

FISHERIES MANAGEMENT PLAN

for

Mountain Lakes in West Rosebud Drainage

Montana

June 1980

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Acknowledgments

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Note on Contents

This report deals only with lakes in the West Rosebud Creek Drainage. Comprehensive coverage of all the lakes in the Absaroka-Beartooth Mountain Range in Montana will be detailed under separate cover. Methods, materials and interpretation of the findings will be part of the comprehensive report. Although not anticipated, some minor changes in the proposed stocking schedules may be necessary to best serve the entire Absaroka-Beartooth study area.

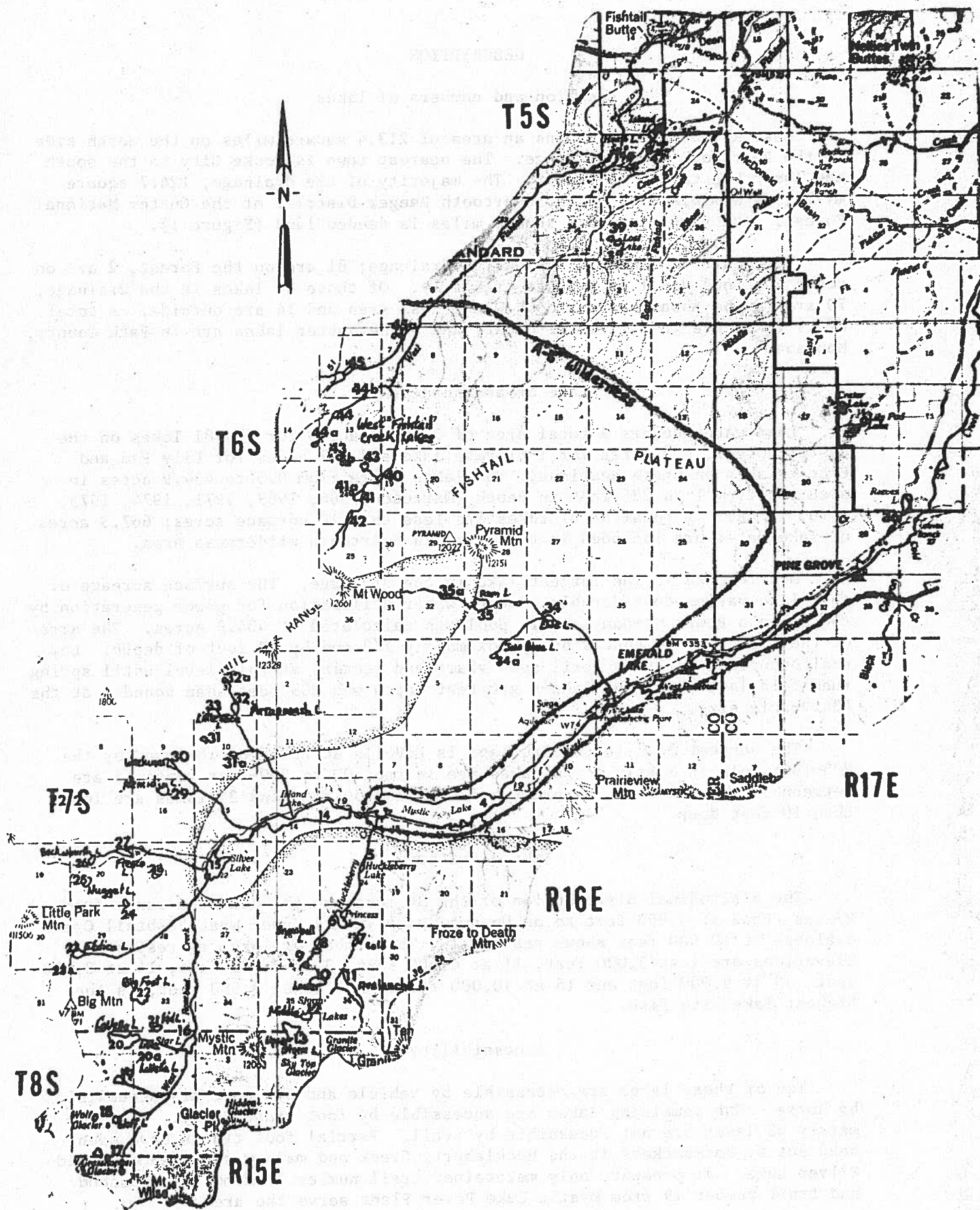


Figure 1. Location of lakes in West Rosebud Creek drainage.

DESCRIPTION

Location and numbers of lakes

West Rosebud Creek drains an area of 213.4 square miles on the north side of the Beartooth Mountain Range. The nearest town is Cooke City to the south and Absarokee to the northwest. The majority of the drainage, 124.7 square miles, is administered by the Beartooth Ranger District of the Custer National Forest. The remaining 88.7 square miles is deeded land (Figure 1).

There are 84 lakes in the entire drainage; 81 are on the Forest, 2 are on state sections and 1 is private (Table 1). Of those 84 lakes in the drainage, 70 are in the Absaroka-Beartooth Wilderness Area and 14 are outside. A total of 71 lakes are in Stillwater County and 13 headwater lakes are in Park County, Montana.

Lake areas and depths

Lake water covers a total area of 1,164.3 acres for the 81 lakes on the Custer Forest, 6.5 acres for 1 private lake and 3.7 acres for Lily Pad and Crater Lakes on state sections. The lakes range from 0.3 to 434.9 acres in size and from 1 to 235 feet in depth (Marcuson 1966, 1969, 1971, 1974, 1975, 1976, 1976a). A total of 67 lakes are less than 10 surface acres; 667.3 acres of lake water are included in the Absaroka-Beartooth Wilderness Area.

Mystic Lake is the largest lake in the drainage. The surface acreage of this lake varies considerably, due to water utilization for power generation by the Montana Power Company. Full pool was calculated at 434.9 acres. The area of the lake can be reduced by approximately 1/3 and by 87 feet of depth. Low pool occurs as early as April some years and remains at this level until spring runoff in late May. The lake's greatest depth was 205 feet when sounded at the 434.9-acre size.

The deepest lake in the drainage is LaVelle at 235 feet followed by the 205-foot hole in Mystic. Two lakes are in the 101 to 200-foot range, 5 are between 51 and 100 feet, 44 are between 11 and 50 feet and 31 lakes are less than 10 feet deep.

Lake elevations

The altitudinal distribution of the 84 lakes in the drainage range from Reeves Pond at 5,950 feet to an Unnamed Lake in the Upper West Fishtail Creek drainage at 10,600 feet above sea level. The number of lakes at respective elevations are 1 at 5,000 feet, 11 at 6,000 feet, 3 at 7,000 feet, 14 at 8,000 feet, 40 at 9,000 feet and 15 at 10,000 feet. Ram Lake, 9,580 feet, is the highest lake with fish.

Accessibility

Ten of these lakes are accessible by vehicle and ten more are accessible by horse. The remaining lakes are accessible by foot travel only. Approximately 68 lakes are not accessible by trail. Partial foot trails have been beat out by backpackers in the Huckleberry Creek and main West Rosebud beyond Silver Lake. At present, only maintained trail number 17 from East Rosebud and trail number 19 from Mystic Lake Power Plant serve the area.

Table 1. Summary of locations, physical features and fisheries information for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range

Location code ^{1/}	Name	County ^{2/}	Forest ^{3/}	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft.)	Ecological zone ^{4/}	Fish species ^{5/}	Fish population type ^{6/}	Fish management ^{7/}
W. ROSEBUD CREEK											
1 .	Emerald	32	C	6,310	28.5	7	100	1	LL EB CT RB	1 1 1 2	1 1 1 2
2 .	West Rosebud	32	C	6,387	19.0	6	100	1	LL EB CT RB	1 1 1 2	1 1 1 2
3 .	Afterbay Pool	32	C	6,480	5.8	4	100	1	LL EB CT RB	1 1 1 2	1 1 1 2
4 .	Mystic	32	C	7,673	434.9	205		1	RB	1	1
HUCKLEBERRY CREEK											
5 .	Huckleberry	32	C	8,380	8.0	8	100	1	RB	1	1
6 .	Princess	32	C	9,080	25.0	35	34	2	B		6
7 .	Cold	32	C	9,660	4.2	11	100	3	B		3
8a.	Snowball (4)	32	C	9,750	1.7	13	100	3	B		3
b.				9,640	4.7	74	35	3	B		1
c.				9,650	3.9	18	73	3	B		1
d.				9,655	1.6	2.5	100	3	B		3
9 .	Unnamed	32	C	9,781	2.0	14	100	3	B		3
10 .	Storm (lower)	32	C	9,839	17.8	95	21	3	B		2
11 .	Avalanche	32	C	9,750	62.2	135	21	4	B		2
12 .	Storm (middle)	32	C	10,440	10.8	95	23	4	B		1

Table 1. Summary of locations, physical features and fisheries information for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name	County ^{2/}	Forest ^{3/}	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft.)	Ecological zone ^{4/}	Fish species ^{5/}	Fish population type ^{6/}	Fish management ^{7/}
13 .	Storm (upper)	32	C	10,550	27.7	85	28	4	B		1
	W. ROSEBUD CREEK										
14 .	Island	32	C	7,717	144.0	45	76	1	RB	1	1
15 .	Silver	32	C	7,820	72.6	21	76	1	RB	1	1
16 .	Star	49	C	8,640	23.5	15	100	1	B		6
17 .	Grasshopper (7)	49	C	10,395	11.8t	12	100	4	B		3
18 .	Wolf (2)	49	C	9,800 10,390	4.3t	4	100	4	B		3
19 .	Unnamed	49	C	9,590	9.3	8	100	3	B		3
20 .	LaVelle	49	C	9,900	44.4	235	6	4	B		1
20a.	Little LaVelle	49	C	9,890	6.7	15	100	3	B		1
21 .	Kid	32	C	9,510	6.1	12	100	3	B		3
22 .	Big Foot	32	C	10,200	23.8	120	22	4	B		1
23 .	Eedica	32	C	9,720	8.9	40	36	4	B		6
23a.	Unnamed	32	C	9,730	1.6	-	100	3	B		3
24 .	Unnamed	32	C	10,360	4.0	14	100	4	B		3
25 .	Nugget	32	C	9,340	8.3	30	29	3	B		2
26 .	Beckwourth	32	C	9,230	6.2	9	100	2	CT	1	1
27 .	Frengo	32	C	9,115	13.9	28	32	2	CT	1	1
27a.	Unnamed (3)	32	C	8,990	2.4t	4	100	2	CT B	1	1 3

Table 1. Summary of locations, physical features and fisheries information for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name	County ^{2/}	Forest ^{3/}	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft.)	Ecological zone ^{4/}	Fish species ^{5/}	Fish population type ^{6/}	Fish management ^{7/}
28 .	Unnamed (3)	32	C	8,890	5.1t	11	100	2	B		3
29 .	Nemidji	32	C	9,595	13.7	25	42	3	B		2
30 .	Weeluna	32	C	9,694	10.2	30	32	3	B		2
31 .	Unnamed	32	C	9,910	2.2	15	100	3	B		1
31a.	Unnamed	32	C	9,480	1.0	5	100	3	B		3
32 .	Arrapooash	32	C	9,637	9.0	25	54	3	B		1
32a.	Unnamed	32	C	9,995	.4	4	100	3	B		3
33 .	Little Face	32	C	9,980	8.4	55	25	3	B		1
CHICKEN CREEK											
34 .	Ewe	32	C	8,670	4.8	3	100	1	B		1
34a.	Jaw Bone	32	C	9,990	2.9	14	100	4	B		3
35 .	Ram	32	C	9,580	14.4	29	31	3	CT	2	2
35a.	Unnamed	32	C	9,545	1.5	3	100	3	B		3
W. ROSEBUD CREEK											
36 .	Reeves	32	P	5,950	6.5	3	100	1	B		3
FIDDLER CREEK											
37 .	Lily Pad	32	ST	6,380	1.4	19	84	1	FC ES	1 1	6
38 .	Crater	32	ST	8,545	2.3	36	32	1	RB	2	2

Table 1. Summary of locations, physical features and fisheries information for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name	County ^{2/}	Forest ^{3/}	Elevation in feet	Area in feet t = total	Maximum depth in feet	Shoal (% of lake less than 15 feet)	Ecological zone ^{4/}	Fish species ^{5/}	Fish population type ^{6/}	Fish management ^{7/}
FISHTAIL CREEK											
39 .	Lost (3)	32	C	6,615	3.0	8	100	1	B		3
				6,630	1.3	12	100	1	B		3
				6,650	0.4	18	83	1	B		3
40 .	W. Fishtail Cr. Lakes	32	C	9,375	1.1	4	100	3	B		6
41 .		32	C	9,690	7.3	40	36	3	B		6
41a.		32	C	9,715	2.0	12	100	3	B		6
42 .		32	C	9,970	4.3	8	100	3	B		3
43 .	(4)	32	C	10,005	8.9t	24	51	4	B		6
44 .	Unnamed	32	C	10,130	3.0	40	29	4	B		1
44a.	Unnamed	32	C	10,600	1.0	3	100	4	B		3
b.		32	C	9,225	.4	5	100	4	B		3
45 .	Fishtail	32	C	9,130	3.2	11	100	1	B		6
45a.	Unnamed	32	C	10,050	1.0	6	100	3	B		3
b.	Unnamed (5)	32	C	8,545	.9t	3	100	1	B		3
46 .	Heart	32	C	6,190	1.1	6	100	1	B		3
47 .	Twin (2)	32	C	6,070	0.3	11	100	1	LL	1	1
					0.3	8	100	1	LL	1	1
48 .	Island	32	C	6,030	2.4	26	57	1	LL	1	1

^{1/} See Figure 1 for locations.

^{2/} 32 = Stillwater County, 49 = Park County.

^{3/} C = Custer National Forest, ST = State, P = private.

Table 1. Summary of locations, physical features and fisheries information for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name	County ^{2/}	Forest ^{3/}	Elevation in feet	Area in feet t = total	Maximum depth in feet	Shoal (% of lake less than 15 feet)	Ecological zone ^{4/}	Fish species ^{5/}	Fish population type ^{6/}	Fish management ^{7/}
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^{4/}1 = Transition, 2 = Canadian, 3 = Subalpine, 4 = Alpine.

^{5/}LL = brown trout, CT = cutthroat trout, RB = rainbow trout, EB = brook trout, FC = flathead chub, ES = emerald shiner, B = barren.

^{6/}1 = self-sustaining, 2 = stocked.

^{7/}1 = no management necessary, 2 = stock at intervals, 3 = no fisheries potential, 6 = stock to establish self-sustaining population.

Water chemistry

Chemical attributes of 35 lakes in the drainage (Table 2) showed little variability between lakes. Waters of the alpine lakes were typically on the acid side of neutrality 6.1 to 7.0. Some of the pond-type environments like Reeves, Lily Pad and Crater lakes had alkaline pH's. Conductivities, alkalinities and pH were higher in lakes of the Transition Zone where either vegetative matter was heaviest or water dilution was minimal. Conductivities of high lakes were less than 40 mhos and were all soft water. The greatest chemical variability among waters was the silica content.

Thermal

Warmest water temperatures were measured at the lowest altitude. The warmest surface water found in the lakes above 7,000 feet was 54° F in late August.

None of the 84 lakes in this report were ice covered the entire year; however, several headwater lakes had partial ice cover. Lakes in the headwaters were usually partially surrounded by permanent snowfields and/or glaciers. The mean number of ice-free days varied from 94 to 183. Many of the large lakes in the headwaters had less than 100 ice-free days per year.

Water clarity

An unusual number of lakes are green or blue-green in color, mostly the result of glacial silts from many glaciers and permanent snowfields. Visibilities were usually less than 12 feet in green lakes and up to 18 feet in the blue-green waters. Waters remained clear during spring freshets.

Plankton

Plankton samples were collected from 42 lakes in the West Rosebud Creek drainage (Table 3). The majority (25) of these 42 lakes had Diaptomus shoshone and/or Daphnia middendorffiana. Mystic and Island lakes had Holopedium gibberum, a large Cladocera which may reach 2.2 mm in length in these waters. Holopedium numbers were not enumerated with the large zooplankton. The volumetric measurement in Table 3 reflects everything in the tow sample, while the numbers per cubic meter depict only zooplankton. The largest densities of large zooplankton were found in Island Lake (#14), lakes in West Fishtail Creek and in Weeluna and Arrapooash lakes.

Fisheries

The 84 mountain lakes of the West Rosebud Creek drainage were a rather fishless group of waters. The only fisheries in truly mountain habitat were Mystic, Island, Silver, Huckleberry, Nugget, Beckwourth, Frencro and Ram lakes. The other waters with fish included Emerald, West Rosebud, the Afterbay Pool, Crater, Lily Pad, Twin and Island lakes which were predominately foothill environments in the mid-6,000-foot elevation zone. Of the truly mountain lake waters, Nugget and Ram received fisheries in 1976 and 1975, respectively. These lakes represent the only recent introductions and the only stocked fish other than those in Emerald and West Rosebud. The stocking history of lakes receiving fish from the State of Montana Department of Fish, Wildlife and Parks is found in Table 4.

Sixteen of the 84 lakes had some type of fishery; Lily Pad supported minnows only. Should stocking be terminated in the lakes of this drainage,

Table 2. Chemical attributes of lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range

Location code ^{1/}	Name of lakes	pH	Conductivity (mhos)	Alkalinity (ppm)	Total hardness (ppm)	Silica (ppm)	Iron (ppm)	Total phosphate (P) t=trace
W. ROSEBUD CREEK								
1 .	Emerald	6.3	25	40	15	1.9	.15	.01
2 .	West Rosebud	6.2	26	35	20	2.2	.41	.01
3 .	Afterbay	7.1	50	65	20	1.2	.27	.25
4 .	Mystic	6.7	35	32	9	.9	0	t
HUCKLEBERRY								
5 .	Huckleberry	6.0	22	45	30	1.0	0	.14
6 .	Princess	6.6	25	25	30	1.7	0	.12
8c.	Snowball	6.2	26	55	40	1.4	.05	.27
10 .	Storm (lower)	6.4	18	15	30	.6	0	.07
11 .	Avalanche	6.4	19	15	40	.8	0	.09
W. ROSEBUD CREEK								
14 .	Island	7.3	22	50	10	.2	0	.05
15 .	Silver	6.4	23	10	5	.4	t	
16 .	Star	6.7	22	10	20	1.5	0	.09
17 .	Grasshopper	6.1	7	20	30	.6	0	.06
18 .	Wolf	6.6	11	12	30	.9	.05	.08
19 .	Unnamed	7.0	20	25	25	1.5	.09	.14
20 .	LaVelle	6.6	10	20	30	.8	0	.11
20a.	Little LaVelle	6.6	18	20	30	.8	0	.11

Table 2. Chemical attributes of lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name of lakes	pH	Conductivity (mhos)	Alkalinity (ppm)	Total hardness (ppm)	Silica (ppm)	Iron (ppm)	Total phosphate (P) t=trace
21 .	Kid	6.5	10	06	35	.8	0	.12
25 .	Nugget	6.6	18	12	28	1.2	.05	.04
26 .	Beckwourth	6.1	19	15	8	1.2	0	.05
27 .	Frengo	6.8	22	22	40	1.3	.05	.09
28 .	Unnamed		13					
29 .	Nemidji	6.6	16	21	30	1.8	.05	.20
30 .	Weeluna	6.4	28	13	30	1.4	.15	.10
32 .	Arrapooash	6.4	14	18	30	2.0	0	.28
33 .	Little Face	6.6	9	10	20	.7	0	.14
CHICKEN CREEK								
34 .	Ewe	6.9	20	33	11	2.5	.01	.15
35 .	Ram	6.9	15	22	5	1.1	.01	.07
W. ROSEBUD CREEK								
36 .	Reeves	8.5	94	145	30	1.6	.31	.01
FISHTAIL CREEK								
37 .	Lily Pad	8.2	60	25	20	1.7	.10	.11
38 .	Crater	8.1	40	25	10	1.0	.05	.11
41 .	West Fishtail Creek	6.8	19	25	40	1.4	.05	.12

Table 2. Chemical attributes of lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name of lakes	pH	Conductivity (mhos)	Alkalinity (ppm)	Total hardness (ppm)	Silica (ppm)	Iron (ppm)	Total phosphate (P) t=trace
43 .	West Fishtail Creek	6.6	18	40	40	1.9	.05	.28
43a.	West Fishtail Creek	6.6	38	40	45	2.3	0	.25
48 .	Island	7.5	19	75	10	1.5	0	.24

^{1/} See Figure 1 for locations.

Table 3. Plankton samples from lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range

Location code ¹ / Name of lakes	Sample date	Volume of plankton cc/m ³	Number/m ³ of zooplankton	Number/m ³ of large zooplankton	Species of large zooplankton
1 . Emerald	7/16/79	3.83	1,340		
2 . West Rosebud	7/16/79	.48	4,786		
3 . Afterbay pool	7/16/79	3.83	3,063		
4 . Mystic	3/18/76	4.10	1,660	415	<u>D. shoshone</u>
	3/19/76	4.80	360	35	<u>D. shoshone</u>
	8/19/76	2.87	598		
5 . Huckleberry	8/31/78	.95	0		
6 . Princess	8/24/72	2.00	310	206	<u>D. shoshone</u>
	8/31/78	1.68	0		
8b. Snowball	8/31/78	1.63	24	24	<u>D. middendorffiana</u>
8c.	8/31/78	.24	0		
9 . Unnamed	7/25/74	-	-		<u>D. middendorffiana</u>
10 . Storm (lower)	8/31/78	19.98	2,697	80	<u>D. shoshone</u>
11 . Avalanche	8/31/78	.82	82		
12 . Storm (middle)	9/7/78	20.00	3,000	85	<u>D. shoshone</u>
13 . Storm (upper)	7/24/74	-	-	-	<u>D. middendorffiana</u>
14 . Island	3/19/76	36.00	7,193	1,798	<u>D. shoshone</u>
15 . Silver	7/20/79	.50	765.9		
16 . Star	9/7/78	0	0		
17 . Grasshopper	9/5/78	.59	0		
18 . Wolf	9/5/78	1.28	51	51	<u>D. shoshone</u>
19 . Unnamed	9/5/78	.65	77	-	<u>D. shoshone</u>

Table 3. Plankton samples from lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name of lakes	Sample date	Volume of plankton cc/m ³	Number/m ³ of zooplankton	Number/m ³ of large zooplankton	Species of large zooplankton
20 .	LaVelle	9/5/78	0	0	-	<u>D. shoshone</u>
20a.	Little LaVelle	9/5/78	.72	24	24	<u>D. shoshone</u>
24 .	Kid	9/5/78	1.28	52	26	<u>D. shoshone</u>
					26	<u>D. middendorffiana</u>
25 .	Nugget	8/5/75	2.90	72		
		9/6/78	0	0		
26 .	Beckwourth	8/5/75	2.40	0		
		9/7/78	.29	29		
27 .	Frengo	8/5/75	.90	0		
		9/6/78	.48	24		
28 .	Unnamed	9/6/78	.26	0		
29 .	Nemidji	9/7/78	2.01	86	57	<u>D. shoshone</u>
30 .	Weeluna	9/7/78	4.68	562	31	<u>D. middendorffiana</u>
		8/5/75	5.10	910	750	<u>D. shoshone</u>
32 .	Arrapooash	9/8/78	10.53	766	718	<u>D. shoshone</u>
33 .	Little Face	9/7/78	2.56	103	26	<u>D. shoshone</u>
					51	<u>D. middendorffiana</u>
34a.	Jaw Bone	7/16/74	-	-	-	<u>D. shoshone</u>
35 .	Ram	7/24/79	.05	814		
37 .	Lily Pad	7/19/79	11.90	22,449		
38 .	Crater	7/11/75	3.20	3,985		
41 .	West Fishtail Cr.	9/8/78	28.70	3,366	749	<u>D. shoshone</u>
41a.	West Fishtail Cr.	7/10/74	29.00	3,400	820	<u>D. shoshone</u>

Table 3. Plankton samples from lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range (cont.)

Location code ^{1/}	Name of lakes	Sample date	Volume of plankton cc/m ³	Number/m ³ of zooplankton	Number/m ³ of large zooplankton	Species of large zooplankton
42 .	West Fishtail Cr.	7/10/74	25.20	3,205	500	<u>D. shoshone</u>
43 .	West Fishtail Cr.	9/8/78	2.05	82		
43b.	West Fishtail Cr.	7/11/74	-	-	-	<u>D. shoshone</u> <u>D. middendorffiana</u>
45 .	West Fishtail Cr.	7/9/74	-	-	-	<u>D. shoshone</u>
45a.	West Fishtail Cr.	7/9/74	-	-	-	<u>D. shoshone</u>
45b.	West Fishtail Cr.	7/9/74	-	-	-	<u>D. shoshone</u>
48 .	Island Lake	7/12/79	7.31	10,002		

^{1/}See Figure 1 for locations.

Table 4. Fish plants by the State of Montana in lakes in the West Rosebud drainage of the Beartooth Mountain Range

Location code ^{1/}	Name of lakes	Number of fish	Species & strains ^{2/}	Total pounds	Number/acre	Pounds/acre	Date planted
1 .	Emerald	7,000 9,000	RB		247 316		Each Year
2 .	West Rosebud	1,500	RB		79 442		Each Year
4 .	Mystic	Extensive	RB				6/11/46- 9/14/51
6 .	Princess	5,400	GR				7/6/56
14 .	Island	25,440 42,240 24,990 4,934	RB RB RB RB				6/9/47 6/4/48 6/14/49 6/30/50
15 .	Silver	25,440 33,792 28,560	RB RB RB				6/9/47 6/9/48 6/14/49
25 .	Nugget	2,550	CT'Y	9.8	307	1.18	8/10/76
35 .	Ram	2,000	CT'M	7.7	139	.53	8/10/75
36 .	Reeves	Insig.	RB				
38 .	Crater	2,550 2,400 1,638 1,040	RB RB RB RB		1,109 1,043 712 452		7/13 & 7/17/55 8/21/64 7/29/69 7/20/70

^{1/} See Figure 1 for locations.

^{2/} RB = rainbow trout; GR = arctic grayling; CT'Y = Yellowstone cutthroat trout; CT'M = McBride cutthroat trout.

there would be 12 lakes with sustaining game fish populations. There would be only five environments with harvestable fisheries.

Rainbow trout were the dominate fishery in eight lakes, cutthroat trout occurred exclusively in four lakes and brown trout occurred in both of the Little Twin Lakes and in Island Lake. Table 5 depicts fish distribution, population type and average size of the sustaining populations of trout.

The stocking history of fish in the West Rosebud dates back to 1909. Mr. Jim Annin, Columbus, informed me that a forest ranger by the name of Harry Kaufman transported rainbow trout to Mystic and Huckleberry lakes in 1909. These fish were brought in on horseback via the East Rosebud-Mystic trail. The fish were supplied by the National Fish Hatchery in Bozeman. The State of Montana Department of Fish, Wildlife and Parks stocked rainbow trout in Mystic Lake between the years 1946 and 1951.

Mystic Lake also has a few mountain whitefish. It is assumed that these fish are indigenous to the lake prior to construction of the Mystic Lake Dam in 1936. Cutthroat trout may also have been present and may account for cutthroat trout characteristics in many of the rainbow trout in Mystic, Island and Silver lakes. The falls below the present dam site would appear to have blocked upstream movement of fish. However, a plant of mountain whitefish seems illogical and a rather doubtful fish to have been used as bait.

No history was found to answer the presence, origin or introduction data of cutthroat trout in Frengo Lake. Cutthroat trout in Emerald and the West Rosebud stream were thought to be indigenous. All other species such as rainbow, browns and brook trout were planted directly or invaded their present locations.

A creel census from 1966 to 1978 revealed a catch of 1.2 rainbow trout per hour for Mystic and Island lakes. Fly fishermen maintained the harvest of 1.2 fish/hour, while bait and lure users caught an average .6 and .7 fish/hour, respectively.

MANAGEMENT RECOMMENDATIONS FOR LAKES IN WEST ROSEBUD CREEK DRAINAGE

Proposed introductions and stocking schedules are listed in Table 6. Six of the proposed plants are one-time introductions. The goal of these plants are self-sustaining fisheries. Golden trout are also intended to ultimately occupy five lakes in the upper West Fishtail Creek basin (Figure 2). In the event of failures with these introductions, new species should be considered. All cutthroat and rainbow plants will be continuous and repeated at intervals to maintain a catchable fishery.

Realization of this plan would increase fisheries from 16 lakes (19%) to 34 lakes (40%). It would offer a variety of six species of fish and would open up country to new recreational opportunities. The drainage would still have 50 lakes (60%) that would remain fishless. Eleven of these barren waters have unquestionable fisheries potentials, but are considered excellent landmark environments for scientific studies.

Modifications of the aquatic ecosystem below Mystic Lake Power Station will mandate the need to evaluate use of catchable or subcatchable rainbow trout. Both sizes should be stocked, marked and censused to determine the best management for Emerald, West Rosebud and the Afterbay Pool.

Table 5. Fisheries distribution, average catch/net, average length, weight and population status of lakes in the West Rosebud drainage

Location code ^{1/}	Name of lakes	Fish species ^{2/}	Ave. catch/net	Ave. length (1/10 inches)	Ave. weight (1/100 pounds)	Sustaining population	Stocked population
1.	Emerald	RB, LL, EB, WF, CT				X CT X EB X LL	X RB
2.	West Rosebud	RB, LL, EB, WF, CT				X CT X EB X LL	X RB
3.	Afterbay Pool	RB, LL, EB, WF, CT				X CT X EB X LL	X RB
4.	Mystic	RB	28	9.3	.32	X	
5.	Huckleberry	RB	20	7.3	.29	X	
14.	Island	RB	82	8.7	.25	X	
15.	Silver	RB	24	7.5	.17	X	
25.	Nugget ^{3/}	CT	33	9.6	.33		X
26.	Beckwourth	CT	1	10.0	.38	X	
27.	Frengo	CT	22	9.2	.24	X	
35.	Ram ^{3/}	CT	37	13.1	.79		X
37.	Lily Pad	minnows	--	--	--	X	
38.	Crater	RB					X
47.	Twin (2)	LL	8	11.0	.57	X	
48.	Island	LL	10	12.3	.70	X	

^{1/} See Figure 1 for locations.

^{2/} RB = rainbow trout; LL = brown trout; EB = brook trout; CT = cutthroat trout; WF = mountain whitefish.

^{3/} Average growth changes yearly.

Table 6. Fish stocking proposals for lakes in the West Rosebud Creek drainage of the Beartooth Mountain Range

Location code 1/	Name of lakes	Next stocking year	Stocking frequency (years) 2/	Fish species 3/	Number of fish	Number fish/acre
1 .	Emerald	1979	1	RB		
2 .	West Rosebud	1979	1	RB		
3 .	Afterbay Pool	1980	1	RB		
6 .	Princess	1980	0	GR		
10 .	Lower Storm	1979	8	CT	1,780	100
11 .	Avalanche	1979	5	CT	12,440	200
16 .	Star	1980	0	GR		
23 .	Eedica	1979	0	CT	2,225	250
25 .	Nugget	1984	8	CT	830	100
29 .	Nemidji	1979	5	CT	4,110	300
30 .	Weeluna	1980	8	CT	1,275	125
35 .	Ram	1983	8	CT	1,440	100
37 .	Lily Pad	1980	0	LMB	2,800	200
38 .	Crater	1979	3	RB	690	300
41a.	West Fishtail Creek	1980	0	GT	--	--
43 .	West Fishtail Creek		0	GT	--	--
45 .	West Fishtail Creek	1980	0	EB	--	--

1/ See Figure 1 for location.

2/ 0 = stocking on one-time basis only.

3/ RB = rainbow trout, GT = golden trout, GR = arctic grayling, CT = cutthroat trout, LMB = largemouth bass, EB = eastern brook.

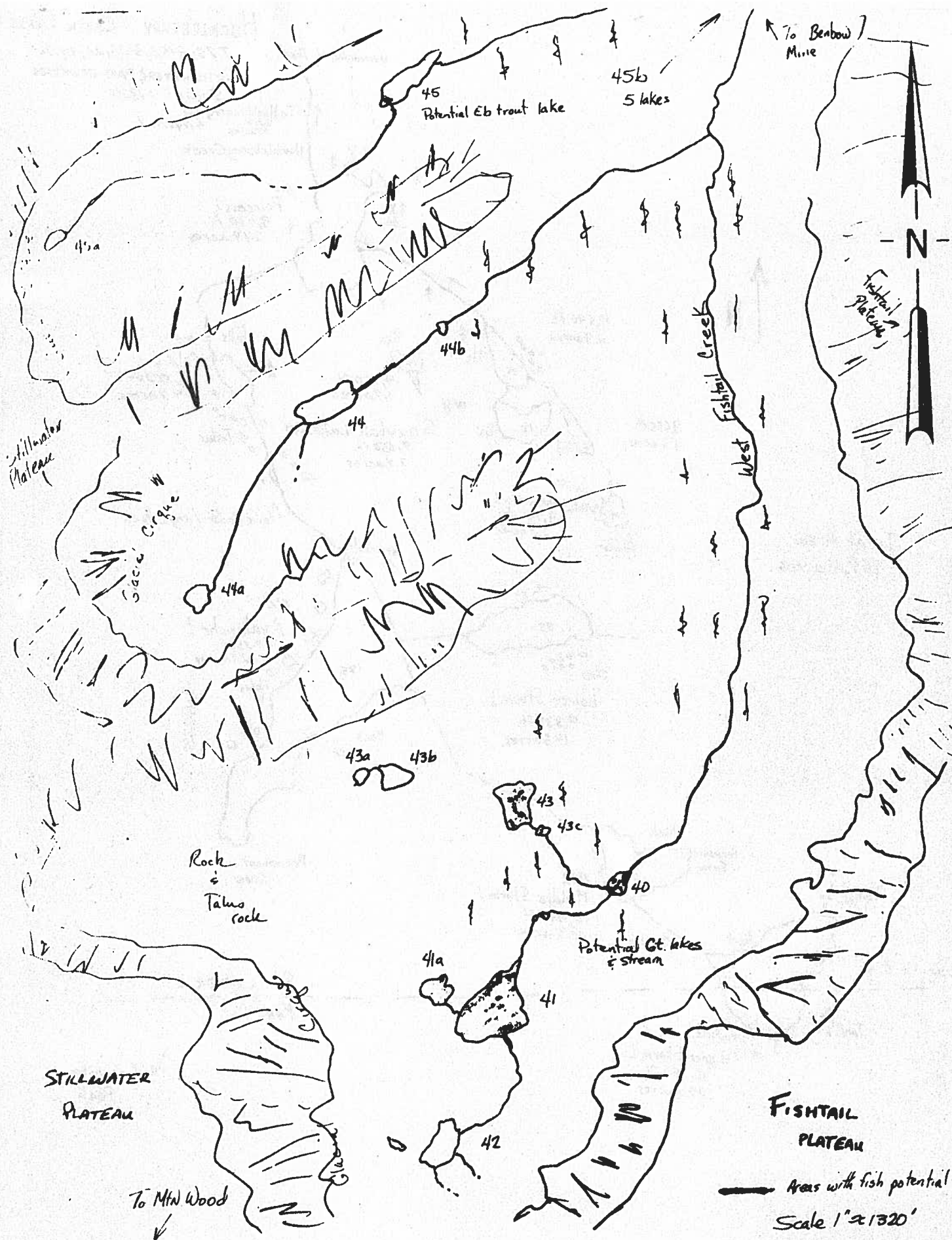


Figure 2. Map of lakes along West Fishtail Creek drainage.

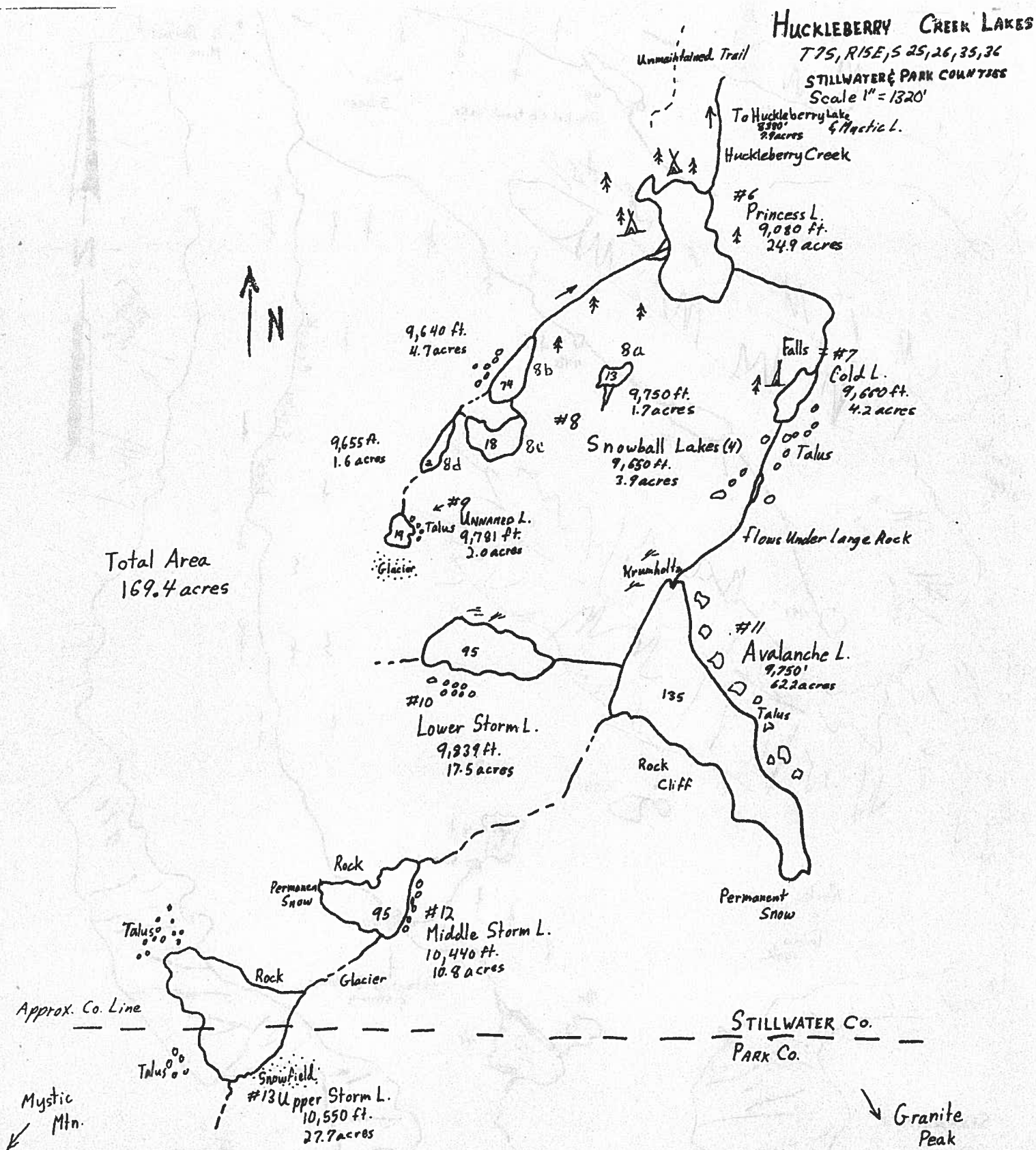


Figure 3. Map of lakes in the Huckleberry Creek drainage.

Arctic grayling requested for Star Lake may result in eventual grayling occurrence in the three large lakes downstream. This invasion is considered a benefit and biologically sound by this investigator. It is felt that the food resources would be better utilized with the combination of rainbow and grayling.

The proposed plant of largemouth bass would be purely experimental and only on a one-time basis. Lily Pad Lake is another water with easy access and should be managed to provide recreation.

A successful golden trout population in the upper West Fishtail Creek would greatly benefit this unique species (Pister pers. com.). Habitat which would allow perpetuation of golden trout is limited in the numerous lakes in the Absaroka-Beartooth Mountains. This plant would not only provide a new recreational opportunity, but would 1) help alleviate heavy use at the two golden trout lakes in the entire mountains, 2) help secure this fish from extinction and 3) provide an additional source of progeny of this rare fish (Marcuson 1976).

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