# Water-Quality and Lake-Stage Data for Wisconsin Lakes, Water Year 1997

U.S. GEOLOGICAL SURVEY
Open-File Report 98-78

*Prepared in cooperation with the*
State of Wisconsin and local agencies

USGS
science for a changing world

# WATER-QUALITY AND LAKE-STAGE DATA FOR WISCONSIN LAKES, WATER YEAR 1997

## By Wisconsin District Lake-Studies Team

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A report by the Wisconsin District Lake-Studies Team–
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Prepared in cooperation with
THE STATE OF WISCONSIN AND OTHER AGENCIES

Middleton, Wisconsin
1998

**U.S. DEPARTMENT OF THE INTERIOR**
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## CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATED WATER-QUALITY UNITS

| Multiply | By | To Obtain |
|---|---|---|
| mile (mi) | 1.609 | kilometer |
| pound (lb) | 453.6 | gram |
| acre | 0.4048 | hectare |
| foot (ft) | 0.3048 | meter |
| gallon (gal) | 3.785 | liter |
| square mile ($mi^2$) | 2.590 | square kilometer |

Temperature, in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by use of the following equation:

$$°F = 1.8(°C) + 32.$$

**Sea level**: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)–a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

**Abbreviated water-quality units**: Chemical concentrations and water temperature are given in metric units. Chemical concentration is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as weight (milligrams) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter. For water with dissolved-solids concentrations less than 7,000 mg/L, the numerical values for concentrations expressed as mg/L and µg/L are the same as for concentrations in parts per million and parts per billion, respectively.

Specific conductance of water is expressed in microsiemens per centimeter at 25 degrees Celsius (µS/cm). This unit is equivalent to micromhos per centimeter at 25 degrees Celsius (µmho/cm), formerly used by the U.S. Geological Survey.

# WATER-QUALITY AND LAKE-STAGE DATA FOR WISCONSIN LAKES, WATER YEAR 1997

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## INTRODUCTION

The U.S. Geological Survey (USGS), in cooperation with local and other agencies, collects data at selected lakes throughout Wisconsin. These data, accumulated over many years, provide a data base for developing an improved understanding of the water quality of lakes. To make these data available to interested parties outside the USGS, the data are published annually in this report series. The location of water-quality and lake-stage stations in Wisconsin for water year 1997 are shown in figure 1. A water year is the 12-month period from October 1 through September 30. It is designated by the calendar year in which it ends. Thus, the period October 1, 1996 through September 30, 1997 is called "water year 1997."

The purpose of this report is to provide information about the physical and chemical characteristics of Wisconsin lakes. Data that have been collected at specific lakes, and information to aid in the interpretation of those data, are included in this report. Data collected include measurements of lake stage and in-lake water quality. Graphs of Secchi depths, surface total-phosphorus and chlorophyll-*a* concentrations versus time are usually included for lakes with two or more years of data. Graphs of vertical profiles of temperature, dissolved oxygen, pH, and specific conductance are included for sites where these parameters were measured. Descriptive information for each lake includes: location of the lake, area of the lake's watershed, period for which data are available, revisions to previously published records, and pertinent remarks. Additional data, such as streamflow and water quality in tributary and outlet streams of some of the lakes, are published in another volume: "Water Resources Data-Wisconsin, 1997."


Note: at some lakes more than one site may be monitored.

**Figure 1.** Location of lake water-quality and lake-stage stations in Wisconsin.

The USGS has done cooperative lake monitoring with local and other agencies since 1983. Cooperators in 1997 included:

Big Muskego Lake District
City of Muskego
Dane County Department of Public Works
Eagle Spring Lake Management District
Geneva Lake Environmental Agency
Green Lake Sanitary District
Little Cedar Lake Protection and Rehabilitation District
Little Green Lake Protection and Rehabilitation District
Little Muskego Lake Protection and Rehabilitation District
Little St. Germain Lake Protection and Rehabilitation District
Middle Genesee Lake District
Montello Lake Inland Protection and Rehabilitation District
Okauchee Lake Management District
Potters Lake Protection and Rehabilitation District
Pretty Lake Protection and Rehabilitation District
Rock County Public Works Department
Silver Lake Protection and Rehabilitation District
Town of Auburn
Town of Casey (McKenzie Lakes Association)
Town of Cedar Lake (Red Cedar Lakes Association)
Town of Delavan (Delavan Lake)
Twin Lakes Protection and Rehabilitation District
U.S. Army Corps of Engineers
Village of Oconomowoc Lake
Whitewater Lake Management District
Wind Lake Management District
Wisconsin Department of Natural Resources
Wolf Lake Management District

Lake data collection sites are identified by a unique identification number. Lake water-quality sites are identified by a 15-digit number that is a concatenation of the site's latitude, longitude, and a two-digit sequence number. The sequence number is used to distinguish between sites located at the same latitude-longitude designation. The site identification number is permanently assigned to the site; actual latitude and longitude of the site are subject to update and are stored separately. For some lakes, which have historical records of lake stage, an eight-to-ten digit number is assigned according to downstream order. Gaps are left in the numerical series to allow for new stations; hence, the numbers are not consecutive. The first two digits of the complete eight-to-ten digit number, such as 04087000, 054310157, or 0407809265, designate the major river basin. For example, "04" designates the St. Lawrence River Basin and "05" designates the Upper Mississippi River Basin.

The water-quality lake stations that were discontinued prior to water year 1997 are listed in table 1. Discontinued lake-stage stations are not included in this table.

This report is the culmination of a concerted effort by a number of people who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to USGS policy and established guidelines. Technicians in charge of the field offices are: T.J. Popowski (Rice Lake), J.J. Hanig (Merrill), and J. Habale (Madison). The data were collected and processed by J. Chaplin, G.L. Goddard, J.J. Hanig, D.E. Housner, S.L. McNamara, S.B. Marsh, E.A. Mergener, D.L. Olson, and J.G. Schuler. P.A. Stark assembled, edited, and formatted the report. Additional assistance in preparation of the report was provided by M.M. Greenwood.

## METHODS OF DATA COLLECTION

Depth profiles of water temperature, dissolved oxygen, pH, and specific conductance were collected using multi-parameter meters. Prior to measurements, the meters were calibrated using standards for pH and conductance, and dissolved oxygen was calibrated using the air calibration method.

Generally, field measurements in profiles were made at 0.5-m intervals if the maximum depth of the lake was 5 m or less and at 1.0-m intervals if the maximum depth was greater than 5 m.

**Table 1.** Discontinued lake stations

| Station name | Site identification number | Period of record |
|---|---|---|
| Alma Lake near St. Germain | 455426089254700 | Oct. 1984–Sept. 1990, May 1992–Sept.1996 |
| Balsam Lake, off Cedar Island, at Balsam Lake | 452755092264600 | Feb. 1991–Aug. 1994 |
| Balsam Lake, off Little Narrows, near Balsam Lake | 452858092265300 | May 1991–Aug. 1994 |
| Balsam Lake, off Rock Island, near Balsam Lake | 452754092234300 | May 1991–Aug. 1994 |
| Bass Lake near Shawano | 445215088300300 | Feb. 1990–Aug. 1992 |
| Bear Lake at Deep Hole near Haugen | 453754091490900 | Mar. 1992–Aug. 1993 |
| Beaver Dam Lake South end at Beaver Dam | 432814088515000 | June–Oct. 1991 |
| Beaver Dam Lake North end near Beaver Dam | 433122088545700 | June–Oct. 1991 |
| Big Blacksmith Lake near Keshena | 445401088334500 | Feb. 1990–Aug. 1992 |
| Big Hills (Hills) Lake near Wild Rose | 440912089092000 | June 1983–Aug. 1984, Feb.–Aug. 1987, Feb.–Aug. 1990, Feb.–Aug. 1993, Feb.–Aug. 1996 |
| Big Muskego Lake at North Site near Muskego | 425301088061300 | Feb.–Aug. 1988 |
| Big Muskego Lake, Research Base, near Muskego | 425235088075300 | May–June 1994 |
| Big St. Germain Lake near St. Germain | 455557089311000 | Feb. 1992–Aug. 1996 |
| Big Sissabagama Lake near Stone Lake | 454724091303600 | Mar. 1986–Aug. 1996 |
| Booth Lake near East Troy | 424800088254800 | Feb. 1992–Aug. 1994 |
| Denoon Lake at Wind Lake | 425044088100300 | Feb. 1991–Aug. 1996 |
| Druid Lake near Hartford | 431643088243300 | Feb. 1991–Sept. 1996 |
| Eagle Lake near Kansasville | 05544500 | 1936–64, 1975–77, 1979, Feb. 1993–Sept. 1996 |
| Eagle Lake, at Deep Hole, near Kansasville | 424207088072400 | Feb. 1993–Aug. 1996 |
| Forest Lake near Dundee | 433632088100200 | Mar. 1994–Aug. 1996 |
| Fowler Lake, Center, at Oconomowoc | 430653088294601 | Jan.–Dec. 1984, Oct. 1986–Sept. 1996 |
| Fox Lake Deep Hole at Fox Lake | 433458088560600 | June 1991–Mar. 1993 |
| Hooker Lake at Salem | 423335088060300 | Feb. 1992–Aug. 1993 |
| Kirby Lake near Cumberland | 453554092042101 | Nov. 1995–Oct. 1996 |
| (Site 1) near Cumberland | 453608092035801 | Nov. 1995–Nov. 1996 |
| (Site 2) near Cumberland | 453601092035301 | Nov. 1995–Nov. 1996 |
| (Site 3) near Cumberland | 453612092034901 | Nov. 1995–Nov. 1996 |
| (Site 4) near Cumberland | 453603092035701 | Nov. 1995–Nov. 1996 |
| (Site 5) near Cumberland | 453608092041201 | Nov. 1995–Nov. 1996 |
| (Site 6) near Cumberland | 453555092040901 | Nov. 1995–Nov. 1996 |
| Lac La Belle Center at Oconomowoc | 430733088305900 | Feb. 1984–Aug. 1985, Feb.–Sep. 1991 |
| Lac La Belle NW at Oconomowoc | 430809088313900 | Feb. 1984–Aug. 1985 |
| Lac La Belle SE at Oconomowoc | 430707088301400 | Feb. 1984–Aug. 1985 |
| Lake Blass at Lake Delton | 433545089482400 | Mar. 1989–Aug. 1990 |
| Lake Keesus, East Bay, near Merton | 4309570088183400 | Apr. 1991Aug. 1995 |
| Lake Keesus, North Bay, near Merton | 431006088191000 | Apr. 1991–Aug. 1995 |

**Table 1.** Discontinued lake stations

| Station name | Site identification number | Period of record |
|---|---|---|
| Lake Morris at Mount Morris | 440654089120500 | Jun. 1983–Sep. 1989 |
| Lake Nebagamon, Northeast Bay, at Lake Nebagamon | 463050091412300 | May 1992–Aug. 1995 |
| Lake Nebaagmon, Southeast Bay, at Lake Nebagamon | 462928091413500 | Mar. 1992–Sep. 1995 |
| Lake Nebagamon, West Bay, at Lake Nebagamon | 463034091425300 | May 1992–Aug. 1995 |
| Lake Noquebay near Crivitz | 451511087550900 | Feb. 1987–Aug. 1988, Apr. 1991–Aug. 1994 |
| Lake Noquebay, East End, near Crivitz | 451540087525700 | Apr. 1991–Aug. 1994 |
| Lamotte Lake near Shawano | 445305088361200 | Feb. 1990–Aug. 1992 |
| Lauderdale Lakes | | |
| at Lauderdale | 424554088332700 | Oct. 1993–Oct. 1994 |
| Green near Lauderdale | 424652088341500 | Nov. 1993–Nov. 1994 |
| Middle at Lauderdale | 424621088335500 | Nov. 1993–Nov. 1994 |
| Mill at Lauderdale | 424555088335700 | Nov. 1993–Nov. 1994 |
| Legend Lake (site 1) near Shawano | 445342088312700 | Feb. 1990–Feb. 1992 |
| Little Rock Lake near Woodruff | 455946089415702 | Oct. 1983–Sept. 1996 |
| Long (Kee Nong Go-Mong) Lake at Wind Lake | 424937088103400 | Feb. 1988–Aug. 1989, Feb. 1991–Aug. 1996 |
| Loon Lake near Shawano | 445009088303700 | Feb. 1991–Aug. 1993 |
| Lost Lake near Beaver Dam | 432640088580500 | June–Oct. 1991 |
| Max Lake near Woodruff | 460128089423501 | Mar. 1988–Dec. 1996 |
| Mead Lake, East Bay near Willard | 444720090445000 | Apr. 1991–Aug. 1995 |
| Mead Lake, West Bay near Willard | 444733090460100 | Feb. 1991–Sep. 1995 |
| Moon Lake near St. Germain | 455504089260500 | Feb. 1992–Aug. 1996 |
| Moshawquit Lake near Shawano | 445352088295800 | Feb. 1990–Aug. 1992 |
| Park Lake (site 1) at Pardeeville | 433239089175800 | Feb. 1986–Aug. 1987, May–Nov. 1993 |
| Park Lake (site 2) at Pardeeville | 433226089175500 | May–Nov. 1993 |
| Park Lake (site 3) at Pardeeville | 433245089173000 | May–Nov. 1993 |
| Park Lake (site 4) at Pardeeville | 433257089165100 | May–Nov. 1993 |
| Powers Lake at Powers Lake | 423246088175800 | Mar. 1986–Aug. 1996 |
| Rice Lake at Deep Hole near Whitewater | 424629088415700 | Apr.–Nov. 1991 |
| Round Lake near Shawano | 445328088335000 | Feb. 1990–Aug. 1992 |
| Sand Lake (Deep Hole) near Keshena | 445321088323101 | June–Aug. 1992 |
| Silver Lake near Oconomowoc | 430436088293300 | Apr. 1992–Aug. 1996 |
| Sinissippi Lake off Anthony Is. at Hustisford | 432113088361100 | Feb. 1991–Aug. 1993 |
| Sinissippi Lake off Butternut Is. near Hustisford | 432240088363900 | Apr. 1991–Aug. 1993 |
| Sinissippi Lake off Sam Point near Hustisford | 432300088374200 | Apr. 1991–Aug. 1993 |
| Spirit Lake near Keshena | 445400088320100 | Apr.–Aug. 1992 |
| Stewart Lake at Mt. Horeb | 430117089442701 | May 1992–Sep. 1993 |
| Tichigan Lake near Waterford | 424854088123300 | Mar. 1994–Aug. 1996 |
| Upper Nemahbin Lake, Center, near Delafield | 430400088254900 | June 1993–Aug. 1995 |
| Upper Nemahbin Lake, South Site, near Delafield | 430339088254800 | June 1993–Aug. 1995 |
| Upper Nemahbin Lake Outlet near Delafield | 430334088255400 | June 1993–Aug. 1995 |
| Watosah-skice Lake near Keshena | 445330088361400 | Feb. 1990–Aug. 1992 |
| Waubeesee Lake at Wind Lake | 424857088101500 | Feb. 1988–Aug. 1989, Feb. 1991–Aug. 1996 |

**Table 1.** Discontinued lake stations

| Station name | Site identification number | Period of record |
|---|---|---|
| Whitewater Lake off Heart Prairie near Whitewater | 424533088420100 | Apr.–Nov. 1991 |
| Whitewater Lake near Whitewater | 424608088414800 | Apr.–Oct. 1991 |
| Whitewater Lake North Bay near Whitewater | 424625088405500 | Apr.–Nov. 1991 |
| Whitewater Lake South Bay near Whitewater | 424501088422300 | Apr.–Nov. 1991 |

In most lakes, water samples were collected at two depths - near the surface and near the bottom. Chemical analyses of water samples were performed using standard analytical methods by either the USGS National Water Quality Laboratory (Wershaw and others, 1987; Fishman and Friedman, 1989; Fishman, 1993) or the Wisconsin State Laboratory of Hygiene (Wisconsin State Laboratory of Hygiene, 1993). Analyses for dissolved constituents were performed on samples that were filtered in the field through a 0.45-µm (micrometer) pore-size filter. Total or total recoverable constituents were determined by analyzing unfiltered water samples. Preservation and shipment of samples followed standard protocols established by the laboratories. Water-quality data were archived in the National Water Data Storage and Retrieval System (WATSTORE). Information about access of WATSTORE data is available in the data report: "Water Resources Data - Wisconsin, 1997". WATSTORE parameter codes and minimum concentration reporting limits for chemical constituents are given in table 2.

Records of lake stage are considered complete when one or more manual or automatic measurements were obtained per day. Partial records of lake stage result when measurements were less frequent than daily. A complete description of manual or automatic measurements of lake stage is described by Rantz and others (1982).

## EXPLANATION OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF LAKES

Following are brief, generalized explanations of some of the common measurements of water quality and some of the physical processes occurring in lakes that influence these measures of water quality. More detailed explanations of water-quality data and lake processes are given by Wetzel (1983), Hem (1985), and Shaw and others (1993).

### Water Temperature and Thermal Stratification

Water temperature in lakes is important because of its role in stratification and because of the temperature dependence of many chemical reactions and life processes of aquatic organisms. The extent of thermal stratification in lakes depends on the interaction between the lake's shape, on water clarity, solar heating, and wind-driven mixing. Complete mixing of the lake is usually inhibited by thermal stratification in summer and by ice cover in winter. Thermal stratification affects water quality and the distribution of organisms in the lake. Summer thermal stratification can occur in any lake, but in Wisconsin it commonly occurs in lakes deeper than about 20 ft (Shaw and others, 1993).

**Table 2.** WATSTORE parameter codes, minimun reporting limits (MRL), and laboratory identifying codes for chemical parameters commonly measured in lakes, and analyzed at the National Water Quality Laboratory (NWQL) or the Wisconsin State Laboratory of Hygiene (WSLH).

| Parameter Name | Units | Parameter Code | (NWQL) MRL | (NWQL) Lab Code | (WSLH) - MRL | (WSLH) - Lab Code | Remarks |
|---|---|---|---|---|---|---|---|
| Calcium, dissolved (Ca) | mg/L | 00915 | 0.02 | 659 | 0.02 | I230IUD | |
| Magnesium, dissolved (Mg) | mg/L | 00925 | 0.004 | 663 | 0.02 | I390IUD | |
| Sodium, dissolved (Na) | mg/L | 00930 | 0.1 | 675 | 0.09 | I80IUD | |
| Potassium, dissolved (K) | mg/L | 00935 | 0.1 | 54 | 0.3 | I540IUD | |
| Sulfate, dissolved (SO4) | mg/L | 00945 | 0.1 | 1572 | 1.0 | I600DLD | |
| Chloride, dissolved (Cl) | mg/L | 00940 | 0.1 | 1571 | 0.1 | I240ELD | |
| Fluoride, dissolved (F) | mg/L | 00950 | 0.1 | 2002 | 0.03 | I330FLD | |
| Silica, dissolved (SiO2) | mg/L | 00955 | 0.1 | 56 | 0.008 | I560LLD | |
| Nitrogen, NO2+NO3, diss(as N) | mg/L | 00631 | 0.005 | 1979 | 0.01 | I460MLD | |
| Nitrogen, ammonia, dissolved (as N) | mg/L | 00608 | 0.002 | 1980 | 0.013 | I440NLD | |
| Nitrogen, organic, total (as N) | mg/L | | | | | | 1 |
| Nitrogen, amm. + org., total (as N) | mg/L | 00625 | 0.1 | 1986 | 0.2 | I470BLT | 2 |
| Nitrogen, total (as N) | mg/L | | | | | | 3 |
| Phosphorus, total (as P) | mg/L | 00665 | 0.001 | 1982 | 0.005 | I520PLT | |
| Phosphorus, ortho, dissolved (as P) | mg/L | 00671 | 0.001 | 1978 | 0.002 | I530ALD | |
| Iron, dissolved (Fe) | ug/L | 01046 | 10 | 645 | 10 | I370IUD | |
| Manganese, dissolved (Mn) | ug/L | 01056 | 4 | 648 | 0.4 | I400IUD | |
| Chlorophyll a, phytoplankton | ug/L | 70953 | 0.1 | 586 | | I250UNF | |

1 Calculated as difference between total ammonia + organic nitrogen and ammonia nitrogen
2 Also known as Total Kjeldahl Nitrogen (TKN)
3 Calculated as sum of TKN + Nitrogen as (NO2+NO3)

The density of water increases with decreasing temperature down to a temperature of 4°C, then decreases with decreasing temperature between 4°C and the freezing point of water (0°C). For a brief period in the spring after the ice is out, water temperature is usually uniform through the entire water column and wind action causes the lake to mix completely. This process is known as "spring turnover." As the lake absorbs the sun's energy, the surface water becomes warmer and its density decreases, making it more resistant to complete mixing. The difference in density caused by different water temperatures can prevent warm and cold water from mixing. In most lakes, therefore, a density "barrier" forms between the warmer surface water and the underlying colder water. This barrier is often marked by a sharp temperature gradient known as the "thermocline." During the stratified summer period, three distinct layers of lake water are present. The upper warm layer is known as the "epilimnion" and the cold lower layer is known as the "hypolimnion." The transition layer between the epilimnion and the hypolimnion has a steep temperature gradient (greatest temperature change with depth), and is known as the "thermocline" or "metalimnion." As the temperature difference between surface and deep water increases, this "stratified" condition stabilizes and can persist until surface temperatures decrease in the fall, which decreases the stability of the stratification. The mixing of the lake water in the fall is known as "fall turnover."

Thermal stratification may also occur under ice cover in the winter. In the winter, the coldest water (near 0°C) under the ice at the surface of the lake is less dense than water deeper in the lake with warmer temperatures.

## Specific Conductance

Specific conductance is a measure of the ability of water to conduct an electrical current and is an indicator of the concentration of dissolved solids in the water. Because conductance is temperature related, reported values are normalized at 25°C and are termed specific conductance. As the concentration of dissolved minerals increases, specific conductance increases. During winter and summer thermal stratification, concentrations of dissolved constituents near the lake bottom increase due to the decomposition of materials settling from the epilimnion, or release of dissolved materials (such as iron, manganese, and phosphorus) from the bottom sediments during anoxic periods. Therefore, differences in specific conductance with depth indicate differences in concentrations of dissolved solids.

## Water Clarity

Water clarity, or transparency, is commonly measured using a Secchi disc. The range of depths within which photosynthetic activity occurs depends largely on depth of light penetration, which is influenced by water clarity. A Secchi disc, most commonly an 8-in.-diameter disc with alternating black-and-white quadrants, is lowered to a depth at which it is no longer visible. This depth is referred to as the Secchi depth. Clarity can be reduced by algae and zooplankton, water color, and suspended sediment. Algae are often the most dominant influence on clarity in most lakes and, therefore, Secchi depth is usually correlated with the algal abundance. Secchi depth is generally the least during summer when algal populations are largest.

## pH

The pH is a measure of the acidity of the water. It is defined as the negative logarithm of hydrogen-ion concentration and varies over a 14-unit log scale, with a pH of 7 being neutral. Values less than 7 indicate acidic conditions; the lower the value, the stronger the acidity. Values greater than 7 indicate alkaline conditions. The pH of water is influenced in part by photosynthesis and respiration of planktonic algae and aquatic plants. It is important because it affects the solubility of many chemical constituents, and because aquatic organisms have limited pH tolerances. Planktonic algae and aquatic plants produce oxygen and consume carbon dioxide as they photosynthesize during daytime; they consume oxygen and produce carbon dioxide when they respire at night. Carbon dioxide combines with the water molecule to form carbonic acid; therefore respiration causes a decrease in pH at night and photosynthesis during the day causes an increase in pH. The result is a daily cycle in pH. Because phytoplankton are usually concentrated in the near-surface water, changes in pH in the epilimnion are more extreme than in the hypolimnion, where less photosynthesis usually occurs.

Lakes having good fish populations and productivity generally have a pH between 6.7 and 8.2. Values of pH greater than 8.5 have been shown to cause the release of phosphorus from lake sediments (James and Barko, 1991).

## Dissolved Oxygen

Dissolved oxygen is one of the most critical factors affecting a lake ecosystem because it is essential to most aquatic organisms, and it is involved in many chemical reactions. Very low dissolved oxygen concentrations can control some types of chemical reactions. The solubility of oxygen in water is inversely related to temperature–that is, oxygen solubility decreases as water temperature increases. This relation is important because at warmer temperatures the metabolic rate of organisms increases but less oxygen is available for respiration. The primary sources of dissolved oxygen are from the air and from photosynthesis. The minimum dissolved oxygen concentration specified in national water-quality criteria for early life stages of warmwater aquatic life is 5.0 mg/L (U.S. Environmental Protection Agency, 1986).

In early summer, if thermal stratification develops, the metalimnion restricts the surface supply of dissolved oxygen to the hypolimnion. The hypolimnion can become isolated from the atmosphere. Thus, as summer progresses, the dissolved oxygen concentration can decrease in response to decomposition of dead algae that settle from the epilimnion and in response to the biological and chemical oxygen demand of the sediments. The oxygen demand from these processes may completely deplete the oxygen (anoxia) in the water near the lake bottom. The oxygen depletion then progresses upward but usually is confined to the hypolimnion.

Anoxia in the hypolimnion is common in stratified eutrophic (nutrient-rich) lakes in Wisconsin. During anoxic conditions, many aquatic organisms cannot survive, but many other species (primarily bacteria) actually function only in such conditions. Therefore, a shift from oxic to anoxic conditions produces a rapid and dramatic change in the biological community and chemical environment. Anoxia also can cause release of phosphorus from the bottom sediments. This phosphorus then mixes throughout the water column during spring and fall turnover.

## Phosphorus

Phosphorus is one of the essential nutrients for plant growth. High phosphorus concentrations can cause dense algal populations (blooms) and can therefore be a major cause of eutrophication in lakes. When phosphorus concentrations exceed 0.025 mg/L at the time of spring overturn in lakes and reservoirs, these water bodies may occasionally experience excess or nuisance growth of algae or other aquatic plants (U.S. Environmental Protection Agency, 1986). In many regions of the country, including the upper Midwest, other nutrients, particularly nitrogen, tend to be in abundant supply. Phosphorus is often the nutrient in shortest supply, therefore limiting or controlling plant growth. About 90 percent of the lakes in Wisconsin are limited by phosphorus (Shaw and others, 1993). In water, dissolved orthophosphate is that part of total phosphorus that is most readily available for use by algae.

Internal phosphorus recycling occurs in many lakes. Phosphorus used by algae, aquatic plants, fish, and zooplankton is stored within these organisms. As these organisms die and decompose, this phosphorus is returned to the lake water and sediments. Anoxia in the hypolimnion makes phosphorus more soluble, adding further to the release of phosphorus from the falling particles and the lake sediments. During spring and fall turnover the phosphorus, which was released from the bottom sediments into the hypolimnion during anoxia, is mixed throughout the lake. The phosphorus is then available for algal growth. These phenomena are part of the internal-recycling processes of lakes.

## Nitrogen

Nitrogen, like phosphorus, is an essential nutrient for plant and algal growth. Usually in Wisconsin lakes, nitrogen is in abundant supply from the atmosphere and other sources. If phosphorus is abundant relative to algal needs, nitrogen can become the limiting nutrient. In that case, algal blooms are more likely to be triggered by increases in nitrogen than by increases in phosphorus. Some bluegreen algal species can fix nitrogen from the atmosphere (Wetzel, 1983). Therefore, in situations where other types of algae are excluded because of a shortage of nitrogen, the nitrogen-fixing bluegreen algae have a competitive advantage and may be present in abundance.

Lakes with a total nitrogen to total phosphorus ratio larger than 15 to 1 near the surface may generally be considered phosphorus limited; a ratio from 10 to 1 to 15 to 1 indicates a transition situation; and a ratio smaller than 10 to 1 generally indicates nitrogen limitation (Lillie and Mason, 1983). Total nitrogen is the sum of ammonia, organic nitrogen, and nitrate-plus-nitrite nitrogen. The near-surface concentration is commonly used to compute the total nitrogen to phosphorus ratio because most algal species grow near the lake surface.

## Chlorophyll *a*

Chlorophyll *a* is a photosynthetic pigment found in algae (Wetzel, 1983) and other green plants. Its concentration, therefore, is commonly used as a measure of the density of the algal population in a lake. Chlorophyll *a* concentrations are generally highest during summer when algal populations are highest. Moderate populations of desirable algae are important in the food chain; however, excessive populations or algal blooms are undesirable. Algal blooms can cause taste and odor problems, and limit light penetration needed to support growth of submerged aquatic plants. Certain species of bluegreen algae can produce toxins (Rapavich and others, 1987).

## CLASSIFICATION OF LAKES

Two methods are commonly used to classify and evaluate Wisconsin lakes according to their water quality or trophic state: Lillie and Mason's (1983) water-quality index and a modification of Carlson's (1977) Trophic State Index (TSI). Three water-quality measures are used in these classification systems: near-surface concentrations of total phosphorus and chlorophyll *a*, and water clarity as indicated by the Secchi depth.

Lillie and Mason's (1983) water-quality index for Wisconsin lakes used random summer measurements of total phosphorus and chlorophyll a concentrations, and Secchi depth to classify the lakes' water quality as shown below:

| Water-quality index | Approximate total phosphorus range (mg/L) | Approximate chlorophyll *a* range (µg/L) | Approximate water clarity range (Secchi depth, in meters) |
|---|---|---|---|
| "Excellent" | <0.001 | <1 | >6.0 |
| "Very good" | .001–.010 | 1–5 | 3.0–6.0 |
| "Good" | .010–.030 | 5–10 | 2.0–3.0 |
| "Fair" | .030–.050 | 10–15 | 1.5–2.0 |
| "Poor" | .050–.150 | 15–30 | 1.0–1.5 |
| "Very poor" | >.150 | >30 | <1.0 |

The TSI approach to lake classification assigns numerical ranges to the three trophic conditions generally used to describe the wide range of lake water-quality conditions. Oligotrophic lakes are typically clear, algal populations and phosphorus concentrations are low, and the deepest water is likely to contain oxygen throughout the year. Mesotrophic lakes typically have a moderate supply of nutrients, experience moderate algal blooms, and have occasional oxygen depletions at depth. Eutrophic lakes are nutrient rich with relatively severe water-quality problems, such as frequent seasonal algal blooms, oxygen depletion in lower parts of the lakes, and poor clarity. When eutrophic conditions are very severe, the lake is considered hypereutrophic.

The WDNR modified the lakes classification scheme developed by Carlson (1977) to apply specifically to Wisconsin lakes. The WDNR system (Lillie and others, 1993) uses surface total phosphorus and chlorophyll *a* concentrations, and Secchi depth for ice-free periods to calculate values for TSI's. The WDNR has adopted the following TSI ranges to classify Wisconsin lakes: indexes of less than 40 define oligotrophic conditions, 40 to 50 define mesotrophic conditions, greater than 50 to define eutrophic conditions, and greater than 70 define hypereutrophic conditions (Wisconsin Department of Natural Resources, 1992). These ranges are used to make relative comparisons in Wisconsin lake trophic-state evaluations by the WDNR and others.

The TSI for a lake can be calculated using the following equations (Lillie and others, 1993):

$TSI_{Secchi} = 60 - 33.2 \times (\log_{10} \text{Secchi depth})$

$TSI_{chlorophyll\ a} = 34.82 + (17.41 \times (\log_{10} \text{chlorophyll } a \text{ concentration}))$

$TSI_{total\ phosphorus} = 28.24 + (17.81 \times (\log_{10} \text{total phosphorus concentration} \times 1{,}000))$

where: Secchi depth is in meters,
chlorophyll *a* is in micrograms per liter, and
total phosphorus is in milligrams per liter.

The three trophic conditions are defined with the following boundaries for total phosphorus, Secchi disc, and chlorophyll *a*:

| Trophic Level | Trophic State Index | Total phosphorus (mg/L) | Secchi disc (m) | Chlorophyll *a* (µg/L) |
|---|---|---|---|---|
| Eutrophic | | | | |
| | 50 | 0.017 | 2.0 | 7.4 |
| Mesotrophic | | | | |
| | 40 | 0.005 | 4.0 | 2.0 |
| Oligotrophic | | | | |

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# LAKE DATA

## 453907091345800 BALSAM LAKE NEAR BIRCHWOOD, WI

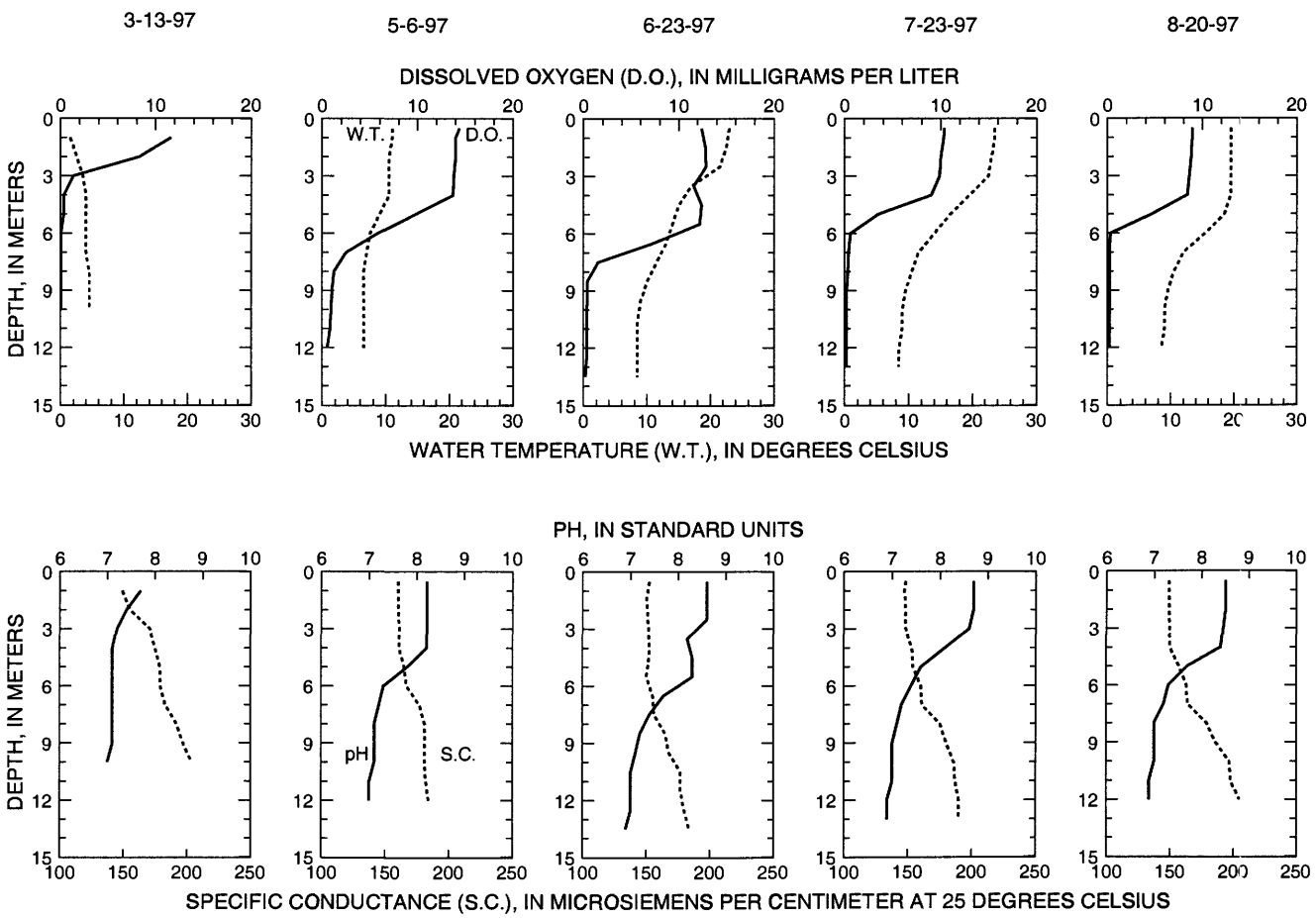
LOCATION.--Lat 45°39'07", long 91°34'58", in NE 1/4 NE 1/4 sec.34, T.37 N., R.10 W., Washburn County, Hydrologic Unit 07050007, 1.2 mi southwest of Birchwood.

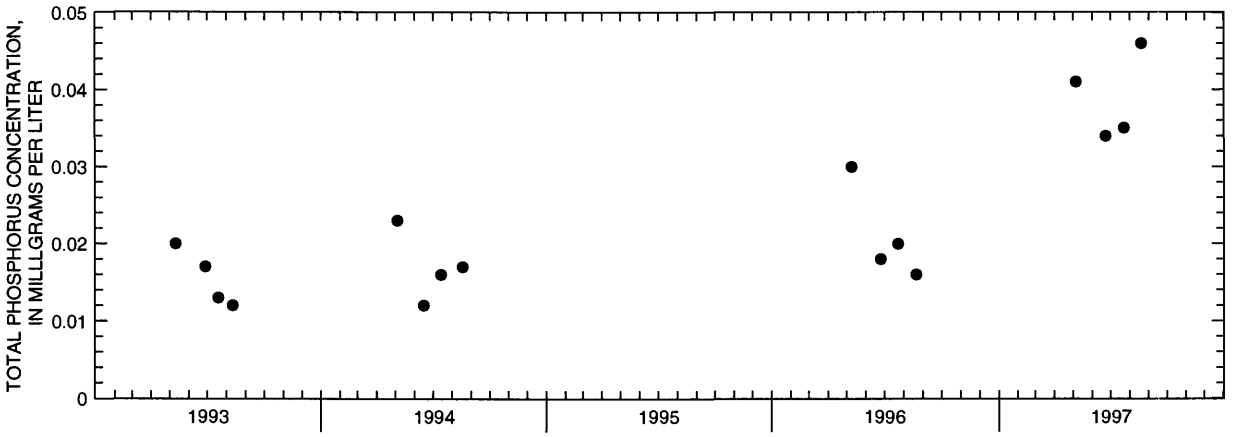
PERIOD OF RECORD.--March 1993 to August 1994 and March 1996 to August 1997 (discontinued).

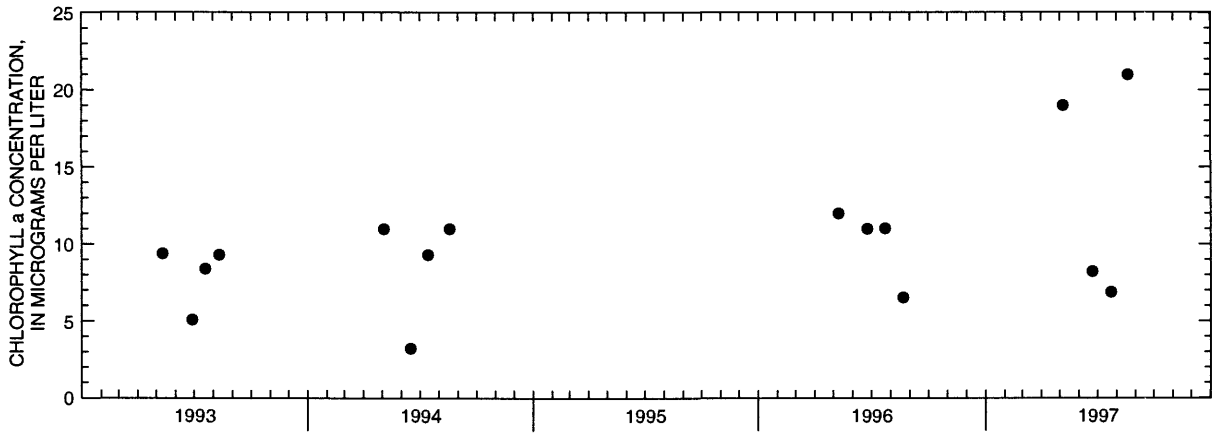
REMARKS.--Lake sampled near southern end at a lake depth of about 14 m. Lake ice-covered during March sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

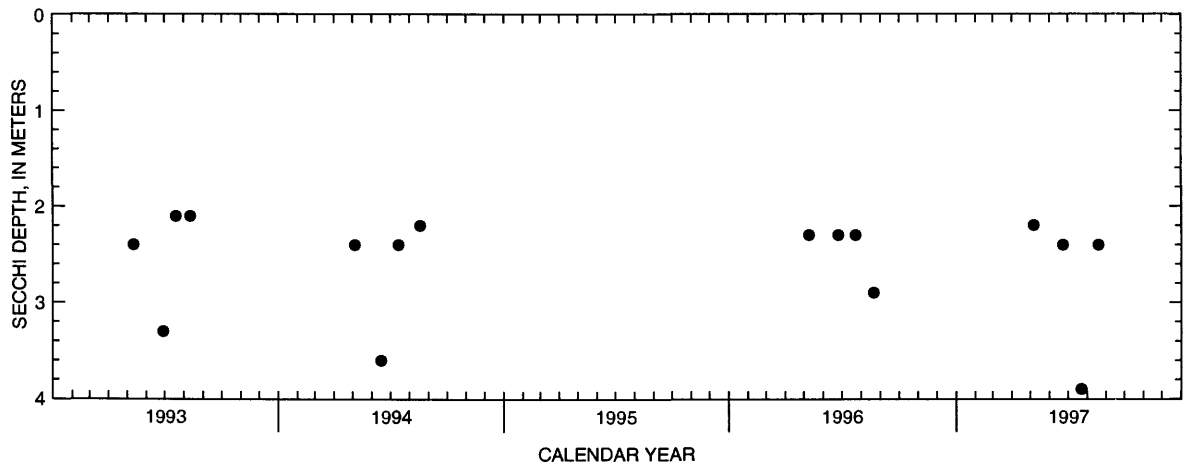
WATER-QUALITY DATA, MARCH 13 TO AUGUST 20, 1997
(Milligrams per liter unless otherwise indicated)

| | Mar. 13 | | May 06 | | June 23 | | July 23 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 9.80 | | 10.65 | | 10.75 | | 10.70 | | 10.90 | |
| Secchi-depth (meters) | --- | | 2.2 | | 2.4 | | 3.9 | | 2.4 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 19 | | 8.2 | | 6.9 | | 21 | |
| Depth of sample (m) | 1.0 | 10 | 0.5 | 12 | 0.5 | 13 | 0.5 | 13 | 0.5 | 12 |
| Water temperature (°C) | 1.5 | 4.5 | 11.0 | 6.5 | 8.5 | 23.0 | 23.5 | 8.5 | 19.5 | 8.5 |
| Specific conductance (µS/cm) | 149 | 204 | 160 | 184 | 152 | 184 | 148 | 190 | 149 | 205 |
| pH (units) | 7.7 | 7.0 | 8.2 | 7.0 | 8.6 | 6.9 | 8.7 | 6.9 | 8.5 | 6.9 |
| Dissolved oxygen | 11.6 | 0.0 | 14.4 | 0.5 | 12.4 | 0.2 | 10.4 | 0.2 | 8.9 | 0.2 |
| Phosphorus, total (as P) | 0.039 | 0.150 | 0.041 | 0.091 | 0.034 | 0.379 | 0.035 | 0.500 | 0.046 | 0.770 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Balsam Lake near Birchwood, Wisconsin.

## 425344088070100 BIG MUSKEGO LAKE, BASS BAY, NEAR MUSKEGO, WI

LOCATION.--Lat 42°53'44", long 88°07'01", in SW 1/4 NE 1/4 sec.15, T.5 N., R.20 E., Waukesha County, Hydrologic Unit 07120006, 1.3 mi southeast of Muskego.

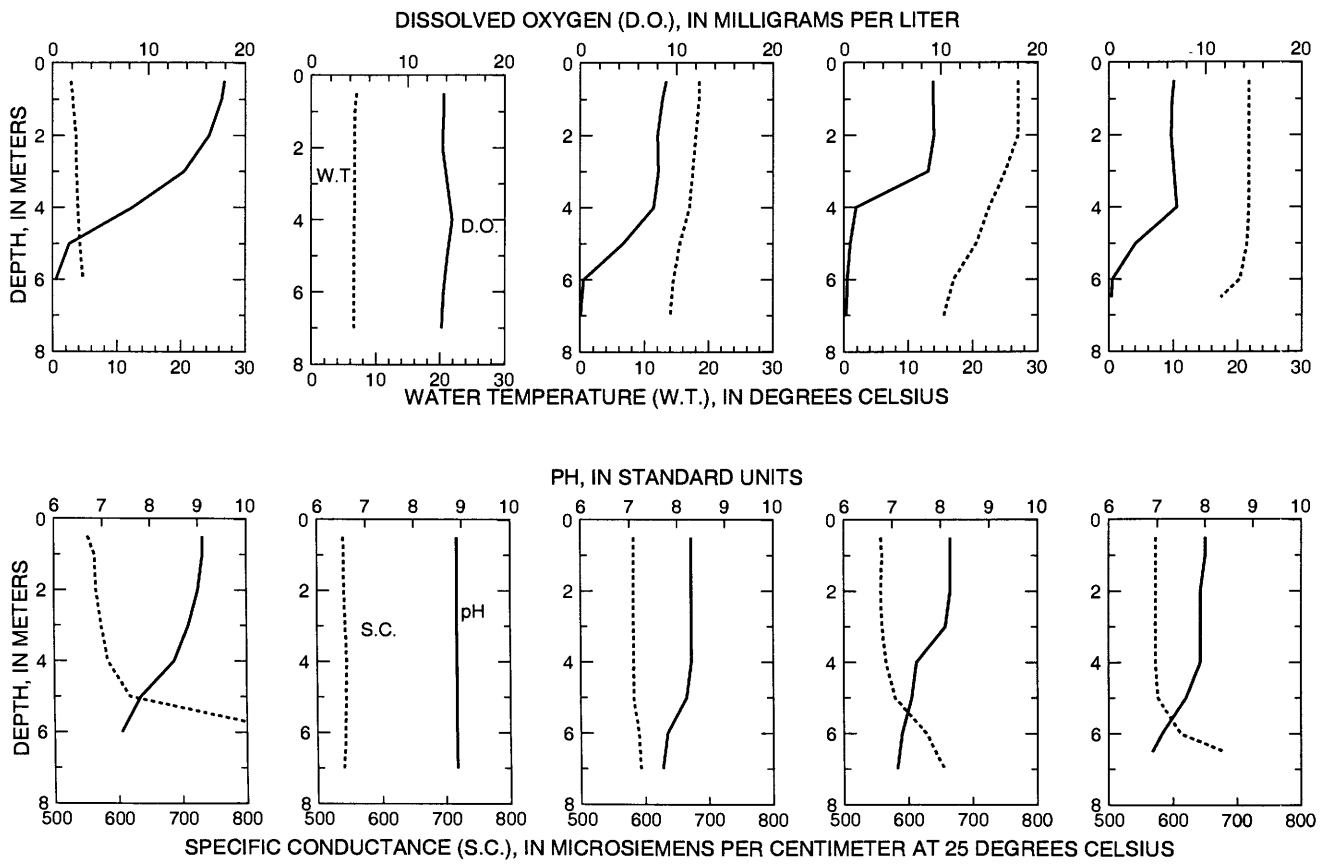
PERIOD OF RECORD.--February 1988 to current year.

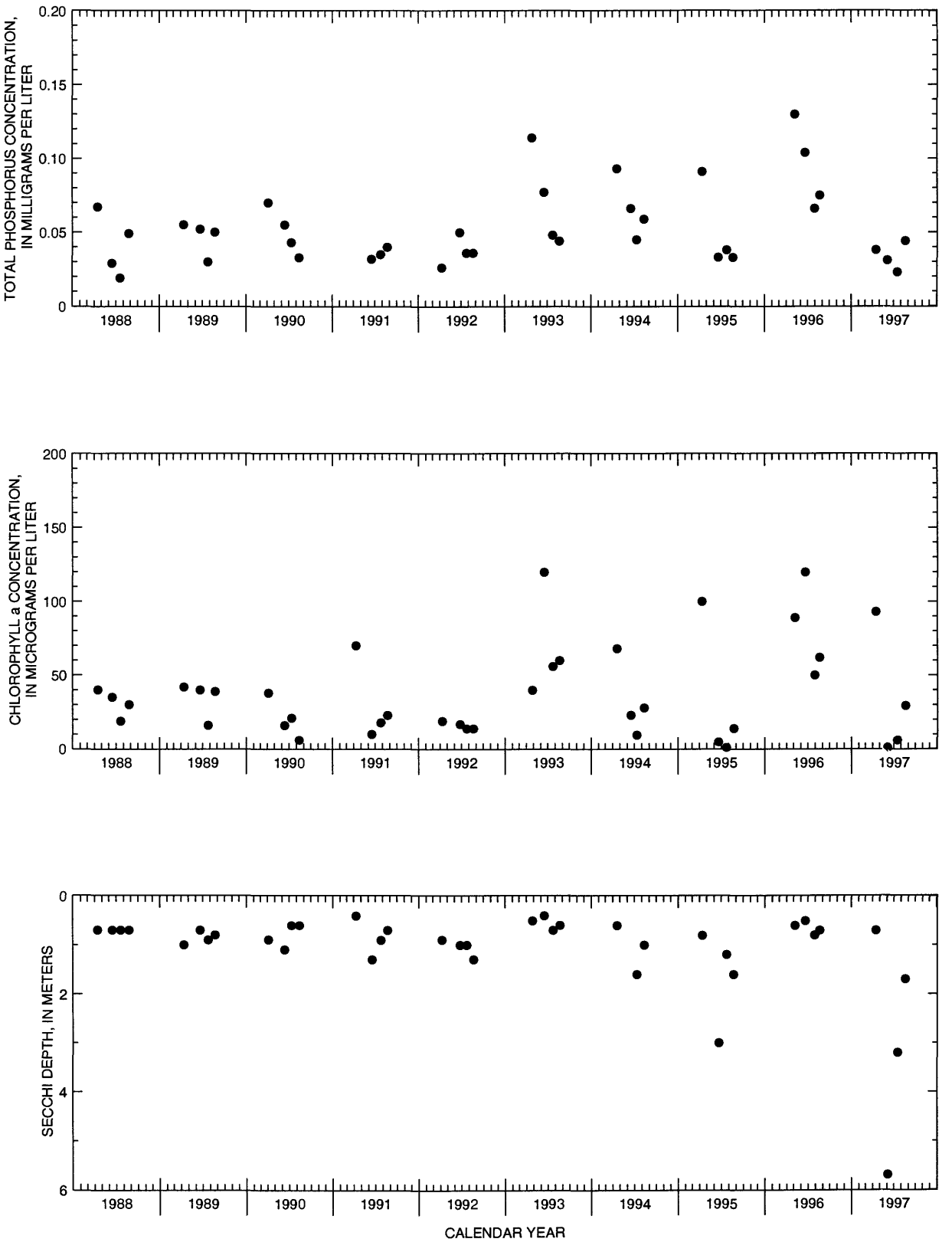
REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 11 TO AUGUST 20, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 11 | | Apr. 15 | | June 05 | | July 16 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 10.87 | | 11.34 | | 11.66 | | 11.56 | |
| Secchi-depth (meters) | --- | | 0.7 | | 5.7 | | 3.2 | | 1.7 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 93 | | 0.9 | | 5.9 | | 29 | |
| Depth of sample (m) | 0.5 | 6.0 | 0.5 | 7.0 | 0.5 | 7.0 | 0.5 | 7.0 | 0.5 | 6.5 |
| Water temperature (°C) | 3.0 | 4.5 | 7.0 | 6.5 | 18.5 | 14.0 | 27.0 | 15.5 | 22.0 | 17.5 |
| Specific conductance (µS/cm) | 552 | 878 | 540 | 540 | 582 | 593 | 557 | 656 | 572 | 680 |
| pH (units) | 9.1 | 7.4 | 8.9 | 8.9 | 8.3 | 7.7 | 8.2 | 7.1 | 8.0 | 6.9 |
| Dissolved oxygen | 17.9 | 0.3 | 13.7 | 13.5 | 8.9 | 0.0 | 9.2 | 0.2 | 6.5 | 0.2 |
| Phosphorus, total (as P) | 0.026 | 0.116 | 0.038 | 0.040 | 0.031 | 0.210 | 0.023 | 0.689 | 0.044 | 0.582 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | 0.007 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.36 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 1.2 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 1.5 | --- | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 55 | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 3.9 | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 230 | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 42 | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 30 | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 23 | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 3 | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 170 | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 50 | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 52 | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 1.0 | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 320 | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | --- | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Big Muskego Lake, Bass Bay, near Muskego, Wisconsin.

## 425212088072800 BIG MUSKEGO LAKE, SOUTH SITE, NEAR MUSKEGO, WI

LOCATION.--Lat 42°52'12", long 88°07'28", in NW 1/4 NW 1/4 sec.27, T.5 N., R.20 E., Waukesha County, Hydrologic Unit 07120006, near Muskego.

DRAINAGE AREA.--33.9 $mi^2$.

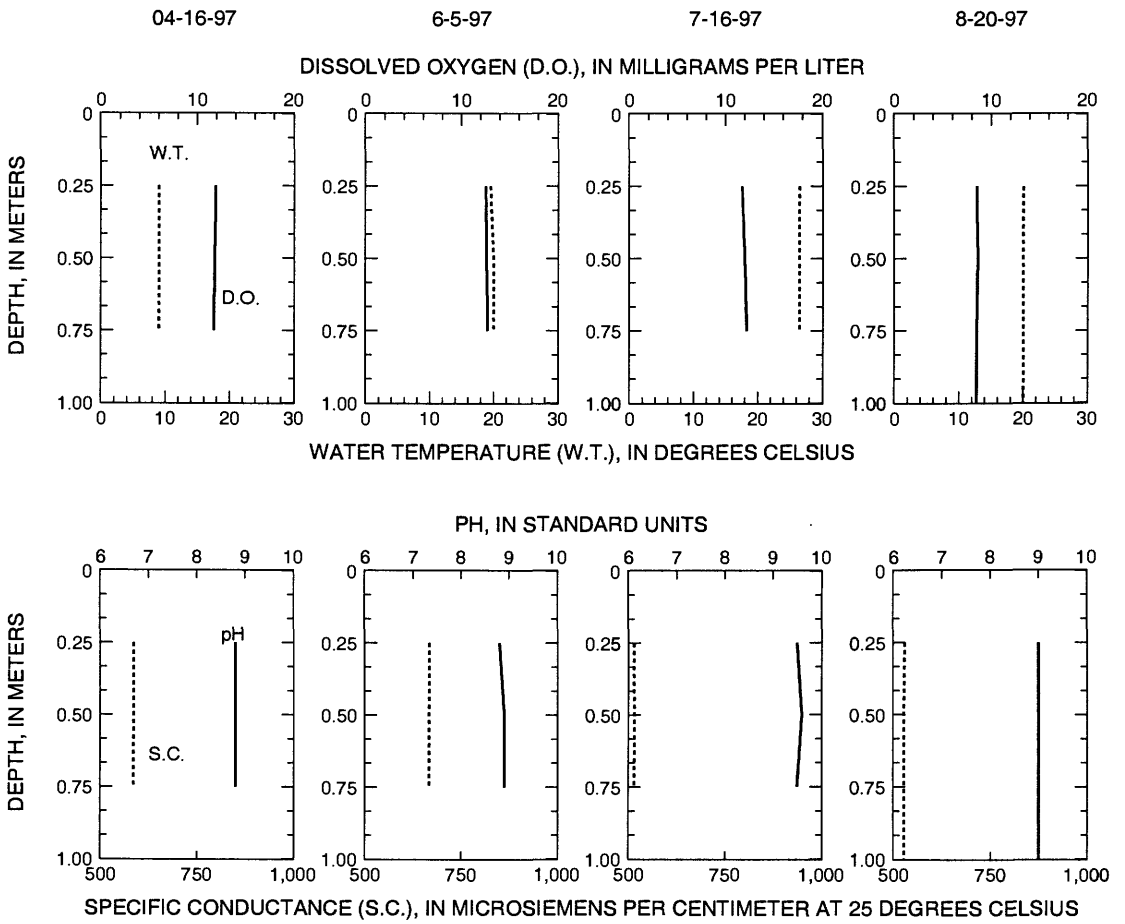
PERIOD OF RECORD.--February 1988 to current year.

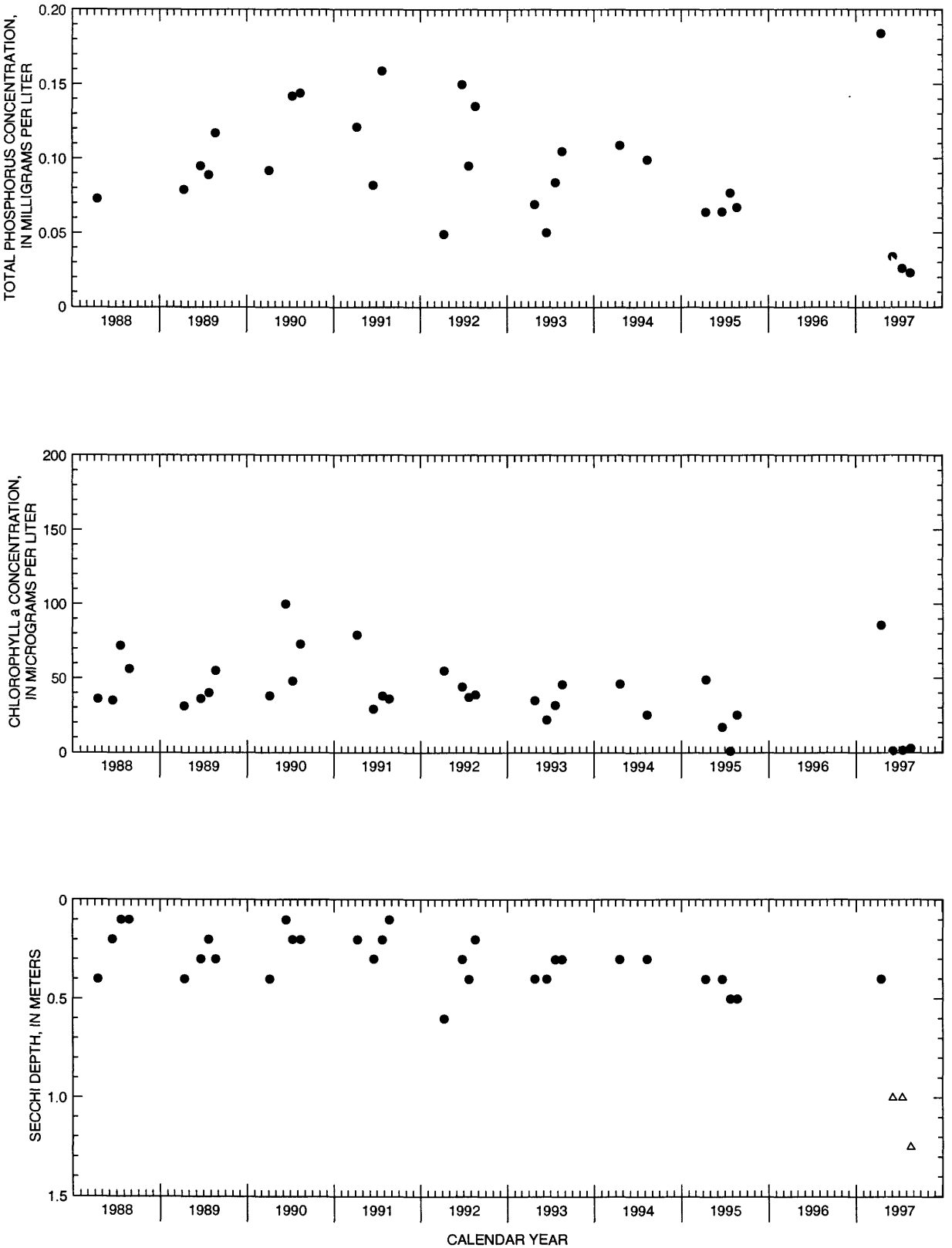
REMARKS.--Lake sampled at south end of lake at a depth of about 1 m. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, APRIL 16 TO AUGUST 20, 1997

(Milligrams per liter unless otherwise indicated)

| | Apr. 16 | June 05 | | July 16 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 10.99 | 11.31 | | 11.66 | | 11.56 | |
| Secchi-depth (meters) | 0.4 | >1.0 | | >1.0 | | >1.3 | |
| Chlorophyll a, phytoplankton (µg/L) | 86 | 1.0 | | 1.3 | | 2.6 | |
| Depth of sample (m) | 0.5 | 0.5 | 0.8 | 0.5 | 0.8 | 0.3 | 1.0 |
| Water temperature (°C) | 9.0 | 19.5 | 20.0 | 26.5 | 26.5 | 20.0 | 20.0 |
| Specific conductance (µS/cm) | 585 | 667 | 666 | 513 | 514 | 528 | 527 |
| pH (units) | 8.8 | 8.8 | 8.9 | 9.5 | 9.5 | 9.0 | 9.0 |
| Dissolved oxygen | 11.9 | 12.5 | 12.7 | 11.7 | 12.2 | 8.5 | 8.5 |
| Phosphorus, total (as P) | 0.184 | 0.034 | 0.037 | 0.026 | 0.031 | 0.023 | 0.020 |
| Phosphorus, ortho, dissolved (as P) | 0.008 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.01 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | 2.6 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | 2.6 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | 55 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 11 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 210 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 40 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 26 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 34 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 3 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 140 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 71 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 68 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | <0.008 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 348 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Big Muskego Lake, South Site, near Muskego, Wisconsin.

(Triangles indicate maximum depth at sampling site. Actual Secchi depth on these days was greater than plotted triangles )

## 425109088075000 BIG MUSKEGO LAKE NEAR WIND LAKE, WI

LOCATION.--Lat 42°51'09", long 88°07'50", in SE 1/4 NE 1/4 sec.33, T.5 N., R.20 E., Waukesha County, Hydrologic Unit 07120006, on left bank 8 ft upstream of dam outlet of Muskego Lake, 700 ft north of Muskego Dam Drive, 2 mi northeast of Wind Lake.

DRAINAGE AREA.--28.3 $mi^2$.

PERIOD OF RECORD.--October 1987 to September 1989, January 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is 760.00 ft above sea level. October to December 1987 and January 1991 to September 1995, nonrecording gage at the same datum. December 1987 through September 1989, data collected using water-stage recorder at the same datum.

REMARKS.--Estimated daily gage heights: Mar. 1 and May 6-20. Lake levels regulated by concrete dam with one 5-ft lift gate. Drawdown of lake for rehabilitation project started Sept. 14, 1995, and ended March 1997. Lake levels from Oct. 1 to Jan. 4 affected by intermittent pumping. Lake levels from Oct. 1 to Feb. 18 were less than 8.72 ft. Prior to October 1993, published as Muskego Lake Outlet near Wind Lake, WI.

EXTREMES FOR PERIOD OF RECORD.--Maximum observed gage height, 12.60 ft, Oct. 7, 1991 and Aug. 8, 1994; minimum instantaneous, less than 8.72 ft, July 12, 1996 to Feb. 18, 1997, due to drawdown of lake.

EXTREMES FOR CURRENT YEAR.--Maximum observed gage-height, 12.02 ft, June 23; minimum instantaneous, less than 8.72 ft, Oct. 1 to Feb. 18, due to drawdown of lake.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | 10.20 | 10.85 | 11.13 | 11.42 | 11.82 | 11.49 | 11.67 |
| 2 | --- | --- | --- | --- | --- | 10.28 | 10.85 | 11.18 | 11.43 | 11.77 | 11.48 | 11.70 |
| 3 | --- | --- | --- | --- | --- | 10.29 | 10.86 | 11.26 | 11.38 | 11.78 | 11.50 | 11.68 |
| 4 | --- | --- | --- | --- | --- | 10.33 | 10.84 | 11.24 | 11.35 | 11.80 | 11.59 | 11.63 |
| 5 | --- | --- | --- | --- | --- | 10.34 | 10.86 | 11.22 | 11.34 | 11.77 | 11.58 | 11.60 |
| 6 | --- | --- | --- | --- | --- | 10.35 | 10.49 | 11.30 | 11.36 | 11.79 | 11.54 | 11.60 |
| 7 | --- | --- | --- | --- | --- | 10.36 | 10.76 | 11.32 | 11.34 | 11.78 | 11.52 | 11.62 |
| 8 | --- | --- | --- | --- | --- | 10.38 | 10.91 | 11.34 | 11.38 | 11.80 | 11.50 | 11.62 |
| 9 | --- | --- | --- | --- | --- | 10.39 | 10.89 | 11.32 | 11.33 | 11.82 | 11.48 | 11.61 |
| 10 | --- | --- | --- | --- | --- | 10.41 | 10.86 | 11.30 | 11.31 | 11.78 | 11.48 | 11.64 |
| 11 | --- | --- | --- | --- | --- | 10.44 | 10.94 | 11.32 | 11.29 | 11.76 | 11.52 | 11.60 |
| 12 | --- | --- | --- | --- | --- | 10.46 | 11.05 | 11.34 | 11.30 | 11.73 | 11.53 | 11.58 |
| 13 | --- | --- | --- | --- | --- | 10.50 | 10.95 | 11.36 | 11.34 | 11.71 | 11.56 | 11.57 |
| 14 | --- | --- | --- | --- | --- | 10.49 | 10.93 | 11.34 | 11.29 | 11.70 | 11.54 | 11.57 |
| 15 | --- | --- | --- | --- | --- | 10.49 | 10.87 | 11.32 | 11.20 | 11.68 | 11.51 | 11.57 |
| 16 | --- | --- | --- | --- | --- | 10.49 | 10.99 | 11.34 | 11.45 | 11.66 | 11.56 | 11.55 |
| 17 | --- | --- | --- | --- | --- | 10.49 | 11.01 | 11.32 | 11.50 | 11.64 | 11.59 | 11.64 |
| 18 | --- | --- | --- | --- | --- | 10.53 | 10.97 | 11.34 | 11.51 | 11.66 | 11.58 | 11.60 |
| 19 | --- | --- | --- | --- | 8.93 | 10.48 | 11.00 | 11.36 | 11.51 | 11.65 | 11.56 | 11.62 |
| 20 | --- | --- | --- | --- | --- | 10.52 | 11.00 | 11.34 | 11.51 | 11.61 | 11.56 | 11.67 |
| 21 | --- | --- | --- | --- | --- | 10.58 | 11.08 | 11.39 | 11.72 | 11.65 | 11.58 | 11.64 |
| 22 | --- | --- | --- | --- | 9.82 | 10.66 | 11.09 | 11.37 | 11.93 | 11.65 | 11.56 | 11.63 |
| 23 | --- | --- | --- | --- | --- | 10.73 | 11.07 | 11.35 | 12.00 | 11.62 | 11.54 | 11.67 |
| 24 | --- | --- | --- | --- | 10.08 | 10.75 | 11.05 | 11.37 | 11.99 | 11.59 | 11.69 | 11.63 |
| 25 | --- | --- | --- | --- | 9.98 | 10.77 | 11.03 | 11.51 | 11.97 | 11.56 | 11.70 | 11.63 |
| 26 | --- | --- | --- | --- | 10.00 | 10.72 | 11.01 | 11.43 | 11.93 | 11.58 | 11.69 | 11.64 |
| 27 | --- | --- | --- | --- | --- | 10.76 | 11.02 | 11.37 | 11.87 | 11.58 | 11.69 | 11.62 |
| 28 | --- | --- | --- | --- | 10.10 | 10.81 | 11.01 | 11.33 | 11.81 | 11.60 | 11.70 | 11.61 |
| 29 | --- | --- | --- | --- | --- | 10.84 | 10.94 | 11.34 | 11.78 | 11.58 | 11.68 | 11.55 |
| 30 | --- | --- | --- | --- | --- | 10.87 | 11.12 | 11.36 | 11.80 | 11.55 | 11.66 | 11.60 |
| 31 | --- | --- | --- | --- | --- | 10.87 | --- | 11.40 | --- | 11.51 | 11.69 | --- |
| MEAN | --- | --- | --- | --- | --- | 10.53 | 10.94 | 11.33 | 11.54 | 11.68 | 11.58 | 11.62 |
| MAX | --- | --- | --- | --- | --- | 10.87 | 11.12 | 11.51 | 12.00 | 11.82 | 11.70 | 11.70 |
| MIN | --- | --- | --- | --- | --- | 10.20 | 10.49 | 11.13 | 11.20 | 11.51 | 11.48 | 11.55 |

## 05390750 BIG ST. GERMAIN LAKE NEAR LAKE TOMAHAWK, WI

LOCATION.--Lat 45°55'00", long 89°31'55" in NE 1/4 SE 1/4 sec.30, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, at dam outlet, 7.7 mi northeast of Lake Tomahawk.

DRAINAGE AREA.--73.1 $mi^2$.

PERIOD OF RECORD.--October 1991 to current year. Lake stages for previous years were recorded by Wisconsin Valley Improvement Company.

GAGE.--Nonrecording gage. Datum of gage is 1,580 ft, above sea level.

COOPERATION.--Lake stages provided by Wisconsin Valley Improvement Company.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 10.94 ft, Oct. 6, 1995; minimum observed, 8.16 ft, Jan. 26, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 10.88 ft, Oct. 30; minimum observed, 8.68 ft, Feb. 28 and Mar. 7, 21, 25.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.60 | 10.84 | 10.34 | --- | --- | --- | 8.80 | 10.48 | 10.48 | 10.60 | 10.56 | 10.62 |
| 2 | 10.60 | 10.82 | 10.30 | --- | --- | --- | 8.82 | 10.46 | 10.48 | 10.62 | 10.54 | 10.70 |
| 3 | 10.58 | 10.80 | 10.26 | 9.66 | --- | --- | 8.84 | 10.48 | 10.48 | 10.66 | 10.54 | 10.68 |
| 4 | 10.54 | 10.78 | 10.22 | --- | --- | 8.70 | 8.88 | 10.48 | 10.50 | 10.68 | 10.52 | 10.60 |
| 5 | 10.50 | 10.78 | 10.18 | --- | 9.02 | --- | 8.92 | 10.50 | 10.56 | 10.68 | 10.52 | 10.54 |
| 6 | 10.48 | 10.76 | 10.14 | --- | --- | --- | 9.08 | 10.52 | 10.62 | 10.68 | 10.50 | 10.58 |
| 7 | 10.52 | 10.74 | --- | 9.62 | 8.92 | 8.68 | 9.16 | 10.56 | 10.66 | 10.64 | 10.52 | 10.58 |
| 8 | 10.52 | 10.70 | --- | --- | --- | --- | 9.28 | 10.62 | 10.68 | 10.68 | 10.50 | 10.54 |
| 9 | 10.52 | 10.68 | --- | --- | --- | --- | 9.36 | 10.62 | 10.72 | 10.66 | 10.50 | 10.54 |
| 10 | 10.52 | 10.68 | 10.02 | 9.66 | --- | --- | 9.44 | 10.60 | 10.76 | 10.64 | 10.48 | 10.52 |
| 11 | 10.50 | 10.66 | --- | --- | 8.86 | 8.70 | 9.52 | 10.60 | 10.74 | 10.62 | 10.48 | 10.52 |
| 12 | 10.50 | 10.60 | --- | --- | --- | --- | 9.60 | 10.68 | 10.76 | 10.62 | 10.50 | 10.50 |
| 13 | 10.50 | 10.56 | 9.92 | --- | --- | --- | 9.68 | 10.70 | 10.68 | 10.60 | 10.50 | 10.50 |
| 14 | 10.50 | 10.52 | --- | 9.64 | 8.84 | --- | 9.76 | 10.70 | 10.62 | 10.58 | 10.52 | 10.56 |
| 15 | 10.50 | 10.50 | --- | --- | --- | 8.70 | 9.82 | 10.72 | 10.62 | 10.56 | 10.58 | 10.58 |
| 16 | 10.50 | 10.66 | --- | 9.52 | --- | --- | 9.90 | 10.70 | 10.62 | 10.54 | 10.70 | 10.58 |
| 17 | 10.58 | 10.68 | 9.86 | --- | --- | --- | 9.94 | 10.68 | 10.56 | 10.62 | 10.74 | 10.60 |
| 18 | 10.58 | 10.68 | --- | --- | 8.76 | 8.70 | 9.98 | 10.70 | 10.54 | 10.58 | 10.72 | 10.64 |
| 19 | 10.58 | 10.68 | --- | --- | --- | --- | 9.07 | 10.74 | 10.50 | 10.54 | 10.70 | 10.68 |
| 20 | 10.58 | 10.66 | 9.80 | --- | --- | --- | 10.14 | 10.72 | 10.52 | 10.52 | 10.78 | 10.70 |
| 21 | 10.60 | 10.64 | --- | 9.44 | 8.72 | 8.68 | 10.22 | 10.70 | 10.50 | 10.52 | 10.76 | 10.60 |
| 22 | 10.66 | 10.60 | --- | --- | --- | --- | 10.24 | 10.70 | 10.50 | 10.48 | 10.76 | 10.54 |
| 23 | 10.72 | 10.56 | --- | --- | --- | --- | 10.28 | 10.66 | 10.48 | 10.48 | 10.76 | 10.50 |
| 24 | 10.72 | 10.54 | 9.79 | --- | --- | --- | 10.28 | 10.64 | 10.48 | 10.46 | 10.74 | 10.46 |
| 25 | 10.72 | 10.48 | --- | 9.36 | 8.74 | 8.68 | 10.28 | 10.62 | 10.52 | 10.46 | 10.72 | 10.46 |
| 26 | 10.72 | 10.44 | --- | --- | --- | --- | 10.30 | 10.60 | 10.52 | 10.56 | 10.70 | 10.44 |
| 27 | 10.74 | 10.42 | 9.72 | --- | --- | --- | 10.30 | 10.56 | 10.52 | 10.56 | 10.70 | 10.42 |
| 28 | 10.74 | 10.40 | --- | 9.24 | 8.68 | 8.70 | 10.28 | 10.52 | 10.52 | 10.60 | 10.62 | 10.48 |
| 29 | 10.76 | 10.38 | --- | --- | --- | --- | 10.30 | 10.50 | 10.54 | 10.58 | 10.56 | 10.52 |
| 30 | 10.88 | 10.38 | --- | --- | --- | --- | 10.40 | 10.52 | 10.56 | 10.58 | 10.56 | 10.52 |
| 31 | 10.86 | --- | 9.68 | 9.14 | --- | --- | --- | 10.50 | --- | 10.56 | 10.60 | --- |
| MEAN | 10.61 | 10.62 | --- | --- | --- | --- | 9.70 | 10.61 | 10.57 | 10.59 | 10.61 | 10.56 |
| MAX | 10.88 | 10.84 | --- | --- | --- | --- | 10.40 | 10.74 | 10.76 | 10.68 | 10.78 | 10.70 |
| MIN | 10.48 | 10.38 | --- | --- | --- | --- | 8.80 | 10.46 | 10.48 | 10.46 | 10.48 | 10.42 |

## 423706088363400 DELAVAN LAKE NEAR DELAVAN, WI

LOCATION.--Lat 42°36'27", long 88°36'19", in SW 1/4 NE 1/4 sec.28, T.2 N., R.16 E., Walworth County, Hydrologic Unit 07090001, at Delavan Lake Sanitary District Lift Station No. 2 at Delavan Lake Yacht Club, 1.0 mi southeast of outlet, and 2.7 mi southeast of Delavan.

DRAINAGE AREA.--41.4 $mi^2$, of which 2.3 $mi^2$ is non-contributing. Area of Delavan Lake, 2,072 acres.

PERIOD OF RECORD.--October 1983 to current year. October 1983 to September 1985 data published in Water Resources Investigation series report "Water Quality and Hydrology of Delavan Lake in Southeastern Wisconsin" by Stephen J. Field and Marvin D. Duerk.

GAGE.--Water-stage recorder. Datum of gage is 922.92 ft above sea level. Prior to Sept. 5, 1989, staff gage at bridge on North Shore Drive at same datum.

REMARKS.--No estimated daily gage heights. Records good. Lake was ice covered from Dec. 26 to Mar. 28. Lake levels controlled by Delavan Lake Sanitary District. Prior to Mar. 20, 1995, lake levels were controlled by Town of Delavan.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 6.19 ft, Feb. 21, 1994; minimum daily, -4.44 ft Nov. 6, 1989 (lake drawn down for lake rehabilitation program).

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 5.55 ft, Feb. 22; minimum, 4.53 ft, Oct. 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.61 | 4.86 | 4.99 | 4.98 | 4.97 | 5.12 | 5.07 | 5.01 | 4.96 | 4.99 | 4.88 | 4.75 |
| 2 | 4.61 | 4.85 | 4.99 | 4.98 | 4.96 | 5.23 | 5.07 | 5.03 | 4.95 | 4.99 | 4.87 | 4.75 |
| 3 | 4.60 | 4.85 | 5.00 | 4.98 | 4.94 | 5.21 | 5.06 | 5.06 | 4.95 | 4.96 | 4.86 | 4.73 |
| 4 | 4.59 | 4.84 | 5.01 | 5.01 | 4.96 | 5.13 | 5.04 | 5.06 | 4.95 | 4.94 | 4.85 | 4.71 |
| 5 | 4.58 | 4.85 | 5.03 | 5.03 | 4.97 | 5.03 | 5.06 | 5.06 | 4.95 | 4.93 | 4.84 | 4.70 |
| 6 | 4.58 | 4.86 | 5.04 | 5.02 | 4.96 | 4.95 | 5.05 | 5.05 | 4.95 | 4.92 | 4.82 | 4.68 |
| 7 | 4.58 | 4.87 | 5.03 | 5.01 | 4.94 | 4.95 | 5.03 | 5.04 | 4.95 | 4.91 | 4.80 | 4.67 |
| 8 | 4.57 | 4.88 | 4.97 | 5.00 | 4.93 | 4.96 | 5.00 | 5.08 | 4.95 | 4.92 | 4.79 | 4.66 |
| 9 | 4.56 | 4.87 | 4.95 | 5.01 | 4.92 | 4.99 | 4.99 | 5.07 | 4.95 | 4.92 | 4.77 | 4.66 |
| 10 | 4.56 | 4.87 | 4.95 | 5.03 | 4.91 | 5.02 | 4.98 | 5.05 | 4.95 | 4.90 | 4.75 | 4.65 |
| 11 | 4.55 | 4.86 | 4.96 | 5.04 | 4.90 | 5.02 | 4.98 | 5.03 | 4.94 | 4.89 | 4.75 | 4.64 |
| 12 | 4.55 | 4.86 | 4.98 | 5.04 | 4.92 | 5.03 | 4.99 | 5.01 | 4.94 | 4.88 | 4.79 | 4.63 |
| 13 | 4.55 | 4.85 | 4.99 | 5.04 | 4.92 | 5.03 | 4.99 | 4.99 | 4.94 | 4.88 | 4.80 | 4.62 |
| 14 | 4.55 | 4.85 | 4.99 | 5.04 | 4.93 | 5.04 | 4.99 | 4.98 | 4.93 | 4.88 | 4.79 | 4.61 |
| 15 | 4.54 | 4.84 | 5.03 | 5.04 | 4.93 | 5.03 | 5.00 | 4.97 | 4.92 | 4.87 | 4.81 | 4.61 |
| 16 | 4.56 | 4.85 | 5.03 | 5.07 | 4.95 | 5.02 | 5.01 | 4.96 | 5.14 | 4.85 | 4.82 | 4.62 |
| 17 | 4.65 | 4.86 | 5.03 | 5.06 | 4.96 | 5.01 | 5.01 | 4.96 | 5.14 | 4.83 | 4.84 | 4.80 |
| 18 | 4.67 | 4.87 | 5.02 | 5.05 | 4.98 | 5.01 | 5.00 | 4.96 | 5.08 | 4.86 | 4.86 | 4.80 |
| 19 | 4.67 | 4.87 | 5.01 | 5.04 | 5.04 | 5.00 | 5.02 | 4.98 | 5.05 | 4.90 | 4.85 | 4.90 |
| 20 | 4.67 | 4.87 | 5.00 | 5.03 | 5.06 | 5.00 | 5.04 | 4.99 | 5.02 | 4.90 | 4.84 | 5.12 |
| 21 | 4.66 | 4.90 | 5.00 | 5.02 | 5.35 | 4.99 | 5.05 | 4.98 | 5.02 | 4.95 | 4.83 | 5.11 |
| 22 | 4.67 | 4.90 | 5.00 | 5.04 | 5.54 | 4.98 | 5.05 | 4.98 | 5.01 | 4.94 | 4.82 | 5.08 |
| 23 | 4.71 | 4.90 | 5.03 | 5.04 | 5.44 | 4.97 | 5.05 | 4.98 | 4.98 | 4.93 | 4.81 | 5.05 |
| 24 | 4.71 | 4.91 | 5.06 | 5.03 | 5.30 | 4.97 | 5.03 | 4.97 | 4.97 | 4.92 | 4.81 | 5.01 |
| 25 | 4.72 | 4.91 | 5.06 | 5.05 | 5.25 | 5.00 | 5.02 | 5.05 | 5.02 | 4.92 | 4.80 | 4.98 |
| 26 | 4.72 | 4.91 | 5.08 | 5.03 | 5.22 | 5.00 | 5.00 | 5.01 | 5.03 | 4.92 | 4.79 | 4.97 |
| 27 | 4.73 | 4.91 | 5.06 | 5.03 | 5.19 | 5.01 | 4.98 | 4.97 | 5.02 | 4.95 | 4.79 | 4.96 |
| 28 | 4.73 | 4.92 | 5.04 | 5.03 | 5.14 | 5.01 | 4.96 | 4.96 | 5.00 | 4.96 | 4.79 | 4.95 |
| 29 | 4.79 | 4.93 | 5.02 | 5.00 | --- | 5.03 | 4.95 | 4.98 | 4.99 | 4.94 | 4.78 | 4.93 |
| 30 | 4.88 | 4.96 | 5.00 | 4.99 | --- | 5.04 | 4.97 | 4.98 | 4.98 | 4.91 | 4.77 | 4.91 |
| 31 | 4.88 | --- | 4.99 | 4.98 | --- | 5.07 | --- | 4.98 | --- | 4.90 | 4.76 | --- |
| MEAN | 4.65 | 4.88 | 5.01 | 5.02 | 5.05 | 5.03 | 5.01 | 5.01 | 4.99 | 4.91 | 4.81 | 4.81 |
| MAX | 4.88 | 4.96 | 5.08 | 5.07 | 5.54 | 5.23 | 5.07 | 5.08 | 5.14 | 4.99 | 4.88 | 5.12 |
| MIN | 4.54 | 4.84 | 4.95 | 4.98 | 4.90 | 4.95 | 4.95 | 4.96 | 4.92 | 4.83 | 4.75 | 4.61 |

## 423556088365001 DELAVAN LAKE AT CENTER NEAR DELAVAN LAKE, WI

LOCATION.--Lat 42°35'56", long 88°36'50", in SE 1/4 SW 1/4, sec.28, T.2 N., R.16 E., Walworth County, Hydrologic Unit 07090001, 2.6 mi southeast of Delavan.

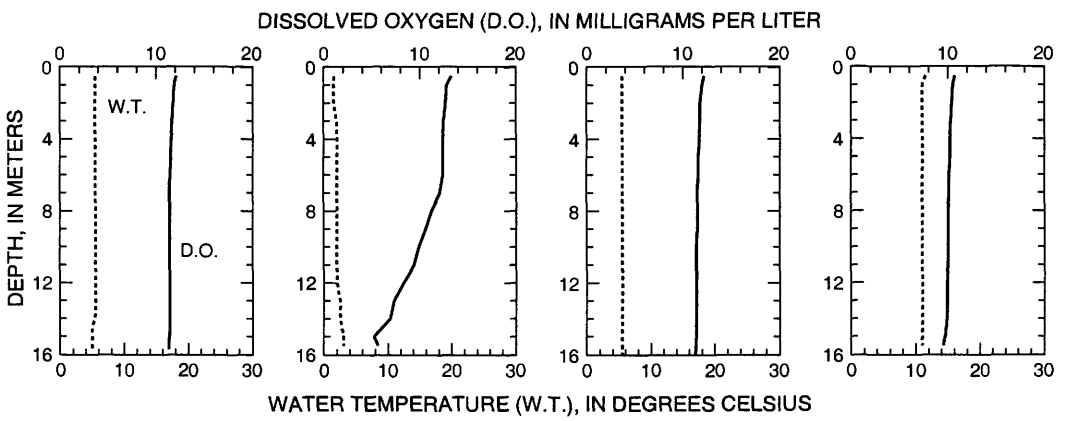
DRAINAGE AREA.--41.4 $mi^2$, of which 2.3 $mi^2$ is non-contributing.

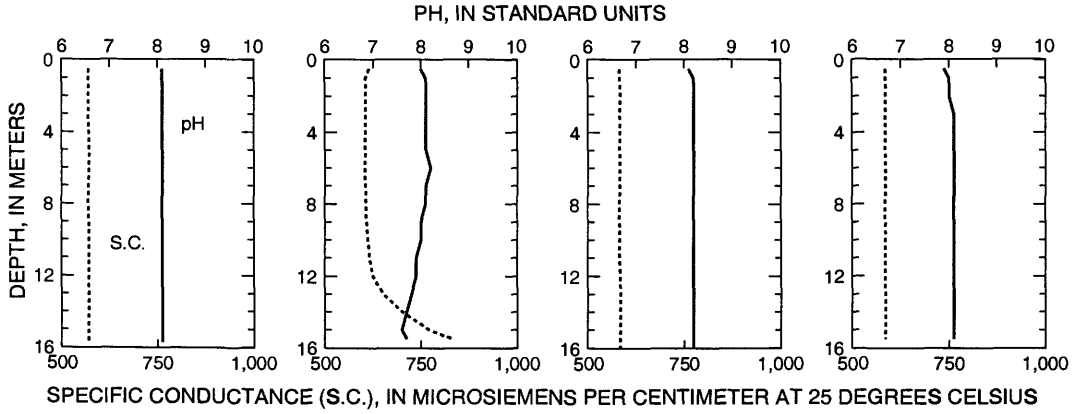
PERIOD OF RECORD.--October 1983 to current year.

REMARKS.--Lake ice-covered during February measurements. Water-quality analyses done by the U.S. Geological Survey National Water Quality Laboratory. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, NOVEMBER 18, 1996 TO MAY 13, 1997
(Milligrams per liter unless otherwise indicated)

| | Nov. 18 | | Feb. 19 | | Apr. 15 | | May 13 | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 4.87 | | 5.04 | | 5.00 | | 4.99 | | |
| Secchi-depth (meters) | 3.8 | | 6.2 | | 4.4 | | 7.8 | | |
| Chlorophyll a, phytoplankton (µg/L) | 0.4 | | <0.1 | | 0.5 | | 0.4 | | |
| Depth of sample (m) | 0.5 | 16 | 0.5 | 16 | 0.5 | 16 | 0.5 | 2.0 | 16 |
| Water temperature (°C) | 5.5 | 5.0 | 1.5 | 3.0 | 5.5 | 5.5 | 11.5 | 11.0 | 11.0 |
| Specific conductance (µS/cm) | 570 | 570 | 614 | 832 | 582 | 583 | 585 | 585 | 585 |
| pH (units) | 8.1 | 8.1 | 8.0 | 7.7 | 8.1 | 8.2 | 7.9 | 8.0 | 8.1 |
| Dissolved oxygen | 12.1 | 11.3 | 13.3 | 5.6 | 12.2 | 11.3 | 10.7 | 10.4 | 9.5 |
| Phosphorus, total (as P) | 0.093 | 0.099 | 0.074 | 0.140 | 0.054 | 0.059 | 0.079 | 0.055 | 0.069 |
| Phosphorus, ortho, dissolved (as P) | 0.012 | 0.030 | 0.045 | 0.070 | 0.043 | 0.047 | 0.044 | --- | 0.047 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.130 | --- | 0.280 | --- | 0.280 | --- | 0.282 | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | 0.011 | --- | 0.115 | --- | 0.047 | --- | 0.055 | --- | --- |
| Nitrogen, amm. + org., total (as N) | 0.80 | --- | 0.60 | --- | 0.60 | 0.50 | 0.56 | --- | --- |
| Nitrogen, total (as N) | 0.93 | --- | 0.88 | --- | 0.88 | --- | 0.84 | --- | --- |
| Color (Pt-Co. scale) | --- | --- | --- | --- | 7 | 7 | --- | --- | --- |
| Turbidity (NTU) | --- | --- | --- | --- | 0.60 | 0.80 | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | --- | --- | 240 | 250 | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | --- | --- | 44 | 44 | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | --- | --- | 32 | 33 | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | --- | --- | 24 | 25 | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | --- | --- | 3 | 3 | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | --- | --- | 180 | 180 | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | --- | --- | 30 | 30 | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | --- | --- | 56 | 56 | --- | --- | --- |
| Fluoride, dissolved (F) | --- | --- | --- | --- | 0.2 | 0.2 | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | --- | --- | 0.3 | 0.3 | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | --- | --- | 308 | 311 | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | --- | --- | <3 | 9 | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | --- | --- | 2 | 1 | --- | --- | --- |
| | 11-18-96 | | 2-19-97 | | 4-15-97 | | 5-13-97 | | |

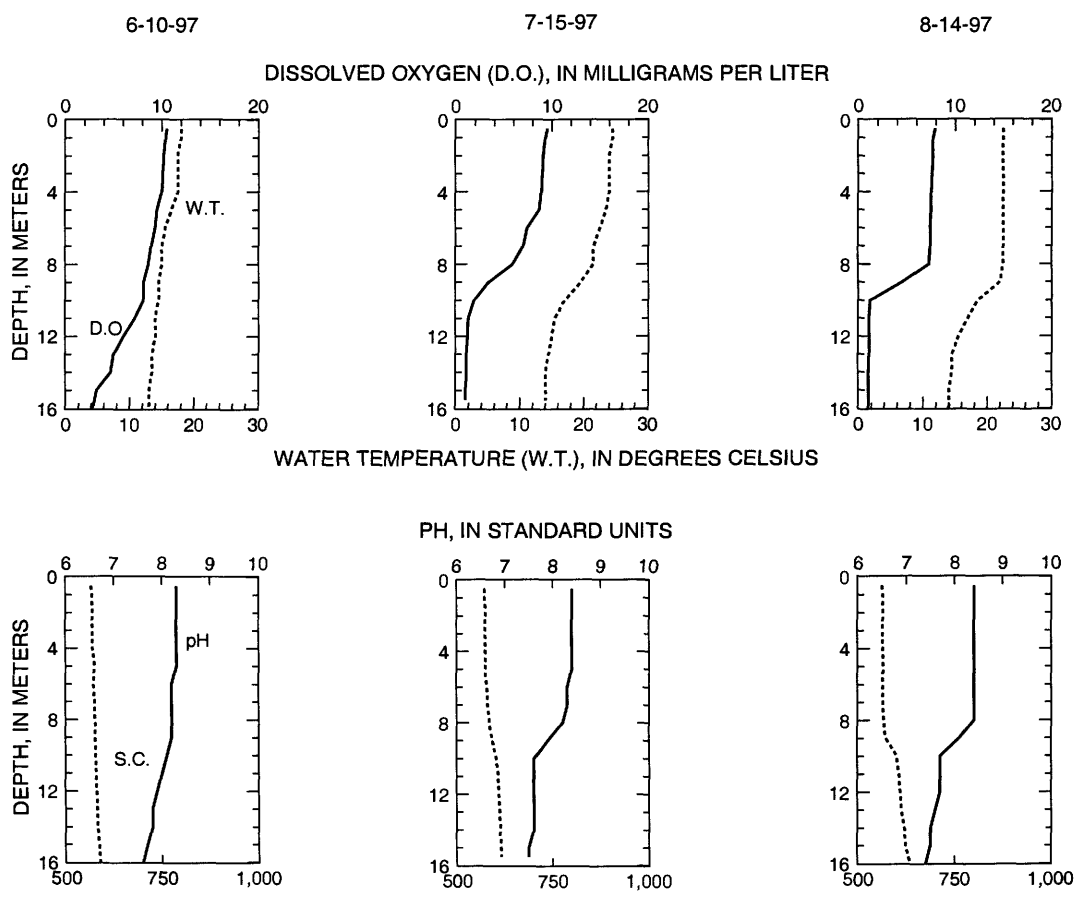


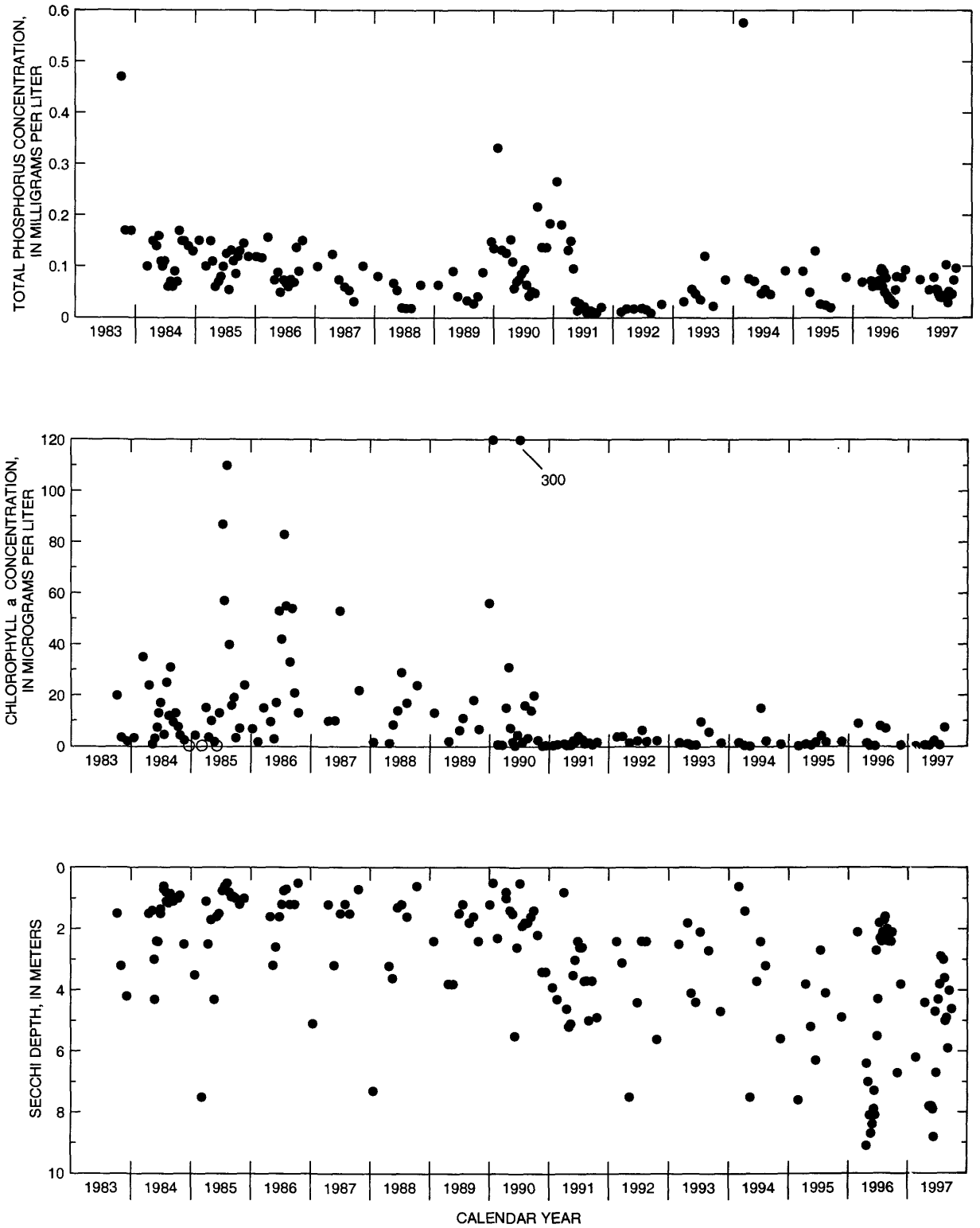



WATER-QUALITY DATA, JUNE 10 TO AUGUST 14, 1997
(Milligrams per liter unless otherwise indicated)

| | June 10 | | | | July 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 4.95 | | | | 4.87 | | | | |
| Secchi-depth (meters) | 8.8 | | | | 3.8 | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 2.2 | | | | 0.5 | | | | |
| Depth of sample (m) | 0.5 | 2.0 | 13 | 16 | 0.5 | 2.0 | 5.0 | 13 | 16 |
| Water temperature (°C) | 18.0 | 17.5 | 13.5 | 13.0 | 24.5 | 24.0 | 23.5 | 14.5 | 14.0 |
| Specific conductance (µS/cm) | 566 | 568 | 582 | 588 | 572 | 574 | 574 | 611 | 616 |
| pH (units) | 8.3 | 8.3 | 7.8 | 7.6 | 8.4 | 8.4 | 8.4 | 7.6 | 7.5 |
| Dissolved oxygen | 10.5 | 10.2 | 5.0 | 2.8 | 9.5 | 9.1 | 8.7 | 1.1 | 1.0 |
| Phosphorus, total (as P) | 0.047 | 0.045 | 0.083 | 0.172 | 0.043 | 0.038 | 0.032 | 0.267 | 0.368 |
| Phosphorus, ortho, dissolved (as P) | 0.026 | --- | 0.064 | 0.137 | 0.009 | --- | 0.011 | 0.226 | 0.319 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.084 | --- | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | 0.011 | --- | --- | --- | 0.010 | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | 0.67 | --- | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | 0.75 | --- | --- | --- | --- | --- | --- | --- | --- |

| | Aug. 14 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 4.79 | | | | | | | |
| Secchi-depth (meters) | 3.6 | | | | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 7.5 | | | | | | | |
| Depth of sample (m) | 0.5 | 2.0 | 8.0 | 9.0 | 11 | 13 | 15 | 17 |
| Water temperature (°C) | 22.5 | 22.5 | 22.5 | 22.0 | 17.0 | 14.5 | 14.0 | 13.5 |
| Specific conductance (µS/cm) | 562 | 563 | 566 | 572 | 606 | 612 | 624 | 640 |
| pH (units) | 8.4 | 8.4 | 8.7 | 8.1 | 7.7 | 7.6 | 7.5 | 7.3 |
| Dissolved oxygen | 7.9 | 7.7 | 7.3 | 4.5 | 1.1 | 1.1 | 1.0 | 1.0 |
| Phosphorus, total (as P) | 0.051 | 0.045 | 0.033 | 0.037 | 0.297 | 0.393 | 0.533 | 0.680 |
| Phosphorus, ortho, dissolved (as P) | 0.007 | --- | 0.007 | --- | --- | 0.367 | --- | 0.586 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.005 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | 0.017 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | 0.71 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | 0.71 | --- | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Delavan Lake at Center near Delavan Lake, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

ADDITIONAL WATER-QUALITY DATA, OCTOBER 28, 1996 TO SEPTEMBER 26, 1997
(Milligrams per liter unless otherwise indicated)

| | Oct. 28 | May 27 | June 03 | June 18 | June 26 | July 07 | July 24 |
|---|---|---|---|---|---|---|---|
| Depth of sample (ft) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Lake stage (ft) | 4.73 | 4.97 | 4.95 | 5.08 | 5.03 | 4.91 | 4.92 |
| Water temperature (°C) | 13.0 | 12.5 | 14.5 | 19.3 | 24.0 | 22.0 | 26.0 |
| Secchi-depth (meters) | 6.7 | 7.8 | 7.9 | 4.7 | 6.7 | 4.3 | 2.9 |
| Phosphorus, total (as P) | 0.078 | 0.055 | 0.054 | 0.040 | 0.039 | 0.040 | 0.038 |

| | July 30 | Aug. 07 | Aug. 19 | Aug. 26 | Sept. 04 | Sept.12 | Sept. 26 |
|---|---|---|---|---|---|---|---|
| Depth of sample (ft) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Lake stage (ft) | 4.91 | 4.80 | 4.85 | 4.79 | 4.71 | 4.63 | 4.97 |
| Water temperature (°C) | 23.0 | 23.0 | 21.5 | 21.5 | 22.0 | 20.0 | 19.0 |
| Secchi-depth (meters) | 2.9 | 3.0 | 5.0 | 4.9 | 5.9 | 4.0 | 4.6 |
| Phosphorus, total (as P) | 0.103 | 0.029 | 0.043 | 0.046 | 0.046 | 0.074 | 0.097 |

## 423659088354401 DELAVAN LAKE, AT NORTH END, NEAR LAKE LAWN, WI

LOCATION.--Lat 42°36'59", long 88°35'44", in NW 1/4 SW 1/4, sec.22, T.2 N., R.16 E., Walworth County, Hydrologic Unit 07090001, 2.6 mi southeast of Delavan.

DRAINAGE AREA.--41.4 $mi^2$, of which 2.3 $mi^2$ is non-contributing.

PERIOD OF RECORD.--October 1983 to current year.

WATER-QUALITY DATA, APRIL 15 TO AUGUST 14, 1997

| | Apr. 15 | May 13 | June 10 | July 15 | Aug. 14 |
|---|---|---|---|---|---|
| Secchi-depth (meters) | 2.0 | 7.5 | 7.9 | 3.0 | 2.9 |

## 423526088380101 DELAVAN LAKE, AT SW END, NEAR DELAVAN LAKE, WI

LOCATION.--Lat 42°35'26", long 88°38'01", in SE 1/4 NW 1/4, sec.32, T.2 N., R.16 E., Walworth County, Hydrologic Unit 07090001, 2.6 mi southeast of Delavan.

DRAINAGE AREA.--41.4 $mi^2$, of which 2.3 $mi^2$ is non-contributing.

PERIOD OF RECORD.--October 1983 to current year.

WATER-QUALITY DATA, APRIL 15 TO AUGUST 14, 1997

| | Apr. 15 | May 13 | June 10 | July 15 | Aug. 14 |
|---|---|---|---|---|---|
| Secchi-depth (meters) | 3.5 | 8.5 | 6.2 | 3.8 | 2.6 |

## 05404500 DEVILS LAKE NEAR BARABOO, WI

LOCATION.--Lat 43°25'18", long 89°43'38", in SW 1/4 SE 1/4 sec.13, T.11 N., R.6 E., Sauk County, Hydrologic Unit 07070004, in Devils Lake State Park, 3.5 mi south of Baraboo.

DRAINAGE AREA.--4.79 $mi^2$. Area of Devils Lake, 361 acres.

PERIOD OF RECORD.--June 1922 to August 1930, June to August 1932, June 1934 to September 1981 (fragmentary). October 1981 to September 1984, data unpublished in district files. October 1984 to current year.

REVISED RECORDS.--WDR WI-78-1: Drainage area.

GAGE.--Water-stage recorder installed July 17, 1991. Datum of gage is 955.00 ft, above sea level.

REMARKS.--Records good. Lake has no surface outlet.

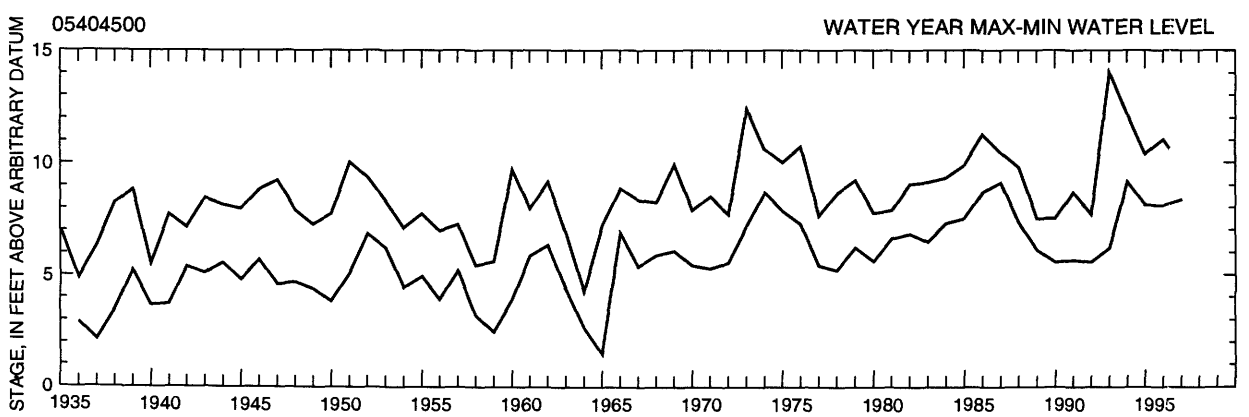
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 14.13 ft, July 18, 1993; minimum observed, 1.49 ft Feb. 8, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 9.95 ft, May 8, 9, and 11; minimum recorded, 8.29 ft, Jan. 31.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.98 | 8.66 | 8.42 | 8.37 | 8.36 | 8.47 | 9.35 | 9.74 | 9.65 | 9.59 | --- | 9.08 |
| 2 | 8.95 | 8.63 | 8.41 | 8.36 | 8.35 | 8.47 | 9.38 | 9.79 | 9.63 | 9.67 | --- | 9.07 |
| 3 | 8.93 | 8.63 | 8.41 | 8.36 | 8.35 | 8.47 | 9.41 | 9.85 | 9.61 | 9.63 | --- | 9.04 |
| 4 | 8.91 | 8.62 | 8.40 | 8.38 | 8.39 | 8.47 | 9.43 | 9.87 | 9.60 | 9.59 | --- | 9.01 |
| 5 | 8.88 | 8.61 | 8.41 | 8.39 | 8.40 | 8.46 | 9.47 | 9.88 | 9.59 | 9.57 | --- | 8.99 |
| 6 | 8.86 | 8.60 | 8.41 | 8.39 | 8.40 | 8.46 | 9.51 | 9.89 | 9.59 | 9.57 | --- | 8.96 |
| 7 | 8.87 | 8.60 | 8.40 | 8.38 | 8.39 | 8.45 | 9.51 | 9.90 | 9.59 | 9.54 | --- | 8.95 |
| 8 | 8.85 | 8.59 | 8.39 | 8.38 | 8.39 | 8.45 | 9.49 | 9.93 | 9.61 | 9.64 | --- | 8.94 |
| 9 | 8.84 | 8.57 | 8.38 | 8.38 | 8.38 | 8.48 | 9.49 | 9.93 | 9.59 | 9.65 | --- | 8.93 |
| 10 | 8.82 | 8.55 | 8.38 | 8.39 | 8.38 | 8.49 | 9.49 | 9.93 | 9.57 | 9.64 | --- | 8.90 |
| 11 | 8.81 | 8.53 | --- | 8.38 | 8.38 | 8.50 | 9.49 | 9.92 | 9.56 | 9.61 | --- | 8.88 |
| 12 | 8.78 | 8.51 | --- | 8.38 | 8.38 | 8.51 | 9.53 | 9.90 | 9.54 | 9.59 | --- | 8.86 |
| 13 | 8.76 | 8.50 | --- | 8.37 | 8.38 | 8.59 | 9.55 | 9.89 | 9.52 | 9.58 | --- | 8.84 |
| 14 | 8.75 | 8.49 | --- | 8.37 | 8.37 | 8.64 | 9.55 | 9.88 | 9.49 | 9.59 | --- | 8.83 |
| 15 | 8.74 | 8.50 | --- | 8.38 | 8.37 | 8.64 | 9.56 | 9.87 | 9.49 | 9.56 | 9.30 | 8.82 |
| 16 | 8.72 | 8.48 | --- | 8.38 | 8.37 | 8.64 | 9.56 | 9.86 | 9.70 | 9.54 | 9.28 | 8.82 |
| 17 | 8.74 | 8.48 | --- | 8.36 | 8.37 | 8.64 | 9.56 | 9.85 | 9.69 | 9.59 | 9.29 | 8.89 |
| 18 | 8.72 | 8.46 | --- | 8.36 | 8.37 | 8.64 | 9.56 | 9.84 | 9.66 | 9.59 | 9.30 | 8.87 |
| 19 | 8.70 | 8.45 | --- | 8.36 | 8.37 | 8.64 | 9.57 | 9.83 | 9.65 | 9.57 | 9.28 | 8.85 |
| 20 | 8.68 | 8.44 | --- | 8.36 | 8.38 | 8.65 | 9.58 | 9.82 | 9.64 | 9.55 | 9.27 | 8.83 |
| 21 | 8.66 | 8.46 | --- | 8.36 | 8.43 | 8.67 | 9.58 | 9.80 | 9.70 | 9.57 | 9.25 | 8.81 |
| 22 | 8.66 | 8.45 | --- | 8.36 | 8.45 | 8.72 | 9.58 | 9.79 | 9.72 | --- | 9.23 | 8.79 |
| 23 | 8.71 | 8.45 | --- | 8.36 | 8.45 | 8.75 | 9.57 | 9.77 | 9.71 | --- | 9.22 | 8.79 |
| 24 | 8.70 | 8.44 | --- | 8.36 | 8.45 | 8.78 | 9.58 | 9.75 | 9.70 | --- | 9.20 | 8.76 |
| 25 | 8.69 | 8.43 | --- | 8.38 | 8.44 | 8.82 | 9.57 | 9.74 | 9.68 | --- | 9.18 | 8.74 |
| 26 | 8.67 | 8.41 | --- | 8.39 | 8.44 | 8.84 | 9.57 | 9.71 | 9.66 | --- | 9.16 | 8.72 |
| 27 | 8.66 | 8.41 | --- | 8.38 | 8.46 | 8.89 | 9.56 | 9.69 | 9.63 | --- | 9.15 | 8.70 |
| 28 | 8.62 | 8.40 | --- | 8.38 | 8.47 | 9.03 | 9.55 | 9.67 | 9.60 | --- | 9.14 | 8.70 |
| 29 | 8.66 | 8.40 | --- | 8.38 | --- | 9.18 | 9.54 | 9.69 | 9.57 | --- | 9.12 | 8.68 |
| 30 | 8.71 | 8.43 | 8.38 | 8.37 | --- | 9.25 | 9.56 | 9.68 | 9.59 | --- | 9.11 | 8.64 |
| 31 | 8.68 | --- | 8.37 | 8.36 | --- | 9.31 | --- | 9.66 | --- | --- | 9.10 | --- |
| MEAN | 8.76 | 8.51 | --- | 8.37 | 8.40 | 8.68 | 9.52 | 9.82 | 9.62 | --- | --- | 8.86 |
| MAX | 8.98 | 8.66 | --- | 8.39 | 8.47 | 9.31 | 9.58 | 9.93 | 9.72 | --- | --- | 9.08 |
| MIN | 8.62 | 8.40 | --- | 8.36 | 8.35 | 8.45 | 9.35 | 9.66 | 9.49 | --- | --- | 8.64 |



## 425103088261500 EAGLE SPRING LAKE AT EAGLEVILLE, WI

LOCATION.--Lat 42°51'03", long 88°26'15", in SE 1/4 NW 1/4 sec.36, T.5 N., R.17 E., Waukesha County, Hydrologic Unit 07120006, at Eagleville.

DRAINAGE AREA.--33.2 $mi^2$.

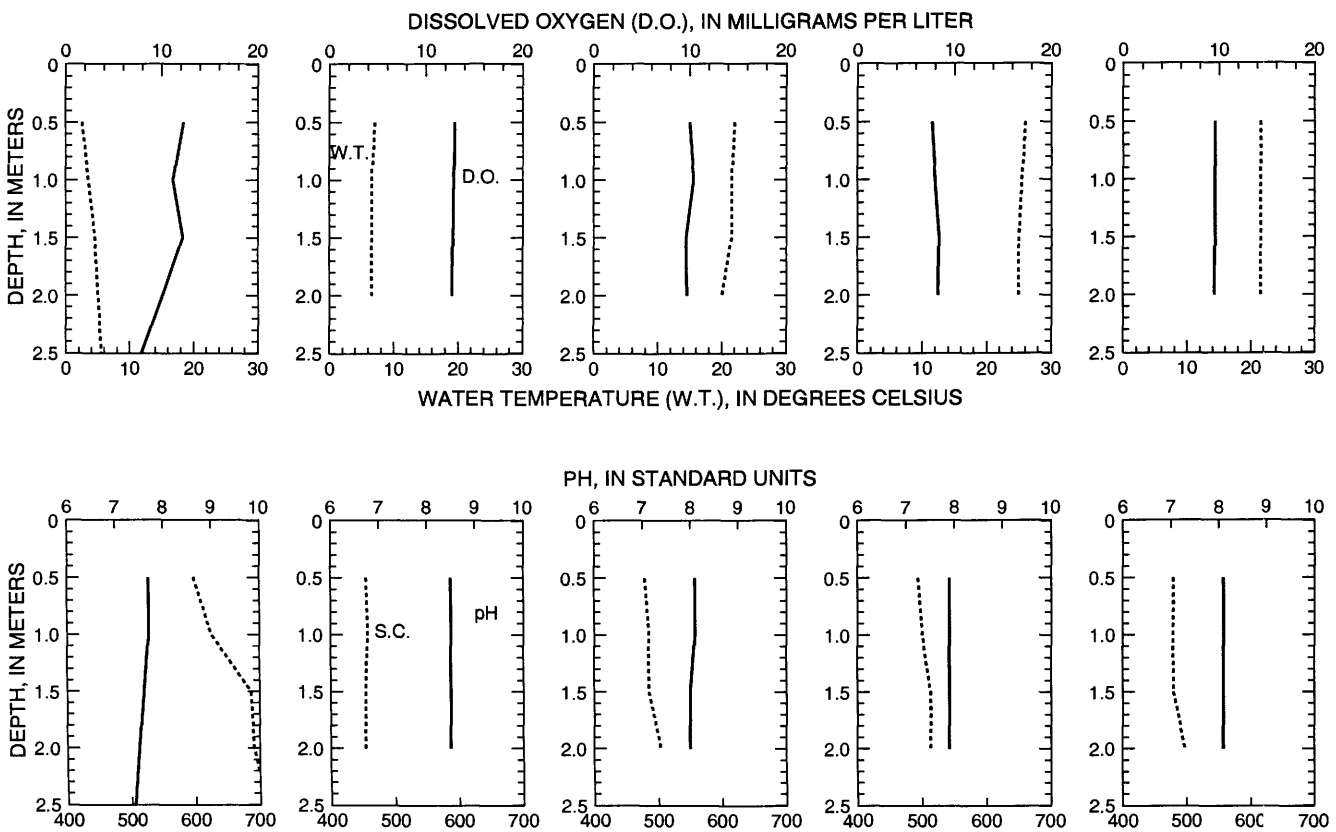
PERIOD OF RECORD.--April 1991 to current year.

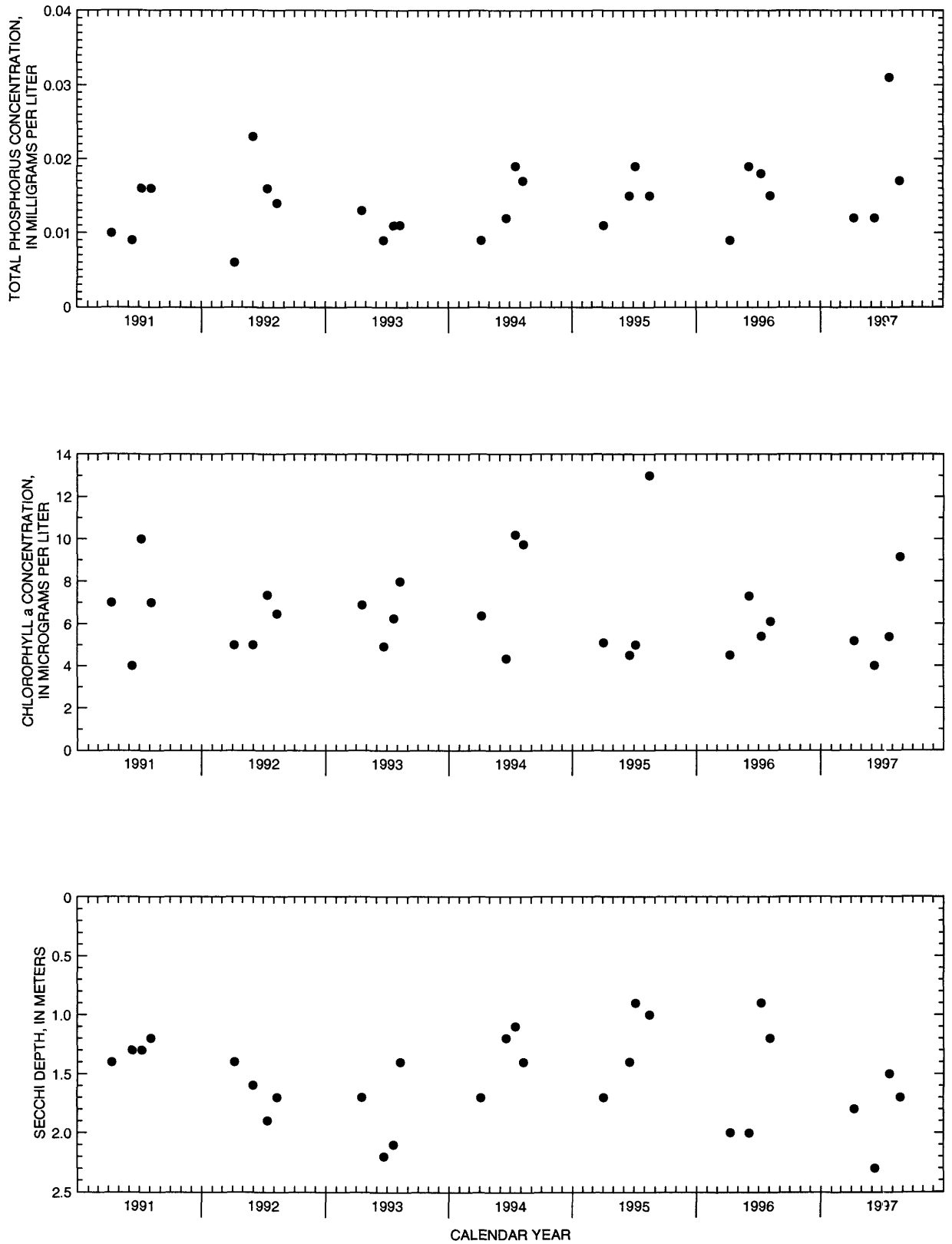
REMARKS.--Lake sampled near southeast end at a lake depth of about 3 m. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Lake-stage readings from 1991 to 1993 (except 2/4/93 and 4/19/93) were previously reported 1 ft too high.

WATER-QUALITY DATA, FEBRUARY 11 TO AUGUST 25, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 11 | | Apr. 10 | | June 10 | | July 24 | | Aug. 25 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 9.71 | | 9.48 | | --- | | 9.52 | | 9.66 | |
| Secchi-depth (meters) | --- | | 1.8 | | 2.3 | | 1.5 | | 1.7 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 5.2 | | 4.0 | | 5.4 | | 9.2 | |
| Depth of sample (m) | 0.5 | 2.5 | 0.5 | 2.0 | 0.5 | 2.0 | 0.5 | 2.0 | 0.5 | 2.0 |
| Water temperature (°C) | 2.5 | 5.5 | 7.0 | 6.5 | 22.0 | 20.0 | 26.0 | 25.0 | 21.5 | 21.5 |
| Specific conductance (µS/cm) | 598 | 712 | 455 | 454 | 479 | 504 | 494 | 513 | 479 | 497 |
| pH (units) | 7.7 | 7.4 | 8.5 | 8.5 | 8.1 | 8.0 | 7.9 | 7.9 | 8.1 | 8.1 |
| Dissolved oxygen | 12.3 | 7.9 | 13.0 | 12.7 | 10.0 | 9.7 | 7.7 | 8.3 | 9.6 | 9.5 |
| Phosphorus, total (as P) | 0.007 | <0.008 | 0.012 | 0.014 | 0.012 | 0.012 | 0.031 | 0.031 | 0.017 | 0.019 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.84 | 0.88 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.02 | 0.02 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.40 | 0.40 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 1.2 | 1.3 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 15 | 10 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 2.7 | 2.7 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 230 | 240 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 49 | 50 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 27 | 27 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 6.2 | 6.2 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 1 | 1 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 210 | 210 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 16 | 17 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 15 | 15 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 4.9 | 4.9 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 258 | 264 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | 10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |
| | 2-11-97 | | 4-10-97 | | 6-10-97 | | 7-24-97 | | 8-25-97 | |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Eagle Spring Lake at Eagleville, Wisconsin.

## 423051088155300 ELIZABETH LAKE NEAR TWIN LAKES, WI

LOCATION.--Lat 42°30'51", long 88°15'53", in NW 1/4 SW 1/4 sec.28, T.1 N., R.19 E., Kenosha County, Hydrologic Unit 07120006, near Twin Lakes.

LAKE-STAGE RECORDS

PERIOD OF RECORD.--April 1995 to current year.

GAGE.--Staff gage read by Judy Jooss. Datum of gage is 782.31 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 12.13 ft, June 7 and 10, 1996; minimum observed, 10.71 ft, Oct. 28, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 11.93 ft, June 16; minimum observed, 10.71, Oct. 28.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

| DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT |
|---|---|---|---|---|---|---|---|
| Apr. 22 | 11.31 | June 24 | 11.21 | July 22 | 11.05 | Aug. 17 | 11.29 |
| May 07 | 11.70 | 29 | 11.25 | 29 | 11.05 | 18 | 11.30 |
| 09 | 11.59 | July 04 | 11.21 | 31 | 11.04 | 21 | 11.31 |
| 15 | 11.66 | 06 | 11.21 | Aug. 01 | 11.08 | 29 | 11.27 |
| 22 | 11.58 | 10 | 11.17 | 04 | 11.09 | Sept.16 | 11.03 |
| June 01 | 11.56 | 14 | 11.14 | 10 | 11.19 | 28 | 11.02 |
| 12 | 11.37 | 15 | 11.13 | 13 | 11.19 | | |

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT |
|---|---|---|---|---|---|---|---|
| Oct. 18 | 11.06 | June 02 | 11.86 | June 17 | 11.97 | Aug. 02 | 11.55 |
| May 03 | 10.87 | 03 | 11.89 | 18 | 12.09 | 12 | 11.50 |
| 13 | 11.14 | 06 | 11.91 | 24 | 11.98 | 21 | 11.43 |
| 20 | 11.31 | 07 | 12.13 | July 03 | 11.71 | Sept.04 | 11.30 |
| 21 | 11.79 | 10 | 12.13 | 13 | 11.50 | 19 | 11.05 |
| 22 | 11.81 | 12 | 12.09 | 23 | 11.69 | | |

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

| DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT |
|---|---|---|---|---|---|---|---|
| Oct. 13 | 10.73 | Apr. 18 | 10.86 | June 15 | 11.43 | July 22 | 11.71 |
| 28 | 10.71 | 28 | 10.81 | 16 | 11.93 | Aug. 26 | 11.59 |
| Nov. 10 | 10.79 | May 04 | 10.98 | 24 | 11.88 | Sept.14 | 11.33 |
| 20 | 10.78 | 13 | 11.11 | July 12 | 11.67 | 28 | 11.38 |

## 423051088155300 ELIZABETH LAKE NEAR TWIN LAKES, WI--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 1995 to August 1997 (discontinued).

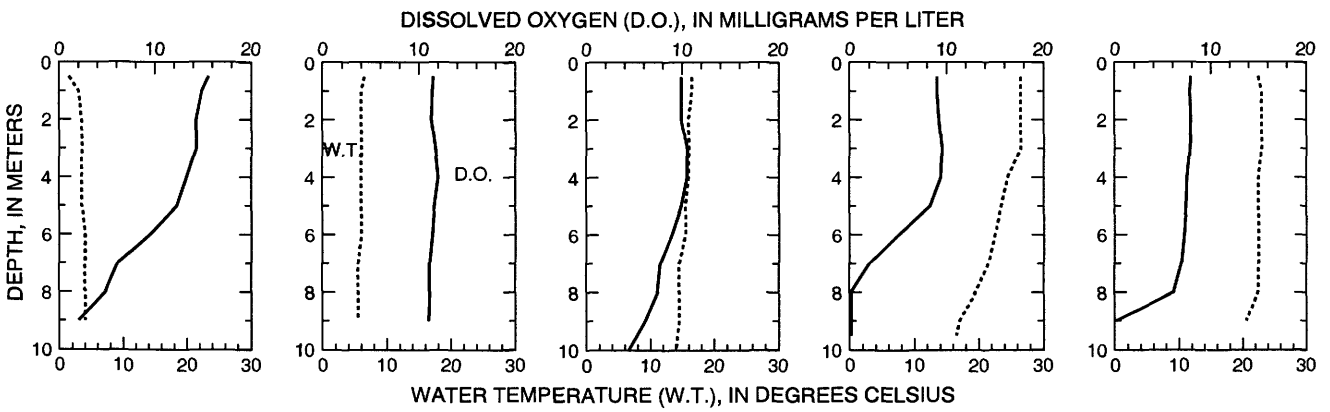
REMARKS.--Lake sampled at the deepest point near north side of lake. Lake was ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

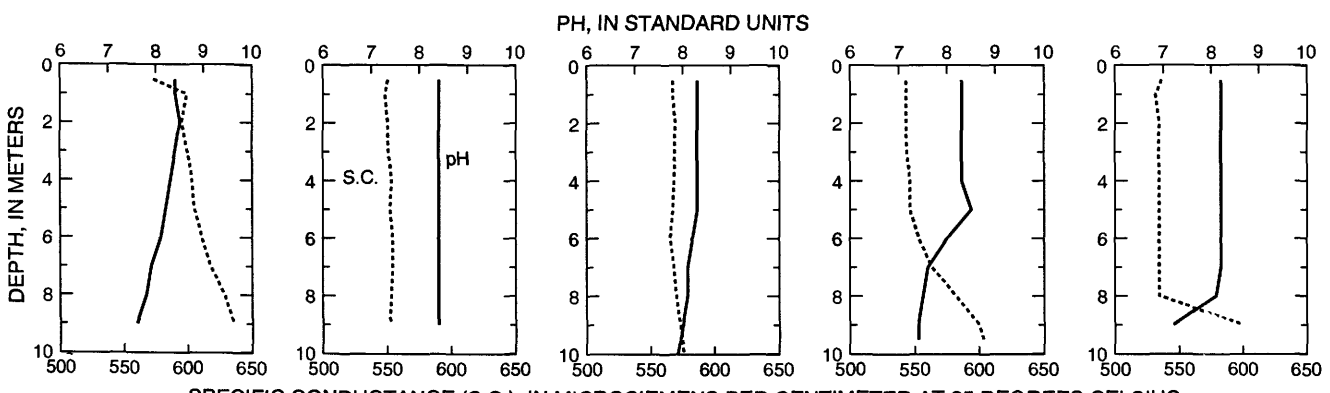
WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 18, 1997

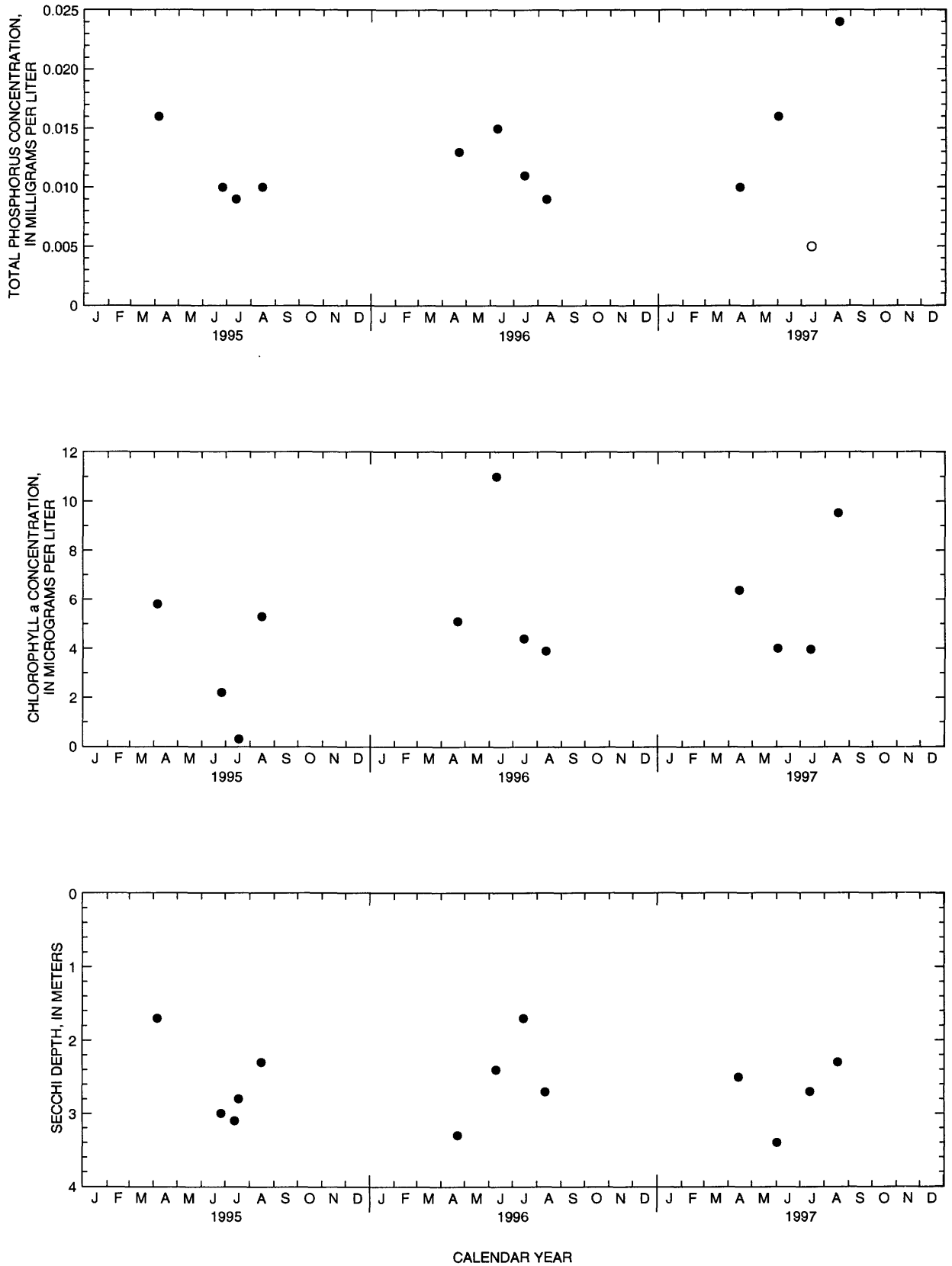
(Milligrams per liter unless otherwise indicated)

| | Feb. 10 | | Apr. 14 | | June 02 | | July 14 | | Aug. 18 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 10.69 | | 10.93 | | --- | | 11.68 | | 11.67 | |
| Secchi-depth (meters) | --- | | 2.5 | | 3.4 | | 2.7 | | 2.3 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 6.4 | | 4.0 | | 4.0 | | 9.5 | |
| Depth of sample (m) | 0.5 | 9.0 | 0.5 | 9.0 | 0.5 | 10 | 0.5 | 9.5 | 0.5 | 9.0 |
| Water temperature (°C) | 1.5 | 4.0 | 6.5 | 5.5 | 16.5 | 14.0 | 26.5 | 16.5 | 22.5 | 20.5 |
| Specific conductance (µS/cm) | 573 | 636 | 550 | 552 | 567 | 576 | 543 | 603 | 536 | 600 |
| pH (units) | 8.4 | 7.6 | 8.4 | 8.4 | 8.3 | 7.9 | 8.3 | 7.4 | 8.2 | 7.2 |
| Dissolved oxygen | 15.6 | 2.0 | 11.5 | 11.0 | 9.9 | 4.4 | 9.0 | 0.1 | 7.9 | 0.1 |
| Phosphorus, total (as P) | 0.011 | 0.018 | 0.010 | <0.008 | 0.016 | 0.059 | <0.005 | 0.072 | 0.024 | 0.053 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.13 | 0.13 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | <0.013 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.50 | 0.70 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.62 | 0.82 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 15 | 15 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.4 | 1.6 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 240 | 240 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 40 | 40 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 34 | 34 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 21 | 21 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 190 | 190 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 36 | 36 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 48 | 48 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 3.3 | 3.3 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 306 | 306 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |

2-10-97 4-14-97 6-02-97 7-14-97 8-18-97






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Elizabeth Lake near Twin Lakes, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 05406050 FISH LAKE NEAR SAUK CITY, WI

LOCATION.--Lat 43°17'02", long 89°39'15" in NE 1/4 SW 1/4 sec.3, T.9 N., R.7 E., Dane County, Hydrologic Unit 07070005, on south side of lake near Ganser's Tavern and Dance Hall, 0.4 mi southwest of Crystal Lake, and 3.1 mi east of Sauk City.

DRAINAGE AREA.--2.23 $mi^2$. Area of Fish Lake, 252 acres.

PERIOD OF RECORD.--November 1966 to September 1981, April 1985 to May 1987, May 1988, April 1989 to October 11, 1990 (fragmentary); continuous record from Oct. 23, 1990 to current year.

REVISED RECORDS.--WDR WI-92-1: Drainage area. WDR WI-87-1: All published values for the 1987 water year are invalid. Two valid values for water years 1987 and 1988 are available: May 7, 1987, water surface 10.52 ft, and May 16, 1988, water surface 10.83 ft.

GAGE.--Water-stage recorder Oct. 1 to Nov. 22; nonrecording gage Nov. 23 to Sept. 30. Datum of gage is 848.07 ft above sea level. Prior to Oct. 23, 1990, nonrecording gage.

REMARKS.--Lake has no surface outlet.

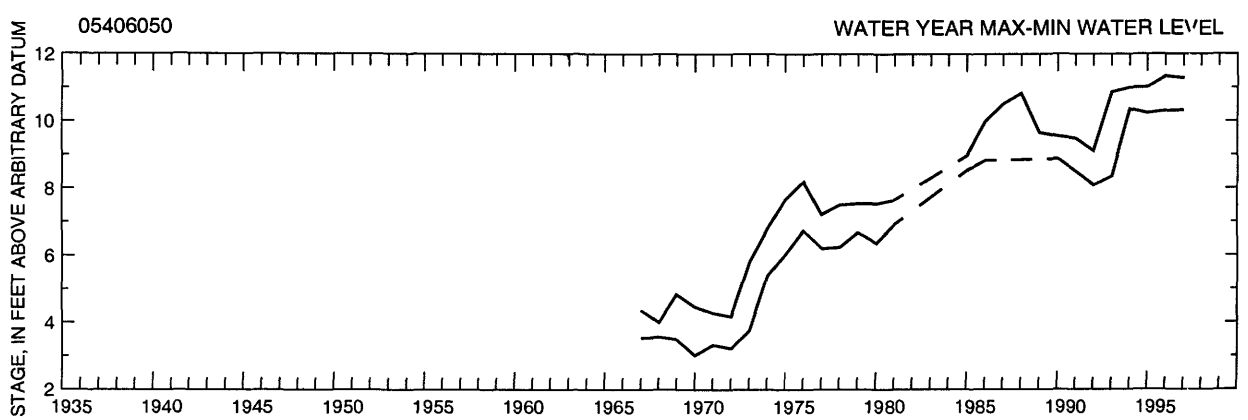
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 11.34 ft, June 21–23, 1996; minimum observed, 3.02 ft, Aug. 29, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 11.29 ft, Apr. 17; minimum observed, 10.33 ft, Oct. 20-22.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.45 | 10.44 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 10.44 | 10.42 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | 10.41 | 10.41 | --- | --- | --- | 11.03 | --- | --- | --- | --- | --- | --- |
| 4 | 10.40 | 10.40 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 10.39 | 10.40 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | 10.39 | 10.41 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 10.43 | 10.42 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 10.41 | 10.42 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | 10.41 | 10.41 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 10.40 | 10.41 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 10.39 | 10.40 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 10.38 | 10.38 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | 10.37 | 10.37 | --- | --- | --- | --- | --- | 11.24 | --- | --- | --- | --- |
| 14 | 10.37 | 10.36 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 10.37 | 10.36 | --- | --- | --- | --- | --- | --- | --- | --- | 11.05 | --- |
| 16 | 10.36 | 10.36 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 10.38 | 10.37 | --- | --- | --- | --- | 11.29 | --- | --- | --- | --- | --- |
| 18 | 10.37 | 10.37 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | 10.35 | 10.37 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | 10.34 | 10.36 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 10.33 | 10.38 | --- | --- | --- | --- | --- | --- | --- | 11.18 | --- | --- |
| 22 | 10.34 | 10.38 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 10.40 | --- | --- | --- | --- | --- | --- | --- | 11.18 | --- | --- | --- |
| 24 | 10.40 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 10.39 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | 10.38 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | 10.38 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | 10.37 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | 10.42 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | 10.49 | --- | 10.44 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | 10.45 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MEAN | 10.39 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MAX | 10.49 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MIN | 10.33 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |



## 423455088263800 GENEVA LAKE AT GENEVA BAY AT LAKE GENEVA, WI

LOCATION.--Lat 42°34'55", long 88°26'38", in NE 1/4 NE 1/4, sec.2, T.1 N., R.17 E., Walworth County, Hydrologic Unit 07120006, 0.7 mi southwest of outlet at Lake Geneva.

DRAINAGE AREA.--28.7 $mi^2$.

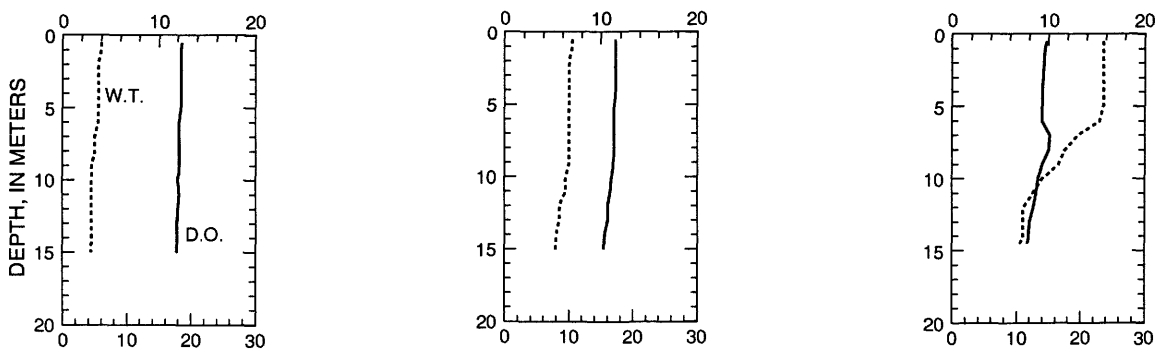
PERIOD OF RECORD.--April to September 1997.

REMARKS.--Lake sampled at a depth of about 15 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, APRIL 21 TO JUNE 24, 1997
(Milligrams per liter unless otherwise indicated)

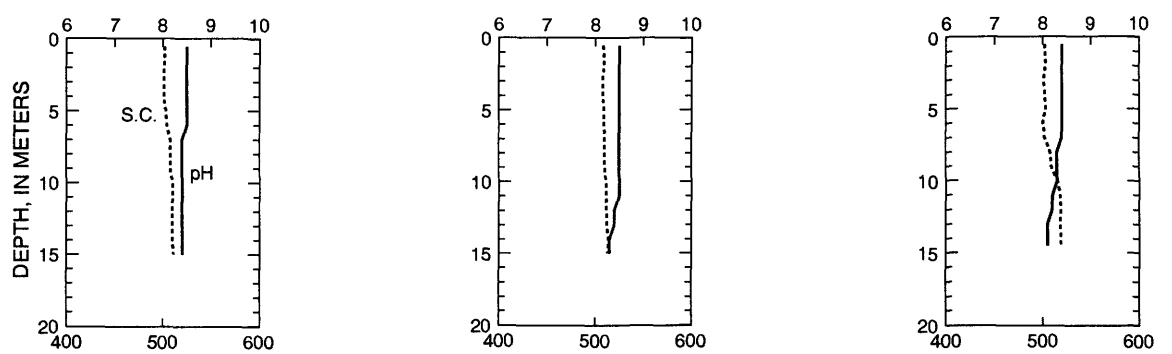
| | Apr. 21 | | May 20 | | | June 24 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 2.53 | | | --- | | | |
| Secchi-depth (meters) | 2.8 | | 2.6 | | | 3.4 | | | |
| Chlorophyll a, phytoplankton (µg/L) | 5.1 | | 7.7 | | | 1.2 | | | |
| Depth of sample (m) | 0.5 | 14.0 | 0.5 | 12.0 | 15.0 | 0.5 | 6.0 | 13.0 | 14.0 |
| Water temperature (°C) | 6.0 | 4.5 | 10.5 | 8.5 | 8.0 | 23.5 | 23.0 | 11.0 | 10.5 |
| Specific Conductance (µS/cm) | 502 | 510 | 508 | 512 | 513 | 502 | 500 | 518 | 519 |
| pH (units) | 8.5 | 8.4 | 8.5 | 8.4 | 8.3 | 8.4 | 8.4 | 8.1 | 8.1 |
| Dissolved oxygen | 12.4 | 11.9 | 11.5 | 10.7 | 10.3 | 9.8 | 9.3 | 8.0 | 7.8 |
| Phosphorus, total (as P) | 0.016 | 0.015 | 0.012 | 0.017 | 0.038 | <0.005 | 0.009 | 0.010 | <0.005 |
| Phosphorus, ortho, dissolved (as P) | 0.003 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.036 | 0.061 | 0.022 | 0.026 | 0.064 | <0.010 | <0.010 | 0.026 | <0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | 0.013 | <0.013 | <0.013 | 0.027 | <0.013 | <0.013 | 0.032 | <0.013 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.30 | 0.40 | 0.50 | 0.70 | 0.54 | 0.70 | 0.39 | 0.44 |
| Nitrogen, total (as N) | 0.44 | 0.36 | 0.42 | 0.53 | 0.76 | 0.54 | 0.70 | 0.42 | 0.44 |
| Color (Pt-Co. scale) | 15 | 15 | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 0.80 | 0.70 | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 220 | 220 | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 34 | 34 | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 16 | 16 | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 1.7 | 1.8 | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 189 | 191 | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 31 | 31 | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | 0.32 | 0.54 | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 268 | 274 | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | <10 | <10 | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.40 | <0.40 | --- | --- | --- | --- | --- | --- | --- |
| | 4-21-97 | | 5-20-97 | | | 6-24-97 | | | |

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS

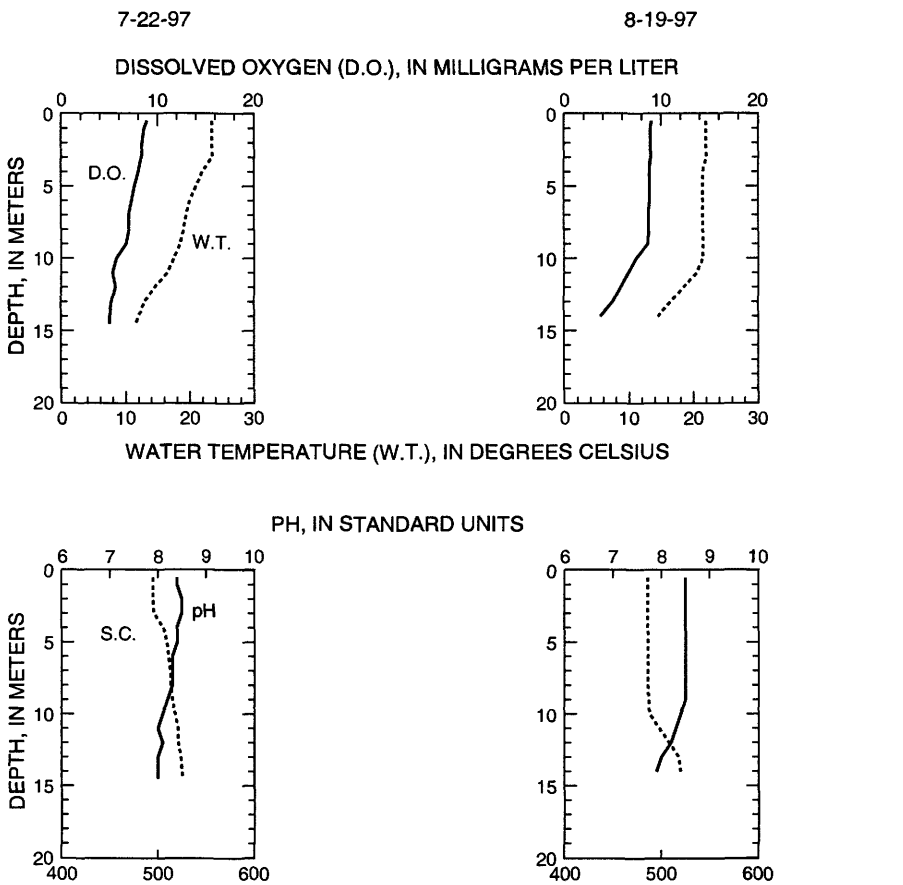



SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

## 423455088263800 GENEVA LAKE AT GENEVA BAY AT LAKE GENEVA, WI

WATER-QUALITY DATA, JULY 22 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | July 22 | | | | Aug. 19 | | | |
|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 2.54 | | | | 2.46 | | | |
| Secchi-depth (meters) | 3.0 | | | | 3.8 | | | |
| Chlorophyll a, phytoplankton (µg/L) | 4.4 | | | | 3.5 | | | |
| Depth of sample (m) | 0.5 | 3.0 | 13.0 | 14.0 | 0.5 | 10.0 | 12.0 | 14.0 |
| Water temperature (°C) | 23.5 | 23.5 | 13.0 | 11.5 | 22.0 | 21.5 | 18.5 | 14.5 |
| Specific Conductance (µS/cm) | 495 | 496 | 524 | 526 | 486 | 488 | 508 | 520 |
| pH (units) | 8.4 | 8.5 | 8.0 | 8.0 | 8.5 | 8.4 | 8.2 | 7.9 |
| Dissolved oxygen | 8.9 | 8.3 | 5.2 | 5.0 | 9.0 | 7.4 | 5.8 | 3.7 |
| Phosphorus, total (as P) | 0.012 | 0.010 | 0.008 | 0.010 | 0.011 | 0.006 | 0.012 | 0.007 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.013 | 0.034 | <0.010 | <0.010 | <0.010 | 0.028 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | 0.037 | 0.059 | <0.013 | <0.013 | <0.013 | 0.047 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.26 | 0.32 | 0.29 | 0.40 | 0.40 | 0.40 | 0.30 |
| Nitrogen, total (as N) | 0.40 | 0.26 | 0.33 | 0.32 | 0.40 | 0.40 | 0.41 | 0.33 |



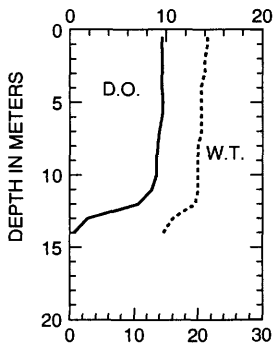
## 423455088263800 GENEVA LAKE AT GENEVA BAY AT LAKE GENEVA, WI

WATER-QUALITY DATA, SEPTEMBER 15, 1997
(Milligrams per liter unless otherwise indicated)

| | Sept. 15 | | | |
|---|---|---|---|---|
| Lake stage (ft) | 2.28 | | | |
| Secchi-depth (meters) | 3.8 | | | |
| Chlorophyll a, phytoplankton (µg/L) | 1.8 | | | |
| Depth of sample (m) | 0.5 | 10.0 | 12.0 | 14.0 |
| Water temperature (°C) | 21.5 | 20.0 | 19.5 | 14.5 |
| Specific Conductance (S/cm) | 487 | 488 | 493 | 522 |
| pH (units) | 8.3 | 8.4 | 8.3 | 7.6 |
| Dissolved oxygen | 9.6 | 9.0 | 7.1 | 0.4 |
| Phosphorus, total (as P) | <0.005 | <0.005 | <0.005 | <0.005 |
| Phosphorus, ortho, dissolved (as P) | <0.002 | 0.002 | 0.002 | 0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | <0.010 | 0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 |
| Nitrogen, amm. + org., total (as N) | 0.60 | 0.40 | 0.40 | 0.50 |
| Nitrogen, total (as N) | 0.60 | 0.40 | 0.40 | 0.51 |

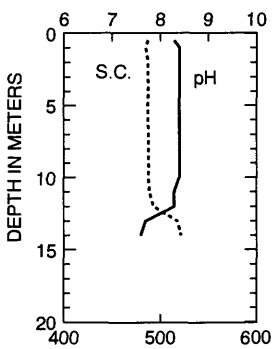
9-15-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

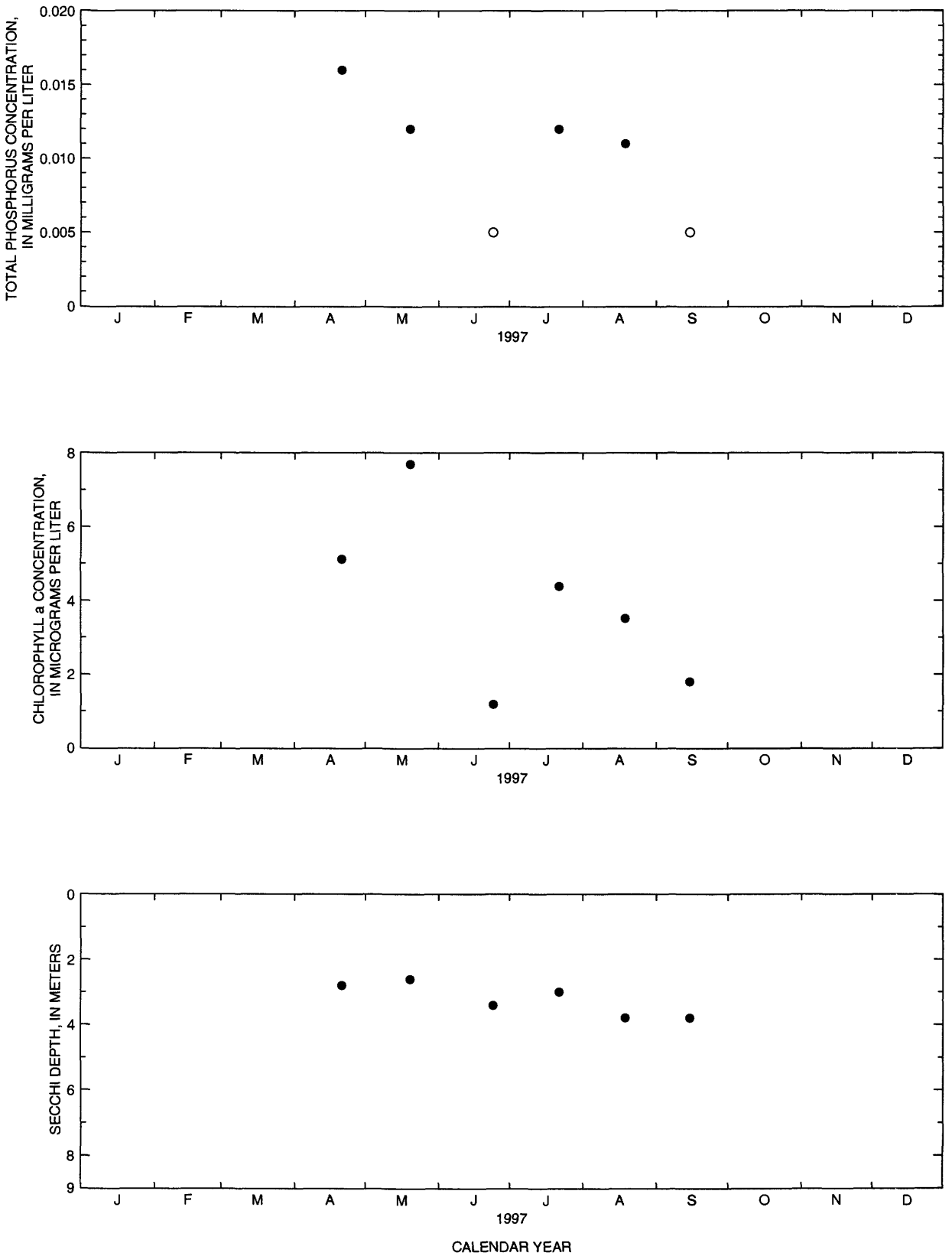



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Geneva Lake at Geneva Bay Lake Geneva, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted c'rcles.)

## 423402088301400 GENEVA LAKE AT CENTER NEAR LAKE GENEVA, WI

LOCATION.--Lat 42°34'02", long 88°30'14", in NE 1/4 NE 1/4, sec.8, T.1 N., R.17 E., Walworth County, Hydrologic Unit 07120006, 3.9 mi southwest of outlet at Lake Geneva.

DRAINAGE AREA.--28.7 $mi^2$.

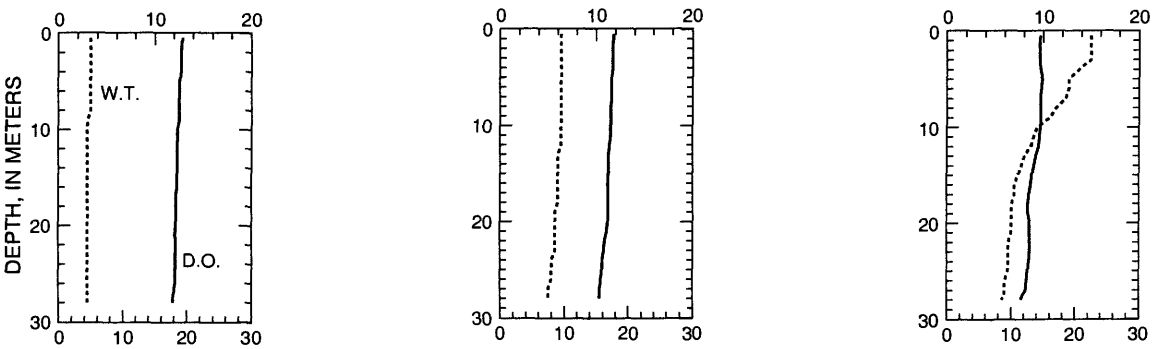
PERIOD OF RECORD.--April to September 1997.

REMARKS.--Lake sampled at a depth of about 29 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, APRIL 21 TO JUNE 24, 1997
(Milligrams per liter unless otherwise indicated)

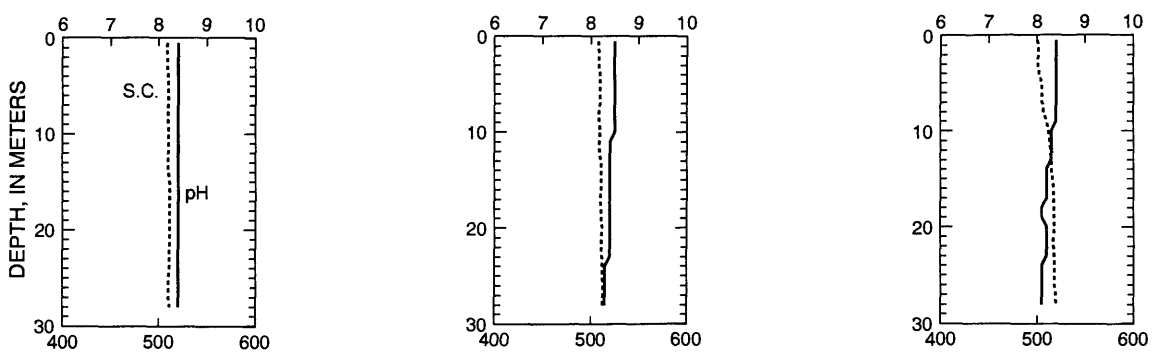
| | Apr. 21 | | May 20 | | | June 24 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 2.53 | | | | | --- | | |
| Secchi-depth (meters) | 3.2 | | 3.0 | | | | | 4.4 | | |
| Chlorophyll a, phytoplankton (µg/L) | 5.2 | | 6.9 | | | | | 1.2 | | |
| Depth of sample (m) | 0.5 | 27.0 | 0.5 | 12.0 | 27.0 | 0.5 | 7.0 | 18.0 | 24.0 | 27.0 |
| Water temperature (°C) | 5.0 | 4.5 | 9.5 | 9.5 | 7.5 | 22.5 | 18.5 | 10.0 | 9.5 | 9.0 |
| Specific Conductance (µS/cm) | 509 | 511 | 508 | 509 | 513 | 500 | 505 | 518 | 518 | 519 |
| pH (units) | 8.4 | 8.4 | 8.5 | 8.4 | 8.3 | 8.4 | 8.4 | 8.1 | 8.1 | 8.1 |
| Dissolved oxygen | 12.9 | 11.9 | 11.8 | 11.4 | 10.4 | 9.7 | 9.7 | 8.4 | 8.5 | 7.9 |
| Phosphorus, total (as P) | 0.016 | 0.015 | 0.013 | 0.024 | 0.026 | 0.007 | <0.005 | 0.006 | <0.005 | 0.006 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.064 | 0.063 | 0.043 | 0.030 | 0.063 | <0.010 | 0.010 | 0.036 | 0.043 | <0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | 0.013 | <0.013 | <0.013 | 0.016 | <0.013 | 0.018 | 0.053 | 0.068 | <0.013 |
| Nitrogen, amm. + org., total (as N) | 0.50 | 0.70 | 0.40 | 0.50 | 0.50 | 0.64 | 0.49 | 0.57 | 0.53 | 0.55 |
| Nitrogen, total (as N) | 0.56 | 0.76 | 0.44 | 0.53 | 0.56 | 0.64 | 0.50 | 0.61 | 0.57 | 0.55 |
| Color (Pt-Co. scale) | 15 | 10 | --- | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 0.90 | 0.80 | --- | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 220 | 220 | --- | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 34 | 34 | --- | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 16 | 16 | --- | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 1.8 | 1.7 | --- | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 192 | 193 | --- | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 31 | 32 | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | 0.46 | 0.57 | --- | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 268 | 264 | --- | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | <10 | <10 | --- | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.40 | <0.40 | --- | --- | --- | --- | --- | --- | --- | --- |
| | 4-21-97 | | 5-20-97 | | | 6-24-97 | | | | |

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

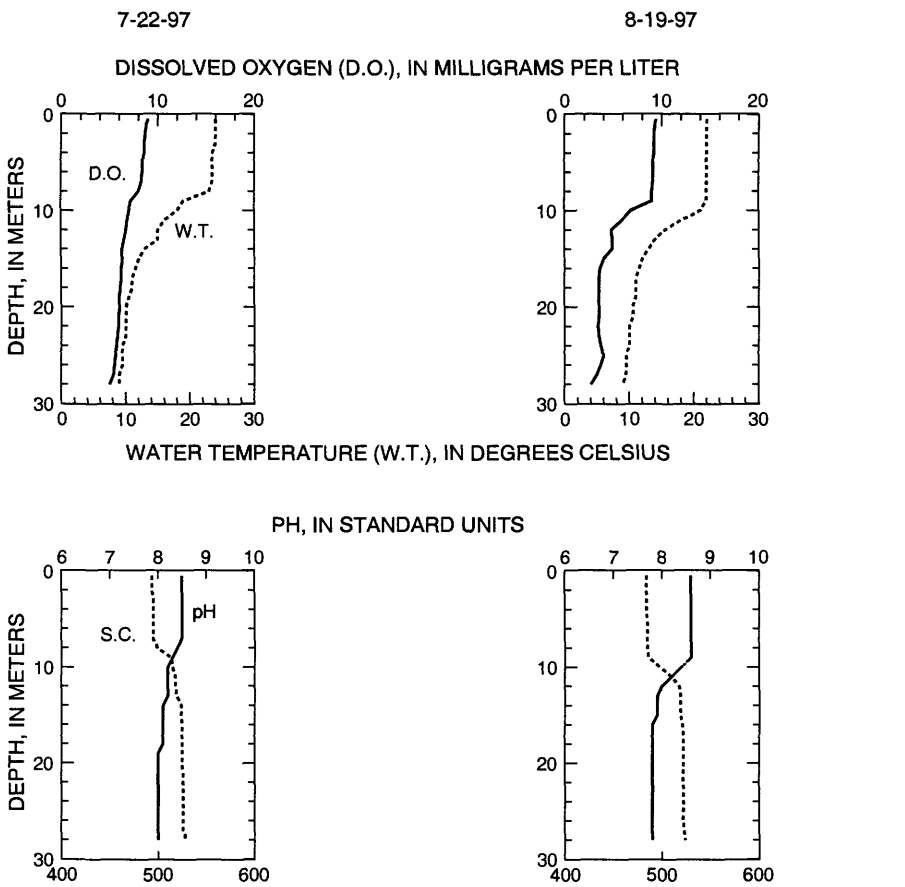
PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

WATER-QUALITY DATA, JULY 22 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | July 22 | | | | | Aug.19 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.54 | | | | | 2.46 | | |
| Secchi-depth (meters) | | | 2.4 | | | | | 3.2 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 4.8 | | | | | 5.9 | | |
| Depth of sample (m) | 0.5 | 7.0 | 20.0 | 24.0 | 27.0 | 0.5 | 9.0 | 17.0 | 23.0 | 28.0 |
| Water temperature (°C) | 24.0 | 23.5 | 10.0 | 9.5 | 9.0 | 22.0 | 22.0 | 11.0 | 10.0 | 9.0 |
| Specific Conductance (µS/cm) | 494 | 495 | 525 | 526 | 528 | 484 | 486 | 522 | 522 | 524 |
| pH (units) | 8.5 | 8.5 | 8.0 | 8.0 | 8.0 | 8.6 | 8.6 | 7.8 | 7.8 | 7.8 |
| Dissolved oxygen | 9.0 | 8.3 | 6.0 | 5.7 | 5.2 | 9.4 | 9.0 | 3.5 | 3.5 | 2.7 |
| Phosphorus, total (as P) | 0.018 | 0.013 | 0.009 | 0.011 | 0.014 | <0.005 | <0.005 | 0.006 | 0.008 | 0.010 |
| Phosphorus, ortho, dissolved (as P) | <0.002 | <0.002 | <0.002 | 0.002 | 0.009 | <0.002 | <0.002 | <0.002 | <0.002 | 0.096 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.043 | 0.065 | 0.096 | <0.010 | <0.010 | 0.109 | 0.195 | 0.253 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | 0.089 | 0.111 | 0.110 | <0.013 | <0.013 | <0.013 | <0.013 | 0.026 |
| Nitrogen, amm. + org., total (as N) | 0.50 | 0.34 | 0.48 | 0.50 | 0.56 | 0.30 | 0.30 | 0.40 | 0.50 | 0.40 |
| Nitrogen, total (as N) | 0.50 | 0.34 | 0.48 | 0.56 | 0.66 | 0.30 | 0.30 | 0.51 | 0.70 | 0.65 |

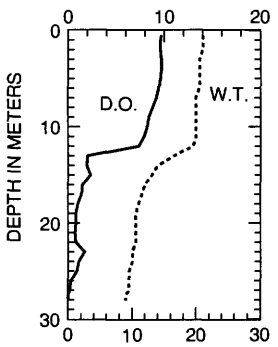


WATER-QUALITY DATA, SEPTEMBER 15, 1997
(Milligrams per liter unless otherwise indicated)

| | Sept. 15 | | | | |
|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.28 | | |
| Secchi-depth (meters) | | | 2.7 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 3.5 | | |
| Depth of sample (m) | 0.5 | 12.0 | 18.0 | 24.0 | 27.0 |
| Water temperature (°C) | 21.0 | 19.5 | 11.0 | 10.0 | 9.0 |
| Specific Conductance (µS/cm) | 485 | 494 | 526 | 525 | 526 |
| pH (units) | 8.5 | 8.3 | 7.6 | 7.6 | 7.5 |
| Dissolved oxygen | 9.7 | 7.4 | 1.0 | 1.1 | 0.0 |
| Phosphorus, total (as P) | <0.005 | <0.005 | <0.005 | <0.005 | 0.011 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | 0.002 | 0.002 | 0.003 | 0.012 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.093 | 0.222 | 0.106 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.40 | 0.40 | 0.30 | 0.50 |
| Nitrogen, total (as N) | 0.40 | 0.40 | 0.49 | 0.52 | 0.61 |

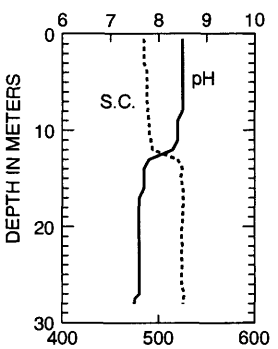
9-15-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

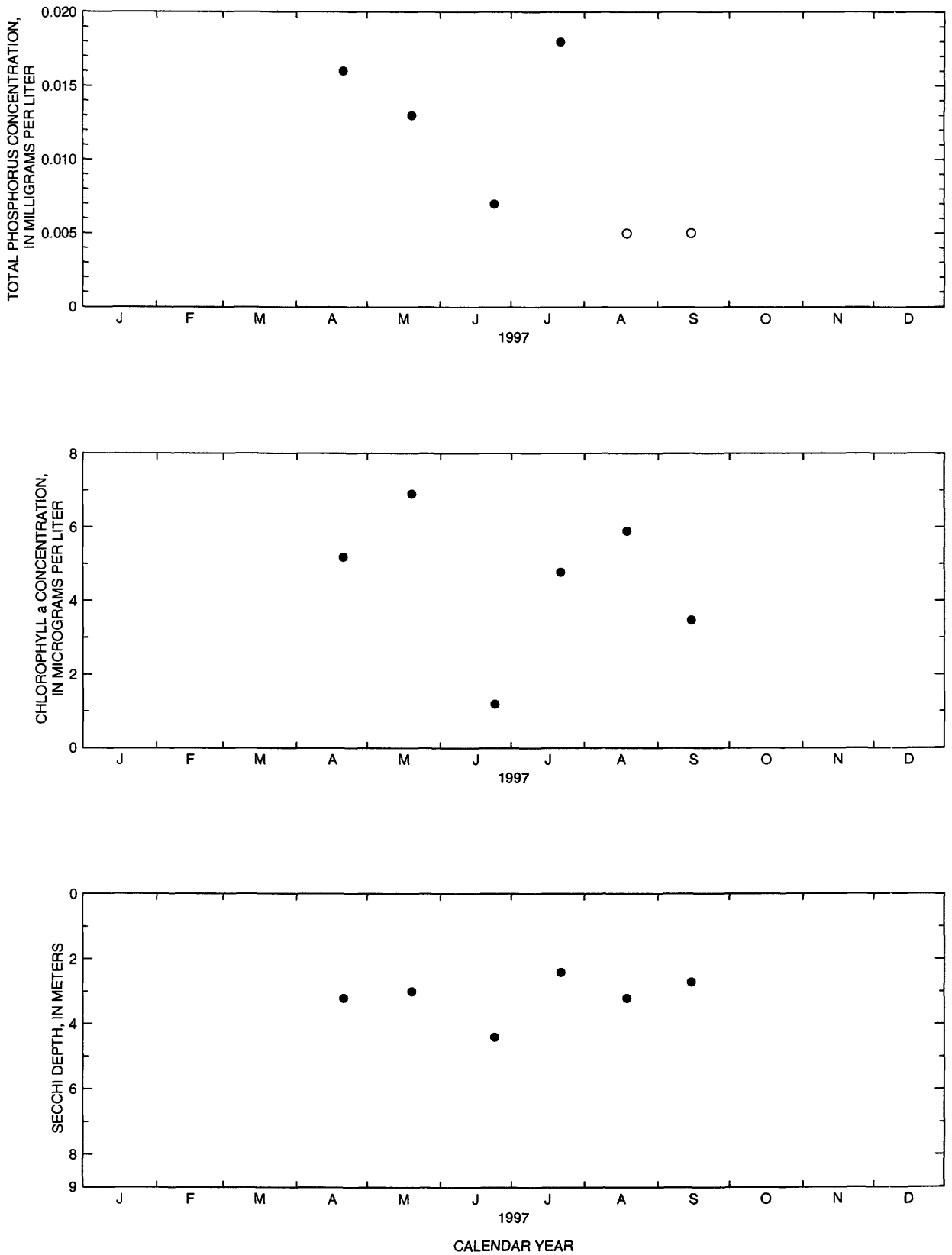



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Geneva Lake at center near Lake Geneva, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 423421088272300 GENEVA LAKE AT EAST END NEAR LAKE GENEVA, WI

LOCATION.--Lat 42°34'21", long 88°27'23", in NE 1/4 SW 1/4, sec.2, T.1 N., R.17 E., Walworth County, Hydrologic Unit 07120006, 1.6 mi southwest of outlet at Lake Geneva.

DRAINAGE AREA.--28.7 $mi^2$.

PERIOD OF RECORD.--April to September 1997.

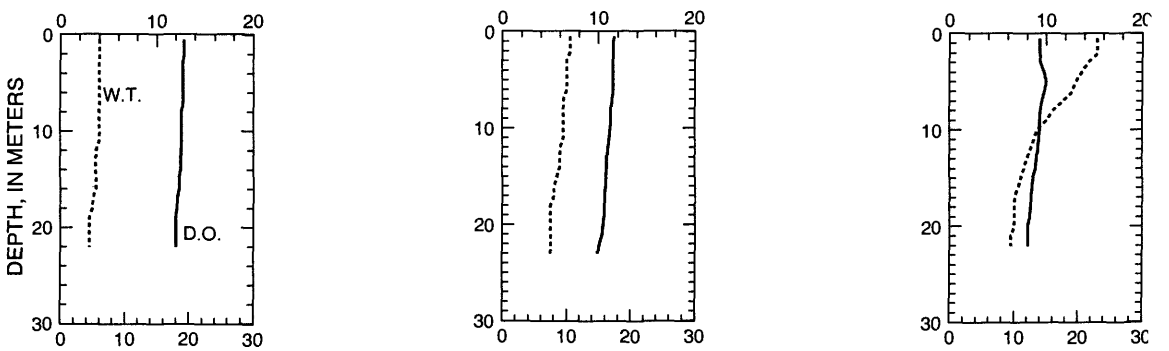
REMARKS.--Lake sampled at a depth of about 23 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, APRIL 21 TO JUNE 24, 1997
(Milligrams per liter unless otherwise indicated)

| | Apr.21 | | May 20 | | | June 24 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 2.53 | | | --- | | | | |
| Secchi-depth (meters) | 2.5 | | 2.9 | | | 4.0 | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 5.2 | | 7.0 | | | 1.2 | | | | |
| Depth of sample (m) | 0.5 | 27.0 | 0.5 | 12.0 | 22.0 | 0.5 | 3.0 | 10.0 | 18.0 | 21.0 |
| Water temperature (°C) | 6.0 | 4.5 | 10.5 | 9.0 | 7.5 | 23.0 | 21.5 | 13.5 | 10.0 | 9.5 |
| Specific Conductance (µS/cm) | 502 | 511 | 509 | 510 | 513 | 500 | 505 | 513 | 518 | 518 |
| pH (units) | 8.5 | 8.4 | 8.5 | 8.4 | 8.3 | 8.4 | 8.4 | 8.3 | 8.1 | 8.1 |
| Dissolved oxygen | 12.8 | 12.0 | 11.6 | 11.0 | 10.1 | 9.3 | 9.4 | 9.3 | 8.4 | 8.1 |
| Phosphorus, total (as P) | 0.017 | 0.015 | 0.023 | 0.010 | 0.014 | <0.005 | <0.005 | 0.015 | <0.005 | 0.010 |
| Phosphorus, ortho, dissolved (as P) | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.031 | 0.065 | 0.022 | 0.039 | 0.067 | 0.010 | <0.010 | 0.010 | <0.010 | 0.022 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 | 0.023 | <0.013 | <0.013 | 0.030 | 0.020 | 0.035 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.50 | 0.40 | 0.30 | 0.40 | 0.48 | 0.51 | 0.63 | 0.57 | 0.51 |
| Nitrogen, total (as N) | 0.43 | 0.56 | 0.42 | 0.34 | 0.47 | 0.49 | 0.51 | 0.64 | 0.57 | 0.53 |
| Color (Pt-Co. scale) | 15 | 10 | --- | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 0.90 | 0.90 | --- | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 220 | 220 | --- | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 34 | 34 | --- | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 32 | 33 | --- | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 16 | 16 | --- | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 1.8 | 1.8 | --- | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 189 | 192 | --- | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 31 | 31 | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 32 | 33 | --- | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | 0.27 | 0.55 | --- | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 268 | 280 | --- | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | <10 | <10 | --- | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.40 | <0.40 | --- | --- | --- | --- | --- | --- | --- | --- |

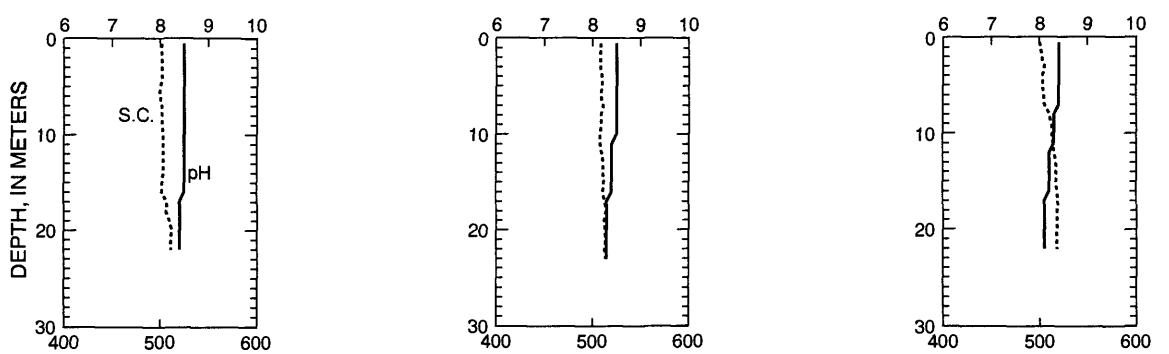
4-21-97 5-20-97 6-24-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS

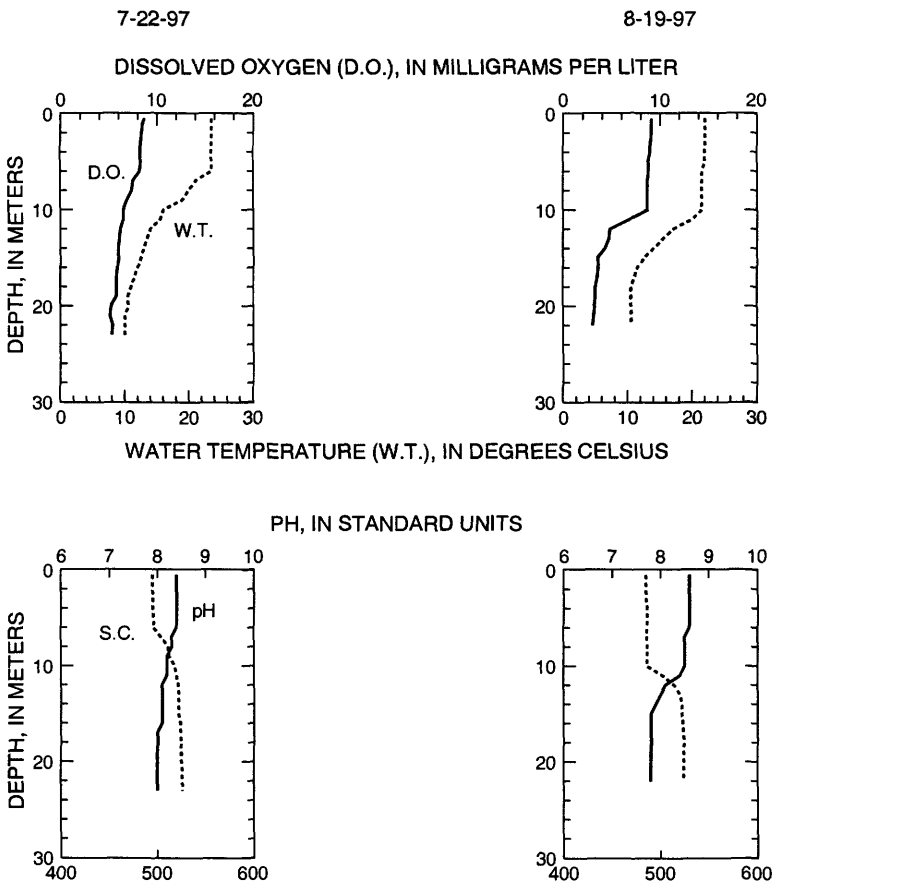



SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

## 423421088272300 GENEVA LAKE AT EAST END NEAR LAKE GENEVA, WI

WATER-QUALITY DATA, JULY 22 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | July 22 | | | | | Aug. 19 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.54 | | | | | 2.46 | | |
| Secchi-depth (meters) | | | 3.0 | | | | | 3.4 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 5.3 | | | | | 4.0 | | |
| Depth of sample (m) | 0.5 | 6.0 | 15.0 | 19.0 | 22.0 | 0.5 | 10.0 | 16.0 | 19.0 | 22.0 |
| Water temperature (°C) | 23.5 | 23.5 | 12.5 | 10.5 | 10.0 | 22.0 | 21.5 | 11.5 | 10.5 | 10.5 |
| Specific Conductance (µS/cm) | 495 | 496 | 522 | 525 | 526 | 485 | 486 | 523 | 524 | 524 |
| pH (units) | 8.4 | 8.4 | 8.1 | 8.0 | 8.0 | 8.6 | 8.5 | 7.8 | 7.8 | 7.8 |
| Dissolved oxygen | 8.7 | 8.2 | 6.0 | 5.8 | 5.4 | 9.1 | 8.7 | 3.6 | 3.3 | 3.0 |
| Phosphorus, total (as P) | 0.017 | 0.010 | 0.009 | 0.010 | 0.013 | <0.005 | 0.013 | 0.013 | 0.008 | 0.009 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | <0.002 | <0.002 | <0.002 | 0.003 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.023 | 0.041 | 0.052 | <0.010 | <0.010 | 0.078 | 0.097 | 0.161 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | 0.040 | 0.085 | 0.107 | <0.013 | <0.013 | <0.013 | <0.013 | 0.033 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.48 | 0.42 | 0.44 | 0.46 | 0.40 | 0.30 | 0.40 | 0.30 | 0.40 |
| Nitrogen, total (as N) | 0.40 | 0.48 | 0.44 | 0.48 | 0.51 | 0.40 | 0.30 | 0.48 | 0.40 | 0.56 |



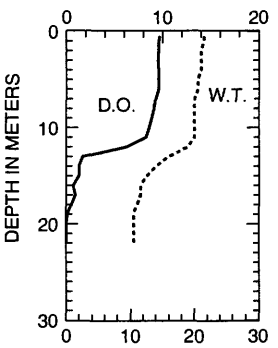
## 423421088272300 GENEVA LAKE AT EAST END NEAR LAKE GENEVA, WI

WATER-QUALITY DATA, SEPTEMBER 15, 1997
(Milligrams per liter unless otherwise indicated)

| | Sept.15 | | | | |
|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.28 | | |
| Secchi-depth (meters) | | | 3.4 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 2.7 | | |
| Depth of sample (m) | 0.5 | 11.0 | 15.0 | 19.0 | 21.0 |
| Water temperature (°C) | 21.5 | 20.5 | 12.5 | 10.5 | 10.5 |
| Specific Conductance (µS/cm) | 485 | 490 | 525 | 525 | 526 |
| pH (units) | 8.5 | 8.4 | 7.6 | 7.5 | 7.5 |
| Dissolved oxygen | 9.7 | 8.3 | 1.3 | 0.1 | 0.0 |
| Phosphorus, total (as P) | <0.005 | <0.005 | <0.005 | <0.005 | 0.009 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | 0.002 | <0.002 | <0.002 | 0.006 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.044 | 0.077 | <0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 | 0.078 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.40 | 0.50 | 0.40 | 0.50 |
| Nitrogen, total (as N) | 0.40 | 0.40 | 0.54 | 0.48 | 0.50 |

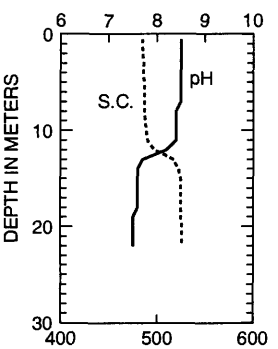
9-15-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

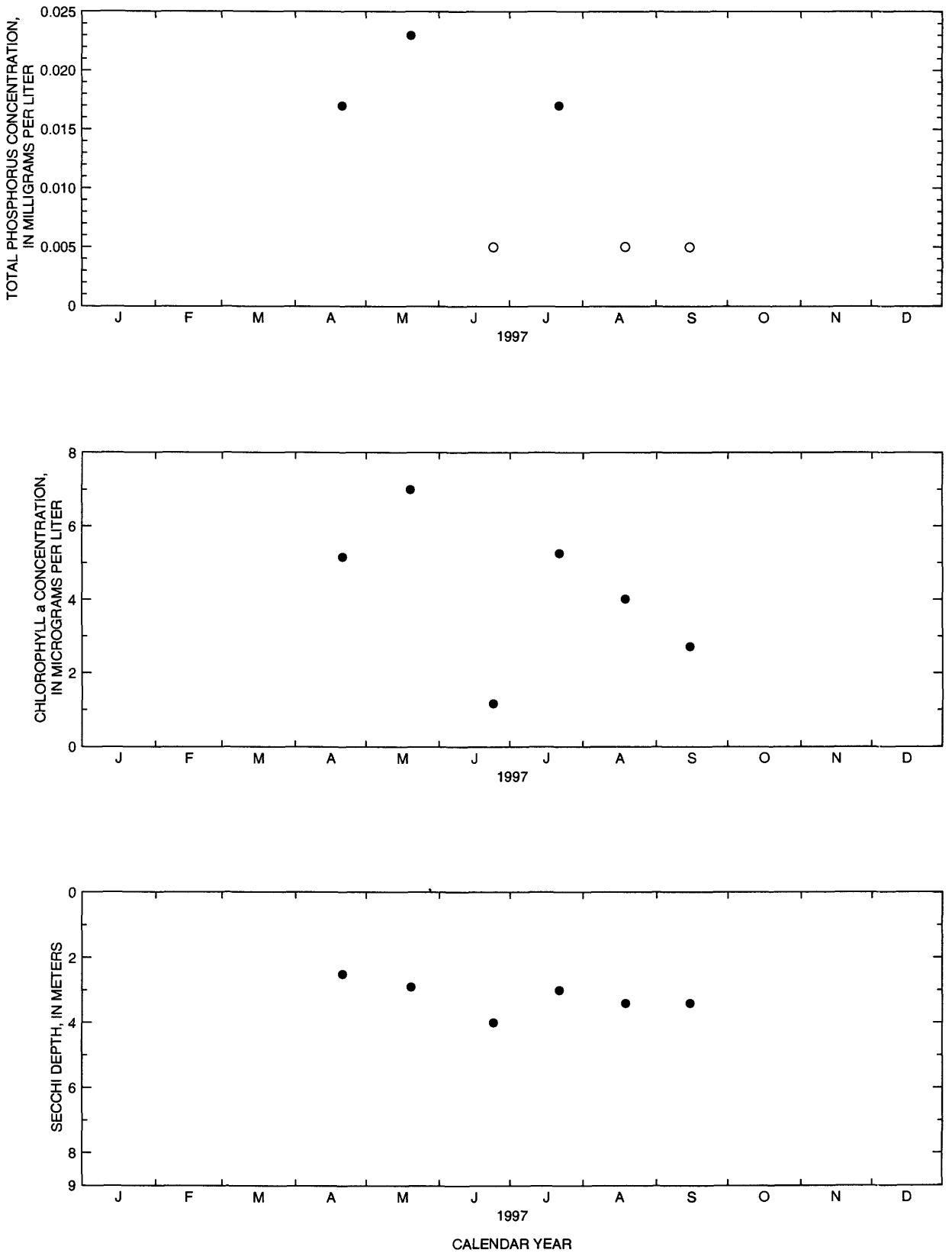



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Geneva Lake at east end near Lake Geneva, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 423420088320500 GENEVA LAKE AT WILLIAMS BAY AT WILLIAMS BAY, WI

LOCATION.--Lat 42°34'20", long 88°32'05", in NE 1/4 SW 1/4, sec.6, T.1 N., R.17 E., Walworth County, Hydrologic Unit 07120006, at Williams Bay.

DRAINAGE AREA.--28.7 $mi^2$.

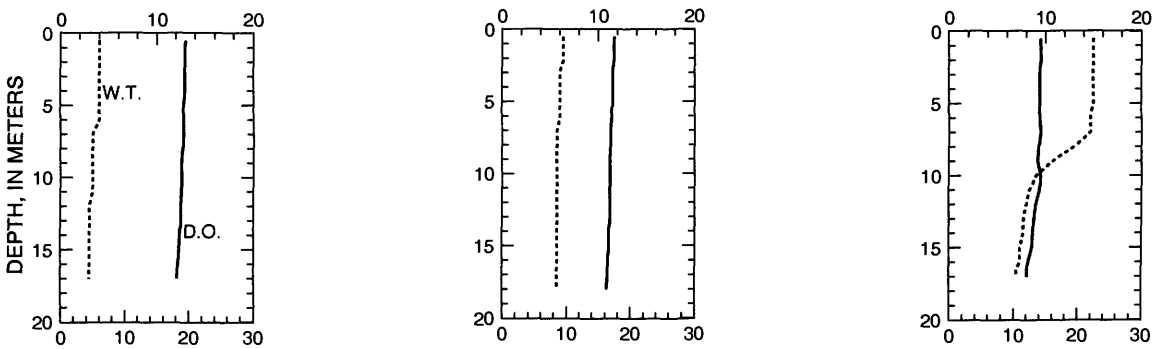
PERIOD OF RECORD.--April to September 1997.

REMARKS.--Lake sampled at a depth of about 18 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, APRIL 21 TO JUNE 24, 1997
(Milligrams per liter unless otherwise indicated)

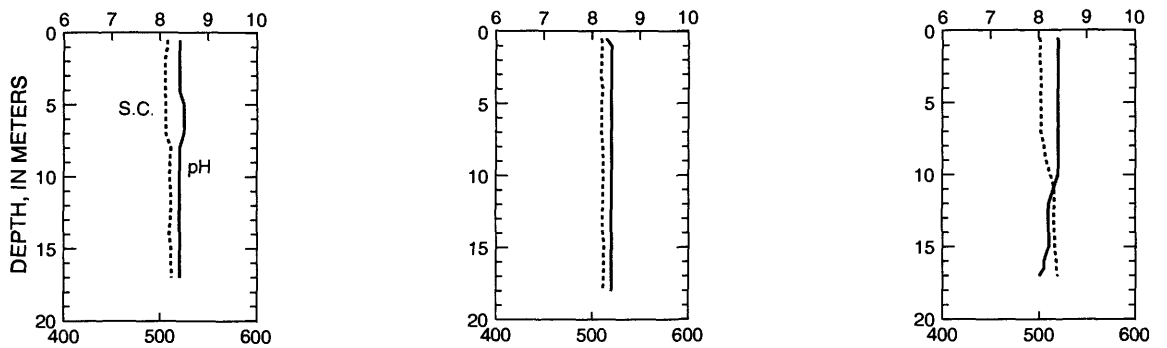
| | Apr. 21 | | May 20 | | | June 24 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 2.53 | | | --- | | | |
| Secchi-depth (meters) | 2.9 | | 3.3 | | | 3.7 | | | |
| Chlorophyll a, phytoplankton (µg/L) | 4.6 | | 5.7 | | | 1.2 | | | |
| Depth of sample (m) | 0.5 | 17.0 | 0.5 | 12.0 | 27.0 | 0.5 | 7.0 | 12.0 | 16.0 |
| Water temperature (°C) | 6.0 | 4.5 | 9.5 | 8.5 | 8.5 | 22.5 | 22.0 | 12.0 | 10.5 |
| Specific Conductance (µS/cm) | 507 | 512 | 510 | 511 | 512 | 501 | 502 | 516 | 518 |
| pH (units) | 8.4 | 8.4 | 8.3 | 8.4 | 8.4 | 8.4 | 8.4 | 8.2 | 8.1 |
| Dissolved oxygen | 13.0 | 12.1 | 11.7 | 11.2 | 11.0 | 9.5 | 9.5 | 9.0 | 8.1 |
| Phosphorus, total (as P) | 0.015 | 0.012 | 0.014 | 0.015 | 0.029 | 0.008 | 0.007 | 0.011 | 0.010 |
| Phosphorus, ortho, dissolved (as P) | 0.003 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.058 | 0.064 | 0.040 | 0.056 | 0.060 | <0.010 | <0.010 | 0.010 | 0.018 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | 0.014 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | 0.025 | 0.031 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.40 | 0.40 | 0.40 | 0.60 | 1.0 | 0.45 | 0.46 | 0.51 |
| Nitrogen, total (as N) | 0.46 | 0.46 | 0.44 | 0.46 | 0.66 | 1.0 | 0.45 | 0.47 | 0.53 |
| Color (Pt-Co. scale) | 10 | 15 | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 0.90 | 0.90 | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 220 | 220 | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 34 | 34 | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 16 | 16 | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 1.8 | 1.8 | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 191 | 192 | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 30 | 31 | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | 0.40 | 0.57 | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 270 | 274 | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | 80 | <10 | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.40 | <0.40 | --- | --- | --- | --- | --- | --- | --- |
| | 4-21-97 | | 5-20-97 | | | 6-24-97 | | | |

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

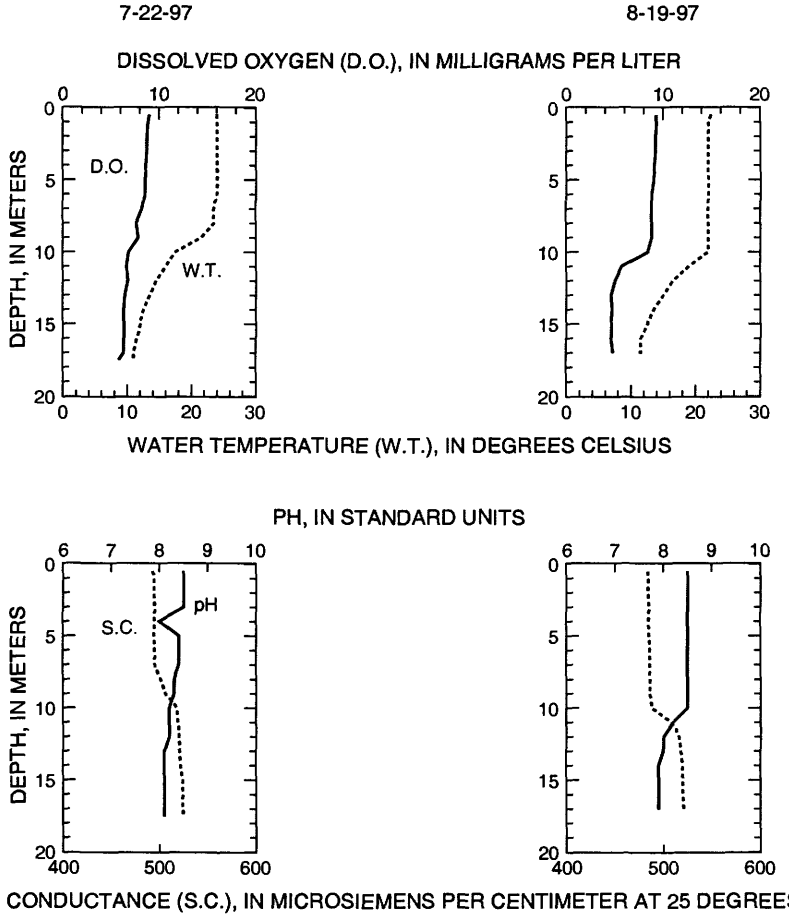
PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

WATER-QUALITY DATA, JULY 22 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | July 22 | | | | | Aug. 19 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.54 | | | | | 2.46 | | |
| Secchi-depth (meters) | | | 3.7 | | | | | 2.9 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 4.7 | | | | | 4.9 | | |
| Depth of sample (m) | 0.5 | 7.0 | 12.0 | 15.0 | 17.0 | 0.5 | 10.0 | 13.0 | 15.0 | 17.0 |
| Water temperature (°C) | 24.0 | 23.5 | 14.5 | 12.0 | 11.0 | 22.5 | 22.0 | 15.0 | 12.5 | 11.5 |
| Specific Conductance (µS/cm) | 493 | 495 | 520 | 524 | 525 | 484 | 488 | 518 | 520 | 521 |
| pH (units) | 8.5 | 8.4 | 8.2 | 8.1 | 8.1 | 8.5 | 8.5 | 8.0 | 7.9 | 7.9 |
| Dissolved oxygen | 9.0 | 8.2 | 6.7 | 6.3 | 5.8 | 9.3 | 8.4 | 4.6 | 4.6 | 4.8 |
| Phosphorus, total (as P) | 0.013 | 0.015 | 0.009 | 0.010 | 0.011 | 0.014 | 0.014 | 0.011 | 0.010 | 0.009 |
| Phosphorus, ortho, dissolved (as P) | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.017 | 0.024 | 0.034 | <0.010 | <0.010 | 0.013 | 0.014 | 0.031 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | 0.039 | 0.078 | <0.013 | <0.013 | <0.013 | <0.013 | 0.017 |
| Nitrogen, amm. + org., total (as N) | 0.30 | 0.40 | 0.38 | 0.33 | 0.39 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Nitrogen, total (as N) | 0.30 | 0.40 | 0.40 | 0.35 | 0.42 | 0.40 | 0.40 | 0.41 | 0.41 | 0.43 |

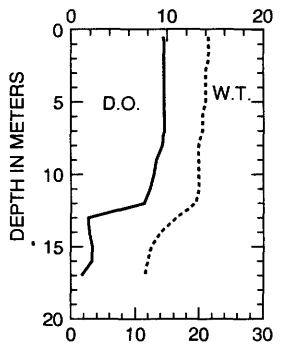


WATER-QUALITY DATA, SEPTEMBER 15, 1997
(Milligrams per liter unless otherwise indicated)

| | Sept. 15 | | | | |
|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.28 | | |
| Secchi-depth (meters) | | | 2.7 | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 2.9 | | |
| Depth of sample (m) | 0.5 | 12.0 | 14.0 | 16.0 | 17.0 |
| Water temperature (°C) | 21.5 | 19.5 | 14.0 | 12.0 | 11.5 |
| Specific Conductance (µS/cm) | 486 | 492 | 524 | 525 | 525 |
| pH (units) | 8.4 | 8.3 | 7.7 | 7.6 | 7.6 |
| Dissolved oxygen | 9.6 | 7.6 | 1.9 | 2.2 | 1.1 |
| Phosphorus, total (as P) | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| Phosphorus, ortho, dissolved (as P) | <0.002 | 0.002 | <0.002 | 0.002 | 0.002 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | <0.010 | 0.037 | <0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Nitrogen, total (as N) | 0.40 | 0.40 | 0.40 | 0.44 | 0.40 |

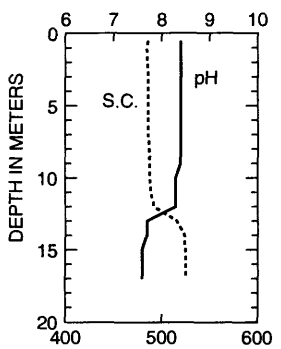
9-15-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

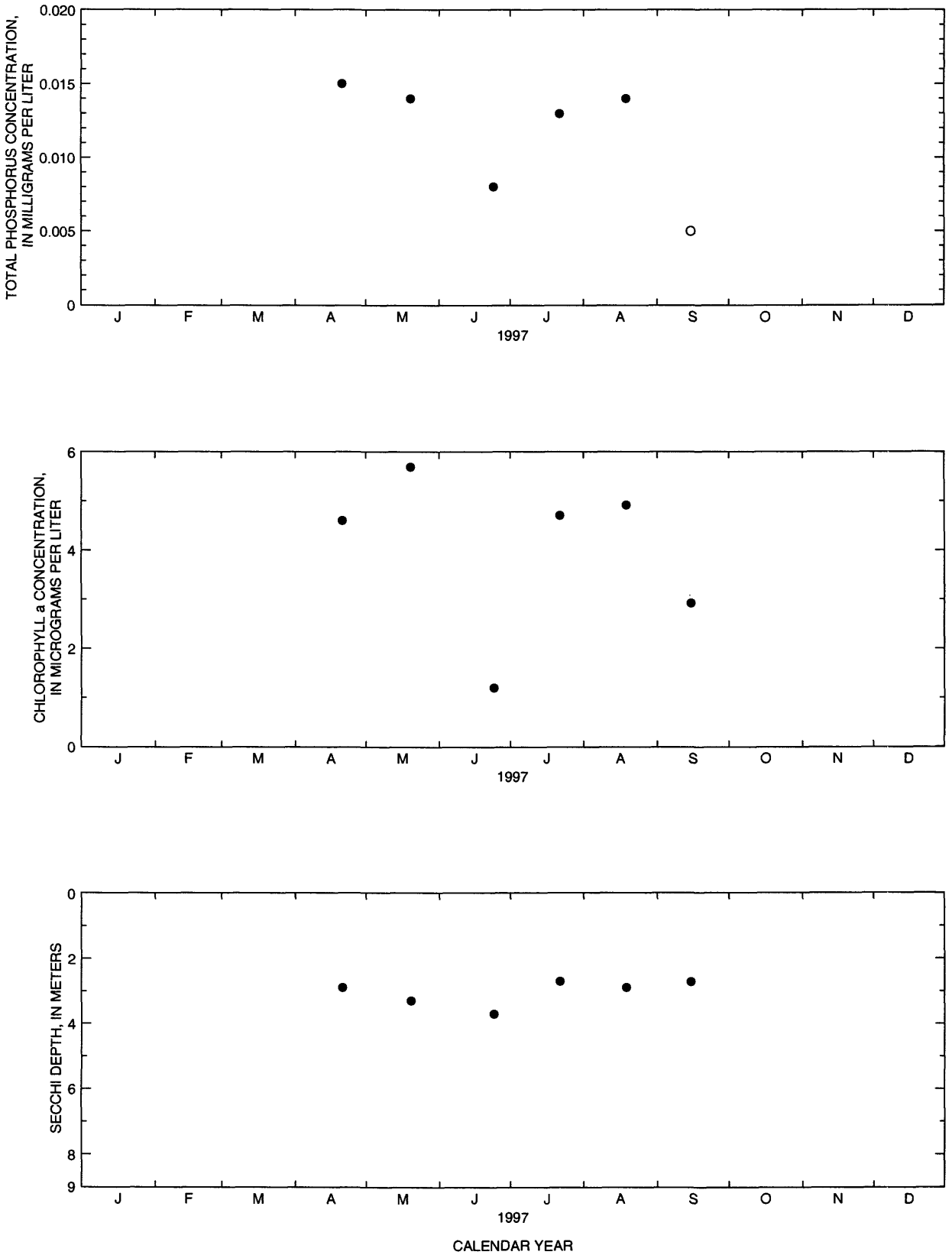



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Geneva Lake at Williams Bay at Williams Bay, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 423329088323300 GENEVA LAKE AT WEST END NEAR WILLIAMS BAY, WI

LOCATION.--Lat 42°33'29", long 88°32'33", in NE 1/4 SE 1/4, sec.12, T.1 N., R.16 E., Walworth County, Hydrologic Unit 07120006, 1.3 mi south of Williams Bay.

DRAINAGE AREA.--28.7 $mi^2$.

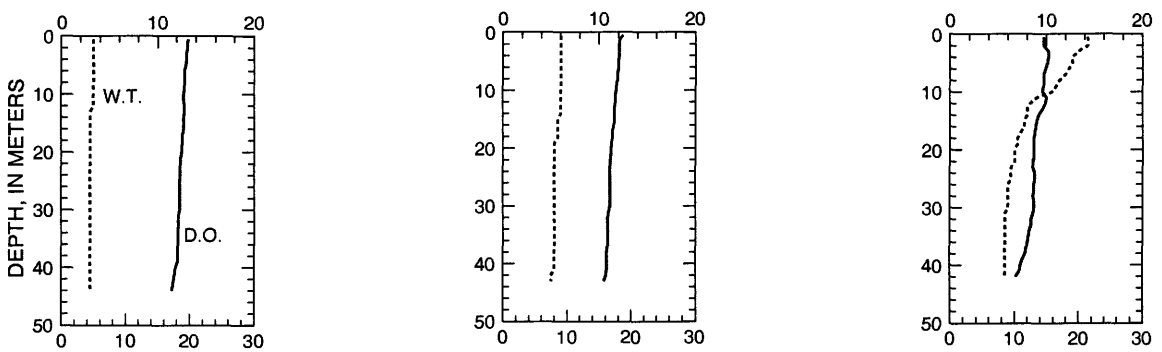
PERIOD OF RECORD.--April to September 1997.

REMARKS.--Lake sampled at deep hole at a depth of about 43 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Samples for determination of chlorophyll-a concentration are collected from the top 1.5 ft of the lake.

WATER-QUALITY DATA, APRIL 21 TO JUNE 24, 1997
(Milligrams per liter unless otherwise indicated)

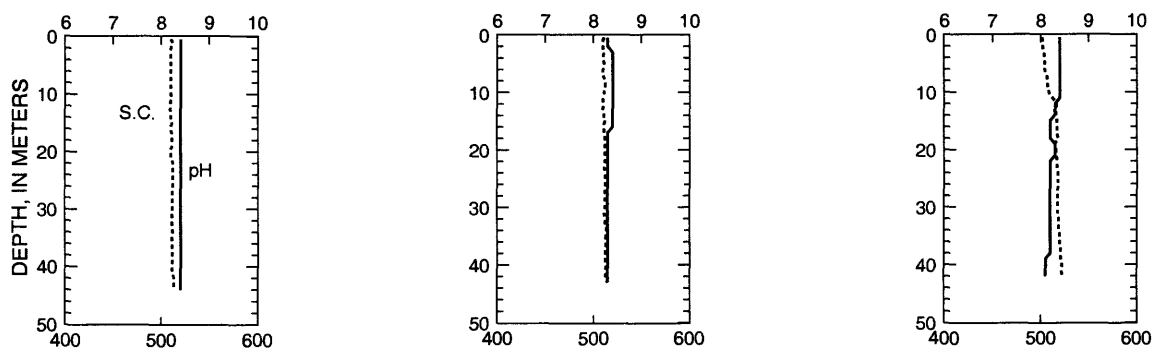
| | Apr. 21 | | May 20 | | | June 24 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 2.53 | | | --- | | | | | |
| Secchi-depth (meters) | 3.0 | | 3.5 | | | 4.3 | | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 5.3 | | 6.2 | | | 1.0 | | | | | |
| Depth of sample (m) | 0.5 | 43.0 | 0.5 | 12.0 | 43.0 | 0.5 | 10.0 | 25.0 | 33.0 | 38.0 | 41.0 |
| Water temperature (°C) | 5.0 | 4.5 | 9.0 | 9.0 | 7.5 | 21.5 | 16.0 | 9.5 | 8.5 | 8.5 | 8.5 |
| Specific Conductance (µS/cm) | 510 | 513 | 511 | 510 | 515 | 502 | 508 | 518 | 519 | 521 | 522 |
| pH (units) | 8.4 | 8.4 | 8.3 | 8.4 | 8.3 | 8.4 | 8.4 | 8.2 | 8.2 | 8.2 | 8.1 |
| Dissolved oxygen | 13.2 | 11.6 | 12.5 | 11.7 | 10.5 | 9.7 | 9.6 | 8.8 | 8.4 | 7.8 | 7.0 |
| Phosphorus, total (as P) | 0.016 | 0.020 | 0.016 | 0.005 | 0.023 | 0.005 | 0.011 | <0.005 | <0.005 | 0.008 | 0.024 |
| Phosphorus, ortho, dissolved (as P) | 0.003 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | 0.007 | 0.008 | 0.013 |
| Nitrogen, NO2 + NO3, diss. (as N) | 0.053 | 0.066 | 0.049 | 0.052 | 0.065 | 0.01 | <0.010 | 0.042 | 0.054 | 0.055 | 0.052 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | 0.035 | <0.013 | <0.013 | 0.019 | <0.013 | 0.018 | 0.072 | 0.100 | 0.154 | 0.188 |
| Nitrogen, amm. + org., total (as N) | 0.60 | 0.50 | 0.40 | 0.40 | 0.70 | 0.47 | 0.56 | 0.45 | 0.60 | 0.61 | 0.78 |
| Nitrogen, total (as N) | 0.65 | 0.57 | 0.45 | 0.45 | 0.76 | 0.49 | 0.56 | 0.49 | 0.65 | 0.67 | 0.83 |
| Color (Pt-Co. scale) | 10 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | 0.70 | 0.80 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | 220 | 220 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | 34 | 34 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | 16 | 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | 1.7 | 1.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | 192 | 193 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | 31 | 32 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | 33 | 33 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | 0.48 | 0.86 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | 268 | 270 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | <10 | <10 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | <0.40 | 3.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 4-21-97 | | 5-20-97 | | | 6-24-97 | | | | | |

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

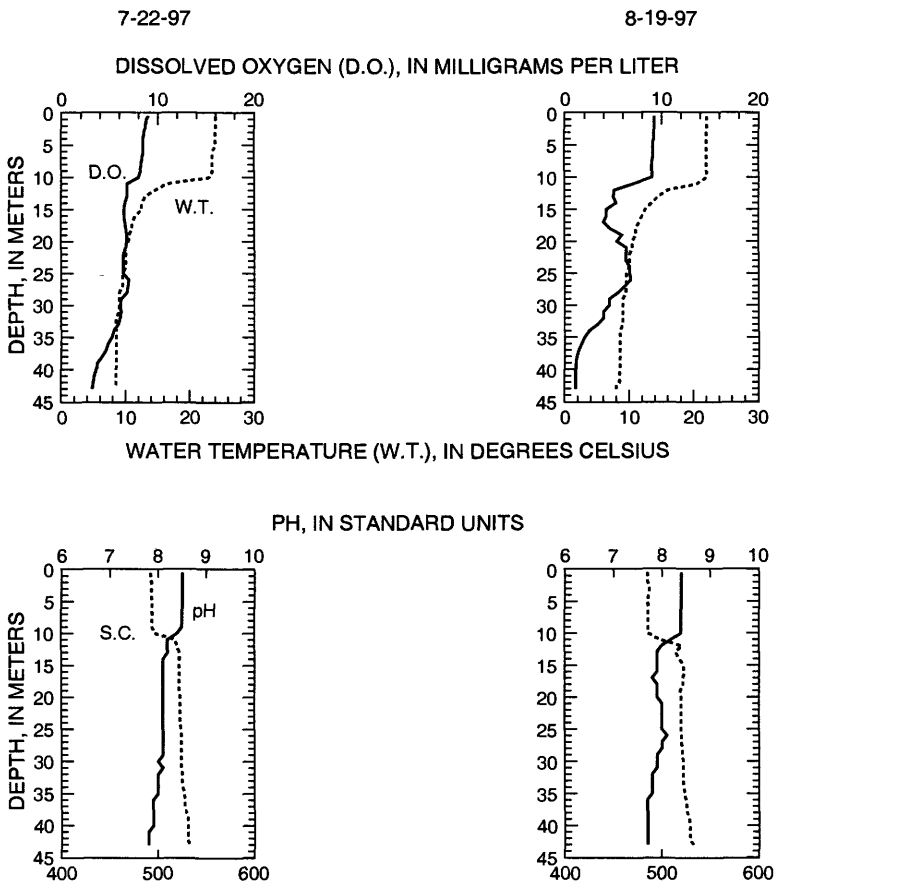
PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

WATER-QUALITY DATA, JULY 22 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | July 22 | | | | | | Aug. 19 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 2.54 | | | | | | 2.46 | | | | | |
| Secchi-depth (meters) | 2.7 | | | | | | 3.0 | | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 4.8 | | | | | | 5.6 | | | | | |
| Depth of sample (m) | 0.5 | 10.0 | 22.0 | 33.0 | 38.0 | 42.0 | 0.5 | 10.0 | 20.0 | 26.0 | 38.0 | 42.0 |
| Water temperature (°C) | 24.0 | 23.0 | 10.0 | 8.5 | 8.5 | 8.5 | 22.0 | 22.0 | 10.5 | 9.5 | 8.5 | 8.0 |
| Specific Conductance (µS/cm) | 492 | 497 | 523 | 525 | 529 | 531 | 485 | 486 | 520 | 520 | 526 | 530 |
| pH (units) | 8.5 | 8.4 | 8.1 | 8.0 | 7.9 | 7.8 | 8.4 | 8.4 | 7.9 | 8.1 | 7.7 | 7.7 |
| Dissolved oxygen | 9.0 | 8.0 | 6.4 | 5.9 | 4.2 | 3.3 | 9.2 | 9.0 | 5.4 | 6.8 | 1.2 | 1.1 |
| Phosphorus, total (as P) | 0.012 | 0.014 | 0.013 | 0.025 | 0.051 | 0.078 | <0.005 | 0.009 | <0.005 | <0.005 | 0.046 | 0.118 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | <0.002 | <0.002 | 0.010 | 0.032 | 0.055 | <0.002 | <0.002 | <0.002 | <0.002 | 0.044 | 0.108 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.040 | 0.157 | 0.177 | 0.135 | <0.010 | <0.010 | 0.056 | 0.096 | 0.351 | <0.010 |
| Nitrogen, ammonia, dissolved (as N | <0.013 | <0.013 | 0.067 | 0.088 | 0.151 | 0.244 | <0.013 | <0.013 | 0.013 | 0.045 | 0.094 | 0.426 |
| Nitrogen, amm. + org., total (as N) | 0.40 | 0.50 | 0.40 | 0.50 | 0.50 | 0.68 | 0.80 | <0.21 | 0.40 | 0.40 | 0.40 | 1.0 |
| Nitrogen, total (as N) | 0.40 | 0.50 | 0.48 | 0.66 | 0.68 | 0.82 | 0.80 | <0.22 | 0.46 | 0.50 | 0.75 | 1.0 |

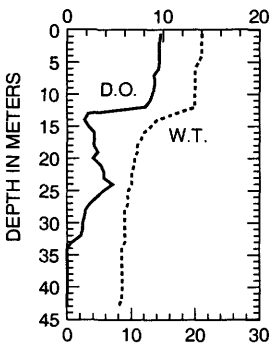


WATER-QUALITY DATA, SEPTEMBER 15, 1997
(Milligrams per liter unless otherwise indicated)

| | Sept. 15 | | | | | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | | | 2.28 | | | |
| Secchi-depth (meters) | | | 3.4 | | | |
| Chlorophyll a, phytoplankton (µg/L) | | | 4.6 | | | |
| Depth of sample (m) | 0.5 | 12.0 | 24.0 | 33.0 | 37.0 | 42.0 |
| Water temperature (°C) | 21.0 | 20.0 | 10.0 | 9.0 | 8.5 | 8.5 |
| Specific Conductance (µS/cm) | 485 | 490 | 521 | 526 | 530 | 533 |
| pH (units) | 8.4 | 8.3 | 7.8 | 7.7 | 7.6 | 7.6 |
| Dissolved oxygen | 9.7 | 8.1 | 5.0 | 0.5 | 0.0 | 0.0 |
| Phosphorus, total (as P) | 0.006 | <0.005 | <0.005 | 0.007 | 0.046 | 0.090 |
| Phosphorus, ortho, dissolved (as P) | 0.002 | 0.002 | 0.002 | 0.003 | 0.046 | 0.092 |
| Nitrogen, NO2 + NO3, diss. (as N) | <0.010 | <0.010 | 0.152 | 0.275 | <0.010 | <0.010 |
| Nitrogen, ammonia, dissolved (as N) | <0.013 | <0.013 | <0.013 | <0.013 | 0.192 | 0.376 |
| Nitrogen, amm. + org., total (as N) | 0.50 | 0.30 | 0.40 | 0.40 | 0.60 | 0.90 |
| Nitrogen, total (as N) | 0.50 | 0.30 | 0.55 | 0.68 | 0.60 | 0.90 |

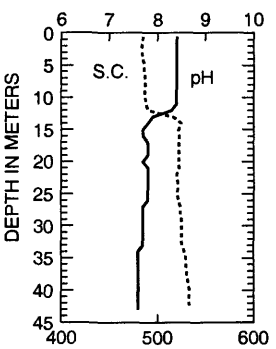
9-15-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

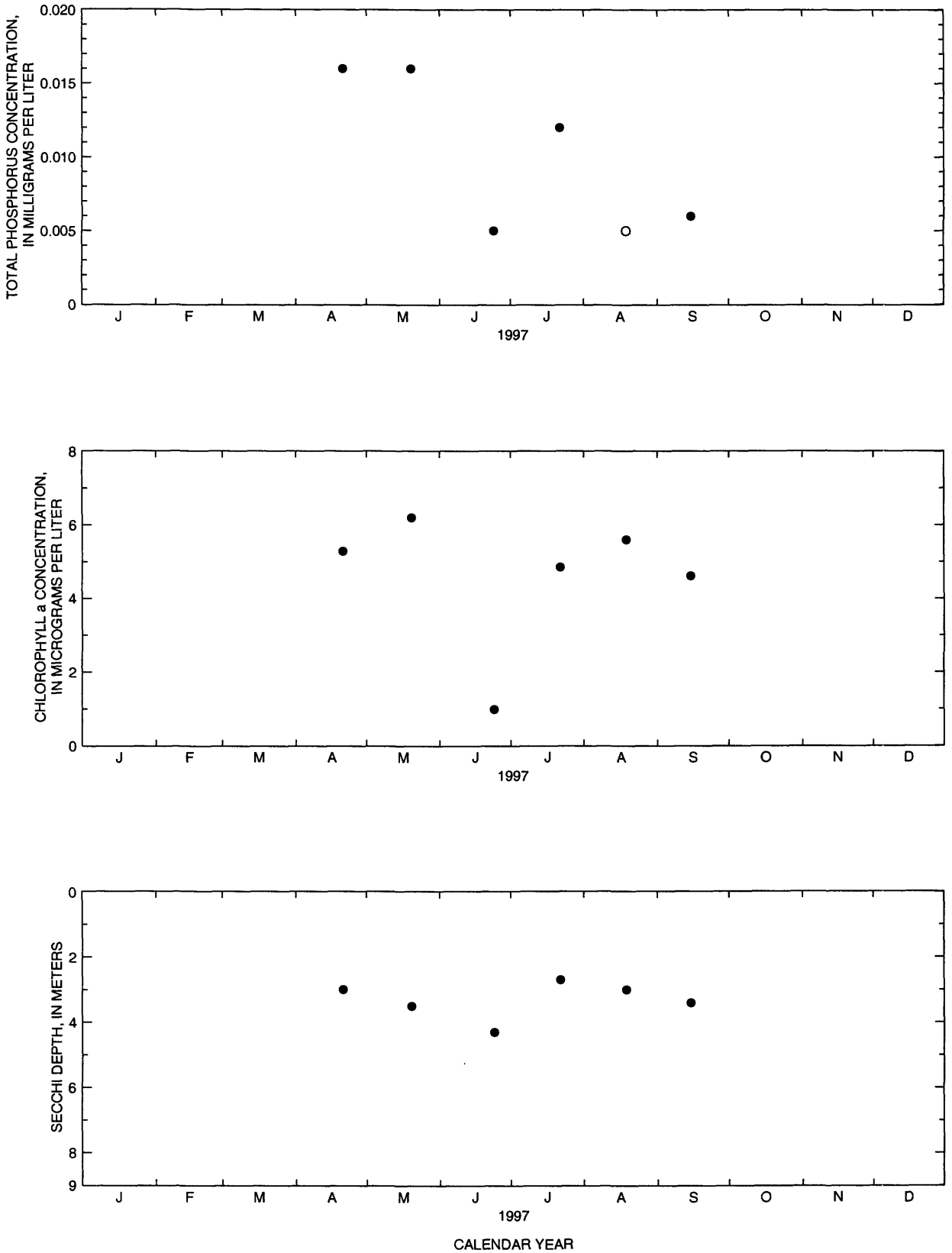



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Geneva Lake at west end near Williams Bay, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 434918088553601 GREEN LAKE AT COUNTY TRUNK HIGHWAY A NEAR GREEN LAKE, WI

LOCATION.--Lat 43°49'18", long 88°55'36" in NE 1/4 SE 1/4 SE 1/4 sec.27, T.16 N., R.13 E., Green Lake County, Hydrologic Unit 04030201, on left bank at downstream side of County Trunk Highway A, 2.3 mi southeast of Green Lake.

DRAINAGE AREA.--103 $mi^2$.

PERIOD OF RECORD.--October 1993 to current year.

GAGE.--Water-stage recorder. Datum of gage is 790.00 ft above sea level.

REMARKS.--No estimated daily gage heights. Records good except for October to February, which are fair. Lake level regulated by dam at outlet at Green Lake. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded gage height, 7.03 ft, June 20, 1996; minimum recorded, 5.41 ft, Jan. 17, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 6.77 ft, Mar. 14; minimum recorded, 5.82 ft, Oct. 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.96 | 6.04 | 6.09 | 6.19 | 6.34 | 6.54 | 6.64 | 6.60 | 6.54 | 6.60 | 6.43 | 6.41 |
| 2 | 5.95 | 6.01 | 6.07 | 6.20 | 6.34 | 6.56 | 6.63 | 6.61 | 6.53 | 6.61 | 6.40 | 6.39 |
| 3 | 5.92 | 6.00 | 6.07 | 6.20 | 6.34 | 6.56 | 6.62 | 6.64 | 6.52 | 6.57 | 6.40 | 6.36 |
| 4 | 5.89 | 6.00 | 6.05 | 6.24 | 6.37 | 6.58 | 6.61 | 6.64 | 6.53 | 6.49 | 6.45 | 6.35 |
| 5 | 5.88 | 6.00 | 6.07 | 6.28 | 6.40 | 6.58 | 6.61 | 6.66 | 6.52 | 6.48 | 6.45 | 6.34 |
| 6 | 5.89 | 6.02 | 6.09 | 6.28 | 6.38 | 6.58 | 6.66 | 6.64 | 6.54 | 6.46 | 6.44 | 6.32 |
| 7 | 5.89 | 6.04 | 6.11 | 6.28 | 6.38 | 6.58 | 6.65 | 6.61 | 6.54 | 6.43 | 6.41 | 6.30 |
| 8 | 5.88 | 6.03 | 6.11 | 6.28 | 6.38 | 6.58 | 6.54 | 6.65 | 6.55 | 6.47 | 6.38 | 6.30 |
| 9 | 5.88 | 6.03 | 6.09 | 6.30 | 6.38 | 6.60 | 6.48 | 6.62 | 6.54 | 6.47 | 6.36 | 6.29 |
| 10 | 5.87 | 6.03 | 6.09 | 6.30 | 6.36 | 6.63 | 6.46 | 6.60 | 6.53 | 6.47 | 6.35 | 6.28 |
| 11 | 5.87 | 6.02 | 6.10 | 6.30 | 6.36 | 6.66 | 6.44 | 6.60 | 6.53 | 6.45 | 6.32 | 6.27 |
| 12 | 5.86 | 6.01 | 6.11 | 6.30 | 6.36 | 6.69 | 6.42 | 6.56 | 6.52 | 6.45 | 6.35 | 6.26 |
| 13 | 5.85 | 6.00 | 6.12 | 6.30 | 6.36 | 6.73 | 6.42 | 6.51 | 6.50 | 6.45 | 6.38 | 6.25 |
| 14 | 5.84 | 5.99 | 6.12 | 6.30 | 6.36 | 6.76 | 6.39 | 6.51 | 6.48 | 6.46 | 6.36 | 6.25 |
| 15 | 5.84 | 5.99 | 6.15 | 6.30 | 6.36 | 6.73 | 6.40 | 6.51 | 6.49 | 6.45 | 6.40 | 6.25 |
| 16 | 5.85 | 5.99 | 6.13 | 6.32 | 6.36 | 6.69 | 6.39 | 6.50 | 6.54 | 6.45 | 6.43 | 6.25 |
| 17 | 5.88 | 6.03 | 6.15 | 6.32 | 6.36 | 6.66 | 6.38 | 6.49 | 6.51 | 6.58 | 6.43 | 6.34 |
| 18 | 5.90 | 6.01 | 6.15 | 6.30 | 6.36 | 6.62 | 6.39 | 6.48 | 6.49 | 6.55 | 6.44 | 6.32 |
| 19 | 5.85 | 5.99 | 6.13 | 6.30 | 6.38 | 6.59 | 6.41 | 6.50 | 6.49 | 6.50 | 6.43 | 6.31 |
| 20 | 5.84 | 5.99 | 6.13 | 6.30 | 6.40 | 6.56 | 6.42 | 6.50 | 6.50 | 6.49 | 6.44 | 6.30 |
| 21 | 5.84 | 6.01 | 6.13 | 6.30 | 6.46 | 6.57 | 6.43 | 6.49 | 6.62 | 6.49 | 6.45 | 6.29 |
| 22 | 5.85 | 6.01 | 6.11 | 6.32 | 6.50 | 6.60 | 6.44 | 6.48 | 6.69 | 6.47 | 6.44 | 6.29 |
| 23 | 5.94 | 6.03 | 6.14 | 6.32 | 6.50 | 6.61 | 6.44 | 6.48 | 6.69 | 6.46 | 6.44 | 6.26 |
| 24 | 5.95 | 6.03 | 6.19 | 6.32 | 6.50 | 6.63 | 6.45 | 6.47 | 6.69 | 6.45 | 6.47 | 6.26 |
| 25 | 5.93 | 6.03 | 6.19 | 6.34 | 6.50 | 6.65 | 6.45 | 6.47 | 6.67 | 6.46 | 6.46 | 6.24 |
| 26 | 5.93 | 6.03 | 6.19 | 6.34 | 6.50 | 6.63 | 6.46 | 6.46 | 6.62 | 6.52 | 6.46 | 6.23 |
| 27 | 5.97 | 6.03 | 6.19 | 6.36 | 6.52 | 6.63 | 6.46 | 6.45 | 6.60 | 6.53 | 6.46 | 6.21 |
| 28 | 5.95 | 6.03 | 6.19 | 6.36 | 6.52 | 6.64 | 6.46 | 6.45 | 6.57 | 6.51 | 6.44 | 6.23 |
| 29 | 5.97 | 6.03 | 6.19 | 6.36 | --- | 6.66 | 6.47 | 6.51 | 6.54 | 6.48 | 6.43 | 6.23 |
| 30 | 6.14 | 6.06 | 6.19 | 6.34 | --- | 6.66 | 6.46 | 6.56 | 6.58 | 6.46 | 6.42 | 6.17 |
| 31 | 6.09 | --- | 6.19 | 6.34 | --- | 6.66 | --- | 6.55 | --- | 6.45 | 6.42 | --- |
| MEAN | 5.91 | 6.02 | 6.13 | 6.30 | 6.40 | 6.63 | 6.48 | 6.54 | 6.56 | 6.49 | 6.42 | 6.29 |
| MAX | 6.14 | 6.06 | 6.19 | 6.36 | 6.52 | 6.76 | 6.66 | 6.66 | 6.69 | 6.61 | 6.47 | 6.41 |
| MIN | 5.84 | 5.99 | 6.05 | 6.19 | 6.34 | 6.54 | 6.38 | 6.45 | 6.48 | 6.43 | 6.32 | 6.17 |

## 453421091333700 HEMLOCK LAKE NEAR MIKANA, WI

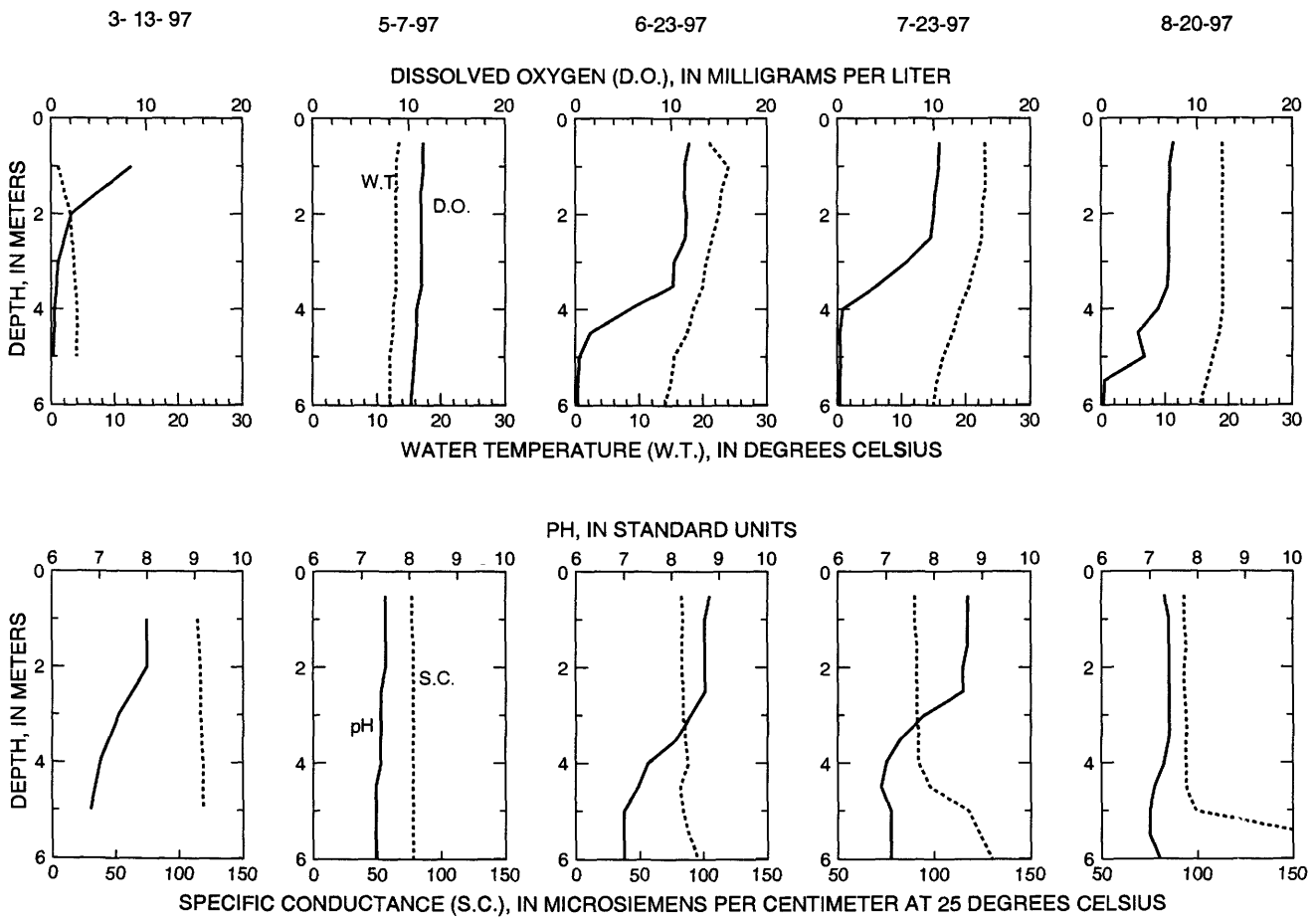
LOCATION.--Lat 45°34'21", long 91°33'37", in SE 1/4 SE 1/4 sec.26, T.36 N., R.10 W., Barron County, Hydrologic Unit 07050007, 2.5 mi southeast of Mikana.

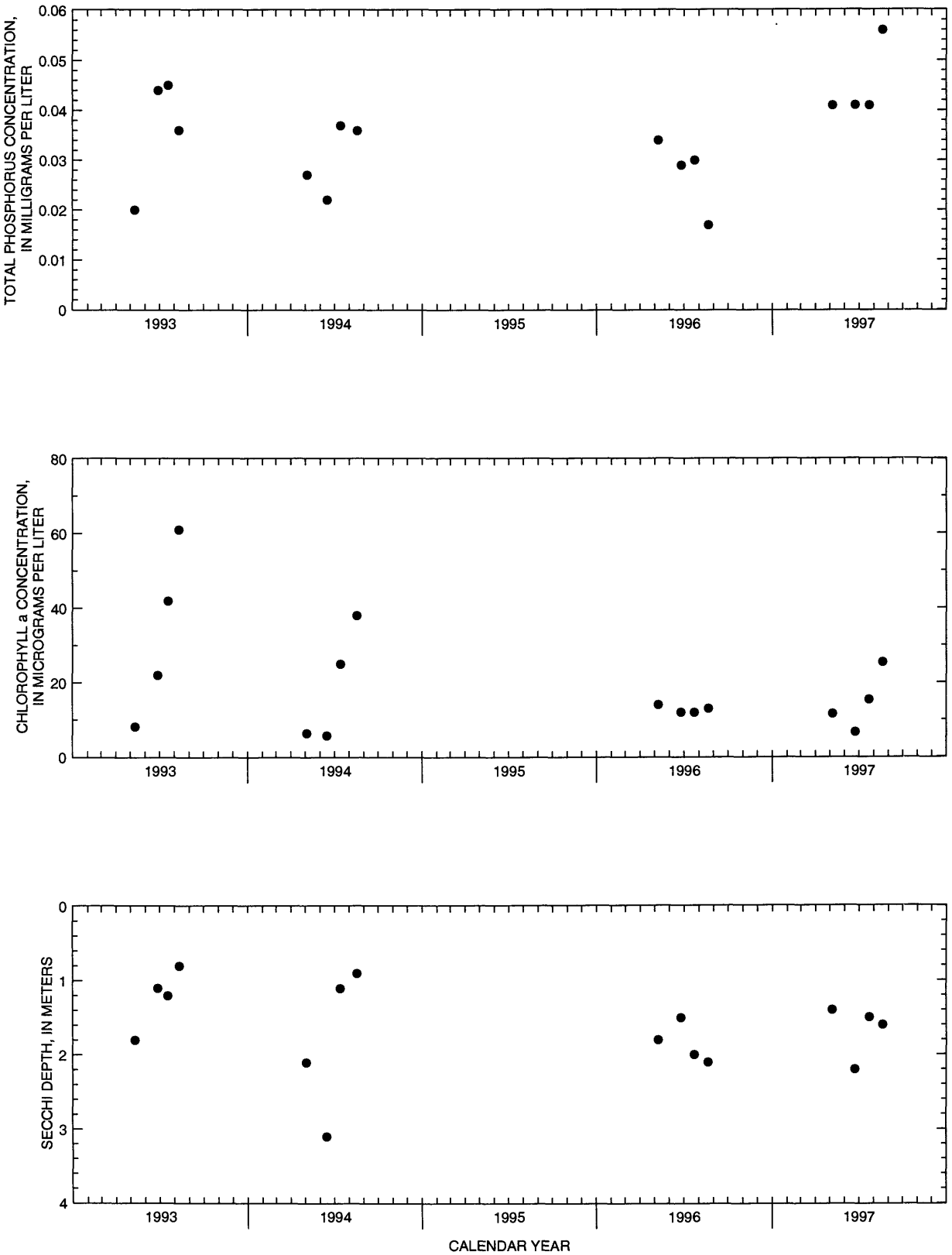
PERIOD OF RECORD.--March 1993 to August 1994 and March 1996 to current year.

REMARKS.--Lake sampled at deep hole near center of lake. Lake ice-covered during March sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 13 TO AUGUST 20, 1997
(Milligrams per liter unless otherwise indicated)

| | Mar. 13 | | May 07 | | June 23 | | July 23 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 9.80 | | 10.65 | | 10.75 | | 10.70 | | 10.90 | |
| Secchi-depth (meters) | --- | | 1.4 | | 2.2 | | 1.5 | | 1.6 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 12 | | 6.5 | | 15 | | 25 | |
| Depth of sample (m) | 1.0 | 5.0 | 0.5 | 6.0 | 0.5 | 6.0 | 0.5 | 6.0 | 0.5 | 6.0 |
| Water temperature (°C) | 1.0 | 4.0 | 13.5 | 12.0 | 21.0 | 14.0 | 23.0 | 15.0 | 19.0 | 15.5 |
| Specific conductance (µS/cm) | 115 | 119 | 77 | 8 | 83 | 96 | 90 | 130 | 93 | 163 |
| pH (units) | 8.2 | 6.8 | 7.5 | 7.3 | 8.8 | 7.0 | 8.7 | 7.1 | 7.3 | 7.2 |
| Dissolved oxygen | 8.4 | 0.2 | 11.5 | 10.2 | 11.9 | 0.2 | 10.6 | 0.2 | 7.5 | 0.2 |
| Phosphorus, total (as P) | 0.032 | 0.046 | 0.041 | 0.046 | 0.041 | 0.062 | 0.041 | 0.042 | 0.056 | 0.237 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Hemlock Lake near Mikana, Wisconsin.

## 05427235 LAKE KOSHKONONG NEAR NEWVILLE, WI

LOCATION.--Lat 42°51'27", long 88°56'27", in NW 1/4 NE 1/4 sec.34, T.5 N., R.13 E., Jefferson County, Hydrologic Unit 07090001, 80 ft east of Pottawatomi Trail Bridge at Bingham Point Estates, and 4.5 mi northeast of Newville.

DRAINAGE AREA.--2,560 $mi^2$, at lake outlet. Area of Lake Koshkonong, 16.3 $mi^2$.

PERIOD OF RECORD.--July 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 770.00 ft above sea level.

REMARKS.--No estimated daily gage heights. Records good. Lake level regulated by dam at Indianford. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded gage height, 12.23 ft, Apr. 25, 1993; minimum recorded, 5.40 ft, Dec. 26, 27, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 9.02 ft, Mar. 14; minimum recorded, 5.63 ft, Nov. 26 27.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.08 | 6.36 | 5.75 | 6.05 | 6.34 | 8.28 | 8.35 | 7.40 | 6.10 | 7.52 | 6.88 | 6.52 |
| 2 | 6.10 | 6.34 | 5.79 | 6.05 | 6.33 | 8.36 | 8.36 | 7.30 | 6.08 | 7.47 | 6.84 | 6.48 |
| 3 | 6.08 | 6.31 | 5.83 | 6.05 | 6.30 | 8.49 | 8.36 | 7.33 | 6.09 | 7.42 | 6.78 | 6.40 |
| 4 | 6.09 | 6.31 | 5.87 | 6.09 | 6.31 | 8.62 | 8.33 | 7.32 | 6.11 | 7.36 | 6.72 | 6.33 |
| 5 | 6.11 | 6.30 | 5.88 | 6.18 | 6.31 | 8.70 | 8.31 | 7.37 | 6.11 | 7.32 | 6.62 | 6.26 |
| 6 | 6.14 | 6.26 | 5.88 | 6.26 | 6.30 | 8.72 | 8.30 | 7.36 | 6.13 | 7.33 | 6.53 | 6.27 |
| 7 | 6.18 | 6.23 | 5.88 | 6.33 | 6.29 | 8.72 | 8.35 | 7.32 | 6.12 | 7.30 | 6.44 | 6.25 |
| 8 | 6.13 | 6.21 | 5.87 | 6.40 | 6.27 | 8.70 | 8.32 | 7.39 | 6.12 | 7.33 | 6.36 | 6.22 |
| 9 | 6.09 | 6.19 | 5.86 | 6.46 | 6.25 | 8.71 | 8.25 | 7.39 | 6.11 | 7.35 | 6.28 | 6.19 |
| 10 | 6.09 | 6.17 | 5.86 | 6.51 | 6.24 | 8.76 | 8.19 | 7.31 | 6.11 | 7.36 | 6.22 | 6.20 |
| 11 | 6.09 | 6.15 | 5.86 | 6.52 | 6.23 | 8.83 | 8.16 | 7.29 | 6.16 | 7.37 | 6.15 | 6.19 |
| 12 | 6.14 | 6.10 | 5.86 | 6.52 | 6.21 | 8.91 | 8.16 | 7.28 | 6.22 | 7.36 | 6.20 | 6.17 |
| 13 | 6.17 | 6.05 | 5.87 | 6.51 | 6.19 | 8.97 | 8.13 | 7.19 | 6.24 | 7.32 | 6.23 | 6.16 |
| 14 | 6.17 | 6.00 | 5.88 | 6.48 | 6.17 | 9.00 | 8.09 | 7.15 | 6.24 | 7.28 | 6.19 | 6.16 |
| 15 | 6.13 | 5.96 | 5.93 | 6.46 | 6.14 | 8.99 | 8.07 | 7.12 | 6.26 | 7.16 | 6.22 | 6.15 |
| 16 | 6.11 | 5.91 | 5.98 | 6.43 | 6.12 | 8.93 | 8.11 | 7.01 | 6.54 | 7.03 | 6.23 | 6.14 |
| 17 | 6.19 | 5.95 | 6.01 | 6.40 | 6.10 | 8.88 | 8.11 | 6.93 | 6.50 | 6.91 | 6.23 | 6.22 |
| 18 | 6.26 | 5.96 | 6.02 | 6.35 | 6.10 | 8.81 | 8.09 | 6.84 | 6.51 | 6.82 | 6.22 | 6.17 |
| 19 | 6.21 | 5.94 | 6.02 | 6.31 | 6.19 | 8.74 | 8.11 | 6.79 | 6.53 | 6.76 | 6.20 | 6.20 |
| 20 | 6.18 | 5.90 | 6.03 | 6.26 | 6.35 | 8.65 | 8.12 | 6.68 | 6.55 | 6.72 | 6.21 | 6.23 |
| 21 | 6.17 | 5.87 | 6.04 | 6.22 | 6.74 | 8.57 | 8.13 | 6.56 | 6.65 | 6.75 | 6.23 | 6.21 |
| 22 | 6.15 | 5.83 | 6.04 | 6.20 | 7.17 | 8.49 | 8.09 | 6.47 | 6.85 | 6.74 | 6.24 | 6.22 |
| 23 | 6.20 | 5.79 | 6.06 | 6.21 | 7.56 | 8.43 | 8.04 | 6.38 | 7.06 | 6.75 | 6.28 | 6.24 |
| 24 | 6.23 | 5.76 | 6.09 | 6.25 | 7.86 | 8.38 | 7.97 | 6.32 | 7.26 | 6.76 | 6.34 | 6.24 |
| 25 | 6.22 | 5.70 | 6.09 | 6.30 | 8.07 | 8.37 | 7.90 | 6.26 | 7.48 | 6.78 | 6.39 | 6.24 |
| 26 | 6.23 | 5.65 | 6.10 | 6.35 | 8.20 | 8.36 | 7.82 | 6.16 | 7.60 | 6.83 | 6.43 | 6.22 |
| 27 | 6.27 | 5.64 | 6.09 | 6.38 | 8.27 | 8.37 | 7.74 | 6.08 | 7.64 | 6.87 | 6.48 | 6.20 |
| 28 | 6.26 | 5.65 | 6.07 | 6.39 | 8.27 | 8.37 | 7.66 | 6.05 | 7.64 | 6.95 | 6.52 | 6.21 |
| 29 | 6.29 | 5.66 | 6.05 | 6.39 | --- | 8.37 | 7.56 | 6.08 | 7.61 | 6.95 | 6.54 | 6.25 |
| 30 | 6.48 | 5.70 | 6.05 | 6.38 | --- | 8.37 | 7.45 | 6.10 | 7.58 | 6.94 | 6.54 | 6.19 |
| 31 | 6.39 | --- | 6.04 | 6.37 | --- | 8.37 | --- | 6.11 | --- | 6.91 | 6.55 | --- |
| MEAN | 6.18 | 6.00 | 5.96 | 6.32 | 6.67 | 8.62 | 8.09 | 6.85 | 6.61 | 7.09 | 6.40 | 6.24 |
| MAX | 6.48 | 6.36 | 6.10 | 6.52 | 8.27 | 9.00 | 8.36 | 7.40 | 7.64 | 7.52 | 6.88 | 6.52 |
| MIN | 6.08 | 5.64 | 5.75 | 6.05 | 6.10 | 8.28 | 7.45 | 6.05 | 6.08 | 6.72 | 6.15 | 6.14 |

## 455446089370300 LITTLE ARBOR VITAE LAKE NEAR WOODRUFF, WI

LOCATION.--Lat 45°54'46" long 89°37'03", in SW 1/4 SE 1/4 sec.28, T.40 N., R.7 E., Vilas County, Hydrologic Unit 07070001, 4 mi northeast of Woodruff.

PERIOD OF RECORD.--February 1991 to current year.

GAGE.--Staff gage read by Glyn A. Roberts.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 8.00 ft, Sept. 16, 1994, and July 15, 19, 1997; minimum observed, 7.72 ft, Feb. 28, June 12, 1991, and Oct. 13, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 8.00 ft, July 15 and 19; minimum observed, 7.80 ft, Aug. 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | 7.88 | --- | --- | --- | --- | 7.84 | --- | --- | --- | --- | --- |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | --- | --- | --- | --- | --- | --- | --- | 7.87 | --- | --- | --- | 7.86 |
| 4 | --- | --- | --- | --- | 7.86 | 7.84 | --- | --- | --- | --- | --- | --- |
| 5 | 7.84 | --- | 7.88 | --- | --- | --- | 7.88 | --- | 7.86 | 7.88 | --- | --- |
| 6 | --- | --- | --- | 7.88 | --- | --- | --- | --- | --- | --- | 7.82 | --- |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | --- | 7.88 | --- | --- | 7.86 | --- | --- | 7.86 | --- | --- | --- | 7.86 |
| 9 | --- | --- | --- | --- | --- | 7.86 | --- | --- | 7.86 | --- | --- | --- |
| 10 | --- | --- | --- | --- | --- | --- | 7.88 | --- | --- | 7.88 | 7.82 | --- |
| 11 | 7.82 | --- | 7.88 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | 7.86 | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | --- | --- | --- | --- | 7.86 | --- | --- | 7.80 | 7.84 |
| 14 | --- | 7.86 | --- | --- | 7.84 | --- | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | --- | --- | --- | 7.88 | --- | 7.86 | 8.00 | --- | --- |
| 16 | --- | --- | --- | --- | --- | 7.86 | --- | --- | --- | --- | --- | --- |
| 17 | 7.88 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | --- | --- | 7.86 | --- | --- | 7.86 | --- | --- | --- | --- | --- | 7.84 |
| 19 | 7.84 | 7.84 | --- | 7.86 | 7.84 | --- | 7.87 | 7.88 | --- | 8.00 | --- | --- |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 7.82 | --- |
| 21 | 7.82 | --- | --- | --- | --- | --- | --- | --- | 7.86 | --- | --- | --- |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 7.82 |
| 23 | 7.88 | --- | --- | --- | --- | --- | --- | 7.86 | --- | --- | --- | --- |
| 24 | --- | --- | 7.86 | --- | --- | 7.86 | 7.86 | --- | --- | --- | --- | --- |
| 25 | --- | 7.86 | --- | 7.86 | --- | --- | --- | --- | --- | 7.86 | --- | --- |
| 26 | --- | --- | --- | --- | 7.84 | --- | --- | --- | 7.88 | --- | 7.84 | 7.82 |
| 27 | --- | --- | 7.88 | --- | --- | 7.84 | --- | --- | --- | --- | --- | --- |
| 28 | 7.86 | --- | --- | --- | --- | --- | 7.86 | 7.84 | --- | --- | --- | --- |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | --- | 7.86 | --- | --- | --- | --- | --- | --- | 7.88 | --- | --- | 7.82 |
| 31 | 7.88 | --- | 7.88 | 7.86 | --- | 7.84 | --- | 7.84 | --- | 7.84 | 7.86 | --- |

## 432255088134700 LITTLE CEDAR LAKE, NORTH SITE, NEAR WEST BEND, WI

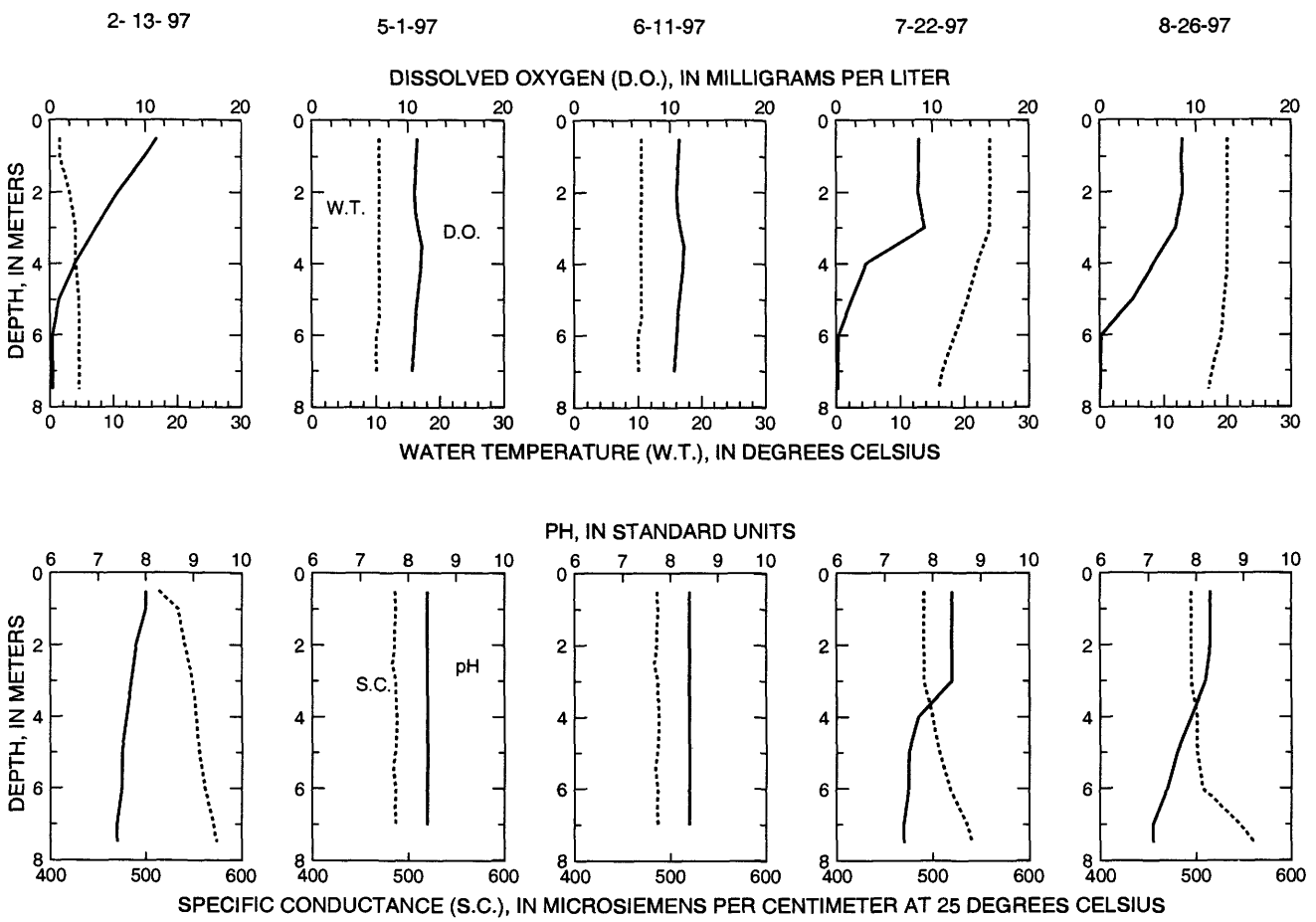
LOCATION.--Lat 43°22'55", long 88°13'47", in NW 1/4 NE 1/4 sec.33, T.11 N., R.19 E., Washington County, Hydrologic Unit 04040003, 2.6 mi southwest of West Bend.

PERIOD OF RECORD.--February to August 1997.

REMARKS.--Lake sampled at center of northern basin at deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 13 TO AUGUST 26, 1997
(Milligrams per liter unless otherwise indicated)

| | Feb. 13 | | May 01 | | June 11 | | July 22 | | Aug. 26 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 8.27 | | 8.38 | | 8.22 | | --- | | 8.34 | |
| Secchi-depth (meters) | --- | | 3.1 | | 6.0 | | 2.7 | | 2.6 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 5.0 | | 1.4 | | 8.1 | | 9.7 | |
| Depth of sample (m) | 0.5 | 7.5 | 0.5 | 7.0 | 0.5 | 7.5 | 0.5 | 7.5 | 0.5 | 7.5 |
| Water temperature (°C) | 1.5 | 4.5 | 10.5 | 10.0 | 21.5 | 14.0 | 24.0 | 16.0 | 20.0 | 17.0 |
| Specific conductance (µS/cm) | 514 | 574 | 486 | 487 | 500 | 522 | 491 | 541 | 495 | 561 |
| pH (units) | 8.0 | 7.4 | 8.4 | 8.4 | 8.5 | 7.6 | 8.4 | 7.4 | 8.3 | 7.1 |
| Dissolved oxygen | 11.2 | 0.2 | 11.0 | 10.4 | 11.4 | 0.8 | 8.6 | 0.1 | 8.6 | 0.0 |
| Phosphorus, total (as P) | 0.010 | 0.128 | 0.017 | 0.036 | 0.006 | 0.098 | 0.019 | 0.369 | 0.037 | 0.505 |



## 432249088134500 LITTLE CEDAR LAKE, SOUTH SITE, NEAR WEST BEND, WI

LOCATION.--Lat 43°22'49", long 88°13'45", in NW 1/4 SE 1/4 sec.33, T.11 N., R.19 E., Washington County, Hydrologic Unit 04040003, 2.8 mi southwest of West Bend.

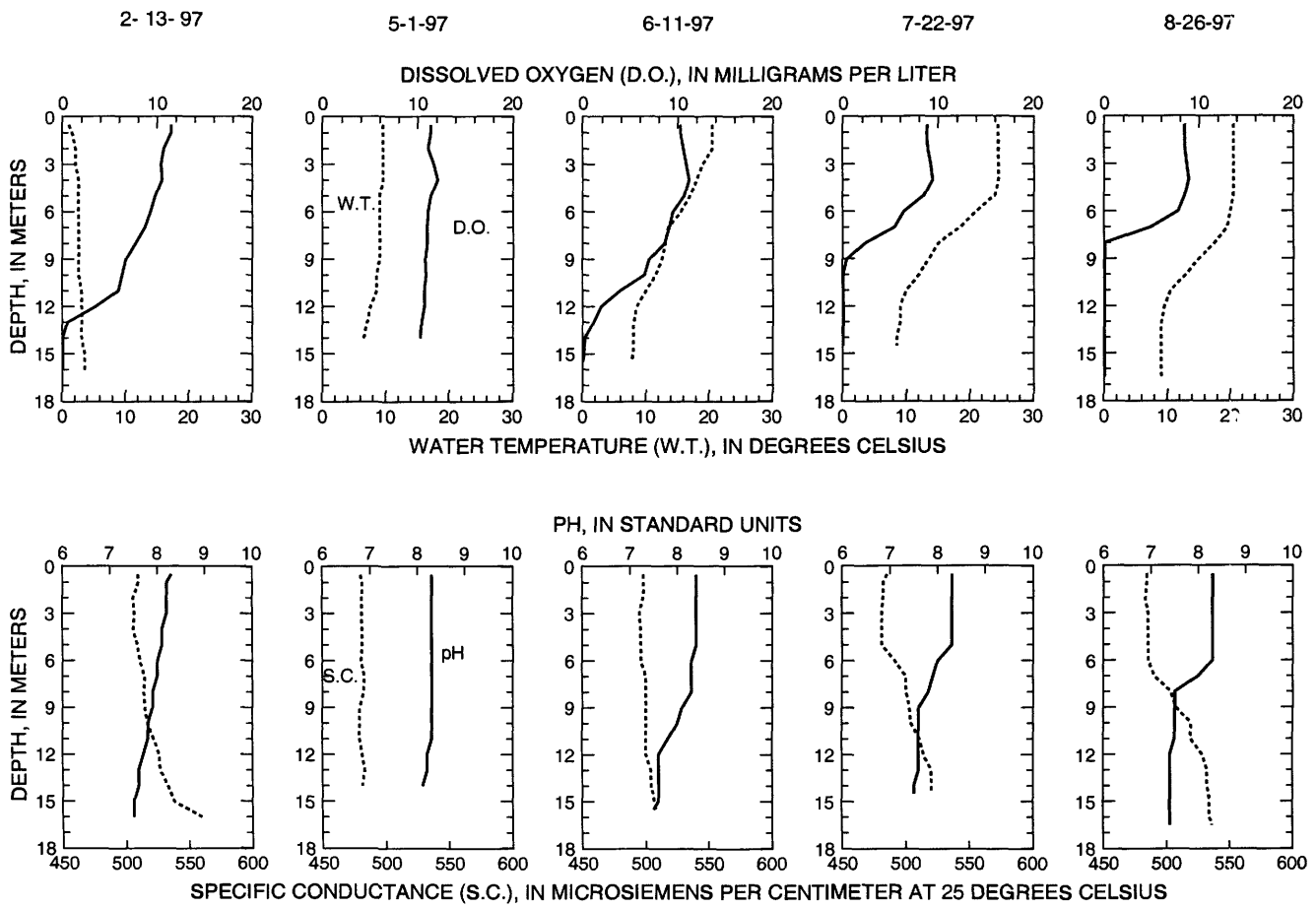
PERIOD OF RECORD.--February to August 1997.

REMARKS.--Lake sampled in southern basin at deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 13 TO AUGUST 26, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 13 | | May 01 | | June 11 | | July 22 | | Aug. 26 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 8.27 | | 8.38 | | 8.22 | | --- | | 8.34 | |
| Secchi-depth (meters) | --- | | 5.0 | | 7.9 | | 4.9 | | 3.9 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 1.5 | | 0.9 | | 3.3 | | 6.6 | |
| Depth of sample (m) | 0.5 | 16 | 0.5 | 14 | 0.5 | 15 | 0.5 | 14 | 0.5 | 17 |
| Water temperature (°C) | 1.0 | 3.5 | 9.5 | 6.5 | 20.5 | 7.5 | 24.5 | 8.5 | 20.5 | 9.0 |
| Specific conductance (µS/cm) | 510 | 560 | 480 | 481 | 498 | 508 | 485 | 520 | 484 | 536 |
| pH (units) | 8.3 | 7.5 | 8.3 | 8.1 | 8.4 | 7.5 | 8.3 | 7.5 | 8.3 | 7.4 |
| Dissolved oxygen | 11.5 | 0.0 | 11.4 | 10.3 | 10.3 | 0.0 | 8.9 | 0.0 | 8.5 | 0.0 |
| Phosphorus, total (as P) | 0.013 | 0.157 | 0.020 | 0.014 | 0.007 | 0.183 | 0.010 | 0.339 | 0.010 | 0.432 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | 0.002 | 0.003 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.09 | 0.12 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.05 | 0.10 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.60 | 0.50 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.69 | 0.62 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 10 | 5 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.70 | 0.50 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 220 | 220 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 38 | 38 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 31 | 31 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 17 | 17 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 190 | 200 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 11 | 11 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 37 | 37 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 0.4 | 1.0 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 274 | 276 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | 2 | 5 | --- | --- | --- | --- | --- | --- |



## 434412088590700 LITTLE GREEN LAKE, AT CENTER, NEAR MARKESAN, WI

LOCATION--Lat 43°44'12", long 88°59'07", in SW 1/4 SW 1/4 sec.29, T.15 N., R.13 E., Green Lake County, Hydrologic Unit 04030201, 2 mi north of Markesan.

PERIOD OF RECORD.--February 1991 to current year.

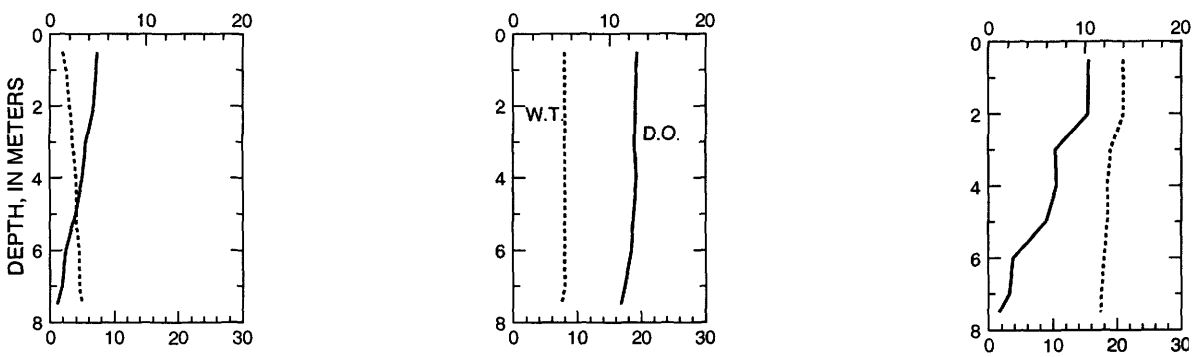
REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 14 TO AUGUST 27, 1997
(Milligrams per liter unless otherwise indicated)

| | Feb. 14 | | Apr. 23 | | June 12 | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | 6.32 | | 6.42 | | --- | |
| Secchi-depth (meters) | --- | | 1.7 | | 5.4 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 24 | | 4.4 | |
| Depth of sample (m) | 0.5 | 7.5 | 0.5 | 7.5 | 0.5 | 7.5 |
| Water temperature (°C) | 2.0 | 5.0 | 8.0 | 7.5 | 21.0 | 17.5 |
| Specific conductance (µS/cm) | 411 | 439 | 350 | 350 | 331 | 359 |
| pH (units) | 7.8 | 7.6 | 8.5 | 8.4 | 8.4 | 7.4 |
| Dissolved oxygen | 4.9 | 0.7 | 12.9 | 11.2 | 10.4 | 1.1 |
| Phosphorus, total (as P) | 0.055 | 0.149 | 0.036 | --- | 0.022 | 0.101 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | <0.01 | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.80 | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.80 | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 15 | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.7 | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 160 | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 31 | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 21 | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 7.1 | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 4 | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 160 | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 6.0 | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 15 | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 0.0 | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 190 | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | --- | --- | --- |

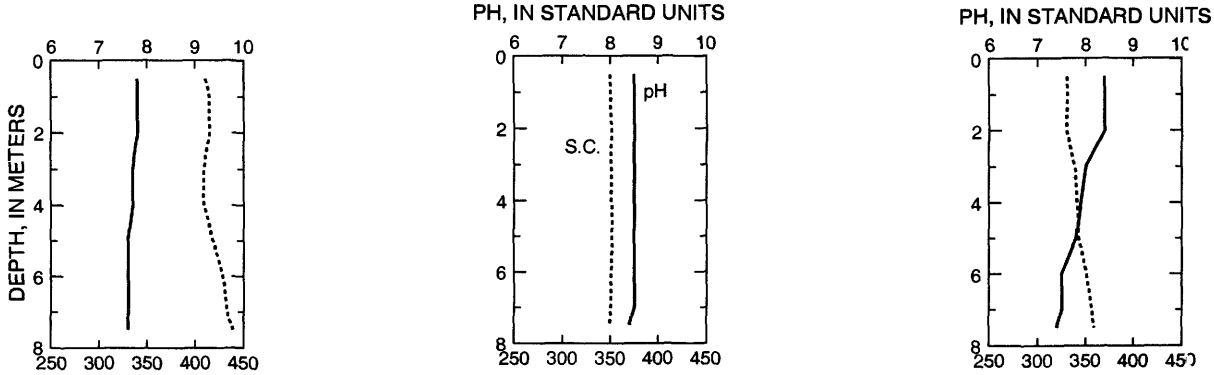
2-14-97 4-23-97 6-12-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER




WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS PH, IN STANDARD UNITS

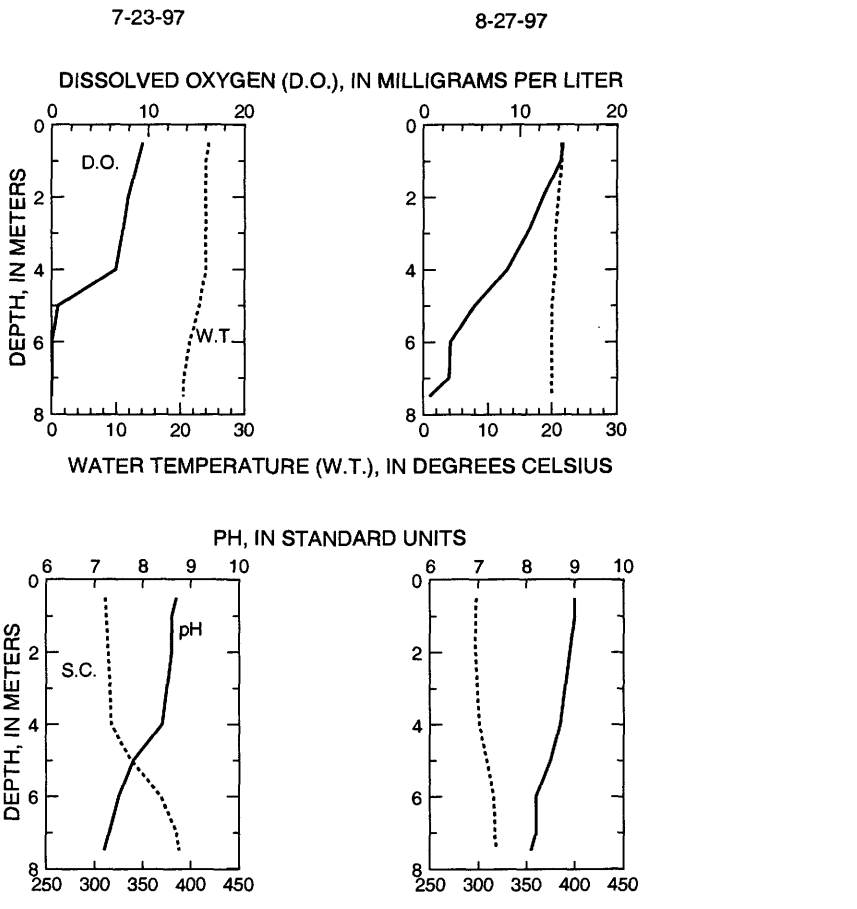


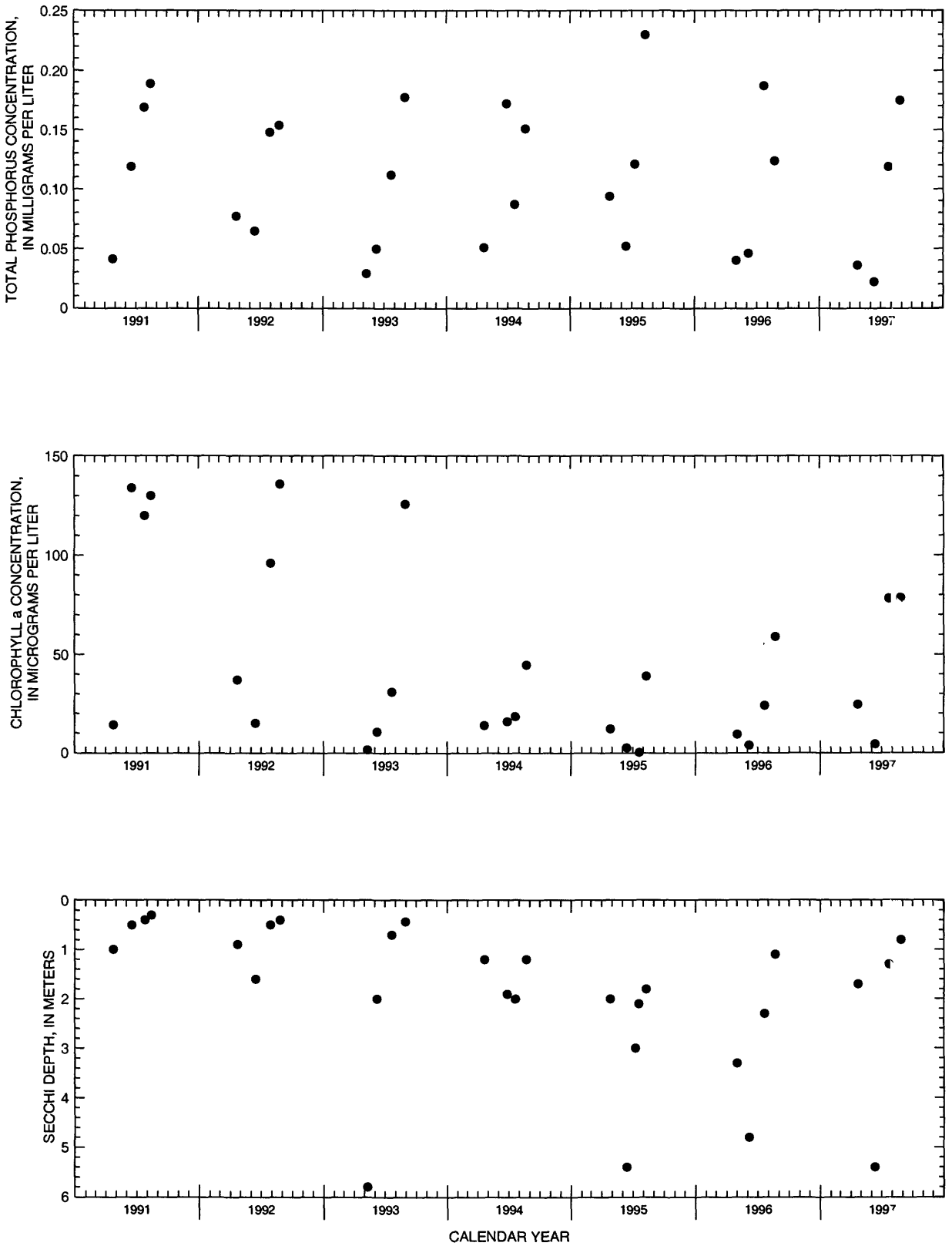

SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

WATER-QUALITY DATA, JULY 23 TO AUGUST 27, 1997

(Milligrams per liter unless otherwise indicated)

| | July 23 | | Aug. 27 | | | | |
|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 6.18 | | | | |
| Secchi-depth (meters) | 1.3 | | 0.8 | | | | |
| Chlorophyll a, phytoplankton (µg/L) | 78 | | 79 | | | | |
| Depth of sample (m) | 0.5 | 7.5 | 0.5 | 2.0 | 4.0 | 6.5 | 7.5 |
| Water temperature (°C) | 24.5 | 20.5 | 21.5 | 21.0 | 20.5 | 20.0 | 20.0 |
| Specific conductance (µS/cm) | 311 | 388 | 298 | 297 | 301 | 317 | 319 |
| pH (units) | 8.7 | 7.2 | 8.7 | 8.2 | 8.1 | | |
| Dissolved oxygen | 9.4 | 0.0 | 14.5 | 12.4 | 8.7 | 2.7 | 0.6 |
| Phosphorus, total (as P) | 0.119 | 0.682 | 0.175 | 0.170 | 0.176 | 0.248 | 0.253 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Little Green Lake near Markesan, Wisconsin.

## 425425088083500 LITTLE MUSKEGO LAKE AT MUSKEGO, WI

LOCATION.--Lat 42°54'25", long 88°08'35", in SE 1/4 NW 1/4 sec.9, T.5 N., R.20 E., Waukesha County, Hydrologic Unit 07120006, at Muskego.

DRAINAGE AREA.--11.6 $mi^2$.

PERIOD OF RECORD.--October 1986 to current year.

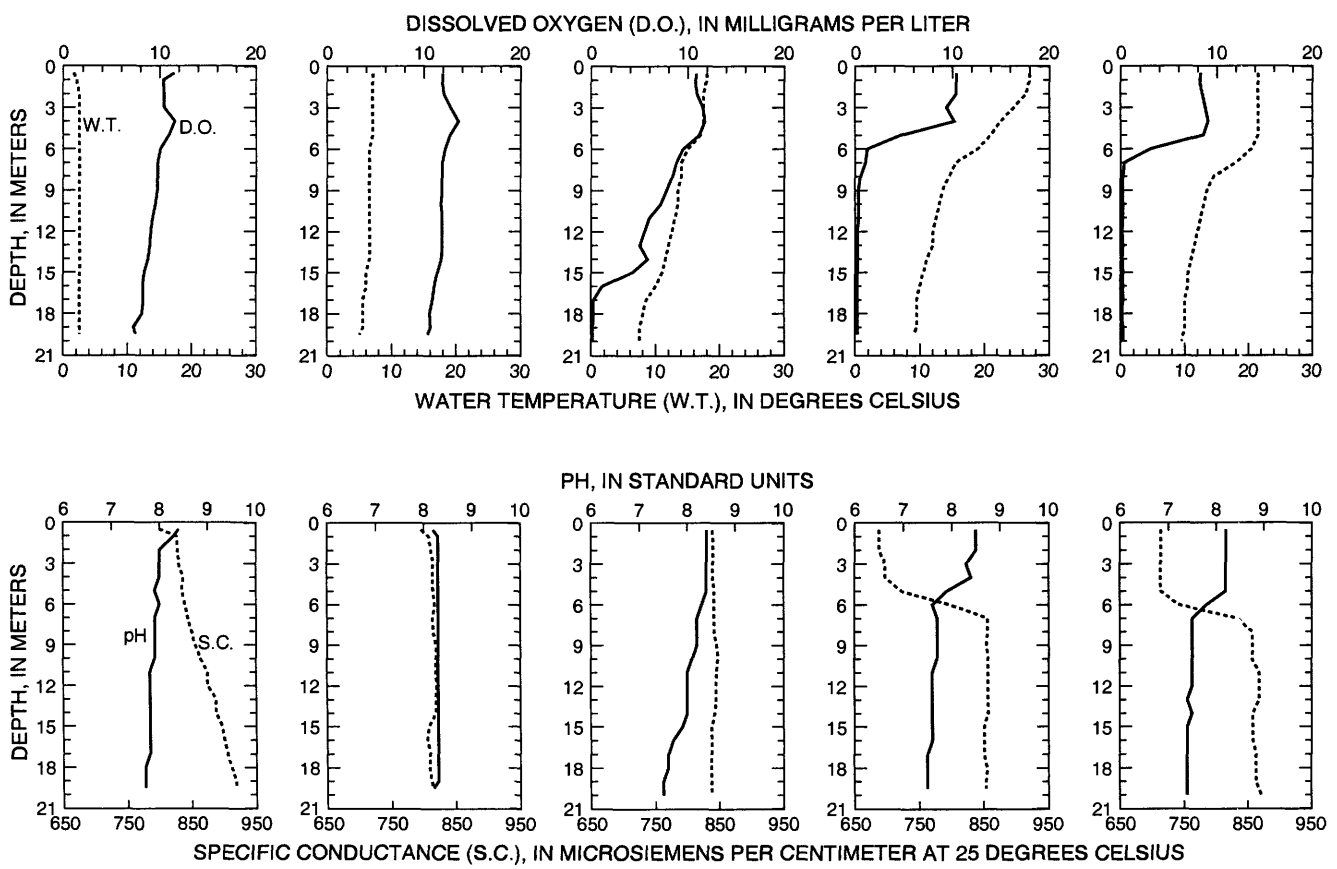
LAKE-STAGE GAGE.--Datum of gage is 693.40 ft above sea level.

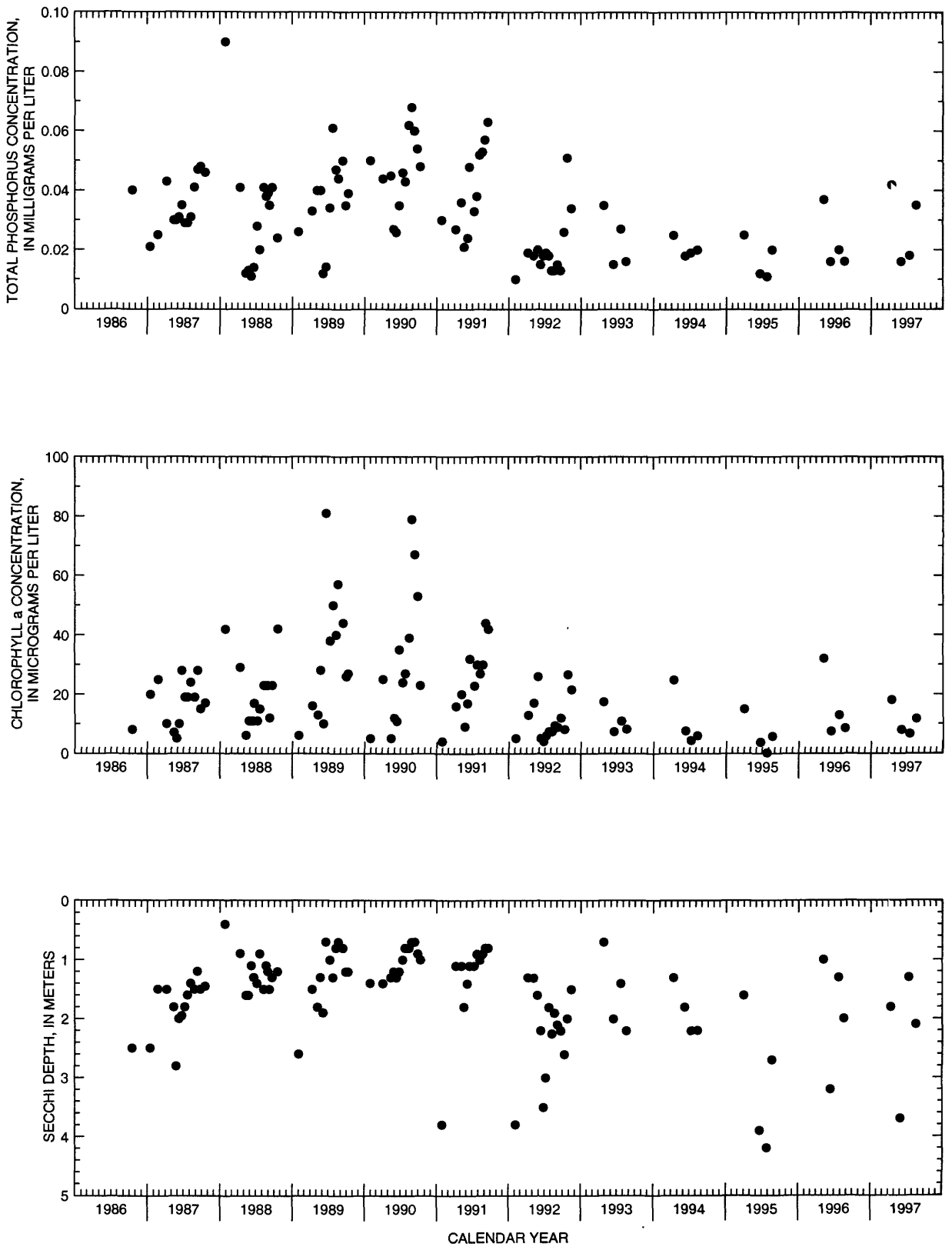
REMARKS.--Lake sampled at the deep hole about 1,000 ft north-northwest of dam at outlet. An aeration system was operated from April to November for the years 1987-91. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Prior to October 1987, published under station number 425450088083500.

WATER-QUALITY DATA, FEBRUARY 11 TO AUGUST 20, 1997
(Milligrams per liter unless otherwise indicated)

| | Feb. 11 | | Apr. 16 | | June 03 | | July 16 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 98.32 | | --- | | 98.85 | | 98.82 | |
| Secchi-depth (meters) | --- | | 1.8 | | 3.7 | | 1.3 | | 2.1 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 18 | | 7.9 | | 6.6 | | 12 | |
| Depth of sample (m) | 0.5 | 20 | 0.5 | 19 | 0.5 | 20 | 0.5 | 20 | 0.5 | 20 |
| Water temperature (°C) | 1.5 | 2.5 | 7.0 | 5.0 | 18.0 | 7.5 | 27.0 | 9.0 | 21.5 | 9.5 |
| Specific conductance (µS/cm) | 800 | 920 | 796 | 8 | 839 | 838 | 687 | 854 | 713 | 871 |
| pH (units) | 8.4 | 7.7 | 8.2 | 8.2 | 8.4 | 7.5 | 8.5 | 7.5 | 8.2 | 7.4 |
| Dissolved oxygen | 11.5 | 7.5 | 11.9 | 10.4 | 10.9 | 0.1 | 10.4 | 0.2 | 8.3 | 0.2 |
| Phosphorus, total (as P) | 0.030 | 0.063 | 0.042 | 0.024 | 0.016 | 0.287 | 0.018 | 0.308 | 0.035 | 0.411 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.20 | 0.19 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.04 | 0.07 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.71 | 0.73 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.91 | 0.92 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 15 | 15 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.7 | 1.4 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 270 | 260 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 51 | 51 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 34 | 33 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 59 | 58 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 3 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 210 | 210 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 42 | 42 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 120 | 120 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 1.1 | 1.3 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 452 | 446 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | 4 | --- | --- | --- | --- | --- | --- |

2-11-97 4-16-97 6-3-97 7-16-97 8-20-97






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Little Muskego Lake at Muskego, Wisconsin.

## 05390700 LITTLE ST. GERMAIN LAKE NEAR EAGLE RIVER, WI

LOCATION--Lat 45°53'55", long 89°27'10", in SW 1/4 SE 1/4 sec.35, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, 9.6 mi west of Eagle River.

DRAINAGE AREA.--19.0 $mi^2$.

PERIOD OF RECORD.--October 1990 to current year.

GAGE.--Staff gage mounted on the dam wall at lake outlet. Datum of gage is 1,600 ft, above sea level.

REMARKS.--Lake level regulated by dam at outlet.

COOPERATION.--Gage readings furnished by Wisconsin Valley Improvement Company.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 14.00 ft, June 6, 1997; minimum observed, 12.00 ft, Jan. 3 and Feb. 3, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 14.00, June 6; minimum observed, 12.05 ft, Feb. 11 and 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUE

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13.74 | 13.72 | 13.32 | --- | --- | --- | 12.64 | 13.64 | 13.78 | 13.80 | 13.74 | 13.80 |
| 2 | 13.76 | 13.74 | 13.28 | --- | --- | --- | 12.66 | 13.66 | 13.78 | 13.86 | 13.74 | 13.82 |
| 3 | 13.76 | 13.74 | 13.22 | 12.98 | --- | --- | 12.70 | 13.70 | 13.80 | 13.88 | 13.74 | 13.80 |
| 4 | 13.70 | 13.76 | 13.18 | --- | --- | 12.32 | 12.74 | 13.68 | 13.82 | 13.88 | 13.74 | 13.76 |
| 5 | 13.72 | 13.80 | 13.14 | --- | 12.22 | --- | 12.78 | 13.70 | 13.86 | 13.86 | 13.72 | 13.74 |
| 6 | 13.72 | 13.80 | 13.16 | --- | --- | --- | 12.86 | 13.72 | 14.00 | 13.84 | 13.72 | 13.74 |
| 7 | 13.72 | 13.80 | --- | 13.02 | 12.18 | 12.32 | 12.94 | 13.74 | 13.98 | 13.82 | 13.72 | 13.72 |
| 8 | 13.72 | 13.80 | --- | --- | --- | --- | 12.96 | 13.76 | 13.90 | 13.88 | 13.70 | 13.72 |
| 9 | 13.74 | 13.78 | --- | --- | --- | --- | 13.00 | 13.78 | 13.86 | 13.86 | 13.70 | 13.74 |
| 10 | 13.76 | 13.78 | 13.12 | 13.02 | --- | --- | 13.02 | 13.78 | 13.78 | 13.86 | 13.70 | 13.74 |
| 11 | 13.72 | 13.78 | --- | --- | 12.05 | 12.36 | 13.04 | 13.76 | 13.74 | 13.86 | 13.68 | 13.72 |
| 12 | 13.70 | 13.78 | --- | --- | --- | --- | 13.08 | 13.78 | 13.76 | 13.82 | 13.68 | 13.70 |
| 13 | 13.72 | 13.78 | 13.08 | --- | --- | --- | 13.12 | 13.80 | 13.78 | 13.82 | 13.68 | 13.68 |
| 14 | 13.72 | 13.76 | --- | 12.96 | 12.05 | --- | 13.14 | 13.80 | 13.78 | 13.82 | 13.66 | 13.70 |
| 15 | 13.72 | 13.72 | --- | --- | 12.22 | 12.44 | 13.16 | 13.80 | 13.76 | 13.80 | 13.72 | 13.70 |
| 16 | 13.72 | 13.86 | --- | --- | --- | --- | 13.20 | 13.78 | 13.86 | 13.80 | 13.84 | 13.70 |
| 17 | 13.80 | 13.84 | 13.08 | 12.90 | --- | 12.44 | 13.20 | 13.78 | 13.76 | 13.82 | 13.84 | 13.74 |
| 18 | 13.82 | 13.82 | --- | --- | 12.28 | 12.44 | 13.22 | 13.78 | 13.74 | 13.76 | 13.84 | 13.74 |
| 19 | 13.80 | 13.80 | --- | --- | --- | --- | 13.24 | 13.82 | 13.68 | 13.68 | 13.82 | 13.80 |
| 20 | 13.78 | 13.76 | 13.08 | --- | --- | --- | 13.30 | 13.80 | 13.70 | 13.70 | 13.86 | 13.80 |
| 21 | 13.78 | 13.72 | --- | 12.82 | 12.28 | 12.44 | 13.34 | 13.76 | 13.70 | 13.70 | 13.88 | 13.80 |
| 22 | 13.78 | 13.68 | --- | 12.82 | --- | --- | 13.38 | 13.74 | 13.70 | 13.70 | 13.86 | 13.80 |
| 23 | 13.86 | 13.64 | --- | --- | --- | --- | 13.42 | 13.72 | 13.70 | 13.70 | 13.84 | 13.80 |
| 24 | 13.84 | 13.60 | 13.02 | 12.74 | --- | --- | 13.46 | 13.72 | 13.70 | 13.70 | 13.82 | 13.78 |
| 25 | 13.80 | 13.56 | --- | --- | 12.28 | 12.48 | 13.48 | 13.72 | 13.76 | 13.70 | 13.82 | 13.78 |
| 26 | 13.78 | 13.50 | --- | --- | --- | --- | 13.52 | 13.70 | 13.76 | 13.76 | 13.82 | 13.78 |
| 27 | 13.72 | 13.42 | 13.02 | --- | --- | --- | 13.52 | 13.68 | 13.78 | 13.78 | 13.82 | 13.76 |
| 28 | 13.68 | 13.40 | --- | 12.58 | 12.30 | 12.50 | 13.52 | 13.68 | 13.76 | 13.78 | 13.80 | 13.80 |
| 29 | 13.72 | 13.34 | --- | --- | --- | --- | 13.54 | 13.70 | 13.78 | 13.78 | 13.76 | 13.78 |
| 30 | 13.90 | 13.34 | --- | --- | --- | --- | 13.58 | 13.78 | 13.80 | 13.76 | 13.74 | 13.80 |
| 31 | 13.78 | --- | 12.99 | 12.48 | --- | --- | --- | 13.78 | --- | 13.76 | 13.82 | --- |
| MEAN | 13.76 | 13.69 | --- | --- | --- | --- | 13.16 | 13.74 | 13.79 | 13.79 | 13.77 | 13.76 |
| MAX | 13.90 | 13.86 | --- | --- | --- | --- | 13.58 | 13.82 | 14.00 | 13.88 | 13.88 | 13.82 |
| MIN | 13.68 | 13.34 | --- | --- | --- | --- | 12.64 | 13.64 | 13.68 | 13.68 | 13.66 | 13.68 |

## 455545089262500 LITTLE ST. GERMAIN LAKE, NORTHEAST BAY, NEAR ST. GERMAIN, WI

LOCATION.--Lat 45°55'45", long 89°26'25", in SW 1/4 SE 1/4 sec.24, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, near St. Germain.

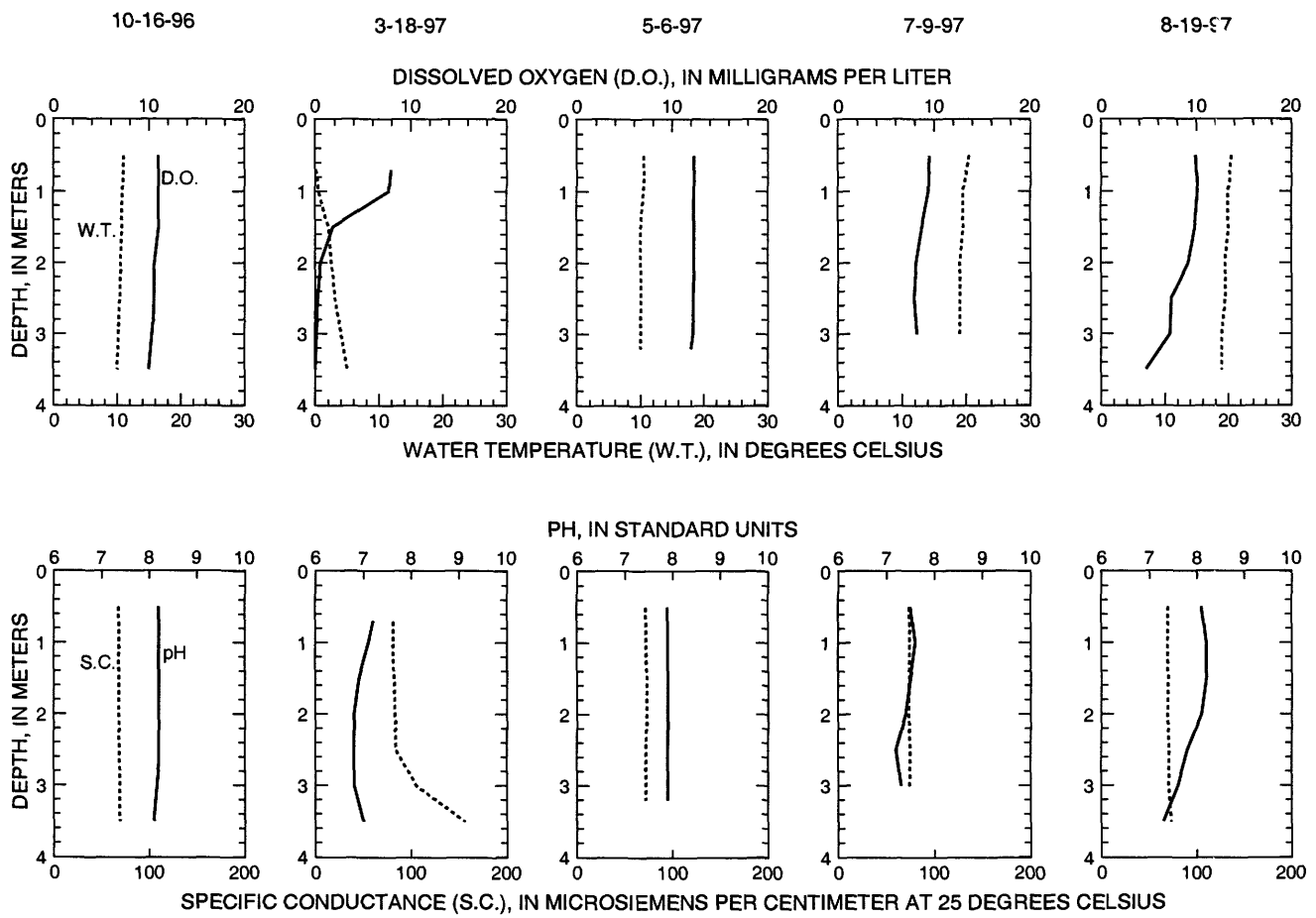
PERIOD OF RECORD.--April 1991 to August 1994, August 1996 to August 1997 (discontinued).

REMARKS.--Lake sampled in northeast bay at a lake depth of about 4 m. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, OCTOBER 16, 1996 TO AUGUST 19, 1997

(Milligrams per liter unless otherwise indicated)

| | Oct. 16 | | Mar. 18 | | May 06 | | July 09 | | Aug. 19 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | --- | | --- | | --- | | --- | | |
| Secchi-depth (meters) | 1.4 | | 1.1 | | 1.5 | | 2.5 | | 1.0 | | |
| Chlorophyll a, phytoplankton(µg/L) | 25 | | 32 | | 20 | | 4.6 | | 44 | | |
| Depth of sample (m) | 0.5 | 3.5 | 1.0 | 3.0 | 0.5 | 3.2 | 0.5 | 3.5 | 0.5 | 2.0 | 3.5 |
| Water temperature (°C) | 11.0 | 10.0 | 0.5 | 4.0 | 10.5 | 10.0 | 20.5 | 19.0 | 20.5 | 19.5 | 19.0 |
| Specific conductance (µS/cm) | 68 | 69 | 81 | 105 | 72 | 72 | 74 | 74 | 70 | 69 | 73 |
| pH (units) | 8.2 | 8.1 | 7.1 | 6.8 | 7.9 | 7.9 | 7.5 | 7.3 | 8.1 | 8.1 | 7.3 |
| Dissolved oxygen | 11.5 | 10.7 | 7.7 | 0.1 | 12.3 | 12.0 | 9.5 | 8.2 | 9.9 | 9.1 | 4.7 |
| Phosphorus, total (as P) | 0.045 | 0.033 | 0.042 | 0.099 | 0.062 | 0.058 | 0.061 | 0.056 | 0.071 | 0.058 | 0.054 |



## 455437089270800 LITTLE ST. GERMAIN LAKE, SOUTH BAY, NEAR ST. GERMAIN, WI

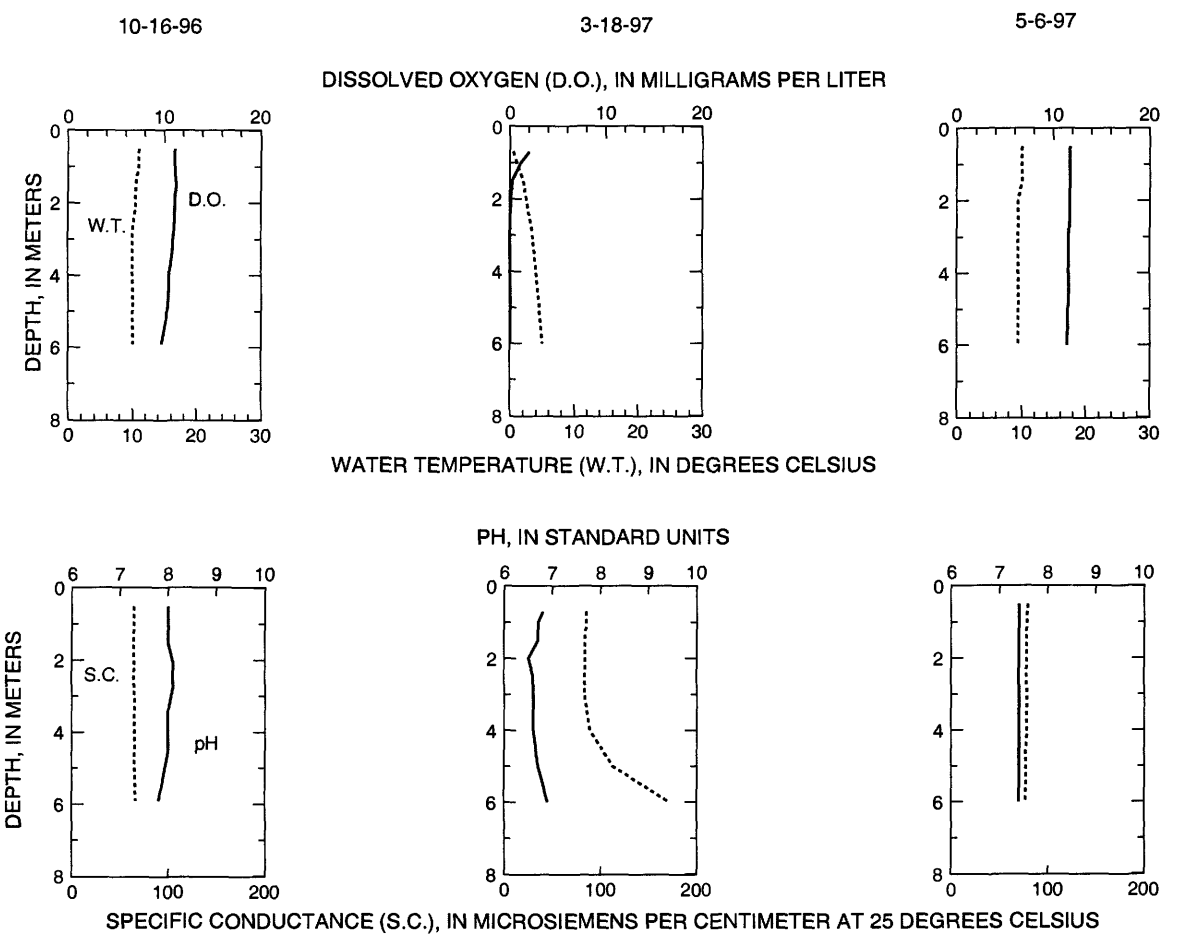
LOCATION.--Lat 45°54'37", long 89°27'08", in NW 1/4 NE 1/4 sec.35, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, 1.7 mi east of St. Germain.

PERIOD OF RECORD.--April 1991 to August 1994, August 1996 to August 1997 (discontinued).

REMARKS.--Lake sampled in south bay at a lake depth of about 7 m. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

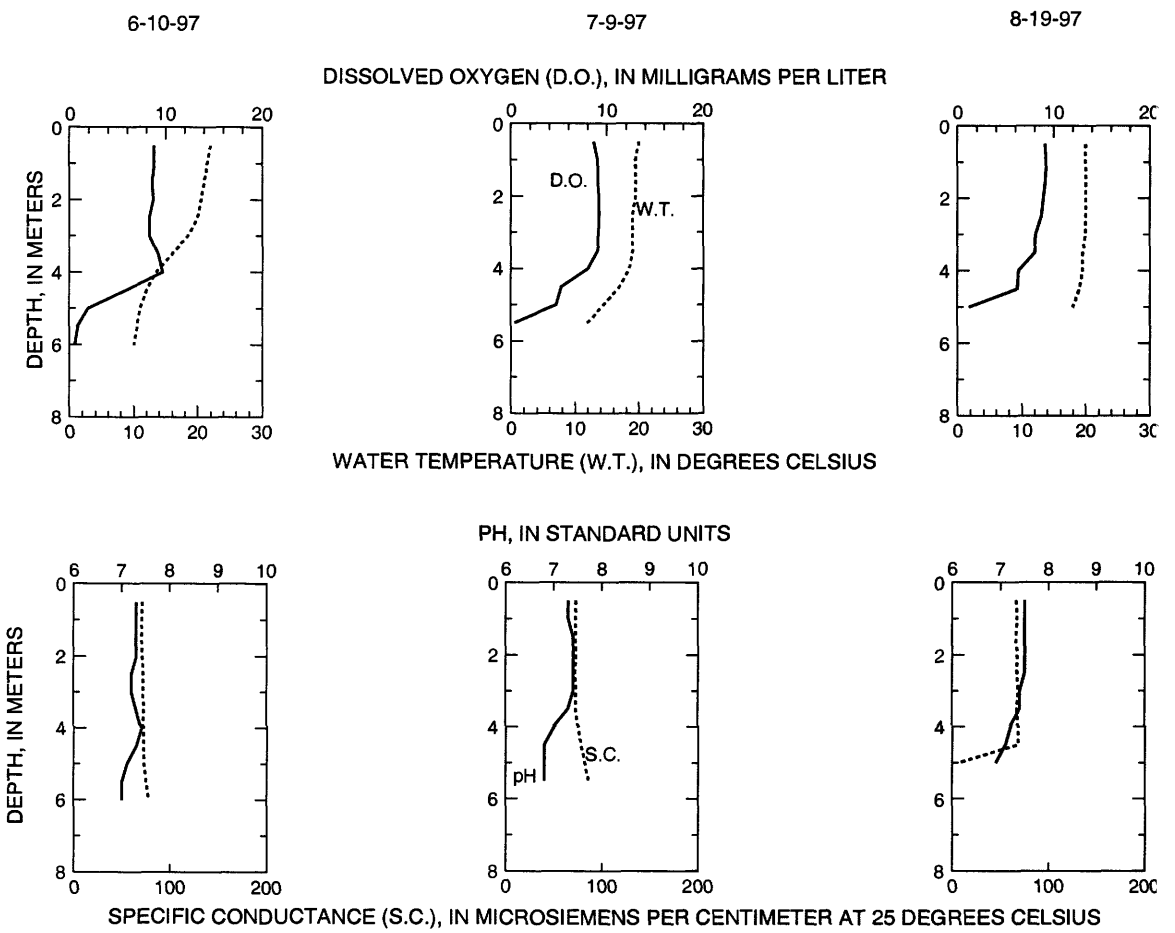
WATER-QUALITY DATA, OCTOBER 16, 1996 TO MAY 06, 1997
(Milligrams per liter unless otherwise indicated)

| | Oct. 16 | | Mar. 18 | | May 06 | |
|---|---|---|---|---|---|---|
| Secchi-depth (meters) | 2.6 | | --- | | 1.6 | |
| Chlorophyll a, phytoplankton (µg/L) | 13 | | --- | | 27 | |
| Depth of sample (m) | 0.5 | 5.9 | 1.5 | 5.0 | 0.5 | 6.0 |
| Water temperature (°C) | 11.0 | 10.0 | 2.0 | 4.5 | 10.0 | 9.5 |
| Specific conductance (µS/cm) | 64 | 66 | 84 | 113 | 79 | 77 |
| pH (units) | 8.0 | 7.8 | 6.7 | 6.7 | 7.4 | 7.4 |
| Dissolved oxygen | 11.1 | 9.7 | 0.2 | 0.0 | 11.7 | 11.4 |
| Phosphorus, total (as P) | 0.024 | 0.021 | 0.055 | 0.182 | 0.054 | 0.053 |



WATER-QUALITY DATA, JUNE 10 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 10 | | July 09 | | Aug. 19 | | |
|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | 4.4 | | 2.4 | | 2.0 | | |
| Chlorophyll a, phytoplankton (µg/L) | 1.8 | | 7.5 | | 11 | | |
| Depth of sample (m) | 0.5 | 6.0 | 0.5 | 5.5 | 0.5 | 3.0 | 5.0 |
| Water temperature (°C) | 22.0 | 10.0 | 20.0 | 12.0 | 20.0 | 20.0 | 18.0 |
| Specific conductance (µS/cm) | 71 | 78 | 73 | 86 | 66 | 68 | 7 |
| pH (units) | 7.3 | 7.0 | 7.3 | 6.8 | 7.5 | 7.4 | 6.9 |
| Dissolved oxygen | 8.8 | 0.5 | 8.6 | 0.4 | 9.1 | 8.1 | 1.2 |
| Phosphorus, total (as P) | 0.051 | 0.136 | 0.030 | 0.064 | 0.034 | 0.040 | 0.078 |



## 455428089282400 LITTLE ST. GERMAIN LAKE, WEST BAY, AT ST. GERMAIN, WI

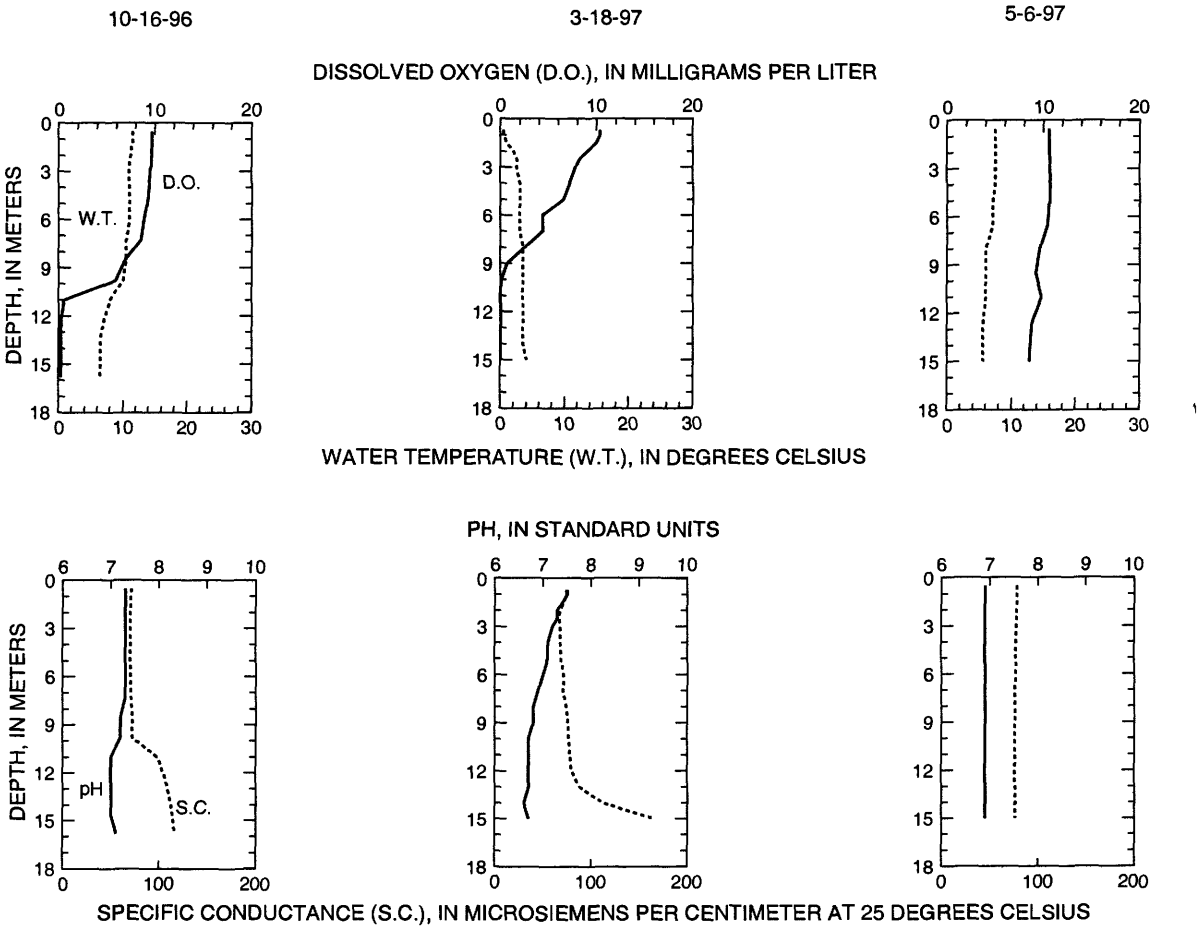
LOCATION.--Lat 45°54'28", long 89°28'24", in SW 1/4 NE 1/4 sec.34, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, at St. Germain.

PERIOD OF RECORD.--April 1991 to August 1994, August 1996 to August 1997 (discontinued).

REMARKS.--Lake sampled in west bay at a lake depth of about 18 m. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

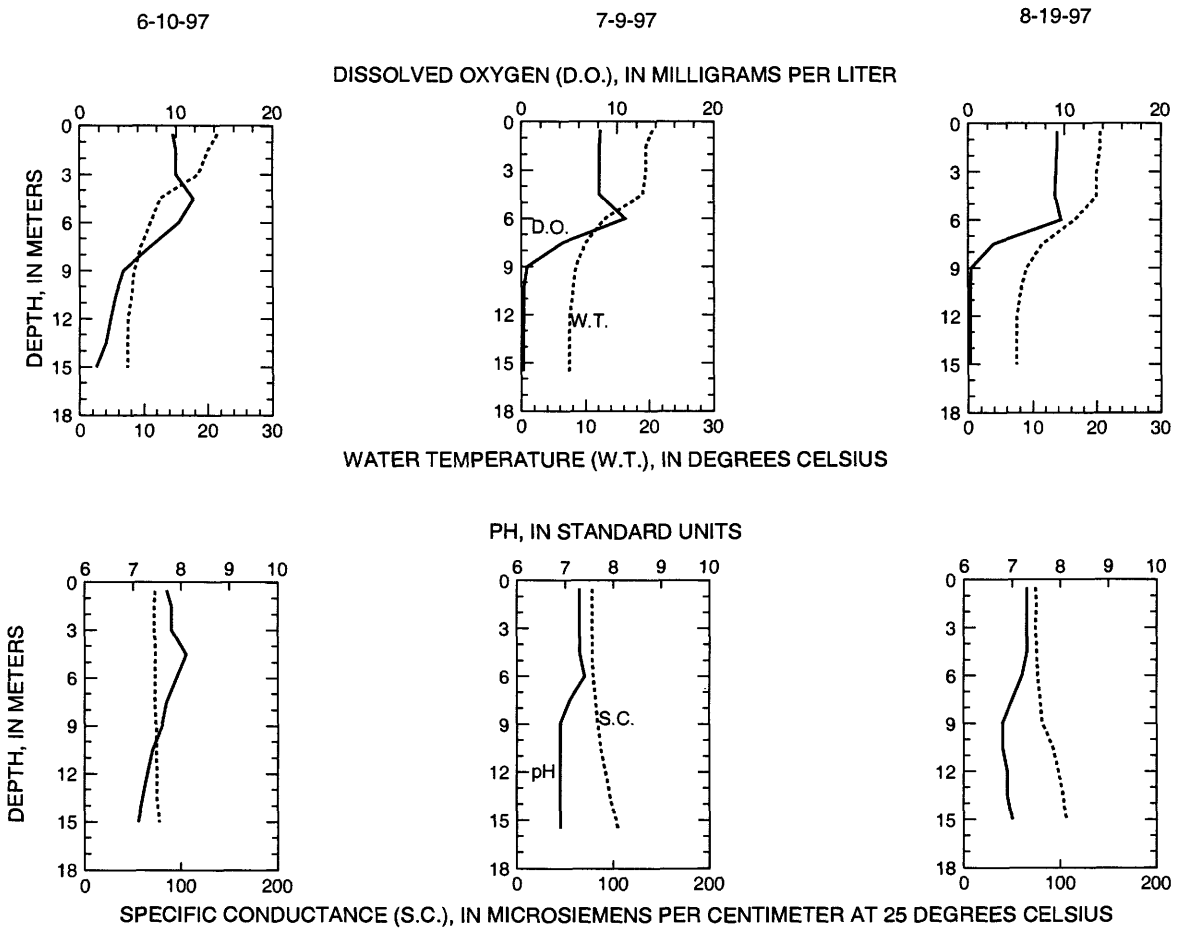
WATER-QUALITY DATA, OCTOBER 16, 1996 TO MAY 06, 1997
(Milligrams per liter unless otherwise indicated)

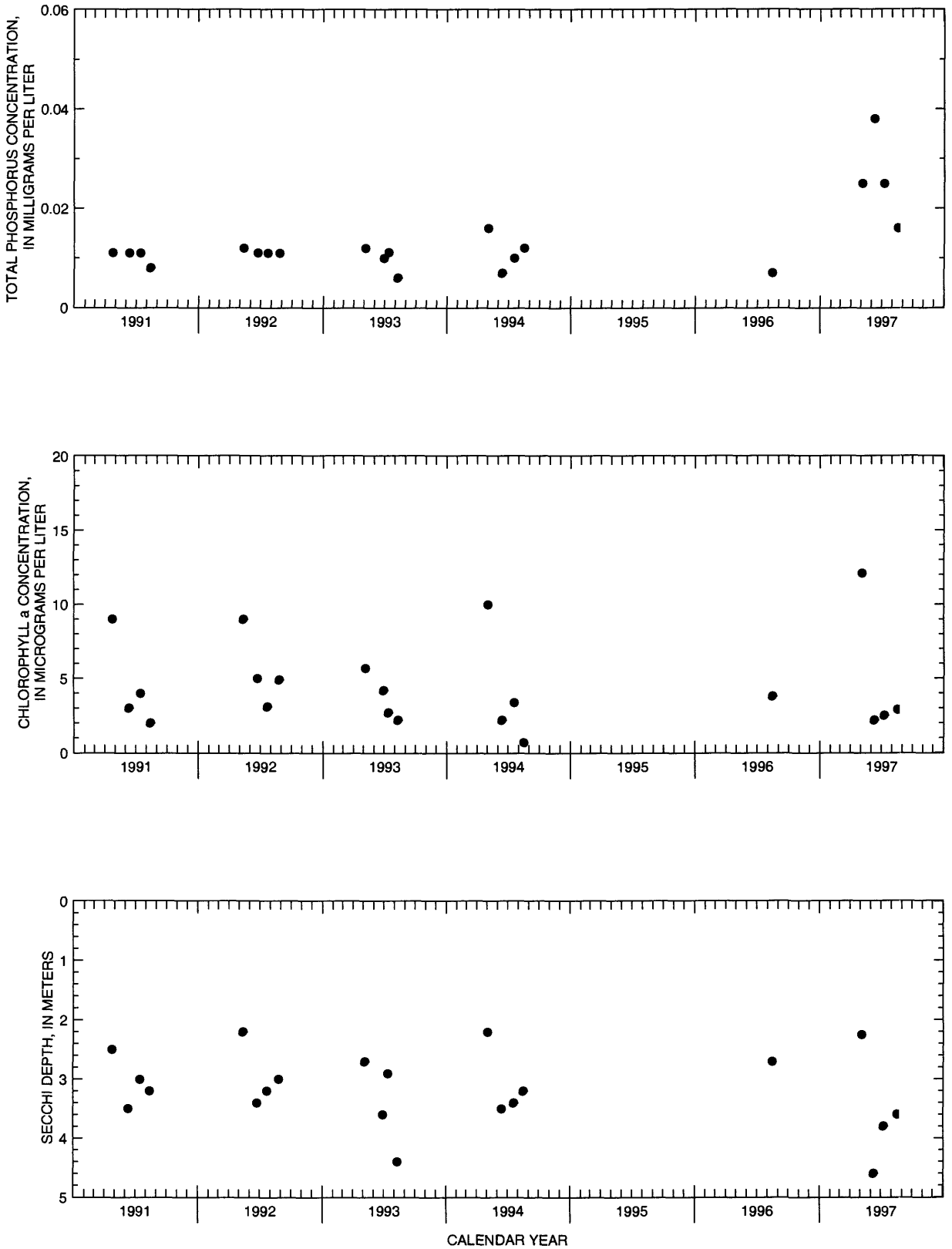
| | Oct. 16 | | Mar. 18 | | | May 06 | |
|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | 3.2 | | --- | | | 2.3 | |
| Chlorophyll a, phytoplankton (µg/L) | 8 | | --- | | | 12 | |
| Depth of sample (m) | 0.5 | 15.8 | 2.0 | 9.0 | 14 | 0.5 | 15 |
| Water temperature (°C) | 11.5 | 6.5 | 2.0 | 3.5 | 3.5 | 7.5 | 5.5 |
| Specific conductance (µS/cm) | 71 | 116 | 68 | 76 | 112 | 78 | 76 |
| pH (units) | 7.3 | 7.1 | 7.3 | 6.8 | 6.8 | 6.9 | 6.9 |
| Dissolved oxygen | 9.7 | 0.2 | 9.0 | 0.7 | 0.0 | 10.6 | 8.5 |
| Phosphorus, total (as P) | 0.013 | 0.264 | 0.008 | 0.025 | 0.173 | 0.025 | 0.023 |



WATER-QUALITY DATA, JUNE 10 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 10 | | July 09 | | Aug. 19 | | | |
|---|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | 4.6 | | 3.8 | | 3.6 | | | |
| Chlorophyll a, phytoplankton (µg/L) | 2.2 | | 2.5 | | 2.9 | | | |
| Depth of sample (m) | 0.5 | 15 | 0.5 | 16 | 0.5 | 4.5 | 11 | 15 |
| Water temperature (°C) | 21.5 | 7.5 | 20.5 | 7.0 | 20.5 | 20.0 | 8.0 | 7.5 |
| Specific conductance (µS/cm) | 73 | 77 | 78 | 105 | 74 | 75 | 92 | 106 |
| pH (units) | 7.7 | 7.1 | 7.3 | 6.9 | 7.3 | 7.3 | 6.8 | 6.9 |
| Dissolved oxygen | 9.7 | 1.7 | 8.2 | 0.2 | 9.2 | 9.0 | 0.2 | 0.2 |
| Phosphorus, total (as P) | 0.038 | 0.066 | 0.025 | 0.126 | 0.016 | 0.017 | 0.070 | 0.163 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Little St. Germain Lake, West Bay, at St. Germain, Wisconsin.

## 04074651 LITTLE SAND LAKE NEAR MOLE LAKE, WI

LOCATION.--Lat 45°28'36" long 88°53'41", in SW 1/4 NE 1/4 sec.31, T.35 N., R.13 E., Forest County, Hydrologic Unit 04030202, on left bank 1 mi upstream of outlet, 3 mi southeast of Mole Lake.

PERIOD OF RECORD.--May 1996 to September 1997.

GAGE.--Water-stage recorder. Datum of gage is 1,587.32 ft above sea level.

REMARKS.--Recorder removed during period of ice, Nov. 5, 1996 to May 7, 1997. Gage heights are obtained from reference point during this period.

EXTREMES FOR CURRENT PERIOD.--May to September 1996: Maximum gage height observed, 5.81 ft, June 29; minimum observed, 5.17 ft, Sept. 30.

October 1996 to September 1997: Maximum gage height observed, 5.97 ft, May 25; minimum observed, 5.04 ft, Oct. 16.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | 5.49 | 5.78 | 5.35 | 5.25 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | 5.54 | 5.80 | 5.32 | 5.26 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | 5.57 | 5.79 | 5.31 | 5.31 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | 5.60 | 5.78 | 5.29 | 5.30 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | 5.60 | 5.76 | 5.33 | 5.29 |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.70 | 5.37 | 5.25 |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.61 | 5.41 | 5.25 |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.53 | 5.41 | 5.27 |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | 5.62 | 5.46 | 5.40 | 5.31 |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | 5.62 | 5.41 | 5.40 | 5.33 |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.38 | 5.38 | 5.38 |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.38 | 5.37 | 5.33 |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | 5.62 | 5.39 | 5.38 | 5.28 |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | 5.61 | 5.39 | 5.37 | 5.26 |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | 5.60 | 5.38 | 5.34 | 5.26 |
| 16 | --- | --- | --- | --- | --- | --- | --- | 5.65 | 5.60 | 5.36 | 5.33 | 5.25 |
| 17 | --- | --- | --- | --- | --- | --- | --- | 5.65 | 5.65 | 5.35 | 5.32 | 5.24 |
| 18 | --- | --- | --- | --- | --- | --- | --- | 5.65 | 5.70 | 5.38 | 5.31 | 5.26 |
| 19 | --- | --- | --- | --- | --- | --- | --- | 5.66 | 5.72 | 5.40 | 5.30 | 5.22 |
| 20 | --- | --- | --- | --- | --- | --- | --- | 5.67 | 5.73 | 5.39 | 5.33 | 5.26 |
| 21 | --- | --- | --- | --- | --- | --- | --- | 5.66 | 5.75 | 5.38 | 5.34 | 5.21 |
| 22 | --- | --- | --- | --- | --- | --- | --- | 5.65 | 5.77 | 5.36 | 5.32 | 5.22 |
| 23 | --- | --- | --- | --- | --- | --- | --- | 5.63 | 5.77 | 5.35 | 5.31 | 5.18 |
| 24 | --- | --- | --- | --- | --- | --- | --- | 5.61 | 5.76 | 5.38 | 5.31 | 5.20 |
| 25 | --- | --- | --- | --- | --- | --- | --- | 5.59 | 5.76 | 5.38 | 5.36 | 5.21 |
| 26 | --- | --- | --- | --- | --- | --- | --- | 5.58 | 5.77 | 5.37 | 5.34 | --- |
| 27 | --- | --- | --- | --- | --- | --- | --- | 5.56 | 5.79 | 5.35 | 5.33 | --- |
| 28 | --- | --- | --- | --- | --- | --- | --- | 5.55 | 5.80 | 5.36 | 5.31 | 5.21 |
| 29 | --- | --- | --- | --- | --- | --- | --- | 5.52 | 5.81 | 5.37 | 5.31 | 5.18 |
| 30 | --- | --- | --- | --- | --- | --- | --- | 5.52 | 5.80 | 5.36 | 5.27 | 5.17 |
| 31 | --- | --- | --- | --- | --- | --- | --- | 5.50 | --- | 5.36 | 5.25 | --- |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | 5.67 | 5.47 | 5.34 | --- |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | 5.81 | 5.80 | 5.41 | --- |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | 5.49 | 5.35 | 5.25 | --- |

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.18 | 5.23 | --- | --- | --- | --- | --- | --- | 5.86 | 5.63 | 5.39 | 5.40 |
| 2 | 5.15 | 5.23 | --- | --- | --- | --- | --- | --- | 5.82 | 5.51 | 5.39 | 5.39 |
| 3 | 5.15 | 5.29 | --- | --- | --- | --- | --- | --- | 5.78 | 5.63 | 5.39 | 5.38 |
| 4 | 5.15 | 5.26 | --- | --- | --- | --- | --- | --- | 5.80 | 5.59 | 5.39 | 5.39 |
| 5 | 5.15 | --- | --- | --- | --- | --- | --- | --- | 5.82 | 5.60 | 5.42 | 5.40 |
| 6 | 5.12 | --- | --- | --- | --- | --- | 5.26 | --- | 5.76 | 5.57 | 5.43 | 5.41 |
| 7 | 5.09 | --- | --- | --- | --- | --- | --- | --- | 5.84 | 5.46 | 5.44 | 5.42 |
| 8 | 5.10 | --- | --- | --- | --- | --- | --- | 5.68 | 5.79 | 5.59 | 5.46 | 5.43 |
| 9 | 5.11 | --- | --- | --- | --- | --- | --- | 5.69 | 5.73 | 5.42 | 5.47 | 5.40 |
| 10 | 5.10 | --- | --- | --- | --- | --- | --- | 5.70 | 5.74 | 5.44 | 5.49 | 5.40 |
| 11 | 5.09 | --- | --- | --- | --- | --- | --- | 5.70 | 5.76 | 5.38 | 5.51 | 5.42 |
| 12 | 5.04 | --- | --- | --- | --- | --- | --- | 5.70 | 5.75 | 5.38 | 5.52 | 5.43 |
| 13 | 5.08 | --- | --- | --- | --- | --- | --- | 5.70 | 5.78 | 5.34 | 5.54 | 5.45 |
| 14 | 5.07 | --- | --- | --- | --- | --- | --- | 5.72 | 5.64 | 5.38 | 5.55 | 5.47 |
| 15 | 5.07 | --- | --- | --- | --- | --- | --- | 5.74 | 5.71 | 5.40 | 5.53 | 5.48 |
| 16 | 5.04 | --- | --- | --- | --- | --- | --- | 5.75 | 5.65 | 5.48 | 5.53 | 5.47 |
| 17 | 5.15 | --- | --- | --- | --- | --- | --- | 5.76 | 5.68 | 5.44 | 5.47 | 5.37 |
| 18 | 5.18 | --- | --- | --- | --- | --- | --- | 5.78 | 5.72 | 5.38 | 5.41 | 5.36 |
| 19 | 5.14 | --- | --- | --- | --- | --- | --- | 5.83 | 5.64 | 5.35 | 5.40 | 5.31 |
| 20 | 5.14 | --- | --- | --- | --- | 4.85 | --- | 5.83 | 5.62 | 5.35 | 5.37 | 5.32 |
| 21 | 5.15 | --- | --- | --- | --- | --- | --- | 5.84 | 5.62 | 5.41 | 5.37 | 5.32 |
| 22 | 5.23 | --- | --- | --- | --- | --- | 5.72 | 5.83 | 5.60 | 5.40 | 5.38 | 5.33 |
| 23 | 5.18 | --- | --- | --- | --- | --- | --- | 5.83 | 5.60 | 5.40 | 5.39 | 5.35 |
| 24 | 5.24 | --- | --- | --- | --- | --- | --- | 5.86 | 5.62 | --- | 5.39 | 5.37 |
| 25 | 5.24 | --- | --- | --- | --- | --- | --- | 5.97 | 5.59 | --- | 5.37 | 5.37 |
| 26 | --- | --- | --- | --- | --- | --- | --- | 5.91 | 5.61 | --- | 5.36 | 5.37 |
| 27 | --- | --- | --- | --- | --- | --- | --- | 5.91 | 5.52 | --- | 5.38 | 5.37 |
| 28 | 5.24 | --- | --- | --- | --- | --- | --- | 5.86 | 5.57 | --- | 5.38 | 5.39 |
| 29 | 5.23 | --- | --- | --- | --- | --- | --- | 5.88 | 5.49 | --- | 5.40 | 5.41 |
| 30 | 5.26 | --- | --- | --- | --- | --- | --- | 5.88 | 5.53 | 5.38 | 5.40 | 5.42 |
| 31 | 5.26 | --- | --- | --- | --- | --- | --- | 5.88 | --- | 5.36 | 5.39 | --- |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | 5.68 | --- | 5.43 | 5.39 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | 5.86 | --- | 5.55 | 5.48 |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | 5.49 | --- | 5.36 | 5.31 |

## 455540092022600 MCKENZIE LAKE, NORTHERN SITE, NEAR SPOONER, WI

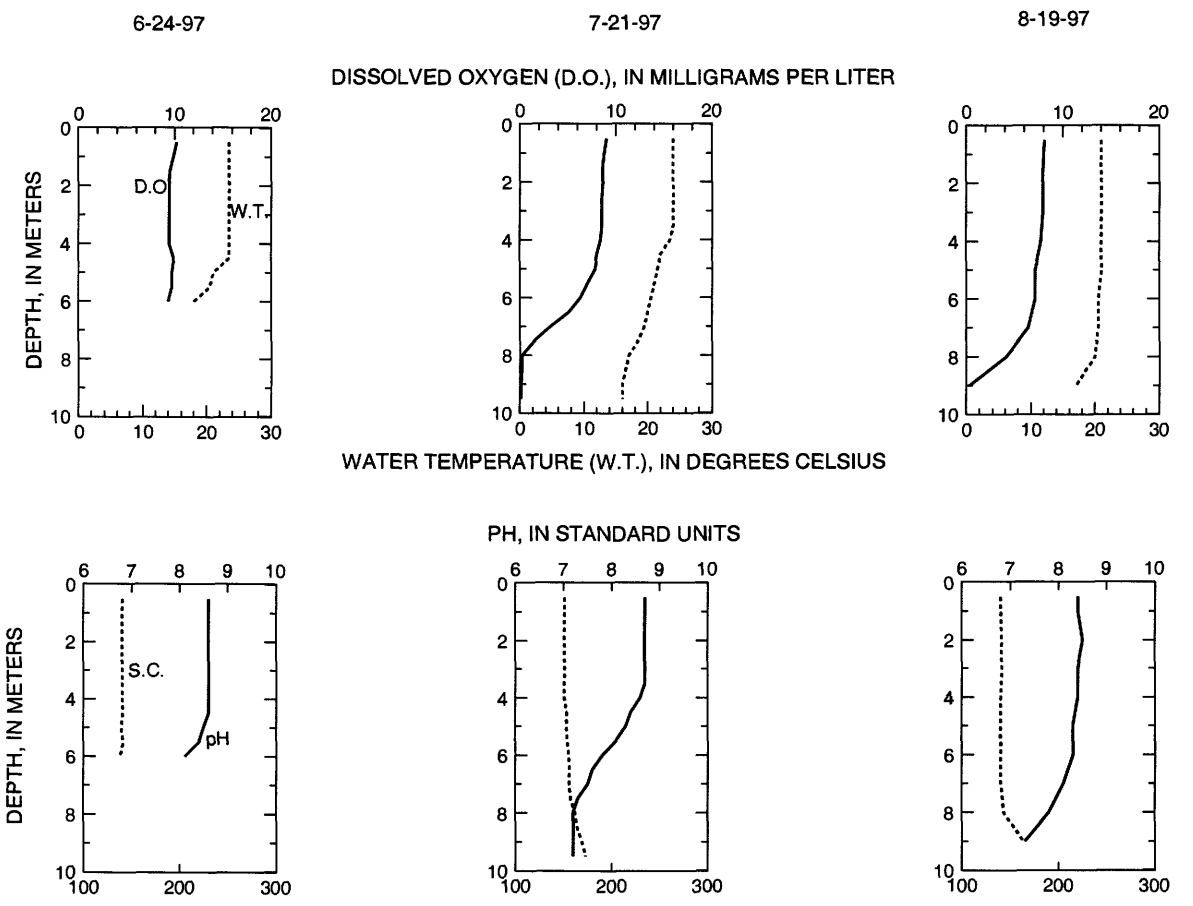
LOCATION.--Lat 45°55'40", long 92°02'26", in NW 1/4 NE 1/4 sec.25, T.40 N., R.14 W., Burnett County, Hydrologic Unit 07030002, 10.3 mi northwest of Spooner.

PERIOD OF RECORD.--June to August 1997.

REMARKS.--Lake sampled at about 8-meter depth in northern region of lake. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, JUNE 24 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 24 | | July 21 | | Aug. 19 | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | 0.06 | | 0.12 | | 0.12 | |
| Secchi-depth (meters) | 3.8 | | 4.4 | | 2.8 | |
| Chlorophyll a, phytoplankton (µg/L) | 3.1 | | 3.1 | | 5.2 | |
| Depth of sample (m) | 0.5 | 7.5 | 0.5 | 9.5 | 0.5 | 9.0 |
| Water temperature (°C) | 23.5 | 15.5 | 24.0 | 16.0 | 21.0 | 17.0 |
| Specific conductance (µS/cm) | 140 | 139 | 151 | 173 | 140 | 163 |
| pH (units) | 8.6 | 7.6 | 8.7 | 7.2 | 8.4 | 7.3 |
| Dissolved oxygen | 10.2 | 7.2 | 9.0 | 0.1 | 8.1 | 0.3 |
| Phosphorus, total (as P) | 0.026 | 0.033 | 0.026 | 0.045 | 0.042 | 0.045 |



## 455507092013500 MCKENZIE LAKE, AT DEEP HOLE, NEAR SPOONER, WI

LOCATION.--Lat 45°55'07", long 92°01'35", in NW 1/4 SW 1/4 sec.30, T.40 N., R.13 W., Washburn County, Hydrologic Unit 07030002, 9.4 mi northwest of Spooner.

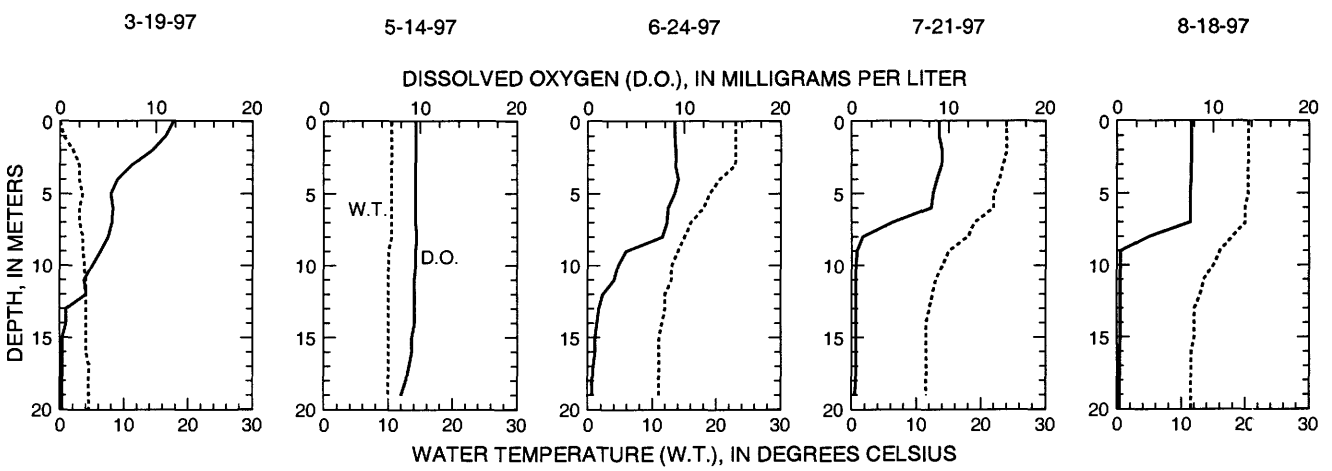
PERIOD OF RECORD.--February 1987 to current year. (Data collected before 1997 available, but not published in this report series.)

REMARKS.--Lake sampled at deepest point in the lake. Water sampling done by Wisconsin Department of Natural Resources. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 19 TO AUGUST 18, 1997
(Milligrams per liter unless otherwise indicated)

| | Mar. 19 | | May 14 | | June 24 | | | July 21 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | --- | | 4.5 | | 3.4 | | | 4.1 | | |
| Chlorophyll a, phytoplankton (µg/L) | 9.1 | | 2.7 | | 4.1 | | | 3.9 | | |
| Depth of sample (m) | 0.5 | 20.0 | 0.5 | 20.0 | 0.5 | 9.0 | 21.0 | 0.5 | 10.0 | 20.0 |
| Water temperature (°C) | 0.0 | 4.6 | 10.3 | 10.0 | 23.0 | 14.0 | 11.0 | 23.9 | 14.2 | 11.2 |
| pH (units) | 7.7 | 7.4 | 7.4 | 7.4 | 7.6 | 7.5 | 7.4 | 8.1 | 7.5 | 7.4 |
| Dissolved oxygen | 11.8 | 0.2 | 9.5 | 7.0 | 9.0 | 3.9 | 0.3 | 9.0 | 0.4 | 0.3 |
| Phosphorus, total (as P) | 0.009 | 0.102 | 0.067 | 0.075 | 0.031 | 0.040 | 0.088 | 0.054 | 0.081 | 0.21 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.012 | 0.018 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | <0.013 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.3 | 0.3 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.3 | 0.3 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 5 | 5 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.6 | 0.8 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 74 | 73 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 20 | 20 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 5.8 | 5.8 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 2.7 | 2.9 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 0.7 | 0.5 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 72 | 72 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | <2 | <2 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 3.5 | 3.1 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 110 | 108 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | 40 | 80 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | 21 | 42 | --- | --- | --- | --- | --- | --- |

| | Aug 18 | | |
|---|---|---|---|
| Secchi-depth (meters) | 3.1 | | |
| Chlorophyll a, phytoplankton (µg/L) | 5.1 | | |
| Depth of sample (m) | 0.5 | 11.0 | 21.0 |
| Water temperature (°C) | 20.3 | 13.5 | 11.2 |
| pH (units) | 7.5 | 7.3 | 7.3 |
| Dissolved oxygen | 7.7 | 0.3 | 0.2 |
| Phosphorus, total (as P) | 0.044 | 0.196 | 0.345 |



## 445437092022300 MCKENZIE LAKE, SOUTH SITE, NEAR SPOONER, WI

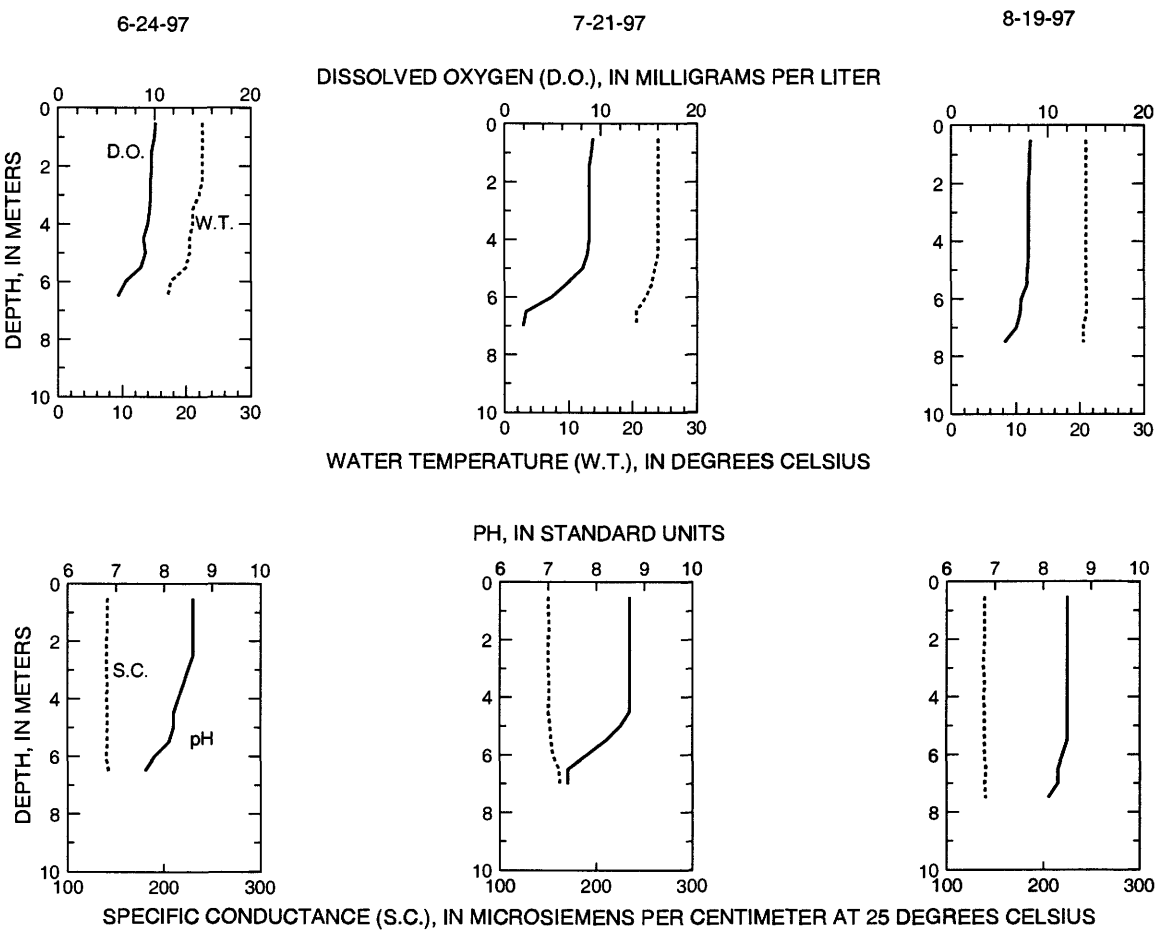
LOCATION.--Lat 45°54'37", long 92°02'23", in SW 1/4 NE 1/4 sec.36, T.40 N., R.14 W., Burnett County, Hydrologic Unit 07030002, 9.2 mi northwest of Spooner.

PERIOD OF RECORD.--June to August 1997.

REMARKS.--Lake sampled at about 8-meter depth in southern region of lake. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, JUNE 24 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 24 | | July 21 | | Aug. 19 | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | 0.06 | | 0.12 | | 0.12 | |
| Secchi-depth (meters) | 3.0 | | 4.0 | | 2.3 | |
| Chlorophyll a, phytoplankton (µg/L) | 3.8 | | 4.2 | | 6.1 | |
| Depth of sample (m) | 0.5 | 6.5 | 0.5 | 7.0 | 0.5 | 7.5 |
| Water temperature (°C) | 22.5 | 17.0 | 24.0 | 20.5 | 21.0 | 20.5 |
| Specific conductance (µS/cm) | 141 | 142 | 150 | 162 | 139 | 140 |
| pH (units) | 8.6 | 7.6 | 8.7 | 7.4 | 8.5 | 8.1 |
| Dissolved oxygen | 10.1 | 6.2 | 9.2 | 1.9 | 8.2 | 5.5 |
| Phosphorus, total (as P) | 0.030 | 0.059 | 0.030 | 0.039 | 0.041 | 0.045 |

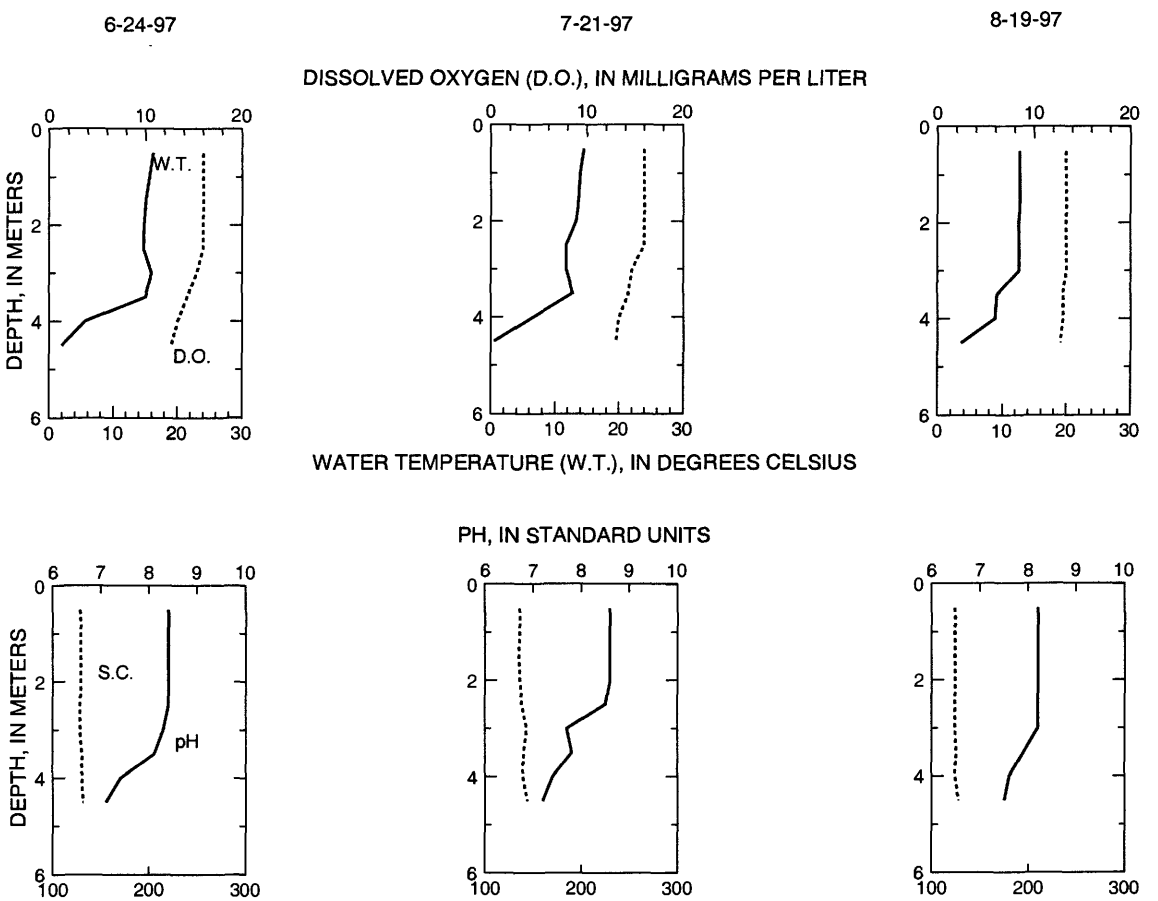


## 455902092011900 LOWER MCKENZIE LAKE NEAR WEBB LAKE, WI

LOCATION.--Lat 45°59'02", long 92°01'19", in NW 1/4 NE 1/4 sec.6, T.40 N., R.13 W., Washburn County, Hydrologic Unit 07030002, 13.8 mi northwest of Spooner.
PERIOD OF RECORD.--June to August 1997.
REMARKS.--Lake sampled at deepest point. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, JUNE 24 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 24 | | July 21 | | Aug. 19 | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 92.39 | | 92.41 | |
| Secchi-depth (meters) | 2.4 | | 2.2 | | 1.8 | |
| Chlorophyll a, phytoplankton (µg/L) | 5.4 | | 6.1 | | 15 | |
| Depth of sample (m) | 0.5 | 4.5 | 0.5 | 4.5 | 0.5 | 4.5 |
| Water temperature (°C) | 24.0 | 19.0 | 24.0 | 19.5 | 20.0 | 19.0 |
| Specific conductance (µS/cm) | 128 | 131 | 136 | 144 | 124 | 127 |
| pH (units) | 8.4 | 7.1 | 8.6 | 7.2 | 8.2 | 7.5 |
| Dissolved oxygen | 10.8 | 1.3 | 9.7 | 0.3 | 8.5 | 2.4 |
| Phosphorus, total (as P) | 0.031 | 0.032 | 0.033 | 0.062 | 0.045 | 0.063 |



## 455635092021800 MIDDLE MCKENZIE LAKE NEAR SPOONER, WI

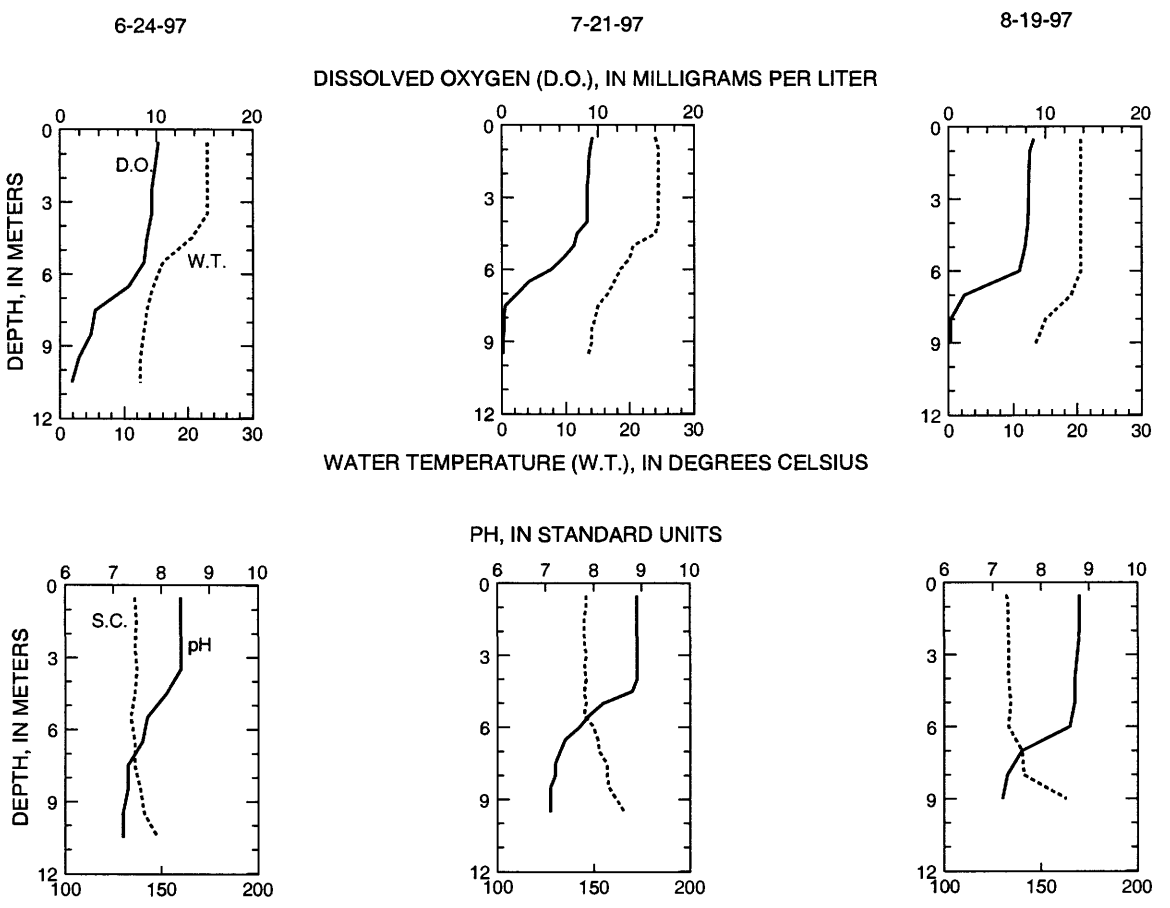
LOCATION.--Lat 45°56'35", long 92°02'18", in SW 1/4 SE 1/4 sec.13, T.40 N., R.14 W., Burnett County, Hydrologic Unit 07030002, 11.2 mi northwest of Spooner.

PERIOD OF RECORD.--June to August 1997.

REMARKS.--Lake sampled near center at deep hole. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, JUNE 24 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | June 24 | | July 21 | | Aug. 19 | |
|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 91.94 | | 92.00 | |
| Secchi-depth (meters) | 2.5 | | 3.1 | | 2.6 | |
| Chlorophyll a, phytoplankton (µg/L) | 2.2 | | 2.2 | | 5.8 | |
| Depth of sample (m) | 0.5 | 10 | 0.5 | 9.5 | 0.5 | 9.0 |
| Water temperature (°C) | 23.0 | 12.5 | 24.0 | 13.5 | 20.5 | 13.5 |
| Specific conductance (µS/cm) | 136 | 148 | 146 | 166 | 132 | 163 |
| pH (units) | 8.4 | 7.2 | 8.9 | 7.1 | 8.8 | 7.2 |
| Dissolved oxygen | 10.2 | 1.2 | 9.4 | 0.1 | 8.8 | 0.2 |
| Phosphorus, total (as P) | 0.030 | 0.052 | 0.034 | 0.043 | 0.040 | 0.099 |



## 423128088151200 MARY (MARIE) LAKE AT TWIN LAKES, WI

LOCATION.--Lat 42°31'28", long 88°15'12", in SW 1/4 SE 1/4 sec.21, T.1 N., R.19 E., Kenosha County, Hydrologic Unit 07120006, near Twin Lakes.

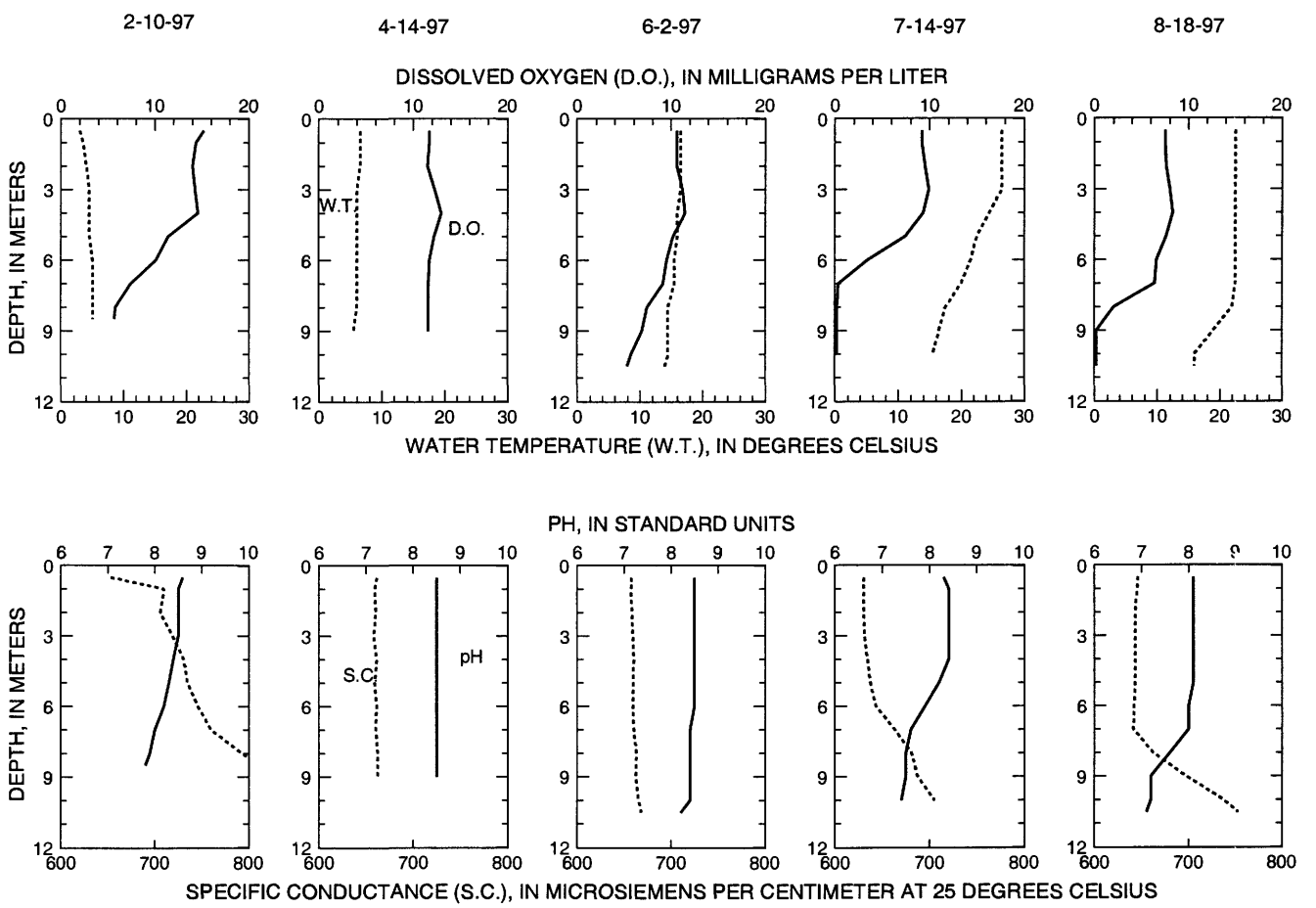
PERIOD OF RECORD.--February 1995 to August 1997 (discontinued).

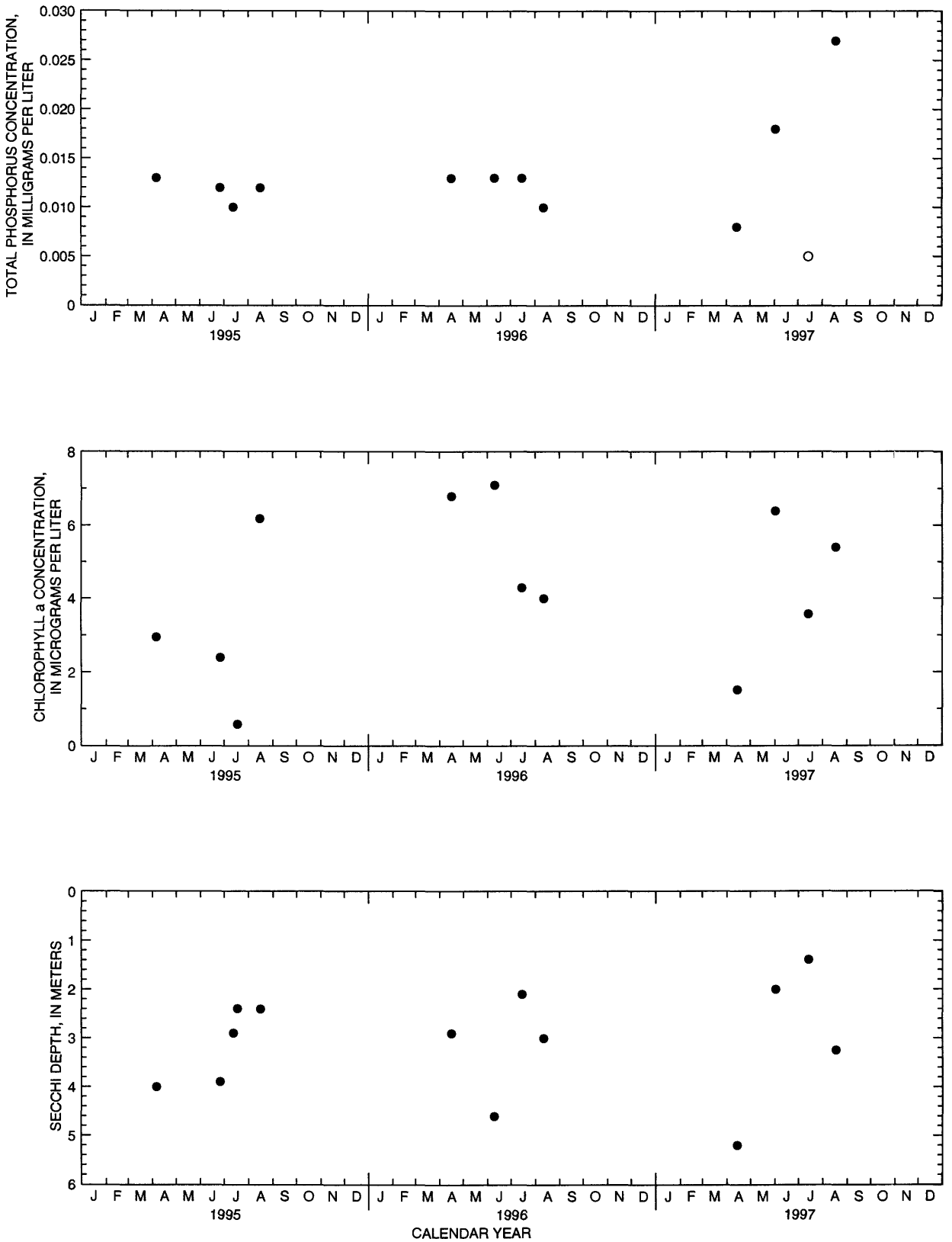
REMARKS.--Lake sampled slightly north of center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 18, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 10 | | Apr. 14 | | June 02 | | July 14 | | Aug. 18 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 11.66 | | 11.69 | | 11.77 | | 11.62 | | 12.02 | |
| Secchi-depth (meters) | --- | | 5.2 | | 2.0 | | 1.4 | | 3.2 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 1.5 | | 6.4 | | 3.6 | | 5.4 | |
| Depth of sample (m) | 0.5 | 8.5 | 0.5 | 9.0 | 0.5 | 10 | 0.5 | 10 | 0.5 | 11 |
| Water temperature (°C) | 3.0 | 5.0 | 6.5 | 5.5 | 16.5 | 14.0 | 26.5 | 15.5 | 22.5 | 16.0 |
| Specific conductance (µS/cm) | 653 | 813 | 661 | 662 | 657 | 668 | 630 | 705 | 646 | 753 |
| pH (units) | 8.6 | 7.8 | 8.5 | 8.5 | 8.5 | 8.2 | 8.3 | 7.4 | 8.1 | 7.1 |
| Dissolved oxygen | 15.2 | 5.7 | 11.7 | 11.6 | 10.6 | 5.3 | 9.2 | 0.2 | 7.5 | 0.2 |
| Phosphorus, total (as P) | 0.009 | 0.009 | 0.008 | <0.008 | 0.018 | 0.029 | <0.005 | 0.042 | 0.027 | 0.088 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.08 | 0.09 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.03 | 0.04 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.50 | 0.60 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.58 | 0.69 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 15 | 15 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.90 | 1.00 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 250 | 250 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 41 | 41 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 37 | 37 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 36 | 36 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 190 | 190 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 40 | 41 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 76 | 76 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 1.6 | 1.6 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 360 | 358 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Mary (Marie) Lake at Twin Lakes, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 05428000 LAKE MENDOTA AT MADISON, WI

LOCATION.--Lat 43°05'42", long 89°22'12", in SE 1/4 sec.12, T.7 N., R.9 E., Dane County, Hydrologic Unit 07090001, in city boat house at dam at outlet, in Madison.

DRAINAGE AREA.--233 $mi^2$. Area of Lake Mendota, 15.2 $mi^2$.

PERIOD OF RECORD.--December 1902 to May 1903, January 1916 to current year (incomplete).

REVISED RECORDS.--WDR WI-73-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 840.00 ft above sea level, or 5.60 ft below City of Madison datum. Prior to Oct. 1, 1979, at datum 7.82 ft higher; prior to Nov. 15, 1971, nonrecording gage at same site.

REMARKS.--No estimated daily gage heights. Records are good. Lake level regulated by concrete dam with two 12-foot gates and 20-foot lock at outlet. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 12.20 ft, July 14–15, 1993; minimum observed, 8.02 ft, Feb. 24 to Mar. 10, 1920, current datum.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 10.68 ft, Mar. 13, 14; minimum recorded, 8.96 ft, Dec. 14 and Jan. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9.47 | 9.66 | 9.21 | 8.99 | 9.27 | 10.22 | 10.18 | 9.72 | 9.54 | 10.02 | 10.33 | 9.98 |
| 2 | 9.47 | 9.62 | 9.18 | 8.99 | 9.27 | 10.33 | 10.14 | 9.73 | 9.53 | 10.04 | 10.31 | 9.97 |
| 3 | 9.44 | 9.58 | 9.16 | 8.99 | 9.27 | 10.43 | 10.11 | 9.79 | 9.53 | 10.02 | 10.32 | 9.93 |
| 4 | 9.42 | 9.56 | 9.13 | 9.05 | 9.31 | 10.47 | 10.07 | 9.77 | 9.53 | 9.98 | 10.35 | 9.91 |
| 5 | 9.41 | 9.56 | 9.13 | 9.13 | 9.32 | 10.48 | 10.06 | 9.79 | 9.53 | 9.96 | 10.33 | 9.88 |
| 6 | 9.42 | 9.56 | 9.13 | 9.17 | 9.32 | 10.47 | 10.10 | 9.76 | 9.55 | 10.00 | 10.31 | 9.87 |
| 7 | 9.44 | 9.56 | 9.12 | 9.19 | 9.32 | 10.46 | 10.05 | 9.74 | 9.57 | 9.99 | 10.28 | 9.85 |
| 8 | 9.43 | 9.55 | 9.11 | 9.20 | 9.31 | 10.44 | 9.97 | 9.80 | 9.60 | 10.12 | 10.25 | 9.85 |
| 9 | 9.44 | 9.53 | 9.07 | 9.21 | 9.31 | 10.47 | 9.92 | 9.80 | 9.60 | 10.17 | 10.22 | 9.85 |
| 10 | 9.43 | 9.51 | 9.05 | 9.22 | 9.30 | 10.55 | 9.88 | 9.76 | 9.60 | 10.15 | 10.21 | 9.84 |
| 11 | 9.41 | 9.48 | 9.04 | 9.22 | 9.30 | 10.60 | 9.86 | 9.75 | 9.60 | 10.14 | 10.19 | 9.82 |
| 12 | 9.41 | 9.45 | 9.03 | 9.21 | 9.31 | 10.62 | 9.89 | 9.74 | 9.60 | 10.12 | 10.23 | 9.80 |
| 13 | 9.41 | 9.42 | 9.01 | 9.21 | 9.30 | 10.60 | 9.87 | 9.70 | 9.60 | 10.10 | 10.25 | 9.78 |
| 14 | 9.41 | 9.40 | 8.99 | 9.20 | 9.30 | 10.60 | 9.84 | 9.69 | 9.57 | 10.14 | 10.22 | 9.77 |
| 15 | 9.42 | 9.35 | 9.04 | 9.21 | 9.29 | 10.56 | 9.80 | 9.69 | 9.57 | 10.13 | 10.23 | 9.75 |
| 16 | 9.42 | 9.34 | 9.01 | 9.20 | 9.30 | 10.52 | 9.80 | 9.65 | 9.75 | 10.11 | 10.23 | 9.74 |
| 17 | 9.49 | 9.36 | 9.02 | 9.19 | 9.29 | 10.50 | 9.76 | 9.63 | 9.77 | 10.16 | 10.22 | 9.79 |
| 18 | 9.51 | 9.35 | 9.02 | 9.19 | 9.30 | 10.47 | 9.72 | 9.62 | 9.77 | 10.17 | 10.22 | 9.75 |
| 19 | 9.47 | 9.33 | 9.00 | 9.18 | 9.45 | 10.44 | 9.71 | 9.63 | 9.76 | 10.15 | 10.20 | 9.74 |
| 20 | 9.46 | 9.31 | 8.99 | 9.18 | 9.60 | 10.41 | 9.69 | 9.60 | 9.77 | 10.14 | 10.20 | 9.74 |
| 21 | 9.47 | 9.32 | 8.98 | 9.17 | 9.82 | 10.39 | 9.69 | 9.57 | 9.85 | 10.30 | 10.18 | 9.70 |
| 22 | 9.48 | 9.30 | 8.98 | 9.19 | 10.01 | 10.37 | 9.67 | 9.55 | 9.92 | 10.30 | 10.15 | 9.69 |
| 23 | 9.55 | 9.29 | 8.99 | 9.23 | 10.12 | 10.34 | 9.66 | 9.53 | 9.91 | 10.30 | 10.13 | 9.69 |
| 24 | 9.56 | 9.29 | 8.99 | 9.26 | 10.17 | 10.32 | 9.66 | 9.52 | 9.91 | 10.29 | 10.11 | 9.66 |
| 25 | 9.55 | 9.27 | 8.99 | 9.28 | 10.17 | 10.34 | 9.65 | 9.53 | 10.00 | 10.30 | 10.09 | 9.65 |
| 26 | 9.55 | 9.26 | 9.01 | 9.29 | 10.17 | 10.32 | 9.63 | 9.50 | 10.00 | 10.36 | 10.07 | 9.62 |
| 27 | 9.57 | 9.22 | 9.01 | 9.29 | 10.19 | 10.30 | 9.62 | 9.47 | 9.99 | 10.40 | 10.07 | 9.59 |
| 28 | 9.56 | 9.20 | 9.01 | 9.29 | 10.19 | 10.28 | 9.61 | 9.45 | 9.98 | 10.42 | 10.05 | 9.58 |
| 29 | 9.60 | 9.18 | 9.00 | 9.29 | --- | 10.27 | 9.59 | 9.52 | 9.97 | 10.39 | 10.02 | 9.58 |
| 30 | 9.75 | 9.20 | 9.00 | 9.28 | --- | 10.25 | 9.61 | 9.54 | 10.01 | 10.37 | 10.00 | 9.54 |
| 31 | 9.68 | --- | 8.99 | 9.27 | --- | 10.22 | --- | 9.54 | --- | 10.34 | 10.00 | --- |
| MEAN | 9.49 | 9.40 | 9.04 | 9.19 | 9.55 | 10.42 | 9.83 | 9.65 | 9.73 | 10.18 | 10.19 | 9.76 |
| MAX | 9.75 | 9.66 | 9.21 | 9.29 | 10.19 | 10.62 | 10.18 | 9.80 | 10.01 | 10.42 | 10.35 | 9.98 |
| MIN | 9.41 | 9.18 | 8.98 | 8.99 | 9.27 | 10.22 | 9.59 | 9.45 | 9.53 | 9.96 | 10.00 | 9.54 |

## 430309088284800 MIDDLE GENESEE LAKE NEAR OCONOMOWOC, WI

LOCATION.--Lat 43°03'09", long 88°28'48", in NW 1/4 SW 1/4 sec.22, T.7 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, 1.8 mi south of Oconomowoc.

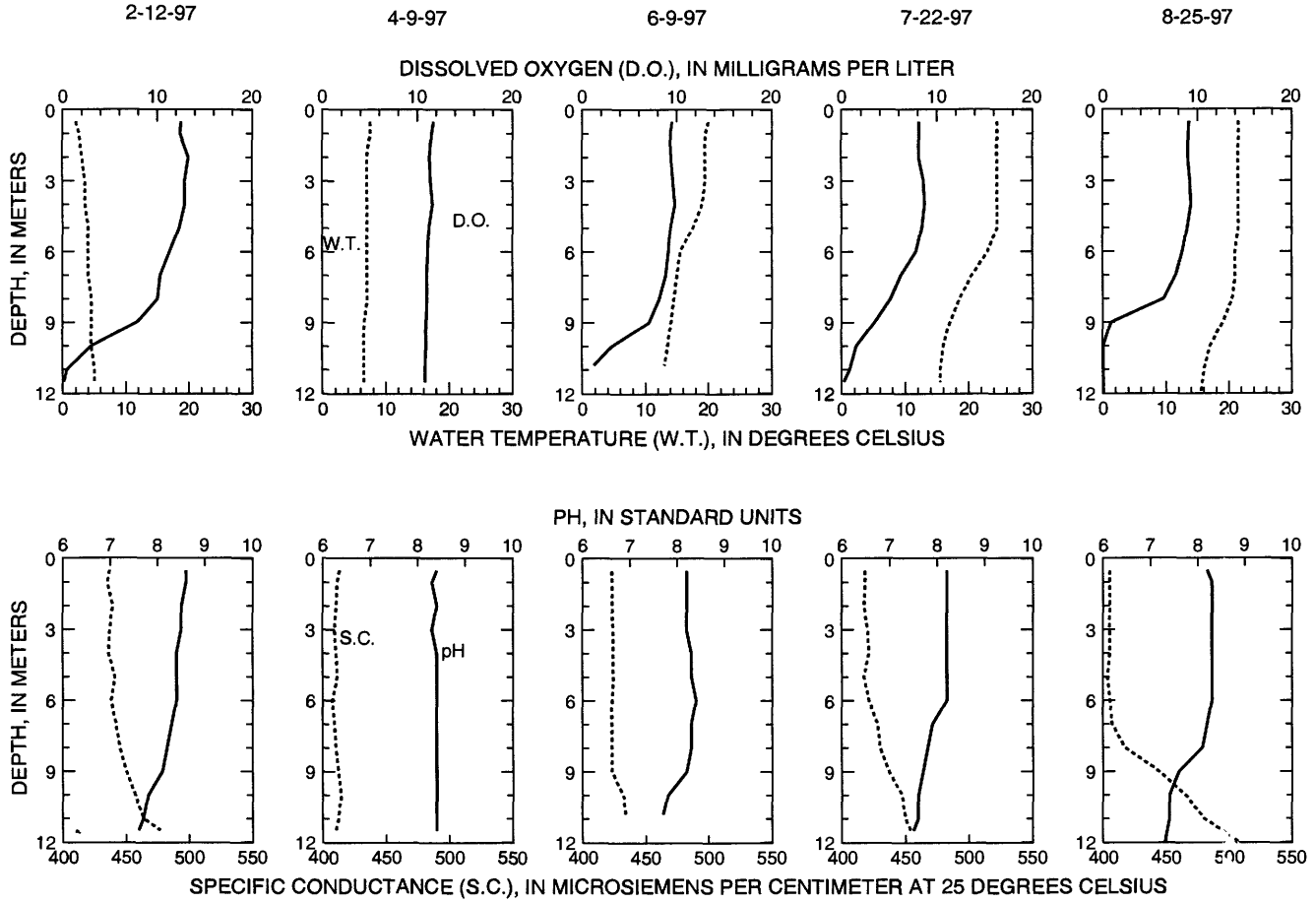
PERIOD OF RECORD.--February 1996 to current year.

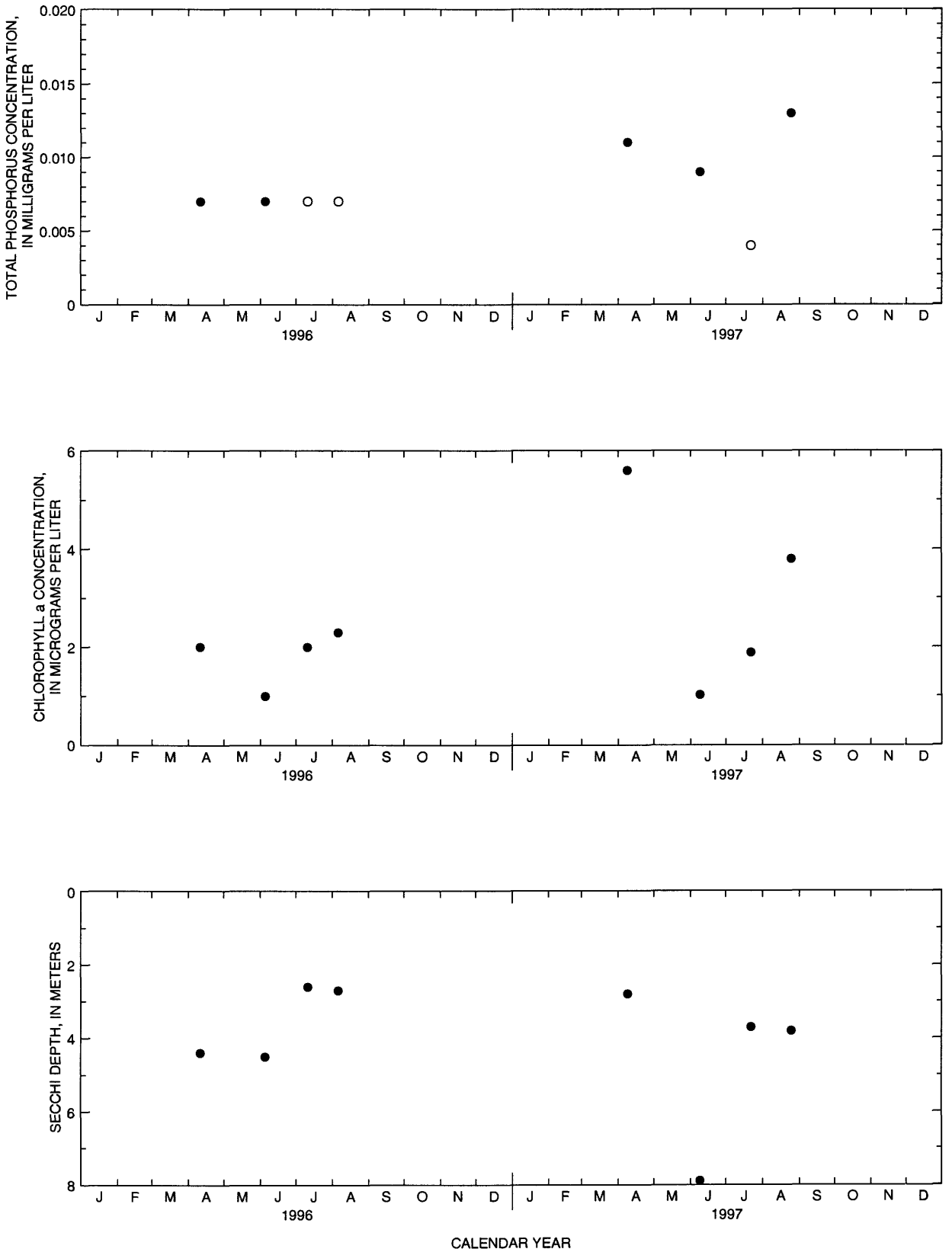
REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 12 TO AUGUST 25, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 12 | | Apr. 09 | | June 09 | | July 22 | | Aug. 25 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 865.70 | | 865.64 | | 865.89 | | 866.04 | |
| Secchi-depth (meters) | --- | | 2.8 | | 7.9 | | 3.7 | | 3.8 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 5.6 | | 1.0 | | 1.9 | | 3.8 | |
| Depth of sample (m) | 0.5 | 12 | 0.5 | 11 | 0.5 | 11 | 0.5 | 12 | 0.5 | 12 |
| Water temperature (°C) | 2.0 | 5.0 | 8.0 | 6.5 | 20.0 | 13.0 | 24.5 | 15.5 | 21.5 | 15.5 |
| Specific conductance (µS/cm) | 437 | 477 | 413 | 410 | 423 | 434 | 418 | 454 | 405 | 508 |
| pH (units) | 8.6 | 7.6 | 8.4 | 8.4 | 8.2 | 7.7 | 8.2 | 7.5 | 8.2 | 7.3 |
| Dissolved oxygen | 12.5 | 0.1 | 11.7 | 10.8 | 9.5 | 1.2 | 8.1 | 0.2 | 9.1 | 0.0 |
| Phosphorus, total (as P) | <0.007 | 0.029 | 0.011 | 0.014 | 0.009 | 0.024 | 0.004 | 0.014 | 0.013 | 0.069 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.08 | 0.08 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.15 | 0.16 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.80 | 0.80 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.88 | 0.88 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 10 | 10 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.1 | 1.5 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 200 | 200 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 31 | 31 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 29 | 29 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 10 | 10 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 170 | 170 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 19 | 18 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 23 | 23 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 1.0 | 1.1 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 238 | 240 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Middle Genesee Lake near Oconomowoc, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 05429000 LAKE MONONA AT MADISON, WI

LOCATION.--Lat 43°03'48", long 89°23'49', in SW 1/4 sec.23, T.7 N., R.9 E., Dane County, Hydrologic Unit 07090001, in Brittingham Park, in Madison.

DRAINAGE AREA.--279 $mi^2$. Area of Lake Monona, 5.3 $mi^2$.

PERIOD OF RECORD.--September 1915 to current year (fragmentary) in reports of the Geological Survey. For 1856 to March 1917 in reports of Wisconsin Railroad Commission, volume 19.

REVISED RECORDS.--WSP 1338: Lake area. WDR WI-73-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 840.00 ft above sea level, or 5.60 ft below City of Madison datum. Prior to Oct. 1, 1979, datum 3.61 ft higher; prior to Nov. 15, 1971, nonrecording gage at same site.

REMARKS.--Estimated daily gage heights: June 14-16, Aug. 18-21, and Sept. 1-3. Records good except for estimated daily gage heights, which are fair. Lake level regulated by concrete dam with four 12-foot stop-log sections and 12-foot lock at outlet of Lake Waubesa. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 7.28 ft, June 19, 1996; minimum observed, 3.22 ft, Jan. 20, 1965, current datum.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 5.68 ft, July 27; minimum recorded, 4.14 ft, Feb. 15-17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.89 | 4.87 | 4.50 | 4.24 | 4.21 | 4.80 | 5.32 | 4.90 | 4.88 | 5.21 | 5.46 | 5.28 |
| 2 | 4.86 | 4.83 | 4.50 | 4.24 | 4.21 | 4.88 | 5.32 | 4.96 | 4.86 | 5.17 | 5.42 | 5.27 |
| 3 | 4.81 | 4.80 | 4.49 | 4.24 | 4.20 | 4.90 | 5.32 | 4.98 | 4.84 | 5.10 | 5.40 | 5.26 |
| 4 | 4.77 | 4.78 | 4.49 | 4.29 | 4.23 | 4.90 | 5.32 | 4.97 | 4.83 | 5.06 | 5.39 | 5.25 |
| 5 | 4.72 | 4.76 | 4.50 | 4.35 | 4.24 | 4.88 | 5.34 | 4.96 | 4.83 | 5.02 | 5.36 | 5.23 |
| 6 | 4.67 | 4.74 | 4.51 | 4.35 | 4.23 | 4.86 | 5.30 | 4.95 | 4.85 | 5.07 | 5.32 | 5.19 |
| 7 | 4.67 | 4.72 | 4.50 | 4.34 | 4.22 | 4.84 | 5.25 | 4.97 | 4.88 | 5.06 | 5.29 | 5.18 |
| 8 | 4.61 | 4.68 | 4.48 | 4.33 | 4.21 | 4.84 | 5.21 | 4.98 | 4.92 | 5.26 | 5.27 | 5.16 |
| 9 | 4.57 | 4.64 | 4.47 | 4.32 | 4.20 | 4.91 | 5.18 | 4.93 | 4.92 | 5.35 | 5.25 | 5.13 |
| 10 | 4.53 | 4.60 | 4.47 | 4.32 | 4.19 | 4.99 | 5.16 | 4.93 | 4.92 | 5.35 | 5.23 | 5.10 |
| 11 | 4.51 | 4.56 | 4.46 | 4.30 | 4.18 | 5.00 | 5.16 | 4.91 | 4.93 | 5.34 | 5.22 | 5.07 |
| 12 | 4.51 | 4.54 | 4.45 | 4.28 | 4.18 | 5.02 | 5.19 | 4.87 | 4.93 | 5.34 | 5.28 | 5.06 |
| 13 | 4.51 | 4.52 | 4.45 | 4.27 | 4.17 | 5.05 | 5.18 | 4.86 | 4.94 | 5.33 | 5.31 | 5.05 |
| 14 | 4.53 | 4.51 | 4.45 | 4.26 | 4.16 | 5.09 | 5.17 | 4.86 | 4.94 | 5.34 | 5.30 | 5.05 |
| 15 | 4.52 | 4.51 | 4.49 | 4.26 | 4.15 | 5.09 | 5.15 | 4.83 | 4.95 | 5.30 | 5.31 | 5.04 |
| 16 | 4.52 | 4.51 | 4.50 | 4.25 | 4.15 | 5.10 | 5.13 | 4.82 | 5.12 | 5.27 | 5.31 | 5.05 |
| 17 | 4.63 | 4.50 | 4.48 | 4.24 | 4.15 | 5.10 | 5.11 | 4.83 | 5.16 | 5.33 | 5.32 | 5.07 |
| 18 | 4.60 | 4.49 | 4.44 | 4.23 | 4.18 | 5.11 | 5.10 | 4.84 | 5.16 | 5.32 | 5.32 | 5.06 |
| 19 | 4.60 | 4.47 | 4.41 | 4.22 | 4.30 | 5.11 | 5.11 | 4.82 | 5.16 | 5.29 | 5.31 | 5.05 |
| 20 | 4.61 | 4.46 | 4.39 | 4.21 | 4.35 | 5.11 | 5.11 | 4.80 | 5.16 | 5.26 | 5.29 | 5.04 |
| 21 | 4.61 | 4.46 | 4.37 | 4.20 | 4.55 | 5.11 | 5.11 | 4.80 | 5.28 | 5.45 | 5.28 | 5.01 |
| 22 | 4.63 | 4.45 | 4.34 | 4.24 | 4.72 | 5.11 | 5.07 | 4.82 | 5.38 | 5.47 | 5.27 | 5.00 |
| 23 | 4.70 | 4.45 | 4.34 | 4.25 | 4.76 | 5.12 | 5.01 | 4.84 | 5.39 | 5.54 | 5.26 | 5.02 |
| 24 | 4.68 | 4.44 | 4.34 | 4.25 | 4.76 | 5.14 | 4.96 | 4.85 | 5.39 | 5.58 | 5.27 | 4.99 |
| 25 | 4.69 | 4.43 | 4.32 | 4.26 | 4.75 | 5.18 | 4.91 | 4.90 | 5.40 | 5.59 | 5.26 | 4.97 |
| 26 | 4.70 | 4.42 | 4.32 | 4.26 | 4.74 | 5.19 | 4.88 | 4.90 | 5.35 | 5.63 | 5.26 | 4.96 |
| 27 | 4.69 | 4.43 | 4.32 | 4.26 | 4.75 | 5.22 | 4.85 | 4.90 | 5.31 | 5.65 | 5.26 | 4.95 |
| 28 | 4.67 | 4.45 | 4.30 | 4.25 | 4.75 | 5.26 | 4.83 | 4.90 | 5.28 | 5.64 | 5.26 | 4.93 |
| 29 | 4.81 | 4.47 | 4.29 | 4.24 | --- | 5.28 | 4.79 | 4.92 | 5.25 | 5.60 | 5.26 | 4.86 |
| 30 | 4.92 | 4.51 | 4.27 | 4.24 | --- | 5.30 | 4.81 | 4.90 | 5.23 | 5.55 | 5.27 | 4.79 |
| 31 | 4.90 | --- | 4.26 | 4.22 | --- | 5.31 | --- | 4.89 | --- | 5.51 | 5.28 | --- |
| MEAN | 4.67 | 4.57 | 4.42 | 4.26 | 4.35 | 5.06 | 5.11 | 4.89 | 5.08 | 5.35 | 5.30 | 5.07 |
| MAX | 4.92 | 4.87 | 4.51 | 4.35 | 4.76 | 5.31 | 5.34 | 4.98 | 5.40 | 5.65 | 5.46 | 5.28 |
| MIN | 4.51 | 4.42 | 4.26 | 4.20 | 4.15 | 4.80 | 4.79 | 4.80 | 4.83 | 5.02 | 5.22 | 4.79 |

## 434748089195800 LAKE MONTELLO AT MONTELLO, WI

LOCATION.--Lat 43°47'48", long 89°19'58", in SW 1/4 NE 1/4 sec.8, T.15 N., R.10 E., Marquette County, Hydrologic Unit 04030201, at Montello.

PERIOD OF RECORD.--February 1995 to current year. Lake-stage and secchi measurements for water years 1984 to 1990 were collected at a different site (station number 434813089204000).

REMARKS.--Lake sampled near southeast end at the deep hole. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

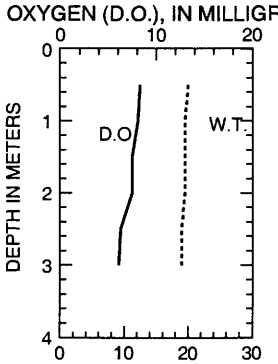
WATER-QUALITY DATA, AUGUST 27, 1997

(Milligrams per liter unless otherwise indicated)

| | Aug. 27 | |
|---|---|---|
| Lake stage (ft) | 11.50 | |
| Secchi-depth (meters) | 2.7 | |
| Chlorophyll a, phytoplankton (µg/L) | 6.0 | |
| Depth of sample (m) | 0.5 | 3.0 |
| Water temperature (°C) | 20.0 | 19.0 |
| Specific conductance (µS/cm) | 283 | 282 |
| pH (units) | 7.7 | 7.5 |
| Dissolved oxygen | 8.3 | 6.1 |
| Phosphorus, total (as P) | 0.021 | 0.040 |

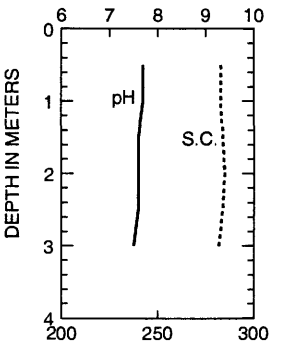
8-27-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

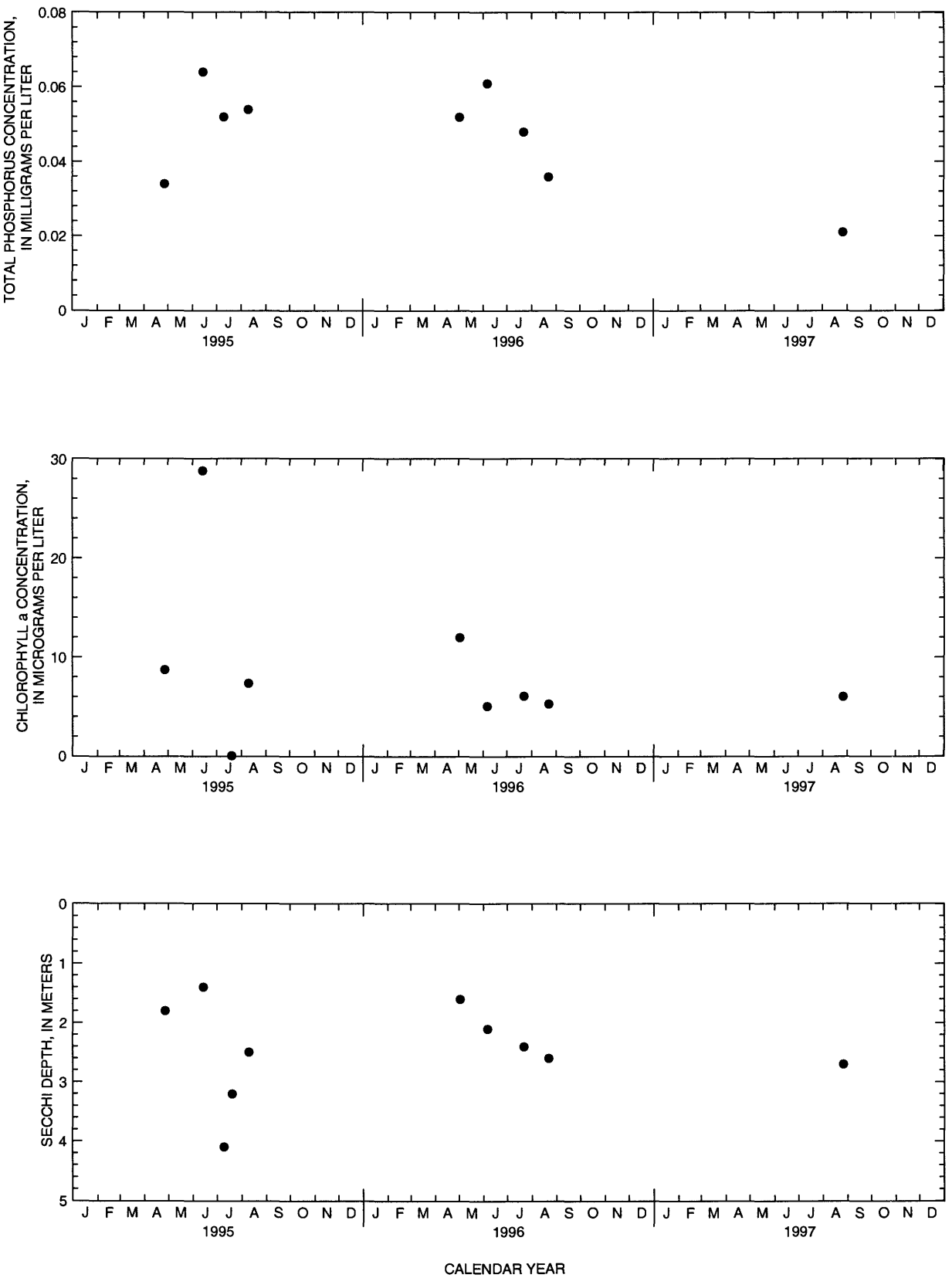



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Montello Lake at Montello, Wisconsin.

## 454622088324801 MORGAN LAKE NEAR FENCE, WI

LOCATION.--Lat 45°46'22", long 88°32'48", in NE 1/4 NW 1/4 SW 1/4 sec.18, T.38 N., R.16 E., Florence County, Hydrologic Unit 04030108, at southwest end of lake on dirt road off Forest Service Road 2161, 6 mi west northwest of Fence.

DRAINAGE AREA.--Not determined. Area of lake, 44 acres.

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is approximately 1,400.00 ft above sea level.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum observed gage height, 66.36 ft, June 21-22, 1993; minimum observed gage height, 63.61 ft, Oct. 19, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum observed gage height, 66.18 ft, May 19; minimum observed gage height, 65.51 ft, Aug. 14 and Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 65.74 | 65.80 | 65.83 | 66.00 | 66.10 | 66.02 | 66.08 | 66.16 | 66.09 | 65.96 | 65.73 | 65.67 |
| 2 | 65.72 | 65.80 | 65.82 | 66.00 | 66.10 | 66.02 | 66.08 | 66.16 | 66.08 | 65.98 | 65.71 | 65.67 |
| 3 | 65.69 | 65.79 | 65.82 | 66.00 | 66.10 | 66.01 | 66.08 | 66.15 | 66.06 | 65.96 | 65.70 | 65.65 |
| 4 | 65.69 | 65.79 | 65.82 | 66.03 | 66.09 | 66.01 | 66.08 | 66.14 | 66.05 | 65.95 | 65.68 | 65.63 |
| 5 | 65.69 | 65.79 | 65.83 | 66.06 | 66.09 | 66.01 | 66.10 | 66.14 | 66.08 | 65.94 | 65.65 | 65.62 |
| 6 | 65.69 | 65.79 | 65.84 | 66.06 | 66.09 | --- | 66.14 | 66.14 | 66.07 | 65.92 | 65.64 | 65.61 |
| 7 | 65.69 | 65.79 | 65.84 | 66.06 | 66.08 | --- | 66.15 | 66.12 | 66.08 | 65.90 | 65.63 | 65.60 |
| 8 | 65.68 | 65.79 | 65.84 | 66.05 | 66.07 | --- | 66.14 | 66.12 | 66.08 | 65.94 | 65.61 | 65.59 |
| 9 | 65.66 | 65.78 | 65.83 | 66.05 | 66.06 | --- | 66.13 | 66.11 | 66.06 | 65.93 | 65.60 | 65.63 |
| 10 | 65.66 | 65.78 | 65.83 | 66.06 | 66.06 | --- | 66.13 | 66.10 | 66.05 | 65.92 | 65.58 | 65.64 |
| 11 | 65.66 | 65.77 | 65.83 | 66.06 | 66.05 | --- | 66.13 | 66.10 | 66.04 | 65.91 | 65.56 | 65.62 |
| 12 | 65.65 | 65.76 | 65.82 | 66.06 | 66.05 | --- | 66.12 | 66.11 | 66.04 | 65.89 | 65.54 | 65.61 |
| 13 | 65.65 | 65.76 | 65.82 | 66.05 | 66.06 | --- | 66.12 | 66.12 | 66.03 | 65.90 | 65.53 | 65.60 |
| 14 | 65.64 | 65.75 | 65.82 | 66.05 | 66.07 | --- | 66.12 | 66.13 | 66.01 | 65.90 | 65.51 | 65.59 |
| 15 | 65.65 | 65.75 | 65.87 | 66.05 | 66.06 | --- | 66.12 | 66.14 | 66.03 | 65.88 | 65.53 | 65.58 |
| 16 | 65.65 | 65.80 | 65.87 | 66.04 | 66.06 | --- | 66.12 | 66.15 | 66.10 | 65.89 | 65.53 | 65.59 |
| 17 | 65.70 | 65.83 | 65.87 | 66.04 | 66.06 | --- | 66.11 | 66.16 | 66.09 | 65.90 | 65.54 | 65.63 |
| 18 | 65.71 | 65.83 | 65.87 | 66.03 | 66.05 | --- | 66.11 | 66.17 | 66.09 | 65.88 | 65.54 | 65.62 |
| 19 | 65.71 | 65.82 | 65.88 | 66.02 | 66.05 | --- | 66.11 | 66.18 | 66.09 | 65.86 | 65.53 | 65.63 |
| 20 | 65.71 | 65.82 | 65.87 | 66.01 | 66.05 | --- | 66.12 | 66.17 | 66.08 | 65.84 | 65.58 | 65.62 |
| 21 | 65.71 | 65.81 | 65.88 | 66.01 | 66.05 | --- | 66.12 | 66.17 | 66.08 | 65.82 | 65.59 | 65.61 |
| 22 | 65.71 | 65.81 | 65.88 | 66.02 | 66.04 | 66.04 | 66.12 | 66.16 | 66.06 | 65.80 | 65.57 | 65.60 |
| 23 | 65.74 | 65.81 | 65.90 | 66.03 | 66.04 | 66.05 | 66.12 | 66.15 | 66.05 | 65.78 | 65.56 | 65.58 |
| 24 | 65.78 | 65.81 | 65.93 | 66.05 | 66.04 | 66.04 | 66.13 | 66.16 | 66.05 | 65.77 | 65.56 | 65.57 |
| 25 | 65.78 | 65.81 | 65.92 | 66.07 | 66.03 | 66.05 | 66.12 | 66.15 | 66.05 | 65.78 | 65.55 | 65.55 |
| 26 | 65.78 | 65.80 | 65.94 | 66.08 | 66.03 | 66.05 | 66.12 | 66.14 | 66.03 | 65.82 | 65.55 | 65.54 |
| 27 | 65.77 | 65.80 | 65.95 | 66.10 | 66.02 | 66.05 | 66.12 | 66.13 | 66.01 | 65.81 | 65.54 | 65.53 |
| 28 | 65.76 | 65.80 | 65.95 | 66.10 | 66.01 | 66.07 | 66.12 | 66.11 | 66.00 | 65.80 | 65.53 | 65.53 |
| 29 | 65.77 | 65.80 | 65.96 | 66.10 | --- | 66.09 | 66.11 | 66.10 | 65.98 | 65.78 | 65.52 | 65.52 |
| 30 | 65.84 | 65.83 | 65.97 | 66.10 | --- | 66.09 | 66.14 | 66.10 | 65.97 | 65.76 | 65.61 | 65.51 |
| 31 | 65.83 | --- | 66.00 | 66.11 | --- | 66.09 | --- | 66.10 | --- | 65.75 | 65.67 | --- |
| MEAN | 65.71 | 65.80 | 65.87 | 66.05 | 66.06 | --- | 66.12 | 66.14 | 66.05 | 65.87 | 65.59 | 65.60 |
| MAX | 65.84 | 65.83 | 66.00 | 66.11 | 66.10 | --- | 66.15 | 66.18 | 66.10 | 65.98 | 65.73 | 65.67 |
| MIN | 65.64 | 65.75 | 65.82 | 66.00 | 66.01 | --- | 66.08 | 66.10 | 65.97 | 65.75 | 65.51 | 65.51 |

## 430551088273500 OCONOMOWOC LAKE NO. 1 (CENTER) AT OCONOMOWOC, WI

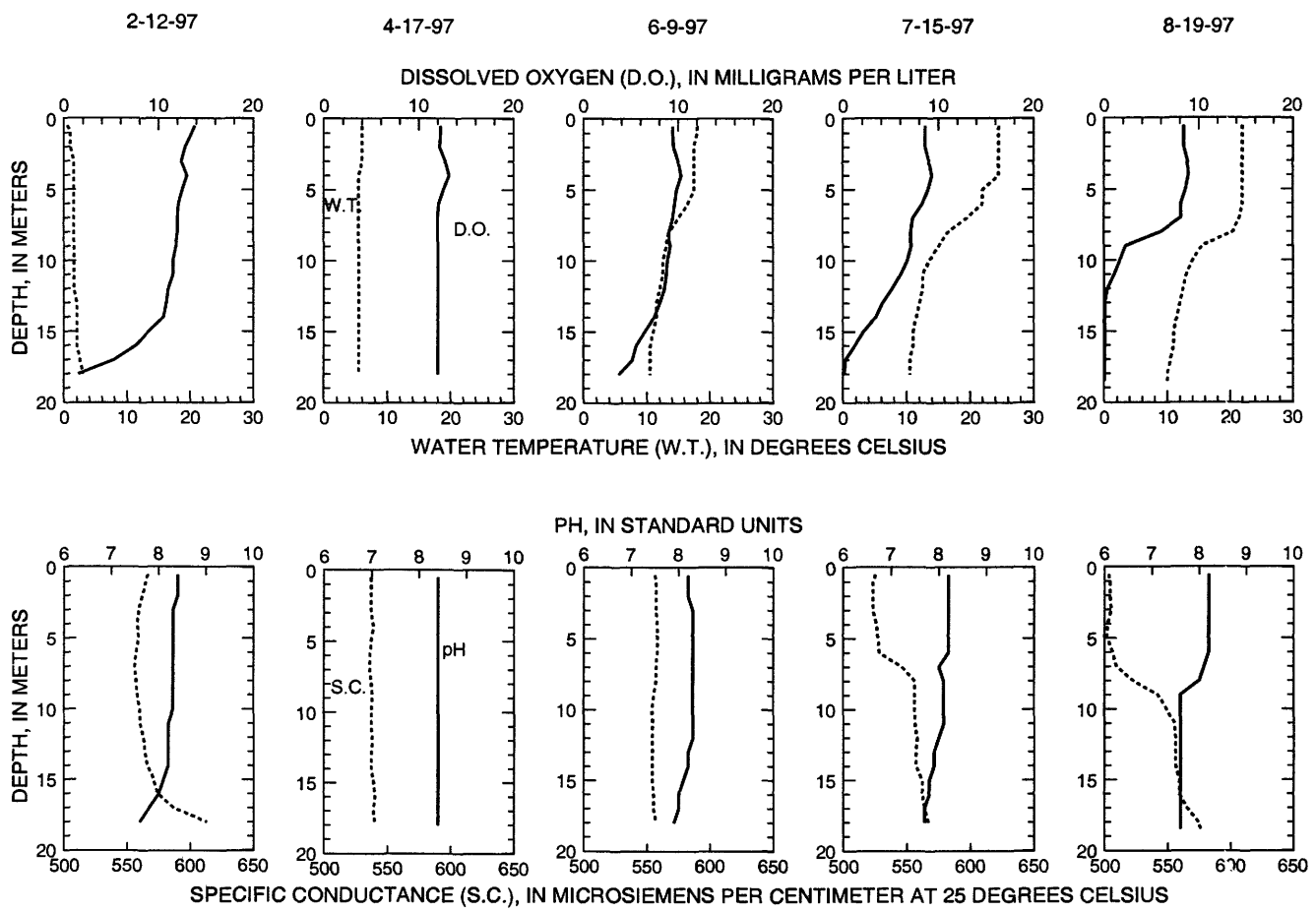
LOCATION.--Lat 43°05'51", long 88°27'35", in NW 1/4 SE 1/4 sec.2, T.7 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Oconomowoc.

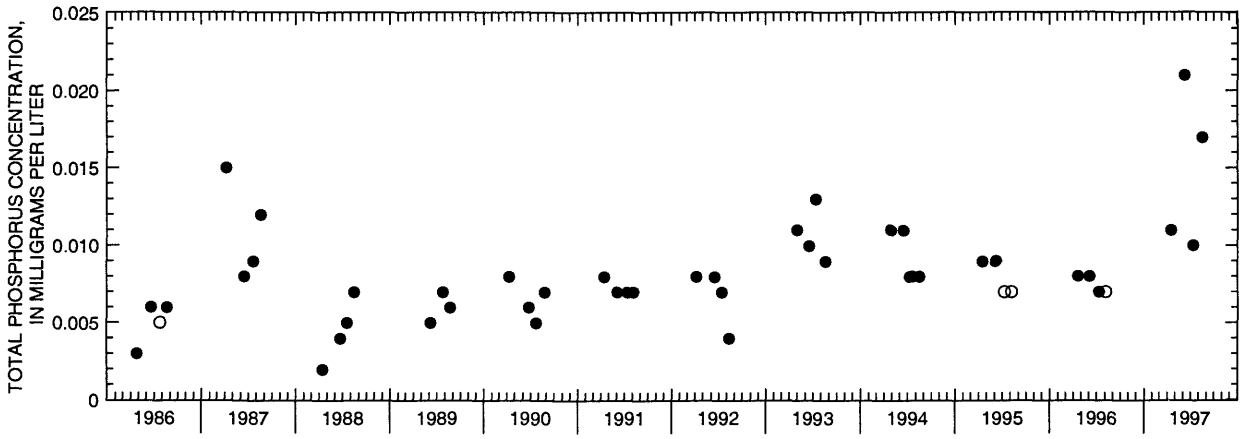
PERIOD OF RECORD.--March 1986 to current year.

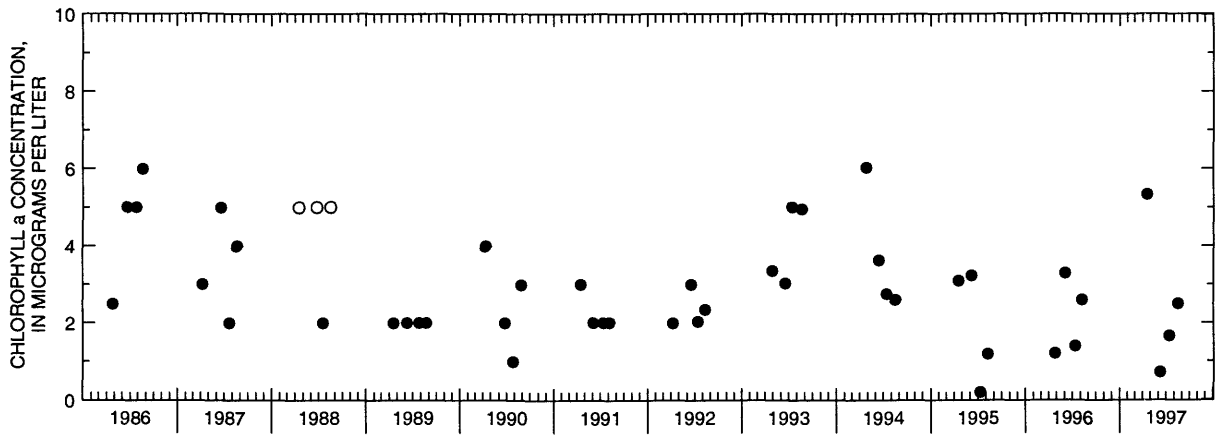
REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

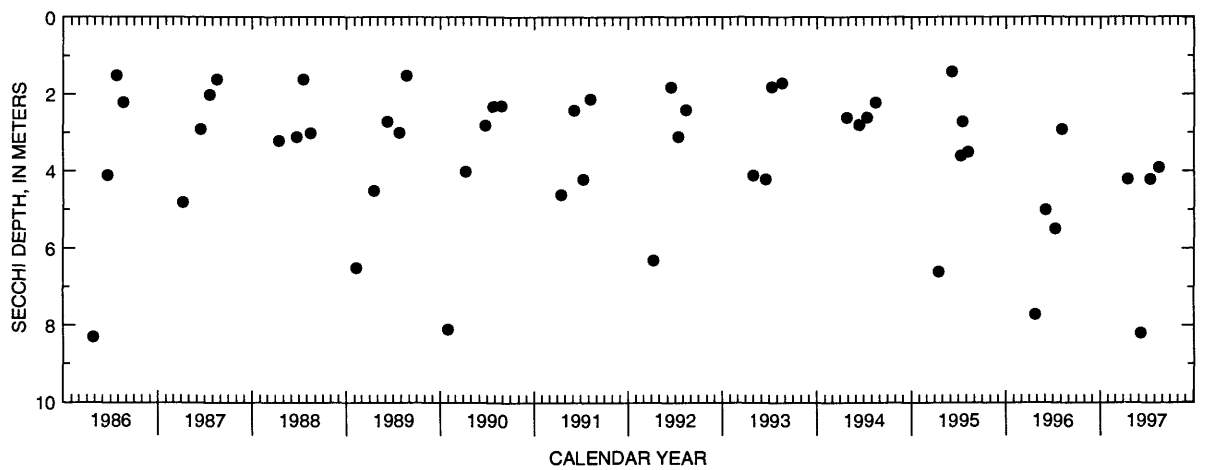
WATER-QUALITY DATA, FEBRUARY 12 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Feb. 12 | | Apr. 17 | | June 09 | | July 15 | | Aug. 19 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 6.90 | | 7.43 | | 7.76 | | 8.06 | | 7.74 | |
| Secchi-depth (meters) | --- | | 4.2 | | 8.2 | | 4.2 | | 3.9 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 5.3 | | 0.7 | | 1.7 | | 2.5 | |
| Depth of sample (m) | 0.5 | 18 | 0.5 | 18 | 0.5 | 18 | 0.5 | 18 | 0.5 | 19 |
| Water temperature (°C) | 0.5 | 3.0 | 6.0 | 5.5 | 18.0 | 10.5 | 24.5 | 10.5 | 22.0 | 10.0 |
| Specific conductance (µS/cm) | 566 | 613 | 537 | 540 | 556 | 557 | 525 | 567 | 503 | 576 |
| pH (units) | 8.4 | 7.6 | 8.4 | 8.4 | 8.2 | 7.9 | 8.2 | 7.7 | 8.0 | 7.6 |
| Dissolved oxygen | 13.8 | 1.5 | 12.3 | 12.0 | 9.4 | 3.7 | 8.6 | 0.1 | 8.4 | 0.0 |
| Phosphorus, total (as P) | <0.007 | 0.107 | 0.011 | 0.012 | 0.021 | 0.053 | 0.010 | 0.140 | 0.017 | 0.153 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.36 | 0.36 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | 0.01 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.40 | 0.60 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.76 | 0.96 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 20 | 20 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.60 | 0.70 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 250 | 250 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 49 | 49 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 32 | 32 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 14 | 14 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 230 | 230 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 25 | 25 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 32 | 32 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 4.4 | 4.4 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 306 | 308 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Oconomowoc Lake, No. 1 (Center) at Oconomowoc, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 430609088262200 OCONOMOWOC LAKE NO. 2 (OFF HEWITT POINT) AT OCONOMOWOC, WI

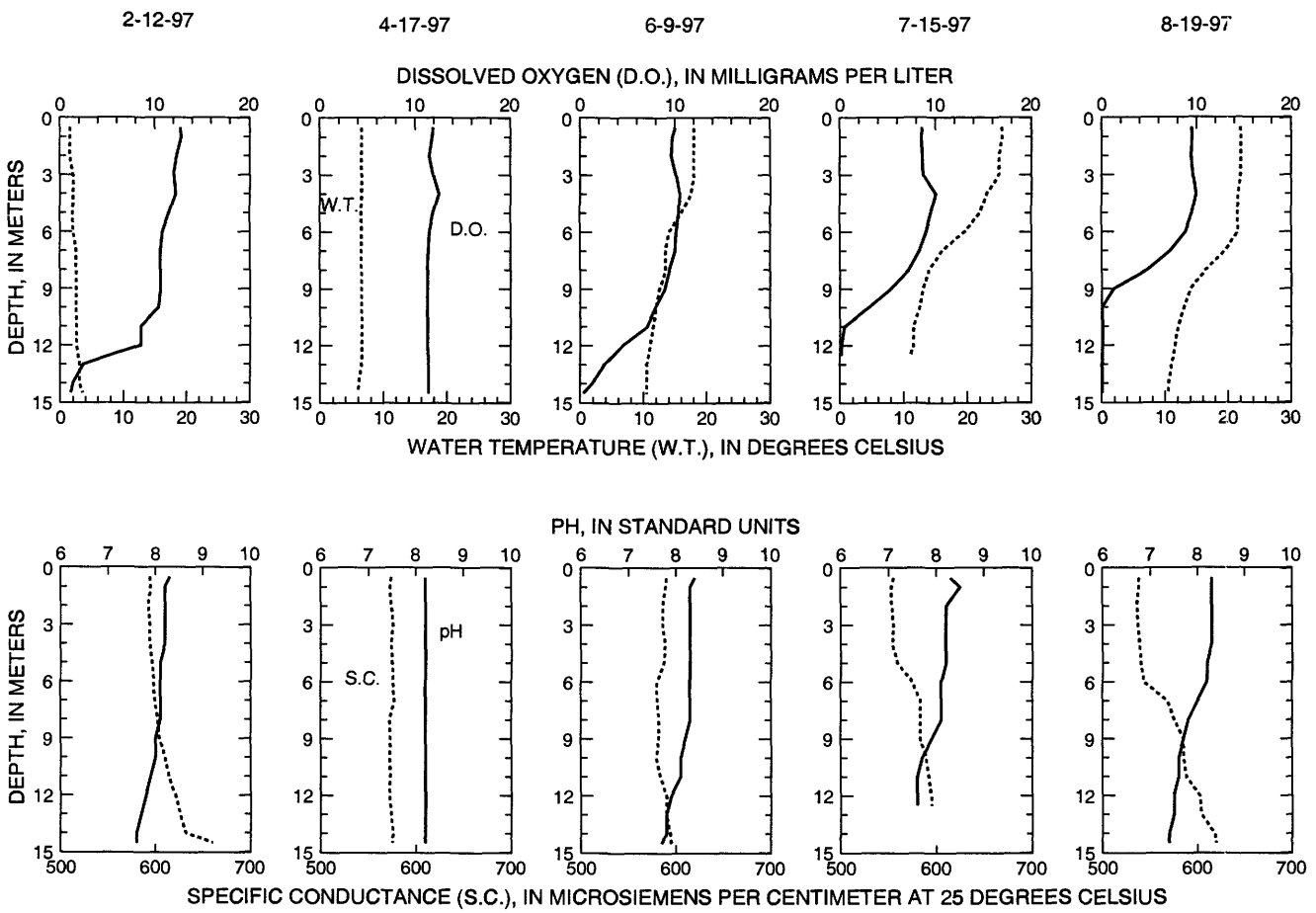
LOCATION.--Lat 43°06'09", long 88°26'22", in NW 1/4 NW 1/4 sec.1, T.7 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Oconomowoc.

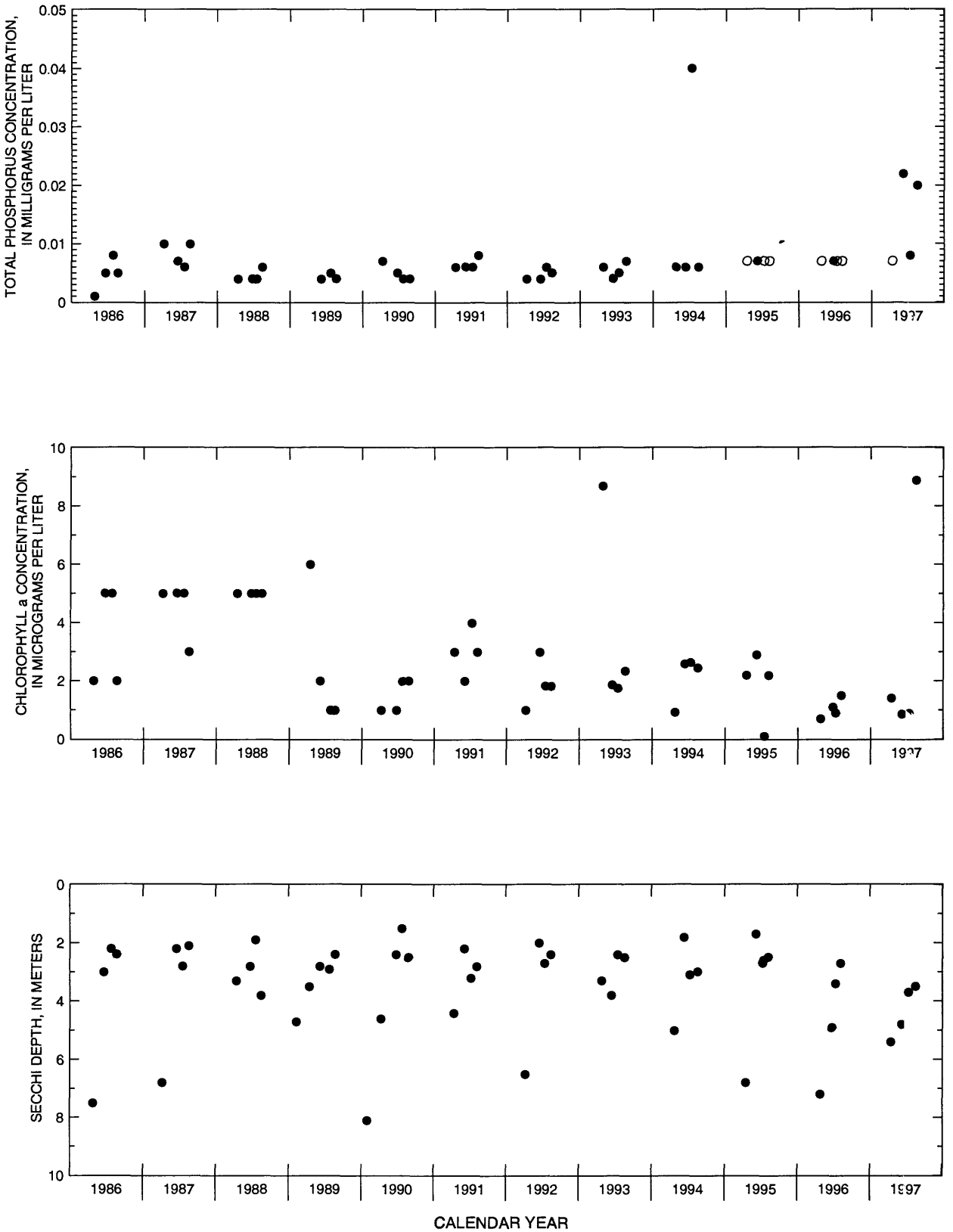
PERIOD OF RECORD.--March 1986 to current year.

REMARKS.--Lake sampled at the deepest point in northeast bay near Hewitt Point. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 12 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Feb. 12 | | Apr. 17 | | June 09 | | July 15 | | Aug. 19 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 6.90 | | 7.43 | | 7.76 | | 8.06 | | 7.74 | |
| Secchi-depth (meters) | --- | | 5.4 | | 4.8 | | 3.7 | | 3.5 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 1.4 | | 0.9 | | 0.9 | | 8.9 | |
| Depth of sample (m) | 0.5 | 15 | 0.5 | 14 | 0.5 | 15 | 0.5 | 12 | 0.5 | 15 |
| Water temperature (°C) | 1.5 | 3.5 | 6.5 | 6.0 | 18.0 | 10.5 | 25.5 | 11.0 | 22.0 | 10.5 |
| Specific conductance (µS/cm) | 594 | 660 | 574 | 575 | 590 | 595 | 555 | 595 | 538 | 620 |
| pH (units) | 8.3 | 7.6 | 8.2 | 8.2 | 8.4 | 7.7 | 8.3 | 7.6 | 8.3 | 7.4 |
| Dissolved oxygen | 12.7 | 1.1 | 11.9 | 11.4 | 10.0 | 0.3 | 8.6 | 0.1 | 9.5 | 0.0 |
| Phosphorus, total (as P) | <0.007 | 0.019 | <0.007 | <0.008 | 0.022 | 0.064 | 0.008 | 0.027 | 0.020 | 0.078 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Oconomowoc Lake, No. 2 (Hewitt Pt.) at Oconomowoc, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 430723088252100 OKAUCHEE LAKE AT OKAUCHEE, WI

LOCATION.--Lat 43°07'23", long 88°25'21", in SE 1/4 SE 1/4, sec.25, T.8 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Okauchee.

DRAINAGE AREA.--80.7 $mi^2$.

PERIOD OF RECORD.--February 1984 to current year.

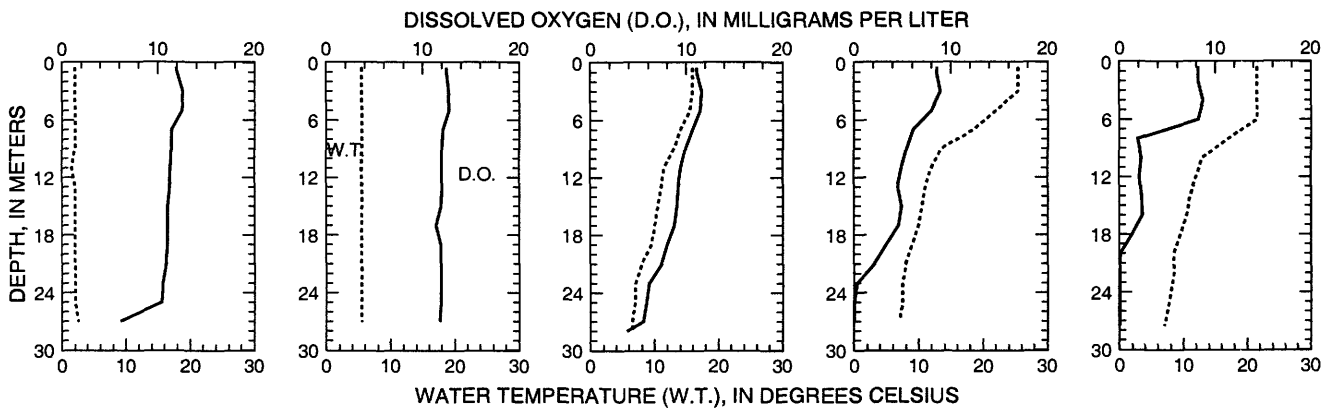
LAKE-STAGE GAGE.--Datum of gage is 869.00 ft above sea level.

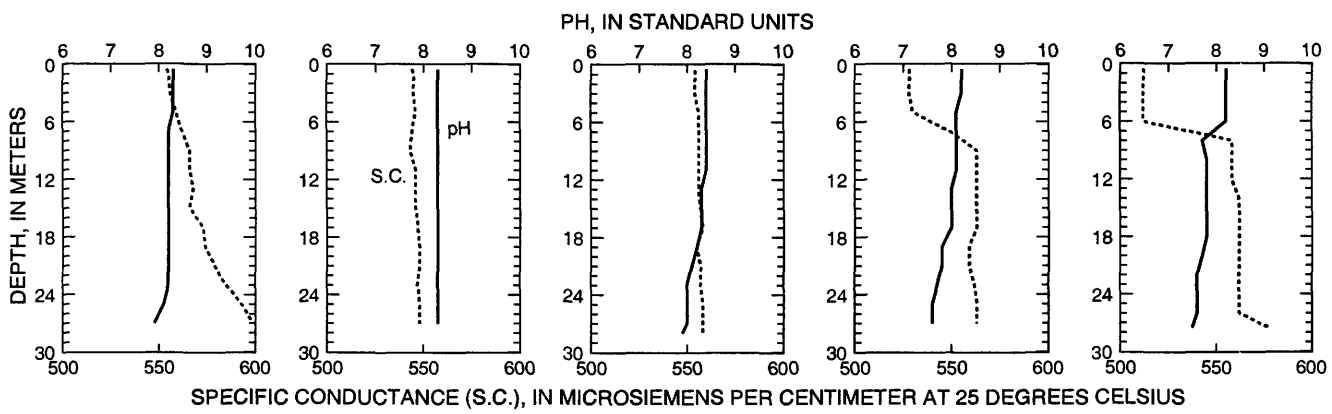
REMARKS.--A detailed water quality management plan has been developed for Okauchee Lake by Southeastern Wisconsin Regional Planning Commission; previous water-quality data are available in this report. Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

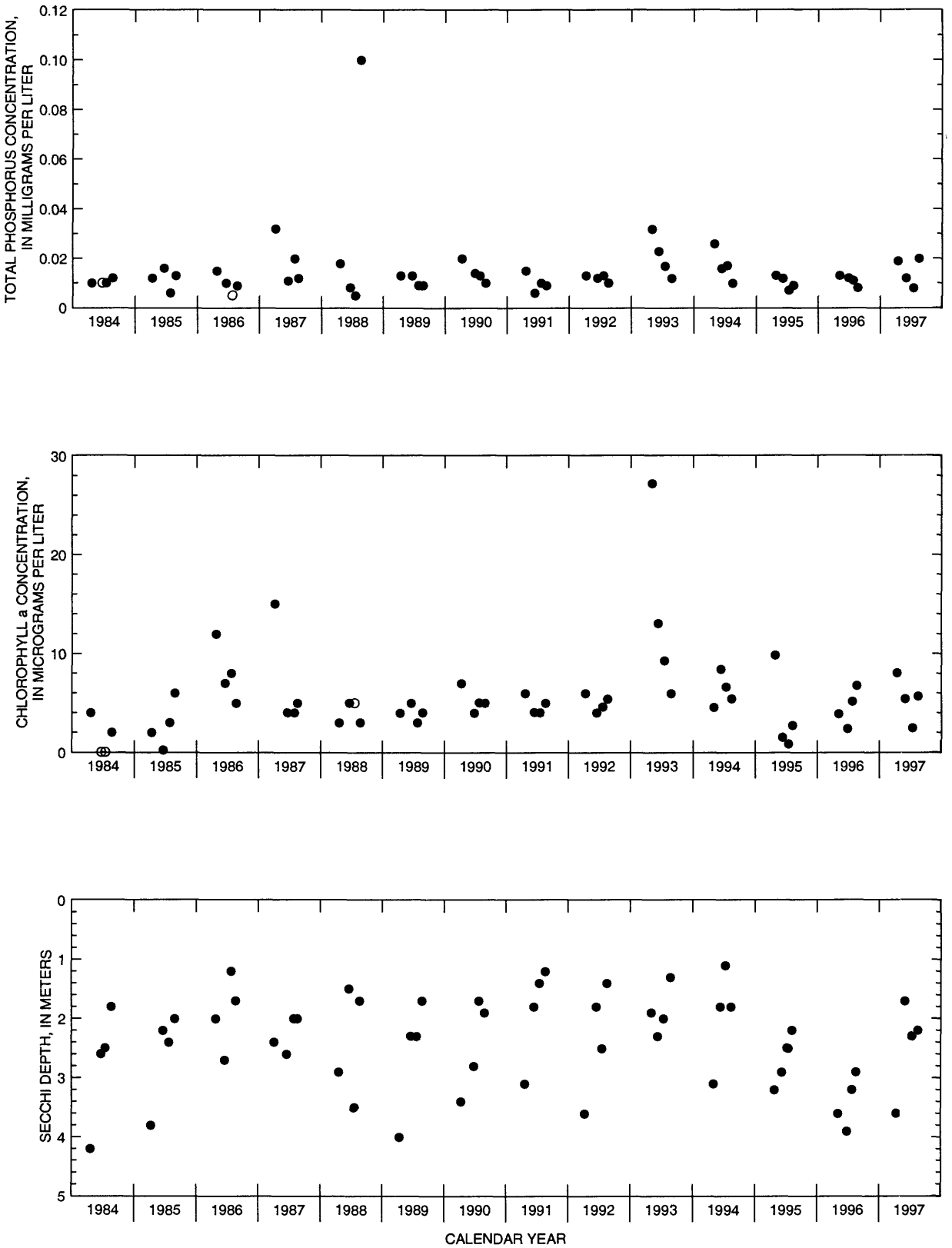
WATER-QUALITY DATA, FEBRUARY 12 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicatedd)

| | Feb. 12 | | Apr. 17 | | June 03 | | July 15 | | Aug. 19 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 3.97 | | 4.17 | | 4.66 | | 4.75 | | 4.74 | |
| Secchi-depth (meters) | --- | | 3.6 | | 1.7 | | 2.3 | | 2.2 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 8.1 | | 5.5 | | 2.4 | | 5.7 | |
| Depth of sample (m) | 0.5 | 27 | 0.5 | 27 | 0.5 | 28 | 0.5 | 27 | 0.5 | 28 |
| Water temperature (°C) | 2.0 | 2.5 | 5.5 | 5.5 | 16.0 | 6.5 | 25.5 | 7.0 | 21.5 | 7.0 |
| Specific conductance (µS/cm) | 554 | 599 | 544 | 548 | 554 | 558 | 528 | 563 | 512 | 577 |
| pH (units) | 8.3 | 7.9 | 8.3 | 8.3 | 8.4 | 7.9 | 8.2 | 7.6 | 8.2 | 7.5 |
| Dissolved oxygen | 11.9 | 6.1 | 12.5 | 11.8 | 11.1 | 3.8 | 8.6 | 0.0 | 8.2 | 0.0 |
| Phosphorus, total (as P) | 0.007 | 0.053 | 0.019 | 0.019 | 0.012 | 0.040 | 0.008 | 0.034 | 0.020 | 0.068 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.56 | 0.56 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | 0.013 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.60 | 0.60 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 1.2 | 1.2 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 25 | 25 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.70 | 1.00 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 270 | 270 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 54 | 54 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 32 | 32 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 12 | 12 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 2 | 2 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 240 | 240 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 24 | 24 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 29 | 29 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 3.0 | 3.0 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 310 | 312 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |

2-12-97 4-17-97 6-3-97 7-15-97 8-19-97






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Okauchee Lake at Okauchee, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 430759088244200 OKAUCHEE LAKE, NO. 1, NEAR OKAUCHEE, WI

LOCATION.--Lat 43°07'59", long 88°24'42", in NE 1/4 NW 1/4 sec.30, T.8 N., R.18 E., Waukesha County, Hydrologic Unit 07090001, near Okauchee.

PERIOD OF RECORD.--April 1986 to current year.

LAKE-STAGE GAGE.--Datum of gage is 869.00 ft above sea level.

REMARKS.--Lake sampled in Crane's Nest Bay, in the northeast part of the lake, at an approximate depth of 2 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, APRIL 17 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Apr. 17 | June 03 | July 15 | Aug. 19 |
|---|---|---|---|---|
| Lake stage (ft) | 4.17 | 4.66 | 4.75 | 4.74 |
| Secchi-depth (meters) | 3.0 | 1.3 | 1.6 | 2.3 |
| Chlorophyll a, phytoplankton (µg/L) | 2.0 | 3.1 | 5.5 | 7.3 |
| Depth of sample (m) | 0.5 | 0.5 | 0.5 | 0.5 |
| Water temperature (°C) | 4.5 | 15.5 | 27.5 | 21.0 |
| Specific conductance (µS/cm) | 547 | 542 | 558 | 554 |
| pH (units) | 8.4 | 8.6 | 8.3 | 8.2 |
| Dissolved oxygen | 12.5 | 13.3 | 9.3 | 7.1 |
| Phosphorus, total (as P) | 0.017 | 0.014 | 0.025 | 0.037 |

## 430645088264500 OKAUCHEE LAKE, NO. 2, AT OKAUCHEE, WI

LOCATION.--Lat 43°06'45", long 88°26'45", in SE 1/4 NE 1/4 sec.35, T.8 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Okauchee.

PERIOD OF RECORD.--April 1986 to current year.

LAKE-STAGE GAGE.--Datum of gage is 869.00 ft above sea level.

REMARKS.--Lake sampled in Lower Okauchee Lake, at an approximate depth of 5 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, APRIL 17 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Apr. 17 | June 03 | July 15 | Aug. 19 |
|---|---|---|---|---|
| Lake stage (ft) | 4.17 | 4.66 | 4.75 | 4.74 |
| Secchi-depth (meters) | 3.0 | 0.9 | 3.3 | 2.1 |
| Chlorophyll a, phytoplankton (µg/L) | 4.8 | 6.9 | 1.6 | 4.1 |
| Depth of sample (m) | 0.5 | 0.5 | 0.5 | 0.5 |
| Water temperature (°C) | 7.0 | 18.0 | 27.5 | 21.5 |
| Specific conductance (µS/cm) | 542 | 545 | 497 | 495 |
| pH (units) | 8.5 | 8.4 | 8.3 | 8.2 |
| Dissolved oxygen | 12.9 | 11.4 | 10.5 | 8.6 |
| Phosphorus, total (as P) | 0.015 | 0.015 | 0.008 | 0.024 |

## 430642088252400 OKAUCHEE LAKE, NO. 3, AT OKAUCHEE, WI

LOCATION.--Lat 43°06'42", long 88°25'24", in NE 1/4 SE 1/4 sec.36, T.8 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Okauchee.

PERIOD OF RECORD.--April 1986 to current year.

LAKE-STAGE GAGE.--Datum of gage is 869.00 ft above sea level.

REMARKS.--Lake sampled in Ice House Bay, in the southern part of the lake, at an approximate depth of 4 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, APRIL 17 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Apr. 17 | June 03 | July 15 | Aug. 19 |
|---|---|---|---|---|
| Lake stage (ft) | 4.17 | 4.66 | 4.75 | 4.74 |
| Secchi-depth (meters) | 2.8 | 1.4 | 2.7 | 2.1 |
| Chlorophyll a, phytoplankton (µg/L) | 5.3 | 3.5 | 2.5 | 6.6 |
| Depth of sample (m) | 0.5 | 0.5 | 0.5 | 0.5 |
| Water temperature (°C) | 6.0 | 18.0 | 27.0 | 22.0 |
| Specific conductance (µS/cm) | 540 | 558 | 498 | 483 |
| pH (units) | 8.5 | 8.4 | 8.3 | 8.3 |
| Dissolved oxygen | 12.9 | 10.3 | 9.7 | 8.2 |
| Phosphorus, total (as P) | 0.016 | 0.015 | 0.011 | 0.032 |

## 430757088261700 OKAUCHEE LAKE, NO. 4, AT OKAUCHEE, WI

LOCATION.--Lat 43°07'57", long 88°26'17", in NW 1/4 NW 1/4 sec.25, T.8 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, at Okauchee.

PERIOD OF RECORD.--June 1986 to current year.

LAKE-STAGE GAGE.--Datum of gage is 869.00 ft above sea level.

REMARKS.--Lake sampled near McDowell (Crazyman's) Island, in the northwest bay of the lake, at an approximate depth of 2 m. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, APRIL 17 TO AUGUST 19, 1997
(Milligrams per liter unless otherwise indicated)

| | Apr. 17 | June 03 | July 15 | Aug. 19 |
|---|---|---|---|---|
| Lake stage (ft) | 4.17 | 4.66 | 4.75 | 4.74 |
| Secchi-depth (meters) | 3.4 | 1.2 | 1.9 | 1.9 |
| Chlorophyll a, phytoplankton (µg/L) | 7.1 | 4.5 | 2.7 | 5.0 |
| Depth of sample (m) | 0.5 | 0.5 | 0.5 | 0.5 |
| Water temperature (°C) | 5.5 | 17.5 | 26.0 | 21.5 |
| Specific conductance (µS/cm) | 545 | 554 | 513 | 501 |
| pH (units) | 8.4 | 8.5 | 8.2 | 8.3 |
| Dissolved oxygen | 12.5 | 10.1 | 9.0 | 8.8 |
| Phosphorus, total (as P) | 0.016 | 0.018 | 0.014 | 0.023 |

## 424905088204000 POTTER LAKE NEAR MUKWONAGO, WI

LOCATION.--Lat 42°49'05", long 88°20'40", in NW 1/4 SW 1/4 sec.11, T.4 N., R.18 E., Walworth County, Hydrologic Unit 07120006, 3.3 mi south of Mukwonago.

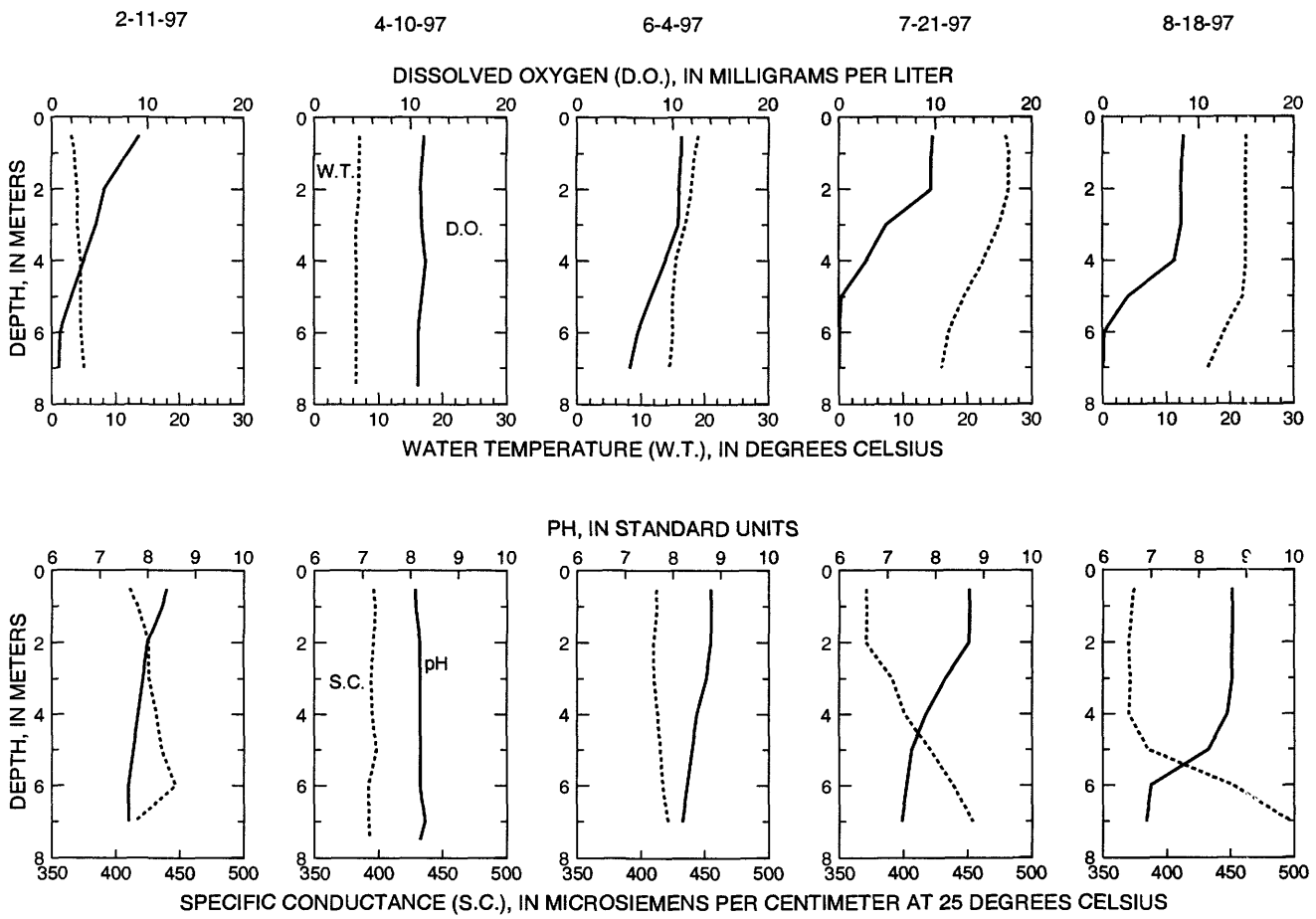
PERIOD OF RECORD.--February 1993 to current year.

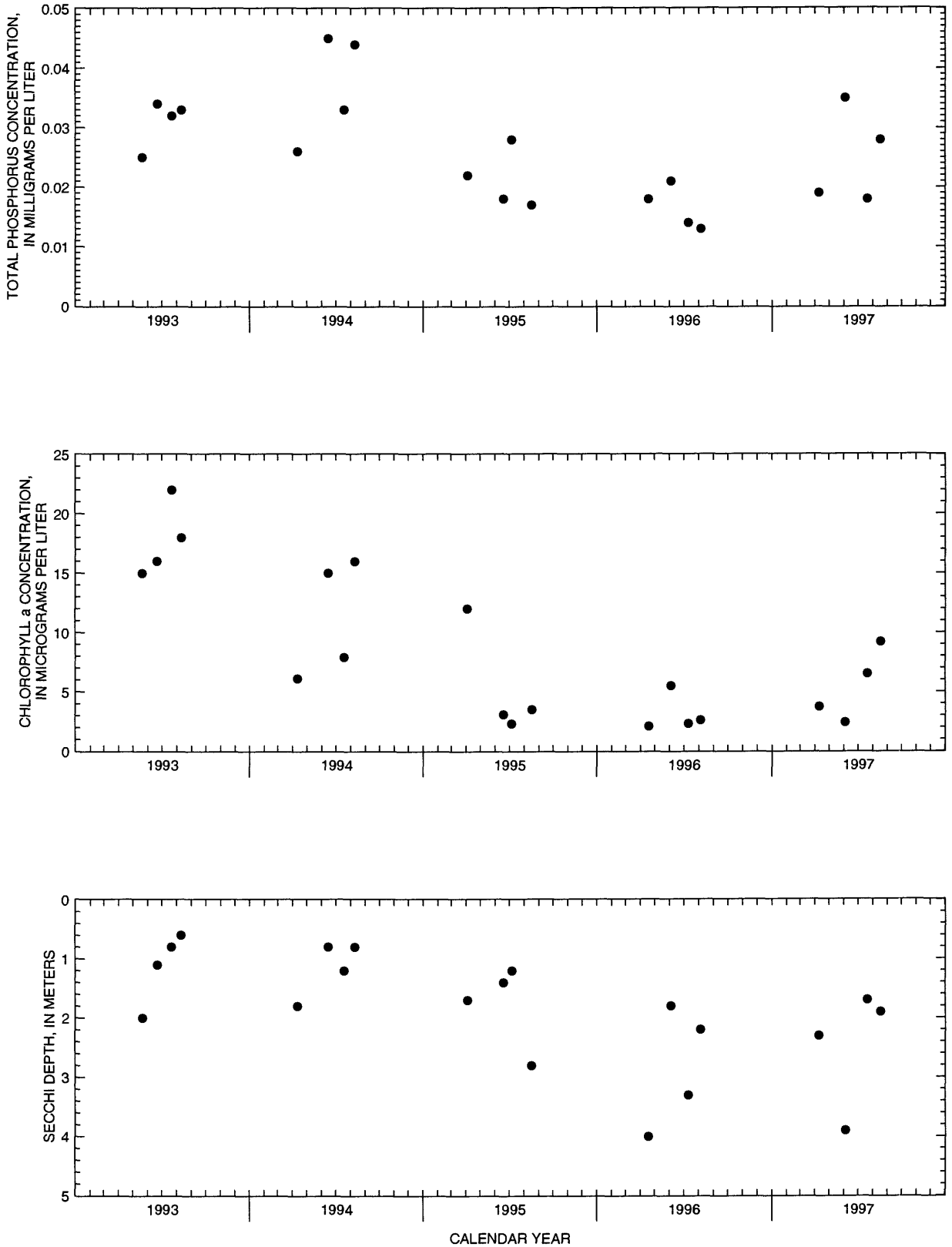
REMARKS.--Lake sampled at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Lake-stage values published in 1994 water year were 0.08 ft too low.

WATER-QUALITY DATA, FEBRUARY 11 TO AUGUST 18, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 11 | | Apr. 10 | | June 04 | | July 21 | | Aug. 18 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 7.60 | | 8.02 | | 7.84 | | 7.77 | | 7.56 | |
| Secchi-depth (meters) | --- | | 2.3 | | 3.9 | | 1.7 | | 1.9 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 3.7 | | 2.4 | | 6.5 | | 9.2 | |
| Depth of sample (m) | 0.5 | 7.0 | 0.5 | 7.5 | 0.5 | 7.0 | 0.5 | 7.0 | 0.5 | 7.0 |
| Water temperature (°C) | 3.0 | 5.0 | 7.0 | 6.5 | 19.0 | 14.5 | 26.0 | 16.0 | 22.5 | 16.5 |
| Specific conductance (µS/cm) | 411 | 465 | 396 | 393 | 412 | 421 | 371 | 454 | 374 | 497 |
| pH (units) | 8.4 | 7.6 | 8.1 | 8.2 | 8.8 | 8.2 | 8.7 | 7.3 | 8.7 | 6.9 |
| Dissolved oxygen | 9.1 | 0.7 | 11.4 | 10.8 | 10.9 | 5.5 | 9.7 | 0.0 | 8.4 | 0.0 |
| Phosphorus, total (as P) | 0.027 | 0.040 | 0.019 | 0.021 | 0.035 | 0.055 | 0.018 | 0.332 | 0.028 | 0.374 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | 0.004 | 0.004 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | <0.01 | <0.01 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | <0.013 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.70 | 0.60 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.70 | 0.60 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 20 | 15 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.8 | 2.0 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 160 | 160 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 28 | 28 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 21 | 21 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 21 | 21 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 1 | 1 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 130 | 130 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 6.0 | 8.0 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 45 | 45 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 0.063 | 0.047 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 224 | 226 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Potter Lake near Mukwonago, Wisconsin.

## 425722088295000 PRETTY LAKE, AT DEEP HOLE, NEAR DOUSMAN, WI

LOCATION.--Lat 42°57'22", long 88°29'50", in NE 1/4 NW 1/4 sec.28, T.6 N., R.17 E., Waukesha County, Hydrologic Unit 07090001, 4.1 mi south of Dousman.

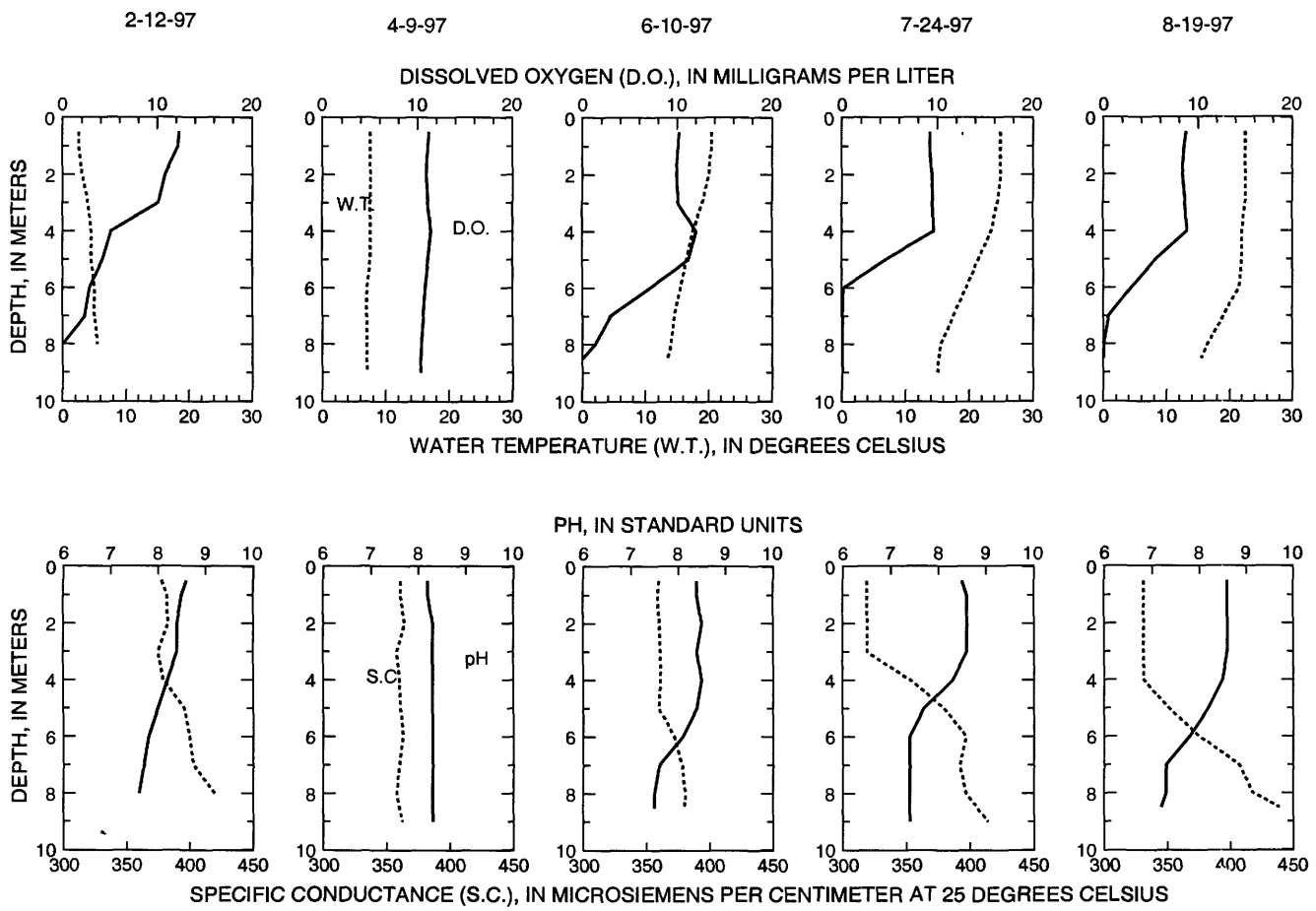
PERIOD OF RECORD.--February 1993 to August 1997 (discontinued).

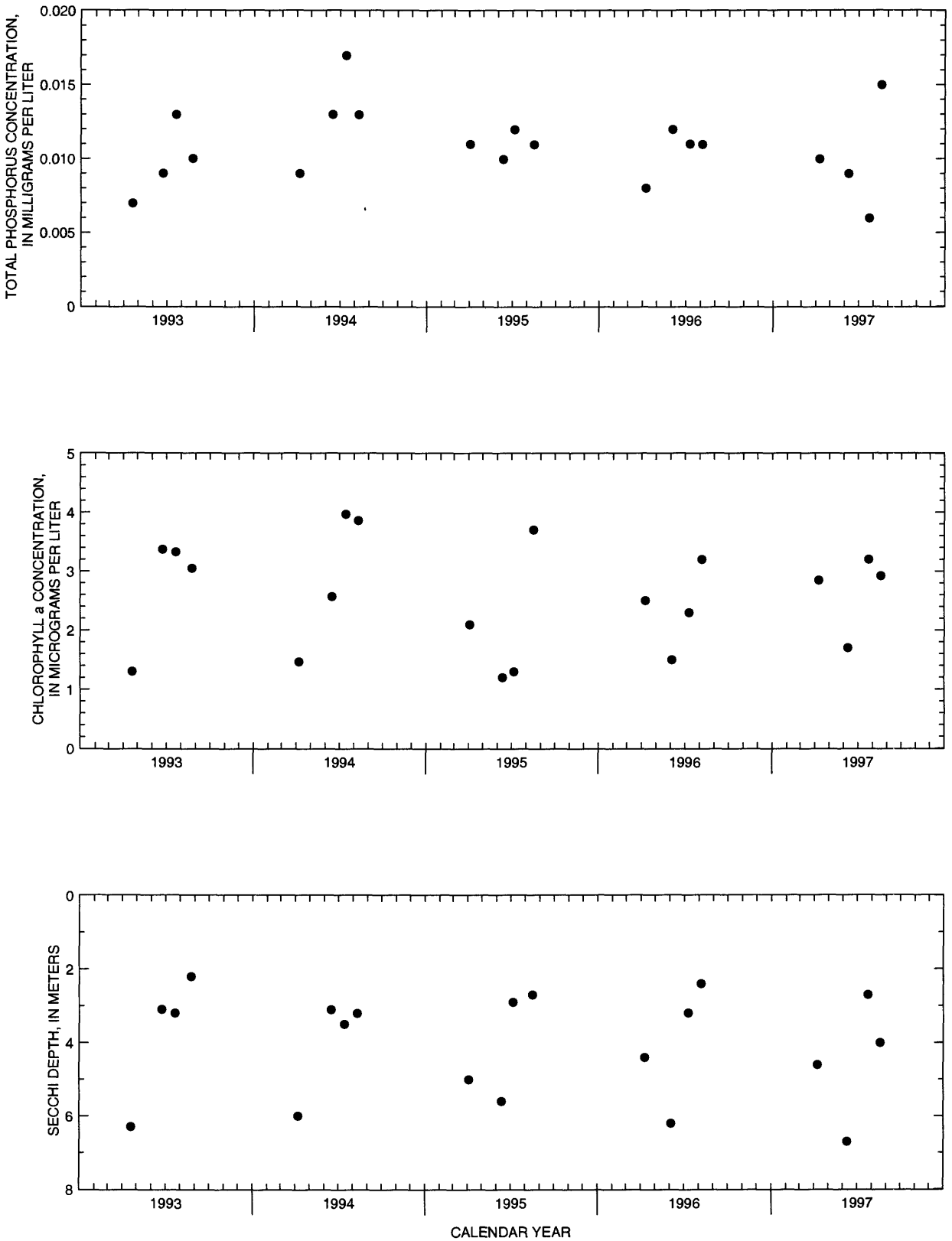
REMARKS.--Lake sampled near northeast end of lake at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 12 TO AUGUST 19, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 12 | | Apr. 09 | | June 10 | | July 24 | | Aug. 19 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | --- | | 865.11 | | 865.27 | | 865.19 | |
| Secchi-depth (meters) | --- | | 4.6 | | 6.7 | | 2.7 | | 4.0 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 2.8 | | 1.7 | | 3.2 | | 2.9 | |
| Depth of sample (m) | 0.5 | 8.0 | 0.5 | 9.0 | 0.5 | 8.5 | 0.5 | 9.0 | 0.5 | 8.5 |
| Water temperature (°C) | 2.5 | 5.5 | 7.5 | 7.0 | 20.5 | 13.5 | 25.0 | 15.0 | 22.5 | 15.5 |
| Specific conductance (µS/cm) | 378 | 420 | 361 | 362 | 360 | 380 | 319 | 414 | 331 | 439 |
| pH (units) | 8.6 | 7.6 | 8.2 | 8.3 | 8.4 | 7.5 | 8.5 | 7.4 | 8.6 | 7.2 |
| Dissolved oxygen | 12.3 | 0.0 | 11.2 | 10.3 | 10.2 | 0.0 | 9.2 | 0.0 | 8.7 | 0.0 |
| Phosphorus, total (as P) | 0.007 | 0.008 | 0.010 | 0.015 | 0.009 | 0.021 | 0.006 | 0.052 | 0.015 | 0.053 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | <0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.07 | 0.02 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.08 | 0.08 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.70 | 0.60 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.77 | 0.62 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 10 | 10 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.50 | 0.50 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 180 | 180 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 28 | 28 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 26 | 26 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 7.6 | 7.9 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 1 | 1 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 170 | 170 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 4.0 | 10 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 13 | 12 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 0.3 | 0.3 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 208 | 210 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Pretty Lake, at Deep Hole, near Dousman, Wisconsin.

## 453725091345100 RED CEDAR LAKE, DEEP HOLE, NEAR MIKANA, WI

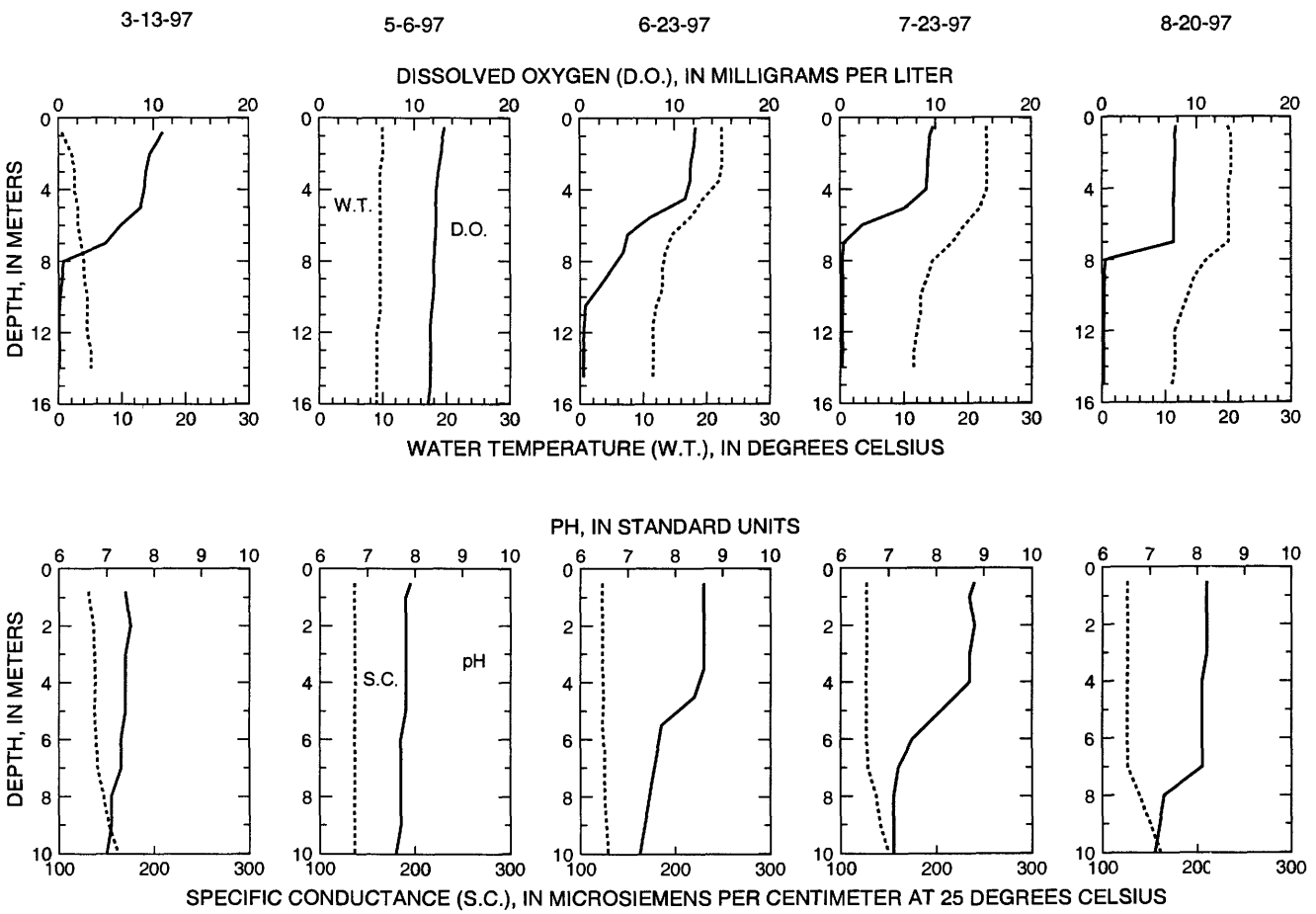
LOCATION.--Lat 45°37'25", long 91°34'51", in NW 1/4 NW 1/4 sec.11, T.36 N., R.10 W., Barron County, Hydrologic Unit 07050007, 2.4 mi northeast of Mikana.

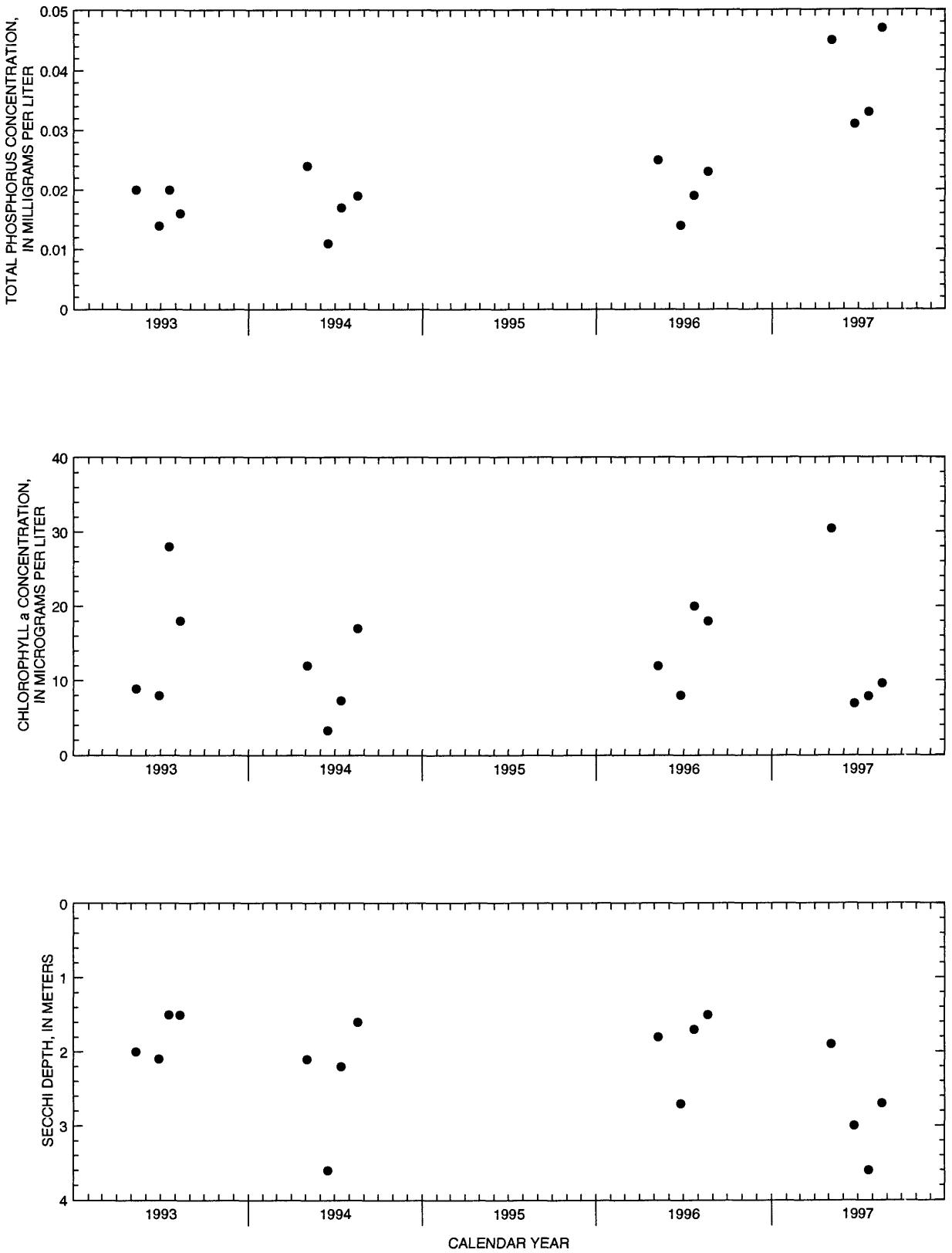
PERIOD OF RECORD.--March 1993 to August 1994 and March 1996 to current year.

REMARKS.--Lake sampled in northern part of lake at deep hole. Lake ice-covered during March sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 13 TO AUGUST 20, 1997
(Milligrams per liter unless otherwise indicated)

| | Mar. 13 | | May 06 | | June 23 | | July 23 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 9.80 | | 10.65 | | 10.75 | | 10.70 | | 10.90 | |
| Secchi-depth (meters) | --- | | 1.9 | | 3.0 | | 3.6 | | 2.7 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 30 | | 6.9 | | 7.8 | | 9.6 | |
| Depth of sample (m) | 0.8 | 14 | 0.5 | 15 | 0.5 | 14 | 0.5 | 13 | 0.5 | 15 |
| Water temperature (°C) | 0.5 | 5.0 | 10.0 | 9.0 | 22.5 | 11.5 | 23.0 | 11.5 | 20.0 | 11.0 |
| Specific conductance (µS/cm) | 131 | 272 | 136 | 135 | 123 | 147 | 127 | 173 | 126 | 192 |
| pH (units) | 7.4 | 7.3 | 7.9 | 7.6 | 8.6 | 7.2 | 8.8 | 7.1 | 8.2 | 7.0 |
| Dissolved oxygen | 11.0 | 0.0 | 13.2 | 11.4 | 12.2 | 0.3 | 9.7 | 0.1 | 7.8 | 0.1 |
| Phosphorus, total (as P) | 0.014 | 1.5 | 0.045 | 0.050 | 0.031 | 0.373 | 0.033 | 0.495 | 0.047 | 0.885 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Red Cedar Lake, Deep Hole, near Mikana, Wisconsin.

## 453519091352500 RED CEDAR LAKE, SOUTH END, AT MIKANA, WI

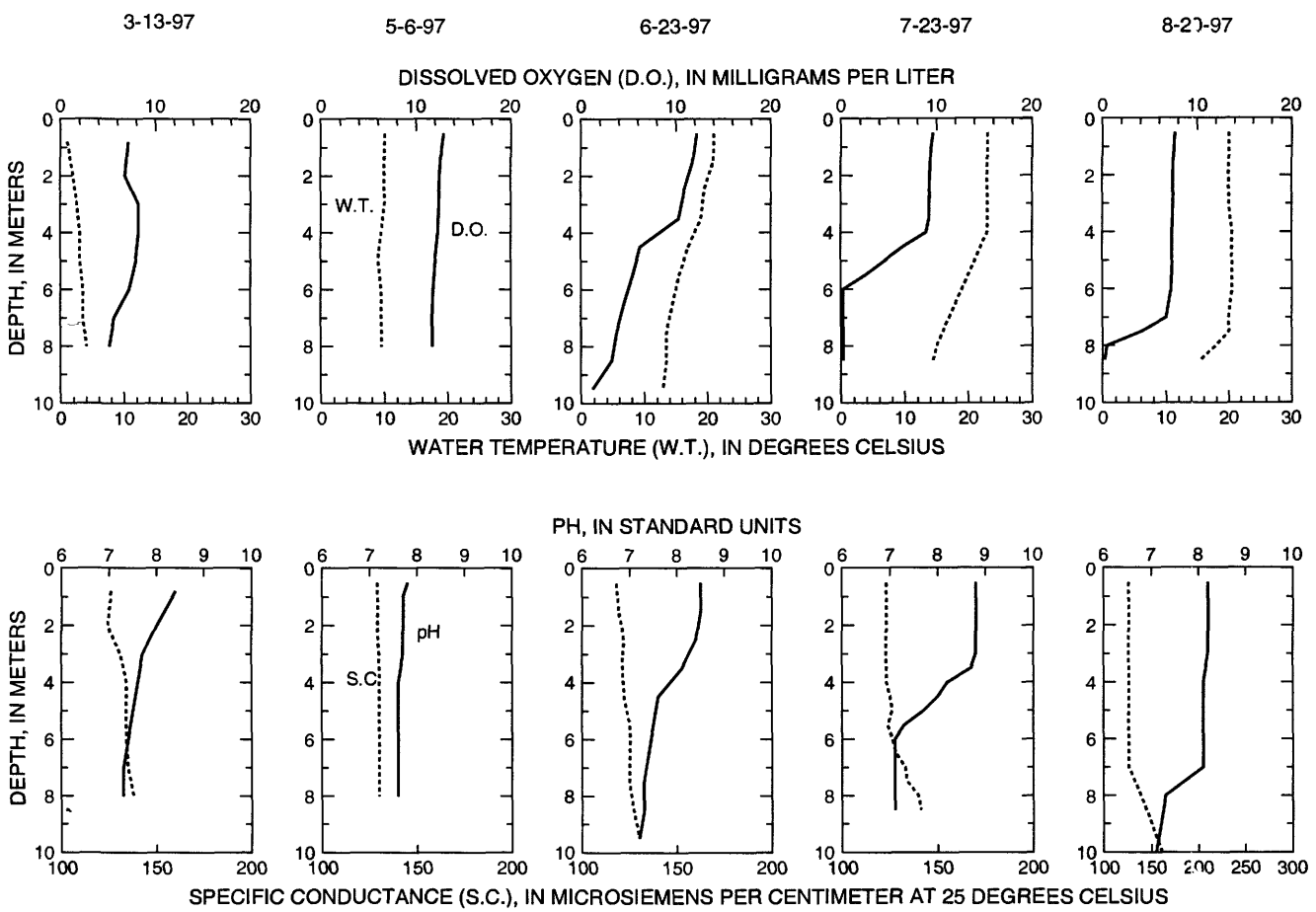
LOCATION.--Lat 45°35'19", long 91°35'25", in SW 1/4 NE 1/4 sec.22, T.36 N., R.10 W., Barron County, Hydrologic Unit 07050007, at Mikana.

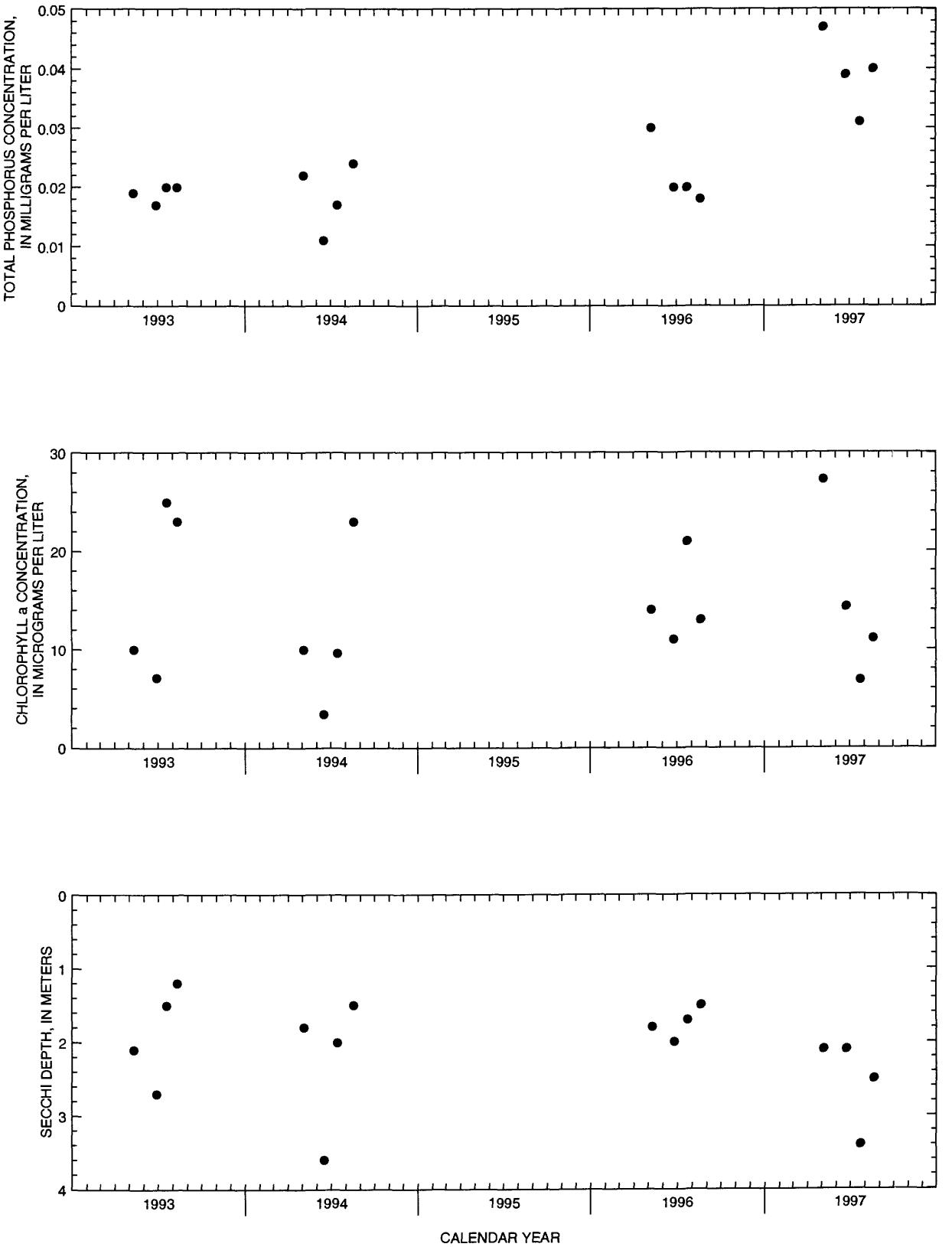
PERIOD OF RECORD.--March 1993 to August 1994 and March 1996 to current year.

REMARKS.--Lake sampled 0.2 mi northwest of Honeymoon Island. Lake ice-covered during March sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 13 TO AUGUST 20, 1997
(Milligrams per liter unless otherwise indicated)

| | Mar. 13 | | May 06 | | June 23 | | July 23 | | Aug. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 9.80 | | 10.65 | | 10.75 | | 10.70 | | 10.90 | |
| Secchi-depth (meters) | --- | | 2.1 | | 2.1 | | 3.4 | | 2.5 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 27 | | 14 | | 6.8 | | 11 | |
| Depth of sample (m) | 0.8 | 8.0 | 0.5 | 8.0 | 0.5 | 9.2 | 0.5 | 8.5 | 0.5 | 8.5 |
| Water temperature (°C) | 1.0 | 4.0 | 10.0 | 9.5 | 21.0 | 13.0 | 23.0 | 14.5 | 20.0 | 15.5 |
| Specific conductance (µS/cm) | 126 | 138 | 129 | 130 | 118 | 130 | 123 | 141 | 125 | 150 |
| pH (units) | 8.4 | 7.3 | 7.8 | 7.6 | 8.5 | 7.2 | 8.8 | 7.1 | 8.0 | 7.1 |
| Dissolved oxygen | 7.1 | 5.1 | 12.9 | 11.7 | 12.2 | 1.2 | 9.6 | 0.2 | 7.6 | 0.2 |
| Phosphorus, total (as P) | 0.018 | 0.017 | 0.047 | 0.046 | 0.039 | 0.070 | 0.031 | 0.076 | 0.040 | 0.136 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | <0.002 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.11 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | <0.013 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.40 | --- | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.51 | --- | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 25 | --- | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 2.6 | --- | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 93 | --- | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 28 | --- | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 5.6 | --- | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 2.8 | --- | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 1.0 | --- | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 63 | --- | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 3.0 | --- | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 2.3 | --- | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 15 | --- | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 96 | --- | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | 170 | --- | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | 130 | --- | --- | --- | --- | --- | --- | --- |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Red Cedar Lake (south end) at Mikana, Wisconsin.

## 432322088125000 SILVER LAKE NEAR WEST BEND, WI

LOCATION.--Lat 43°23'22", long 88°12'50", in NE 1/4 SW 1/4 sec.27, T.11 N., R.19 E., Washington County, Hydrologic Unit 04040003, 1.4 mi southwest of West Bend.

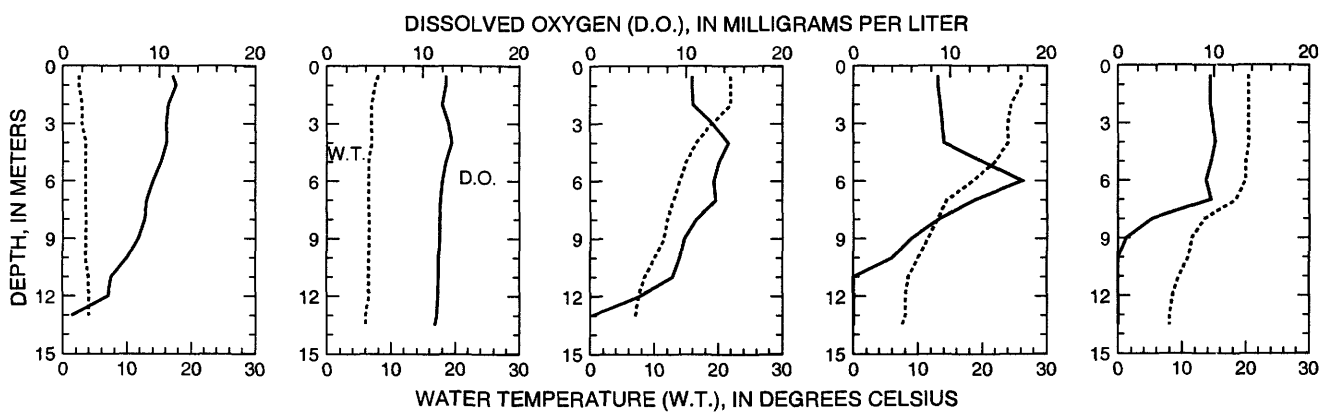
PERIOD OF RECORD.--February 1996 to August 1997 (discontinued).

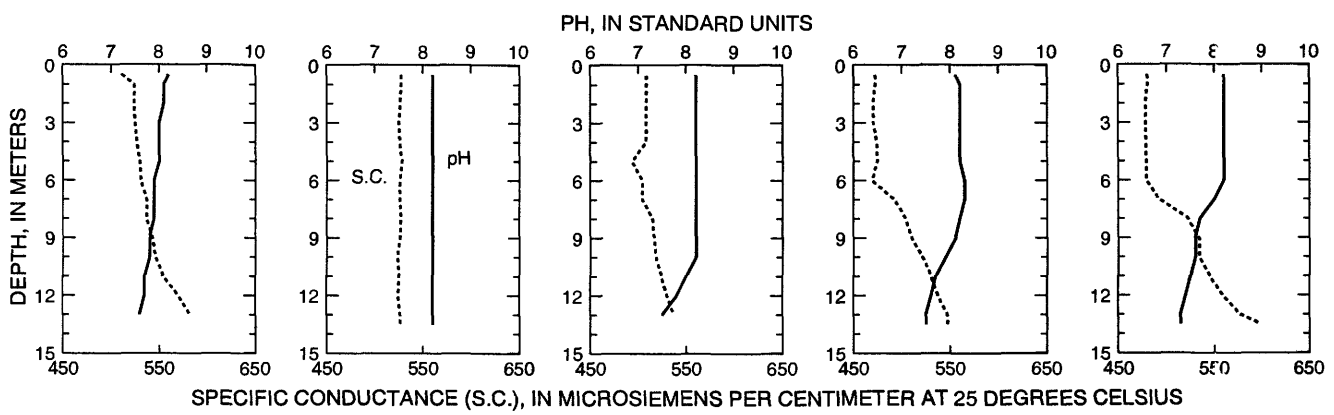
REMARKS.--Lake sampled at northern end of southern basin of lake at the deep hole. Lake ice-covered during February measurements. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 13 TO AUGUST 26, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 13 | | Apr. 22 | | June 11 | | July 24 | | Aug. 26 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | --- | | 11.08 | | 11.09 | | 11.15 | | 11.17 | |
| Secchi-depth (meters) | --- | | 5.4 | | 2.7 | | 3.1 | | 4.7 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 2.7 | | 1.7 | | 1.8 | | 2.4 | |
| Depth of sample (m) | 0.5 | 13 | 0.5 | 13 | 0.5 | 13 | 0.5 | 13 | 0.5 | 14 |
| Water temperature (°C) | 2.5 | 4.0 | 8.0 | 6.0 | 22.0 | 7.0 | 26.0 | 7.5 | 20.5 | 8.0 |
| Specific conductance (µS/cm) | 511 | 582 | 527 | 526 | 508 | 537 | 472 | 547 | 480 | 598 |
| pH (units) | 8.2 | 7.6 | 8.2 | 8.2 | 8.2 | 7.5 | 8.1 | 7.5 | 8.2 | 7.3 |
| Dissolved oxygen | 11.4 | 0.9 | 12.4 | 11.2 | 10.6 | 0.1 | 8.7 | 0.0 | 9.6 | 0.0 |
| Phosphorus, total (as P) | <0.007 | 0.060 | 0.017 | <0.008 | 0.024 | 0.102 | 0.014 | 0.094 | 0.015 | 0.083 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | 0.002 | 0.002 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.19 | 0.19 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.22 | 0.25 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 0.60 | 0.70 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 0.80 | 0.89 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 5 | 10 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 0.50 | <0.50 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 260 | 250 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 46 | 44 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 36 | 35 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 8.9 | 8.8 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 1 | 1 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 240 | 240 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 22 | 21 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 19 | 19 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 13 | 13 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 298 | 294 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | <0.4 | <0.4 | --- | --- | --- | --- | --- | --- |
| | 2-13-97 | | 4-22-97 | | 6-11-97 | | 7-24-97 | | 8-26-97 | |



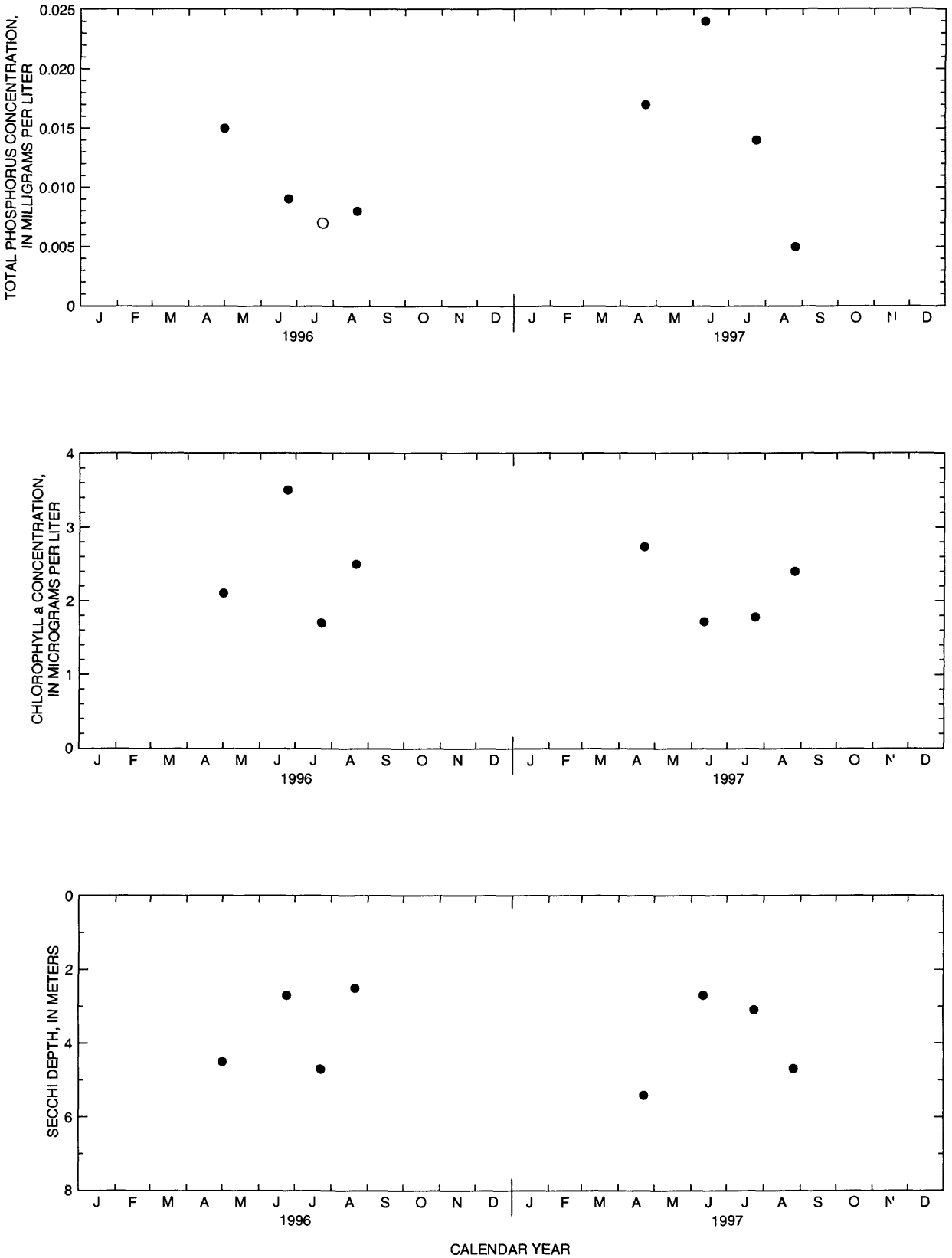



Figure 3. Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Silver Lake near West Bend, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

## 455909089405602 VANDERCOOK LAKE NEAR WOODRUFF, WI

LOCATION.--Lat 45°59'09", long 89°40'56", in SW 1/4 NE 1/4 SE 1/4 sec.36, T.41 N., R.6 E., Vilas County, Hydrologic Unit 07070001, at north end of lake on dirt road off County Trunk Highway M, 6.1 mi north of Woodruff.

DRAINAGE AREA.--1.11 $mi^2$. Area of lake, 0.17 $mi^2$.

PERIOD OF RECORD.--November 1980 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft above sea level.

REMARKS.--Lake does not have surface inlet or outlet.

EXTREMES FOR PERIOD OF RECORD.--Maximum observed gage height, 32.26 ft, Apr. 8–10, 1986; minimum observed gage height, 28.97 ft, Oct. 28, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum observed gage height, 31.82 ft, July 17; minimum observed gage height, 30.93 ft, Oct. 8-10.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 31.01 | --- | 31.40 | --- | --- | 31.65 | 31.70 | 31.67 | 31.66 | 31.67 | 31.68 | 31.60 |
| 2 | 31.00 | --- | 31.40 | --- | --- | 31.65 | 31.70 | 31.66 | 31.65 | 31.70 | 31.67 | 31.62 |
| 3 | 30.98 | --- | 31.39 | --- | --- | 31.64 | 31.71 | 31.65 | 31.64 | 31.69 | 31.66 | 31.60 |
| 4 | 30.97 | --- | 31.39 | --- | --- | 31.65 | 31.71 | 31.64 | 31.64 | 31.72 | 31.65 | 31.59 |
| 5 | 30.97 | 31.19 | --- | --- | --- | 31.64 | 31.72 | 31.64 | 31.66 | 31.70 | 31.62 | 31.57 |
| 6 | 30.96 | 31.19 | --- | --- | --- | 31.64 | 31.75 | 31.65 | 31.65 | 31.68 | 31.60 | 31.56 |
| 7 | 30.95 | 31.19 | --- | --- | --- | 31.63 | 31.75 | 31.64 | 31.64 | 31.67 | 31.59 | 31.55 |
| 8 | 30.93 | 31.18 | --- | --- | --- | 31.63 | 31.75 | 31.64 | 31.64 | 31.71 | 31.58 | 31.55 |
| 9 | 30.93 | 31.20 | --- | --- | --- | 31.64 | 31.74 | 31.63 | 31.63 | 31.70 | 31.56 | 31.57 |
| 10 | 30.93 | 31.21 | --- | --- | --- | 31.65 | 31.74 | 31.62 | 31.62 | 31.69 | 31.54 | 31.57 |
| 11 | 30.94 | 31.21 | --- | --- | --- | 31.65 | 31.73 | 31.63 | 31.61 | 31.68 | 31.53 | 31.56 |
| 12 | --- | 31.20 | --- | --- | --- | 31.64 | 31.73 | 31.65 | 31.60 | 31.67 | 31.51 | 31.55 |
| 13 | --- | 31.19 | --- | --- | --- | 31.65 | 31.72 | 31.65 | 31.59 | 31.68 | 31.50 | 31.54 |
| 14 | --- | 31.19 | --- | --- | --- | 31.69 | 31.71 | 31.65 | 31.57 | 31.72 | 31.48 | 31.54 |
| 15 | --- | 31.20 | --- | --- | --- | 31.70 | 31.71 | 31.65 | 31.58 | 31.71 | 31.52 | 31.53 |
| 16 | --- | 31.34 | --- | --- | --- | 31.70 | 31.70 | 31.65 | 31.60 | 31.77 | 31.57 | 31.54 |
| 17 | --- | 31.37 | --- | --- | --- | 31.68 | 31.70 | 31.66 | 31.59 | 31.82 | 31.57 | 31.58 |
| 18 | --- | 31.37 | --- | --- | 31.67 | 31.67 | 31.69 | 31.68 | 31.59 | 31.80 | 31.57 | 31.57 |
| 19 | --- | 31.37 | --- | --- | 31.67 | 31.66 | 31.69 | 31.70 | 31.58 | 31.78 | 31.56 | 31.58 |
| 20 | --- | 31.37 | --- | --- | 31.66 | 31.66 | 31.70 | 31.69 | 31.58 | 31.77 | 31.60 | 31.58 |
| 21 | --- | 31.36 | --- | --- | 31.66 | 31.65 | 31.69 | 31.68 | 31.57 | 31.76 | 31.62 | 31.56 |
| 22 | --- | 31.36 | --- | --- | 31.65 | 31.65 | 31.69 | 31.67 | 31.56 | 31.74 | 31.60 | 31.55 |
| 23 | --- | 31.36 | --- | --- | 31.64 | 31.65 | 31.68 | 31.68 | 31.55 | 31.73 | 31.59 | 31.54 |
| 24 | --- | 31.36 | --- | --- | 31.64 | 31.64 | 31.68 | 31.69 | 31.56 | 31.72 | 31.60 | 31.52 |
| 25 | --- | 31.36 | --- | --- | 31.64 | 31.67 | 31.67 | 31.68 | 31.59 | 31.75 | 31.59 | 31.51 |
| 26 | --- | 31.36 | --- | --- | 31.64 | 31.66 | 31.67 | 31.67 | 31.57 | 31.77 | 31.58 | 31.50 |
| 27 | --- | 31.36 | --- | --- | 31.63 | 31.66 | 31.66 | 31.65 | 31.56 | 31.76 | 31.57 | 31.49 |
| 28 | --- | 31.36 | --- | --- | 31.63 | 31.68 | 31.66 | 31.64 | 31.55 | 31.74 | 31.56 | 31.48 |
| 29 | --- | 31.37 | --- | --- | --- | 31.72 | 31.65 | 31.65 | 31.54 | 31.72 | 31.55 | 31.48 |
| 30 | --- | 31.40 | --- | --- | --- | 31.71 | 31.67 | 31.68 | 31.62 | 31.71 | 31.58 | 31.48 |
| 31 | --- | --- | --- | --- | --- | 31.71 | --- | 31.67 | --- | 31.69 | 31.60 | --- |
| MEAN | --- | --- | --- | --- | --- | 31.66 | 31.70 | 31.66 | 31.60 | 31.72 | 31.58 | 31.55 |
| MAX | --- | --- | --- | --- | --- | 31.72 | 31.75 | 31.70 | 31.66 | 31.82 | 31.68 | 31.62 |
| MIN | --- | --- | --- | --- | --- | 31.63 | 31.65 | 31.62 | 31.54 | 31.67 | 31.48 | 31.48 |

## 424608088414800 WHITEWATER LAKE NEAR WHITEWATER, WI

LOCATION.--Lat 42°46'08", long 88°41'48", in NW 1/4 NW 1/4 sec.35, T.4 N., R.15 E., Walworth County, Hydrologic Unit 07090001, at outlet, 5.0 mi southeast of Whitewater and 10.0 mi north of Delavan.

DRAINAGE AREA.--10.9 $mi^2$, of which 8.5 $mi^2$ is non-contributing.

PERIOD OF RECORD.--November 1990 to current year.

GAGE.--Water-stage recorder. Datum of gage is 861.00 ft above sea level, revised, (Wisconsin Department of Natural Resources).

REMARKS.--No estimated daily gage heights. Records good. Point of zero flow of dam crest is 10.97 ft. Rainfall data published in 1991 under this station number are now stored under station number 424559088420300.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 11.42 ft, June 18, 19, 1996; minimum daily gage height, 8.89 ft, Oct. 2, 3, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 11.26 ft, Feb. 27 to Mar. 3; minimum daily gage height, 10.45 ft, Oct. 14, 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.52 | 10.66 | 10.73 | 10.87 | 11.00 | 11.26 | 11.14 | 11.12 | 10.97 | 10.98 | 10.73 | 10.68 |
| 2 | 10.50 | 10.65 | 10.72 | 10.88 | 11.00 | 11.26 | 11.12 | 11.13 | 10.96 | 10.97 | 10.72 | 10.67 |
| 3 | 10.48 | 10.65 | 10.73 | 10.88 | 11.00 | 11.26 | 11.11 | 11.15 | 10.96 | 10.92 | 10.72 | 10.65 |
| 4 | 10.48 | 10.64 | 10.73 | 10.90 | 11.02 | 11.25 | 11.11 | 11.14 | 10.95 | 10.89 | 10.73 | 10.63 |
| 5 | 10.47 | 10.64 | 10.75 | 10.91 | 11.02 | 11.23 | 11.13 | 11.13 | 10.94 | 10.88 | 10.73 | 10.62 |
| 6 | 10.47 | 10.65 | 10.76 | 10.90 | 11.02 | 11.23 | 11.13 | 11.12 | 10.92 | 10.88 | 10.71 | 10.60 |
| 7 | 10.48 | 10.65 | 10.76 | 10.90 | 11.02 | 11.22 | 11.08 | 11.11 | 10.92 | 10.87 | 10.70 | 10.59 |
| 8 | 10.48 | 10.65 | 10.76 | 10.90 | 11.02 | 11.21 | 11.06 | 11.14 | 10.92 | 10.88 | 10.70 | 10.59 |
| 9 | 10.48 | 10.64 | 10.76 | 10.91 | 11.01 | 11.22 | 11.05 | 11.11 | 10.91 | 10.87 | 10.68 | 10.59 |
| 10 | 10.47 | 10.63 | 10.76 | 10.92 | 11.01 | 11.23 | 11.05 | 11.10 | 10.91 | 10.86 | 10.66 | 10.57 |
| 11 | 10.47 | 10.63 | 10.76 | 10.93 | 11.01 | 11.22 | 11.05 | 11.10 | 10.91 | 10.85 | 10.65 | 10.56 |
| 12 | 10.46 | 10.62 | 10.77 | 10.93 | 11.02 | 11.21 | 11.08 | 11.07 | 10.90 | 10.84 | 10.70 | 10.56 |
| 13 | 10.46 | 10.62 | 10.77 | 10.93 | 11.01 | 11.20 | 11.10 | 11.06 | 10.89 | 10.83 | 10.73 | 10.55 |
| 14 | 10.45 | 10.61 | 10.77 | 10.93 | 11.01 | 11.20 | 11.10 | 11.06 | 10.87 | 10.85 | 10.71 | 10.54 |
| 15 | 10.45 | 10.62 | 10.81 | 10.94 | 11.01 | 11.19 | 11.10 | 11.05 | 10.88 | 10.84 | 10.74 | 10.53 |
| 16 | 10.46 | 10.63 | 10.81 | 10.96 | 11.02 | 11.18 | 11.09 | 11.05 | 11.00 | 10.82 | 10.75 | 10.54 |
| 17 | 10.56 | 10.64 | 10.81 | 10.96 | 11.02 | 11.18 | 11.08 | 11.04 | 10.99 | 10.81 | 10.76 | 10.61 |
| 18 | 10.56 | 10.63 | 10.80 | 10.96 | 11.02 | 11.17 | 11.08 | 11.03 | 10.98 | 10.81 | 10.79 | 10.61 |
| 19 | 10.55 | 10.62 | 10.80 | 10.96 | 11.03 | 11.16 | 11.10 | 11.04 | 10.97 | 10.81 | 10.78 | 10.61 |
| 20 | 10.55 | 10.62 | 10.81 | 10.96 | 11.03 | 11.16 | 11.10 | 11.03 | 10.98 | 10.80 | 10.78 | 10.62 |
| 21 | 10.54 | 10.65 | 10.81 | 10.96 | 11.20 | 11.16 | 11.12 | 11.02 | 11.04 | 10.80 | 10.77 | 10.60 |
| 22 | 10.56 | 10.65 | 10.81 | 10.97 | 11.25 | 11.15 | 11.11 | 11.02 | 11.06 | 10.78 | 10.76 | 10.60 |
| 23 | 10.61 | 10.65 | 10.82 | 10.96 | 11.25 | 11.14 | 11.10 | 11.01 | 11.05 | 10.78 | 10.74 | 10.60 |
| 24 | 10.60 | 10.66 | 10.84 | 10.97 | 11.24 | 11.14 | 11.10 | 10.99 | 11.06 | 10.77 | 10.74 | 10.59 |
| 25 | 10.60 | 10.65 | 10.84 | 10.99 | 11.24 | 11.14 | 11.09 | 10.98 | 11.07 | 10.78 | 10.73 | 10.58 |
| 26 | 10.59 | 10.65 | 10.86 | 10.99 | 11.24 | 11.14 | 11.09 | 11.00 | 11.05 | 10.78 | 10.73 | 10.57 |
| 27 | 10.59 | 10.65 | 10.87 | 11.00 | 11.26 | 11.13 | 11.09 | 10.96 | 11.04 | 10.80 | 10.73 | 10.57 |
| 28 | 10.59 | 10.66 | 10.88 | 11.00 | 11.26 | 11.13 | 11.08 | 10.98 | 11.02 | 10.80 | 10.72 | 10.56 |
| 29 | 10.65 | 10.67 | 10.88 | 11.00 | --- | 11.13 | 11.08 | 10.98 | 11.01 | 10.78 | 10.71 | 10.54 |
| 30 | 10.70 | 10.70 | 10.87 | 11.00 | --- | 11.13 | 11.08 | 10.98 | 10.99 | 10.77 | 10.70 | 10.51 |
| 31 | 10.68 | --- | 10.87 | 11.00 | --- | 11.14 | --- | 10.97 | --- | 10.74 | 10.69 | --- |
| MEAN | 10.53 | 10.64 | 10.80 | 10.94 | 11.08 | 11.19 | 11.09 | 11.05 | 10.97 | 10.83 | 10.73 | 10.59 |
| MAX | 10.70 | 10.70 | 10.88 | 11.00 | 11.26 | 11.26 | 11.14 | 11.15 | 11.07 | 10.98 | 10.79 | 10.68 |
| MIN | 10.45 | 10.61 | 10.72 | 10.87 | 11.00 | 11.13 | 11.05 | 10.96 | 10.87 | 10.74 | 10.65 | 10.51 |

## 424915088083900 WIND LAKE AT WIND LAKE, WI

LOCATION.--Lat 42°49'15", long 88°08'39", in NW 1/4 SW 1/4 sec.9, T.4 N., R.20 E., Racine County, Hydrologic Unit 07120006, at Wind Lake.

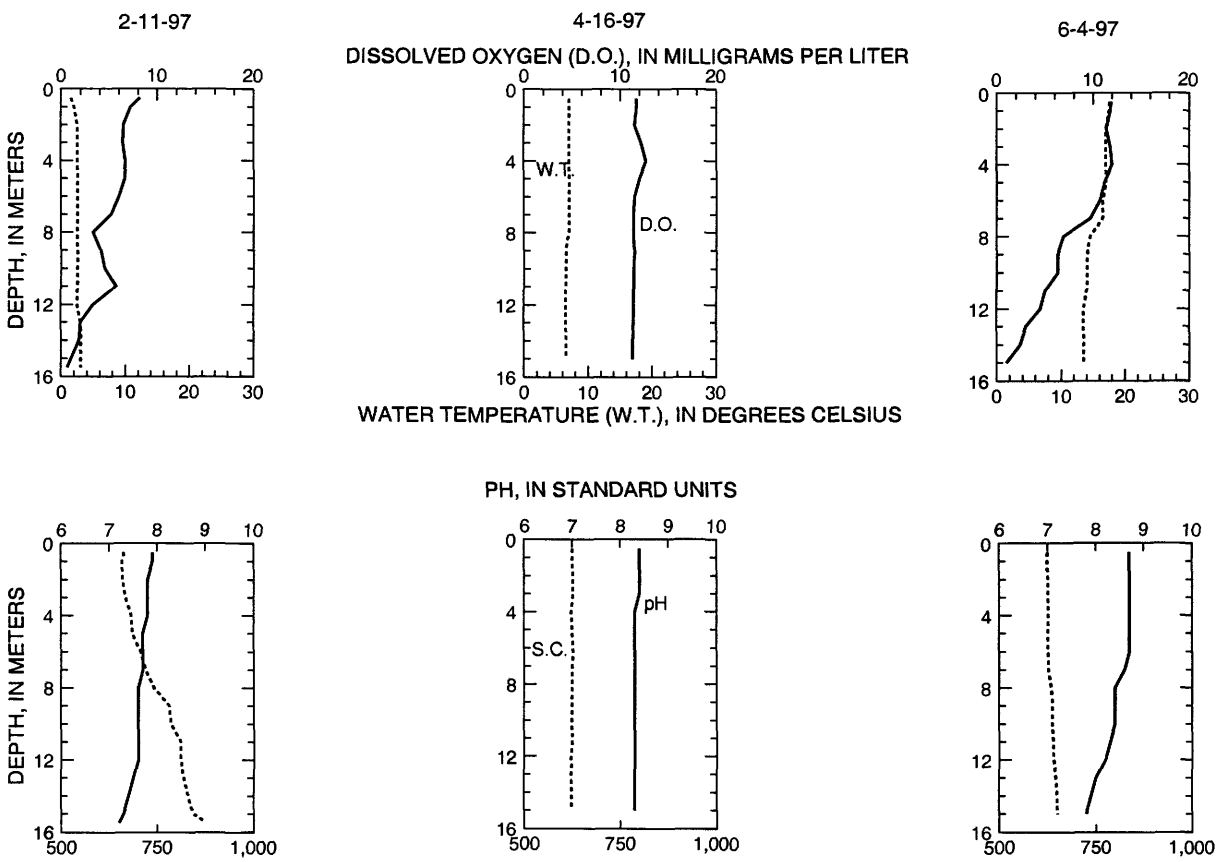
PERIOD OF RECORD.--February 1985 to current year.

REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality ana'yses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 11 TO JUNE 04, 1997

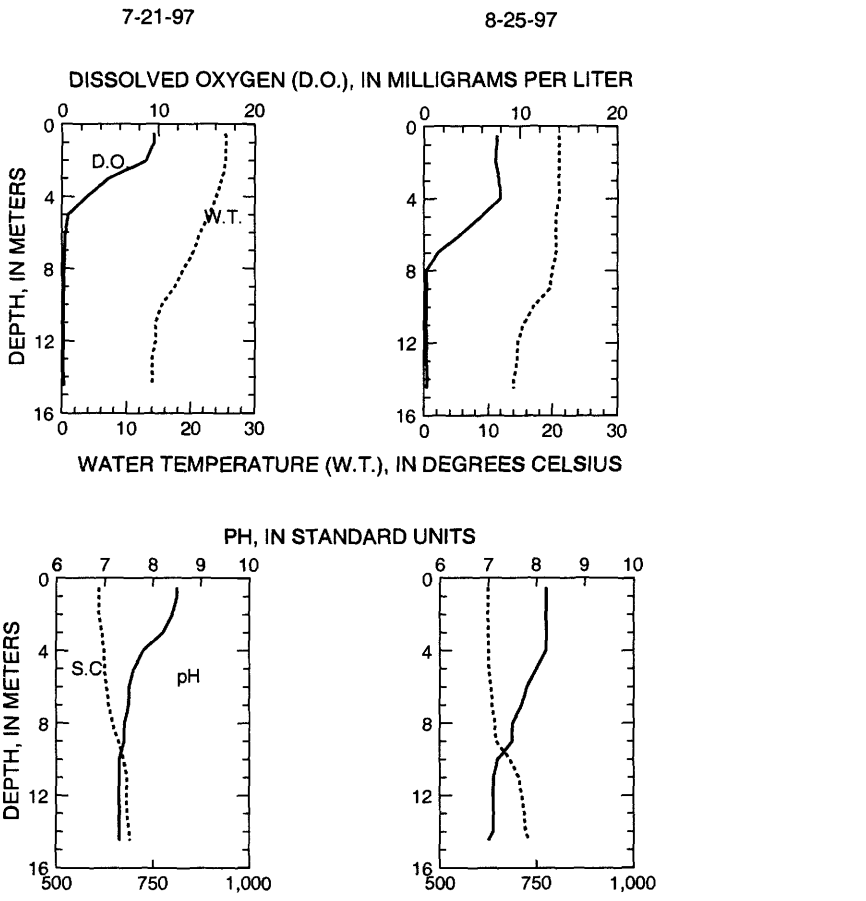
(Milligrams per liter unless otherwise indicated)

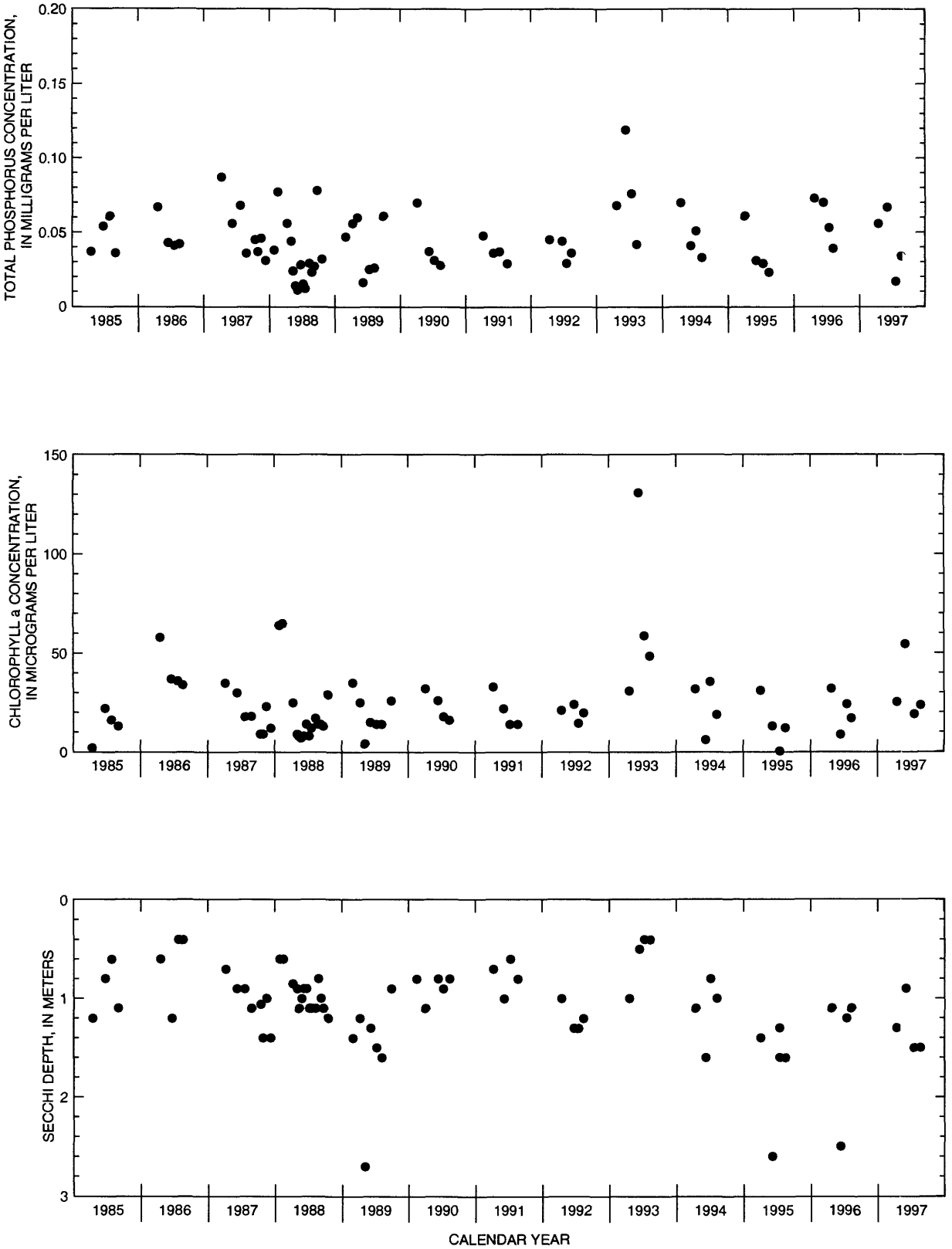
| | Feb. 11 | | | Apr. 16 | | June 04 | | |
|---|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | | --- | | 1.3 | | | 0.9 | |
| Chlorophyll a, phytoplankton (µg/L) | | --- | | 25 | | | 55 | |
| Depth of sample (m) | 0.5 | 8.0 | 16 | 0.5 | 15 | 0.5 | 11 | 15 |
| Water temperature (°C) | 1.5 | 2.5 | 3.0 | 7.0 | 6.5 | 17.5 | 14.0 | 13.5 |
| Specific conductance (µS/cm) | 664 | 741 | 877 | 625 | 623 | 624 | 638 | 650 |
| pH (units) | 7.9 | 7.6 | 7.2 | 8.4 | 8.3 | 8.7 | 8.3 | 7.8 |
| Dissolved oxygen | 8.2 | 3.3 | 0.6 | 11.7 | 11.3 | 11.9 | 5.0 | 1.0 |
| Phosphorus, total (as P) | 0.047 | 0.049 | 0.312 | 0.056 | 0.064 | 0.067 | 0.078 | 0.259 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | --- | <0.002 | 0.003 | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | --- | 0.31 | 0.30 | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | --- | 0.28 | 0.31 | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | --- | 1.9 | 2.0 | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | --- | 2.2 | 2.3 | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | --- | 25 | 25 | --- | --- | --- |
| Turbidity (NTU) | --- | --- | --- | 3.1 | 3.2 | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | --- | 230 | 230 | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | --- | 46 | 46 | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | --- | 28 | 28 | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | --- | 35 | 35 | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | --- | 3 | 3 | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | --- | 180 | 180 | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | --- | 45 | 44 | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | --- | 69 | 69 | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | --- | 0.008 | 0.018 | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | --- | 366 | 366 | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | --- | <10 | <10 | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | --- | 0.7 | 5 | --- | --- | --- |



WATER-QUALITY DATA, JULY 21 TO AUGUST 25, 1997
(Milligrams per liter unless otherwise indicated)

| | July 21 | | Aug. 25 | | | | |
|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | 1.5 | | | | 1.5 | | |
| Chlorophyll a, phytoplankton (µg/L) | 19 | | | | 24 | | |
| Depth of sample (m) | 0.5 | 15 | 0.5 | 9.0 | 12 | 13 | 15 |
| Water temperature (°C) | 25.5 | 14.0 | 21.0 | 19.5 | 14.5 | 14.5 | 14.0 |
| Specific conductance (µS/cm) | 609 | 690 | 624 | 645 | 713 | 718 | 731 |
| pH (units) | 8.5 | 7.3 | 8.2 | 7.5 | 7.1 | 7.1 | 7.0 |
| Dissolved oxygen | 9.5 | 0.2 | 7.6 | 0.2 | 0.2 | 0.2 | 0.2 |
| Phosphorus, total (as P) | 0.017 | 0.551 | 0.034 | 0.061 | 0.548 | 0.620 | 0.674 |






Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Wind Lake, Deep Hole, at Wind Lake, Wisconsin.

## 424938088080800 WIND LAKE, NORTHEAST BASIN, AT WIND LAKE, WI

LOCATION.--Lat 42°49'38", long 88°08'08", in SW 1/4 SE 1/4 sec.4, T.4 N., R.20 E., Racine County, Hydrologic Unit 07120006, at Wind Lake.

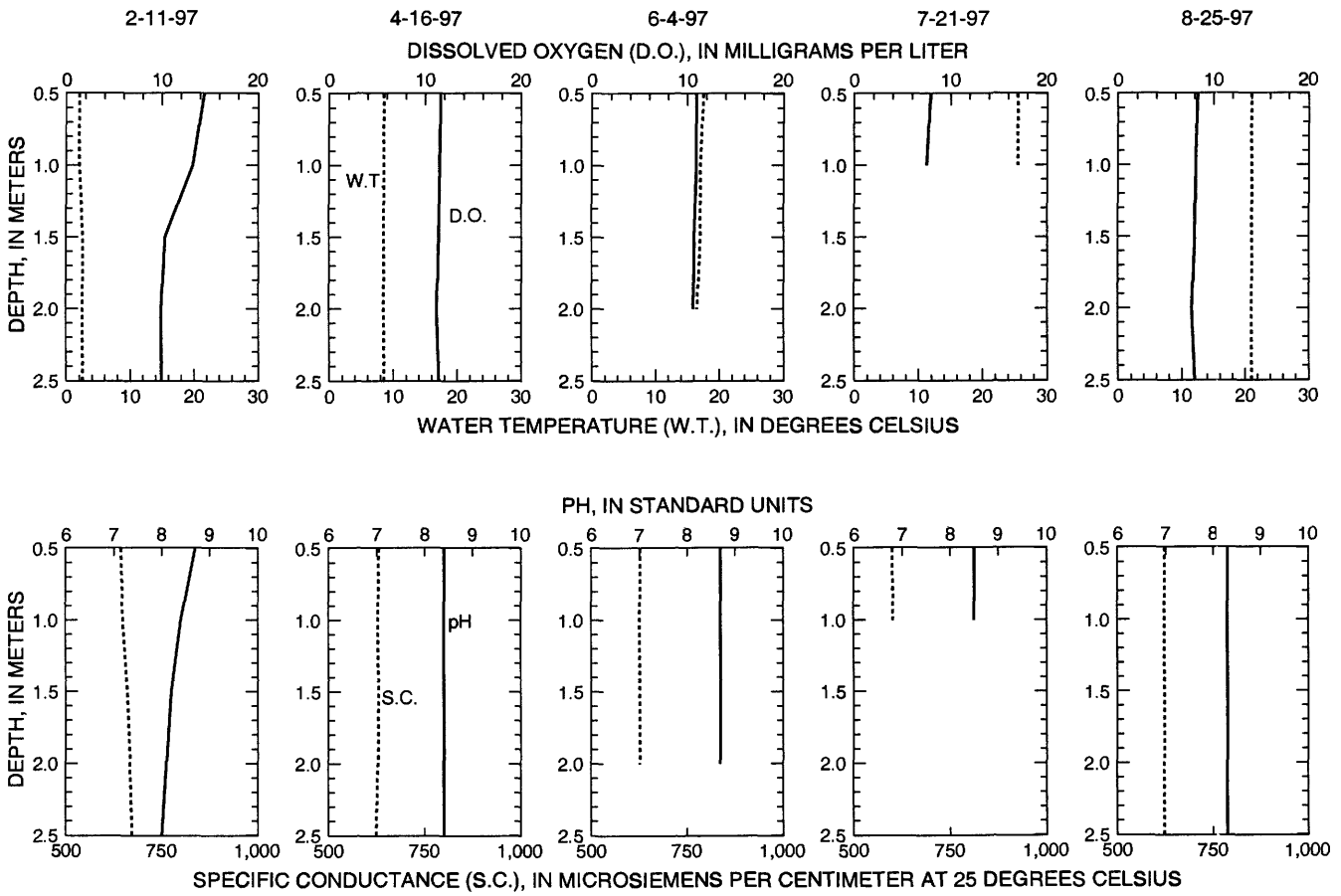
PERIOD OF RECORD.--February 11 to August 25, 1997.

REMARKS.--Lake sampled in northeast basin about 1/3 mi south of Muskego Canal inlet. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 11 TO AUGUST 25, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 11 | | Apr. 16 | | June 04 | | July 21 | | Aug. 25 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Secchi-depth (meters) | --- | | 1.1 | | 1.5 | | 1.1 | | 1.1 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 25 | | 27 | | 11 | | 26 | |
| Depth of sample (m) | 0.5 | 2.5 | 0.5 | 2.5 | 0.5 | 2.0 | 0.5 | 1.0 | 0.5 | 2.5 |
| Water temperature (°C) | 2.0 | 2.5 | 8.5 | 8.5 | 17.5 | 16.5 | 25.5 | 25.5 | 21.0 | 21.0 |
| Specific conductance (µS/cm) | --- | 672 | 630 | 623 | 627 | 626 | 599 | 601 | 622 | 622 |
| pH (units) | 8.7 | 8.0 | 8.4 | 8.4 | 8.7 | 8.7 | 8.5 | 8.5 | 8.3 | 8.3 |
| Dissolved oxygen | 14.4 | 9.9 | 11.6 | 11.4 | 10.9 | 10.6 | 7.9 | 7.5 | 8.3 | 8.0 |
| Phosphorus, total (as P) | 0.094 | 0.063 | 0.068 | 0.082 | 0.047 | 0.051 | 0.033 | 0.042 | 0.038 | 0.036 |



## 424848088083100 WIND LAKE OUTLET AT WIND LAKE, WI

LOCATION.--Lat 42°48'48" long 88°08'31", in NE 1/4 NW 1/4 sec.16, T.4 N., R.20 E., Racine County, Hydrologic Unit 07120006, at Wind Lake.

DRAINAGE AREA.--39.6 $mi^2$.

PERIOD OF RECORD.--March 1985 to current year.

REVISED RECORDS.--WDR WI-91-1: 1988(m).

GAGE.--Water-stage recorder and concrete dam. Datum of gage is 760.30 ft above sea level. Prior to Oct. 2, 1987, nonrecording gage at same site and datum.

REMARKS.--Lake ice-covered Nov. 28 to Dec. 15 and Dec. 27 to Mar. 21. Records good. Lake level regulated by dam with two 10-foot gates at outlet. Prior to October 1987, published as Wind Lake at Wind Lake, Wis.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 8.61 ft, Sept. 1, 1989; minimum recorded, 5.95 ft, Jan. 2, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 8.44 ft, July 8, 9; minimum recorded, 7.15 ft, Dec. 23.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.88 | 7.89 | 7.91 | 7.38 | 7.46 | 7.47 | 7.55 | 7.65 | 7.74 | 8.17 | 8.00 | 8.08 |
| 2 | 7.88 | 7.89 | 7.79 | 7.40 | 7.46 | 7.49 | 7.54 | 7.66 | 7.73 | 8.24 | 7.99 | 8.09 |
| 3 | 7.86 | 7.87 | 7.67 | 7.43 | 7.46 | 7.46 | 7.53 | 7.72 | 7.72 | 8.25 | 7.98 | 8.08 |
| 4 | 7.84 | 7.88 | 7.52 | 7.49 | 7.50 | 7.45 | 7.51 | 7.74 | 7.71 | 8.27 | 8.00 | 8.07 |
| 5 | 7.82 | 7.89 | 7.39 | 7.55 | 7.52 | 7.42 | 7.51 | 7.75 | 7.71 | 8.29 | 7.99 | 8.05 |
| 6 | 7.81 | 7.92 | 7.30 | 7.57 | 7.52 | 7.40 | 7.51 | 7.76 | 7.71 | 8.34 | 7.96 | 8.04 |
| 7 | 7.83 | 7.95 | 7.27 | 7.58 | 7.51 | 7.37 | 7.51 | 7.74 | 7.70 | 8.35 | 7.95 | 8.04 |
| 8 | 7.82 | 7.98 | 7.26 | 7.57 | 7.52 | 7.38 | 7.49 | 7.78 | 7.69 | 8.41 | 7.93 | 8.03 |
| 9 | 7.81 | 8.00 | 7.24 | 7.56 | 7.53 | 7.40 | 7.46 | 7.80 | 7.68 | 8.43 | 7.91 | 8.04 |
| 10 | 7.81 | 8.02 | 7.22 | 7.57 | 7.53 | 7.42 | 7.45 | 7.77 | 7.67 | 8.38 | 7.91 | 8.05 |
| 11 | 7.79 | 8.04 | 7.21 | 7.53 | 7.53 | 7.44 | 7.45 | 7.75 | 7.66 | 8.31 | 7.90 | 8.04 |
| 12 | 7.77 | 8.03 | 7.21 | 7.50 | 7.53 | 7.45 | 7.50 | 7.76 | 7.65 | 8.25 | 7.92 | 8.02 |
| 13 | 7.76 | 8.04 | 7.21 | 7.45 | 7.51 | 7.46 | 7.50 | 7.74 | 7.65 | 8.19 | 7.93 | 8.02 |
| 14 | 7.76 | 8.05 | 7.22 | 7.40 | 7.50 | 7.51 | 7.50 | 7.74 | 7.62 | 8.15 | 7.91 | 8.01 |
| 15 | 7.76 | 8.05 | 7.26 | 7.40 | 7.47 | 7.52 | 7.50 | 7.76 | 7.60 | 8.14 | 7.93 | 8.00 |
| 16 | 7.75 | 8.06 | 7.26 | 7.41 | 7.45 | 7.51 | 7.52 | 7.74 | 7.79 | 8.13 | 7.94 | 8.00 |
| 17 | 7.79 | 8.10 | 7.26 | 7.41 | 7.43 | 7.52 | 7.52 | 7.74 | 7.81 | 8.13 | 7.93 | 8.12 |
| 18 | 7.80 | 8.10 | 7.25 | 7.39 | 7.41 | 7.52 | 7.51 | 7.74 | 7.81 | 8.13 | 7.93 | 8.10 |
| 19 | 7.78 | 8.11 | 7.23 | 7.39 | 7.44 | 7.52 | 7.52 | 7.75 | 7.81 | 8.13 | 7.92 | 8.10 |
| 20 | 7.77 | 8.12 | 7.21 | 7.37 | 7.47 | 7.53 | 7.53 | 7.75 | 7.82 | 8.11 | 7.91 | 8.12 |
| 21 | 7.76 | 8.15 | 7.19 | 7.36 | 7.67 | 7.54 | 7.57 | 7.73 | 7.96 | 8.11 | 7.91 | 8.11 |
| 22 | 7.76 | 8.15 | 7.17 | 7.37 | 7.78 | 7.53 | 7.57 | 7.72 | 8.13 | 8.12 | 7.89 | 8.11 |
| 23 | 7.79 | 8.15 | 7.18 | 7.38 | 7.74 | 7.53 | 7.57 | 7.71 | 8.30 | 8.11 | 7.87 | 8.12 |
| 24 | 7.79 | 8.15 | 7.23 | 7.39 | 7.64 | 7.53 | 7.57 | 7.70 | 8.38 | 8.10 | 7.99 | 8.12 |
| 25 | 7.77 | 8.15 | 7.24 | 7.43 | 7.51 | 7.57 | 7.56 | 7.74 | 8.37 | 8.08 | 8.00 | 8.12 |
| 26 | 7.77 | 8.16 | 7.28 | 7.43 | 7.44 | 7.56 | 7.55 | 7.73 | 8.36 | 8.10 | 8.01 | 8.11 |
| 27 | 7.77 | 8.12 | 7.30 | 7.44 | 7.50 | 7.56 | 7.55 | 7.70 | 8.33 | 8.11 | 8.03 | 8.11 |
| 28 | 7.77 | 8.06 | 7.31 | 7.45 | 7.50 | 7.56 | 7.55 | 7.69 | 8.29 | 8.10 | 8.04 | 8.10 |
| 29 | 7.82 | 7.99 | 7.34 | 7.45 | --- | 7.56 | 7.54 | 7.72 | 8.21 | 8.07 | 8.04 | 8.09 |
| 30 | 7.89 | 7.96 | 7.34 | 7.45 | --- | 7.56 | 7.56 | 7.74 | 8.11 | 8.04 | 8.05 | 8.07 |
| 31 | 7.88 | --- | 7.35 | 7.46 | --- | 7.57 | --- | 7.74 | --- | 8.02 | 8.07 | --- |
| MEAN | 7.80 | 8.03 | 7.32 | 7.45 | 7.52 | 7.49 | 7.52 | 7.73 | 7.89 | 8.19 | 7.96 | 8.07 |
| MAX | 7.89 | 8.16 | 7.91 | 7.58 | 7.78 | 7.57 | 7.57 | 7.80 | 8.38 | 8.43 | 8.07 | 8.12 |
| MIN | 7.75 | 7.87 | 7.17 | 7.36 | 7.41 | 7.37 | 7.45 | 7.65 | 7.60 | 8.02 | 7.87 | 8.00 |

## 04082500 LAKE WINNEBAGO AT OSHKOSH, WI

LOCATION.--Lat 44°00'35", long 88°31'38", in NE 1/4 NE 1/4 sec.25, T.18 N., R.16 E., Winnebago County, Hydrologic Unit 04030203, at 905 Bay Shore Drive, 800 ft east of mouth of the upper Fox River.

DRAINAGE AREA.--5,880 $mi^2$, at lake outlet at Menasha Dam. Area of Lake Winnebago, 215 $mi^2$.

PERIOD OF RECORD.--October 1938 to current year in reports of Geological Survey. Records from 1882 to 1938 in files of Geological Survey and U.S. Army Corps of Engineers. A report on Fox River by U.S. Army Corps of Engineers, published as House Document No. 146, 67th Congress, 2nd session, contains semi-monthly records of inflow of Lake Winnebago for the period 1896-1917.

REVISED RECORD.--WDR WI-83-1: Drainage area.

GAGE.--Water-stage recorder. Nonrecording gage read once daily October 1938 to October 1978. Datum of gage is 745.05 ft above mean tide at New York City (levels by U.S. Army Corps of Engineers). Datum of Deuchman gage is 745.00 ft above mean tide at New York City.

REMARKS.--Estimated daily gage heights: May 20, 21. Records good except for estimated daily gage heights, which are fair. Lake elevations controlled by dams at Menasha and Neenah, which are operated in the interest of navigation. Crests of both dams are at elevation 746.73 ft. Present limits of regulation are from 21 1/4 in. above the crest of Menasha dam to crest during navigation season, plus additional 18 in. below crest during winter. Oshkosh staff gage gives true level of lake, while Deuchman gage readings are affected by loss of head in the channel between lake and dam. Data-collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.33 ft (Deuchman gage) Nov. 8, 1881; minimum observed, -2.00 ft (Deuchman gage) Nov. 28, 1891.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 3.88 ft, June 24; minimum recorded, 1.25 ft, Mar. 9.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.81 | 2.79 | 2.26 | 2.14 | 1.92 | 1.46 | 1.76 | 2.77 | 3.12 | 3.04 | 2.78 | 2.85 |
| 2 | 2.80 | 2.77 | 2.26 | 2.14 | 1.91 | 1.44 | 1.80 | 2.92 | 3.12 | 2.88 | 2.77 | 2.88 |
| 3 | 2.82 | 2.73 | 2.25 | 2.13 | 1.89 | 1.42 | 1.85 | 2.93 | 3.08 | 2.89 | 2.77 | 2.85 |
| 4 | 2.79 | 2.71 | 2.25 | 2.16 | 1.88 | 1.40 | 1.92 | 3.01 | 3.06 | 2.91 | 2.77 | 2.80 |
| 5 | 2.78 | 2.70 | 2.25 | 2.20 | 1.87 | 1.38 | 1.99 | 2.99 | 3.06 | 2.86 | 2.71 | 2.76 |
| 6 | 2.78 | 2.67 | 2.25 | 2.21 | 1.84 | 1.37 | 1.88 | 3.09 | 3.07 | 2.84 | 2.67 | 2.79 |
| 7 | 2.84 | 2.66 | 2.26 | 2.20 | 1.80 | 1.34 | 1.91 | 3.11 | 3.12 | 2.83 | 2.65 | 2.81 |
| 8 | 2.81 | 2.64 | 2.25 | 2.19 | 1.76 | 1.32 | 2.15 | 2.98 | 3.15 | 2.86 | 2.62 | 2.80 |
| 9 | 2.81 | 2.62 | 2.25 | 2.19 | 1.72 | 1.32 | 2.23 | 3.05 | 3.13 | 2.89 | 2.58 | 2.81 |
| 10 | 2.84 | 2.61 | 2.24 | 2.20 | 1.69 | 1.33 | 2.22 | 3.10 | 3.11 | 2.89 | 2.56 | 2.83 |
| 11 | 2.78 | 2.60 | 2.24 | 2.20 | 1.65 | 1.33 | 2.25 | 2.99 | 3.08 | 2.89 | 2.57 | 2.82 |
| 12 | 2.80 | 2.56 | 2.24 | 2.20 | 1.62 | 1.34 | 2.32 | 3.01 | 3.04 | 2.91 | 2.58 | 2.82 |
| 13 | 2.82 | 2.53 | 2.24 | 2.19 | 1.58 | 1.37 | 2.29 | 3.02 | 3.05 | 2.92 | 2.59 | 2.80 |
| 14 | 2.83 | 2.53 | 2.24 | 2.19 | 1.55 | 1.41 | 2.33 | 2.90 | 2.99 | 2.93 | 2.57 | 2.81 |
| 15 | 2.80 | 2.52 | 2.21 | 2.18 | 1.53 | 1.40 | 2.30 | 2.89 | 2.92 | 2.96 | 2.57 | 2.83 |
| 16 | 2.82 | 2.47 | 2.26 | 2.17 | 1.51 | 1.39 | 2.31 | 2.90 | 3.00 | 2.94 | 2.67 | 2.84 |
| 17 | 2.80 | 2.35 | 2.23 | 2.15 | 1.48 | 1.38 | 2.36 | 2.90 | 3.00 | 2.97 | 2.74 | 2.87 |
| 18 | 2.79 | 2.40 | 2.23 | 2.13 | 1.46 | 1.36 | 2.36 | 2.89 | 2.99 | 2.99 | 2.70 | 2.88 |
| 19 | 2.83 | 2.40 | 2.21 | 2.11 | 1.47 | 1.35 | 2.36 | 2.88 | 2.99 | 2.97 | 2.72 | 2.92 |
| 20 | 2.80 | 2.39 | 2.20 | 2.08 | 1.49 | 1.34 | 2.36 | 2.93 | 3.07 | 2.92 | 2.75 | 2.96 |
| 21 | 2.78 | 2.36 | 2.18 | 2.06 | 1.54 | 1.35 | 2.36 | 2.92 | 3.24 | 2.96 | 2.78 | 2.96 |
| 22 | 2.81 | 2.33 | 2.17 | 2.05 | 1.56 | 1.38 | 2.37 | 2.92 | 3.34 | 2.94 | 2.79 | 2.94 |
| 23 | 2.77 | 2.37 | 2.17 | 2.04 | 1.56 | 1.40 | 2.41 | 2.91 | 3.35 | 2.93 | 2.79 | 2.98 |
| 24 | 2.79 | 2.34 | 2.20 | 2.03 | 1.55 | 1.43 | 2.47 | 2.97 | 3.32 | 2.93 | 2.82 | 2.93 |
| 25 | 2.82 | 2.30 | 2.20 | 2.03 | 1.53 | 1.46 | 2.52 | 3.05 | 3.27 | 2.91 | 2.83 | 2.94 |
| 26 | 2.79 | 2.28 | 2.19 | 2.02 | 1.51 | 1.51 | 2.56 | 3.03 | 3.24 | 2.92 | 2.82 | 2.97 |
| 27 | 2.73 | 2.27 | 2.18 | 2.01 | 1.50 | 1.55 | 2.60 | 3.02 | 3.18 | 2.92 | 2.84 | 2.96 |
| 28 | 2.78 | 2.25 | 2.17 | 2.00 | 1.48 | 1.58 | 2.63 | 3.02 | 3.10 | 2.92 | 2.86 | 2.95 |
| 29 | 2.81 | 2.24 | 2.16 | 1.98 | --- | 1.63 | 2.63 | 3.03 | 3.04 | 2.88 | 2.85 | 2.89 |
| 30 | 2.63 | 2.26 | 2.15 | 1.96 | --- | 1.68 | 2.82 | 3.09 | 3.05 | 2.85 | 2.83 | 3.00 |
| 31 | 2.78 | --- | 2.15 | 1.94 | --- | 1.73 | --- | 3.12 | --- | 2.82 | 2.87 | --- |
| MEAN | 2.79 | 2.49 | 2.22 | 2.11 | 1.64 | 1.42 | 2.28 | 2.98 | 3.11 | 2.91 | 2.72 | 2.88 |
| MAX | 2.84 | 2.79 | 2.26 | 2.21 | 1.92 | 1.73 | 2.82 | 3.12 | 3.35 | 3.04 | 2.87 | 3.00 |
| MIN | 2.63 | 2.24 | 2.15 | 1.94 | 1.46 | 1.32 | 1.76 | 2.77 | 2.92 | 2.82 | 2.56 | 2.76 |

## 04084255 LAKE WINNEBAGO NEAR STOCKBRIDGE, WI

LOCATION.--Lat 44°04'17", long 88°19'52", Stockbridge Indian Reservation, Calumet County, Hydrologic Unit 04030203, on east shore of Lake Winnebago, 300 ft south of County Highway E and 1.6 mi west of Stockbridge.

DRAINAGE AREA.--5,880 $mi^2$, at lake outlet at Menasha Dam. Area of Lake Winnebago, 215 $mi^2$.

PERIOD OF RECORD.--November 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 745.05 ft above mean tide of New York City (levels by U. S. Army Corps of Engineers).

REMARKS.--Records good. Lake elevations controlled by dams at Menasha and Neenah, which are operated in the interest of navigation. Crests of both dams are at elevation 746.73 ft. Present limits of regulation are from 21 1/4 in. above the crest of Menasha dam to crest during navigation season, plus additional 18 in. below crest during winter. Data-collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 4.13 ft, July 9, 1993; minimum observed, 0.30 ft, Mar. 1, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 3.74 ft, June 24; minimum recorded, 1.26 ft, Mar. 9, 21.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.77 | 2.91 | 2.23 | 2.10 | 1.89 | 1.42 | 1.73 | 2.76 | 3.07 | 2.99 | 2.82 | 2.82 |
| 2 | 2.77 | 2.80 | 2.22 | 2.09 | 1.88 | 1.42 | 1.77 | 2.84 | 3.04 | 3.03 | 2.77 | 2.78 |
| 3 | 2.78 | 2.76 | 2.21 | 2.09 | 1.86 | 1.39 | 1.83 | 2.89 | 3.02 | 3.03 | 2.74 | 2.75 |
| 4 | 2.75 | 2.70 | 2.21 | 2.12 | 1.85 | 1.37 | 1.89 | 2.99 | 3.03 | 2.89 | 2.68 | 2.78 |
| 5 | 2.75 | 2.66 | 2.21 | 2.18 | 1.85 | 1.36 | 1.95 | 3.07 | 3.03 | 2.88 | 2.66 | 2.81 |
| 6 | 2.78 | 2.66 | 2.22 | 2.18 | 1.82 | 1.34 | 2.16 | 3.11 | 3.01 | 2.84 | 2.69 | 2.78 |
| 7 | 2.72 | 2.68 | 2.22 | 2.16 | 1.77 | 1.30 | 2.24 | 3.04 | 3.06 | 2.79 | 2.65 | 2.74 |
| 8 | 2.75 | 2.65 | 2.23 | 2.15 | 1.73 | 1.29 | 2.20 | 3.08 | 3.07 | 2.78 | 2.62 | 2.75 |
| 9 | 2.77 | 2.67 | 2.21 | 2.15 | 1.69 | 1.28 | 2.18 | 3.12 | 3.08 | 2.83 | 2.57 | 2.76 |
| 10 | 2.75 | 2.66 | 2.20 | 2.17 | 1.65 | 1.29 | 2.21 | 3.07 | 3.07 | 2.85 | 2.55 | 2.75 |
| 11 | 2.83 | 2.63 | 2.20 | 2.17 | 1.62 | 1.30 | 2.21 | 3.08 | 3.03 | 2.86 | 2.48 | 2.77 |
| 12 | 2.79 | 2.58 | 2.20 | 2.16 | 1.59 | 1.31 | 2.18 | 3.09 | 3.01 | 2.88 | 2.50 | 2.77 |
| 13 | 2.77 | 2.51 | 2.20 | 2.15 | 1.55 | 1.33 | 2.29 | 2.97 | 2.97 | 2.90 | 2.55 | 2.77 |
| 14 | 2.74 | 2.46 | 2.19 | 2.14 | 1.52 | 1.38 | 2.31 | 2.89 | 2.93 | 2.96 | 2.54 | 2.79 |
| 15 | 2.77 | 2.46 | 2.22 | 2.14 | 1.49 | 1.37 | 2.34 | 2.88 | 2.98 | 2.97 | 2.57 | 2.79 |
| 16 | 2.78 | 2.42 | 2.22 | 2.16 | 1.48 | 1.35 | 2.32 | 2.88 | 3.00 | 2.95 | 2.64 | 2.79 |
| 17 | 2.84 | 2.47 | 2.22 | 2.13 | 1.44 | 1.34 | 2.31 | 2.84 | 2.95 | 2.98 | 2.58 | 2.92 |
| 18 | 2.91 | 2.45 | 2.20 | 2.10 | 1.42 | 1.32 | 2.32 | 2.84 | 2.92 | 2.94 | 2.65 | 2.92 |
| 19 | 2.79 | 2.38 | 2.17 | 2.07 | 1.44 | 1.30 | 2.33 | 2.90 | 2.93 | 2.88 | 2.68 | 2.88 |
| 20 | 2.74 | 2.33 | 2.15 | 2.05 | 1.45 | 1.29 | 2.32 | 2.90 | 3.03 | 2.90 | 2.70 | 2.89 |
| 21 | 2.73 | 2.32 | 2.12 | 2.03 | 1.50 | 1.30 | 2.31 | 2.89 | 3.21 | 2.86 | 2.74 | 2.93 |
| 22 | 2.71 | 2.32 | 2.12 | 2.02 | 1.52 | 1.34 | 2.32 | 2.87 | 3.32 | 2.85 | 2.75 | 2.98 |
| 23 | 2.82 | 2.26 | 2.14 | 2.01 | 1.53 | 1.37 | 2.35 | 2.87 | 3.34 | 2.87 | 2.76 | 2.92 |
| 24 | 2.87 | 2.25 | 2.18 | 1.99 | 1.51 | 1.39 | 2.42 | 2.89 | 3.36 | 2.89 | 2.76 | 2.97 |
| 25 | 2.76 | 2.27 | 2.16 | 2.02 | 1.49 | 1.44 | 2.48 | 2.85 | 3.33 | 2.88 | 2.79 | 2.96 |
| 26 | 2.75 | 2.25 | 2.15 | 1.98 | 1.47 | 1.47 | 2.52 | 2.86 | 3.24 | 2.88 | 2.79 | 2.92 |
| 27 | 2.81 | 2.22 | 2.14 | 1.98 | 1.47 | 1.50 | 2.56 | 2.91 | 3.16 | 2.89 | 2.82 | 2.92 |
| 28 | 2.80 | 2.20 | 2.1[illegible] | 1.96 | 1.44 | 1.54 | 2.59 | 2.93 | 3.09 | 2.86 | 2.80 | 2.99 |
| 29 | 2.74 | 2.20 | 2. | 1.94 | --- | 1.61 | 2.64 | 2.99 | 3.04 | 2.82 | 2.79 | 3.10 |
| 30 | 3.02 | 2.22 | 2.1[illegible] | 1.92 | --- | 1.65 | 2.51 | 3.09 | 3.00 | 2.81 | 2.80 | 3.01 |
| 31 | 3.05 | --- | 2.11 | 1.91 | --- | 1.70 | --- | 3.08 | --- | 2.81 | 2.83 | --- |
| MEAN | 2.79 | 2.48 | 2.18 | 2.08 | 1.60 | 1.39 | 2.26 | 2.95 | 3.08 | 2.89 | 2.69 | 2.86 |
| MAX | 3.05 | 2.91 | 2.23 | 2.18 | 1.89 | 1.70 | 2.64 | 3.12 | 3.36 | 3.03 | 2.83 | 3.10 |
| MIN | 2.71 | 2.20 | 2.11 | 1.91 | 1.42 | 1.28 | 1.73 | 2.76 | 2.92 | 2.78 | 2.48 | 2.74 |

## 435152088123100 WOLF LAKE NEAR MT. CALVARY, WI

LOCATION.--Lat 43°51'52", long 88°12'31", in SW 1/4 SE 1/4 sec.10, T.16 N., R.19 E., Fond du Lac County, Hydrologic Unit 04030101, 3.2 mi northeast of Mt. Calvary.

DRAINAGE AREA.--3.43 mi2.

LAKE-STAGE RECORDS

PERIOD OF RECORD.--November 1983 to September 1986, November 1992 to September 1997 (discontinued).

GAGE.--Stage measured by Alan Depies at lake outlet.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 6.81 ft, Sept. 15, 1986; minimum observed, 4.42 ft, July 24, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 6.22 ft, Mar. 2, 30; minimum observed, 4.81 ft, Dec. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

| DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT | DATE | GAGE HEIGHT |
|---|---|---|---|---|---|---|---|
| Oct. 02 | 5.06 | Mar. 02 | 6.22 | June 11 | 5.47 | Aug. 15 | 5.22 |
| Nov. 02 | 4.89 | 30 | 6.22 | July 05 | 5.35 | 26 | 5.39 |
| Dec. 01 | 4.81 | Apr. 23 | 5.64 | 13 | 5.31 | Sept.01 | 5.31 |
| 31 | 4.84 | May 03 | 5.39 | 23 | 5.45 | 14 | 5.14 |
| Feb. 13 | 5.41 | 26 | 5.31 | Aug. 02 | 5.22 | 28 | 5.06 |

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 1984 to September 1987, February 1993 to August 1997 (discontinued).

REMARKS.--Lake sampled near center at the deep hole. Lake ice-covered during February measurements. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

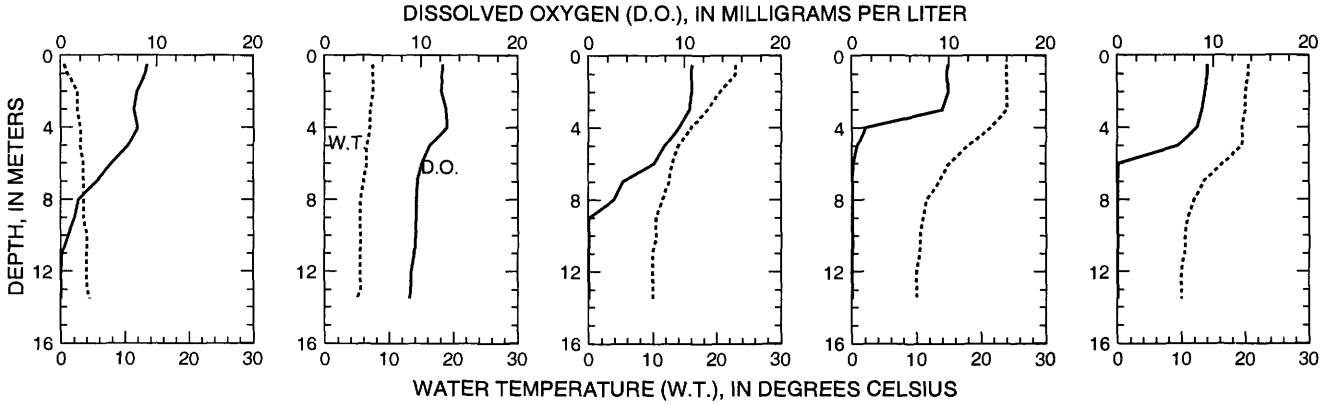
WATER-QUALITY DATA, FEBRUARY 13 TO AUGUST 26, 1997

(Milligrams per liter unless otherwise indicated)

| | Feb. 13 | | Apr. 23 | | June 11 | | July 23 | | Aug. 26 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lake stage (ft) | 5.41 | | 5.64 | | 5.47 | | 5.45 | | 5.39 | |
| Secchi-depth (meters) | --- | | 2.2 | | 4.9 | | 1.5 | | 2.6 | |
| Chlorophyll a, phytoplankton (µg/L) | --- | | 22 | | 1.1 | | 37 | | 8.4 | |
| Depth of sample (m) | 0.5 | 14 | 0.5 | 14 | 0.5 | 13 | 0.5 | 13 | 0.5 | 14 |
| Water temperature (°C) | 0.5 | 4.5 | 7.5 | 5.0 | 23.0 | 10.0 | 24.0 | 10.0 | 20.5 | 10.0 |
| Specific conductance (µS/cm) | 562 | 630 | 517 | 518 | 521 | 544 | 496 | 558 | 496 | 585 |
| pH (units) | 8.1 | 7.3 | 8.0 | 7.5 | 8.3 | 7.6 | 8.5 | 7.5 | 8.4 | 7.3 |
| Dissolved oxygen | 9.0 | 0.0 | 12.3 | 8.8 | 10.8 | 0.0 | 9.9 | 0.0 | 9.4 | 0.0 |
| Phosphorus, total (as P) | 0.059 | 0.552 | 0.082 | 0.108 | 0.011 | 0.334 | 0.022 | 0.486 | 0.012 | 0.576 |
| Phosphorus, ortho, dissolved (as P) | --- | --- | 0.031 | 0.047 | --- | --- | --- | --- | --- | --- |
| Nitrogen, NO2 + NO3, diss. (as N) | --- | --- | 0.24 | 0.30 | --- | --- | --- | --- | --- | --- |
| Nitrogen, ammonia, dissolved (as N) | --- | --- | 0.13 | 0.25 | --- | --- | --- | --- | --- | --- |
| Nitrogen, amm. + org., total (as N) | --- | --- | 1.3 | 1.4 | --- | --- | --- | --- | --- | --- |
| Nitrogen, total (as N) | --- | --- | 1.5 | 1.7 | --- | --- | --- | --- | --- | --- |
| Color (Pt-Co. scale) | --- | --- | 30 | 30 | --- | --- | --- | --- | --- | --- |
| Turbidity (NTU) | --- | --- | 1.4 | 1.5 | --- | --- | --- | --- | --- | --- |
| Hardness, as CaCO3 | --- | --- | 250 | 250 | --- | --- | --- | --- | --- | --- |
| Calcium, dissolved (Ca) | --- | --- | 43 | 43 | --- | --- | --- | --- | --- | --- |
| Magnesium, dissolved (Mg) | --- | --- | 34 | 34 | --- | --- | --- | --- | --- | --- |
| Sodium, dissolved (Na) | --- | --- | 6.7 | 6.5 | --- | --- | --- | --- | --- | --- |
| Potassium, dissolved (K) | --- | --- | 4 | 4 | --- | --- | --- | --- | --- | --- |
| Alkalinity, as CaCO3 | --- | --- | 210 | 210 | --- | --- | --- | --- | --- | --- |
| Sulfate, dissolved (SO4) | --- | --- | 32 | 32 | --- | --- | --- | --- | --- | --- |
| Chloride, dissolved (Cl) | --- | --- | 27 | 27 | --- | --- | --- | --- | --- | --- |
| Silica, dissolved (SiO2) | --- | --- | 3.2 | 3.6 | --- | --- | --- | --- | --- | --- |
| Solids, dissolved, at 180°C | --- | --- | 300 | 296 | --- | --- | --- | --- | --- | --- |
| Iron, dissolved (Fe) µg/L | --- | --- | <10 | <10 | --- | --- | --- | --- | --- | --- |
| Manganese, dissolved (Mn) µg/L | --- | --- | 4 | 7 | --- | --- | --- | --- | --- | --- |

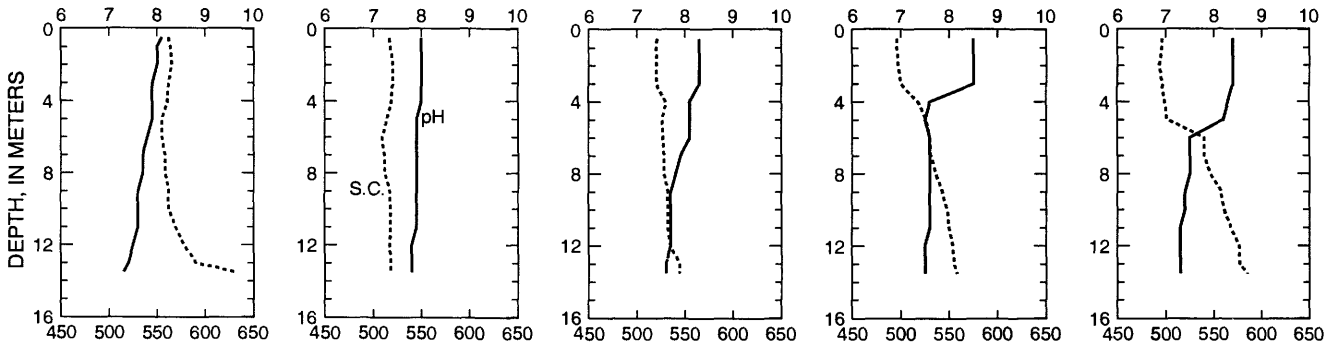
2-13-97 4-23-97 6-11-97 7-23-97 8-26-97

DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

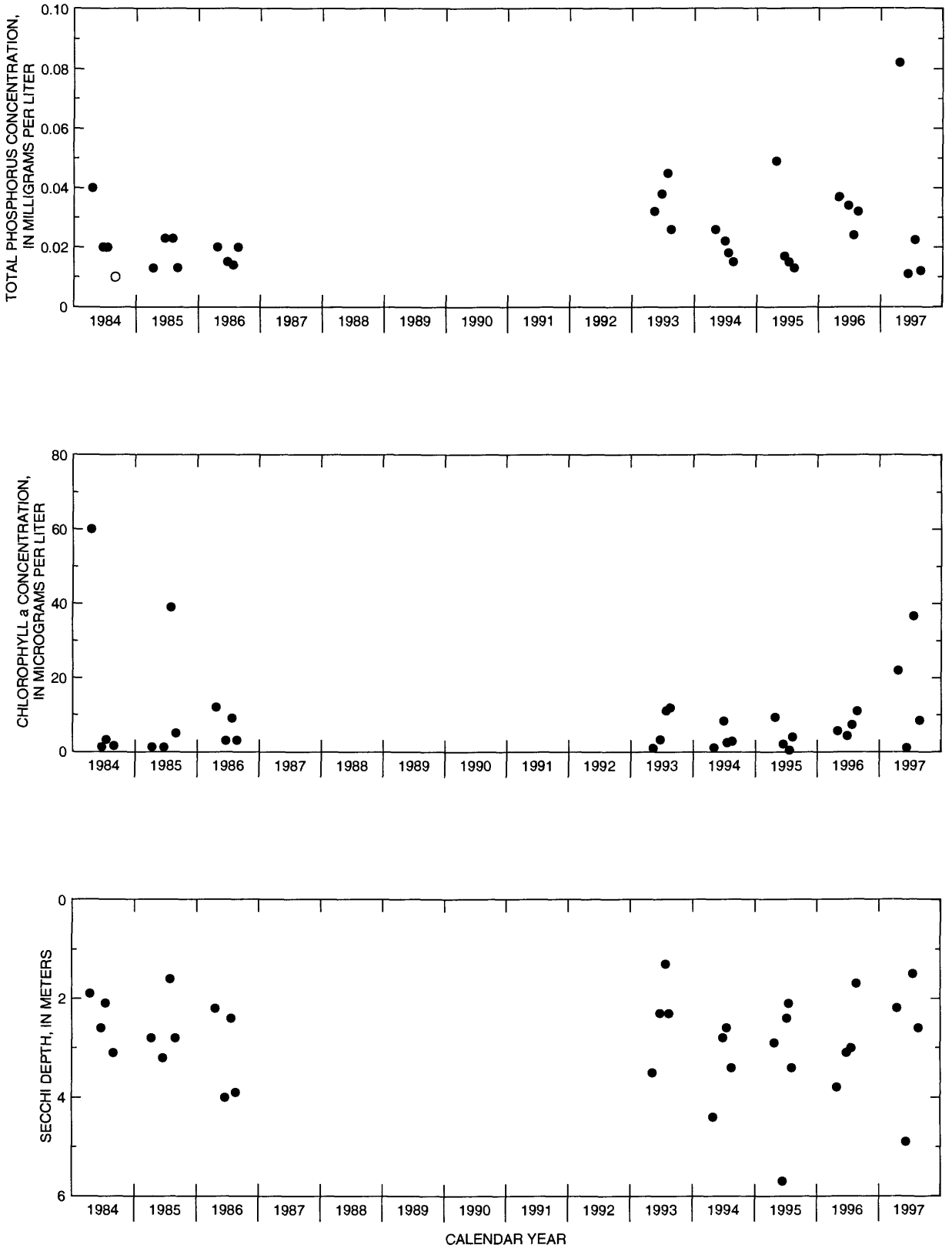



WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

PH, IN STANDARD UNITS




SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS




Surface total phosphorus and chlorophyll a concentrations, and Secchi depths for Wolf Lake near Mt. Calvary, Wisconsin.

(Circles indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.)

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