Pioneer Mountain Lake Survey, 1983, Dillon and Wise River Ranger Districts

Prepared for

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Beaverhead National Forest
Dillon, Montana 59725

by

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INTRODUCTION

The Beaverhead National Forest contains 254 lakes which support a significant proportion of the estimated 48,700 fisherman-days of recreation expended on the forest in 1980 (USFS 1982). The Pioneer Mountains contain 86 (34%) of the lakes of the Beaverhead Forest, primarily within the boundaries of the Dillon and Wise River Ranger Districts. These mountain lakes represent a valuable recreational resource because of their alpine settings, spectacular scenery, isolation and sport fisheries.

Most of the lakes (62) of the Pioneer Mountains support sport fisheries. These fisheries are the result of hatchery plants which began as early as the 1930's. Many lakes have established naturally reproducing self-sustaining fish populations while others require regular hatchery plants to maintain fisheries due to lacking or inadequate spawning habitat. Pioneer lakes have received introductions and currently support populations of cutthroat, rainbow, brook and golden trout as well as arctic grayling. Some lakes, which have received introductions of cutthroat and rainbow trout in the presence of spawning habitat, hold populations of rainbow X cutthroat hybrid trout.

Since 1976, the Montana Department of Fish, Wildlife and Parks (MDFWP) has emphasized the stocking of McBride Yellowstone cutthroat trout in mountain lakes. The McBride strain, which originated in McBride Lake in Yellowstone National Park, is particularly well adapted to alpine lake habitats. They grow rapidly because of their ability to efficiently use the dominant food base of alpine lakes which consists of zooplankton and midges (Chironomidae). They are also able to reproduce successfully in most lakes which have suitable spawning habitat.

Fisheries and habitat data were collected from many Beaverhead Forest lakes in 1967 and 1973-73 in order to determine fisheries status and potential. In an effort to gather more recent management data, the Beaverhead National Forest and MDFWP entered a cooperative survey of mountain lakes in 1981. Under this survey, 16 West Big Hole lakes in the Wisdom Ranger District were studied in 1981 (Wells, 1982) and 13 Pioneer Mountain lakes in the Wise River Ranger District were studied in 1982 (McMullin 1983). As the final phase of the cooperative survey, 11 Pioneer Mountain lakes in the Wise River (6) and Dillon (5) Ranger Districts were inventoried in 1983. The project was designed to gather data necessary to develop management recommendations for the inventoried lakes and to evaluate the success of McBride cutthroat trout introductions in some of the lakes in 1976 and 1979. The necessity of the development of management objectives for these lakes is imperative because a portion of the East Pioneer Mountains has been recommended for wilderness designation.

STUDY AREA

The Pioneer Mountains, located in the Beaverhead National Forest in southwest Montana lay within the boundaries of three ranger districts. The 428,840 acres within the Dillon and Wise River Ranger Districts represent eighty percent of the Beaverhead Forest Pioneer Planning Unit. Lands within this unit are managed for timber harvest, grazing, mining and many forms of dispersed and non-dispersed recreation including fishing. The Dillon Ranger District contains 48 lakes, 34 of which support fisheries while the Wise River Ranger District contains 67 lakes, 42 of which support fisheries. Collectively, the Dillon and Wise River Districts hold forty-five percent of the lakes and forty-nine percent of the lake fisheries of the Beaverhead Forest.

Lakes sampled in 1983 were located on the east slope of the East Pioneer Mountains. The six Wise River District lakes were located in the Big Hole River drainage and included Lion, Grayling, Vera, Crescent, Canyon and Abundance Lakes. The five Dillon District lakes included North and South Gorge, Waukena and Tendoy Lakes in the Big Hole River drainage and Scott Lake in the Beaverhead River drainage.

METHODS

Eleven lakes were sampled August 22-24, 1983 by using a helicopter mounted on inflatable pontoons. A single monofilament experimental mesh gill net was fished approximately 24 hours as a sinking set in each lake. Each gill net measured 125 feet by 5 feet and consisted of five panels measuring .75 in., 1.0 in., 1.25 in., 1.50 in. and 2.0 in. bar mesh. Fish collected were measured for length (.1 in.), weighed (.01 lb.) and aged by the scale method. Fish condition was calculated as:

$$K = \frac{100{,}000\ W}{L^3}$$

where K = Coefficient of condition
W = Weight in lbs. (nearest .01)
L = Length in inches (nearest .1)

Water samples were collected from each lake to determine water quality and relative potential productivity. Water samples were analyzed by Dr. Gordon Pagenkopf, Department of Chemistry, Montana State University, Bozeman. Depth profiles and contours were not determined due to a malfunction in the helicopter power source and weather conditions that prevented land soundings.

RESULTS

Water Quality

Selected water quality parameters for the eleven lakes sampled in 1983 are presented in Table 1. All of the lakes sampled were calcium-bicarbonate waters with near-neutral pH (6.80-7.51). Calcium was the dominant anion in all lakes generally followed by magnesium in more productive lakes (specific conductance greater than 20 umhos/cm) and sodium in less productive waters

Table 1. Selected Water Quality Parameters for Pioneer Mountain Lakes Sampled in 1983.

Lake	Specific Conductance (umhos/cm)	Total Alkalinity (mg/l)	pH	Major Ions (mg/l)						
				Ca	Mg	Na	K	Cl	SO_4	NO_3
Canyon	42.8	26.1	7.30	3.9	1.7	0.4	<.10	<.5	1.3	<1.0
Crescent	17.1	8.8	6.92	1.4	0.4	0.4	<.10	<.5	1.4	<1.0
Gorge (North)	18.9	9.7	6.90	1.6	0.3	0.6	<.10	<.5	1.6	<1.0
Gorge (South)	12.6	6.5	6.90	1.2	0.2	0.3	<.10	<.5	1.1	<1.0
Grayling	36.1	20.8	7.10	3.3	0.9	0.4	0.10	<.5	1.4	<1.0
Lake Abundance	11.0	4.5	7.51	0.6	0.2	0.3	0.15	0.9	<1.0	<1.0
Lion Lake	31.5	19.7	7.32	3.3	0.9	0.3	<.10	<.5	1.4	<1.0
Scott Lake	39.8	22.1	6.97	3.7	0.9	0.8	0.15	0.7	2.2	<1.0
Tendoy Lake	16.0	8.4	6.80	1.5	0.3	0.5	<.10	<.5	<1.0	<1.0
Vera Lake	25.3	16.2	6.99	2.6	0.7	0.5	<.10	<.5	1.7	<1.0
Waukena Lake	21.8	12.3	7.10	2.1	0.4	0.4	<.10	1.0	1.0	<1.0
Averages	24.8	14.1	7.07	2.3	0.6	0.4	-	-	-	-

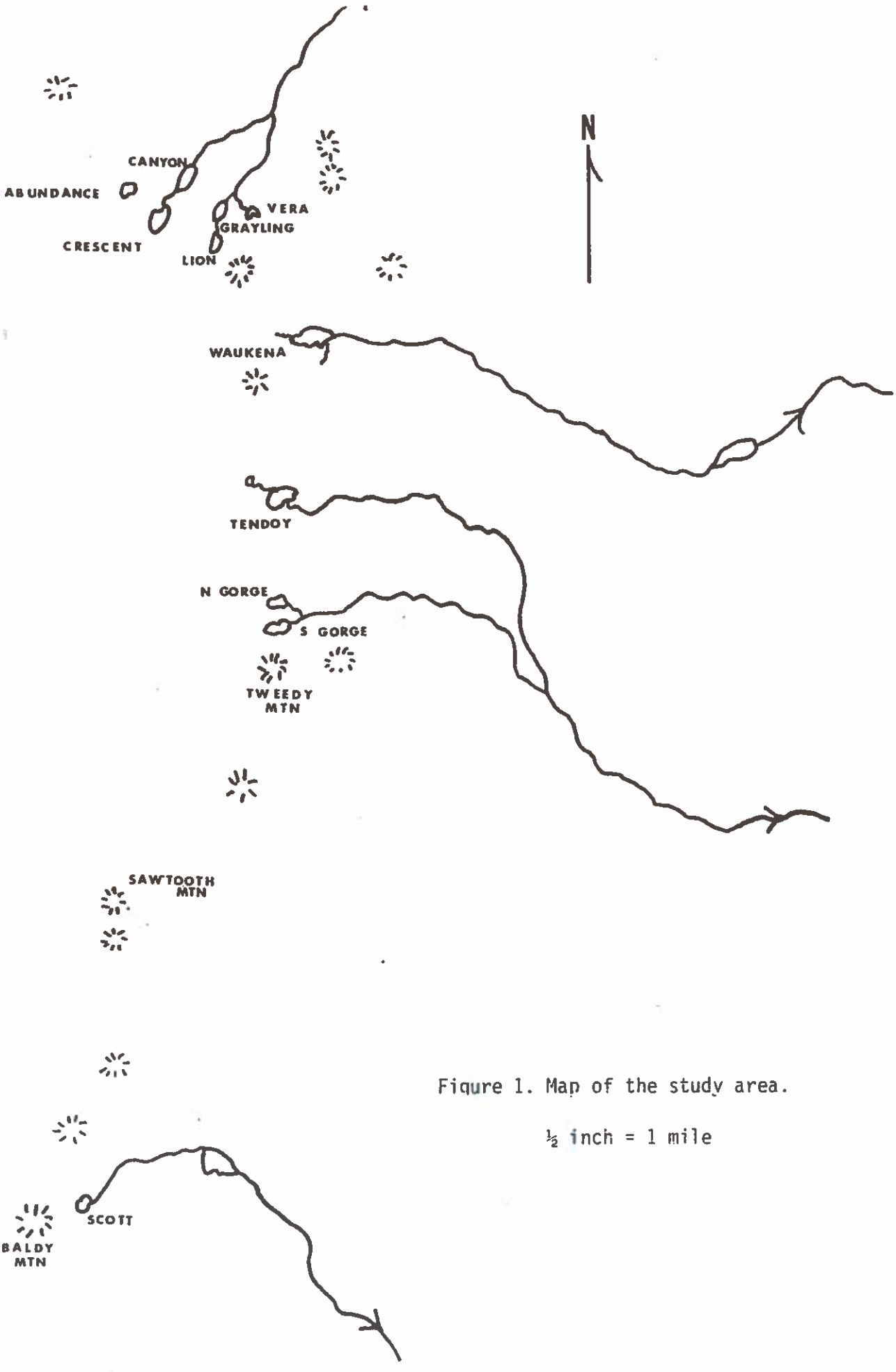


Figure 1. Map of the study area.

½ inch = 1 mile

(specific conductance less than 20 umhos/cm). The bicarbonate ion was the dominant cation in all waters surveyed. Sulphate exceeded 2.0 mg/1 in Scott Lake.

A relative index of lake productivity can be obtained from specific conductance and bicarbonate alkalinity. Specific conductance ranged from 11.0 umhos/cm in Lake Abundance to 42.8 umhos/cm in Canyon Lake. The average value of 24.8 umhos/cm observed in 1983 compares favorable with values observed by McMullin (1983) in 13 other Pioneer Mountain Lakes (28.4 umhos/cm) and exceeds those observed by Wells (1982) in 15 West Big Hole Lakes (ave. = 17.4 umhos/cm). Bicarbonate alkalinity values ranged 4.54 to 26.10 mg/1 and averaged 14.1 mg/1 in the surveyed lakes. By comparison, lakes in the West Big Hole exhibited an alkalinity range of 2.0 to 16.0 mg/1 and averaged 8.7 mg/1. Dissolved nitrate was present at concentrations of less than one milligram per liter in all of the lakes surveyed. All of the lakes studied in 1983 would be classified as oligotrophic.

Fisheries

The status of the lake fisheries surveyed in 1983 is presented by individual lake. The planting history of each lake is summarized. Parameters such as species composition, sample number, fish size, growth and reproduction are compared with past samples. Management suggestions, based on evaluation of existing data, are presented for each lake.

Canyon Lake

Planting History

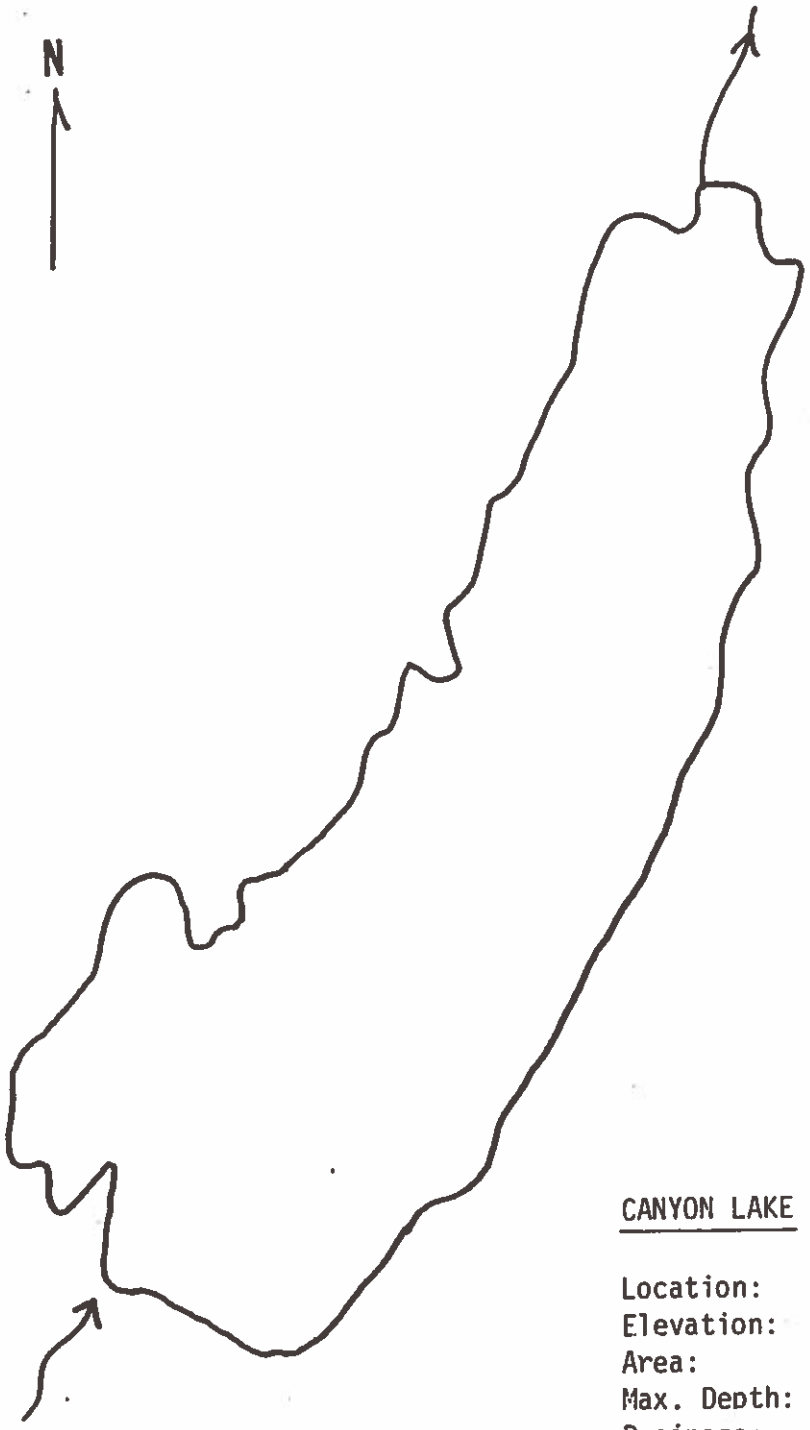
Year	Species	Number	Size
1936	Rb	19,200	2"
1945	Rb	8,640	2"
1948	YCt	8,320	2"

Description and Fish Population

Canyon Lake is a relatively shallow lake located near the head of the Canyon Creek drainage. The entire lake is classified as littoral. This, coupled with the highest specific conductance (42.8 umhos/cm) and bicarbonate alkalinity (26.1 mg/1) of the surveyed lakes, indicates a relatively high productivity for mountain lakes.

The 1983 sample indicated that Canyon Lake supports an abundant trout population. Comparisons with 1967 data show that average size of cutthroat trout has remained stable while the population has shifted from a dominance of rainbow X cutthroat hybrids to a dominance of cutthroat trout over the hybrids.

The presence of a range of age groups in the cutthroat trout sample indicated good reproductive success. Age I cutthroat trout averaged 6.7 in. while age II fish averaged 8.6 in., age III fish averaged 9.8 in. and age IV and older fish averaged 12.0 in. in length, indicative of relatively slow



CANYON LAKE

Location:	T3S R11W S8
Elevation:	8392'
Area:	14 acres
Max. Depth:	9'
Drainage:	Canyon Creek
Scale:	1 in. = 220'

growth. Condition of both cutthroat and hybrid trout was well below averages for the respective species in Pioneer Lakes. This observation was somewhat surprising in light of the potential productivity of Canyon Lake and may be indicative of overpopulation.

Canyon Lake supports a relatively popular fishery. The lake is utilized by a local guest ranch for fishing pack trips. Fisherman log reports from 1966-69 indicate catch rates as high as 2.0 fish per hour for cutthroat trout.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1967	YCt	7	9.3 - 10.4	9.9	0.32	32.7
	Rb X Ct	14	8.3 - 14.0	9.8	0.30	30.1
1983	YCt	27	6.5 - 16.0	9.9	0.35	32.6
	Rb X Ct	2	8.0 - 9.2	8.6	0.23	34.9

Management Suggestions

Canyon Lake should be managed as a wild trout fishery. Reproduction is adequate in the two inlet streams to stock the lake. Data suggest that reproductive success may be limiting trout growth in very productive environment. Increased harvest in Canyon Lake could result in a better balance between reproduction and standing crop and further result in faster growth rates for cutthroat trout.

Crescent Lake

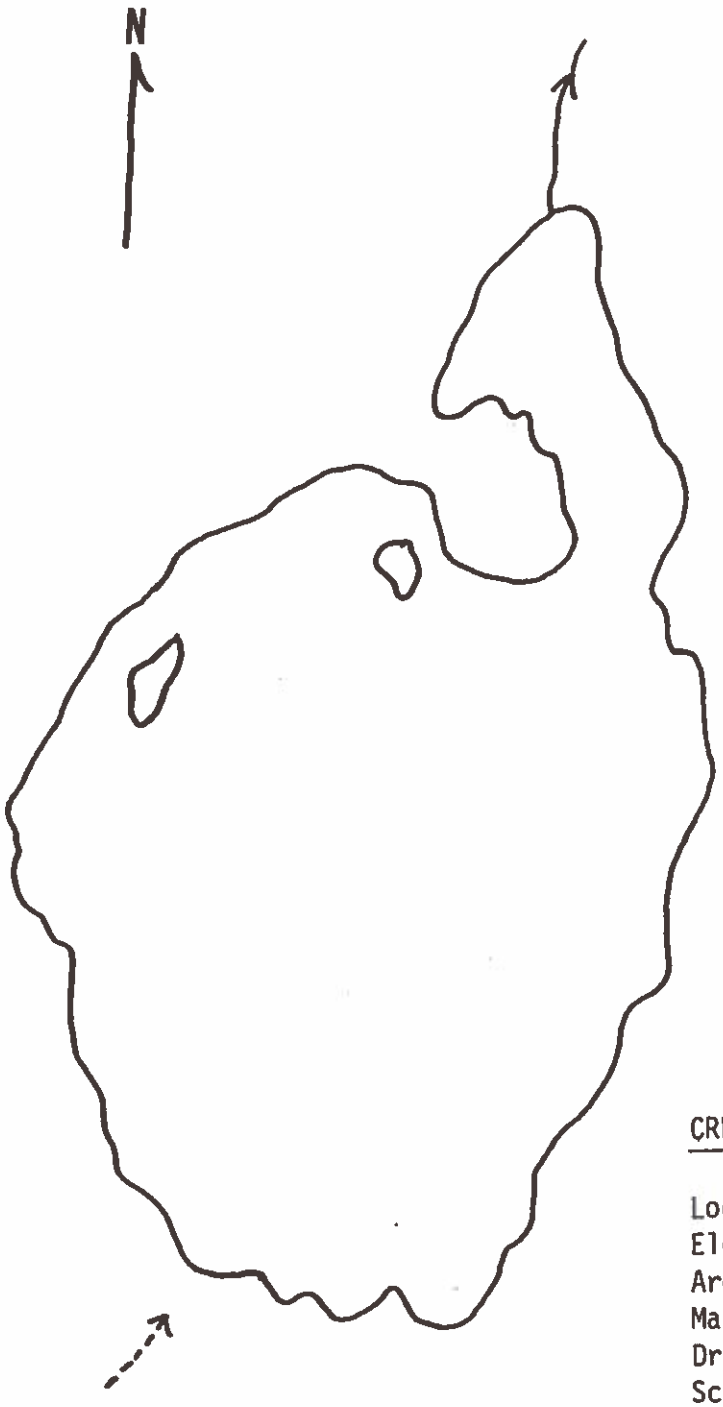
Planting History

Year	Species	Number	Size
1946	YCt	12,160	1"
1947	YCt	2,400	Fry
1948	YCt	8,320	2"
1949	YCt	16,600	1"
1976	MYCt	1,513	2"
1979	MYCt	1,000	2"

Description and Fish Population

Crescent Lake is a relatively large (24 acre) alpine lake located at the head of the Canyon Creek drainage. The lake exhibits a maximum depth of 22 feet and its sturcture is composed of about 50 percent littoral zone. Below average specific conductance and bicarbonate alkalinity suggest limited productivity.

Crescent Lake was heavily planted with cutthroat trout in the late 1940's. While no record of a rainbow trout introduction exists, a 1967 sample revealed



CRESCENT LAKE

Location:	T3S R11W S18
Elevation:	8600'
Area:	24 acres
Max. Depth:	22'
Drainage:	Canyon Creek
Scale:	1 in. = 330'

the presence of rainbow X cutthroat hybrid trout aged II, III, IV and older. In 1976 and 1979, Crescent Lake received introductions of McBride Yellowstone cutthroat trout.

The 1983 sample resulted in the capture of eight McBride cutthroat which were age IV fish from the 1979 plant and averaged 13.9 inches in length. Condition was good and near average for Pioneer Lakes. Somewhat perplexing was the presence of three apparently pure rainbow trout in the sample. The rainbow trout were age III and IV fish indicating that some limited reproduction is possible in the outlet stream or near springs along the lake shore.

Crescent Lake supports a relatively popular fishery. The lake is used by a local guest ranch for fishing pack trips and supported an estimated 150 angler-days in 1975-76 (MDFWP data). Fisherman logs reported catch rates as high as 2.8 fish per hour for cutthroat trout averaging 12-13 inches in 1981-82.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave./ Length (in.)	Ave./ Wt.(lbs.)	Condition
1967	Rb X Ct	4.0	8.5 - 15.6	12.3	0.84	35.8
1983	MYCt	8.0	13.0 - 15.1	13.9	0.97	35.4
	Rb	3.0	10.2 - 13.0	11.5	0.52	34.0

Management Suggestions

Crescent Lake should be restocked with McBride Yellowstone cutthroat trout every five years at a rate of 50-100 per acre. While some natural reproduction of rainbow or rainbow X cutthroat trout does occur, it is probably not adequate to sufficiently stock the lake. Furthermore, the McBride cutthroat exhibited a growth rate and average size far superior to the wild trout. Crescent Lake should be re-sampled in four or five years to determine whether the McBride cutthroat can establish a naturally reproducing population.

Gorge Lake (North)

Planting History

Year	Species	Number	Size
1976	MYCt	1,018	2"
1979	MYCt	1,000	2"

Description and Fish Population

The Gorge Lakes are among the highest elevation fisheries in the Pioneer Mountains. Both are located over 9,100 feet in elevation. North Gorge Lake is a relatively small deep body of water located at the head of Gorge Creek. The lake exhibited below average specific conductance (18.9 umhos/cm) and bicarbonate alkalinity (9.74 mg/l) indicative of relatively low productivity.

North Gorge Lake was sampled in 1967 and found to be barren of fish. In 1976 and 1979, McBride Yellowstone cutthroat trout were introduced to establish a fishery.

The 1983 sample revealed that North Gorge Lake currently supports an abundant fishery for McBride cutthroat trout. Age IV fish, probably survivors from the 1979 plant, averaged 13.5 inches and 0.86 lbs.; good growth for the trophic state and elevation of the lake. The survey further revealed that 68% of the sample (13 fish) was composed of age I, II and III fish. The 1967 inventory determined that spawning habitat was lacking in North Gorge Lake. Results from the present study indicate that McBride cutthroat have found suitable spawning habitat, possibly outlet or a short portion in inlet, and are reproducing naturally. Growth of the wild trout is good with age II fish averaging 10.0 inches. No apparent survivors of the 1976 plant were collected.

Fisherman logs from 1979-83 reported catch rates of less than one fish per hour in 1979-80 which increased to 1.7 fish per hour in 1982-83. The reported catch consisted of 12 to 15 inch McBride cutthroat trout.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1967	--	0.0	--	--	--	--
1983	MYCt	19.0	7.2-13.8	11.4	0.58	36.7

Management Suggestions

North Gorge Lake should be re-surveyed in two to three years. It is apparent that McBride cutthroat trout are successfully reproducing in the lake, however, it is not presently known if the natural reproduction will be sufficient to adequately stock the lake in the future. If natural reproduction proves to be sufficient, the lake should be managed as a wild cutthroat trout fishery. If natural reproduction is insufficient to meet harvest demands, the lake should be stocked every 5 years with 50-100 McBride cutthroat trout per acre.

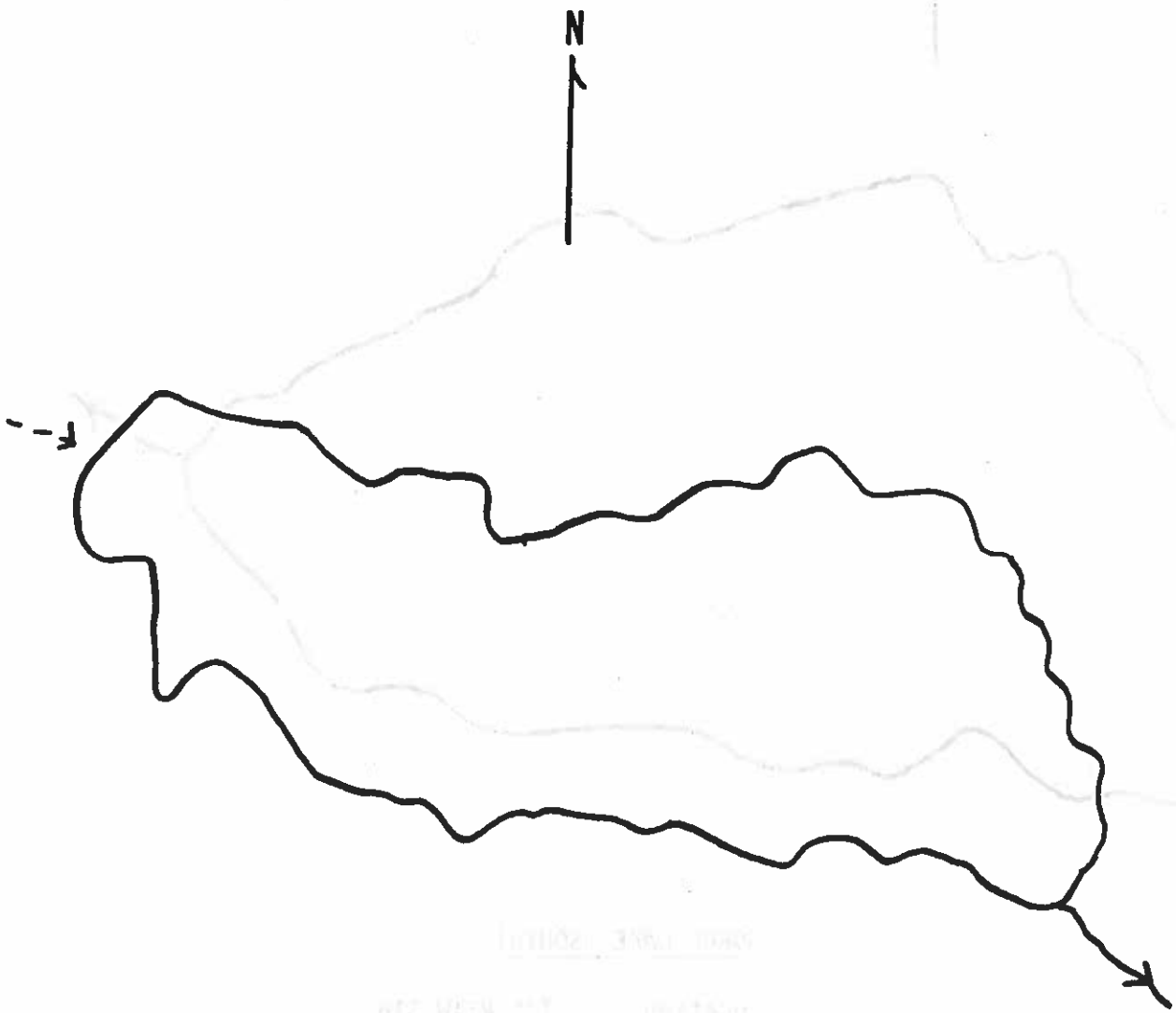
Gorge Lake (South)

Planting History

Year	Species	Number	Size
1976	MYCt	1,018	2"
1979	MYCt	1,000	2"

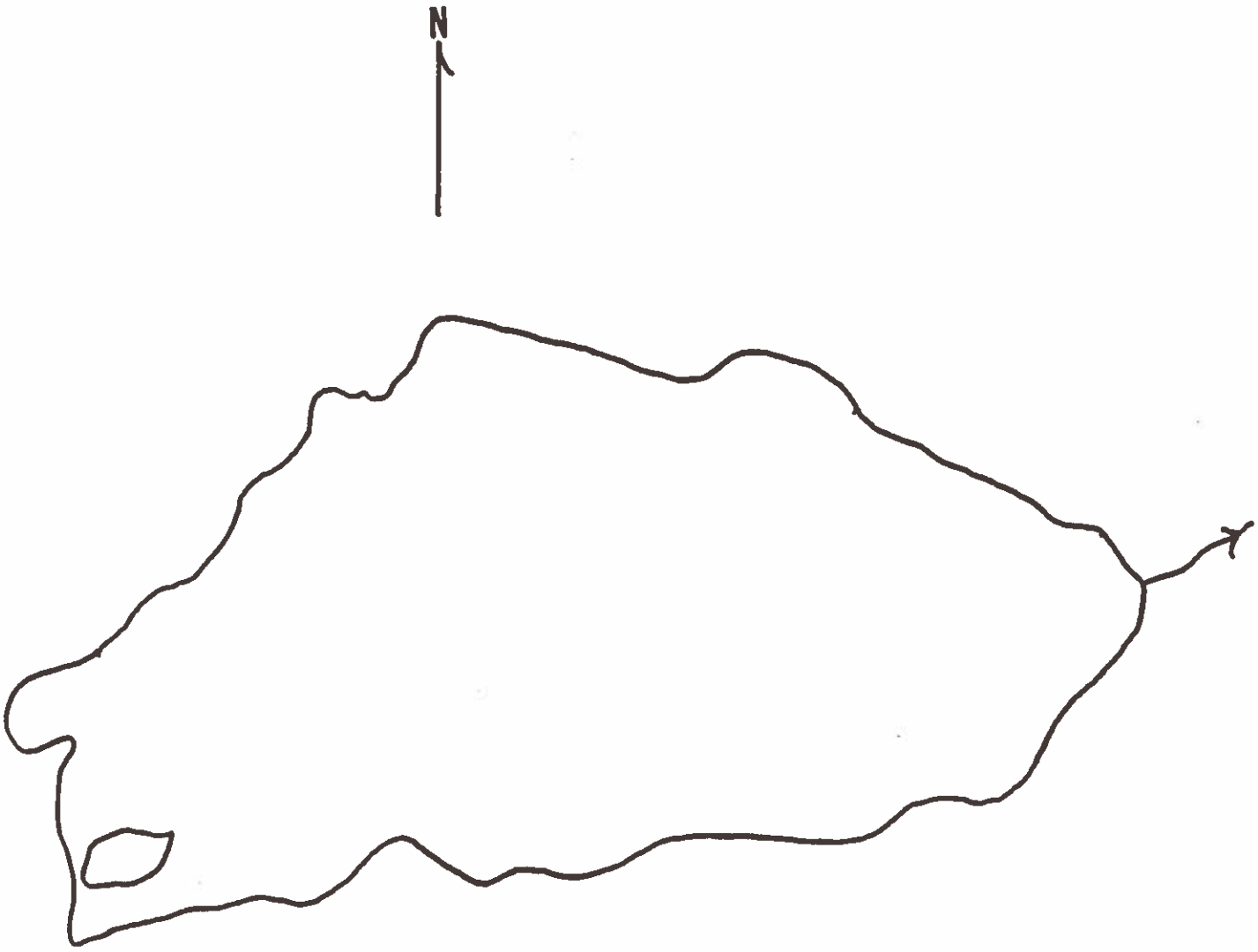
Description and Fish Population

South Gorge Lake represents one of the highest altitude fisheries in the Pioneer Mountains at 9,185 feet. The twelve acre lake is relatively



GORGE LAKE (NORTH)

Location:	T4S R11W S9
Elevation:	9140'
Area:	9 acres
Max. Depth:	30'
Drainage:	Gorge Creek
Scale:	1 in. = 220'



GORGE LAKE (SOUTH)

Location:	T4S R11W S16
Elevation:	9185'
Area:	12 acres
Max. Depth:	43'
Drainage:	Gorge Creek
Scale:	1 in. = 220'

deep (43 ft.) and is located at the head of Gorge Creek. Potential productivity as indicated by specific conductance (12.6 umhos/cm) and bicarbonate alkalinity (6.50 mg/l) is low; classifying South Gorge Lake as one of the most oligotrophic in the Pioneer Mountains.

South Gorge Lake was surveyed in 1967 and found to be barren. The study further indicated that suitable trout spawning habitat was lacking. In 1976 and 1979, South Gorge Lake was planted with McBride Yellowstone cutthroat trout.

The 1983 survey revealed that the McBride cutthroat have established an abundant population in South Gorge Lake. Age III fish, probably -urvivors from the 1979 plant, averaged 13.8 inches and 0.96 lbs. Fish condition was average for Pioneer lakes which was somewhat surprising in the absence of much chemical enrichment. As was the case in North Gorge, McBride cutthroat have reproduced naturally in South Gorge Lake. Fifty-three percent (nine fish) of the 1983 sample was composed of wild progeny (ages I, II and III) from the McBride cutthroat introductions. These wild progeny exhibited good growth with age II fish averaging 9.4 inches. No apparent survivors of the 1976 plant were collected.

Fisherman Logs from 1980-82 report catch rates ranging from 0.5 fish per hour in 1980 to 1.7 fish per hour in 1982. McBride cutthroat averaging 12 to 14 inches comprised the catch.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1967	--	0.0	--	--	--	--
1983	MYCt	17.0	6.2 - 14.3	11.2	0.62	37.6

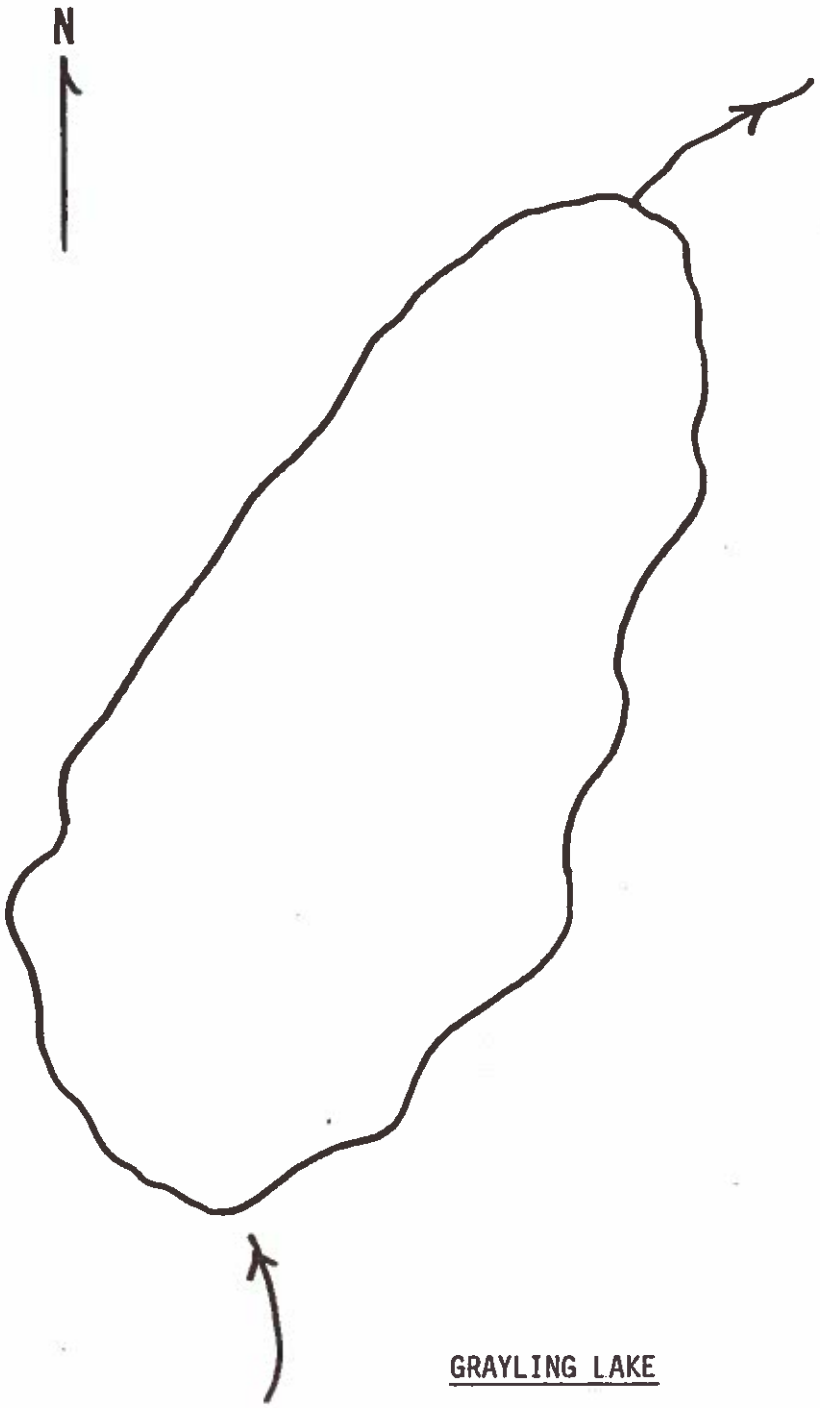
Management Suggestions

South Gorge Lake should be re-surveyed in two to three years. It is apparent that the McBride cutthroat trout are successfully reproducing in the lake, however it is not presently known if the natural reproduction will be sufficient to adequately stock the lake in the future. If natural reproduction proves to be sufficient, the lake should be managed as a wild cutthroat trout fishery. If natural reproduction is insufficient to meet harvest demands, the lake should be stocked every five years with 50-100 McBride cutthroat trout per acre.

Grayling Lake

Planting History

Year	Species	Number	Size
1942	Gr	100,000	Fry
	Gr	420	4"
1950	Gr	100,000	Fry



GRAYLING LAKE

Location:	T3S R11W S17
Elevation:	8700'
Area:	18 acres
Max. Depth:	33'
Drainage:	Lion Creek
Scale:	1 in. = 220'

Description and Fish Population

Grayling Lake, located in the Lion Creek drainage, has a surface area of 18 acres and a maximum depth of 33 feet. The lake exhibits a specific conductance of 36.1 umhos/cm and bicarbonate alkalinity of 20.8 mg/l, both well above average for Pioneer lakes and indicative of relatively high potential productivity.

Grayling Lake was rated as having substantial grayling habitat and adequate grayling spawning habitat. Planting records show that arctic grayling were introduced to the lake in 1942 and re-stocked in 1950. No arctic grayling have been collected in subsequent samples.

Although no record of cutthroat or rainbow trout plants exist for Grayling Lake, a 1967 sample yielded rainbow, rainbow X cutthroat hybrid and Yellowstone cutthroat trout. It is probable that Grayling Lake was stocked with these species by downstream drift from Lion Lake (see Lion Lake) and has since established naturally reproducing populations.

The 1983 sample resulted in the capture of 30 trout, 25 of which appeared to be pure rainbow trout averaging 9.0 inches in length. Scale analysis revealed a good age distribution, ages I through IV and older present, indicative of adequate natural reproduction. Rainbow trout condition was below average for Pioneer Lakes and growth was relatively slow e.g., age I = 6.1 in., age II = 7.0 in., age III = 9.0 in. and age IV and older = 10.8 in.

Grayling Lake supported an estimated 186 angler-days of fishing pressure in 1975-76 (MDFWP data). Fisherman logs from 1975-81 reported exceptional catch rates of 2.3 to 6.0 fish per hour.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Ave. Condition
1967	Rb	7.0	8.6 - 12.1	10.0	0.28	27.6
	YCt	5.0	9.3 - 12.6	10.5	0.37	31.6
	Rb X Ct	11.0	7.3 - 12.2	9.5	0.28	29.7
1983	Rb	25.0	6.0 - 12.9	9.0	0.28	34.7
	Rb X Ct	5.0	8.1 - 12.2	10.5	0.38	31.8

Management Suggestions

Grayling Lake should be managed as a wild trout fishery. Reproduction is adequate to stock the lake. Data suggest that reproductive success may be limiting rainbow trout growth and average size in a relatively productive environment. Increased harvest in Grayling Lake could provide a better balance between reproduction and standing crop resulting in faster growth rates and larger average size in the population.

Lake Abundance

Planting History

Year	Species	Number	Size
1948	YCt	8,320	2"
1980*	MYCt	2,000	2"
1981	MYCt	2,015	2"

Description and Fish Population

Lake Abundance is a relatively small (7 acre) but deep (35 ft) lake located in the upper Canyon Creek drainage. Abundance exhibited the lowest specific conductance (11.0 umhos/cm) and bicarbonate alkalinity (4.5 mg/1) observed in 24 Pioneer Lakes. Spawning habitat appears inadequate or extremely limited at both outlet and inlet.

While no record of a rainbow trout introduction exists for Lake Abundance, a 1967 sample captured three rainbow X cutthroat hybrid trout ages II through IV. In 1980 an attempt was made to plant McBride Yellowstone cutthroat trout in the lake, however, this plant apparently did reach Lake Abundance. A successful introduction of McBride cutthroat was made in 1981.

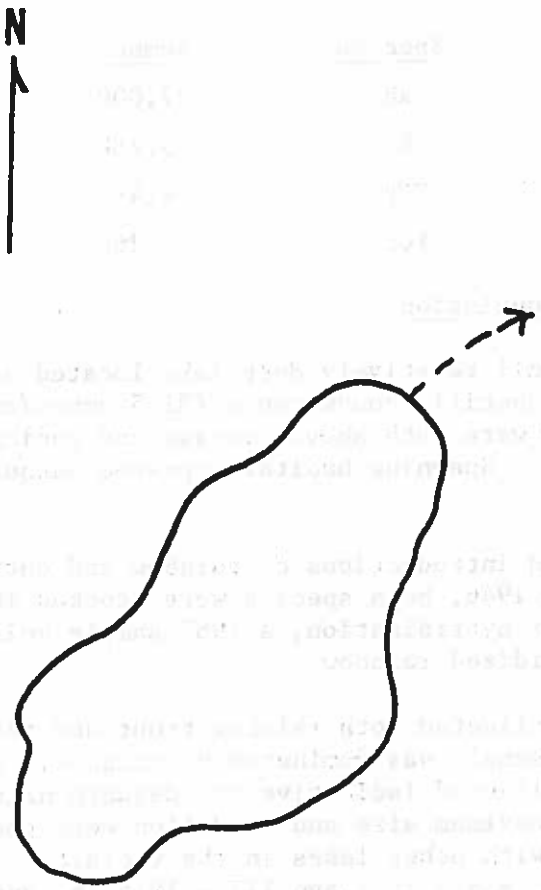
The 1983 sample consisted entirely of McBride cutthroat from the 1981 plant. These age II fish averaged 9.3 inches and one-fourth pound. Trout condition was well below average for Pioneer Lakes. While cutthroat trout growth in Lake Abundance is slow, it is comparable to many other lakes in the area and probably reflective of the low productivity of the water.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave./ Length (in.)	Ave./ Wt. (lbs.)	Condition
1967	Rb X Ct	3.0	10.1 - 15.4	12.8	0.75	34.3
1983	MYCt	7.0	9.0 - 9.7	9.3	0.25	31.4

Management Suggestions

Lake Abundance should be stocked with McBride Yellowstone cutthroat trout every five years at a rate of 50-100 per acre. Care must be taken, owing to the low productivity of the lake, to avoid overstocking. The lake should be re-surveyed in five years to evaluate gorwth rate and average size relative to the numbers of fish planted.



LAKE ABUNDANCE

Location:	T3S R11W S7
Elevation:	8600'
Area:	7 acres
Max. Depth:	35'
Drainage:	Canyon Creek
Scale:	1 in. = 220'

Lion Lake

Planting History

Year	Species	Number	Size
1934	Rb	27,000	Fry
1946	Rb	5,280	2"
	YCt	4,480	1"
1949	YCt	7,260	1"

Description and Fish Population

Lion Lake is a small relatively deep lake located at the head of the Lion Creek drainage. Specific conductance (31.5 umhos/cm) and bicarbonate alkalinity (19.7 mg/l) were both above average and indicative of a relatively productive environment. Spawning habitat appeared adequate in both inlet and outlet streams.

Lion Lake received introductions of rainbow and cutthroat trout in the 1930's and 1940's. In 1946, both species were stocked in the lake. Despite this high potential for hybridization, a 1967 sample collected trout which apparently were unhybridized rainbow.

The 1983 sample collected both rainbow trout and rainbow X cutthroat hybrids, however, the sample was dominated by rainbow. Rainbow trout of all age groups were collected indicative of adequate natural reproduction. Rainbow trout growth, maximum size and condition were good, although not exceptional, compared with other lakes in the vicinity. Age I fish averaged 5.4 inches while age II = 8.2 in., age III = 10.5 in. and the age IV and older fish averaged 13.9 inches. The relatively slow growth of the age I fish compared to the other age groups may be due to late spawning dates at high altitude.

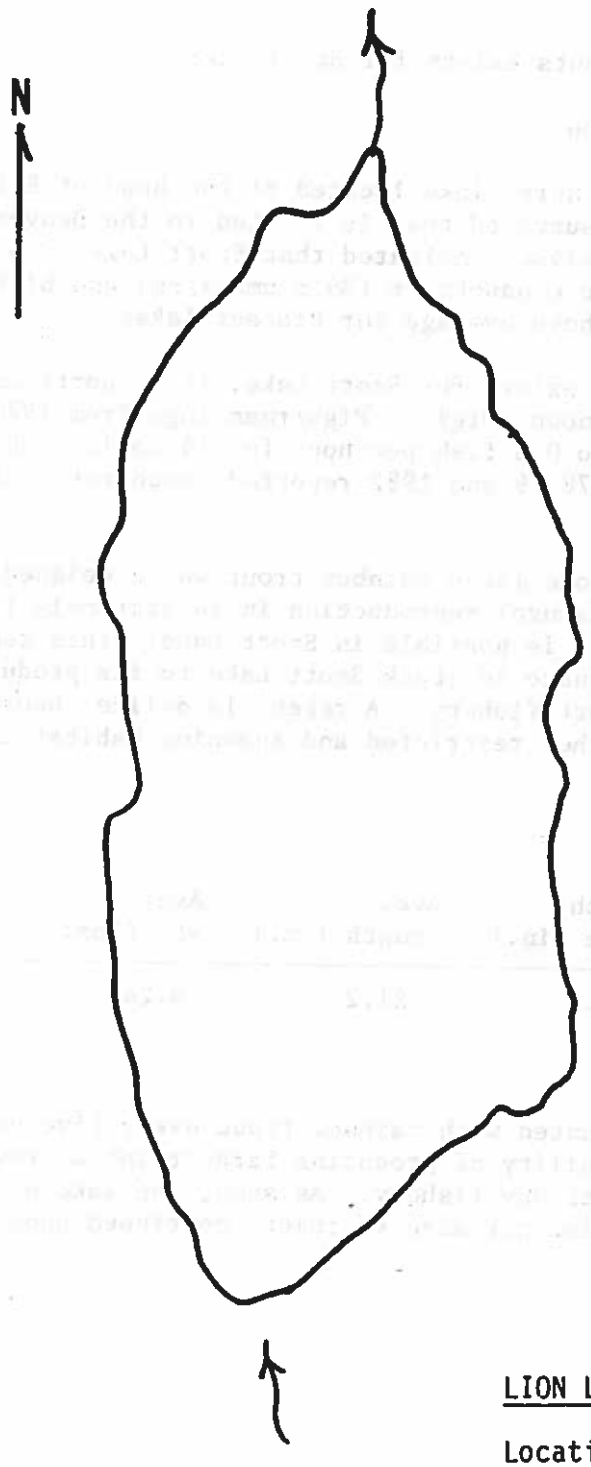
Fisherman logs in 1975 and 1980 reported good catch rates of 1.3-3.0 fish per hour. The reported catch consisted of fish averaging 10.5-11.0 inches in length.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1967	Rb	4.0	10.2 - 14.4	12.3	0.64	34.2
1983	Rb	17.0	5.1 - 14.7	10.3	0.50	38.7
	Rb X Ct	2.0	7.9 - 15.5	11.7	0.79	38.8

Management Suggestions

Lion Lake should be managed as a wild rainbow trout fishery. Natural reproduction is adequate to stock the lake at current harvest levels. The population exhibited good growth and condition and appeared to maintain a good balance between recruitment and mortality.



LION LAKE

Location:	T3S R11W S17
Elevation:	8840'
Area:	10 acres
Max. Depth:	32'
Drainage:	Lion Creek
Scale:	1 in. = 220'

Scott Lake

Planting History

No record of any fish plants exists for Scott Lake.

Description and Fish Population

Scott Lake is a small (8 acre) lake located at the head of Estler Creek. It was the only Pioneer Lake surveyed that is located in the Beaverhead River drainage. Water chemistry analyses indicated that Scott Lake is a relatively productive water with specific conductance (39.8 umhos/cm) and bicarbonate alkalinity (22.1 mg/l) well above average for Pioneer lakes.

While no planting record exists for Scott Lake, it supports low numbers of large rainbow trout of unknown origin. Fisherman logs from 1971-73 reported catch rates of 0.2 to 0.3 fish per hour for 14 to 16 inch rainbow trout. Log summaries from 1978-79 and 1982 reported catch rates of 0.0 fish per hour.

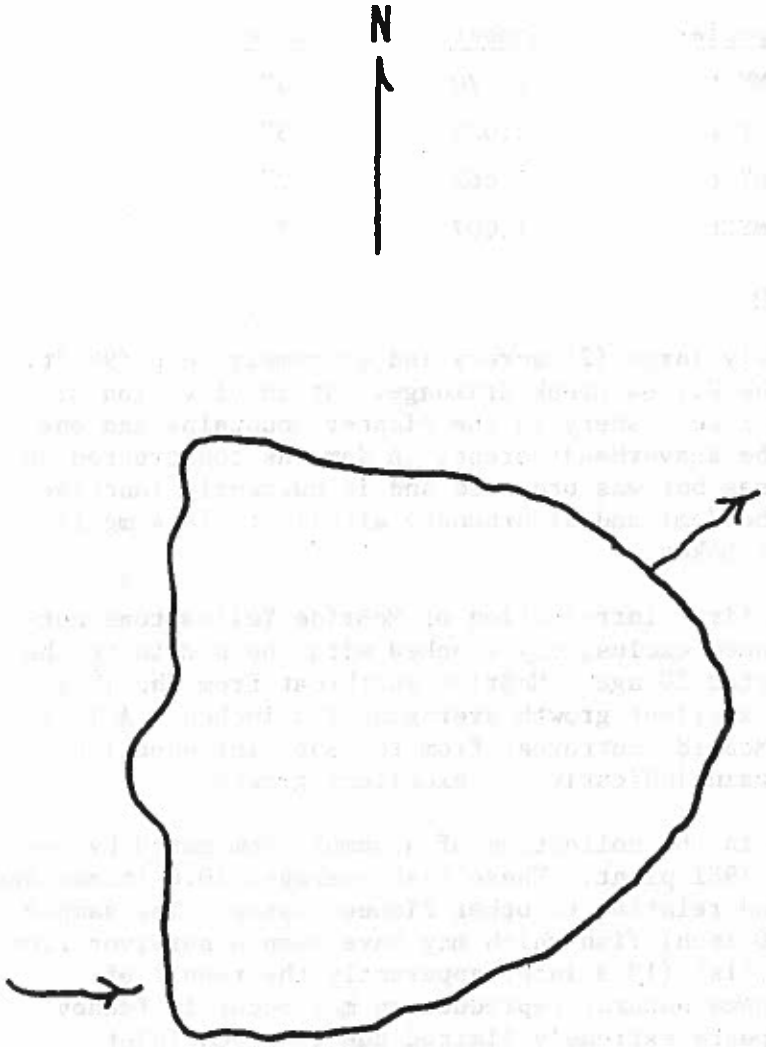
The 1983 survey yielded one large rainbow trout which weighed nearly 4¼ pounds. Apparently some natural reproduction in an extremely limited portion of the inlet or outlet is possible in Scott Lake. This reproduction, however, does not appear adequate to stock Scott Lake to its productive potential or to support a sport fishery. A recent landslide observed during the 1983 survey may have further restricted and spawning habitat in the inlet stream.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1983	Rb	1.0	21.2	21.2	4.24	44.5

Management Suggestions

Scott Lake should be planted with rainbow trout every five years. Due to its productivity and capability of producing large rainbow trout, Scott Lake should be managed as a trophy fishery. As such, the lake should be stocked at a rate of 50-60 fish per acre to insure continued good growth and avoid overcrowding.



SCOTT LAKE

Location:	T5S R11W S30
Elevation:	8700'
Area:	8 acres
Max. Depth:	Unknown
Drainage:	Estler Creek
Scale:	1 in. = 220'

Tendoy Lake

Planting History

Year	Species	Number	Size
1968	MYCt	2,120	3"
1971	MYCt	2,028	3"
1976	MYCt	2,062	2"
1981	MYCt	1,007	2"

Description and Fish Population

Tendoy Lake is a relatively large (21 acres) and extremely deep (98 ft.) lake located at the head of the Willow Creek drainage. At an elevation of 9,240 feet, it is the highest lake fishery in the Pioneer Mountains and one of the highest fisheries on the Beaverhead Forest. A dam was constructed on the lake for irrigation pruposes but was breached and is currently inactive. Specific conductance (16.0 umhos/cm) and bicarbonate alkalinity (8.4 mg/l) were below average for Pioneer Lakes.

Tendoy Lake received its first introduction of McBride Yellowstone cutthroat trout in 1968 and has been exclusively stocked with the strain to the present. A 1972 survey collected 20 age I McBride cutthroat from the 1971 plant. These fish exhibited excellent growth averaging 9.2 inches. A 1971 creel check revealed age III McBride cutthroat from the 1968 introduction which averaged 14.4 inches, again indicative of excellent growth.

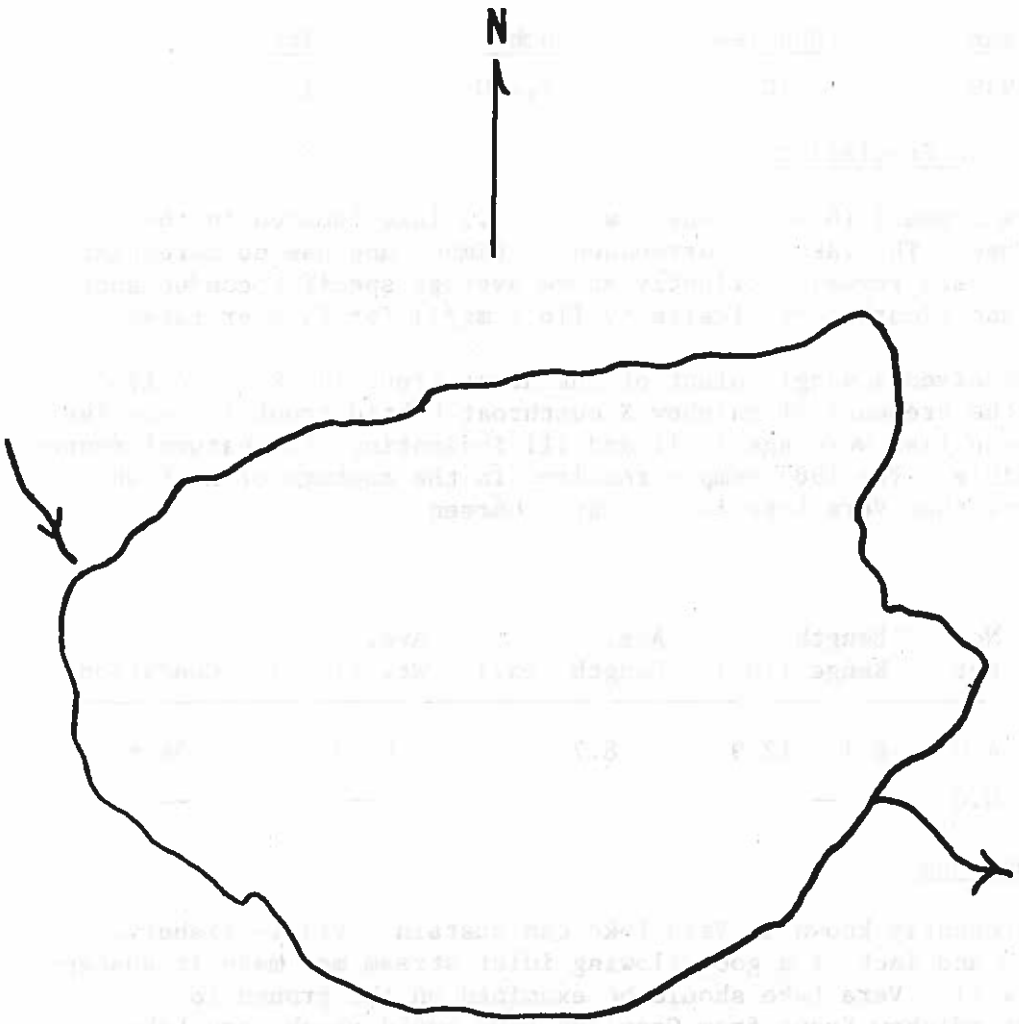
The 1983 survey resulted in the collection of a sample dominated by age II McBride cutthroat from the 1981 plant. These fish averaged 10.0 inches and were in above average condition relative to other Pioneer Lakes. The sample also contained one large (16.6 inch) fish which may have been a survivor from the 1976 plant and an age III fish (13.9 inch) apparently the result of natural reproduction. While some natural reproduction may occur in Tendoy Lake, the spawning habitat appears extremely limited due to steep inlet gradient. Natural reporduction does not appear adequate to sustain the fishery.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1972	MYCt	10.0	7.0 - 10.7	9.2	0.28	34.4
1983	MYCt	12.0	8.6 - 16.6	10.9	0.59	40.2

Management Suggestions

Tendoy Lake should be planted with McBride Yellowstone cutthroat trout every five years at a rate of 50-100 per acre. The lake should provide excellent fishing in 1985.



TENDOY LAKE

Location:	T4S R11W S4
Elevation:	9240'
Area:	21 acres
Max. Depth:	98'
Drainage:	Willow Creek
Scale:	1 in. = 330'

Vera Lake

Planting History

Year	Species	Number	Size
1949	YCt	7,260	1"

Description and Fish Population

Vera Lake is a small (5 acre) shallow (10 ft.) lake located in the Lion Creek drainage. The lake is surrounded by timber and has no perennial inlet. Water analysis revealed slightly above average specific conductance (25.3 umhos/cm) and bicarbonate alkalinity (16.2 mg/1) for Pioneer Lakes.

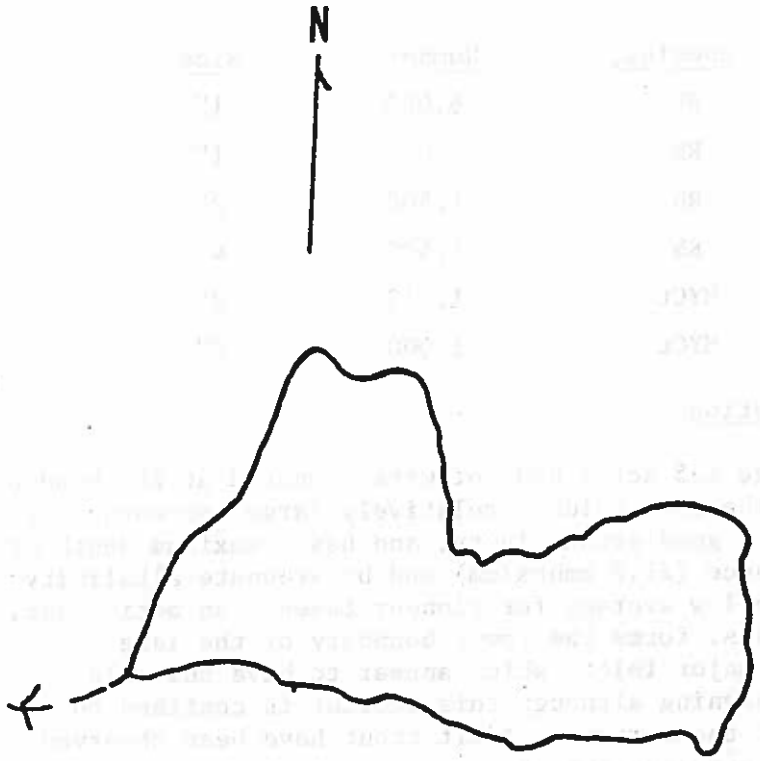
Vera Lake received a single plant of cutthroat trout in 1949. A 1967 sample revealed the presence of rainbow X cutthroat hybrid trout in relatively low numbers. These fish were age I, II and III indicating that natural reproduction was possible. The 1983 sample resulted in the capture of no fish which may indicate that Vera Lake is presently barren.

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Condition
1967	Rb X Ct	4.0	6.1 - 12.9	8.7	0.33	36.6
1983	--	0.0	--	--	---	--

Management Suggestions

It is not presently known if Vera Lake can sustain a viable fishery. Its shallow depth and lack of a good flowing inlet stream may make it susceptible to winter kill. Vera Lake should be examined on the ground to ascertain whether rainbow trout from Grayling Lake could reach Vera Lake via outlet streams. If this is possible, Vera Lake should be stocked on a trial basis with rainbow trout at a rate of 50 per acre. If a barrier exists between Grayling and Vera Lakes, then Vera Lake should be stocked with McBride cutthroat trout, on a trial basis, at a rate of 50 per acre. If either species is planted, immediate followup sampling should occur in two-three years to ascertain the success or failure of the introduction. If such a plant fails, Vera Lake should be abandoned as a fishery.



VERA LAKE

Location:	T3S R11W S16
Elevation:	8700'
Area:	5 acres
Max. Depth:	10'
Drainage:	Lion Creek
Scale:	1 in. = 220'

Waukena Lake

Planting History

Year	Species	Number	Size
1959	Rb	6,000	1"
1960	Rb	6,000	1"
1963	Rb	1,500	2"
1965	Rb	1,500	4"
1976	MYCt	1,513	2"
1979	MYCt	1,000	2"

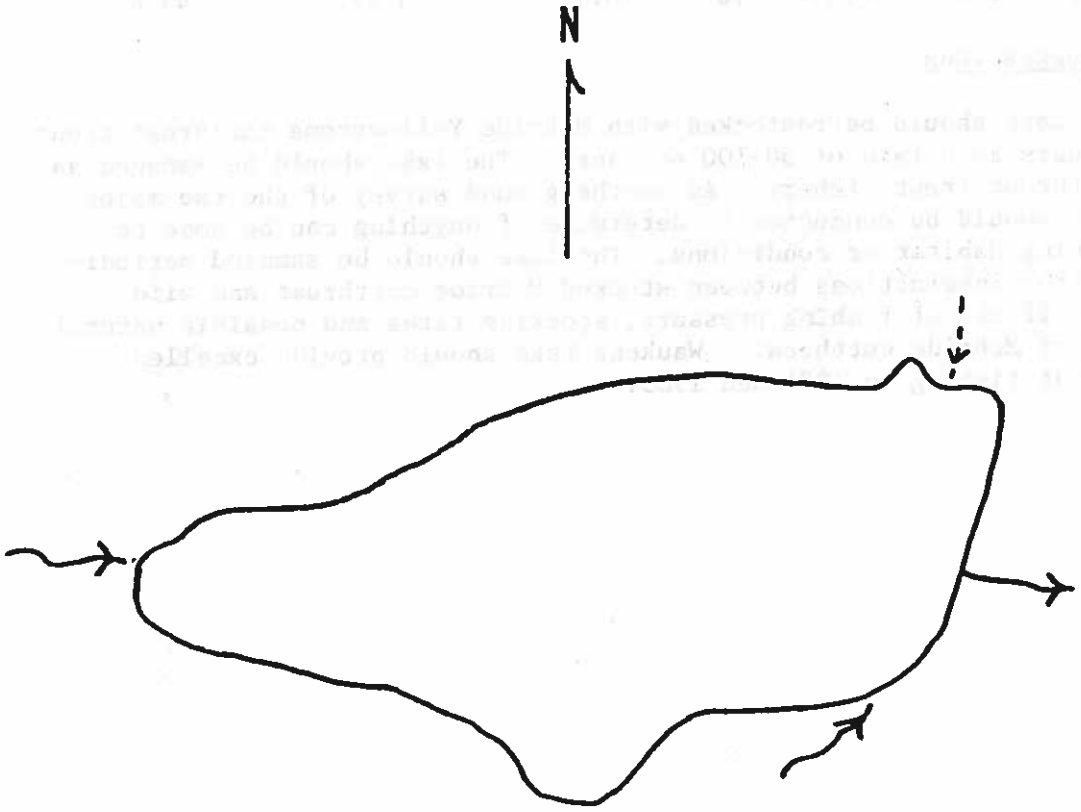
Description and Fish Population

Waukena Lake is a large (35 acre) body of water located at the head of the Rock Creek drainage. The lake holds a relatively large percentage of littoral zone, indicative of good productivity, and has a maximum depth of 35 feet. Specific conductance (21.8 umhos/cm) and bicarbonate alkalinity (12.3 mg/l) were slightly below average for Pioneer Lakes. An active dam, built for irrigation purposes, forms the lower boundary of the lake. Waukena Lake is fed by two major inlets which appear to have suitable gravels and gradient for spawning although this habitat is confined to relatively short reaches of the streams. Adult trout have been observed in both streams during the spawning season.

Waukena Lake was sampled in 1958 and found to be barren of fish. In the period spanning 1959-1965, Waukena Lake was stocked with rainbow trout. In 1976 and 1979, the lake received introductions of McBride Yellowstone cutthroat trout. It is interesting to note that a 1972 sample, prior to the introduction of cutthroat trout, collected a single 16.1 inch fish identified as a cutthroat.

The 1983 survey documented the survival and growth of McBride cutthroat in Waukena Lake. Four McBride cutthroat from the 1979 plant were captured. These fish exhibited excellent growth averaging 16.2 inches and nearly two pounds at age IV. Condition of the fish was superior ranking among the highest observed in Pioneer Lakes. The sample also contained two rainbow X cutthroat hybrids age I and II, indicative that some natural reproduction occurs in Waukena Lake.

Waukena Lake supports a popular sport fishery with frequent reports of catches of trophy trout. Fisherman Logs for 1966 and 1980 reported catch rates as high as 1.0 fish per hour for McBride cutthroat averaging 15.8 inches and rainbow trout averaging 12.0 inches.



WAUKENA LAKE

Location:	T3S R11W S22
Elevation:	8666'
Area:	35 acres
Max. Depth:	35'
Drainage:	Rock Creek
Scale:	1 in. = 500'

Sampling History

Year	Species	No./ Net	Length Range (in.)	Ave. Length (in.)	Ave. Wt. (lbs.)	Ave. Condition
1958	--	0.0	--	--	--	--
1972	Ct	1.0	16.1	16.1	1.74	41.7
1983	MYCt	4.0	15.0 - 17.1	16.2	1.94	45.5
	Rb X Ct	2.0	6.3 - 13.8	10.1	0.57	43.4

Management Suggestions

Waukena Lake should be restocked with McBride Yellowstone cutthroat trout every five years at a rate of 50-100 per acre. The lake should be managed as a trophy cutthroat trout fishery. An on-the-ground survey of the two major inlet streams should be conducted to determine if anything can be done to improve spawning habitat or conditions. The lake should be sampled periodically to monitor interactions between stocked McBride cutthroat and wild populations, effects of fishing pressure, stocking rates and possible natural reproduction of McBride cutthroat. Waukena Lake should provide excellent cutthroat trout fishing in 1984 and 1985.

LITERATURE CITED

McMullin, S. L. 1983. Wise River District Mountain Lake Survey, 1982. USFS Rpt., Bvhd. Nat. Forest. 31 pp.

Wells, J. D. 1982. West Big Hole Mountain Lake Survey, 1981. USFS Rpt. Bvhd. Nat. Forest. 44 pp.

USFS, 1982. Beaverhead National Forest Proposed Land Management Plan. USDA, USFS, Bvhd. Nat. Forest. 216 pp.

Interagency Lake Database

Water Codes

Canyon Lake	3-02-7550	Lion Lake	3-02-8400
Crescent Lake	3-02-7663	Scott Lake	3-01-9500
Gorge Lake (North)	3-02-7915	Tendoy Lake	3-02-9575
Gorge Lake (South)	3-02-7916	Vera Lake	3-02-9550
Grayling Lake	3-02-7975	Waukena Lake	3-02-9625
Lake Abundance	3-02-7100		