

AQUATIC INVENTORIES OF THREE MOUNTAIN LAKES IN NORTH-CENTRAL IDAHO



by

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**Aquatic Inventories of Three Mountain Lakes
in North-Central Idaho**

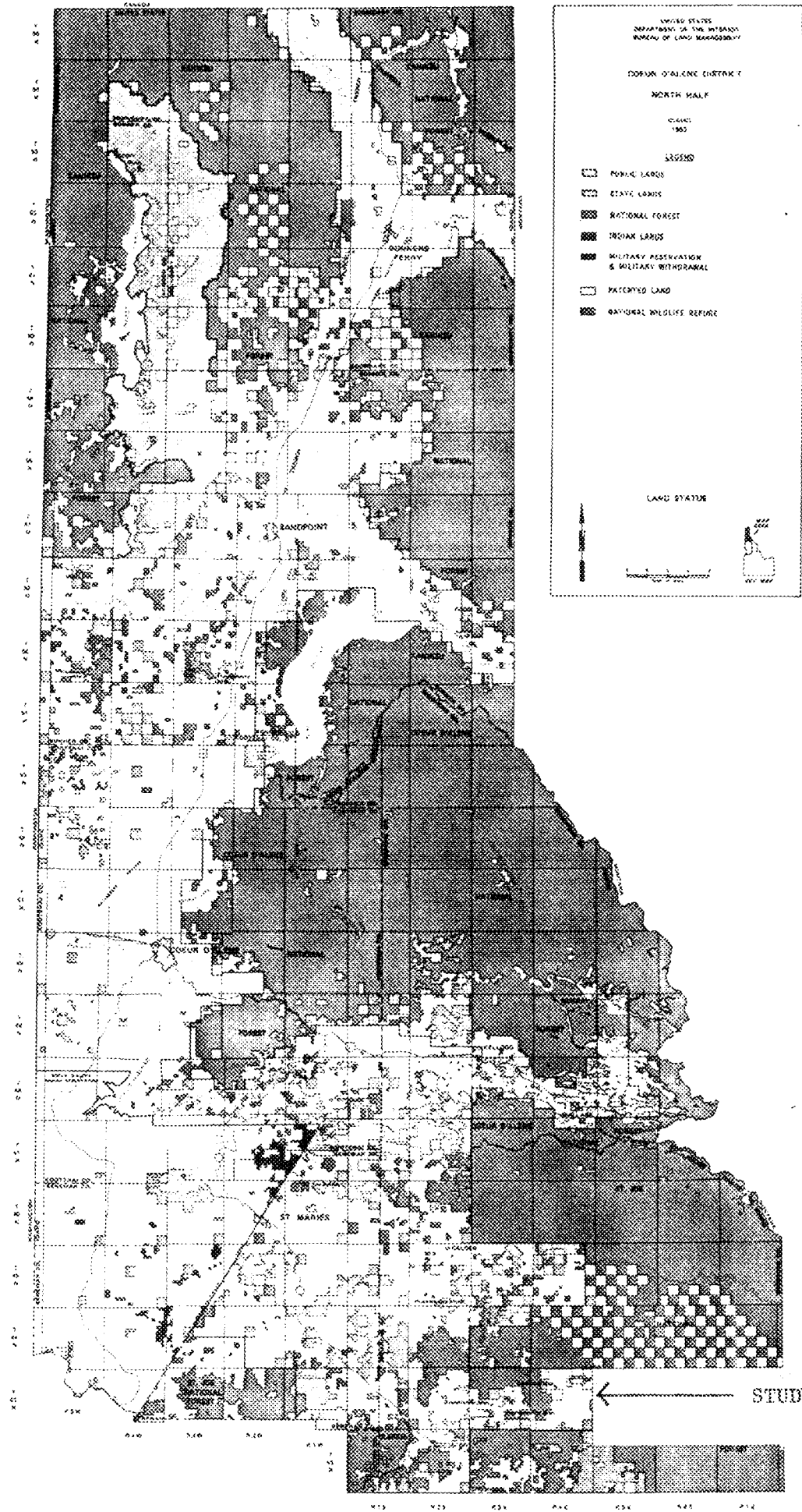
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Abstract.-Aquatic inventories were conducted on three small, shallow, high mountain, cirque lakes located on lands managed by the Bureau of Land Management, Coeur d'Alene District Office. The lakes are in the Widow Mountain Quadrangle of north-central Idaho. Crater Lake contains grayling, Fish Lake contains westslope cutthroat trout, and Little Lost Lake contains no fish. The lakes are similar by being slightly acidic, low on conductivity and alkalinities, slowly filling from erosion from steep slopes, having low diversity of zooplankton and aquatic insects, and have limited human use. Only Fish Lake has spawning tributaries with sustained fish production.

Key Words: aquatic inventories, mountain lakes, grayling, westslope cutthroat trout, north-central Idaho.

Raleigh, R.F. 1992. Aquatic inventories of three mountain lakes in north-central Idaho. Bureau of Land Management, Technical Bulletin 92-2, Boise, Idaho.



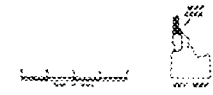
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DOONUN SHALENE DISTRICT
NORTH HALF

1983

- LEGEND
- PUBLIC LANDS
 - STATE LANDS
 - NATIONAL FOREST
 - INJAKI LANDS
 - MILITARY RESERVATION & MILITARY WITHDRAWAL
 - PATENTED LAND
 - NATIONAL WILDLIFE REFUGE

LAND 274336



← STUDY AREA

MOUNTAIN LAKE AQUATIC INVENTORY

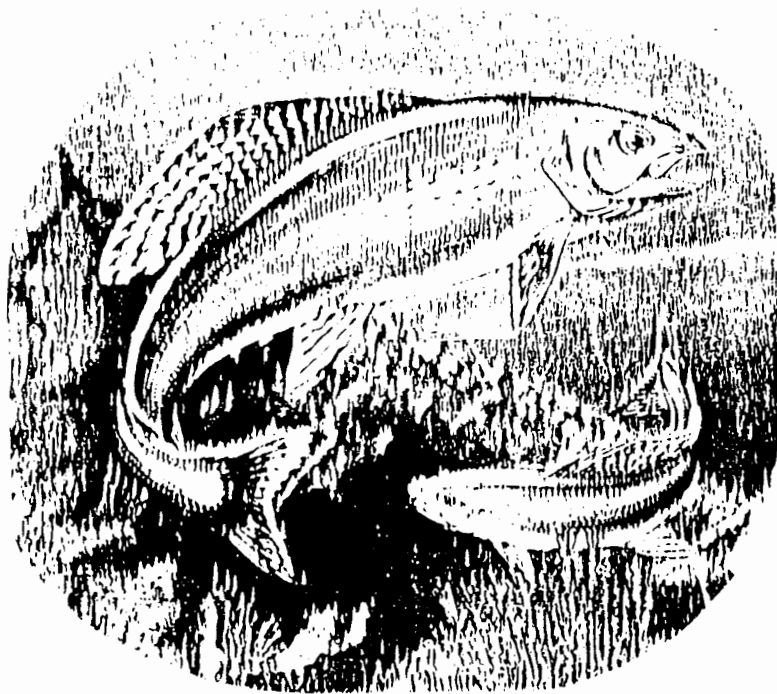
BUREAU OF LAND MANAGEMENT

Contract #D060C20003

August 1992

CRATER LAKE

Widow Mountain Quadrangle, Idaho



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RH: Inventory of Crater Lake (Contract #D060C20003). Raleigh

PHYSICAL, CHEMICAL, AND BIOLOGICAL INVENTORY OF CRATER LAKE,
SHOSHONE COUNTY, IDAHO.

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ID. 83612

ABSTRACT: Crater Lake is a small, shallow, high mountain, cirque lake located in north central Idaho. The lake was stocked with cutthroat trout fry (Onchorhynchus clarki) in 1969 and 1973. Since 1975, only grayling (Thymallus arcticus) have been stocked. At present, Crater Lake contains a moderate sized population of grayling. Cutthroat trout are no longer present in the lake. The grayling population appears to be from the last two stockings in 1988 and 1990. Usable spawning habitat is absent from the lake system. Aquatic insects and #10 net zooplankton are limited in diversity. The lake water is slightly acidic with low conductivity and alkalinities. The lake is slowly filling from erosion of the steep mountain slopes and warming due to shallow depth and a dark silt bottom. Human activity around the lake appears to be light.

INTRODUCTION

A variety of laws, Executive Orders, and policy statements require the Bureau of Land Management (BLM) to manage fisheries and associated aquatic resources on a sustained yield basis within a multiple-use framework, without loss of habitat capability, and with special attention to aquatic resources with unique values. A basic knowledge of the character and extent of the aquatic resources is required in order to meet the requirements of this mandate. Basic information needed to guide management policy direction is obtained by inventorying each aquatic resource and incorporating the data base into Resource Management Plans (RMP). These RMPs are used to prescribe general management practices and land use decisions that may affect the management and well-being of the aquatic resources. More detailed site specific Habitat Management Plans (HMP) are prepared from the data base as needed to protect unique aquatic resources.

The objectives of this study were to provide the BLM with:

1. An inventory of the aquatic resources and level of use of Crater Lake;
2. Information on the existing fish habitat condition, species composition, relative abundance, size classes, and condition of fishes in the lake; and
3. Recommendations for the future management of lands surrounding the aquatic resources.

Crater Lake is a small, high mountain, cirque lake located in a wilderness study area east of Clarkia, Shoshone County, Idaho in Township 43N., Range 4E., Section 29.

METHODS

The study methods follow those outlined in "Preliminary Report Of A Survey Methodology For High Mountain Lakes" (Bahls, 1989). The variables measured are categorized as pertaining to the fish species and their habitat with habitat data referring to the physical, chemical, and biological characteristics of the lake, the lake outlet stream in the near vicinity of the lake, and lake tributaries. The impacts of human and animal uses of the lake area are also documented. The variables measured during the survey are as follows.

Habitat Data Collected

Physical.--Lake surface area (hectares) was estimated at the lake and checked by use of a modified acreage grid and map.

Deep (>6m) and shallow (<6m) areas (% of lake surface area) were determined by depth soundings along lake transect lines.

Maximum depth was determined from depth soundings.

Lake elevation was obtained from a contour map.

Lake exposure direction was obtained from a map.

Shoreline development ratio was obtained by observation.

Geomorphic lake type was determined from field observation.

Watershed area was measured using a modified acreage grid and a contour map.

Percent substrate composition from shore to the three meter depth contour interval was determined by observations at the

lake, by use of a modified acreage grid, and a lake contour map developed from depth soundings.

Littoral zone substrate sediment type (color and texture) was determined by field observations and hand texture sampling.

Potential spawning areas (in lake, lake tributaries and outlet) was estimated by walking the lake shore and making ocular estimates of the square meters of potential spawning substrate within the lake, along the lake outlet, and along all tributaries with a sufficient estimated water depth to permit spawning during spring flows. Substrate from coarse sand to gravel ≤ 7.5 mm in size was considered usable spawning substrate. I selected a 7.5 mm maximum gravel size because all fishes observed were < 25 cm in length.

Average bankfull width, wetted perimeter width, and depth of streams were measured across the high water mark and across the wetted perimeter along each potential spawning tributary.

Average stream gradient was estimated in percentage.

Dominant stream substrate was from ocular estimates as the streams were surveyed by walking.

Fish access length was estimated by pacing the distance from the lake to a fish barrier, or absence of spawning habitat.

Barrier type was classified by observation.

Minor inlet streams, springs, and seeps were marked on a rough drawing of the lake as the shoreline was walked. All water sources were later placed on a scale drawing of the lake.

Air and surface water temperatures were taken with a hand held thermometer with the time of day noted.

Deep water temperature was measured from water collected by sampling bottle near the lake bottom. The temperatures were read immediately after reaching the surface.

Chemical.--Shoreline, shallow, and deep water pH were measured with an Oakton water test kit with a rated accuracy of ± 0.1 from water collected by sampling bottle: 1. about 1 m from the shoreline at a depth of about 0.5 m; 2. from about 1.5 m deep; and 3. from water collected near the bottom of the deepest part of the lake. The Oakton test equipment was calibrated for pH just prior to sampling the lake.

Shoreline, shallow, and deep water conductivities were measured with an Oakton water test kit with a rated accuracy of ± 1 mV from samples of water collected at the same locations as the pH tests. The Oakton water test kit was recalibrated for conductivity just prior to sampling the lake.

Shallow and deep water alkalinities were titrated with 0.5N H₂SO₄ from the same water samples collected for pH tests. I measured phenolphthalein and methyl orange alkalinities.

Biological Data Collected

Flora.--Aquatic vascular macrophytes were from ocular estimates of the relative abundance (rare, common, or abundant) of each type during the shoreline survey.

Sedges were determined as above.

Terrestrial lakeshore vegetation was from ocular estimates of the percent coverage of vegetative types within a 10 m wide strip around the lake as the lake shore was walked.

Fauna.--Deep and shallow water zooplankton were determined from four plankton hauls: two 5-7 m horizontal hauls from shore about 10 m apart and two vertical hauls from the deepest part of the lake. A #10 net with a 30 cm diameter opening was used for zooplankton collections. The two samples for each area, shore or deep water, were combined and preserved in collection bottles. Counts and identifications were made from aliquot samples using a microscope and counting cell. Since the plankton net did not have a meter, plankton abundance was estimated.

Aquatic invertebrates were collected using a small mesh (0.2 cm) dip net while surveying the shoreline. Every habitat type encountered along the shoreline was sampled several times. Rubble-boulder substrate was removed and examined from stream habitats. In addition, fish stomachs from gill net mortalities were examined. Aquatic invertebrates were identified to order, life stage, and relative abundance noted.

Vertebrate animals observed in the vicinity of the lake were noted in a field book.

Fish data.--Fish species composition of the lake was determined from angling, gill net captures, and observations in shallow water areas while surveying the lake shore, tributary, and outlet streams. An experimental gill net with six 25 ft. panels of the following inch bar mesh sizes

(3/8, 1/2, 3/4, 1, 1 1/2, 2) was used.

The relative abundance of the species (very low, low, moderate, high, and very high) was estimated from catch-per-unit-of-effort figures from angling and gill net captures and from observations of the frequency of fish rises on the lake.

Fish size range and condition (very poor, poor, fair, good, or excellent) was determined for all fish captured. Each fish was weighed to the nearest gram and the fork length measured. The condition factor was calculated from the individual lengths and weights.

Natural reproduction potential was estimated based on data collected on fish size classes sampled and observed and the estimated amount and condition of spawning substrate present.

Habitat Use Data

Numbers of people and activities were observed during the time we were at the lake.

Numbers of campsites and impacts were estimated from counts of campsites and fire rings in the vicinity of the lake, the amount of litter, and the condition of the trail and lake shore.

Animal damage was determined by observed animal-use damage to trails, stream banks, and lake shore areas.

Access difficulty was determined by the trail condition, distance to the lake, and the steepness of the trail.

Angling pressure was determined by the number of people in the area, observed activities, and talking to people while at the lake. It was also indirectly assessed by the numbers and condition of campsites around the lake.

Photo Documentation

Photographs (35mm slides) were taken of the lake, fish sampled, and any notable conditions. The slides were taken with a 35mm Minolta camera with a 50mm lens.

Notes

Notes of all of the above aspects of the survey were recorded in a waterproof notebook.

RESULTS

Crater Lake lies at the base of Crater Peak at an elevation of 5755 feet on lands managed by the BLM in the St. Joe National Forest. There is a campground on a ridge located on the east side of the lake. You can see part of Crater Lake from the ridge less than one half mile below, but there is an elevation difference of about 460 feet in that half mile. There is no trail into Crater Lake, most of the elevation difference occurs within the last quarter mile, and the mountain side is brushy. The hike is not difficult, but it is best to contour the mountain side and pick your way through the forest around the dense patches of huckleberry bushes.

The lake is surrounded by steep mountains on three sides with a northern exposure. Shoreline vegetation within a 10 m band around the lake included an estimated (30%) sedges, (5%) grasses, (10%) alder, (20%) huckleberry bushes, (35%) pine trees, and a few stinging nettles. There were some signs of a trail along the north, northwest, and northeast sides of the lake and three lightly used camps and five fire rings in the areas with the trails. The rest of the lake had no established camps or trails. The campsites and lake area were clean of debris. No other people were seen in the vicinity of the lake during our two day stay. All evidence suggests that the lake is only lightly used by hikers, campers, or fishermen.

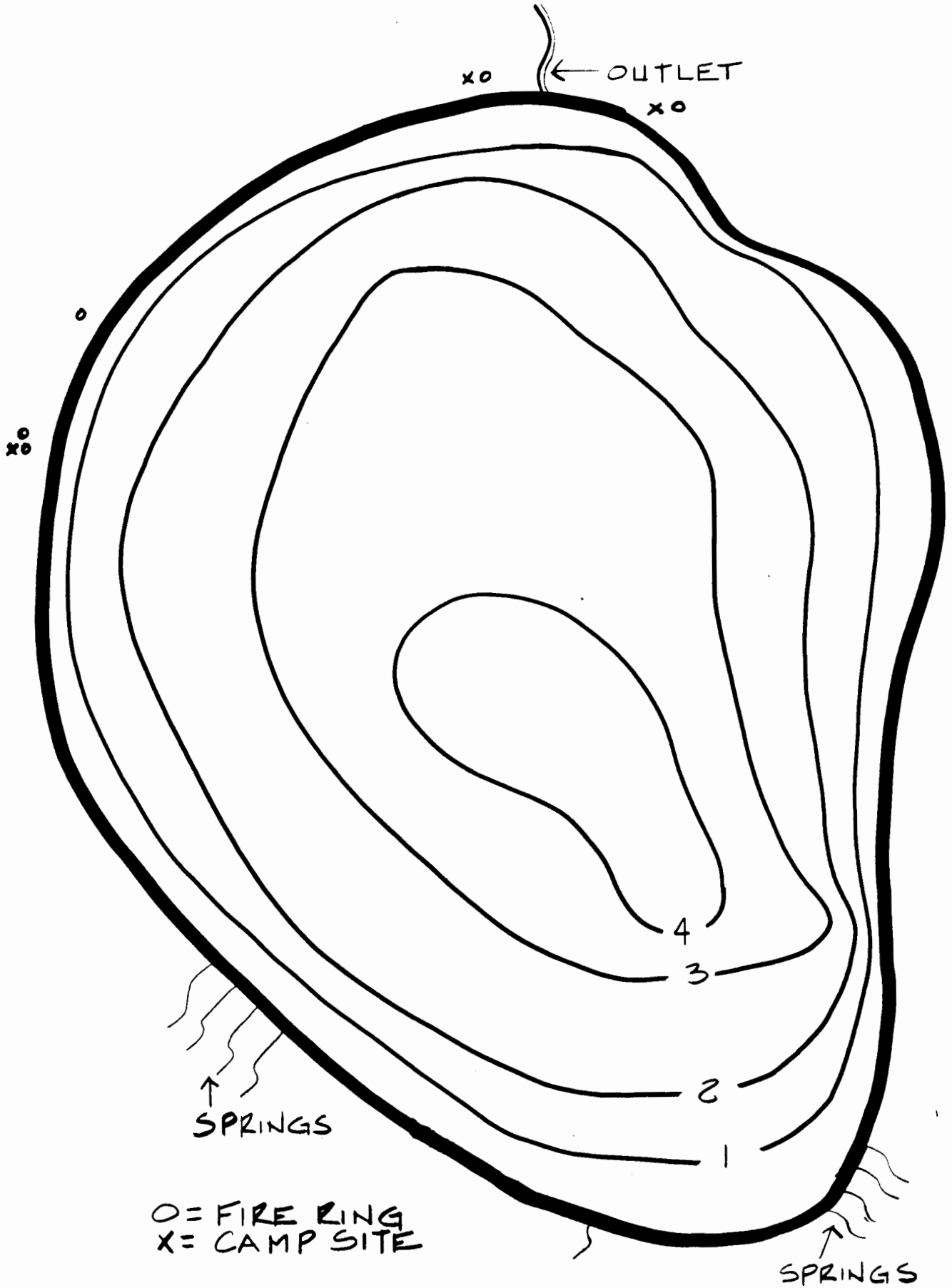
We saw a small buck deer on our way into the lake, a few deer and elk tracks around the lake, about three species of birds (jays, hawks, and a smaller species), squirrels, and a large population of frogs in and around the lake.

Crater Lake is small, only about 1.74 hectares in area. It is shallow (100% is <6 m deep), with an average depth of 2.4 m, and a maximum depth of 3.8 m at the south end of the lake where it butts up against the steep mountainside (Figure 1). The entire lake is littoral zone with a 100% mud and silt substrate. The secchi disk just disappeared at the bottom in the deepest part of the lake. Lake water temperatures were 21.6 C. near the surface and 17.5 C. near the bottom at 1830 hours in the afternoon. The air temperature was 25.2 C. The lake stratifies through the summer and winter months, but the protected location, small size, and shallow depth probably prevent a rapid lake turnover in the spring or fall. According to the Widow Mountain Quadrangle, 7.5 minute series (topographic) map, Crater Lake had a small projecting bay in the northwest corner in 1969. That bay has virtually filled and is not as prominent now.

The outlet to the lake is at the north end. It is about 1.5 m wide and 10 cm deep. The water flow was sluggish and shallow with an estimated flow of 2 cfs and a mud silt bottom. The outlet flowed through a marshy, low gradient (<1%) area almost

FIGURE 1 CRATER LAKE

ELEV 5755



hidden by sedge and downed logs for a distance of about 12 m after leaving the lake. It then entered a well defined channel with 3-4.5 m high, steep banks. The stream gradient increased to about 4% with a rubble-cobble substrate. Spawning gravel was scarce, in patches too small to be of use, and of poor quality over the first 45-50 m of stream surveyed. The portion of the watershed that drains directly into the lake is only about 19 hectares. Crater Lake has no tributaries; just seven short, shallow, low flow volume (<2 cfs combined) mud bottom springs and seeps located primarily at the southwest, south, and southeast corners of the lake (Figure 1). There are no apparent usable spawning gravel areas in the Crater Lake system.

The lake is relatively unproductive due to a poor nutrient supply and a short growing season. The pH was 6.8 at the surface and 6.6 near the bottom; slightly acidic as you would expect from evergreen forest soil. Alkalinities at the surface were 0.0 ppm phenolphthalein and 0.5 ppm methyl orange. Deep water alkalinity was 50 ppm made up entirely of HCO₃. This means that there is no free hydroxide (OH) or normal carbonate (CO₃) and only a small amount of bicarbonate (HCO₃) present. Lake conductivity was 010 umho/cm² at the surface and 007 umho/cm² near the bottom (corrected to 25 C.). Aquatic plants were few in quantity and variety. There were some emergent sedges, a bit of filamentous algae on the submerged logs, and a small amount of water milfoil around the lake shore. There were no aquatic plants except phytoplankton in water deeper than about 1 m.

Zooplankton were few in species. Copepods and cladocerans were relatively abundant in both shore and deep water samples with a few mosquito larvae collected by the plankton net in the shallow water samples (Work Sheet Attachment). There were both calinoid and cyclopoid copepods present along with a few hydracarina and mosquito larvae.

Aquatic invertebrates were few in quantity and diversity. I observed hemiptera, odonata, diptera (simuliidae and culicidae), and coleoptera, but no tricoptera, plecoptera or ephemeroptera even in the outlet stream where I examined the cobble and boulder substrate. The food supply appears to be adequate for the present moderate sized population of fishes as evidenced by a calculated condition factor of 0.99 for the grayling population.

Crater Lake supports a moderate population of stocked grayling (Thymallus arcticus) fishes (Figure 2). Crater Lake was stocked with 2640 cutthroat trout fry (Onchorhynchus clarki) in August 1969; with 2080 cutthroat fry in 1973; with 4515 grayling fry in 1975; with 5000 grayling fry in 1979; with 5000 grayling in 1983; with 2100 grayling fry in 1987; with 2500 grayling fry in 1988; and with 2500 grayling fry in 1990. The only fish species observed or captured in the lake or the

lake outlet were grayling. The gill net was set in the lake at 2100 hrs. By 2230 hrs, no fish had been caught so the net was left in overnight. It was removed at 0630 hrs. Twelve grayling were captured that formed two distinct size classes. One size class was 16.5 cm in fork length and 85 grams in weight. The second group ranged in size from 22.8-24.1 cm in fork length and 255.6-269.8 grams in weight (see attached work sheet). One grayling was removed from the net alive. It was weighed and measured and released back into the lake. Those grayling killed by the net were buried about 15 m back from the shoreline. In one hour of fishing, two people (30 minutes each) captured seven additional grayling using spinning rods and #16 flies. These fishes were anesthetized, weighed, measured, and released alive into the lake. They were in the same two size classes as the gillnet captured grayling (Addendum Field Worksheet).

DISCUSSION

The cutthroat trout have apparently disappeared from the lake. Grayling are present in limited numbers and two size classes. The two distinct size classes of grayling strongly suggest that the larger size class are survivors of the 1988 stocking of fry and the smaller size class are survivors of the 1990 stocking of fry. The apparent complete lack of cutthroat trout and juvenile grayling is probably due to a complete lack of spawning habitat in the drainage system. The lack of any salmonids larger than 24.1 cm in the lake suggests that mortality rates may be high for adult grayling unable to spawn or that periodic harsh environmental conditions exist may exist in Crater lake.

High mountain, cirque lakes tend to be deep, cold, and oligotrophic. The low nutrient level of Crater Lake suggests that it may have started out this way. The fact that it is now only 2.4 m average depth, has a maximum depth of 3.8 m, a shoreline that is becoming marshy and less complex, and a mud-silt substrate indicates that it is filling. The shallow depth and the dark mud-silt bottom absorbs heat and the lake is a cool rather than a cold water lake during the hot summer months. This filling and warming trend can be expected to continue. The north shore outlet end and the southeast and southwest sections of the lake are bog areas. It appears that Crater Lake is slowly approaching bog lake conditions.

In cold winters, the ice layer on the lake may occasionally reach close to 1 m in thickness. This would reduce the habitable area of the lake by about one third. The snow cover would shut out the light thereby preventing oxygen accretion or production. If there were abundant aquatic plants present, shallow Crater Lake would winterkill on cold winters. There is reason to believe that salmonid habitat is sometimes marginal and slowly deteriorating in Crater Lake. Few, if any,

salmonids survive more than four winters in the lake, but Crater Lake should continue to support stocked grayling for many more years.

RECOMMENDATIONS

1. Maintain Crater Lake as a grayling fishery. Periodic supplemental planting of grayling will continue to be necessary to maintain the fishery.
2. The current catch and release fishery should be continued with single, barbless hooks.
3. Do not improve access to Crater Lake.
4. Prohibit land uses in the watershed above the lake that would increase soil erosion into the lake.

LITERATURE CITED

- Bahls, P. 1989. A survey methodology for high mountain lakes. Preliminary Report, Nez Perce National Forest and Idaho Fish and Game.
- U.S.G.S. 1969. 7.5 min. topographic map, Id., Widow Mtn. Quad., T.43N., R.4E., S.29.

Addendum 1.

Idaho Fish and Game
Mountain Lake Survey Form

Lake Name: CRATER LAKE Date: 8/10/92
IDFG Catalog #: 03:00:00 0 - :01 33 EPA #: _____
Major Drainage Spokane Minor Drainage: St. Joe
County: Shoshone Region: 2
USFS Ranger Dist: St. Maries Wilderness Area: Study area
Section: 29 Township: 43N Range: 4E Elevation: 5755 feet

PHYSICAL:

Lake Type: 1 1. cirque 2. moraine 3. slump 4. caldera 5. beaver
Total Surface Area: 1.74 Hectares
Depth profile: 3 Aspect: 1
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth 3.8 meters 4. Lake has west facing exposure
Average Depth 2.4 meters 5. Lake is exposed in all directions

Chemical

Alkalinity 50 mg/l pH 6.7
Conductance 010 umho/cm² @ 25C Temp (surface) 21.6 C
Secchi depth 3.8 meters Temp (bottom) 17.5 C

Spawning Potential

Inlet(s) 7 sprgs (number) Outlet(s) 1 (number)
Length accessible for spawning Length accessible for spawning
0 meters 3 meters
Inlet spawning suitability: 4 Outlet spawning suitability: 4

- 1. excellent (abundant)
- 2. adequate (enough to maintain suitable spawning population)
- 3. fair (not adequate to maintain population)
- 4. poor (not suitable for successful spawning)

USE

Campsites 3 (number) Fire pits 5 (number) Litter (L) M H
Trail around lake: ___ complete x partial, trampled: YES (NO)
Access: ___ good trail ___ poor trail x cross country

BIOLOGICAL

Zooplankton Composition and Density

Genera Identified	% of sample	Size	Density (o/l)
copepods-calinoid & cyclopoid	<u>60</u>		<u>abundant</u>
cladocera- (Bosmina)	<u>35</u>		<u>abundant</u>
hydracarina	<u>3</u>		<u>few</u>
mosquito larvae	<u>2</u>		<u>few</u>

CRATER LAKE

Insect Composition and Abundance

Aquatic Genera	relative abundance			Terrestrial Genera	relative abundance		
hemiptera	(L)	M	H	diptera	(L)	M	(H)
odonata	(L)	M	H	hymenoptera	(L)	M	H
diptera	(L)	M	H	lepidoptera	(L)	M	H
coleoptera	(L)						

Fish Survey

Fishermen 2 (numbers) Hours fished 1.0 (total)
 Fish caught 7 Fish / hour 7 Abundance L (M) H

Length Frequency (Collection Method: x angling; x gill net - net hours 9.5)

Species	Total Length in mm								
	10-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
Grayling	0	0	0	8	11	0	0	0	0
Total	0	0	0	8	11	0	0	0	0

Fish Condition

Species	Total Length (mm)		Weight (g)		Condition (K)	
	mean	range	mean	range	mean	range
Grayling						
1988 stock	232.2	228.6-241.3	125.1	112.1-140.2	0.99	1.0-1.0
1990 stock	165.1	165.1-165.1	45.0	44.6-45.2	1.0	0.99-1.0
	200.7		80.32		0.99	

Stocking History

Year	Species	Number of Fish	Comments
1969	O. clarki	2640	fry
1973	O. clarki	2080	fry
1975	T. arcticus	4515	fry
1978	T. arcticus	2500	fry
1988	T. arcticus	2100	fry

COMMENTS:

(1990, T. Arcticus, 2500 fry).

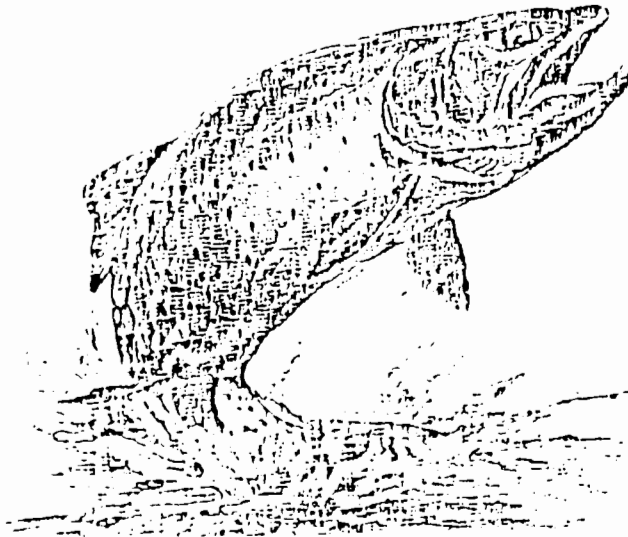
The grayling population in the lake appears to be from the 1988 and 1990 stockings. There is no evidence of cutthroat trout in the lake, or of any natural reproduction.

MOUNTAIN LAKE AQUATIC INVENTORY

**BUREAU OF LAND MANAGEMENT
Contract #D060C20003
August 1992**

FISH LAKE

Widow Mountain Quadrangle, Idaho



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14 August 1992
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RH: Inventory of Fish Lake (Contract #D060C20003). Raleigh

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SHOSHONE COUNTY, IDAHO.

ROBERT F. RALEIGH, Raleigh Consultants, P.O. Box 66, Council,
ID. 83612

ABSTRACT: Fish Lake is a small, shallow, cirque lake with two spawning tributaries. The lake contains a moderate population of native West Slope cutthroat trout (Oncorhynchus clarki Lewisii). There is no record that Fish Lake has ever been stocked with hatchery fishes. Aquatic insects and #10 net zooplankton were limited in diversity. The lake water is slightly acidic with low conductivity and alkalinity. The lake is slowly filling from erosion of the steep mountain sides and warming due to the shallow depth and dark silt bottom. Human activity around the lake appears to be light to moderate.

INTRODUCTION

A variety of laws, Executive Orders, and policy statements require the Bureau of Land Management (BLM) to manage fisheries and associated aquatic resources on a sustained yield basis within a multiple-use framework, without loss of habitat capability, and with special attention to aquatic resources with unique values. A basic knowledge of the character and extent of the aquatic resources is required in order to meet the requirements of this mandate. Basic information needed to guide management policy direction is obtained by inventorying each aquatic resource and incorporating the data base into Resource Management Plans (RMP). These RMPs are used to prescribe general management practices and land use decisions that may affect the management and well-being of the aquatic resources. More detailed site specific Habitat Management Plans (HMP) are prepared from the data base as needed to protect unique aquatic resources.

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1. An inventory of the aquatic resources and level of use of Fish Lake;

2. Information on the existing fish habitat condition, species composition, relative abundance, size classes, and condition of fishes in the lake; and

3. Recommendations for the future management of lands surrounding the aquatic resources.

Fish Lake is a small, stratified, high mountain, cirque lake located east of Clarkia, Shoshone County, Idaho in Township 43N., Range 4E., Section 4. The lake lies on the northern slope of Lookout Mountain at an elevation of 5457 feet on lands managed by the BLM in the St. Joe National Forest.

METHODS

The study methods follow those outlined in "Preliminary Report Of A Survey Methodology For High Mountain Lakes" (Bahls, 1989). The variables measured are categorized as pertaining to the fish species and their habitat with habitat data referring to the physical, chemical, and biological characteristics of the lake, the lake outlet stream in the near vicinity of the lake, and lake tributaries. The impacts of human and animal uses of the lake area are also documented. The variables measured during the survey are as follows.

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Shallow and deep water alkalinities were titrated with 0.5N H₂SO₄ from the same water samples collected for pH tests. Both phenolphthalein and methyl orange alkalinities were measured.

Biological Data Collected

Flora.--Aquatic vascular macrophytes were from ocular estimates of the relative abundance (rare, common, or abundant) of each type during the shoreline survey.

Sedges were determined as above.

Terrestrial lakeshore vegetation was from ocular estimates of the percent coverage of vegetative types within a 10m wide strip around the lake as the lake shore .

Fauna.--Deep and shallow water zooplankton were determined from four plankton hauls: two 5-7 m horizontal hauls from shore about 10 m apart and two vertical hauls from the deepest part of the lake. A #10 net with a 30 cm diameter opening was used for zooplankton collections. The two samples for each area, shore or deep water, were combined and preserved in collection bottles. Counts and identifications were made from aliquot samples using a microscope and counting cell. Since the plankton net did not have a meter, plankton abundance was estimated.

Aquatic invertebrates were collected using a small mesh (0.2 cm) dip net while surveying the shoreline. Every habitat type encountered along the shoreline was sampled several times. Rubble-boulder substrate was removed and examined from stream habitats. In addition, fish stomachs from gill net mortalities were examined. Aquatic invertebrates were identified to order, life stage, and relative abundance noted.

Vertebrate animals observed in the vicinity of the lake were noted in a field book.

Fish data.--Fish species composition of the lake was determined from angling, gill net captures, and observations in shallow water areas while surveying the lake shore,

tributary, and outlet streams. An experimental gill net with six 25 ft. panels of the following inch bar mesh sizes (3/8, 1/2, 3/4, 1, 1 1/2, 2) was used.

The relative abundance of the species (very low, low, moderate, high, and very high) was estimated from catch-per-unit-of-effort figures from angling and gill net captures and from observations of the frequency of fish rises on the lake.

Fish size range and condition (very poor, poor, fair, good, or excellent) was determined for all fish captured. Each fish was weighed to the nearest gram and the fork length measured. The condition factor was calculated from the individual lengths and weights.

Natural reproduction potential was estimated based on data collected on fish size classes sampled and observed and the estimated amount and condition of spawning substrate present.

Habitat Use Data

Numbers of people and activities were observed during the time we were at the lake.

Numbers of campsites and impacts were estimated from counts of campsites and fire rings in the vicinity of the lake, the amount of litter, and the condition of the trail and lake shore.

Animal damage was determined by observed animal-use damage to trails, stream banks, and lake shore areas.

Access difficulty was determined by the trail condition, distance to lake, and the steepness of the trail.

Angling pressure was determined by the number of people in the area, observed activities, and talking to people while at the lake. It was also indirectly assessed by the numbers and condition of campsites around the lake.

Photo Documentation

Photographs (35mm slides) were taken of the lake, fish sampled, and any notable conditions. The slides were taken with a 35mm Minolta camera with a 50mm lens.

Notes

Notes of all of the above aspects of the survey were recorded in a waterproof notebook.

RESULTS

The lake is surrounded by steep mountains on three sides with an eastern exposure. Shoreline vegetation within a 10 meter band around the lake included an estimated (35%) sedges, (15%) grasses, (10%) alder, (10%) huckleberry bushes, (30%) pine trees. There is a narrow jeep trail (closed to cars) that extends about one and a quarter miles up the south side of the Little North Fork Clearwater River that flows down the valley from Fish Lake. A good to fair trail continues from the end of the road up the valley to the lake. We located five campsites and five fire rings in the areas with trails. The campsites and lake area contained a moderate amount of debris and although no other people were at the lake during our two day visit, the lake appears to receive more visitors than Crater Lake. All evidence suggests that the lake is moderately to lightly used by hikers, campers, and fisherman.

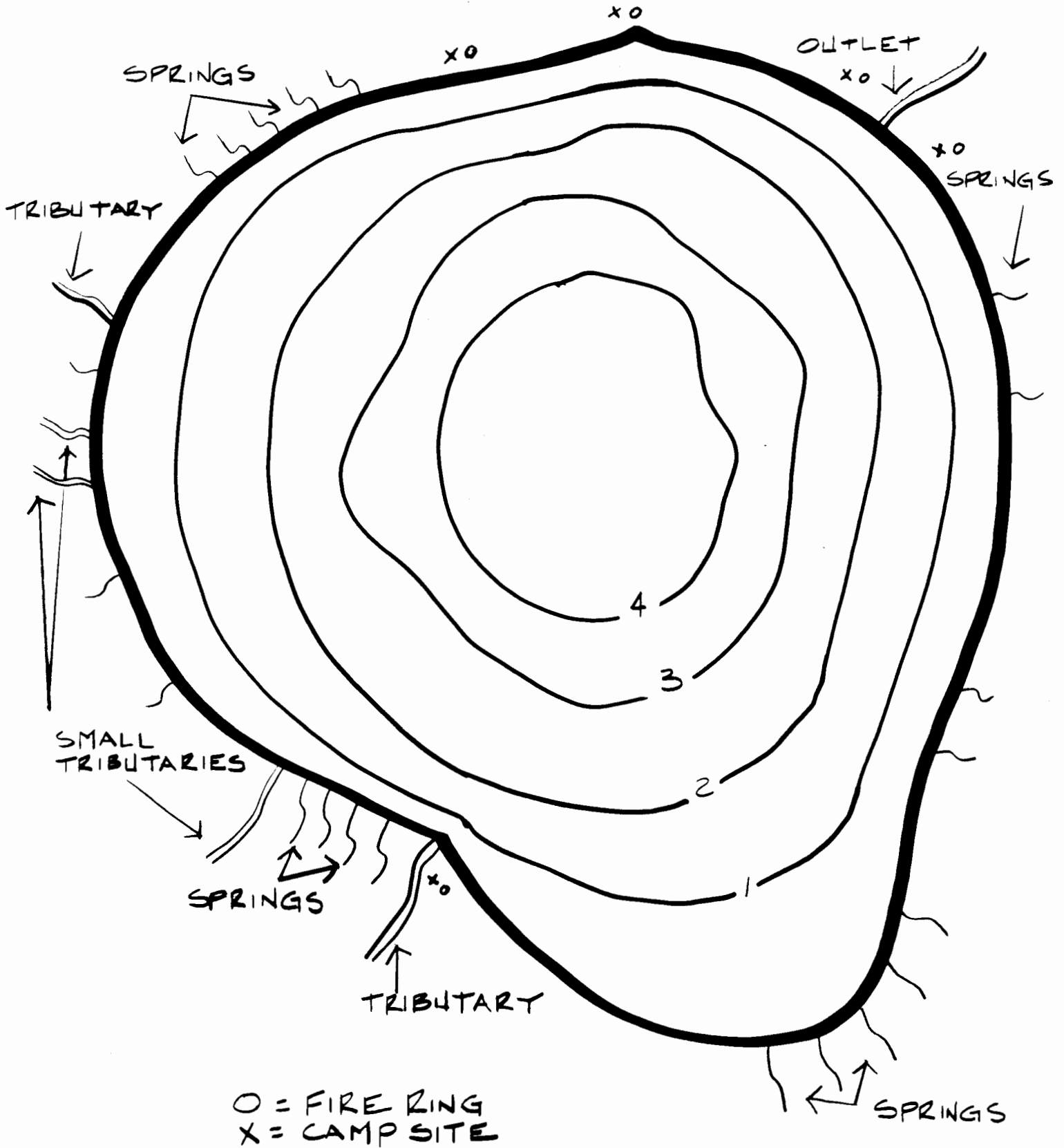
We saw a few squirrels, chipmunks, voles, an ermine, a hawk, an osprey, two ducks, and kingfishers at the lake. There were a few deer and elk tracks around the lake. We saw a bear track and possibly a raccoon track on the trail into the lake.

Fish Lake is small, only about 2.3 hectares in area. It is shallow (100% is <6 m deep), with an average depth of 2.5 m, and a maximum depth of 3.7 m near the north side of the lake where it butts up against the steep mountain side (Figure 1). The entire lake is littoral zone with a 100% mud and silt substrate. The secchi disk was visible to the bottom at the deepest part of the lake. Lake water temperatures were 21.5 C. near the surface and 19.7 C. near the bottom at 1710 hrs in the afternoon. The air temperature was 22.3 C. The lake has a weak stratification through the summer and winter months, but the protected location, small size, and the shallow depth probably prevent a rapid lake turnover in the spring and fall.

The outlet to the lake is at the northeast corner. It is about 2.8 m wide and 12 cm deep. The water flow was an estimated 12-15 cfs contained in a well defined channel with 1.5 m high, moderately steep banks. The gradient was about 1-2% near the outlet, but it increased to an estimated 6-8% downstream with a rubble-cobble substrate. There was virtually no usable spawning substrate in the outlet stream. A short distance downstream from the lake there are fish barriers in the form of chutes and small plunge falls. There are four small tributaries and several small springs flowing

FIGURE 1 FISH LAKE

ELEV 5457



into Fish Lake from the 97.4 hectare portion of the watershed that appears to drain into the lake (Figure 1). Two tributaries on the west side of the lake contain spawning gravel. The stream furthest to the north on the west end is about 1 m wide, 25.4 cm deep and has an estimated flow of about 7-8 cfs. This tributary has an estimated 240 square meters of spawning gravel; probably sufficient spawning habitat for the entire cutthroat population of the lake. A second tributary about 30 cm wide and 15 cm deep with an estimated flow of 3 cfs had an estimated 3 square m of usable spawning gravel. The east and south ends of the lake are extensive boggy, sedge covered areas. The 1969 topographic map of the lake shows a small arm of the lake extending west in the northwest corner. This arm is now filled in and boggy giving the lake a rough heart shape (Figure 1).

The lake is relatively unproductive due to a poor nutrient supply and a short growing season. The pH was 6.6 at the surface and 6.3 near the bottom; slightly acidic as you would expect from evergreen forest soil. Alkalinities at the surface were 0.0 ppm phenolphthalein and 0.5 ppm methyl orange. Deep water alkalinity was 30 ppm made up entirely of HCO_3 . This means that there is no free hydroxide (OH) or normal carbonate (CO_3) and only a small amount of bicarbonate (HCO_3) present. Lake conductivity was 009 $\mu\text{mho}/\text{cm}^2$ at the surface and 009 $\mu\text{mho}/\text{cm}^2$ near the bottom (corrected to 25 C.). Aquatic plants were few in quantity and variety. There were some emergent sedges, a bit of filamentous algae on submerged logs, and a small amount of water milfoil around the lakeshore. There were no aquatic plants except phytoplankton in water deeper than about 1 m.

Zooplankton were few in species. Copepods and cladocerans were relatively abundant in both shore and deep water samples with a few mosquito larvae collected by the plankton net in the shallow water samples (Appendix Field Worksheet). There were only cyclopoid copepods present in the plankton net catches. Calinoid copepods are seldom present in lakes containing trout.

Aquatic invertebrates were present in moderate quantities and diversity. Hemiptera, odonata, diptera (simuliidae and culicidae), and mollusca were observed in the lake. The lake outlet stream contained tricoptera (three species), mollusca, and ephemeroptera (two species). The plankton and invertebrates provide a sufficient food supply for the cutthroat trout population as evidenced by the calculated condition factor of 1.0 derived from the length-weight data (Addendum Field Worksheet).

Fish Lake supports a population of native West Slope cutthroat trout (*Oncorhynchus clarki lewisi*). The gill net was set in the lake at 1730 hrs. We captured, anesthetized, and

processed 16 cutthroat trout in two hours of fly fishing. By 2130 hrs the gill net had captured four cutthroat trout. The net was pulled and the four trout processed. We released two live cutthroat captured by the gill net back into the lake. The two cutthroat killed by the net were buried. The cutthroat ranged in size from 11.4 to 20.9 cm fork length and weighed 14.8 to 92.6 gm. No other species of fish were observed anywhere in the lake system.

DISCUSSION

High mountain, cirque lakes tend to be deep, cold, and oligotrophic. The low nutrient level of Fish Lake indicates that it possibly started out this way. The fact that it is now only 2.5 m average depth with a maximum depth of 3.7 m, an apparently reduced surface area, has a less complex shoreline development than in 1969, and a mud-silt substrate indicates that Fish Lake is slowly filling. The shallow depth and the dark mud-silt bottom absorb heat and the lake is now a cool rather than a cold water lake during the summer months. This filling and warming trend can be expected to continue. The north shore, west side, and the southeast sections of the lake are bog areas. It appears that Fish Lake is slowly approaching a bog lake condition.

Length frequency data on captured cutthroat trout suggest the presence of two or three age classes (114.3-209.6 cm) of trout. Gill net captures and angling do not adequately sample fishes under 10 cm. Since the cutthroat trout of Fish Lake are self-sustaining, it is assumed that the population consists of four to five age classes.

Although the catch-per-unit-of-effort is high the trout population in a small shallow lake such as Fish Lake is limited in numbers. Cutthroat trout have a very high catchability coefficient and are highly susceptible to angling. They are a species that are easily overfished. A large fishing party could significantly reduce the population of cutthroat trout in Fish Lake in a single weekend of intense fishing. Viable populations of West Slope cutthroat are getting scarce and deserve protection.

There is no record of any fish having been stocked in Fish Lake. The existing cutthroat trout population appears to be indigenous to the lake even though the outlet stream apparently has fish migration blocks at least during low flow periods. There is adequate suitable spawning habitat in two of the tributaries to support a self-sustaining trout population and the food supply appears to be adequate for the present population of cutthroat trout as evidenced by a condition factor of 1 for the population. The complete lack of large cutthroat trout in the lake may be due to a short growing season, a short life span, or may indicate that

periodic harsh trout habitat conditions may exist.

In cold winter months the ice layer on the lake can reach nearly 1 m in thickness. This would reduce the habitable area of the lake by about one third. The snow and ice cover would occlude light thereby preventing oxygen accretion or production. If there were abundant aquatic plants present, Fish Lake would winterkill on cold winters. There is reason to believe that salmonid habitat may occasionally be marginal and slowly deteriorating in Fish Lake. The short growing season, occasional harsh winter conditions, and the high susceptibility to angling may explain the lack of large trout. In spite of these factors, Fish Lake supports and can be expected to continue to support a valuable population of native West Slope cutthroat trout for many years to come.

RECOMMENDATIONS

1. Maintain Fish Lake as a cutthroat trout fishery.
2. Consider implementing a catch and release fishery with single barbless hooks.
3. Prohibit any land use practices in the watershed that would increase soil erosion into the lake.

LITERATURE CITED

- Bahls, P. 1989. A survey methodology for high mountain lakes. Preliminary Report, Nez Perce National Forest and Idaho Fish and Game.
- U.S.G.S. 1969. 7.5 min. topographic map, Id, Widow Mtn. Quad., T.4E., S.29.

FISH LAKE

Insect Composition and Abundance

Aquatic Genera	relative abundance			Terrestrial Genera	relative abundance		
hemiptera	L	(M)	H	diptera	L	M	(H)
odonata	(L)	M	H	hymenoptera	(L)	M	H
diptera (2 sp)	L	M	(H)	lepidoptera	(L)	M	H
tricoptera (3 sp) (M)	ephemeroptera (2 sp) (L)			coleoptera	(L)		

Fish Survey
 Fishermen 2 (numbers) Hours fished 2 hrs 15 min (total)
 Fish caught 16 Fish / hour 7.1 Abundance L (M) H

Length Frequency (Collection Method: x angling; x gill net - net hours 4)

Species	Total Length in mm									
	10-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400-449	450-499
O. clarki	0	0	6	11	3	0	0	0	0	0
Total										

data from gill net captures and fly fishing

Fish Condition

Species	Total Length (mm)		Weight (g)		Condition (K)	
	mean	range	mean	range	mean	range
O. clarki	165.6	114.3-209.6	45.1	14.8-92.6	0.99	0.99-1.02

Stocking History

Year	Species	Number of Fish	Comments

COMMENTS:

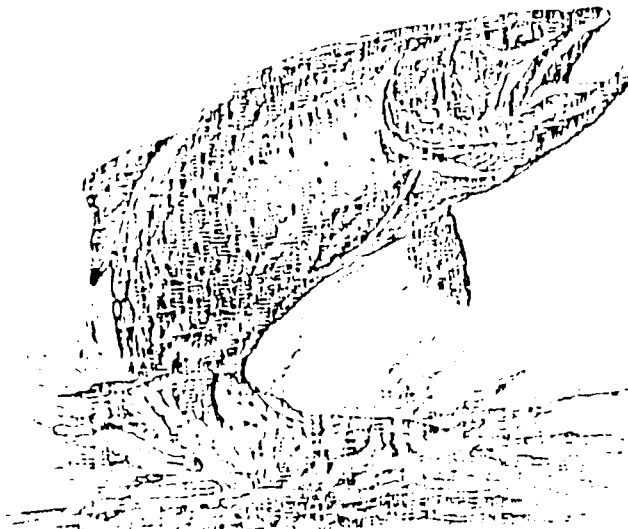
There is no record of Fish Lake ever having been stocked with any species of fish.

MOUNTAIN LAKE AQUATIC INVENTORY

**BUREAU OF LAND MANAGEMENT
Contract #D060C20003
August 1992**

LITTLE LOST LAKE

Widow Mountain Quadrangle, Idaho



**Raleigh Consultants
P.O. Box 66
Council, Idaho 83612
Phone (208) 253-6883
Fax. (208) 253-6883**

12 August 1992
Robert F. Raleigh
Raleigh Consultants
P.O. Box 66
Council, ID 83612
208-253-6883

RH: Inventory of Little Lost Lake (Contract #D060C20003).
Raleigh

PHYSICAL, CHEMICAL, AND BIOLOGICAL INVENTORY OF LITTLE LOST
LAKE, SHOSHONE COUNTY, IDAHO.

ROBERT F. RALEIGH, Raleigh Consultants, P.O. Box 66, Council,
ID. 83612

ABSTRACT: Little Lost Lake is a small, shallow, cirque lake with springs and seeps, but no tributaries and no spawning habitat. The lake is barren of fishes. Aquatic insects were limited in diversity and abundance. The #10 net zooplankton was abundant but limited in diversity. The lake water is slightly acidic with low conductivity and alkalinities. The lake is slowly filling with erosion from the steep mountain sides and warming due to a shallow depth and a dark silt bottom. Human activity around the lake appears to be very light.

INTRODUCTION

A variety of laws, Executive Orders, and policy statements require the Bureau of Land Management (BLM) to manage fisheries and associated aquatic resources on a sustained yield basis within a multiple-use framework, without loss of habitat capability, and with special attention to aquatic resources with unique values. A basic knowledge of the character and extent of the aquatic resources is required in order to meet the requirements of this mandate. Basic information needed to guide management policy direction is obtained by inventorying each aquatic resource and incorporating the data base into Resource Management Plans (RMP). These RMPs are used to prescribe general management practices and land use decisions that may affect the management and well-being of the aquatic resources. More detailed site specific Habitat Management Plans (HMP) are prepared from the data base as needed to protect unique aquatic resources.

The objectives of this study were to provide the BLM with:

1. An inventory of the aquatic resources and level of use of Little Lost Lake;

2. Information on the existing fish habitat condition, species composition, relative abundance, size classes, and condition of fishes in the lake; and

3. Recommendations for the future management of lands surrounding the aquatic resources.

Little Lost Lake is a small, stratified, high mountain, cirque lake located east of Clarkia, Shoshone County, Idaho in Township 43N., Range 4E., Section 15. The lake lies at the base of Widow Mountain at an elevation of 5765 feet on lands managed by the BLM in the St. Joe National Forest.

METHODS

The study methods follow those outlined in "Preliminary Report Of A Survey Methodology For High Mountain Lakes" (Bahls, 1989). The variables measured are categorized as pertaining to the fish species and their habitat with habitat data referring to the physical, chemical, and biological characteristics of the lake, the lake outlet stream in the near vicinity of the lake, and lake tributaries. The impacts of human and animal uses of the lake area are also documented. The variables measured during the survey are as follows.

Habitat Data Collected

Physical.--Lake surface area (hectares) was estimated at the lake and checked by use of a modified acreage grid and map.

Deep (>6m) and shallow (<6m) areas (% of lake surface area) were determined by depth soundings along lake transect lines.

Maximum depth was determined from depth soundings.

Lake elevation was obtained from a contour map.

Lake exposure direction was obtained from a map.

Shoreline development ratio was obtained by observation.

Geomorphic lake type was determined from field observation.

Watershed area was measured using a modified acreage grid and a contour map.

Percent substrate composition from shore to the three meter depth contour interval was determined by observations at the lake, by use of a modified acreage grid, and a lake contour

map developed from depth soundings.

Littoral zone substrate sediment type (color and texture) was determined by field observations and hand texture sampling.

Potential spawning areas (in lake, lake tributaries and outlet) was estimated by walking the lake shore and making ocular estimates of the square meters of potential spawning substrate within the lake, along the lake outlet, and along all tributaries with a sufficient estimated water depth to permit spawning during spring flows. Substrate from coarse sand to gravel ≤ 7.5 cm in size was considered usable spawning substrate. I selected a 7.5 cm maximum gravel size because all fishes observed were < 25 cm in length.

Average bankfull width, wetted perimeter width, and depth of streams were measured across the high water mark and across the wetted perimeter along each potential spawning tributary.

Average stream gradient was estimated in percentage.

Dominant stream substrate was from ocular estimates as the streams were surveyed by walking.

Fish access length was estimated by pacing the distance from the lake to a fish barrier, or absence of spawning habitat.

Barrier type was classified by observation.

Minor inlet streams, springs, and seeps were marked on a rough drawing of the lake as the shoreline was walked. All water sources were marked on a scale drawing of the lake.

Air and surface water temperatures were taken with a hand held thermometer with the time of day noted.

Deep water temperature was measured from water collected by sampling bottle near the lake bottom. The temperatures were read immediately after reaching the surface.

Chemical.--Shoreline, shallow, and deep water pH were measured with an Oakton water test kit with a rated accuracy of ± 0.1 from water collected by sampling bottle: 1. about 1 m from the shoreline at a depth of about 0.5 m; 2. from about 1.5 m deep; and 3. from water collected near the bottom of the deepest part of the lake. The Oakton test equipment was calibrated for pH just prior to sampling the lake.

Shoreline, shallow, and deep water conductivities were measured with an Oakton water test kit with a rated accuracy of + 1 mV from samples of water collected at the same locations as the pH tests. The Oakton water test kit was recalibrated for conductivity just prior to sampling the lake.

Shallow and deep water alkalinities were titrated with 0.5N H₂SO₄ from the same water samples collected for pH tests. Both phenolphthalein and methyl orange alkalinities were measured.

Biological Data Collected

Flora.--Aquatic vascular macrophytes were from ocular estimates of the relative abundance (rare, common, or abundant) of each type during the shoreline survey.

Sedges were determined as above.

Terrestrial lakeshore vegetation was from ocular estimates of the percent coverage of vegetative types within a 10 m wide strip around the lake as the lake shore was walked.

Fauna.--Deep and shallow water zooplankton were determined from four plankton hauls: two 5-7 m horizontal hauls from shore about 10 m apart and two vertical hauls from the deepest part of the lake. A #10 net with a 30 cm diameter opening was used for zooplankton collections. The two samples for each area, shore or deep water, were combined and preserved in collection bottles. Counts and identifications were made from aliquot samples using a microscope and counting cell. Since the plankton net did not have a meter, plankton abundance was estimated.

Aquatic invertebrates were collected using a small mesh (0.2 cm) dip net while surveying the shoreline. Every habitat type encountered along the shoreline was sampled several times. Rubble-boulder substrate was removed and examined from stream habitats. In addition, fish stomachs from gill net mortalities were examined. Aquatic invertebrates were identified to order, life stage, and relative abundance noted.

Vertebrate animals observed in the vicinity of the lake were noted in a field book.

Fish data.--Fish species composition of the lake was determined from angling, gill net captures, and observations

in shallow water areas while surveying the lake shore, tributary, and outlet streams. An experimental gill net with six 25 ft panels of the following inch bar mesh sizes (3/8, 1/2, 3/4, 1, 1 1/2, 2) was used.

The relative abundance of the fish by species (very low, low, moderate, high, and very high) was estimated from catch-per-unit-of-effort figures from angling and gill net captures and from observations of the frequency of fish rises on the lake.

Fish size range and condition (very poor, poor, fair, good, or excellent) was determined for all fish captured. Each fish was weighed to the nearest gram and the fork length measured. The condition factor was calculated from the individual lengths and weights.

Natural reproduction potential was estimated based on data collected on fish size classes sampled and observed and the estimated amount and condition of spawning substrate present.

Habitat Use Data

Numbers of people and activities were observed during the time we were at the lake.

Numbers of campsites and impacts were estimated from counts of campsites and fire rings in the vicinity of the lake, the amount of litter, and the condition of the trail and lake shore.

Animal damage was determined by observed animal-use damage to trails, stream banks, and lake shore areas.

Access difficulty was determined by the trail condition, distance to lake, and the steepness of the trail.

Angling pressure was determined by the number of people in the area, observed activities, and talking to people while at the lake. It was also indirectly assessed by the numbers and condition of campsites around the lake.

Photo Documentation

Photographs (35mm slides) were taken of the lake, fish sampled, and any notable conditions. The slides were taken with a 35mm Minolta camera with a 50mm lens.

Notes

Notes of all of the above aspects of the survey were recorded in a waterproof notebook.

RESULTS

The lake is surrounded by steep mountains on three sides with a northern exposure. About 15.3 hectares of the watershed drains directly into Little Lost Lake. Shoreline vegetation within a 10 meter band around the lake included an estimated (30%) sedges, (15%) grasses, (15%) alder, (5%) huckleberry bushes, (35%) pine trees. There is an old, grown over, narrow jeep trail that extends a quarter mile up the canyon on the north side of Little Lost Lake Creek. From this point there is a trail that continues up the canyon for another mile and a quarter. The trail ends in a cattle grazing area. The best trail into the lake follows the ridge line along the northern edge of the canyon. This trail climbs most of the way, but is well marked and well maintained.

There is a poorly defined trail on the north and west sides of the lake, a camp site and fire ring on the north end and a second camp about 30 meters back into the forest on the north side. Camping debris was light around the lake except for a large piece of plastic that had been left at each camp. All evidence suggests that the lake is only lightly used by hikers, campers, and hunters. We did not meet any people at or near Little Lost Lake.

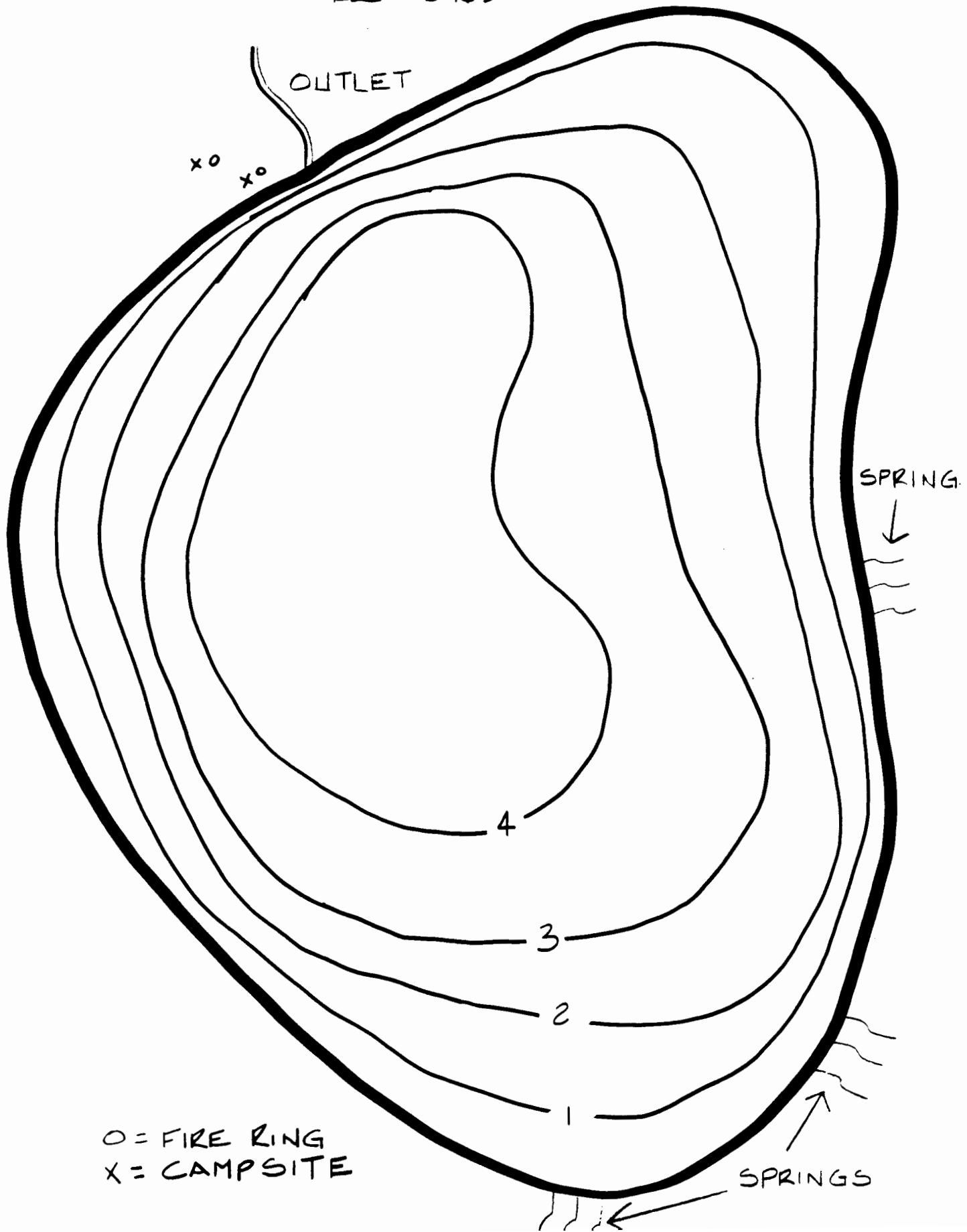
We saw a few squirrels, chipmunks, voles, a hawk, a mountain jay, and some smaller birds at the lake. There were a few deer tracks around the lake.

Little Lost Lake is small, only about 1.58 hectares in area. It is shallow (100% is <6 m deep), with an average depth of 2.4 m, and a maximum depth of 4.1 m near the northwest center of the lake where it butts up against the steep side of Widow Mountain (Figure 1). The entire lake is littoral zone with a 100% mud and silt substrate. The secchi disk was visible to the bottom at the deepest part of the lake. Lake water temperatures were 21.6 C. near the surface and 17.5 C. near the bottom at 1940 hrs in the afternoon. The air temperature was 21.2 C. The lake stratifies through the summer and winter months, but the protected location, small size, and shallow depth probably prevent a rapid lake turnover in the spring or fall.

The outlet to the lake is at the north end. The topographic map shows the outlet stream flowing into a spring fed tributary that originates on the steep mountain slope just to

FIGURE 1 LITTLE LOST LAKE

ELEV 5765



the west of the lake. This is not accurate. The outlet flows down the canyon in a separate channel from the larger spring fed stream to the west. The outlet was about 1.8 m wide and nearly dry (<0.3 cfs estimated). There was only a shallow pool near the mouth with water seeping through the cobble and boulder substrate. The outlet stream gradient is <1% for at least the first 45 m. The substrate was silt, cobbles, and boulders, with no usable spawning gravel.

The nearby spring fed stream has a flow of about 7 to 8 cfs with a substrate of mostly cobble and boulders but it does contain some spawning gravel. If this stream flowed through the lake it would probably enable the lake to support a self sustaining trout population, but the cost of diverting the stream in this remote area would be prohibitive.

The lake is relatively unproductive due to a poor nutrient supply and a short growing season. The pH was 6.7 at the surface and 6.8 near the bottom; slightly acidic as would be expected from evergreen forest soil. Alkalinities at the surface were 0.0 ppm phenolphthalein and 0.7 ppm methyl orange. Deep water alkalinity was 50 ppm made up entirely of HCO₃. This means that there is no free hydroxide (OH) or normal carbonate (CO₃) and only a small amount of bicarbonate (HCO₃) present. Lake conductivity was 009 umho/cm² at the surface and 004 umho/cm² near the bottom (corrected to 25 C.). Aquatic plants were few in quantity and variety probably due to the lack of nutrients (low conductivity and alkalinity) and a short growing season. There were some emergent sedges, a bit of filamentous algae on the submerged logs, and a small amount of water milfoil around the lakeshore. There were no aquatic plants except phytoplankton in water deeper than about 1 m.

Zooplankton were few in species. Two species of copepods and two species of cladocerans (Bosmina and an unidentified genera) were present and relatively abundant in both shore and deep water samples. There were a few hydracarina and mosquito larvae collected by the plankton net in the shallow water samples (Appendix Field Worksheet). There were both cyclopoid and calinoid copepods present in the plankton net catches. Calinoid copepods do not usually occur, or are scarce, in lakes with trout as they seem to be a favorite trout food item.

Aquatic invertebrates were present in moderate quantities and diversity. Hemiptera, odonata, diptera (simuliidae and culicidae), and coleoptera were observed in the lake. The lake outlet stream did not contain any invertebrate species. The plankton and aquatic invertebrate populations of Little Lost Lake appear abundant enough to support a moderate population of salmonid fishes.

The gill net was placed in the lake at 2115 hrs. and left in until 0745 the following morning. There was zero catch. We did not see a single surface rise or any other evidence of the presence of fishes in Little Lost lake throughout our two days of observations and sampling at the lake. There is no record that Little Lost Lake has ever been stocked with fishes of any kind.

DISCUSSION

Little Lost Lake has no suitable spawning habitat and no tributary streams. The water supply to the lake is from a series of springs and seeps primarily around the south and east sides of the lake. The lake is now 2.4 m average depth with a maximum depth of 4.1 m. The surface area and shoreline complexity appears to be reduced since 1969. These factors indicate that the lake is slowly filling. The shallow depth and the dark mud-silt bottom absorb heat and the lake is now a cool rather than a cold water lake during the summer months. This filling and warming trend can be expected to continue. The north shore of the lake is boggy with emergent sedges. It appears that Little Lost Lake is slowly approaching a bog lake condition.

There are no records of any fish stocking in the lake. The lake appears to be barren of fishes and possibly always has been. Little Lost Lake could probably support a moderate population of salmonid fishes if stocked on a regular basis, but a particular cohort could not be expected to survive more than four winters. Any fishery would have to be catch and release due to the small size of the lake, the apparently limited longevity of salmonids in lakes of this type, and the high catchability rate for cutthroat trout. For these reasons salmonid stocking of Little Lost Lake is not recommended.

RECOMMENDATIONS

1. Little Lost Lake does not have any usable spawning gravel and provides only marginal habitat for salmonids; stocking of salmonid fishes is not recommended.
2. Prohibit land uses on the watershed that would cause increased erosion into the lake.

LITERATURE CITED

Bahls, P. 1989. A survey methodology for high mountain lakes. Preliminary Report, Nez Perce National Forest and Idaho Fish and Game.

U.S.G.S. 1969. 7.5 min. topographic map, Id., Widow Mtn.
Quad., T.43N., R.4E., S.29.

Addendum 1.

Idaho Fish and Game
Mountain Lake Survey Form

Lake Name: LITTLE LOST LAKE Date: 8/12/92
IDFG Catalog #: _____ EPA #: _____
Major Drainage: Clearwater Minor Drainage: North Fork
County: Shoshone Region: 2
USFS Ranger Dist: St. Maries Wilderness Area: _____
Section: 15 Township: 43N Range: 4E Elevation: 5765 feet

PHYSICAL:

Lake Type: 1 1. cirque 2. moraine 3. slump 4. caldera 5. beaver
Total Surface Area: 1.58 Hectares
Depth profile: 3 Aspect: 1
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth 4.1 meters 4. Lake has west facing exposure
Average Depth 2.4 meters 5. Lake is exposed in all directions

Chemical

Alkalinity 0.7 mg/l pH 6.8-6.7
Conductance 009 umho/cm^2 @ 25C Temp (surface) 21.1 C
Secchi depth 4.1 meters Temp (bottom) 17.5 C

Spawning Potential

(several springs)
Inlet(s) 0 (number) Outlet(s) 1 (number)
Length accessible for spawning _____ Length accessible for spawning _____
0 meters 0 meters
Inlet spawning suitability: 4 Outlet spawning suitability: 4
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning population)
3. fair (not adequate to maintain population)
4. poor (not suitable for successful spawning)

USE

Campsites 2 (number) Fire pits 2 (number) Litter (L) M H
Trail around lake: _____ complete x partial, trampled: YES (NO)
Access: x good trail _____ poor trail _____ cross country

BIOLOGICAL

Zooplankton Composition and Density

Genera Identified	% of sample	Size	Density (o/l)
copepods-calinoid	<u>40</u>	_____	<u>abundant</u>
copepods-cycloid	<u>30</u>	_____	<u>abundant</u>
cladocera (Bosmina)	<u>15</u>	_____	<u>abundant</u>
cladocera (?)	<u>10</u>	_____	<u>common</u>
hydracarina	<u>5</u>	_____	<u>few</u>

LITTLE LOST LAKE

Insect Composition and Abundance

Aquatic Genera	relative abundance			Terrestrial Genera	relative abundance		
	L	M	H		L	M	H
hemiptera	(L)	M	H	diptera	L	M	(H)
odonata	(L)	M	H	hymenoptera	(L)	M	H
diptera	L	(H)	H	lepidoptera	(L)	M	H
coleoptera	(L)						

Fish Survey

Fishermen 2 (numbers) Hours fished 1 (total)
 Fish caught 0 Fish / hour _____ Abundance (L) M H

Length Frequency (Collection Method: X angling; X gill net - net hours 12)

Species	Total Length in mm								
	10-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400
0									
Total									

Fish Condition

Species	Total Length (mm)		Weight (g)		Condition (K)	
	mean	range	mean	range	mean	range
0						

Stocking History

Year	Species	Number of Fish	Comments

COMMENTS:

There are no fish species in Little Lost Lake and no record of any fish being stocked in the lake.

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