cut between the mandible and tongue before the tag could be applied. A total of 30 fish were tagged in this drainage (3 Dolly Varden, 27 cutthroat trout). Two returns have been received at present with no movements indicated. Both fish were cutthroat trout (8.8 and 11.8 inches total length). Time of recapture varied from 19 to 30 days. No irritation from the tags was noted on either fish.

The average total length of all cutthroat collected by hook and line on the Middle Fork River was 1.3 inches smaller than of the trout collected by angling on the South Fork River.

Fishermen access to both river systems are primarily by non-guided pack trips and by flying to periphery landing fields. L. D. Merriam, Jr.,[1] estimated total summer and fall use in the wilderness area, based on reports by outfitters in the area as to the number of people they catered, and people they observed while on their trips. During the months of June to September, 36 percent of the use was by guided parties (number of people) while 64 percent were non-guided parties. The total estimated use during the summer was 2,190 people. After September 15, big game hunting coincided with the fishing season and an overlap of use occurred. The individual breakdown for hunting and fishing use during the overlap is not known, although during the fall (Sept. 15 through Nov. 25) guided parties increase to 62 percent. This would indicate the primary motive of use at this time had switched to hunting. Camp interviews during October showed limited fishing use, although hunting was the incentive for the particular trip. Total fall use estimate was 1,800, making a total of 3,990 people using the wilderness area during 1960.

There are 50 established camps and 30 secondary camp sites in the Wilderness and adjoining area, west of the Continental Divide. Camp distribution is illustrated on Figure 1. Camp sites locations were based on information obtained from the U. S. Forest Rangers at Spotted Bear and Big Prairie stations; and on observations of Fish and Game Department personnel.

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[1] L. D. Merriam, Jr., Asst. Professor, Forestry, Montana State University Unpublished, 1960.

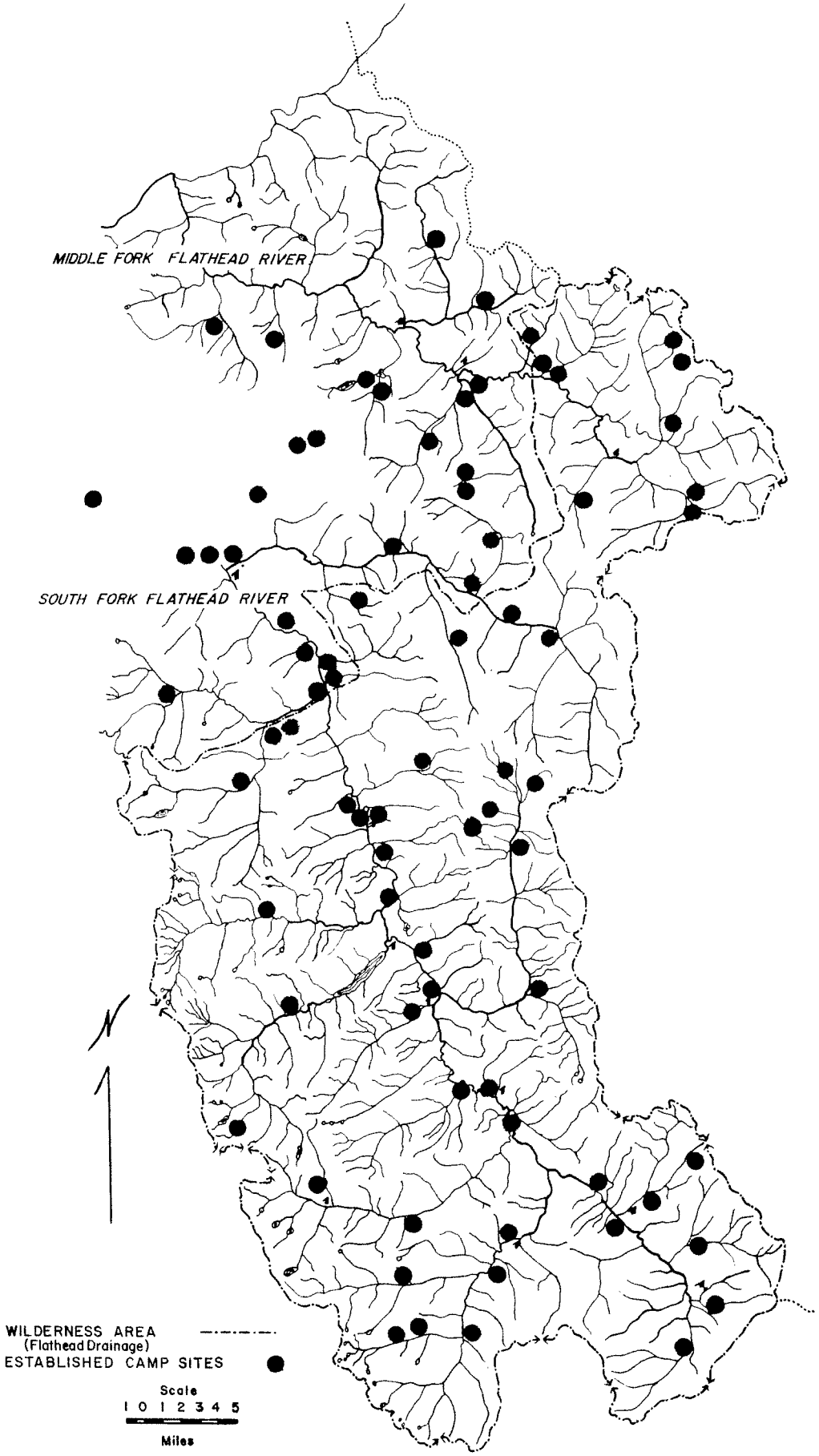

Figure 1. Established outfitter camp sites on the Middle and South Forks of the Flathead River.

Pinkham Creek Fish Population. This study, involving the effects of logging on a fish population, was initiated in 1951. It was the purpose of this investigation to measure the standing fish population of Pinkham Creek over a period of years so that any changes which developed in the population could be measured. This area of virgin timber is now being logged. If this logging affects the aquatic environment, it is expected that the change will be reflected in the fish population.

Previously eight randomly selected stations were electrically sampled in eight miles of Pinkham Creek. Since the last censusing in 1956, all personnel involved in this study have been transferred and the permanent location of the eight sampling stations are not known. Three previously sampled stations (one lower, one middle, and one upper section) were found in 1960 and were censused, using 220-volt A.C. generator. Each section (300 feet) was blocked with one-half inch nets before sampling. The amounts of timber cut in the drainage was obtained from the U. S. Forest Ranger at Eureka, Montana.

The stream and drainage have been described in previous completion reports (Project F-7-R).

During the years 1957-60, approximately 1,595 acres of land were logged, resulting in the removal of 11,100 MBM* of lumber. An estimated 2,500 MBM of timber was cut on 1,500 acres of private lands in addition to that cut on Forest Service land. Logging procedure on federal lands varied from 40 percent cut (1,215A.) to clear cutting (380A.). To date, a total of 108,227 MBM of timber has been removed from 12,085 acres of timberland. Cutting thus far has taken place on 30 percent of the total 39,300 acres of land in the Pinkham Creek drainage.

No stream channel changes were observed on the stations sampled; however, beaver activity has increased in the lower sections. During a two week period, a dam was built in the center of section 2. Sections 2 and 7 had extensive areas (70 percent) where from 1/4- to 1/2-inch of fine silt covered the entire stream bottom. Section 5, located between the other sections, had no appreciable amount of silt, probably due to the increased velocity of the water in this section compared to the other sections.

Total numbers and weights of fish captured in the three sections sampled in 1960 were more than any previous year on the same sections (Table 3). Brook trout were again predominant in the upper section (93 percent) and rainbow trout predominated the lowest section (71 percent). Brook trout made up 60 percent of the fish collected (numbers) and 47 percent by weight. Of the fish collected 8.1 percent were over 7 inches total length. Rainbow trout comprised 77 percent of these fish. The condition factor of all fish weighing 0.04 pounds or more were calculated. The average condition factor ("C") for brook trout was 36.1 and for rainbow trout 39.3.

The most striking change in fish populations occurred in Section 5. While the brook trout population in the section remained relatively stable or slightly increased from prior years, the number and weight of rainbow trout increased

*Thousand board feet measure

Table 3. The numbers and weights of all fish captured in the various sections in Pinkham Creek from 1951 to 1960.

Sections	Species*	1951		1952		1953		1954		1955		1956		1960	
		No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
2	Eb	47	2.29	55	2.59	35	1.88	21	1.66	38	1.56	19	1.17	31	1.11
	Rb	26	1.81	41	2.96	68	4.63	60	2.76	63	4.34	51	2.48	77	3.56
5	Eb	30	1.99	30	1.51	25	.85	31	1.25	54	1.92	34	1.14	66	3.52
	Rb	7	.49	15	1.63	12	.90	19	.76	29	1.72	17	1.18	82	6.05
7	Eb	109	6.48	70	3.28	102	4.13	31	1.01	41	1.46	66	2.70	153	4.92
	Rb	1	.27	4	.36	6	.43	8	.85	6	.49	10	1.29	11	1.02
Totals	Eb	186	10.76	155	7.38	162	6.86	83	3.92	133	4.94	119	5.01	250	9.55
	Rb	34	2.57	60	4.95	86	5.96	87	4.37	98	6.55	78	4.95	170	10.63
Grand Total		220	13.33	215	12.33	248	12.82	170	8.29	231	11.49	197	9.96	420	20.18

*Eb- brook trout; Rb- rainbow trout

nearly five times (Table 3.). There has been no fish stocking in this stream since this study was initiated.

From data collected thus far in the study, it does not appear that logging had any serious effects on the fish. However, an interview with a landowner on the stream indicated that by visual observations water volumes were the lowest since 1919. The volume measured with a velocity head-rod in section 7 was 7.82 cfs, other recorded volumes were 12 cfs in 1956 and 7 cfs in 1952.

Since, as mentioned, only three of the original eight sampling stations could be located, it is recommended that the Pinkham Creek study be discontinued.

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