MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of: Montana Name: Helicopter Mountain Lake Survey

Project No.: F-32-R-5 Title: Mountain Lake Survey - District

Job No.: IV Three

Period Covered: July 1, 1968, to June 30, 1969

ABSTRACT:

Seven mountain lakes were surveyed in the Upper Yellowstone River drainage with the aid of a helicopter in August, 1968. The area of the lakes ranged from 3.2 to 49.7 acres and maximum depths varied from 20 to 110 feet. Potential spawning areas were classified as good for two lakes, poor for two and nil for the remaining. Yellowstone cutthroat trout were found in four lakes, and two of these supported self-sustaining populations. Four lakes were recommended for plants of cutthroat trout in 1969.

RECOMMENDATIONS:

Increased popularity of sport fishing and the urge to "get away from it all" makes the high mountain lake an important facet of fishery management, for the present and the future. High mountain lake surveys yield information necessary to provide a basis for sound management recommendations. The survey of these lakes should be continued to maintain and complete the district and state files of fishing waters.

Cottonwood, Smeller, Fire and Crystal Lakes were recommended for plants of fingerling Yellowstone cutthroat trout in 1969. Cottonwood and Smeller Lakes were stocked with cutthroat trout in 1962 and have provided good angling. Although no fish were taken from Fire or Crystal Lakes, there were reports of a sport fishery in the past.

OBJECTIVES:

The purpose of this survey is to provide physical and biological characteristics of high mountain lakes and to determine the sport fishery potential of these lakes. The characteristics and past history of each lake are examined to determine if the stocking of hatchery fish is desirable.

TECHNIQUES:

Survey gear was transported to each lake via a helicopter equipped with pontoons. The helicopter also served as a raft from which the equipment was

handled. Water temperatures were obtained at the surface and near the bottom with an electrical resistance thermometer. Lake depths were registered with a Bendix depth recorder, or with a calibrated hand line.

One 125-foot experimental monofilament gill net was fished in each lake for 12 to 48 hours. Netted fish were measured to the nearest 0.1 foot and weighed to the nearest 0.02 pounds. Scales were obtained from all fish. Data for each lake was recorded on lake survey cards for the district and Helena files.

Potential spawning areas were observed and classified into three categories as follows:

Good - adequate reproduction judged likely to occur annually;

Poor - questionable whether reproduction occurs every year, successful spawning may occur in favorable years;

Nil - no suitable spawning areas available.

FINDINGS:

A total of seven lakes were surveyed in the Upper Yellowstone River drainage (Figure 1), three in the Crazy Mountain Range and four in the Absaroka Mountain Range. A summary of the survey data is shown in Table 1. Populations of Yellowstone cutthroat trout were found in four of the lakes (Cottonwood, Rock, Elbow and Thompson). Trout 12.0 inches in total length were taken from those lakes. The largest fish captured was taken in Thompson Lake (13.9 inches, 1.14 pounds). No fish were netted in the remaining lakes.

Spawning areas appeared to be adequate in Elbow and Thompson Lakes and the number of fish taken in the nets indicated good reproductive success. Depth was not considered a limiting factor for any lake. Each lake had a permanent inlet and outlet.

The lakes in the Crazy Mountains: Cottonwood, Rock, and Smeller, were planted with cutthroat trout in 1962. The fish taken from Cottonwood and Rock Lakes were of hatchery origin, as evidenced by eroded and misshapen fins. Examination of scales from these fish indicated an age of V, corresponding to the year they were planted. Additional plants of fingerling Yellowstone cutthroat trout were recommended for Cottonwood and Smeller Lakes to increase the sport fishery of the lakes.

Rock Lake, while containing trout, lies on deeded land, and access is limited. In addition, a tunnel has been constructed in the outlet area, allowing for a drawdown of the lake of 57 feet for use as irrigation water. For these reasons, it was recommended that Rock Lake not be planted.

Scale samples were obtained for analysis of age and growth (Table 2). The scales were also valuable in determining if natural reproduction occurs in a lake. Nearly all fish attained a length of seven inches by their third growing season, which is about average for mountain lakes in Montana. Fish in Thompson Lake were growing at a faster rate than the fish in the remaining lakes. Thompson Lake lies at a lower elevation and tends toward a eutrophic (older, more productive) condition rather than the oligotrophic (younger, less productive) condition typical of the mountain lakes in glaciated basins or cirques.

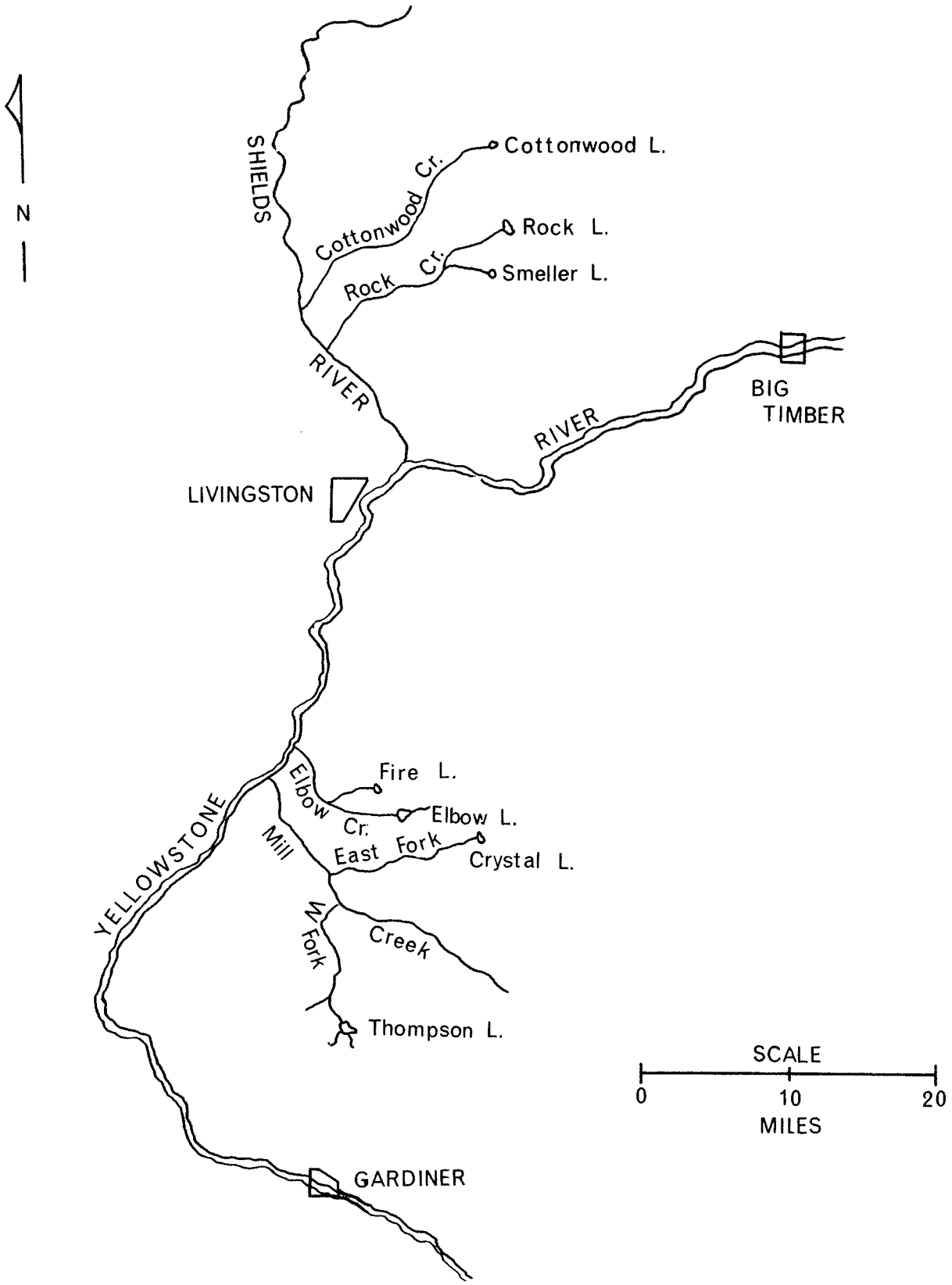

Figure 1. Map of the Upper Yellowstone River drainage, showing mountain lakes surveyed, August, 1968.

TABLE 1. Summary of mountain lakes surveyed in the Upper Yellowstone River drainage, August, 1968. (Lakes listed alphabetically).

Lake	Location T.	R.	S.	Area (A)	Max. Depth (ft)	Elevation (ft)	Species	No.	Size Range (in)	Spawning Areas
CRAZY MOUNTAINS										
Cottonwood	3N,	11E,	3	9.2	35	8,550	Cutthroat	1	12.0	Nil
Rock	3N,	11E,	11	49.7	90	8,550	Cutthroat	2	13.4-13.5	Nil
Smeller	3N,	11E,	13	22.0	110	8,800	None			Nil
ABSAROKA MOUNTAINS										
Crystal	5S,	11E,	29	3.2	33	9,300	None			Poor
Elbow	5S,	10E,	27	8.1	43	8,550	Cutthroat	9	6.6-13.6	Good
Fire	5S,	10E,	20	6.4	90	9,400	None			Poor
Thompson	8S	9E,	1	8.5	20	7,850	Cutthroat	44	6.1-13.9	Good

TABLE 2. Age and growth of cutthroat trout from mountain lakes in the Upper Yellowstone River drainage. (Number of fish in sample shown in parentheses).

Lake	Length at Annulus				
	I	II	III	IV	V
Cottonwood	2.1	3.8	5.7	7.1	9.0
	(1)	(1)	(1)	(1)	(1)
Rock	2.2	4.4	7.0	9.3	11.6
	(2)	(2)	(2)	(2)	(2)
Elbow	2.8	5.1	7.3	9.7	12.8
	(9)	(9)	(7)	(6)	(1)
Thompson	3.6	7.0	9.8	11.7	
	(44)	(31)	(17)	(4)	

No fish were taken or observed in Fire or Crystal Lakes. Both lie at high elevations and are deep. Reproductive potential was classified as poor for both lakes, with the possibility of limited reproduction in their outlets. The food supply appeared more than adequate in each lake, with Trichopterans and Isopods present. Plants of fingerling Yellowstone cutthroat trout were recommended for each lake in 1969.

Considerable effort is required to reach the lakes surveyed. Trails provide access to most of the lakes, but are steep and poorly maintained. A good horse trail provides access to Thompson Lake.

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