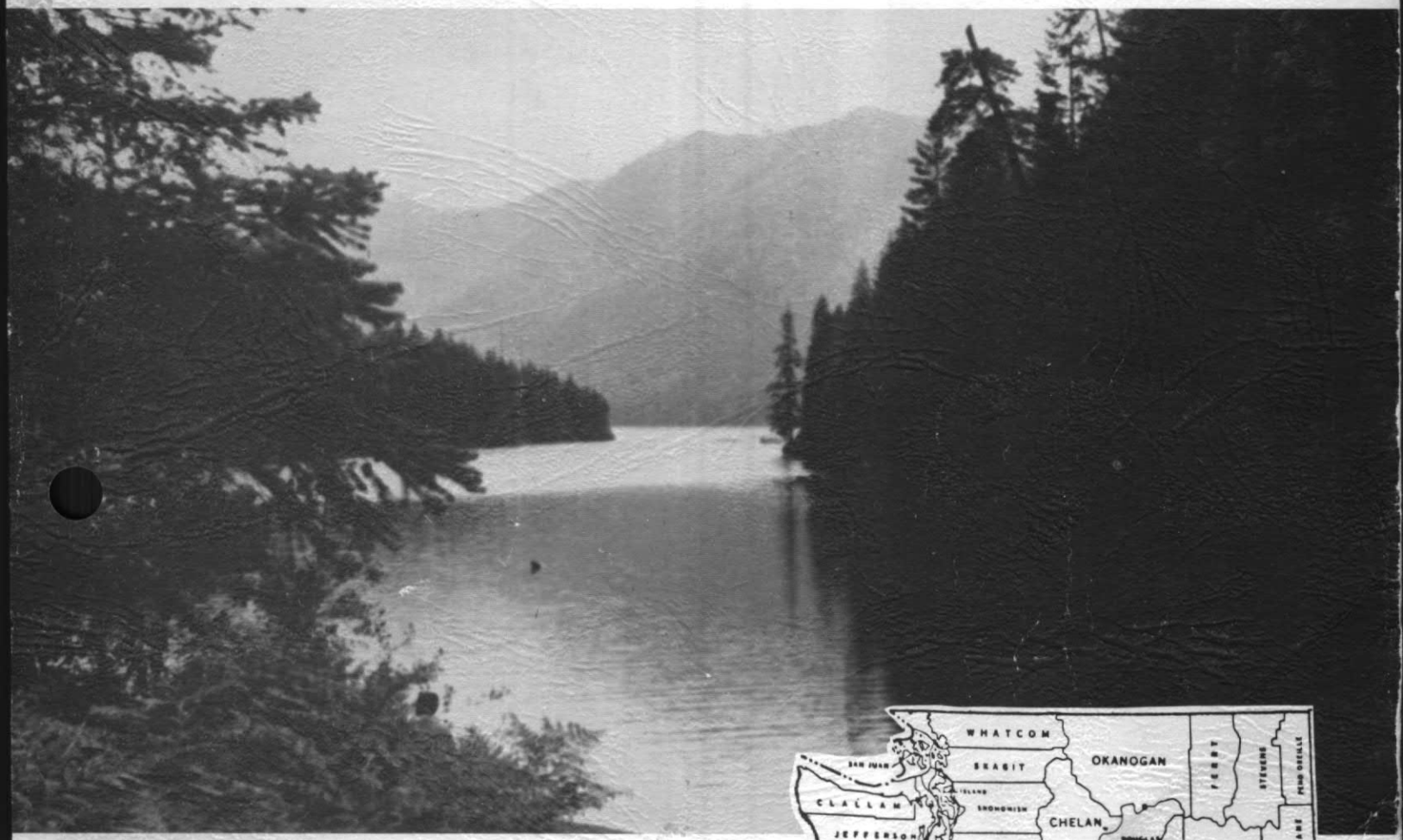
RECONNAISSANCE DATA ON LAKES IN WASHINGTON VOLUME 4

CLARK, COWLITZ, GRAYS HARBOR, LEWIS, PACIFIC, SKAMANIA, AND THURSTON COUNTIES



STATE OF WASHINGTON
DANIEL J. EVANS, Governor

DEPARTMENT OF ECOLOGY
JOHN A. BIGGS, Director

Water-Supply Bulletin 43, Vol. 4

Prepared in Cooperation with
United States Department of the Interior
Geological Survey • 1976

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VOLUME 4

CLARK, COWLITZ, GRAYS HARBOR, LEWIS, PACIFIC, SKAMANIA, AND THURSTON COUNTIES

By

G. C. Bortleson, N. P. Dion, J. B. McConnell, and L. M. Nelson

Prepared in cooperation with

UNITED STATES GEOLOGICAL SURVEY

1976

CONTENTS

ILLUSTRATION

The following factors are provided for conversion of English values used in this report to metric values:

Multiply	By	To obtain
Inches	2.54	centimetres (cm)
Feet (ft)	.3048	metres (m)
Miles (mi)	1.609	kilometres (km)
Cubic feet (ft^3)	.02832	cubic metres (m^3)
Square miles (sq mi)	2.590	square kilometres (km^2)
Acres	4047.	square metres (m^2)
	.4047	hectares (ha)
Cubic feet per second (ft^3/s)	.02832	cubic metres per second (m^3/s)

RECONNAISSANCE DATA ON LAKES IN WASHINGTON
VOLUME 4

CLARK, COWLITZ, GRAYS HARBOR, LEWIS, PACIFIC, SKAMANIA, AND THURSTON COUNTIES

By G. C. Bortleson, N. P. Dion, J. B. McConnell, and L. M. Nelson

ABSTRACT

A total of 69 lakes in seven counties of southwestern Washington was sampled using helicopter or boat to obtain information on their physical, cultural, and water-quality conditions. The basic data presented will be useful to planning groups involved in lake management and to sportsmen, tourists, and others interested in Washington's lakes.

INTRODUCTION

The State of Washington has more than 7,800 lakes, ponds, and reservoirs (Wolcott, 1964 and 1965), many of which provide excellent recreational opportunities and supply water for agricultural, municipal, and industrial purposes. These water bodies constitute an important part of the State's total water resources and are an integral part of the hydrology of many drainage basins.

This is the fourth of a seven-volume series of reports on Washington lakes and contains data from 69 lakes in Clark, Cowlitz, Grays Harbor, Lewis, Pacific, Skamania, and Thurston Counties in the southwestern part of the State (fig. 1). There were no lakes studied in Wahkiakum County. The lack of continental or alpine glaciation in the county is one reason why Wahkiakum County is noticeably free from natural lakes.

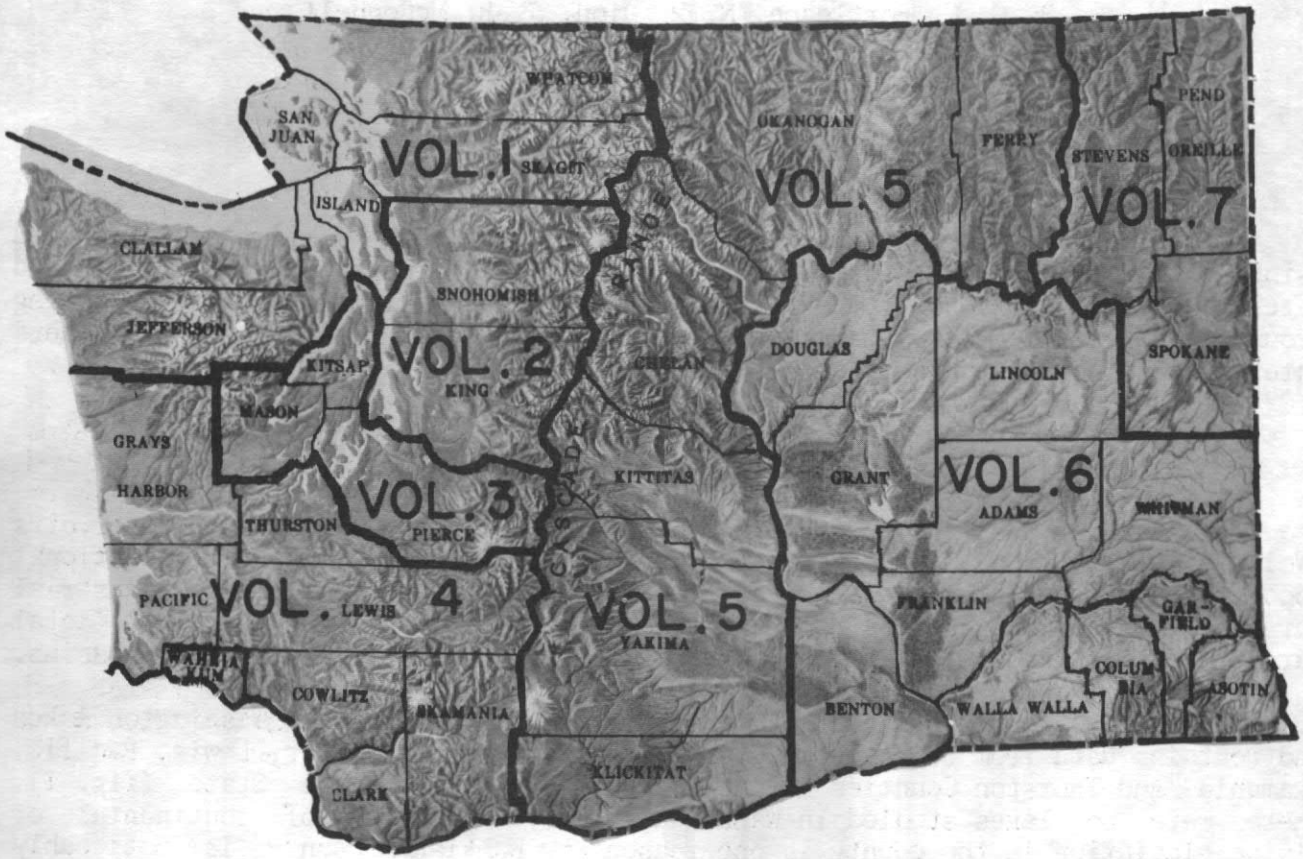

FIGURE 1.--Location of counties covered in each of seven-volume report series.

Purpose and Scope

Although both the importance and value of the Washington lakes are widely recognized, the quantity and types of information currently available for most of the lakes are not adequate to provide the understanding needed for wise management of the lakes. Thus, the need to obtain additional information about lakes resulted in the initiation in 1970 of a cooperative program between the Washington State Department of Ecology and the U.S. Geological Survey, whereby selected lakes in Washington would be investigated (Collings, 1973; Bortleson and others, 1974). Because the program--designed for the study of approximately 25 lakes per year during fiscal years 1970-74--deals with only a small fraction of the total number of lakes in the State, a reconnaissance study involving several hundred lakes was undertaken to provide preliminary information for use by planning groups as well as sportsmen, tourists, and others interested in preserving the water quality of Washington's lakes.

In general, the study consists of a data-collection program designed to (1) document the present water quality and the overall status of the lakes, and (2) provide basic data pertaining to the physical, cultural, and water- quality characteristics of the lakes.

More than 750 lakes in all but four counties of the State were studied; these are equally distributed between western and eastern Washington. Most of the lakes investigated were 20 acres or larger in size and were selected because they constitute shorelines of the State covered under the Shoreline Management Act of 1971 (Washington State Department of Ecology, 1973). However, some of the lakes listed as constituting shorelines of the State were not sampled; these included marshes with no open water or intermittent lakes which were dry at the time of visit.

Acknowledgments

The authors gratefully acknowledge the assistance of the State of Washington Department of Game for permission to reproduce many of the lake bathymetric maps. Many other bathymetric maps were reproduced from those in the reports by Wolcott (1964, 1965).

Occurrence of Lakes in Washington

Lakes in Washington occur under various geologic conditions. In the Puget Sound Lowland of western Washington most lakes occupy depressions in the surface of glacial drift--the sand, gravel, silt, clay, and till laid down by the Puget lobe of continental glaciers during the ice age. These depressions are either elongate troughs cut by the passing ice sheet or are more circular kettles formed by the melting of stagnant ice blocks.

In the adjacent foothills of the Cascade Range and Olympic Mountains, most lakes occupy depressions eroded into the bedrock by the passing continental glacier, while lakes in the higher mountains are in basins cut by local alpine glaciers.

In eastern Washington, lakes in the higher northern areas--the Okanogan Highlands and Selkirk Mountains--and on the eastern slope of the Cascade Range generally occur in glacier-cut depressions in bedrock. In the semiarid Columbia Plateau, underlain by basalt, most lakes occupy the more deeply cut parts of some coulees of the channeled scablands. Most of these coulees were cut by gigantic, catastrophic floods (Bretz, 1959) resulting from the breaking of ice dams and the rapid emptying of large glacial lakes.

Many lakes have been formed, or increased in size, by man's activities. Numerous reservoirs are located in mountain valleys and serve a variety of purposes, including municipal water supply, irrigation, electrical-power generation, flood control, and recreation. In lowland areas some natural lakes have been enlarged or new lakes have been formed by small dams. In the Columbia Basin Irrigation Project area of eastern Washington, several lakes have been enlarged and reservoirs (Banks Lake and Potholes Reservoir) have been created in conjunction with large-scale irrigation by water diverted from the Columbia River at Grand Coulee Dam. Also, numerous small lakes and ponds have resulted from irrigation in the area.

Data Collected and Definitions

The data collected and the lake parameters used in describing the individual lakes are explained here, prior to presentation of the data for each lake. The parameters are discussed in the sequence in which they appear on the data sheets. The definitions of additional limnological and hydrological terms used throughout the report are found in the Glossary (p. 10).

Lake name. The lake name was taken from U.S. Geological Survey topographic maps. Duplicate lake names are followed by location designations for uniqueness. Lakes that are not named on the topographic map and for which no local name is known are referred to as "unnamed," followed by a location designation. Only the proper name of the lake is given; in common usage the term "Lake" may either precede or follow the proper name. All adjectives (for example, Big, East, and Upper) follow the lake name. When a lake has two names, both are given, but priority is given to the topographic-map name. The lake names and respective data are listed alphabetically by counties.

Location. Latitude, longitude, township, range, and section location were determined from U.S. Geological Survey quadrangle maps. The location point is the lake outlet. For lakes without outlets, the southernmost shoreline point is used. The lakes are presented in the report according to the county in which the location point occurs.

Drainage basin. The major drainage system in which the lake is located was determined. Some lakes drain directly into Puget Sound or the Pacific Ocean without entering a major river system.

Physical data. Physical parameters were determined from topographic and bathymetric (bottom-contour) maps of the lakes. If bathymetric maps were not available, the lakes were sounded and charted by boat using a continuous-recording fathometer. For lakes with no boat access, a helicopter equipped with a fathometer, pontoons, and a conventional outboard motor was used to chart the lake. By use of aerial photographs and lake depths, the bathymetric data were digitized and transferred to computer cards which served as input to a computerized program that calculated lake morphometric parameters (for example, lake volume, surface area, and length of shoreline).

Drainage area.--The surface-drainage area, that contributes water to the lake is given in square miles (sq mi). These areas were delineated on U.S. Geological Survey topographic maps and measured by planimeter. Some lakes are in drainage basins of low relief in which surface runoff to the lake may not be a significant factor. Nevertheless, in all cases the drainage area was determined according to topographic divide.

Surface altitude.--A single altitude in feet (ft) above mean sea level (msl), obtained from topographic maps, is given for each lake. If not specifically shown on the map, altitudes are estimated from the nearest contour line. The altitude of a reservoir is given as the level of the water surface at normal full reservoir capacity.

Surface area (A).--The surface area of the lake, in acres, was obtained from planimetry of the lake outline or from computerized calculations of digitized data.

Volume (V).--Lake volume, in acre-feet, was obtained either by computing and then summing the volumes of each stratum of water between successive contours on the bathymetric map or by calculating from digitized data. Because lake volume can vary between seasons and from year to year, the volume figures reported (as well as other morphometric data) are intended only to describe the general size of the lake.

Mean depth ($\bar{Z}$).--The mean depth, in feet, for a specified lake stage, was obtained by dividing the volume of the lake by its area.

Maximum depth (Z_m).--The difference in elevation, in feet, between the bottom and the surface of the lake. The maximum depth obtained from field surveys may not necessarily be shown on the bathymetric maps.

Length of shoreline (L).--The distance around, or perimeter, in miles, of the water surface touching the shore at a specified lake stage. The shoreline length depends on the fineness of detail of the shore outline on the bathymetric map.

Shoreline configuration (D_L).--A dimensionless ratio of the length of shoreline to the circumference of a circle having an area equal to that of the lake, given as

$$D_L = \frac{L}{2\sqrt{\pi A}} \quad .$$

This quantity may be regarded as an index of the geological and littoral processes affecting the shape of the lake. Nearly circular lakes have values near unity, subcircular lakes have slightly greater D_L values and elongate lakes have the highest D_L values. High D_L values are common to lakes formed along old drainages or by the damming of streams to form a lake in the valley behind a dam.

High values for shoreline configuration suggest the presence of shallow water and protected bays--areas suitable for plant growth--and also indicate an increase in contact between land and water. Therefore, shoreline configuration is often an indirect indicator of plant growth capacity and enrichment potential from nearshore development and runoff.

Development of volume (D_V).--The development of volume is defined as the ratio of the mean depth ($\bar{Z}$) to the maximum depth (Z_m). Thus, lakes with a low D_V ratio are usually conical-shaped depressions, and lakes with a high D_V ratio are steep-sided with flat bottoms. Shallow lakes which have large values for development of volume (D_V), tend to provide the greater opportunity for exposure of bottom sediments to overlying water and for circulation of bottom nutrients.

Bottom slope (Z_r).--The slope profile of a lake bottom, expressed as a percentage ratio of the maximum depth to the mean lake diameter (referred to by Hutchinson, 1957, p. 167, as relative depth) and given as

$$Z_r = \frac{Z_m \times 50\sqrt{\pi}}{\sqrt{A}} .$$

Bottom slope is a measure of the extent of shallow water and is important to the growth of rooted aquatic plants and potential for wind mixing of water with bottom sediments.

Basin geology. The predominant geology of the lake's drainage basin was obtained from a geologic map of the State of Washington (Huntting and others, 1961). The drainage basin is indicated as being underlain by either (1) unconsolidated sedimentary deposits and (or) metasedimentary rocks, or (2) igneous rocks.

Inflow. Perennial or intermittent surface inflow is indicated, if known. Some lakes have no visible inflow, and water gain is from direct precipitation on the lake and (or) from ground-water seepage.

Outflow. The presence or absence of a surface-water outflow channel is indicated. Some lakes have no surface-water outflow, and water loss is through evaporation, transpiration, and (or) ground-water seepage.

Cultural data. Data related to cultural development were obtained from topographic maps, aerial photographs, and shoreline reconnaissance by helicopter or boat.

Nearshore residential development.--The percentage of shoreline occupied by residential development was determined from aerial photographs.

Number of nearshore homes.--A count of the number of nearshore homes adjoining the lakefront was made from field observations, topographic maps, or aerial photographs.

Land use.--The drainage basins of the lakes were partitioned into various generalized land-use categories. Values given reflect the percentages of the basin used primarily for forest or for residential urban, residential suburban, or agricultural development. The lake surface is also given as a percentage of the total drainage basin. A general description of the land-use categories is as follows:

a. Residential urban.--Predominant use is for single-family residences, where apartment complexes and commercial or industrial activities also may be present.

b. Residential suburban.--Predominant use is single-family residences.

c. Agricultural.--Pasture or cropland.

d. Forest or unproductive.--Public and private forest lands and tree farms. Lands may include cleared or fallow unproductive land, meadows, wetlands, and seasonal recreational areas.

e. Lake surface.--Includes surface area of the lake and of upstream tributary lakes.

Public boat access to lake.--The presence of a public boat access is indicated. Most public boat access facilities are maintained by the State of Washington Department of Game. The location of the boat access (symbol ⚓) is shown on the bathymetric map.

Water-quality data. From helicopters fitted with pontoons or from boats, vertical profiles of temperature and DO (dissolved oxygen) concentration were measured in the deepest part of each lake. Multiple sites were sampled on lakes with areas greater than 1,000 acres and on irregular-shaped lakes. Secchi-disc visibility was also determined. Water samples were collected for color, nutrient, and specific-conductance analyses at depths 3.0 feet below the water surface and 3-5 feet above the lake bottom. Lakes less than 5 feet deep were sampled at about one-third and two-thirds the depth of the lake. For most lakes, estimates of the percentage of both lake area and lake shoreline covered by emersed and (or) floating rooted aquatic plants were made by a visual inspection of the lake during aerial reconnaissance. Samples for fecal-coliform bacteria were collected at selected nearshore sites, approximately 100 feet offshore at a depth of 1 foot below the water surface.

Information from most of the lakes was collected during the periods of July-September 1973 or May-September 1974. Prior to 1973, some of the lakes were sampled four times during a year by Bortleson, Higgins, and Hill (1974). For those lakes sampled more than once during a year, the data from the midsummer sample period are presented. All samples were collected and analyzed according to accepted standardized procedures (American Public Health Association and others, 1971; Brown and others, 1970; and Slack and others, 1973).

Nutrients.--A nutrient is any chemical element, ion, or compound that is required by an organism for the continuation of growth, reproduction, and other life processes. Many elements and compounds act as nutrients to supply the food for aquatic plants and algae. However, nitrogen and phosphorus usually are considered the limiting nutrients to plant growth and as such received the most emphasis in this study. Whatever nutrient is limiting aquatic plant growth, the concentrations of nitrogen and phosphorus are useful in evaluating the trophic conditions of a lake (Lee, 1970). The nutrient concentrations that were determined at top and bottom sampling depths included total nitrate, nitrite, ammonia and organic nitrogen, phosphorus, and orthophosphate. For those lakes sampled during previous studies (Bortleson and others, 1974), the samples for orthophosphate, nitrite, and nitrate were filtered through a 0.45-μm (micrometre) millipore filter. The concentrations of these particular samples are indicated as "dissolved."

Specific conductance.--Specific conductance is a measure of the water's ability to conduct an electric current and is expressed in micromhos per centimetre at 25°C (Celsius). Because the specific conductance is related to the number and specific chemical types of ions in solution, it can be used for approximating the dissolved-solids concentration in the water.

Water temperature.--Temperature, which varies in lakes with depth and time of year, is an important controlling factor for life processes and chemical-reaction rates, as well as many physical events that occur in the aquatic environment.

For most lakes, the water temperatures listed for the upper, near-surface water were probably close to the maximum for the year when sampled. Temperature profiles in lakes during midsummer, when thermal stratification is marked, generally follow one of two common patterns. In shallow lakes, well exposed to the wind, temperatures will be found to be practically constant from top to bottom. This uniformity of temperature indicates that the waters are well mixed throughout. The other common pattern occurs in deeper lakes, where three characteristic thermal layers are present: (1) an upper zone (epilimnion) of generally warmer water in which temperature is more or less uniform throughout; (2) an intermediate zone (metalimnion) in which temperature decreases rapidly with depth; and (3) a lower zone (hypolimnion) of colder water in which temperature is again more or less uniform throughout.

The temperature of the deep-water layer (hypolimnion) during midsummer is of biological significance because (1) temperature stratification and water circulation affect the vertical distribution of nutrients, and (2) water temperatures affect the potential of cold-water fisheries resources.

Color.--Color is one control of light transmission through water. High color values often result from the decomposition of vegetation, giving the water a brown, tea-like color and reducing water clarity. Color value is determined by a comparison of the water with standardized colored-glass discs and is reported in platinum-cobalt (Pt-Co) units.

Secchi-disc visibility.--Secchi-disc visibility is the depth at which a black and white disc (8 inches in diameter) disappears from view when lowered into the water. Secchi-disc visibility is a measure of water transparency or clarity. Because changes in biological production can cause changes in the color and turbidity of a lake, Secchi-disc visibility often is used as a gross measure of the quantity of plankton in the water. Secchi-disc depths preceded by the symbol ">" indicate the disc was resting on the bottom of the lake and was still visible.

Dissolved oxygen.--The concentration of DO in a lake varies with time of year and depth of water and is a function of many factors, including the water temperature, atmospheric pressure, and salinity of the water. Oxygen concentration in water is continually being altered by life processes, such as photosynthesis and respiration, and by complex chemical reactions. Of special biological significance is the amount of DO in the hypolimnion during midsummer. The organisms in the lighted upper layers of water produce organic matter which eventually settles to the bottom where bacteria consume oxygen to degrade the organic materials, thereby reducing the DO concentration in the hypolimnion. The hypolimnetic-oxygen deficit frequently is related to the biomass or plant growth in the upper waters (Hutchinson, 1957). For good growth and general health of trout, salmon, and other species of cold-water biota, the DO concentrations should not be less than 6.0 mg/l (milligrams per litre) according to the Federal Water Pollution Control Administration (1968).

Emersed plants.--These are large plants that can be seen without magnification. Examples of emersed plants include cattails and sedges in which the leaves or other structures extend above the water surface. In this report, rooted floating aquatic plants such as waterlilies and watershield are considered emersed. The rooted aquatic-plant growth was assessed according to the percentage of the lakeshore and water surface covered by emersed and (or) floating plants.

Remarks. This includes other useful lake information that was obtained during the reconnaissance. Such topics as the following might be included.

1. Descriptive information.
2. Qualifying statements.
3. Availability of additional information.
4. Unusual lake or drainage-basin characteristics.

Bathymetric maps. With the exception of one lake and seven large reservoirs, a bathymetric map is given for each lake. The map source and date of the survey are indicated.

Aerial photographs. With the exception of one lake, an aerial photograph is shown for each lake and reservoir. Black-and-white aerial photographs at an approximate scale of 1:12,000 and 1:63,000 were obtained from the State of Washington Department of Natural Resources. Additional aerial photographs at an approximate scale of 1:4,800 were taken by the U.S. Geological Survey of selected lakes in the populated, 10-county Puget Sound area and of other selected lakes throughout the State. Many of the bathymetric maps produced by the U.S. Geological Survey are shown superimposed on the aerial photographs.

GLOSSARY

Acre-foot. Volume of water required to cover 1 acre to a depth of 1 foot, and equal to 43,560 ft^3 (325,851 gallons).

Algae. Simple plants, many microscopic; contain chlorophyll and lack roots, stems, and leaves. Most algae are aquatic and may become a nuisance when environmental conditions are suitable for prolific growth.

Algal bloom. A large number of a particular algal species. A condition when water looks green because of the abundance of planktonic algae.

Bathymetric. Relating to the measurement of water depths, as for a lake.

Cultural eutrophication. The acceleration of the natural process of nutrient enrichment in a lake as a result of man's activities.

Emersed plant. These are large plants that can be seen without magnification. Examples of emersed plants include cattails and sedges in which the leaves or other structures extend above the water surface. In this report, rooted floating aquatic plants such as waterlilies and watershield are considered emersed.

Eutrophication, eutrophic. The enrichment of water, a natural process that may be accelerated by the activities of man; pertains to waters in which primary productivity is generally high as a consequence of a large supply of available nutrients.

Hydrogen sulfide. A gas with a distinctive "rotten egg" odor which can be detected in the hypolimnetic water containing only a few tenths of a milligram per litre of sulfide.

Intermittent or seasonal stream. Flows at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

Littoral. The shoreward region of a body of water.

Macrophyte. Large plants that can be seen without magnification; includes mosses and seed plants.

Marsh. Periodically wet or continually flooded areas where the surface is not deeply submerged, covered dominantly with sedges, cattails, rushes, or other plants that require marshy conditions for their growth.

Morphometry. Definition of physical shape and size, as of a water body.

Muck. A mixture containing highly decomposed organic material in which the original plant parts are not recognizable. Contains more mineral matter, and is usually darker, than peat.

Plankton. Suspended organisms that drift with the water currents.

Production. The total amount of living matter produced in an area per unit time regardless of the fate of the living matter.

Submersed plant. A rooted aquatic plant that lives and completes its life cycle entirely below the surface of the water. Examples of submersed plants include water milfoil, pondweed, and elodea.

Thermal stratification. The layering of water masses owing to different densities in response to temperature.

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-----1965, Lakes of Washington, vol. 1, Western Washington [2d ed.]: Washington Div. Water Resources Water Supply Bull. 14, 619 p.

BATTLEGROUND LAKE CLARK COUNTY

LATITUDE 45*48'11" LONGITUDE 122*29'37" T4N-R3E-30
LAKE RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.13 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	504. FT		
LAKE AREA	27. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	840. ACRE-FT		
MEAN DEPTH	31. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	60. FT		
SHORELINE LENGTH	0.79 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.1	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.52	AGRICULTURAL	3 %
BOTTOM SLOPE	4.9 %	FOREST OR UNPRODUCTIVE	65 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	32 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

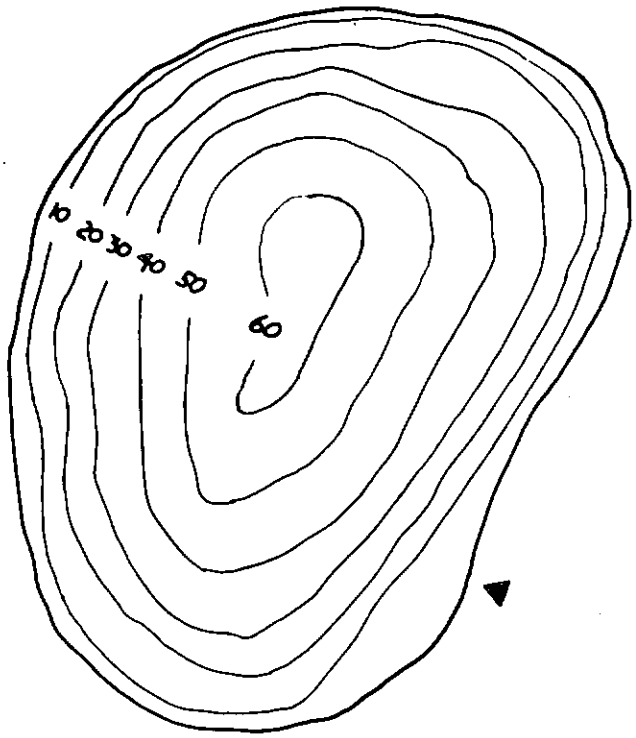
SAMPLE SITE	1	
DATE	8/ 6/74	
TIME	1105	1115
DEPTH (FT)	3.	46.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.01	0.37
TOTAL ORGANIC NITROGEN (N)	0.25	0.41
TOTAL PHOSPHORUS (P)	0.009	0.16
DISSOLVED ORTHOPHOSPHATE (P)	0.004	0.043
SPECIFIC CONDUCTANCE (MICROMHOS)	18	38
WATER TEMPERATURE (DEG C)	24.0	5.0
COLOR (PLATINUM-COBALT UNITS)	5	30
SECCHI-DISC VISIBILITY (FT)	18	
DISSOLVED OXYGEN	7.9	0.1

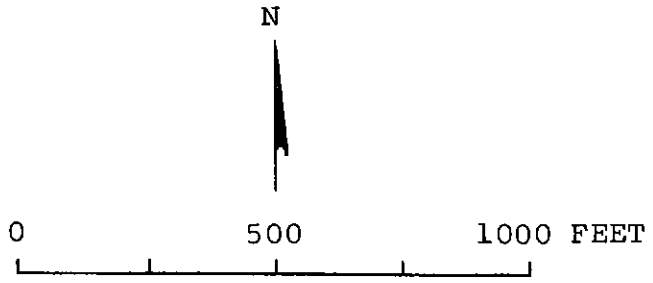
LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/ 6/74
TIME	1525
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	2
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

THE LAKE IS IN AN OLD CRATER AND IS DEEP IN RELATION TO ITS SIZE. THE LAKE IS IN BATTLEGROUND STATE PARK. FEW AQUATIC MACROPHYTES WERE OBSERVED. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 6, 1974.



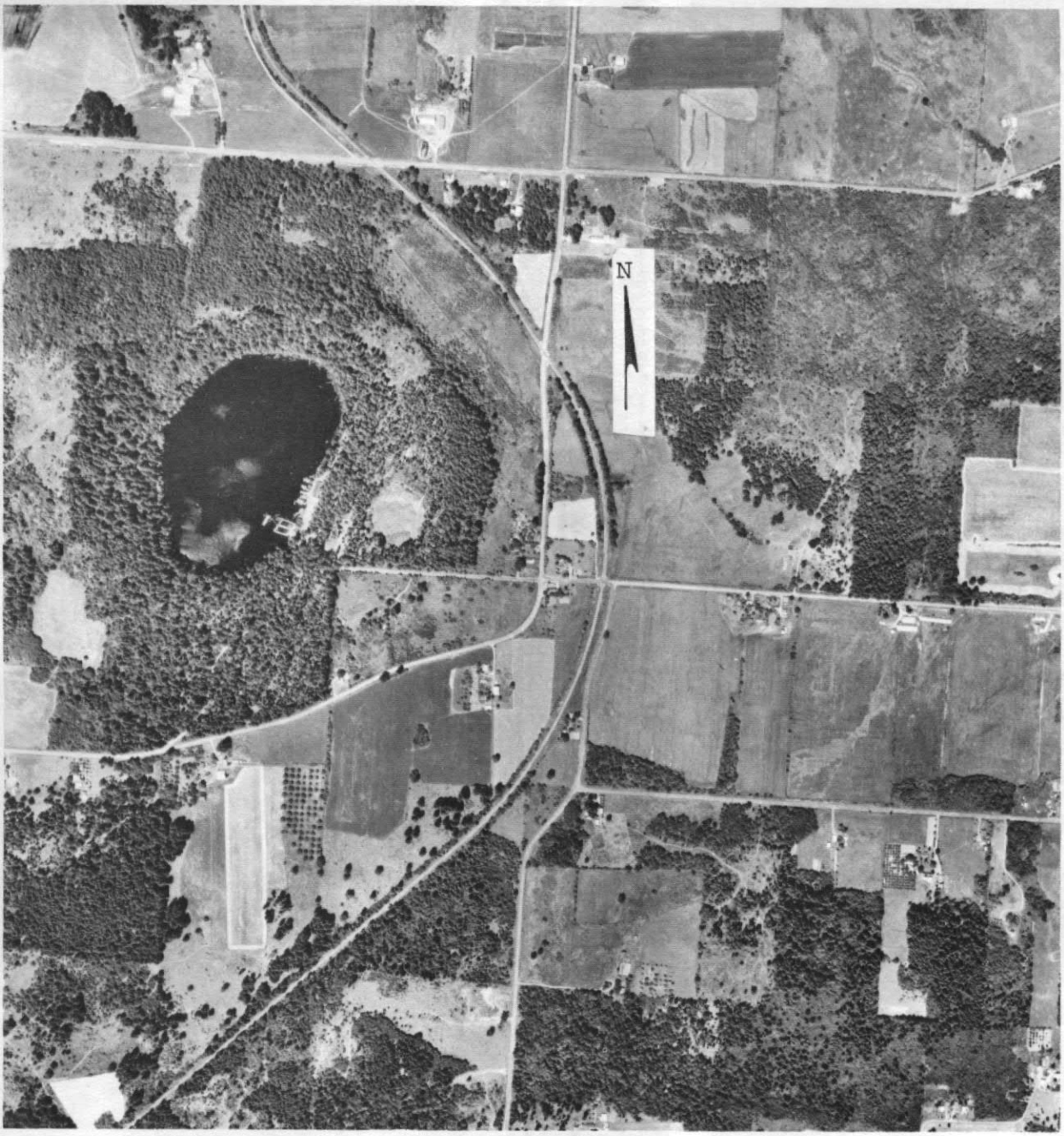


EXPLANATION

—— 20 ——

Line of equal
water depth
Interval 10 feet

Battleground Lake, Clark County. From Washington Department of Game, September 22, 1949.



Battleground Lake, Clark County. July 1, 1968. Approx. scale 1:12,000.

LACKAMAS LAKE CLARK COUNTY

LATITUDE 45°36'16" LONGITUDE 122°24'22" T1N-R3E-2
WASHOUGAL RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	64.3 SQ MI	RESIDENTIAL DEVELOPMENT	3 %
ALTITUDE	179. FT		
LAKE AREA	320. ACRES	NUMBER OF NEARSHORE HOMES	11
LAKE VOLUME	7500. ACRE-FT		
MEAN DEPTH	24. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	65. FT		
SHORELINE LENGTH	5.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.1	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.37	AGRICULTURAL	49 %
BOTTOM SLOPE	1.6 %	FOREST OR UNPRODUCTIVE	50 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

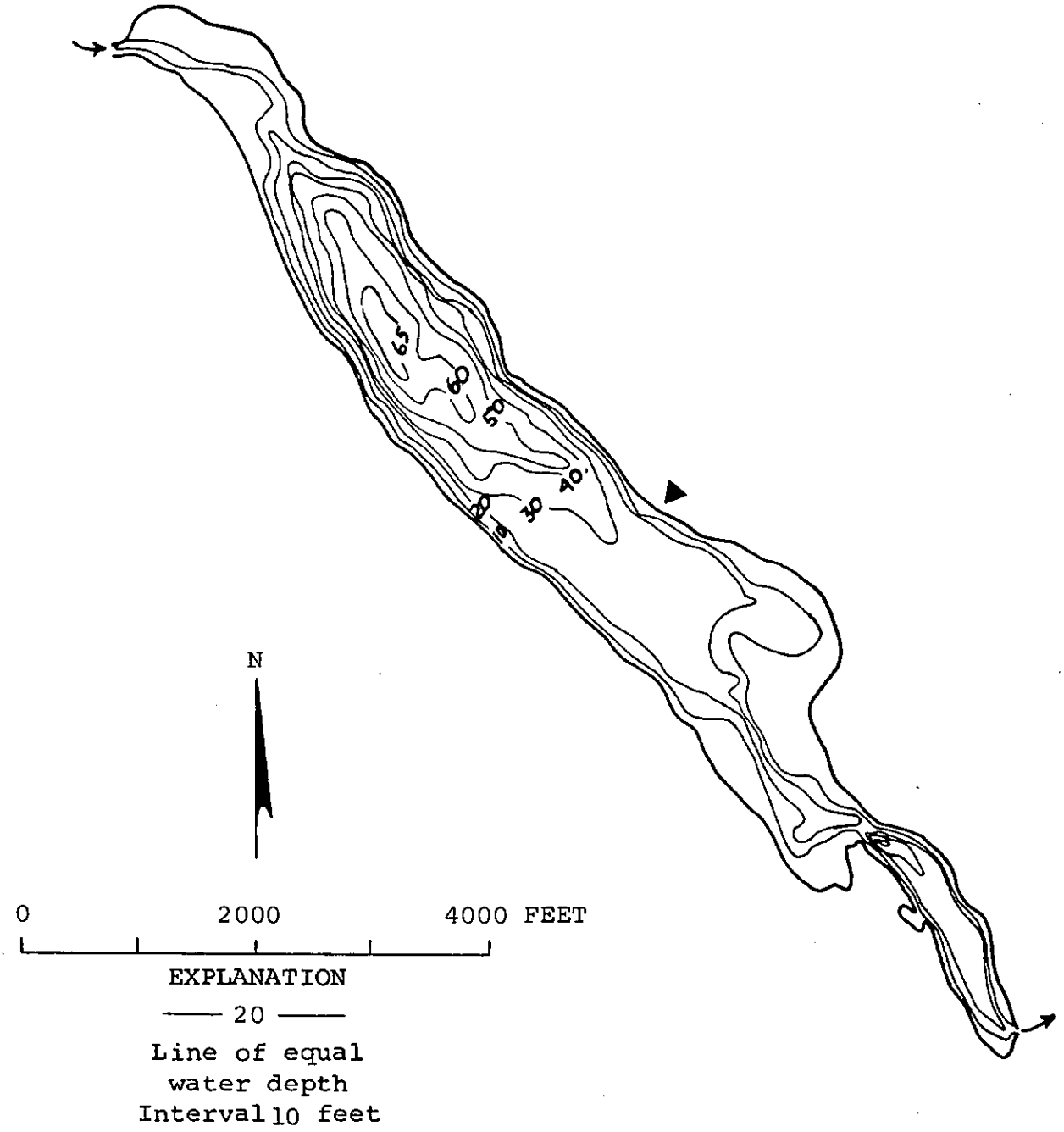
SAMPLE SITE	1	
DATE	6/26/74	
TIME	1040	1050
DEPTH (FT)	3.	59.
TOTAL NITRATE (N)	0.32	0.53
TOTAL NITRITE (N)	0.01	0.00
TOTAL AMMONIA (N)	0.06	0.16
TOTAL ORGANIC NITROGEN (N)	0.26	0.20
TOTAL PHOSPHORUS (P)	0.047	0.086
DISSOLVED ORTHOPHOSPHATE (P)	0.004	0.038
SPECIFIC CONDUCTANCE (MICROMHOS)	73	55
WATER TEMPERATURE (DEG C)	21.0	10.0
COLOR (PLATINUM-COBALT UNITS)	10	25
SECCHI-DISC VISIBILITY (FT)	8	
DISSOLVED OXYGEN	8.9	0.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/26/74
TIME	1130
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A LAKE FORMED BY TWO DAMS ON LACAMAS CREEK NEAR THE CITY OF CAMAS. ROUND LAKE IS CONNECTED TO LACAMAS LAKE BY A NARROW CHANNEL CROSSED BY A HIGHWAY BRIDGE. WATER IS DIVERTED FROM ROUND LAKE FOR AN INDUSTRIAL WATER SUPPLY. THE LAKE HAS A RESORT AND MARINA AND RECEIVES HEAVY RECREATIONAL USE. APPROXIMATELY 35 PERCENT OF THE SHORE ON THE EAST SIDE IS BORDERED BY A ROAD. MOST OF THE SUBMERSED AQUATIC PLANTS (ELODEA, COONTAIL, AND PONDWEED) WERE ON THE NORTH END OF THE LAKE NEAR THE INFLOW AND ON THE SOUTHEAST END OF THE LAKE NEAR THE SHALLOW BAY. THE LAKE HAS MANY STANDING DEAD TREES AND SNAGS. THE LITTORAL BOTTOM IS SILT. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON SEPTEMBER 5, 1974.



Lackamas Lake, Clark County. From Washington Department of Game, November 18, 1947.

Lackamas Lake, Clark County. July 1, 1968. Approx. scale 1:15,000.

MERWIN LAKE CLARK COUNTY

LATITUDE 45°57'26" LONGITUDE 122°33'15" T4N-R1E-6
LEWIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	730. SQ MI	RESIDENTIAL DEVELOPMENT	3 %
ALTITUDE	239. FT		
LAKE AREA	4000. ACRES	NUMBER OF NEARSHORE HOMES	23
LAKE VOLUME	420000. ACRE-FT		
MEAN DEPTH	100. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	190. FT		
SHORELINE LENGTH	32. MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	3.6	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.55	AGRICULTURAL	<1 %
BOTTOM SLOPE	1.3 %	FOREST OR UNPRODUCTIVE	97 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	3 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1		2	
DATE	9/13/74		9/13/74	
TIME	1545	1550	1635	1640
DEPTH (FT)	3.	144.	3.	98.
TOTAL NITRATE (N)	0.02	0.05	0.01	0.03
TOTAL NITRITE (N)	0.00	0.00	0.00	0.00
TOTAL AMMONIA (N)	0.03	0.05	0.05	0.04
TOTAL ORGANIC NITROGEN (N)	0.05	0.05	0.01	0.07
TOTAL PHOSPHORUS (P)	0.003	0.009	0.006	0.007
TOTAL ORTHOPHOSPHATE (P)	0.001	0.005	0.001	0.002
SPECIFIC CONDUCTANCE (MICROMHOS)	34	38	36	37
WATER TEMPERATURE (DEG C)	19.8	12.7	19.3	13.5
COLOR (PLATINUM-COBALT UNITS)	5	5	0	5
SECCHI-DISC VISIBILITY (FT)	21		20	
DISSOLVED OXYGEN	9.1	8.4	9.3	7.8

LAKE SHORELINE COVERED BY EMERSED PLANTS	LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/13/74
TIME	1710
NUMBER OF FECAL COLIFORM SAMPLES	7
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	2
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

FORMED BY A DAM ON THE LEWIS RIVER AND USED FOR HYDROPOWER BY PACIFIC POWER AND LIGHT. THE LAKE IS IN BOTH COWLITZ AND CLARK COUNTIES. THE BANKS OF THE RESERVOIR ARE STEEP AND ERODED. NO EMERSED AND SUBMERSED AQUATIC MACROPHYTES WERE OBSERVED. THE DO WAS NEAR SATURATION THROUGHOUT THE WATER COLUMN. FLOATING AND SUBMERGED LOGS WERE OBSERVED ALONG THE SHORELINE. INFORMATION CONCERNING RESERVOIR VOLUME CHANGES IS AVAILABLE FROM U.S. GEOLOGICAL SURVEY PUBLICATIONS. THE WASHINGTON DEPT. OF FISHERIES DISCHARGES WATER FROM THE SPEELYAI FISH HATCHERY TO THE LEWIS RIVER VIA A TRIBUTARY.

Merwin Lake, Clark County. May 8, 1969. Approx. scale 1:63,000.

MUD LAKE CLARK COUNTY

LATITUDE 45*51'49" LONGITUDE 122*44'27" T4N-R1E-6
LEWIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	5.20 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	20. FT		
LAKE AREA	77. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	240. ACRE-FT		
MEAN DEPTH	3. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	5. FT		
SHORELINE LENGTH	2.4 MI	RESIDENTIAL URBAN	2 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.62	AGRICULTURAL	71 %
BOTTOM SLOPE	0.24 %	FOREST OR UNPRODUCTIVE	25 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

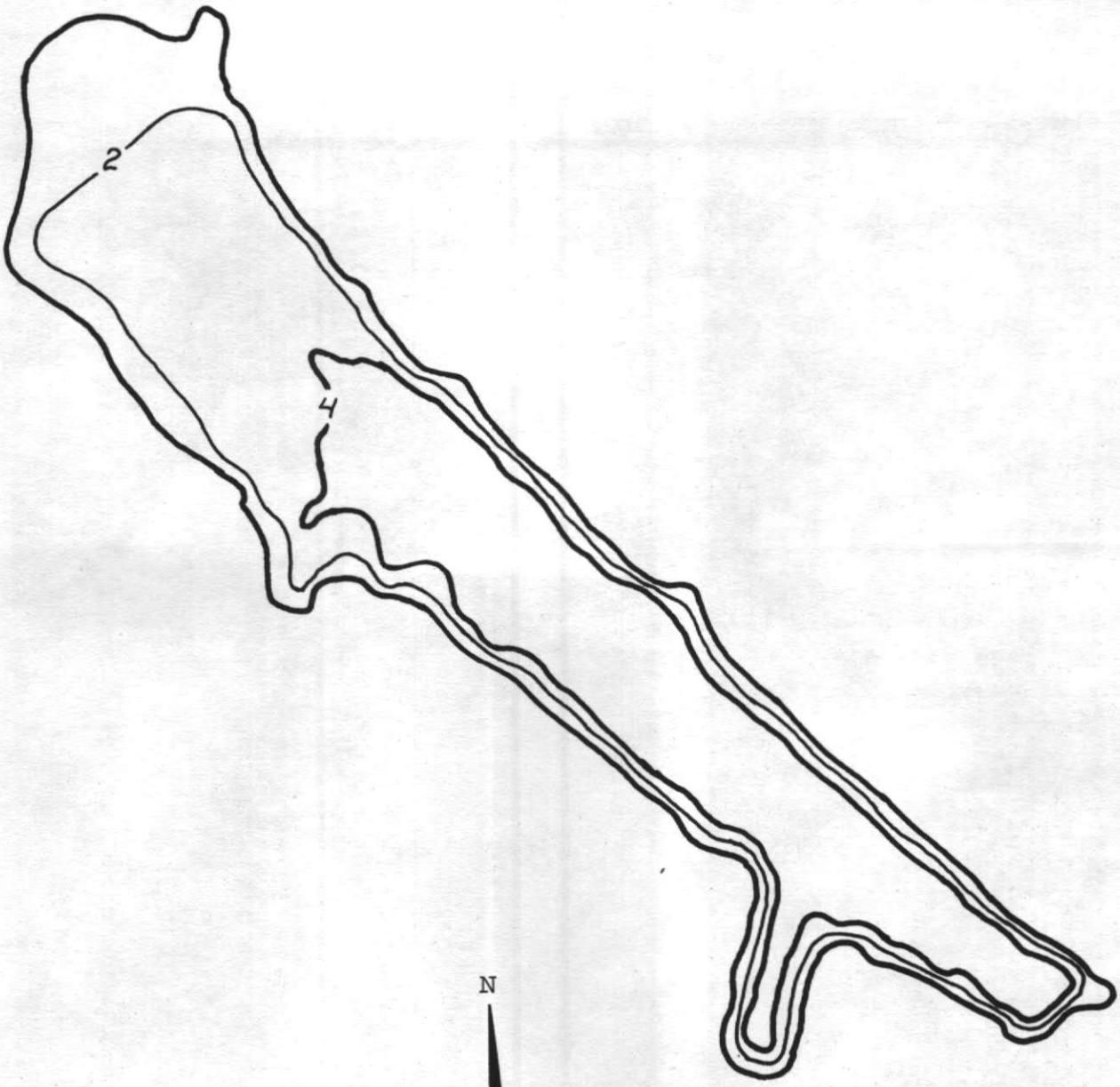
SAMPLE SITE	1	
DATE	9/12/74	
TIME	1405	1410
DEPTH (FT)	1.	2.
TOTAL NITRATE (N)	0.03	0.05
TOTAL NITRITE (N)	0.04	0.04
TOTAL AMMONIA (N)	0.87	0.87
TOTAL ORGANIC NITROGEN (N)	2.3	1.9
TOTAL PHOSPHORUS (P)	0.56	0.62
TOTAL ORTHOPHOSPHATE (P)	0.11	0.067
SPECIFIC CONDUCTANCE (MICROMHOS)	70	70
WATER TEMPERATURE (DEG C)	18.7	18.8
COLOR (PLATINUM-COBALT UNITS)	--	--
SECCHI-DISC VISIBILITY (FT)	1	
DISSOLVED OXYGEN	8.8	8.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	9/12/74
TIME	1347
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	22
FECAL COLIFORM, MEAN (COL./100ML)	17

REMARKS

A SHALLOW LAKE FED BY TWO UNNAMED TRIBUTARIES WHICH DRAINS MOSTLY AGRICULTURAL LAND. THE SECCHI-DISC VISIBILITY WAS ONLY 0.6 FEET DUE TO EXCESSIVE TURBIDITY. THE HIGH TURBIDITY PRECLUDED A COLOR DETERMINATION. MOST OF THE OBSERVED AQUATIC PLANTS WERE OBSERVED NEAR THE INFLOWS AND OUTFLOW OF THE LAKE. THE LITTORAL BOTTOM IS SILT.



Mud Lake, Clark County. From
U.S. Geological Survey, February 27, 1974.

Mud Lake, Clark County. June 18, 1968. Approx. scale 1:12,000.

ROUND LAKE CLARK COUNTY

LATITUDE 45°36' 3" LONGITUDE 122°24'10" T1N-R3E-2
WASHOUGAL RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	64.7 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	182. FT		
LAKE AREA	30. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	790. ACRE-FT		
MEAN DEPTH	26. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	55. FT		
SHORELINE LENGTH	1.1 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.48	AGRICULTURAL	49 %
BOTTOM SLOPE	4.3 %	FOREST OR UNPRODUCTIVE	50 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

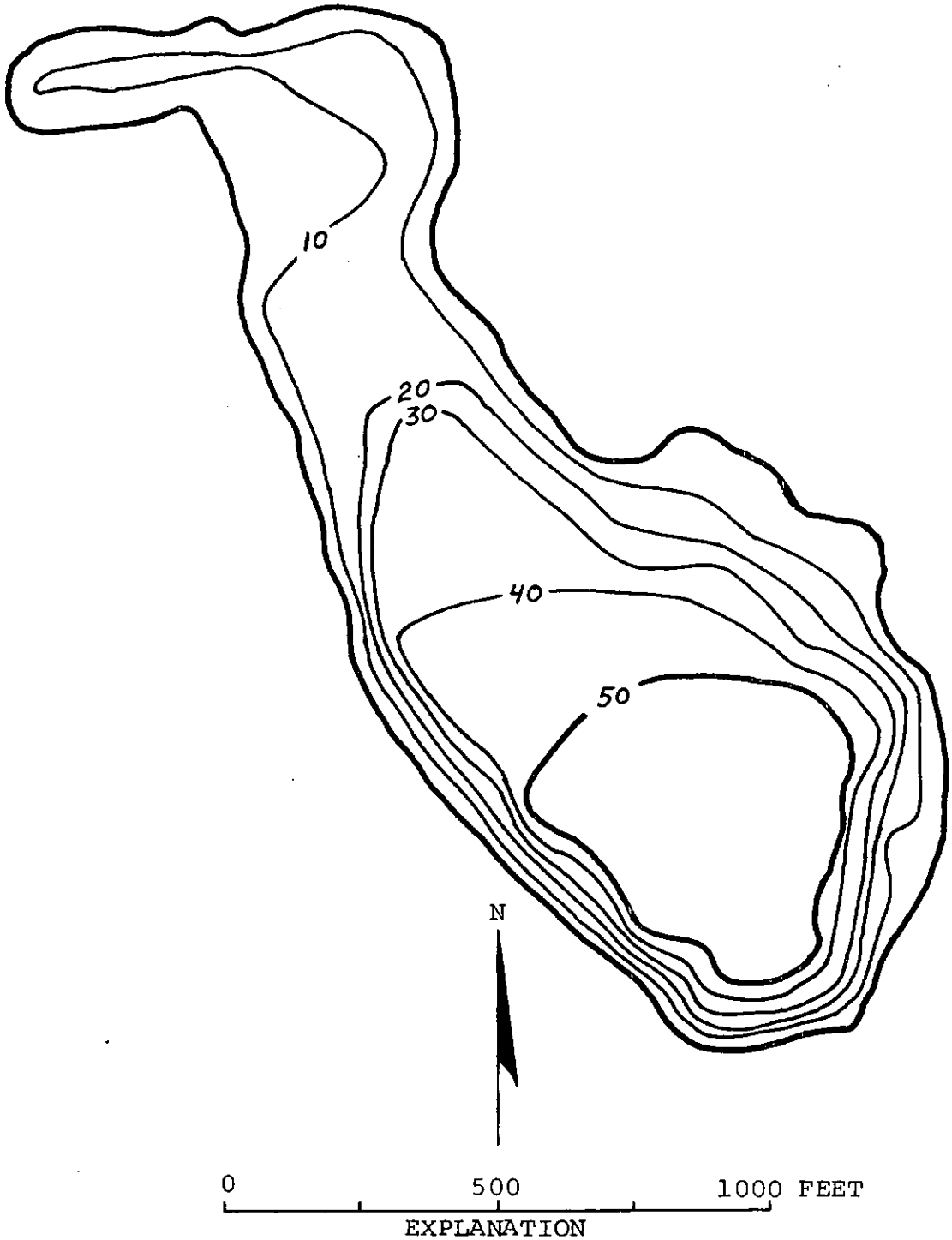
SAMPLE SITE	1	
DATE	9/12/74	
TIME	1205	1210
DEPTH (FT)	3.	46.
TOTAL NITRATE (N)	0.00	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.10	2.0
TOTAL ORGANIC NITROGEN (N)	0.59	0.40
TOTAL PHOSPHORUS (P)	0.029	0.29
TOTAL ORTHOPHOSPHATE (P)	0.012	0.21
SPECIFIC CONDUCTANCE (MICROMHOS)	85	120
WATER TEMPERATURE (DEG C)	19.8	6.8
COLOR (PLATINUM-COBALT UNITS)	25	200
SECCHI-DISC VISIBILITY (FT)	4	
DISSOLVED OXYGEN	9.8	0.3

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/12/74
TIME	1617
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	2
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

ROUND LAKE IS CONNECTED TO LACAMAS LAKE BY A NARROW CHANNEL CROSSED BY A HIGHWAY BRIDGE. WATER IS DIVERTED FROM THE LAKE FOR AN INDUSTRIAL WATER SUPPLY. A COUNTY PARK IS LOCATED ON THE WEST SHORE. EMERSED PLANTS WERE THINLY SCATTERED AND SUBMERSED PLANTS (ELODEA) WERE IN DENSE BEDS. AN ALGAL BLOOM WAS OBSERVED. THE DO CONCENTRATION BELOW 10 FEET IN DEPTH WAS NEAR DEPLETION. A SLIGHT HYDROGEN SULFIDE ODOR WAS DETECTED IN THE HYPOLIMNION. FLOATING LOGS AND SNAGS WERE OBSERVED ALONG THE SHORE.



Round Lake, Clark County. From
U.S. Geological Survey, February 27, 1974.

Round Lake, Clark County. July 1, 1968. Approx. scale 1:13,000.

UNNAMED (2N-1E-9) LAKE CLARK COUNTY

LATITUDE 45*40'19" LONGITUDE 122*41' 2" T2N-R1E-9
LAKE RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	26.8 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	25. FT		
LAKE AREA	28. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	110. ACRE-FT		
MEAN DEPTH	4. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	6. FT		
SHORELINE LENGTH	1.0 MI	RESIDENTIAL URBAN	11 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	14 %
DEVELOPMENT OF VOLUME	0.63	AGRICULTURAL	45 %
BOTTOM SLOPE	0.48 %	FOREST OR UNPRODUCTIVE	30 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	<1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

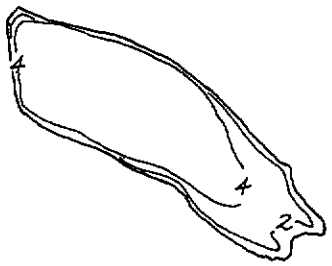
SAMPLE SITE	1	
DATE	9/12/74	
TIME	1810	1815
DEPTH (FT)	1.	2.
TOTAL NITRATE (N)	0.75	0.75
TOTAL NITRITE (N)	0.02	0.02
TOTAL AMMONIA (N)	0.16	0.17
TOTAL ORGANIC NITROGEN (N)	0.74	0.66
TOTAL PHOSPHORUS (P)	0.19	0.19
TOTAL ORTHOPHOSPHATE (P)	0.033	0.035
SPECIFIC CONDUCTANCE (MICROMHOS)	70	70
WATER TEMPERATURE (DEG C)	19.0	19.0
COLOR (PLATINUM-COBALT UNITS)	35	40
SECCHI-DISC VISIBILITY (FT)	1	
DISSOLVED OXYGEN	8.8	8.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/12/74
TIME	1827
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	12
FECAL COLIFORM, MAXIMUM (COL./100ML)	--
FECAL COLIFORM, MEAN (COL./100ML)	--

REMARKS

THE LAKE IS AT THE MOUTH OF BURNT BRIDGE CREEK NEAR THE CITY OF VANCOUVER AND DRAINS TO VANCOUVER LAKE. THE INLET SIDE OF THE LAKE IS WETLAND AND THE OUTLET SIDE IS DIKED BY HIGHWAY FILL. THE DRAINAGE AREA OF THE LAKE IS LARGE IN RELATION TO THE SIZE OF THE LAKE. EMERSED PLANTS COVERED THE SHORELINE IN A MARGIN CLOSE TO SHORE. NO SUBMERSED PLANTS WERE OBSERVED. THE WATER WAS TURBID AND AN ALGAL BLOOM WAS OBSERVED. ONE OF THE FECAL COLIFORM SAMPLES HAD COLONIES TOO NUMEROUS TO COUNT. THE BEACH AND LITTORAL BOTTOM IS MUCK AND SILT. THE VANCOUVER LAKE TASK FORCE HAS ISSUED A REPORT ON RECOMMENDED LAND USE AND POLICIES FOR THE LAKE ENVIRONS.



N

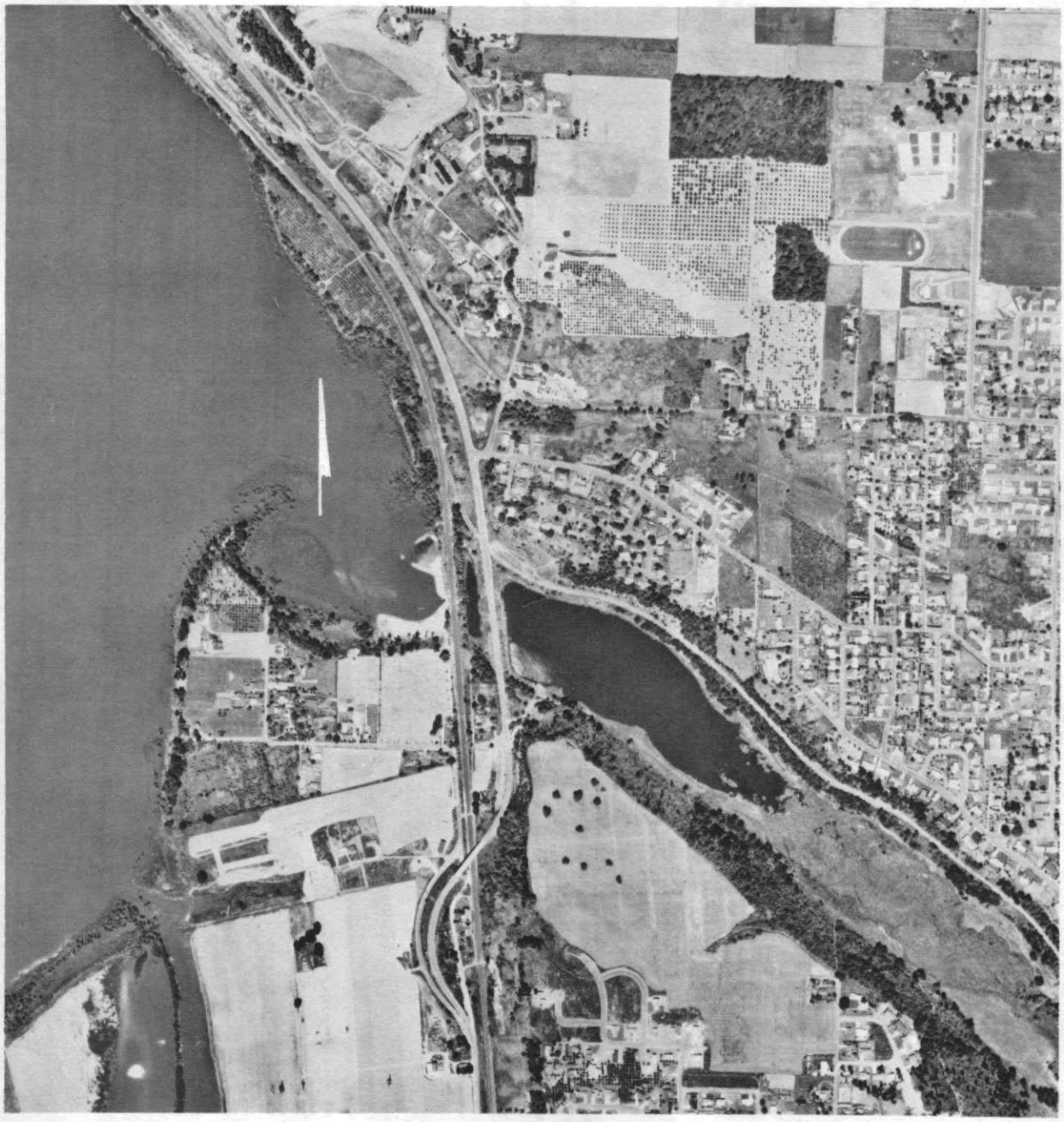
0 1000 2000 FEET

EXPLANATION

—— 4 ——

Line of equal
water depth
Interval 2 feet

Unnamed (2N-1E-9) Lake, Clark County. From U.S. Geological Survey, June 4, 1974.



Unnamed (2N-1E-9) Lake, Clark County. June 18, 1968.
Approx. scale 1:13,000.

YALE LAKE CLARK COUNTY

LATITUDE 45*57'53" LONGITUDE 122*19'56" T6N-R4E-32
LEWIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	596. SQ MI	RESIDENTIAL DEVELOPMENT	2 %
ALTITUDE	490. FT		
LAKE AREA	3800. ACRES	NUMBER OF NEARSHORE HOMES	5
LAKE VOLUME	400000. ACRE-FT		
MEAN DEPTH	110. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	250. FT		
SHORELINE LENGTH	26. MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	3.0	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.42	AGRICULTURAL	<1 %
BOTTOM SLOPE	1.7 %	FOREST OR UNPRODUCTIVE	98 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

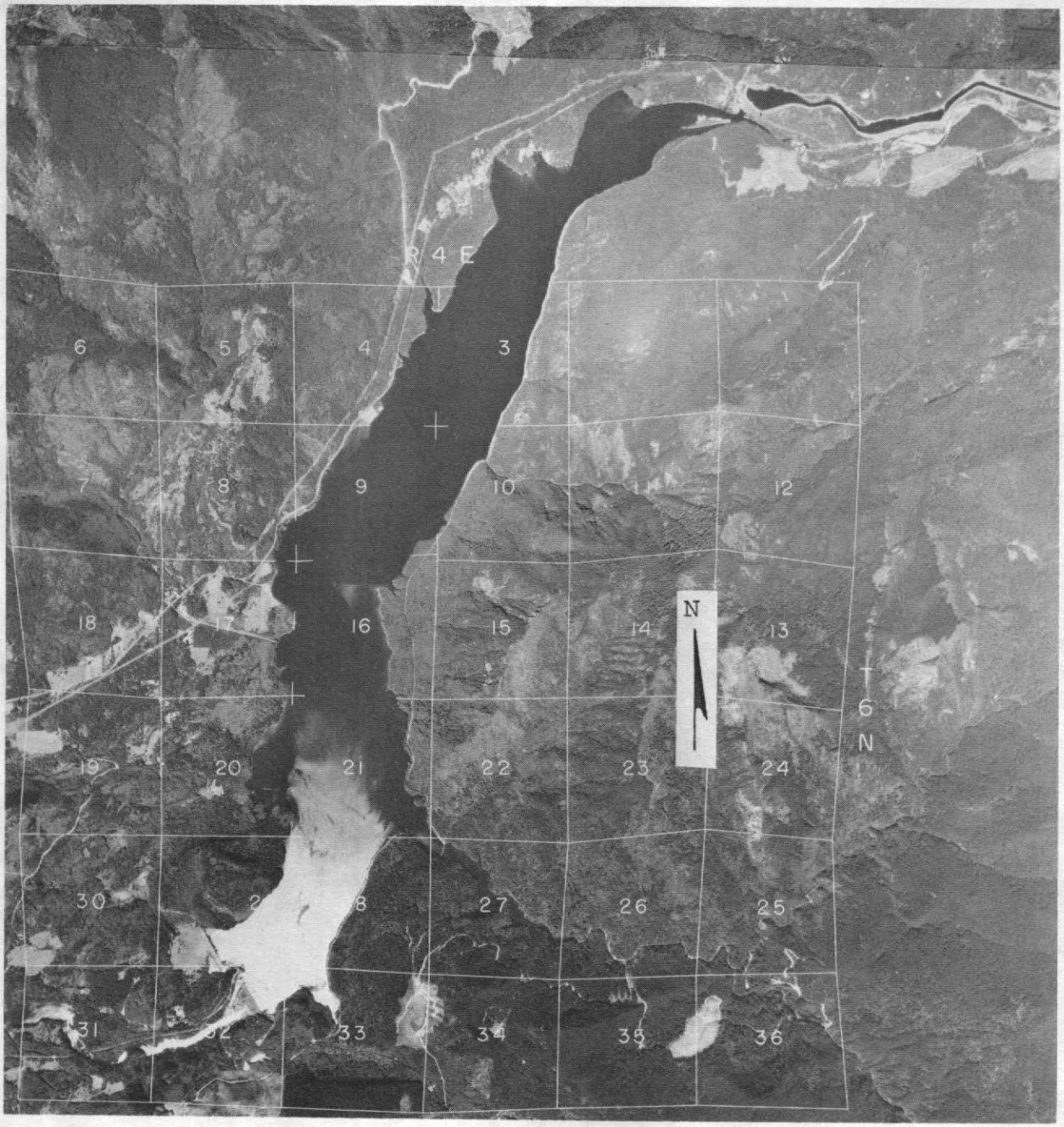
SAMPLE SITE	1		2	
DATE	9/13/74		9/13/74	
TIME	1715	1720	1045	1050
DEPTH (FT)	3.	98.	4.	164.
TOTAL NITRATE (N)	0.00	0.06	0.00	0.04
TOTAL NITRITE (N)	0.00	0.01	0.00	0.00
TOTAL AMMONIA (N)	0.02	0.04	0.03	0.03
TOTAL ORGANIC NITROGEN (N)	0.07	0.03	0.05	0.00
TOTAL PHOSPHORUS (P)	0.006	0.010	0.004	0.008
TOTAL ORTHOPHOSPHATE (P)	0.001	0.004	0.002	0.004
SPECIFIC CONDUCTANCE (MICROMHOS)	35	40	36	39
WATER TEMPERATURE (DEG C)	16.6	7.1	7.4	5.1
COLOR (PLATINUM-COBALT UNITS)	5	10	10	10
SECCHI-DISC VISIBILITY (FT)	21		18	
DISSOLVED OXYGEN	9.6	7.0	9.3	9.6

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

DATE	9/13/74
TIME	1015
NUMBER OF FECAL COLIFORM SAMPLES	6
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	2
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A RESERVOIR FORMED BY A DAM ON THE LEWIS RIVER AND USED FOR HYDROPOWER BY PACIFIC POWER AND LIGHT. THE LAKE IS IN BOTH COWLITZ AND CLARK COUNTIES. VERY FEW EMERSED OR SUBMERSED PLANTS WERE OBSERVED. THE DO WAS NEAR SATURATION THROUGHOUT THE WATER COLUMN. FLOATING AND SUBMERGED LOGS WERE OBSERVED ALONG THE SHORELINE. INFORMATION CONCERNING RESERVOIR VOLUME CHANGES IS AVAILABLE FROM U.S. GEOLOGICAL SURVEY PUBLICATIONS.



Yale Lake, Clark County. August 22, 1969. Approx. scale 1:63,000.

FAWN LAKE COWLITZ COUNTY

LATITUDE 46*19'27" LONGITUDE 122*15'21" T10N-R4E-25
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.22 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	3700. FT		
LAKE AREA	20. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	540. ACRE-FT		
MEAN DEPTH	27. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	84. FT		
SHORELINE LENGTH	0.90 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.32	AGRICULTURAL	0 %
BOTTOM SLOPE	8.0 %	FOREST OR UNPRODUCTIVE	86 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	14 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

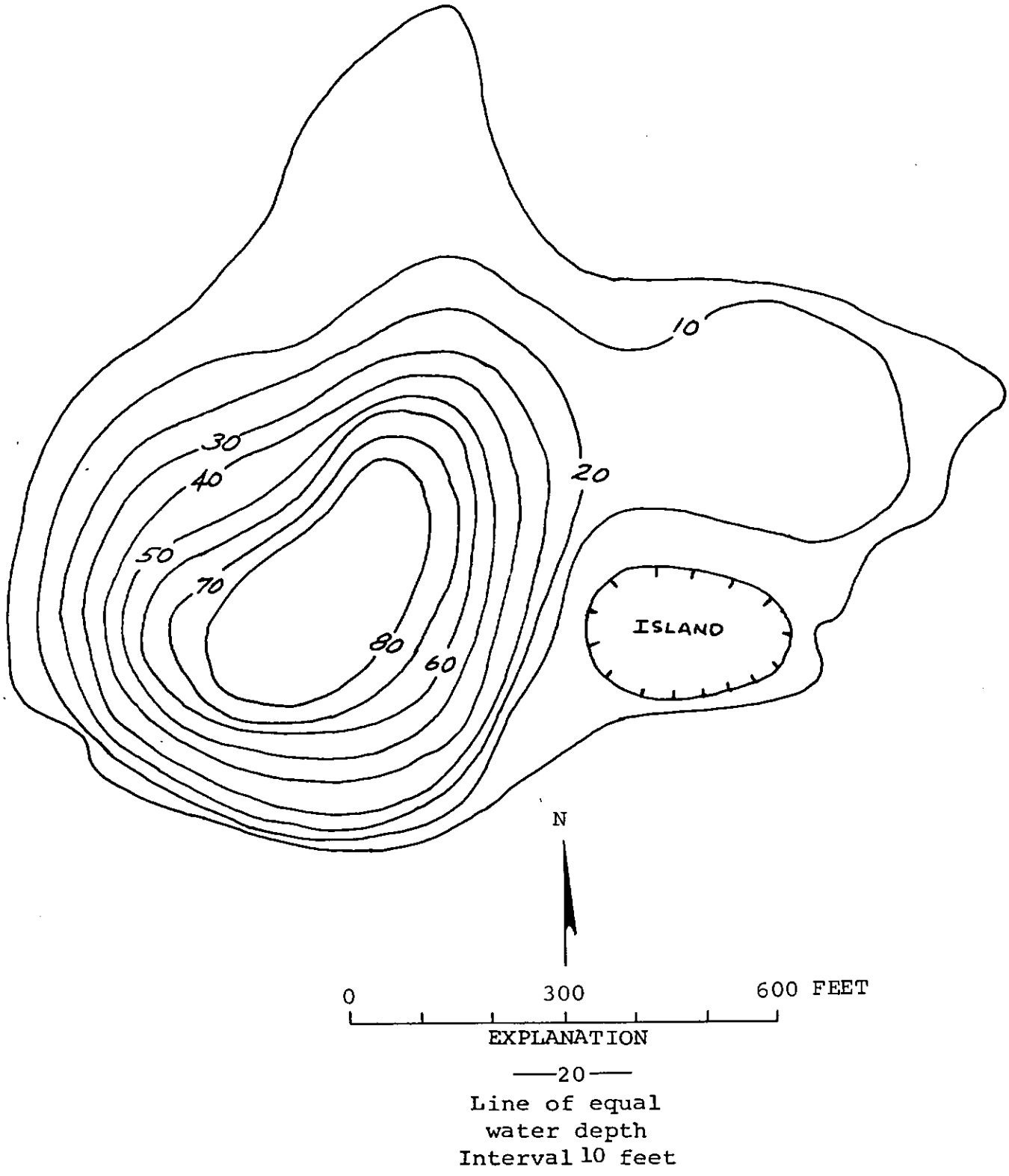
SAMPLE SITE	1	
DATE	9/14/74	
TIME	1350	1355
DEPTH (FT)	3.	72.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.01	0.00
TOTAL AMMONIA (N)	0.06	0.27
TOTAL ORGANIC NITROGEN (N)	0.05	0.02
TOTAL PHOSPHORUS (P)	0.003	0.051
TOTAL ORTHOPHOSPHATE (P)	0.001	0.022
SPECIFIC CONDUCTANCE (MICROMHOS)	30	46
WATER TEMPERATURE (DEG C)	14.8	3.7
COLOR (PLATINUM-COBALT UNITS)	15	35
SECCHI-DISC VISIBILITY (FT)	21	
DISSOLVED OXYGEN	8.8	1.0

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

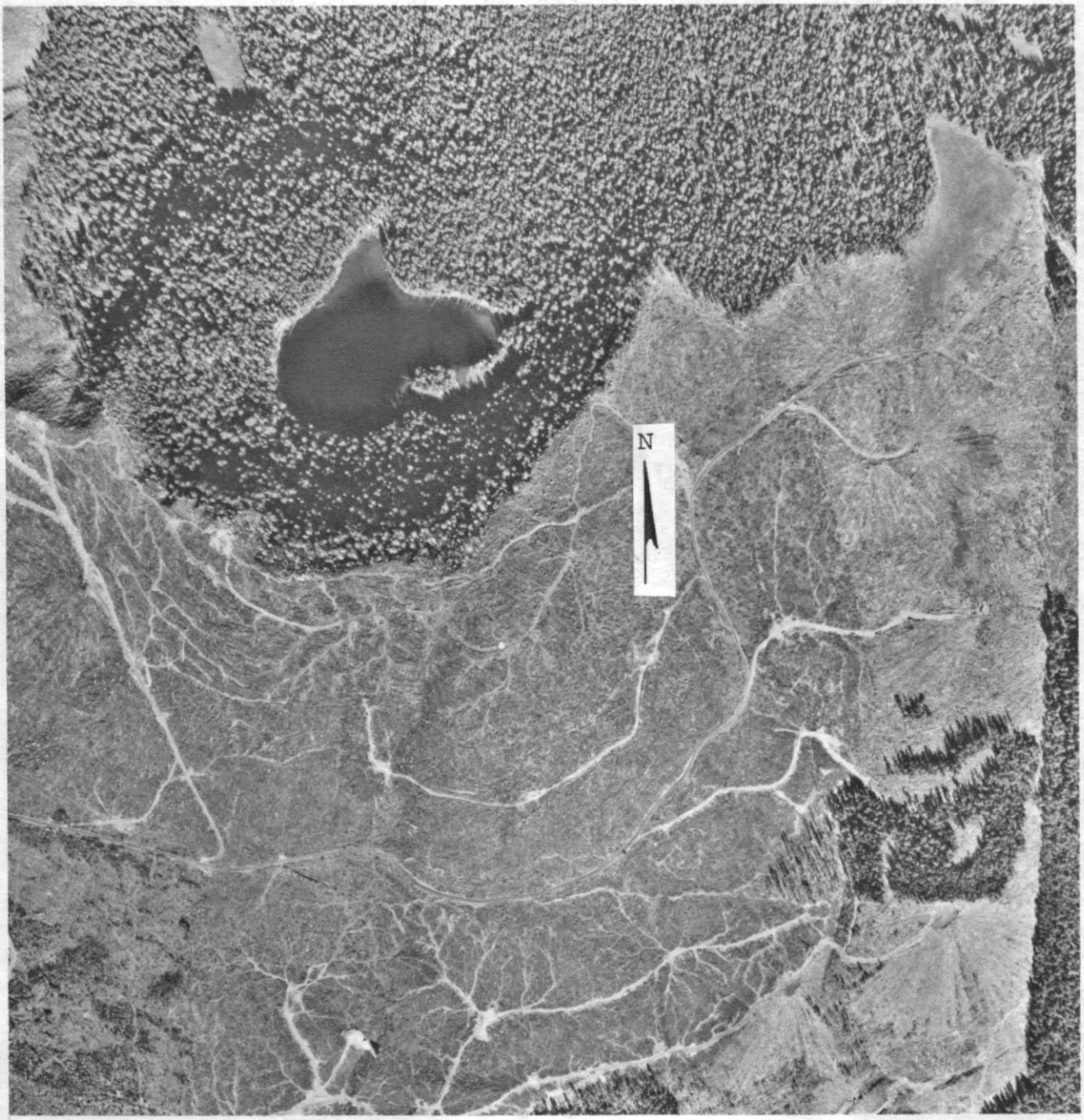
DATE	9/14/74
TIME	1318
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

EMERSED PLANTS (HORSETAIL AND SEDGES) COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE. SUBMERSED PLANTS WERE SPARSE. LOGS AND WOOD DEBRIS COVERED THE SHORELINE. THE DO WAS NEAR SATURATION DOWN TO A DEPTH OF 40 FEET. THE LITTORAL BOTTOM IS SILT.



Fawn Lake, Cowlitz County. From
U.S. Geological Survey, September 20, 1974.



Fawn Lake, Cowlitz County. October 7, 1974. Approx. scale 1:10,000.

HORSESHOE LAKE COWLITZ COUNTY

LATITUDE 45*53'30" LONGITUDE 122*44'19" T5N-R1E-30
LEWIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.41 SQ MI	RESIDENTIAL DEVELOPMENT	16 %
ALTITUDE	20. FT		
LAKE AREA	85. ACRES	NUMBER OF NEARSHORE HOMES	15
LAKE VOLUME	470. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	16. FT		
SHORELINE LENGTH	3.0 MI	RESIDENTIAL URBAN	2 %
SHORELINE CONFIGURATION	2.3	RESIDENTIAL SUBURBAN	4 %
DEVELOPMENT OF VOLUME	0.35	AGRICULTURAL	0 %
BOTTOM SLOPE	0.74 %	FOREST OR UNPRODUCTIVE	62 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	32 %
INFLOW	NOT DETERMINED		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

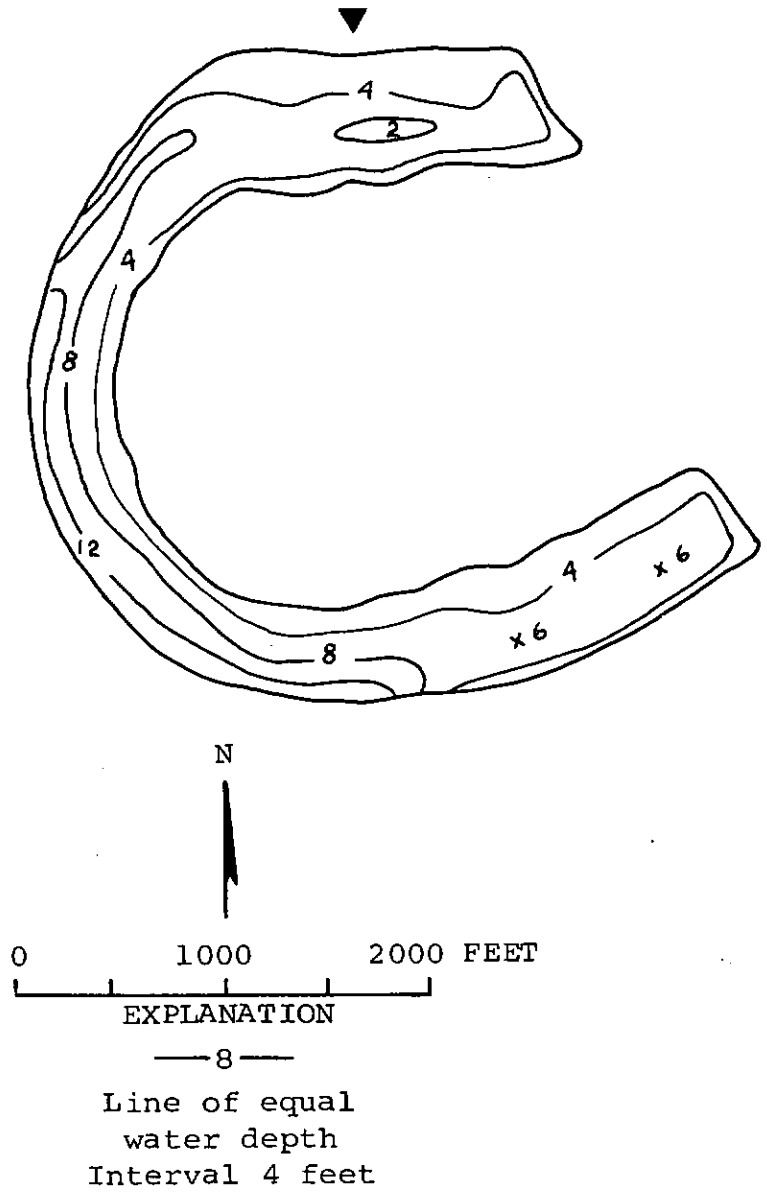
SAMPLE SITE	1	
DATE	9/12/74	
TIME	1450	1455
DEPTH (FT)	2.	3.
TOTAL NITRATE (N)	0.08	0.08
TOTAL NITRITE (N)	0.12	0.11
TOTAL AMMONIA (N)	0.14	0.15
TOTAL ORGANIC NITROGEN (N)	0.50	0.38
TOTAL PHOSPHORUS (P)	0.073	0.058
TOTAL ORTHOPHOSPHATE (P)	0.013	0.005
SPECIFIC CONDUCTANCE (MICROMHOS)	90	90
WATER TEMPERATURE (DEG C)	20.3	20.3
COLOR (PLATINUM-COBALT UNITS)	35	35
SECCHI-DISC VISIBILITY (FT)	2	
DISSOLVED OXYGEN	9.7	9.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

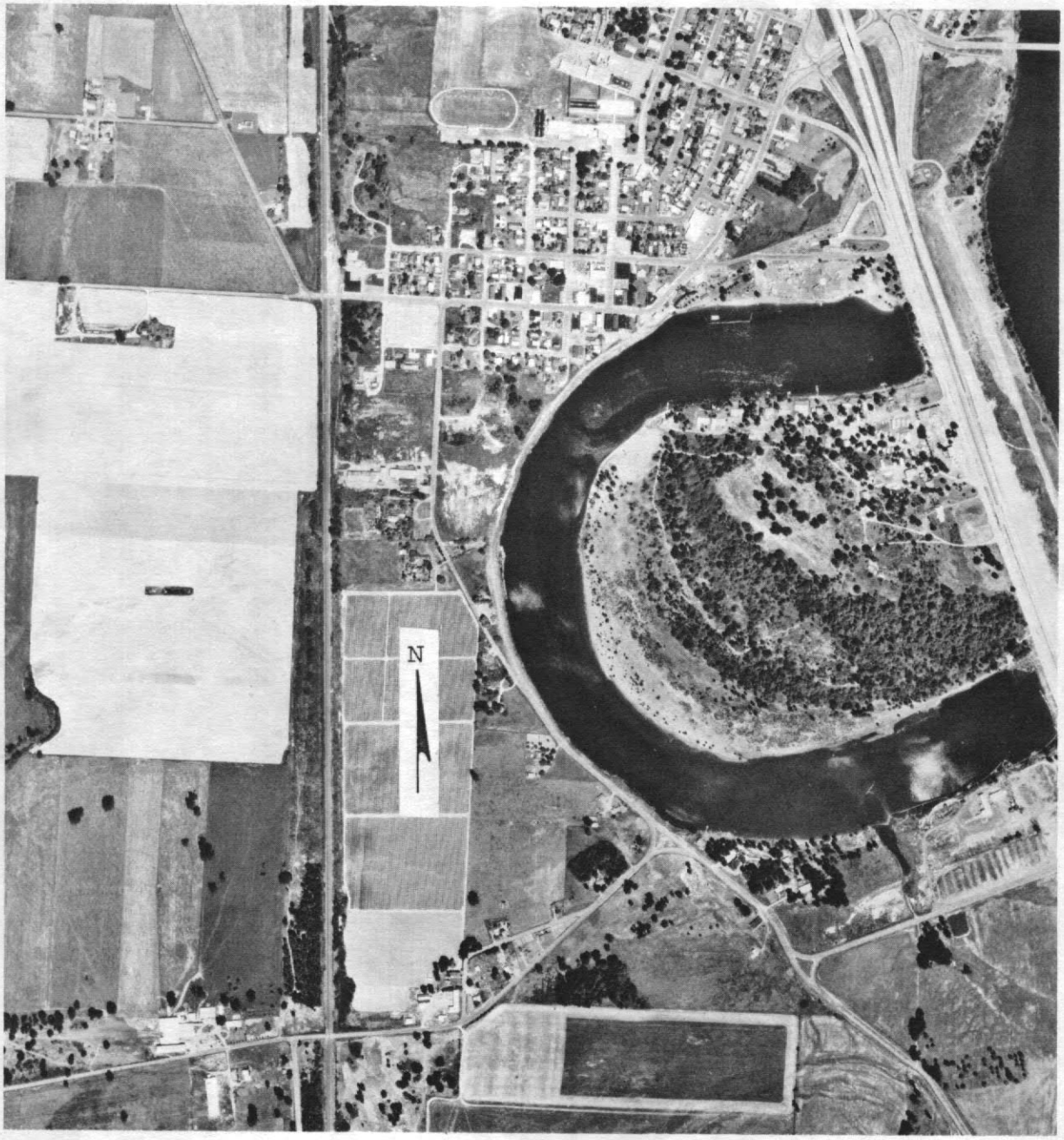
DATE	9/12/74
TIME	1429
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	16
FECAL COLIFORM, MEAN (COL./100ML)	11

REMARKS

AN OXBOW LAKE (OLD RIVER CHANNEL OF LEWIS RIVER) DIKED BY A HIGHWAY FILL. THE LAKE IS ON THE SOUTH SIDE OF THE TOWN OF WOODLAND AND LIES IN BOTH CLARK AND COWLITZ COUNTIES. A CITY PARK AND SWIM AREA ARE LOCATED ON THE NORTH SIDE OF THE LAKE.



Horseshoe Lake, Cowlitz County. From Washington Department of Game, July 13, 1947.



Horseshoe Lake, Cowlitz County. June 18, 1968. Approx. scale 1:12,000.

MERRILL LAKE COWLITZ COUNTY

LATITUDE 46° 4'43" LONGITUDE 122°18'52" T7N-R4E-21
KALAMA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	9.08 SQ MI	RESIDENTIAL DEVELOPMENT	4 %
ALTITUDE	1541. FT		
LAKE AREA	490. ACRES	NUMBER OF NEARSHORE HOMES	8
LAKE VOLUME	19000. ACRE-FT		
MEAN DEPTH	39. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	77. FT		
SHORELINE LENGTH	6.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.50	AGRICULTURAL	0 %
BOTTOM SLOPE	8.1 %	FOREST OR UNPRODUCTIVE	92 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	8 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

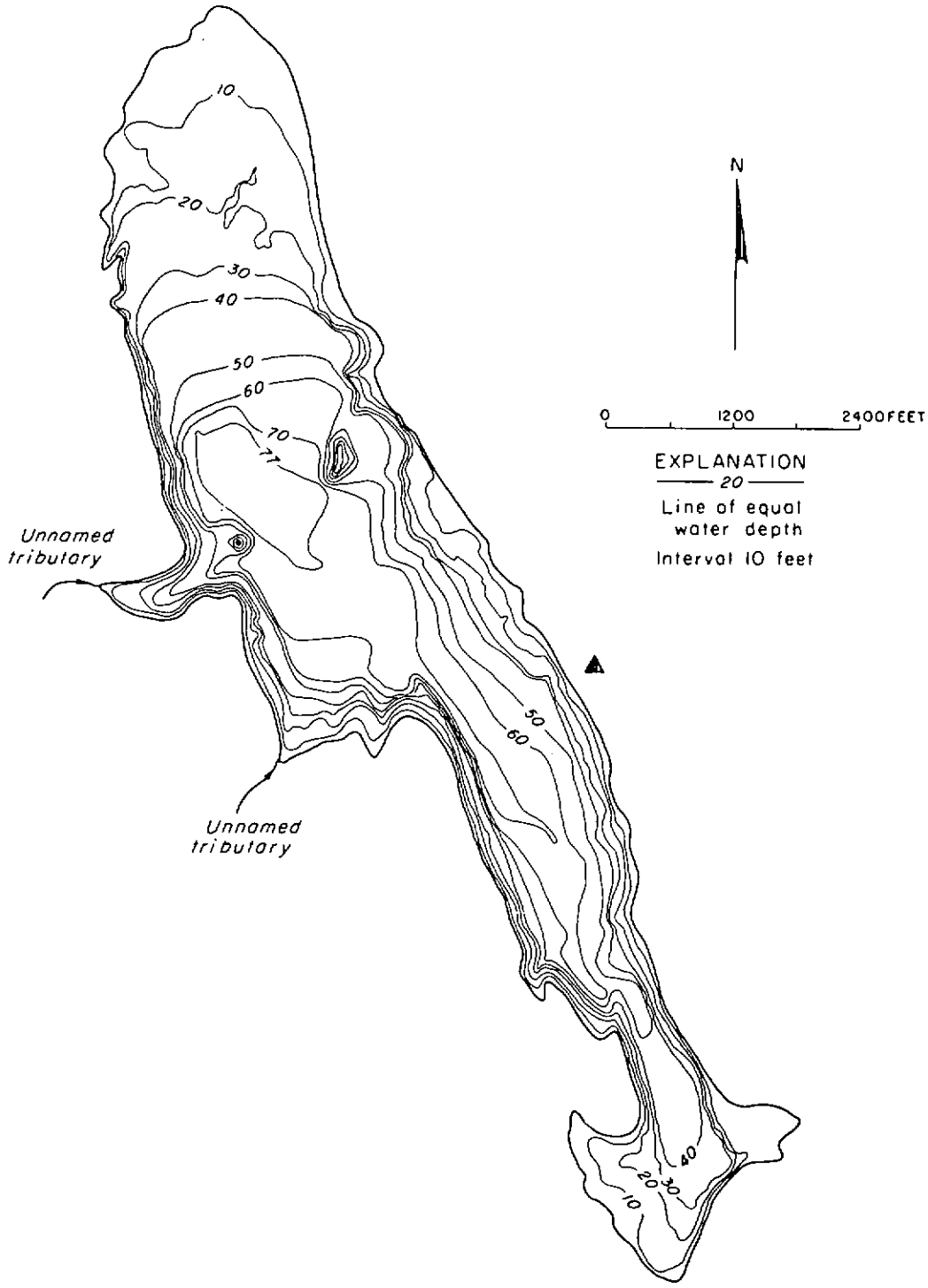
SAMPLE SITE	1	
DATE	7/ 9/71	
TIME	1045	1050
DEPTH (FT)	3.	49.
DISSOLVED NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.00	0.00
TOTAL ORGANIC NITROGEN (N)	0.00	0.00
TOTAL PHOSPHORUS (P)	0.010	0.010
DISSOLVED ORTHOPHOSPHATE (P)	0.000	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	23	22
WATER TEMPERATURE (DEG C)	14.0	8.0
COLOR (PLATINUM-COBALT UNITS)	5	--
SECCHI-DISC VISIBILITY (FT)	33	
DISSOLVED OXYGEN	9.8	10.1

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/13/74
TIME	1500
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE INFLOW IS FROM THREE MAIN TRIBUTARIES AS WELL AS FROM SMALLER INTERMITTENT STREAMS. NO SURFACE OUTLET EXISTS AND THE LAKE STAGE IS SUBJECT TO WIDE SEASONAL FLUCTUATIONS. FOR EXAMPLE, DURING WATER YEAR 1971, THE OBSERVED LAKE STAGE VARIED 33.8 FEET. SEVERE RAINSTORMS IN LATE JANUARY 1972 CAUSED SLIDES CARRYING MUD, LOGS, AND DEBRIS INTO THE LAKE FROM THE LOGGED HILLSIDES. THE LITTORAL ZONE OF THE LAKE IS COMPOSED OF SAND, SILT, AND MUCK WHICH FORM A MATRIX FOR GRAVEL TO BOULDER-SIZED ROCKS. THE LAKE HAS BEEN UNDER CONSIDERATION AS A SOURCE OF HYDROPOWER. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 4, 1971.



Merrill Lake, Cowlitz County. From R. W. Beck, August 25, 1969.

Merrill Lake, Cowlitz County. September 28, 1974. Approx. scale 1:12,000.

SACAJAWEA LAKE COWLITZ COUNTY

LATITUDE 46* 7'39" LONGITUDE 122*56'27" T8N-R2W-33
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	5.48 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	10. FT		
LAKE AREA	61. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	350. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	21. FT		
SHORELINE LENGTH	4.6 MI	RESIDENTIAL URBAN	29 %
SHORELINE CONFIGURATION	4.2	RESIDENTIAL SUBURBAN	14 %
DEVELOPMENT OF VOLUME	0.28	AGRICULTURAL	2 %
BOTTOM SLOPE	1.1 %	FOREST OR UNPRODUCTIVE	53 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

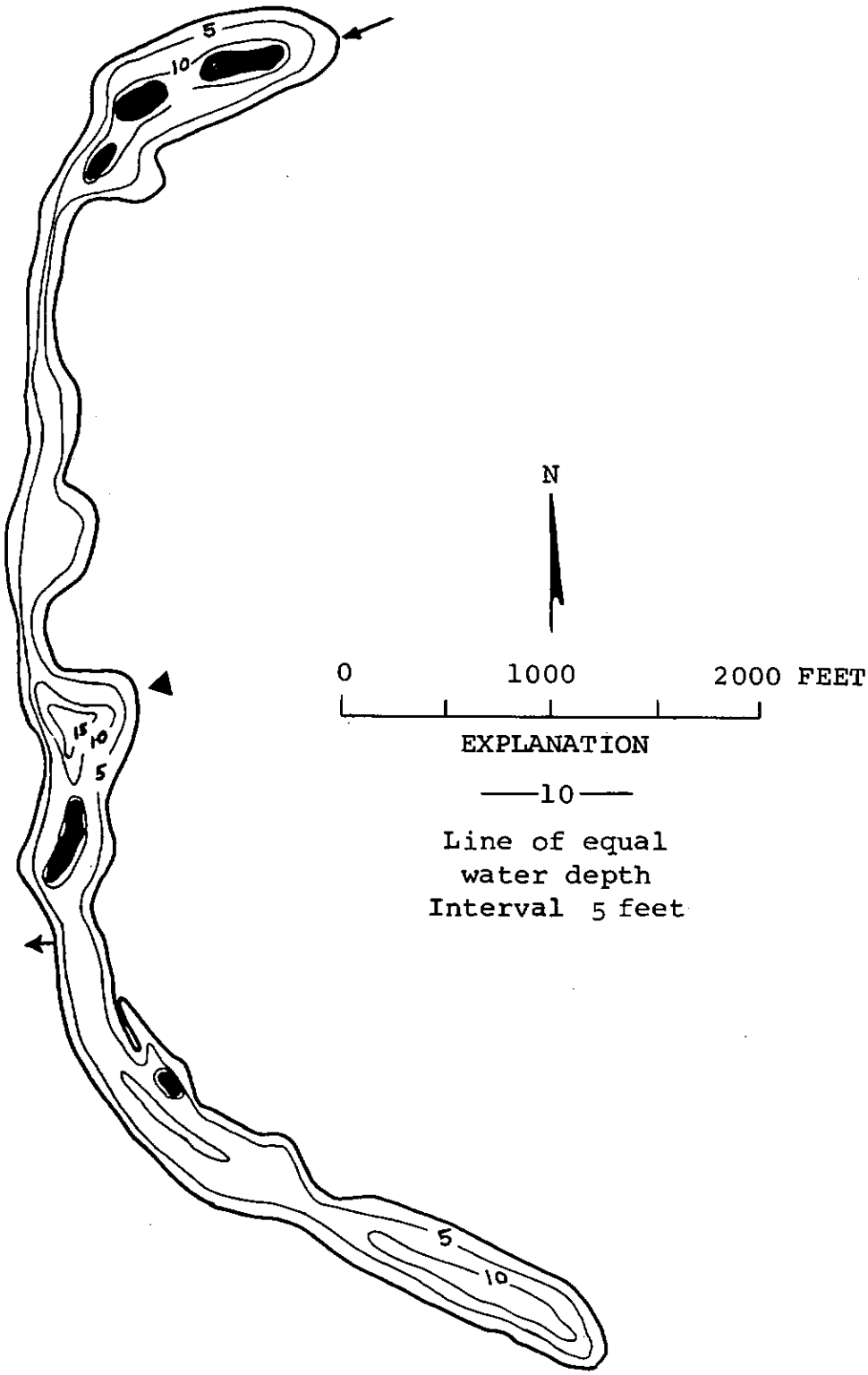
SAMPLE SITE	1	
DATE	9/12/74	
TIME	1555	1600
DEPTH (FT)	3.	11.
TOTAL NITRATE (N)	0.02	0.01
TOTAL NITRITE (N)	0.01	0.00
TOTAL AMMONIA (N)	0.18	2.0
TOTAL ORGANIC NITROGEN (N)	0.29	0.10
TOTAL PHOSPHORUS (P)	0.072	0.060
TOTAL ORTHOPHOSPHATE (P)	0.017	0.005
SPECIFIC CONDUCTANCE (MICROMHOS)	130	340
WATER TEMPERATURE (DEG C)	18.8	12.9
COLOR (PLATINUM-COBALT UNITS)	45	200
SECCHI-DISC VISIBILITY (FT)	2	
DISSOLVED OXYGEN	6.0	0.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	11- 25 %

DATE	9/12/74
TIME	1522
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	26
FECAL COLIFORM, MEAN (COL./100ML)	18

REMARKS

A CRESENT-SHAPED LAKE LOCATED IN THE CITY OF LONGVIEW. THE ENTIRE SHORELINE IS OCCUPIED BY A CITY PARK. DENSE URBAN HOUSING EXISTS BEYOND THE PARK BUFFER ZONE. EMERSED PLANTS COVERED THE SHORELINE IN A MARGIN CLOSE TO SHORE. THE LITTORAL BOTTOM IS MOSTLY SILT. THE WATER WAS TURBID. THE LAKE SUPPORTS A LARGE WATERFOWL POPULATION.



Sacajawea Lake, Cowlitz County. From Washington Department of Game, July 7, 1948.

Sacajawea Lake, Cowlitz County. June 24, 1968. Approx. scale 1:12,000.

SILVER LAKE COWLITZ COUNTY

LATITUDE 46°18'15" LONGITUDE 122°44'45" T10N-R1W-36
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	39.3 SQ MI	RESIDENTIAL DEVELOPMENT	11 %
ALTITUDE	484. FT		
LAKE AREA	2300. ACRES	NUMBER OF NEARSHORE HOMES	97
LAKE VOLUME	13000. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	10. FT		
SHORELINE LENGTH	18. MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.6	RESIDENTIAL SUBURBAN	1 %
DEVELOPMENT OF VOLUME	0.56	AGRICULTURAL	5 %
BOTTOM SLOPE	0.09 %	FOREST OR UNPRODUCTIVE	85 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	9 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

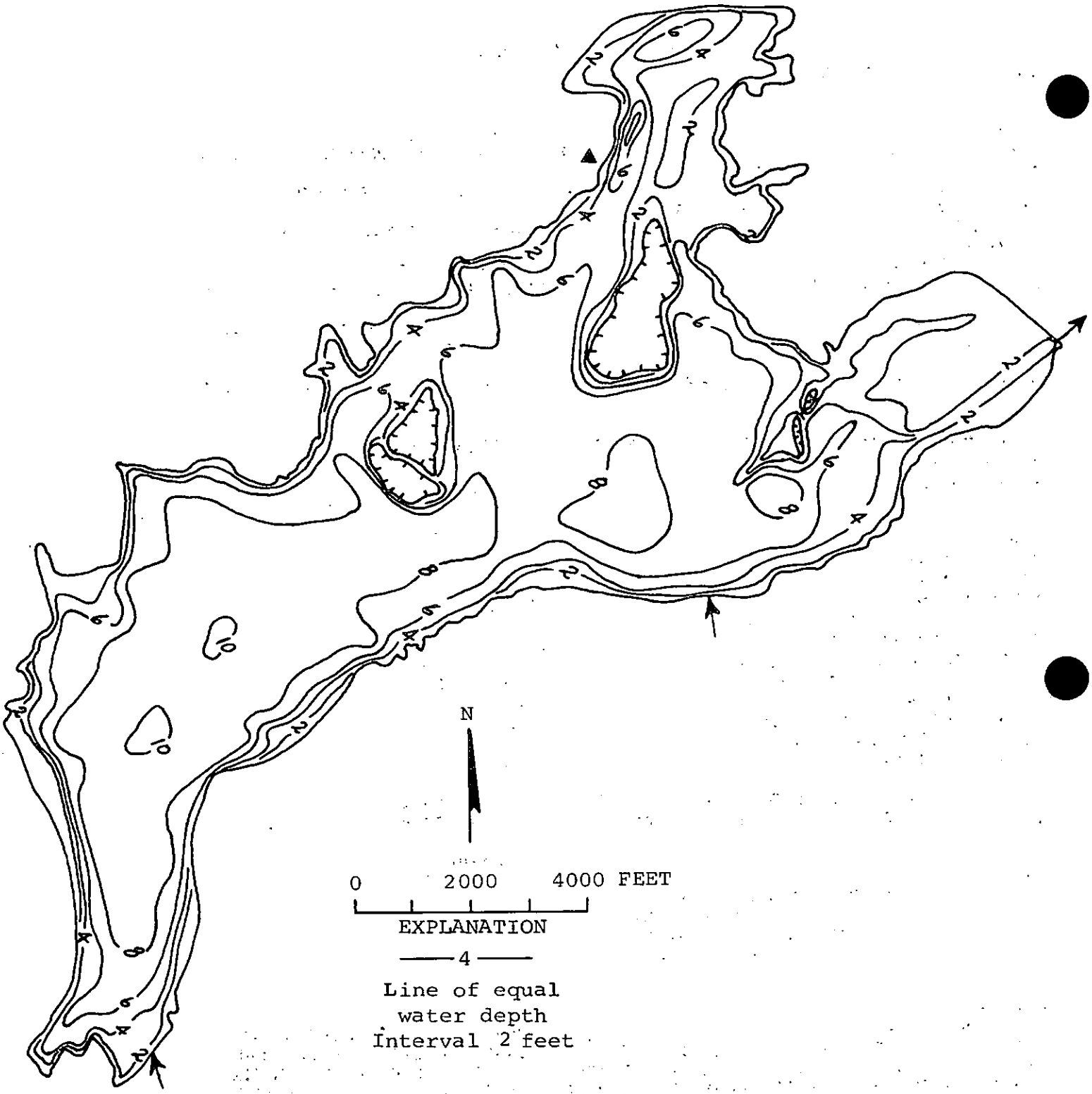
SAMPLE SITE	1	
DATE	6/28/74	
TIME	920	920
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.00	--
TOTAL NITRITE (N)	0.00	--
TOTAL AMMONIA (N)	0.08	--
TOTAL ORGANIC NITROGEN (N)	0.30	--
TOTAL PHOSPHORUS (P)	0.025	--
DISSOLVED ORTHOPHOSPHATE (P)	0.002	--
SPECIFIC CONDUCTANCE (MICROMHOS)	28	28
WATER TEMPERATURE (DEG C)	17.0	17.0
COLOR (PLATINUM-COBALT UNITS)	25	--
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	9.0	8.8

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	26- 50 %

DATE	6/28/74
TIME	930
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE SURFACE AREA OF THE LAKE (2300 ACRES) IS VERY LARGE IN RELATION TO THE MAXIMUM DEPTH OF THE LAKE (10 FEET). THE LAKE RECEIVES INFLOW FROM HEMLOCK AND SUCKER CREEKS. THE LAKE STAGE IS CONTROLLED BY AN EARTHFILL STABILIZATION DAM LOCATED NEAR THE HEAD OF OUTLET CREEK. EMERSED PLANTS (MOSTLY YELLOW LILY) COVERED APPROXIMATELY 35 PERCENT OF THE LAKE SURFACE. SUBMERSED PLANTS (MOSTLY COONTAIL) COVERED MOST OF THE LAKE BOTTOM. AN ALGAL BLOOM WAS OBSERVED. THE LITTORAL BOTTOM IS MOSTLY MUCK WITH SOME SILT AND CLAY. THE LAKE RECEIVES HEAVY RECREATIONAL USE AND IS A POPULAR SPINY RAY FISHING LAKE. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 8, 1974. THE WASHINGTON STATE UNIVERSITY DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING IS MAKING A COMPREHENSIVE STUDY TO DETERMINE POSSIBLE METHODS FOR LAKE RESTORATION. THE U.S. GEOLOGICAL SURVEY HAS MAINTAINED A WATER-STAGE RECORDER AT THE LAKE SINCE 1949.



Silver Lake, Cowlitz County. From U.S. Geological Survey, March 11, 1974.

Silver Lake, Cowlitz County. May 8, 1969. Approx. scale 1:63,000.

ABERDEEN LAKE GRAYS HARBOR COUNTY

LATITUDE 46*58'53" LONGITUDE 123*44'30" T17N-R9W-12
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	4.94 SQ MI	RESIDENTIAL DEVELOPMENT	7 %
ALTITUDE	22. FT		
LAKE AREA	63. ACRES	NUMBER OF NEARSHORE HOMES	6
LAKE VOLUME	420. ACRE-FT		
MEAN DEPTH	7. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	21. FT		
SHORELINE LENGTH	2.2 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.32	AGRICULTURAL	0 %
BOTTOM SLOPE	1.1 %	FOREST OR UNPRODUCTIVE	98 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

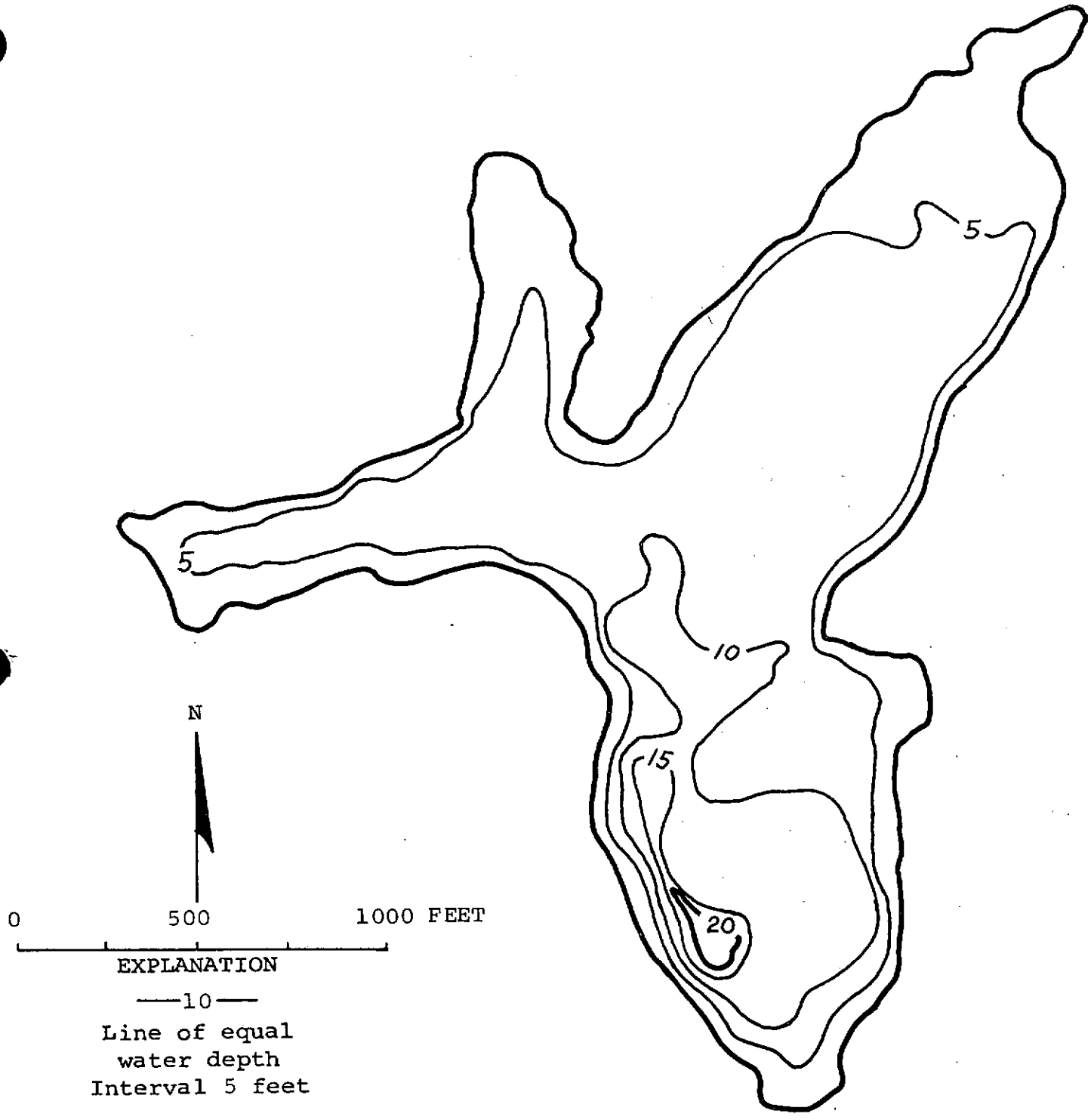
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1335	1340
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.04	0.04
TOTAL ORGANIC NITROGEN (N)	0.17	0.04
TOTAL PHOSPHORUS (P)	0.009	0.009
TOTAL ORTHOPHOSPHATE (P)	0.003	0.002
SPECIFIC CONDUCTANCE (MICROMHOS)	58	58
WATER TEMPERATURE (DEG C)	17.4	16.1
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	> 9	
DISSOLVED OXYGEN	9.6	9.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/14/74
TIME	1137
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	16
FECAL COLIFORM, MEAN (COL./100ML)	12

REMARKS

A PUBLIC WATER SUPPLY RESERVOIR FOR THE CITY OF ABERDEEN. THE LAKE WAS FORMED BY A DAM ON VAN WINKLE CREEK AND BY WATER PIPED IN FROM THE WYNOOCHEE RIVER. THE CITY OF ABERDEEN OPERATES A RESORT ON THE LAKE. EMERSED AQUATIC PLANT GROWTH WAS SPOTTY, BUT SUBMERSED PLANTS (PONDWEED AND ELODEA) COVERED MUCH OF THE LAKE BOTTOM. ALDER TREES OVERHANG THE SHORELINE. THE LITTORAL BOTTOM IS MOSTLY SILT.



Aberdeen Lake, Grays Harbor County. From
U.S. Geological Survey, March 7, 1974.

Aberdeen Lake, Grays Harbor County. May 26, 1972. Approx. scale 1:13,000.

DUCK LAKE GRAYS HARBOR COUNTY

LATITUDE 46*57'33" LONGITUDE 124* 8'12" T17N-R12W-14
PACIFIC OCEAN BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.44 SQ MI	RESIDENTIAL DEVELOPMENT	6 %
ALTITUDE	10. FT		
LAKE AREA	280. ACRES	NUMBER OF NEARSHORE HOMES	14
LAKE VOLUME	3000. ACRE-FT		
MEAN DEPTH	11. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	30. FT		
SHORELINE LENGTH	11. MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	4.8	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.36	AGRICULTURAL	0 %
BOTTOM SLOPE	0.76 %	FOREST OR UNPRODUCTIVE	70 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	30 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

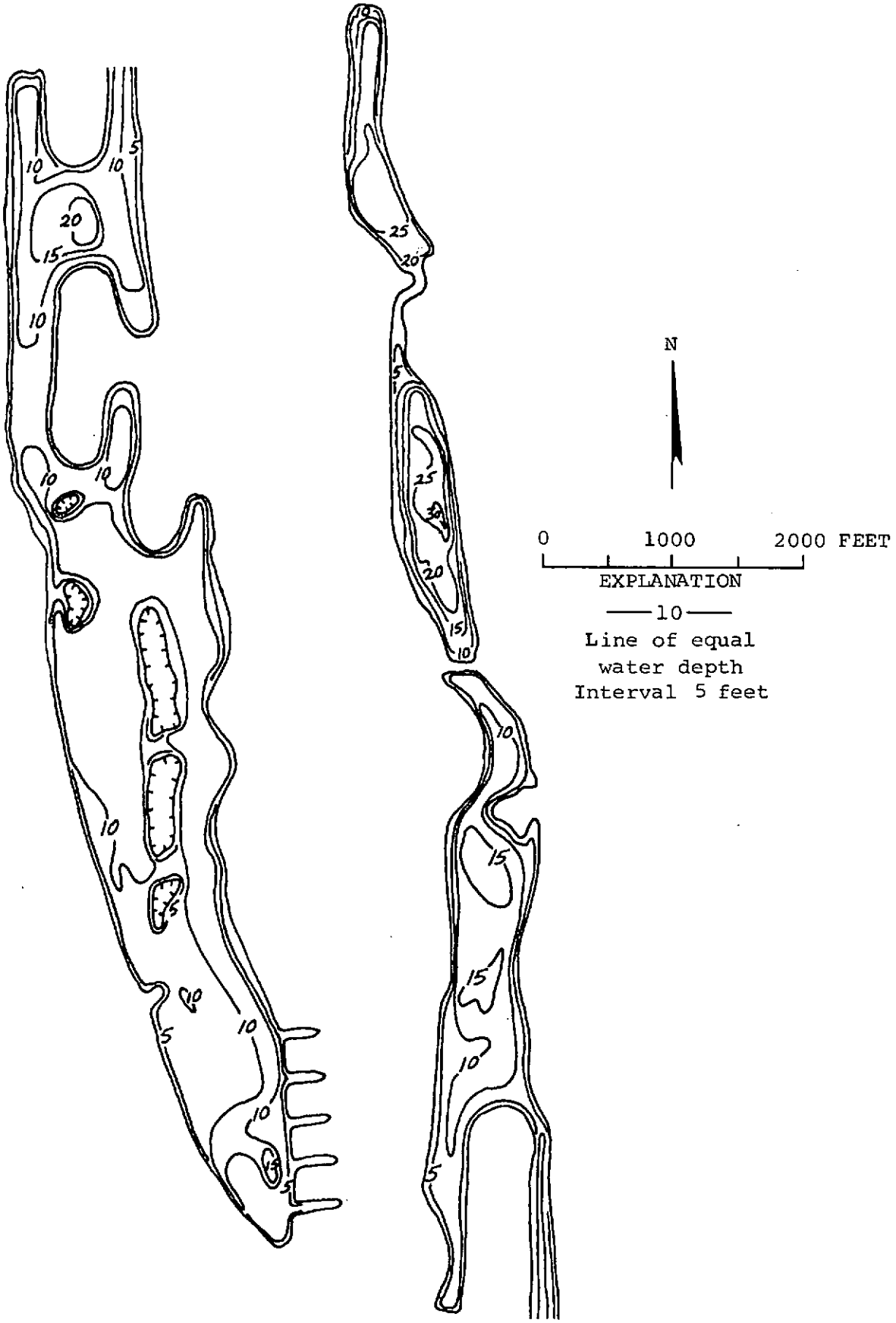
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1130	1135
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.02	0.02
TOTAL AMMONIA (N)	0.37	0.38
TOTAL ORGANIC NITROGEN (N)	1.6	1.6
TOTAL PHOSPHORUS (P)	0.13	0.13
TOTAL ORTHOPHOSPHATE (P)	0.028	0.030
SPECIFIC CONDUCTANCE (MICROMHOS)	230	230
WATER TEMPERATURE (DEG C)	19.1	19.0
COLOR (PLATINUM-COBALT UNITS)	80	80
SECCHI-DISC VISIBILITY (FT)	1	
DISSOLVED OXYGEN	11.6	11.0

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/19/74
TIME	1220
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	49
FECAL COLIFORM, MEAN (COL./100ML)	17

REMARKS

A SHALLOW LAKE WITH NUMEROUS ISLANDS AND PENINSULAS. THE LAKE HAS BEEN EXTENSIVELY DREDGED AND FILLED FOR RESIDENTIAL AND RECREATIONAL DEVELOPMENT. EMERSED PLANTS COVERED THE SHORELINE IN A MARGIN CLOSE TO SHORE. AN ALGAL BLOOM WAS OBSERVED GIVING A "PEA SOUP" APPEARANCE.



Duck Lake, Grays Harbor County. From U.S. Geological Survey, March 6, 1974.

Duck Lake, Grays Harbor County. May 19, 1972. Approx. scale 1:24,000.

FAILOR LAKE GRAYS HARBOR COUNTY

LATITUDE 47* 6'26" LONGITUDE 123*57'48" T19N-R10W-30
HUMPTULIPS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	4.89 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	117. FT		
LAKE AREA	65. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	500. ACRE-FT		
MEAN DEPTH	8. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	22. FT		
SHORELINE LENGTH	1.9 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.7	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.35	AGRICULTURAL	0 %
BOTTOM SLOPE	1.2 %	FOREST OR UNPRODUCTIVE	98 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

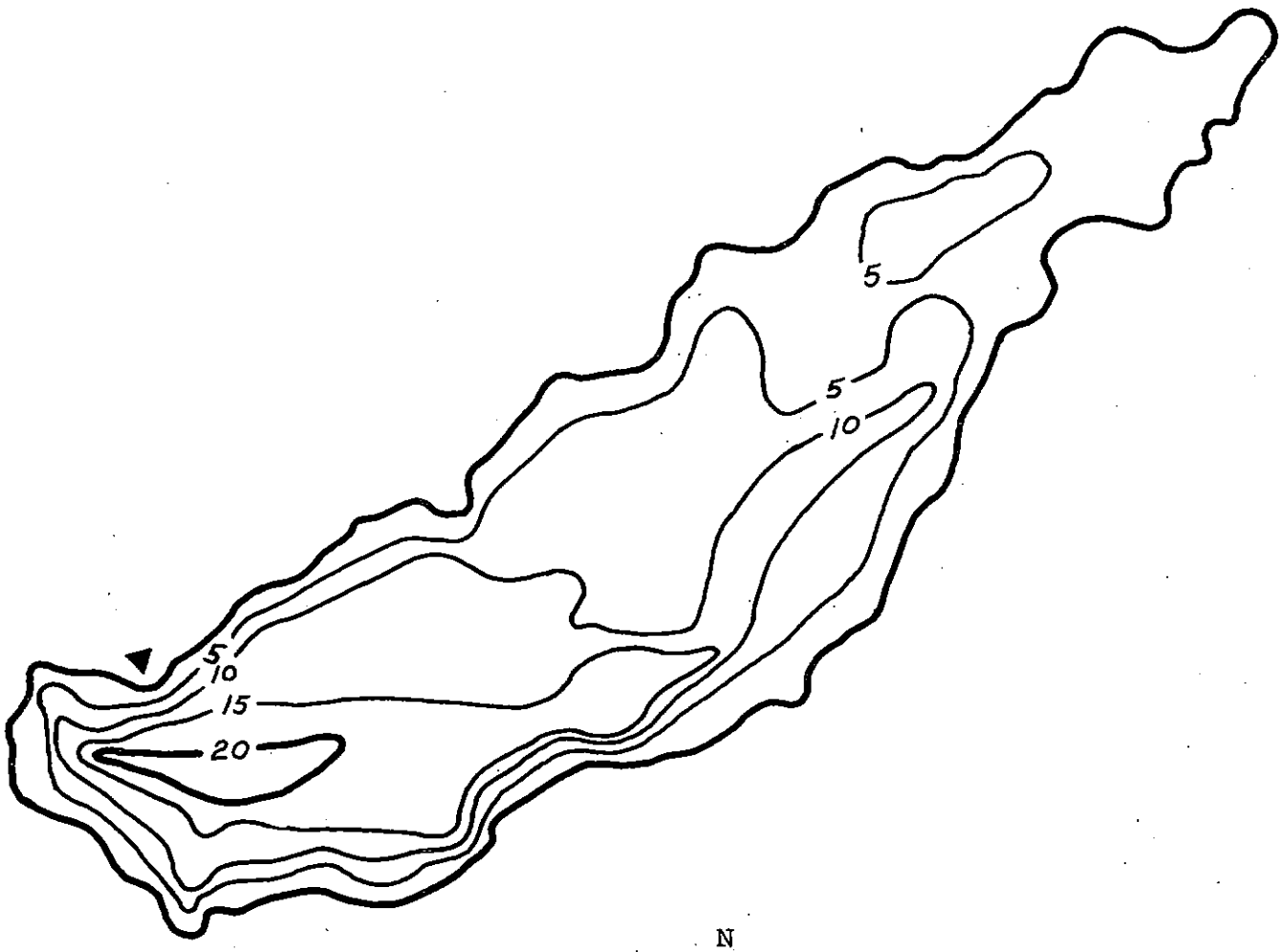
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1240	1245
DEPTH (FT)	3.	11.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.06	0.07
TOTAL ORGANIC NITROGEN (N)	0.19	0.10
TOTAL PHOSPHORUS (P)	0.016	0.016
TOTAL ORTHOPHOSPHATE (P)	0.003	0.003
SPECIFIC CONDUCTANCE (MICROMHOS)	48	42
WATER TEMPERATURE (DEG C)	18.3	13.3
COLOR (PLATINUM-COBALT UNITS)	20	20
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	8.9	7.9

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

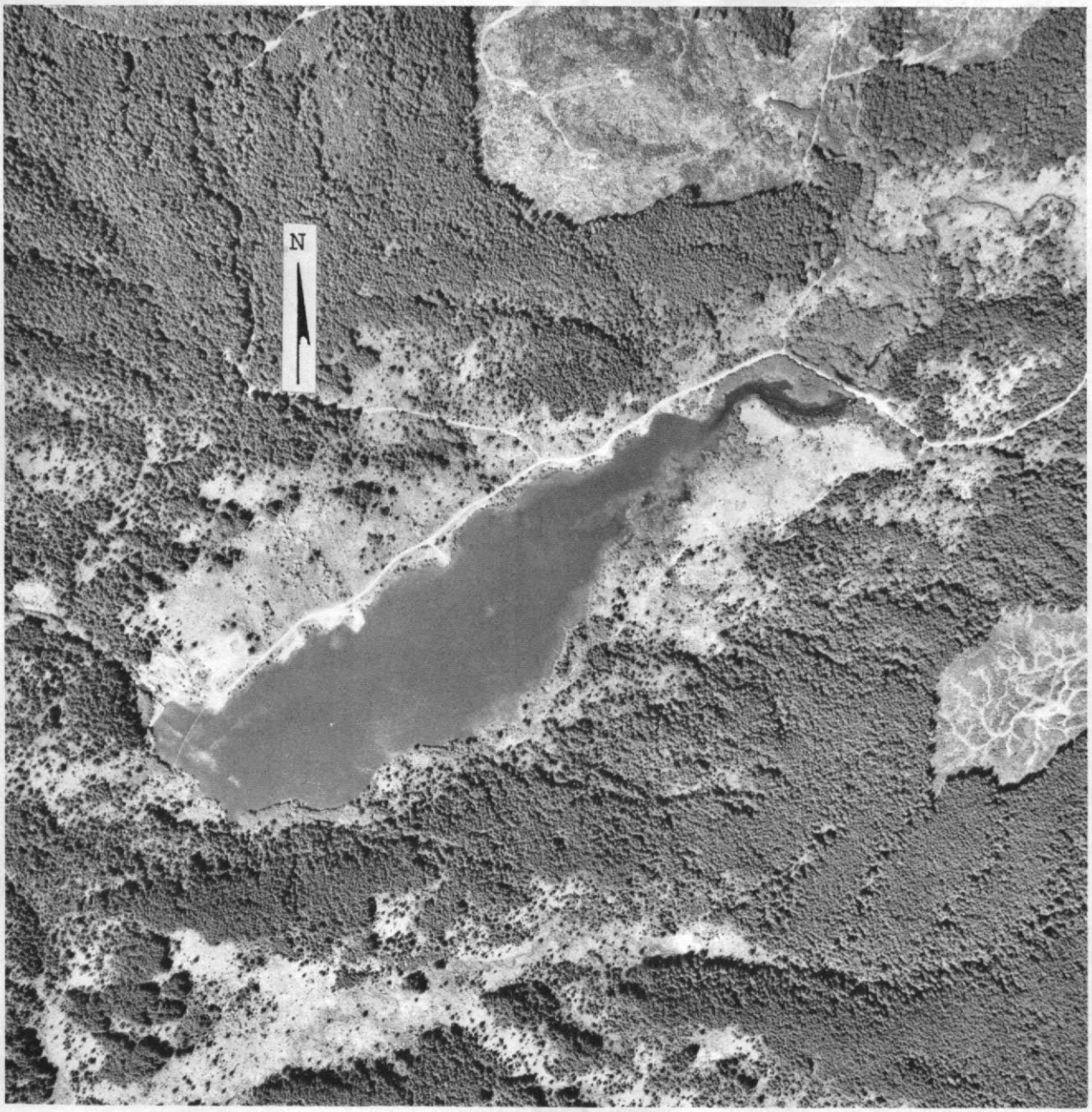
DATE	8/19/74
TIME	1202
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	8
FECAL COLIFORM, MEAN (COL./100ML)	5

REMARKS

AN ARTIFICIAL LAKE FORMED BY A DAM ON DEEP CREEK. EMERSED PLANTS WERE SPARSELY SCATTERED ALONG THE LAKE SHORE. THE LITTORAL BOTTOM IS MOSTLY SILT.



Failor Lake, Grays Harbor County. From
U.S. Geological Survey, March 4, 1974.



Failor Lake, Grays Harbor County. May 19, 1972. Approx. scale 1:12,000.

SYLVIA LAKE GRAYS HARBOR COUNTY

LATITUDE 46*59'47" LONGITUDE 123*35'50" T18N-R7W-31
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	5.07 SQ MI	RESIDENTIAL DEVELOPMENT	8 %
ALTITUDE	80. FT		
LAKE AREA	32. ACRES	NUMBER OF NEARSHORE HOMES	2
LAKE VOLUME	320. ACRE-FT		
MEAN DEPTH	10. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	49. FT		
SHORELINE LENGTH	2.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.9	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.20	AGRICULTURAL	0 %
BOTTOM SLOPE	3.7 %	FOREST OR UNPRODUCTIVE	99 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

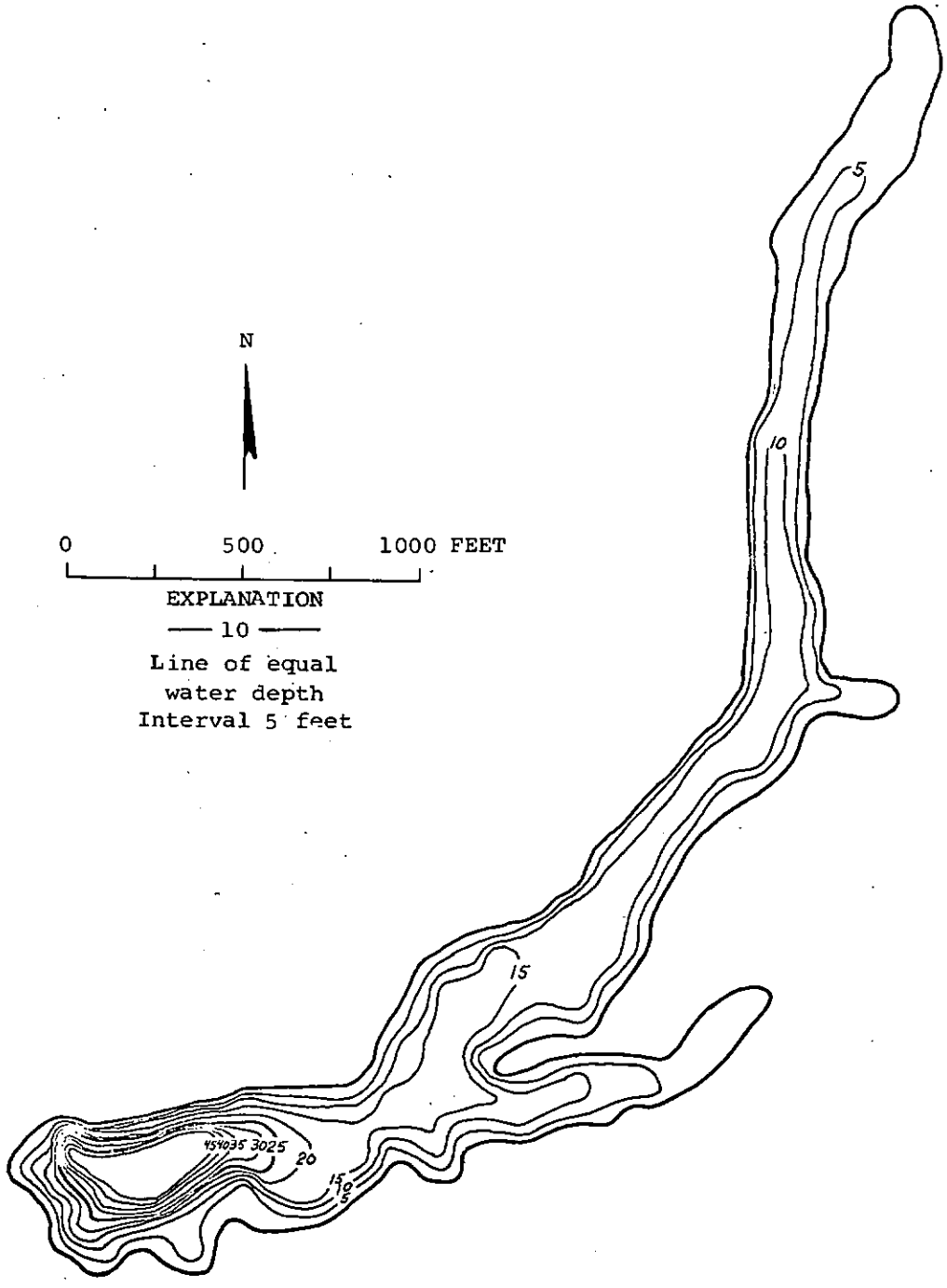
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1440	1445
DEPTH (FT)	3.	39.
TOTAL NITRATE (N)	0.07	0.01
TOTAL NITRITE (N)	0.00	0.01
TOTAL AMMONIA (N)	0.10	1.5
TOTAL ORGANIC NITROGEN (N)	0.18	--
TOTAL PHOSPHORUS (P)	0.014	0.024
TOTAL ORTHOPHOSPHATE (P)	0.003	0.007
SPECIFIC CONDUCTANCE (MICROMHOS)	49	110
WATER TEMPERATURE (DEG C)	17.3	5.0
COLOR (PLATINUM-COBALT UNITS)	25	240
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	8.8	0.1

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/14/74
TIME	1122
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	35
FECAL COLIFORM, MEAN (COL./100ML)	18

REMARKS

THE LAKE WAS FORMED BY A DAM ON SYLVIA CREEK AND IS LOCATED ENTIRELY IN SYLVIA STATE PARK. THE RECREATIONAL USE OF THE LAKE IS HEAVY. MOST OF THE AQUATIC MACROPHYTES WERE OBSERVED NEAR THE INFLOW. FLOATING AND SUBMERGED LOGS COVERED MUCH OF THE SHORELINE.



Sylvia Lake, Grays Harbor County. From U.S. Geological Survey, February 28, 1974.

Sylvia Lake, Grays Harbor County. May 26, 1972. Approx. scale 1:12,000.

BORST PARK LAKE LEWIS COUNTY

LATITUDE 46*43'20" LONGITUDE 122*58'35" T14N-R2W-6
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.19 SQ MI	RESIDENTIAL DEVELOPMENT	2 %
ALTITUDE	160. FT		
LAKE AREA	8. ACRES	NUMBER OF NEARSHORE HOMES	1
LAKE VOLUME	44. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	13. FT		
SHORELINE LENGTH	0.50 MI	RESIDENTIAL URBAN	37 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	19 %
DEVELOPMENT OF VOLUME	0.43	AGRICULTURAL	0 %
BOTTOM SLOPE	2.0 %	FOREST OR UNPRODUCTIVE	32 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	12 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

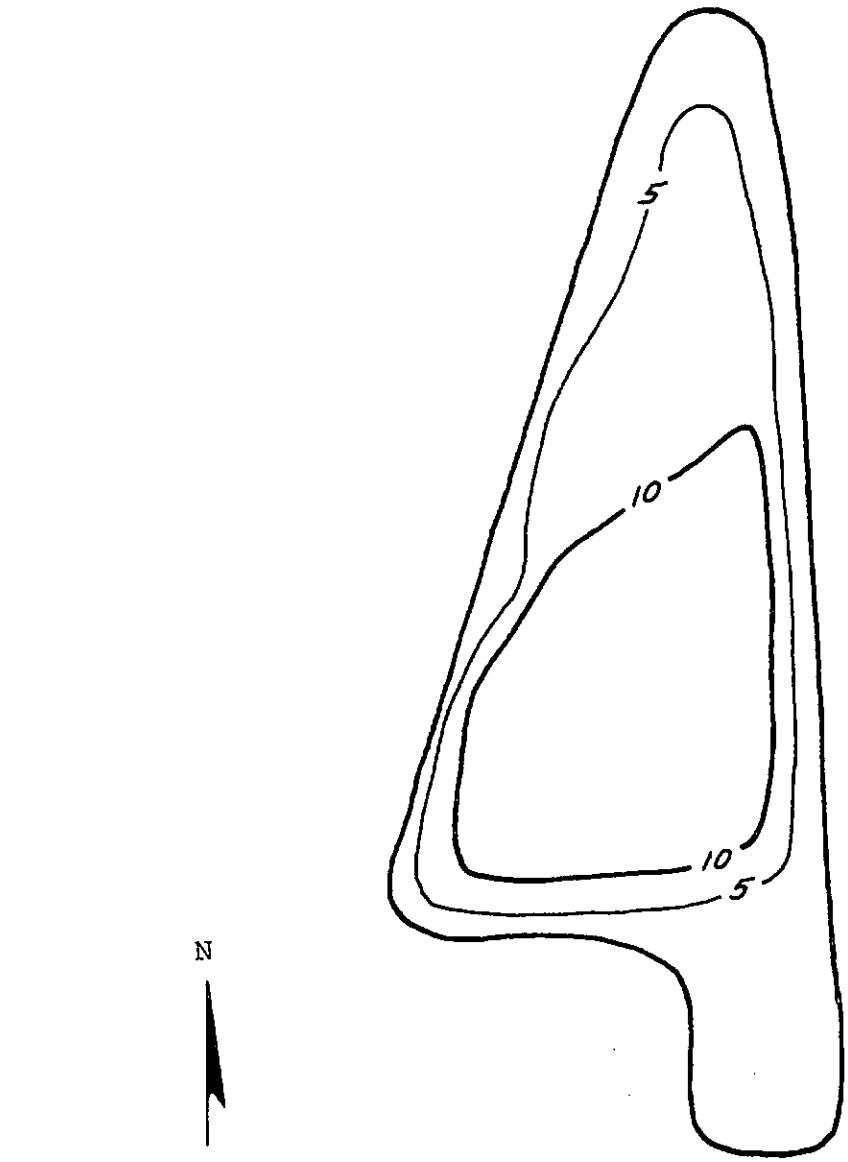
SAMPLE SITE	1	
DATE	7/ 1/74	
TIME	945	955
DEPTH (FT)	3.	8.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.05	0.08
TOTAL ORGANIC NITROGEN (N)	0.26	0.37
TOTAL PHOSPHORUS (P)	0.018	0.044
DISSOLVED ORTHOPHOSPHATE (P)	0.002	0.003
SPECIFIC CONDUCTANCE (MICROMHOS)	122	125
WATER TEMPERATURE (DEG C)	21.0	20.0
COLOR (PLATINUM-COBALT UNITS)	10	9
SECCHI-DISC VISIBILITY (FT)	8	
DISSOLVED OXYGEN	20.0	30.0

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	7/ 1/74
TIME	1025
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	19
FECAL COLIFORM, MAXIMUM (COL./100ML)	84
FECAL COLIFORM, MEAN (COL./100ML)	42

REMARKS

AN ARTIFICIAL LAKE LOCATED IN CENTRALIA CITY PARK. HIGHWAY I-5 BORDERS THE EAST SIDE OF THE LAKE. SUBMERSED PLANTS (MOSTLY ELODEA) COVERED APPROXIMATELY 50 PERCENT OF THE BOTTOM. THE LAKE SUPPORTS A MODERATE POPULATION OF DOMESTIC DUCKS AND GEESE. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 8, 1974.



Borst Park Lake, Lewis County. From
U.S. Geological Survey, June 5, 1974.

Borst Park Lake, Lewis County. May 30, 1970. Approx. scale 1:13,000.

CARLISLE LAKE LEWIS COUNTY

LATITUDE 46*34'41" LONGITUDE 122*43'34" T13N-R1E-30
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	4.15 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	506. FT		
LAKE AREA	29. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	85. ACRE-FT		
MEAN DEPTH	3. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	10. FT		
SHORELINE LENGTH	1.1 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	1 %
DEVELOPMENT OF VOLUME	0.29	AGRICULTURAL	32 %
BOTTOM SLOPE	0.79 %	FOREST OR UNPRODUCTIVE	66 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	1 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

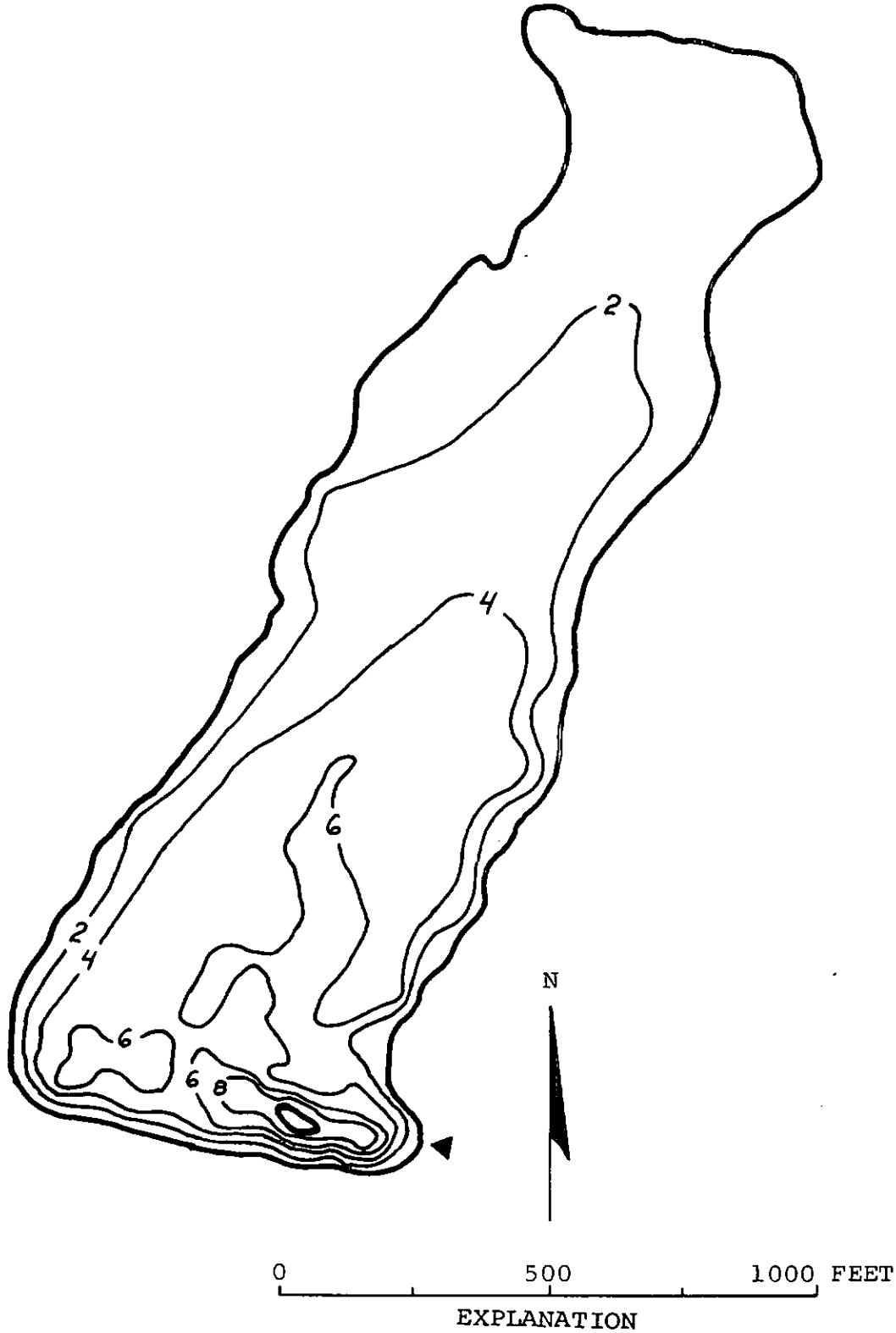
SAMPLE SITE	1	
DATE	6/28/74	
TIME	1335	1340
DEPTH (FT)	3.	5.
TOTAL NITRATE (N)	0.00	--
TOTAL NITRITE (N)	0.00	--
TOTAL AMMONIA (N)	0.29	--
TOTAL ORGANIC NITROGEN (N)	0.49	--
TOTAL PHOSPHORUS (P)	0.17	--
DISSOLVED ORTHOPHOSPHATE (P)	0.070	--
SPECIFIC CONDUCTANCE (MICROMHOS)	48	48
WATER TEMPERATURE (DEG C)	15.5	15.5
COLOR (PLATINUM-COBALT UNITS)	100	--
SECCHI-DISC VISIBILITY (FT)	4	
DISSOLVED OXYGEN	3.4	1.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	26- 50 %

DATE	6/28/74
TIME	1335
NUMBER OF FECAL COLIFORM SAMPLES	2
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	--
FECAL COLIFORM, MEAN (COL./100ML)	--

REMARKS

AN ABANDONED MILL POND FORMED BY A LOG AND EARTHFILL DAM. APPROXIMATELY 45 PERCENT OF THE LAKE SURFACE WAS COVERED WITH EMERSED PLANTS AND THE ENTIRE LAKE BOTTOM WAS COVERED WITH SUBMERSED PLANTS. THE LITTORAL BOTTOM IS SILT AND MUCK. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 8, 1974. ONE SAMPLE FOR FECAL COLIFORM BACTERIA HAD COLONIES TOO NUMEROUS TO COUNT.



Carlisle Lake, Lewis County. From
U.S. Geological Survey, February 28, 1974.

Carlisle Lake, Lewis County. May 2, 1970. Approx. scale 1:12,000.

DAVISSON (MOSSYROCK) LAKE LEWIS COUNTY

LATITUDE 46*32' 7" LONGITUDE 122*25'25" T12N-R3E-10
COWLITZ RIVER BASIN

PHYSICAL DATA

DRAINAGE AREA	1150. SQ MI
ALTITUDE	750. FT
LAKE AREA	12000. ACRES
LAKE VOLUME	1700000. ACRE-FT
MEAN DEPTH	140. FT
MAXIMUM DEPTH	360. FT
SHORELINE LENGTH	52. MI
SHORELINE CONFIGURATION	3.4
DEVELOPMENT OF VOLUME	0.39
BOTTOM SLOPE	1.4 %
BASIN GEOLOGY	IGNEOUS
INFLOW	PERENNIAL
OUTFLOW CHANNEL	PRESENT

CULTURAL DATA

RESIDENTIAL DEVELOPMENT	2 %
NUMBER OF NEARSHORE HOMES	5

LAND USE IN DRAINAGE BASIN

RESIDENTIAL URBAN	<1 %
RESIDENTIAL SUBURBAN	<1 %
AGRICULTURAL	2 %
FOREST OR UNPRODUCTIVE	96 %
LAKE SURFACE	2 %

PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1		2	
DATE	9/ 9/74		9/ 9/74	
TIME	1225	1230	1350	1355
DEPTH (FT)	3.	98.	3.	164.
TOTAL NITRATE (N)	0.01	0.02	0.01	0.03
TOTAL NITRITE (N)	0.00	0.00	0.00	0.00
TOTAL AMMONIA (N)	0.02	0.03	0.02	0.03
TOTAL ORGANIC NITROGEN (N)	0.03	0.11	0.03	0.00
TOTAL PHOSPHORUS (P)	0.002	0.007	0.004	0.006
TOTAL ORTHOPHOSPHATE (P)	0.001	0.006	0.001	0.004
SPECIFIC CONDUCTANCE (MICROMHOS)	40	40	38	37
WATER TEMPERATURE (DEG C)	19.2	11.7	18.6	10.3
COLOR (PLATINUM-COBALT UNITS)	0	0	0	0
SECCHI-DISC VISIBILITY (FT)	15		18	
DISSOLVED OXYGEN	8.9	9.0	9.3	9.9

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/ 9/74
TIME	1245
NUMBER OF FECAL COLIFORM SAMPLES	6
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A RESERVOIR FORMED BY A DAM ON THE COWLITZ RIVER AND USED FOR HYDROPOWER BY TACOMA CITY LIGHT. FLOATING LOGS AND WOOD DEBRIS COVERED MUCH OF THE SHORELINE. MOST OF THE AQUATIC MACROPHYTES WERE ON THE WEST END OF THE LAKE. THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN. INFORMATION CONCERNING RESERVOIR VOLUME CHANGES IS AVAILABLE FROM U.S. GEOLOGICAL SURVEY PUBLICATIONS.

Davisson (Mossyrock) Lake, Lewis County.
May 8, 1969. Approx. scale 1:63,000.

MAYFIELD LAKE LEWIS COUNTY

LATITUDE 46*30'13" LONGITUDE 122*35'11" T12N-R2E-29
COWLITZ RIVER BASIN

PHYSICAL DATA

DRAINAGE AREA	1400. SQ MI
ALTITUDE	450. FT
LAKE AREA	2200. ACRES
LAKE VOLUME	130000. ACRE-FT
MEAN DEPTH	61. FT
MAXIMUM DEPTH	180. FT
SHORELINE LENGTH	34. MI
SHORELINE CONFIGURATION	5.1
DEVELOPMENT OF VOLUME	0.34
BOTTOM SLOPE	1.6 %
BASIN GEOLOGY	IGNEOUS
INFLOW	PERENNIAL
OUTFLOW CHANNEL	PRESENT

CULTURAL DATA

RESIDENTIAL DEVELOPMENT	6 %
NUMBER OF NEARSHORE HOMES	29

LAND USE IN DRAINAGE BASIN

RESIDENTIAL URBAN	<1 %
RESIDENTIAL SUBURBAN	<1 %
AGRICULTURAL	3 %
FOREST OR UNPRODUCTIVE	95 %
LAKE SURFACE	2 %

PUBLIC BOAT ACCESS TO LAKE YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

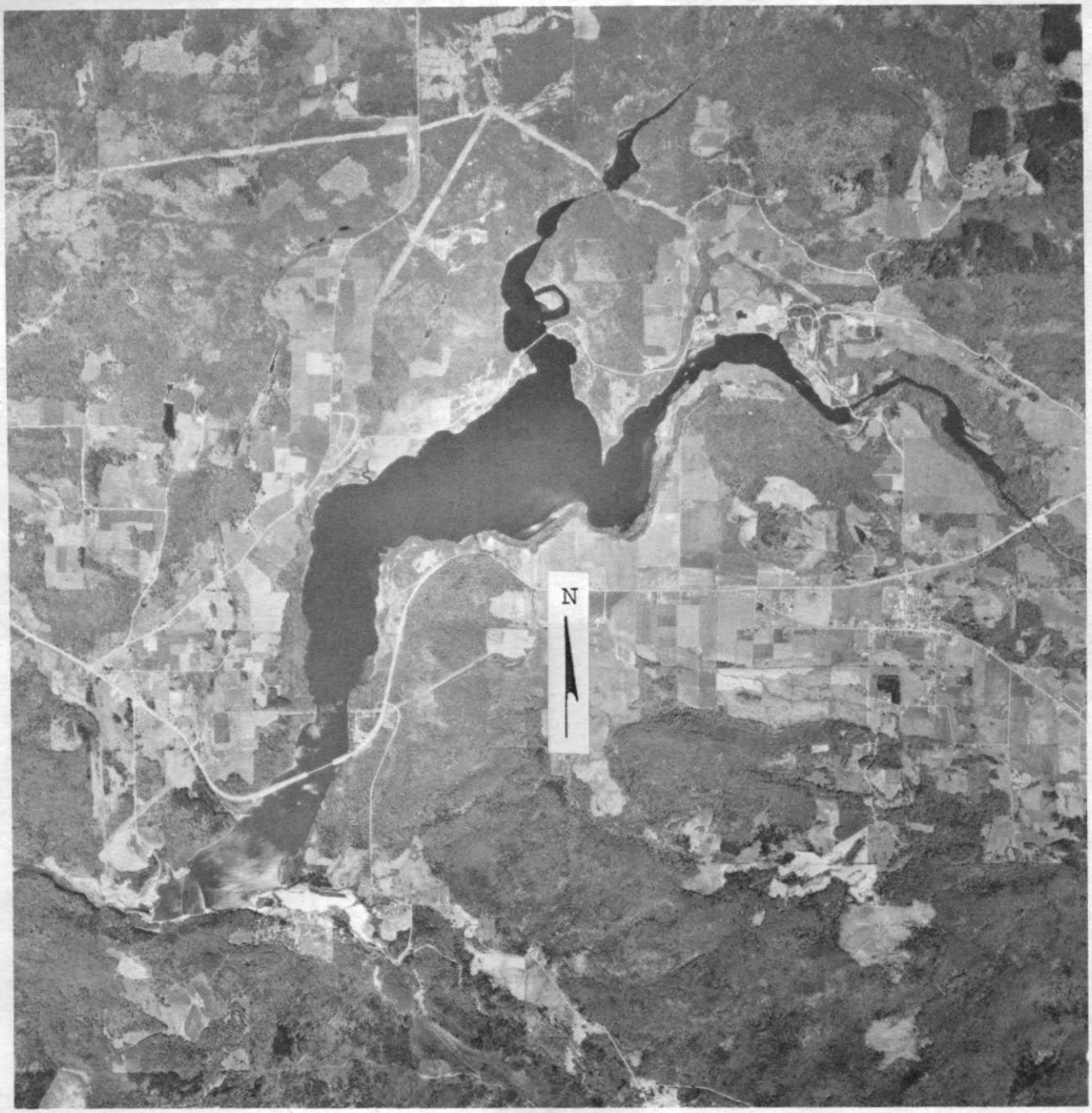
SAMPLE SITE	1		2	
DATE	9/ 9/74		9/ 9/74	
TIME	1450	1455	1535	1540
DEPTH (FT)	3.	33.	3.	16.
TOTAL NITRATE (N)	0.01	0.04	0.01	0.04
TOTAL NITRITE (N)	0.00	0.00	0.00	0.00
TOTAL AMMONIA (N)	0.03	0.02	0.02	0.02
TOTAL ORGANIC NITROGEN (N)	0.10	0.02	0.07	0.01
TOTAL PHOSPHORUS (P)	0.004	0.005	0.006	0.006
TOTAL ORTHOPHOSPHATE (P)	0.001	0.003	0.001	0.003
SPECIFIC CONDUCTANCE (MICROMHOS)	48	40	46	39
WATER TEMPERATURE (DEG C)	14.0	10.1	17.3	11.0
COLOR (PLATINUM-COBALT UNITS)	0	0	0	0
SECCHI-DISC VISIBILITY (FT)	13		13	
DISSOLVED OXYGEN	10.7	10.0	10.2	10.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/ 9/74
TIME	1505
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

A RESERVOIR FORMED BY A DAM ON THE COWLITZ RIVER AND USED FOR HYDROPOWER BY TACOMA CITY LIGHT. AQUATIC MACROPHYTES WERE SPARSE. FLOATING AND SUBMERGED LOGS AND WOOD DEBRIS COVERED THE SHORELINE IN LOCAL AREAS. THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN. INFORMATION CONCERNING RESERVOIR VOLUME CHANGES IS AVAILABLE FROM U.S. GEOLOGICAL SURVEY PUBLICATIONS.



Mayfield Lake, Lewis County. May 8, 1969. Approx. scale 1:63,000.

MINERAL LAKE — LEWIS COUNTY

LATITUDE 46°43' 8" LONGITUDE 122°10'36" T14N-R5E-9
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.19 SQ MI	RESIDENTIAL DEVELOPMENT	28 %
ALTITUDE	1450. FT		
LAKE AREA	280. ACRES	NUMBER OF NEARSHORE HOMES	12
LAKE VOLUME	7600. ACRE-FT		
MEAN DEPTH	26. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	38. FT		
SHORELINE LENGTH	3.3 MI	RESIDENTIAL URBAN	13 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.69	AGRICULTURAL	0 %
BOTTOM SLOPE	0.95 %	FOREST OR UNPRODUCTIVE	67 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	20 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

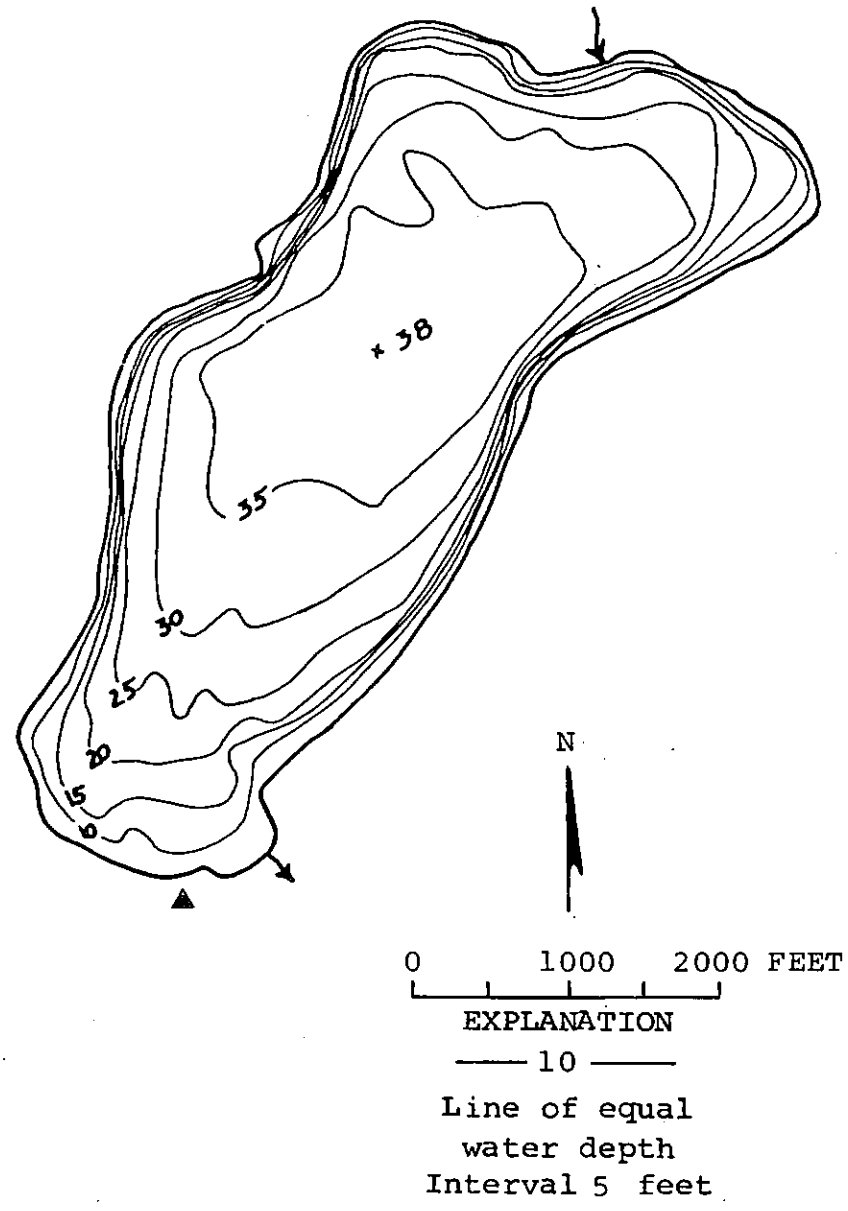
SAMPLE SITE	1	
DATE	6/30/72	
TIME	1035	1045
DEPTH (FT)	3.	30.
DISSOLVED NITRATE (N)	0.04	0.15
DISSOLVED NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.05	0.31
TOTAL ORGANIC NITROGEN (N)	0.26	0.19
TOTAL PHOSPHORUS (P)	0.020	0.040
DISSOLVED ORTHOPHOSPHATE (P)	0.000	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	43	52
WATER TEMPERATURE (DEG C)	18.7	8.7
COLOR (PLATINUM-COBALT UNITS)	15	30
SECCHI-DISC VISIBILITY (FT)	16	
DISSOLVED OXYGEN	9.5	0.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

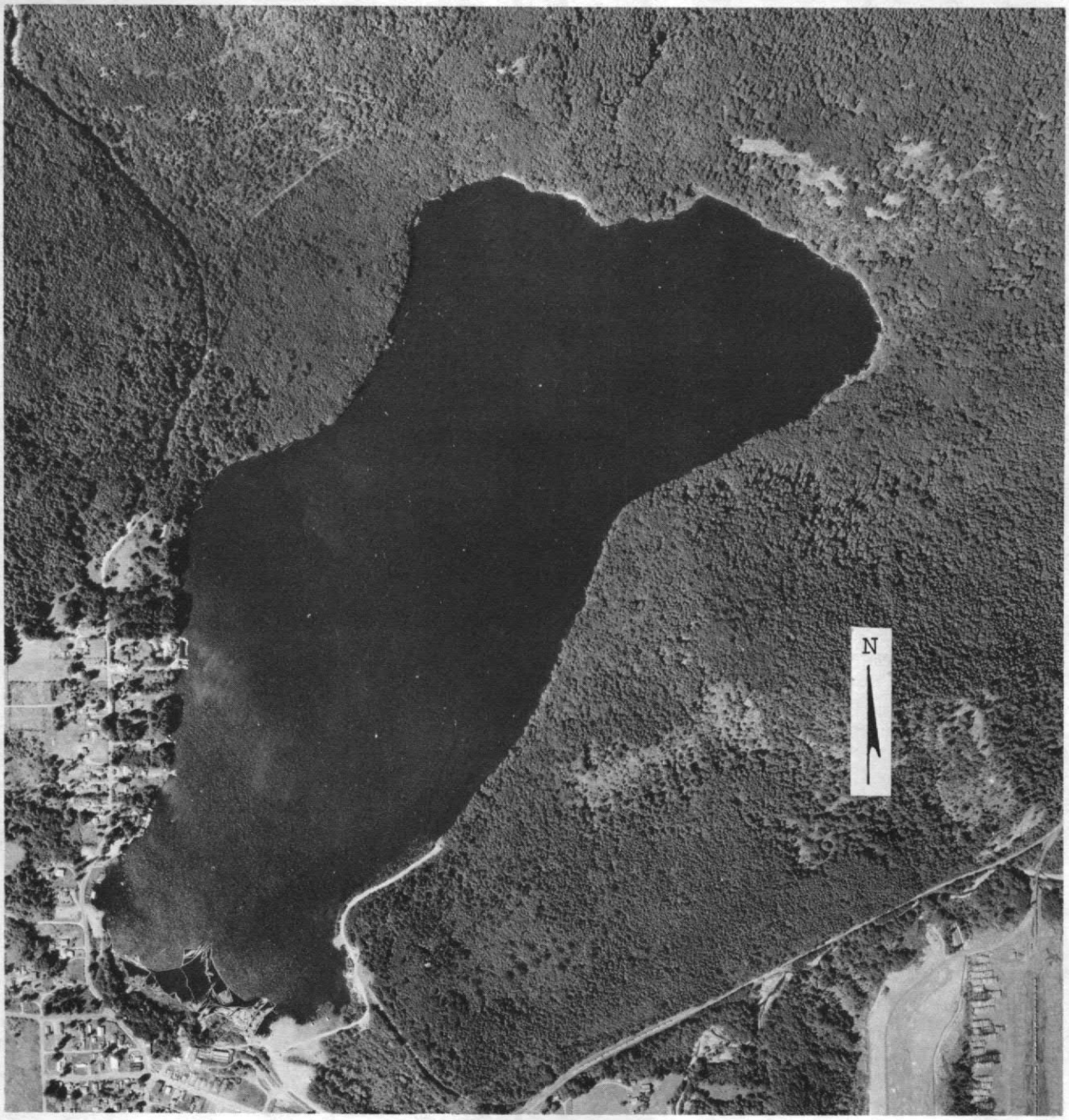
DATE	6/30/72
TIME	1100
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	6
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE TOWN OF MINERAL IS LOCATED ON THE SOUTH SIDE OF THE LAKE. THE LAKE SUPPORTED A SPARSE GROWTH OF AQUATIC PLANTS. MANY LOGS AND BRANCHES COVERED THE BEACH AND LAKE BOTTOM. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 16, 1972.



Mineral Lake, Lewis County. From Washington Department of Game, February 26, 1952.



Mineral Lake, Lewis County. August 9, 1972. Approx. scale 1:12,000.

PACKWOOD LAKE LEWIS COUNTY

LATITUDE 46*35'47" LONGITUDE 121*34' 7" T13N-R10E-28
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	19.2 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	2857. FT		
LAKE AREA	400. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	28000. ACRE-FT		
MEAN DEPTH	71. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	120. FT		
SHORELINE LENGTH	4.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.61	AGRICULTURAL	0 %
BOTTOM SLOPE	2.5 %	FOREST OR UNPRODUCTIVE	97 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	3 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

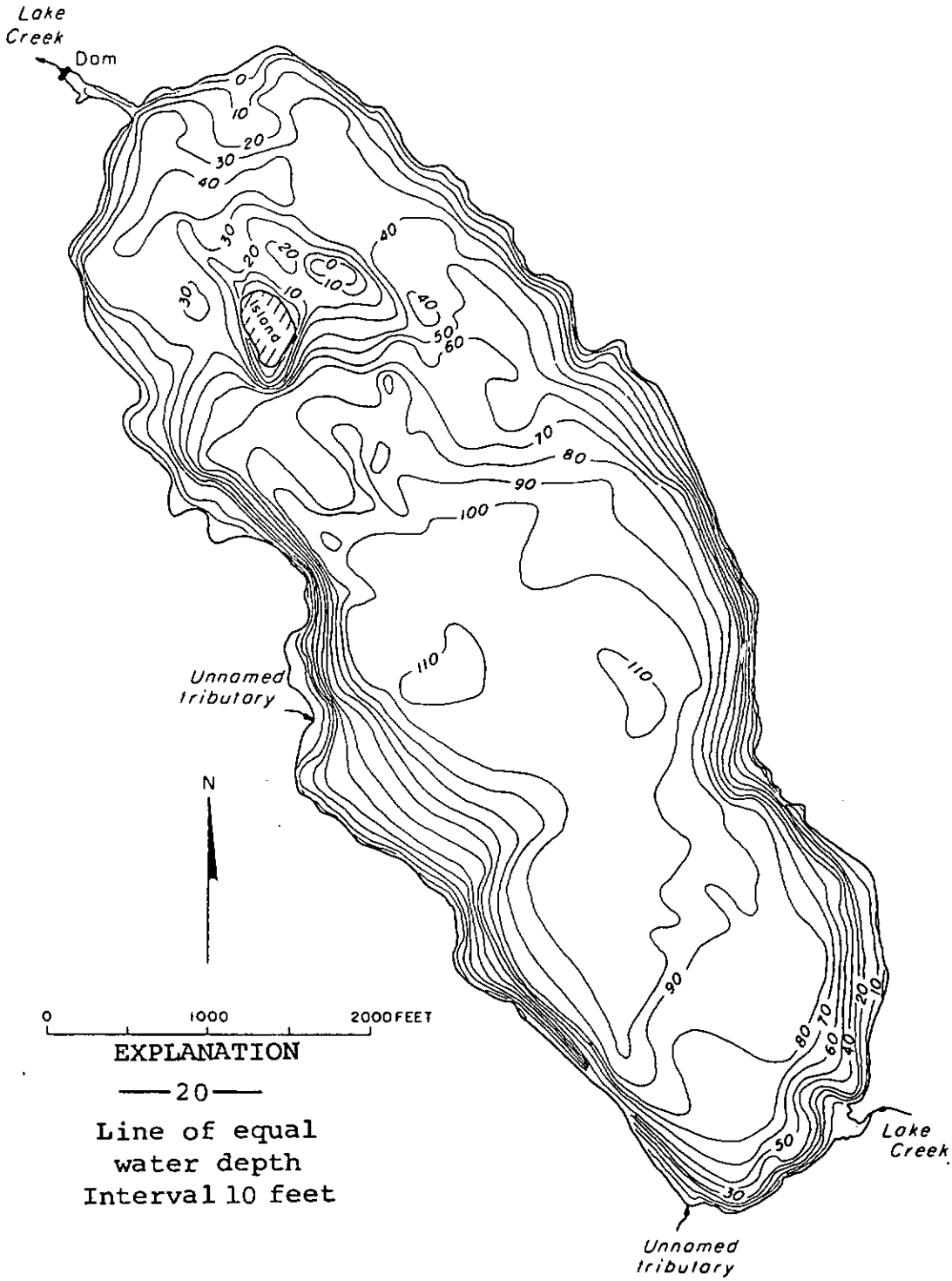
SAMPLE SITE	1	
DATE	10/15/70	
TIME	1230	1240
DEPTH (FT)	3.	98.
DISSOLVED NITRATE (N)	0.02	0.04
DISSOLVED NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	--	--
TOTAL ORGANIC NITROGEN (N)	--	--
TOTAL PHOSPHORUS (P)	0.010	0.006
DISSOLVED ORTHOPHOSPHATE (P)	0.006	0.006
SPECIFIC CONDUCTANCE (MICROMHOS)	49	57
WATER TEMPERATURE (DEG C)	10.2	4.9
COLOR (PLATINUM-COBALT UNITS)	--	0
SECCHI-DISC VISIBILITY (FT)	13	
DISSOLVED OXYGEN	9.8	7.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	0/ 0/ 0
TIME	0
NUMBER OF FECAL COLIFORM SAMPLES	0
FECAL COLIFORM, MINIMUM (COL./100ML)	--
FECAL COLIFORM, MAXIMUM (COL./100ML)	--
FECAL COLIFORM, MEAN (COL./100ML)	--

REMARKS

A NATURAL LAKE STABILIZED BY A DAM AT OUTLET. WATER IS DIVERTED FROM THE LAKE AT THE OUTLET FOR HYDORELECTRIC POWER. MOST OF THE MACROPHYTES WERE OBSERVED NEAR THE INFLOW TRIBUTARIES AND THE OUTLET. THE U.S. GEOLOGICAL SURVEY MAINTAINS A WATER-STAGE RECORDER AT THE LAKE. IN 1970 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE THREE TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 15, 1970.



Packwood Lake, Lewis County. From U.S. Geological Survey, July 1970.

WALUPT LAKE LEWIS COUNTY

LATITUDE 46°25'15" LONGITUDE 121°28'17" T11N-R11E-20
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	13.7 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	3927. FT		
LAKE AREA	350. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	62000. ACRE-FT		
MEAN DEPTH	180. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	300. FT		
SHORELINE LENGTH	3.4 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.60	AGRICULTURAL	0 %
BOTTOM SLOPE	24. %	FOREST OR UNPRODUCTIVE	96 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	4 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

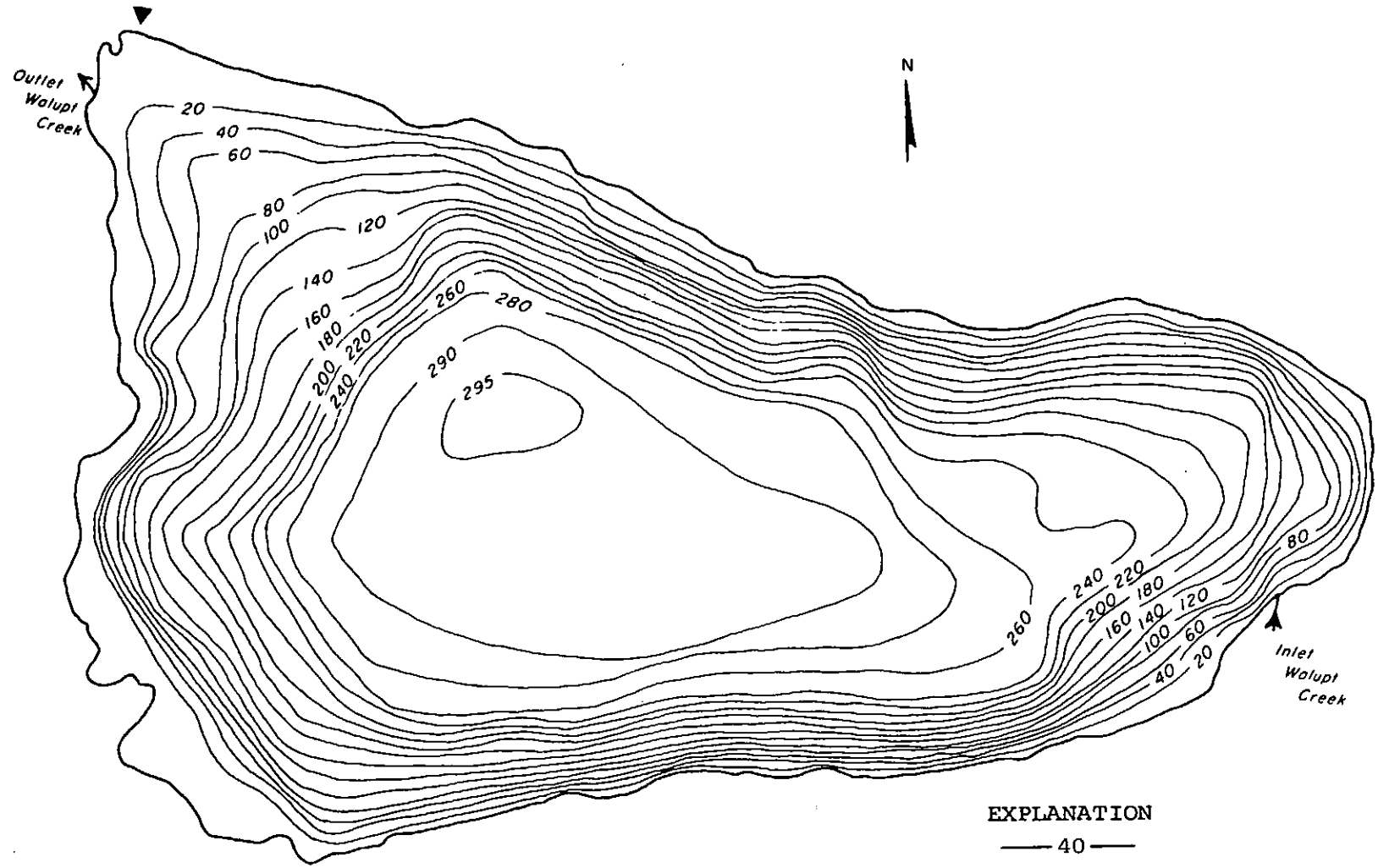
SAMPLE SITE	1	
DATE	8/18/71	
TIME	1300	1305
DEPTH (FT)	3.	200.
DISSOLVED NITRATE (N)	0.15	0.24
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.05	0.02
TOTAL ORGANIC NITROGEN (N)	0.07	0.09
TOTAL PHOSPHORUS (P)	0.010	0.010
DISSOLVED ORTHOPHOSPHATE (P)	0.000	0.000
SPECIFIC CONDUCTANCE (MICROMHOS)	27	28
WATER TEMPERATURE (DEG C)	17.5	4.0
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	26	
DISSOLVED OXYGEN	8.8	9.2

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

DATE	0/ 0/ 0	
TIME	0	
NUMBER OF FECAL COLIFORM SAMPLES	0	
FECAL COLIFORM, MINIMUM (COL./100ML)	--	
FECAL COLIFORM, MAXIMUM (COL./100ML)	--	
FECAL COLIFORM, MEAN (COL./100ML)	--	

REMARKS

THE INFLOW IS FROM WALUPT CREEK, AS WELL AS FROM SEVERAL INTERMITTENT AND EPHEMERAL STREAMS. SUBMERSED AQUATIC PLANTS WERE SPARSE. FLOATING AND SUBMERGED LOGS COVERED THE SHORELINE. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE THREE TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 4, 1971.



Walupt Lake, Lewis County. From
U.S. Geological Survey, July 18, 1971.

Walupt Lake, Lewis County. August 23, 1970. Approx. scale 1:8000.

BLACK LAKE PACIFIC COUNTY

LATITUDE 46*19'13" LONGITUDE 124* 2'29" T10N-R11W-28
PACIFIC OCEAN BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.31 SQ MI	RESIDENTIAL DEVELOPMENT	5 %
ALTITUDE	25. FT		
LAKE AREA	32. ACRES	NUMBER OF NEARSHORE HOMES	2
LAKE VOLUME	420. ACRE-FT		
MEAN DEPTH	13. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	32. FT		
SHORELINE LENGTH	1.5 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	11 %
DEVELOPMENT OF VOLUME	0.41	AGRICULTURAL	0 %
BOTTOM SLOPE	2.4 %	FOREST OR UNPRODUCTIVE	73 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	16 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

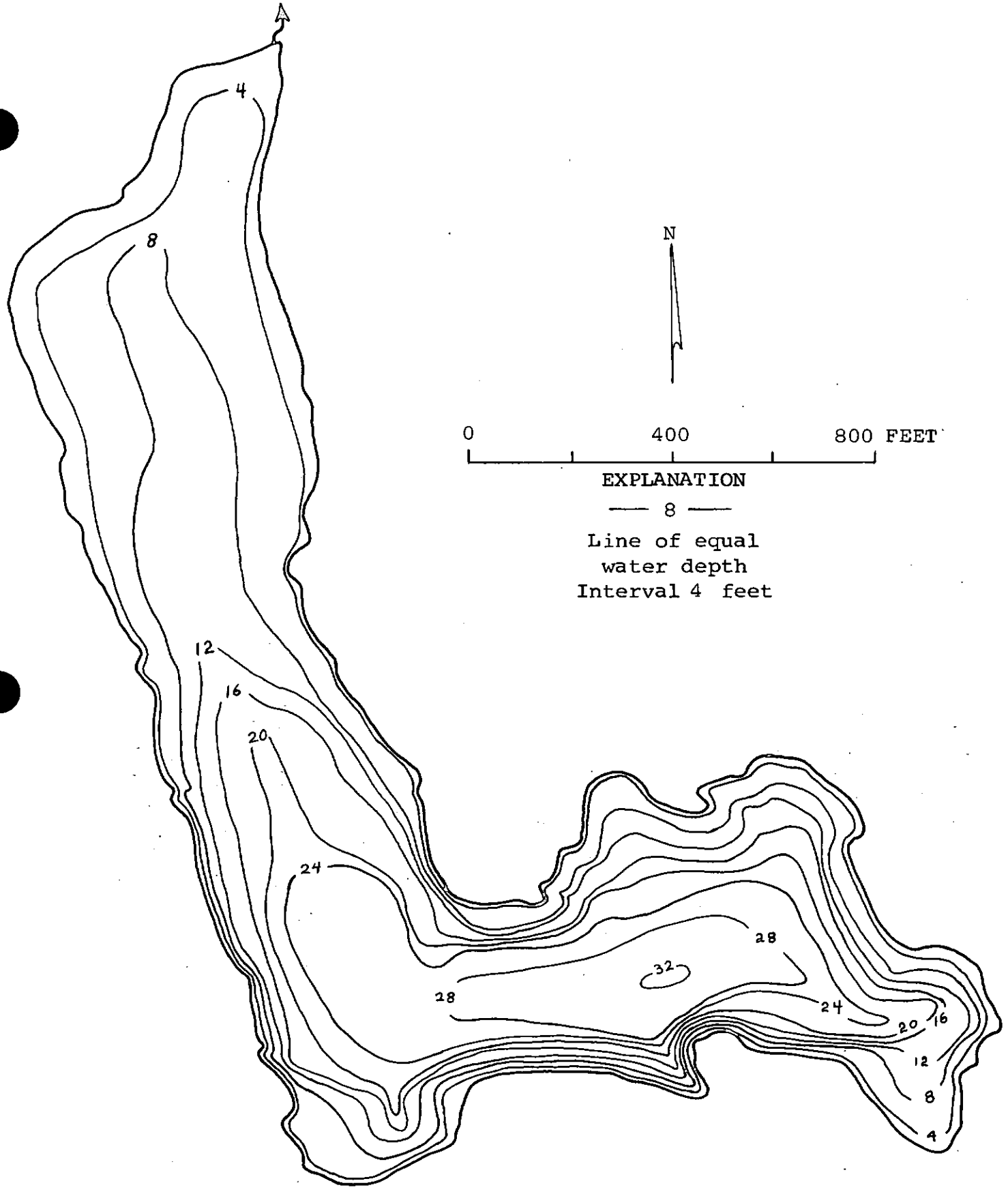
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1215	1220
DEPTH (FT)	3.	20.
TOTAL NITRATE (N)	0.00	0.01
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.11	0.16
TOTAL ORGANIC NITROGEN (N)	0.19	0.11
TOTAL PHOSPHORUS (P)	0.019	0.019
TOTAL ORTHOPHOSPHATE (P)	0.007	0.008
SPECIFIC CONDUCTANCE (MICROMHOS)	110	120
WATER TEMPERATURE (DEG C)	19.6	16.9
COLOR (PLATINUM-COBALT UNITS)	55	55
SECCHI-DISC VISIBILITY (FT)	6	
DISSOLVED OXYGEN	8.1	1.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

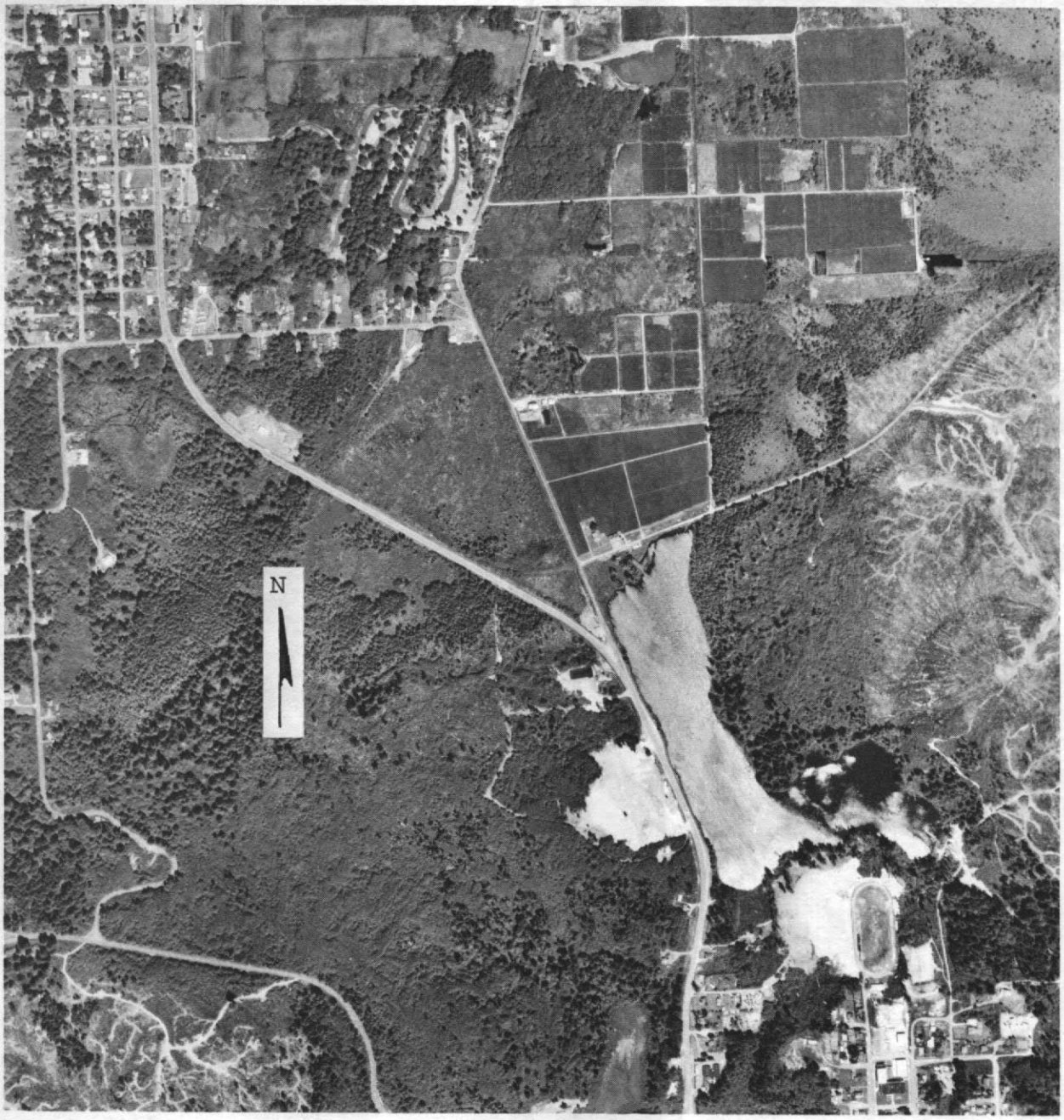
DATE	8/19/74
TIME	1230
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	5
FECAL COLIFORM, MEAN (COL./100ML)	3

REMARKS

THE LAKE IS USED AS A MUNICIPAL WATER SUPPLY FOR THE TOWN OF ILWACO. THE WATER IS A BROWN COLOR. EMERSED AQUATIC PLANTS COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE. THE BATHYMETRIC MAP WAS FURNISHED BY THE TOWN OF ILWACO.



Black Lake, Pacific County. From
Livingston, Moore, and Wallace, 1965.



Black Lake, Pacific County. May 24, 1970. Approx. scale 1:12,000.

BREAKER LAKE PACIFIC COUNTY

LATITUDE 46*22'32" LONGITUDE 124* 2'51" T10N-R11W-4
PACIFIC OCEAN BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.26 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	20. FT		
LAKE AREA	15. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	24. ACRE-FT		
MEAN DEPTH	2. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	5. FT		
SHORELINE LENGTH	0.93 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.7	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.32	AGRICULTURAL	0 %
BOTTOM SLOPE	0.55 %	FOREST OR UNPRODUCTIVE	91 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	9 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

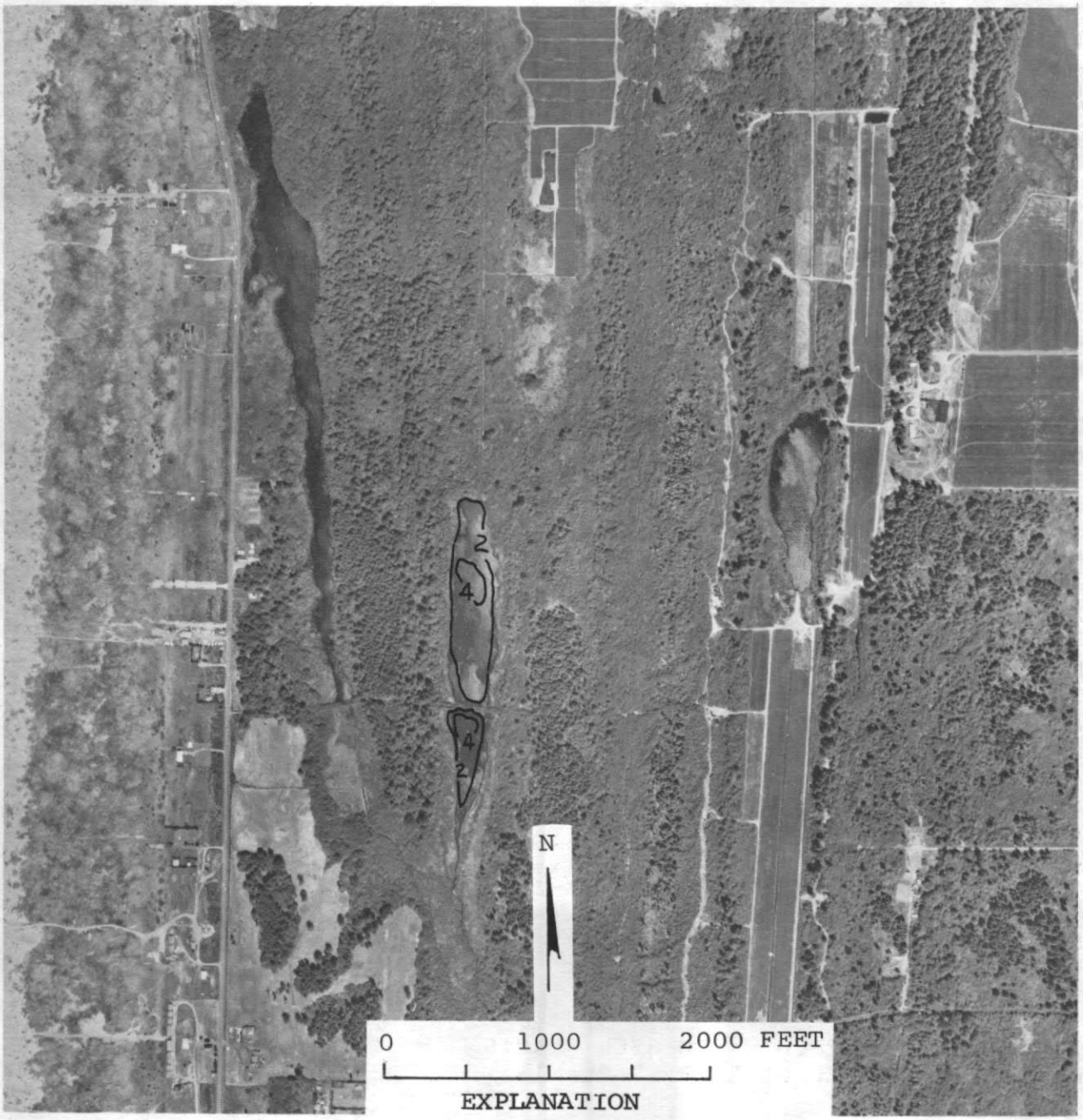
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1250	1255
DEPTH (FT)	1.	2.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.02	0.02
TOTAL AMMONIA (N)	0.53	0.53
TOTAL ORGANIC NITROGEN (N)	1.4	1.4
TOTAL PHOSPHORUS (P)	0.68	0.68
TOTAL ORTHOPHOSPHATE (P)	0.52	0.53
SPECIFIC CONDUCTANCE (MICROMHOS)	200	200
WATER TEMPERATURE (DEG C)	19.0	19.2
COLOR (PLATINUM-COBALT UNITS)	520	520
SECCHI-DISC VISIBILITY (FT)	2	
DISSOLVED OXYGEN	7.4	6.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	26- 50 %

DATE	8/19/74
TIME	1320
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	6
FECAL COLIFORM, MAXIMUM (COL./100ML)	34
FECAL COLIFORM, MEAN (COL./100ML)	16

REMARKS

THE LAKE IS LESS THAN .5 MILES FROM THE PACIFIC OCEAN. THE WATER COLOR IS A VERY DARK BROWN. MOST OF THE SHORELINE IS SURROUNDED BY MARSH. THE LAKE HAD A HEAVY GROWTH OF BOTH EMERSED AND SUBMERSED PLANTS. THE BOTTOM OF THE LAKE WAS ENTIRELY COVERED WITH EMERSED PLANTS. THE BEACH AND LITTORAL BOTTOM IS MUCK.



Breaker Lake, Pacific County. Bathymetric map from U.S. Geological Survey, March 12, 1974. Aerial photo, May 24, 1970.

ISLAND LAKE PACIFIC COUNTY

LATITUDE 46*25' 7" LONGITUDE 124* 2' 6" T11N-R11W-21
PACIFIC OCEAN BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.81 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	20. FT		
LAKE AREA	64. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	320. ACRE-FT		
MEAN DEPTH	5. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	8. FT		
SHORELINE LENGTH	2.8 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.5	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.62	AGRICULTURAL	0 %
BOTTOM SLOPE	0.42 %	FOREST OR UNPRODUCTIVE	83 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	17 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	UNKNOWN	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

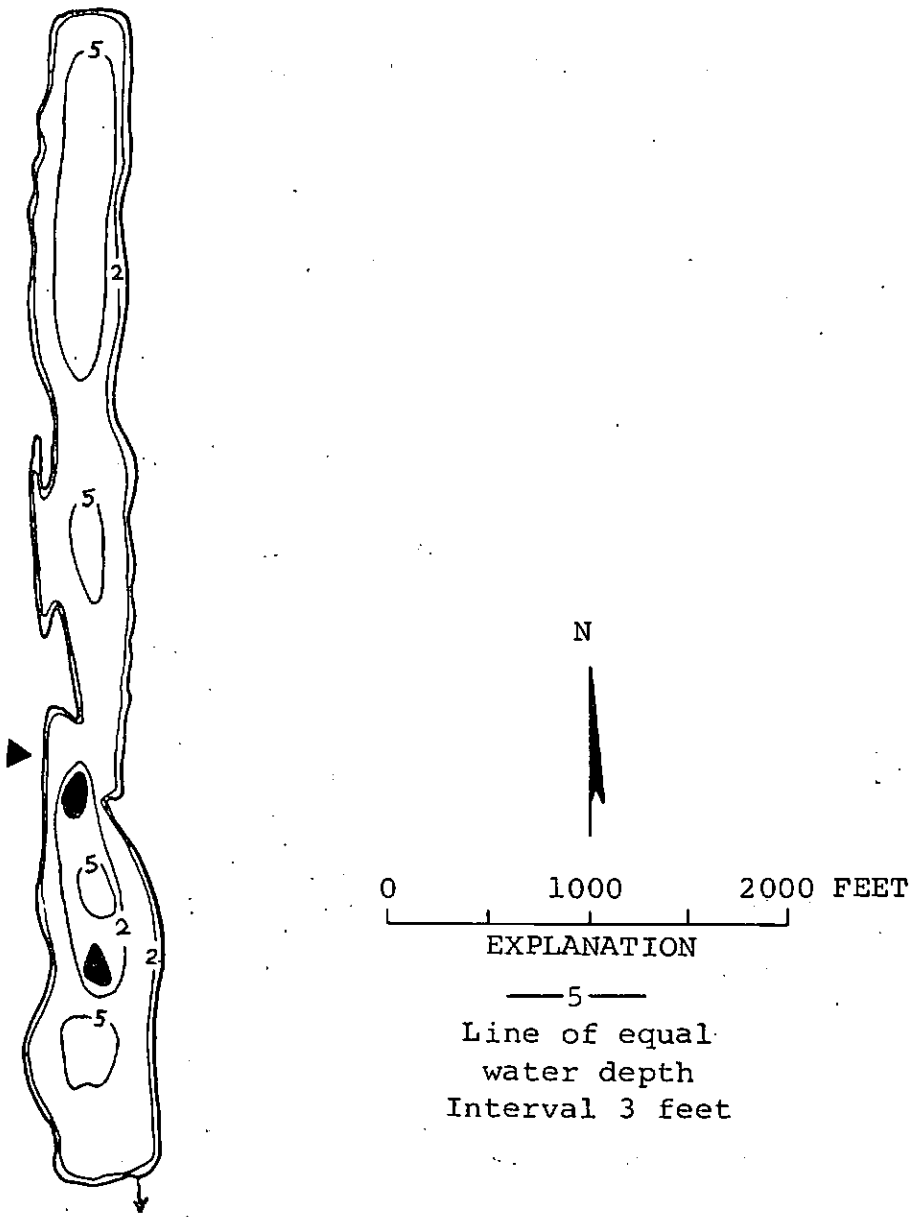
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1415	1420
DEPTH (FT)	1.	3.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.23	0.23
TOTAL ORGANIC NITROGEN (N)	0.50	0.47
TOTAL PHOSPHORUS (P)	0.019	0.023
TOTAL ORTHOPHOSPHATE (P)	0.007	0.007
SPECIFIC CONDUCTANCE (MICROMHOS)	70	70
WATER TEMPERATURE (DEG C)	19.8	20.2
COLOR (PLATINUM-COBALT UNITS)	90	90
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	8.7	8.3

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

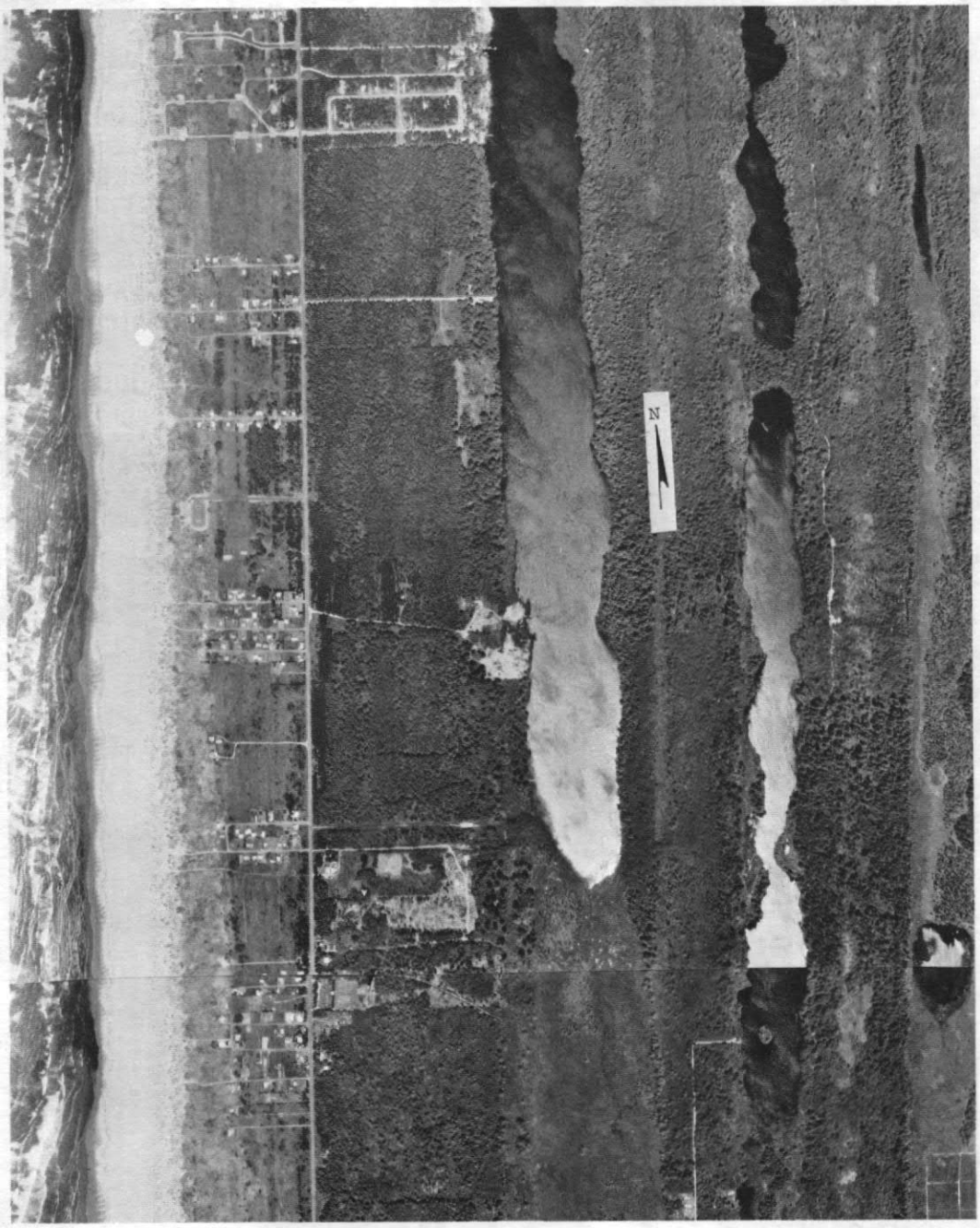
DATE	8/19/74
TIME	1430
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

A LONG, NARROW LAKE LOCATED ABOUT ONE MILE FROM THE PACIFIC OCEAN. THE LAKE HAS A THIN EDGE OF MARSH AROUND THE SHORE. THE WATER IS BROWN COLOR. THE MUCK LITTORAL BOTTOM SUPPORTED A MODERATE GROWTH OF AQUATIC PLANTS.



Island Lake, Pacific County. From Washington Department of Game, April 20, 1950.



Island Lake, Pacific County. June 17, 1974. Approx. scale 1:17,000.

LOOMIS LAKE PACIFIC COUNTY

LATITUDE 46*25'26" LONGITUDE 124* 2'27" T11N-R11W-21
PACIFIC OCEAN BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.44 SQ MI	RESIDENTIAL DEVELOPMENT	15 %
ALTITUDE	17. FT		
LAKE AREA	170. ACRES	NUMBER OF NEARSHORE HOMES	12
LAKE VOLUME	830. ACRE-FT		
MEAN DEPTH	5. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	9. FT		
SHORELINE LENGTH	4.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.4	RESIDENTIAL SUBURBAN	1 %
DEVELOPMENT OF VOLUME	0.56	AGRICULTURAL	0 %
BOTTOM SLOPE	0.30 %	FOREST OR UNPRODUCTIVE	81 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	18 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

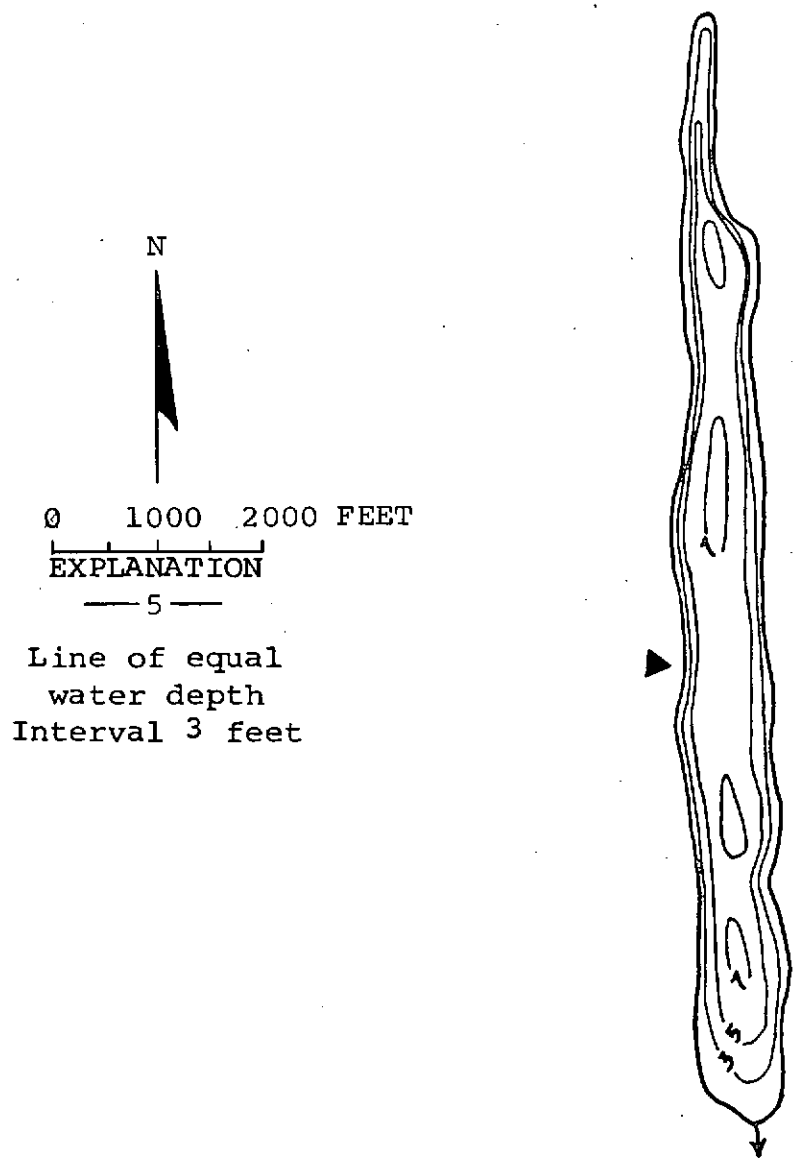
SAMPLE SITE	1	
DATE	8/14/74	
TIME	1445	1450
DEPTH (FT)	3.	5.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.11	0.10
TOTAL ORGANIC NITROGEN (N)	0.52	0.46
TOTAL PHOSPHORUS (P)	0.025	0.028
TOTAL ORTHOPHOSPHATE (P)	0.005	0.005
SPECIFIC CONDUCTANCE (MICROMHOS)	120	130
WATER TEMPERATURE (DEG C)	20.3	20.3
COLOR (PLATINUM-COBALT UNITS)	25	25
SECCHI-DISC VISIBILITY (FT)	> 6	
DISSOLVED OXYGEN	10.5	10.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

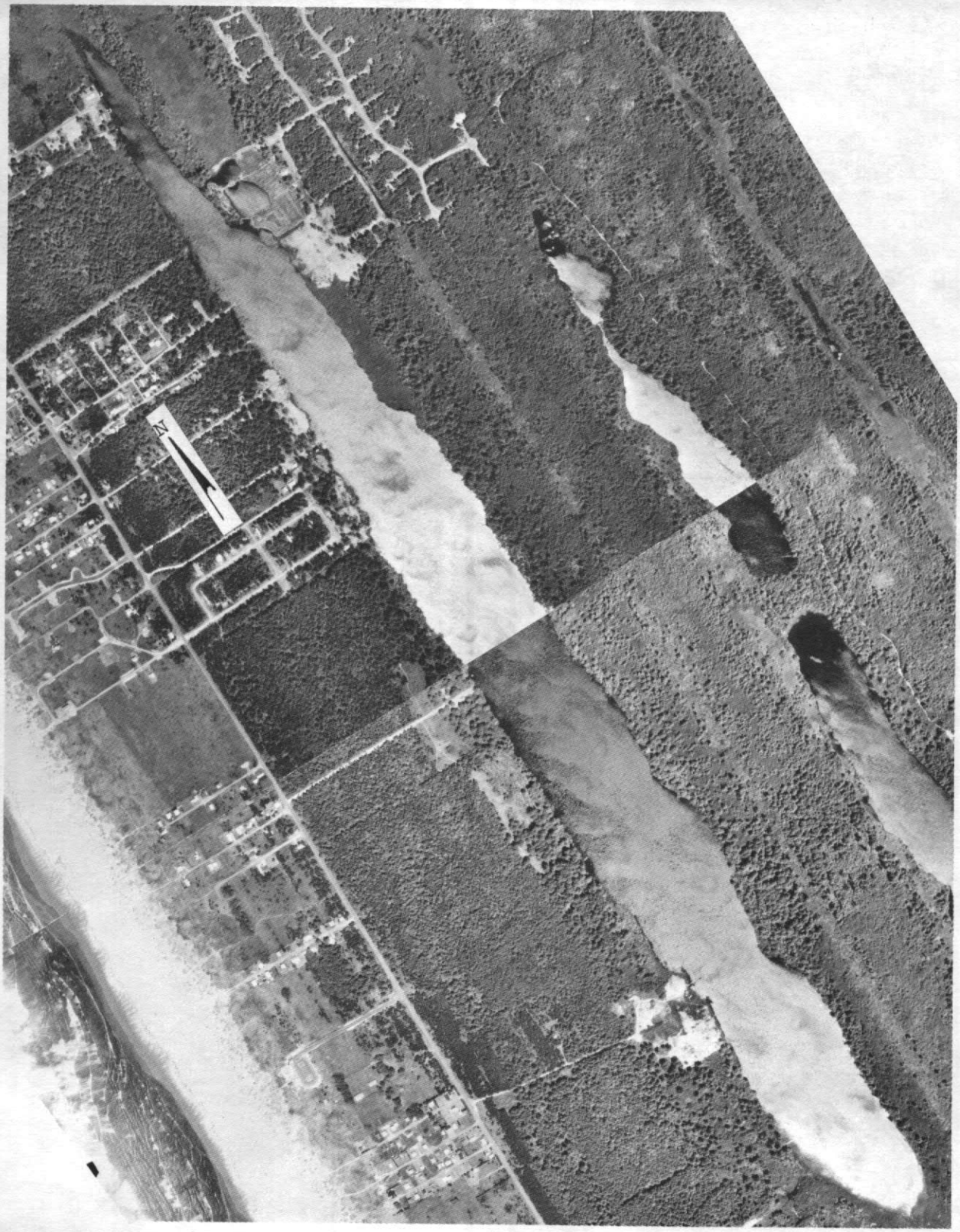
DATE	8/19/74
TIME	1500
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	4
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

A NARROW LAKE 2.5 MILES LONG. THE LAKE DRAINS A LARGE MARSH NEAR THE SOUTH END OF THE LAKE. EMERSED AQUATIC PLANTS WERE SPARSE. THE LITTORAL BOTTOM IS SAND. AN ALGAL BLOOM WAS OBSERVED.



Loomis Lake, Pacific County. From Washington Department of Game, July 1, 1950.



Loomis Lake, Pacific County. June 17, 1974. Approx. scale 1:13,000.

ASHES LAKE SKAMANIA COUNTY

LATITUDE 45*40'16" LONGITUDE 121*54'51" T2N-R7E-11
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	3.82 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	75. FT		
LAKE AREA	54. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	740. ACRE-FT		
MEAN DEPTH	14. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	25. FT		
SHORELINE LENGTH	1.5 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.55	AGRICULTURAL	0 %
BOTTOM SLOPE	1.4 %	FOREST OR UNPRODUCTIVE	98 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

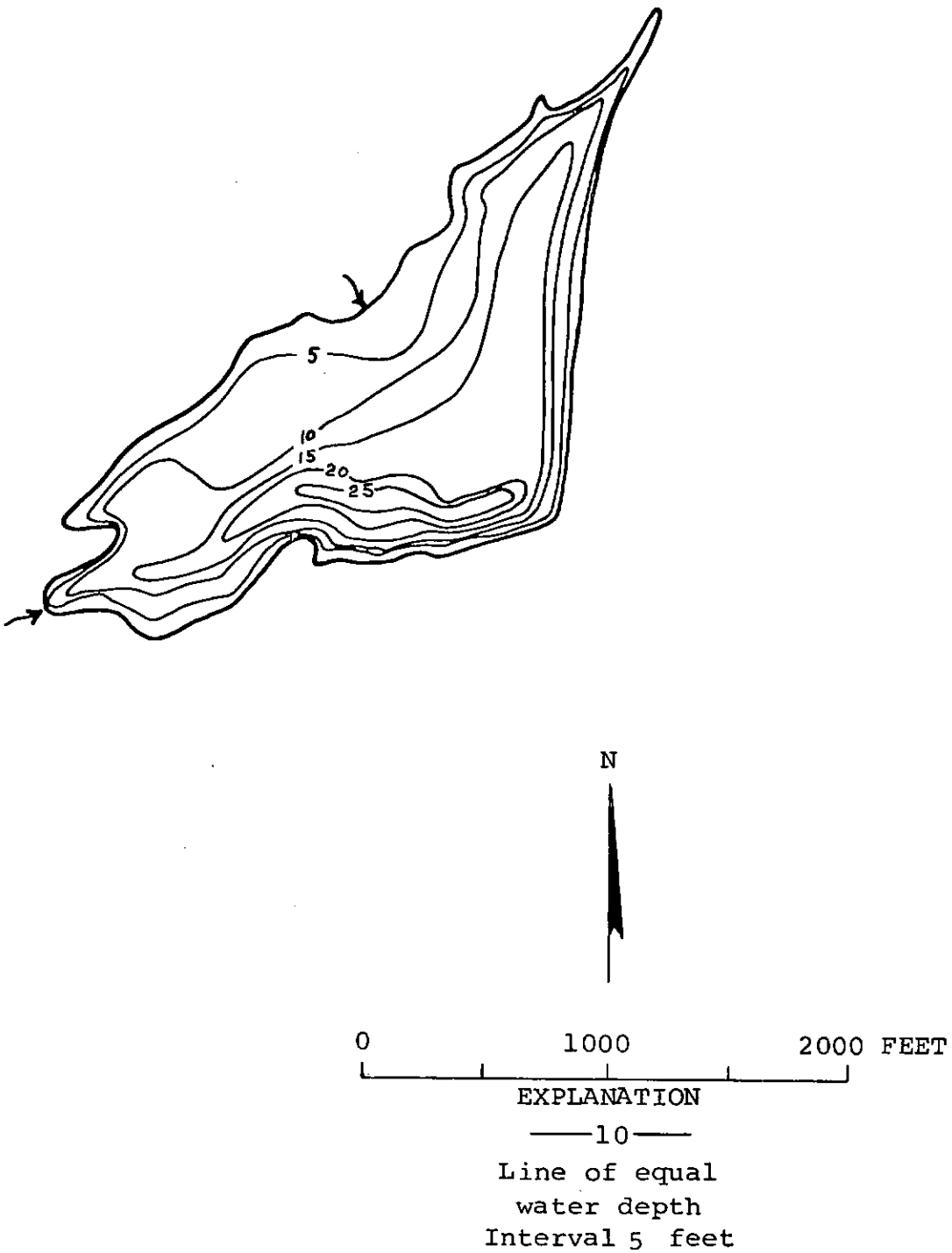
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1020	1025
DEPTH (FT)	3.	11.
TOTAL NITRATE (N)	0.00	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.08	0.06
TOTAL ORGANIC NITROGEN (N)	0.26	0.32
TOTAL PHOSPHORUS (P)	0.047	0.051
TOTAL ORTHOPHOSPHATE (P)	0.008	0.009
SPECIFIC CONDUCTANCE (MICROMHOS)	130	130
WATER TEMPERATURE (DEG C)	18.9	18.8
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	9.2	9.0

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1522
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS SEPARATED FROM THE COLUMBIA RIVER BY A HIGHWAY FILL. THE LAKE RECEIVES INFLOW FROM THE BLUE LAKES AND BACKWATER FROM THE COLUMBIA RIVER. THE DRAINAGE AREA AND LAND USE DATA DO NOT REFLECT DRAINAGE FROM THE COLUMBIA RIVER.



Ashes Lake, Skamania County. From Washington Department of Game, November 24, 1947.

Ashes Lake, Skamania County. June 18, 1968. Approx. scale 1:12,000.

DRANO LAKE SKAMANIA COUNTY

LATITUDE 45*42'43" LONGITUDE 121*38'49" T3N-R9E-26
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	136. SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	72. FT		
LAKE AREA	200. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	4200. ACRE-FT		
MEAN DEPTH	21. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	40. FT		
SHORELINE LENGTH	3.7 MI	RESIDENTIAL URBAN	<1 %
SHORELINE CONFIGURATION	1.9	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.53	AGRICULTURAL	<1 %
BOTTOM SLOPE	1.2 %	FOREST OR UNPRODUCTIVE	100 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	<1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

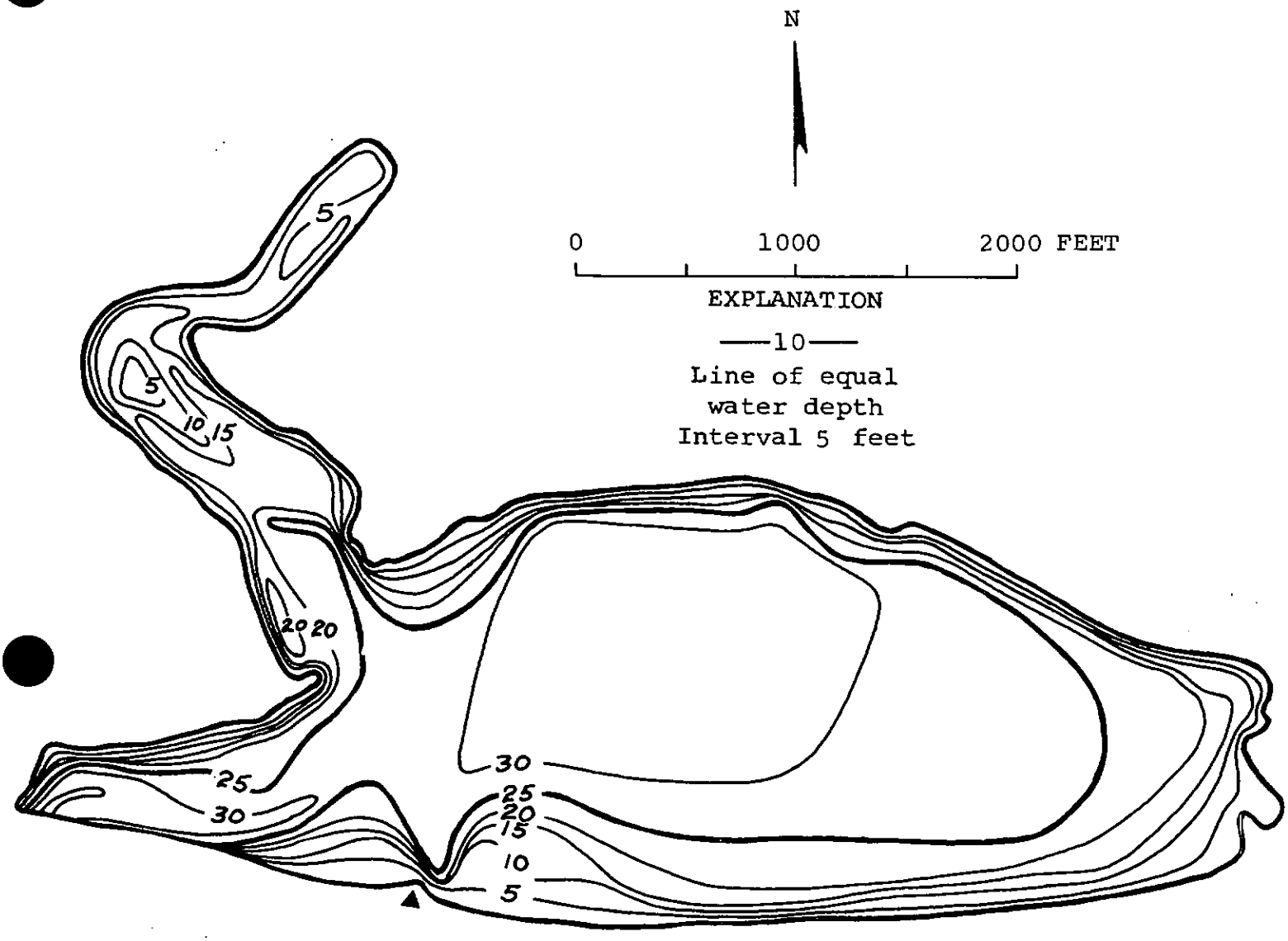
WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	9/10/74	
TIME	1630	1635
DEPTH (FT)	3.	20.
TOTAL NITRATE (N)	0.01	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.04	0.00
TOTAL ORGANIC NITROGEN (N)	0.09	0.05
TOTAL PHOSPHORUS (P)	0.014	0.019
TOTAL ORTHOPHOSPHATE (P)	0.008	0.012
SPECIFIC CONDUCTANCE (MICROMHOS)	110	85
WATER TEMPERATURE (DEG C)	18.2	14.0
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	9	
DISSOLVED OXYGEN	8.5	9.6
LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %	
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %	

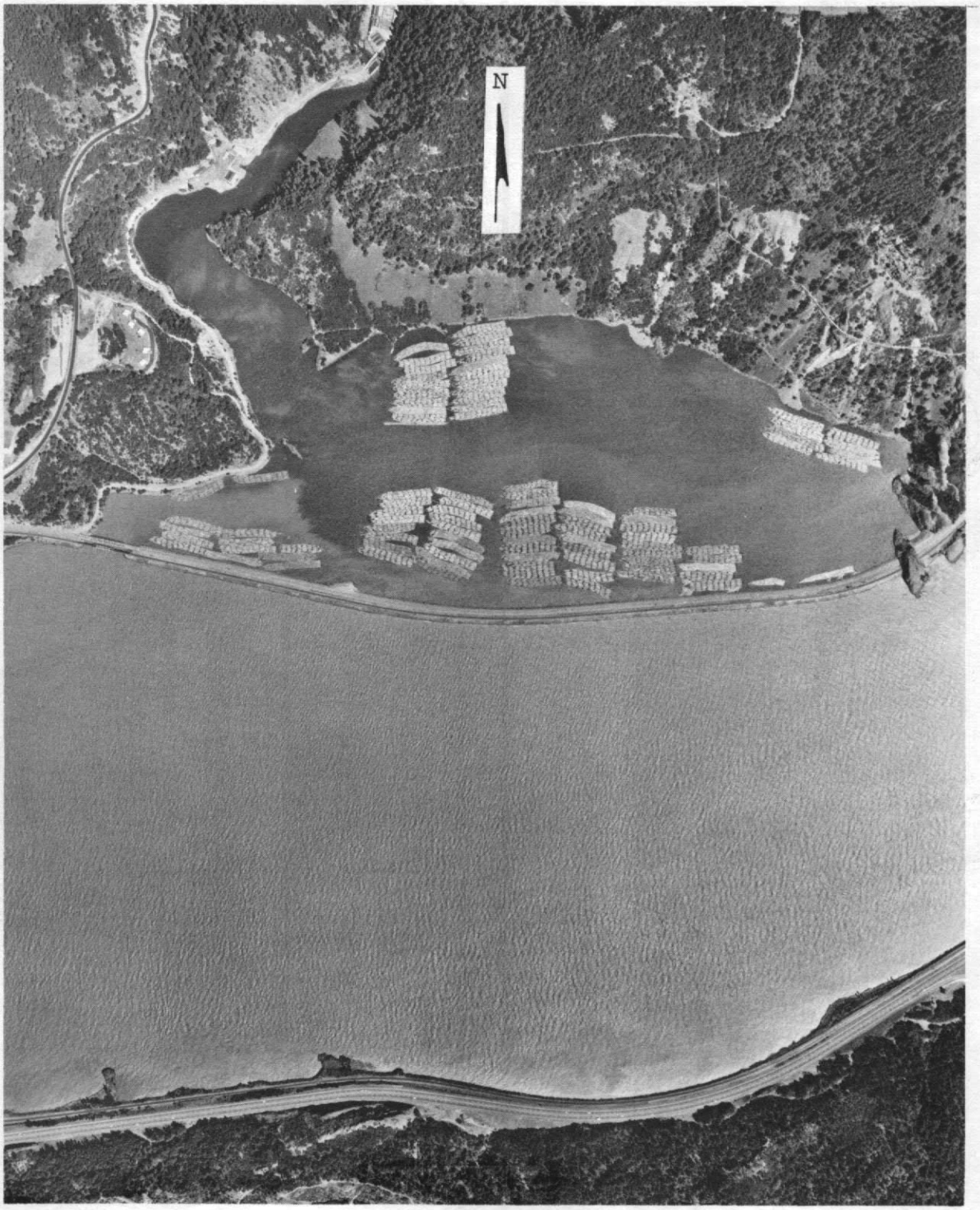
DATE	9/10/74
TIME	1647
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS SEPARATED FROM THE COLUMBIA RIVER BY A HIGHWAY FILL. THE LAKE RECEIVES INFLOW FROM THE LITTLE WHITE SALMON RIVER AND BACKWATER FROM THE COLUMBIA RIVER. THE LAKE IS USED FOR LOG STORAGE. VERY FEW AQUATIC PLANTS WERE OBSERVED. THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN. THE DRAINAGE AREA AND LAND USE DATA DO NOT REFLECT DRAINAGE FROM THE COLUMBIA RIVER.



Drano Lake, Skamania County. From
U.S. Geological Survey, February 26, 1974.



Drano Lake, Skamania County. June 24, 1974. Approx. scale 1:13,000.

ELK LAKE SKAMANIA COUNTY

LATITUDE 46*20'15" LONGITUDE 122*14'13" T10N-R5E-19
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.59 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	3978. FT		
LAKE AREA	29. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	580. ACRE-FT		
MEAN DEPTH	20. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	46. FT		
SHORELINE LENGTH	0.95 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.44	AGRICULTURAL	0 %
BOTTOM SLOPE	3.6 %	FOREST OR UNPRODUCTIVE	83 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	17 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

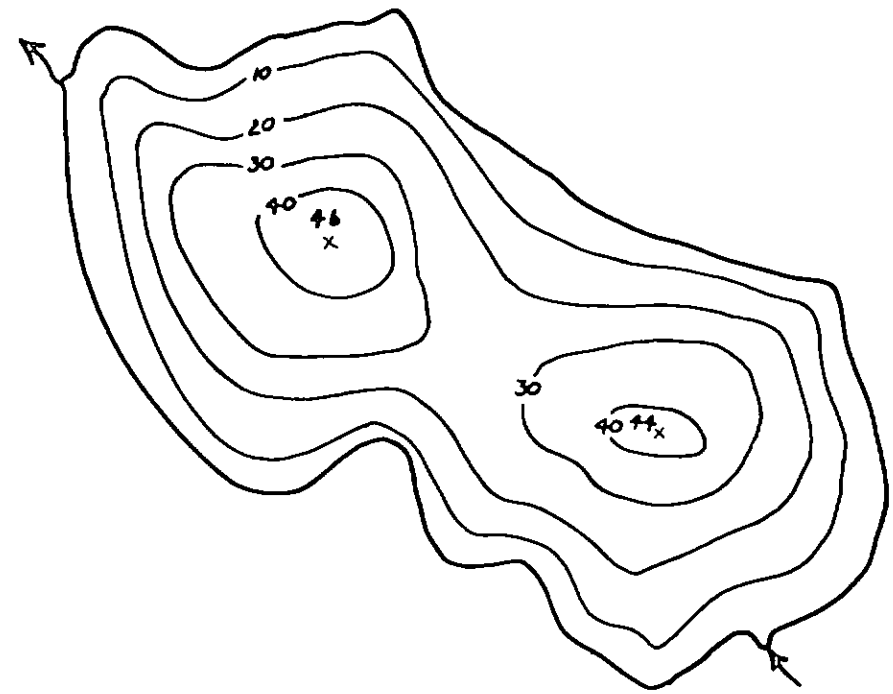
SAMPLE SITE	1	
DATE	9/14/74	
TIME	1300	1305
DEPTH (FT)	3.	39.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.03	0.04
TOTAL ORGANIC NITROGEN (N)	0.05	0.07
TOTAL PHOSPHORUS (P)	0.003	0.013
TOTAL ORTHOPHOSPHATE (P)	0.001	0.004
SPECIFIC CONDUCTANCE (MICROMHOS)	18	21
WATER TEMPERATURE (DEG C)	14.0	8.2
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	30	
DISSOLVED OXYGEN	9.2	8.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/14/74
TIME	1242
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE RECEIVES INFLOW FROM HANAFORD LAKE. TREES AND SHRUBS OVERHANG THE SHORELINE. AQUATIC MACROPHYTES WERE SPARSE. THE DO WAS NEAR SATURATION THROUGHOUT THE WATER COLUMN.



N

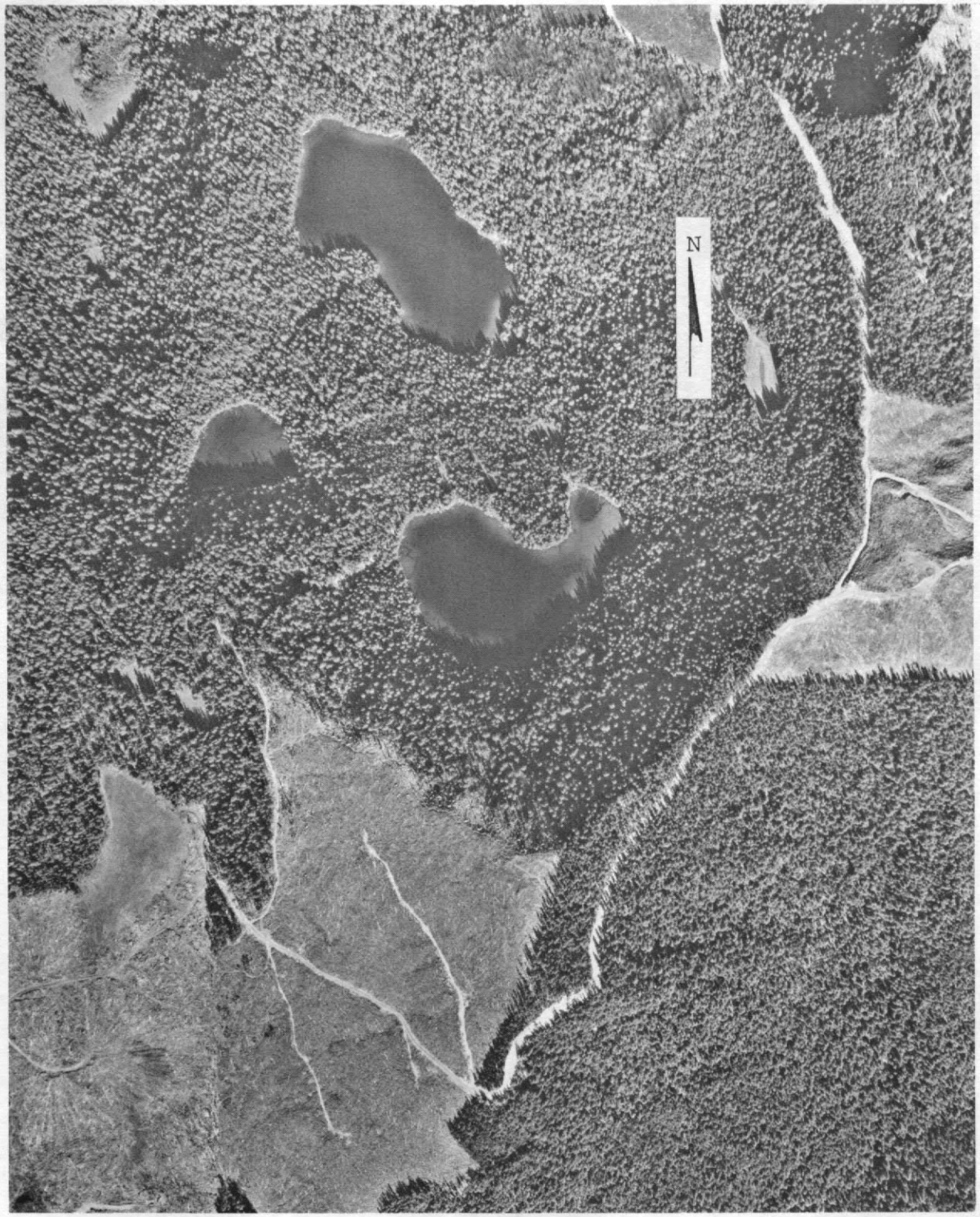
0 500 1000 FEET

EXPLANATION

—20—

Line of equal
water depth
Interval 10 feet

Elk Lake, Skamania County. From Washington Department of Game, September 7, 1954.



Elk Lake, Skamania County. October 7, 1974. Approx. scale 1:12,000.

FRANZ LAKE SKAMANIA COUNTY

LATITUDE 45*36' 9" LONGITUDE 122* 5' 4" T1N-R6E-5
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	3.75 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	50. FT		
LAKE AREA	110. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	360. ACRE-FT		
MEAN DEPTH	3. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	6. FT		
SHORELINE LENGTH	2.8 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.9	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.57	AGRICULTURAL	3 %
BOTTOM SLOPE	0.25 %	FOREST OR UNPRODUCTIVE	93 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	4 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

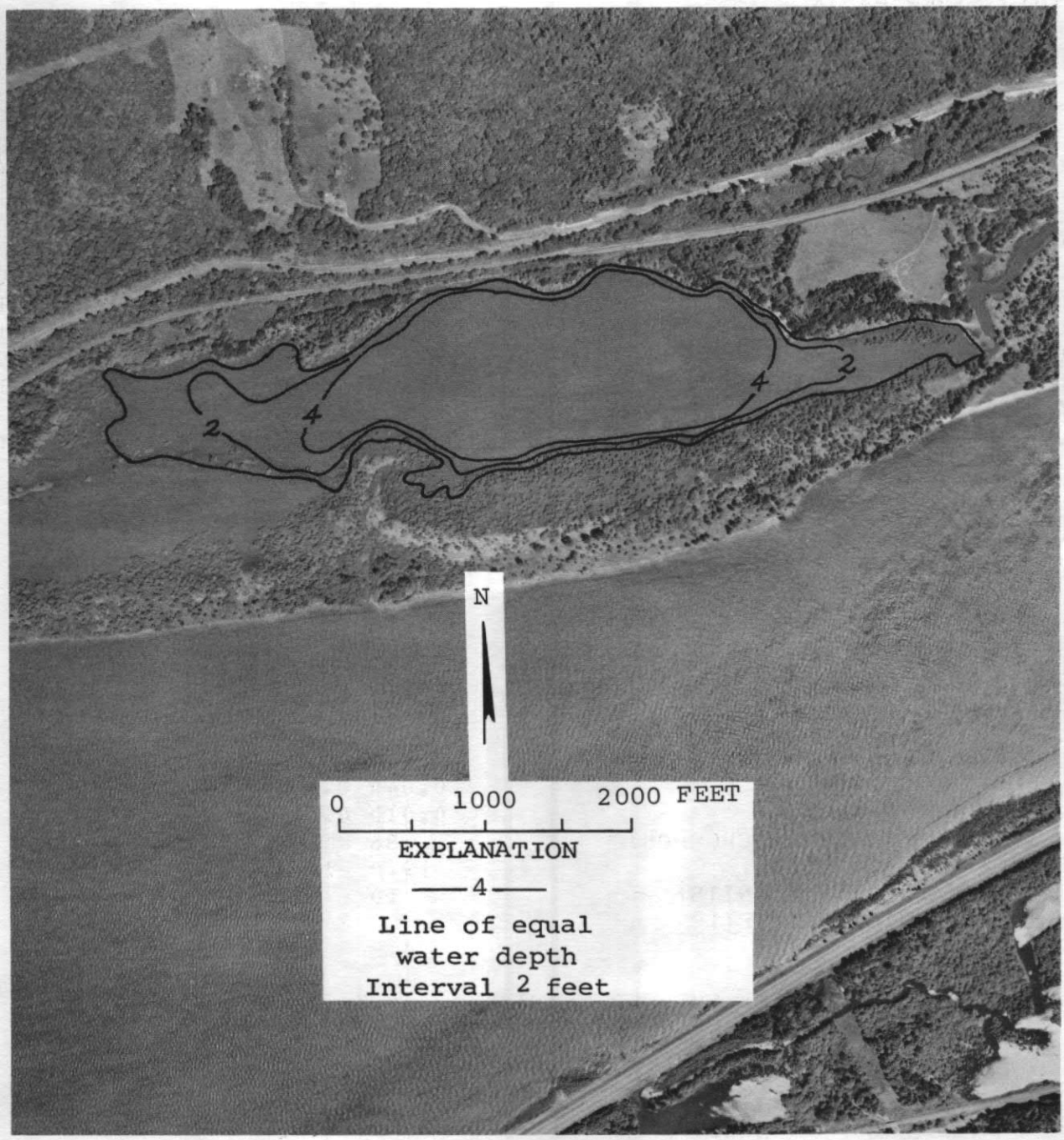
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1015	1020
DEPTH (FT)	0.	1.
TOTAL NITRATE (N)	0.02	--
TOTAL NITRITE (N)	0.03	--
TOTAL AMMONIA (N)	0.49	--
TOTAL ORGANIC NITROGEN (N)	1.4	--
TOTAL PHOSPHORUS (P)	0.13	--
TOTAL ORTHOPHOSPHATE (P)	0.12	--
SPECIFIC CONDUCTANCE (MICROMHOS)	56	56
WATER TEMPERATURE (DEG C)	15.1	15.1
COLOR (PLATINUM-COBALT UNITS)	80	--
SECCHI-DISC VISIBILITY (FT)	0	
DISSOLVED OXYGEN	9.4	9.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1027
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	18
FECAL COLIFORM, MEAN (COL./100ML)	8

REMARKS

A VERY SHALLOW LAKE THAT RECEIVES BACKWATER FROM THE COLUMBIA RIVER DURING HIGH WATER STAGES. THE WATER WAS TURBID, PROBABLY DUE TO WAVE ACTION AND MIXING OF THE BOTTOM SEDIMENTS. EMERSED PLANTS (SEDGES AND GRASSES) COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE. THE LITTORAL BOTTOM IS SILT. THE DRAINAGE AREA AND LAND USE DATA DO NOT REFLECT DRAINAGE FROM THE COLUMBIA RIVER.



Franz Lake, Skamania County. Bathymetric map from
U.S. Geological Survey, June 4, 1974.
Aerial photo, June 18, 1968.

GREENLEAF LAKE SKAMANIA COUNTY

LATITUDE 45*38'36" LONGITUDE 121*58'33" T2N-R7E-20
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	7.53 SQ MI	RESIDENTIAL DEVELOPMENT	5 %
ALTITUDE	65. FT		
LAKE AREA	54. ACRES	NUMBER OF NEARSHORE HOMES	4
LAKE VOLUME	600. ACRE-FT		
MEAN DEPTH	11. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	24. FT		
SHORELINE LENGTH	2.9 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.9	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.46	AGRICULTURAL	<1 %
BOTTOM SLOPE	1.4 %	FOREST OR UNPRODUCTIVE	99 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

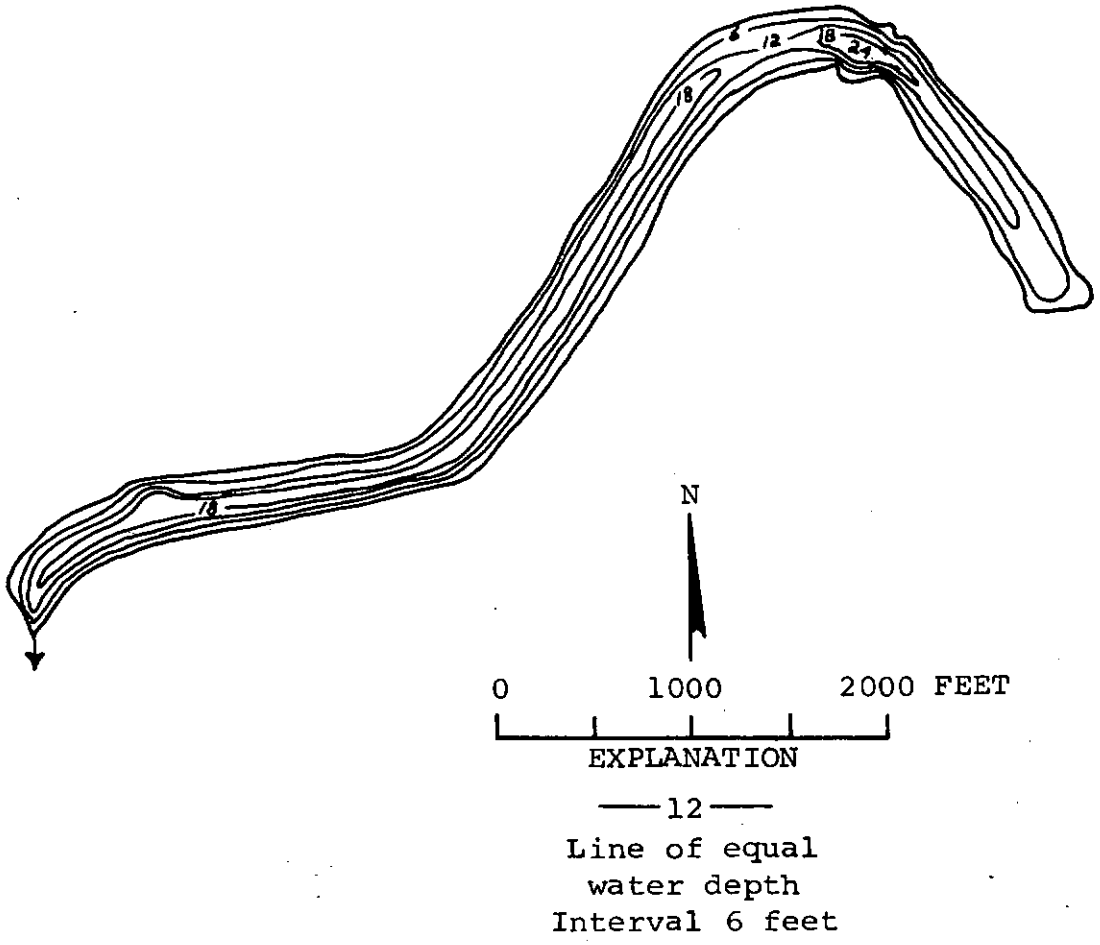
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1155	1200
DEPTH (FT)	3.	11.
TOTAL NITRATE (N)	0.03	0.03
TOTAL NITRITE (N)	0.01	0.00
TOTAL AMMONIA (N)	0.13	0.16
TOTAL ORGANIC NITROGEN (N)	0.34	0.26
TOTAL PHOSPHORUS (P)	0.040	0.034
TOTAL ORTHOPHOSPHATE (P)	0.010	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	86	86
WATER TEMPERATURE (DEG C)	19.0	18.1
COLOR (PLATINUM-COBALT UNITS)	10	15
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	8.5	6.7

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1210
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	12
FECAL COLIFORM, MEAN (COL./100ML)	8

REMARKS

A REMNANT CHANNEL OF THE COLUMBIA RIVER. AN ELECTRIC-POWER SUBSTATION IS LOCATED CLOSE TO SHORE. AQUATIC PLANT GROWTH WAS EITHER SCATTERED OR IN A THIN MARGIN CLOSE TO SHORE. AN ALGAL BLOOM WAS OBSERVED.



Greenleaf Lake, Skamania County. From Washington Department of Game, July 6, 1946.

Greenleaf Lake, Skamania County. June 18, 1968. Approx. scale 1:12,000.

HANAFORD LAKE SKAMANIA COUNTY

LATITUDE 46*19'50" LONGITUDE 122*13'48" T10N-R5E-19
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.22 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	4090. FT		
LAKE AREA	34. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	630. ACRE-FT		
MEAN DEPTH	19. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	50. FT		
SHORELINE LENGTH	0.97 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.2	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.37	AGRICULTURAL	0 %
BOTTOM SLOPE	3.6 %	FOREST OR UNPRODUCTIVE	76 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	24 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

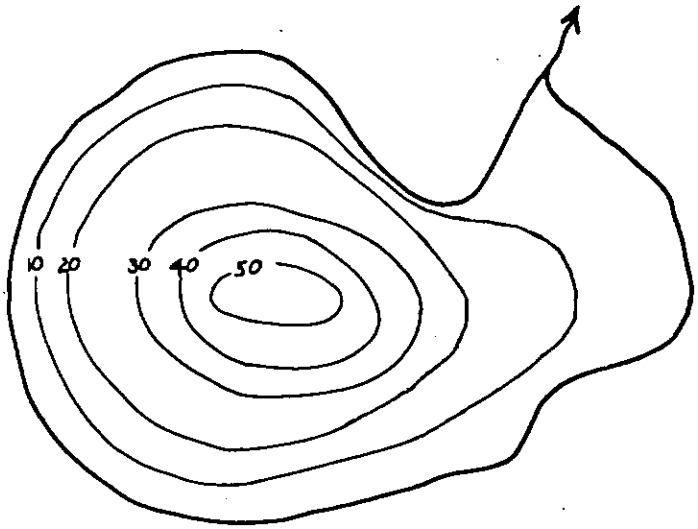
SAMPLE SITE	1	
DATE	9/14/74	
TIME	1225	1230
DEPTH (FT)	3.	46.
TOTAL NITRATE (N)	0.01	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.05	0.04
TOTAL ORGANIC NITROGEN (N)	0.00	0.04
TOTAL PHOSPHORUS (P)	0.001	0.004
TOTAL ORTHOPHOSPHATE (P)	0.001	0.002
SPECIFIC CONDUCTANCE (MICROMHOS)	17	20
WATER TEMPERATURE (DEG C)	13.7	7.1
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	43	
DISSOLVED OXYGEN	9.0	6.7

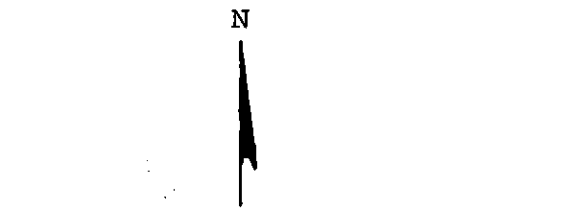
LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/14/74
TIME	1200
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE DRAINS TO ELK LAKE. TREES AND SHRUBS OVERHANG THE SHORELINE. AQUATIC PLANTS WERE VERY SPARSE. THE LITTORAL BOTTOM IS SILT. EXCEPT FOR THE LAST THREE FEET OF WATER, THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN. FLOATING AND SUBMERGED LOGS COVERED THE SHORELINE.





EXPLANATION

— 20 —

Line of equal
water depth
Interval 10 feet

Hanaford Lake, Skamania County. From Washington Department of Game, September 8, 1954.

Hanaford Lake, Skamania County. July 31, 1968. Approx. scale 1:12,000.

NORTHWESTERN LAKE SKAMANIA COUNTY

LATITUDE 45*46' 3" LONGITUDE 121*32'15" T3N-R10E-10
WHITE SALMON RIVER

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	385. SQ MI	RESIDENTIAL DEVELOPMENT	18 %
ALTITUDE	301. FT		
LAKE AREA	100. ACRES	NUMBER OF NEARSHORE HOMES	34
LAKE VOLUME	2100. ACRE-FT		
MEAN DEPTH	21. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	120. FT		
SHORELINE LENGTH	5.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	3.8	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.17	AGRICULTURAL	5 %
BOTTOM SLOPE	5.1 %	FOREST OR UNPRODUCTIVE	95 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	<1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

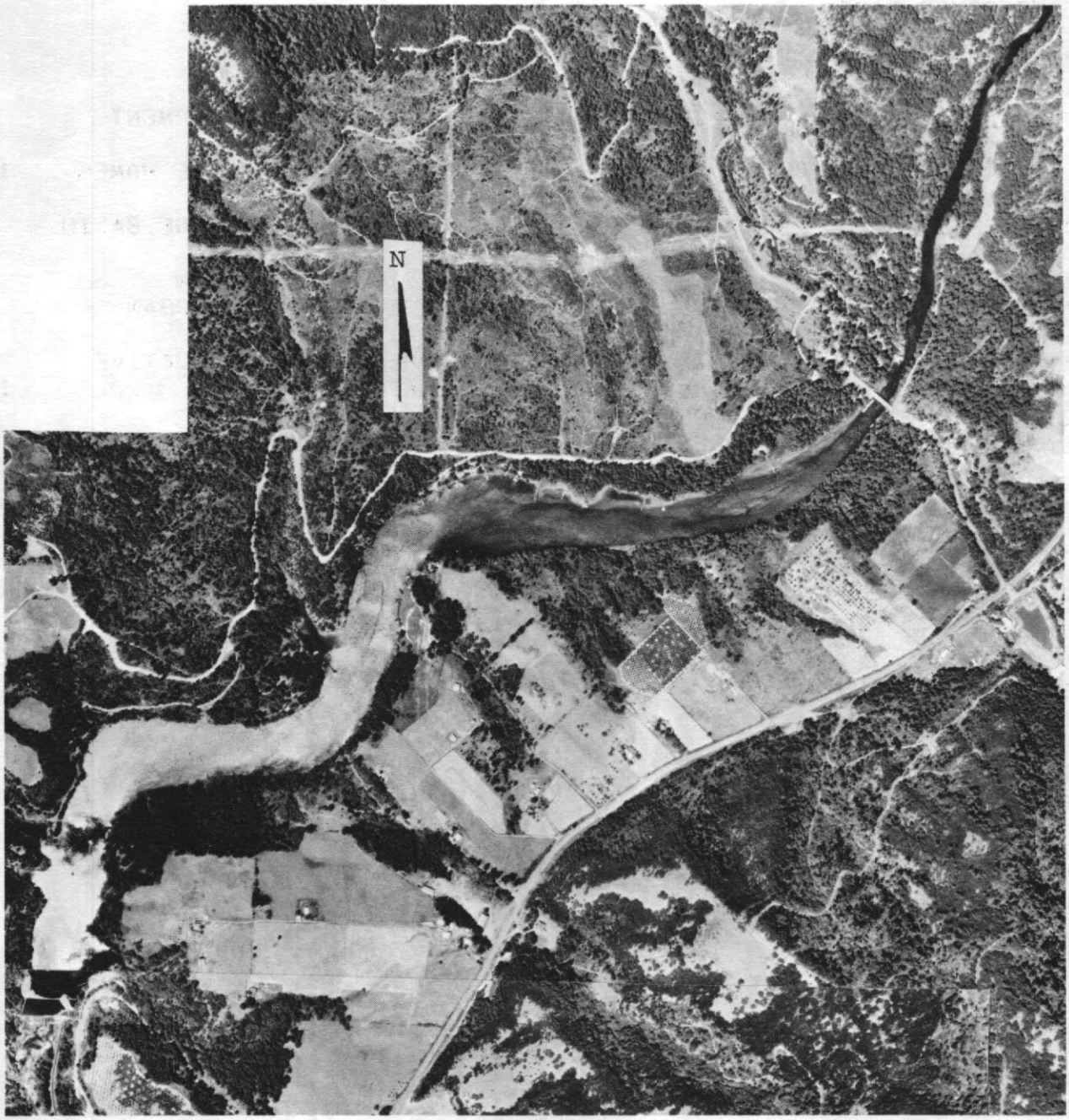
SAMPLE SITE	1	
DATE	9/10/74	
TIME	1445	1450
DEPTH (FT)	3.	20.
TOTAL NITRATE (N)	0.12	0.12
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.03	0.04
TOTAL ORGANIC NITROGEN (N)	0.00	0.00
TOTAL PHOSPHORUS (P)	0.027	0.030
TOTAL ORTHOPHOSPHATE (P)	0.027	0.030
SPECIFIC CONDUCTANCE (MICROMHOS)	70	70
WATER TEMPERATURE (DEG C)	9.5	9.0
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	16	
DISSOLVED OXYGEN	11.2	11.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/10/74
TIME	1507
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

A RESERVOIR FORMED BY A DAM ON THE WHITE SALMON RIVER AND USED FOR HYDROPOWER BY PACIFIC POWER AND LIGHT COMPANY. AQUATIC MACROPHYTES WERE SPARSE. THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN.



Northwestern Lake, Skamania County. June 18, 1968. Approx. scale 1:12,000.

SPIRIT LAKE SKAMANIA COUNTY

LATITUDE 46*15'58" LONGITUDE 122* 9'36" T9N-R5E-15
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	14.9 SQ MI	RESIDENTIAL DEVELOPMENT	8 %
ALTITUDE	3198. FT		
LAKE AREA	1300. ACRES	NUMBER OF NEARSHORE HOMES	15
LAKE VOLUME	160000. ACRE-FT		
MEAN DEPTH	130. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	190. FT		
SHORELINE LENGTH	8.8 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.8	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.69	AGRICULTURAL	0 %
BOTTOM SLOPE	2.2 %	FOREST OR UNPRODUCTIVE	86 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	14 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

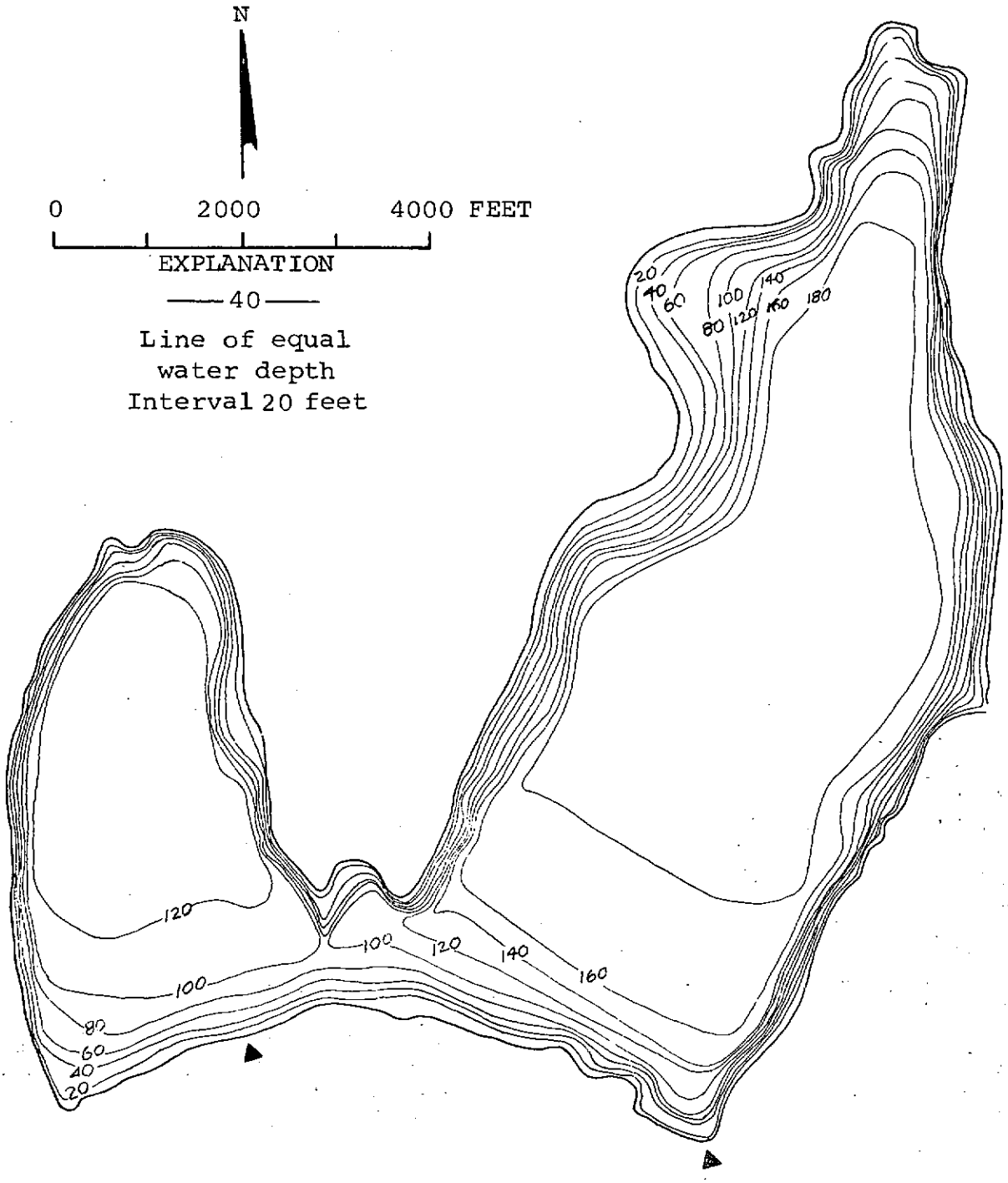
SAMPLE SITE	1	
DATE	8/ 7/74	
TIME	1250	1300
DEPTH (FT)	3.	171.
TOTAL NITRATE (N)	0.00	0.20
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.01	0.01
TOTAL ORGANIC NITROGEN (N)	0.09	0.05
TOTAL PHOSPHORUS (P)	0.002	0.012
DISSOLVED ORTHOPHOSPHATE (P)	0.002	0.009
SPECIFIC CONDUCTANCE (MICROMHOS)	25	35
WATER TEMPERATURE (DEG C)	16.0	4.0
COLOR (PLATINUM-COBALT UNITS)	5	5
SECCHI-DISC VISIBILITY (FT)	36	
DISSOLVED OXYGEN	9.0	1.9

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

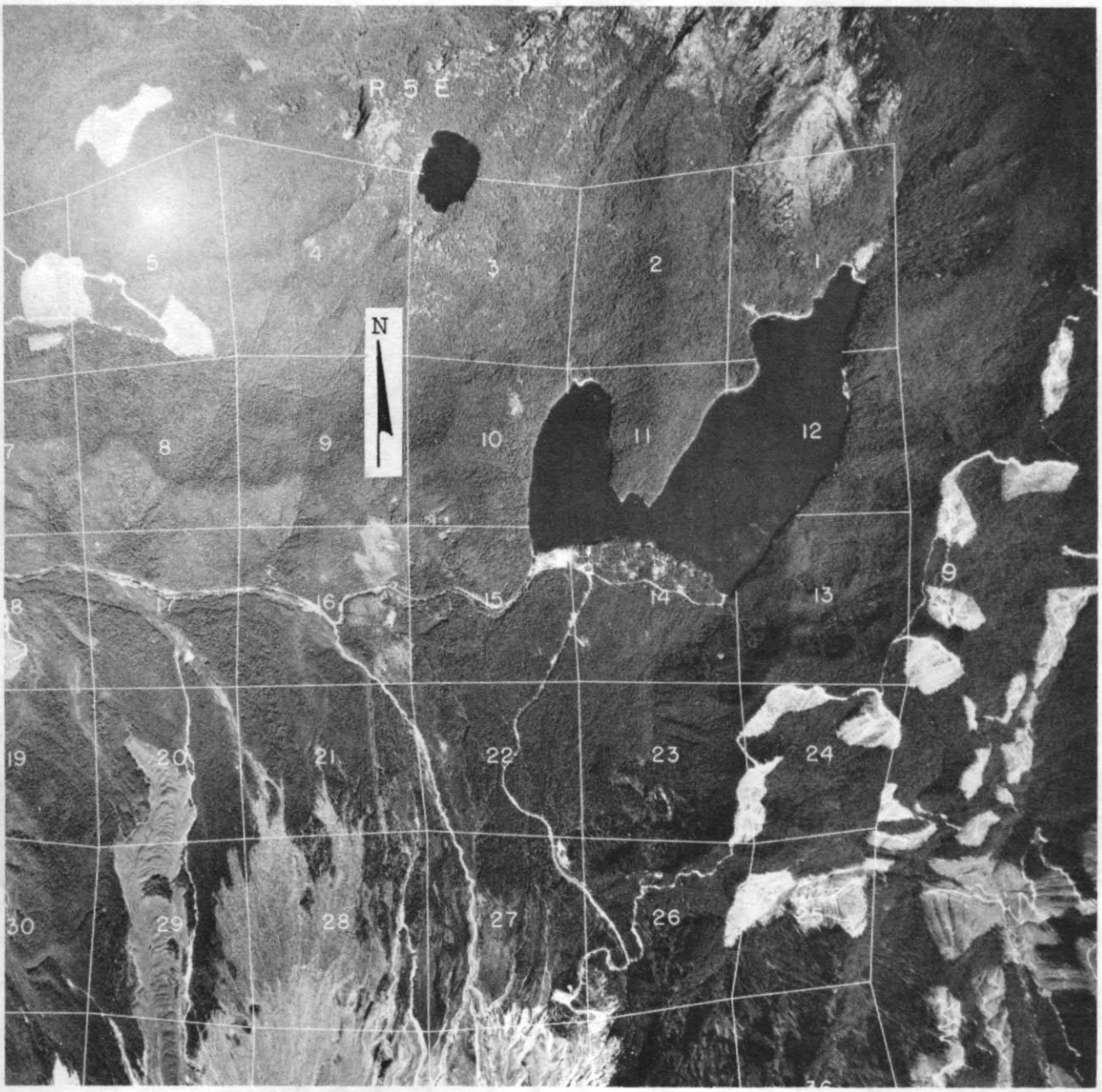
DATE	8/ 7/74
TIME	1540
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE RECEIVES INFLOW FROM BEAR CREEK AND FIVE SMALLER TRIBUTARIES. NO EMERSED PLANTS WERE OBSERVED. THE GRAVEL, SAND, AND ROCK LITTORAL BOTTOM SUPPORTED SCATTERED BEDS OF MOSS. THE DO WAS NEAR SATURATION TO A DEPTH OF 130 FEET. FLOATING AND SUBMERGED LOGS WERE OBSERVED LOCALLY ALONG THE SHORELINE. IN 1974 THE LAKE WAS SAMPLED FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 7, 1974.



Spirit Lake, Skamania County. From
U.S. Geological Survey, October 17, 1974.



Spirit Lake, Skamania County. August 22, 1969. Approx. scale 1:63,000.

STEVENSON LAKE SKAMANIA COUNTY

LATITUDE 45*41'25" LONGITUDE 121*53'17" T2N-R7E-1
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	42.2 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	75. FT		
LAKE AREA	62. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	380. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	15. FT		
SHORELINE LENGTH	2.8 MI	RESIDENTIAL URBAN	<1 %
SHORELINE CONFIGURATION	2.5	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.41	AGRICULTURAL	1 %
BOTTOM SLOPE	0.81 %	FOREST OR UNPRODUCTIVE	99 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	<1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

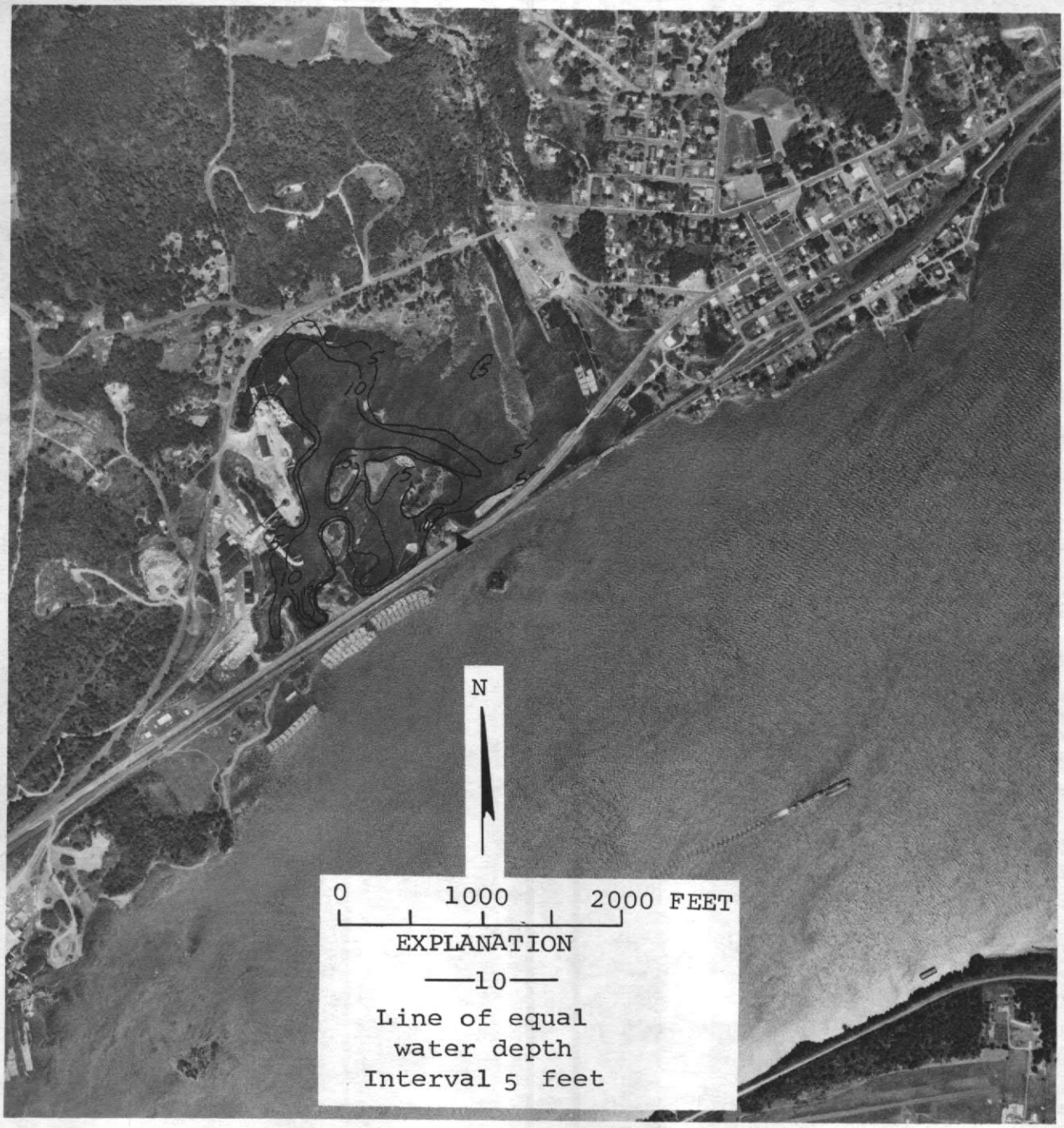
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1345	1350
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.05	0.06
TOTAL ORGANIC NITROGEN (N)	0.20	0.22
TOTAL PHOSPHORUS (P)	0.041	0.048
TOTAL ORTHOPHOSPHATE (P)	0.005	0.008
SPECIFIC CONDUCTANCE (MICROMHOS)	130	130
WATER TEMPERATURE (DEG C)	19.2	18.5
COLOR (PLATINUM-COBALT UNITS)	0	5
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	9.0	8.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1404
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	6
FECAL COLIFORM, MEAN (COL./100ML)	4

REMARKS

THE LAKE IS SEPARATED FROM THE COLUMBIA RIVER BY A HIGHWAY FILL AND RECEIVES INFLOW FROM ROCK CREEK AND BACKWATER FROM THE COLUMBIA RIVER. THE DRAINAGE AREA AND LAND USE DATA DO NOT REFLECT DRAINAGE FROM THE COLUMBIA RIVER. THE LAKE IS USED FOR LOG STORAGE. AQUATIC MACROPHYTES WERE VERY SPARSE.



Stevenson Lake, Skamania County. Bathymetric map from U.S. Geological Survey, February 25, 1974. Aerial photo, June 18, 1968.

SWIFT LAKE SKAMANIA COUNTY

LATITUDE 46* 3'38" LONGITUDE 122*11'44" T7N-R5E-28
LEWIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	481. SQ MI	RESIDENTIAL DEVELOPMENT	6 %
ALTITUDE	1000. FT		
LAKE AREA	4600. ACRES	NUMBER OF NEARSHORE HOMES	40
LAKE VOLUME	760000. ACRE-FT		
MEAN DEPTH	160. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	380. FT		
SHORELINE LENGTH	33. MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	3.5	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.44	AGRICULTURAL	0 %
BOTTOM SLOPE	2.3 %	FOREST OR UNPRODUCTIVE	99 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

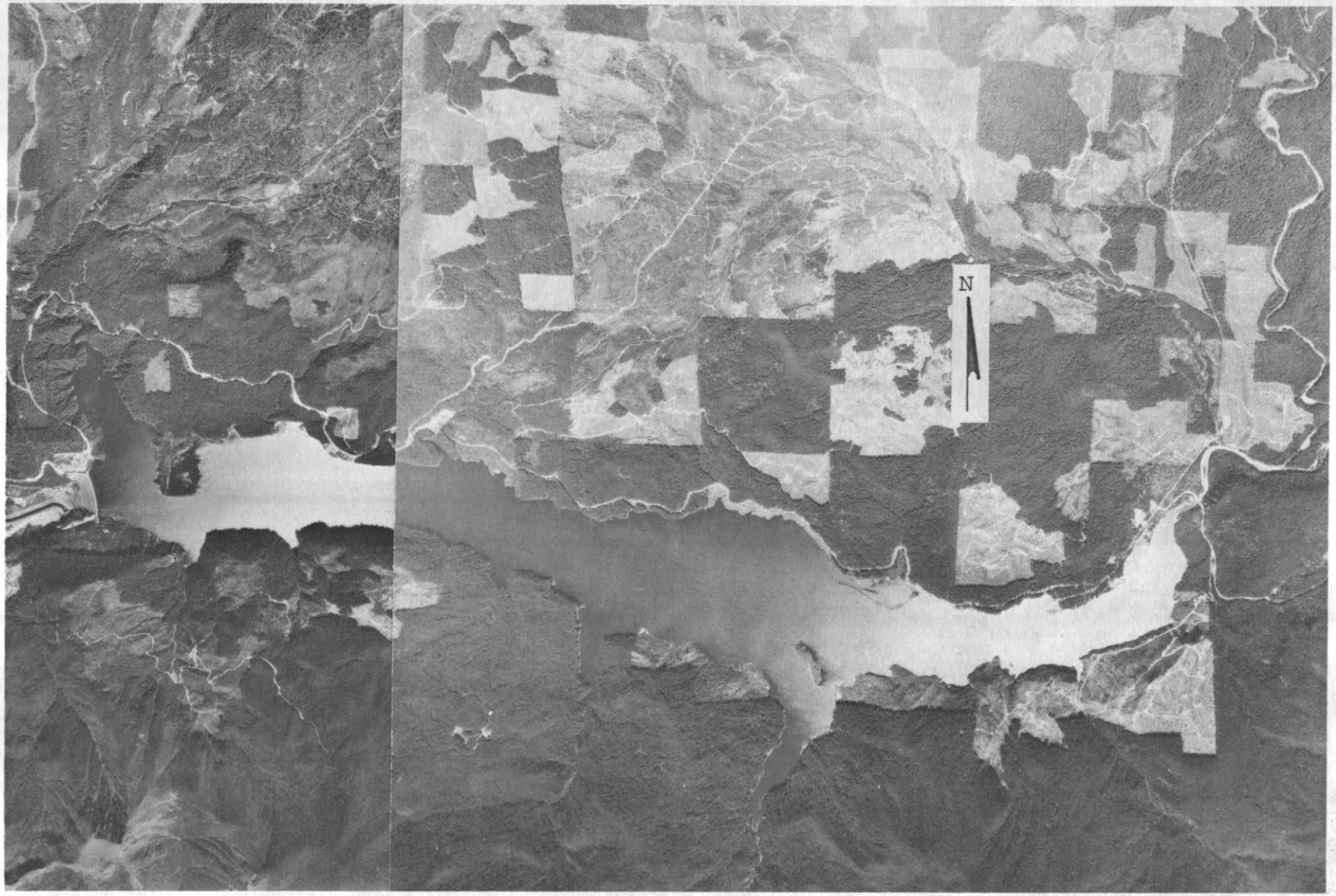
SAMPLE SITE	1		2	
DATE	9/13/74		9/14/74	
TIME	1825	1830	1000	1005
DEPTH (FT)	3.	164.	3.	118.
TOTAL NITRATE (N)	0.00	0.03	0.00	0.06
TOTAL NITRITE (N)	0.00	0.01	0.00	0.01
TOTAL AMMONIA (N)	0.02	0.05	0.06	0.05
TOTAL ORGANIC NITROGEN (N)	0.13	0.02	0.11	0.08
TOTAL PHOSPHORUS (P)	0.008	0.020	0.010	0.030
TOTAL ORTHOPHOSPHATE (P)	0.002	0.014	0.003	0.011
SPECIFIC CONDUCTANCE (MICROMHOS)	37	38	41	38
WATER TEMPERATURE (DEG C)	17.7	4.8	16.2	5.7
COLOR (PLATINUM-COBALT UNITS)	5	10	10	10
SECCHI-DISC VISIBILITY (FT)	11		9	
DISSOLVED OXYGEN	9.4	10.2	9.3	8.8

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

DATE	9/13/74
TIME	1218
NUMBER OF FECAL COLIFORM SAMPLES	7
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A RESERVOIR FORMED BY A DAM ON THE LEWIS RIVER AND USED FOR HYDROPOWER BY PACIFIC POWER AND LIGHT. AQUATIC MACROPHYTES WERE SPARSE. ALGAL BLOOMS WERE OBSERVED IN THE SHELTERED BAYS. THE DO WAS NEAR SATURATION THROUGHOUT THE WATER COLUMN. LOGS AND WOOD DEBRIS COVERED THE SHORELINE IN LOCAL AREAS.



Swift Lake, Skamania County. August 22, 1969. Approx. scale 1:63,000.

UNNAMED (2N-6E-35) LAKE SKAMANIA COUNTY

LATITUDE 45*36'57" LONGITUDE 122* 2'24" T2N-R6E-35
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	5.80 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	50. FT		
LAKE AREA	36. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	290. ACRE-FT		
MEAN DEPTH	8. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	14. FT		
SHORELINE LENGTH	1.4 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.7	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.58	AGRICULTURAL	2 %
BOTTOM SLOPE	0.99 %	FOREST OR UNPRODUCTIVE	97 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

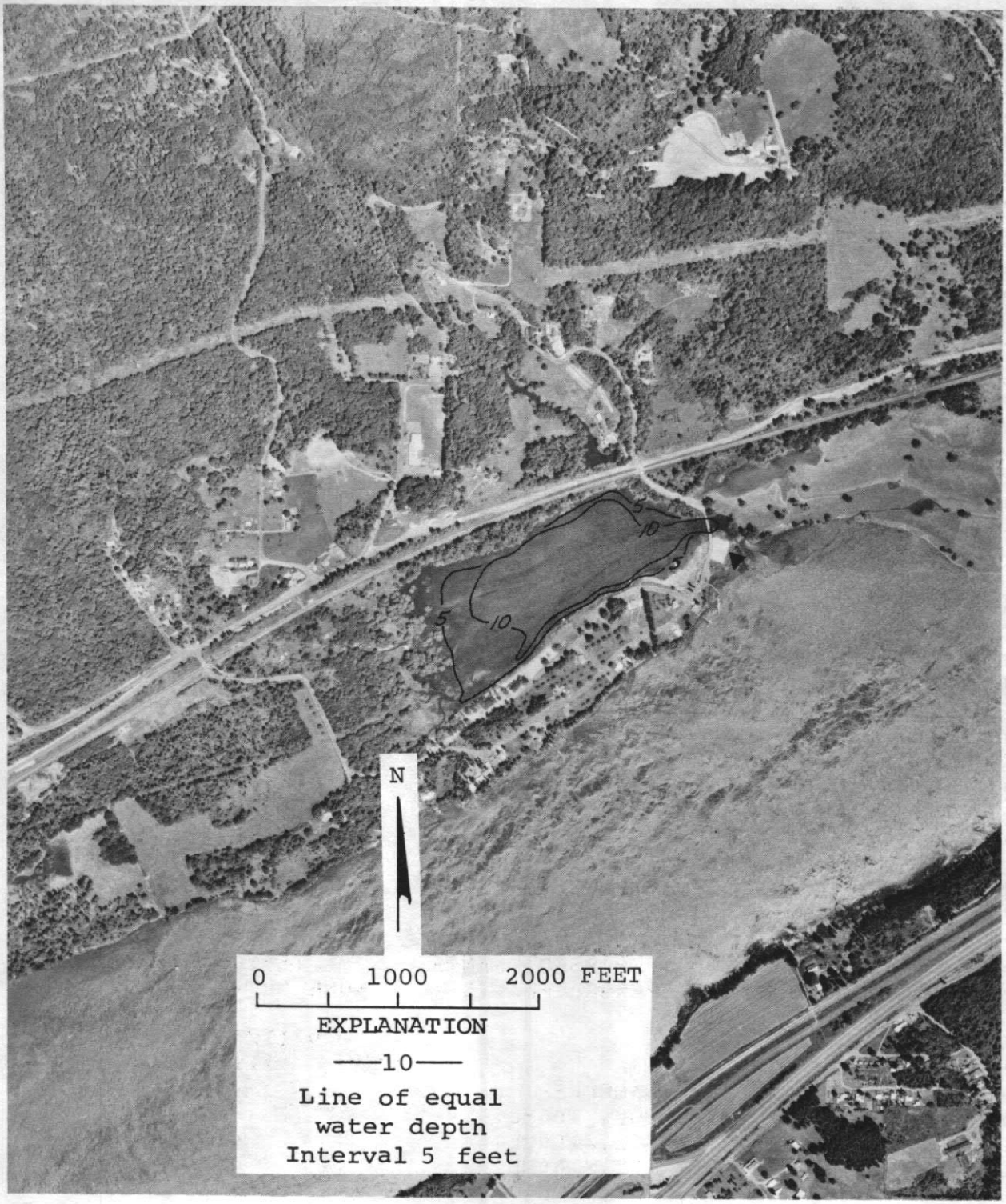
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1100	1105
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.22	0.18
TOTAL ORGANIC NITROGEN (N)	0.57	0.60
TOTAL PHOSPHORUS (P)	0.064	0.059
TOTAL ORTHOPHOSPHATE (P)	0.010	0.008
SPECIFIC CONDUCTANCE (MICROMHOS)	52	52
WATER TEMPERATURE (DEG C)	19.1	19.0
COLOR (PLATINUM-COBALT UNITS)	20	25
SECCHI-DISC VISIBILITY (FT)	2	
DISSOLVED OXYGEN	8.8	8.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1117
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS BETWEEN THE COLUMBIA RIVER AND A HIGHWAY AND RAILROAD FILL. INFLOW TO THE LAKE IS FROM DUNCUN CREEK. THE OUTFLOW TO THE COLUMBIA RIVER IS CONTROLLED BY A DAM. EMERSED PLANTS (GRASSES) COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE. AN ALGAL BLOOM WAS OBSERVED.



Unnamed (2N-6E-35) Lake, Skamania County. Bathymetric map from U.S. Geological Survey, February 26, 1974. Aerial photo, June 18, 1968.

VENUS LAKE SKAMANIA COUNTY

LATITUDE 46°20'35" LONGITUDE 122° 9' 4" T10N-R5E-14
COWLITZ RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.20 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	4920. FT		
LAKE AREA	20. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	930. ACRE-FT		
MEAN DEPTH	47. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	140. FT		
SHORELINE LENGTH	0.79 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.35	AGRICULTURAL	0 %
BOTTOM SLOPE	13. %	FOREST OR UNPRODUCTIVE	84 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	16 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

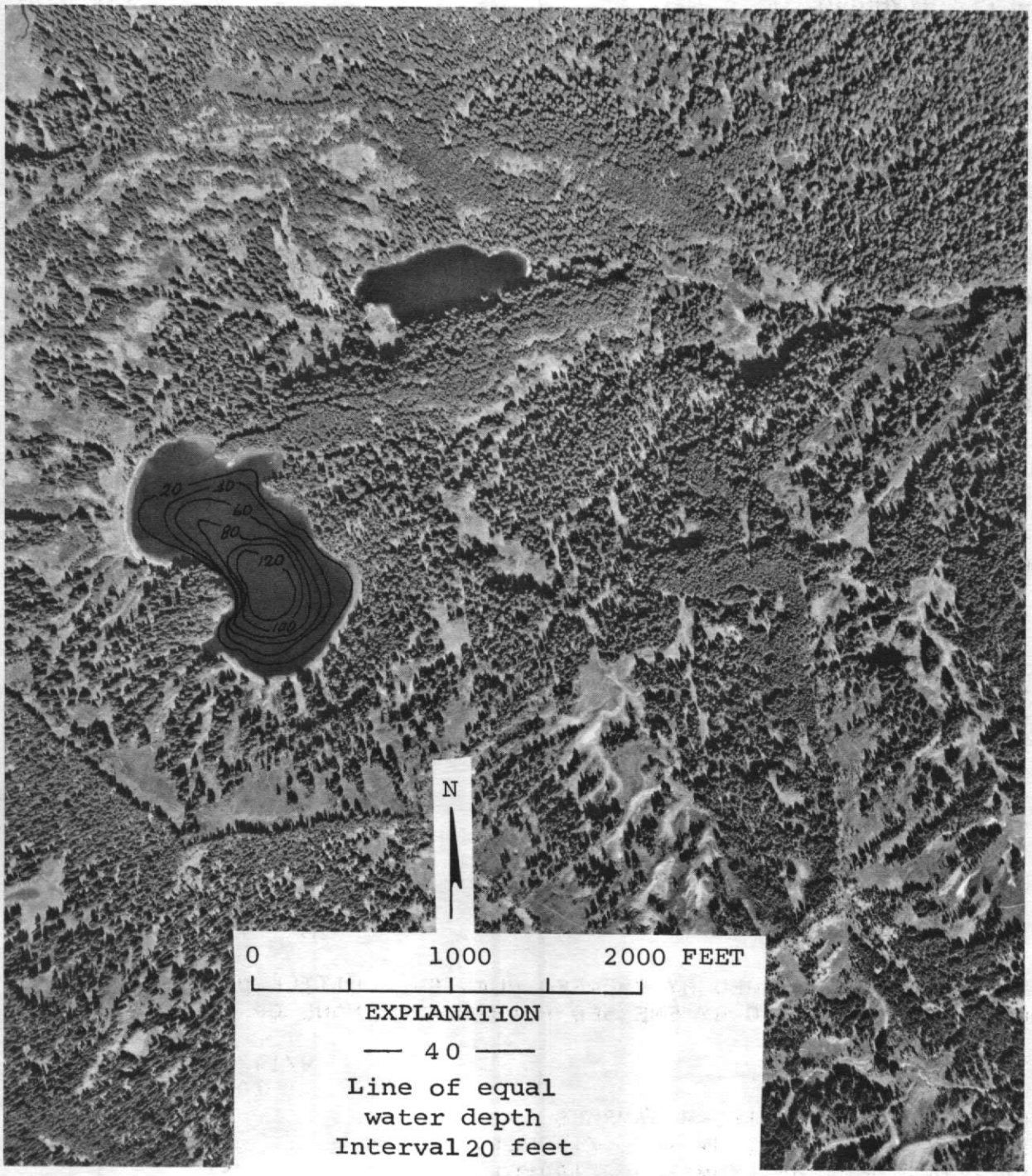
SAMPLE SITE	1	
DATE	9/14/74	
TIME	1135	1140
DEPTH (FT)	3.	125.
TOTAL NITRATE (N)	0.01	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.04	0.03
TOTAL ORGANIC NITROGEN (N)	0.10	0.08
TOTAL PHOSPHORUS (P)	0.002	0.007
TOTAL ORTHOPHOSPHATE (P)	0.001	0.001
SPECIFIC CONDUCTANCE (MICROMHOS)	9	12
WATER TEMPERATURE (DEG C)	9.4	3.8
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	66	
DISSOLVED OXYGEN	9.5	7.2

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

DATE	9/14/74
TIME	1053
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

NO AQUATIC PLANTS WERE OBSERVED. THE DO WAS NEAR SATURATION THROUGHOUT THE ENTIRE WATER COLUMN. THE LITTORAL BOTTOM IS ROCK, COBBLE, OR SAND.



Venus Lake, Skamania County. Bathymetric map from U.S. Geological Survey, September 19, 1974. Aerial photo, 1968.

WAUNA LAKE SKAMANIA COUNTY

LATITUDE 45*39'38" LONGITUDE 121*55' 0" T2N-R7E-14
COLUMBIA RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.26 SQ MI	RESIDENTIAL DEVELOPMENT	44 %
ALTITUDE	260. FT		
LAKE AREA	54. ACRES	NUMBER OF NEARSHORE HOMES	32
LAKE VOLUME	2900. ACRE-FT		
MEAN DEPTH	54. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	120. FT		
SHORELINE LENGTH	1.4 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	16 %
DEVELOPMENT OF VOLUME	0.46	AGRICULTURAL	0 %
BOTTOM SLOPE	6.8 %	FOREST OR UNPRODUCTIVE	47 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	37 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

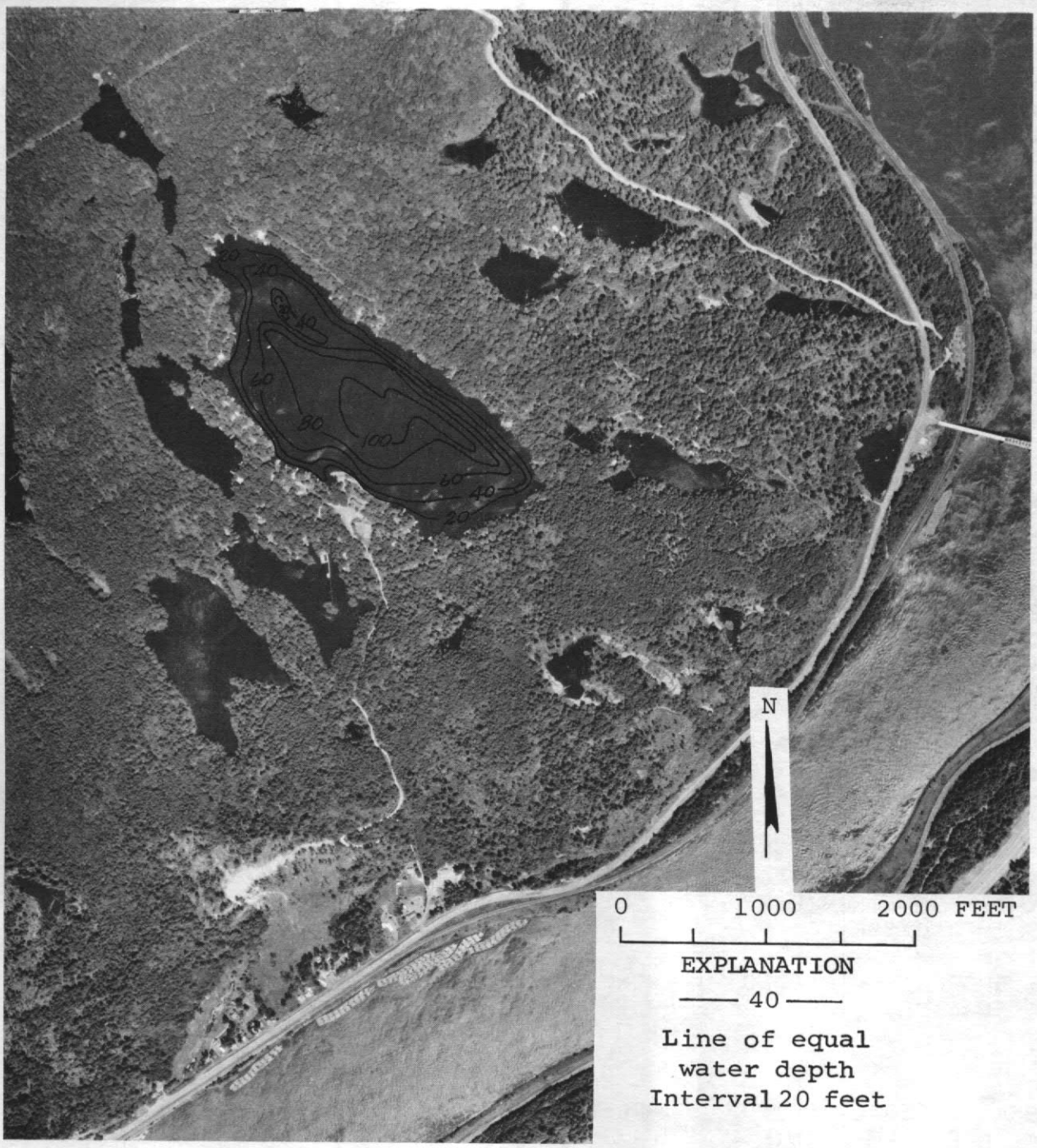
SAMPLE SITE	1	
DATE	9/11/74	
TIME	1105	1110
DEPTH (FT)	3.	79.
TOTAL NITRATE (N)	0.01	0.02
TOTAL NITRITE (N)	0.00	0.08
TOTAL AMMONIA (N)	0.03	0.21
TOTAL ORGANIC NITROGEN (N)	0.22	0.01
TOTAL PHOSPHORUS (P)	0.012	0.15
TOTAL ORTHOPHOSPHATE (P)	0.003	0.13
SPECIFIC CONDUCTANCE (MICROMHOS)	90	90
WATER TEMPERATURE (DEG C)	20.3	4.4
COLOR (PLATINUM-COBALT UNITS)	0	0
SECCHI-DISC VISIBILITY (FT)	15	
DISSOLVED OXYGEN	9.4	0.9

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	9/11/74
TIME	1528
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS ONE OF THE LARGEST IN A GROUP OF LAKES LOCATED NEAR THE TOWN OF NORTH BONNEVILLE ON THE COLUMBIA RIVER. TREES AND SHRUBS OVERHANG THE WATER ALONG MOST OF THE SHORE. EMERSED PLANTS (SEDGES) COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE.



Wauna Lake, Skamania County. Bathymetric map
from U.S. Geological Survey, February 25, 1974.
Aerial photo, June 18, 1968.

BALD HILL LAKE THURSTON COUNTY

LATITUDE 46*49' 4" LONGITUDE 122*26'33" T15N-R3E-4
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.42 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	633. FT		
LAKE AREA	45. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	280. ACRE-FT		
MEAN DEPTH	6. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	11. FT		
SHORELINE LENGTH	1.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.56	AGRICULTURAL	0 %
BOTTOM SLOPE	0.70 %	FOREST OR UNPRODUCTIVE	95 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	5 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	8/16/74	
TIME	1205	1210
DEPTH (FT)	1.	3.
TOTAL NITRATE (N)	0.01	0.03
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.56	0.96
TOTAL ORGANIC NITROGEN (N)	0.54	0.62
TOTAL PHOSPHORUS (P)	0.053	0.18
TOTAL ORTHOPHOSPHATE (P)	0.018	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	40	55
WATER TEMPERATURE (DEG C)	15.7	15.3
COLOR (PLATINUM-COBALT UNITS)	>60	>60
SECCHI-DISC VISIBILITY (FT)	1	
DISSOLVED OXYGEN	1.3	0.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	76-100 %

DATE	8/16/74
TIME	1220
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

APPROXIMATELY 90 PERCENT OF THE LAKE WAS COVERED WITH EMERSED AQUATIC PLANTS (MOSTLY WHITE LILIES). THE WATER HAD A DISTINCT ODOR WHICH WAS PROBABLY FROM DECAYING VEGETATION. THE WATER COLOR WAS TOO DARK TO DETERMINE BY USING THE STANDARD COLOR UNITS, BUT THE COLOR WAS ESTIMATED AS GREATER THAN 60 PT-CO UNITS. THE BOTTOM OF THE LAKE AT THE SAMPLE SITE WAS VERY SOFT SILTY MUCK.

Bald Hill Lake, Thurston County. Bathymetric map from U.S. Geological Survey, February 6, 1974. Aerial photo, August 27, 1972.

BLACK LAKE THURSTON COUNTY

LATITUDE 47* 0'36" LONGITUDE 122*57'50" T18N-R2W-32
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	10.1 SQ MI	RESIDENTIAL DEVELOPMENT	84 %
ALTITUDE	131. FT		
LAKE AREA	570. ACRES	NUMBER OF NEARSHORE HOMES	145
LAKE VOLUME	11000. ACRE-FT		
MEAN DEPTH	19. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	29. FT		
SHORELINE LENGTH	6.0 MI	RESIDENTIAL URBAN	1 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	2 %
DEVELOPMENT OF VOLUME	0.65	AGRICULTURAL	33 %
BOTTOM SLOPE	2.8 %	FOREST OR UNPRODUCTIVE	55 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	9 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

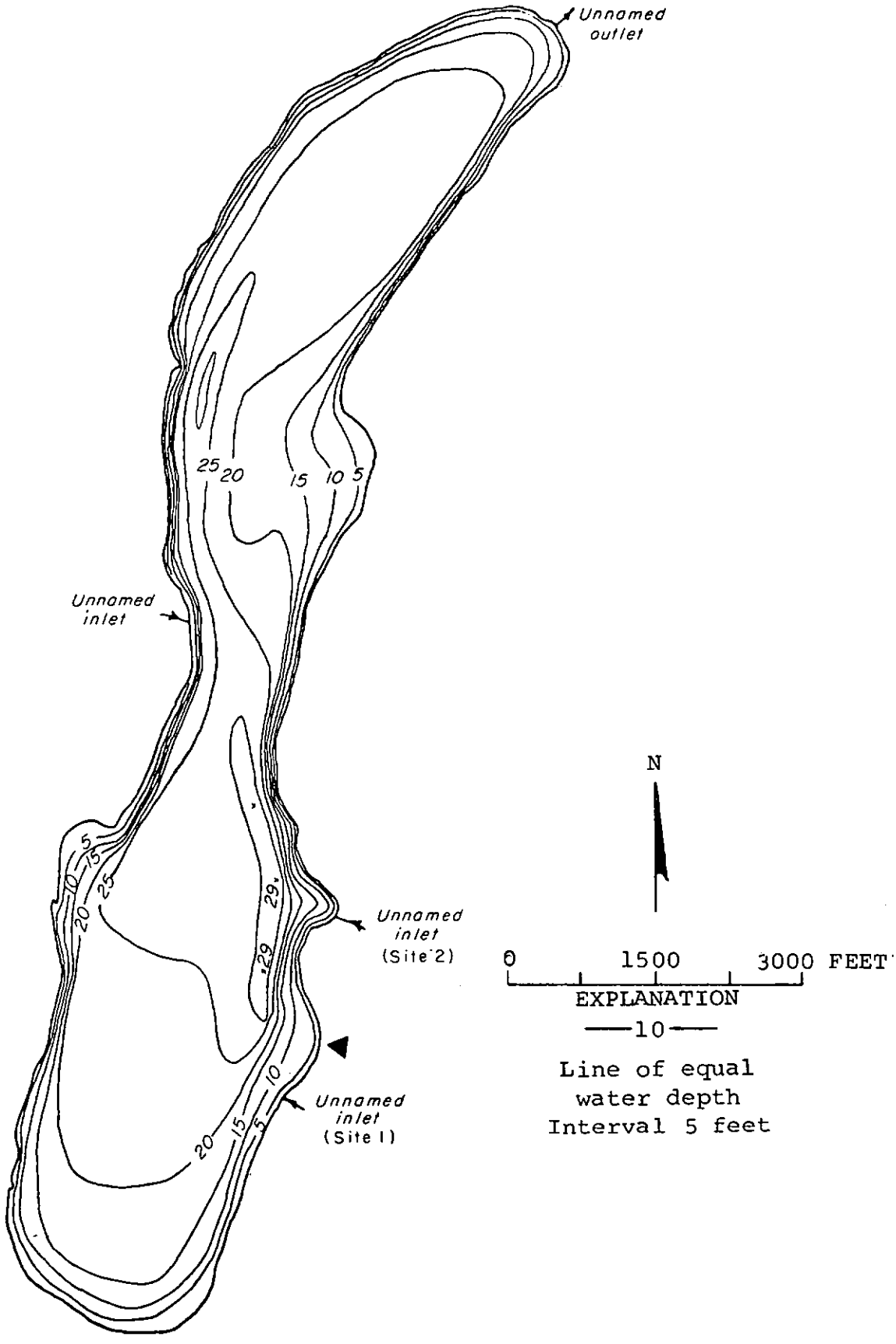
SAMPLE SITE	1	
DATE	7/ 7/71	
TIME	1230	1235
DEPTH (FT)	3.	23.
DISSOLVED NITRATE (N)	0.05	0.06
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.23	0.11
TOTAL ORGANIC NITROGEN (N)	0.01	0.00
TOTAL PHOSPHORUS (P)	0.020	0.020
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	55	64
WATER TEMPERATURE (DEG C)	18.0	14.0
COLOR (PLATINUM-COBALT UNITS)	--	--
SECCHI-DISC VISIBILITY (FT)	8	
DISSOLVED OXYGEN	9.7	0.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/19/74
TIME	1415
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	53
FECAL COLIFORM, MEAN (COL./100ML)	17

REMARKS

THE LAKE IS FED BY TWO UNNAMED PERENNIAL TRIBUTARIES WHICH DRAIN MARSH OR WETLAND. MOST OF THE EMERSED AND SUBMERSED AQUATIC PLANT GROWTH WAS AT THE NORTH AND SOUTH ENDS OF THE LAKE. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON SEPTEMBER 21, 1971. COLOR WAS NOT DETERMINED ON WATER QUALITY SAMPLING DATE SHOWN ABOVE, BUT THE AVERAGE OF THREE COLOR DETERMINATIONS MADE IN 1971 WAS 55 PT-CO UNITS.



Black Lake, Thurston County. From U.S. Geological Survey, August 23, 1971.

Black Lake, Thurston County. September 2, 1973. Approx. scale 1:18,000.

CAPITOL LAKE THURSTON COUNTY

LATITUDE 47° 2'37" LONGITUDE 122°54'29" T18N-R2W-15
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	185. SQ MI	RESIDENTIAL DEVELOPMENT	2 %
ALTITUDE	0. FT		
LAKE AREA	270. ACRES	NUMBER OF NEARSHORE HOMES	2
LAKE VOLUME	2400. ACRE-FT		
MEAN DEPTH	9. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	20. FT		
SHORELINE LENGTH	5.3 MI	NOT DETERMINED	
SHORELINE CONFIGURATION	2.3		
DEVELOPMENT OF VOLUME	0.43		
BOTTOM SLOPE	0.51 %		
BASIN GEOLOGY	SED./META.		
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1		2	
DATE	6/17/74		6/17/74	
TIME	1310	1315	1135	1145
DEPTH (FT)	3.	8.	3.	11.
TOTAL NITRATE (N)	0.00	--	0.00	0.04
TOTAL NITRITE (N)	0.00	--	0.00	0.00
TOTAL AMMONIA (N)	0.07	--	0.03	0.04
TOTAL ORGANIC NITROGEN (N)	0.52	--	0.42	0.22
TOTAL PHOSPHORUS (P)	0.071	--	0.044	0.029
DISSOLVED ORTHOPHOSPHATE (P)	0.009	--	0.004	0.004
SPECIFIC CONDUCTANCE (MICROMHOS)	99	99	99	116
WATER TEMPERATURE (DEG C)	18.5	16.0	22.0	18.0
COLOR (PLATINUM-COBALT UNITS)	35	--	30	30
SECCHI-DISC VISIBILITY (FT)	3		5	
DISSOLVED OXYGEN	12.7	12.0	10.8	9.0

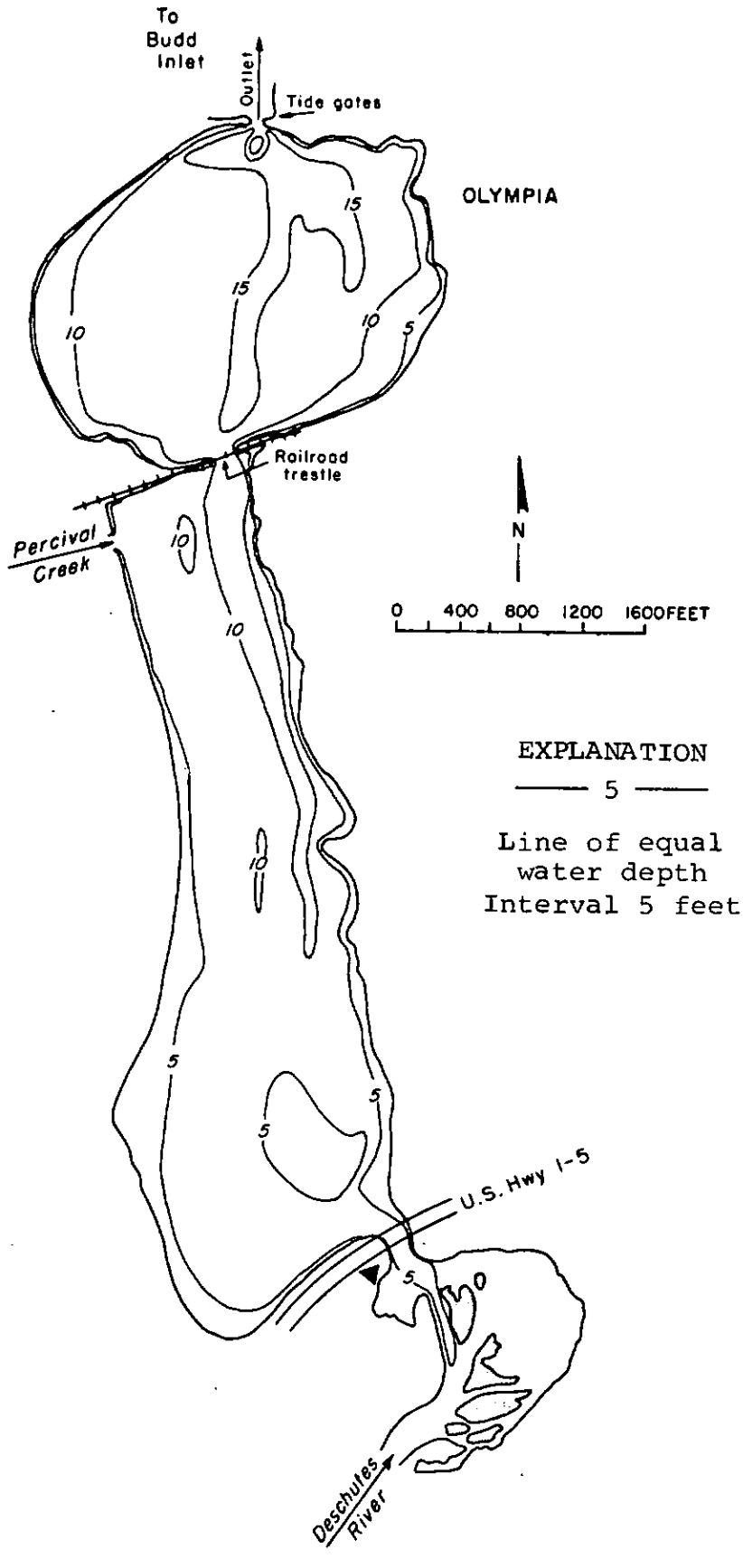
LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	6/17/74
TIME	1235
NUMBER OF FECAL COLIFORM SAMPLES	6
FECAL COLIFORM, MINIMUM (COL./100ML)	3
FECAL COLIFOPM, MAXIMUM (COL./100ML)	--
FECAL COLIFORM, MEAN (COL./100ML)	--

REMARKS

AN ARTIFICIAL LAKE WAS FORMED BY THE CONSTRUCTION OF A TIDE GATE IN THE BUDD INLET OF PUGET SOUND AT THE MOUTH OF THE DESCHUTES RIVER. THE LAKE IS FED BY PERCIVAL CREEK AND THE DESCHUTES RIVER.

THE WASHINGTON DEPT. OF FISHERIES IS USING THE LAKE FOR SALMON REARING(FINN AND TARR,1975). THE DEPT. OF ECOLOGY WASTE-WATER DISCHARGE MASTER INVENTORY INDICATES TWO DIFFERENT TYPES OF POINT DISCHARGES TO THE DESCHUTES RIVER. THE OLYMPIA BREWING CO. DISCHARGES WASTE WATER USED IN THE BREWERY PROCESS FROM FOUR SOURCES. THE COMBINED AVERAGE FLOW IS 1.4 MGD (MILLION GALLON PER DAY). NO PHOSPHORUS DATA ARE LISTED, BUT THE AVERAGE CONCENTRATION OF KJELDAHL NITROGEN IS GIVEN AS .002 MG/L. THE DESCHUTES RIVER RECEIVES AN AVERAGE FLOW OF 32.3 MGD FROM THE WASH DEPT. OF FISHERIES SALMON HOLDING PONDS. NO DATA ARE GIVEN ON NUTRIENT CONCENTRATIONS. ONE OF THE FECAL COLIFORM SAMPLES HAD COLONIES TOO NUMEROUS TO COUNT.



Capitol Lake, Thurston County. From
U.S. Geological Survey, December 5, 1973.

Capitol Lake, Thurston County. May 12, 1972. Approx. scale 1:15,000.

CHAMBERS LAKE THURSTON COUNTY

LATITUDE 47* 1'21" LONGITUDE 122*50' 4" T18N-R1W-29
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.83 SQ MI	RESIDENTIAL DEVELOPMENT	18 %
ALTITUDE	194. FT		
LAKE AREA	60. ACRES	NUMBER OF NEARSHORE HOMES	38
LAKE VOLUME	270. ACRE-FT		
MEAN DEPTH	5. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	8. FT		
SHORELINE LENGTH	2.2 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	16 %
DEVELOPMENT OF VOLUME	0.57	AGRICULTURAL	33 %
BOTTOM SLOPE	0.44 %	FOREST OR UNPRODUCTIVE	40 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	11 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

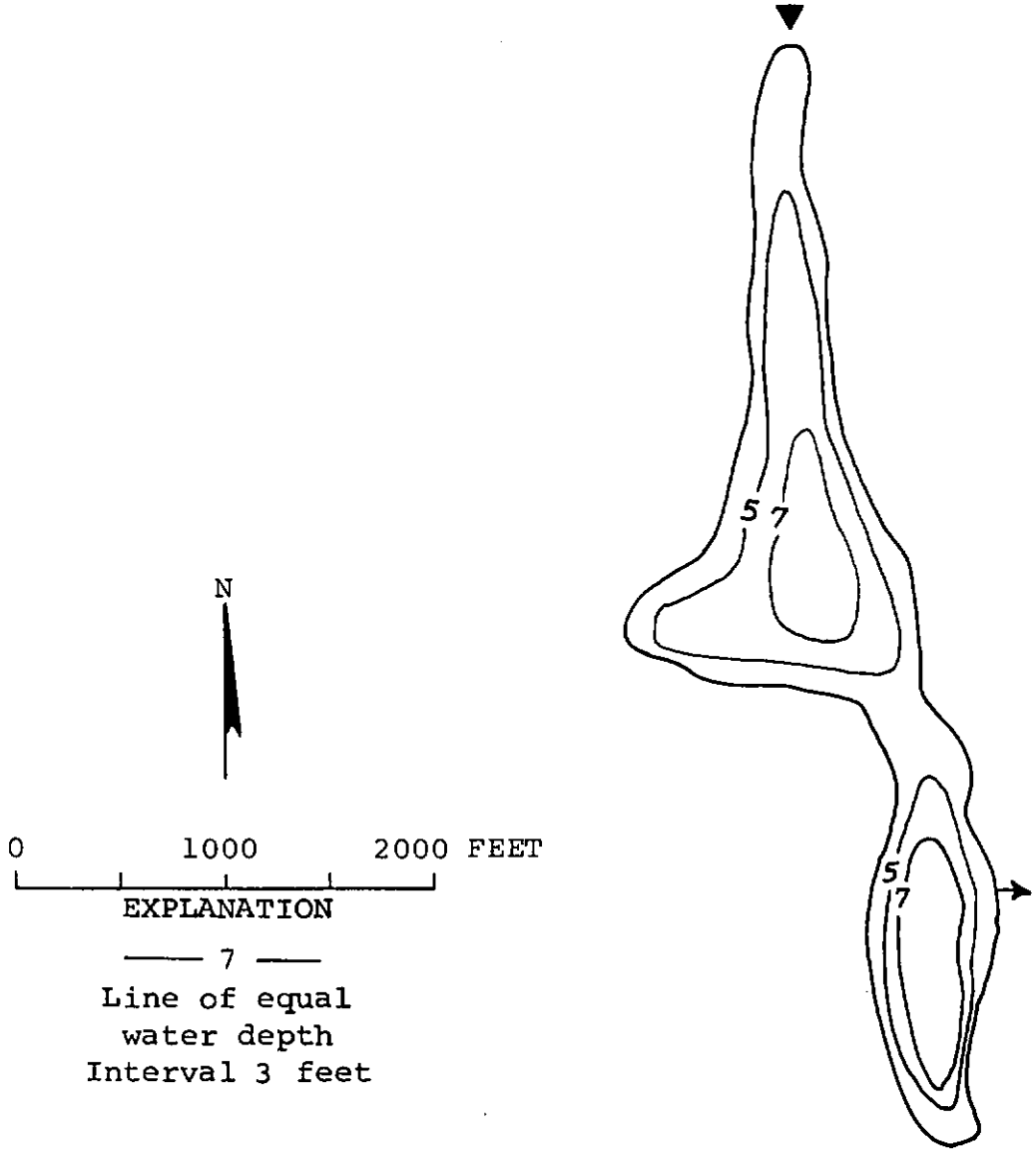
SAMPLE SITE	1		2	
DATE	8/20/74		8/20/74	
TIME	1230	1235	1305	1310
DEPTH (FT)	1.	3.	1.	3.
TOTAL NITRATE (N)	0.00	0.00	0.00	0.00
TOTAL NITRITE (N)	0.01	0.01	0.01	0.01
TOTAL AMMONIA (N)	0.17	0.16	0.20	0.22
TOTAL ORGANIC NITROGEN (N)	0.82	0.68	0.75	0.69
TOTAL PHOSPHORUS (P)	0.027	0.056	0.035	0.032
TOTAL ORTHOPHOSPHATE (P)	0.005	0.007	0.007	0.011
SPECIFIC CONDUCTANCE (MICROMHOS)	35	35	35	35
WATER TEMPERATURE (DEG C)	17.9	17.9	18.5	18.6
COLOR (PLATINUM-COBALT UNITS)	30	35	40	35
SECCHI-DISC VISIBILITY (FT)	5		6	
DISSOLVED OXYGEN	8.1	8.2	7.6	7.5

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	26- 50 %

DATE	8/20/74
TIME	1245
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	8
FECAL COLIFORM, MEAN (COL./100ML)	4

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. EMERSED AQUATIC PLANTS COVERED APPROXIMATELY 25-30 PERCENT OF THE LAKE SURFACE. SUBMERSED AQUATIC PLANTS COVERED MOST OF THE LAKE BOTTOM. THE LITTORAL BOTTOM IS SOFT ORGANIC MUCK. THE SHORE NORTHWEST OF THE LAKE IS MARSHY. THE U.S. GEOLOGICAL SURVEY WILL SAMPLE THE LAKE FOUR TIMES IN 1975.



Chambers Lake, Thurston County. From Washington Department of Game, August 14, 1959.

Chambers Lake, Thurston County. May 12, 1972. Approx. scale 1:12,000.

CHAMBERS, LITTLE LAKE THURSTON COUNTY

LATITUDE 47* 1' 5" LONGITUDE 122*49'56" T18N-R1W-29
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.51 SQ MI	RESIDENTIAL DEVELOPMENT	28 %
ALTITUDE	194. FT		
LAKE AREA	58. ACRES	NUMBER OF NEARSHORE HOMES	26
LAKE VOLUME	240. ACRE-FT		
MEAN DEPTH	4. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	7. FT		
SHORELINE LENGTH	1.2 MI	RESIDENTIAL URBAN	6 %
SHORELINE CONFIGURATION	1.1	RESIDENTIAL SUBURBAN	22 %
DEVELOPMENT OF VOLUME	0.58	AGRICULTURAL	31 %
BOTTOM SLOPE	0.39 %	FOREST OR UNPRODUCTIVE	29 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	12 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

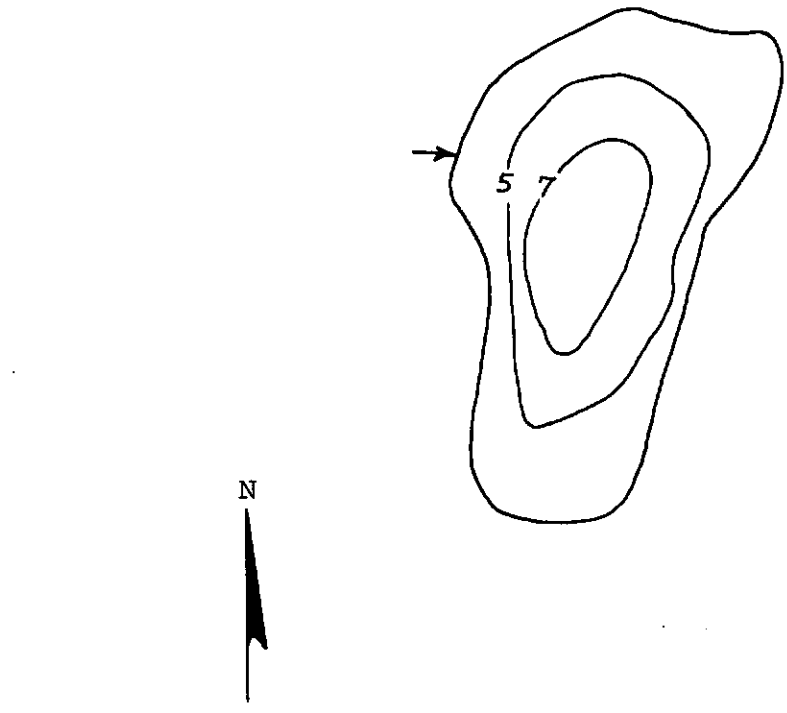
SAMPLE SITE	1	
DATE	8/20/74	
TIME	1350	1355
DEPTH (FT)	1.	3.
TOTAL NITRATE (N)	0.00	0.01
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.17	0.16
TOTAL ORGANIC NITROGEN (N)	0.79	0.78
TOTAL PHOSPHORUS (P)	0.023	0.046
TOTAL ORTHOPHOSPHATE (P)	0.006	0.006
SPECIFIC CONDUCTANCE (MICROMHOS)	35	35
WATER TEMPERATURE (DEG C)	18.1	18.1
COLOR (PLATINUM-COBALT UNITS)	40	35
SECCHI-DISC VISIBILITY (FT)	5	
DISSOLVED OXYGEN	8.5	8.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	11- 25 %

DATE	8/20/74
TIME	1400
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	7
FECAL COLIFORM, MAXIMUM (COL./100ML)	33
FECAL COLIFORM, MEAN (COL./100ML)	17

REMARKS

THE LAKE IS FED BY CHAMBERS LAKE. EMERSED AQUATIC PLANTS COVERED 11-25 PERCENT OF THE LAKE SURFACE. SUBMERSED AQUATIC PLANTS COVERED MOST OF THE LAKE BOTTOM. THE LITTORAL BOTTOM IS SOFT ORGANIC MUCK. THE U.S. GEOLOGICAL SURVEY WILL SAMPLE THE LAKE FOUR TIMES IN 1975.



Chambers, Little Lake, Thurston County. From Washington Department of Game, August 14, 1959.

Chambers, Little Lake, Thurston County. May 12, 1972. Approx. scale 1:12,000.

CLEAR LAKE THURSTON COUNTY

LATITUDE 46*49'42" LONGITUDE 122*28'32" T16N-R3E-31
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.61 SQ MI	RESIDENTIAL DEVELOPMENT	16 %
ALTITUDE	516. FT		
LAKE AREA	170. ACRES	NUMBER OF NEARSHORE HOMES	9
LAKE VOLUME	3200. ACRE-FT		
MEAN DEPTH	19. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	25. FT		
SHORELINE LENGTH	2.7 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	3 %
DEVELOPMENT OF VOLUME	0.75	AGRICULTURAL	0 %
BOTTOM SLOPE	4.0 %	FOREST OR UNPRODUCTIVE	87 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	10 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

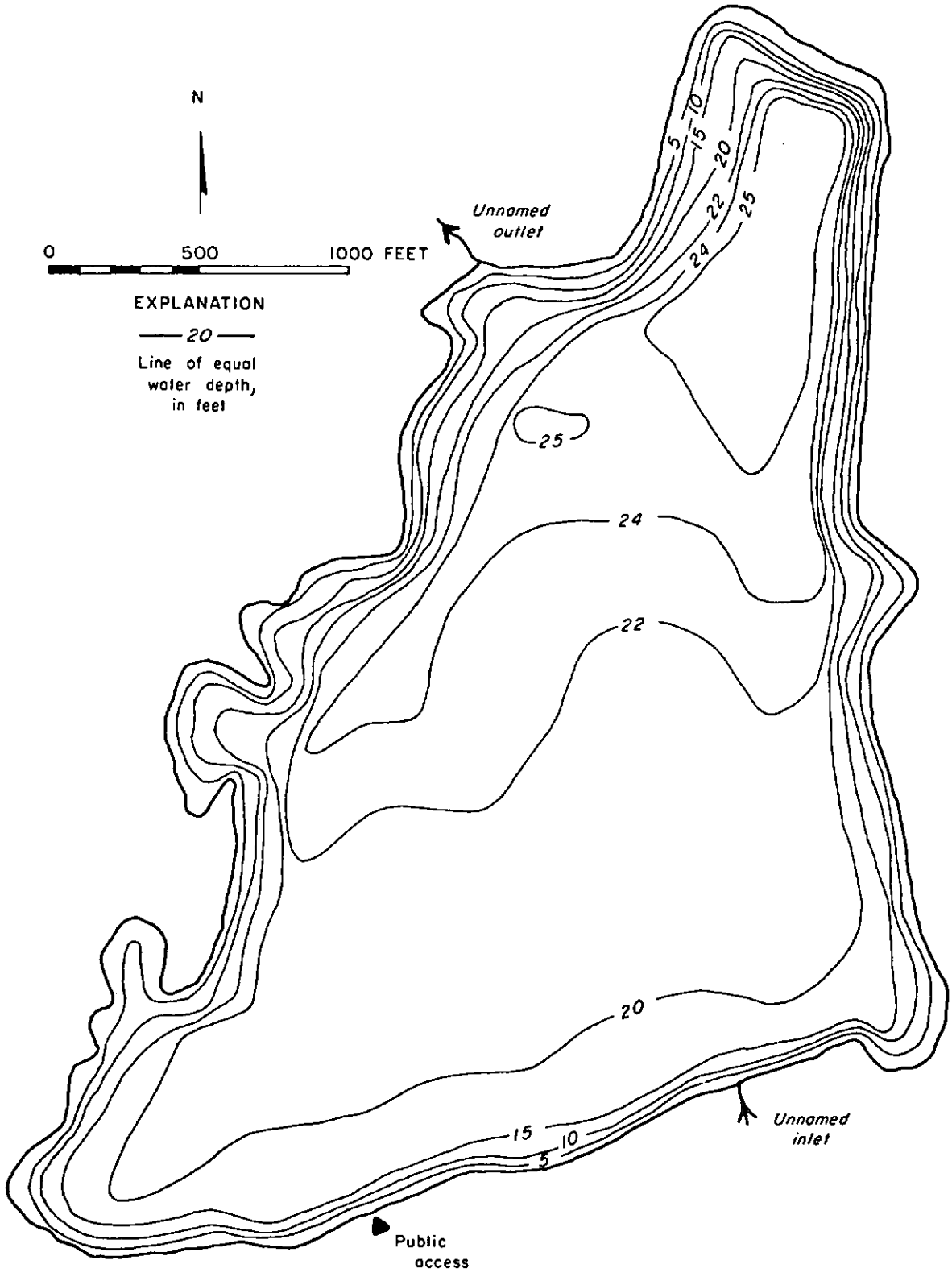
SAMPLE SITE	1	
DATE	7/12/71	
TIME	1235	1240
DEPTH (FT)	3.	18.
DISSOLVED NITRATE (N)	0.05	0.05
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.13	0.63
TOTAL ORGANIC NITROGEN (N)	0.06	0.12
TOTAL PHOSPHORUS (P)	0.010	0.020
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.020
SPECIFIC CONDUCTANCE (MICROMHOS)	70	84
WATER TEMPERATURE (DEG C)	18.0	15.0
COLOR (PLATINUM-COBALT UNITS)	--	--
SECCHI-DISC VISIBILITY (FT)	14	
DISSOLVED OXYGEN	9.5	0.2

LAKE SHORELINE COVERED BY EMERSED PLANTS LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS NONE OR <1 %

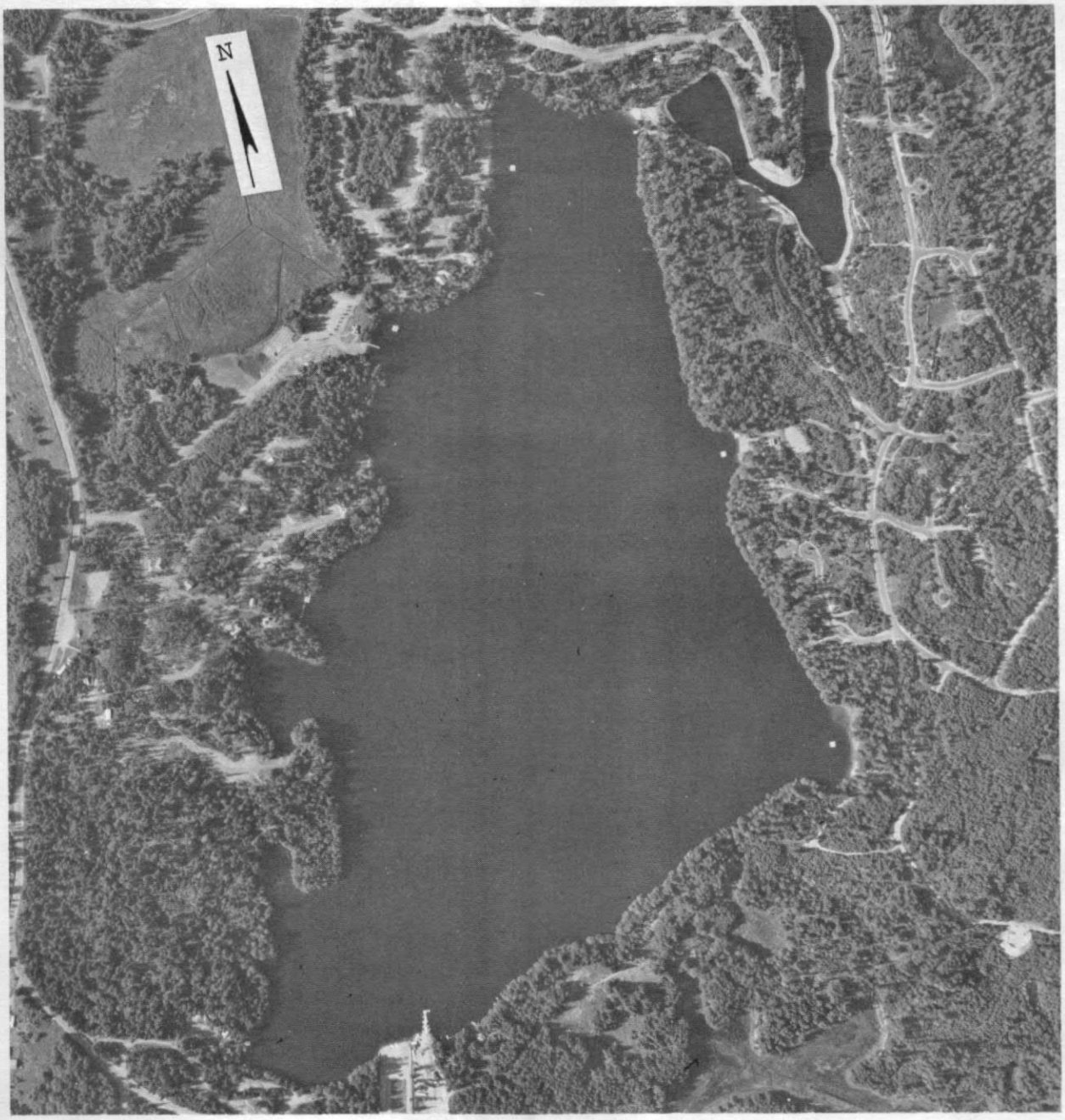
DATE	8/16/74
TIME	1340
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A RESIDENTIAL AND RECREATIONAL HOUSING DEVELOPMENT IS LOCATED BEYOND A NEARSHORE BUFFER ZONE OF FOREST. TREES AND SHRUBS OVERHANG THE SHORELINE. ROOTED AQUATIC PLANTS WERE SPARSE. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON SEPTEMBER 22, 1971. COLOR WAS NOT DETERMINED ON THE WATER QUALITY DATE SHOWN ABOVE, BUT THE AVERAGE OF FOUR COLOR DETERMINATIONS MADE IN 1971 WAS 5 PT-CO UNITS.



Clear Lake, Thurston County. From Washington Department of Game, February 19, 1952.



Clear Lake, Thurston County. July 14, 1971. Approx. scale 1:8900.

DEEP LAKE THURSTON COUNTY

LATITUDE 46*54'33" LONGITUDE 122*54'54" T16N-R2W-3
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.17 SQ MI	RESIDENTIAL DEVELOPMENT	6 %
ALTITUDE	198. FT		
LAKE AREA	66. ACRES	NUMBER OF NEARSHORE HOMES	3
LAKE VOLUME	770. ACRE-FT		
MEAN DEPTH	12. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	17. FT		
SHORELINE LENGTH	1.4 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.69	AGRICULTURAL	38 %
BOTTOM SLOPE	0.89 %	FOREST OR UNPRODUCTIVE	53 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	9 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

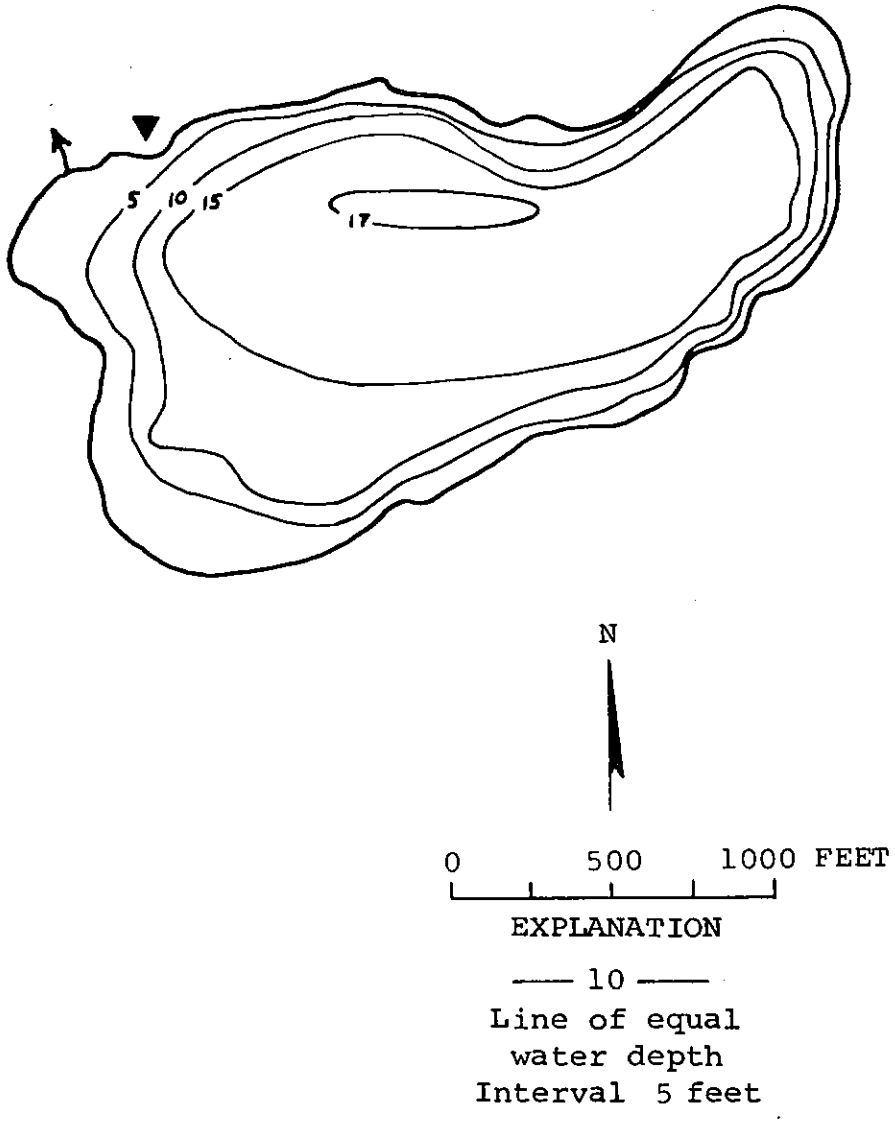
SAMPLE SITE	1	
DATE	8/15/74	
TIME	1650	1655
DEPTH (FT)	3.	13.
TOTAL NITRATE (N)	0.01	0.06
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.06	0.09
TOTAL ORGANIC NITROGEN (N)	0.59	0.36
TOTAL PHOSPHORUS (P)	0.014	0.014
TOTAL ORTHOPHOSPHATE (P)	0.008	0.005
SPECIFIC CONDUCTANCE (MICROMHOS)	75	75
WATER TEMPERATURE (DEG C)	21.4	18.7
COLOR (PLATINUM-COBALT UNITS)	0	10
SECCHI-DISC VISIBILITY (FT)	13	
DISSOLVED OXYGEN	11.2	17.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/15/74
TIME	1700
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	3

REMARKS

MILLERSYLVANIA STATE PARK IS LOCATED ON THE NORTH SIDE OF THE LAKE. THE LAKE RECEIVES HEAVY RECREATIONAL USE. MOST OF THE ROOTED AQUATIC PLANTS WERE IN SHALLOW WATER ON THE WEST SIDE OF THE LAKE. IN 1975 THE U.S. GEOLOGICAL SURVEY WILL SAMPLE THE LAKE FOUR TIMES.



Deep Lake, Thurston County. From Washington Department of Game, August 12, 1947.

Deep Lake, Thurston County. June 29, 1974. Approx. scale 1:4800.

ELBOW LAKE THURSTON COUNTY

LATITUDE 46*49'59" LONGITUDE 122*27'15" T16N-R3E-32
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.44 SQ MI	RESIDENTIAL DEVELOPMENT	2 %
ALTITUDE	479. FT		
LAKE AREA	86. ACRES	NUMBER OF NEARSHORE HOMES	2
LAKE VOLUME	920. ACRE-FT		
MEAN DEPTH	11. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	25. FT		
SHORELINE LENGTH	2.8 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.1	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.42	AGRICULTURAL	0 %
BOTTOM SLOPE	1.1 %	FOREST OR UNPRODUCTIVE	69 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	31 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

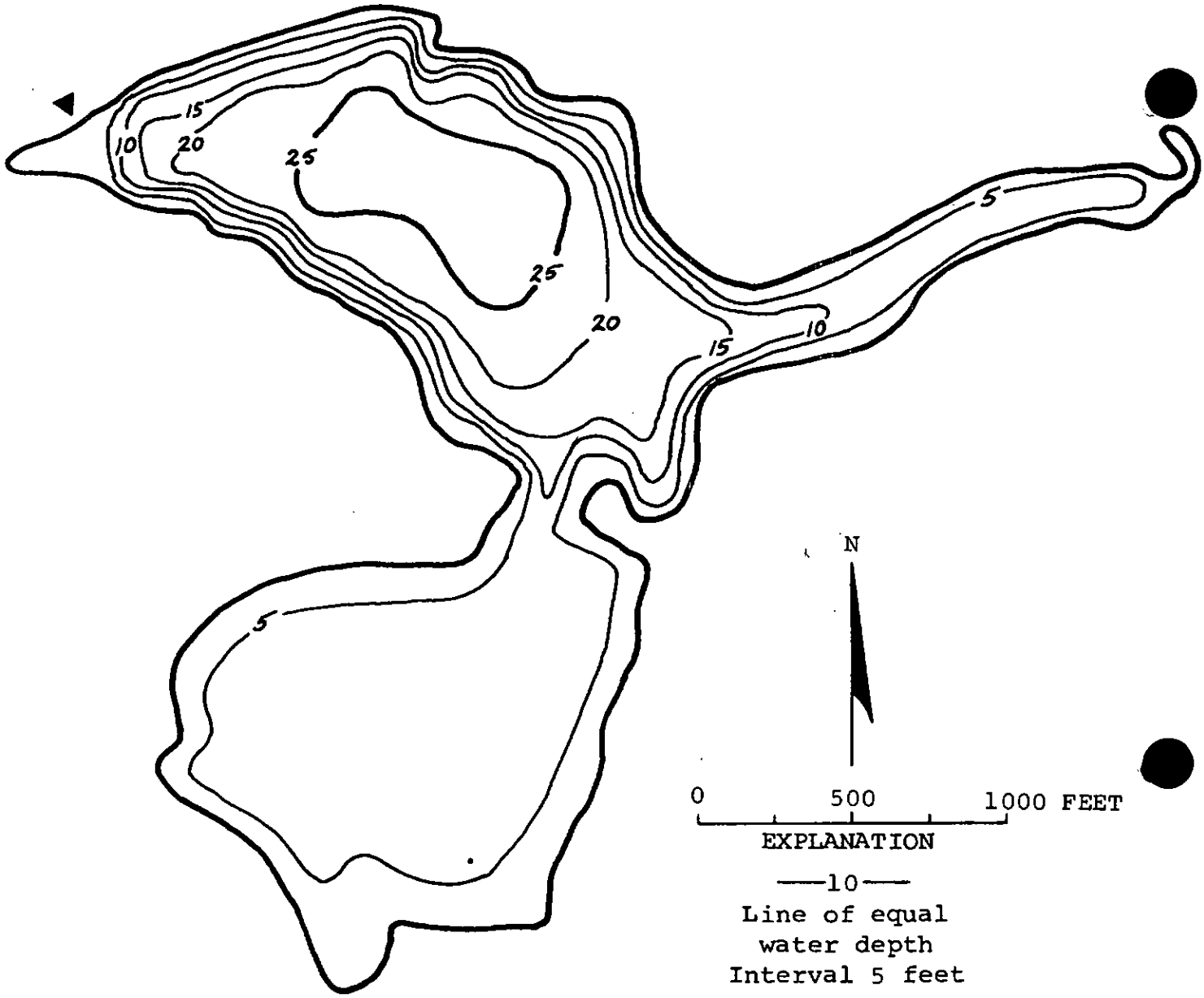
SAMPLE SITE	1	
DATE	8/16/74	
TIME	1315	1320
DEPTH (FT)	3.	18.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.05	0.24
TOTAL ORGANIC NITROGEN (N)	0.51	1.5
TOTAL PHOSPHORUS (P)	0.022	0.34
TOTAL ORTHOPHOSPHATE (P)	0.002	0.11
SPECIFIC CONDUCTANCE (MICROMHOS)	95	110
WATER TEMPERATURE (DEG C)	22.3	20.4
COLOR (PLATINUM-COBALT UNITS)	0	5
SECCHI-DISC VISIBILITY (FT)	10	
DISSOLVED OXYGEN	11.2	7.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/16/74
TIME	1325
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

TREES AND SHRUBS OVERHANG THE SHORELINE. A HEAVY COVER OF EMERSED AND SUBMERSED AQUATIC PLANTS WERE OBSERVED IN THE SOUTH AND WEST ARMS OF THE LAKE. LOGS AND WOOD DEBRIS LITTERED THE SHORELINE, ESPECIALLY IN THE BAY AREAS.



Elbow Lake, Thurston County. From
U.S. Geological Survey, February 6, 1974.

Elbow Lake, Thurston County. August 27, 1972. Approx. scale 1:12,000.

HEWITT LAKE THURSTON COUNTY

LATITUDE 46*59'59" LONGITUDE 122*52'12" T18N-R2W-36
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.22 SQ MI	RESIDENTIAL DEVELOPMENT	68 %
ALTITUDE	128. FT		
LAKE AREA	26. ACRES	NUMBER OF NEARSHORE HOMES	30
LAKE VOLUME	710. ACRE-FT		
MEAN DEPTH	28. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	56. FT		
SHORELINE LENGTH	0.81 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.1	RESIDENTIAL SUBURBAN	19 %
DEVELOPMENT OF VOLUME	0.49	AGRICULTURAL	22 %
BOTTOM SLOPE	4.7 %	FOREST OR UNPRODUCTIVE	41 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	18 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	8/20/74	
TIME	1120	1125
DEPTH (FT)	3.	43.
TOTAL NITRATE (N)	0.20	0.00
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.07	1.0
TOTAL ORGANIC NITROGEN (N)	0.45	0.19
TOTAL PHOSPHORUS (P)	0.010	0.45
TOTAL ORTHOPHOSPHATE (P)	0.005	0.41
SPECIFIC CONDUCTANCE (MICROMHOS)	75	90
WATER TEMPERATURE (DEG C)	20.1	6.7
COLOR (PLATINUM-COBALT UNITS)	0	10
SECCHI-DISC VISIBILITY (FT)	22	
DISSOLVED OXYGEN	9.7	0.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/20/74
TIME	1130
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	2
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

A SPRING-FED LAKE LOCATED NEAR OLYMPIA. THE GRAVEL AND SAND SHORE SUPPORTED A SPARSE GROWTH OF AQUATIC PLANTS.

EXPLANATION

——10——

Line of equal
water depth
Interval 5 feet

Hewitt Lake, Thurston County. Bathymetric map from U.S. Geological Survey, May 29, 1974. Aerial photo, July 14, 1971.

HICKS LAKE THURSTON COUNTY

LATITUDE 47* 1' 2" LONGITUDE 122*47'42" T18N-R1W-27
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	1.80 SQ MI	RESIDENTIAL DEVELOPMENT	77 %
ALTITUDE	162. FT		0
LAKE AREA	160. ACRES	NUMBER OF NEARSHORE HOMES	90
LAKE VOLUME	2700. ACRE-FT		
MEAN DEPTH	18. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	35. FT		
SHORELINE LENGTH	2.4 MI	RESIDENTIAL URBAN	16 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	33 %
DEVELOPMENT OF VOLUME	0.51	AGRICULTURAL	31 %
BOTTOM SLOPE	1.2 %	FOREST OR UNPRODUCTIVE	6 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	14 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

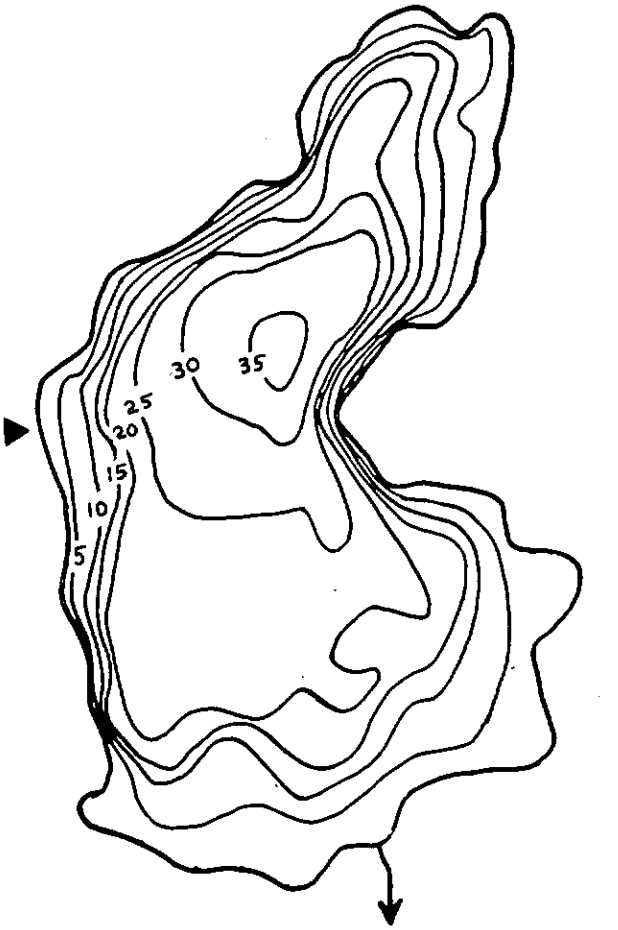
SAMPLE SITE	1	
DATE	6/27/72	
TIME	1045	1055
DEPTH (FT)	3.	33.
DISSOLVED NITRATE (N)	0.00	0.00
DISSOLVED NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.04	0.17
TOTAL ORGANIC NITROGEN (N)	0.39	0.28
TOTAL PHOSPHORUS (P)	0.020	0.060
DISSOLVED ORTHOPHOSPHATE (P)	0.000	0.030
SPECIFIC CONDUCTANCE (MICROMHOS)	31	37
WATER TEMPERATURE (DEG C)	17.0	10.0
COLOR (PLATINUM-COBALT UNITS)	35	40
SECCHI-DISC VISIBILITY (FT)	10	
DISSOLVED OXYGEN	9.2	0.2

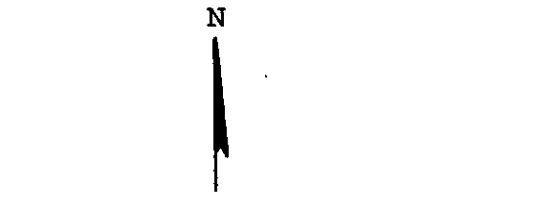
LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	11- 25 %

DATE	6/27/72
TIME	1115
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	34
FECAL COLIFORM, MEAN (COL./100ML)	10

REMARKS

A SPRING-FED LAKE LOCATED NEAR OLYMPIA. THE LAKE IS THE FIRST IN A SERIES OF THREE LAKES (HICKS, PATTERSON, AND LONG LAKES) WHICH DRAIN TO WOODLAND CREEK. THE LAKE HAS A YEAR-ROUND OUTFLOW. A HEAVY COVER OF EMERSED AND SUBMERSED AQUATIC PLANTS WAS OBSERVED NEAR THE MARSHY SOUTH END OF THE LAKE. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 4, 1972.





EXPLANATION

—10—

Line of equal
water depth
Interval 5 feet

Hicks Lake, Thurston County. From Washington Department of Game, June 12, 1949.

Hicks Lake, Thurston County. July 14, 1971. Approx. scale 1:11,000.

LAWRENCE LAKE THURSTON COUNTY

LATITUDE 46°50'57" LONGITUDE 122°34'51" T16N-R2E-29
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	3.35 SQ MI	RESIDENTIAL DEVELOPMENT	39 %
ALTITUDE	421. FT		
LAKE AREA	330. ACRES	NUMBER OF NEARSHORE HOMES	117
LAKE VOLUME	4400. ACRE-FT		
MEAN DEPTH	13. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	26. FT		
SHORELINE LENGTH	4.0 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.6	RESIDENTIAL SUBURBAN	4 %
DEVELOPMENT OF VOLUME	0.51	AGRICULTURAL	19 %
BOTTOM SLOPE	0.61 %	FOREST OR UNPRODUCTIVE	63 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	14 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

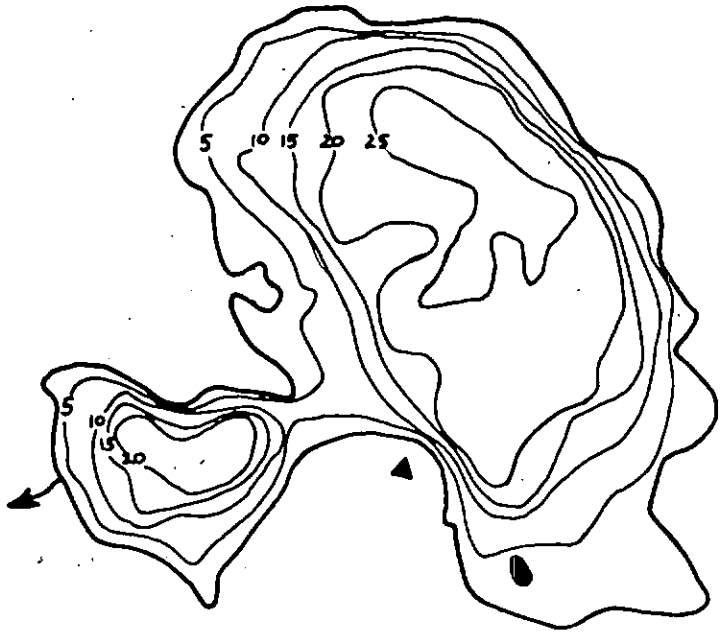
SAMPLE SITE	1	
DATE	6/18/74	
TIME	1155	1205
DEPTH (FT)	3.	20.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.07	0.57
TOTAL ORGANIC NITROGEN (N)	0.89	0.53
TOTAL PHOSPHORUS (P)	0.032	0.29
DISSOLVED ORTHOPHOSPHATE (P)	0.003	0.092
SPECIFIC CONDUCTANCE (MICROMHOS)	70	82
WATER TEMPERATURE (DEG C)	21.0	13.0
COLOR (PLATINUM-COBALT UNITS)	35	55
SECCHI-DISC VISIBILITY (FT)	5	
DISSOLVED OXYGEN	10.1	0.3

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/18/74
TIME	1235
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	1
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

A LARGE SPRING-FED LAKE THAT RECEIVES HEAVY RECREATIONAL USE. EMERSED AQUATIC PLANTS COVERED MUCH OF THE SHORELINE IN INTERSPERSED THIN AND DENSE PATCHES. SUBMERSED AQUATIC PLANTS (MOSTLY ELODEA) COVERED APPROXIMATELY 35 PERCENT OF THE LAKE BOTTOM. AN ALGAL BLOOM WAS OBSERVED. A LONG NARROW CHANNEL HAS BEEN DREDGED ON THE WEST SHORE. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON JULY 30, 1974. IN 1975 THE U.S. GEOLOGICAL SURVEY WILL AGAIN SAMPLE THE LAKE FOUR TIMES.



N

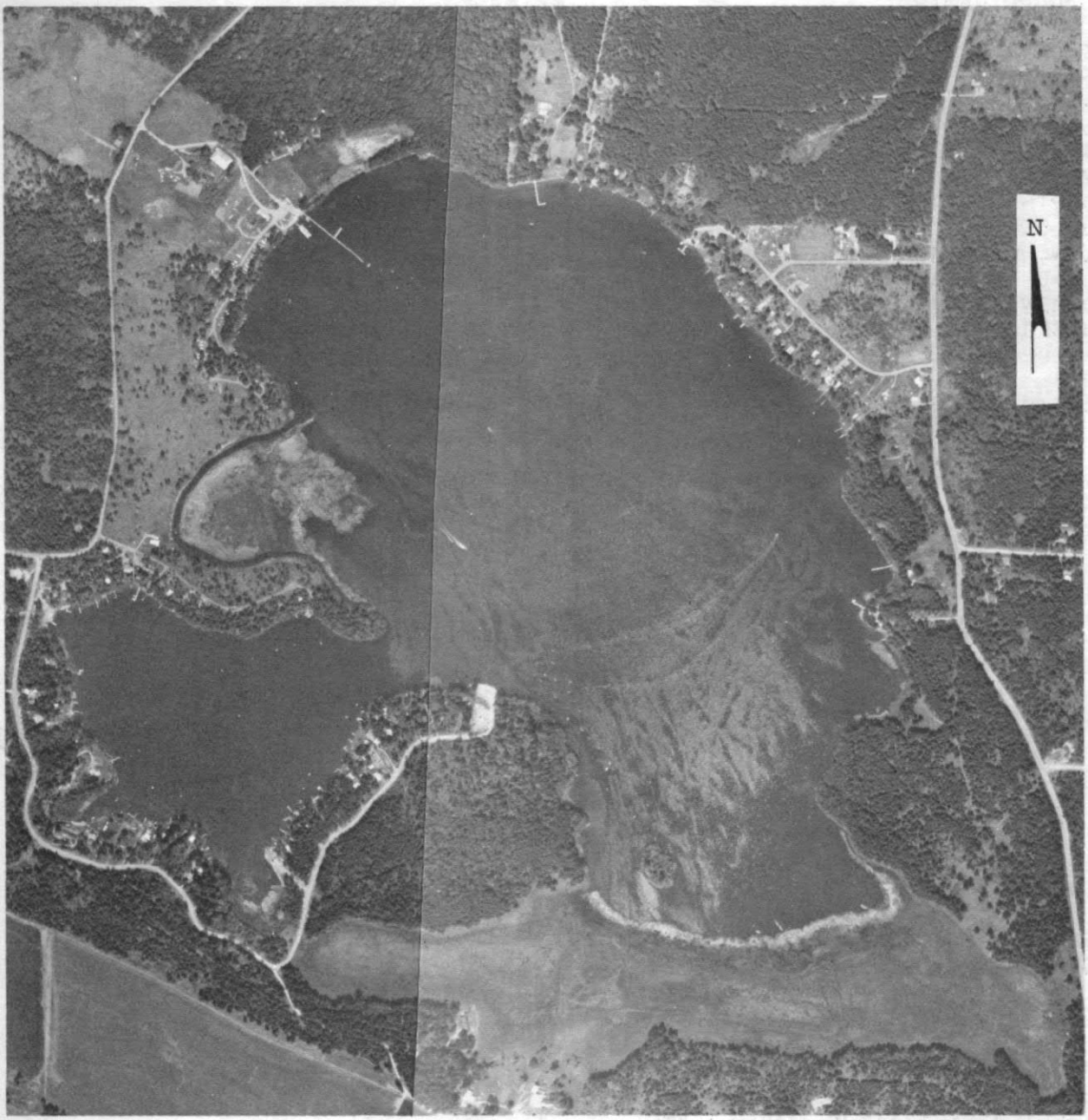
0 1000 2000 FEET

EXPLANATION

—10—

Line of equal
water depth
Interval 5 feet

Lawrence Lake, Thurston County. From Washington Department of Game, June 5, 1951.



Lawrence Lake, Thurston County. May 13, 1972. Approx. scale 1:12,000.

LONG LAKE THURSTON COUNTY

LATITUDE 47° 2' 3" LONGITUDE 122°46'48" T18N-R1W-22
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	8.25 SQ MI	RESIDENTIAL DEVELOPMENT	89 %
ALTITUDE	158. FT		
LAKE AREA	330. ACRES	NUMBER OF NEARSHORE HOMES	205
LAKE VOLUME	3900. ACRE-FT		
MEAN DEPTH	12. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	21. FT		
SHORELINE LENGTH	7.1 MI	RESIDENTIAL URBAN	4 %
SHORELINE CONFIGURATION	2.8	RESIDENTIAL SUBURBAN	11 %
DEVELOPMENT OF VOLUME	0.57	AGRICULTURAL	20 %
BOTTOM SLOPE	3.8 %	FOREST OR UNPRODUCTIVE	51 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	14 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

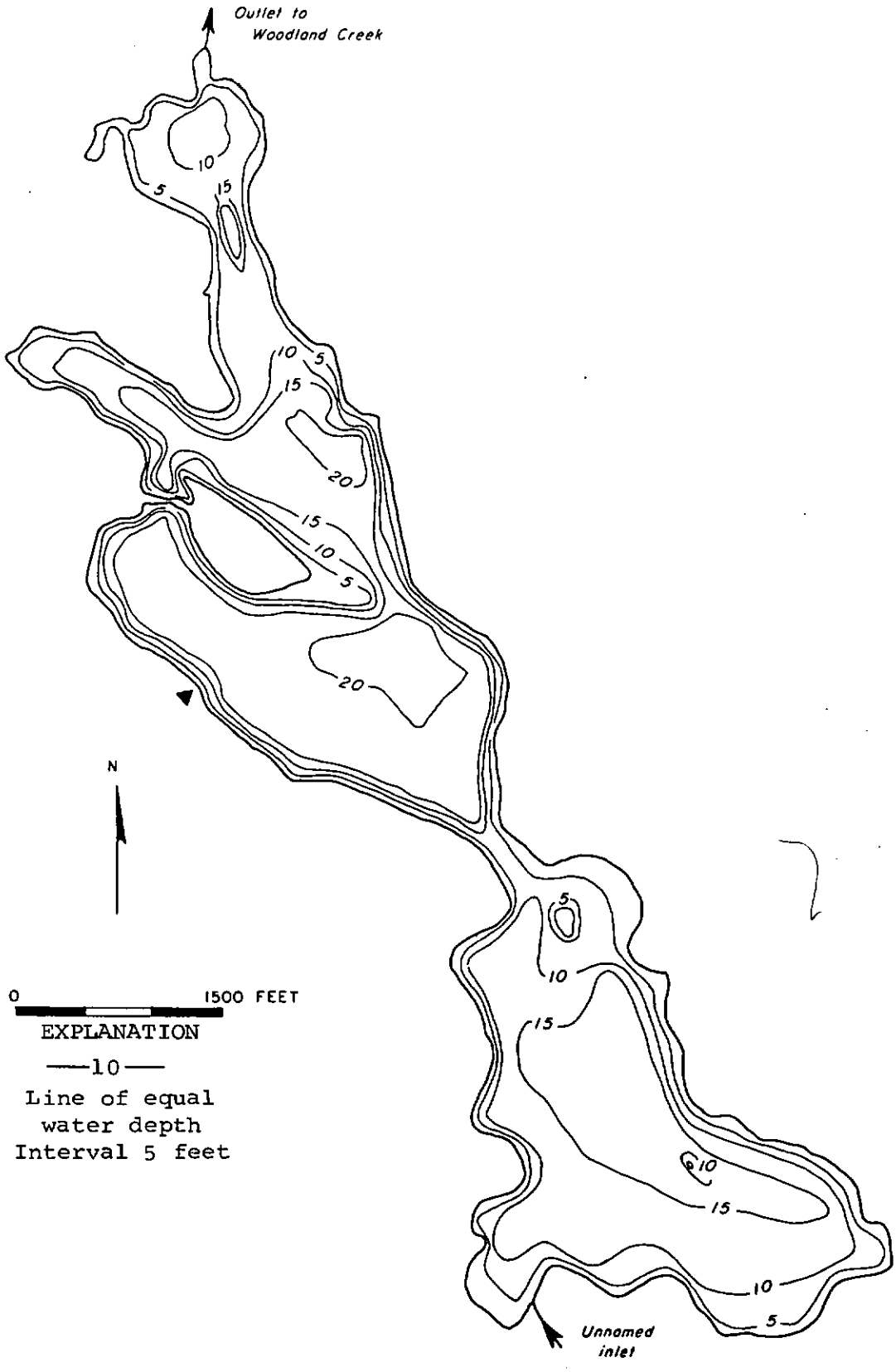
SAMPLE SITE	1	
DATE	7/12/71	
TIME	1000	1005
DEPTH (FT)	3.	16.
DISSOLVED NITRATE (N)	0.05	0.07
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.13	0.53
TOTAL ORGANIC NITROGEN (N)	0.02	0.11
TOTAL PHOSPHORUS (P)	0.010	0.030
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	85	99
WATER TEMPERATURE (DEG C)	18.0	14.0
COLOR (PLATINUM-COBALT UNITS)	--	--
SECCHI-DISC VISIBILITY (FT)	10	
DISSOLVED OXYGEN	9.9	0.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/20/74
TIME	1534
NUMBER OF FECAL COLIFORM SAMPLES	5
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	6
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. THE LAKE IS THE THIRD IN A SERIES OF THREE LAKES (HICKS, PATTERSON, AND LONG LAKES) WHICH DRAIN TO WOODLAND CREEK. LONG LAKE IS ACTUALLY TWO LAKES JOINED BY A NARROW NECK. ROOTED SUBMERSED AQUATIC-PLANT GROWTH WAS HEAVY BUT THE EMERSED GROWTH WAS LIGHT. MOST OF THE MACROPHYTES WERE OBSERVED NEAR THE INFLOW AND OUTFLOW OF THE LAKE AND NEAR THE SOUTH SIDE OF THE NARROW CHANNEL BETWEEN THE LAKES. A LOW-DENSITY ALGAL BLOOM WAS OBSERVED. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON SEPTEMBER 20, 1971. COLOR WAS NOT DETERMINED ON THE WATER QUALITY DATE SHOWN ABOVE, BUT THE AVERAGE OF FOUR COLOR DETERMINATIONS MADE IN 1971 WAS 20 PT-CO UNITS.



Long Lake, Thurston County. From Soil Conservation Service, September 20, 1971.

Long Lake, Thurston County. May 12, 1972. Approx. scale 1:14,000.

MCINTOSH LAKE THURSTON COUNTY

LATITUDE 46*51'41" LONGITUDE 122*46'29" T16N-R1W-33
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.26 SQ MI	RESIDENTIAL DEVELOPMENT	44 %
ALTITUDE	336. FT		
LAKE AREA	93. ACRES	NUMBER OF NEARSHORE HOMES	55
LAKE VOLUME	700. ACRE-FT		
MEAN DEPTH	8. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	11. FT		
SHORELINE LENGTH	2.6 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.0	RESIDENTIAL SUBURBAN	5 %
DEVELOPMENT OF VOLUME	0.68	AGRICULTURAL	0 %
BOTTOM SLOPE	0.48 %	FOREST OR UNPRODUCTIVE	89 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	6 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

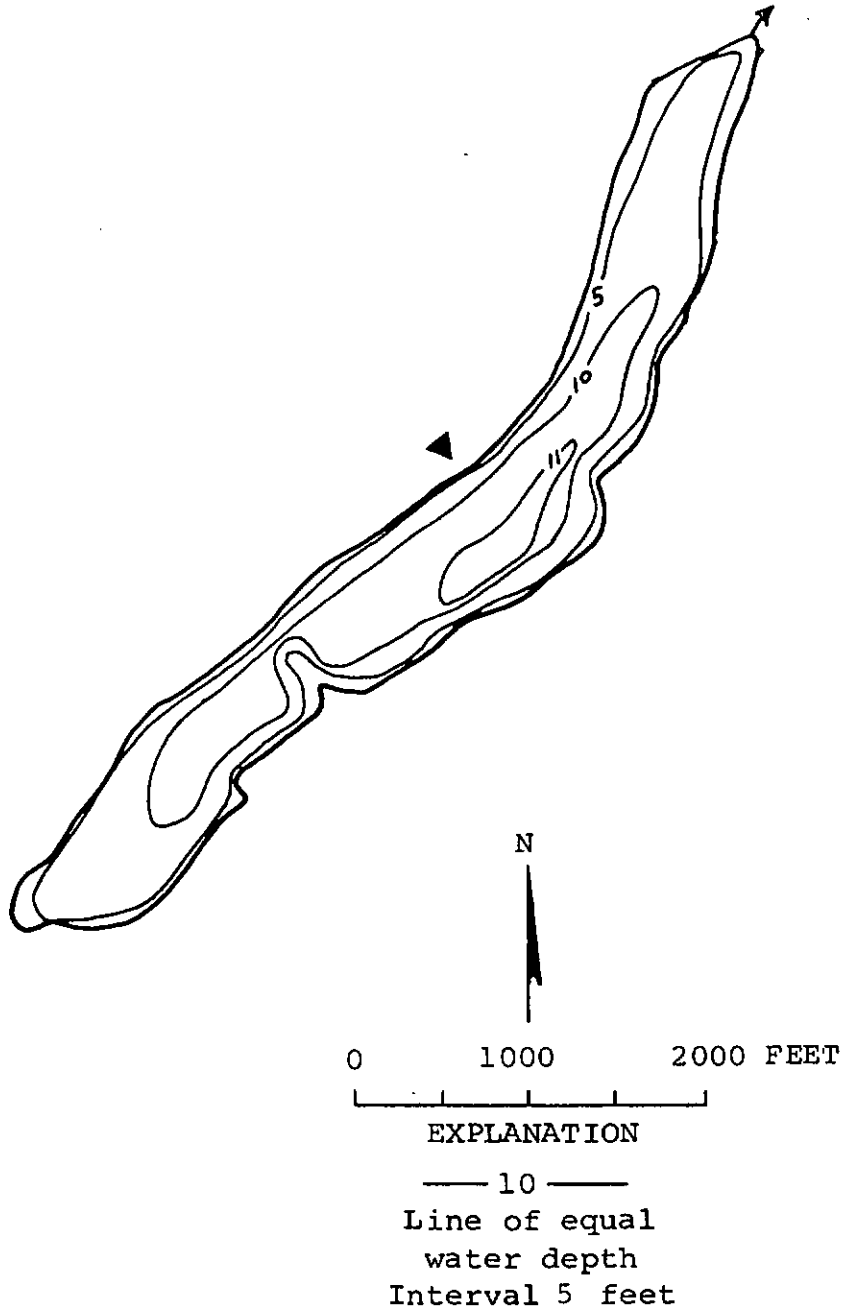
SAMPLE SITE	1	
DATE	6/19/73	
TIME	930	940
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.20	0.18
TOTAL ORGANIC NITROGEN (N)	0.09	0.02
TOTAL PHOSPHORUS (P)	0.038	0.040
DISSOLVED ORTHOPHOSPHATE (P)	0.002	0.002
SPECIFIC CONDUCTANCE (MICROMHOS)	63	63
WATER TEMPERATURE (DEG C)	17.1	16.9
COLOR (PLATINUM-COBALT UNITS)	20	35
SECCHI-DISC VISIBILITY (FT)	8	
DISSOLVED OXYGEN	8.2	7.8

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

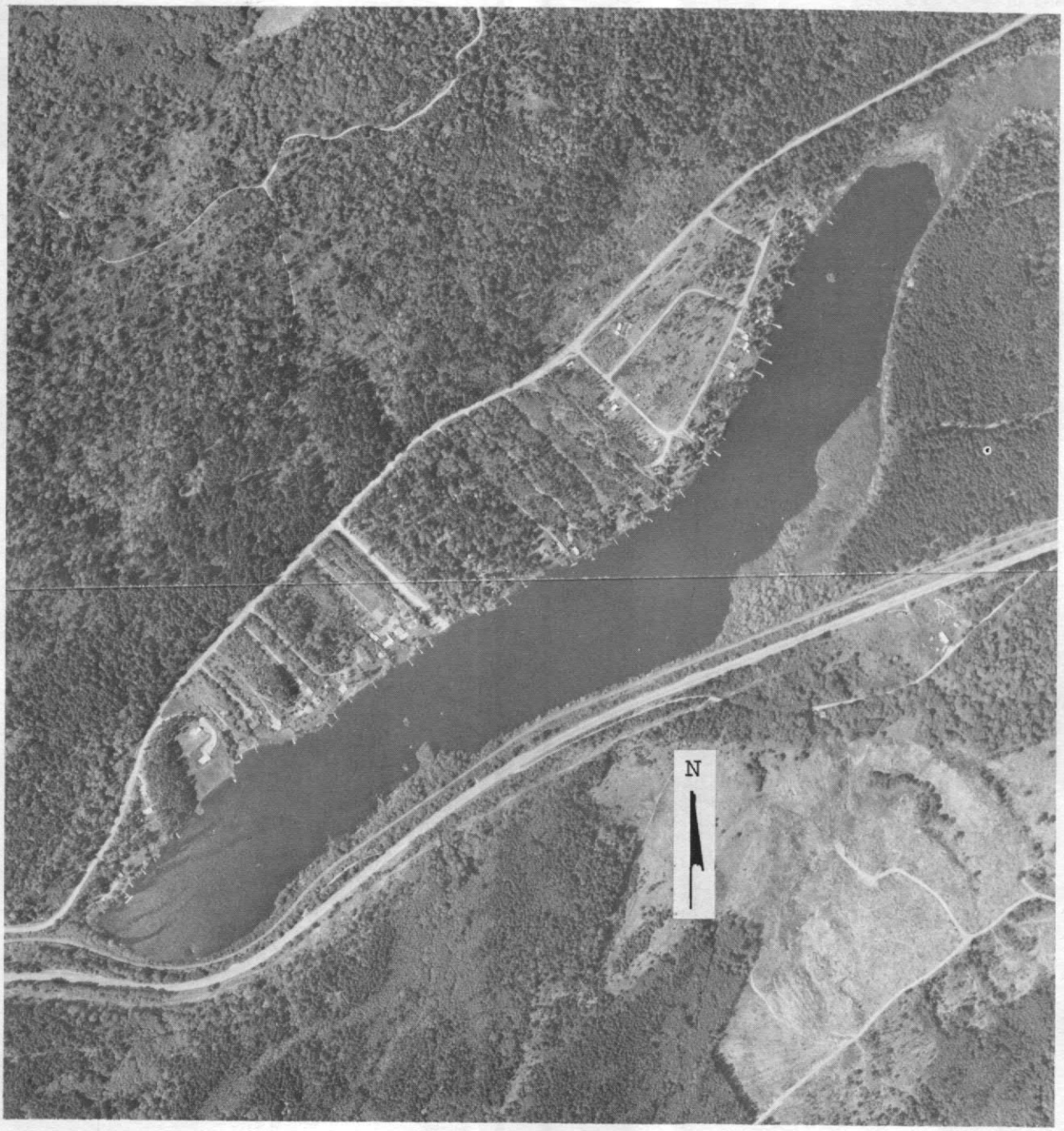
DATE	9/17/73
TIME	930
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	5
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE LAKE IS SHALLOW RELATIVE TO ITS SIZE. PART OF THE SOUTH SHORE AND THE NORTH END OF THE LAKE ARE MARSHY. THE EMERSED PLANT GROWTH WAS SPARSE, BUT APPROXIMATELY 55 PERCENT OF THE LAKE BOTTOM WAS COVERED BY SUBMERSED PLANTS (ELODEA AND PONDWEED). AN ALGAL BLOOM WAS OBSERVED. MUCH OF THE EAST SHORE OF THE LAKE IS COVERED WITH SUBMERGED AND FLOATING LOGS. IN 1973 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 7, 1973.



McIntosh Lake, Thurston County. From Washington Department of Game, December 14, 1949.



McIntosh Lake, Thurston County. May 12, 1972. Approx. scale 1:12,000.

MUNN LAKE THURSTON COUNTY

LATITUDE 46°58'56" LONGITUDE 122°52'49" T17N-R2W-1
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.67 SQ MI	RESIDENTIAL DEVELOPMENT	33 %
ALTITUDE	139. FT		
LAKE AREA	34. ACRES	NUMBER OF NEARSHORE HOMES	9
LAKE VOLUME	350. ACRE-FT		
MEAN DEPTH	10. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	19. FT		
SHORELINE LENGTH	1.1 MI	RESIDENTIAL URBAN	3 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	4 %
DEVELOPMENT OF VOLUME	0.53	AGRICULTURAL	42 %
BOTTOM SLOPE	1.4 %	FOREST OR UNPRODUCTIVE	42 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	9 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

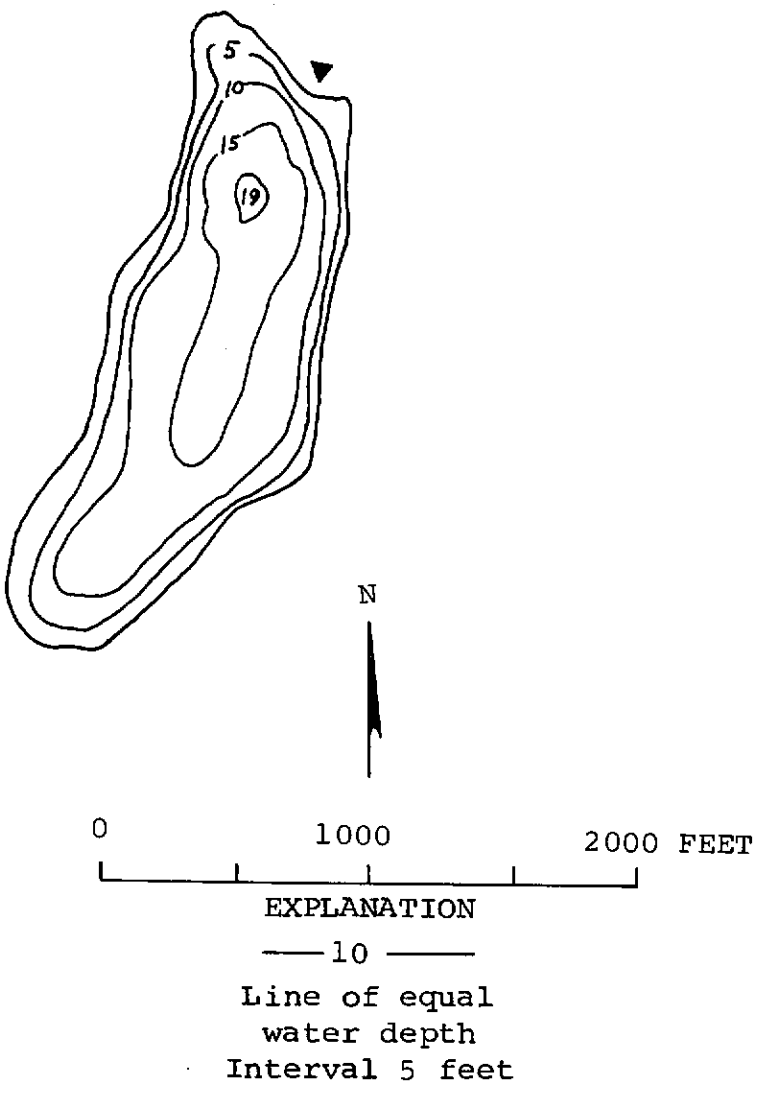
SAMPLE SITE	1	
DATE	6/19/73	
TIME	1300	1310
DEPTH (FT)	3.	10.
TOTAL NITRATE (N)	0.01	0.01
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.25	0.22
TOTAL ORGANIC NITROGEN (N)	0.01	0.04
TOTAL PHOSPHORUS (P)	0.049	0.045
DISSOLVED ORTHOPHOSPHATE (P)	0.002	0.004
SPECIFIC CONDUCTANCE (MICROMHOS)	26	--
WATER TEMPERATURE (DEG C)	18.4	17.1
COLOR (PLATINUM-COBALT UNITS)	30	55
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	9.9	7.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

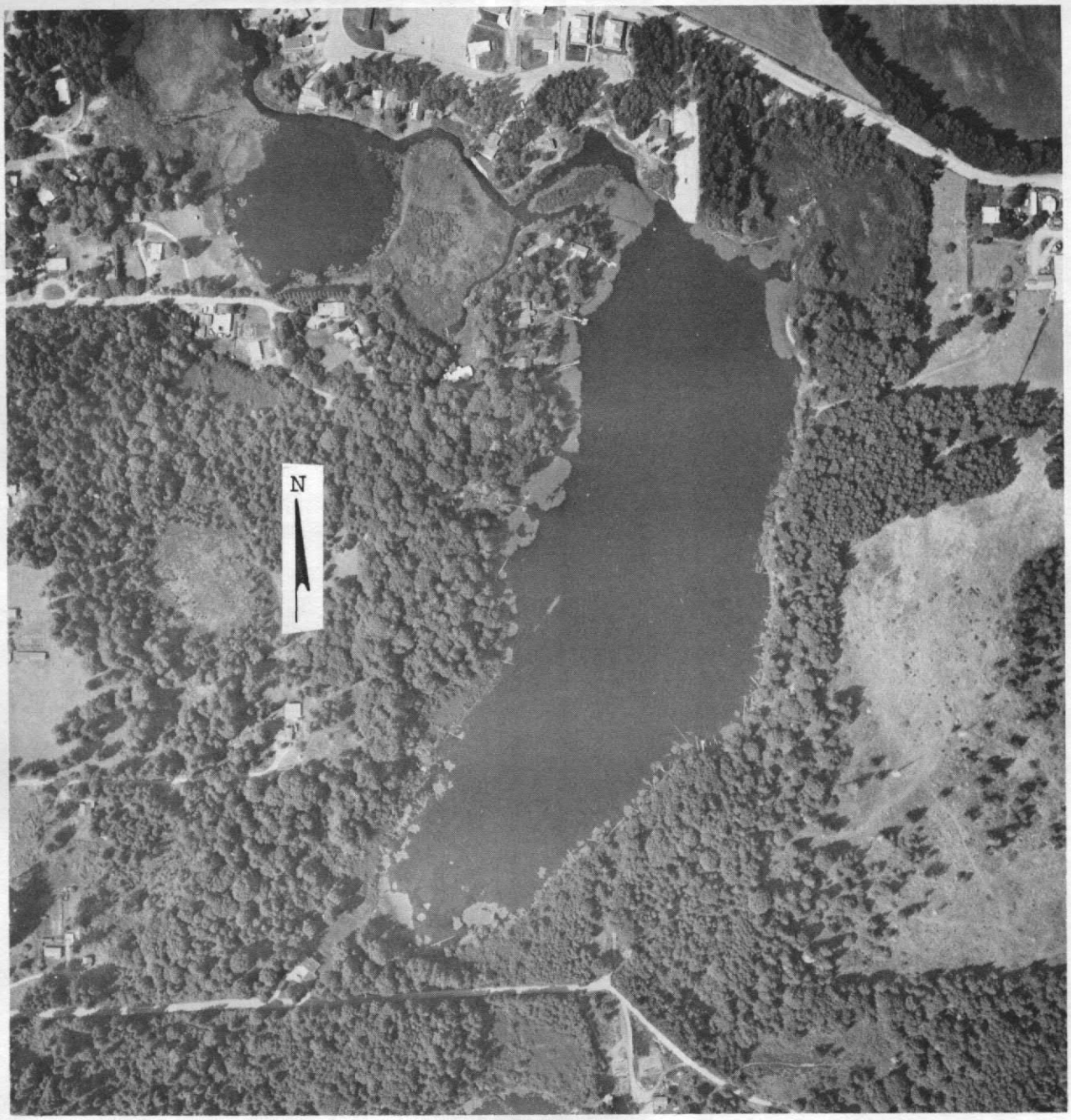
DATE	9/17/73
TIME	1600
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. EMERSED PLANTS COVERED APPROXIMATELY 10 PERCENT OF THE LAKE SURFACE AND SUBMERSED PLANTS COVERED APPROXIMATELY 60 PERCENT OF THE LAKE BOTTOM. THE LITTORAL BOTTOM IS MUCK. AN ALGAL BLOOM WAS OBSERVED. FLOATING AND SUBMERGED LOGS WERE OBSERVED ALONG THE SHORELINE. IN 1973 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 7, 1973.



Munn Lake, Thurston County. From Washington Department of Game, May 31, 1950.



Munn Lake, Thurston County. July 31, 1973. Approx. scale 1:4800.

OFFUTT LAKE THURSTON COUNTY

LATITUDE 46*55' 6" LONGITUDE 122*49' 4" T17N-R1W-33
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.70 SQ MI	RESIDENTIAL DEVELOPMENT	52 %
ALTITUDE	230. FT		
LAKE AREA	200. ACRES	NUMBER OF NEARSHORE HOMES	73
LAKE VOLUME	2900. ACRE-FT		
MEAN DEPTH	15. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	25. FT		
SHORELINE LENGTH	2.9 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.5	RESIDENTIAL SUBURBAN	5 %
DEVELOPMENT OF VOLUME	0.60	AGRICULTURAL	15 %
BOTTOM SLOPE	0.76 %	FOREST OR UNPRODUCTIVE	69 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	11 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

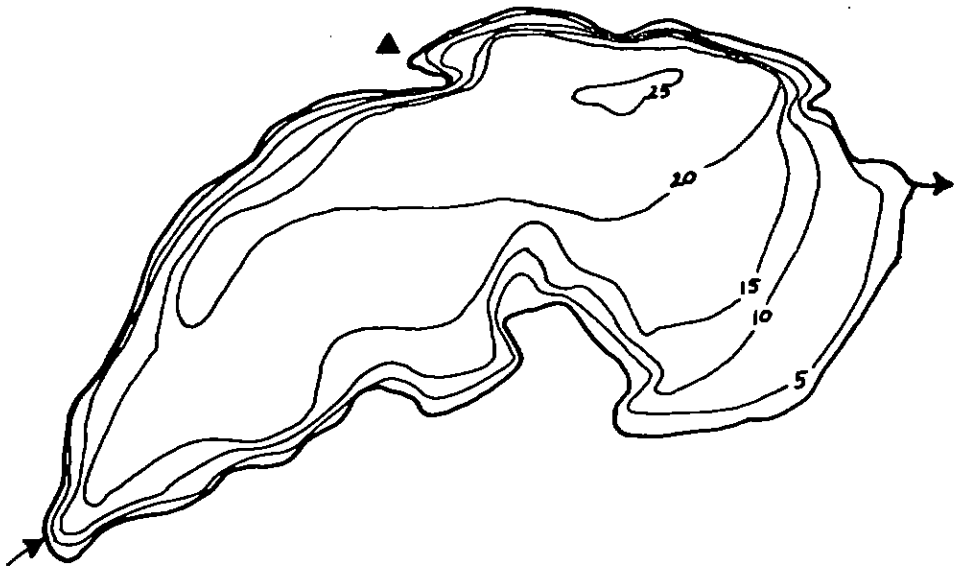
SAMPLE SITE	1	
DATE	6/28/72	
TIME	1340	1350
DEPTH (FT)	3.	20.
DISSOLVED NITRATE (N)	0.00	0.00
DISSOLVED NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.09	0.05
TOTAL ORGANIC NITROGEN (N)	0.32	0.33
TOTAL PHOSPHORUS (P)	0.020	0.030
DISSOLVED ORTHOPHOSPHATE (P)	0.004	0.000
SPECIFIC CONDUCTANCE (MICROMHOS)	49	72
WATER TEMPERATURE (DEG C)	19.0	11.9
COLOR (PLATINUM-COBALT UNITS)	40	45
SECCHI-DISC VISIBILITY (FT)	10	
DISSOLVED OXYGEN	9.4	0.3

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/28/72
TIME	1530
NUMBER OF FECAL COLIFORM SAMPLES	4
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	4
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. MOST OF THE AQUATIC MACROPHYTE GROWTH WAS AT THE SHALLOW END OF THE LAKE NEAR THE MARSHY EAST SHORE. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 4, 1972.



N

0 1000 2000 FEET

EXPLANATION

—— 10 ——

Line of equal
water depth
Interval 5 feet

Offutt Lake, Thurston County. From Washington Department of Game, May 24, 1949.

Offutt Lake, Thurston County. August 9, 1972. Approx. scale 1:10,000.

PATTERSON (NORTH ARM) LAKE THURSTON COUNTY

LATITUDE 46°59'48" LONGITUDE 122°46'56" T18N-R1W-34
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.90 SQ MI	RESIDENTIAL DEVELOPMENT	79 %
ALTITUDE	154. FT		
LAKE AREA	81. ACRES	NUMBER OF NEARSHORE HOMES	74
LAKE VOLUME	1100. ACRE-FT		
MEAN DEPTH	14. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	22. FT		
SHORELINE LENGTH	1.7 MI	RESIDENTIAL URBAN	11 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	23 %
DEVELOPMENT OF VOLUME	0.63	AGRICULTURAL	21 %
BOTTOM SLOPE	1.0 %	FOREST OR UNPRODUCTIVE	32 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	13 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	6/19/74	
TIME	940	950
DEPTH (FT)	3.	16.
TOTAL NITRATE (N)	0.51	0.54
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.06	0.17
TOTAL ORGANIC NITROGEN (N)	0.33	0.45
TOTAL PHOSPHORUS (P)	0.014	0.041
DISSOLVED ORTHOPHOSPHATE (P)	0.003	0.007
SPECIFIC CONDUCTANCE (MICROMHOS)	89	102
WATER TEMPERATURE (DEG C)	21.5	9.5
COLOR (PLATINUM-COBALT UNITS)	55	55
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	8.7	0.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/19/74
TIME	1055
NUMBER OF FECAL COLIFORM SAMPLES	2
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA AND IS THE SECOND IN A SERIES OF THREE LAKES (HICKS, PATTERSON, AND LONG LAKES) WHICH DRAIN TO WOODLAND CREEK. THE LAKE HAS A PERENNIAL INFLOW. THE LAKE IS SEPARATED INTO TWO PARTS BY A DIKE WITH A NARROW CHANNEL. EMERSED PLANTS WERE SCATTERED IN DENSE BEDS AND SUBMERSED PLANTS COVERED APPROXIMATELY 25 PERCENT OF THE BOTTOM. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE NORTH ARM OF THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE JULY 31, 1974.

PATTERSON (SOUTH ARM) LAKE THURSTON COUNTY

LATITUDE 46*59'54" LONGITUDE 122*46'15" T18N-R1W-35
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	3.77 SQ MI	RESIDENTIAL DEVELOPMENT	49 %
ALTITUDE	154. FT		
LAKE AREA	190. ACRES	NUMBER OF NEARSHORE HOMES	95
LAKE VOLUME	2500. ACRE-FT		
MEAN DEPTH	13. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	19. FT		
SHORELINE LENGTH	4.6 MI	RESIDENTIAL URBAN	8 %
SHORELINE CONFIGURATION	2.4	RESIDENTIAL SUBURBAN	20 %
DEVELOPMENT OF VOLUME	0.70	AGRICULTURAL	16 %
BOTTOM SLOPE	0.59 %	FOREST OR UNPRODUCTIVE	35 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	21 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

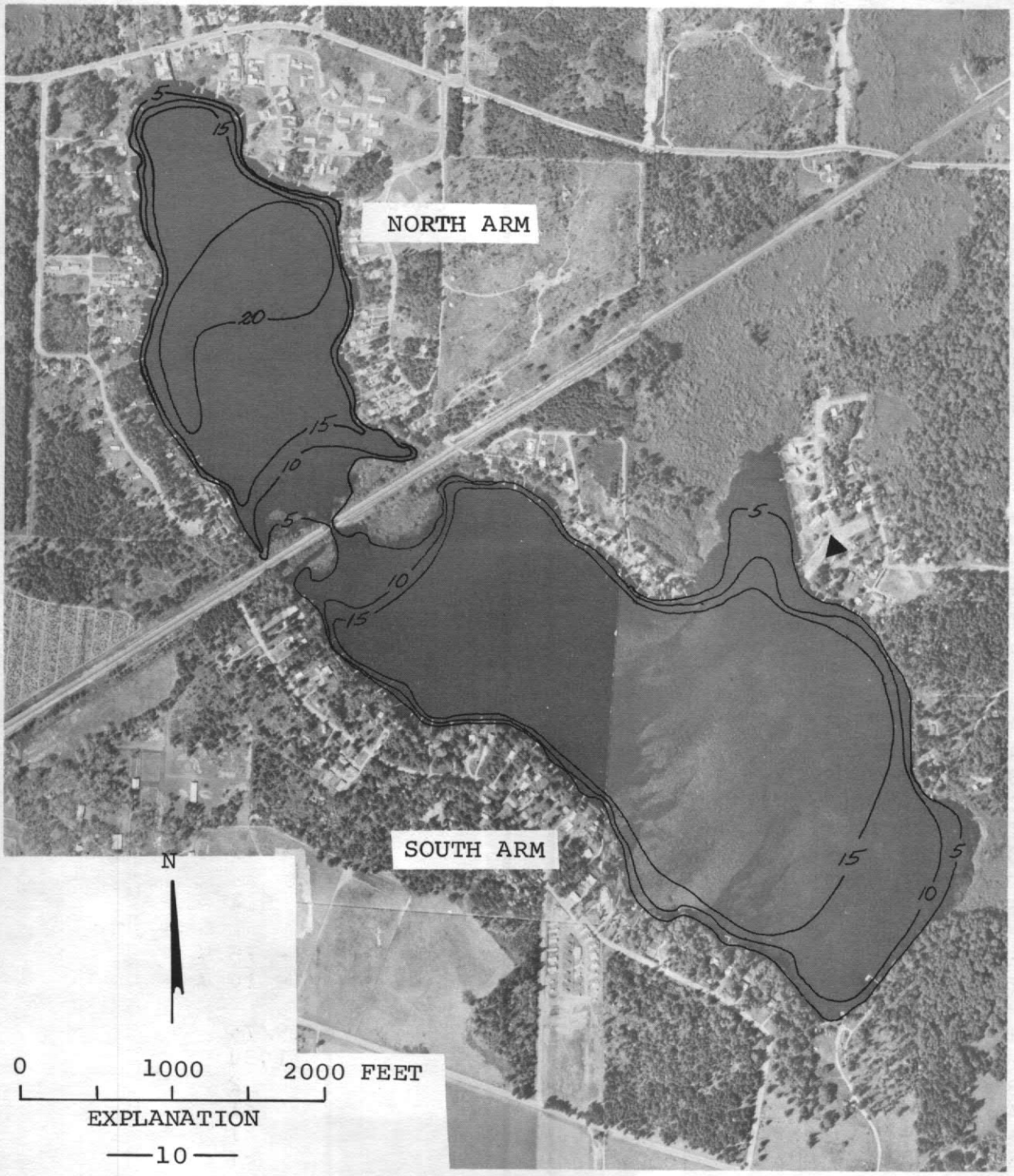
SAMPLE SITE	1	
DATE	6/19/74	
TIME	1155	1205
DEPTH (FT)	3.	13.
TOTAL NITRATE (N)	0.05	0.11
TOTAL NITRITE (N)	0.01	0.00
TOTAL AMMONIA (N)	0.03	0.05
TOTAL ORGANIC NITROGEN (N)	0.39	0.72
TOTAL PHOSPHORUS (P)	0.019	0.059
DISSOLVED ORTHOPHOSPHATE (P)	0.002	0.003
SPECIFIC CONDUCTANCE (MICROMHOS)	94	102
WATER TEMPERATURE (DEG C)	22.0	14.5
COLOR (PLATINUM-COBALT UNITS)	30	40
SECCHI-DISC VISIBILITY (FT)	8	
DISSOLVED OXYGEN	10.1	5.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/19/74
TIME	1050
NUMBER OF FECAL COLIFORM SAMPLES	2
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

EMERSED PLANTS WERE SCATTERED IN DENSE BEDS. SUBMERSED PLANTS COVERED APPROXIMATELY 30 PERCENT OF THE LAKE BOTTOM. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1974 THE U.S. GEOLOGICAL SURVEY SAMPLED THE SOUTH ARM OF THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE JULY 31, 1974.



Patterson Lake, Thurston County. Bathymetric map from U.S. Geological Survey, December 19, 1973. Aerial photo, May 12, 1972.

PERCIVAL COVE LAKE THURSTON COUNTY

LATITUDE 47* 2' 9" LONGITUDE 122*54'39" T18N-R2W-22
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	20.0 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	0. FT		
LAKE AREA	22. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME (EST.)	80. ACRE-FT		
MEAN DEPTH (EST.)	4. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	7. FT		
SHORELINE LENGTH	0.91 MI	RESIDENTIAL URBAN	1 %
SHORELINE CONFIGURATION	1.4	RESIDENTIAL SUBURBAN	2 %
DEVELOPMENT OF VOLUME	0.55	AGRICULTURAL	25 %
BOTTOM SLOPE	0.60 %	FOREST OR UNPRODUCTIVE	67 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	5 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

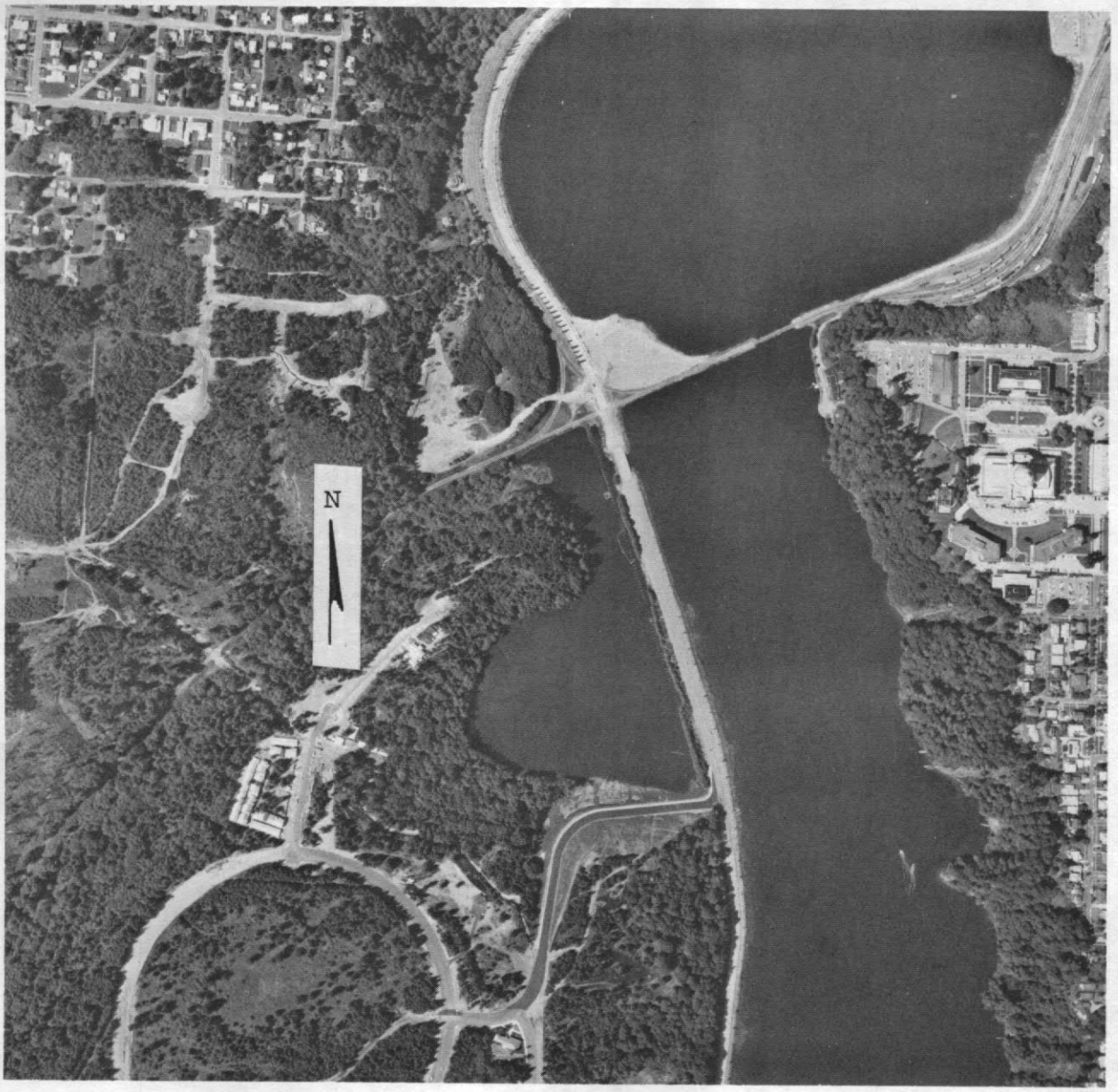
SAMPLE SITE	1	
DATE	8/19/74	
TIME	1555	1600
DEPTH (FT)	3.	5.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.12	0.14
TOTAL ORGANIC NITROGEN (N)	1.0	0.93
TOTAL PHOSPHORUS (P)	0.28	0.28
TOTAL ORTHOPHOSPHATE (P)	0.13	0.13
SPECIFIC CONDUCTANCE (MICROMHOS)	130	130
WATER TEMPERATURE (DEG C)	18.0	17.5
COLOR (PLATINUM-COBALT UNITS)	30	30
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	11.0	8.5

LAKE SHORELINE COVERED BY EMERSED PLANTS	51- 75 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/19/74
TIME	1612
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

THE LAKE IS LOCATED AT THE MOUTH OF PERCIVAL CREEK IN THE CITY OF OLYMPIA. AN ARTIFICIAL LAKE WAS FORMED BY A HIGHWAY FILL ON THE WEST SIDE OF CAPITOL LAKE. THE WASHINGTON DEPARTMENT OF FISHERIES IS PRESENTLY USING THE LAKE FOR SALMON REARING. SUBMERSED PLANTS WERE SCATTERED SPARSELY OVER MOST OF THE LAKE BOTTOM.



Percival Cove Lake, Thurston County.
July 14, 1971. Approx. scale 1:8400.

PITMAN LAKE THURSTON COUNTY

LATITUDE 46*55' 1" LONGITUDE 122*53'22" T17N-R2W-35
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.57 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	198. FT		
LAKE AREA	33. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	320. ACRE-FT		
MEAN DEPTH	10. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	16. FT		
SHORELINE LENGTH	0.85 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.0	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.60	AGRICULTURAL	18 %
BOTTOM SLOPE	1.2 %	FOREST OR UNPRODUCTIVE	80 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	2 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	8/15/74	
TIME	1545	1550
DEPTH (FT)	3.	7.
TOTAL NITRATE (N)	0.01	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.18	0.20
TOTAL ORGANIC NITROGEN (N)	0.82	0.90
TOTAL PHOSPHORUS (P)	0.036	0.033
TOTAL ORTHOPHOSPHATE (P)	0.012	0.013
SPECIFIC CONDUCTANCE (MICROMHOS)	60	60
WATER TEMPERATURE (DEG C)	19.3	19.0
COLOR (PLATINUM-COBALT UNITS)	55	60
SECCHI-DISC VISIBILITY (FT)	4	
DISSOLVED OXYGEN	7.3	6.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	8/15/74
TIME	1555
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	18
FECAL COLIFORM, MEAN (COL./100ML)	7

REMARKS

A SMALL CIRCULAR LAKE COMPLETELY SURROUNDED BY MARSH. EMERSED PLANTS COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO THE SHORE. A LOW-DENSITY ALGAL BLOOM WAS OBSERVED.

0 1000 2000 FEET

EXPLANATION

—10—

Line of equal water depth Interval 5 feet

Pitman Lake, Thurston County. Bathymetric map from U.S. Geological Survey, January 16, 1974. Aerial photo, May 12, 1972.

SCOTT LAKE THURSTON COUNTY

LATITUDE 46*55'12" LONGITUDE 122*56' 7" T17N-R2W-33
CHEHALIS RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.52 SQ MI	RESIDENTIAL DEVELOPMENT	72 %
ALTITUDE	189. FT		
LAKE AREA	69. ACRES	NUMBER OF NEARSHORE HOMES	26
LAKE VOLUME	760. ACRE-FT		
MEAN DEPTH	11. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	18. FT		
SHORELINE LENGTH	1.3 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.1	RESIDENTIAL SUBURBAN	1 %
DEVELOPMENT OF VOLUME	0.69	AGRICULTURAL	26 %
BOTTOM SLOPE	0.92 %	FOREST OR UNPRODUCTIVE	65 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	8 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

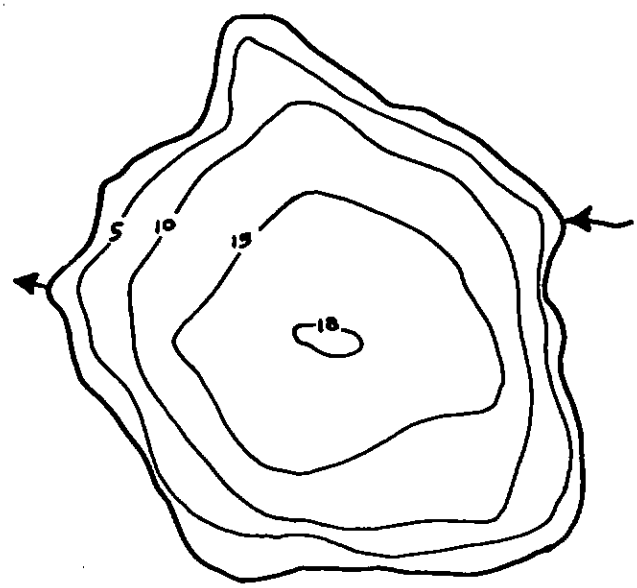
SAMPLE SITE	1	
DATE	6/29/73	
TIME	1010	1015
DEPTH (FT)	3.	11.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.21	0.15
TOTAL ORGANIC NITROGEN (N)	0.16	0.10
TOTAL PHOSPHORUS (P)	0.031	0.042
DISSOLVED ORTHOPHOSPHATE (P)	0.005	0.005
SPECIFIC CONDUCTANCE (MICROMHOS)	94	96
WATER TEMPERATURE (DEG C)	18.3	15.8
COLOR (PLATINUM-COBALT UNITS)	5	10
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	9.5	4.6

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/29/73
TIME	1036
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	10
FECAL COLIFORM, MAXIMUM (COL./100ML)	58
FECAL COLIFORM, MEAN (COL./100ML)	29

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. A GOLF COURSE AND PARK ARE LOCATED NEARSHORE AND THE LAKE RECEIVES HEAVY RECREATIONAL USE. EMERSED PLANTS COVERED THE SHORELINE IN SCATTERED DENSE BEDS. SUBMERSED PLANTS COVERED ABOUT 35 PERCENT OF THE LAKE BOTTOM. THE LITTORAL BOTTOM IS MOSTLY MUCK. AN ALGAL BLOOM WAS OBSERVED. THE LAKE RECEIVES PERENNIAL INFLOW FROM DEEP LAKE. IN 1973 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON AUGUST 8, 1973.



0 1000 2000 FEET

EXPLANATION

—— 10 ——

Line of equal
water depth
Interval 5 feet

Scott Lake, Thurston County. From Washington Department of Game, May 27, 1950.

Scott Lake, Thurston County. July 31, 1973. Approx. scale 1:4800.

SIMMONS (KEN) LAKE THURSTON COUNTY

LATITUDE 47* 1'50" LONGITUDE 122*56'55" T18N-R2W-20
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.62 SQ MI	RESIDENTIAL DEVELOPMENT	80 %
ALTITUDE	140. FT		
LAKE AREA	27. ACRES	NUMBER OF NEARSHORE HOMES	35
LAKE VOLUME	200. ACRE-FT		
MEAN DEPTH	7. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	11. FT		
SHORELINE LENGTH	0.88 MI	RESIDENTIAL URBAN	2 %
SHORELINE CONFIGURATION	1.2	RESIDENTIAL SUBURBAN	17 %
DEVELOPMENT OF VOLUME	0.66	AGRICULTURAL	3 %
BOTTOM SLOPE	0.89 %	FOREST OR UNPRODUCTIVE	71 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	7 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	8/20/74	
TIME	1020	1025
DEPTH (FT)	3.	8.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.09	0.10
TOTAL ORGANIC NITROGEN (N)	0.61	0.41
TOTAL PHOSPHORUS (P)	0.024	0.051
TOTAL ORTHOPHOSPHATE (P)	0.004	0.008
SPECIFIC CONDUCTANCE (MICROMHOS)	40	30
WATER TEMPERATURE (DEG C)	18.9	18.9
COLOR (PLATINUM-COBALT UNITS)	30	5
SECCHI-DISC VISIBILITY (FT)	6	
DISSOLVED OXYGEN	6.8	6.5

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	51- 75 %

DATE	8/20/74
TIME	1040
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	1
FECAL COLIFORM, MAXIMUM (COL./100ML)	3
FECAL COLIFORM, MEAN (COL./100ML)	2

REMARKS

A SPRING-FED LAKE LOCATED NEAR OLYMPIA. THE LAND OWNERS NEAR THE LAKE HAVE FORMED A COMMUNITY CLUB TO MANAGE THE LAKE. THE LAKE HAD A HEAVY COVER OF BOTH EMERSED AND SUBMERSED AQUATIC MACROPHYTES. SUBMERSED PLANTS COVERED MOST OF THE LAKE BOTTOM. A MECHANICAL WEED HARVESTER IS USED PERIODICALLY TO ALLEVIATE AQUATIC PLANT GROWTH.

Simmons (Ken) Lake, Thurston County. Bathymetric map
from U.S. Geological Survey, May 29, 1974.
Aerial photo, June 29, 1974.

SKOOKUMCHUCK LAKE THURSTON COUNTY

LATITUDE 46*47'10" LONGITUDE 122*42'48" T15N-R1E-17
SKOOKUM CHUCK RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	61.7 SQ MI	RESIDENTIAL DEVELOPMENT	0 %
ALTITUDE	330. FT		
LAKE AREA	540. ACRES	NUMBER OF NEARSHORE HOMES	0
LAKE VOLUME	35000. ACRE-FT		
MEAN DEPTH	64. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	140. FT		
SHORELINE LENGTH	8.9 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.7	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.48	AGRICULTURAL	0 %
BOTTOM SLOPE	2.5 %	FOREST OR UNPRODUCTIVE	99 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

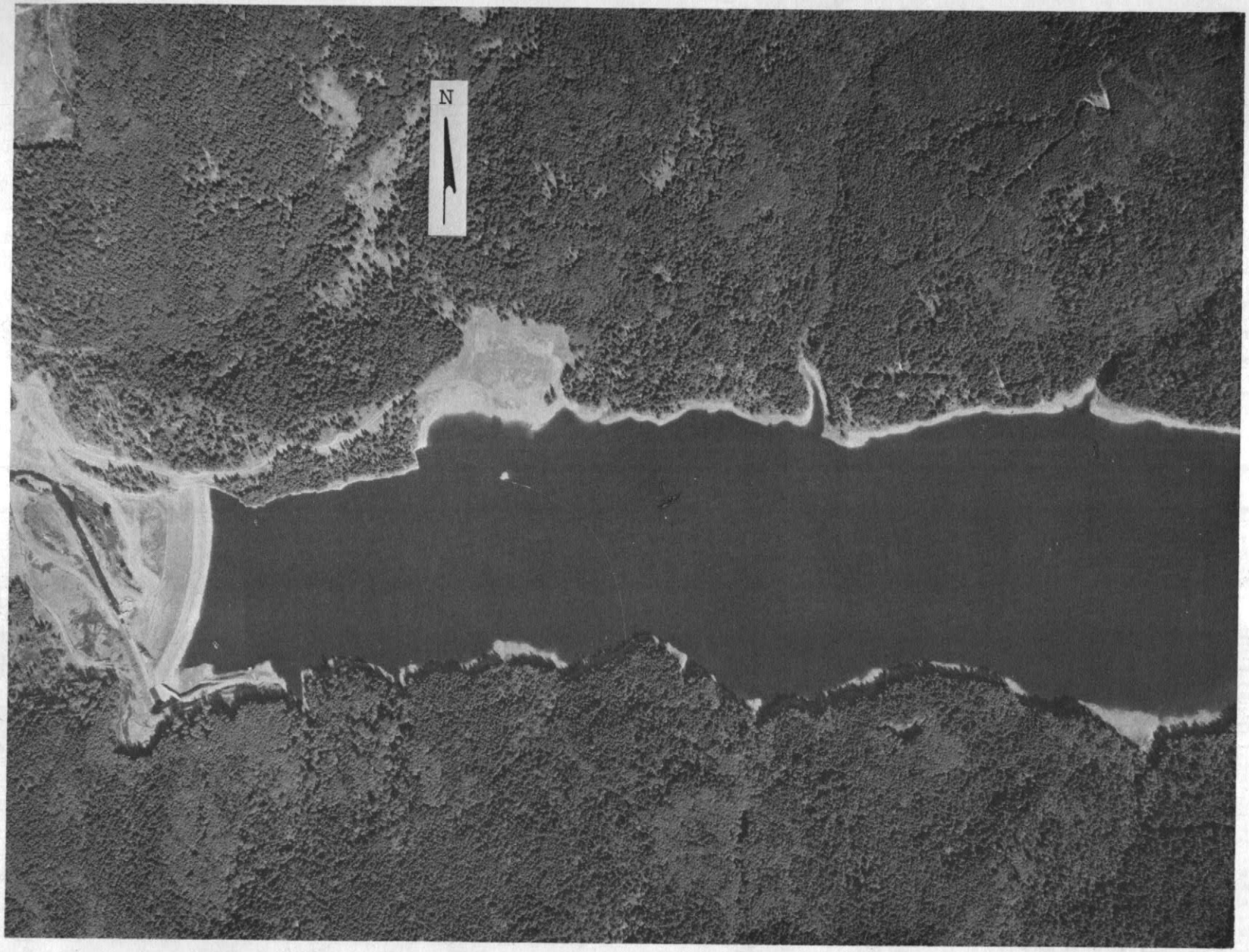
SAMPLE SITE	1	
DATE	8/15/74	
TIME	1340	1345
DEPTH (FT)	3.	118.
TOTAL NITRATE (N)	0.01	0.27
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.17	0.15
TOTAL ORGANIC NITROGEN (N)	0.10	--
TOTAL PHOSPHORUS (P)	0.013	0.036
TOTAL ORTHOPHOSPHATE (P)	0.003	0.019
SPECIFIC CONDUCTANCE (MICROMHOS)	50	50
WATER TEMPERATURE (DEG C)	19.9	6.8
COLOR (PLATINUM-COBALT UNITS)	0	15
SECCHI-DISC VISIBILITY (FT)	7	
DISSOLVED OXYGEN	9.1	4.9

LAKE SHORELINE COVERED BY EMERSED PLANTS	LITTLE OR NONE
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/15/74
TIME	1400
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	<1
FECAL COLIFORM, MEAN (COL./100ML)	<1

REMARKS

A LAKE FORMED BY A DAM ON THE SKOOKUMCHUCK RIVER. THE RESERVOIR WAS BUILT BY PACIFIC POWER AND LIGHT COMPANY AND WASHINGTON WATER POWER IN 1971. IN 1924 A DAM (SKOOKUM RESERVOIR) WAS BUILT UPSTREAM OF THE PRESENT DAMSITE BUT WAS BLOWN OUT SOMETIME LATER. NO AQUATIC MACROPHYTES WERE OBSERVED. THE DO WAS ABOVE 4.9 MG/L THROUGHOUT THE ENTIRE WATER COLUMN. THE PHYSICAL DATA WERE OBTAINED FROM WASHINGTON POWER AND LIGHT COMPANY.



Skookumchuck Lake, Thurston County. September 2, 1973. Approx. scale 1:12,000.

SOUTHWICK LAKE THURSTON COUNTY

LATITUDE 47* 0'12" LONGITUDE 122*48'17" T18N-R1W-33
PUGET SOUND BASIN

PHYSICAL DATA	
DRAINAGE AREA	0.92 SQ MI
ALTITUDE	173. FT
LAKE AREA	36. ACRES
LAKE VOLUME	250. ACRE-FT
MEAN DEPTH	7. FT
MAXIMUM DEPTH	17. FT
SHORELINE LENGTH	1.0 MI
SHORELINE CONFIGURATION	1.2
DEVELOPMENT OF VOLUME	0.42
BOTTOM SLOPE	1.2 %
BASIN GEOLOGY	SED./META.
INFLOW	NONE VISIBLE
OUTFLOW CHANNEL	ABSENT

CULTURAL DATA	
RESIDENTIAL DEVELOPMENT	10 %
NUMBER OF NEARSHORE HOMES	1
LAND USE IN DRAINAGE BASIN	
RESIDENTIAL URBAN	0 %
RESIDENTIAL SUBURBAN	2 %
AGRICULTURAL	66 %
FOREST OR UNPRODUCTIVE	26 %
LAKE SURFACE	6 %
PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

SAMPLE SITE	1	
DATE	8/16/74	
TIME	1450	1455
DEPTH (FT)	3.	16.
TOTAL NITRATE (N)	0.03	0.04
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.09	0.17
TOTAL ORGANIC NITROGEN (N)	0.76	--
TOTAL PHOSPHORUS (P)	0.029	0.072
TOTAL ORTHOPHOSPHATE (P)	0.006	0.019
SPECIFIC CONDUCTANCE (MICROMHOS)	40	50
WATER TEMPERATURE (DEG C)	20.7	15.9
COLOR (PLATINUM-COBALT UNITS)	10	35
SECCHI-DISC VISIBILITY (FT)	5	
DISSOLVED OXYGEN	9.0	0.5

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	26- 50 %

DATE	8/16/74
TIME	1500
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	8
FECAL COLIFORM, MAXIMUM (COL./100ML)	59
FECAL COLIFORM, MEAN (COL./100ML)	28

REMARKS

THE LAKE IS LOCATED NEAR OLYMPIA. APPROXIMATELY 50 PERCENT OF THE SHORELINE ADJOINS MARSH AND WETLAND. THE LAKE HAD A HEAVY COVER OF EMERSED PLANTS, ESPECIALLY NEAR THE MARSHY WEST AND SOUTH SHORES.

Southwick Lake, Thurston County. Bathymetric map from U.S. Geological Survey, December 18, 1973. Aerial photo, May 12, 1972.

ST CLAIR (NORTH ARM) LAKE THURSTON COUNTY

LATITUDE 46*59'51" LONGITUDE 122*43' 8" T18N-R1E-31
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	6.40 SQ MI	RESIDENTIAL DEVELOPMENT	57 %
ALTITUDE	73. FT		
LAKE AREA	180. ACRES	NUMBER OF NEARSHORE HOMES	163
LAKE VOLUME	5100. ACRE-FT		
MEAN DEPTH	28. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	70. FT		
SHORELINE LENGTH	7.5 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	4.0	RESIDENTIAL SUBURBAN	6 %
DEVELOPMENT OF VOLUME	0.40	AGRICULTURAL	21 %
BOTTOM SLOPE	2.2 %	FOREST OR UNPRODUCTIVE	69 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	4 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

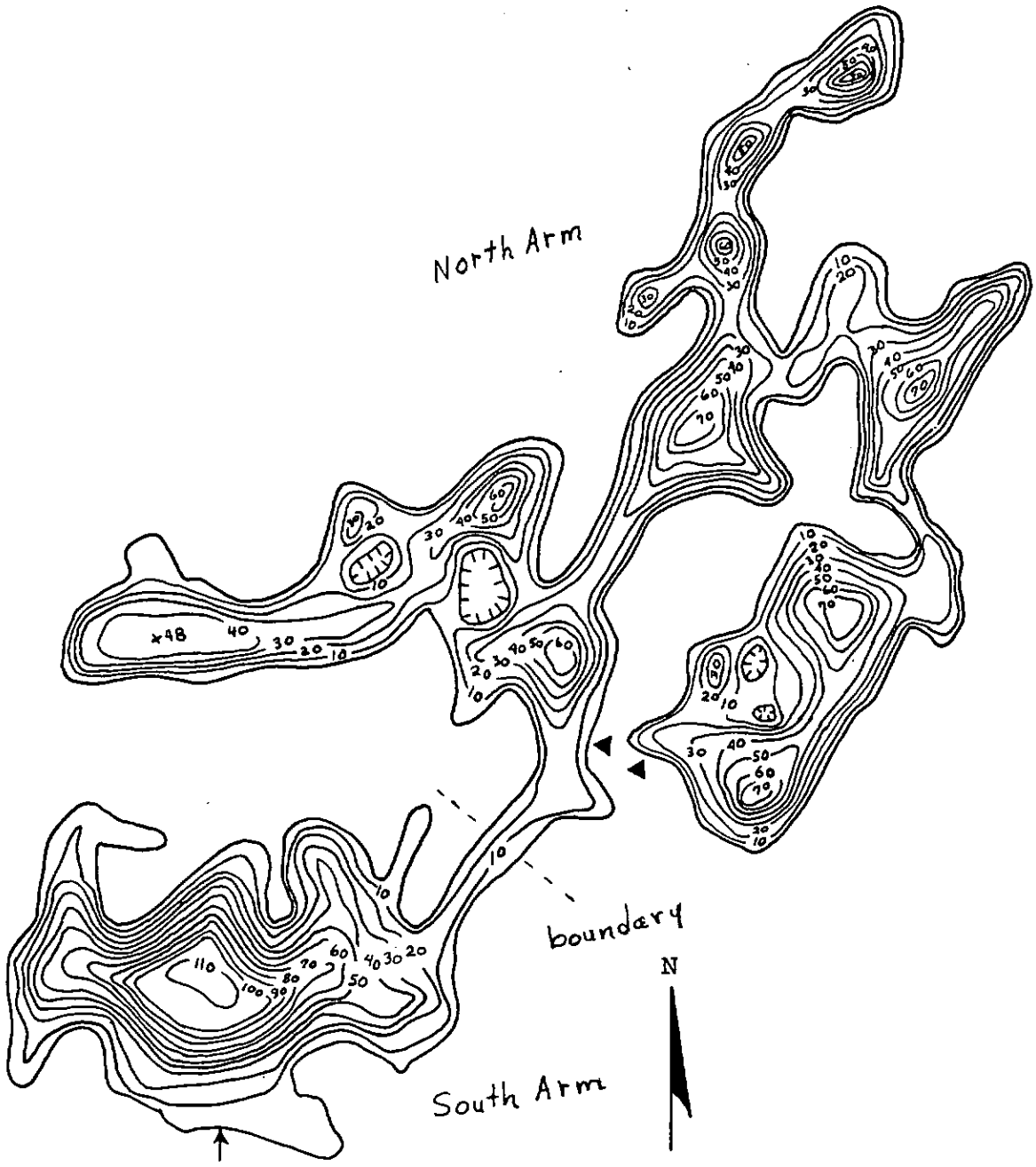
SAMPLE SITE	1	
DATE	6/28/72	
TIME	1120	1130
DEPTH (FT)	3.	62.
DISSOLVED NITRATE (N)	0.01	0.32
DISSOLVED NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.11	0.22
TOTAL ORGANIC NITROGEN (N)	0.40	0.26
TOTAL PHOSPHORUS (P)	0.020	0.060
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.040
SPECIFIC CONDUCTANCE (MICROMHOS)	80	86
WATER TEMPERATURE (DEG C)	1.5	5.3
COLOR (PLATINUM-COBALT UNITS)	70	80
SECCHI-DISC VISIBILITY (FT)	9	
DISSOLVED OXYGEN	11.2	7.3

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/28/72
TIME	1130
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	4
FECAL COLIFORM, MEAN (COL./100ML)	1

REMARKS

AN IRREGULARLY-SHAPED LAKE HAVING STEEP SIDES AND A GENERALLY CONICAL-SHAPED BOTTOM. THE LAKE WATER IS HIGHLY COLORED FROM NATURAL SOURCES. THE NORTH ARM OF THE LAKE HAD ONLY A LIGHT GROWTH OF AQUATIC PLANTS. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADF ON OCTOBER 18, 1972.



St. Clair (North Arm) Lake, Thurston County.
From Washington Department of Game, February 12, 1951.

St. Clair (North Arm) Lake, Thurston County.
August 9, 1972. Approx. scale 1:11,000.

ST CLAIR (SOUTH ARM) LAKE THURSTON COUNTY

LATITUDE 46°59'31" LONGITUDE 122°43'22" T17N-R1E-6
NISQUALLY RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	14.5 SQ MI	RESIDENTIAL DEVELOPMENT	41 %
ALTITUDE	73. FT		
LAKE AREA	88. ACRES	NUMBER OF NEARSHORE HOMES	65
LAKE VOLUME	3600. ACRE-FT		
MEAN DEPTH	40. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	110. FT		
SHORELINE LENGTH	2.9 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.2	RESIDENTIAL SUBURBAN	<1 %
DEVELOPMENT OF VOLUME	0.37	AGRICULTURAL	29 %
BOTTOM SLOPE	4.8 %	FOREST OR UNPRODUCTIVE	70 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	1 %
INFLOW	PERENNIAL		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

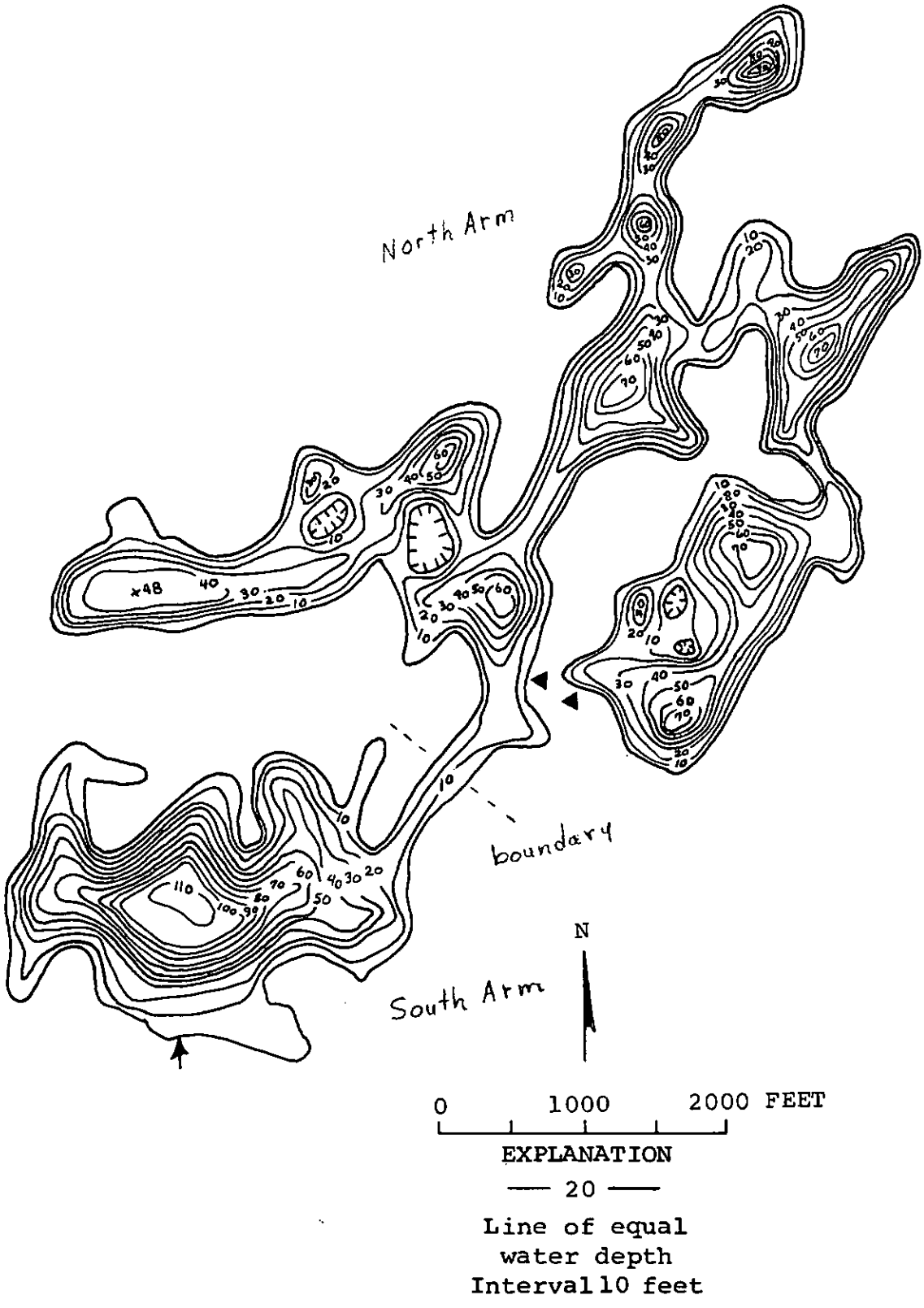
SAMPLE SITE	1	
DATE	6/28/72	
TIME	940	950
DEPTH (FT)	3.	95.
DISSOLVED NITRATE (N)	0.0	0.54
DISSOLVED NITRITE (N)	0.0	0.04
TOTAL AMMONIA (N)	0.14	0.14
TOTAL ORGANIC NITROGEN (N)	0.49	0.46
TOTAL PHOSPHORUS (P)	0.030	0.15
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.090
SPECIFIC CONDUCTANCE (MICROMHOS)	95	82
WATER TEMPERATURE (DEG C)	16.9	5.2
COLOR (PLATINUM-COBALT UNITS)	65	125
SECCHI-DISC VISIBILITY (FT)	6	
DISSOLVED OXYGEN	11.4	0.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/28/72
TIME	945
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	4
FECAL COLIFORM, MEAN (COL./100ML)	3

REMARKS

THE SOUTH ARM OF ST. CLAIR LAKE IS A DEEP CONICAL-SHAPED DEPRESSION. THE BEACH AND LITTORAL ZONE OF THE LAKE CONTAIN A LARGE QUANTITY OF MUCK IN THE SHALLOW EMBAYMENTS AND SUPPORTED A HEAVY GROWTH OF EMERSED AQUATIC PLANTS AND A MODERATE GROWTH OF SUBMERSED AQUATIC PLANTS. THE LAKE WATER IS HIGHLY COLORED FROM NATURAL SOURCES, BUT IS LOW IN DISSOLVED-MINERAL CONCENTRATION. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 18, 1972.



St. Clair (South Arm) Lake, Thurston County.
From Washington Department of Game, February 12, 1951.

St. Clair (South Arm) Lake, Thurston County.
May 12, 1972. Approx. scale 1:11,000.

SUMMIT LAKE THURSTON COUNTY

LATITUDE 47° 3'12" LONGITUDE 123° 7'20" T18N-R4W-13
PUGET SOUND BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	2.82 SQ MI	RESIDENTIAL DEVELOPMENT	93 %
ALTITUDE	500. FT		
LAKE AREA	530. ACRES	NUMBER OF NEARSHORE HOMES	290
LAKE VOLUME	28000. ACRE-FT		
MEAN DEPTH	53. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	100. FT		
SHORELINE LENGTH	5.6 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.7	RESIDENTIAL SUBURBAN	9 %
DEVELOPMENT OF VOLUME	0.53	AGRICULTURAL	0 %
BOTTOM SLOPE	9.1 %	FOREST OR UNPRODUCTIVE	62 %
BASIN GEOLOGY	IGNEOUS	LAKE SURFACE	29 %
INFLOW	INTERMITTENT		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

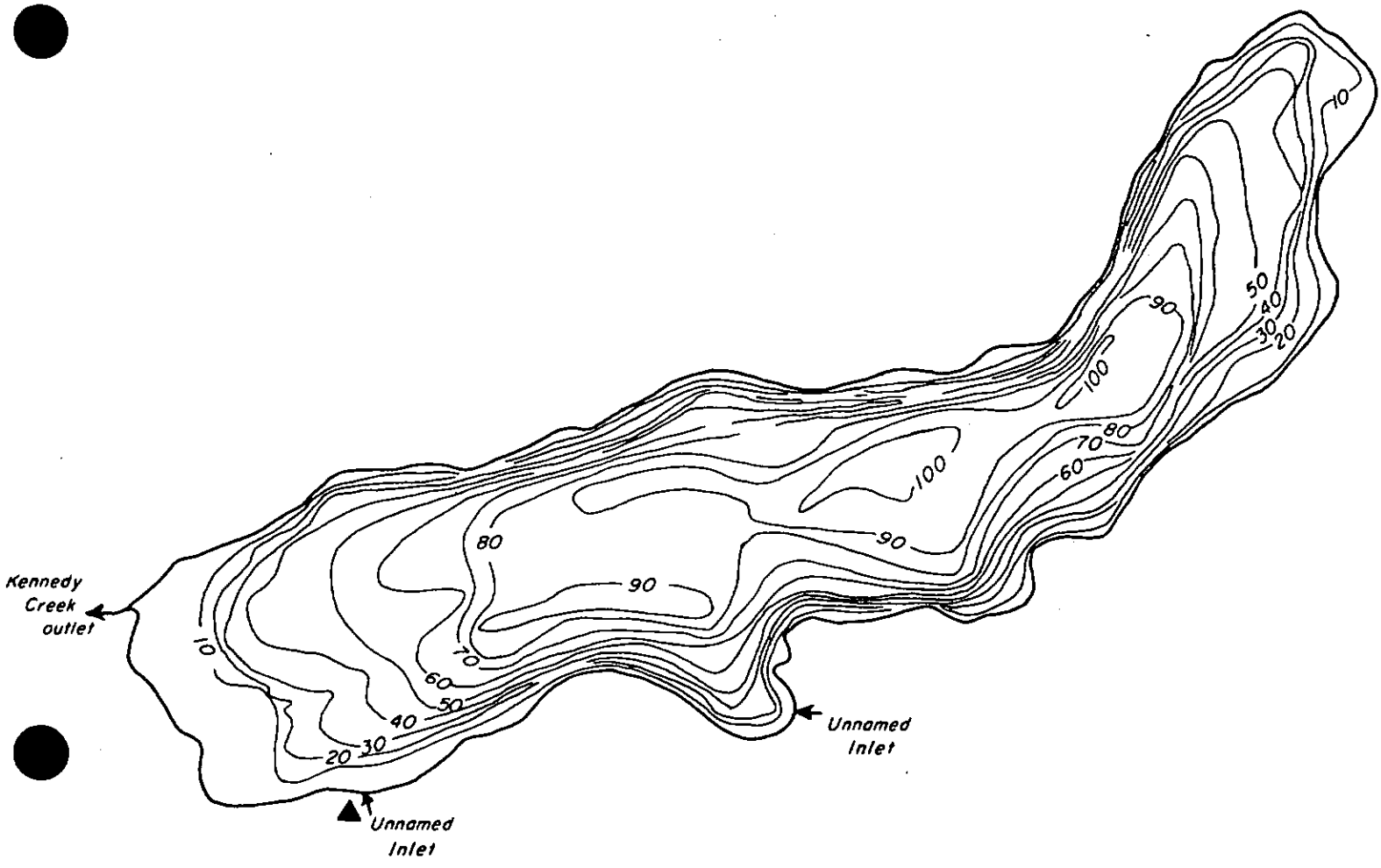
SAMPLE SITE	1	
DATE	7/ 7/71	
TIME	940	945
DEPTH (FT)	3.	75.
DISSOLVED NITRATE (N)	0.0	0.02
TOTAL NITRITE (N)	--	--
TOTAL AMMONIA (N)	0.01	0.02
TOTAL ORGANIC NITROGEN (N)	0.01	0.01
TOTAL PHOSPHORUS (P)	0.010	0.010
DISSOLVED ORTHOPHOSPHATE (P)	0.010	0.010
SPECIFIC CONDUCTANCE (MICROMHOS)	47	--
WATER TEMPERATURE (DEG C)	16.2	8.5
COLOR (PLATINUM-COBALT UNITS)	--	--
SECCHI-DISC VISIBILITY (FT)	16	
DISSOLVED OXYGEN	10.0	4.7

LAKE SHORELINE COVERED BY EMERSED PLANTS	1- 10 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

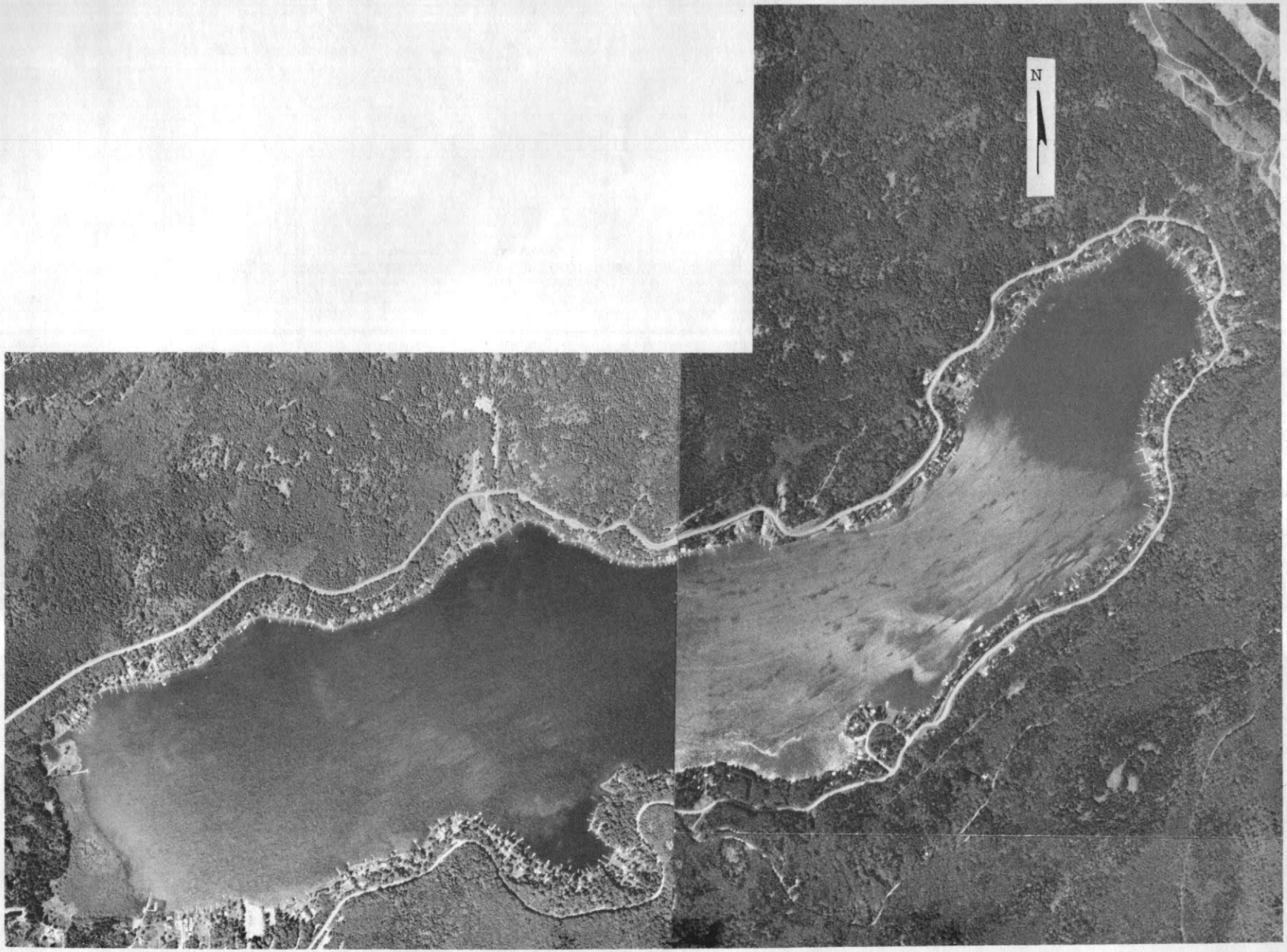
DATE	8/19/74
TIME	1344
NUMBER OF FECAL COLIFORM SAMPLES	6
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	25
FECAL COLIFORM, MEAN (COL./100ML)	7

REMARKS

THE LAKE WAS FORMED IN A STEEP VALLEY DAMMED BY TERRACE DEPOSITS OF FLUVIAL AND GLACIOFLUVIAL ORIGIN. THE SHORELINE ON THE WEST SIDE OF THE LAKE ADJOINS MARSH OR POORLY DRAINED WETLAND. MOST OF THE AQUATIC MACROPHYTES WERE ON THE WEST END OF THE LAKE AND EXTENDED AS MUCH AS 1000 FEET FROM SHORE. THE LAKE RECEIVES HEAVY RECREATIONAL USE. IN 1971 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON SEPTEMBER 21, 1971. COLOR WAS NOT DETERMINED ON THE WATER QUALITY DATE SHOWN ABOVE, BUT THE AVERAGE OF FOUR COLOR DETERMINATIONS MADE IN 1971 WAS 20 PT-CO UNITS.



Summit Lake, Thurston County. From Washington Department of Game, June 23, 1952.



Summit Lake, Thurston County. May 13, 1972. Approx. scale 1:15,000.

SUNWOOD LAKE THURSTON COUNTY

LATITUDE 46*58'12" LONGITUDE 122*46'25" T17N-R1W-11
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.36 SQ MI	RESIDENTIAL DEVELOPMENT	14 %
ALTITUDE	245. FT		
LAKE AREA	21. ACRES	NUMBER OF NEARSHORE HOMES	11
LAKE VOLUME (EST.)	81. ACRE-FT		
MEAN DEPTH (EST.)	4. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	7. FT		
SHORELINE LENGTH	1.7 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	2.6	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.55	AGRICULTURAL	0 %
BOTTOM SLOPE	0.65 %	FOREST OR UNPRODUCTIVE	91 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	9 %
INFLOW	NOT DETERMIN		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	--

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

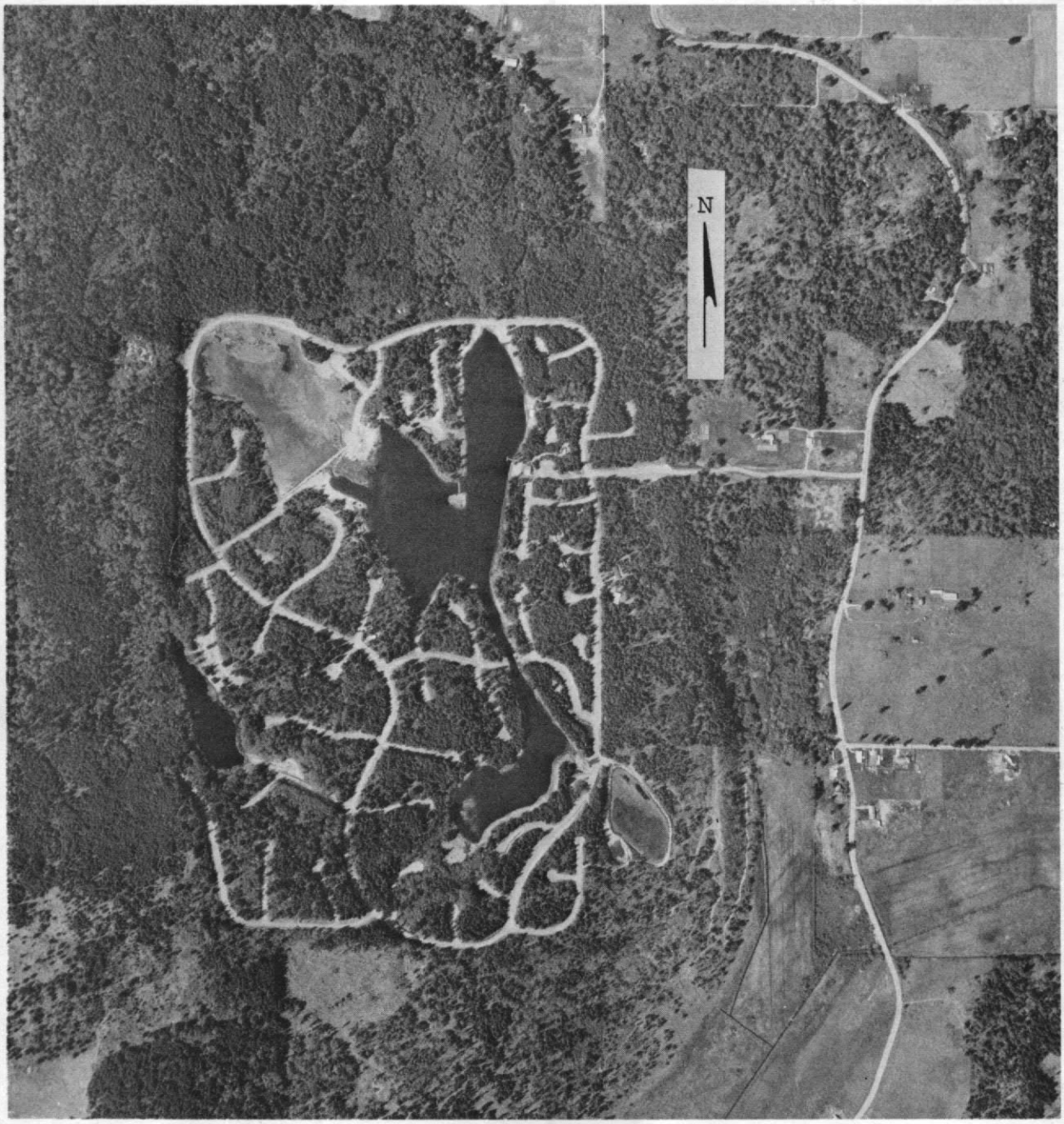
SAMPLE SITE	1	
DATE	8/20/74	
TIME	1455	1500
DEPTH (FT)	3.	5.
TOTAL NITRATE (N)	0.00	0.00
TOTAL NITRITE (N)	0.01	0.01
TOTAL AMMONIA (N)	0.21	0.16
TOTAL ORGANIC NITROGEN (N)	0.71	0.79
TOTAL PHOSPHORUS (P)	0.045	0.054
TOTAL ORTHOPHOSPHATE (P)	0.018	0.019
SPECIFIC CONDUCTANCE (MICROMHOS)	45	45
WATER TEMPERATURE (DEG C)	18.0	17.8
COLOR (PLATINUM-COBALT UNITS)	55	85
SECCHI-DISC VISIBILITY (FT)	3	
DISSOLVED OXYGEN	7.4	7.2

LAKE SHORELINE COVERED BY EMERSED PLANTS	76-100 %
LAKE SURFACE COVERED BY EMERSED PLANTS	NONE OR <1 %

DATE	8/20/74
TIME	1510
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	24
FECAL COLIFORM, MEAN (COL./100ML)	8

REMARKS

AN ARTIFICIAL LAKE CREATED FOR RESIDENTIAL AND RECREATIONAL PURPOSES. THE LAKE RECEIVES INFLOW FROM WELL PUMPAGE. EMERSED PLANTS COVERED THE SHORELINE IN A THIN MARGIN CLOSE TO SHORE. THE WATER IS BROWN COLOR. VOLUME, SURFACE AREA, AND RELATED MORPHOMETRIC PARAMETERS ARE ESTIMATED.



Sunwood Lake, Thurston County. May 12, 1972. Approx. scale 1:12,000.

TEMPO(BUSHMAN) LAKE THURSTON COUNTY

LATITUDE 46*55'43" LONGITUDE 122*48'26" T17N-R1W-28
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.96 SQ MI	RESIDENTIAL DEVELOPMENT	55 %
ALTITUDE	255. FT		
LAKE AREA	32. ACRES	NUMBER OF NEARSHORE HOMES	15
LAKE VOLUME	400. ACRE-FT		
MEAN DEPTH	13. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	24. FT		
SHORELINE LENGTH	1.0 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.3	RESIDENTIAL SUBURBAN	0 %
DEVELOPMENT OF VOLUME	0.52	AGRICULTURAL	5 %
BOTTOM SLOPE	1.8 %	FOREST OR UNPRODUCTIVE	90 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	5 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	PRESENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

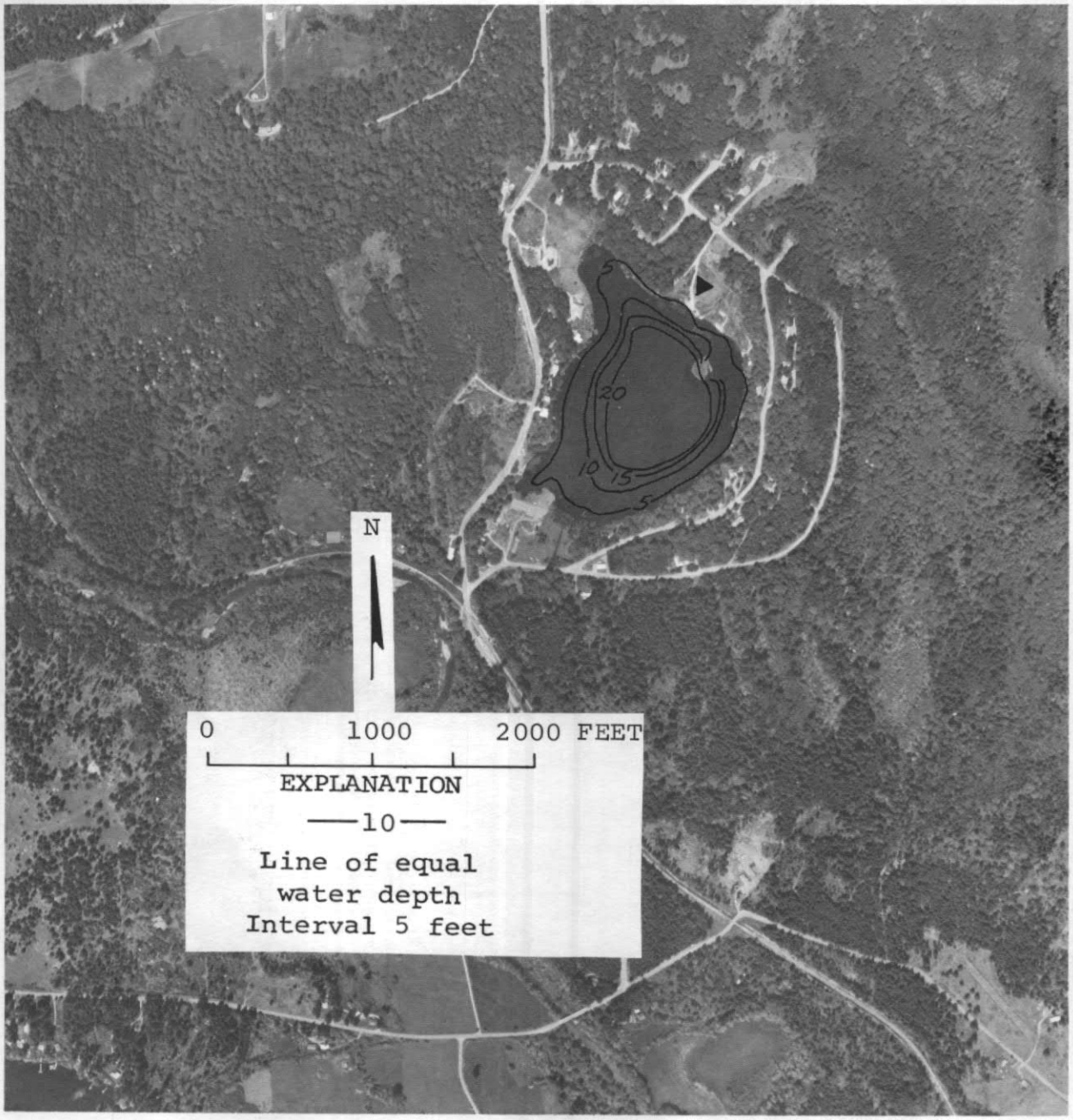
SAMPLE SITE	1	
DATE	8/15/74	
TIME	1505	1510
DEPTH (FT)	3.	16.
TOTAL NITRATE (N)	0.02	0.02
TOTAL NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.12	0.15
TOTAL ORGANIC NITROGEN (N)	0.65	0.36
TOTAL PHOSPHORUS (P)	0.026	0.020
TOTAL ORTHOPHOSPHATE (P)	0.004	0.006
SPECIFIC CONDUCTANCE (MICROMHOS)	55	55
WATER TEMPERATURE (DEG C)	20.8	10.1
COLOR (PLATINUM-COBALT UNITS)	30	40
SECCHI-DISC VISIBILITY (FT)	6	
DISSOLVED OXYGEN	7.6	0.4

LAKE SHORELINE COVERED BY EMERSED PLANTS	26- 50 %
LAKE SURFACE COVERED BY EMERSED PLANTS	11- 25 %

DATE	8/15/74
TIME	1515
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	2
FECAL COLIFORM, MAXIMUM (COL./100ML)	14
FECAL COLIFORM, MEAN (COL./100ML)	6

REMARKS

IN 1960 THE SURFACE AREA AND VOLUME OF THE ORIGINAL BUSHMAN LAKE WERE INCREASED BY A DAM AT THE OUTLET. THE LAKE HAD A MODERATELY HEAVY COVER OF EMERSED PLANTS. A LOW-DENSITY ALGAL BLOOM WAS OBSERVED.



Tempo (Bushman) Lake, Thurston County. Bathymetric map from U.S. Geological Survey, January 3, 1974. Aerial photo, May 12, 1972.

WARD LAKE THURSTON COUNTY

LATITUDE 47° 0'21" LONGITUDE 122°52'36" T18N-R2W-36
DESCHUTES RIVER BASIN

PHYSICAL DATA		CULTURAL DATA	
DRAINAGE AREA	0.95 SQ MI	RESIDENTIAL DEVELOPMENT	67 %
ALTITUDE	126. FT		
LAKE AREA	65. ACRES	NUMBER OF NEARSHORE HOMES	30
LAKE VOLUME	2100. ACRE-FT		
MEAN DEPTH	33. FT	LAND USE IN DRAINAGE BASIN	
MAXIMUM DEPTH	67. FT		
SHORELINE LENGTH	1.4 MI	RESIDENTIAL URBAN	0 %
SHORELINE CONFIGURATION	1.2	RESIDENTIAL SUBURBAN	49 %
DEVELOPMENT OF VOLUME	0.49	AGRICULTURAL	40 %
BOTTOM SLOPE	3.5 %	FOREST OR UNPRODUCTIVE	0 %
BASIN GEOLOGY	SED./META.	LAKE SURFACE	11 %
INFLOW	NONE VISIBLE		
OUTFLOW CHANNEL	ABSENT	PUBLIC BOAT ACCESS TO LAKE	YES

WATER-QUALITY DATA (IN MG/L UNLESS OTHERWISE INDICATED)

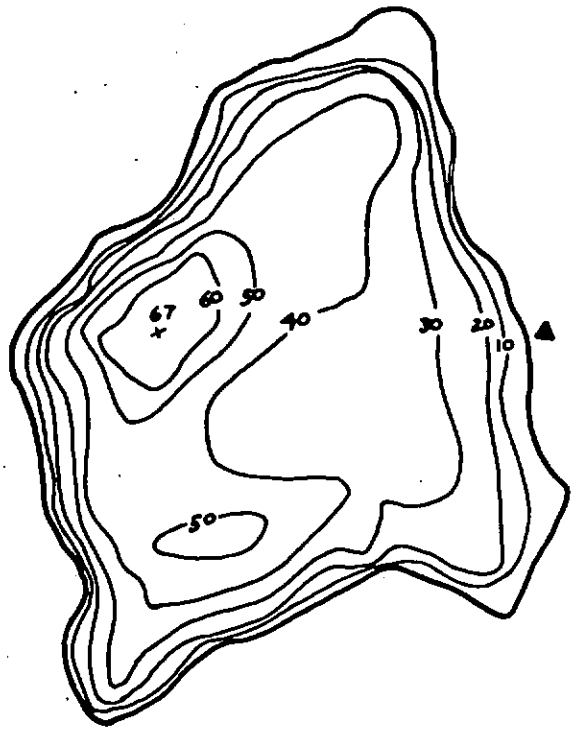
SAMPLE SITE	1	
DATE	6/27/72	
TIME	900	910
DEPTH (FT)	3.	59.
DISSOLVED NITRATE (N)	0.00	0.02
DISSOLVED NITRITE (N)	0.00	0.00
TOTAL AMMONIA (N)	0.07	0.16
TOTAL ORGANIC NITROGEN (N)	0.24	0.16
TOTAL PHOSPHORUS (P)	0.010	0.020
DISSOLVED ORTHOPHOSPHATE (P)	0.000	0.000
SPECIFIC CONDUCTANCE (MICROMHOS)	17	20
WATER TEMPERATURE (DEG C)	17.8	6.8
COLOR (PLATINUM-COBALT UNITS)	10	10
SECCHI-DISC VISIBILITY (FT)	12	
DISSOLVED OXYGEN	9.9	1.8

LAKE SHORELINE COVERED BY EMERSED PLANTS	11- 25 %
LAKE SURFACE COVERED BY EMERSED PLANTS	1- 10 %

DATE	6/27/72
TIME	920
NUMBER OF FECAL COLIFORM SAMPLES	3
FECAL COLIFORM, MINIMUM (COL./100ML)	<1
FECAL COLIFORM, MAXIMUM (COL./100ML)	26
FECAL COLIFORM, MEAN (COL./100ML)	11

REMARKS

A SPRING-FED LAKE LOCATED NEAR OLYMPIA. THE STEEP-SIDED BEACH AND LITTORAL ZONE IS COMPOSED PREDOMINANTLY OF SILT AND FINE SAND AND SUPPORTED ONLY A LIGHT GROWTH OF AQUATIC PLANTS. THE WATER IS DILUTE AS INDICATED BY A SPECIFIC CONDUCTANCE VALUE OF 17 MICROMHOS. IN LOCAL AREAS THE SHORELINE IS COVERED WITH SUBMERSED LOGS. IN 1972 THE U.S. GEOLOGICAL SURVEY SAMPLED THE LAKE FOUR TIMES. THE PLANT SURVEY WAS MADE ON OCTOBER 3, 1972.



N

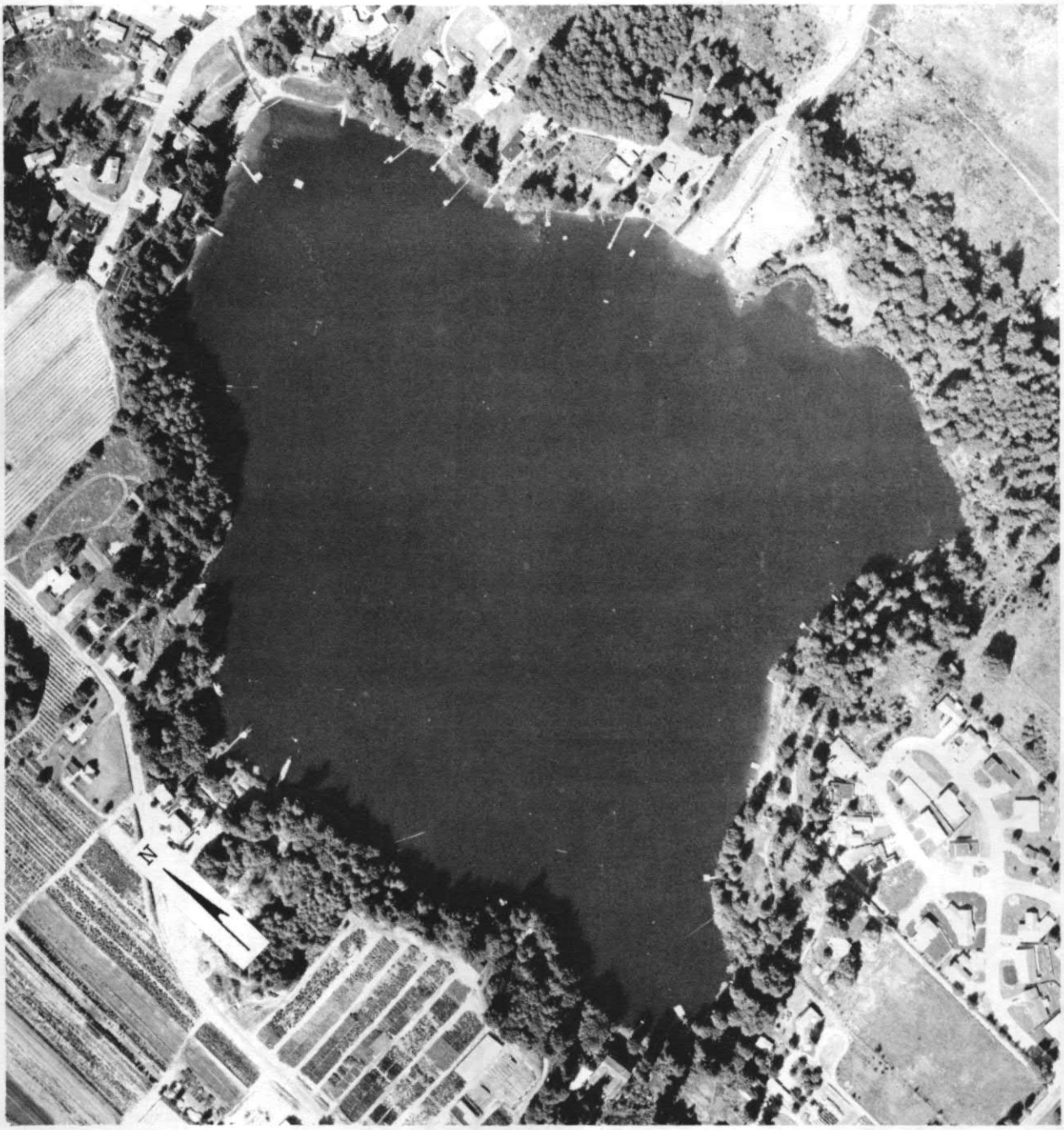
0 500 1000 FEET

EXPLANATION

20

Line of equal water depth Interval 10 feet

Ward Lake, Thurston County. From Washington Department of Game, April 14, 1949.



Ward Lake, Thurston County. July 14, 1971. Approx. scale 1:4800.

INDEX