MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State Montana

Project No. F-32-R-10 Title Helicopter Mountain Lake Survey

Job No. I-e Title Helicopter Mountain Lake Survey - Region Five

Period Covered July 1, 1973 through June 30, 1974

ABSTRACT

This report summarizes survey information collected on all the lakes on the Crazy Mountains. The mountains have 48 lakes which accumulatively cover 405.7 surface acres in Park, Sweet Grass and Meagher Counties. A total of 24 lakes are exclusively on the Gallatin National Forest, 13 are on private sections, 1 is in the Lewis and Clark National Forest and 10 are partly on forest and private land. The lake locations vary from 6,500 to 9,000 feet in elevation, and from less than 1 to 50 acres in size. Pear Lake is the deepest lake with 185 feet depth, while 27 lakes are less than 10 feet deep. Trout exist in 15 lakes and stocking rates are recommended for 9 lakes. Half of the lakes in the Crazy Mountains could support fish and two lakes were not recommended for stocking due to low potential use by anglers.

BACKGROUND

Very little information has been collected on the aquatic resources of the Crazy Mountains. Rock Lake was surveyed in 1968, Forest Lake in the Lewis and Clark National Forest was surveyed in 1970 and Lone, Cottonwood and Smeller Lakes were surveyed in 1972. Fisheries management in these mountains was limited to setting seasons, limits and stocking fish in five lakes. The overall objectives were to survey the remainder of the unsurveyed lakes, to compile findings on all lakes into one report and to formulate a management plan for the entire aquatic resources in the mountain system.

OBJECTIVES

1. To survey all unsurveyed lakes in the Crazy Mountains.

2. To formulate a management plan for all aquatic resources in the Crazy Mountains.

PROCEDURES

After preparation of outlines of each lake from aerial photographs, a crew flew to each lake with a helicopter equipped with pontoons. The lake was sounded with a portable echo sounder, a gill net was set, temperatures were recorded with a thermistor thermometer at intervals from the water surface to the bottoms of the lake. A standard survey card was filled out with information on various characteristics of the lake, area, water source and stream conditions. The gill net was pulled the following day and fish data were collected. After each lake was surveyed, morphological information was calculated, summarized and compiled into this report.

FINDINGS

All 41 lakes on the east side of the Crazy Mountains were surveyed during August 1973. This included 6 lakes in Swamp Creek drainage, 16 lakes in Big Timber Creek drainage and 19 lakes in Sweet Grass Creek drainage. Previous surveys included three lakes in Cottonwood Creek, three in Rock Creek drainage on the south and west sides and one lake in the Middle Fork, Cottonwood Creek drainage on the north side of the mountains. All lakes are in the general forest boundary of the Gallatin National Forest, except Forest Lake in the Lewis and Clark National Forest. Ownership of the land within these forests is of the checkerboard type with the Gallatin owning approximately 137 sections and 112 sections being privately owned. A total of 31 lakes is in Park County, 15 in Sweet Grass County, 1 in Meagher County and 1 in both Park and Sweet Grass Counties. A total of 24 lakes on this mountain is exclusively on the Gallatin National Forest, 13 on private sections, 1 on Lewis and Clark National Forest land and 10 partly on Forest and private sections.

Access is best served by Forest roads. Roads to the Crazy Mountains include: Sweet Grass Creek road on the northeast side, Big Timber Creek road on the east, Rock Creek road on the south side, Cottonwood Creek road on the southwest, Porcupine Creek road on the west and the Shields River road on the northwest side. All these roads will get one to Forest lands. Numberous other unmaintained roads are in the area, but are on private lands. Maintained trails provide access from all sides except the north. A total of 21 lakes can be reached by trail; 27 have no trail all the way to the lake and horses can be ridden to 25 of the 48 lakes.

No geodetic survey has been accomplished with the exception of some of the peaks. The altimeter on the helicopter indicated that the lakes ranged from 6,500 to 9,000 feet in elevation. The highest point in the Crazy Mountains is 11,214 feet on Crazy Mountain.

The 48 lakes occupy a total of 405.7 surface acres and range in size from less than 1 acre to 50 acres. The majority (35) of the 48 lakes covered less than 10 acres. Areas were computed from aerial photographs and are subject to error, due to deviations of photographic scale at various altitudes of land features on the pictures.

The deepest lake in the Crazy Mountains is Pear Lake with a depth of 185 feet. Most (27) are less than 10 feet, 13 are between 11 and 49 feet, 6 are 50 to 99 feet and 2 are 100+ feet deep.

The majority (33) of the 48 lakes had no fish populations, 7 contain rainbow trout, 6 have cutthroat trout and 2 have brook trout. Of the 33 lakes barren of fish, 23 have no potential as fisheries, 8 could support fish if stocked at intervals, 1 might become self-sustaining if stocked and management recommendations are not made for Rock Lake which is on private land. Of those 15 lakes having fish populations in 1973, 5 had been stocked by the Montana Department of Fish and Game, 7 had been stocked by private individuals and 3 were populated from fish movement from these introductions. A total of 11 of the 15 lakes has self-sustaining populations. During the 1930's and 1940's, nearly all of the lakes with the exception of some very small ones were stocked by individuals having access to rainbow and cutthroat trout. These lakes did not have adequate spawning areas and failed to sustain their populations. A miner, dude ranchers and a couple of cattle ranchers did the early fish stocking.

DISCUSSION

Management of the aquatic environment in the Crazy Mountains for optimum recreational benefits will require periodic fish stocking in several lakes. Pear and

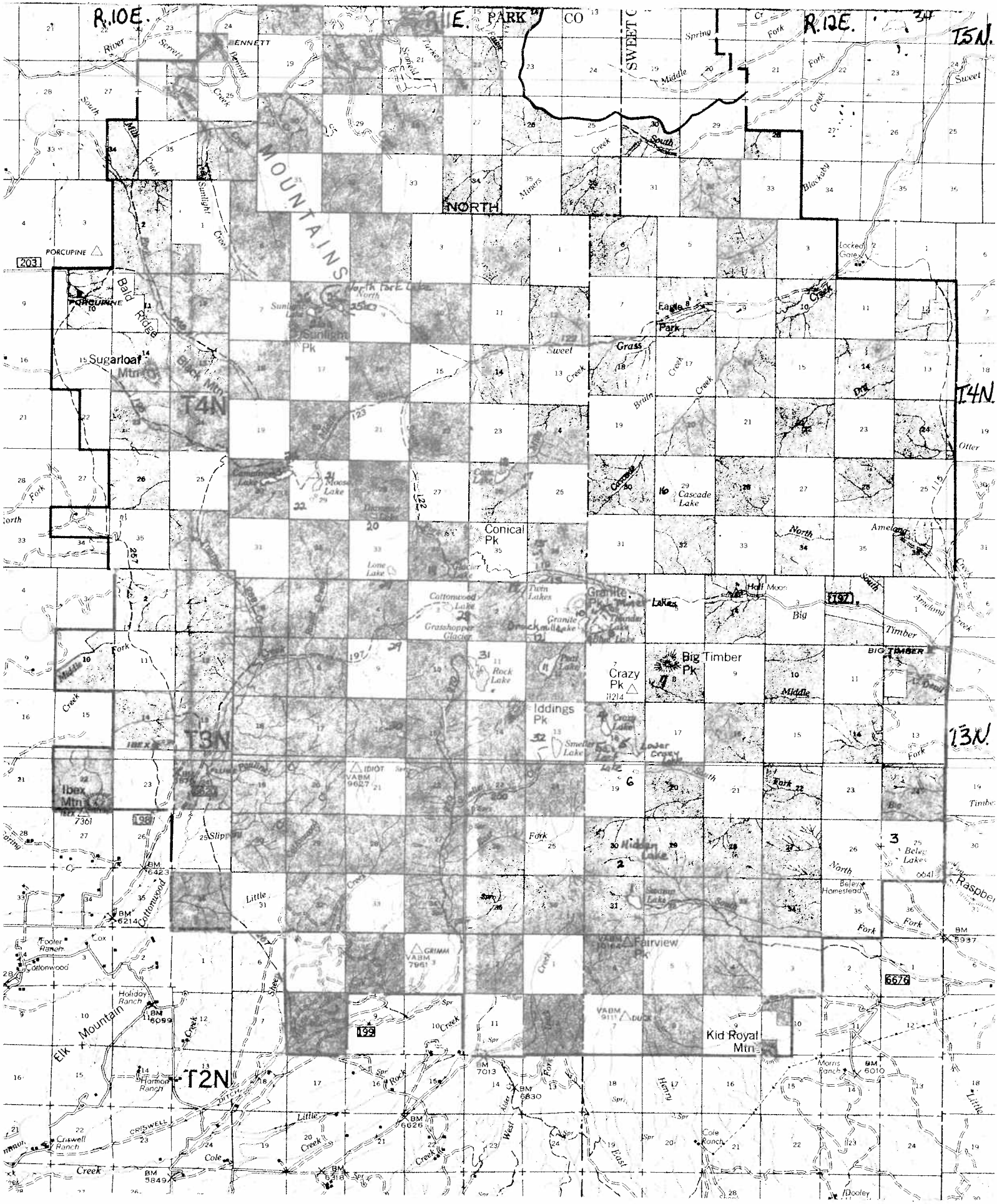

Figure 1. Map of Crazy Mountains with numbers used in Table 1.

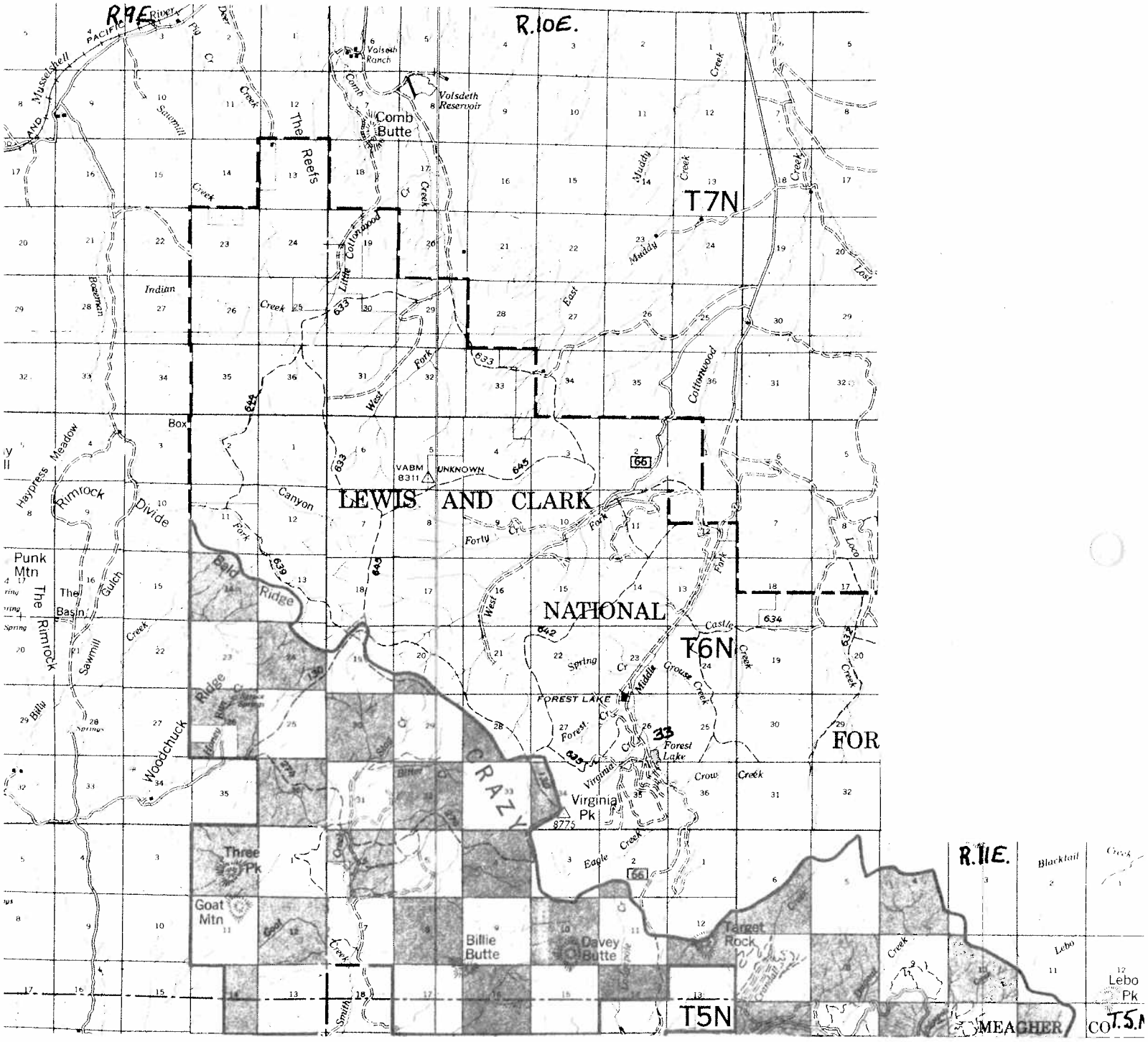

Figure 1. Map of Crazy Mountains with numbers used in Table 1 (continued).

Table 1. Location, ownership, access and some physical features of the lakes in the Crazy Mountains

No. & Drainage [1]	Lake & Location	Co [2]	Land Ownership [3]	Elevation (ft) [4]	Area in Acres [5]	Max Depth (ft)	Shoreline Development	Length Shoreline	Access				
									4-Wheel Drive	Horse	Foot	Trail	No Trail
Swamp Creek													
1	Swamp T3N,R12E,S.31	40	G	8,350	22.2	61	1.2	4,092		X	X	X	
2	Hidden or Fish T3N,R12E,S.30D	40	G	8,910	5.0	63	1.7	1,914			X		X
3	Beley (4) T3N,R12E,S.25CB	40	P	6,500	4.7 [6]	<10	-	-	X	X	X	X	
Big Timber Creek													
4	Crazy T3N,R12E,S.18	40	G	8,700	16.9	58	1.2	3,590		X	X	X	
5	Lower Crazy T3N,R12E,S.18D	40	G	8,600	4.9	12	1.3	2,165		X	X	X	
5a	Lost T3N,R12E,S.18C	40	G	8,640	1.9	14	1.2	1,245		X	X	X	
6	Unnamed (2) T3N,R12E,S.19A	40	P	8,620	2.5 [6]	& 6 8	-	-			X		X
7	Unnamed T4N,R12E,S.8	40	G	9,000	3.3	14	1.6	2,079			X		X
8	Thunder T3N,R12E,S.6CD	40	G	7,900	3.2	8	1.2	1,625		X	X	X	
9	Blue T3N,R12E,S.6CC	40	G	7,900	10.1	42	1.7	4,007		X	X	X	
10	Granite T2N,R11E,S.1 T3N,R12E,S.6	& 40 49	G-P	7,900	21.4	95	1.5	4,045		X	X	X	

Table 1. Location, ownership, access and some physical features of the lakes in the Crazy Mountains (cont.)

No. & Drainage[1]	Lake & Location	Co.[2]	Land Ownership[3]	Elevation (ft)[4]	Area in Acres[5]	Max Depth (ft)	Shoreline Development	Length Shoreline	Access			
									4-Wheel Drive	Horse	Foot Trail	No Trail
Big Timber Creek (cont.)												
11	Pear T3N,R11E,S.12	49	G	8,450	39.8	185	1.6	7,260		X	X	X
12	Druckenmiller T3N,R11E,S.1	49	P	8,500	24.2	97	1.3	4,785		X	X	X
13	Lower Twin T4N,R11E,S.36C	49	G	7,650	10.6	6	1.2	2,772		X	X	X
14	Upper Twin T3N,R11E,S.2AA	49	G	7,700	6.8	5	1.9	3,565		X	X	X
15	Unnamed (3) T4N,R11E,S.36B	49	G	8,000	1.0[6]	3	-	-		X	X	X
Sweet Grass Creek												
16	Cascade T4N,R12E,S.29	40	P	8,450	6.8	25	1.3	2,492			X	X
17	Hellroaring T4N,R11E,S.26AD	49	G	8,300	2.4	2	1.6	1,848		X	X	X
18	Cave T4N,R11E,S.26	49	G	8,250	15.5	41	1.4	3,960		X	X	X
19	Glacier T4N,R11E,S.34	49	G	8,400	6.7	8	1.4	2,657		X	X	X
20	Diamond T4N,R11E,S.28	49	G	8,750	4.4	31	1.1	1,682			X	X
21	Moose T4N,R11E,S.29	49	P	7,550	13.1	11	1.2	3,274		X	X	X

Table 1. Location, ownership, access and some physical features of the lakes in the Crazy Mountains (cont.)

No. & Drainage[1]	Lake & Location	Co.[2]	Land Ownership[3]	Elevation (ft)[4]	Area in Acres[5]	Max Depth (ft)	Shoreline Development	Length Shoreline	Access: 4-Wheel Drive	Horse	Foot Trail	No Trail
Sweet Grass Creek (cont.)												
22	Unnamed (4) T4N,R11E,S.29CA	49	P-G	7,552 8,240	5.0[6]	8	-	-		X	X	X	
23	Campfire or Hindu T4N,R11E,S.30	49	P-G	8,250	35.4	30	2.0	8,646		X	X	X	
24	Unnamed T4N,R11E,S.20C	49	G	8,255	2.0	5	1.1	1,172		X	X	X	
25	North Fork T4N,R11E,S.8A	49	G	8,150	4.5	6	1.3	2,062		X	X	X	
25a	Unnamed (3) T4N,R11E,S.8&9	49	P-G	8,150	1.4[6]	5	-	-		X	X	X	
26	Sunlight T4N,R11E,S.8	49	G	8,500	8.0	34	1.2	2,574		X	X	X	
26a	Unnamed (3) T4N,R11E,S.8	49	G	8,500	2.8[6]	2	-	-		X	X	X	
Cottonwood Creek												
27	Lone T4N,R11E,S.33	49	P	8,700	6.0[7]	45	-	-			X		X
28	Cottonwood T3N,R11E,S.3	49	P	8,550	9.2	36	-	-		X	X	X	
29	Unnamed T3N,R11E,S.4D	49	G	8,200	3.5[7]	<10	-	-		X	X		X

Table 1. Location, ownership, access and some physical features of the lakes in the Crazy Mountains (cont.)

No. & Drainage[1]	Lake & Location	Co.[2]	Land Ownership[3]	Elevation (ft)[4]	Area in Acres[5]	Max Depth (ft)	Shoreline Development	Length Shoreline	Access				
									4-Wheel Drive	Horse	Foot Trail		No Trail
Rock Creek													
30	Unnamed T3N,R11E,S.16	49	G	8,200	5.0[7]	< 10	-	-			X		X
31	Rock T3N,R11E,S.11	49	P	8,550	50.0	90	-	-		X	X	X	
32	Smeller T3N,R11E,S.13	49	P	8,800	22.0	110	-	-		X	X	X	
Middle Fork Cottonwood Creek													
33	Forest T6N,R10E,S.26&35	47	L&C & P	8,000	23.5	30	-	-	X	X	X	X	

[1] See Figure 1.

[2] 40 = Sweet Grass County, 49 = Park County, 47 = Meagher County.

[3] G = Gallatin National Forest, L&C = Lewis and Clark National Forest, P = private.

[4] Altimeter reading in helicopter on lake surface.

[5] Figured from aerial photo scale.

[6] Total of all lakes in the group.

[7] Estimate.

Table 2. Summary of fish data collected from lakes in the Crazy Mountains

Lake	Location	Fish[1] Sp	Size Range in Inches	Average L	Average Wt	Average Size[2] I	II	III	IV	V	VI+
Swamp	T3N,R12E,S.31	Eb	7.2-13.5	9.6	0.45	<7(0)	7.9(11)	12.0(10)	13.5(1)	-	-
Thunder	T3N,R12E,S.6CD	Rb	6.3-10.8	8.4	0.22	<6(0)	6.3(1)	7.5(6)	9.3(4)	10.2(2)	-
Blue	T3N,R12E,S.6CC	Rb	8.2- 9.7	9.1	0.27	-	-	8.8(3)	9.7(2)	-	-
Granite	T3N,R11E,S.1 T3N,R12E,S.6	Rb	7.3-14.9	10.2	0.40	-	-	8.3(5)	-	11.1(5)	14.9(1)
Lower Twin	T4N,R11E,S.36C	Rb	8.0-15.5	12.3	0.85	-	-	9.1(5)	12.3(5)	15.1(5)	-
Cascade[3]	T4N,R12E,S.29	Eb	-	20.5	5.12	-	-	-	-	-	20.5(1)
Moose & Unnamed	T4N,R11E,S.29	Rb	9.8-12.3	10.6	0.48	-	-	10.0(4)	11.9(2)	-	-
Campfire	T4N,R11E,S.30	Rb	13.4-17.7	16.1	1.72	-	-	-	14.1(2)	17.0(1)	17.5(2)
North Fork & Unnamed	T4N,R11E,S.8A	Ct	7.5-13.3	10.8	0.48	-	-	8.2(3)	11.9(5)	13.3(1)	-
Cottonwood	T3N,R11E,S.3	Ct	-	10.1	0.37	-	-	-	(known age) 10.1(2)		
Smeller	T3N,R11E,S.13	Ct	-	-	-						
Rock	T3N,R11E,S.11	Ct	-	13.5	-	-	-	-	-	(known age) 13.5(2)	-
Forest	T6N,R10E,S.26&35	Ct	-	9.4	0.30						

[1] Eb = brook trout, Rb = rainbow trout, Ct = cutthroat trout.

[2] Number in parentheses is sample size.

[3] Remnant population dying out from old age.

Table 3. Recommended stocking and sampling schedule for lakes in the Crazy Mountains

Lakes[1]	Location	Fish[2] Sp	Size (In.)	No.	Past Plants	Future Plants	Sample[3] Year
Pear	T3N,R11E,S.12	Rb	03	2,000	-	1974-78	1980
Druckenmiller	T3N,R11E,S.1	Rb	03	2,000	-	1974-78	1980
Cottonwood	T3N,R11E,S.3	Ct	03	1,500	1972	1974-78	1980
Smeller	T3N,R11E,S.13	Ct	03	1,500	1972	1974-78	1980
Hidden	T3N,R12E,S.30D	Ct	03	1,000	-	1974-78	1980
Crazy	T3N,R12E,S.18	Ct	03	1,500	-	1974-78	1980
Cascade	T4N,R12E,S.29	Ct	03	1,000	-	1974-78	1980
Sunlight	T4N,R11E,S.8	Ct	03	1,500	-	1974-78	1980
Cave	T4N,R11E,S.26	Ct	03	2,000+	-	1975	1980

[1] Other lakes such as Diamond and Lone Lakes could support fish, but angler use would probably be too low to justify at this time.

[2] Rb = rainbow trout, Ct = cutthroat trout, Gt = golden trout.

[3] At this time the lakes should have fish 2½ and 6½ years old.

Druckenmiller Lakes in the Big Timber Creek drainage would need periodic plants and since rainbow trout occupy lakes downstream, it would be best to stock these lakes with rainbow trout. Cave Lake has some potential as a golden trout fishery and would provide anglers an opportunity for additional diversification of angling experience. The rest of the four barren lakes would best be served by stocking Yellowstone cutthroat trout. These lakes would have to be stocked at intervals to maintain a catchable fish.

One of the most important assets of a mountain is its contribution of steady flows of high quality water. Most streams provide fishing in high alpine meadows, but they are typically poor fisheries along the steep gradient zone leaving high reaches. The most productive zone is the area from the foothills to the mouths of some river system. Unfortunately, this is the zone most abused by man's activities. Mountains not only provide most of this water downstream, but provide quality waters which help dilute man-made pollution.

Some threats always exist to this guaranteed source of quality water. They include overgrazing of the watershed, logging, mining and irrigation. Any one of these activities could appreciably degrade the area. Damming lakes for manipulating stream flows could be detrimental to lake fisheries and productivity of streams below the impoundments. Diversity of land ownership in the Crazy Mountains increases possibilities of abusing the aquatic resources of the area.

Specific information on each of the lakes in the Crazy Mountains is summarized in Tables 1 and 2. Their location is coded on the map in Figure 1. Additional information is available and filed with the fisheries management biologist at Red Lodge and in the regional fish and game headquarters in Billings.

RECOMMENDATIONS

1. Assist efforts to protect the mountain by getting protective status.

2. Work toward gaining maximum access for the benefit of recreational use.

3. Introduce golden trout fry into Cave Lake and the pond in its outlet.

4. Stock 2,000 rainbow trout fry in Pear and Druckenmiller Lakes every fourth summer.

5. Stock Yellowstone cutthroat trout every fourth year in the following waters: Cottonwood, Smeller, Hidden, Crazy, Cascade and Sunlight Lakes (see Table 3).

6. Resample stocked lakes the sixth year after stocking to evaluate stocking rates and stocking intervals.

7. Monitor man's activities in the mountains by periodic helicopter flights with personnel familiar with the area.

Prepared by Pat Marcuson

Date January 15, 1974

Waters referred to:

229380 - Swamp
227910 - Hidden or Fish
- Beley (4)

229632 - Crazy
229632 - Lower Crazy
228540 - Lost (2)
- Unnamed
- Unnamed
229464 - Thunder
227306 - Blue
228008 - Granite
228871 - Pear
227694 - Druckenmiller
229525 - Lower Twin
229525 - Upper Twin
- Unnamed (3)
227448 - Cascade
- Hellroaring
227449 - Cave
227978 - Glacier
227688 - Diamond
228715 - Moose
- Unnamed (4)
227420 - Campfire or Hindu
- Unnamed
228810 - North Fork
- Unnamed (3)
229366 - Sunlight
- Unnamed (3)
- Lone
227537 - Cottonwood
- Unnamed
- Unnamed
229009 - Rock
229268 - Smeller
187510 - Forest