Introduction

Absaroka-Beartooth Wilderness Lakes

The Absaroka-Beartooth Wilderness Area (A-B) established in 1978 encompasses 930,584 acres and contains more area over 10,000 feet in elevation than any other area in the U.S. It rates as one of the top four or five wilderness areas in the country, receiving about 320,000 visitor-days of use each year. For comparison, the Bob Marshall Wilderness Area receives about 150,000 visitor-days use yearly. The Absaroka-Beartooth Wilderness Area and lands immediately adjacent contain 948 high mountain lakes, 318 of which contain fish and 630 that are barren. Approximately 204 of these lakes have self-sustaining fisheries and 114 are stocked. Stocking schedules vary from annually in some of the more heavily used areas to once every six to ten years in the lakes managed for trophy fisheries.

Pat Marcuson, during the time he worked for the Montana Department of Fish, Wildlife and Parks (MDFWP) out of Red Lodge, gathered a tremendous amount of information on the A-B lakes and created a massive database. In 1980 he developed fisheries management plans for each major drainage. Since that time, a computer database containing the latest information on the lakes with fisheries has also been developed. This database is located at the MDFWP Regional Headquarters in Billings. Additional information about individual lakes can be obtained from that office.

The purpose of this document is to update the 1980 lake management plan with the latest fisheries information available for the mountain lakes in the West Rosebud Drainage.

Methods

Mountain lake information is collected primarily by a lake survey team consisting of two temporary employees who spend about eight weeks backpacking into the remote lakes of the A-B Mountains. Lakes scheduled for sampling are selected based on length of time since last survey, questions about the status of fish introductions, impending scheduled fish plants, and angler reports. Fish populations are monitored with lightweight experimental nylon gill nets, hook and line, and visual surveys. Additional information gathered includes lake access, pH, air and surface water temperatures, availability of firewood and campsites, and extent of recreational use. Observations are also made of aquatic invertebrates, cruising and rising fish, fish fry, and suitability of substrate for spawning. Inlet and outlet streams are visually surveyed for fish and spawning activity or potential.

Fish collected are weighed and measured, and scales are taken for later age determination. Live fish are released, dead fish are dissected to check for parasites and general health and condition; stomachs are examined for food organisms.

Spot creel checks are conducted by enforcement and fisheries personnel to determine catch rates and angler satisfaction with regulations. Additional angler use information was gathered during 1988 and 1989 with a voluntary trailhead creel information survey implemented at the major access points to the A-B Wilderness Area. The purpose of this survey was to address a proposed new three-fish limit, estimate harvest and catch rates, solicit public comments, and gather additional fisheries information. Supplemental fisheries information is also obtained from guides and outfitters, Wilderness Rangers and other Forest Service personnel, as well as reports from other Wilderness users.

Information gathered from all sources is summarized and analyzed to make fish management decisions for the mountain lakes. Regulations are adjusted as necessary to help achieve desired fish population levels. Stocking rates and individual lake management strategies are adjusted as necessary to maintain desired angler catch rates, fish growth rates, and species distribution. Summarized information is used to update the computer database for each mountain lake sampled.

DESCRIPTION

Location and number 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, 1976a; Marcuson and Bishop 1971, 1974, 1975, 1976). 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 40 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.

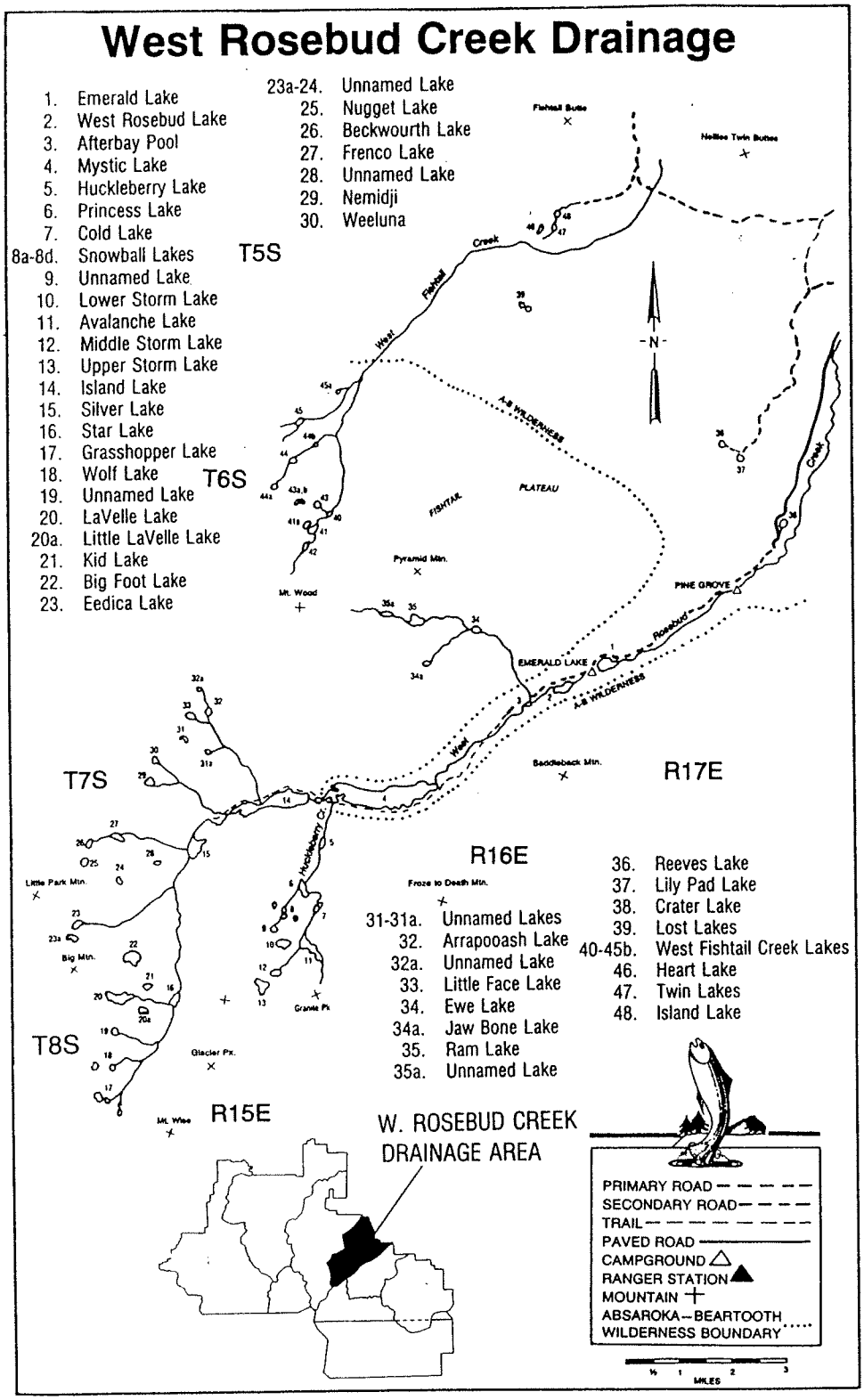

Figure 1. Location of lakes in the West Rosebud Creek Drainage.

Source: Marcuson, P. 1985. The Beartooth fishing guide. Falcon Press Publishing Co., Inc. Billings and Helena, Montana.

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 of lake	County [2]	Forest [3]	Elevation in feet	Area in acres t-total	Maximum depth in feet	Shoal (% of lake less than 15 ft. deep)	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 WF LNS	1 1 1 2 1 1	1 1 1 2 1 1
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(1990)		6
7	Cold	32	C	9,660	4.2	11	100	3	B		3
8a b c d	Snowball (4)	32	C	9,750 9,640 9,650 9,655	1.7 4.7 3.9 1.6	13 74 18 2.5	100 35 73 100	3 3 3 3	B B B B		3 1 1 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	CT	2	2
11	Avalanche	32	C	9,750	62.2	135	21	4	CT	2	2
12	Storm (middle)	32	C	10,440	10.8	95	23	4	B		1
13	Storm (Upper)	32	C	10,550	27.7	85	28	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 (continued).

Location code [1]	Name of lake	County [2]	Forest [3]	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft. deep)	Ecological zone [4]	Fish species [5]	Fish population type [6]	Fish management [7]
	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	CT		2
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	CT		2
26	Beckwourth	32	C	9,230	6.2	9	100	2	CT	1	1
27	Frenco	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
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	CT		2
30	Weeluna	32	C	9,694	10.2	30	32	3	CT		2

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

Location code [1]	Name of lake	County [2]	Forest [3]	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft. deep)	Ecological zone [4]	Fish species [5]	Fish population type [6]	Fish management [7]
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
	FISHTAIL CREEK										
39	Lost (3)	32	C	6,615 6,630 6,650	3.0 1.3 0.4	8 12 18	100 100 83	1 1 1	B B B		3 3 3
40	W. Fishtail Creek 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

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

Location code 1/	Name of lake	County 2/	Forest 3/	Elevation in feet	Area in acres t=total	Maximum depth in feet	Shoal (% of lake less than 15 ft. deep)	Ecological zone 4/	Fish species 5/	Fish population type 6/	Fish management 7/
42		32	C	9,970	4.3	8	100	3	B		3
43	(4)	32	C	10,005	8.9	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.

4/ 1 = Transition; 2 = Canadian; 3 = Sub-alpine; 4 = Alpine

5/ LL = Brown trout; CT = Cutthroat trout; RB = Rainbow trout; EB = Brook trout; FC = Flathead chub; ES = Emerald shiner; B = Barren; WF = Mountain whitefish; LNS = Longnose sucker.

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.

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.

Water chemistry

According to sampling during the 1970's, chemical attributes of 35 lakes in the drainage (Table 2) varied little 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. Water 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 cladacera 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.

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

Location code[1]/	Name of lake	pH	Conductivity (mhos)	Alkalinity (ppm)	Total hardness (ppm)	Silica (ppm)	Iron (ppm)	Total phosphate (P) t = trace (no units)
	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
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	Frenco	6.8	22	22	40	1.3	.05	.09

Table 2. Chemical attributes of lakes in the West Rosebud Drainage of the Beartooth Mountain Range (continued).

Location code[1/]	Name of lake	pH	Conductivity (mhos)	Alkalinity (ppm)	Total hardness (ppm)	Silica (ppm)	Iron (ppm)	Total phosphate (P) t = trace (no units)
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	W. Fishtail Creek	6.8	19	25	40	1.4	.05	.12
43	West Fishtail Cr.	6.6	18	40	40	1.9	.05	.28
43a	West Fishtail Cr.	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 Drainage of the Beartooth Mountain Range.

Location code[1]/	Name of lake	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	D. shoshone
		3/19/76	4.80	360	35	D. shoshone
		8/19/76	2.87	598		
5	Huckleberry	8/31/78	.95	0		
6	Princess	8/24/72	2.00	310	206	D. shoshone
		8/31/78	1.68	0		
8b	Snowball	8/31/78	1.63	24	24	D. middendorffiana
8c		8/31/78	.24	0		
9	Unnamed	7/25/74				D. middendorffiana
10	Storm (lower)	8/31/78	19.98	2,697	80	D. shoshone
11	Avalanche	8/31/78	.82	82		
12	Storm (middle)	9/7/78	20.00	3,000	85	D. shoshone
13	Storm (upper)	7/24/74				D. middendorffiana
14	Island	3/19/76	36.00	7,193	1,798	D. shoshone
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	D. shoshone
19	Unnamed	9/5/78	.65	77		D. shoshone
20	LaVelle	9/5/78	0	0		D. shoshone

Table 3. Plankton samples from lakes in the West Rosebud Drainage of the Beartooth Mountain Range (continued).

Location code[1]/	Name of lake	Sample date	Volume of plankton cc/m^3	Number/m^3 of zooplankton	Number/m^3 of large zooplankton	Species of large zooplankton
20a	Little LaVelle	9/5/78	.72	24	24	D. shoshone
24	Kid	9/5/78	1.28	52	26	D. shoshone
					26	D. middendorffiana
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	Frenco	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	D. shoshone
30	Weeluna	9/7/78	4.68	562	31	D. middendorffiana
		8/5/75	5.10	910	750	D. shoshone
32	Arrapooash	9/8/78	10.53	766	718	D. shoshone
33	Little Face	9/7/78	2.56	103	26	D. shoshone
					51	D. middendorffiana
34a	Jaw Bone	7/16/74				D. shoshone
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	W. Fishtail Cr.	9/8/78	28.70	3,366	749	D. shoshone
41a	W. Fishtail Cr.	7/10/74	29.00	3,400	820	D. shoshone
42	W. Fishtail Cr.	7/10/74	25.20	3,205	500	D. shoshone
43	W. Fishtail Cr.	9/8/78	2.05	82		
43b	W. Fishtail Cr.	7/11/74				D. shoshone
						D. middendorffiana

Table 3. Plankton samples from lakes in the West Rosebud Drainage of the Beartooth Mountain Range (continued).

Location code[1]/	Name of lake	Sample date	Volume of plankton cc/m^3	Number/m^3 of zooplankton	Number/m^3 of large zooplankton	Species of large zooplankton
45	W. Fishtail Cr.	7/9/74				D shoshone
45a	W. Fishtail Cr.	7/9/74				D shoshone
45b	W. Fishtail Cr.	7/9/74				D shoshone
48	Island Lake	7/12/79	7.31	10,002		

1/ See Figure 1 for locations.

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. Prior to 1979, the only fisheries in truly mountain habitat were Mystic, Island, Silver, Huckleberry, Nugget, Beckwourth, Frenco and Ram lakes. The other waters with fish included Emerald, West Rosebud, the Afterbay Pool, Crater, Lily Pad, Twin and Island lakes which were predominantly foothill environments in the mid-6,000-foot elevation zone. Of the truly mountain lakes, Nugget and Ram received fisheries in 1976 and 1975, respectively. Lower Storm, Avalanche, Eedica, and Nemidji were added to the list of lakes stocked with cutthroat trout in 1979; Weeluna was added in 1980. Golden trout were planted in two of the West Fishtail lakes in 1982, and grayling were released in Princess Lake in 1984. The stocking history of lakes receiving fish from the Montana Department of Fish Wildlife and Parks (MDFW&P) is found in Table 4.

Twenty-four of the 84 lakes have some type of fishery. Lily Pad supports minnows only. Should stocking be terminated in the lakes of this drainage, there would be 12 lakes with sustaining game fish populations. There would be ten environments with harvestable fisheries.

Rainbow trout are the dominant fishery in seven lakes, cutthroat trout occurred exclusively in nine lakes, and brown trout dominated in both Little Twin Lakes and in Island Lake. Table 5 depicts fish distribution, population type and average size of the 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 MDFWP stocked rainbow trout from the Yellowstone River Trout Hatchery (Big Timber) into Emerald and West Rosebud lakes most years beginning in 1931. MDFWP also stocked rainbow trout into Mystic, Island, and Silver lakes between 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.

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

Location code [1]	Name of lake	Number of fish	Species and strain [2]	Number/acre	Date planted
1	Emerald	7,000	RB	247	Most Years since 1931
		9,000	RB	316	
		2,617	CT'M	92	1986-1989
		1,516	RB	53	5/15/90
2	West Rosebud	1,500	RB	79	Most Years since 1931
		2,627	CT'M	138	1986-1989
		2,400	RB	126	5/15/90
4	Mystic	Extensive	RB		6/11/46-9/14/51
6	Princess	5,400	GR	216	7/6/56
		1,344	GR	54	8/18/84
10	Lower Storm	1,780	CT'M	100	8/17/79
		1,800	CT'M	102	8/13/87
11	Avalanche	12,440	CT'M	200	8/18/84
		12,390	CT'M	200	8/17/79
		3,180	CT'Y	51	7/24/50
14	Island	25,440	RB	176	6/9/47
		42,240	RB	293	6/4/48
		24,990	RB	173	6/14/49
		4,934	RB	34	6/30/50
15	Silver	25,440	RB	350	6/9/47
		33,792	RB	465	6/9/48
		28,560	RB	393	6/30/50
23	Eedica	2,334	CT'M	262	8/16/79
25	Nugget	2,550	CT'Y	307	8/10/76
		830	CT'M	830	1984

Table 4. Fish planted by the State of Montana in lakes in the West Rosebud Drainage of the Beartooth Mountain Range (continued).

Location code 1/	Name of lake	Number of fish	Species and strain 2/	Number/acre	Date planted
29	Nemidji	4,110	CT'M	300	8/17/79
		4,110	CT'M	300	8/18/84
		4,110	CT'M	300	8/20/90
30	Weeluna	1,275	CT'M	125	8/7/80
		1,275	CT'M	125	8/7/89
35	Ram	2,000	CT'M	139	8/10/76
		1,440	CT'M	100	8/2/83
38	Crater	2,550	RB	1,109	7/13 & 7/17/55
		2,400	RB	1,043	8/21/64
		1,638	RB	712	7/29/69
		1,040	RB	452	7/20/70
41a	West Fishtail	3,360	GT	1,680	9/24/82
43	West Fishtail	6,500	GT	730	7/27/82

1/ See Figure 1 for locations.

2/ RB = Rainbow trout; GT = Golden trout; GR = Arctic grayling; CT'Y = Yellowstone cutthroat trout; CT'M = McBride cutthroat trout.

Table 5. Fisheries distribution, average catch/net, average length, population status, and last survey date of lakes in the West Rosebud Drainage.

Location code [1]	Name of lake	Fish species [2]	Average catch/net	Average length	Sustaining population	Stocked population	Survey date
1	Emerald	RB					
		EB	13	11.0	X		
		CT	1	8.0		X	5/3/90
		LL	28	10.8	X		
		WF	13	13.1	X		
		LNSU	1	14.3	X		
2	West Rosebud	RB					
		EB					
		CT	4.3	10.6		X	
		LL	13	12.3	X		5/3/90
		WF	7.3	14.9	X		
		LNSU	1	14.3	X		
3	Afterbay pool	RB				X	
		EB			X		
		CT			X		8/76
		LL			X		
		WF					
4	Mystic	RB	23	10.3	X		8/15/84
5	Huckleberry	RB	3	6.7	X		8/15/90
6	Princess	GR	5	11.1		X	8/86
			0				8/15/90
10	Lower Storm	CT	8	13.4		X	8/16/90
11	Avalanche	CT	12	11.6		X	8/16/90
14	Island	RB	82	8.7	X		7/02/74
15	Silver	RB	24	7.5	X		7/01/74

Table 5. Fisheries distribution, average catch/net, average length, population status, and last survey date of lakes in the West Rosebud Drainage (continued).

Location code 1/	Name of lake	Fish species 2/	Average catch/net	Average length	Sustaining population	Stocked population	Survey date
23	Eedica	CT	25	12.4		X	8/01/86
25	Nugget	CT	34	8.7		X	7/30/86
26	Beckwourth	CT	6	11.1	X		7/30/86
27	Frenco	CT	17	9.4	X		7/30//86
29	Nemidji	CT	26	11.7		X	7/24/87
30	Weeluna	CT	16	13.1		X	7/24/87
35	Ram	CT	1	15.5		X	9/08/81
38	Crater	RB	12 0	8.2		X X	6/07/71 8/03/90

1/ See Figure 1 for locations.

2/ RB = Rainbow trout; LL = Brown trout; EB = Brook trout; CT = Cutthroat trout; WF = Mountain whitefish; LNSU = Longnose sucker.

No history was found to answer the presence, origin or introduction data of cutthroat trout in Frenco Lake. Cutthroat trout in Emerald and the West Rosebud stream were thought to be indigenous. All other species such as rainbow, brown, 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.

During 1988 and 1989 (Poore and Frazer 1990), a voluntary trailhead creel information survey was implemented at the major access points to the Absaroka-Beartooth Wilderness Area (A-B). That study showed, in spite of liberal fish limits for the A-B mountains, anglers kept only 26% of their catch in 1988 and 27% in 1989. Anglers released three out of four fish they presently catch without being required to by restrictive regulations. By a four to one majority, those fishermen responding to the survey wanted to see the present liberal fish limits retained in the A-B.

A-B anglers kept 35% of the brook trout they caught, 24% of the rainbows, and 22% of the cutthroat. The average catch per hour for each fish species was: 0.94 for cutthroat trout, 0.72 for rainbow trout, and 1.27 for brook trout. Catch rates for 1988 and 1989 were identical with 2.6 fish per hour on lakes, 4.3 fish per hour on streams, and 2.4 fish per hour for people fishing both lakes and streams.

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 1). A golden trout introduction in 1982 failed, but another plant is scheduled when the fish become available.

Realization of this plan would increase fisheries from 18 lakes (21%) to 29 lakes (35%). It would offer a variety of six species of fish and would open up country to new recreational opportunities. The drainage would still have 55 lakes (65%) that would remain fishless. Eleven of these barren waters have unquestionable fisheries potential, but are considered excellent landmark environments for scientific studies.

West Rosebud and Emerald lakes were planted with McBride cutthroat from 1986 through 1989 with the idea of establishing a self-sustaining fishery (Poore & Frazer 1990). Growth and survival of cutthroat was poor, with no sign of reproduction. Evidence suggested brown trout common in each lake were using cutthroat and all other species present for forage. DeSmet strain rainbow trout

Table 6. Fish stocking proposal for lakes in the West Rosebud Drainage of the Beartooth Mountains.

Location code [1]	Name of lake	Next stocking year	Stocking frequency [2]	Fish species [3]	Number of fish	Number of fish/acre	Comments
1	Emerald	1991	1	RB	1,500	126	
2	West Rosebud	1991	1	RB	2,400	53	
6	Princess	When available	0	GR	1,344	54	
10	Lower Storm	1995	8	CT	1,780	100	
11	Avalanche	1992	5	CT	10,000	160	
16	Star	When available	0	GR	2,350	100	
23	Eedica	1992	8	CT	890	100	
25	Nugget	1992	8	CT	830	100	
29	Nemidji	1994	5	CT	1,370	100	
30	Weeluna	1997	8	CT	1,020	100	
35	Ram	1991	8	CT	1,455	100	
37	Lily Pad	1991	0	LMB	1,400	100	
38	Crater	1991	0	LMB	230	100	
41a	West Fishtail	When available	0	GT			
43	West Fishtail	When available	0	GT			

1/ See Figure 1 for location.

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

3/ GT = Golden trout; GR = Arctic grayling; CT = Cutthroat trout; LMB = Largemouth bass; RB = Rainbow trout.

were introduced into both lakes during May 1990 and are also scheduled for 1991 and 1992. If a self-sustaining fishery is not established, annual stocking of legal sized trout may be necessary.

Grayling from two introductions made into Princess Lake in 1956 and 1984 failed to establish a self-sustaining population. One more introduction of grayling should be tried. If it also fails, cutthroat trout should be introduced. 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. The food resources would be better utilized with the combination of rainbow and grayling.

The proposed plants of largemouth bass would be purely experimental and only on a one-time basis. Lily Pad Lake and Crater are waters with access and should be managed to provide recreation. Largemouth bass should establish a self-sustaining fishery that will make good use of the abundant minnow forage base.

A successful golden trout population in 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 on the existing golden trout lakes, 2) help secure this fish from extinction and 3) provide an additional source of progeny of this rare fish (Marcuson 1976b).

Implementation of more restrictive regulations throughout the entire A-B Wilderness at this time is not warranted because: 1) Use is restricted by difficult access and the large number of lakes containing fisheries. Maintained trails lead to less than half the lakes with fish. 2) Many A-B lakes need more harvest because they contain overabundant populations of brook trout and (in some lakes) Yellowstone cutthroat. 3) Unlike most wilderness lakes many A-B lakes are uniquely fertile and productive. Even with liberal limits, optimum harvest has not been reached. 4) Our trailhead creel survey indicates people are regulating their own harvest and prefer this to being required to follow unnecessarily stringent regulations.

Several areas along major trails (especially where horses are allowed) are showing signs of overuse and may require some type of special management. Most A-B Wilderness users, however, are satisfied with present management and the resource is in excellent shape.

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