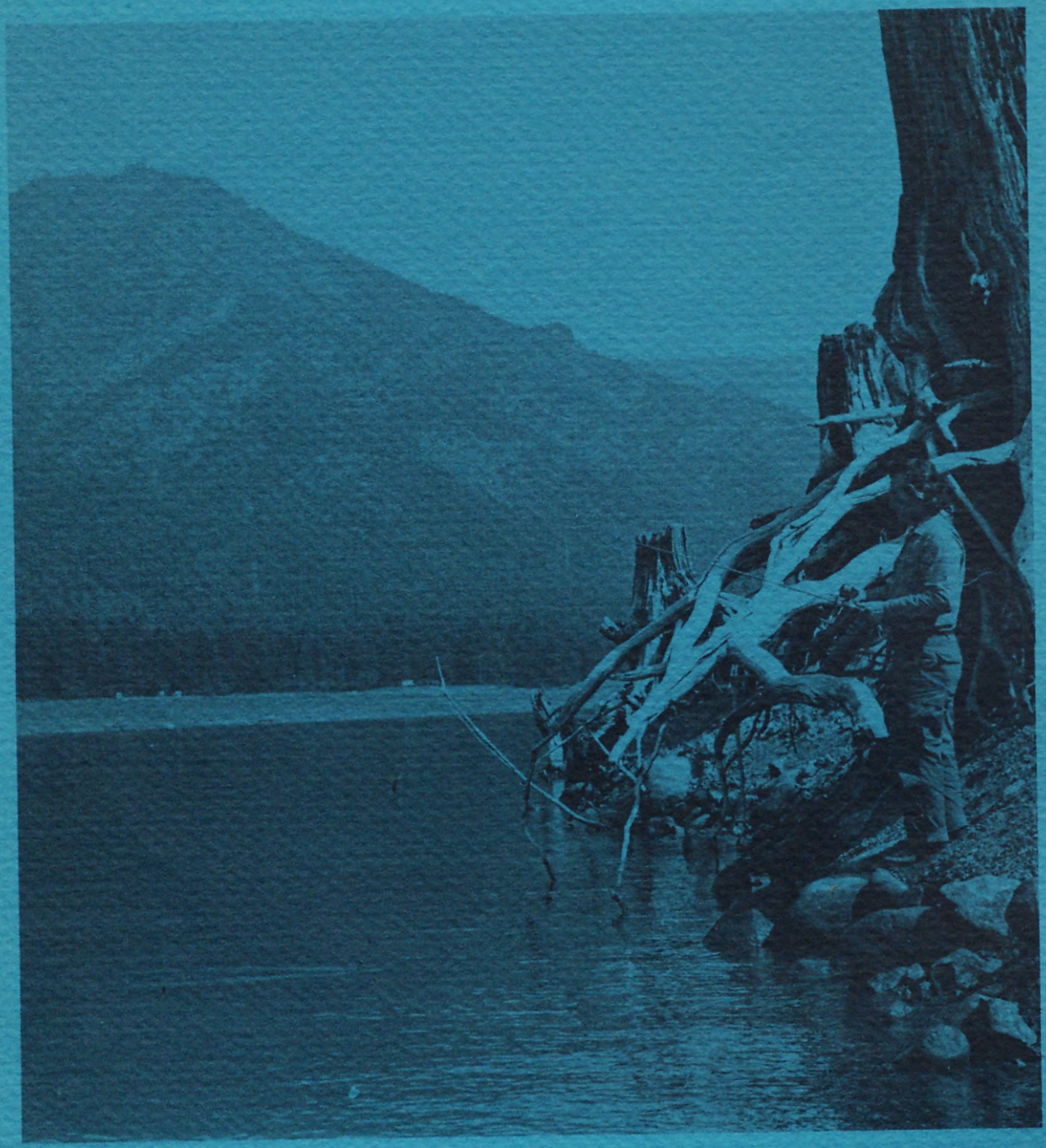
Lakes of Oregon

VOLUME 5

Marion County



Detroit Lake, 1977

OPEN-FILE REPORT. 1977

LAKES OF OREGON

VOLUME 5

Marion County

By

Joseph F. Rinella

Prepared by
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

In cooperation with
OREGON WATER RESOURCES DEPARTMENT

UNITED STATES DEPARTMENT OF THE INTERIOR
CECIL D. ANDRUS, *Secretary*

Geological Survey
V. E. McKelvey, *Director*

Water Resources Division
Joseph S. Cragwall, Jr., *Chief Hydrologist*
William H. Robinson, *Regional Hydrologist, Western Region*

Oregon District
Stanley F. Kapustka, *District Chief*

Table of Contents

Detroit Lake

Introduction

An inventory of lakes and reservoirs of Oregon is essential for a complete evaluation of the total surface-water supply of the State and to provide a basis for answering questions about Oregon's lakes. Much of the information on lakes and reservoirs previously collected by Federal and State agencies has never been published. Those data were compiled and used as a basis for collecting additional information. This report provides information for use by city, county, and State planning groups as a basis for designing more advanced interpretative studies. The information also will be useful to sportsmen, tourists, and others interested in preserving the recreational value of Oregon's lakes.

Because of the large number of lakes and reservoirs in Oregon, a single report covering the State would be bulky. Therefore, the lake information is being issued in several volumes on a county or multicounty basis. Volume 1, released in 1973, covered Clatsop, Columbia, and Tillamook Counties; volume 2 (1974) included Benton, Lincoln, and Polk Counties; volume 3 (1975) included Hood River, Multnomah, Washington, and Yamhill Counties; and volume 4 (1976) included Clackamas County. Marion County was selected for volume 5. (See figure 1.)

The southeast part of Marion County lies in a national wilderness area. Wilderness areas are protected under the National Wilderness Preservation System that directs management "for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and

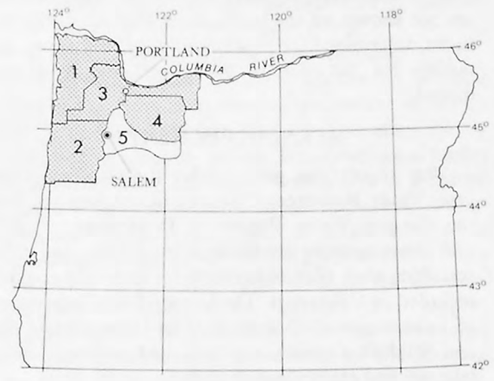


Figure 1.—Index map of Oregon showing location of Marion County(5) and areas covered in volumes 1, 2, 3, and 4.

enjoyment as wilderness." Regulations for wilderness use and entry permits may be obtained at U.S. Forest Service offices.

In addition to office compilation of existing data, each lake was visited. Most visits were made in summer or early fall when lakes were most accessible and when water temperature and biological activitiy were near maximum.

CRITERIA USED FOR DESIGNATING LAKES

There are no commonly accepted criteria for distinguishing among lakes, ponds, pools, sloughs, and other water bodies. In general, any lake with a surface area greater than 5 acres (20,000 m^2) is included in this inventory, but a few smaller bodies are also included at the author's discretion. One of these is Hidden Lake (p. 42), which is less than 5 acres (<20,000 m^2), but is unusual because a mechanical oxygen reaerator was placed in the western part of the lake to help alleviate an algae problem. Natural ephemeral lakes are not included nor are manmade ponds several acres in size that are used solely for stock water. Therefore, the inclusion of lakes in this report is based primarily on size and on the author's judgment of their actual or potential use.

Natural lakes, as well as manmade ponds and reservoirs, all form and disappear with surprising frequency. Maps may not show all the lakes in a given area nor do they indicate recent changes. Some large lakes shrink into several small ones during the dry season, and the process is reversed when the rains come. Named lakes in Marion County that did not meet the criteria for inclusion in this report are listed on page 9 .

RESERVOIRS

A steadily increasing number of reservoirs are being constructed in Oregon. Because many of these are not shown on the latest maps, their existence had to be determined from other sources, and some that qualify for inclusion in this report may have been missed.

ACKNOWLEDGMENTS

This report was prepared by the Geological Survey, Water Resources Division, in cooperation with the Oregon Water Resources Department. Several other agencies contributed much time and effort searching their files and reports for data that could be included in this report. The Oregon State Department of Environmental Quality and the Oregon State Fish and Wildlife Commission furnished information on lake use and other valuable data.

Special thanks are due Stanley F. Kapustka and John Friday for their help in taking aerial photographs of the individual lakes.

Explanation of Terms

Information for each lake included in this report has been grouped under several general terms. Most of the numerical information is given in English units; water-quality data are reported in metric units. Factors for converting between English and metric units are given in table 1.

Table 1.–FACTORS FOR CONVERTING ENGLISH UNITS TO INTERNATIONAL SYSTEM (SI) UNITS

Multiply English units	By	To obtain SI units
Feet (ft)	0.3048	Meters (m)
Miles (mi)	1.609	Kilometers (km)
Acres	4047	Square meters (m^2)
	.4047	Square hectometer (hm^2) 1/
	.004047	Square kilometers (km^2)
Square miles (mi^2)	2.590	Square kilometers (km^2)
Acre-feet (acre-ft)	1233	Cubic meters (m^3)
	1.233×10^{-3}	Cubic hectometers (hm^3)
	1.233×10^{-6}	Cubic kilometers (km^3)
Cubic feet per second (ft^3/s)	.02832	Cubic meters per second (m^3/s)

1/ One hectometer is equal to 100 meters.

An explanation of terms used on the individual lake sheets, with comments on their significance and on accuracy of the data, follows:

Identification number.–The identification number in parentheses preceding the lake name, is used only for identifying the lake on the county map. (See figure 4.) Within the county, lakes are listed in alphabetical order and numbered serially.

Survey date.–The survey date, in the upper right-hand corner of the page, gives the date the lake was visited by the Geological Survey field party. Most of the field data, including water-quality data, depth soundings, and observations of inflow and outflow, were obtained during this visit. Separate dates are shown where specific data were collected at a time other than the survey date.

Location.–Latitude, longitude, township, range, and section were determined from U.S. Geological Survey quadrangle maps (topographic series; see p 11), with the largest scale map available for the lake area given by name and size; for example, St. Paul 7½-minute quadrangle map. In areas where the township, range, and section grid is not drawn on the Geological Survey quadrangle maps, the grid information was obtained from the most recent U.S. Forest Service map and checked against U.S. Bureau of Land Management protractions. The latitude and longitude identifies the point of surface-water outflow, or if there is no outflow, the southernmost tip of the lake.

Direction and distance, rounded to the nearest one-half mile from prominent landmarks, such as towns, roads, or rivers, are included to aid in rapid, easy location. In some instances, a lake is not shown or named on the topographic map and is so indicated.

Drainage basin.—The smallest well-known river basin in which the lake is located is shown first; the major drainage system is listed in parentheses following the basin. For example, the Santiam River is the smallest well-known river basin in which Tumble Lake (p. 81) is located, and it is part of the major drainage system known as the Willamette River basin; therefore, the drainage basin is reported as Santiam River (Willamette River). For a few lakes, the major drainage system is the smallest well-known basin. An example of this is Skookum Lake (p. 75), which drains directly into the Willamette River. A lake that contributes no outflow to the basin cited is reported as "noncontributing."

Drainage area.—The surface-drainage area, in square miles (mi^2), is the area that contributes water to the lake. These areas were delineated on U.S. Geological Survey topographic maps and measured by planimeter. Drainage areas for some lakes were classified as indeterminate because either the surface-drainage area cannot be accurately delineated or the inflow consists primarily of precipitation and ground water.

Surface area.—The surface areas of lakes, in acres, were obtained from several sources. Published reports were an important source of information; however, most surface areas were measured by planimeter on aerial photographs. Because the surface area of many lakes varies widely, depending on the surface elevation and time of year, areas shown in this report are intended only to describe the general size of the lake. Reservoir areas are generally taken from construction drawings and represent normal pool.

Surface elevation.—A single elevation, in feet (ft) above mean sea level, estimated from the best available topographic maps or other source, is shown for each lake. In addition, other information, such as the actual water-surface elevation on the survey date, may be included if available.

Volume.—Lake volume, in acre-feet (acre-ft), was obtained by computing and then summing the volume of each stratum of water between successive contours on the bathymetric map. Each volume was computed using a standard equation incorporating the areas within both the upper and lower contours of the stratum being computed and the vertical distance between them. Reservoir capacity was generally determined from construction drawings and represents normal pool. Because volume can vary widely between seasons and from year to year, volume figures reported are intended to illustrate only the relative size of the lakes. Where data were not adequate to compute volume, it is reported as "not determined."

Inflow.—Information pertaining to the surface inflow, including the name of a stream or streams and direction of flow, is given. Although many lakes receive inflow from several streams, inflow generally could not be measured because the lakes were visited during the low-flow season. Where a rate is reported for inflow, it generally was estimated by computing cross-sectional area of the channel and by timing drift. The rate of inflow, where it was measured or estimated, is reported in cubic feet per second (ft^3/s). Inflow from direct precipitation on the lake or from ground-water seepage was neither measured nor estimated.

Outflow.—Generally, surface outflow is confined to one channel. All available information pertaining to it, including the name of the stream and general direction of outflow, is given. Some lakes have no visible outflow, and the water loss other than that from evaporation and transpiration is by ground-water outflow. Where possible, surface outflows were estimated, but no attempt was made to identify nor to determine ground-water outflow.

Use.—Information on recreational use of the lakes and their surrounding areas, whether private or public, was obtained from other publications, by observation, and from local residents.

Remarks.—Useful information that is not easily classified under the above headings is listed under REMARKS. Topics that might be included in this section are:

1. Descriptive information.
2. Directions or access.
3. Water rights.
4. Qualifying statements.
5. References that provide additional information pertaining to the lake are indicated by numbers from the list of references (p. 10).
6. Agencies furnishing bathymetric data.

Bathymetric map.—Depth contours on the map were made from soundings taken on the SURVEY DATE or from data furnished by some other agency. Soundings were made by the U.S. Geological Survey field party, using either a sounding line or a recording-chart fathometer, and should be considered approximate. Depths are reported in feet and can be converted readily to meters using a conversion factor (see table 1) or a feet-meter scale on the dissolved oxygen-temperature grid. Agencies that supplied depth data are cited. When bathymetric information was not available, only the outline of the lake was shown.

The sampling site (symbol▼) at each lake is shown on the map, as are marshes and other features. Aerial

Calibrating field instruments

photographs, taken in the summer of 1973, were used to estimate the horizontal scale, which is meant to represent relative size only. Inflow and outflow streams are shown graphically by direction and location.

Water-Quality Data

The water-quality data reported in this volume were collected at the time indicated on the SURVEY DATE. Most of the quality data were determined from samples collected 1 foot (0.3 m) below the water surface at the sampling site shown on the map of the lake. Dissolved oxygen, temperature, pH, and conductivity were measured at various depths.

The percentage of cloud cover is given as an indicator of the amount of direct sunlight reaching the lake at the time of sampling. Increasing light intensity in the presence of chlorophyll-bearing aquatic plants increases photosynthetic activity which, in turn, produces more dissolved oxygen and increases the pH of the water in the lighted (trophogenic) zone.

Sampling sites are generally near the deepest part of each lake or reservoir and are considered to be reasonably representative of the physical and chemical characteristics of the entire lake. Some of the larger lakes or those occupying irregular basins were sampled at several sites, because parts of the lakes may have distinctive physical and chemical characteristics.

Data on alkalinity, hardness, dissolved solids, and dissolved oxygen are reported in milligrams per liter (mg/l). One milligram per liter is a weight of 1 milligram of the particular constituent dissolved in 1 liter of water. At the low concentrations given in this report, 1 mg/l is equivalent to 1 ppm (part per million) used in some water-quality reports.

Chemical analyses were made of waters from several lakes to determine concentrations of major ions in solution, plus iron, nitrogen, phosphorus, and silica (table 2). The report "Water-quality criteria, 1972," prepared for the Environmental Protection Agency by the National Academy of Sciences (1974), gives limits for each constituent recommended for public water supplies and other uses. All the plant nutrients, with the exception of nitrogen and phosphorus, are usually sufficiently abundant so as not to limit plant growth. Nitrogen and phosphorus concentrations generally vary inversely with phytoplankton concentrations during bloom periods. Silica (SiO_2) forms the basis of the skeletal structure of an important group of algae, the diatoms, and can be depleted rapidly by a large diatom population. During periods of thermal stratification, the chemical characteristics of water in the hypolimnion can differ significantly from the warmer water in the oxygen-rich epilimnion. (See fig. 3.)

Table 2. – Chemical analyses of waters from selected lakes

Lake	Date of collection	Time (2400 hours)	Dissolved constituents (Milligrams per liter)															Conductivity (micromhos/cm at 25°C)	pH
			Iron (Fe)	Manganese (Mn)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite + Nitrate (as N)	Orthophorphorus (as P)	Dissolved solids	Hardness (as $CaCO_3$)		
Breitenbush Lake	[1]9-11-74	–	–	–	3.8	–	–	–	–	2	–	–	–	–	–	14	–	7	6.6
Do	8- 4-76	1230	–	–	–	–	–	–	–	5	–	–	–	–	–	22	5	7	7.6
Case Creek Reservoir	7-13-76	1300	0.04	0.38	17	32	11	10	2.8	182	7.4	6.5	0.2	0.49	0.02	184	120	269	7.5
Clear Lake	7-20-76	1120	.06	.00	42	26	12	9.8	1.9	146	11	6.7	.1	.96	.10	176	97	258	8.5
Detroit Lake (site 1)	8- 3-76	1430	.00	.00	15	3.4	.7	2.1	.5	29	.5	.8	.0	.00	.00	41	10	34	7.6
Fish Lake	8-18-76	1045	.00	.00	11	2.7	.4	1.1	.4	16	.0	.6	.0	.01	.00	20	7	24	7.3
Gibson Lake	[1]9-13-74	–	–	–	.5	–	–	–	–	2	–	–	–	–	–	7	–	3	6.9
Do	8- 4-76	1615	–	–	–	–	–	–	–	2	–	–	–	–	–	10	1	4	6.8
Neknoberts Lake	8-20-76	1000	.00	.00	.3	.1	.0	.1	.0	2	1.1	1.0	.0	.01	.00	14	1	4	5.5
Round Lake	8-27-76	1100	.07	.01	18	6.3	2.1	2.4	.7	40	1.9	.7	.1	.08	.01	64	25	60	8.2
Salem Sand and Gravel Pond	10-27-76	1345	.02	.08	6.8	28	14	9.6	2.6	161	9.4	5.0	.1	.07	.01	162	134	288	7.8
Silver Creek Reservoir	10-14-76	1030	.27	.02	12	3.1	1.2	2.4	.7	17	.8	1.4	.0	.03	.01	32	10	38	6.8
Tumble Lake	8-10-76	1600	.01	.00	4.0	2.3	.2	.8	.0	10	.1	1.3	.0	.01	.02	24	5	18	7.4
Wirth Lake	7-21-76	1700	.12	.01	10	5.9	2.2	3.1	.6	30	2.0	2.6	.1	.00	.00	54	16	60	9.3

[1]Robison and Laenen (1976, p. 72).

Water samples were analyzed at the U.S. Geological Survey central laboratory in Arvada, Colorado, using the methods described by Brown, Skougstad, and Fishman (1970).

To help those unfamiliar with the technical terms and the measurements made in this study, the methods used and the significance of the variables measured are reviewed briefly for each quality parameter.

pH.—The pH of a solution is a measure of the effective hydrogen-ion activity. The pH of a sample is an important parameter in controlling the solubility of dissolved constituents and thus affects chemical concentrations. The range of pH values is from 0 to 14; solutions in the range of 0 to 7 are considered to be acidic, and those in the range of 7 to 14 are considered to be alkaline. At a pH of 7, water is neither acidic nor alkaline, but is a neutral solution. The pH scale is logarithmic, so that a change of one pH unit represents a ten-fold change in hydrogen-ion activity.

The pH of lake water may be altered through photosynthesis and respiration by waterborne plants, as well as by other activities. The uptake of carbon dioxide during photosynthesis increases the pH of the water, whereas the release of carbon dioxide during respiration decreases the pH value.

On most lakes, profiles of pH were taken with a portable pH meter, utilizing a submersible probe, but only values near the surface and 1 foot (0.3 m) above lake bottom are reported. On the remaining lakes, pH determinations were made only on water samples collected in a Van Doren bottle 1 foot (0.3 m) below the surface and 1 foot (0.3 m) above the lake bottom. The pH of these samples was determined as soon as possible after collection.

Conductivity.—Specific conductance, or conductivity, is a measure of the ability of water to conduct an electrical current and is expressed as micromhos per centimeter at 25°C (Celsius). The specific conductance is low for pure water, but increases as water becomes more mineralized. Hence, specific conductance is related to the concentration of ionized minerals in the water. In this report, specific conductance was measured for samples taken at various depths, but values are reported only near the surface and bottom.

Alkalinity.—Alkalinity is the capacity of water to neutralize an acid by means of chemical buffering. In natural waters, alkalinity is caused primarily by the presence of bicarbonate, carbonate, or hydroxide ions. Waters with low alkalinity may tend to show large daily and seasonal fluctuations in pH. For this study, alkalinity is reported in milligrams per liter as $CaCO_3$ (calcium carbonate) and was determined by titrating the samples with 0.01639 N sulfuric acid to a pH of 4.5.

Total hardness.—Historically, water has been classified as "hard" or "soft" depending on how readily the water produces a lather when mixed with soap. For this study, hardness values are reported in milligrams per liter as $CaCO_3$. Any water with hardness of less than 60 mg/l as $CaCO_3$ is considered to be soft on an arbitrary scale used by the Geological Survey. Generally, hard-water lakes tend to be more biologically productive than soft-water lakes, but there are many exceptions (Iwatsubo, Britton, and Averett, 1972, p. 11). Hardness was determined using the complexometric method (Brown, Skougstad, and Fishman, 1970, p. 95).

Dissolved solids.—Dissolved solids was determined by evaporating a known quantity of filtered water at 180°C and weighing the residue. The U.S. Public Health Service (1962) has established a recommended limit of 500 mg/l of dissolved solids for drinking water supplies, although this limit may be exceeded if no better water is available. Commonly, the numerical value for dissolved solids (milligrams per liter) is about two-thirds the specific conductance value in micromhos per centimeter). However, in the low range of conductivity values found in many parts of Oregon, either proportionately high silica concentrations or abundant organic material may contribute significantly to the dissolved-solids content, causing a higher value than might be expected by comparison with conductivity readings.

Dissolved-oxygen profile.—The concentration of dissolved oxygen in water is a function of the temperature and salinity of the water and of the partial pressure of atmospheric oxygen in contact with the water. Oxygen solubility is inversely related to the water temperature and salinity. The warmer the water the less oxygen it will contain. The oxygen concentration in water is continually being altered by life processes such as photosynthesis and respiration and by complex chemical reactions. For example, in enriched lakes, it is common in late summer to find maximum oxygen concentrations in the epilimnion resulting from photosynthesis. In contrast, oxygen depletion can occur in the hypolimnion of these lakes due to bacterial decomposition of organic matter (Britton, Averett, and Ferreira, 1975, p. 17). In lakes at low altitude, such as those in the Willamette Valley where atmospheric pressure is high, dissolved-oxygen concentrations at saturation are higher than at equivalent temperatures in lakes at higher altitudes.

Although dissolved-oxygen values in this report represent only one group of observations, they will provide a guide for evaluating the suitability of a lake for fish life and other fresh-water organisms. A generalization based on thousands of field determinations on inland waters (Welch, 1952) states that "dissolved oxygen at levels of 3 ppm [mg/1] or lower should be regarded as hazardous to lethal [for fish]

under average stream and lake conditions; and that 5 ppm [mg/1] or more of dissolved oxygen should be present in waters, if conditions are to be favorable for freshwater fishes." This statement, which applies mainly to warm-water fish, assumes that other vital requirements are held within their proper limits. The combined influence of dissolved oxygen and temperature on rainbow trout is illustrated in figure 2, which is patterned after figure 11 in a report by Smith and Bella (1973).

Temperature profile.—Temperature, which varies in lakes with depth and time of year, is the most important controlling factor in the aquatic environment. Life processes, chemical-reaction rates, and many physical events occur only within definite temperature ranges. Because the density of fresh water is primarily a function of temperature, layering of water of equal temperature (homothermal) often occurs in lakes. Fresh water reaches its maximum density at 3.98°C and is less dense either above or below this temperature. Generally during the summer, a warm, oxygen-rich, circulating layer of water, the epilimnion (upper layer), is separated from the cooler, oxygen-poor hypolimnion (deep layer) water by a zone called the metalimnion, which is characterized by rapid changes in temperature and oxygen with increasing depth. The plane of maximum rate of decrease in temperature within the metalimnion (transition layer) is termed the "thermocline" (fig. 3). Temperature profiles for the lakes depict this stratification. In late fall, as the surface waters begin to cool, the stable stratified condition that has developed during the warm summer months begins to break down, the lake soon becomes homothermal from top to bottom. This is the fall turnover period. If the water continues to cool below 3.98°C, a reverse stratification will occur with colder water overlying water several degrees warmer. This is the winter stratification period. After another mixing period or turnover in the spring, the entire process begins again. These temperature variations in lakes influence the suitability of a lake for uses such as recreation, fish production (see fig. 2), and public water supplies.

For most lakes, the temperatures listed were probably close to the maximum for the year when sampled. However, temperatures at other times may vary considerably from these, depending on weather conditions, inflow, lake depth, etc. For most lakes, temperature was plotted against depth, and a solid line was drawn on the graph between the plotted points.

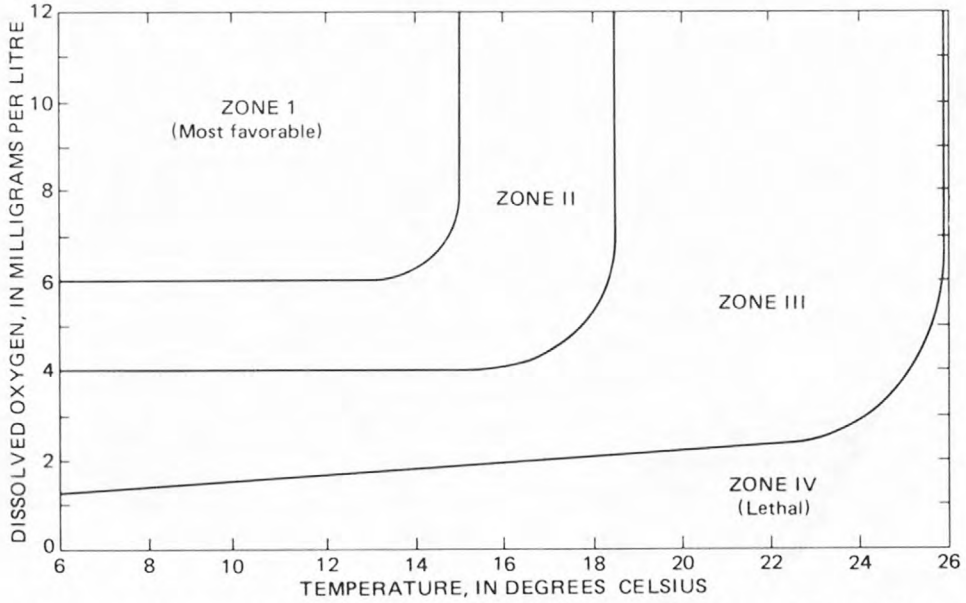


Figure 2.—Livability zones for rainbow trout based on combinations of dissolved oxygen and temperature. (Adapted from Smith and Bella, 1973, p. 129.)

Temperatures are reported in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) using the following table:

°C	°F	°C	°F	°C	°F
0	32	10	50	20	68
1	34	11	52	21	70
2	36	12	54	22	72
3	37	13	55	23	73
4	39	14	57	24	75
5	41	15	59	25	77
6	43	16	61	26	79
7	45	17	63	27	81
8	46	18	64	28	82
9	48	19	66	29	84

Transparency.—Transparency, or penetration of light, refers to the depth to which light can penetrate through water. Light penetration is dependent on materials in the water that scatter or absorb light, such as suspended sediment and phytoplankton which limit light transmission. Because photosynthesis can occur only to depths where sufficient light is available, transparency is one of the more important parameters that govern the biological activity of a lake.

Transparency measurements were made by lowering a 20-centimeter Secchi disc on a graduated line, noting the depth beneath the water surface at which it disappeared, then lifting the plate and noting the depth at which it reappeared. The average of the two readings gives the reported transparency depth and has been calculated to be in the region of approximately 5 percent light transmittance (Reid, 1961). Depths are reported to the nearest 0.1 meter. These measurements provide comparative information on the transparency of water in the various lakes. Transparency at a given lake will be influenced by cloud cover.

Color.—Color value is determined by a comparison of the water with standardized colored-glass discs and is reported in platinum-cobalt (Pt-Co) units. Water color in lakes generally results from the decomposition of vegetation, which gives the water a brown, tea-like color.

Coliform bacteria.—For this report, the fecal coliform bacteria group is defined as all organisms that produce blue colonies when grown on M-FC medium at 44.5°C within 24 hours (Slack and others, 1973). A 100-milliliter water sample was filtered for this examination, using 0.45-micron membrane filters. If no colonies developed after 24 hours of incubation, a value of less than one colony per 100 milliliters of sample was reported. Because fecal coliforms are that part of the total coliform group that is present in the gut or feces of warmblooded animals, their presence may indicate recent and possibly dangerous contamination. If any coliform bacteria are indicated, the water should be considered to have disease-producing potential.

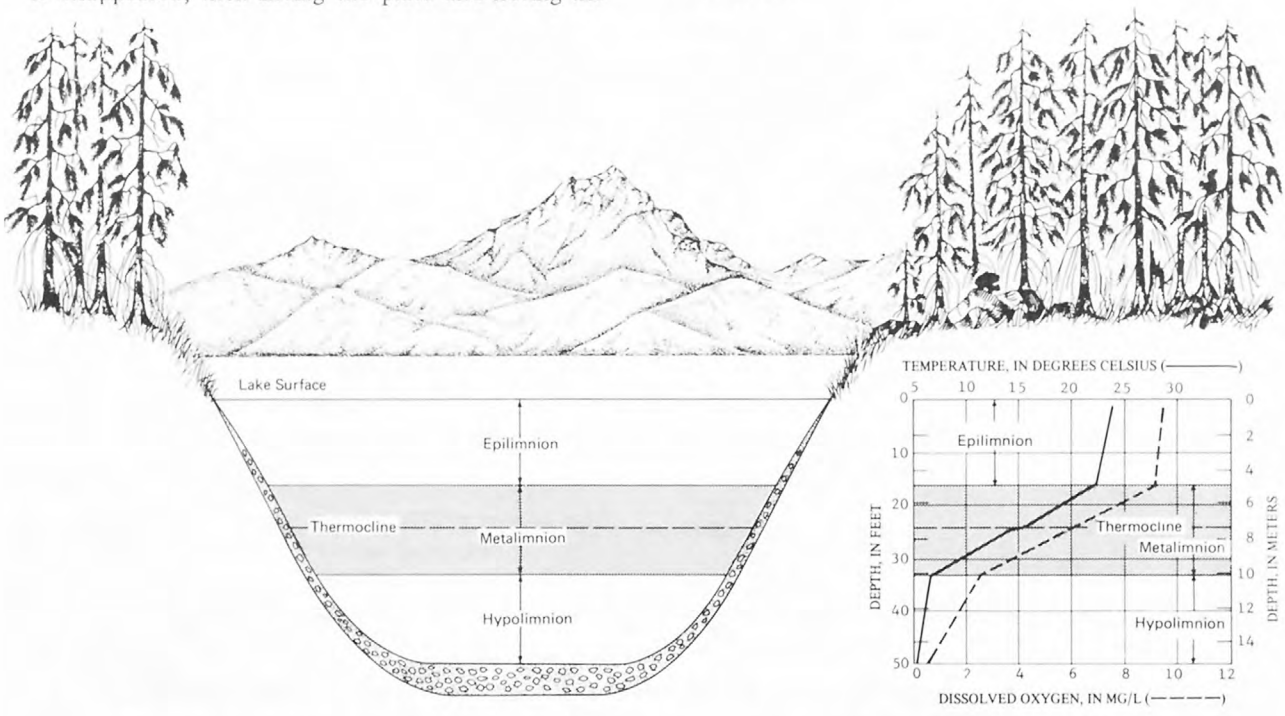


Figure 3.—Idealized thermal stratification during summer in a lake in the North Temperate zone.

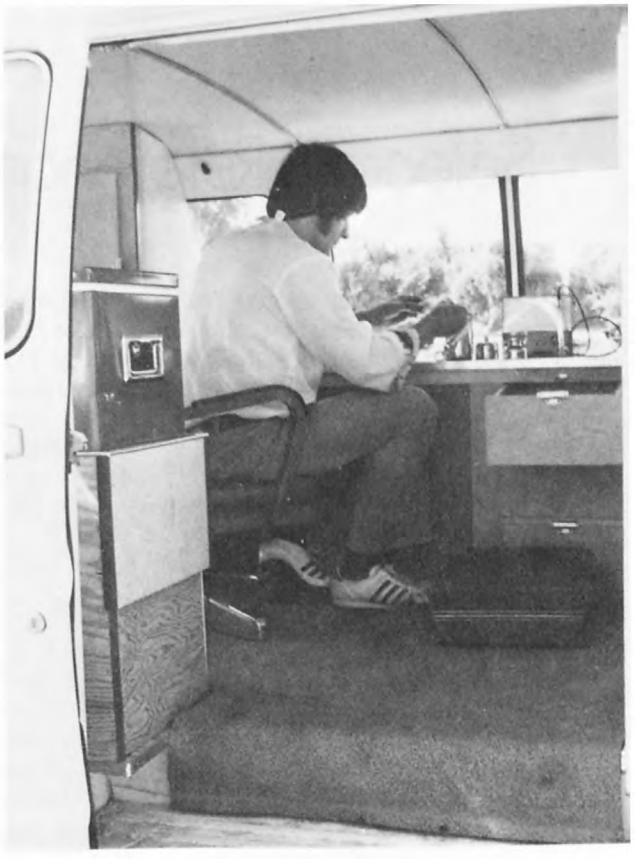
Algae.—Algae are chlorophyll-containing plants ranging from microscopic sizes to more than 100 ft. (30 m) in length. The aggregate of algae that drift with the currents are called phytoplankton. The algae that are attached to or live upon submerged solid surfaces make up the periphyton community. Algae composition and abundance are related to water quality and may affect the taste, odor, and color of the water.

For selected lakes, algae were identified by the common name followed by the genus name. Water samples for phytoplankton analyses were collected 1 ft. (0.3 m) below the water surface at the sampling site. Periphyton samples were scrapings collected from submerged plants, trees, stones, and other objects. (See "REMARKS" for algae data.)

Other Named Lakes

Some Marion County lakes named on the U.S. Geological Survey topographic maps or listed by the Oregon Department of Fish and Wildlife were not studied because they did not meet the established criteria at the time of the survey. However, because at other times of the year these lakes might be of some importance and would therefore meet the criteria, they are listed alphabetical below.

Lake	Section	Township	Range
Abiqua Lake[1]	13	8 S.	2 E.
Babe Lake	34	9 S.	8 E.
Big Spud Lake[1]	4	9 S.	8 E.
Bump Lake	28	8 S.	8 E.
Butte Lake[1]	11	8 S.	3 E.
Cache Box Lake[1]	18	8 S.	6 E.
Davey Lake	27	9 S.	8 E.
Dicker Reservoir	23	8 S.	4 W.
Double Peaks Lake	9	9 S.	8 E.
Elkhorn Lake[1]	3	9 S.	4 E.
Ercrama Lake[1]	20	8 S.	6 E.
Fibre Lake[1]	10, 11	8 S.	3 E.
Finley Lake	3	9 S.	8 E.
First Lake	2	9 S.	8 E.
Fork Lake	4	9 S.	8 E.
Franzen Reservoir	28, 29	8 S.	2 W.
Geibler Lake[1]	12	9 S.	5 E.
Gifford Lake	3	9 S.	8 E.
Indian Lakes	9, 16	9 S.	8 E.
Kuenzi Reservoir	16	7 S.	1 W.
L Lake	2	9 S.	8 E.
Mildred Lake	29	9 S.	8 E.



On site analysis

Lake	Section	Township	Range
Nippon Lake[1]	2	9 S.	8 E.
Papoose Lakes	36	9 S.	8 E.
Park Lake	15	10 S.	8 E.
Pawnee Lake	9, 10	9 S.	8 E.
Rhody Lake[1]	11	8 S.	3 E.
Rimrock Lake	10	9 S.	8 E.
Ring Lake	10	9 S.	8 E.
Rock Lake	15	10 S.	8 E.
Rose Lake	26, 35	8 S.	4 W.
Ruddy Lake[1]	22	9 S.	8 E.
Sheep Lake	31	9 S.	8 E.
Short Lake[1]	18	9 S.	7 E.
Silver King Lake[1]	24	8 S.	5 E.
Spinning Lake	22	9 S.	8 E.
Sportsman Lakes	1, 2	9 S.	7 E.
Swindle Lake	28, 33	9 S.	8 E.
Triangle Lake	25	8 S.	8 E.
Tub Lake	2	9 S.	8 E.
West Lake	16	8 S.	6 E.
Whitewater Lake	20	10 S.	8 E.

[1] Name used by Oregon Department of Fish and Wildlife; not named on topographic map.

Selected References

1. American Public Health Association and others, 1971, Standard methods for the examination of water and wastewater [13th ed.]: New York, Am. Public Health Assoc., 874 p.
2. Britton, L. J., Averett, R. C., and Ferreira, R. F., 1975, An introduction to the processes, problems, and management of urban lakes: U.S. Geol. Survey Circ. 601-K, 22 p.
3. Brown, Eugene, Skougstad, M. W., and Fishman, M. J., 1970, Methods for collection and analysis of water samples for dissolved minerals and gases: U.S. Geol. Survey Technical Water-Resources Inv., book 5, chap. Al, 160 p.
4. Campbell, C. J., 1940, Lake survey—Mount Hood National Forest: Portland, Oreg., U.S. Forest Service Pub., 43 p.
5. Coleman, L. S., 1953, Lake survey of some lakes in the Willamette, Deschutes, and Mt. Hood National Forests: Corvallis, Oreg., Oregon State Game Comm. rept., 114 p.
6. Foster Sporting Goods, no date, The Oregon sportsman's guide, Fishing edition, 1960-61: Portland, Oreg., Foster Sporting Goods, 262 p.
7. Hem, J. D., 1971, Study and interpretation of the chemical characteristics of natural water [2d ed.]: U.S. Geol. Survey Water-Supply Paper 1473, 363 p.
8. Hilliker, B., 1959, Lake survey report of some lakes in the Willamette and Mt. Hood National Forests, 1959: Corvallis, Oreg., Oregon State Game Comm. rept., 244 p.
9. Iwatsubo, R. T., Britton, L. J., and Averett, R. C., 1972, Selected physical and chemical characteristics of twenty California lakes: U.S. Geol. Survey open-file rept., 59 p.
10. Koski, C., 1957, Lake survey of some lakes in the Mt. Hood National Forest: Corvallis, Oreg., Oregon State Game Comm., 540 p.
11. Larson, D. W., and Donaldson, J. R., 1971, A complication of the named lakes in Oregon: Corvallis, Oregon State Univ., Dept. Fisheries and Wildlife, 125 p.
12. Maltezos, G. C., 1955, Lake survey of some lakes in the Umpqua, Willamette, Deschutes, and Mt. Hood National Forests: Bend, Oreg., Oregon State Game Comm., 321 p.
13. McHugh, R. A., 1972, An interim study of some physical, chemical and biological properties of selected Oregon lakes: Oregon State Dept. Environmental Quality, 109 p.
14. National Academy of Sciences, National Academy of Engineering, 1974, Water quality criteria, 1972: U.S. Govt. Printing Office, Washington, D.C., 594 p.
15. Oregon State Engineer, 1973, Oregon reservoir inventory: Salem, Oreg.
16. Oregon State Water Resources Board, 1971, Surface area of lakes and reservoirs, Oregon: Salem, Oreg., 40 p.
17. Reid, G. K., 1961, Ecology of inland waters and estuaries: New York, D. Van Nostrand Co., 375 p.
18. Robison, J. H., and Laenen, Antonius, 1976, Water resources of the Warm Springs Indian Reservation, Oregon: Portland, Oreg., U.S. Geol. Survey Water-Resources Inv., WRI 72-26, 85 p.
19. Slack, K. V., Averett, R. C., Greeson, P. E., and Lipscomb, R. G., 1973, Methods for collection and analysis of aquatic biological and microbiological samples: U.S. Geol. Survey Tech. Water-Resources Inv., book 5, chap. A4, 165 p.
20. Smith, S. A., and Bella, D. A., 1973, Dissolved oxygen and temperature in a stratified lake: Jour. Water Pollution Control Federation, v. 45, no. 1, p. 119-133.
21. Smith, W. D., and Greenup, W., 1939, Lakes of Oregon: Northwest Sci., v. 13, no. 4, p. 76-96.
22. Stout, W., Swan, R., and Wetherbee, J., 1961, Lake survey of some lakes in the Willamette and Mt. Hood National Forest: Corvallis, Oreg., Oregon State Game Commission, 224 p.
23. U.S. Geological Survey, 1976, Water resources data for Oregon, 1975: Portland, Oreg., U.S. Geol. Survey, Water Resources Div., 586 p.; available from U.S. Dept. Commerce, Nat. Tech. Inf. Service, Springfield, Va., as Rept. PB-257 153.
24. U.S. Public Health Service, 1962, Drinking water standards, 1962: U.S. Public Health Service Pub. 956, 61 p.
25. Welch, P. S., 1952, Limnology: New York, McGraw-Hill Book Co., 538 p.
26. Ziesenhenne, F. C., 1937, Lake survey of the Willamette National Forest: Eugene, Oreg., U.S. Forest Service rept., 32 p.
27. _____1938, Lake survey of the Willamette National Forest: Eugene, Oreg., U.S. Forest Service rept., 44 p.

A State index showing topographic maps is available free on request to the Distribution Section, U.S. Geological Survey, Denver Federal Center, Lakewood, Colo. 80225. The index contains lists of special maps, addresses of local map reference libraries, local map dealers, and Federal map distribution centers. An order blank and detailed instructions for ordering maps are supplied with each index.

Detroit Lake

Lakes of Marion County

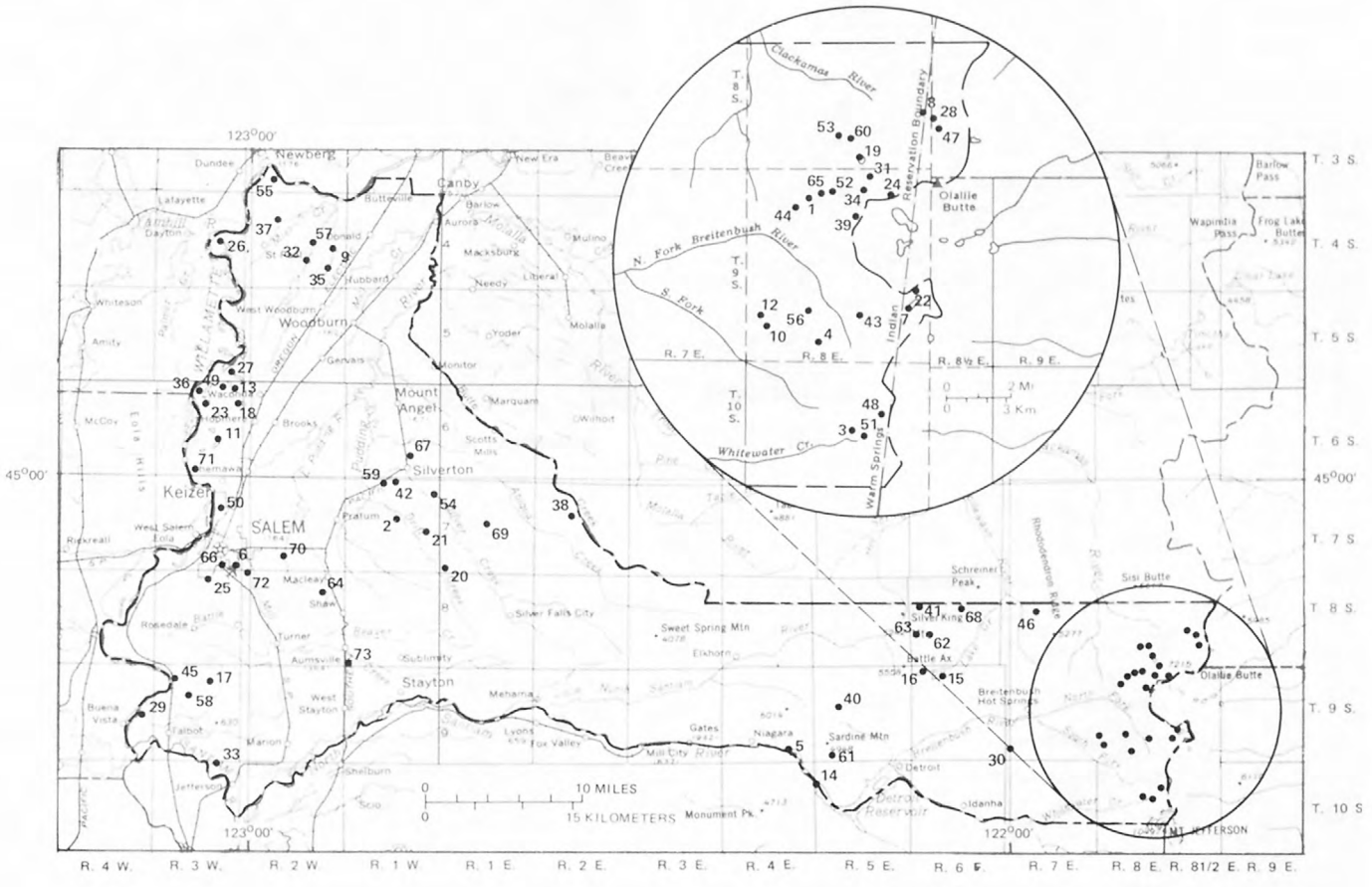


Figure 4.—Locations and identification numbers of lakes in Marion County.

LOCATION: Secs.4, 5, 8, and 9, T.9 S., R.8 E., in the Mount Hood National Forest about 4 mi (6.5 km) west of Olallie Butte Lookout and 6.5 mi (10 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°48'56", long 121°50'45". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 1.31 mi^2 (3.39 km^2).

SURFACE AREA: 13 acres (53,000 m^2).

SURFACE ELEVATION: 4,680 ft (1,430 m) above mean sea level, from topographic map.

VOLUME: 55 acre-ft (68,000 m^3).

INFLOW: No measurable flow from unnamed stream on northeast end of lake.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on west end of lake to Cub Creek.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Emergent grass was observed along the perimeter of the lake, and about 1 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud with rock and detritus observed along the shoal area.
Access to the lake 2 mi (3.2 km) by Forest Service Trail 719 from Forest Service Road S46A.
References: 4, 8, 11.

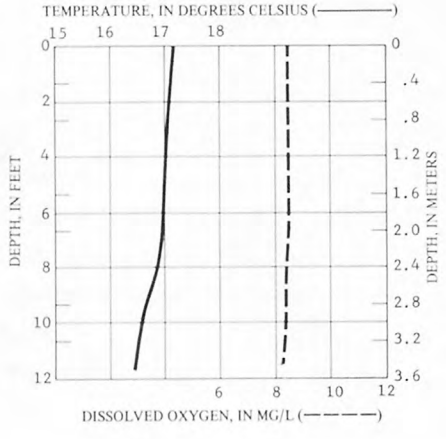
Photograph taken July 28, 1976.

WATER-QUALITY DATA

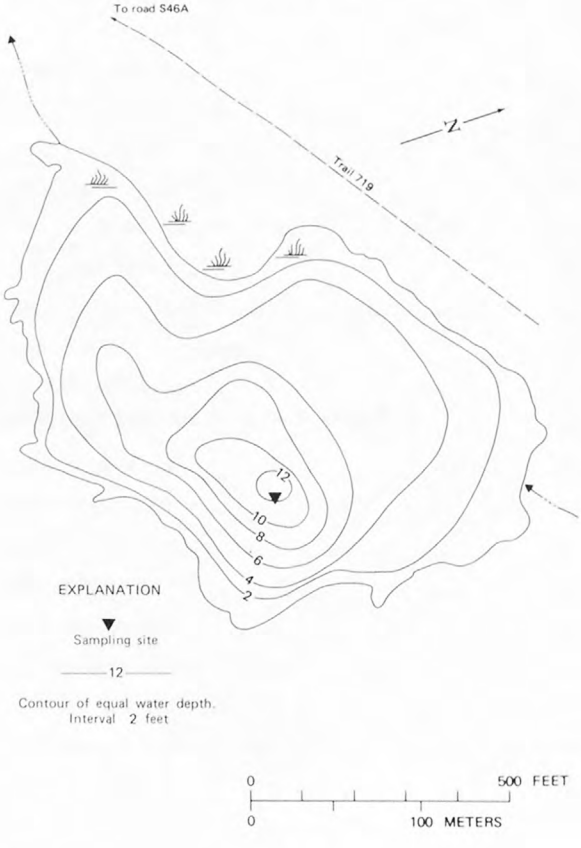
SAMPLING TIME: 1615 hours
CLOUD COVER: 5 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.2	5
BOTTOM	6.1	5

ALKALINITY (mg/l as $CaCO_3$)	2
TOTAL HARDNESS (mg/l as $CaCO_3$)	2
DISSOLVED SOLIDS (mg/l)	8
TRANSPARENCY (meters)	3.7 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.15, T.7 S., R.1 W., about 3 mi (5 km) south of Silverton and 9 mi (14 km) east of Salem. Surface-water outlet at lat 44°57'29", long 122°47'56". Stayton NE 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.59 mi^2 (4.12 km^2).

SURFACE AREA: 6 acres (24,000 m^2) at normal pool.

SURFACE ELEVATION: 430 ft (130 m) above mean sea level, from topographic map.

VOLUME: 63 acre-ft (78,000 m^3) at normal pool.

INFLOW: No flow observed from unnamed stream on south side of reservoir.

OUTFLOW: No measurable flow over spillway into channel on north end of reservoir to Pudding River.

USE: No public recreation.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud. An algal bloom was observed on the survey date.

This reservoir is the larger of the two reservoirs which are owned by the Barnes Brothers.

Water-rights certificate issued for the combined reservoir storage is 67.6 acre-ft (83,000 m^3) for irrigation.

Information on surface area, volume, drainage area, and bathymetry furnished by the Oregon Water Resources Department.

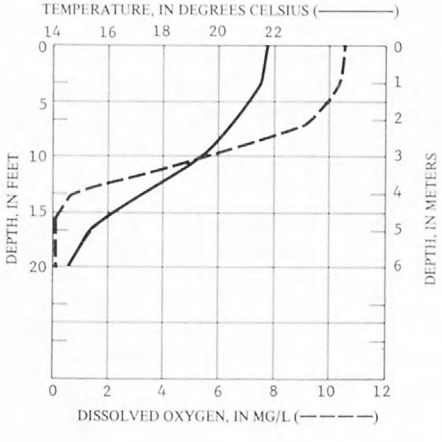
Photograph taken August 24, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1200 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.2	38
BOTTOM	6.8	64

ALKALINITY (mg/l as $CaCO_3$)	20
TOTAL HARDNESS (mg/l as $CaCO_3$)	14
DISSOLVED SOLIDS (mg/l)	30
TRANSPARENCY (meters)	1.2
COLOR (Pt-Co units)	20
FECAL COLIFORM (colonies/100 ml)	36



LOCATION: Sec.15, T.10 S., R.8 E., in the Mount Jefferson Wilderness about 2 mi (3.2 km) north of Mount Jefferson, 3.5 mi (5.5 km) southeast of Bear Point Lookout and 9 mi (14 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°42'37", long 121°49'01". Mount Jefferson 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.25 mi^2 (0.65 km^2).

SURFACE AREA: 14 acres (57,000 m^2).

SURFACE ELEVATION: 5,840 ft (1,780 m) above mean sea level, from topographic map.

VOLUME: 130 acre-ft (160,000 m^3).

INFLOW: No measurable flow from unnamed stream on east end of lake.

OUTFLOW: No flow observed through channel on northwest end of lake to the South Fork Breitenbush River.

USE: Public recreation. The lake has been periodically stocked with golden trout and brook trout by the Oregon Department of Fish and Wildlife. The lake is in Jefferson Park, a wilderness camp area.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud, boulders, and sand.

Access to the lake 5 mi (8 km) by Forest Service Trail 3429 and Pacific Crest Trail from Forest Service Road 1044.

References: 11, 26, 27.

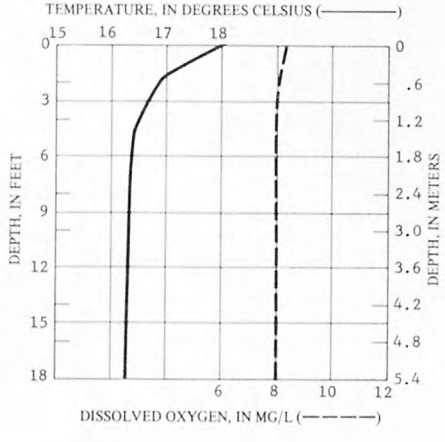
Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1545 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	5.7	4
BOTTOM	5.7	4

ALKALINITY (mg/l as $CaCO_3$)	1
TOTAL HARDNESS (mg/l as $CaCO_3$)	2
DISSOLVED SOLIDS (mg/l)	8
TRANSPARENCY (meters)	6.1 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP

LOCATION: Sec.33, T.9 S., R.8 E., in the Mount Jefferson Wilderness about 0.5 mi (0.8 km) east of Bear Point Lookout and 6.5 mi (10 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°44'59", long 121°50'26". Breitenbush Hot Springs and Mount Jefferson 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.15 mi^2 (0.39 km^2).

SURFACE AREA: 10 acres (40,000 m^2).

SURFACE ELEVATION: 5,280 ft (1,610 m) above mean sea level, from topographic map.

VOLUME: 80 acre-ft (99,000 m^3).

INFLOW: No flow observed from channel on south end of lake. Inflow stream not indicated on topographic map.

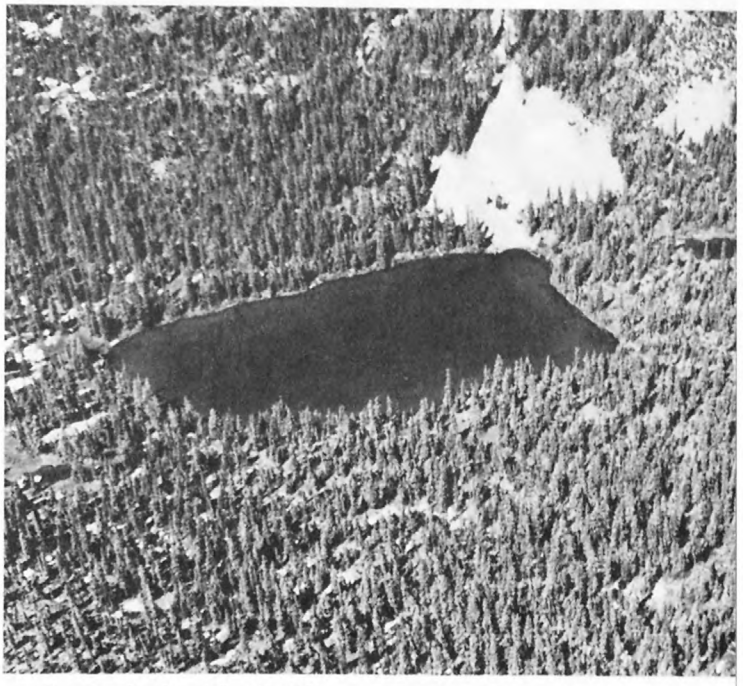
OUTFLOW: No flow observed through channel on northeast end of lake to the South Fork of the North Fork Breitenbush River.

USE: Public recreation. The lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: No evidence of emergent growth; however, some submerged aquatic growth was observed in the southern part of the lake. Bottom material is primarily sand and rock with some detritus along the shoal area.

There are no maintained trails to the lake. The lake is directly south of Slideout Lake (see p. 76) about 1 mi (1.6 km) through dense vegetation.

References: 10, 11, 26, 27.



Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1500 hours
CLOUD COVER: 2 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.3	6
BOTTOM	6.2	6

ALKALINITY (mg/l as $CaCO_3$) 2

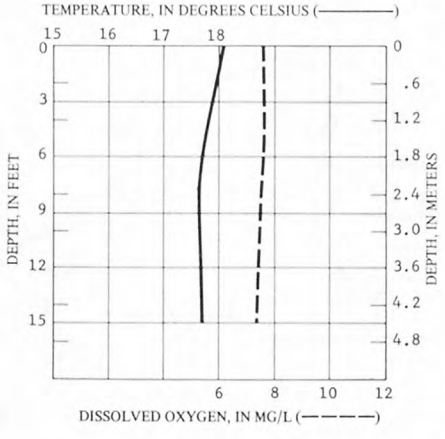
TOTAL HARDNESS (mg/l as $CaCO_3$) 2

DISSOLVED SOLIDS (mg/l) 10

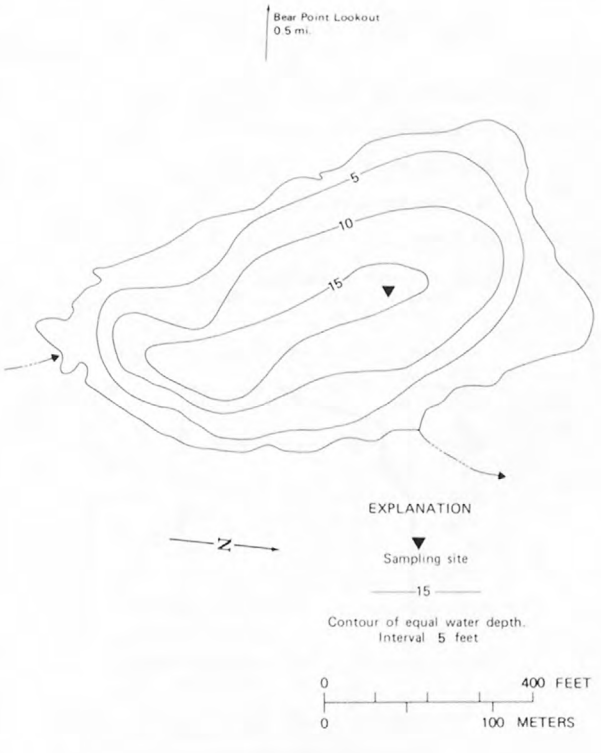
TRANSPARENCY (meters) 4.9 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP



LOCATION: Secs.35 and 36, T.9 S., R.4 E., Secs. 1 and 12, T.10 S., R.4 E., and Sec.7, T.10 S., R.5 E., about 6 mi (10 km) west of Detroit and 9 mi (14 km) east of Mill City. Surface-water outlet at lat 44°45'05", long 122°16'55". Mill City and Quartzville 15-minute quadrangle maps.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 449 mi^2 (1,160 km^2).

SURFACE AREA: 141 acres (571,000 m^2) at normal pool.

SURFACE ELEVATION: 1,206 ft (368 m) above mean sea level at normal pool.

VOLUME: 6,450 acre-ft (7.95 hm^3) at normal pool.

INFLOW: Principal inflow from North Santiam River and from small streams named on the bathymetric map.

OUTFLOW: North Santiam River.

USE: Public recreation. The reservoir was stocked with fingerling winter steelhead in 1974 and 1976 by the Oregon Department of Fish and Wildlife. There is a public boat launch at the reservoir. Big Cliff Reservoir is a small retaining reservoir used to reregulate the water that flows through the generation plant at Detroit Dam.

REMARK: No evidence of either floating or submerged aquatic growth. Bottom material is primarily sand, mud, and rocks.

The bathymetric map represents the reservoir at 6 ft (1.8 m) below normal pool.

A small generation plant is located at Big Cliff Dam, and has a maximum electrical output of 21 megawatts.

Information on surface area, volume, elevation, and bathymetry furnished by the U.S. Army Corps of Engineers, Portland District.

Access to the reservoir from State Highway 22.

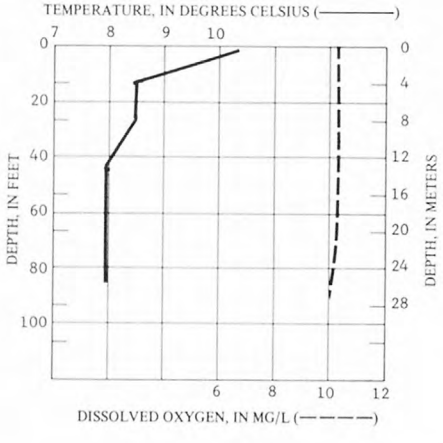
Photograph taken September 8, 1976.

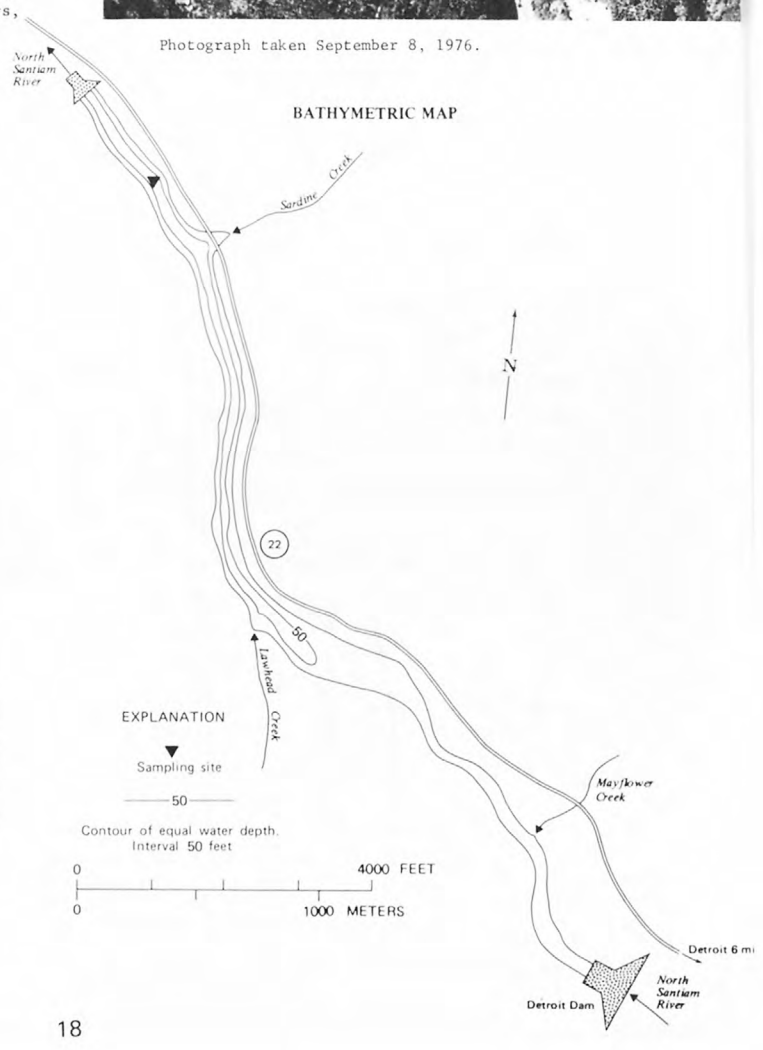
WATER-QUALITY DATA

SAMPLING TIME: 1030 hours
CLOUD COVER: 1 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.9	36
BOTTOM	7.0	35

ALKALINITY (mg/l as $CaCO_3$)	27
TOTAL HARDNESS (mg/l as $CaCO_3$)	10
DISSOLVED SOLIDS (mg/l)	38
TRANSPARENCY (meters)	11.1
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	
Sampling site	<1
Sardine Creek	<1





LOCATION: Sec.36, T.7 S., R.3 W., just southwest of intersection of Interstate Highway I-5 and State Highway 22, in southeast Salem. Southernmost tip of lake at lat 44°54'50", long 122°59'27". Salem East 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Mill Creek (Willamette River).

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 200 ft (61 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: No inflow channel observed and none indicated on topographic map.

OUTFLOW: No outflow channel observed and none indicated on topographic map.

USE: Public recreation. The lake has been periodically stocked with fingerling rainbow trout by the Oregon Department of Fish and Wildlife. Boating and swimming are not allowed. The lake is in Blue Gill City Park.

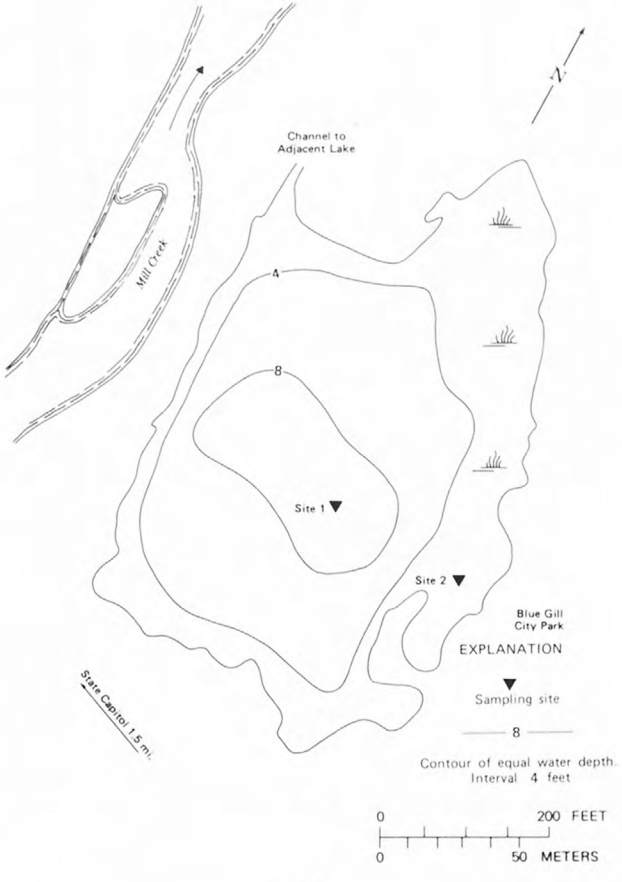
REMARKS: Emergent grass covered about 10 percent of the lake, and about 10 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud with sand along the shore.

An algal bloom was observed on both survey dates. On July 22, 1976, phytoplankton analysis showed the blue-green algae Aphanizomen and the green algae Spirogyra to be the codominant algae present; also, the green algae Oedogonium was observed in some periphyton samples.

On July 22, 1976, numerous ducks were observed on the lake.

Photograph taken August 24, 1976.

BATHYMETRIC MAP



WATER-QUALITY DATA
Site 1

SAMPLING TIME: 1215 hours - October 5, 1976
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	88
BOTTOM	6.5	87

ALKALINITY (mg/l as $CaCO_3$) 34

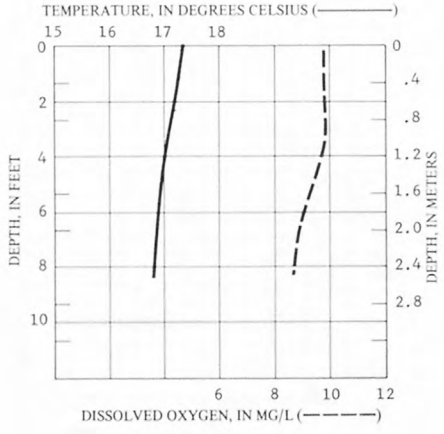
TOTAL HARDNESS (mg/l as $CaCO_3$) 32

DISSOLVED SOLIDS (mg/l) 60

TRANSPARENCY (meters) .7

COLOR (Pt-Co units) 25

FECAL COLIFORM (colonies/100 ml) 2



WATER-QUALITY DATA
Site 2

SAMPLING TIME: 0945 hours - July 22, 1976
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.8	86
BOTTOM	8.6	86

ALKALINITY (mg/l as $CaCO_3$) 47

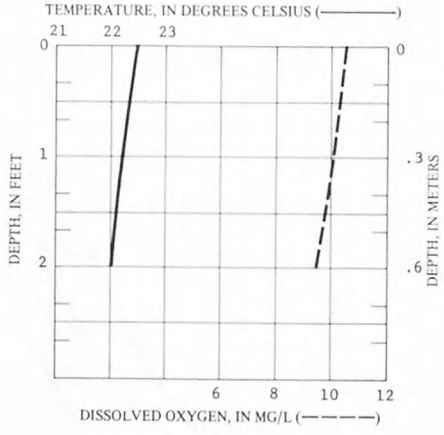
TOTAL HARDNESS (mg/l as $CaCO_3$) 32

DISSOLVED SOLIDS (mg/l) 76

TRANSPARENCY (meters) .6

COLOR (Pt-Co units) 30

FECAL COLIFORM (colonies/100 ml) 340



LOCATION: Sec.25, T.9 S., R.8 E., in the Warm Springs Indian Reservation about 3.5 mi (5.5 km) northeast of Bear Point Lookout and 9.5 mi (15 km) east of Breitenbush Hot Springs. Surface-water outlet at lat 44°45'55", long 121°46'54". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 1.47 mi^2 (3.81 km^2).

SURFACE AREA: 60 acres (240,000 m^2).

SURFACE ELEVATION: 5,500 ft (1,680 m) above mean sea level, from topographic map.

VOLUME: 400 acre-ft (490,000 m^3).

INFLOW: No measurable flows from the unnamed intermittent stream on the east end of the lake nor from the unnamed perennial stream on the south end of the lake.

OUTFLOW: Estimated 3 ft^3/s (0.08 m^3/s) through channel on southwest end of lake to the North Fork Breitenbush River.

USE: Public recreation. The lake has been periodically stocked with golden trout and rainbow trout by the Oregon Department of Fish and Wildlife. The U.S. Forest Service maintains a campground with two shelters at the lake. No powerboats are permitted.

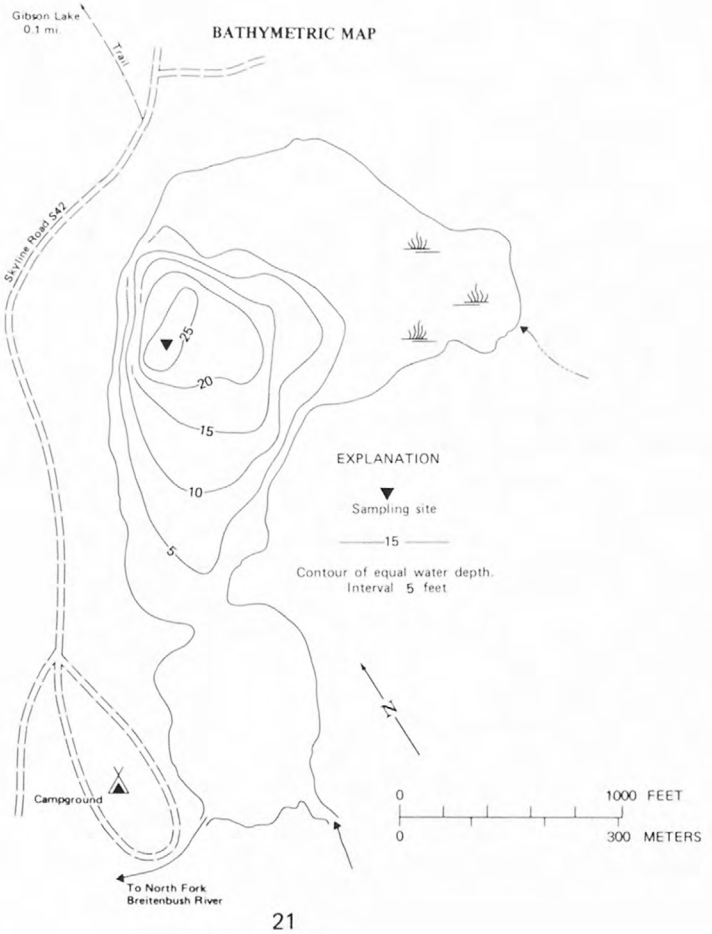
REMARKS: Emergent grass covered about 10 percent of the lake, and dense submerged aquatic growth was observed in the southern section of the lake. Bottom material is primarily mud with some sand and gravel observed along the shoal area.

Phytoplankton analysis showed the green algae Selenastrum and the yellow-green algae Ophiocytium to be the codominant algae present.

Access to the lake from Skyline Road S42 (off Breitenbush Road, route 224).

References: 4, 5, 11, 13, 18.

Photograph taken September 7, 1976.



WATER-QUALITY DATA

SAMPLING TIME: 1230 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.6	7
BOTTOM	7.0	6

ALKALINITY (mg/l as $CaCO_3$) 4

TOTAL HARDNESS (mg/l as $CaCO_3$) 5

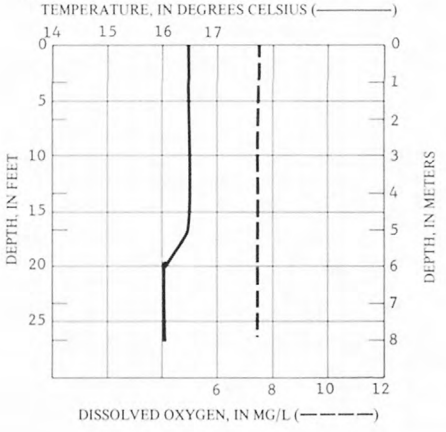
DISSOLVED SOLIDS (mg/l) 22

TRANSPARENCY (meters) 6.4

COLOR (Pt-Co units) 0

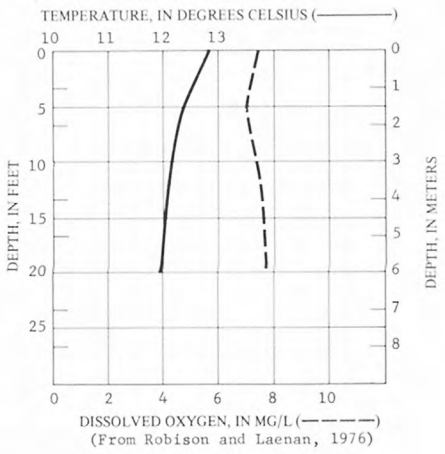
FECAL COLIFORM (colonies/100 ml)
Sampling site 10
Inflow (south end) 60

(Chemical analysis in table 2, p. 5)



WATER-QUALITY DATA

September 11, 1974



(From Robison and Laenan, 1976)

LOCATION: Sec.25, T.8 S., R.8 E., in the Warm Springs Indian Reservation about 2.5 mi (4 km) north of Olallie Butte Lookout and 11 mi (18 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°51'22", long 121°46'03". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.24 mi^2 (0.62 km^2).

SURFACE AREA: 2 acres (8,100 m^2).

SURFACE ELEVATION: 4,560 ft (1,390 m) above mean sea level, from topographic map.

VOLUME: 13 acre-ft (16,000 m^3).

INFLOW: No flow observed from unnamed stream on east end of lake.

OUTFLOW: No flow observed in Olallie Creek on northwest side of lake.

USE: Public recreation. The lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife. Crayfish were observed in the lake.

REMARKS: No evidence of submerged vegetation; however, about 10 percent of the lake was covered with floating pond lilies. Bottom material is primarily mud and detritus.

The lake is also referred to as Jude Lake in records of the Oregon Department of Fish and Wildlife.

Access to the lake 0.5 mi (0.8 km) by Forest Service trail from Russ Lake Forest Camp (off Skyline Road S42).

References: 4, 8, 11.

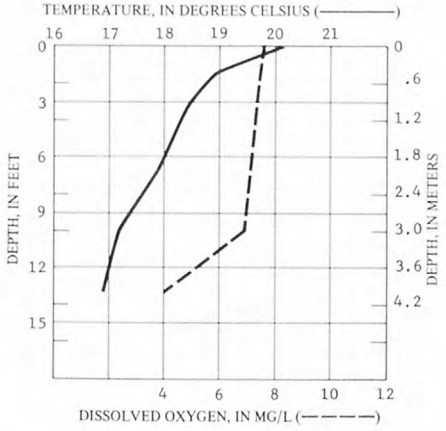
Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1215 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.0	27
BOTTOM	6.6	48

ALKALINITY (mg/l as $CaCO_3$)	16
TOTAL HARDNESS (mg/l as $CaCO_3$)	8
DISSOLVED SOLIDS (mg/l)	32
TRANSPARENCY (meters)	4.6 (bottom)
COLOR (Pt-Co units)	10
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP

LOCATION: Secs. 24, 25, and 26, T.4 S., R.2 W., about 2.5 mi (4 km) north of West Woodburn and 4 mi (6.5 km) east of St. Paul. Surface-water outlet at lat 45°12'18", long 122°53'03". St. Paul 7½-minute quadrangle map, photorevised 1970 (not named on map).

DRAINAGE BASIN: Champoeg Creek (Willamette River).

DRAINAGE AREA: 6.10 mi^2 (15.80 km^2).

SURFACE AREA: 7 acres (28,000 m^2) during low pool in the summer of 1973.

SURFACE ELEVATION: 130 ft (40 m) above mean sea level, from topographic map.

VOLUME: 213 acre-ft (263,000 m^3) at full pool.

INFLOW: No measurable flow from Case Creek on south end of reservoir.

OUTFLOW: No measurable flow into Case Creek on north end of reservoir.

USE: No public recreation.

REMARKS: Emergent plants, floating logs, and snags were observed in the lake. Bottom material in the north end of the lake is primarily mud and detritus.

A bloom of blue-green algae was observed on the survey date.

Water-rights certificate issued for storage of 213.0 acre-ft (263,000 m^3) for irrigation.

Photograph taken August 24, 1976.

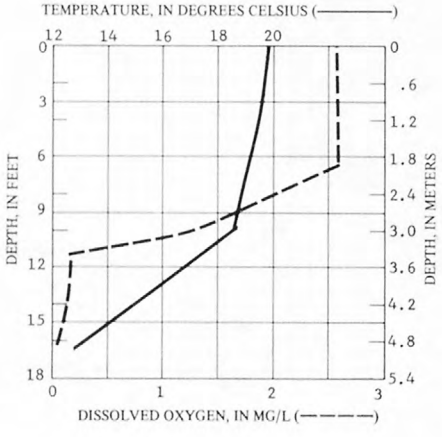
WATER-QUALITY DATA

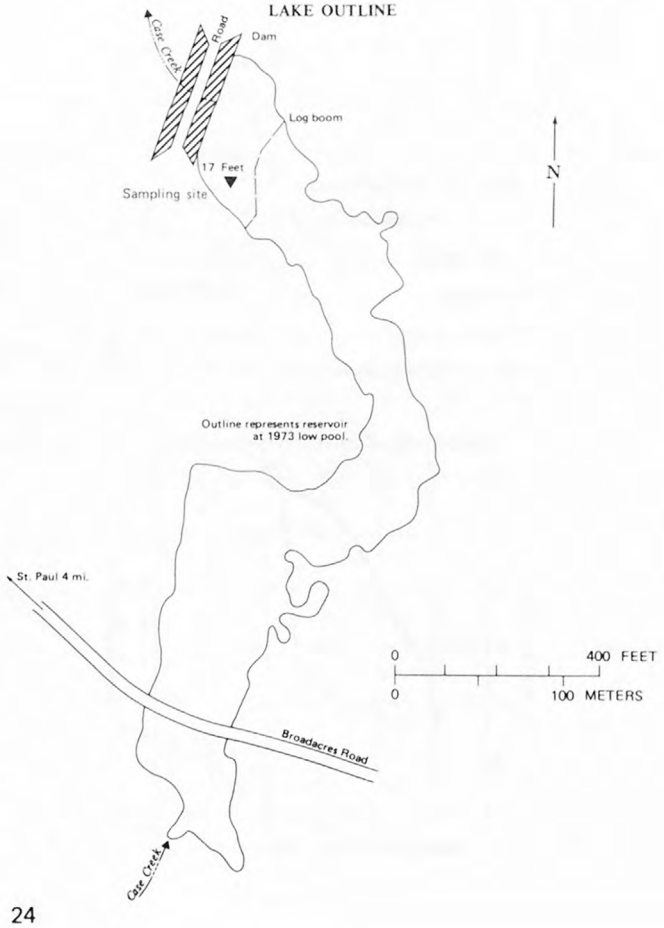
SAMPLING TIME: 1300 hours
CLOUD COVER: 5 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.5	269
BOTTOM	6.9	455

ALKALINITY (mg/l as $CaCO_3$)	149
TOTAL HARDNESS (mg/l as $CaCO_3$)	120
DISSOLVED SOLIDS (mg/l)	184
TRANSPARENCY (meters)	1.7
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	31

(Chemical analysis in table 2, p. 5)





LOCATION: Secs.30 and 31, T.9 S., R.8 E., in the Willamette National Forest about 1.5 mi (2.4 km) northwest of Bear Point Lookout and 5 mi (8 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°45'26", long 121°52'31". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.11 mi^2 (0.28 km^2).

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 4,920 ft (1,500 m) above mean sea level, from topographic map.

VOLUME: 45 acre-ft (55,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

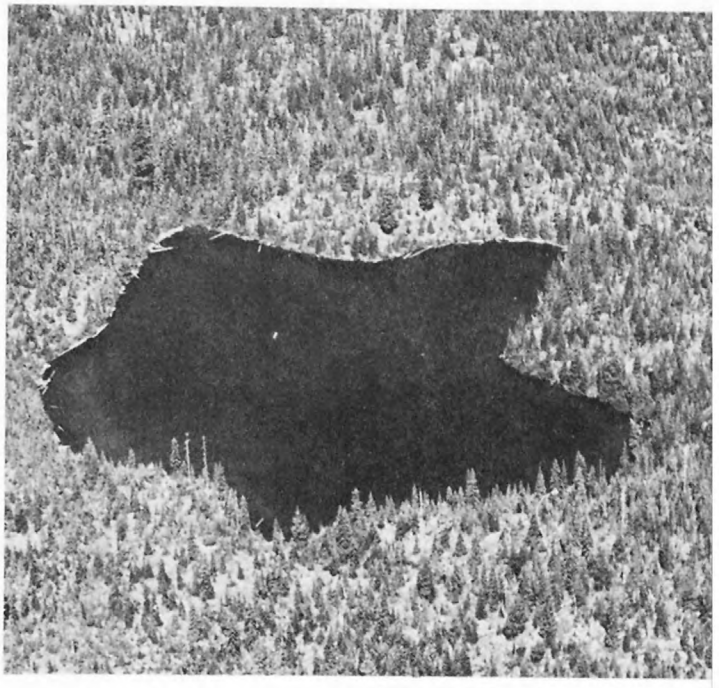
OUTFLOW: No flow observed through channel on west end of lake to the South Fork Breitenbush River.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife. There is an unimproved campsite at the lake.

REMARKS: No evidence of emergent plants; however, submerged aquatic growth covered about 90 percent of the lake. Bottom material is primarily sand with rocks and detritus along the shoal area.

Access to the lake from Crown Lake (see p. 27). Claggett Lake is about 0.5 mi (0.8 km) southeast of Crown Lake. There are no maintained trails to the lake.

References: 10, 11, 26, 27.



Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1400 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.6	4
BOTTOM	6.5	3

ALKALINITY (mg/l as $CaCO_3$) 3

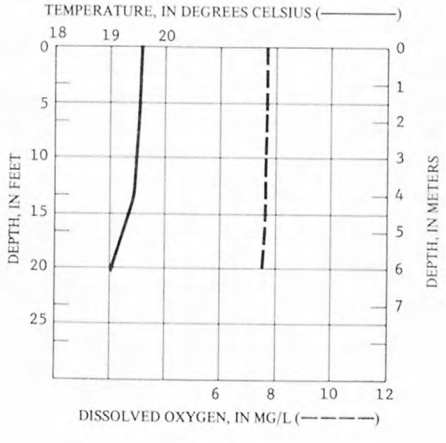
TOTAL HARDNESS (mg/l as $CaCO_3$) 1

DISSOLVED SOLIDS (mg/l) 8

TRANSPARENCY (meters) 5.3

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) 35



BATHYMETRIC MAP

LOCATION: Secs.22, 23, and 27, T.6 S., R.3 W., about 3.5 mi (5.5 km) south of Wheatland Ferry and 3.5 mi (5.5 km) north of Salem. Surface-water outlet at lat 45°02'19", long 123°02'01". Mission Bottom 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 25 acres (100,000 m^2).

SURFACE ELEVATION: 110 ft (34 m) above mean sea level, from topographic map.

VOLUME: 140 acre-ft (170,000 m^3).

INFLOW: Estimated 3.5 ft^3/s (0.1 m^3/s) from unnamed stream on southeast side of lake.

OUTFLOW: Estimated 3.5 ft^3/s (0.1 m^3/s) through channel on north end of lake to the Willamette River.

USE: No public recreation. There is a natural reproduction of a variety of fish, including squawfish and brown bullheads.

REMARKS: No evidence of submerged vegetation; however, dead trees and floating pond lilies were observed along the perimeter of the lake. Bottom material is primarily mud and detritus.

An algal bloom was observed on the survey date. Phytoplankton analysis showed the green algae Pediastrum and a variety of diatoms, including Fragilaria, Cymbella, and Melosira varians, to be present. The green algae Cladophora and the blue-green algae Oscillatoria were observed in some periphyton samples.

Water-rights certificates for diversion of 7;573 ft^3/s (0.214 m^3/s) for irrigation and 0.5 ft^3/s (0.01 m^3/s) for fire protection.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1120 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.5	258
BOTTOM	7.5	288

ALKALINITY (mg/l as $CaCO_3$) 120

TOTAL HARDNESS (mg/l as $CaCO_3$) 97

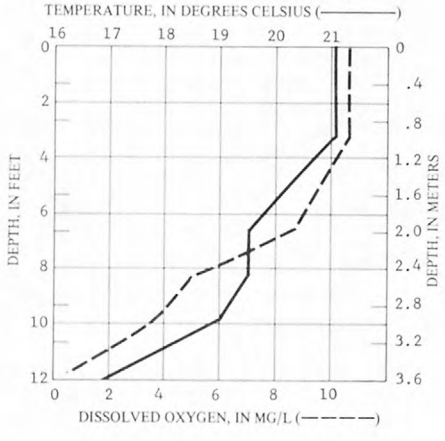
DISSOLVED SOLIDS (mg/l) 176

TRANSPARENCY (meters) .8

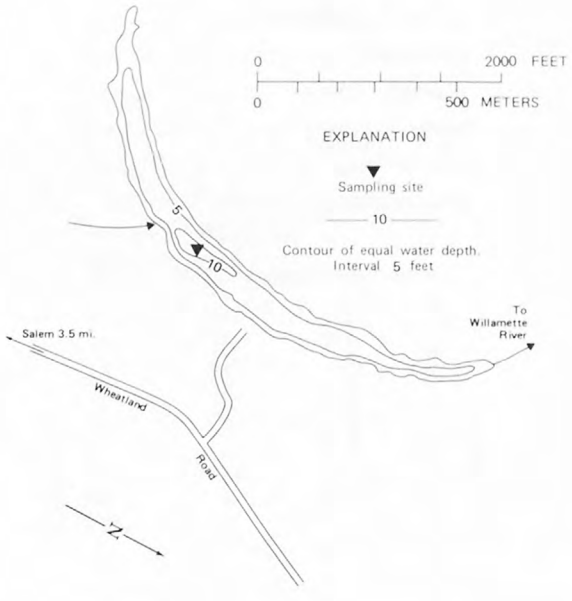
COLOR (Pt-Co units) 25

FECAL COLIFORM (colonies/100 ml)
Sampling site 10
Inflow 120

(Chemical analysis in table 2, p. 5)



BATHYMETRIC MAP



LOCATION: Sec.30, T.9 S., R.8 E., in the Willamette National Forest about 1.5 mi (2.4 km) northwest of Bear Point Lookout and 5 mi (8 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°45'37", long 121°52'42". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.91 mi^2 (2.36 km^2).

SURFACE AREA: 13 acres (53,000 m^2).

SURFACE ELEVATION: 4,850 ft (1,480 m) above mean sea level, from topographic map.

VOLUME: 30 acre-ft (37,000 m^3).

INFLOW: No measurable flow from unnamed intermittent stream on northeast side of lake.

OUTFLOW: No flow observed into Lake Creek on southwest side of lake.

USE: Public recreation. The lake has been periodically stocked with fingerling rainbow trout by the Oregon Department of Fish and Wildlife.

REMARKS: Emergent plants were observed, and about 90 percent of the lake bottom was covered with submerged vegetation. Bottom material is primarily sand and rock.

Access to the lake 1.5 mi (2.4 km) by Roaring Creek Trail 3361 from Forest Service Road S918.

References: 10, 11, 26, 27.

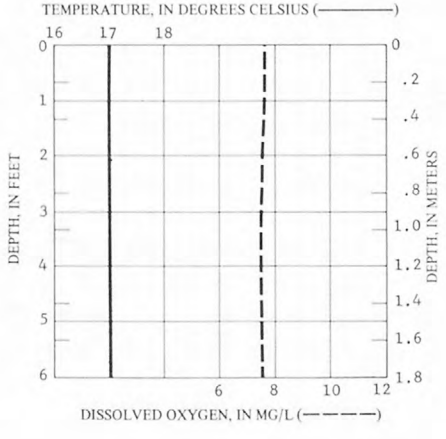
Photograph taken July 28, 1976.

WATER-QUALITY DATA

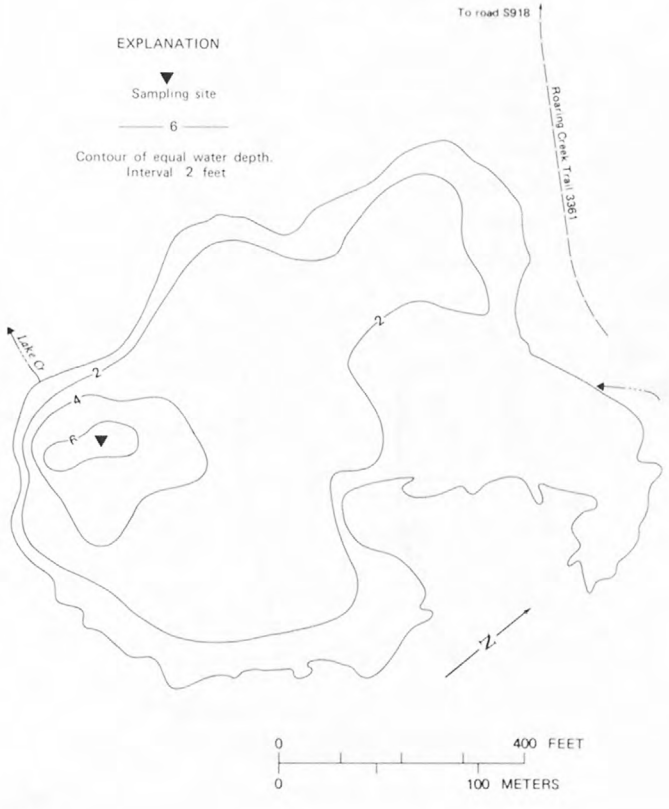
SAMPLING TIME: 1130 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.8	5
BOTTOM	7.5	5

ALKALINITY (mg/l as $CaCO_3$)	2
TOTAL HARDNESS (mg/l as $CaCO_3$)	2
DISSOLVED SOLIDS (mg/l)	21
TRANSPARENCY (meters)	1.8
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	< 1



BATHYMETRIC MAP



LOCATION: Sec.2, T.6 S., R.3 W., about 2 mi (3.2 km) southeast of Wheatland Ferry and 7 mi (11 km) north of Salem. Surface-water outlet at lat 45°04'47", long 123°00'37". Mission Bottom 7½-minute quadrangle map, photorevised 1970 (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 55 acre-ft (68,000 m^3).

INFLOW: No flow observed in channel on northwest side of lake from Ryan Lake nor in channel on south end of lake from Finney and Egan Lake.

OUTFLOW: No flow observed through channel on northeast side of lake to Hubbard Lake.

USE: No public recreation. There is a natural reproduction of a variety of fish, including squawfish and carp.

REMARKS: No evidence of submerged aquatic growth; however, emergent grass was observed along the shore. Bottom material is primarily mud and detritus.
Water-rights certificate for diversion of 1.63 ft^3/s (0.05 m^3/s) for irrigation.

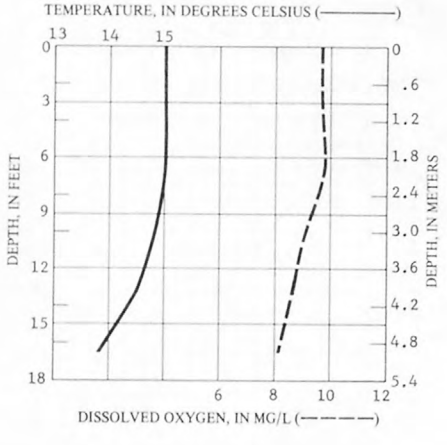
Photograph taken August 24, 1976.

WATER-QUALITY DATA

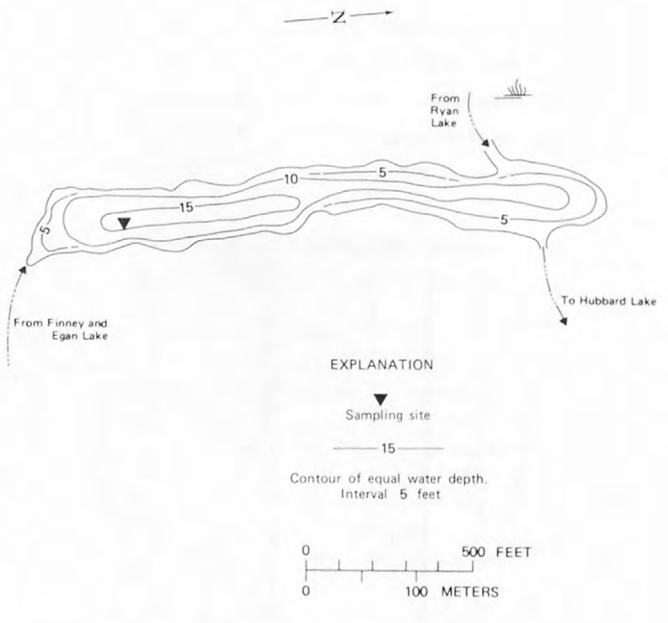
SAMPLING TIME: 1030 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.5	274
BOTTOM	7.0	269

ALKALINITY (mg/l as $CaCO_3$)	120
TOTAL HARDNESS (mg/l as $CaCO_3$)	120
DISSOLVED SOLIDS (mg/l)	188
TRANSPARENCY (meters)	.4
COLOR (Pt-Co units)	30
FECAL COLIFORM (colonies/100 ml)	8



BATHYMETRIC MAP



LOCATION: Secs.35 and 36, T.9 S., R.5 E., sec.24, T.10 S., R.4 E., and secs.1, 2, 3, 7, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 27, and 28, T.10 S., R.5 E., and secs.7 and 18, T.10 S., R.6 E., at Detroit in the Willamette National Forest about 9 mi (14 km) southwest of Breitenbush Hot Springs. Surface-water outlet at lat 44°43'17", long 122°14'55". Detroit and Quartzville 15-minute quadrangle maps.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 437 mi^2 (1,130 km^2).

SURFACE AREA: 3,580 acres (1,450 hm^2) at full pool.

SURFACE ELEVATION: 1,569 ft (478 m) above mean sea level at full pool.

VOLUME: 455,100 acre-ft (561 hm^3) at full pool.

INFLOW: Principal inflow streams are named on the bathymetric map.

OUTFLOW: North Santiam River into Big Cliff Reservoir.

USE: Power generation and public recreation, including boating, swimming, water skiing, and fishing. The lake has been stocked monthly each summer with fingerling and legal-size rainbow trout. In 1974 and 1975, the lake was also stocked with chinook. Overnight camping areas include: Hoover Campground, South Shore Campground, and Piety Boat Camp, maintained by the U.S. Forest Service; and Detroit Lake State Park, maintained by Oregon State Parks.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud with rocks and dead tree stumps in the shoal area.

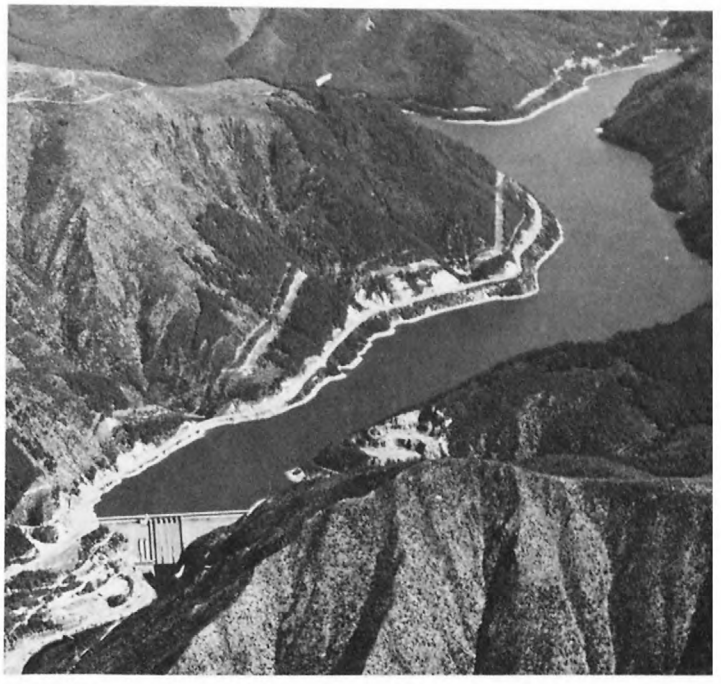
Phytoplankton analysis showed the green algae Dictyosphaerium, the diatom Fragilaria, and the blue-green algae Anacystis to be the codominant algae present.

This popular recreational lake receives heavy use during the summer months. The dam, completed in 1953, has a generation plant with a maximum electrical output of 115 megawatts.

Water-rights permits issued for diversion of 2,900 ft^3/s (82 m^3/s) for irrigation.

Information on surface area and bathymetry furnished by the U.S. Army Corps of Engineers, Portland District.

Access to the lake from State Highway 22.



Photograph taken September 7, 1976.

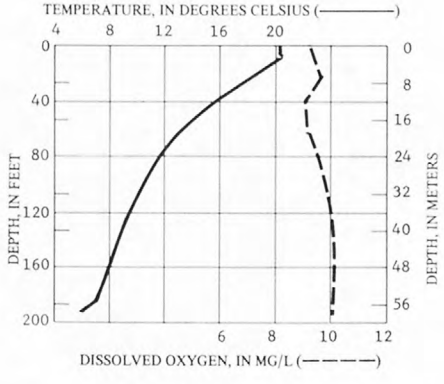
WATER-QUALITY DATA
Site 1

SAMPLING TIME: 1430 hours
CLOUD COVER: 25 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.6	34
BOTTOM	7.2	35

ALKALINITY (mg/l as $CaCO_3$)	24
TOTAL HARDNESS (mg/l as $CaCO_3$)	10
DISSOLVED SOLIDS (mg/l)	42
COLOR (Pt-Co units)	0

(Chemical analysis in table 2, p. 5)



WATER-QUALITY DATA
Site 2

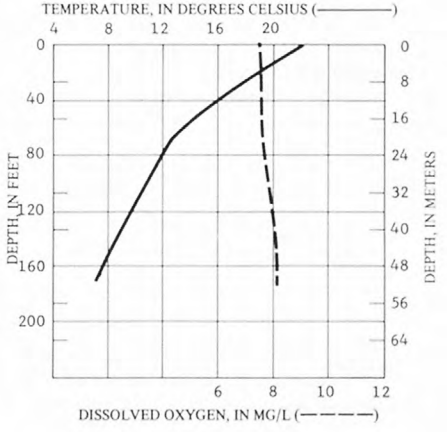
SAMPLING TIME: 1530 hours
CLOUD COVER: 35 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.8	33
BOTTOM	7.4	35

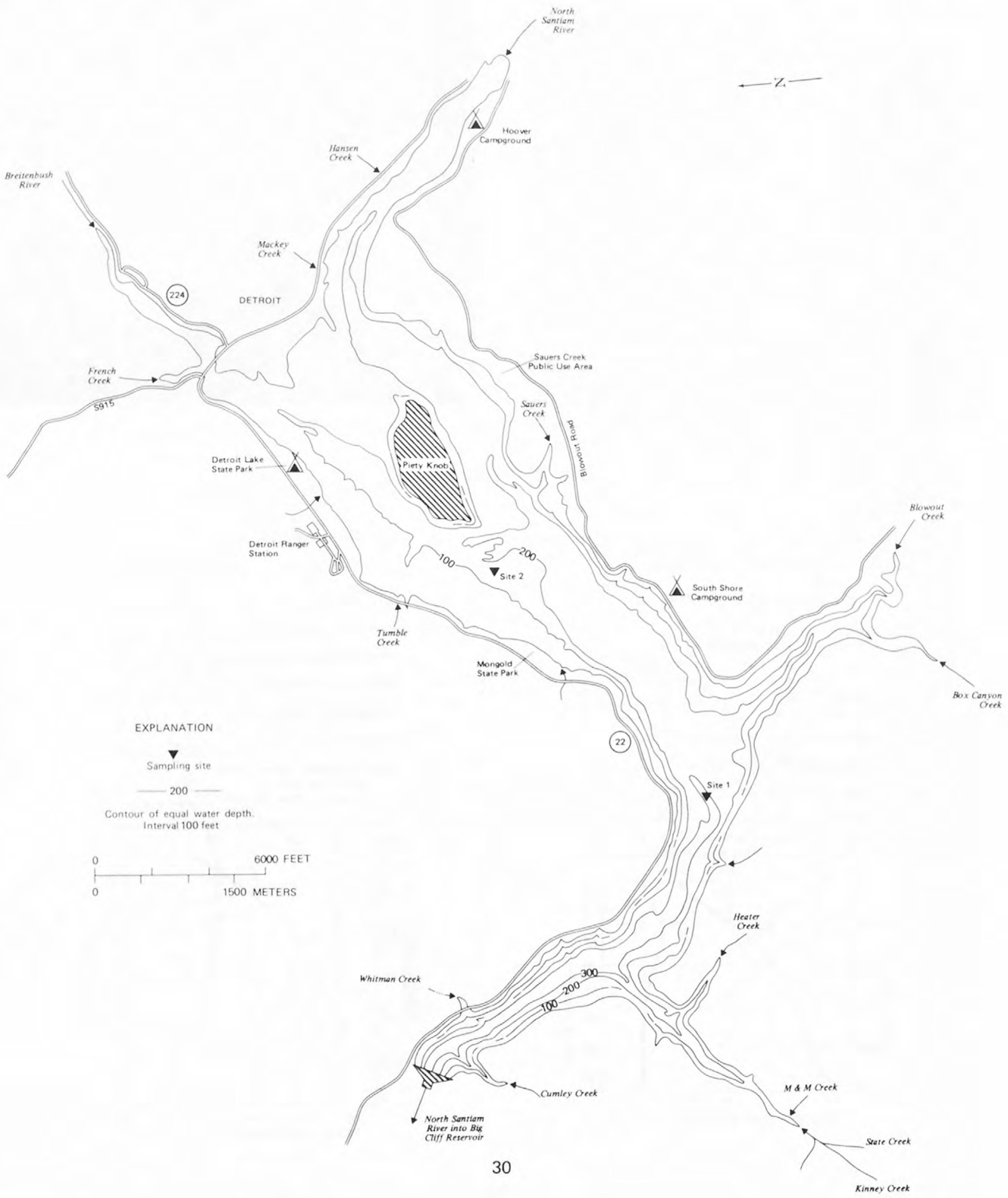
ALKALINITY (mg/l as $CaCO_3$)	23
TOTAL HARDNESS (mg/l as $CaCO_3$)	11
DISSOLVED SOLIDS (mg/l)	40
TRANSPARENCY (meters)	6
COLOR (Pt-Co units)	0

FECAL COLIFORM (colonies/100 ml)

Sampling site 2	<1
Mongold swimming area	<1



BATHYMETRIC MAP



LOCATION: Sec.5, T.9 S., R.6 E., in the Willamette National Forest about 6 mi (9.5 km) northwest of Breitenbush Hot Springs and 6 mi (9.5 km) northeast of Detroit. Surface-water outlet at lat 44°49'01", long 122°05'41". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.04 mi^2 (0.10 km^2).

SURFACE AREA: 7 acres (28,000 m^2).

SURFACE ELEVATION: 3,800 ft (1,160 m) above mean sea level, from topographic map.

VOLUME: 75 acre-ft (92,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

OUTFLOW: No flow observed through channel on south end of lake. Outflow not indicated on topographic map.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife. There is a forest camp on the northwest side of the lake.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud with some rocks and detritus in the shoal area.

Access to the lake from Forest Service Road S80 (off Breitenbush Road, route 224).

References: 5, 11, 26, 27.

Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 0930 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.1	11
BOTTOM	6.4	13

ALKALINITY (mg/l as $CaCO_3$) 3

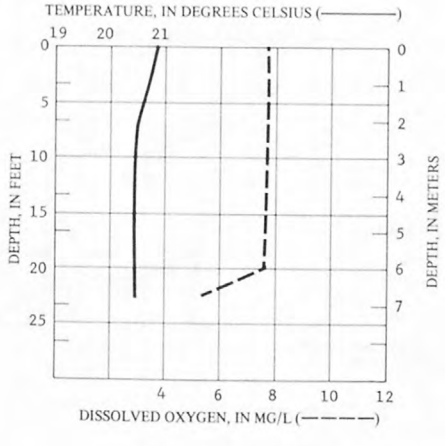
TOTAL HARDNESS (mg/l as $CaCO_3$) 3

DISSOLVED SOLIDS (mg/l) 24

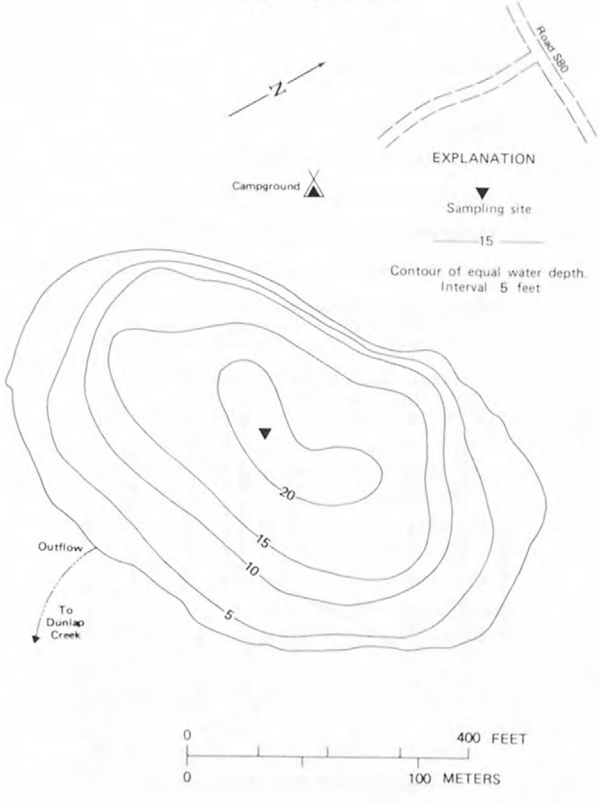
TRANSPARENCY (meters) 7 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP



LOCATION: Sec.6, T.9 S., R.6 E., in the Willamette National Forest about 7 mi (11 km) northwest of Breitenbush Hot Springs and 5.5 mi (9 km) north of Detroit. Surface-water outlet at lat 44°49'28", long 122°06'47". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 1.54 mi^2 (3.99 km^2).

SURFACE AREA: 65 acres (260,000 m^2).

SURFACE ELEVATION: 3,760 ft (1,150 m) above mean sea level, from topographic map.

VOLUME: 820 acre-ft (1.0 hm^3).

INFLOW: Estimated 8 ft^3/s (0.2 m^3/s) from unnamed stream on west end of lake. Inflow stream not indicated on topographic map.

OUTFLOW: Estimated 2 ft^3/s (0.06 m^3/s) into Elk Lake Creek on east end of lake.

USE: Public recreation. The lake has been periodically stocked with cutthroat and brook trout by the Oregon Department of Fish and Wildlife. The U.S. Forest Service maintains a campground at the lake; an unimproved boat-launching site is available.

REMARKS: Some emergent grass was observed along the perimeter of the lake, and less than 5 percent of the lake bottom was covered with aquatic growth. Bottom material is primarily mud with sand, gravel, and detritus in the shoal area.
Access to the lake from Forest Service Road S80 (off Breitenbush Road, route 224).
References: 5, 11, 26, 27.

Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1900 hours
CLOUD COVER: 90 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.0	18
BOTTOM	6.1	21

ALKALINITY (mg/l as $CaCO_3$) 9

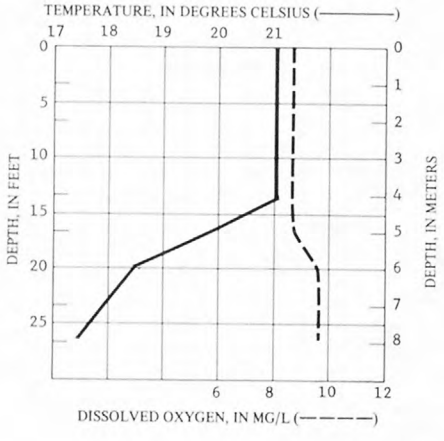
TOTAL HARDNESS (mg/l as $CaCO_3$) 5

DISSOLVED SOLIDS (mg/l) 20

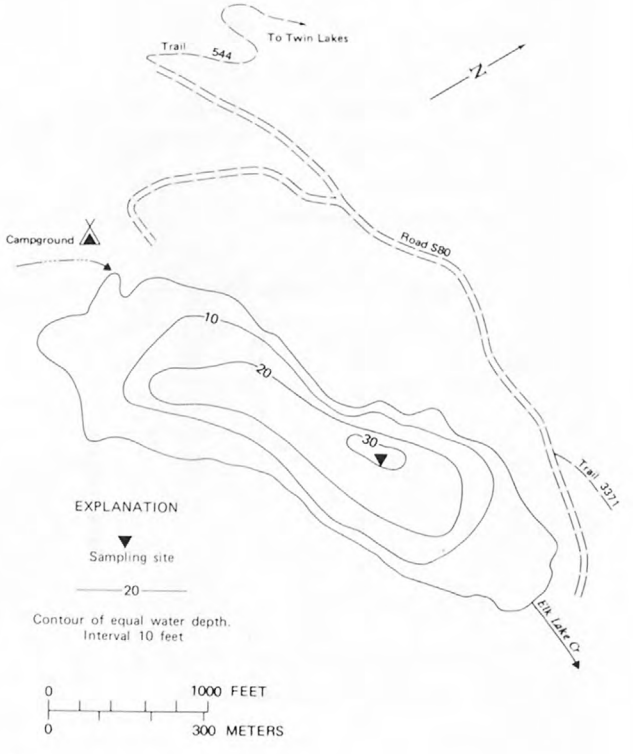
TRANSPARENCY (meters) 9.2 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml)
Sampling site 2
Inflow 15



BATHYMETRIC MAP



LOCATION: Sec.3, T.9 S., R.3 W., near the Willamette River about 0.3 mi (0.5 km) west of Interstate Highway 5 and 2.5 mi (4.0 km) south of Salem. Surface-water outlet at lat 44°48'54", long 123°01'53". Sidney 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: 3.5 mi^2 (9.1 km^2).

SURFACE AREA: 7 acres (28,000 m^2) at full pool.

SURFACE ELEVATION: 360 ft (110 m) above mean sea level, from topographic map.

VOLUME: 80.7 acre-ft (99,500 m^3) at full pool.

INFLOW: No flow observed from Neil Creek on west end of reservoir.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) over spillway into Neil Creek on east end of reservoir.

USE: No public recreation.

REMARKS: No evidence of submerged aquatic growth; however, some emergent vegetation was observed.

Water-rights certificate issued for storage of 80.7 acre-ft (99,500 m^3) for irrigation.

The bathymetric map represents the reservoir 2 ft (0.6 m) below normal pool.

Information on surface area, volume, drainage area, and bathymetry furnished by the Oregon Water Resources Department.

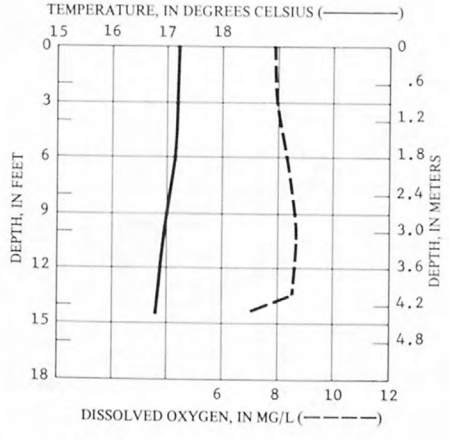
Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1500 hours
CLOUD COVER: 85 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	42
BOTTOM	6.4	42

ALKALINITY (mg/l as $CaCO_3$)	18
TOTAL HARDNESS (mg/l as $CaCO_3$)	19
DISSOLVED SOLIDS (mg/l)	30
TRANSPARENCY (meters)	2.4
COLOR (Pt-Co units)	20
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP

LOCATION: Sec.12, T.6 S., R.3 W., about 2.5 mi (4 km) southeast of Wheatland Ferry and 6 mi (9.5 km) north of Salem. Surface-water outlet at lat 45°04'05", long 123°00'02". Mission Bottom 7½-minute quadrangle map, photorevised 1970, and Gervais 7½-minute quadrangle map.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 35 acre-ft (43,000 m^3).

INFLOW: No flow observed from two unnamed intermittent streams on southeast end of lake.

OUTFLOW: No flow observed in channel on north end of lake to Deep Lake.

USE: Private recreation. There is a natural reproduction of a variety of fish, including brown bullheads and white crappie.

REMARKS: About 1 percent of the surface of the lake was covered with emergent growth. No submerged vegetation was observed; however, dead tree stumps and snags were abundant in the northern section of the lake. Bottom material is primarily mud covered with detritus.

An algal bloom was observed on the survey date. Phytoplankton analysis showed the diatom Synedra ulva and small free-floating colonies of the blue-green algae Aphanizomenon flos-aquae to be the codominant algae present. The green algae Mougeotia was observed in some periphyton samples.

A pungent odor was noticed in the southern part of the lake.

Water-rights certificates issued for diversion of 5.17 ft^3/s (0.15 m^3/s) for irrigation.

The lake is also known as Jones and Finney Lake.

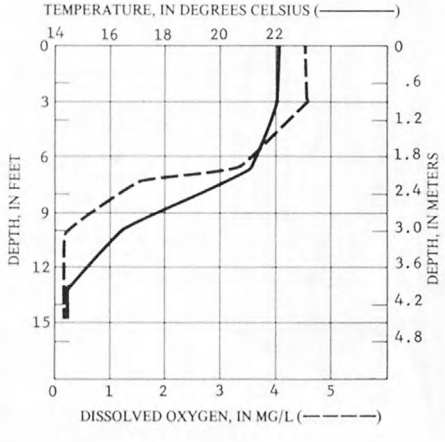
Photograph taken August 24, 1976.

WATER-QUALITY DATA

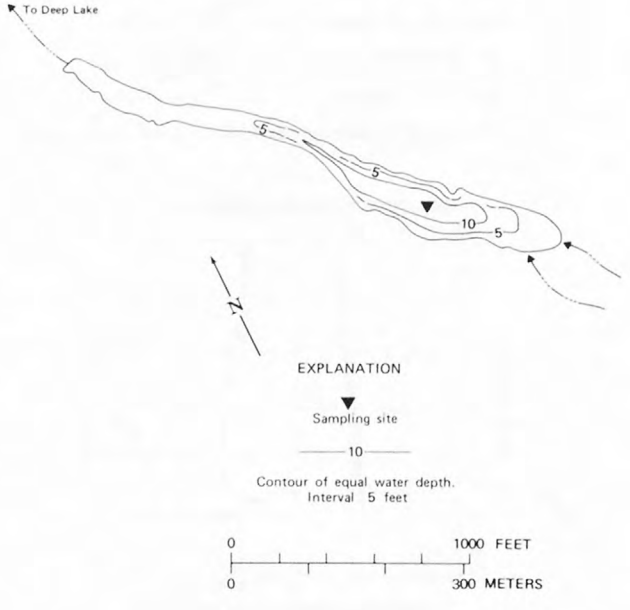
SAMPLING TIME: 1030 hours
CLOUD COVER: 75 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.6	263
BOTTOM	6.7	482

ALKALINITY (mg/l as $CaCO_3$)	130
TOTAL HARDNESS (mg/l as $CaCO_3$)	110
DISSOLVED SOLIDS (mg/l)	204
TRANSPARENCY (meters)	1.1
COLOR (Pt-Co units)	35
FECAL COLIFORM (colonies/100 ml)	1



BATHYMETRIC MAP



LOCATION: Sec.34, T.8 S., R.8 E., in the Mount Hood National Forest about 1.5 mi (2.4 km) northeast of Potato Butte, 2.5 mi (4 km) northwest of Olallie Butte Lookout and 8.5 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°50'10", long 121°48'53". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 1.71 mi^2 (4.43 km^2).

SURFACE AREA: 40 acres (160,000 m^2).

SURFACE ELEVATION: 4,280 ft (1,300 m) above mean sea level from topographic map.

VOLUME: 900 acre-ft (1.1 hm^3).

INFLOW: Five unnamed intermittent streams on south end of lake. Estimated total flow less than 1 ft^3/s (0.03 m^3/s) from channels 3, 4, and 5. No measurable flow from channels 1 and 2.

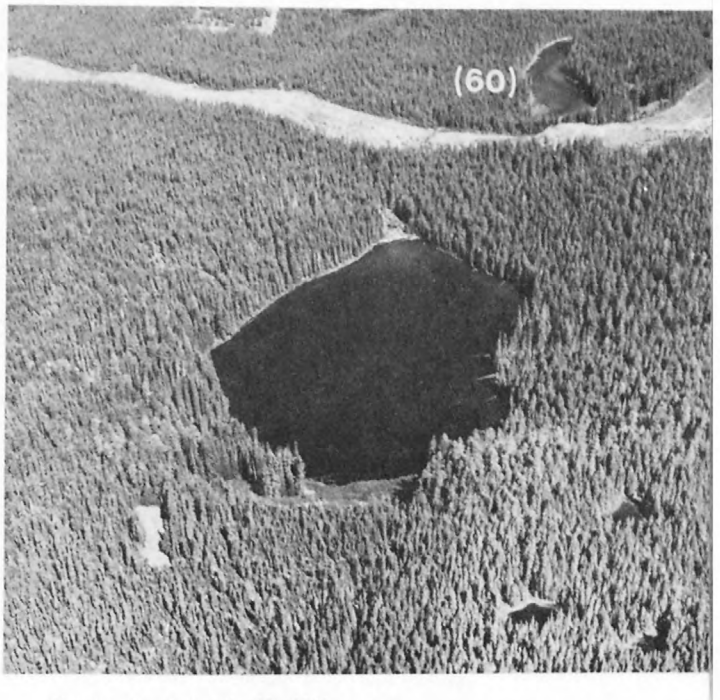
OUTFLOW: Estimated 1 ft^3/s (0.03 m^3/s) through channel on northwest side of lake flowing into Surprise Lake.

USE: Public recreation. The lake has been periodically stocked with brook trout and cutthroat by the Oregon Department of Fish and Wildlife. Unimproved campsites are on the northwest side of the lake.

REMARKS: Emergent grass was observed on the perimeter of the lake, and about 1 percent of the bottom was covered with submerged aquatic growth. Bottom material along the shoal area is composed primarily of sand and gravel covered by detritus.

Access to the lake 1.5 mi (2.4 km) by Forest Service Trail 717 from Forest Service Road S829A.

References: 4, 8, 11.



Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1045 hours
CLOUD COVER: 70 percent

(Chemical analysis in table 2, p. 5)

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	22
BOTTOM	6.8	24

ALKALINITY (mg/l as $CaCO_3$) 13

TOTAL HARDNESS (mg/l as $CaCO_3$) 7

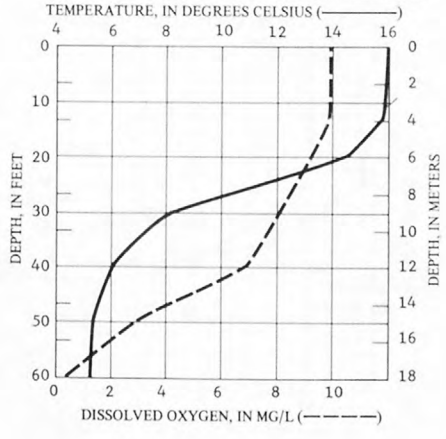
DISSOLVED SOLIDS (mg/l) 20

TRANSPARENCY (meters) 6.5

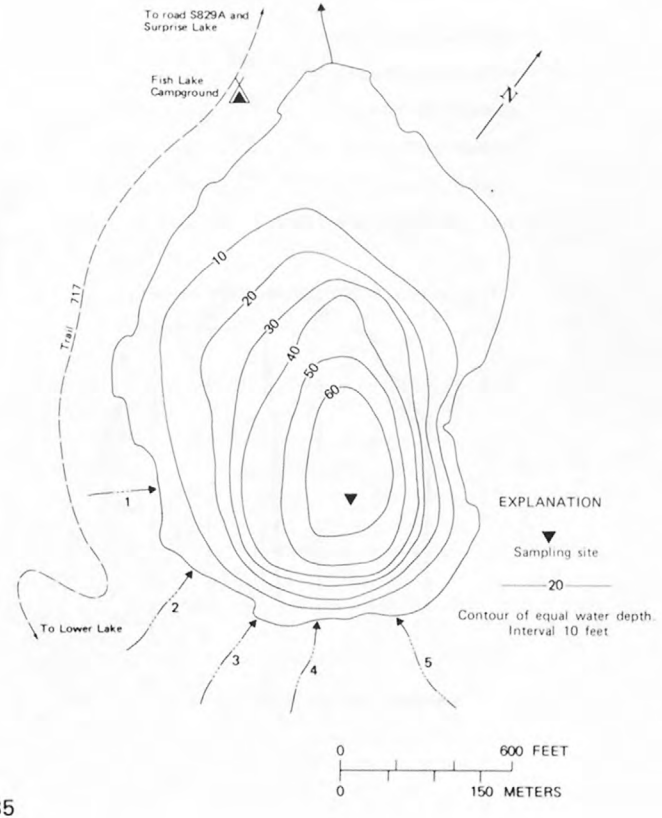
COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml)

Sampling site	<1
Inflow 2	<1
Inflow 3	<1



BATHYMETRIC MAP



LOCATION: Sec.31, T.7 S., R.1 E., about 2.5 mi (4 km) northwest of Silver Creek Falls State Park and 6 mi (10 km) southeast of Silverton. Surface-water outlet at lat 44°54'56", long 122°43'26". Lyons 15-minute quadrangle map (not named on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.50 mi^2 (3.89 km^2).

SURFACE AREA: 14 acres (57,000 m^2).

SURFACE ELEVATION: 920 ft (280 m) above mean sea level, from topographic map.

VOLUME: 100 acre-ft (120,000 m^3).

INFLOW: Primarily from two unnamed creeks, one on the north end and the other on the southeast end of the reservoir.

OUTFLOW: Through channel on southeast end of reservoir to Drift Creek.

USE: No public recreation.

REMARKS: Emergent vegetation covered about 15 percent of the surface of the lake, and submerged aquatic growth was observed in the shoal area. Bottom material is primarily mud. Water-rights certificate issued for storage of 104 acre-ft (128,000 m^3) for irrigation and fish culture.

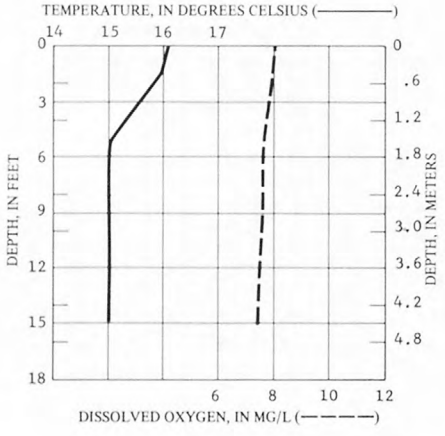
Photograph taken August 24, 1976.

WATER-QUALITY DATA

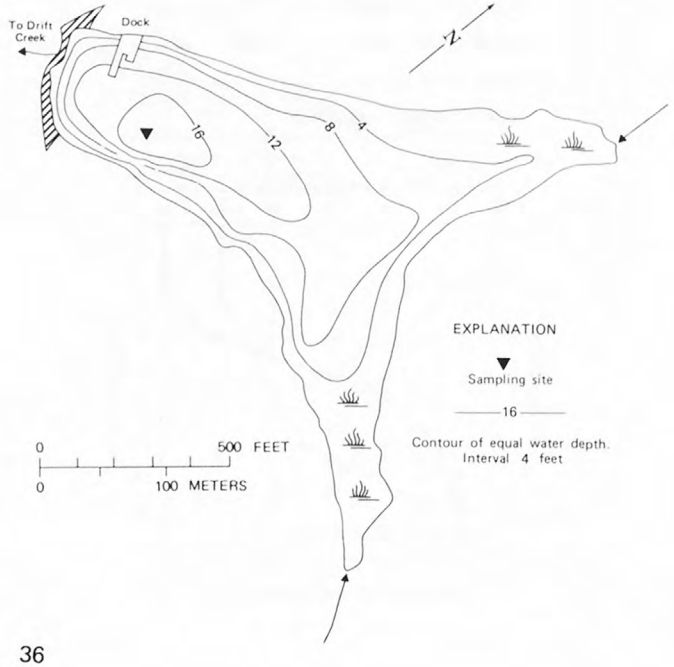
SAMPLING TIME: 1600 hours
CLOUD COVER: 10 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.6	31
BOTTOM	6.0	32

ALKALINITY (mg/l as $CaCO_3$)	18
TOTAL HARDNESS (mg/l as $CaCO_3$)	14
DISSOLVED SOLIDS (mg/l)	20
TRANSPARENCY (meters)	1.3
COLOR (Pt-Co units)	40
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.24, T.7 S., R.1 W., about 2.5 mi (4 km) south of Silverton and 11 mi (18 km) east of Salem. Surface-water outlet at lat 44°56'59", long 122°45'23". Stayton NE 7½-minute quadrangle map (not shown on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.02 mi^2 (2.64 km^2).

SURFACE AREA: 12 acres (49,000 m^2) at normal pool.

SURFACE ELEVATION: 670 ft (200 m) above mean sea level, from topographic map.

VOLUME: 100.2 acre-ft (124,000 m^3) at normal pool.

INFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) from unnamed intermittent stream on east end of reservoir. No flow observed from unnamed intermittent stream on north side of reservoir.

OUTFLOW: No measurable flow through channel on southwest end of reservoir to Drift Creek.

USE: Private recreation. The reservoir has been stocked with trout.

REMARKS: No evidence of submerged aquatic growth; however, emergent grass was observed near the shoreline. Bottom material is primarily mud.

Water-rights permit issued to store 100.2 acre-ft (124,000 m^3) for irrigation.

Information on surface area, volume, drainage area, and bathymetry furnished by the Oregon Water Resources Department.

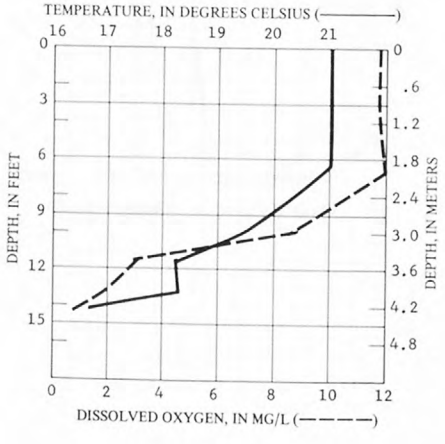
Photograph taken August 24, 1976.

WATER-QUALITY DATA

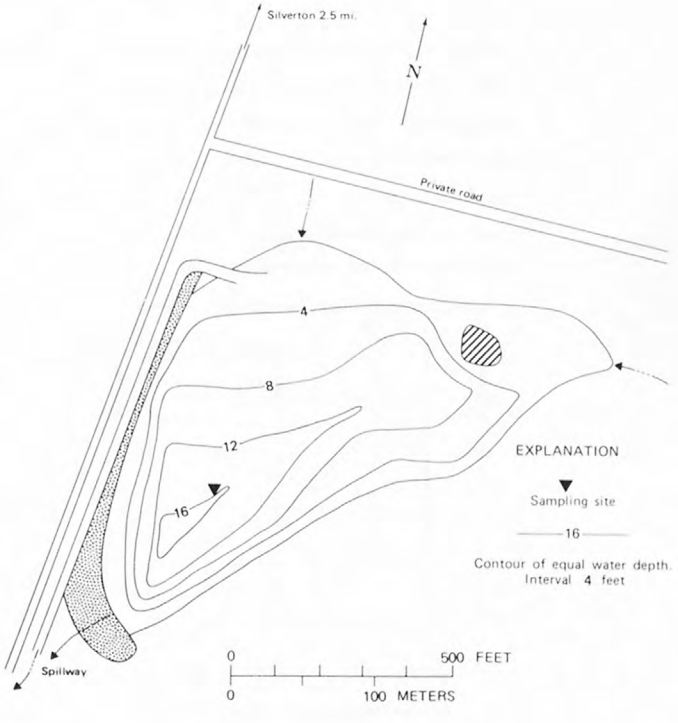
SAMPLING TIME: 1030 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.8	34
BOTTOM	7.0	110

ALKALINITY (mg/l as $CaCO_3$)	15
TOTAL HARDNESS (mg/l as $CaCO_3$)	11
DISSOLVED SOLIDS (mg/l)	34
TRANSPARENCY (meters)	1.0
COLOR (Pt-Co units)	15
FECAL COLIFORM (colonies/100 ml)	6



BATHYMETRIC MAP



LOCATION: Sec.24, T.9 S., R.8 E., in the Warm Springs Indian Reservation about 3.5 mi (5.5 km) northeast of Bear Point Lookout and 9.5 mi (15 km) east of Breitenbush Hot Springs. Surface-water outlet at lat 44°46'25", long 121°46'41". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.04 mi^2 (0.10 km^2).

SURFACE AREA: 6 acres (24,000 m^2) (revised figure).

SURFACE ELEVATION: 5,650 ft (1,720 m) above mean sea level, from topographic map.

VOLUME: 30 acre-ft (37,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

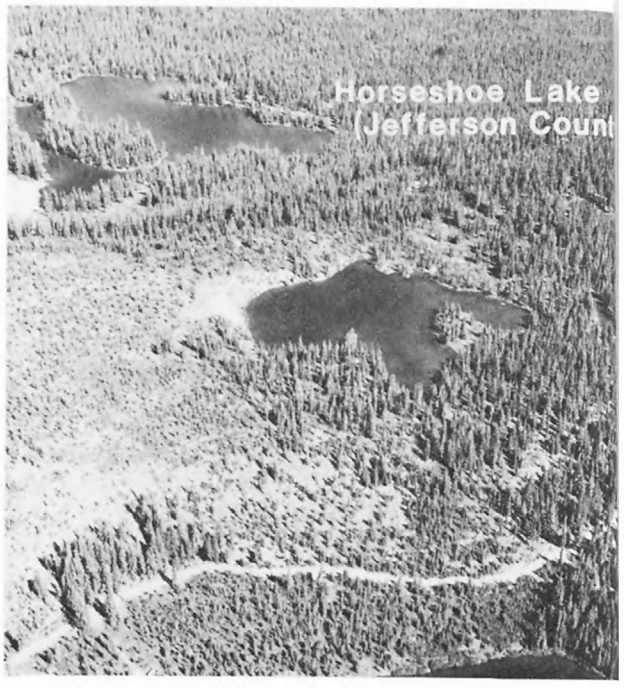
OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on southeast end of lake. Outflow not indicated on topographic map.

USE: Public recreation. The lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: No evidence of submerged aquatic growth; however, some emergent grass was observed along the shoreline. Bottom material is primarily rock and sand with mud observed in the deeper sections.

Access to the lake 0.5 mi (0.8 km) by Forest Service Trail from Skyline Road S42 near the north end of Breitenbush Lake. (See p. 21.

Reference: 18.



Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1615 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	5
BOTTOM	6.6	5

ALKALINITY (mg/l as $CaCO_3$) 2

TOTAL HARDNESS (mg/l as $CaCO_3$) 1

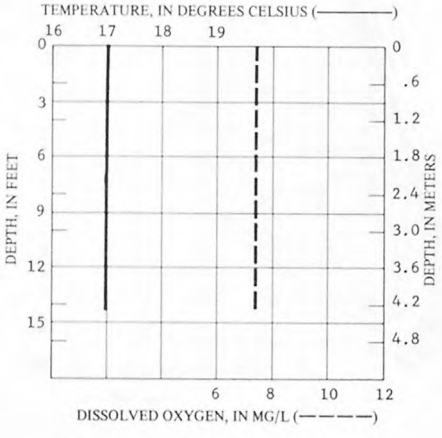
DISSOLVED SOLIDS (mg/l) 10

TRANSPARENCY (meters) 4.2

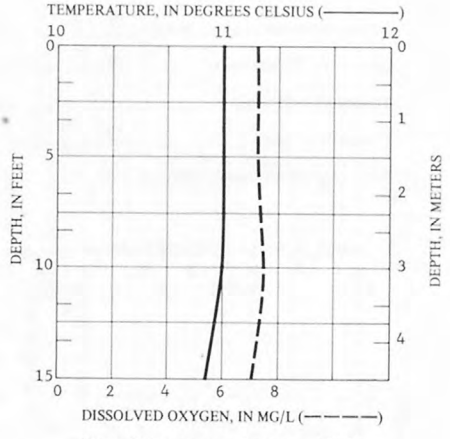
COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) 1

(Chemical analysis in table 2, p. 5)



September 13, 1974



(From Robison and Laenan, 1976)

BATHYMETRIC MAP

LOCATION: Sec.10, T.6 S., R.3 W., about 1.5 mi (2.4 km) south of Wheatland Ferry and 6 mi (9.5 km) north of Salem. Surface-water outlet at lat 45°04'16", long 123°02'42". Mission Bottom 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 9 acres (36,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 55 acre-ft (68,000 m^3).

INFLOW: Through unnamed intermittent stream on east side of lake.

OUTFLOW: Through intermittent stream on north end of lake. Channel not indicated on topographic map.

USE: Private recreation. There is a natural reproduction of a variety of fish, including bluegill and squawfish.

REMARKS: Floating pond lilies covered about 5 percent of the lake, and about 20 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud.

The green algae Spirogyra and Mougeotia were observed in some periphyton samples.

Water-rights certificates for diversion of 2.005 ft^3/s (0.057 m^3/s) for irrigation.

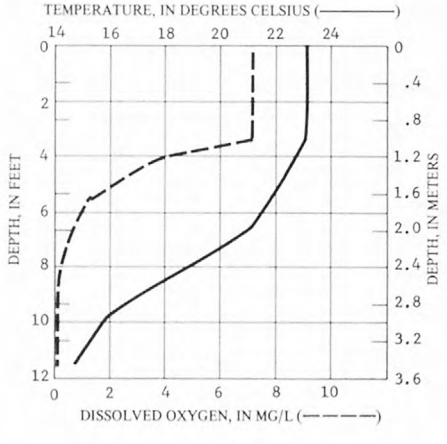
Photograph taken May 9, 1977.

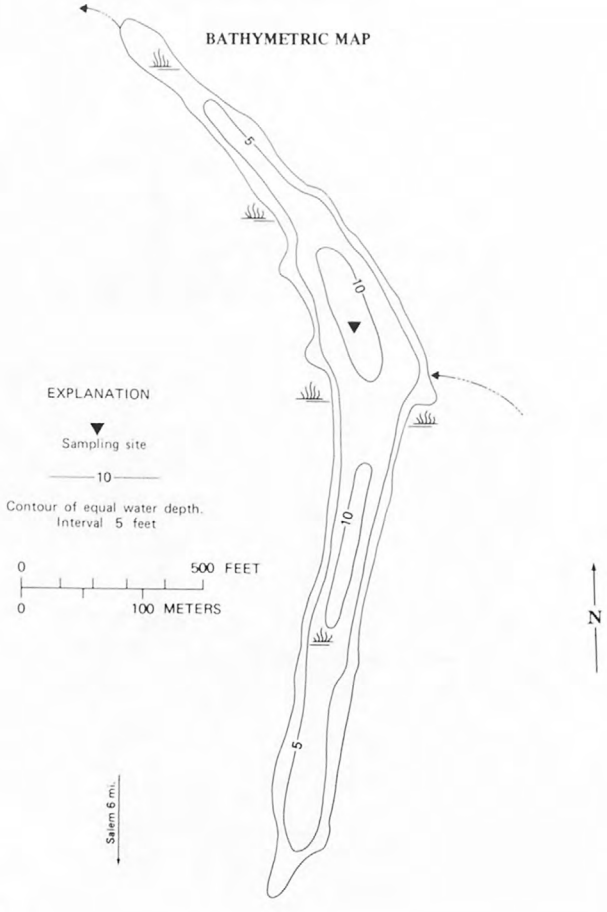
WATER-QUALITY DATA

SAMPLING TIME: 1345 hours
CLOUD COVER: 95 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	266
BOTTOM	6.6	487

ALKALINITY (mg/l as $CaCO_3$)	140
TOTAL HARDNESS (mg/l as $CaCO_3$)	120
DISSOLVED SOLIDS (mg/l)	276
TRANSPARENCY (meters)	1.1
COLOR (Pt-Co units)	30
FECAL COLIFORM (colonies/100 ml)	6





LOCATION: Secs.2 and 11, T.9 S., R.8 E., in the Mount Hood National Forest about 1.5 mi (2.4 km) west of Olallie Butte Lookout and 9 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°49'01", long 121°47'27". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.15 mi^2 (0.39 km^2).

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 4,960 ft (1,510 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: No flow observed from channel on south end of lake. Inflow not indicated on topographic map.

OUTFLOW: No flow observed through channel on north end of lake. Outflow not indicated on topographic map.

USE: Public recreation. The lake has been periodically stocked with cutthroat, rainbow and brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Some emergent grass was observed, and about half the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and detritus.

Access to the lake from Skyline Road S42 (off Forest Service Road 224).

References: 4, 5, 8, 11.

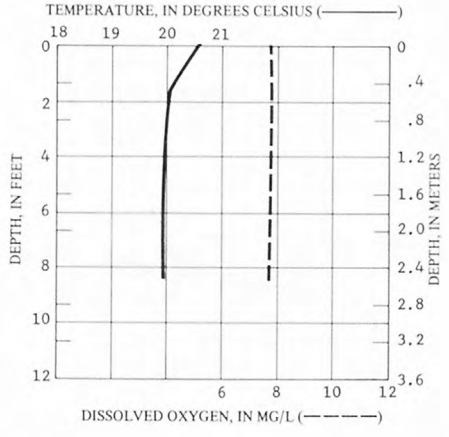
Photograph taken July 28, 1976.

WATER-QUALITY DATA

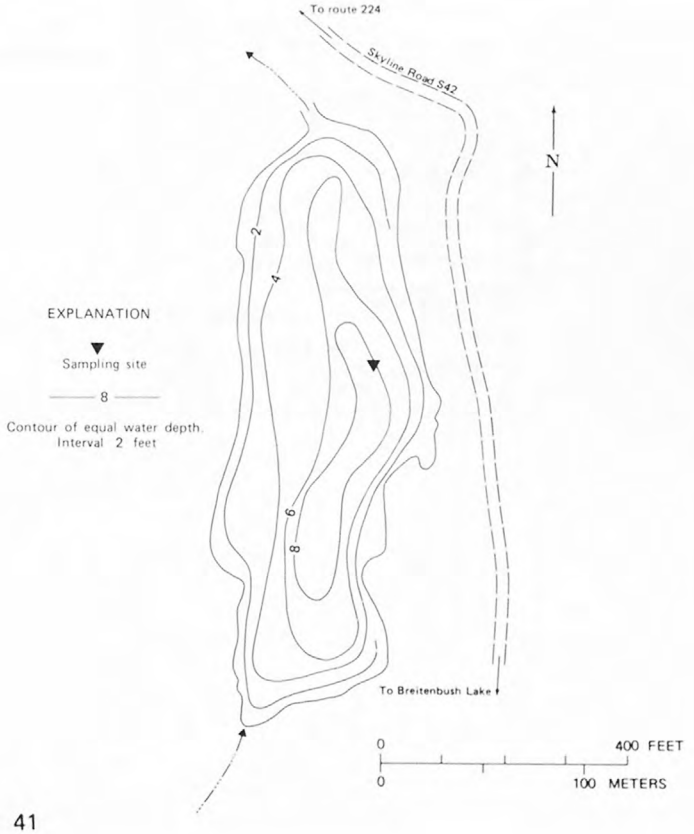
SAMPLING TIME: 1440 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	5.9	4
BOTTOM	6.0	4

ALKALINITY (mg/l as $CaCO_3$)	2
TOTAL HARDNESS (mg/l as $CaCO_3$)	1
DISSOLVED SOLIDS (mg/l)	10
TRANSPARENCY (meters)	2.7 (bottom)
COLOR (Pt-Co units)	5
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.3, T.8 S., R.3 W., at the intersection of Madrona Avenue and Liberty Road South in southwest Salem. Surface-water outlet at lat 44°54'13", long 123°02'40". Salem West 7½-minute quadrangle map (shown as Berger Lake on map).

DRAINAGE BASIN: Pringle Creek (Willamette River).

DRAINAGE AREA: 0.78 mi^2 (2.02 km^2).

SURFACE AREA: 4.5 acres (18,000 m^2).

SURFACE ELEVATION: 340 ft (100 m) above mean sea level, from topographic map.

VOLUME: 40 acre-ft (49,000 m^3).

INFLOW: Estimated 0.5 ft^3/s (0.01 m^3/s) from unnamed intermittent stream on southwest end of lake.

OUTFLOW: Estimated 0.5 ft^3/s (0.01 m^3/s) over trickle tube into channel on east side of lake. Outflow not indicated on topographic map.

USE: Private recreation for lakeside residents only. There is a natural reproduction of a variety of fish, including bass and crappie.

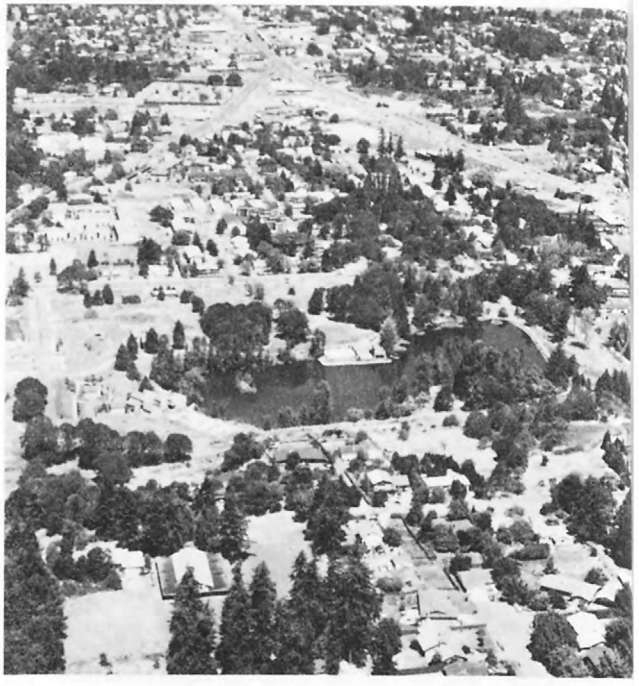
REMARKS: Emergent grass and floating pond lilies covered about 5 percent of the lake, and about 90 percent of the lake bottom was covered with the submerged aquatic plant, Nitella.

An algal bloom was observed on the survey date. Phytoplankton analysis showed the green algae Spirogyra to be one of the dominant algae present.

Water-rights certificate issued for storage of 44.5 acre-ft (55,000 m^3) for irrigation and fish propagation.

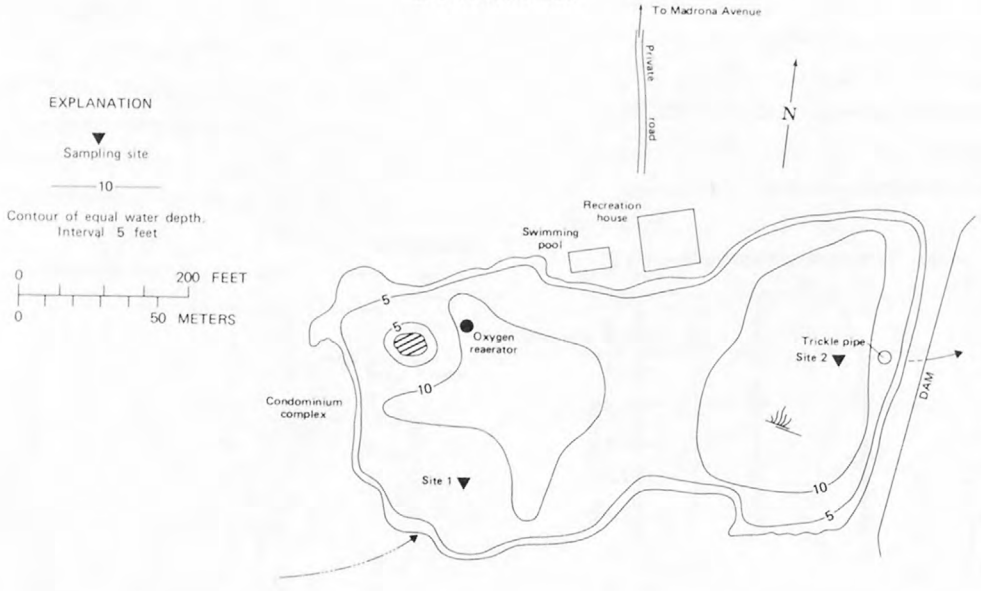
A mechanical oxygen reaerator was located in the western part of the lake.

Formerly an old rock quarry, this artificial lake now provides a lakefront view for a development of condominiums.



Photograph taken July 28, 1976.

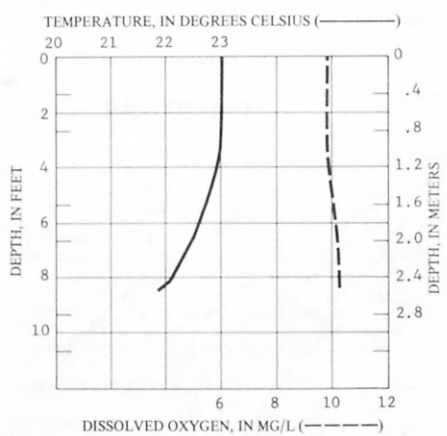
BATHYMETRIC MAP



WATER-QUALITY DATA
Site 1

SAMPLING TIME: 1430 hours
CLOUD COVER: 40 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	85
BOTTOM	7.4	86



WATER-QUALITY DATA
Site 2

SAMPLING TIME: 1430 hours
CLOUD COVER: 40 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.5	85
BOTTOM	6.6	170

ALKALINITY (mg/l as $CaCO_3$) 38

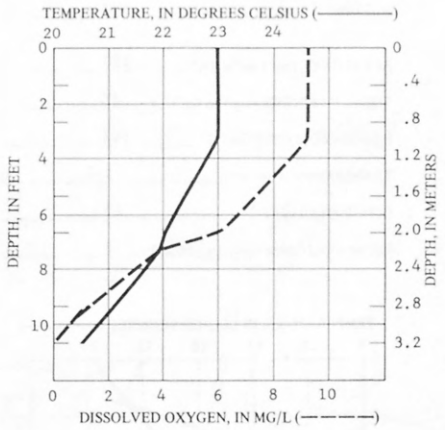
TOTAL HARDNESS (mg/l as $CaCO_3$) 32

DISSOLVED SOLIDS (mg/l) 78

TRANSPARENCY (meters) 2.0

COLOR (Pt-Co units) 20

FECAL COLIFORM (colonies/100 ml)
Sampling site 2 5
Inflow 4



LOCATION: Sec.23, T.4 S., R.3 W., about 2 mi (3.2 km) east of Dayton and 2 mi (3.2 km) west of St. Paul. Surface-water outlet at lat 45°12'47", long 123°01'36". Dayton 7½-minute quadrangle map.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 22 acres (89,000 m^2).

SURFACE ELEVATION: 80 ft (24 m) above mean sea level, from topographic map.

VOLUME: 200 acre-ft (250,000 m^3).

INFLOW: Through one unnamed perennial stream on the south end of the lake and one unnamed intermittent stream on the east side of the lake.

OUTFLOW: No flow observed in the channel on the north end of the lake to the Willamette River.

USE: Open to public recreation at a fee. There is a natural reproduction of a variety of fish, including bluegill, coarsescale sucker, and largemouth bass.

REMARKS: No evidence of submerged aquatic growth; however, floating pond lilies covered about 5 percent of the lake. Bottom material appeared to be primarily sand and mud.
Water-rights certificate for diversion of 6.375 ft^3/s (0.181 m^3/s) for irrigation.
References: 11, 21.

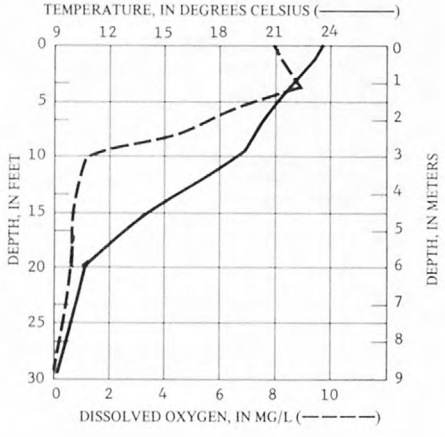
Photograph taken August 24, 1976.

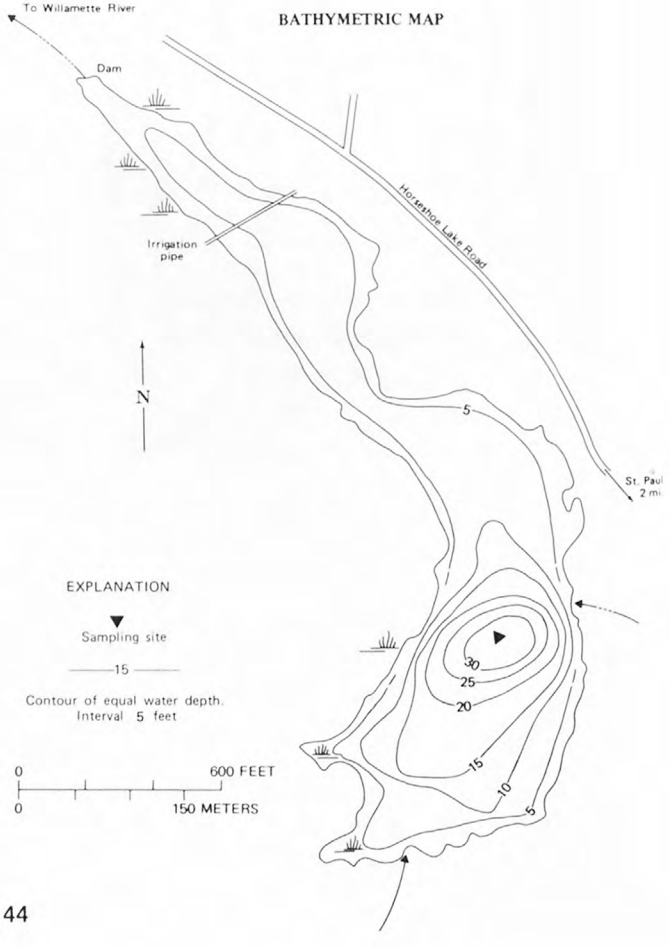
WATER-QUALITY DATA

SAMPLING TIME: 1245 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	220
BOTTOM	7.1	373

ALKALINITY (mg/l as $CaCO_3$)	120
TOTAL HARDNESS (mg/l as $CaCO_3$)	81
DISSOLVED SOLIDS (mg/l)	142
TRANSPARENCY (meters)	1.1
COLOR (Pt-Co units)	15
FECAL COLIFORM (colonies/100 ml)	7





LOCATION: Secs.35 and 36, T.5 S., R.3 W., and sec.1, T.6 S., R.3 W., about 1.5 mi (2.4 km) east of Wheatland Ferry and 7 mi (11 km) north of Salem. Surface-water outlet at lat 45°05'34", long 123°00'39". Mission Bottom 7½-minute quadrangle map, photorevised 1970, and Gervais 7½-minute quadrangle map.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 12 acres (49,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 60 acre-ft (74,000 m^3).

INFLOW: Through springs and two unnamed intermittent streams. No flow observed in channel on south end of lake from Deep Lake.

OUTFLOW: Estimated 2 ft^3/s (0.06 m^3/s) through channel on northwest end of lake to the Willamette River. Channel not indicated on topographic map.

USE: Private recreation. There is a natural reproduction of a variety of fish, including bluegill, white crappie, and brown bullhead.

REMARKS: Floating pond lilies covered about 15 percent of the lake, and about 10 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and sand.

A bloom of green algae was observed on the survey date. Water-rights certificates for diversion of 1.33 ft^3/s (0.04 m^3/s) for irrigation.

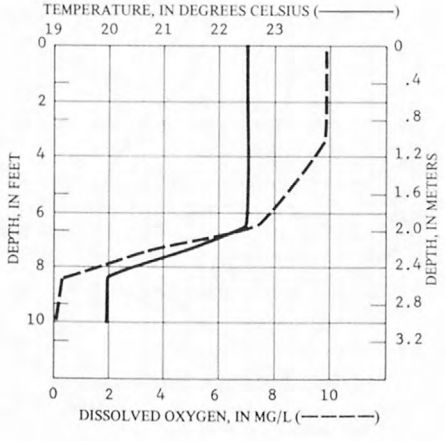
Photograph taken August 24, 1976.

WATER-QUALITY DATA

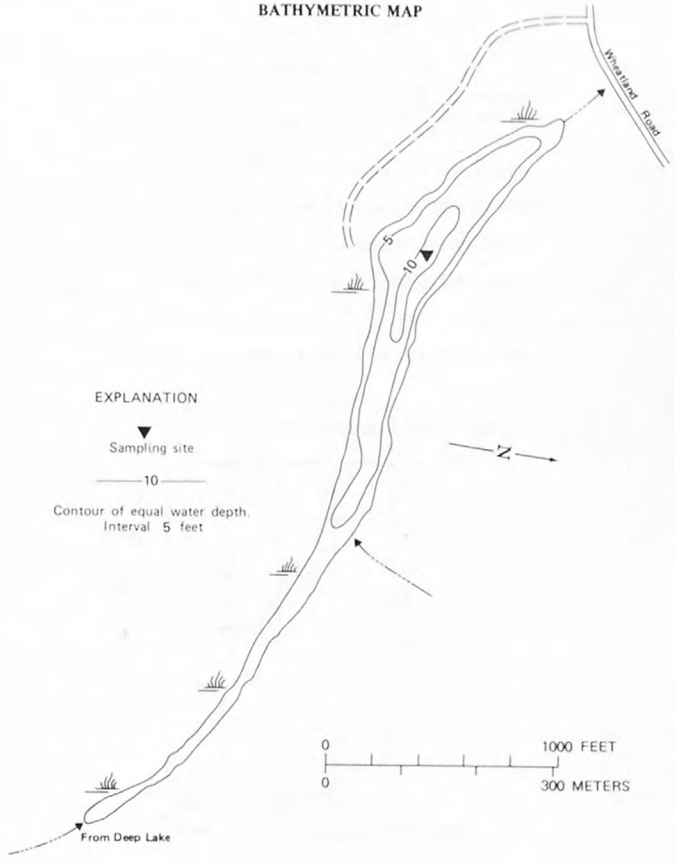
SAMPLING TIME: 1950 hours
CLOUD COVER: 10 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.6	268
BOTTOM	6.8	312

ALKALINITY (mg/l as $CaCO_3$)	150
TOTAL HARDNESS (mg/l as $CaCO_3$)	120
DISSOLVED SOLIDS (mg/l)	164
TRANSPARENCY (meters)	.6
COLOR (Pt-Co units)	35
FECAL COLIFORM (colonies/100 ml)	5



BATHYMETRIC MAP



LOCATION: Secs.23 and 26, T.8 S., R.8½ E., in the Warm Springs Indian Reservation about 2 mi (3.2 km) north of Olallie Butte Lookout and 11 mi (18 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°51'20", long 121°45'47". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.15 mi^2 (0.39 km^2).

SURFACE AREA: 7 acres (28,000 m^2).

SURFACE ELEVATION: 4,600 ft (1,400 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

OUTFLOW: No flow observed through channel on the northwest end of lake to Brook Lake.

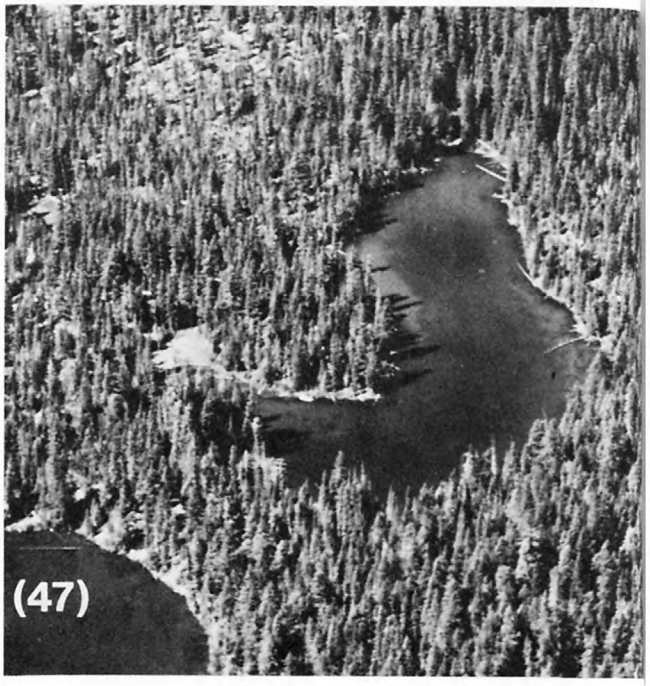
USE: Public recreation. The lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Emergent vegetation covered about 5 percent of the lake, and submerged aquatic growth sparsely covered about half the lake. Bottom material is primarily detritus and silt.

The lake is also referred to as Brook Lake in records of the Oregon Department of Fish and Wildlife.

Access to the lake 1 mi (1.6 km) by Forest Service trail from Russ Lake Forest Camp (off Skyline Road S42).

References: 4, 8, 11.



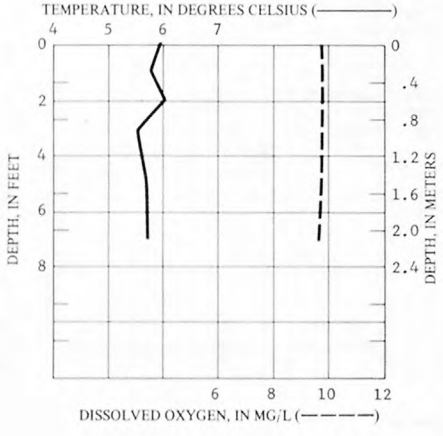
Photograph taken September 7, 1976.

WATER-QUALITY DATA

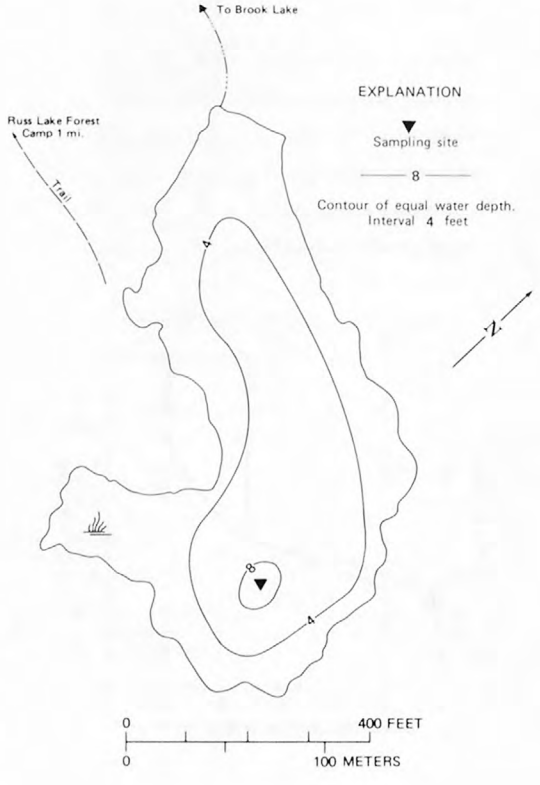
SAMPLING TIME: 1230 hours
CLOUD COVER: 10 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	40
BOTTOM	7.4	37

ALKALINITY (mg/l as $CaCO_3$)	20
TOTAL HARDNESS (mg/l as $CaCO_3$)	12
DISSOLVED SOLIDS (mg/l)	76
TRANSPARENCY (meters)	2.5 (bottom)
COLOR (Pt-Co units)	5
FECAL COLIFORM (colonies/100 ml)	< 1



BATHYMETRIC MAP



LOCATION: Secs.13 and 24, T.9 S., R.4 W., near the Willamette River about 1.5 mi (2.4 km) northwest of Talbot and 7 mi (11 km) south of Salem. Surface-water outlet at lat 44°47'15", long 123°07'20". Sidney 7½-minute quadrangle map.

DRAINAGE BASIN: Rock Creek (Willamette River).

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 11 acres (45,000 m^2).

SURFACE ELEVATION: 165 ft (50 m) above mean sea level, from topographic map.

VOLUME: 85 acre-ft (100,000 m^3).

INFLOW: Estimated 6 ft^3/s (0.17 m^3/s) from unnamed intermittent stream on south end of lake.

OUTFLOW: Estimated 12 ft^3/s (0.34 m^3/s) into Rock Creek on north end of lake.

USE: No public recreation.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud and detritus. Dead trees and snags were observed throughout the lake. The water was a muddy brown color on the survey date.
Water-rights certificates issued for diversion of 1.355 ft^3/s (0.038 m^3/s) for irrigation.

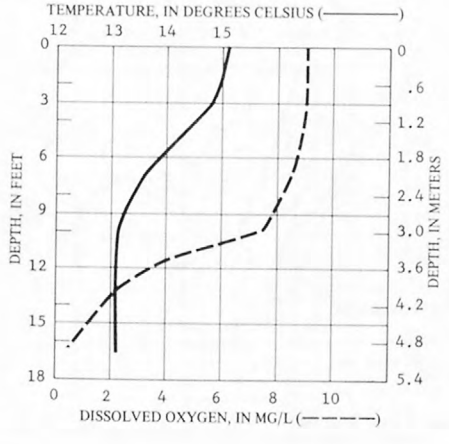
Photograph taken July 28, 1976.

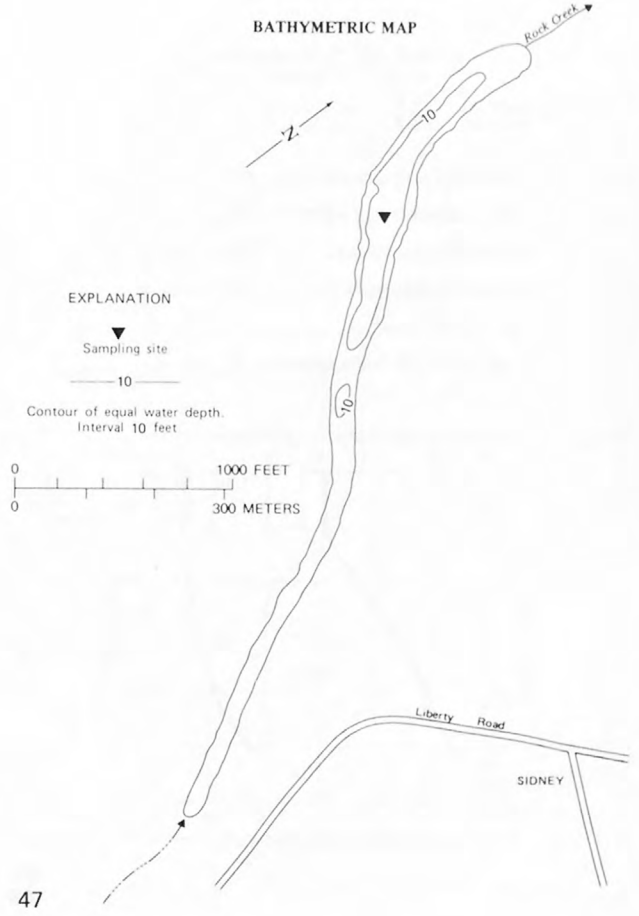
WATER-QUALITY DATA

SAMPLING TIME: 1415 hours
CLOUD COVER: 5 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.6	66
BOTTOM	6.7	64

ALKALINITY (mg/l as $CaCO_3$)	25
TOTAL HARDNESS (mg/l as $CaCO_3$)	22
DISSOLVED SOLIDS (mg/l)	42
TRANSPARENCY (meters)	1.0
COLOR (Pt-Co units)	15
FECAL COLIFORM (colonies/100 ml)	140





LOCATION: Sec.31, T.9 S., R.7 E., in the Willamette National Forest about 2 mi (3.2 km) southwest of Breitenbush Hot Springs and 7 mi (11 km) east of Detroit. Surface-water outlet at lat 44°45'20", long 122°00'05". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.30 mi^2 (0.78 km^2).

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 3,640 ft (1,110 m) above mean sea level, from topographic map.

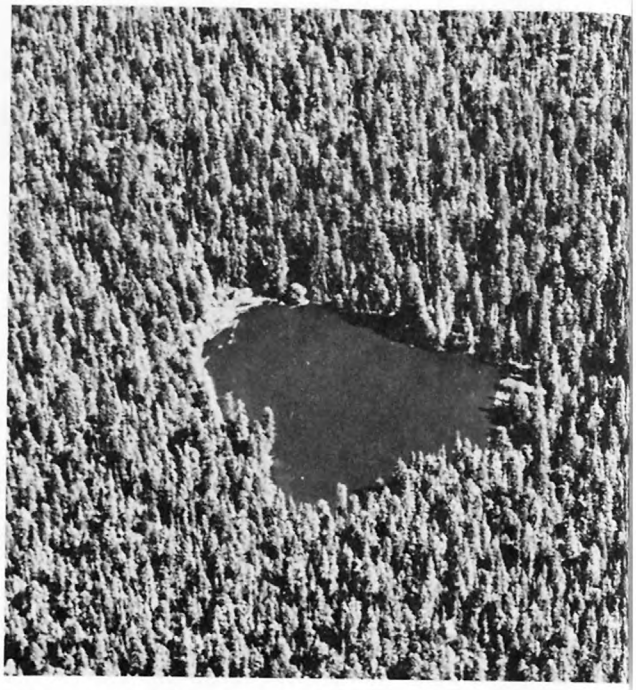
VOLUME: 40 acre-ft (49,000 m^3).

INFLOW: Estimated 0.5 ft^3/s (0.01 m^3/s) from channel on east end of lake. Channel not indicated on topographic map.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) into Leone Creek on north end of lake.

USE: Public recreation. The lake was last stocked in 1957 with fingerling brook trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake.

REMARKS: No evidence of submerged aquatic growth; however, some emergent grass was observed along the shoreline. Bottom material is primarily mud and detritus.
An algal bloom was observed on the survey date.
Access to the lake 1 mi (1.6 km) by Forest Service Trail 3367 from Forest Service Road S916.
References: 10, 11, 26, 27.



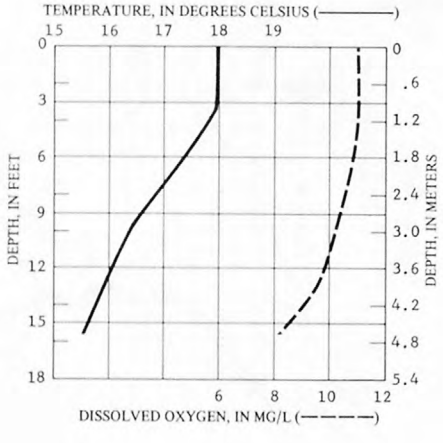
Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1045 hours
CLOUD COVER: 4 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	9.2	42
BOTTOM	7.9	39

ALKALINITY (mg/l as $CaCO_3$)	21
TOTAL HARDNESS (mg/l as $CaCO_3$)	13
DISSOLVED SOLIDS (mg/l)	47
TRANSPARENCY (meters)	3.4
COLOR (Pt-Co units)	5
FECAL COLIFORM (colonies/100 ml)	1



BATHYMETRIC MAP

LOCATION: Secs.2 and 3, T.9 S., R.8 E., in the Mount Hood National Forest about 2 mi (3.2 km) west of Olallie Butte Lookout and 8.5 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°49'37", long 121°48'22". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.58 mi^2 (1.50 km^2).

SURFACE AREA: 14 acres (57,000 m^2).

SURFACE ELEVATION: 4,760 ft (1,450 m) above mean sea level, from topographic map.

VOLUME: 430 acre-ft (530,000 m^3).

INFLOW: Two unnamed intermittent streams on south side of lake. Estimated less than 0.5 ft^3/s (0.01 m^3/s) from channel 1. Channel 2 is the outflow from Gifford Lake.

OUTFLOW: Estimated 1 ft^3/s (0.03 m^3/s) through channel on northwest end of lake to Fish Lake.

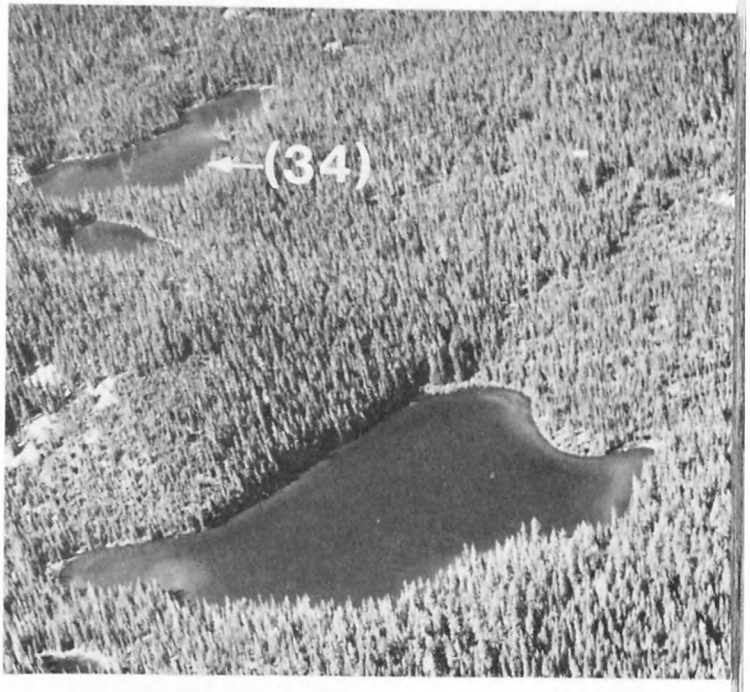
USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout. Lower Lake campground is about 0.5 mi (0.8 km) to the east of the lake.

REMARKS: Some emergent grass and submerged aquatic growth was observed in the lake. Bottom material is primarily mud, with sand, rock, and detritus observed in the shoal area.

Phytoplankton analysis showed the green algae Crucigenia and Sphaerocystis to be the codominant algae present.

Access to the lake 0.5 mi (0.8 km) by Forest Service Trail 717 from Skyline Road S42.

References: 4, 8, 11.



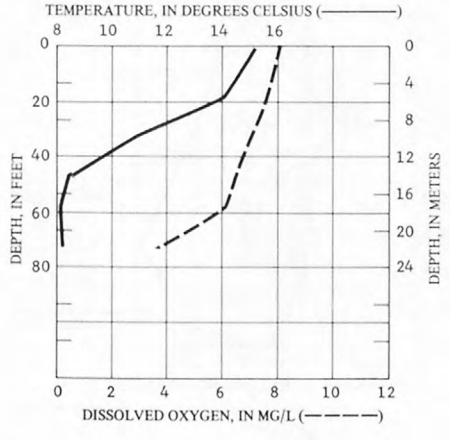
Photograph taken July 28, 1976.

WATER-QUALITY DATA

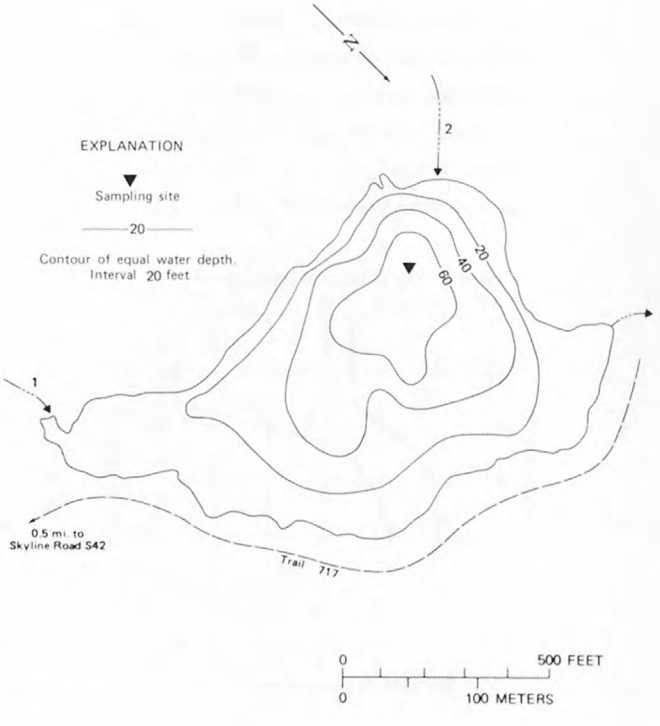
SAMPLING TIME: 1400 hours
CLOUD COVER: 80 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	13
BOTTOM	6.5	20

ALKALINITY (mg/l as $CaCO_3$)	7
TOTAL HARDNESS (mg/l as $CaCO_3$)	10
DISSOLVED SOLIDS (mg/l)	24
TRANSPARENCY (meters)	13.3
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	
Sampling site	<1
Inflow 1	<1



BATHYMETRIC MAP



LOCATION: Sec.27, T.4 S., R.2 W., about 3 mi (5 km) northwest of West Woodburn and 3 mi (5 km) east of St. Paul. Surface-water outlet at lat 45°12'03", long 122°55'05". St. Paul 7½-minute quadrangle map, photorevised 1970 (not named on map).

DRAINAGE BASIN: Champoeg Creek (Willamette River).

DRAINAGE AREA: 20.1 mi^2 (52.0 km^2).

SURFACE AREA: 72 acres (290,000 m^2) at normal pool.

SURFACE ELEVATION: 110 ft (34 m) above mean sea level, from topographic map.

VOLUME: 461.1 acre-ft (569,000 m^3) at normal pool.

INFLOW: Primarily Champoeg Creek on the south end of the reservoir. An unnamed intermittent stream also contributes flow on the west side of the reservoir.

OUTFLOW: Estimated 2 ft^3/s (0.06 m^3/s) over spillway into Spada Reservoir on the north end of the reservoir.

USE: Private recreation.

REMARKS: Emergent dead trees were observed throughout the reservoir, and some submerged aquatic growth was observed in the shoal area. Bottom material is primarily clay.

Water-rights certificate issued for storage of 461.1 acre-ft (569,000 m^3) for irrigation.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

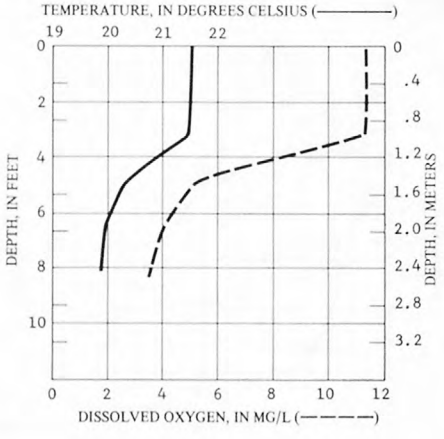
Photograph taken August 24, 1976.

WATER-QUALITY DATA

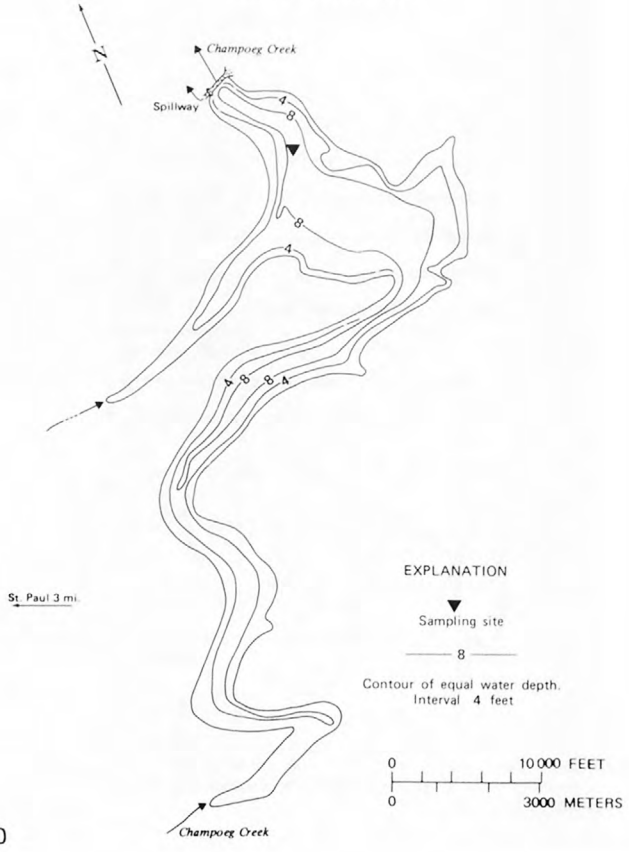
SAMPLING TIME: 1700 hours
CLOUD COVER: 1 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.2	299
BOTTOM	7.6	316

ALKALINITY (mg/l as $CaCO_3$)	180
TOTAL HARDNESS (mg/l as $CaCO_3$)	144
DISSOLVED SOLIDS (mg/l)	192
TRANSPARENCY (meters)	.8
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	4



BATHYMETRIC MAP



LOCATION: Sec.35, T.9 S., R.3 W., and sec.2, T.10 S., R.3 W., about 1 mi (1.6 km) northwest of Jefferson and 6.5 mi (10 km) northeast of Albany. Surface-water outlet at lat 44°44'21", long 123°01'42". Albany 7½-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 205 ft (62 m) above mean sea level, from topographic map.

VOLUME: 20 acre-ft (25,000 m^3).

INFLOW: Estimated 4 ft^3/s (0.1 m^3/s) from Morgan Creek on south end of lake.

OUTFLOW: Estimated 4 ft^3/s (0.1 m^3/s) into Morgan Creek on north end of lake.

USE: Private recreation. There is a natural reproduction of a variety of fish, including bluegill, black crappie, and squawfish.

REMARKS: Floating pond lilies and other emergent growth covered about 10 percent of the lake. Some submerged aquatic growth was observed along the perimeter of the lake.

Water-rights certificates for diversion of 2.39 ft^3/s (0.07 m^3/s) for irrigation and 3.00 ft^3/s (0.08 m^3/s) for flax retting and fire protection.

Reference: 11.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1250 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	76
BOTTOM	6.3	77

ALKALINITY (mg/l as $CaCO_3$) 28

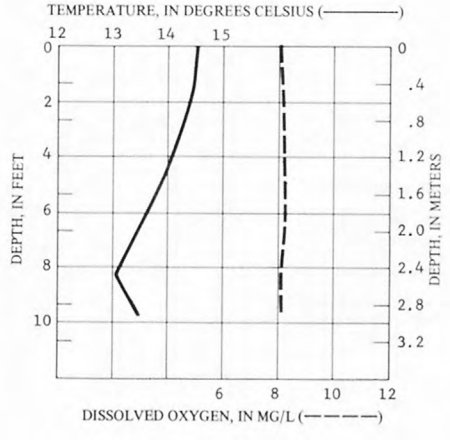
TOTAL HARDNESS (mg/l as $CaCO_3$) 28

DISSOLVED SOLIDS (mg/l) 54

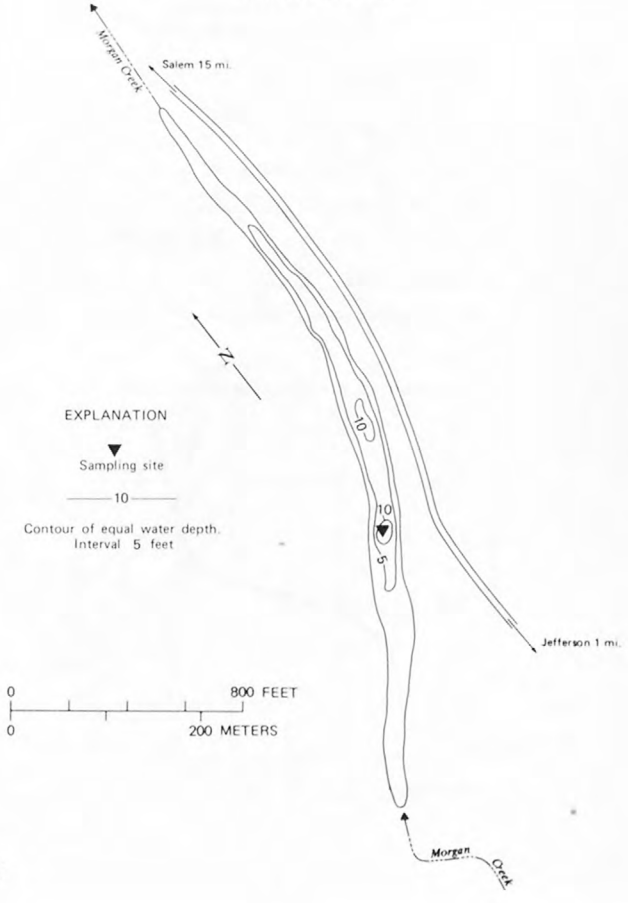
TRANSPARENCY (meters) 1.0

COLOR (Pt-Co units) 10

FECAL COLIFORM (colonies/100 ml) < 1



BATHYMETRIC MAP



LOCATION: Sec.3, T.9 S., R.8 E., in the Mount Hood National Forest about 2 mi (3.2 km) west of Olallie Butte Lookout and 8.5 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°49'16", long 121°48'22". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.31 mi^2 (0.80 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 4,920 ft (1,500 m) above mean sea level, from topographic map.

VOLUME: 150 acre-ft (180,000 m^3).

INFLOW: No flow observed from unnamed stream on south side of lake.

OUTFLOW: No flow observed through channel on northeast end of lake to Gifford Lake.

USE: Public recreation. The lake has been stocked annually with fingerling rainbow trout by the Oregon Department of Fish and Wildlife.

REMARKS: Some emergent grass was observed along the perimeter of the lake, and submerged aquatic growth was observed in the deepest part of the lake. Bottom material is primarily mud with silt, rocks, and detritus in the shoal area.

The lake is also referred to as Gifford Lake in the records of the Oregon Department of Fish and Wildlife and U.S. Forest Service.

Access to the lake 1.5 mi (2.4 km) by Forest Service Trails 717 and 706 from Skyline Road S42.

References: 4, 8, 11.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1400 hours
CLOUD COVER: 90 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.3	5
BOTTOM	5.9	5

ALKALINITY (mg/l as $CaCO_3$) 3

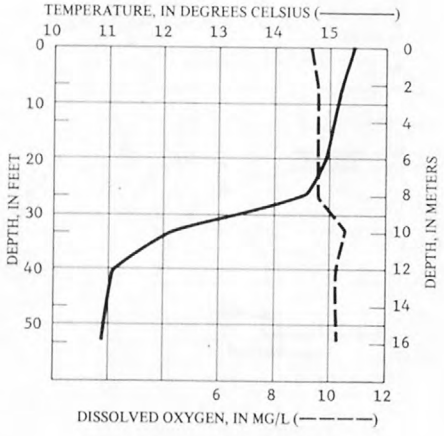
TOTAL HARDNESS (mg/l as $CaCO_3$) 1

DISSOLVED SOLIDS (mg/l) 8

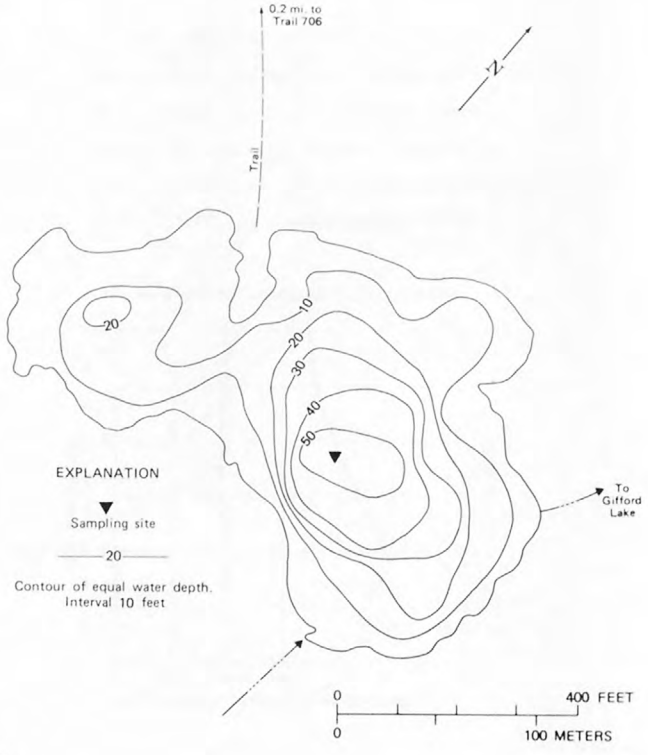
TRANSPARENCY (meters) 16.5 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) 3



BATHYMETRIC MAP



LOCATION: Secs.26 and 35, T.4 S., R.2 W., about 2 mi (3.2 km) north of West Woodburn and 4 mi (6.5 km) southeast of St. Paul. Surface-water outlet at lat 45°11'20", long 122°53'27". St. Paul 7½-minute quadrangle map, photorevised 1970 (not shown on map).

DRAINAGE BASIN: Champoeg Creek (Willamette River).

DRAINAGE AREA: 4.67 mi^2 (12.1 km^2).

SURFACE AREA: 10 acres (40,000 m^2) at normal pool.

SURFACE ELEVATION: 140 ft (43 m) above mean sea level, from topographic map.

VOLUME: 35.3 acre-ft (43,500 m^3) at normal pool.

INFLOW: No flow observed from Case Creek on the south end of the reservoir. Two unnamed intermittent streams and a spring also contribute to the reservoir.

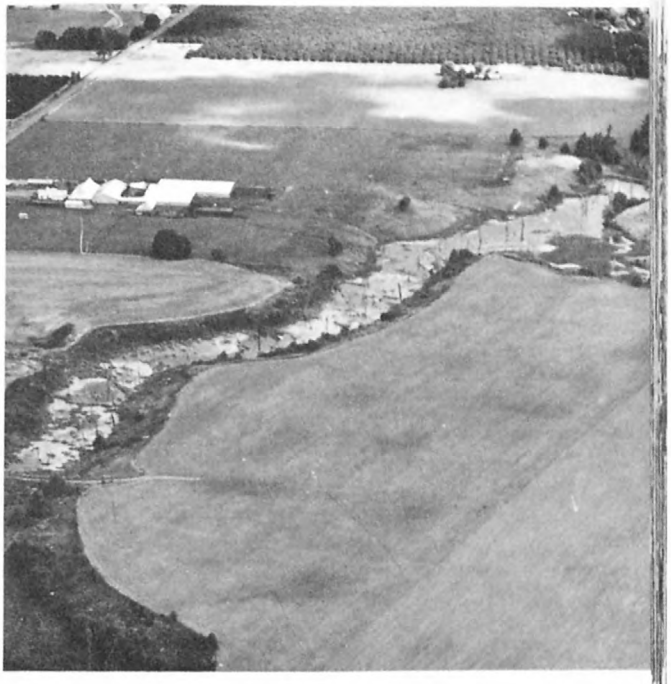
OUTFLOW: No flow observed into Case Creek on the north end of the reservoir to Case Creek Reservoir.

USE: No recreational use.

REMARKS: Emergent growth and dead trees covered about 40 percent of the lake, and about 90 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud.

Water-rights certificate issued for storage of 31.3 acre-ft (39,000 m^3) for irrigation.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.



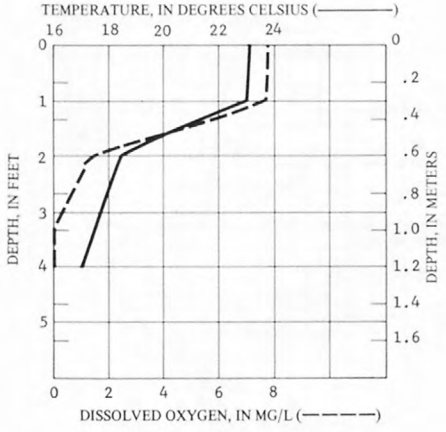
Photograph taken August 24, 1976.

WATER-QUALITY DATA

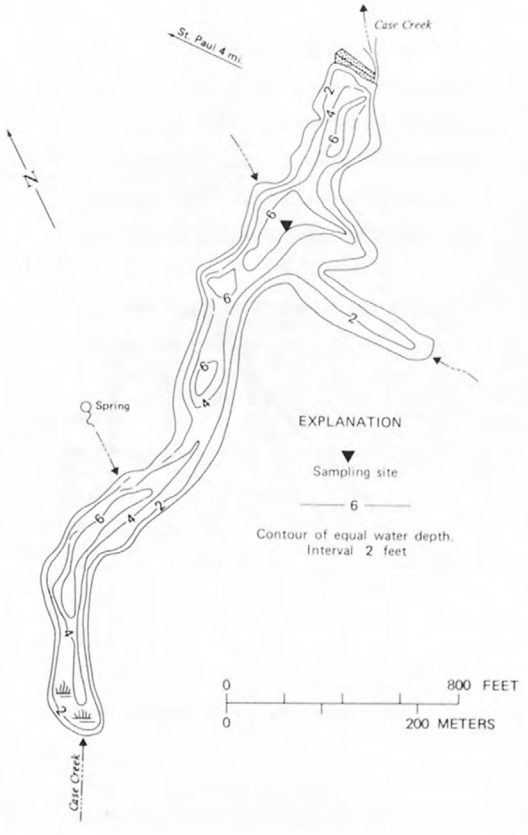
SAMPLING TIME: 1430 hours
CLOUD COVER: 1 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	290
BOTTOM	6.9	366

ALKALINITY (mg/l as $CaCO_3$)	170
TOTAL HARDNESS (mg/l as $CaCO_3$)	120
DISSOLVED SOLIDS (mg/l)	212
TRANSPARENCY (meters)	.6
COLOR (Pt-Co units)	30
FECAL COLIFORM (colonies/100 ml)	20



BATHYMETRIC MAP



LOCATION: Sec.34, T.5 S., R.3 W., and secs.3 and 4, T.6 S., R.3 W., near Wheatland Ferry about 7 mi (11 km) north of Salem. Surface-water outlet at lat 45°05'19", long 123°02'36". Mission Bottom 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 19 acres (77,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 100 acre-ft (120,000 m^3).

INFLOW: No flow observed in unnamed channel on south end of lake.

OUTFLOW: No flow observed through channel on north end of lake to the Willamette River. Channel not indicated on topographic map.

USE: Private recreation. There is a natural reproduction of a variety of fish, including bluegill, white crappie, and squawfish.

REMARKS: No evidence of submerged aquatic growth; however, some floating pond lilies were observed near the shoreline. Bottom material is primarily silt and mud.

An algal bloom was observed on the survey date.

Water-rights certificates for diversion of 4.76 ft^3/s (0.14 m^3/s) for irrigation.

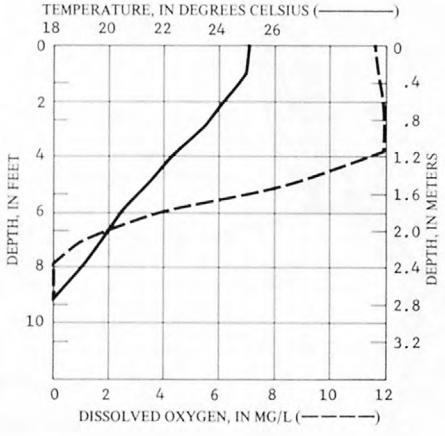
Photograph taken August 24, 1976.

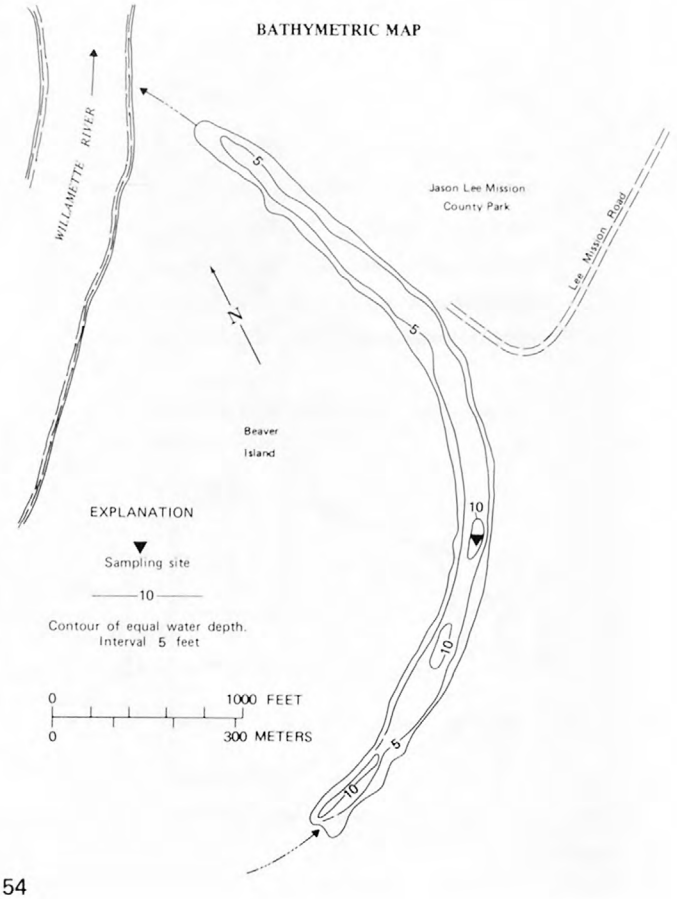
WATER-QUALITY DATA

SAMPLING TIME: 1300 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.5	215
BOTTOM	6.9	249

ALKALINITY (mg/l as $CaCO_3$)	110
TOTAL HARDNESS (mg/l as $CaCO_3$)	88
DISSOLVED SOLIDS (mg/l)	126
TRANSPARENCY (meters)	.9
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	< 1





LOCATION: Secs.8, 17, 19, 20, and 30, T.4 S., R.2 W., at St. Paul about 1.5 mi (2.4 km) west of Willamette River Mile 55 and 5 mi (8 km) northwest of West Woodburn. Surface-water outlet at lat 45°13'56", long 122°57'11". St. Paul 7½-minute quadrangle map, photorevised 1970 (not shown on map).

DRAINAGE BASIN: Mission Creek (Willamette River).

DRAINAGE AREA: 8.25 mi^2 (21.4 km^2).

SURFACE AREA: 114 acres (461,000 m^2) at normal pool.

SURFACE ELEVATION: 136 ft (42 m) above mean sea level at normal pool.

VOLUME: 1,147 acre-ft (1.4 hm^3) at normal pool.

INFLOW: No flow observed from Mission Creek on south end of reservoir. Five unnamed intermittent streams also contribute to the reservoir.

OUTFLOW: No flow observed into Mission Creek on the north end of the reservoir.

USE: Private recreation.

REMARKS: No evidence of submerged aquatic growth in the northern part of the reservoir. Some emergent grass was observed. Bottom material in the northern part of the reservoir is primarily mud and detritus.

Water-rights permit issued for diversion of 3 ft^3/s (0.08 m^3/s) for irrigation.

The bathymetric map represents the reservoir at a stage of 3.6 ft (11 m) above normal pool.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

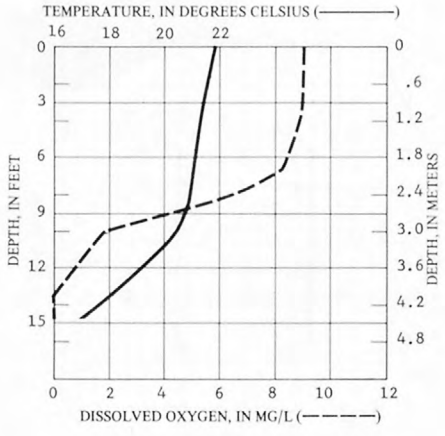
Photograph taken August 24, 1976.

WATER-QUALITY DATA

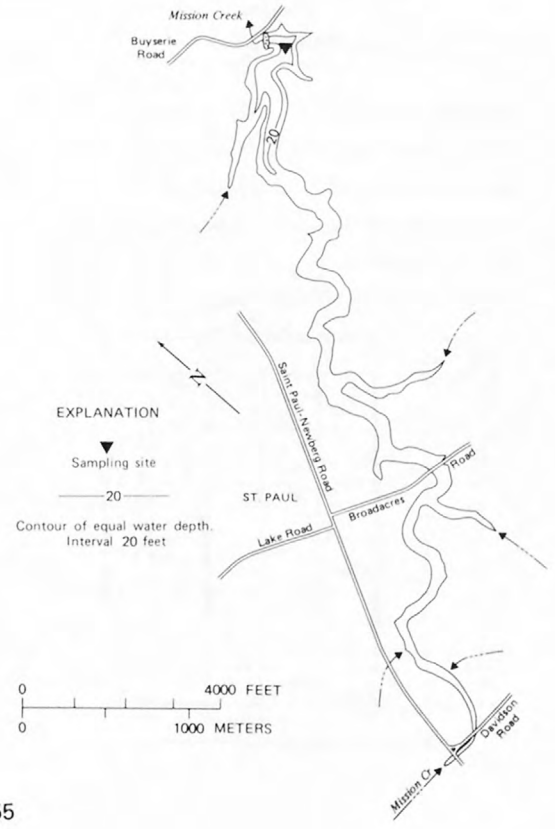
SAMPLING TIME: 1345 hours
CLOUD COVER: 70 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.2	212
BOTTOM	7.2	214

ALKALINITY (mg/l as $CaCO_3$)	98
TOTAL HARDNESS (mg/l as $CaCO_3$)	87
DISSOLVED SOLIDS (mg/l)	124
TRANSPARENCY (meters)	1.2
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	67



BATHYMETRIC MAP



LOCATION: Sec.16, T.7 S., R.2 E., about 6 mi (10 km) northeast of Silver Creek Falls State Park and 10 mi (16 km) southeast of Silverton. Surface-water outlet at lat 44°58'09", long 122°33'54". Lyons 15-minute quadrangle map (not shown on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 0.26 mi^2 (0.67 km^2).

SURFACE AREA: 6 acres (24,000 m^2) at normal pool.

SURFACE ELEVATION: 1,280 ft (390 m) above mean sea level, from topographic map.

VOLUME: 55.6 acre-ft (69,000 m^3) at normal pool from original blueprint of lake.

INFLOW: Possible channel on south end of lake. No channel indicated on topographic map.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) over spillway through channel on north end of lake to Butte Creek.

USE: Private recreation.

REMARKS: Emergent grass and submerged aquatic growth were observed along the perimeter of the lake. Bottom material is primarily mud and detritus.

Water-rights permit issued for storage of 55.6 acre-ft (69,000 m^3) for irrigation and recreation.

The original construction drawing of the lake, which is on file with the Oregon Water Resources Department, does not represent the present bathymetry of the lake. An island now exists in the northern part of the lake near the damsite.

Information on surface area and volume furnished by the Oregon Water Resources Department.

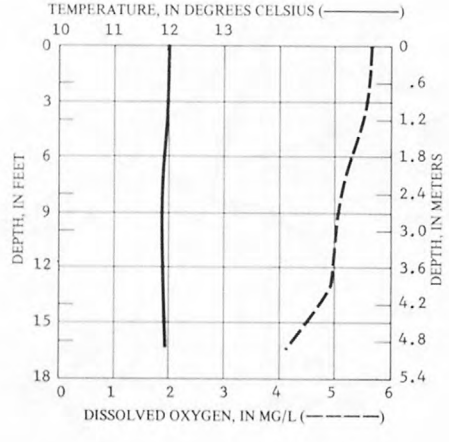
Photograph taken September 7, 1976.

WATER-QUALITY DATA

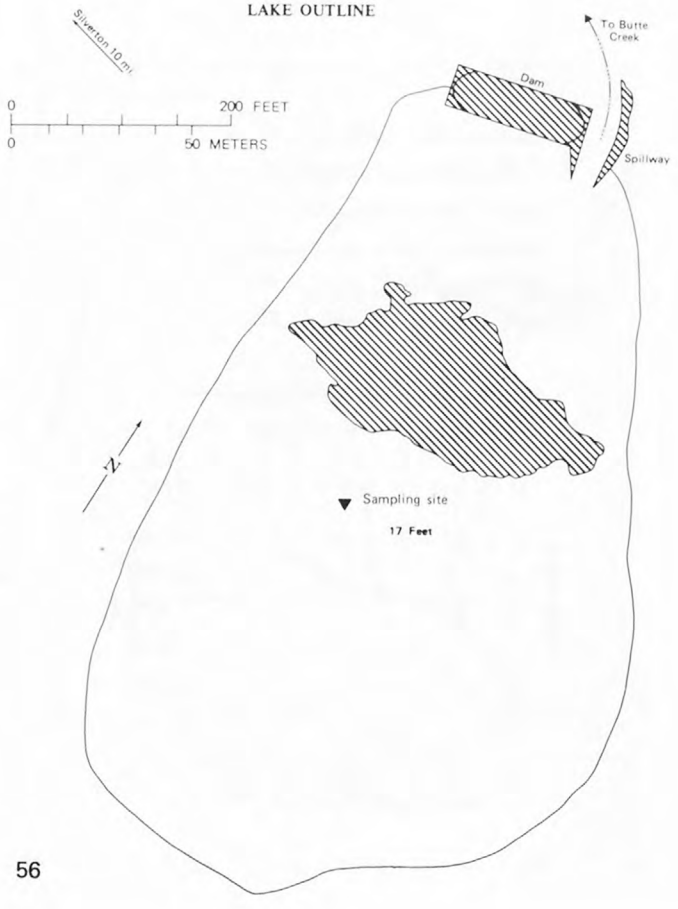
SAMPLING TIME: 1230 hours
CLOUD COVER: 70 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.0	63
BOTTOM	6.4	68

ALKALINITY (mg/l as $CaCO_3$)	25
TOTAL HARDNESS (mg/l as $CaCO_3$)	24
DISSOLVED SOLIDS (mg/l)	46
TRANSPARENCY (meters)	2.1
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	1



LAKE OUTLINE



LOCATION: Sec.10, T.9 S., R.8 E., in the Mount Hood National Forest about 2.5 mi (4 km) southwest of Olallie Butte Lookout and 8 mi (13 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°48'27", long 121°48'50". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.05 mi^2 (0.13 km^2).

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 5,240 ft (1,600 m) above mean sea level, from topographic map.

VOLUME: 30 acre-ft (37,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

OUTFLOW: No flow observed in channel on southwest side of lake. Outflow not indicated on topographic map.

USE: Public recreation. The lake has been stocked periodically with rainbow and brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Some emergent grass was observed, and about 30 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and silt with some rock and detritus.

The lake is also referred to as Nekbobets Lake by the Oregon Department of Fish and Wildlife.

Access to the lake 1.5 mi (2.4 km) by Forest Service Trail 725 and Skyline Trail from Skyline Road S42.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1000 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	5.5	4
BOTTOM	5.2	4

ALKALINITY (mg/l as $CaCO_3$) 2

TOTAL HARDNESS (mg/l as $CaCO_3$) 1

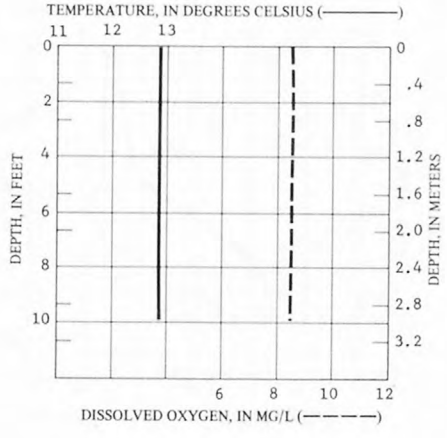
DISSOLVED SOLIDS (mg/l) 14

TRANSPARENCY (meters) 3.4 (bottom)

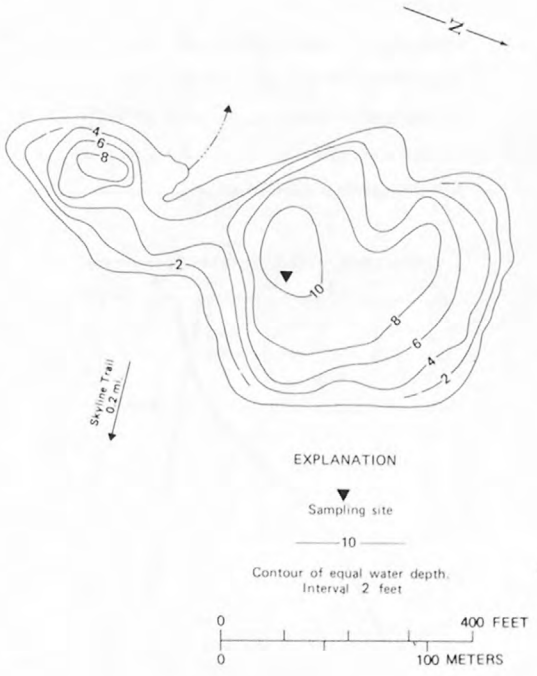
COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1

(Chemical analysis in table 2, p. 5)



BATHYMETRIC MAP



LOCATION: Sec.17, T.9 S., R.5 E., in the Willamette National Forest about 4.5 mi (7 km) northwest of Detroit and 11 mi (18 km) west of Breitenbush Hot Springs. Surface-water outlet at lat 44°47'40", long 122°13'00". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.63 mi^2 (1.63 km^2).

SURFACE AREA: 12 acres (49,000 m^2).

SURFACE ELEVATION: 3,440 ft (1,050 m) above mean sea level, from topographic map.

VOLUME: 250 acre-ft (310,000 m^3).

INFLOW: No flow observed from channel on southwest end of lake. Inflow not indicated on topographic map.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) into Opal Creek on northeast end of lake (October 6, 1976).

USE: Public recreation. The lake has been stocked annually with rainbow and brook trout by the Oregon Department of Fish and Wildlife. There is an unimproved campsite on the northwest side of the lake.

REMARKS: Some emergent grass and floating pond lilies were observed. Submerged aquatic growth covered about 5 percent of the lake bottom. Bottom material is primarily detritus and mud.

Phytoplankton analysis showed the green algae Dictyosphaerium, and the diatoms Synedra and Nitzschia to be the codominant algae present.

Access to the lake 0.5 mi (0.8 km) down steep trail from Opal Rim Road (off Forest Service Road S915).

References: 10, 11, 26, 27.

Photograph taken September 7, 1976.

WATER-QUALITY DATA
Site 1

SAMPLING TIME: 1330 hours - August 6, 1976
CLOUD COVER: 2 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.7	15
BOTTOM	6.2	17

ALKALINITY (mg/l as $CaCO_3$) 7

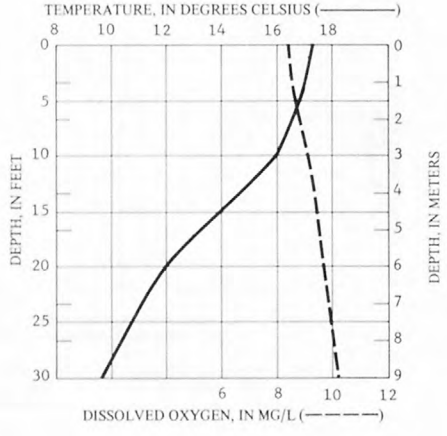
TOTAL HARDNESS (mg/l as $CaCO_3$) 5

DISSOLVED SOLIDS (mg/l) 8

TRANSPARENCY (meters) 9.4 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1



WATER-QUALITY DATA
Site 2

SAMPLING TIME: 1200 hours - October 6, 1976
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.4	16
BOTTOM	5.8	57

ALKALINITY (mg/l as $CaCO_3$) 6

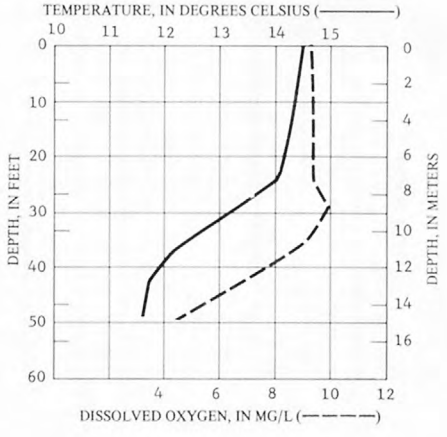
TOTAL HARDNESS (mg/l as $CaCO_3$) 4

DISSOLVED SOLIDS (mg/l) 23

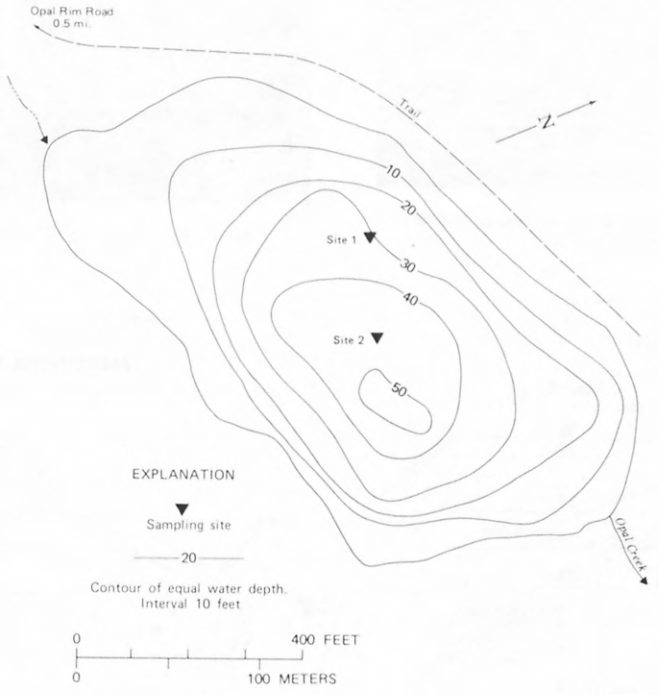
TRANSPARENCY (meters) 10.2

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) 1



BATHYMETRIC MAP



LOCATION: Sec.18, T.8 S., R.6 E., in the Mount Hood National Forest about 9.5 mi (15 km) northwest of Breitenbush Hot Springs and 10 mi (16 km) north of Detroit. Surface-water outlet at lat 44°53'13", long 122°06'49". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.34 mi^2 (0.88 km^2).

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 4,000 ft (1,220 m) above mean sea level, from topographic map.

VOLUME: 13 acre-ft (16,000 m^3).

INFLOW: Four intermittent streams, not indicated on topographic map. Estimated total flow less than 0.5 ft^3/s (0.01 m^3/s) from channels 1 and 2. No flow observed from channels 3 and 4.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) into Pansy Creek on north end of lake.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife. Pansy Basin Forest Camp is about 0.5 mi (0.8 km) north of the lake.

REMARKS: Emergent grass covered about 25 percent of the lake, and submerged aquatic growth covered about 25 percent of the lake bottom. Bottom material is primarily mud and detritus with boulders observed in the middle of the lake.

The lake is in the 10,200-acre (4,130 hm^2) Bull of the Woods roadless area in which motor vehicles and motorboats are prohibited.

Access to the lake 1 mi (1.6 km) by Forest Service Trail 551 from Forest Service Road S739.

References: 4, 10, 11.

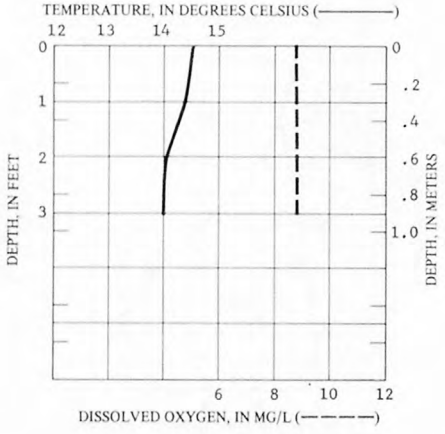
Photograph taken September 7, 1976.

WATER-QUALITY DATA

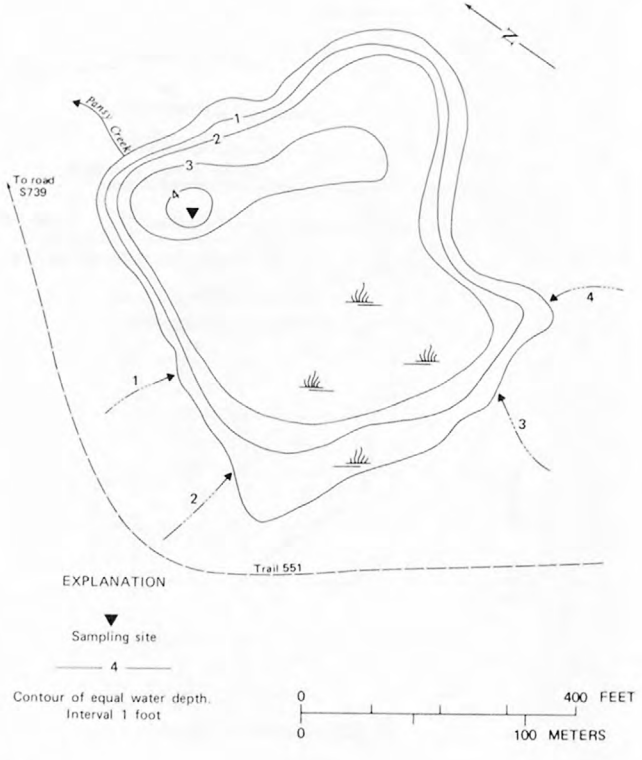
SAMPLING TIME: 1515 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	39
BOTTOM	6.6	39

ALKALINITY (mg/l as $CaCO_3$)	19
TOTAL HARDNESS (mg/l as $CaCO_3$)	16
DISSOLVED SOLIDS (mg/l)	38
TRANSPARENCY (meters)	1.3 (bottom)
COLOR (Pt-Co units)	10
FECAL COLIFORM (colonies/100 ml)	< 1



BATHYMETRIC MAP



LOCATION: Sec.3, T.7 S., R.1 W., about 0.5 mi (0.8 km) south of Silverton and 9 mi (14 km) east of Salem. Surface-water outlet at lat 44°59'32", long 122°47'52". Stayton NE 7½-minute quadrangle map.

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.66 mi^2 (4.30 km^2).

SURFACE AREA: 19 acres (77,000 m^2) at normal pool.

SURFACE ELEVATION: 230 ft (70 m) above mean sea level, from topographic map.

VOLUME: 223 acre-ft (275,000 m^3) at normal pool.

INFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) from Brush Creek on southeast end of reservoir. Three unnamed intermittent streams also flow into the reservoir.

OUTFLOW: No flow observed into Brush Creek on northwest end of reservoir.

USE: Private recreation.

REMARKS: No evidence of submerged aquatic growth; however, a small patch of emergent growth was observed. Bottom material is primarily mud.

Water-rights certificate issued for storage of 223.0 acre-ft (275,000 m^3) for fish culture and recreation.

Information on surface area, volume, drainage area, and bathymetry furnished by the Oregon Water Resources Department.

Photograph taken August 24, 1976.

WATER-QUALITY DATA

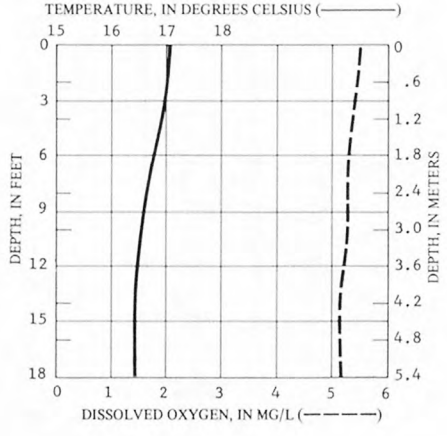
SAMPLING TIME: 1330 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.7	49
BOTTOM	6.4	48

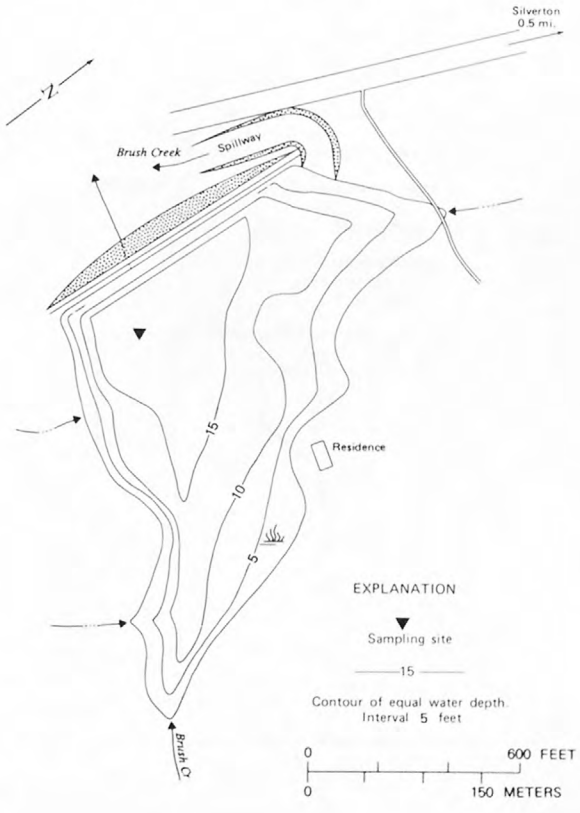
ALKALINITY (mg/l as $CaCO_3$)	20
TOTAL HARDNESS (mg/l as $CaCO_3$)	15
DISSOLVED SOLIDS (mg/l)	30
TRANSPARENCY (meters)	4.0
COLOR (Pt-Co units)	10

FECAL COLIFORM (colonies/100 ml)

Sampling site	<1
Brush Creek	<1



BATHYMETRIC MAP



LOCATION: Sec.27, T.9 S., R.8 E., in the Mount Hood National Forest about 2 mi (3.2 km) northeast of Bear Point Lookout and 8 mi (13 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°45'46", long 121°48'38". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.47 mi^2 (1.22 km^2).

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 5,400 ft (1,650 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: Three unnamed intermittent streams on south side of lake. Estimated total flow less than 2 ft^3/s (0.06 m^3/s) from channels 1 and 2. No measurable flow from channel 3. Channel 2 not indicated on topographic map.

OUTFLOW: Estimated less than 2 ft^3/s (0.06 m^3/s) through channel on north end of lake to North Fork Breitenbush River.

USE: Public recreation. This lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife. This lake has experienced a loss of fish population during severe winters.

REMARKS: No evidence of emergent growth; however, about 5 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and detritus.

Access to the lake 0.5 mi (0.8 km) south of Skyline Road S42. There are no maintained trails to the lake.

Reference: 11.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1500 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.7	21
BOTTOM	7.7	21

ALKALINITY (mg/l as $CaCO_3$) 25

TOTAL HARDNESS (mg/l as $CaCO_3$) 4

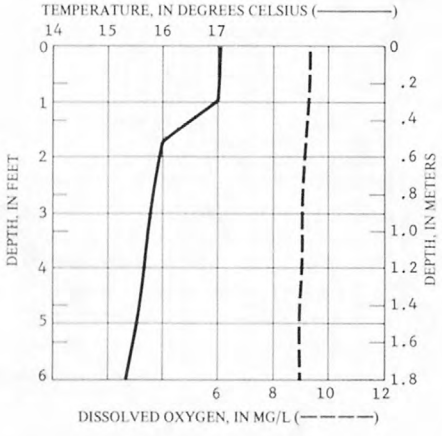
DISSOLVED SOLIDS (mg/l) 30

TRANSPARENCY (meters) 2.4 (bottom)

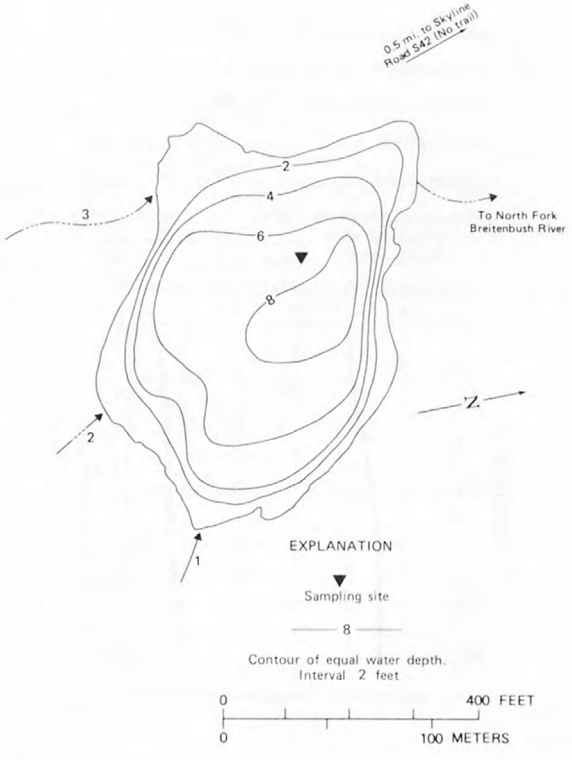
COLOR (Pt-Co units) 5

FECAL COLIFORM (colonies/100 ml)

Sampling site	<1
Inflow 2	<1



BATHYMETRIC MAP



LOCATION: Sec.8, T.9 S., R.8 E., in the Mount Hood National Forest about 4.5 mi (7 km) west of Olallie Butte Lookout and 6 mi (10 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°48'45", long 121°51'10". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.05 mi^2 (0.13 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 4,600 ft (1,400 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) from channel on north side of lake. Inflow not indicated on topographic map.

OUTFLOW: Two intermittent streams on south side of lake, not indicated on topographic map. Estimated less than 0.5 ft^3/s (0.01 m^3/s) from channel 2. No flow observed in channel 1.

USE: Public recreation. The lake has been stocked periodically with fingerling brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: No evidence of submerged aquatic growth; however, some emergent grass was observed along the shoreline. Bottom material is primarily mud and detritus.

Access to the lake 1.5 mi (2.4 km) by Forest Service Trail 719 from Forest Service Road S46A (off Skyline Road S42).

References: 4, 8, 11.

Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1730 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.1	6
BOTTOM	6.1	6

ALKALINITY (mg/l as $CaCO_3$) 1

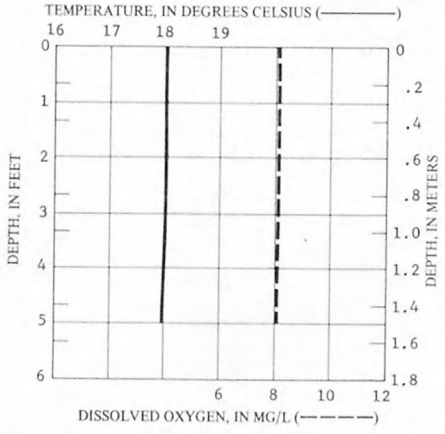
TOTAL HARDNESS (mg/l as $CaCO_3$) 1

DISSOLVED SOLIDS (mg/l) 20

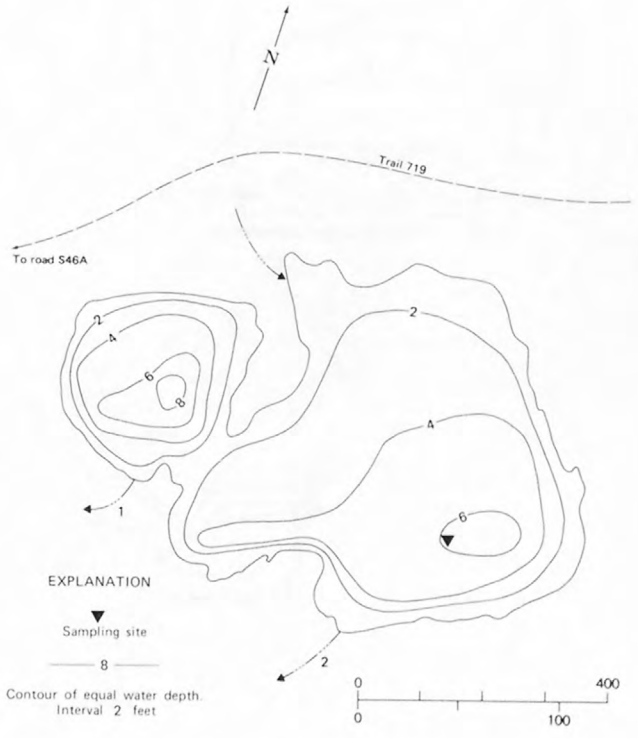
TRANSPARENCY (meters) 1.9 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP



LOCATION: Sec.5, T.9 S., R.3 W., near the Willamette River about 4.5 mi (7 km) south of Salem and 6.5 mi (10 km) southwest of Turner. Surface-water outlet at lat 44°48'59", long 123°05'20". Sidney 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 6 acres (24,000 m^2) at full pool.

SURFACE ELEVATION: 200 ft (61 m) above mean sea level, from topographic map.

VOLUME: 62.5 acre-ft (77,100 m^3) at full pool.

INFLOW: No flow observed from unnamed stream on south end of reservoir. Willamette River water is sometimes pumped into the reservoir during the summer months.

OUTFLOW: No flow observed through channel on northwest end of reservoir to the Willamette River.

USE: No recreational use.

REMARKS: No evidence of emergent growth; however, some submerged aquatic growth was observed near the shoreline. Bottom material is primarily mud.

An algal bloom was observed on the survey date.

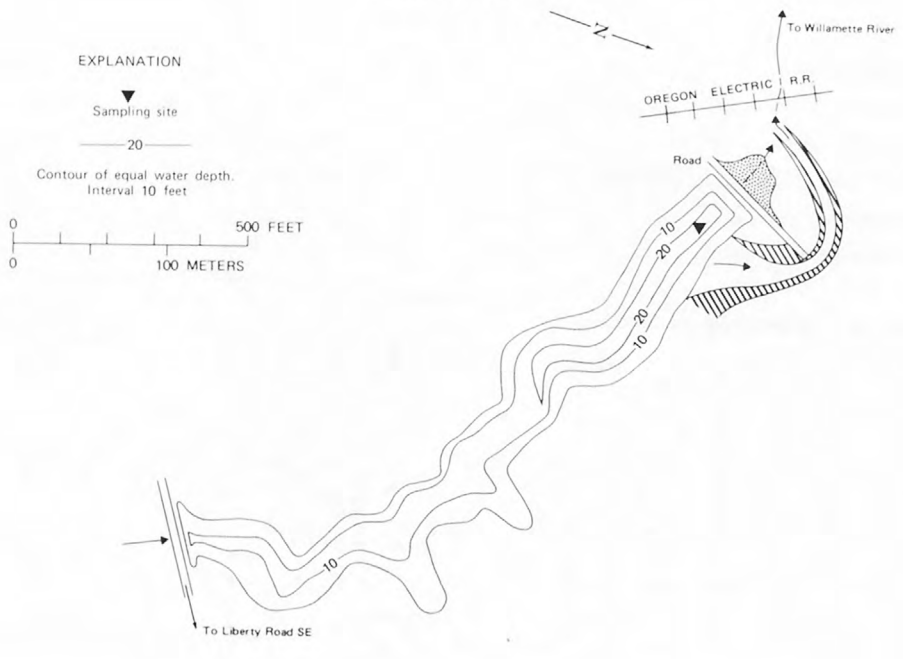
Water-rights certificate issued for storage of 62.5 acre-ft (77,100 m^3) for irrigation.

The bathymetric map represents the reservoir 1.5 ft (0.5 m) below full pool.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

Photograph taken July 28, 1976.

BATHYMETRIC MAP



WATER-QUALITY DATA

SAMPLING TIME: 1030 hours - October 7, 1976
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.3	226
BOTTOM	7.1	225

ALKALINITY (mg/l as $CaCO_3$) 99

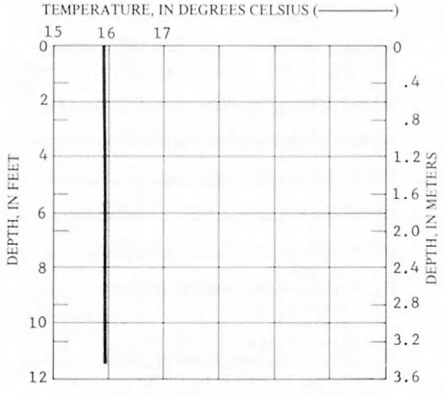
TOTAL HARDNESS (mg/l as $CaCO_3$) 85

DISSOLVED SOLIDS (mg/l) 134

TRANSPARENCY (meters) .4

COLOR (Pt-Co units) 50

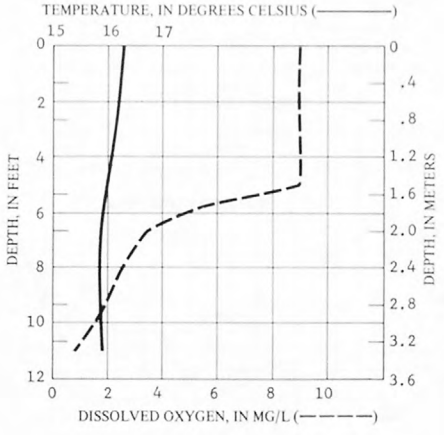
FECAL COLIFORM (colonies/100 ml) 7



WATER-QUALITY DATA

SAMPLING TIME: 1030 hours - October 8, 1976
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.5	209
BOTTOM	7.0	215



LOCATION: Secs.16 and 17, T.8 S., R.7 E., in the Mount Hood National Forest about 10 mi (16 km) northwest of Olallie Butte Lookout and 6.5 mi (10 km) north of Breitenbush Hot Springs. Surface-water outlet at lat 44°52'30", long 121°58'13". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.46 mi^2 (1.19 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 3,560 ft (1,080 m) above mean sea level, from topographic map.

VOLUME: 65 acre-ft (80,000 m^3).

INFLOW: Two intermittent streams on east end of lake, not indicated on topographic map. Estimated 1.5 ft^3/s (0.04 m^3/s) through marsh from channel 1. No measurable flow from channel 2.

OUTFLOW: Estimated 1 ft^3/s (0.03 m^3/s) through channel on south side of lake to Round Creek.

USE: Public recreation. This lake has been periodically stocked with brook, brown, and rainbow trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake. The U.S. Forest Service maintains six campsites to the north of the lake.

REMARKS: Emergent grass and floating pond lilies covered about 5 percent of the lake, and about 20 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and detritus.

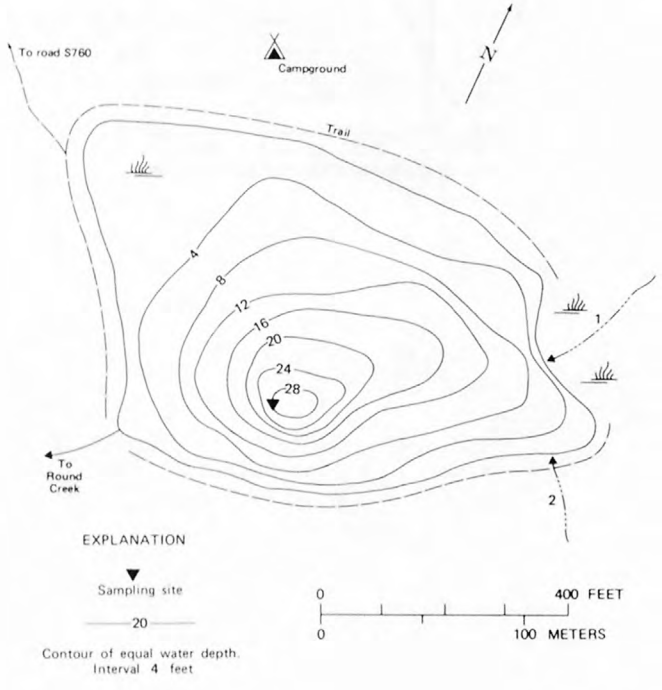
An algal bloom was observed on the survey date. Phytoplankton analysis showed the green algae Sphaerocystis, and the blue-green Anacystis and Anabaena to be the codominant algae present.

Access to the lake less than 0.5 mi (0.8 km) by trail from Forest Service Road S760.

References: 4, 10, 11.

Photograph taken September 7, 1976.

BATHYMETRIC MAP



WATER-QUALITY DATA

SAMPLING TIME: 1100 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.2	60
BOTTOM	6.5	59

ALKALINITY (mg/l as $CaCO_3$) 33

TOTAL HARDNESS (mg/l as $CaCO_3$) 25

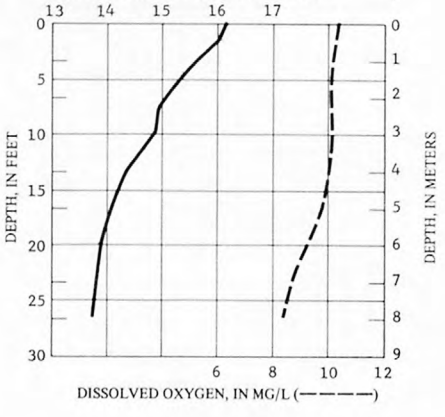
DISSOLVED SOLIDS (mg/l) 64

TRANSPARENCY (meters) 6.7

COLOR (Pt-Co units) 10

FECAL COLIFORM (colonies/100 ml)
Sampling site <1
Inflow 1 6

(Chemical analysis in table 2, p. 5)



LOCATION: Sec.26, T.8 S., R.8½ E., in the Warm Springs Indian Reservation about 2 mi (3.2 km) north of Olallie Butte Lookout and 11 mi (18 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°51'05", long 121°45'40". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.18 mi^2 (0.47 km^2).

SURFACE AREA: 10 acres (40,000 m^2).

SURFACE ELEVATION: 4,600 ft (1,400 m) above mean sea level, from topographic map.

VOLUME: 80 acre-ft (99,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

OUTFLOW: Estimated 0.5 ft^3/s (0.01 m^3/s) through channel on south side of lake. Outflow not indicated on topographic map.

USE: Public recreation. This lake has been stocked annually with fingerling brook trout by the Oregon Department of Fish and Wildlife. Crayfish were observed in the lake.

REMARKS: Some emergent grass and submerged aquatic growth was observed along the shoreline. Bottom material is primarily mud with sand, rock, and detritus observed along the shoal area.

Access to the lake 1 mi (1.6 km) by trail from Russ Lake Forest Camp (off Skyline Road S42).

References: 8, 11.

Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1030 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.2	29
BOTTOM	6.0	44

ALKALINITY (mg/l as $CaCO_3$) 13

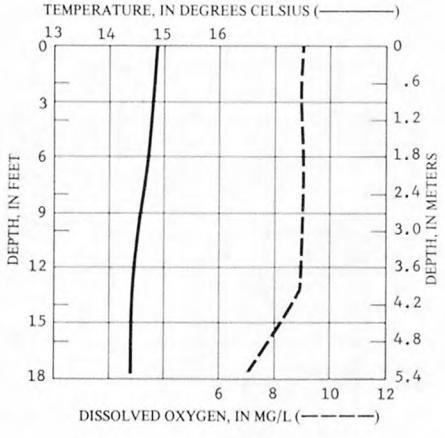
TOTAL HARDNESS (mg/l as $CaCO_3$) 10

DISSOLVED SOLIDS (mg/l) 44

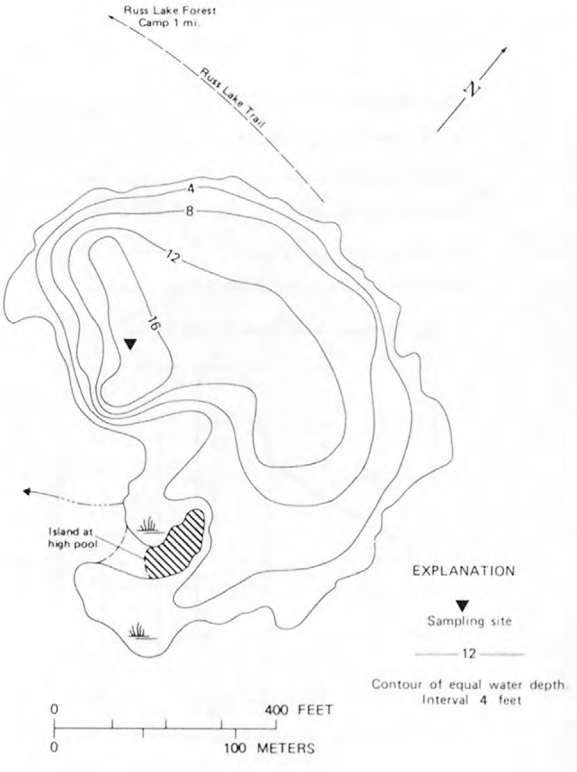
TRANSPARENCY (meters) 5.5 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) < 1



BATHYMETRIC MAP



LOCATION: Sec.11, T.10 S., R.8 E., in the Mount Jefferson Wilderness about 3 mi (5 km) north of Mount Jefferson, 3.5 mi (5.5 km) southeast of Bear Point Lookout, and 9.5 mi (15 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°42'58", long 121°47'59". Mount Jefferson 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.17 mi^2 (0.44 km^2).

SURFACE AREA: 10 acres (40,000 m^2).

SURFACE ELEVATION: 5,856 ft (1,785 m) above mean sea level, from topographic map.

VOLUME: 85 acre-ft (100,000 m^3).

INFLOW: One perennial and five intermittent streams feed into the lake. Estimated total flow less than 0.5 ft^3/s (0.01 m^3/s) from channels 1 and 2. No flow observed in channels 3, 4, 5, and 6. Channels 2, 3, 4, 5, and 6 are not indicated on topographic map.

OUTFLOW: Estimated flow less than 0.5 ft^3/s (0.01 m^3/s) through channel on northwest end of lake to South Fork Breitenbush River.

USE: Public recreation. The lake has been periodically stocked with cutthroat and golden trout by the Oregon Department of Fish and Wildlife. The lake is in Jefferson Park, a wilderness camp area.

REMARKS: No evidence of emergent growth; however, submerged aquatic growth was observed in the deeper parts of the lake. Bottom material is primarily sand and gravel along the shoal area.

Access to the lake 5.5 mi (9 km) by Forest Service Trail 3429 and the Pacific Crest Trail from Forest Service Road 1044.

References: 5, 11, 26, 27.

Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1130 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.5	6
BOTTOM	6.6	7

ALKALINITY (mg/l as $CaCO_3$) 5

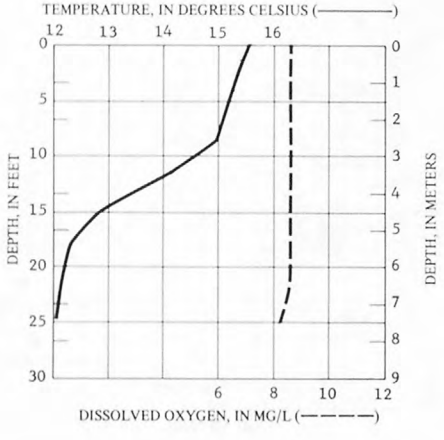
TOTAL HARDNESS (mg/l as $CaCO_3$) 1

DISSOLVED SOLIDS (mg/l) 16

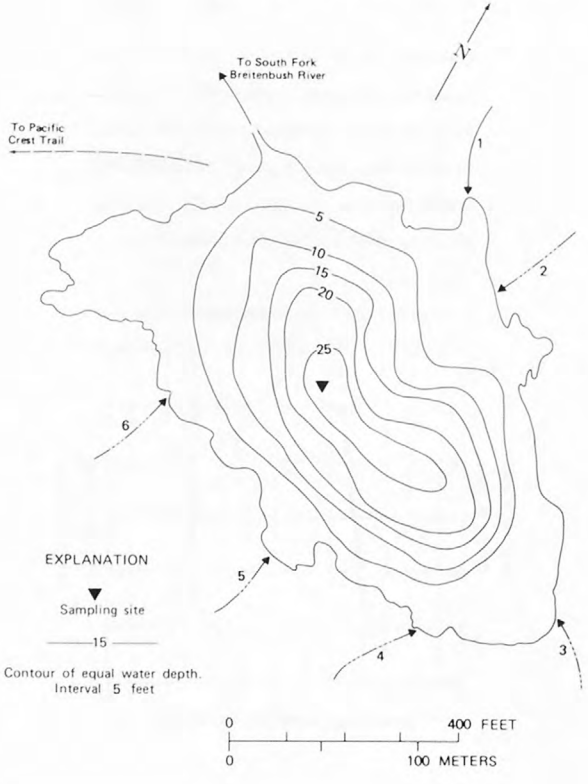
TRANSPARENCY (meters) 7.9 (bottom)

COLOR (Pt-Co units) 5

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP



LOCATION: Sec.35, T.5 S., R.3 W., and sec.2, T.6 S., R.3 W., about 1 mi (1.6 km) east of Wheatland Ferry and 7 mi (11 km) north of Salem. Surface-water outlet at lat 45°04'53", long 123°00'54". Mission Bottom 7½-minute quadrangle map, photorevised 1970 (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 100 ft (30 m) above mean sea level, from topographic map.

VOLUME: 55 acre-ft (68,000 m^3).

INFLOW: No flow observed from channel on north end of lake. Channel not indicated on topographic map.

OUTFLOW: No flow observed through channel on south end of lake to Deep Lake.

USE: Private recreation, some fishing.

REMARKS: Emergent vegetation covered more than 30 percent of the lake, and more than 90 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud.

Photograph taken August 24, 1976

WATER-QUALITY DATA

SAMPLING TIME: 1130 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	282
BOTTOM	6.8	283

ALKALINITY (mg/l as $CaCO_3$) 134

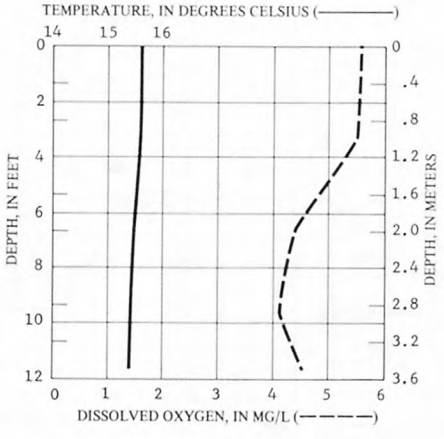
TOTAL HARDNESS (mg/l as $CaCO_3$) 130

DISSOLVED SOLIDS (mg/l) 176

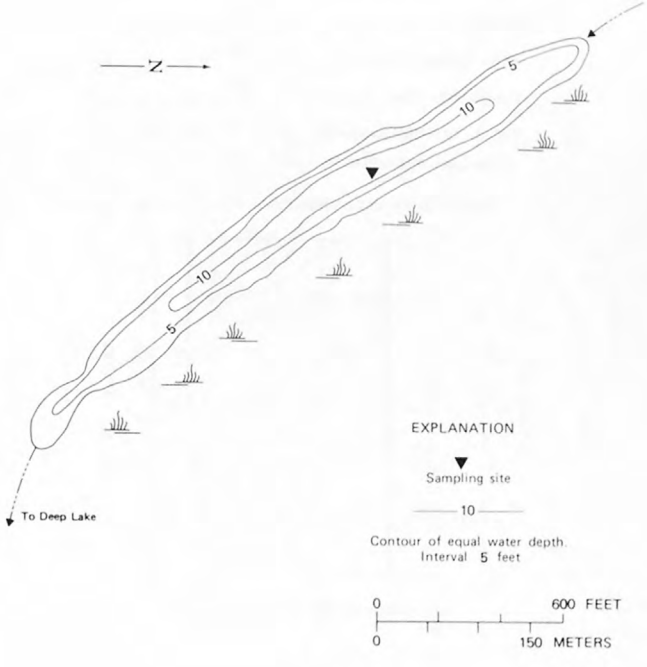
TRANSPARENCY (meters) .9

COLOR (Pt-Co units) 30

FECAL COLIFORM (colonies/100 ml) 1



BATHYMETRIC MAP



LOCATION: Secs. 11 and 14, T.7 S., R.3 W., in Salem about 0.5 mi (0.8 km) east of Willamette River (Mile 82) and 1 mi (1.6 km) northwest of the State Fairgrounds. Southernmost tip of the lake at lat 44°58'11", long 123°01'19". Salem West 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 14 acres (57,000 m^2).

SURFACE ELEVATION: 128 ft (39 m) above mean sea level, from topographic map.

VOLUME: 230 acre-ft (280,000 m^3).

INFLOW: No channels observed and none indicated on topographic map.

OUTFLOW: No channels observed and none indicated on topographic map.

USE: No recreational use. Receiving waste pond for a truck-cleaning station on northeast end of lake.

REMARKS: No evidence of submerged aquatic growth; however, about 25 percent of the lake was covered with emergent vegetation and dead tree stumps. Bottom material is primarily mud. Algal mats were observed on the survey date.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1345 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.8	288
BOTTOM	7.2	297

ALKALINITY (mg/l as $CaCO_3$) 132

TOTAL HARDNESS (mg/l as $CaCO_3$) 130

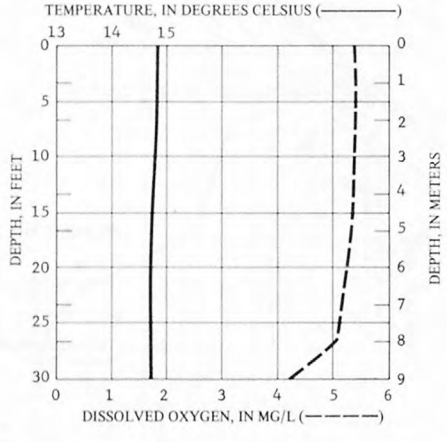
DISSOLVED SOLIDS (mg/l) 162

TRANSPARENCY (meters) 5.0

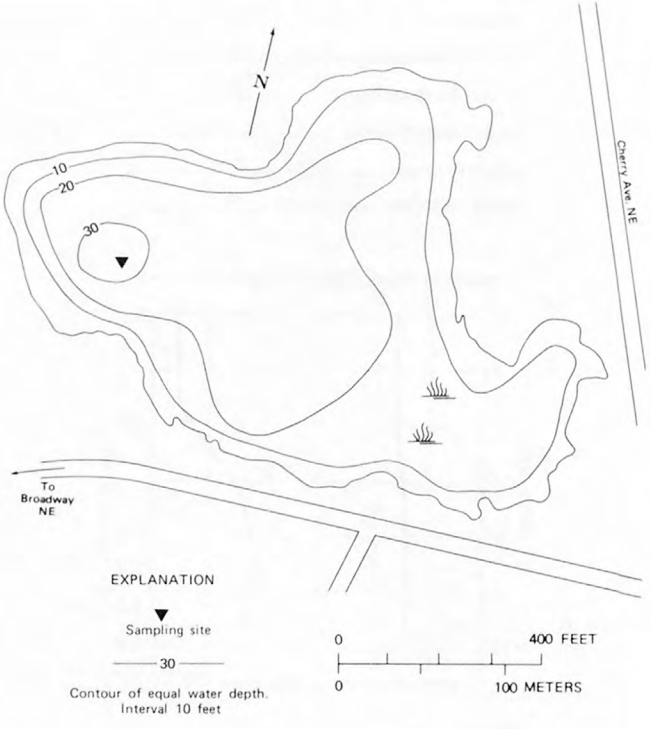
COLOR (Pt-Co units) 10

FECAL COLIFORM (colonies/100 ml) 2

(Chemical analysis in table 2, p. 5)



BATHYMETRIC MAP



LOCATION: Sec.15, T.10 S., R.8 E., in the Mount Jefferson Wilderness about 2.5 mi (4 km) northwest of Jefferson, 3.5 mi (5.5 km) southeast of Bear Point Lookout, and 9 mi (14 km) southeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°42'32", long 121°48'42". Mount Jefferson 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.19 mi^2 (0.49 km^2).

SURFACE AREA: 9 acres (36,000 m^2).

SURFACE ELEVATION: 5,840 ft (1,780 m) above mean sea level, from topographic map.

VOLUME: 120 acre-ft (150,000 m^3).

INFLOW: Five intermittent streams on north and east side of lake, not indicated on topographic map. Estimated total flow less than 0.5 ft^3/s (0.01 m^3/s) from channels 1 and 2. No flow observed from channels 3, 4, and 5.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on northwest side of lake to South Fork Breitenbush River. Channel not indicated on topographic map.

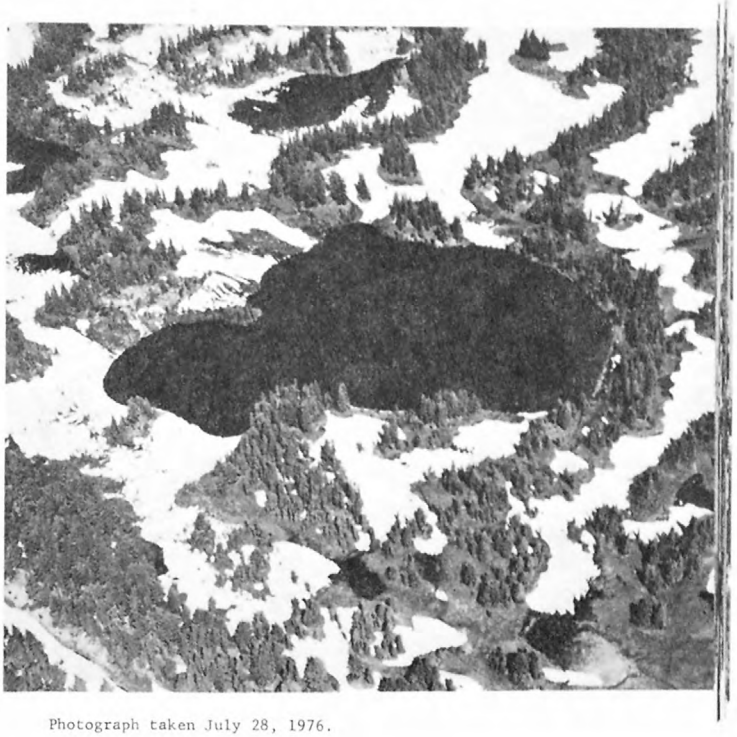
USE: Public recreation. The lake has been periodically stocked with golden trout and brook trout by the Oregon Department of Fish and Wildlife. The lake is in Jefferson Park, a wilderness camp area.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material primarily sand and gravel with some detritus along the shoreline.

The lowest pH readings in the county were observed in this poorly buffered lake.

Access to the lake 5 mi (8 km) by Forest Service Trail 3429 and the Pacific Crest Trail from Forest Service Road 1044.

References: 11, 26, 27.



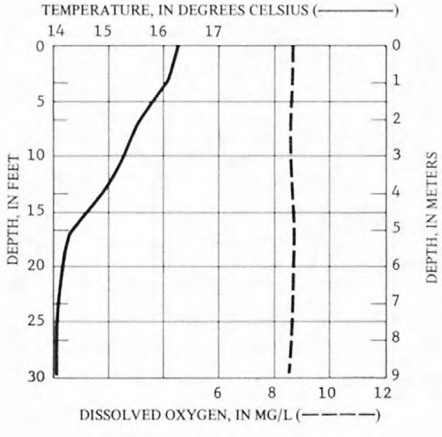
Photograph taken July 28, 1976.

WATER-QUALITY DATA

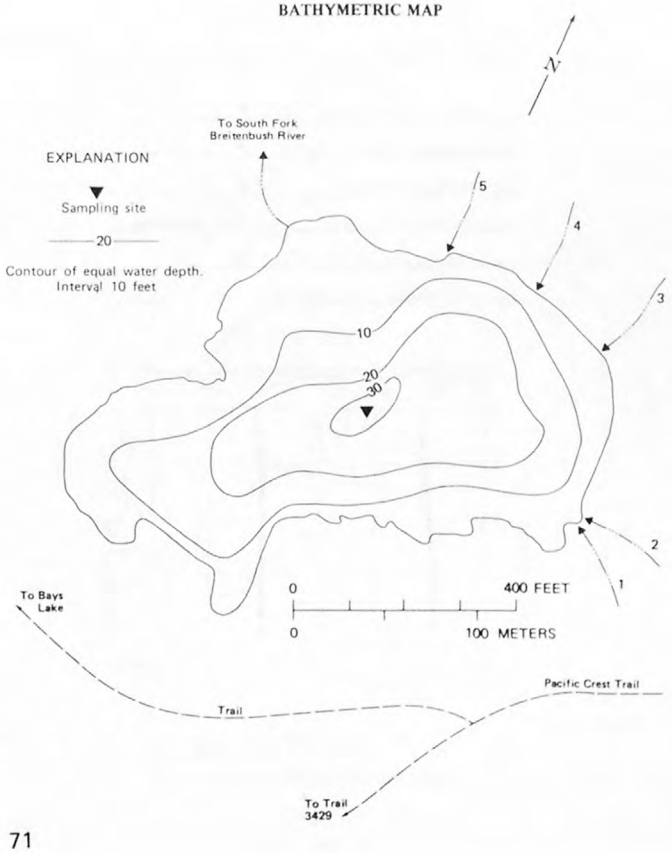
SAMPLING TIME: 1300 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	5.8	4
BOTTOM	5.1	4

ALKALINITY (mg/l as $CaCO_3$)	1
TOTAL HARDNESS (mg/l as $CaCO_3$)	1
DISSOLVED SOLIDS (mg/l)	8
TRANSPARENCY (meters)	9.5 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.4, T.9 S., R.8 E., in the Mount Hood National Forest about 3.5 mi (5.5 km) west of Olallie Butte Lookout and 7.5 mi (12 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°49'08", long 121°49'52". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.33 mi^2 (0.85 km^2).

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 4,840 ft (1,480 m) above mean sea level, from topographic map.

VOLUME: 20 acre-ft (25,000 m^3).

INFLOW: No measurable flow from unnamed intermittent stream on east side of lake.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on west side of lake to Wall Lake.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Emergent vegetation was observed, and about 20 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud with some detritus observed along the shoal area.

Access to the lake 3 mi (5 km) by Forest Service Trail 719 from Forest Service Road S46A (off Skyline Road S42).

References: 4, 5, 8, 11, 26, 27.

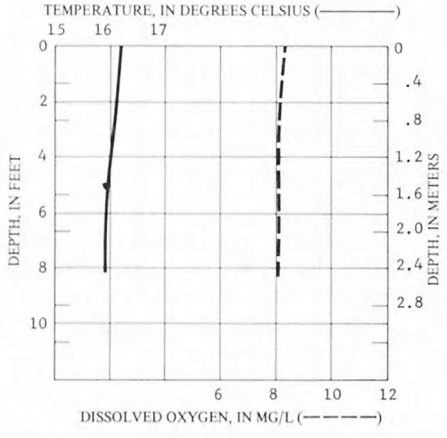
Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1400 hours
CLOUD COVER: 5 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.1	6
BOTTOM	6.2	6

ALKALINITY (mg/l as $CaCO_3$)	1
TOTAL HARDNESS (mg/l as $CaCO_3$)	2
DISSOLVED SOLIDS (mg/l)	8
TRANSPARENCY (meters)	3.1 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP

LOCATION: Secs.27, 28, 33, and 34, T.8 S., R.8 E., in the Mount Hood National Forest about 3.5 mi (5.5 km) northwest of Olallie Butte Lookout and 8.5 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°50'44", long 121°49'30". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.45 mi^2 (1.17 km^2).

SURFACE AREA: 5 acres (20,000 m^2).

SURFACE ELEVATION: 4,120 ft (1,260 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: No flow observed from unnamed stream on south end of lake.

OUTFLOW: No flow observed through channel on north end of lake to Squirrel Creek.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife. The lake has experienced a loss of fish population during severe winters.

REMARKS: Emergent grass was observed along the shoreline, and about 70 percent of the lake bottom was covered with submerged aquatic vegetation. Bottom material is primarily mud and detritus.

Access to the lake 0.5 mi (0.8 km) by Forest Service Trail 717 from Forest Service Road S829A.

References: 4, 8, 11.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1515 hours
CLOUD COVER: 95 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.1	6
BOTTOM	6.1	6

ALKALINITY (mg/l as $CaCO_3$) 2

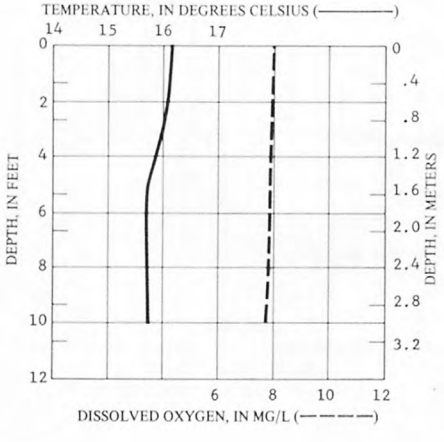
TOTAL HARDNESS (mg/l as $CaCO_3$) 4

DISSOLVED SOLIDS (mg/l) 20

TRANSPARENCY (meters) 3.7 (bottom)

COLOR (Pt-Co units) 0

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP

LOCATION: Sec.12, T.7 S., R.1 W., and secs. 7 and 18, T.7 S., R.1 E., about 4.5 mi (7 km) northwest of Silver Creek Falls State Park and 1.5 mi (2.4 km) southeast of Silverton. Surface-water outlet at lat 44°58'56", long 122°45'01". Lyons and Stayton 15-minute quadrangle maps (not shown on maps).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 45.6 mi^2 (118 km^2).

SURFACE AREA: 65 acres (260,000 m^2) at normal pool.

SURFACE ELEVATION: 424 ft (129 m) above mean sea level at normal pool.

VOLUME: 1,300 acre-ft (1.6 hm^3) at normal pool.

INFLOW: Primarily from Silver Creek on the south end of the reservoir.

OUTFLOW: Flow was observed over the spillway into Silver Creek on the northwest end of the reservoir.

USE: Public recreation, including boating, fishing, and swimming. No powerboats allowed. The reservoir provides a municipal water supply for the city of Silverton.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud with some detritus.

Water-rights permit issued for storage of 1,300 acre-ft (1.6 hm^3) for municipal water supply.

Information on surface area, volume, elevation, and bathymetry furnished by CH2M Hill, consulting engineers.

Access to reservoir off State Highway 214.

Photograph taken August 24, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1030 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	38
BOTTOM	6.3	171

ALKALINITY (mg/l as $CaCO_3$) 14

TOTAL HARDNESS (mg/l as $CaCO_3$) 10

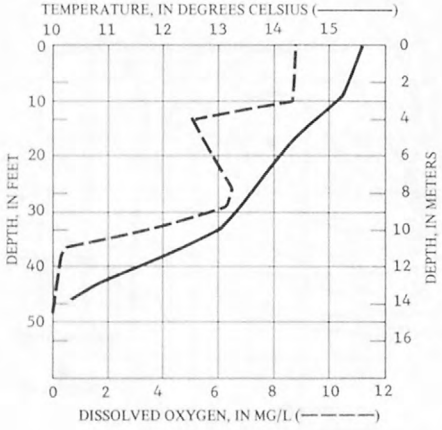
DISSOLVED SOLIDS (mg/l) 32

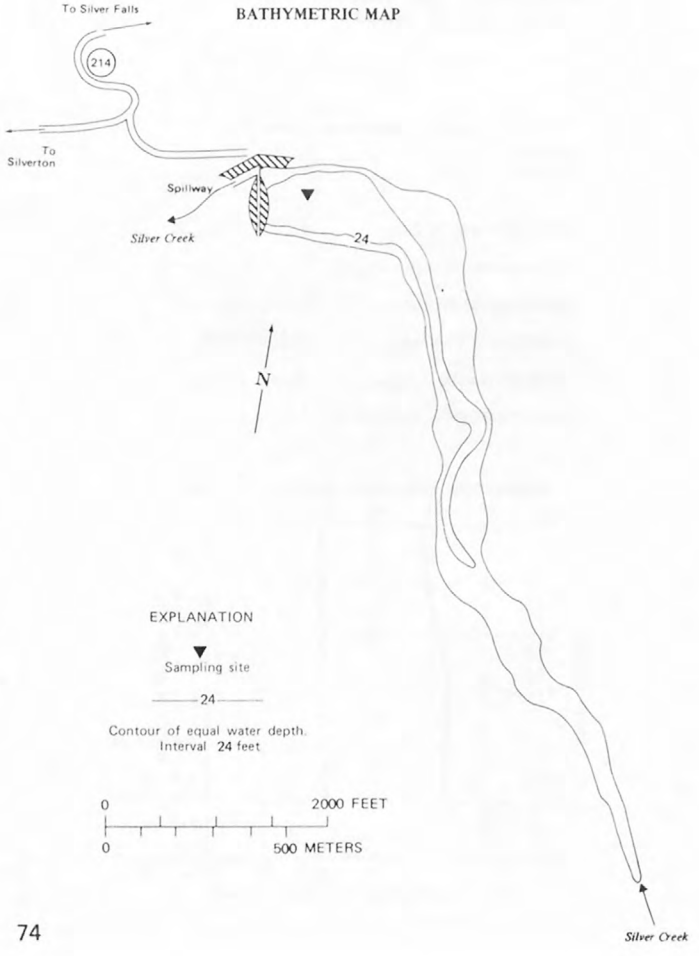
TRANSPARENCY (meters) 2.6

COLOR (Pt-Co units) 15

FECAL COLIFORM (colonies/100 ml) 4

(Chemical analysis in table 2, p. 5)





LOCATION: Sec.32, T.3 S., R.2 W., about 2.5 mi (4 km) west of Champoeg State Park and 2 mi (3.2 km) south of Newberg. Surface-water outlet at lat 45°15'51", long 122°57'31". Newberg 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: 3.51 mi^2 (9.09 km^2).

SURFACE AREA: 25 acres (100,000 m^2).

SURFACE ELEVATION: 80 ft (24 m) above mean sea level, from topographic map.

VOLUME: 180 acre-ft (220,000 m^3).

INFLOW: Two unnamed streams, one on the west end of the lake and the other on the southeast side of the lake, emerging through a growth of lily pads.

OUTFLOW: Estimated less than 1 ft^3/s (0.03 m^3/s) through channel on the north side of the lake to the Willamette River.

USE: Private recreation. There is a natural reproduction of a variety of fish in the lake, including bluegill, black crappie, and brown bullhead.

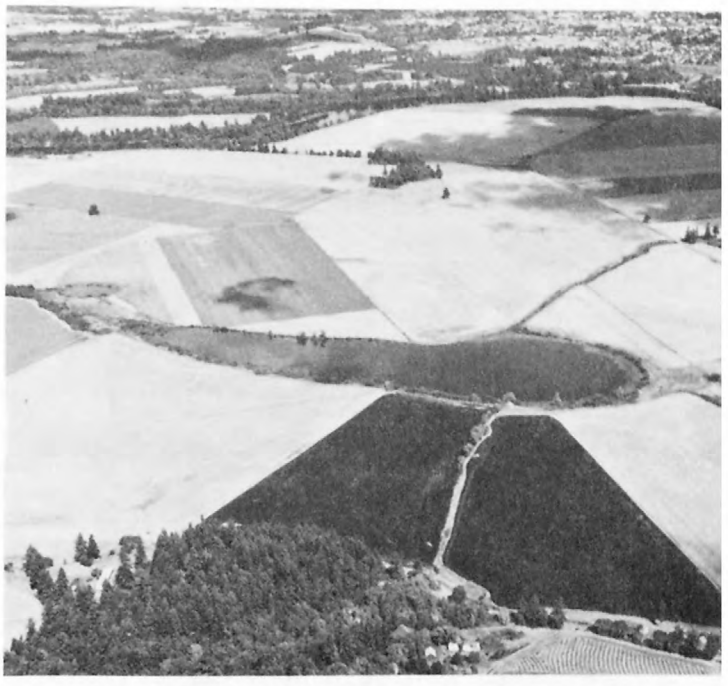
REMARKS: No evidence of submerged aquatic growth; however, about 10 percent of the lake was covered with floating pond lilies. Bottom material is primarily mud.

An algal bloom was observed on the survey date.

Water-rights permit and certificates issued for diversion of 4.61 ft^3/s (0.13 m^3/s) for irrigation.

The lake is the larger of the two lakes called Skookum Lakes on the topographic map.

Reference: 11.



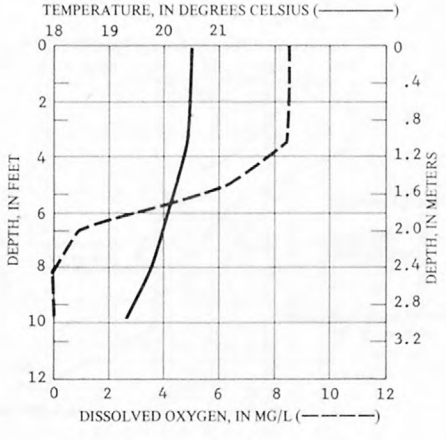
Photograph taken August 24, 1976.

WATER-QUALITY DATA

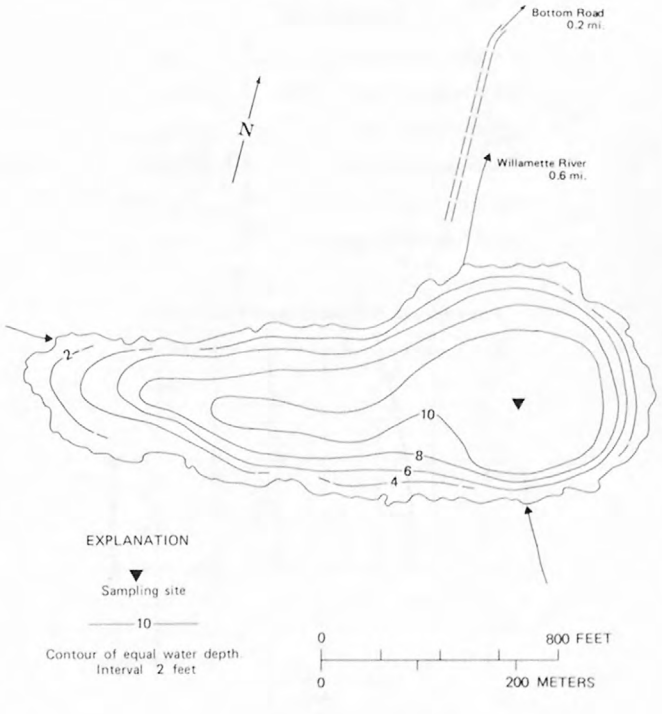
SAMPLING TIME: 1100 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	9.2	263
BOTTOM	8.6	294

ALKALINITY (mg/l as $CaCO_3$)	140
TOTAL HARDNESS (mg/l as $CaCO_3$)	110
DISSOLVED SOLIDS (mg/l)	188
TRANSPARENCY (meters)	1.3
COLOR (Pt-Co units)	35
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Secs.28 and 29, T.9 S., R.8 E., in the Mount Jefferson Wilderness about 1 mi (1.6 km) north of Bear Point Lookout and 6 mi (9.5 km) east of Breitenbush Hot Springs. Surface-water outlet at lat 44°45'54", long 121°50'45". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.16 mi^2 (0.41 km^2).

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 4,760 ft (1,450 m) above mean sea level, from topographic map.

VOLUME: 45 acre-ft (55,000 m^3).

INFLOW: No flow observed from unnamed stream on southwest side of lake.

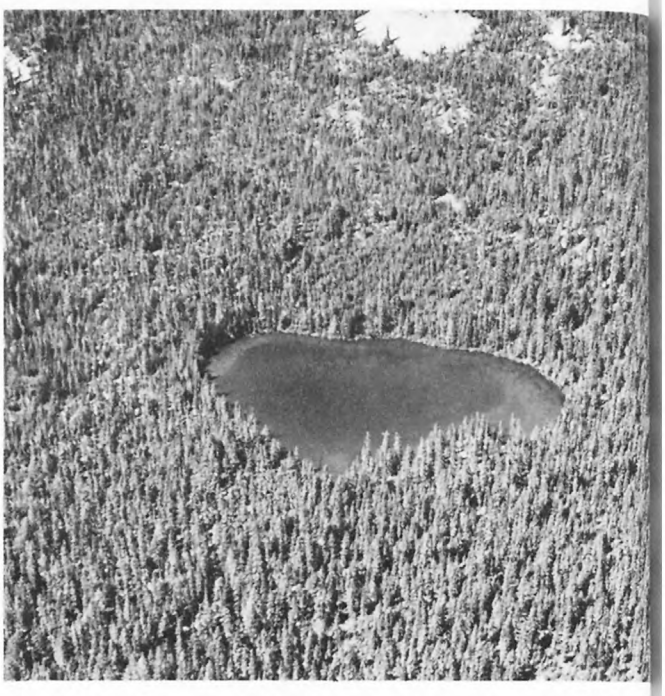
OUTFLOW: No flow observed in channel on east side of lake to the South Fork of the North Fork Breitenbush River.

USE: Public recreation. The lake has been stocked periodically with fingerling brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily sand with some rock and detritus observed in the shoal area.

There are no trails directly to the lake. Access part way to the lake on Forest Service Trail 3361, from Forest Service Road S918. Leave Trail 3361 after about 1 mi (1.6 km) and travel about 2 mi (3.2 km) directly east over a rocky terrain.

References: 10, 11, 26, 27.



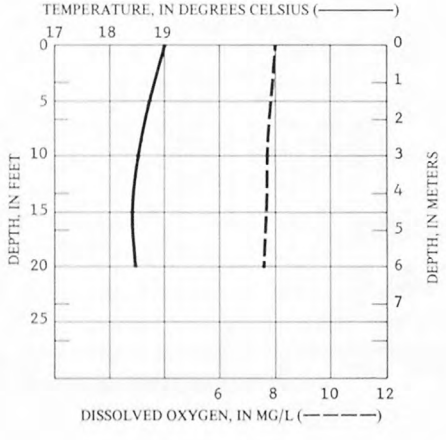
Photograph taken July 28, 1976.

WATER-QUALITY DATA

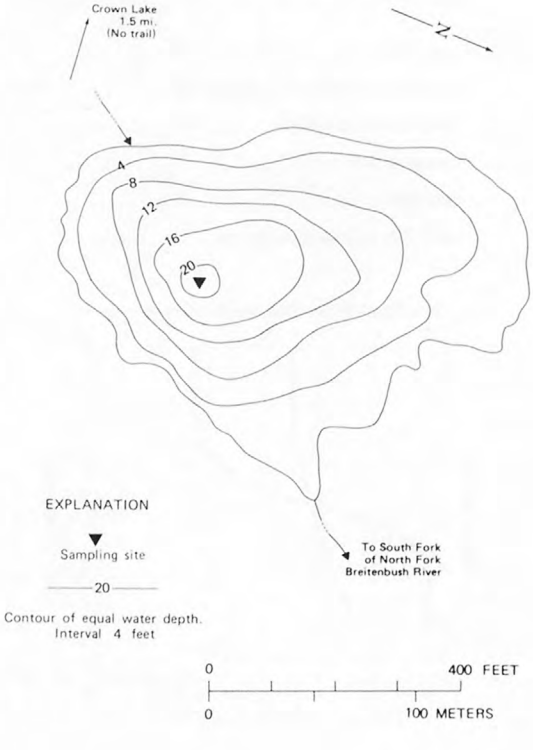
SAMPLING TIME: 1245 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.5	6
BOTTOM	6.6	5

ALKALINITY (mg/l as $CaCO_3$)	1
TOTAL HARDNESS (mg/l as $CaCO_3$)	1
DISSOLVED SOLIDS (mg/l)	8
TRANSPARENCY (meters)	6.4 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Secs.22 and 23, T.4 S., R.2 W., about 3.5 mi (5.5 km) north of West Woodburn and 3 mi (5 km) east of St. Paul. Surface-water outlet at lat 45°12'44", long 122°54'24". St. Paul 7½-minute quadrangle map, photorevised 1970 (not named on map).

DRAINAGE BASIN: Champoeg Creek (Willamette River).

DRAINAGE AREA: 21.3 mi^2 (55.2 km^2).

SURFACE AREA: 33 acres (130,000 m^2) at normal summer pool.

SURFACE ELEVATION: 110 ft (34 m) above mean sea level, from topographic map.

VOLUME: 329 acre-ft (406,000 m^3) at normal summer pool.

INFLOW: Estimated 2 ft^3/s (0.06 m^3/s) from Champoeg Creek over McKay Dam spillway on south end of reservoir. An unnamed intermittent stream also contributes on the east end of the reservoir.

OUTFLOW: Champoeg Creek.

USE: Private recreation, and water supply for livestock.

REMARKS: Emergent vegetation, dead trees, and some submerged aquatic growth were observed. Bottom material is primarily mud.

An algal bloom was observed on the survey date.

Water-rights certificate issued for storage of 329 acre-ft (406,000 m^3) for irrigation.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

Photograph taken August 24, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1500 hours
CLOUD COVER: 85 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.0	291
BOTTOM	7.2	321

ALKALINITY (mg/l as $CaCO_3$) 160

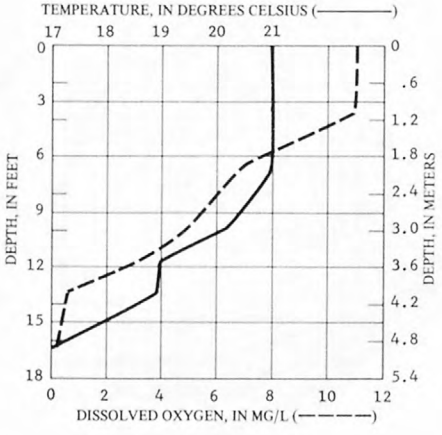
TOTAL HARDNESS (mg/l as $CaCO_3$) 130

DISSOLVED SOLIDS (mg/l) 176

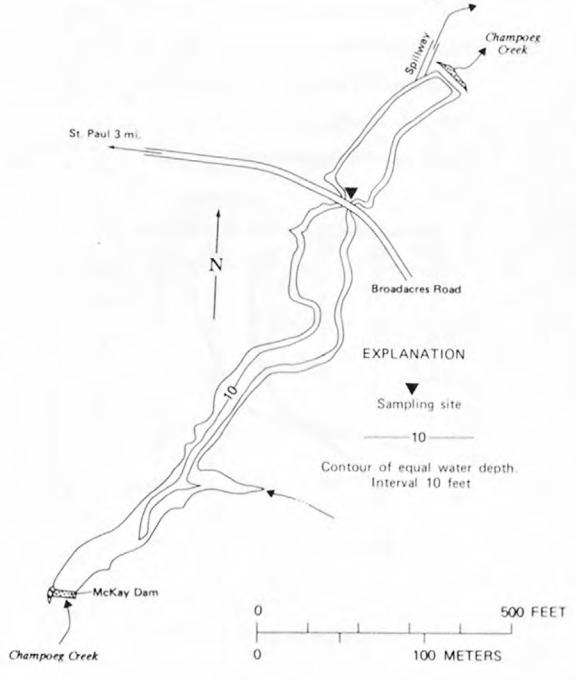
TRANSPARENCY (meters) .7

COLOR (Pt-Co units) 25

FECAL COLIFORM (colonies/100 ml) 1



BATHYMETRIC MAP



LOCATION: Sec.9, T.9 S., R.3 W., about 5 mi (8 km) southwest of Turner and 4 mi (6.5 km) south of Salem. Surface-water outlet at lat 44°48'10", long 123°03'25". Sidney 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: 0.5 mi^2 (1.3 km^2).

SURFACE AREA: 8 acres (32,000 m^2) at normal pool.

SURFACE ELEVATION: 310 ft (94 m) above mean sea level, from topographic map.

VOLUME: 103.6 acre-ft (128,000 m^3) at normal pool.

INFLOW: No flow observed from unnamed stream on northeast end of reservoir.

OUTFLOW: No flow observed in channel on southwest end of reservoir. Outflow not indicated on topographic map.

USE: Private recreation for lakeside residents only.

REMARKS: No evidence of submerged aquatic growth; however, some emergent vegetation was observed. Bottom material is primarily mud.

Water-rights permit issued for storage of 103.6 acre-ft (128,000 m^3) for recreation.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

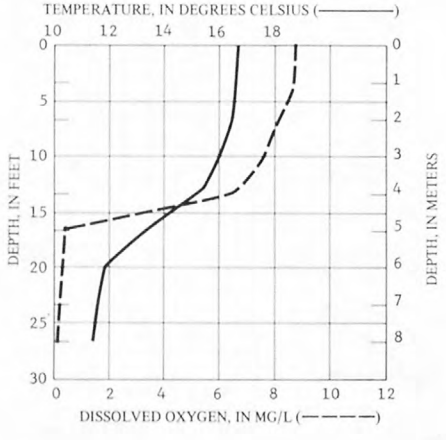
Photograph taken July 28, 1976.

WATER-QUALITY DATA

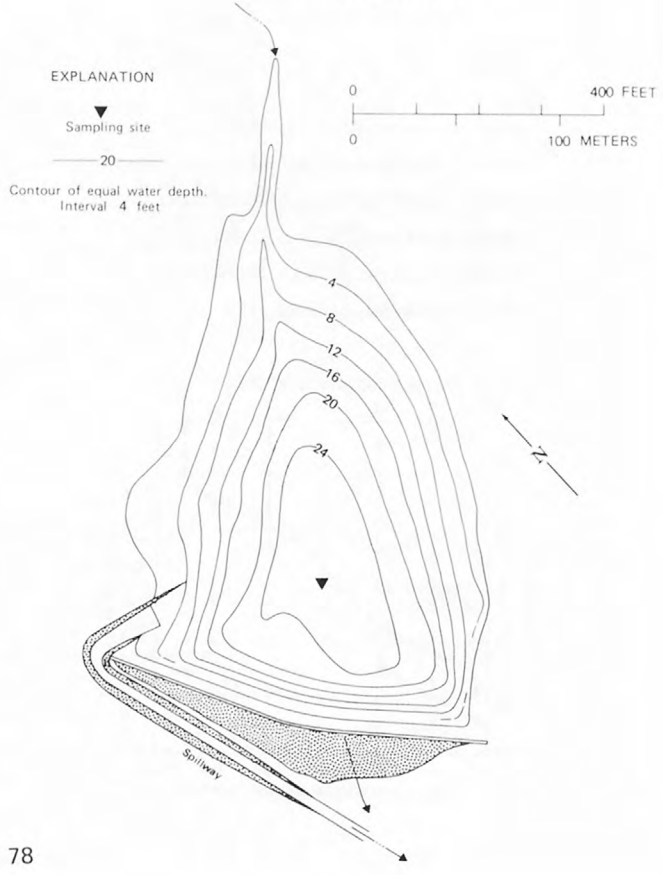
SAMPLING TIME: 0930 hours
CLOUD COVER: 85 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.2	76
BOTTOM	6.7	156

ALKALINITY (mg/l as $CaCO_3$)	19
TOTAL HARDNESS (mg/l as $CaCO_3$)	23
DISSOLVED SOLIDS (mg/l)	66
TRANSPARENCY (meters)	1.0
COLOR (Pt-Co units)	50
FECAL COLIFORM (colonies/100 ml)	15



BATHYMETRIC MAP



LOCATION: Sec.4, T.7 S., R.1 W., about 1 mi (1.6 km) southwest of Silverton and 8.5 mi (14 km) east of Salem. Surface-water outlet at lat 44°59'33", long 122°48'32". Stayton NE 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.13 mi^2 (2.93 km^2).

SURFACE AREA: 7 acres (28,000 m^2) at normal pool.

SURFACE ELEVATION: 210 ft (64 m) above mean sea level, from topographic map.

VOLUME: 47 acre-ft (58,000 m^3) at normal pool.

INFLOW: No flow observed from unnamed stream on south end of reservoir, nor from unnamed stream on west side of reservoir.

OUTFLOW: No flow observed in channel on north end of reservoir to Brush Creek.

USE: Private recreation.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud.

An algal bloom was observed on the survey date.

Water-rights certificate issued for storage of 47 acre-ft (58,000 m^3) for irrigation.

Information on surface area, volume, drainage area, and bathymetry furnished by the Oregon Water Resources Department.

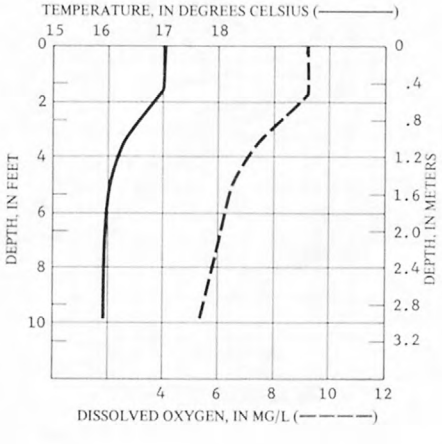
Photograph taken August 24, 1976.

WATER-QUALITY DATA

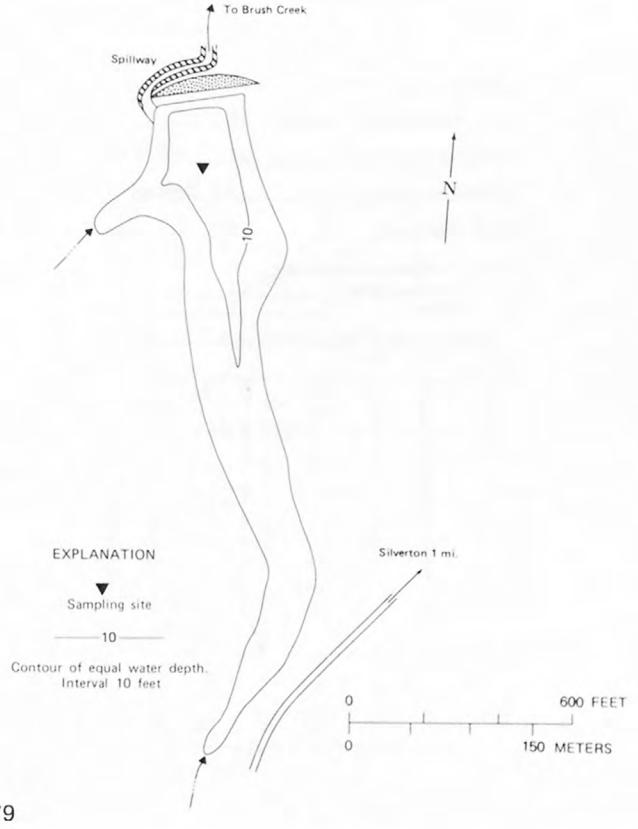
SAMPLING TIME: 1500 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.1	112
BOTTOM	6.5	116

ALKALINITY (mg/l as $CaCO_3$)	52
TOTAL HARDNESS (mg/l as $CaCO_3$)	40
DISSOLVED SOLIDS (mg/l)	68
TRANSPARENCY (meters)	.3
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Secs.27 and 34, T.8 S., R.8 E., in the Mount Hood National Forest about 3 mi (5 km) northwest of Olallie Butte Lookout and 8.5 mi (14 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°50'41", long 121°49'05". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 2.16 mi^2 (5.59 km^2).

SURFACE AREA: 14 acres (57,000 m^2).

SURFACE ELEVATION: 4,200 ft (1,280 m) above mean sea level, from topographic map.

VOLUME: 20 acre-ft (25,000 m^3).

INFLOW: Estimated 1 ft^3/s (0.03 m^3/s) from unnamed perennial stream on southwest side of lake.

OUTFLOW: Estimated 2 ft^3/s (0.06 m^3/s) into Squirrel Creek on north end of lake.

USE: Public recreation. The lake was last stocked in 1960 with fingerling brook trout by the Oregon Department of Fish and Wildlife. The success of natural reproduction warranted the discontinuance of stocking.

REMARKS: Emergent growth and floating pond lilies covered about 25 percent of the lake, and less than 5 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and detritus.

A periphyton growth of green algae was observed near the outlet of the lake.

Access to the lake 1 mi (1.6 km) by Forest Service Trail 717 from Forest Service Road S829A.

References: 4, 11.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1330 hours
CLOUD COVER: 50 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.0	24
BOTTOM	6.6	24

ALKALINITY (mg/l as $CaCO_3$): 20

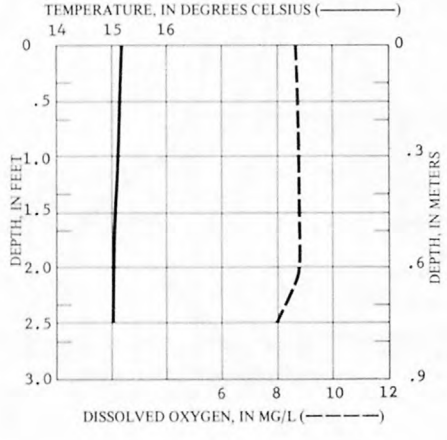
TOTAL HARDNESS (mg/l as $CaCO_3$): 8

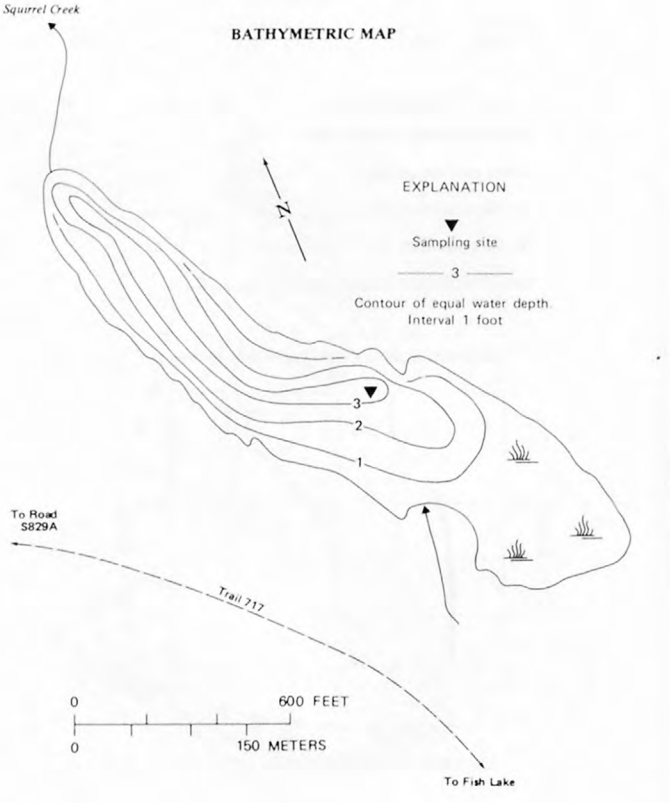
DISSOLVED SOLIDS (mg/l): 38

TRANSPARENCY (meters): 1.0 (bottom)

COLOR (Pt-Co units): 5

FECAL COLIFORM (colonies/100 ml)
Sampling site: <1
Inflow: 1





LOCATION: Sec.32, T.9 S., R.5 E., in the Willamette National Forest about 2 mi (3.2 km) northeast of Detroit Dam and 3 mi (5 km) west of Detroit. Surface-water outlet at lat 44°44'52", long 122°13'17". Detroit 15-minute quadrangle map.

DRAINAGE BASIN: Santiam River (Willamette River).

DRAINAGE AREA: 0.80 mi^2 (2.07 km^2).

SURFACE AREA: 20 acres (81,000 m^2).

SURFACE ELEVATION: 3,680 ft (1,120 m) above mean sea level, from topographic map.

VOLUME: 340 acre-ft (420,000 m^3).

INFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) from intermittent stream on south side of lake. Inflow stream not indicated on topographic map.

OUTFLOW: Tumble Creek.

USE: Public recreation. The lake was last stocked in 1956 with fingerling brook trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake.

REMARKS: No evidence of submerged aquatic growth; however, emergent grass and floating pond lilies covered less than 5 percent of the lake. Bottom material is primarily mud with some detritus.

Access to the lake 0.5 mi (0.8 km) down steep trail from Forest Service Road S915 (off State Highway 22).

References: 10, 11, 26, 27.

Photograph taken September 7, 1976.

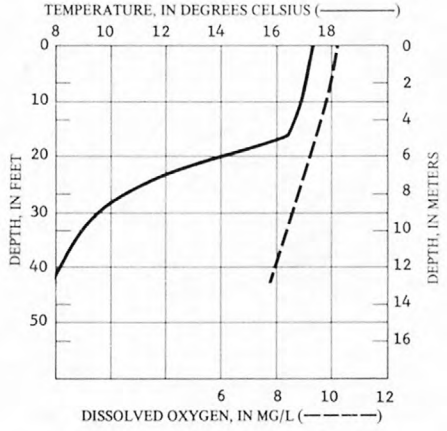
WATER-QUALITY DATA

SAMPLING TIME: 1600 hours
CLOUD COVER: 30 percent

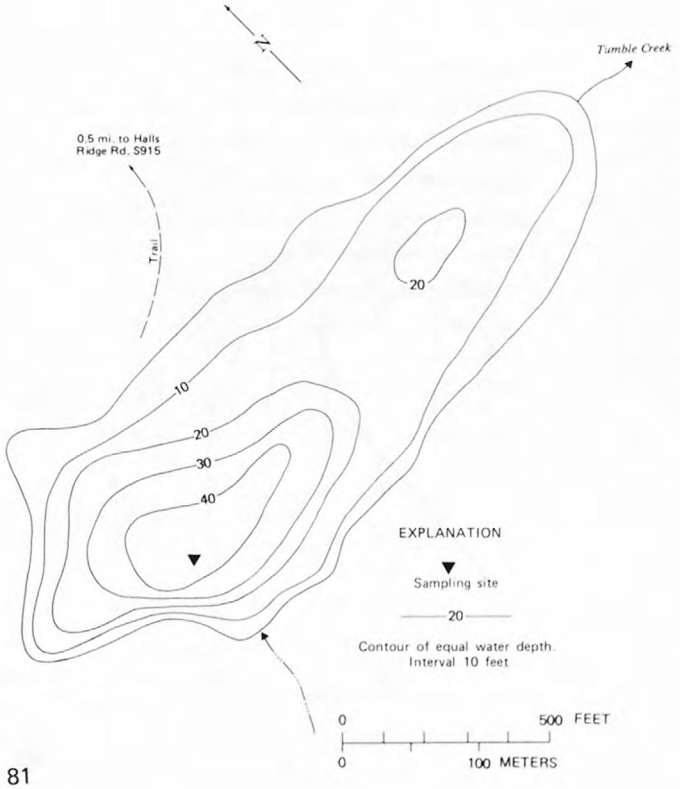
	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	18
BOTTOM	6.7	27

ALKALINITY (mg/l as $CaCO_3$)	8
TOTAL HARDNESS (mg/l as $CaCO_3$)	5
DISSOLVED SOLIDS (mg/l)	24
TRANSPARENCY (meters)	13.7 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1

(Chemical analysis in table 2, p. 5)



BATHYMETRIC MAP



LOCATION: Secs.29 and 30, T.8 S., R.6 E., in the Mount Hood National Forest about 8 mi (13 km) northwest of Breitenbush Hot Springs and 8 mi (13 km) north of Detroit. Surface-water outlet at lat 44°51'19", long 122°06'20". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 1.00 mi^2 (2.59 km^2).

SURFACE AREA: 12 acres (49,000 m^2).

SURFACE ELEVATION: 3,920 ft (1,190 m) above mean sea level, from topographic map.

VOLUME: 250 acre-ft (310,000 m^3).

INFLOW: Estimated 1 ft^3/s (0.03 m^3/s) from intermittent stream on west end of lake. Inflow stream not indicated on topographic map.

OUTFLOW: Through channel on east end of lake, not indicated on topographic map.

USE: Public recreation. The lake was last stocked in 1960 with fingerling brook trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake. An unimproved campsite is on the west end of the lake.

REMARKS: Some floating pond lilies were observed, and about 10 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily sand, mud, and detritus along the shoal area.

Twin Lake (Lower) is the eastern lake of the two shown as Twin Lakes on the topographic map.

The lake is in the 10,200-acre (4,130 hm^2) Bull of the Woods roadless area in which motor vehicles and motorboats are prohibited.

Access to the lake 6 mi (9.5 km) by Forest Service Trails 544 and 573 from Forest Service Road S80.

References: 4, 11.

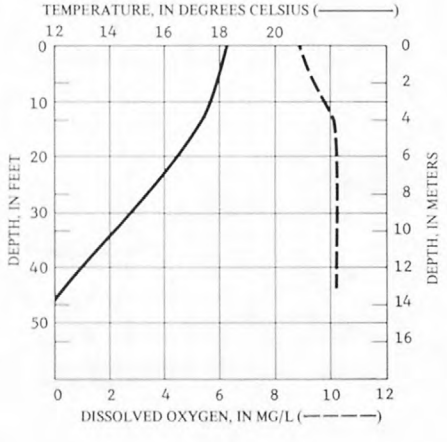
Photograph taken September 7, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1430 hours
CLOUD COVER: 10 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.0	17
BOTTOM	6.8	48

ALKALINITY (mg/l as $CaCO_3$)	2
TOTAL HARDNESS (mg/l as $CaCO_3$)	4
DISSOLVED SOLIDS (mg/l)	24
TRANSPARENCY (meters)	11.0
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



LOCATION: Sec.30, T.8 S., R.6 E., in the Mount Hood National Forest about 8.5 mi (14 km) northwest of Breitenbush Hot Springs and 8 mi (13 km) north of Detroit. Surface-water outlet at lat 44°51'26", long 122°06'58". Battle Ax 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.57 mi^2 (1.48 km^2).

SURFACE AREA: 12 acres (49,000 m^2).

SURFACE ELEVATION: 4,000 ft (1,220 m) above mean sea level, from topographic map.

VOLUME: 200 acre-ft (250,000 m^3).

INFLOW: Three intermittent streams on west and south side of lake, not indicated on topographic map. Estimated less than 0.5 ft^3/s (0.01 m^3/s) from channel 1. No flow observed from channels 2 and 3.

OUTFLOW: Estimated 1 ft^3/s (0.03 m^3/s) through channel on east end of lake. Outflow not indicated on topographic map.

USE: Public recreation. The lake was last stocked in 1960 with fingerling brook trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake. An unimproved campsite is on the west end of the lake.

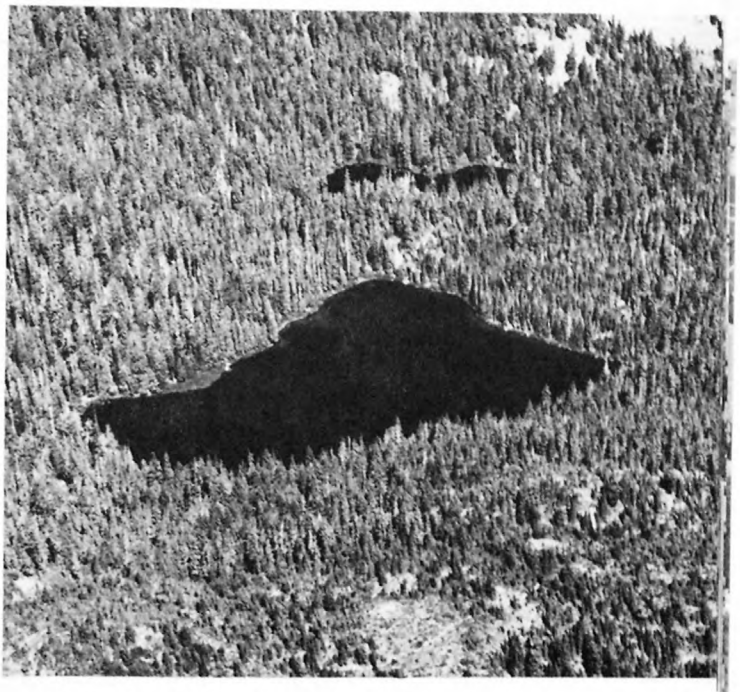
REMARKS: No evidence of emergent growth; however, some submerged aquatic growth was observed. Bottom material is primarily sand, mud, and detritus with some rocks along the shoal area.

Twin Lake (Upper) is the western lake of the two shown as Twin Lakes on the topographic map.

The lake is in the 10,200-acre (4,130 hm^2) Bull of the Woods roadless area in which motor vehicles and motorboats are prohibited.

Access to the lake 5 mi (8 km) by Forest Service Trails 544 and 573 from Forest Service Road S80.

References: 4, 11.



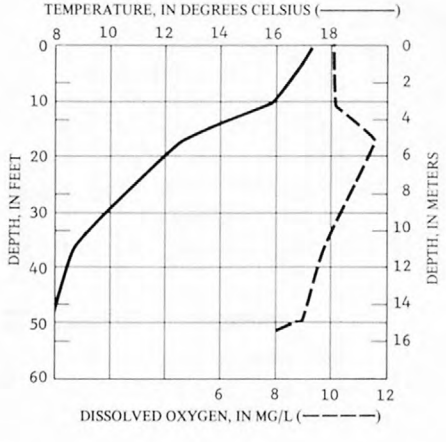
Photograph taken September 7, 1976.

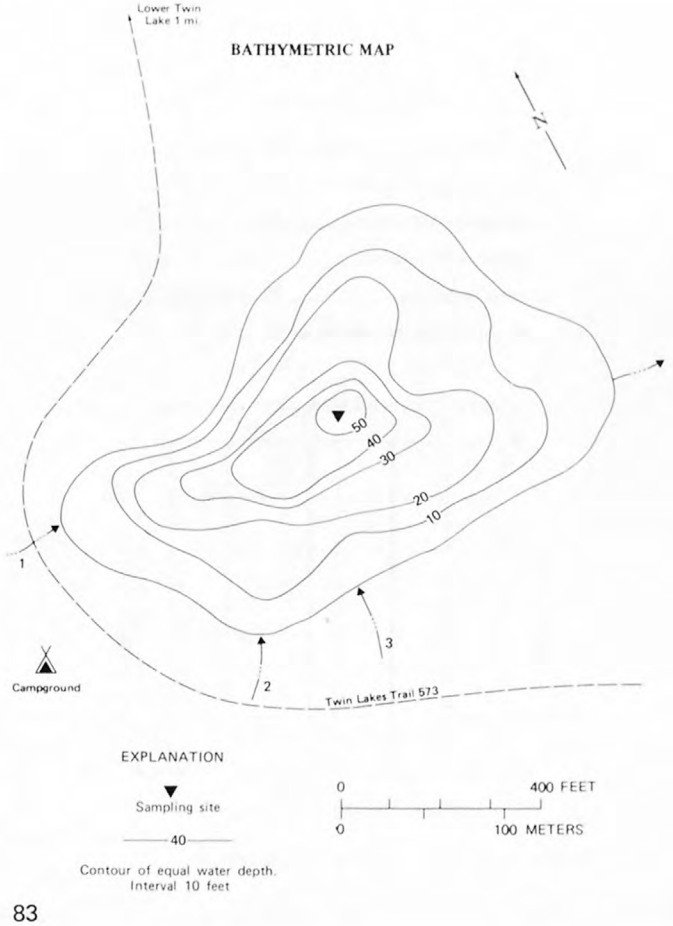
WATER-QUALITY DATA

SAMPLING TIME: 1200 hours
CLOUD COVER: 5 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	16
BOTTOM	6.4	16

ALKALINITY (mg/l as $CaCO_3$)	10
TOTAL HARDNESS (mg/l as $CaCO_3$)	13
DISSOLVED SOLIDS (mg/l)	28
TRANSPARENCY (meters)	13.3
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1





LOCATION: Sec.11, T.8 S., R.2 W., about 3.5 mi (5.5 km) northeast of Turner and 5 mi (8 km) east of Salem. Surface-water outlet at lat 44°53'43", long 122°53'29". Salem East 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 1.41 mi^2 (3.65 km^2).

SURFACE AREA: 18 acres (73,000 m^2) at normal pool.

SURFACE ELEVATION: 420 ft (130 m) above mean sea level, from topographic map.

VOLUME: 55.5 acre-ft (68,400 m^3) at normal pool.

INFLOW: Through unnamed intermittent stream on southeast corner of reservoir and underground springs.

OUTFLOW: No flow observed into Little Pudding River on north side of reservoir.

USE: Private recreation, including swimming, boating, water skiing, and fishing.

REMARKS: Emergent grass was observed near the shoreline, and submerged aquatic growth covered most of the lake bottom. Bottom material is primarily mud.

Water-rights certificate issued for storage of 55.5 acre-ft (68,400 m^3) for irrigation.

Information on surface area, volume, and bathymetry furnished by the Oregon Water Resources Department.

Photograph taken July 28, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 0915 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.8	45
BOTTOM	6.7	44

ALKALINITY (mg/l as $CaCO_3$) 18

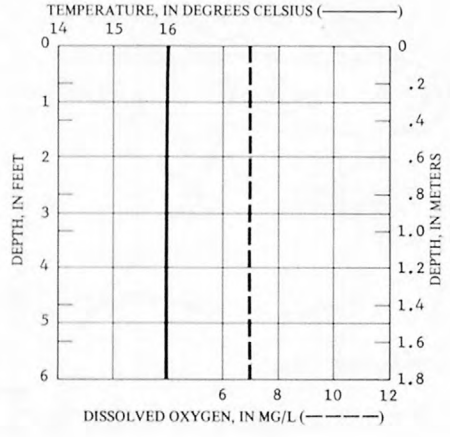
TOTAL HARDNESS (mg/l as $CaCO_3$) 9

DISSOLVED SOLIDS (mg/l) 48

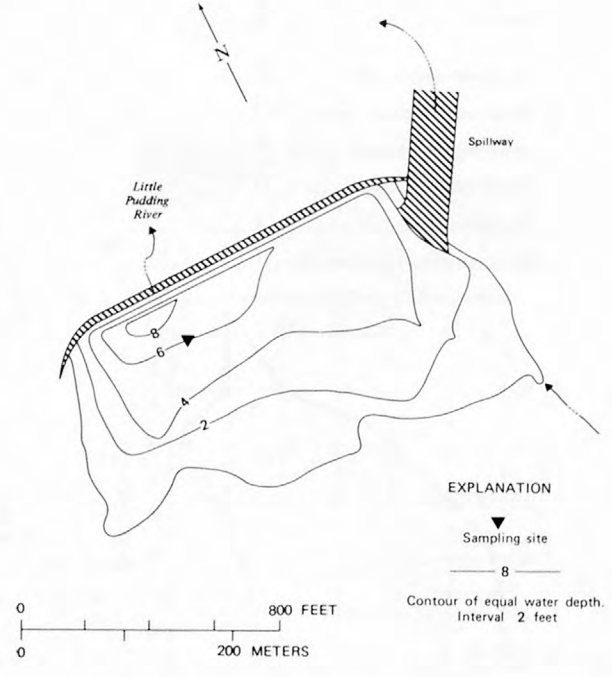
TRANSPARENCY (meters) .6

COLOR (Pt-Co units) 60

FECAL COLIFORM (colonies/100 ml) <1



BATHYMETRIC MAP



LOCATION: Sec.4, T.9 S., R.8 E., in the Mount Hood National Forest about 3.5 mi (5.5 km) west of Olallie Butte Lookout and 7 mi (11 km) northeast of Breitenbush Hot Springs. Surface-water outlet at lat 44°49'06", long 121°50'06". Breitenbush Hot Springs 15-minute quadrangle map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.41 mi^2 (1.06 km^2).

SURFACE AREA: 6 acres (24,000 m^2).

SURFACE ELEVATION: 4,840 ft (1,480 m) above mean sea leve, from topographic map.

VOLUME: 35 acre-ft (43,000 m^3).

INFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) from unnamed stream on east end of lake.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on west side of lake to Averill Lake.

USE: Public recreation. The lake has been periodically stocked with rainbow and brook trout by the Oregon Department of Fish and Wildlife.

REMARKS: Some emergent grass and submerged aquatic growth was observed in the lake. Bottom material is primarily mud with some rocks and detritus observed near the shore.

Access to the lake 2.5 mi (4 km) by Forest Service Trail 719 from Forest Service Road S46A (off Skyline Road S42).

References: 4, 8, 11.

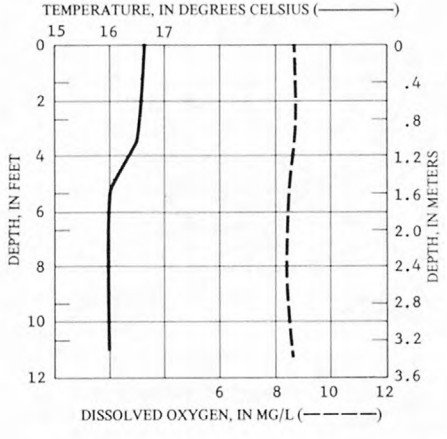
Photograph taken July 28, 1976.

WATER-QUALITY DATA

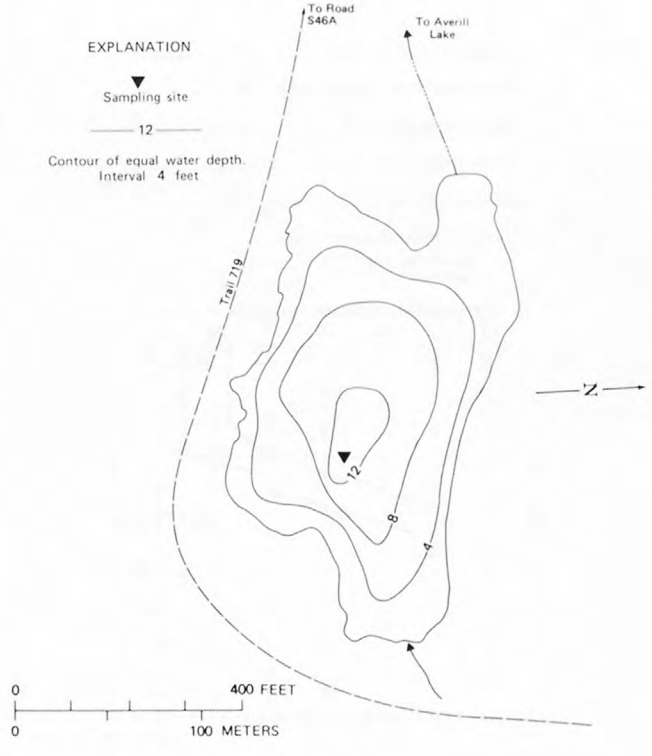
SAMPLING TIME: 1445 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.2	5
BOTTOM	6.2	5

ALKALINITY (mg/l as $CaCO_3$)	2
TOTAL HARDNESS (mg/l as $CaCO_3$)	5
DISSOLVED SOLIDS (mg/l)	14
TRANSPARENCY (meters)	3.7 (bottom)
COLOR (Pt-Co units)	0
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.35, T.7 S., R.3 W., at the intersection of 22nd Street and McGilchrist Street SE. about 1.5 mi (2.4 km) south of the State Capitol in Salem. Surface-water outlet at lat 44°55'10", long 123°01'12". Salem West 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: 1.54 mi^2 (3.99 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 180 ft (55 m) above mean sea level, from topographic map.

VOLUME: 150 acre-ft (180,000 m^3).

INFLOW: Through channel on east side of lake from adjacent pond. Channel not indicated on topographic map.

OUTFLOW: Estimated 3.5 ft^3/s (0.1 m^3/s) through channel on north side of lake. Channel not indicated on topographic map.

USE: Privately owned. Open for public recreation, including fishing. The lake has been stocked with kokanee. Swimming and boating are not permitted.

REMARKS: No evidence of submerged aquatic growth; however, some emergent grass was observed. Bottom material is primarily sand and gravel.

An algal bloom was observed on the survey date. A periphyton sample taken near the shore showed the presence of the diatom Melosira granulata and the green algae Oedogonium and Mougeotia.

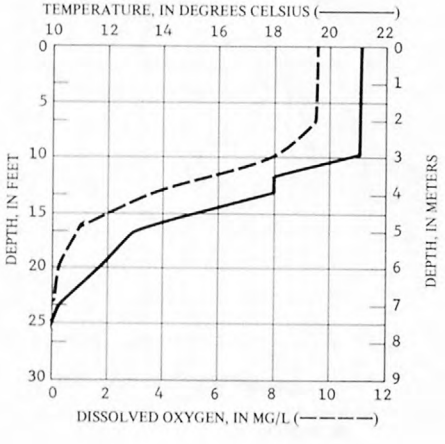
Photograph taken August 24, 1976.

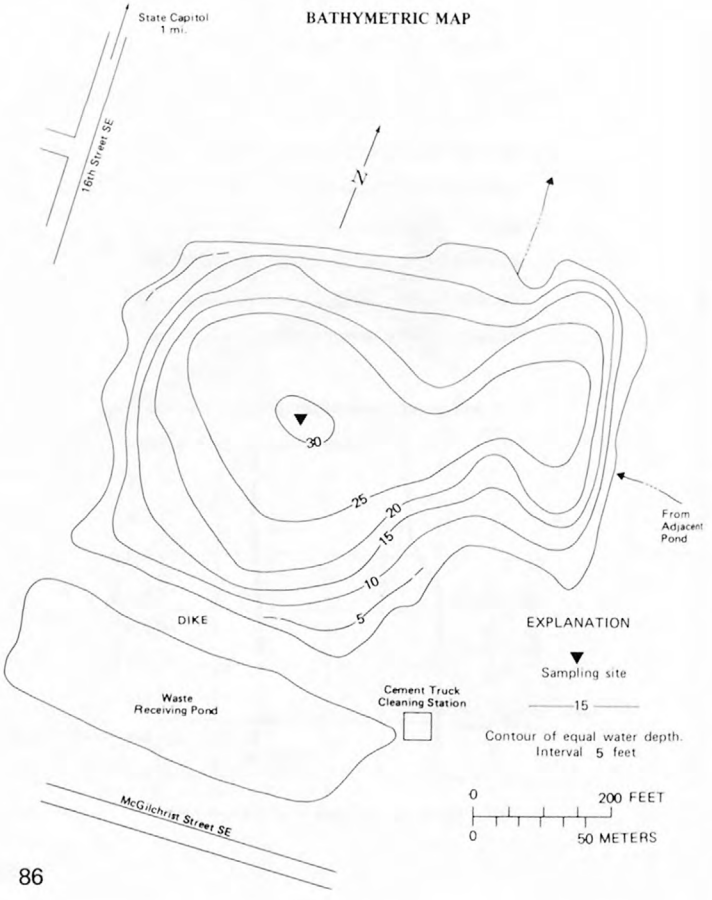
WATER-QUALITY DATA

SAMPLING TIME: 1330 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	8.4	96
BOTTOM	7.2	139

ALKALINITY (mg/l as $CaCO_3$)	44
TOTAL HARDNESS (mg/l as $CaCO_3$)	38
DISSOLVED SOLIDS (mg/l)	74
TRANSPARENCY (meters)	1.7
COLOR (Pt-Co units)	5
FECAL COLIFORM (colonies/100 ml)	
Sampling site	<1
Inflow	15





LOCATION: Sec.26, T.6 S., R.1 W., about 3 mi (5 km) south of Mount Angel and 0.5 mi (0.8 km) north of Silverton. Surface-water outlet at lat 45°01'18", long 122°46'45". Silverton 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 0.74 mi^2 (1.92 km^2).

SURFACE AREA: 10 acres (40,000 m^2).

SURFACE ELEVATION: 233 ft (71 m) above mean sea level, from topographic map.

VOLUME: 50 acre-ft (62,000 m^3).

INFLOW: Estimated less than 1 ft^3/s (0.03 m^3/s) from intermittent stream on east end of lake. Inflow stream not indicated on topographic map.

OUTFLOW: Estimated less than 1 ft^3/s (0.03 m^3/s) through channel on north side of lake to Abiqua Creek.

USE: Private recreation. There is a natural reproduction of catfish, bass, and bluegill in the lake.

REMARKS: No evidence of emergent growth; however, about 90 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud.

A bloom of blue-green algae was observed on the survey date.

The lake was formerly a log pond, but now provides a lakefront view for adjacent property.

Water-rights permit issued for storage of 68.4 acre-ft (84,000 m^3) for irrigation.

Photograph taken August 24, 1976.

WATER-QUALITY DATA

SAMPLING TIME: 1745 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	9.3	45
BOTTOM	6.4	59

ALKALINITY (mg/l as $CaCO_3$) 25

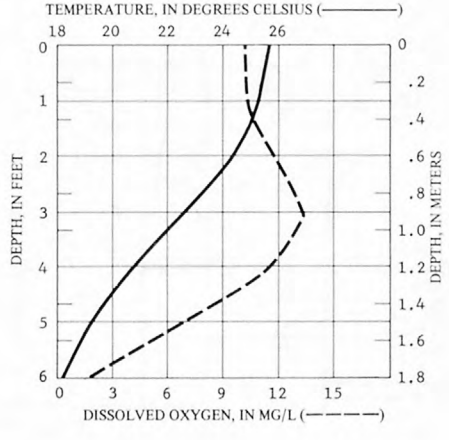
TOTAL HARDNESS (mg/l as $CaCO_3$) 12

DISSOLVED SOLIDS (mg/l) 36

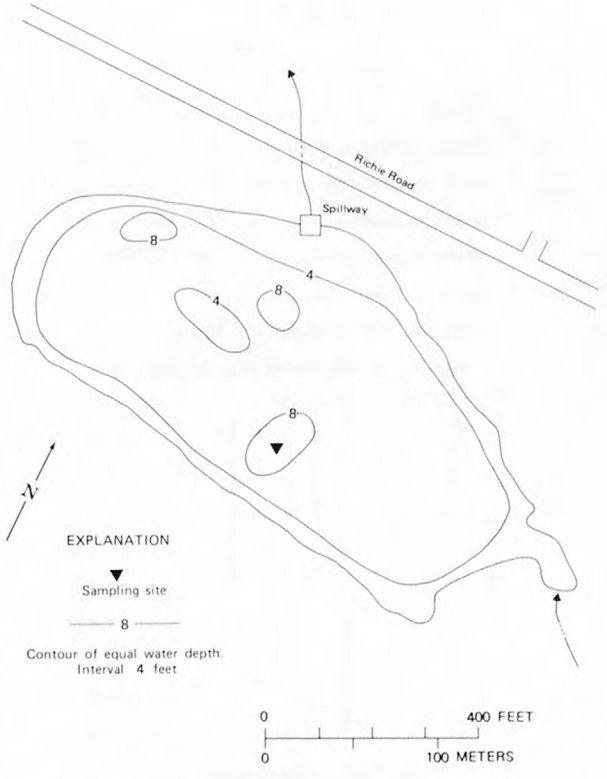
TRANSPARENCY (meters) 1.7

COLOR (Pt-Co units) 15

FECAL COLIFORM (colonies/100 ml) 35



BATHYMETRIC MAP



LOCATION: Sec.15, T.8 S., R.6 E., in the Mount Hood National Forest about 0.6 mi (0.9 km) south of Clackamas-Marion County line, 7.5 mi (12 km) northwest of Breitenbush Hot Springs and 10 mi (16 km) northeast of Detroit. Surface-water outlet at lat 44°52'46", long 122°03'50". Battle Ax 15-minute quadrangle map. The lake is the larger of the two lakes shown on the topographic map.

DRAINAGE BASIN: Clackamas River (Willamette River).

DRAINAGE AREA: 0.18 mi^2 (0.47 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 4,200 ft (1,280 m) above mean sea level, from topographic map.

VOLUME: 40 acre-ft (49,000 m^3).

INFLOW: Three intermittent streams on southwest side of lake, not indicated on topographic map. Estimated total flow less than 0.5 ft^3/s (0.01 m^3/s) from channels 1 and 2. No flow observed from channel 3.

OUTFLOW: Estimated less than 0.5 ft^3/s (0.01 m^3/s) through channel on southeast side of lake to Welcome Creek. Outflow not indicated on topographic map.

USE: Public recreation. The lake has been periodically stocked with fingerling brook trout by the Oregon Department of Fish and Wildlife. There is a natural reproduction of brook trout in the lake. Welcome Lake Forest Camp is on the southwest side of the lake.

REMARKS: Emergent grass and floating pond lilies covered about 20 percent of the lake, and about 50 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud and sand with detritus and rocks observed in the shoal area.

The lake is in the 10,200-acre (4,130 hm^2) Bull of the Woods roadless area in which motor vehicles and motorboats are prohibited.

Access to the lake 4 mi (6.5 km) by Forest Service Trails 559 and 554 from Forest Service Road S63.

References: 4, 10, 11.

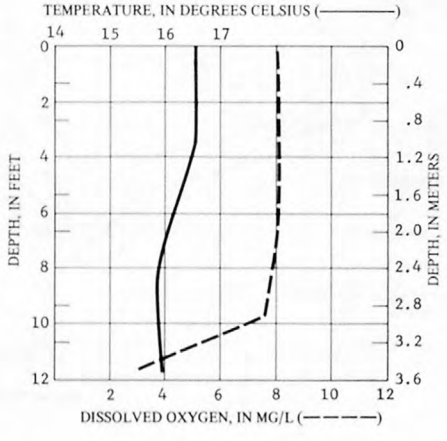
Photograph taken September 7, 1976.

WATER-QUALITY DATA

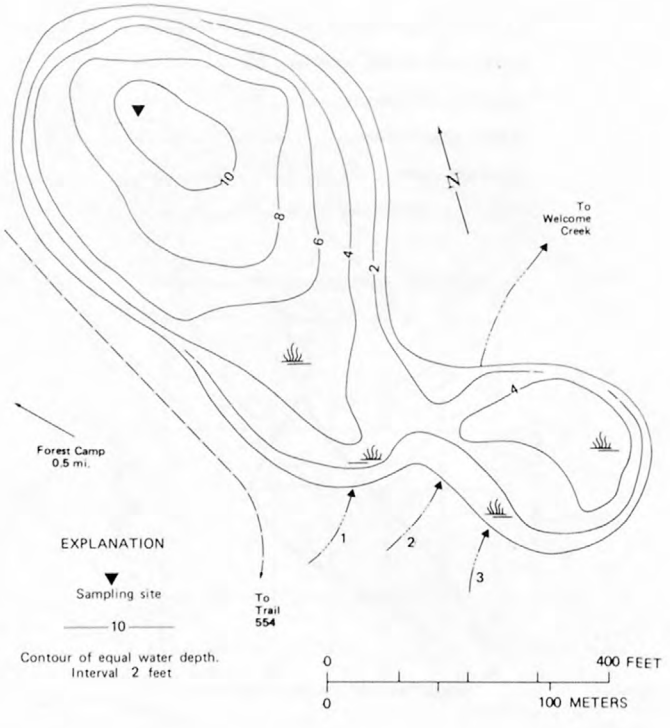
SAMPLING TIME: 1500 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.7	22
BOTTOM	6.3	22

ALKALINITY (mg/l as $CaCO_3$)	6
TOTAL HARDNESS (mg/l as $CaCO_3$)	6
DISSOLVED SOLIDS (mg/l)	32
TRANSPARENCY (meters)	3.6 (bottom)
COLOR (Pt-Co units)	5
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



LOCATION: Sec.15, T.7 S., R.1 E., about 3 mi (5 km) north of Silver Creek Falls State Park and 5 mi (8 km) southeast of Silverton. Surface-water outlet at lat 44°57'32", long 122°40'46". Lyons 15-minute quadrangle map (not named on map).

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 2.57 mi^2 (6.66 km^2).

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 1,180 ft (360 m) above mean sea level, from topographic map.

VOLUME: 80 acre-ft (99,000 m^3).

INFLOW: Two unnamed streams on the south end of the reservoir. Estimated less than 1.5 ft^3/s (0.04 m^3/s) from the perennial stream. No flow observed from the intermittent stream, not indicated on topographic map.

OUTFLOW: Estimated less than 2 ft^3/s (0.06 m^3/s) over spillway on the north end of the reservoir into Powers Creek.

USE: Private recreation, including swimming, boating, and fishing.

REMARKS: No evidence of either floating or submerged aquatic growth; however, emerging dead tree stumps were observed in the southern part of the lake. Bottom material is primarily mud.

Water-rights certificate issued for storage of 88.0 acre-ft (109,000 m^3) for fish culture and recreation.

The lake has also been known as Willards Pool.

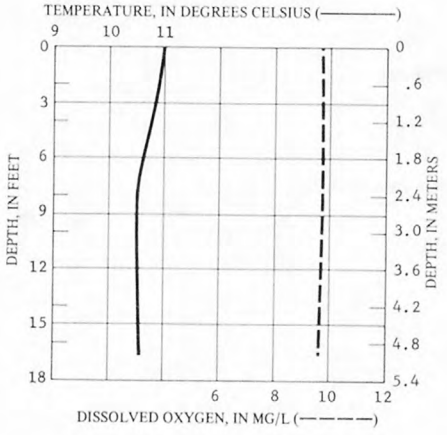
Photograph taken August 24, 1976.

WATER-QUALITY DATA

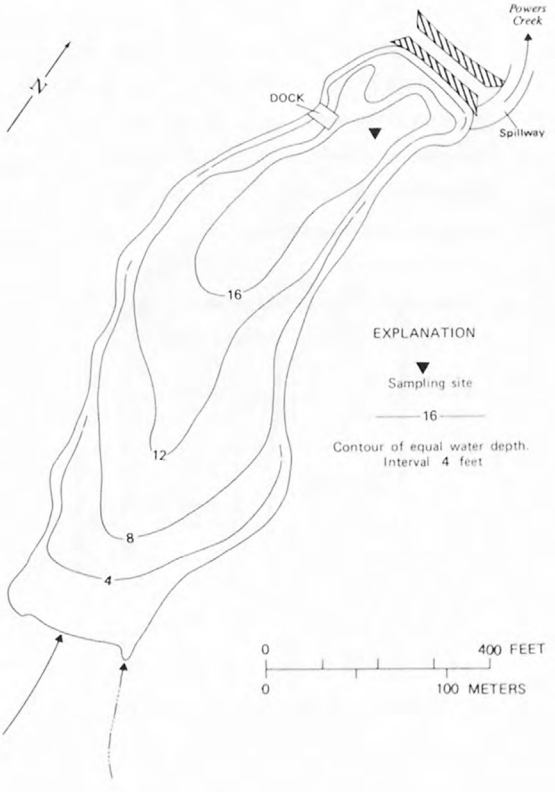
SAMPLING TIME: 1115 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.4	36
BOTTOM	7.0	36

ALKALINITY (mg/l as $CaCO_3$)	16
TOTAL HARDNESS (mg/l as $CaCO_3$)	12
DISSOLVED SOLIDS (mg/l)	26
TRANSPARENCY (meters)	2.2
COLOR (Pt-Co units)	20
FECAL COLIFORM (colonies/100 ml)	4



BATHYMETRIC MAP



LOCATION: Secs.28 and 33, T.7 S., R.2 W., about 2 mi (3.2 km) northeast of the Oregon Correctional Institution and 2.5 mi (4 km) east of Salem on State Street. Surface-water outlet at lat 44°55'41", long 122°56'13". Salem East 7½-minute quadrangle map.

DRAINAGE BASIN: Pudding River (Willamette River).

DRAINAGE AREA: 0.47 mi^2 (1.22 km^2).

SURFACE AREA: 4 acres (16,000 m^2).

SURFACE ELEVATION: 220 ft (67 m) above mean sea level, from topographic map.

VOLUME: 11 acre-ft (14,000 m^3).

INFLOW: No flow observed from unnamed intermittent stream on south end of lake.

OUTFLOW: No flow observed through channel on north end of reservoir to Pudding River.

USE: Private recreation for lakeside residents only.

REMARKS: Some emergent growth was observed, and about 90 percent of the lake bottom was covered with submerged aquatic growth. Bottom material is primarily mud.

Phytoplankton analysis showed a variety of diatoms present. The green algae Oedogonium and Mougeotia were observed in some periphyton samples.

A sprinkler system is located in the middle of the lake for the purpose of reaerating the water.

The artificial lake provides a lakefront view for adjacent housing on the west side of the lake.

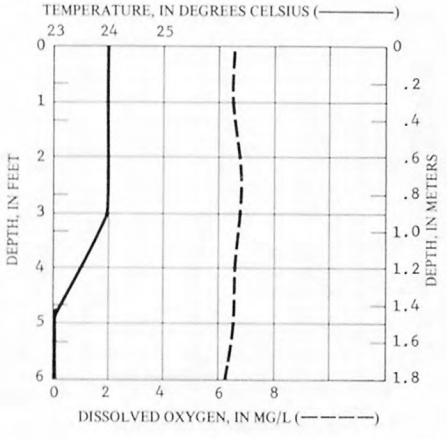
Photograph taken July 28, 1976.

WATER-QUALITY DATA

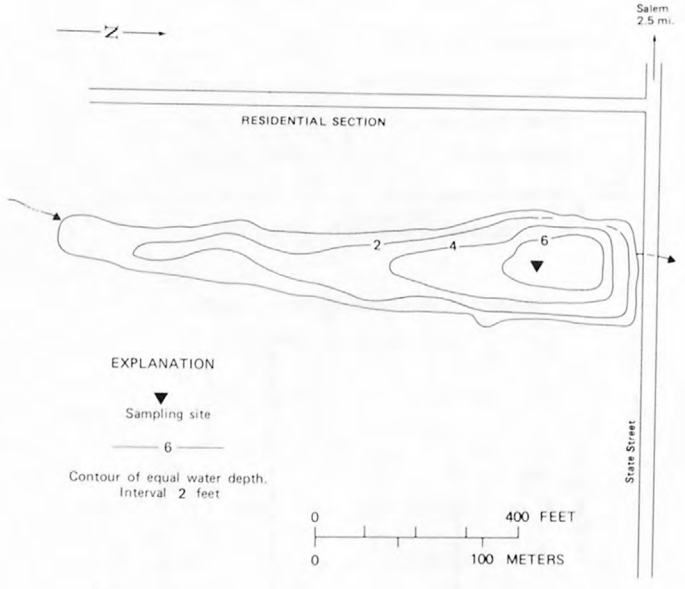
SAMPLING TIME: 1400 hours
CLOUD COVER: 0 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.7	116
BOTTOM	7.6	111

ALKALINITY (mg/l as $CaCO_3$)	62
TOTAL HARDNESS (mg/l as $CaCO_3$)	42
DISSOLVED SOLIDS (mg/l)	84
TRANSPARENCY (meters)	.9
COLOR (Pt-Co units)	30
FECAL COLIFORM (colonies/100 ml)	22



BATHYMETRIC MAP



LOCATION: Sec.33, T.6 S., R.3 W., about 0.5 mi (0.8 km) northeast of Willamette River Mile 79 and 2 mi (3.2 km) northwest of Salem. Surface-water outlet at lat 45°00'29", long 123°03'26". Mission Bottom 7½-minute quadrangle map, photorevised 1970.

DRAINAGE BASIN: Willamette River.

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 8 acres (32,000 m^2).

SURFACE ELEVATION: 120 ft (37 m) above mean sea level, from topographic map.

VOLUME: 25 acre-ft (31,000 m^3).

INFLOW: No channel observed and none indicated on topographic map.

OUTFLOW: No flow observed through channel on northwest side of lake to adjacent pond.

USE: Private recreation. There is a natural reproduction of a variety of fish, including white crappie, bluegill, goldfish, and redside shiner.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud and sand.

An algal bloom was observed on the survey date. Phytoplankton analysis showed the blue-green algae Anabaena to be one of the dominant algae present. The green algae Spirogyra and Oedogonium were observed in some periphyton samples.

The lake is cut into two sections by a dirt road. However, the sections are connected by a culvert which permits flow under the road.

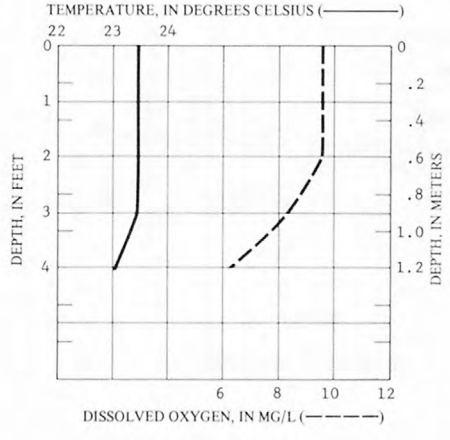
Photograph taken July 28, 1976.

WATER-QUALITY DATA

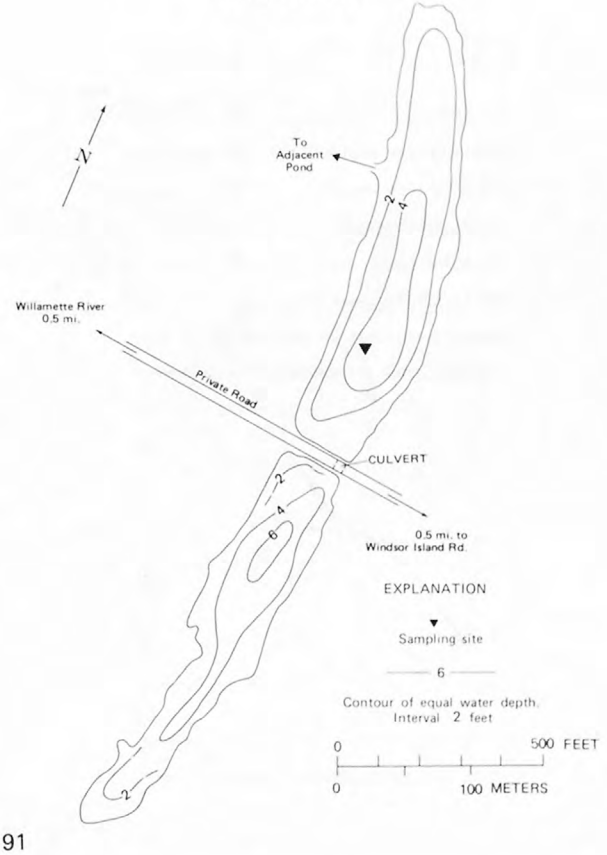
SAMPLING TIME: 1800 hours
CLOUD COVER: 70 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	7.8	162
BOTTOM	7.4	162

ALKALINITY (mg/l as $CaCO_3$)	71
TOTAL HARDNESS (mg/l as $CaCO_3$)	60
DISSOLVED SOLIDS (mg/l)	100
TRANSPARENCY (meters)	.3
COLOR (Pt-Co units)	70
FECAL COLIFORM (colonies/100 ml)	11



BATHYMETRIC MAP



LOCATION: Sec.31, T.7 S., R.2 W.; sec.36, T.7 S., R.3 W.; sec.6, T.8 S., R.2 W.; and sec.1, T.8 S., R.3 W., just southwest of intersection of Interstate Highway I-5 and State Highway 22, in southeast Salem. Surface-water outlet at lat 44°54'45", long 122°59'22". Salem East 7½-minute quadrangle map.

DRAINAGE BASIN: Mill Creek (Willamette River).

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 18 acres (73,000 m^2).

SURFACE ELEVATION: 210 ft (64 m) above mean sea level from topographic map.

VOLUME: 130 acre-ft (160,000 m^3).

INFLOW: No flow observed through channel connecting Mill Creek to the south side of the lake.

OUTFLOW: No measurable flow over spillway to Mill Creek on north end of lake.

USE: Public recreation. This lake is in Cascades Gateway Park and is maintained by Marion County. No swimming nor powerboats are allowed. Rubber rafts, canoes, and small sailboats were on the lake at the time of this survey.

REMARKS: No evidence of submerged vegetation; however, some emergent grass was observed on the perimeter of the lake. Bottom material is primarily soft mud. A bloom of green algae was evident at the time of this survey.

The lake is also referred to as Gateway Park Pond by the Oregon Department of Fish and Wildlife.

Photograph taken July 28, 1976.

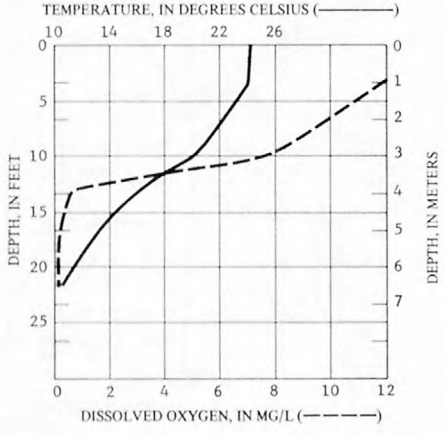
WATER-QUALITY DATA

SAMPLING TIME: 1700 hours
CLOUD COVER: 20 percent

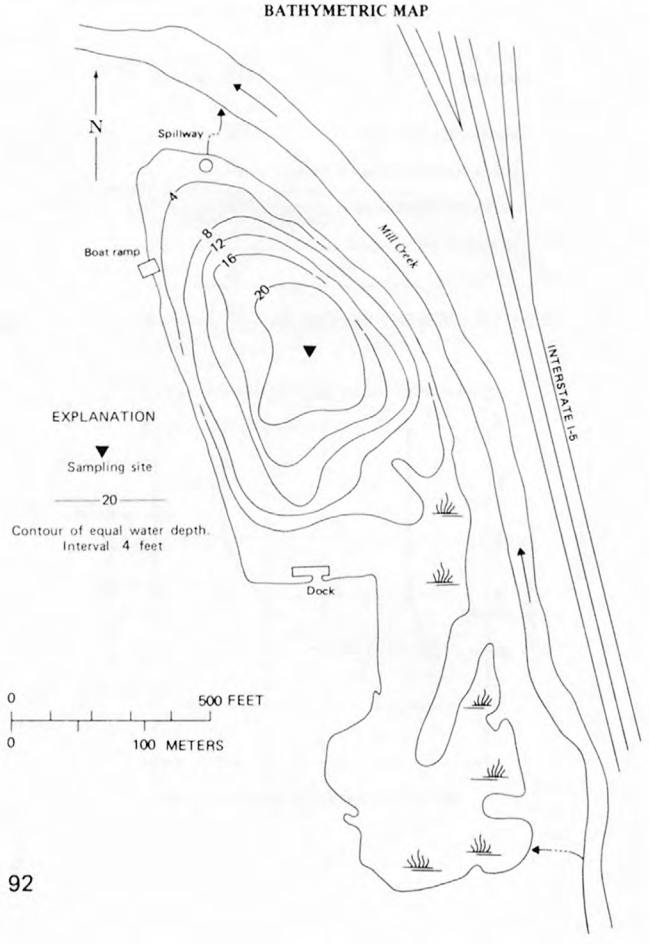
	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	9.3	60
BOTTOM	7.0	158

ALKALINITY (mg/l as $CaCO_3$)	25
TOTAL HARDNESS (mg/l as $CaCO_3$)	16
DISSOLVED SOLIDS (mg/l)	54
TRANSPARENCY (meters)	.8
COLOR (Pt-Co units)	25
FECAL COLIFORM (colonies/100 ml)	<1

(Chemical analysis in table 2, p. 5)



BATHYMETRIC MAP



LOCATION: Sec.31, T.8 S., R.1 W., about 0.5 mi (0.8 km) southeast of Aumsville and 2.5 mi (4 km) northwest of Stayton. Surface-water outlet at lat 44°49'55", long 122°51'30". Stayton 7½-minute quadrangle map (not named on map).

DRAINAGE BASIN: Mill Creek (Willamette River).

DRAINAGE AREA: Indeterminate.

SURFACE AREA: 7 acres (28,000 m^2).

SURFACE ELEVATION: 380 ft (120 m) above mean sea level, from topographic map.

VOLUME: 85 acre-ft (100,000 m^3).

INFLOW: Estimated 1 ft^3/s (0.03 m^3/s) from intermittent stream on south side of lake. Inflow not indicated on topographic map.

OUTFLOW: Estimated 1 ft^3/s (0.03 m^3/s) into Porter Creek on northwest end of lake.

USE: No recreational use.

REMARKS: No evidence of either floating or submerged aquatic growth. Bottom material is primarily mud and gravel with some detritus.
An algal bloom was observed on the survey date.
The lake was formerly a site for a gravel-pit operation.

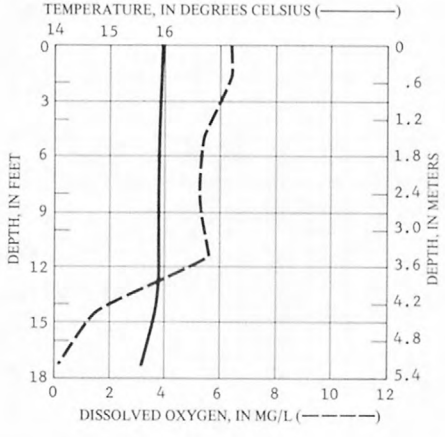
Photograph taken July 28, 1976.

WATER-QUALITY DATA

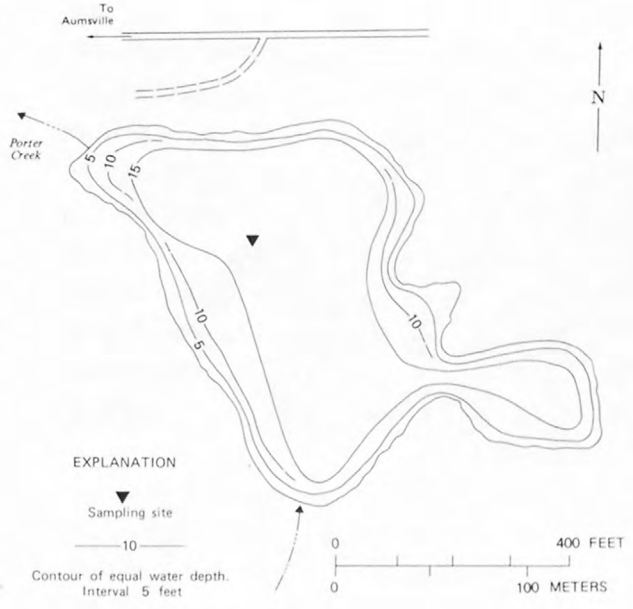
SAMPLING TIME: 1100 hours
CLOUD COVER: 100 percent

	pH (units)	CONDUCTIVITY (micromhos/cm at 25°C)
SURFACE	6.6	93
BOTTOM	6.1	262

ALKALINITY (mg/l as $CaCO_3$)	34
TOTAL HARDNESS (mg/l as $CaCO_3$)	33
DISSOLVED SOLIDS (mg/l)	62
TRANSPARENCY (meters)	1.7
COLOR (Pt-Co units)	15
FECAL COLIFORM (colonies/100 ml)	<1



BATHYMETRIC MAP



Index

U. S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
PORTLAND, OREGON