

# Water-Quality and Lake-Stage Data for Wisconsin Lakes, Water Year 2000



U.S. GEOLOGICAL SURVEY  
Open-File Report 01-86

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





# **WATER-QUALITY AND LAKE-STAGE DATA FOR WISCONSIN LAKES, WATER YEAR 2000**

**By Wisconsin District Lake-Studies Team**

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Open-File Report 01-86

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  
2001

**U.S. DEPARTMENT OF THE INTERIOR**  
**GALE A. NORTON, Secretary**

**U.S. GEOLOGICAL SURVEY**  
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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 <sup>2</sup> )	2.590	square kilometer

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

$$^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32.$$

**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 2000**

***By Wisconsin District Lake-Studies Team***

## **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 locations of water-quality and lake-stage stations in Wisconsin for water year 2000 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, 1999 through September 30, 2000 is called "water year 2000."

The purpose of this report is to provide information about the chemical and physical 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 in-lake water quality and lake stage. Time series of Secchi depths, surface total phosphorus and chlorophyll *a* concentrations collected during non-frozen periods 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, 2000."

Water-resources data, including stage and discharge data at most streamflow-gaging stations, are available through the World Wide Web on the Internet. The Wisconsin District's home page is at <http://wi.water.usgs.gov/>. Information on the Wisconsin District's Lakes Program is found at [wi.water.usgs.gov/lake/index.html](http://wi.water.usgs.gov/lake/index.html).



**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 2000 included:

Benedict/Tombeau Lake District  
Big Cedar Lake Protection and Rehabilitation District  
Big Muskego Lake District  
Buffalo Lake District  
City of Muskego  
Dane County Department of Public Works  
Eagle Spring Lake Management District  
Geneva Lake Environmental Agency  
Green Lake Sanitary District  
Lauderdale Lakes Lake 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  
Okauchee Lake Management District  
Pike Lake Protection and Rehabilitation District  
Potters Lake Protection and Rehabilitation District  
Powers Lake District  
Rock County Public Works Department  
Town of Auburn  
Town of Delavan (Delavan Lake)  
Town of Sand Lake (Big Sissabagama Lake Association)  
Town of Wascott (Whitefish Lake Association)  
U.S. Army Corps of Engineers  
Village of Oconomowoc Lake  
Whitewater Lake Management District  
Wind Lake Management District  
Wisconsin Department of Natural Resources

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 or 054310157, 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 2000 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 (Middleton). The data were collected and processed by G.L. Goddard, B.M. Gray, J.J. Hanig, D.E. Housner, J.A. Jasinski, E.A. Mergener, D.L. Olson, E.A. Roerish, 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
off Little Narrows, near Balsam Lake	452858092265300	May 1991–Aug. 1994
off Rock Island, near Balsam Lake	452754092234300	May 1991–Aug. 1994
near Birchwood	453907091345800	Mar. 1993–Aug. 1994, Mar. 1996–Aug. 1997
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
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, Feb.–Aug. 1999
Big Muskego Lake, at North Site, near Muskego	425301088061300	Feb.–Aug. 1988
Research Base, near Muskego	425235088075300	May–June 1994
Big St. Germain Lake near St. Germain	455557089311000	Feb. 1992–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
Elizabeth Lake near Twin Lakes	423051088155300	Feb. 1995–Sept. 1997
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
Geneva Lake		
Geneva Bay, at Lake Geneva	423455088263800	Apr. 1997–Feb. 1999
Williams Bay, at Williams Bay	423420088320500	Apr. 1997–Feb. 1999
Center, near Lake Geneva	423402088301400	Apr. 1997–Mar. 1999
Hemlock Lake near Mikana	453421091333700	Mar. 1993–Aug. 1994, Mar. 1996–Aug. 1997
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

**Table 1.** Discontinued lake stations

Station name	Site identification number	Period of record
Lac La Belle, Center, at Oconomowoc	430733088305900	Feb. 1984–Aug. 1985, Feb.–Sept. 1991
NW, at Oconomowoc	430809088313900	Feb. 1984–Aug. 1985
SE at Oconomowoc	430707088301400	Feb. 1984–Aug. 1985
Lake Blass at Lake Delton	433545089482400	Mar. 1989–Aug. 1990
Lake Keesus, East Bay, near Merton	430957088183400	Apr. 1991–Aug. 1995
North Bay, near Merton	431006088191000	Apr. 1991–Aug. 1995
Lake Morris at Mount Morris	440654089120500	Jun. 1983–Sept. 1989
Lake Nebagamon, Northeast Bay, at Lake Nebagamon	463050091412300	May 1992–Aug. 1995
Southeast Bay, at Lake Nebagamon	462928091413500	Mar. 1992–Sept. 1995
West Bay, at Lake Nebagamon	463034091425300	May 1992–Aug. 1995
Lake Noquebay near Crivitz	451511087550900	Feb. 1987–Aug. 1988, Apr. 1991–Aug. 1994
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
Mill at Lauderdale	424555088335700	Nov. 1993–Nov. 1994
Legend Lake (site 1) near Shawano	445342088312700	Feb. 1990–Feb. 1992
Little Cedar Lake		
North Site, near West Bend	432255088134700	Feb. 1997–Aug. 1999
South Site, near West Bend	432249088134500	Feb. 1997–Aug. 1999
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
McKenzie Lakes		
McKenzie (Big McKenzie)		
Deep Hole, near Spooner	455507092013500	Feb. 1987–Aug. 1998
Northern Site, near Spooner	455540092022000	June 1997–Aug. 1998
South Site, near Spooner	455437092022300	June 1997–Aug. 1998
Lower McKenzie, near Webb Lake	455902092011900	June 1997–Aug. 1998
Middle McKenzie, near Spooner	455635092021800	June 1997–Aug. 1998
Mary (Marie) Lake at Twin Lakes	423128088151200	Feb. 1995–Aug. 1997
Max Lake near Woodruff	460128089423501	Mar. 1988–Dec. 1996
Mead Lake, East Bay near Willard	444720090445000	Apr. 1991–Aug. 1995
West Bay near Willard	444733090460100	Feb. 1991–Sept. 1995
Montello Lake at Montello	434748089195800	Feb. 1995–Aug. 1998
Moon Lake near St. Germain	455504089260500	Feb. 1992–Aug. 1996
Morgan Lake near Fence	454622088324801	Oct. 1987–Sept. 1998.
Moshawquit Lake near Shawano	445352088295800	Feb. 1990–Aug. 1992

**Table 1.** Discontinued lake stations

Station name	Site identification number	Period of record
Namekagon Lakes		
Garden, near Cable	461224091033200	Mar. 1998–Aug. 1999
Jackson, near Cable	461457091065900	Mar. 1998–Aug. 1999
Namekagon		
Deep Hole, near Cable	461308091065100	Mar. 1998–Aug. 1999
East Basin, near Cable	461228091044300	Mar. 1998–Aug. 1999
Northeast Basin, near Cable	461410091050700	Mar. 1998–Aug. 1999
Park Lake (site 1) at Pardeeville	433239089175800	Feb. 1986–Aug. 1987, May–Nov. 1993
(site 2) at Pardeeville	433226089175500	May–Nov. 1993
(site 3) at Pardeeville	433245089173000	May–Nov. 1993
(site 4) at Pardeeville	433257089165100	May–Nov. 1993
Pretty Lake, at Deep Hole, near Dousman	425722088295000	Feb. 1993–Aug. 1997
Red Cedar Lake, Deep Hole, near Mikana	453725091345100	Mar. 1993–Aug. 1994, Mar. 1996–Aug. 1997
South End, at Mikana	453519091352500	Mar. 1993–Aug. 1994, Mar. 1996–Aug. 1997
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
Shell Lake at Shell Lake	05334000	Aug. 1936–Sept. 1999
Silver Lake near Oconomowoc	430436088293300	Apr. 1992–Aug. 1996
Silver Lake near West Bend	432322088125000	Feb. 1996–Aug. 1997
Sinissippi Lake, off Anthony Is., at Hustisford	432113088361100	Feb. 1991–Aug. 1993
off Butternut Is., near Hustisford	432240088363900	Apr. 1991–Aug. 1993
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–Sept. 1993
Tichigan Lake near Waterford	424854088123300	Mar. 1994–Aug. 1996
Upper Nemahbin Lake, Center, near Delafield	430400088254900	June 1993–Aug. 1995
South Site, near Delafield	430339088254800	June 1993–Aug. 1995
Outlet near Delafield	430334088255400	June 1993–Aug. 1995
Vandercook Lake near Woodruff	455909089405602	Nov. 1980–Aug. 1998
Watosah-skice Lake near Keshena	445330088361400	Feb. 1990–Aug. 1992
Waubessee Lake at Wind Lake	424857088101500	Feb. 1988–Aug. 1989, Feb. 1991–Aug. 1996
Whitewater Lake, off Heart Prairie, near Whitewater	424533088420100	Apr.–Nov. 1991
near Whitewater	424608088414800	Apr.–Oct. 1991
North Bay, near Whitewater	424625088405500	Apr.–Nov. 1991
South Bay, near Whitewater	424501088422300	Apr.–Nov. 1991
Wind Lake, Northeast Basin, at Wind Lake	424938088080800	Feb. 1997–Aug. 1998
Wolf Lake near Mt. Calvary	435152088123100	Nov. 1983–Sept. 1986, Nov. 1992–Sept. 1997

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- $\mu$ m (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 Water Quality Data Base (QWDATA) of the National Water Information System (NWIS). Additional descriptive information about water-quality data is available in the data report: "Water Resources Data – Wisconsin, 2000". NWIS parameter codes and minimum laboratory reporting levels 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, 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 6 m (Shaw and others, 1993).



**Table 2.** Parameter identification numbers and laboratory reporting levels (LRL) 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	CAS Number (1)	Parameter Code (2)	(NWQL)				(WSLH)	
				Standard Analysis		Low-Level Analysis		LRL	Test Code
				LRL	Lab Code	LRL	Lab Code		
Calcium, diss. (Ca)	mg/L	7440-70-2	00915	0.020	659	0.002	1895	0.02	I230IUD
Magnesium, diss. (Mg)	mg/L	7439-95-4	00925	0.004	663	0.001	1897	0.02	I390IUD
Sodium, diss. (Na)	mg/L	7440-23-5	00930	0.09	675	0.025	1898	0.09	I80IUD
Potassium, diss. (K)	mg/L	7440-09-7	00935	0.24	54	0.01	833	0.3	I540IUD
Sulfate, diss. (SO <sub>4</sub> )	mg/L	14808-79-8	00945	0.31	1572	0.01	1263	1.0	I600DLD
Chloride, diss. (Cl)	mg/L	16887-00-6	00940	0.29	1571	0.01	1259	0.1	I240ELD
Fluoride, diss. (F)	mg/L	16984-48-8	00950	0.100	31	0.01	1260	0.03	I330FLD
Iron, diss. (Fe)	µg/L	7439-89-6	01046	10	645	3	1896	10	I370IUD
Manganese, diss. (Mn)	µg/L	7439-96-5	01056	2.2	648	1	1793	0.4	I400IUD
Silica, diss. (SiO <sub>2</sub> )	mg/L	7631-86-9	00955	0.1	56	0.02	1899	0.008	I560LLD
Nitrogen, NO <sub>2</sub> +NO <sub>3</sub> , diss.	mg/L		00631	0.05	1975	0.005	1979	0.01	I460MLD
Nitrogen, ammonia, diss.	mg/L	7664-41-7	00608	0.02	1976	0.002	1980	0.013	I440NLD
Nitrogen, organic, total (3)	mg/L								
Nitrogen, amm.+org., total (4)	mg/L	17778-88-0	00623	0.100	1985			0.2	I470BLT
Nitrogen, total (5)	mg/L								
Phosphorus, total	mg/L	7723-14-0	00665	0.05	1984	0.001	837	0.005	I520PLT
Phosphorus, ortho, diss.	mg/L	14265-44-2	00671	0.01	1262	0.001	1978	0.002	I530CLD
Chlorophyll a, phytoplankton	µg/L	479-61-8	70953	0.1	586				
Chlorophyll a, phytoplankton	µg/L	479-61-8	32210					1	I250UNF

**Footnotes:**

- 1: CAS (Chemical Abstracting Services) number= unique identification for each constituent
- 2: Parameter Code - unique number for storage of data in database
- 3: Calculated as difference between total ammonia + organic nitrogen and ammonia nitrogen
- 4: Also known as Total Kjeldahl Nitrogen (TKN)
- 5: Calculated as sum of TKN + Nitrogen as (NO<sub>2</sub>+NO<sub>3</sub>)

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 (epilimnion) and the underlying colder water (hypolimnion). This barrier is often marked by a sharp temperature gradient known as the “thermocline (metalimnion).” During the stratified summer period, these three distinct layers of lake water are often present. 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 20-cm.-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, zooplankton, water color, and suspended sediment. Algae are often the most dominant influence on clarity in lakes and, therefore, Secchi depth is usually correlated with the algal abundance. Secchi depths are 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. Complete anoxia, however, is often not detected because of meter constraints. 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.

2

## **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 nitrogen to 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. 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) by Lillie and others (1993). 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 indices for Wisconsin lakes were developed based on 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	Total phosphorus range (mg/L)	Chlorophyll <i>a</i> range (µg/L)	Water clarity range (Secchi depth, in meters)
"Excellent"	<0.001	<1.0	>6.0
"Very good"	.001–.009	1.0– 4.9	3.0–6.0
"Good"	.010–.029	5.0– 9.9	2.0–2.9
"Fair"	.030–.049	10.0–14.9	1.5–1.9
"Poor"	.050–.149	15.0–30.0	1.0–1.4
"Very poor"	>.150	>30.0	<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 hyper-eutrophic.

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: indices 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):

$$TSI_{\text{Secchi}} = 60.0 - 33.2 \times (\log_{10} \text{ Secchi depth})$$

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

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

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 depth (m)	Chlorophyll <i>a</i> (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**

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# 423201088180800 BENEDICT LAKE NEAR POWERS LAKE, WI

LOCATION.--Lat 42°32'01", long 88°18'08", in NW 1/4 NW 1/4 sec.19, T.1 N., R.19 E., Kenosha County, Hydrologic Unit 07120006, 1.4 mi south-west of Powers Lake.

PERIOD OF RECORD.--May 1998 to current year.

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

## WATER-QUALITY DATA, FEBRUARY 09 TO AUGUST 08, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-9		Apr-10		Jun-7		Jul-10		Aug-8		
Lake stage (ft)	---		825.86		826.42		826.47		825.86		
Secchi-depth (m)	---		3.5		2.5		1.7		1.8		
Chlorophyll a, phytoplankton (µg/L)	---		7		5		3		1.7		
Depth of sample (m)	0.5	11.0	0.5	10.0	0.5	11.0	0.5	10.0	0.5	8.0	10.5
Water temperature (°C)	2.7	4.4	8.1	7.7	19.9	8.4	25.3	8.7	25.3	11.5	8.7
Specific conductance (µS/cm)	600	639	634	632	605	677	573	607	587	663	742
pH (units)	8.1	7.5	8.2	8.1	8.0	7.3	7.9	7.3	8.1	7.5	7.2
Dissolved oxygen (mg/L)	11.3	6.4	11.7	10.7	9.6	0.0	9.0	0.0	9.4	1.0	0.0
Phosphorus, total (as P)	0.016	0.037	0.012	0.017	0.011	0.027	0.009	0.077	0.012	0.033	0.079
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	<0.002	---	---	---	---
Nitrogen, NO2 + NO3, diss. (as N)	---	---	0.425	---	---	---	0.493	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.495	---	---	---	0.06	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	1.2	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., diss. (as N)	---	---	---	---	---	---	0.66	---	---	---	---
Nitrogen, total (as N)	---	---	1.7	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	10	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	0.1	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	270	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	45	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	38	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	28	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.4	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	217	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	33.8	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	58.7	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	6.5	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	348	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---	---

2-09-00

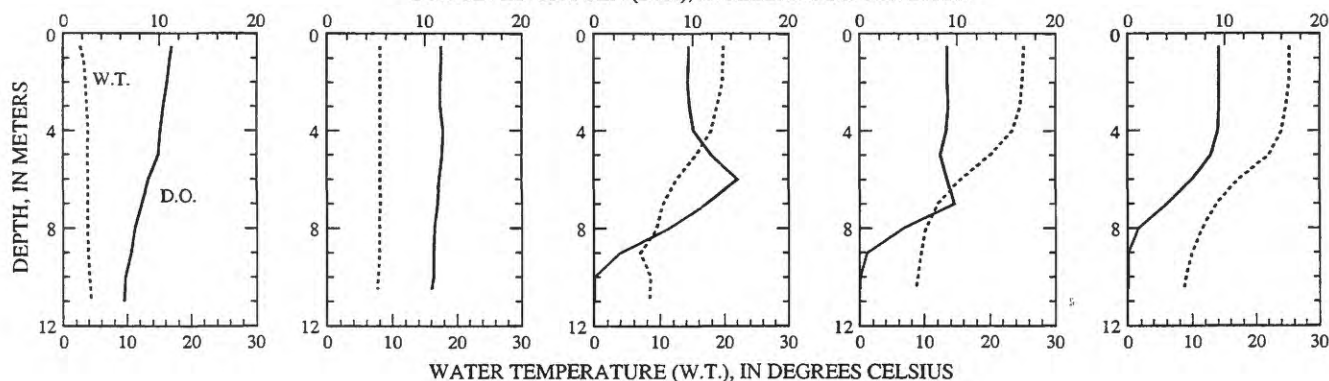
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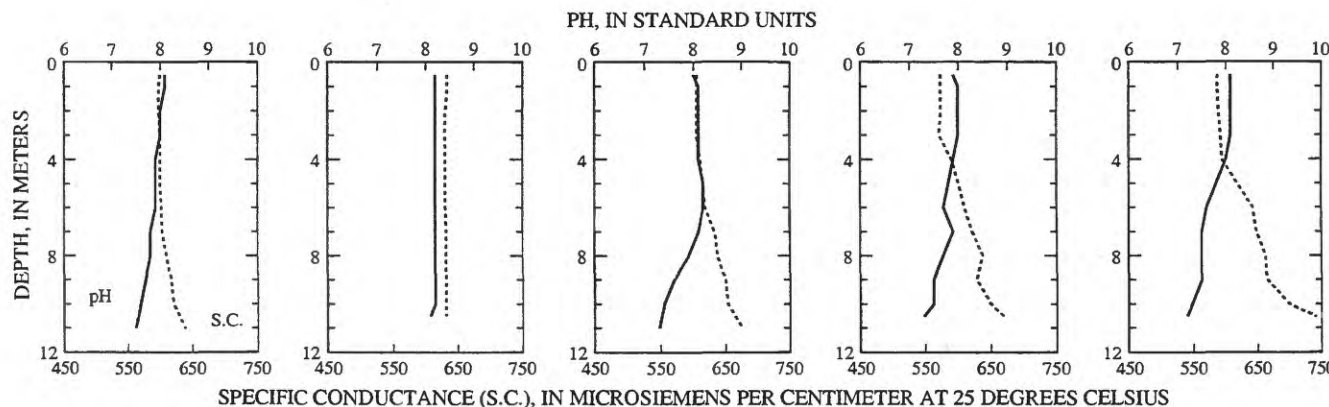
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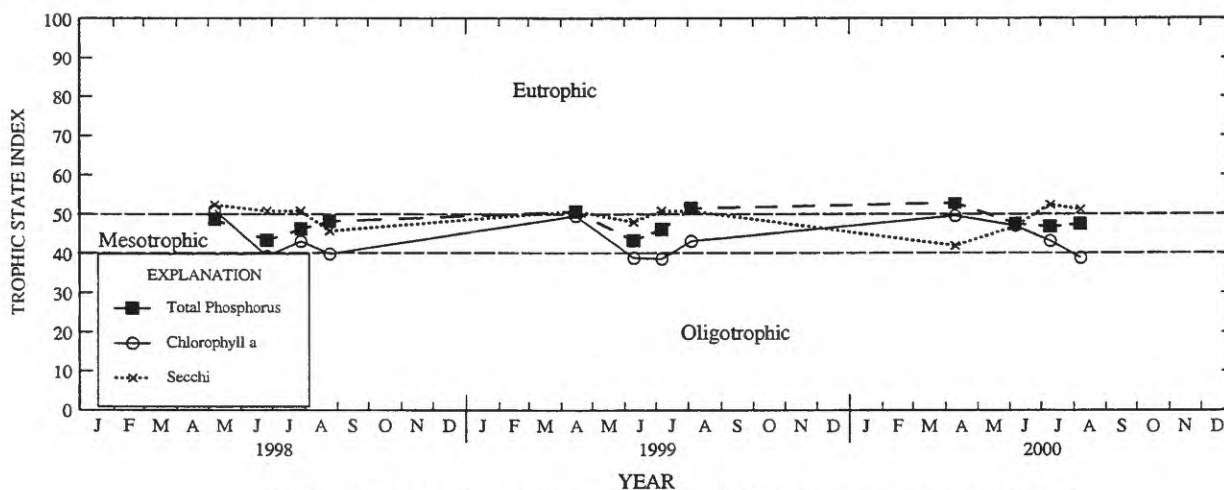
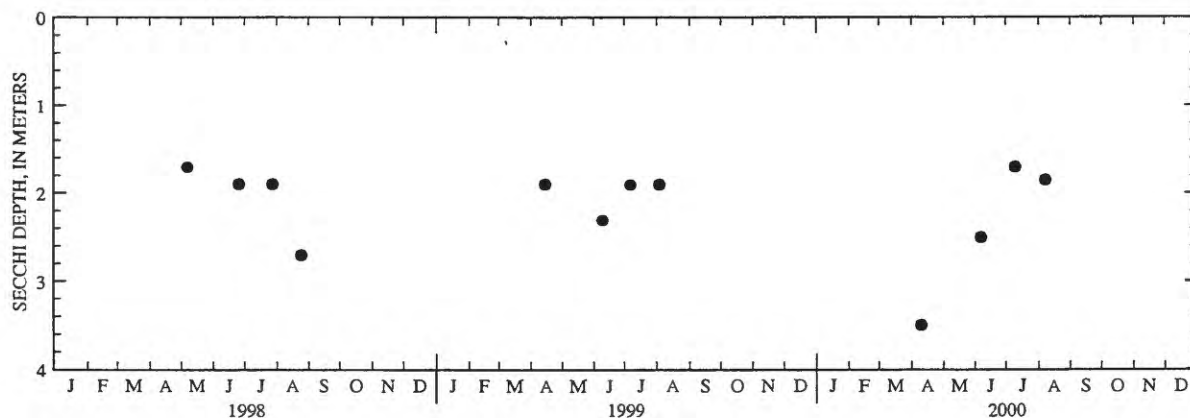
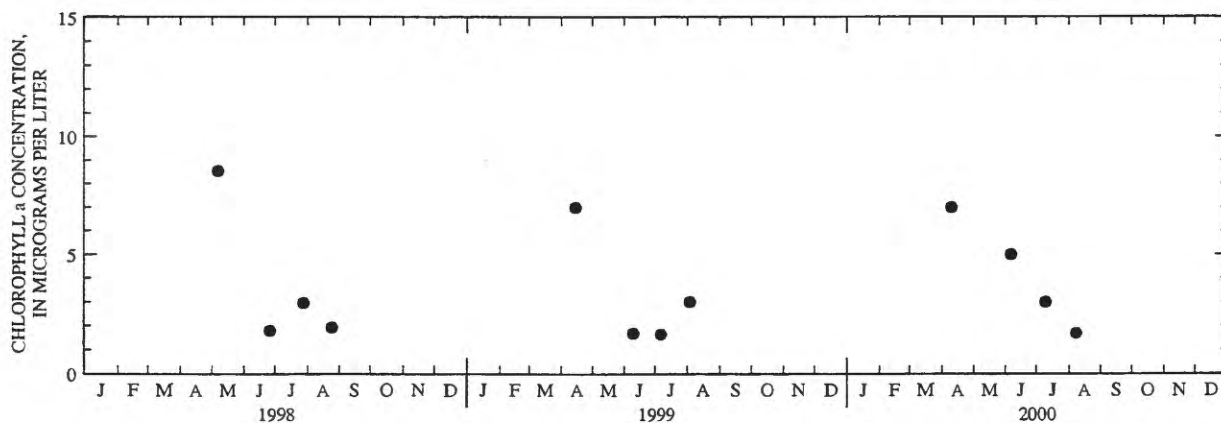
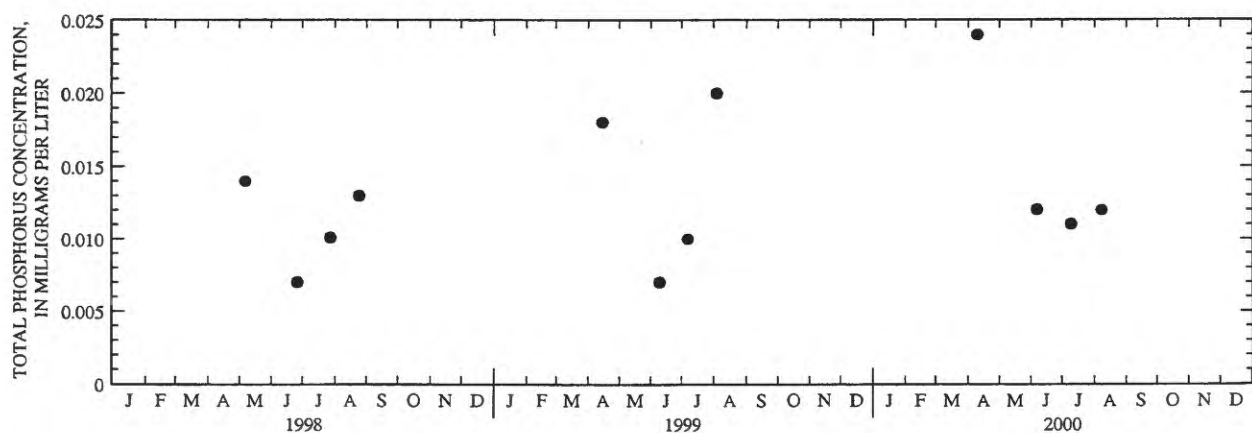
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Benedict Lake near Powers Lake, Wisconsin.

# 432409088151600 BIG CEDAR LAKE, NORTH SITE, NEAR WEST BEND, WI

LOCATION.--Lat 43°24'09", long 88°15'16", in NE 1/4 sw 1/4 sec.20, T.11 N., R.19 E., Washington County, Hydrologic Unit 04040003, near West Bend.

PERIOD OF RECORD.--February to September 2000.

REMARKS.--Lake sampled on north side at depth of 12 m. Lake ice-covered during February sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 16 TO AUGUST 10, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-16		Apr-18		Jun-13		Jul-17		Aug-10	
Lake stage (ft)	---	---	8.72	---	8.62	---	8.62	---	8.56	---
Secchi-depth (m)	---	---	1.9	---	5.3	---	3.9	---	2.9	---
Chlorophyll a, phytoplankton (µg/L)	---	---	9.0	---	1.5	---	1.7	---	4.2	---
Depth of sample (m)	0.5	10.0	0.5	11.0	0.5	11.5	0.5	11.0	0.5	12.0
Water temperature (°C)	0.9	4.0	7.2	6.5	20.6	9.5	26.6	11.3	24.4	11.6
Specific conductance (µS/cm)	559	683	522	523	513	543	503	546	499	584
pH (units)	8.2	7.3	8.4	8.2	8.0	7.4	8.2	7.3	8.3	7.2
Dissolved oxygen (mg/L)	13.4	3.5	11.5	10.7	8.6	0.0	8.8	0.0	8.6	0.0
Phosphorus, total (as P)	0.013	0.013	0.012	0.017	0.011	0.027	0.009	0.077	0.012	0.072
Phosphorus, ortho, dissolved (as P)	---	---	---	---	---	---	0.003	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	---	---	---	---	0.081	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	---	---	---	---	0.025	---	---	---

2-16-00

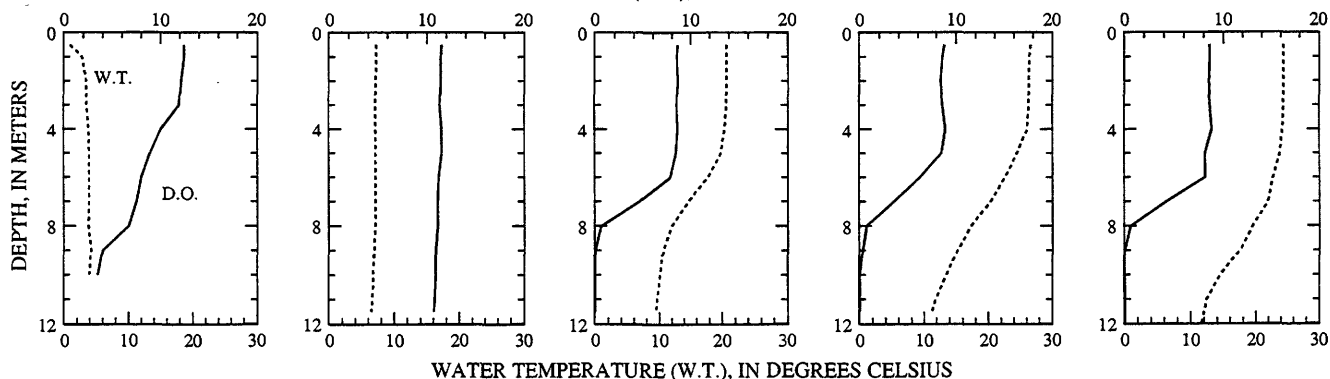
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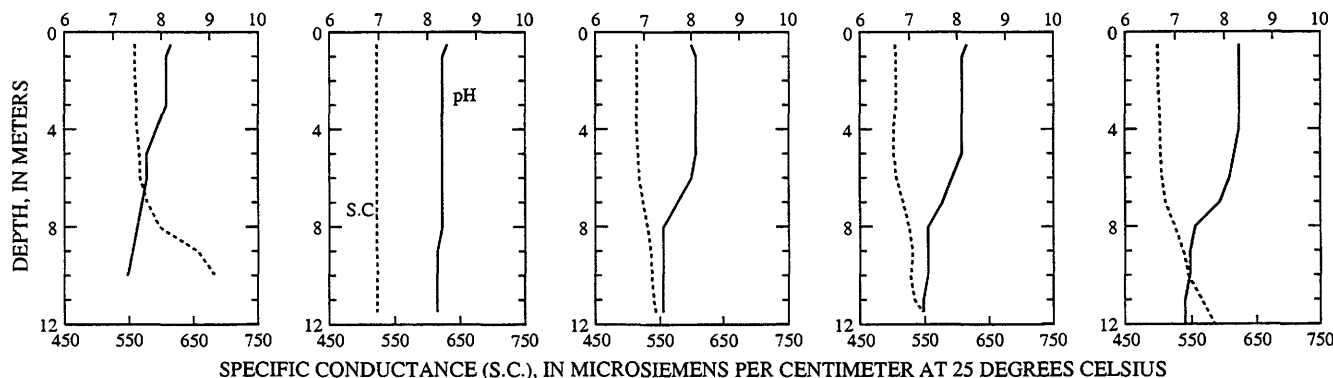
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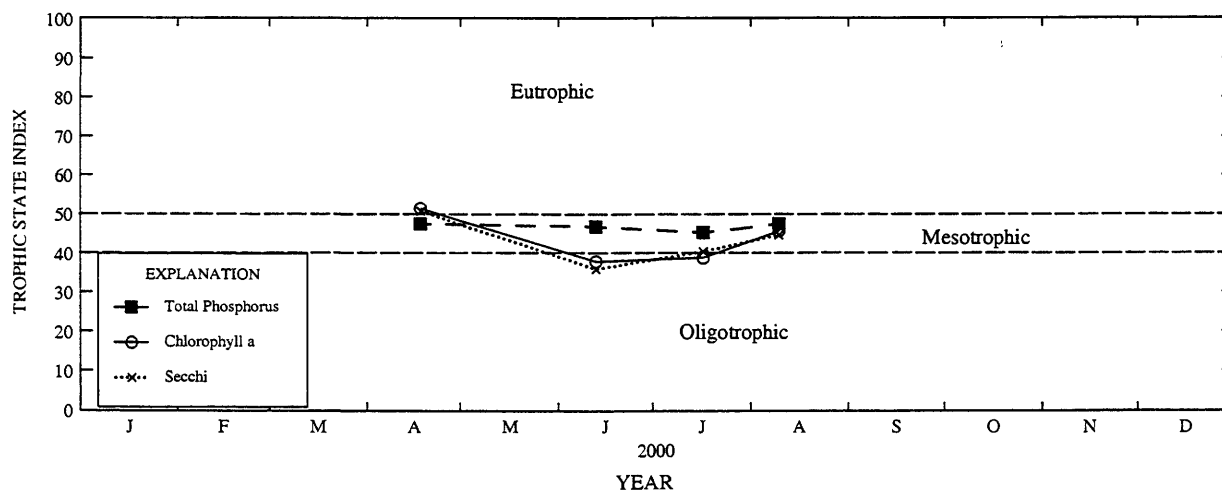
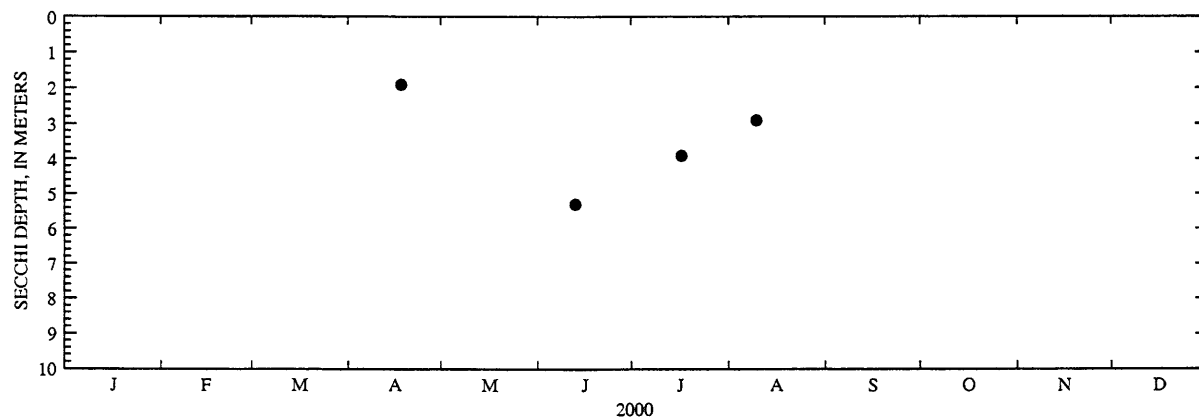
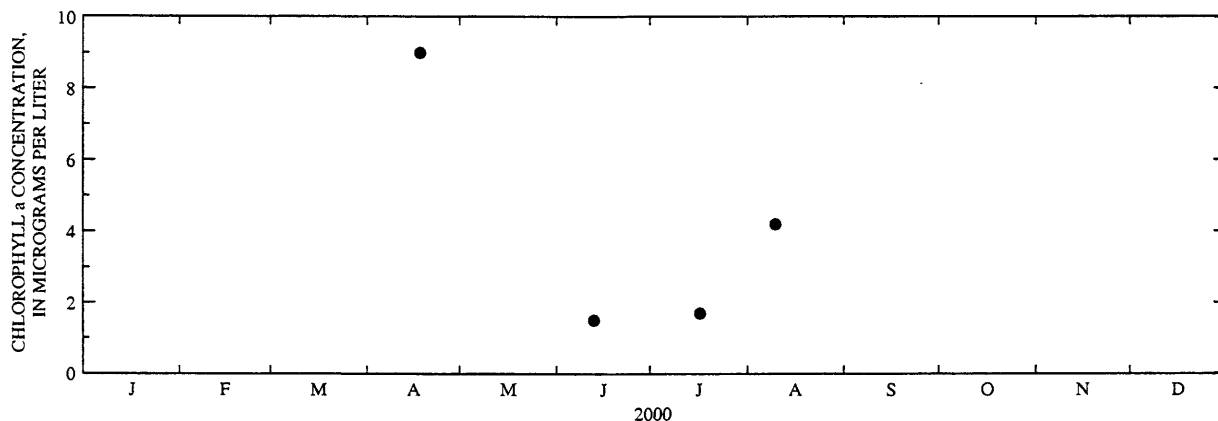
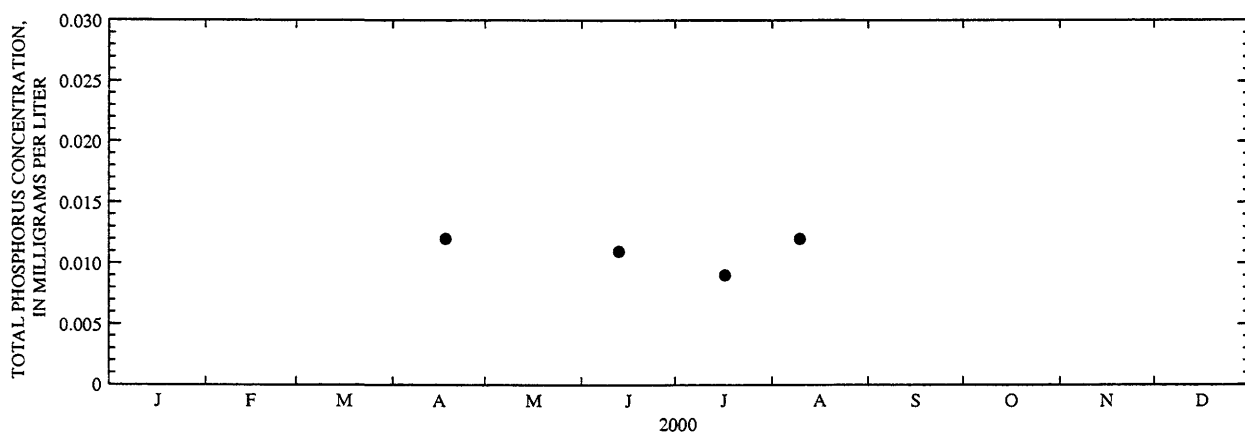
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## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



## pH, IN STANDARD UNITS





Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Big Cedar Lake, North Site, near West Bend, Wisconsin.



# 432224088154900 BIG CEDAR LAKE, SOUTH SITE, NEAR WEST BEND, WI

LOCATION.--Lat 43°22'24", long 88°15'49", in NE 1/4 SE 1/4 sec.31, T.11 N., R.19 E., Washington County, Hydrologic Unit 04040003, near West Bend.

PERIOD OF RECORD.--February to September 2000.

REMARKS.--Lake sampled on south side at deep hole. Lake ice-covered during February sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 16 TO AUGUST 10, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-16		Apr-18		Jun-13		Jul-17		Aug-10	
Lake stage (ft)	---		8.72		8.62		8.62		8.56	
Secchi-depth (m)	---		4.3		4.7		4.1		3.0	
Chlorophyll a, phytoplankton (µg/L)	---		3.0		2.6		1.9		4.3	
Depth of sample (m)	0.5	29.5	0.5	30.0	0.5	29.5	0.5	30.0	0.5	30.0
Water temperature (°C)	0.6	2.6	6.0	5.8	19.5	5.9	25.2	5.9	23.8	5.9
Specific conductance (µS/cm)	517	536	515	514	518	535	501	525	490	552
pH (units)	8.2	7.5	8.1	8.1	8.4	7.4	8.2	7.4	8.1	7.3
Dissolved oxygen (mg/L)	13.0	5.8	12.0	10.0	9.5	0.0	9.0	0.0	9.4	0.0
Phosphorus, total (as P)	0.014	0.021	0.011	0.012	0.012	0.081	0.010	0.011	0.012	0.102
Phosphorus, ortho, dissolved (as P)	---	---	0.005	---	---	---	0.003	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.226	---	---	---	0.114	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.063	---	---	---	<0.013	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.59	---	---	---	---	---	---	---
Nitrogen, amm. + org., diss (as N)	---	---	---	---	---	---	0.65	---	---	---
Nitrogen, total (as N)	---	---	0.82	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	5	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	0.1	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	230	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	39	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	33	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	18	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	1.8	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	195	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	21.7	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	38.7	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.2	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	306	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---

2-16-00

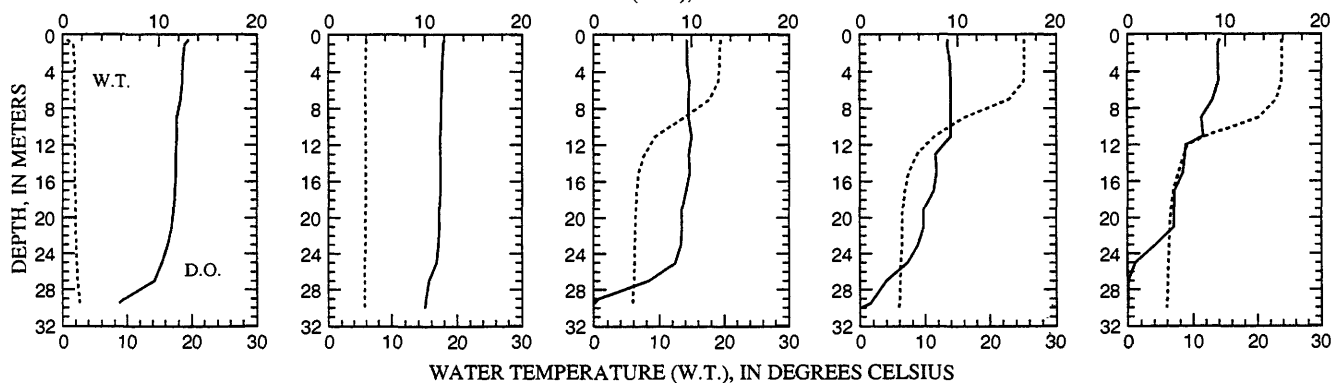
4-18-00

6-13-00

7-17-00

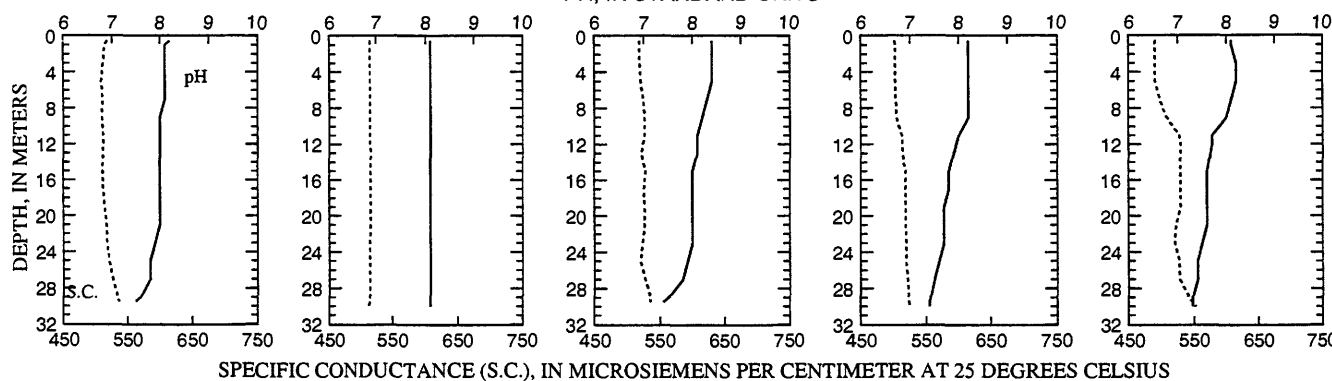
8-10-00

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

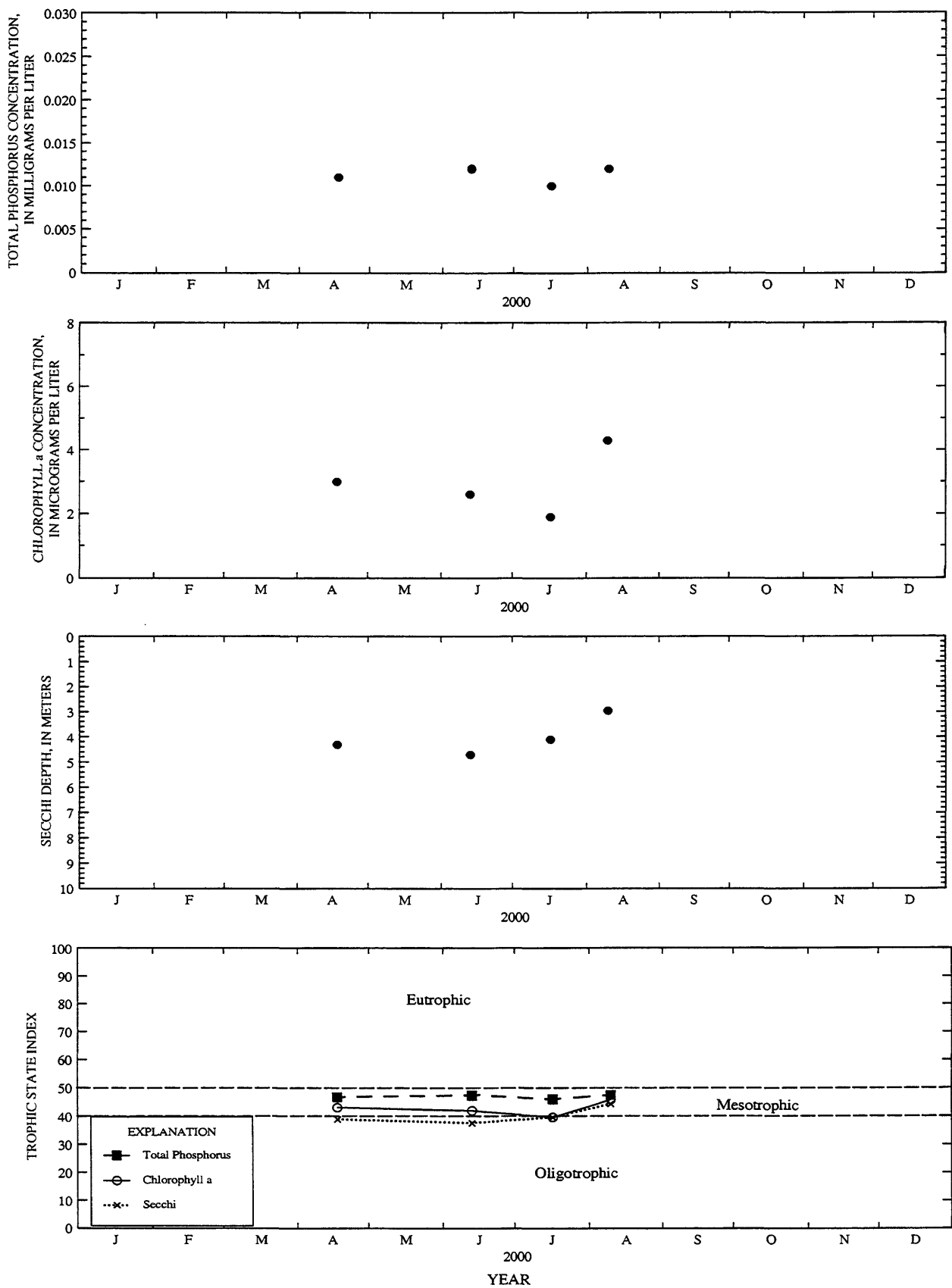


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Big Cedar Lake, South Site, near West Bend, Wisconsin.

**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<sup>2</sup>.

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, 10.98 ft, May 9, 1999; minimum observed, 8.16 ft, Jan. 26, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 10.92 ft, July 9; minimum observed, 8.36 ft, Feb. 13, 18.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000****DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.56	10.48	---	---	8.80	---	9.86	10.56	10.60	10.64	10.56	10.52
2	10.54	10.46	---	9.08	---	---	9.88	10.54	10.64	10.64	10.54	10.52
3	10.52	---	9.66	---	---	8.80	9.88	10.54	10.60	10.64	10.54	10.60
4	10.52	10.34	---	9.21	8.62	8.86	9.90	10.52	10.60	10.64	10.54	10.60
5	10.52	---	9.60	---	---	8.90	9.90	10.52	10.58	10.64	10.52	10.58
6	10.50	---	---	---	8.50	---	9.92	10.52	10.54	10.62	10.54	10.58
7	10.50	10.22	9.54	9.18	---	8.98	9.94	10.52	10.54	10.62	10.54	10.58
8	10.58	---	---	---	8.48	9.04	9.96	10.54	10.54	10.88	10.54	10.58
9	10.60	10.14	---	9.18	---	9.14	9.98	10.52	10.54	10.92	10.56	10.58
10	10.60	---	9.46	---	---	9.20	9.98	10.50	10.52	10.88	10.56	10.56
11	10.63	---	---	9.18	8.40	9.24	10.00	10.50	10.52	10.82	10.56	10.54
12	10.62	10.08	9.42	---	---	9.26	10.02	10.50	10.50	10.76	10.56	10.58
13	10.64	---	---	---	8.36	9.28	10.04	10.48	10.50	10.74	10.56	10.58
14	10.66	10.00	9.40	9.16	---	9.32	10.06	10.48	10.50	10.64	10.56	10.60
15	10.66	---	---	---	8.38	9.34	10.08	10.48	10.52	10.58	10.64	10.58
16	10.64	9.92	---	9.16	---	9.40	10.10	10.48	10.52	10.52	10.68	10.58
17	10.62	---	9.36	---	---	9.42	10.18	10.46	10.52	10.50	10.68	10.56
18	10.62	---	---	9.12	8.36	9.44	10.24	10.46	10.52	10.46	10.68	10.58
19	10.60	9.84	9.34	---	---	9.48	10.36	10.48	10.52	10.48	10.65	10.58
20	10.60	---	---	---	8.38	9.50	10.42	10.44	10.54	10.48	10.62	10.60
21	10.58	9.80	9.32	9.02	---	9.52	10.52	10.42	10.70	10.50	10.60	10.60
22	10.56	---	---	---	8.44	9.52	10.56	10.48	10.70	10.50	10.56	10.58
23	10.54	9.76	---	8.98	---	9.56	10.56	10.54	10.76	10.50	10.54	10.60
24	10.52	---	9.30	---	---	9.57	10.56	10.56	10.74	10.50	10.52	10.60
25	10.50	---	---	8.96	8.50	9.64	10.54	10.56	10.72	10.50	10.48	10.60
26	10.48	9.78	9.26	---	---	9.66	10.56	10.54	10.70	10.50	10.46	10.60
27	10.48	---	---	---	8.66	9.68	10.56	10.52	10.70	10.52	10.48	10.58
28	10.48	9.74	9.22	8.92	---	9.74	10.58	10.54	10.68	10.54	10.48	10.56
29	10.50	---	---	---	8.65	9.76	10.58	10.54	10.68	10.56	10.48	10.56
30	10.46	9.70	---	8.90	---	9.80	10.56	10.56	10.66	10.56	10.48	10.56
31	10.48	---	9.18	---	---	9.84	---	10.58	---	10.56	10.50	---
MEAN	10.56	---	---	---	---	---	10.21	10.51	10.60	10.61	10.56	10.58
MAX	10.66	---	---	---	---	---	10.58	10.58	10.76	10.92	10.68	10.60
MIN	10.46	---	---	---	---	---	9.86	10.42	10.50	10.46	10.46	10.52

**454724091303600 BIG SISSABAGAMA LAKE NEAR STONE LAKE, WI**

LOCATION.--Lat 45°47'24", long 91°30'36", in NW 1/4 SE 1/4 sec.6, T.38 N., R.9 W., Sawyer County, Hydrologic Unit 07050001, near Stone Lake.

DRAINAGE AREA.--9.47 mi<sup>2</sup>.

**LAKE-STAGE RECORDS**

PERIOD OF RECORD.--1986 to 1996, and October 1997 to current year, during open-water periods.

GAGE.--Water surface measured from reference point near lake outlet. Measurements were made by Richard Roehrich and James Eary.

EXTREMES FOR PERIOD OF RECORD: Maximum gage height observed, 6.39 ft, July 9, 2000; minimum observed, 4.78 ft, Sept. 15, 16, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 6.39 ft, July 9; minimum observed, less than 5.55 ft, Oct. 5, 6, and Sept. 30.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.63	5.65	5.67	---	---	---	---	5.89	---	5.82	5.96	5.73
2	5.61	5.64	5.67	---	---	---	---	5.89	5.75	5.83	5.95	5.73
3	5.60	5.62	5.67	---	---	---	---	5.88	5.75	5.82	5.93	5.81
4	5.58	5.64	5.67	---	---	---	---	5.87	5.78	5.81	5.91	5.79
5	5.55	5.59	5.67	---	---	---	---	5.85	5.76	5.80	5.89	5.78
6	5.55	5.60	---	---	---	---	---	5.84	5.75	5.80	5.87	5.77
7	5.58	5.62	---	---	---	---	---	5.81	5.77	5.87	---	5.76
8	5.62	5.60	---	---	---	---	---	5.92	5.76	5.98	5.88	5.75
9	5.65	5.60	---	---	---	---	---	5.90	5.75	6.39	5.84	5.75
10	5.67	5.61	---	---	---	---	---	5.90	5.75	6.37	5.83	5.74
11	5.70	5.62	---	---	---	---	---	5.93	5.74	6.36	5.81	5.74
12	5.70	5.61	---	---	---	---	---	5.91	5.73	6.35	5.84	5.73
13	5.69	5.60	---	---	---	---	---	5.89	5.72	6.30	5.82	5.71
14	5.68	5.60	---	---	---	---	---	5.84	5.78	6.25	5.81	5.70
15	5.68	5.60	---	---	---	---	---	5.83	5.77	6.20	5.92	5.68
16	5.68	5.60	---	---	---	---	---	5.85	5.78	6.16	5.91	5.68
17	5.67	5.60	---	---	---	---	---	5.85	5.77	6.10	5.92	5.67
18	5.67	5.60	---	---	---	---	---	5.85	5.77	6.08	5.90	5.66
19	5.66	5.60	---	---	---	---	---	5.83	5.76	6.05	5.90	5.65
20	5.70	5.60	---	---	---	---	---	5.82	5.91	6.03	5.88	5.64
21	5.67	5.60	---	---	---	---	---	5.81	5.92	6.00	5.85	5.62
22	5.65	5.60	---	---	---	---	---	5.81	5.94	5.98	5.83	5.62
23	5.63	5.63	---	---	---	---	---	5.76	5.92	5.95	5.82	---
24	5.63	5.67	---	---	---	---	---	5.75	5.90	5.94	5.81	---
25	5.61	5.69	---	---	---	---	---	5.75	5.91	5.92	---	5.59
26	5.61	5.70	---	---	---	---	---	5.74	5.91	6.08	5.80	5.59
27	5.59	5.69	---	---	---	---	---	5.74	5.90	---	5.79	5.57
28	5.60	5.67	---	---	---	---	---	5.74	5.89	---	5.77	5.56
29	5.60	5.67	---	---	---	---	---	5.73	5.85	---	5.76	5.56
30	5.63	5.67	---	---	---	---	---	---	5.84	5.99	5.75	5.55
31	5.64	---	---	---	---	---	---	---	---	5.96	5.75	---
MEAN	5.64	5.63	---	---	---	---	---	---	---	---	---	---
MAX	5.70	5.70	---	---	---	---	---	---	---	---	---	---
MIN	5.55	5.59	---	---	---	---	---	---	---	---	---	---

## 454724091303600 BIG SISSABAGAMA LAKE NEAR STONE LAKE, WI--CONTINUED

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--1986 to 1996, and March 1998 to current year.

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

WATER-QUALITY DATA, MARCH 03 TO AUGUST 11, 2000  
(Milligrams per liter unless otherwise indicated)

	Mar-3		Apr-11		Jun-8		Jul-12		Aug-11		
Lake stage (ft)	---		5.96		5.77		6.32		5.82		
Secchi-depth (m)	---		2.5		3.3		2.4		2.3		
Chlorophyll a, phytoplankton (µg/L)	---		6		3.4		2.3		8		
Depth of sample (m)	0.5	14.0	0.5	14.0	0.5	14.0	0.5	14.0	0.5	8.0	13.0
Water temperature (°C)	1.5	5.3	5.8	5.8	17.9	8.0	23.2	9.5	24.2	16.5	9.8
Specific conductance (µS/cm)	28	171	63	62	64	81	58	95	60	92	117
pH (units)	7.0	6.7	7.1	7.3	7.1	6.7	7.9	7.0	8.2	6.7	7.0
Dissolved oxygen (mg/L)	10.5	0.2	12.4	12.0	9.1	0.2	8.3	0.1	9.6	0.1	0.1
Phosphorus, total (as P)	0.013	0.343	0.029	0.030	0.013	0.102	---	0.078	0.024	0.080	0.167
Phosphorus, ortho, dissolved (as P)	---	---	0.004	---	---	---	0.003	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.062	---	---	---	0.025	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	<0.013	---	---	---	0.038	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.57	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., diss. (as N)	---	---	---	---	---	---	0.66	---	---	---	---
Nitrogen, total (as N)	---	---	0.63	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	30	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	2.0	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	54	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	17	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	2.8	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	1.7	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	0.7	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	37	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	<4.5	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	1.2	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	7.5	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	46	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	240	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	27	---	---	---	---	---	---	---	---

3-03-00

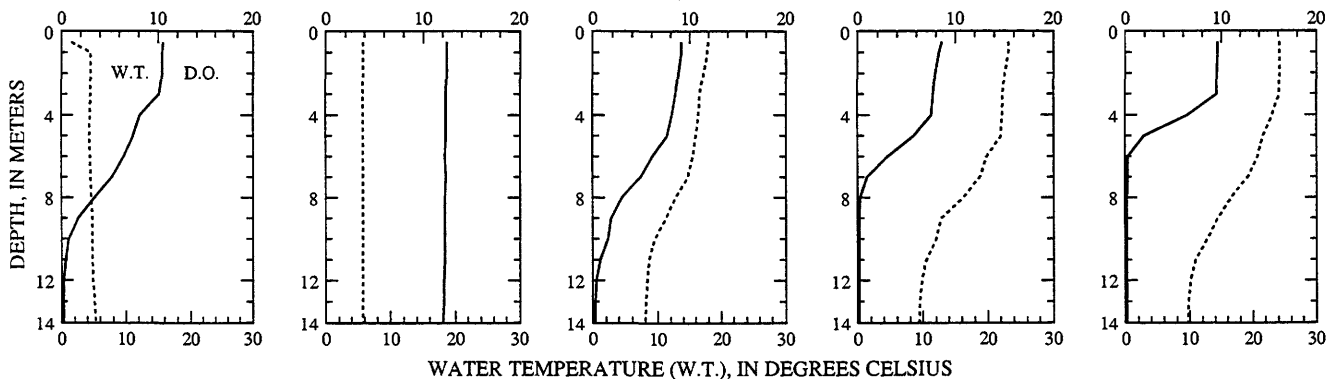
4-11-00

6-08-00

7-12-00

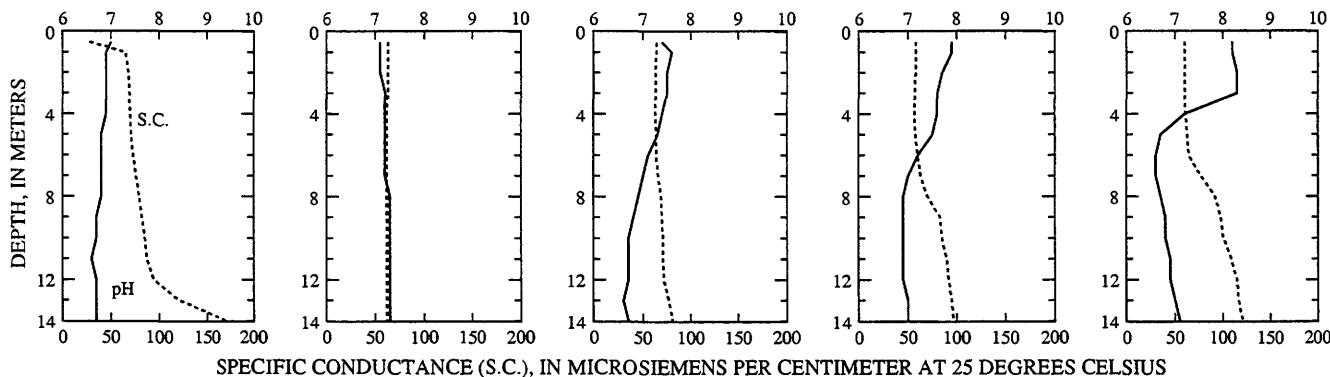
8-11-00

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

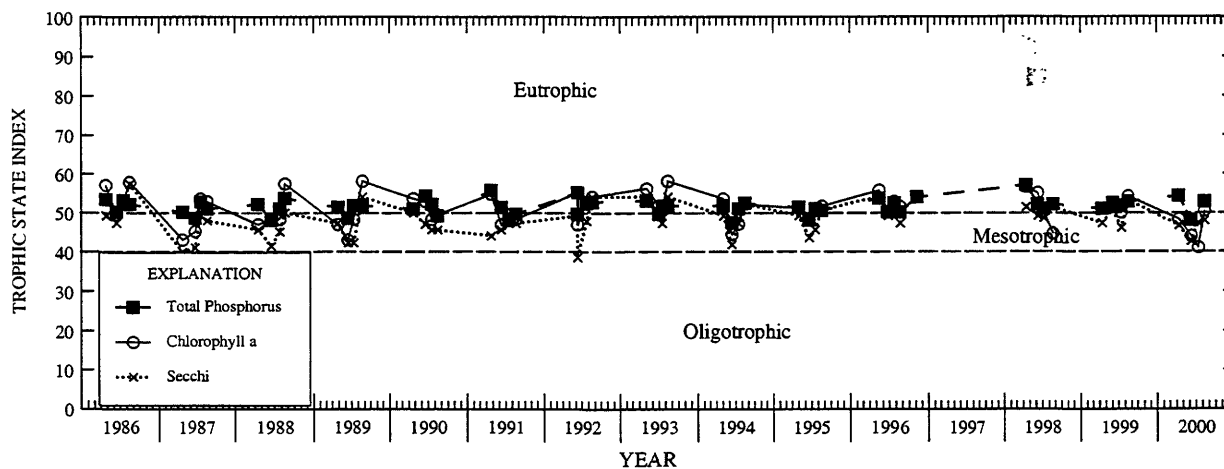
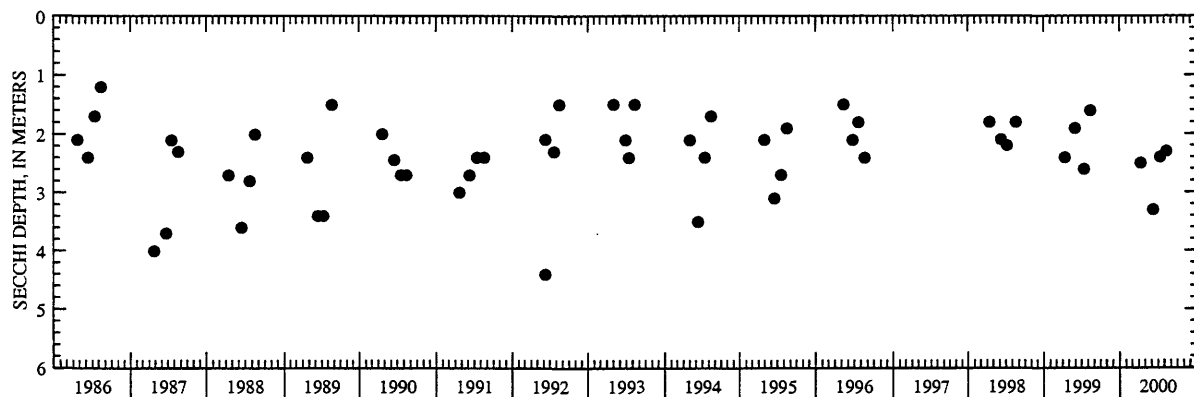
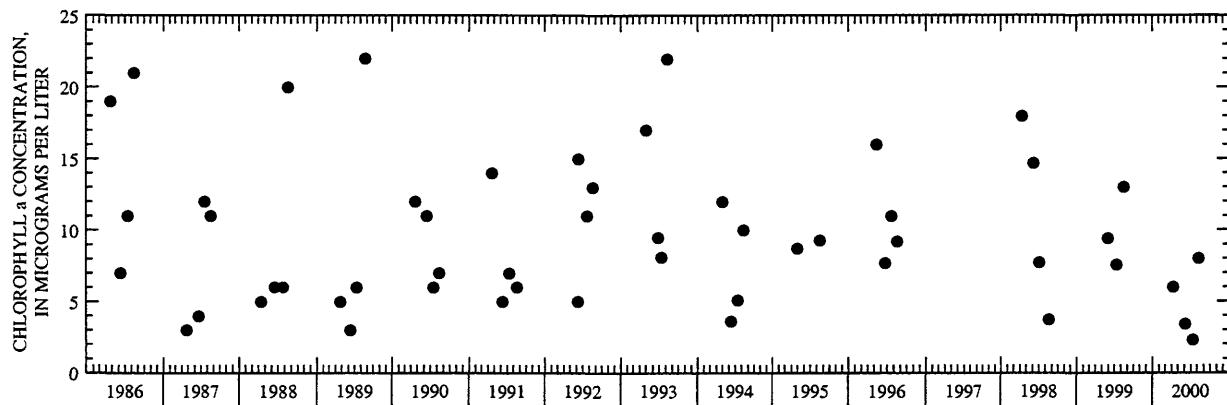
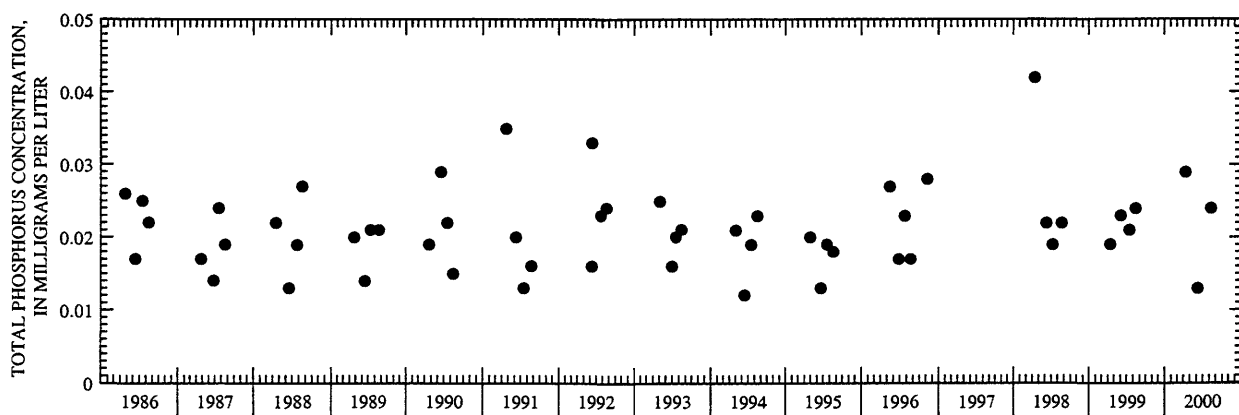


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Big Sissabagama Lake near Stone Lake, Wisconsin.

**454800091312900 BIG SISSABAGAMA LAKE, NORTH SITE, NEAR STONE LAKE, WI**

LOCATION.--Lat 42°48'00", long 91°31'29", in NE 1/4 SE 1/4 sec.6, T.38 N., R.9 W., Sawyer County, Hydrologic Unit 07050001, near Stone Lake.

DRAINAGE AREA.--9.47 mi<sup>2</sup>.

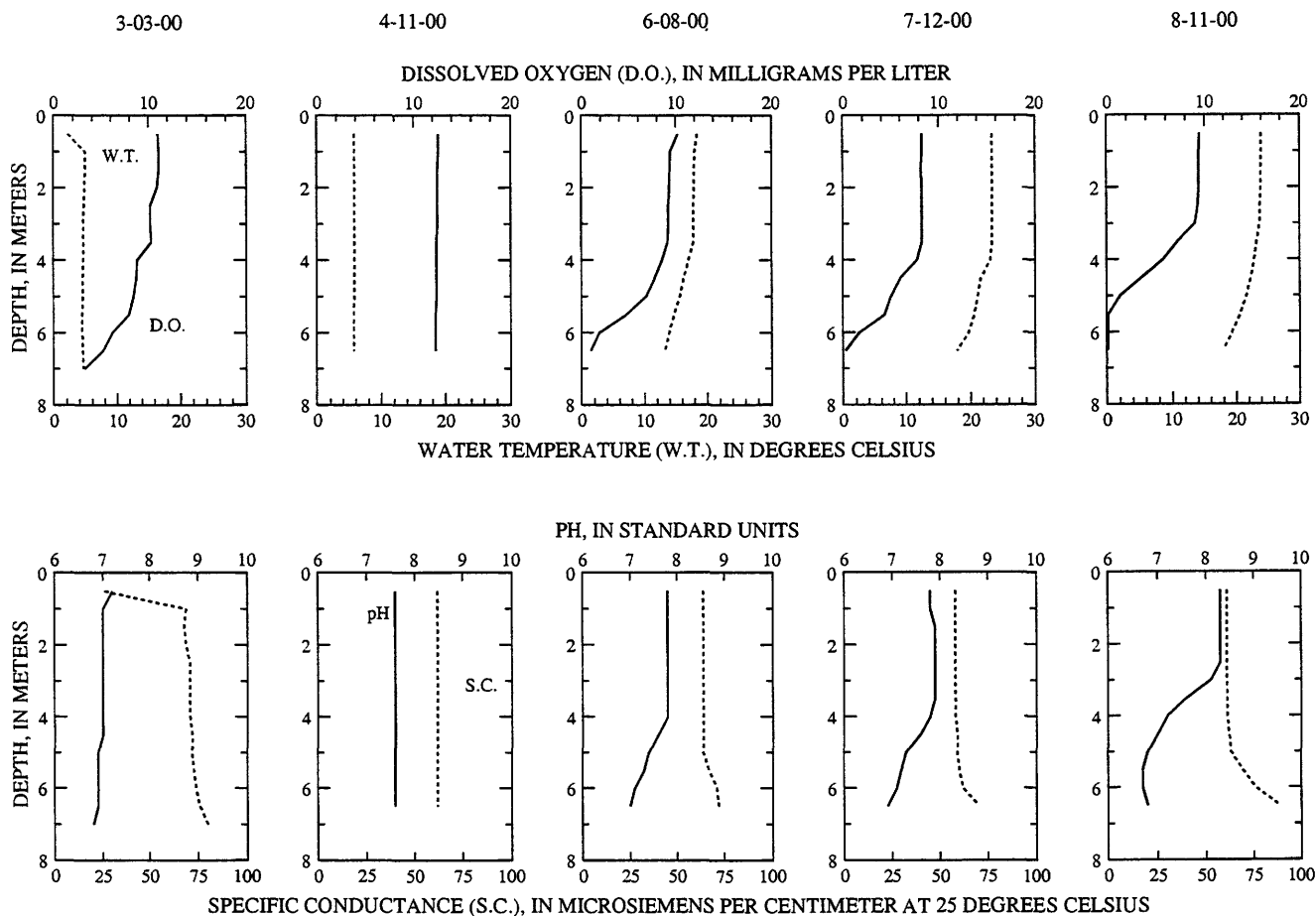
PERIOD OF RECORD.--March 1998 to current year.

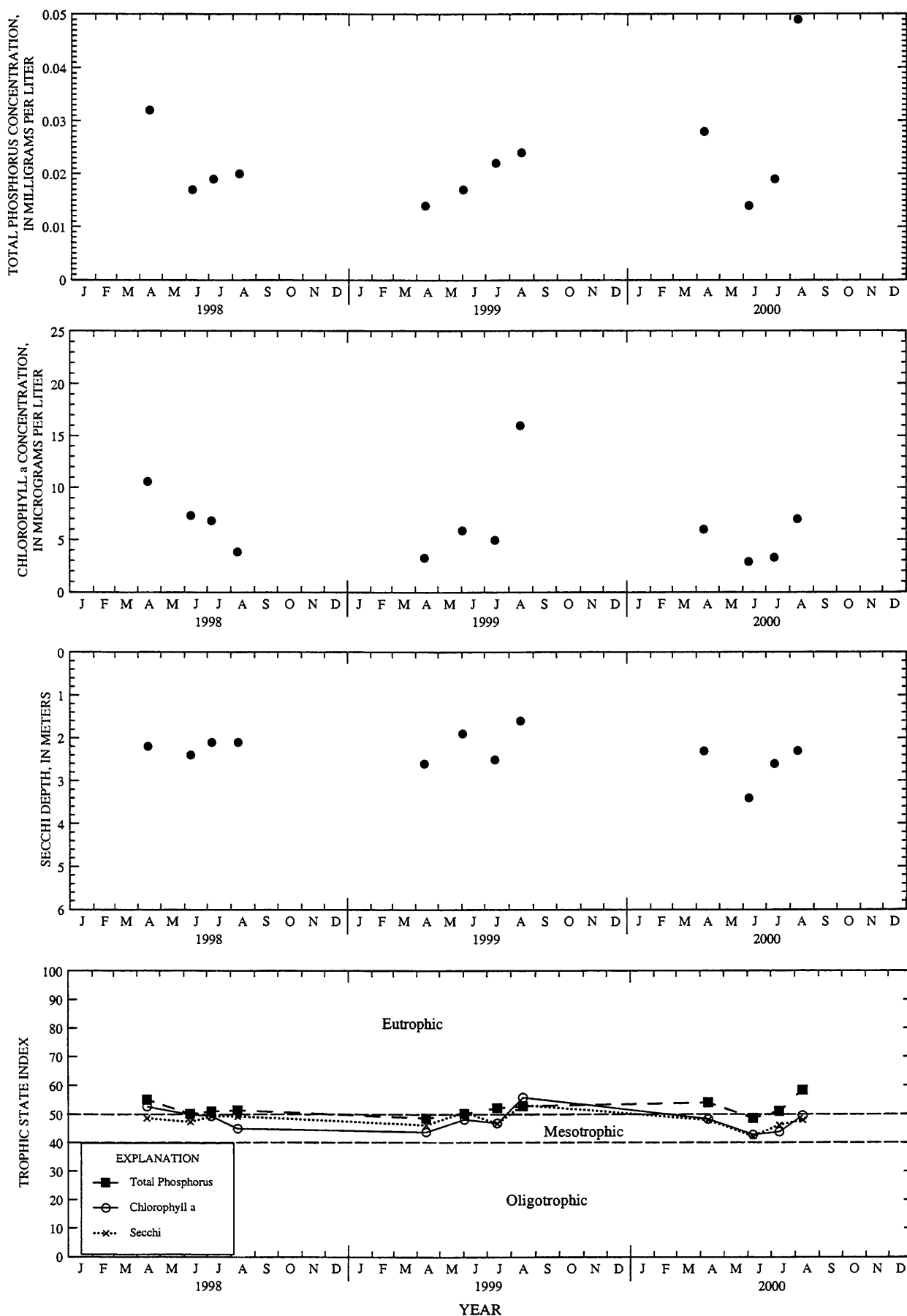
REMARKS.--Lake sampled near the deepest part of the North Bay. Lake ice-covered during March sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

**WATER-QUALITY DATA, MARCH 03 TO AUGUST 11, 2000**

(Milligrams per liter unless otherwise indicated)

	Mar-3	Apr-11	Jun-8	Jul-12		Aug-11	
Lake stage (ft)	---	5.96	5.77	6.32		5.82	
Secchi-depth (m)	---	2.3	3.4	2.6		2.3	
Chlorophyll a, phytoplankton (µg/L)	---	6	2.9	3.3		7	
Depth of sample (m)	0.5	0.5	0.5	0.5	6.0	0.5	6.0
Water temperature (°C)	2.2	5.8	18.4	23.4	19.7	23.4	19.3
Specific conductance (µS/cm)	26	62	64	58	62	58	76
pH (units)	7.2	7.6	7.8	7.8	7.1	7.8	6.7
Dissolved oxygen (mg/L)	11.0	12.6	10.2	8.3	1.6	8.3	0.1
Phosphorus, total (as P)	0.014	0.028	0.014	0.019	0.022	0.049	0.023





Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Big Sissabagama Lake, North Site, near Stone Lake, Wisconsin.



# 434558089260600 BUFFALO LAKE, CENTER SITE, AT PACKWAUKEE, WI

LOCATION.--Lat 43°45'58", long 89°26'06", in NW 1/4 SE 1/4 sec.21, T.15 N., R.9 E., Marquette County, Hydrologic Unit 04030201, 1.1 mi northeast of Packwaukee.

PERIOD OF RECORD.--May 1998 to current year. Data collected 1991-94 by Wisconsin Department of Natural Resources are available.

REMARKS.--Site sampled near center of lake. Lake ice-covered during February sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 22 TO AUGUST 10, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-22	Apr-24	Jun-12	Jul-13	Aug-10
Lake stage (ft)	89.62	89.38	89.71	89.98	89.12
Secchi-depth (m)	---	0.6	1.1	1.3	0.8
Chlorophyll a, phytoplankton (µg/L)	---	16	7	9	24
Depth of sample (m)	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	1.5	14.3	23.0	25.8	27.0
Specific conductance (µS/cm)	454	336	338	378	387
pH (units)	7.6	8.2	7.4	7.9	8.0
Dissolved oxygen (mg/L)	6.1	11.4	4.8	5.1	7.9
Phosphorus, total (as P)	0.022	0.067	0.095	0.123	0.134
Phosphorus, ortho, dissolved (as P)	---	0.004	---	0.072	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	1.33	---	0.165	---
Nitrogen, ammonia, dissolved (as N)	---	0.031	---	<0.013	---
Nitrogen, amm. + org., total (as N)	---	1.1	---	---	---
Nitrogen, amm. + org., diss. (as N)	---	---	---	0.79	---
Nitrogen, total (as N)	---	2.5	---	---	---
Color (Pt-Co. scale)	---	50	---	---	---
Turbidity (NTU)	---	7	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	170	---	---	---
Calcium, dissolved (Ca)	---	35	---	---	---
Magnesium, dissolved (Mg)	---	20	---	---	---
Sodium, dissolved (Na)	---	4.8	---	---	---
Potassium, dissolved (K)	---	1.7	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	149	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	14.4	---	---	---
Chloride, dissolved (Cl)	---	9.4	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	5.6	---	---	---
Solids, dissolved, at 180°C	---	214	---	---	---
Iron, dissolved (Fe) µg/L	---	120	---	---	---
Manganese, dissolved (Mn) µg/L	---	7.5	---	---	---

2-22-00

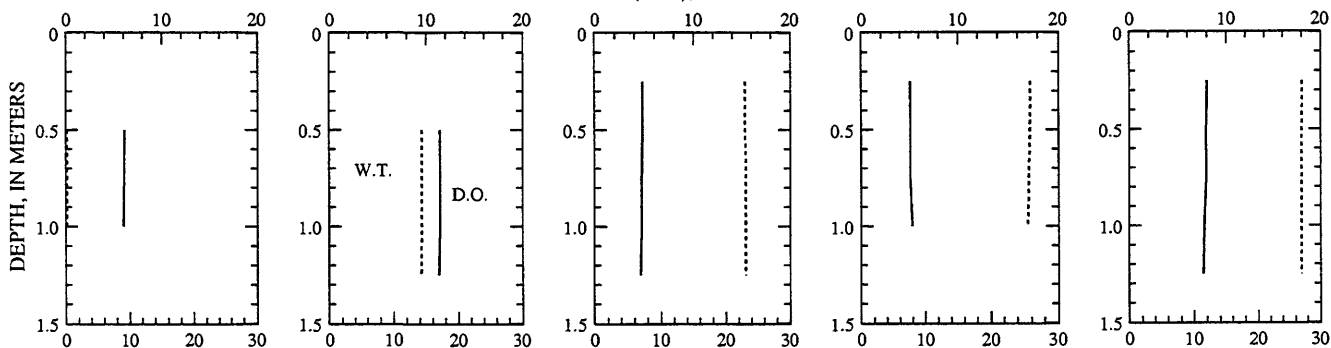
4-24-00

6-12-00

7-13-00

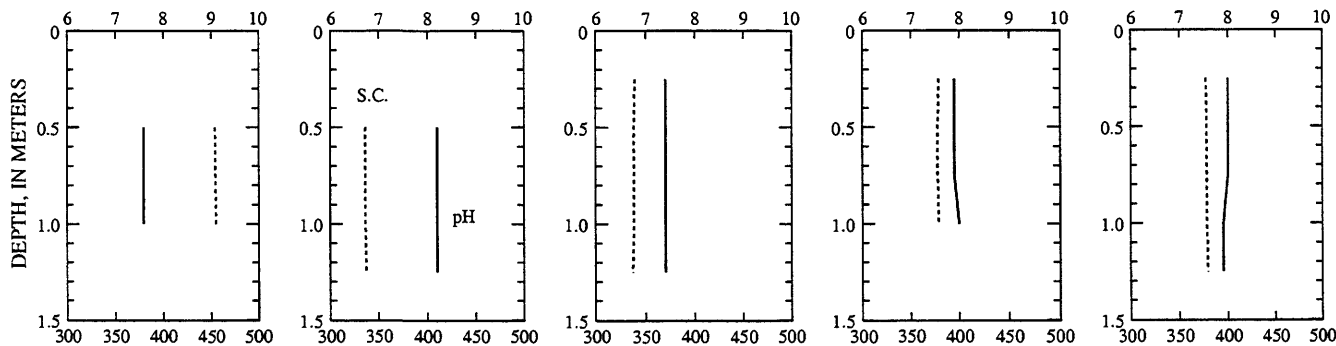
8-10-00

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

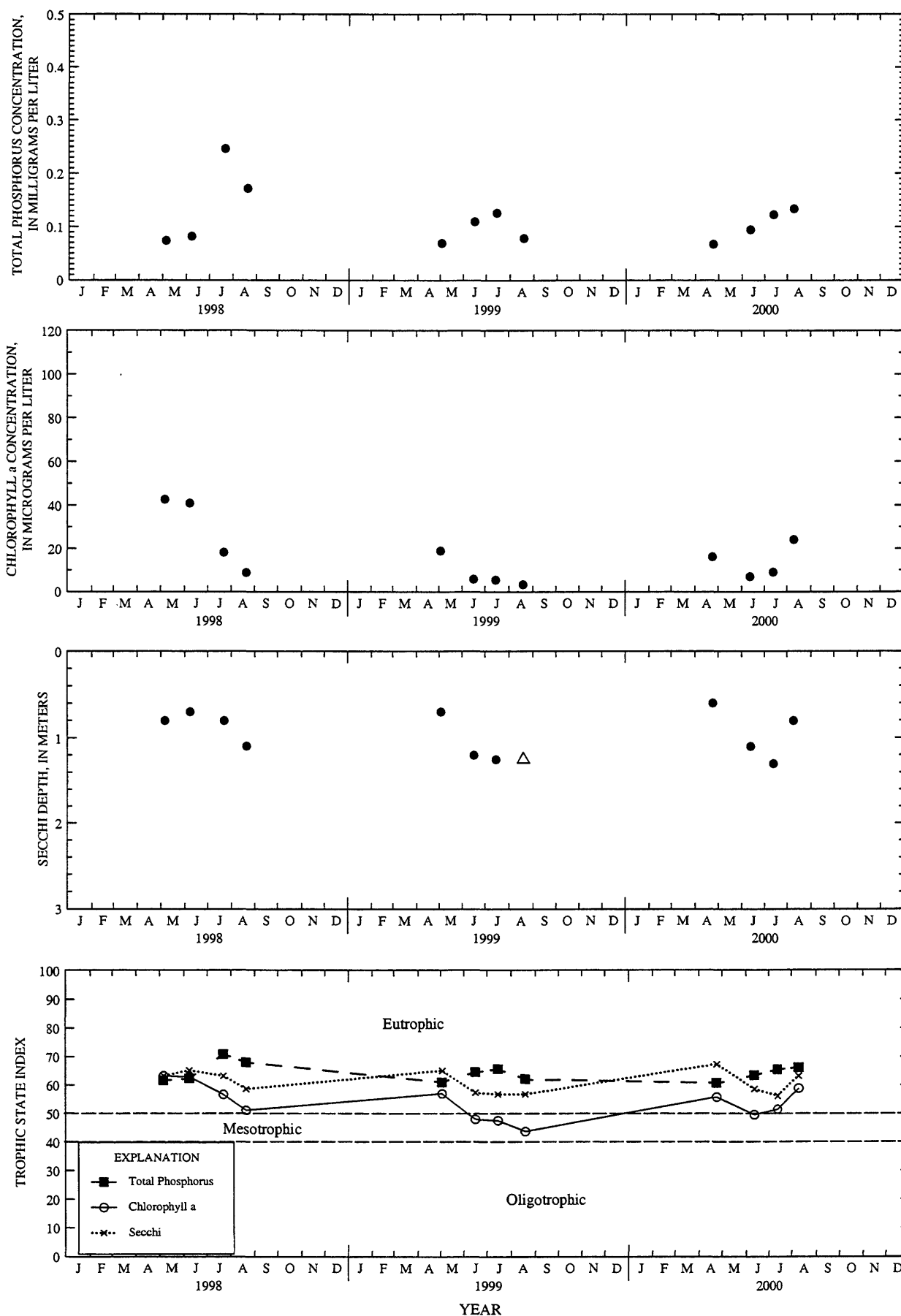


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## pH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Buffalo Lake, Center Site, near Packwaukee, Wisconsin.

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

# 434720089201600 BUFFALO LAKE, EAST END, AT MONTELLO, WI

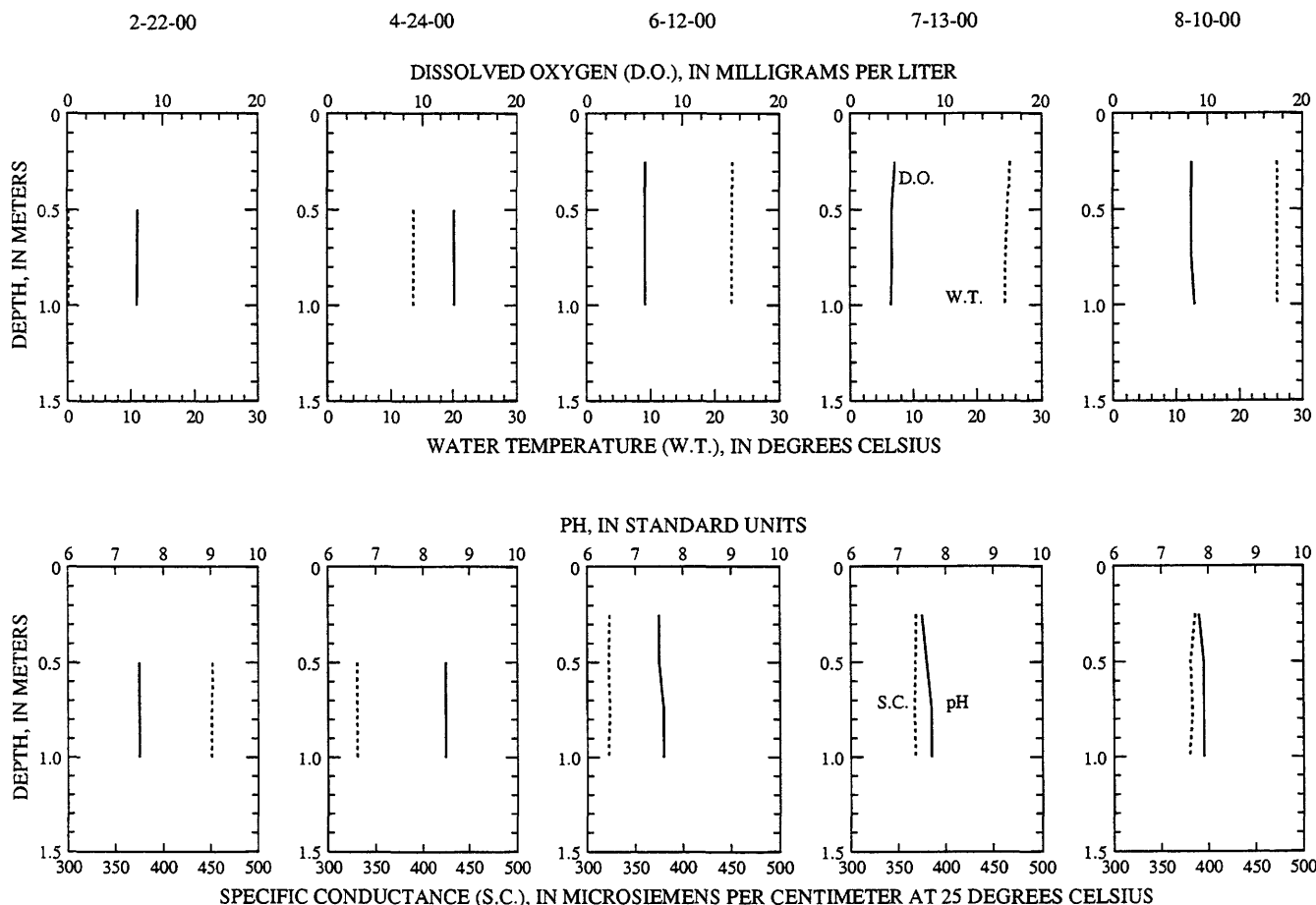
LOCATION.--Lat 43°47'20", long 89°20'16", in SE 1/4 SW 1/4 sec.8, T.15 N., R.10 E., Marquette County, Hydrologic Unit 04030201, at Montello.

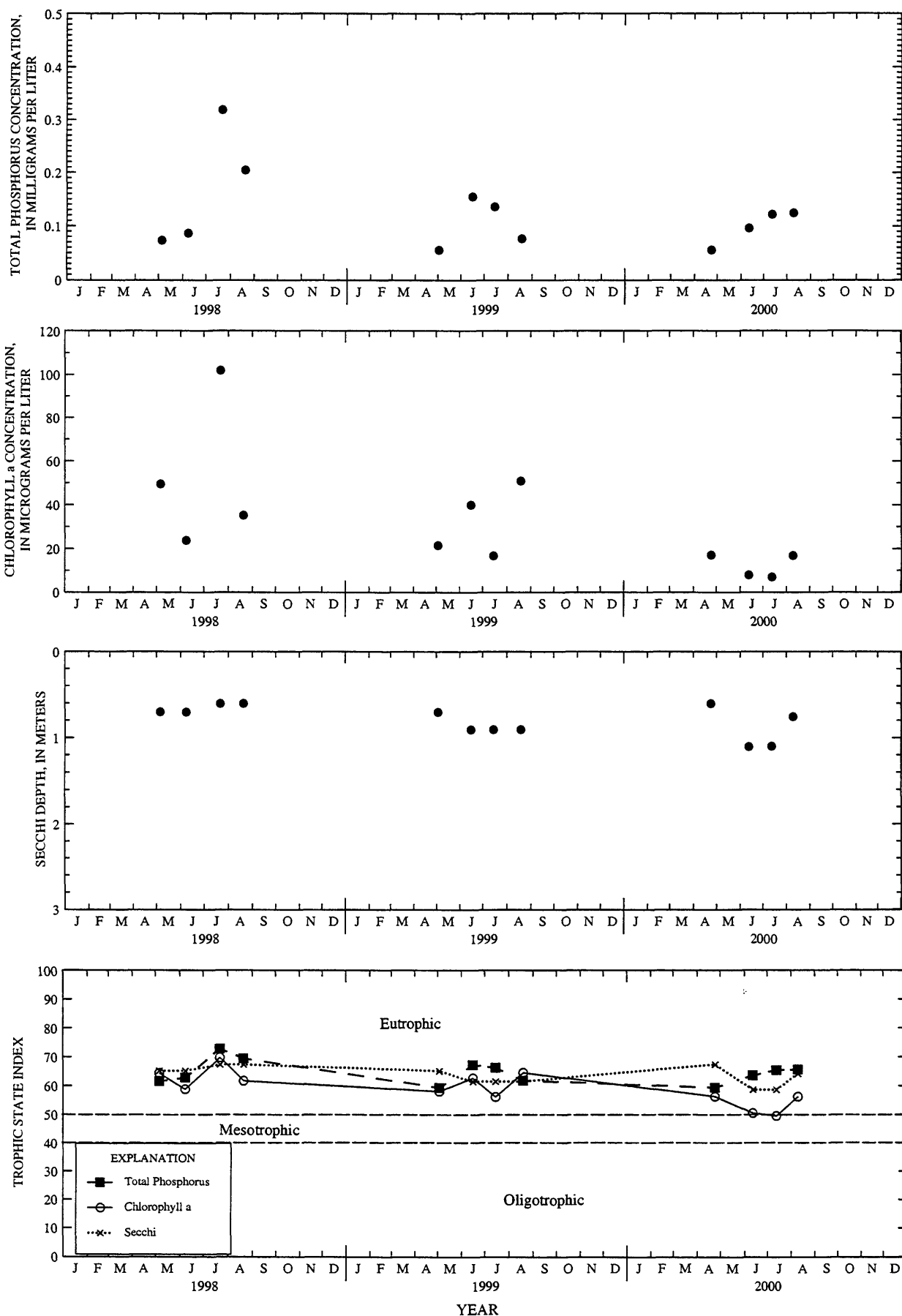
PERIOD OF RECORD.--May 1998 to current year. Data collected 1991-94 by Wisconsin Department of Natural Resources are available.

REMARKS.--Site sampled at east end of lake. Lake ice-covered during February sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 22 TO AUGUST 10, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-22	Apr-24	Jun-12	Jul-13	Aug-10
Lake stage (ft)	89.62	89.38	89.71	88.99	89.12
Secchi-depth (m)	---	0.6	1.1	1.1	0.8
Chlorophyll a, phytoplankton (µg/L)	---	17	8	7	17
Depth of sample (m)	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	0.1	13.6	22.8	24.8	26.1
Specific conductance (µS/cm)	452	330	322	368	381
pH (units)	7.5	8.5	7.5	7.6	7.9
Dissolved oxygen (mg/L)	7.4	13.5	6.1	4.4	8.3
Phosphorus, total (as P)	0.028	0.056	0.096	0.122	0.125





Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Buffalo Lake, East Site, at Montello, Wisconsin.

# 434414089282400 BUFFALO LAKE, WEST END, NEAR ENDEAVOR, WI

LOCATION.--Lat 43°44'14", long 89°28'24", in NW 1/4 SE 1/4 sec.31, T.15 N., R.9 E., Marquette County, Hydrologic Unit 04030201, 1.5 mi north of Endeavor.

PERIOD OF RECORD.--May 1998 to current year. Data collected 1991-94 by Wisconsin Department of Natural Resources are available.

REMARKS.--Site sampled near west end of lake. Lake ice-covered during February sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 22 TO AUGUST 10, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-22	Apr-24	Jun-12	Jul-13	Aug-10
Lake stage (ft)	89.62	89.38	89.71	88.98	89.12
Secchi-depth (m)	---	0.6	1.1	0.5	0.4
Chlorophyll a, phytoplankton (µg/L)	---	22	9	16	88
Depth of sample (m)	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	0.1	14.7	22.5	26.3	27.2
Specific conductance (µS/cm)	446	357	356	406	387
pH (units)	7.7	7.7	7.3	8.0	8.2
Dissolved oxygen (mg/L)	10.7	10.2	5.3	10.8	12.9
Phosphorus, total (as P)	0.042	0.085	0.099	0.102	0.171

2-22-00

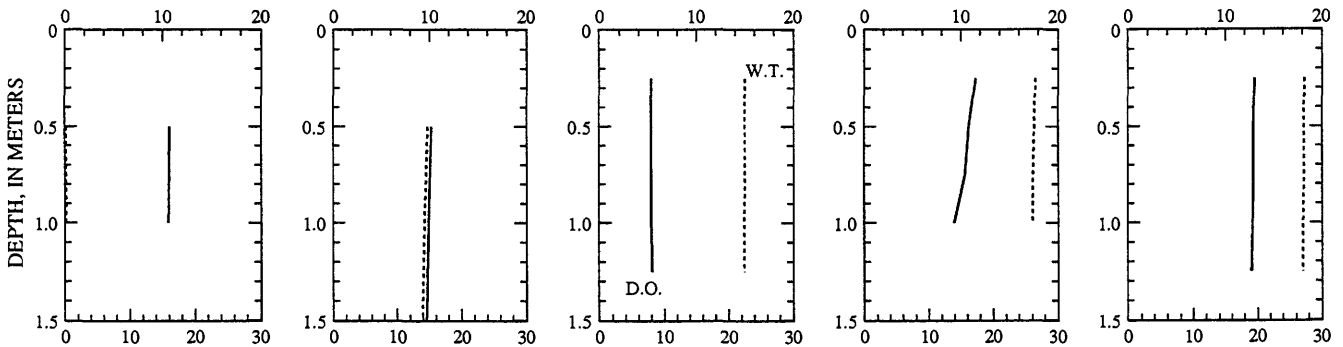
4-24-00

6-12-00

7-13-00

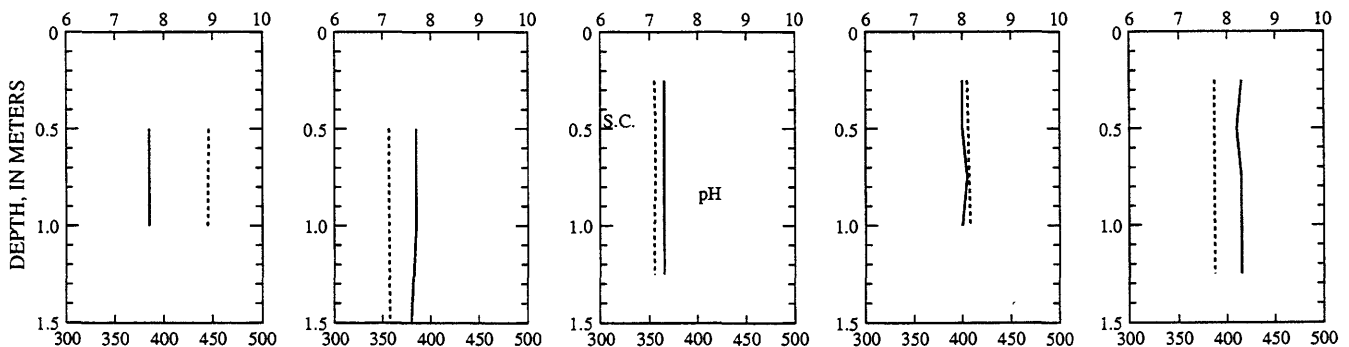
8-10-00

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

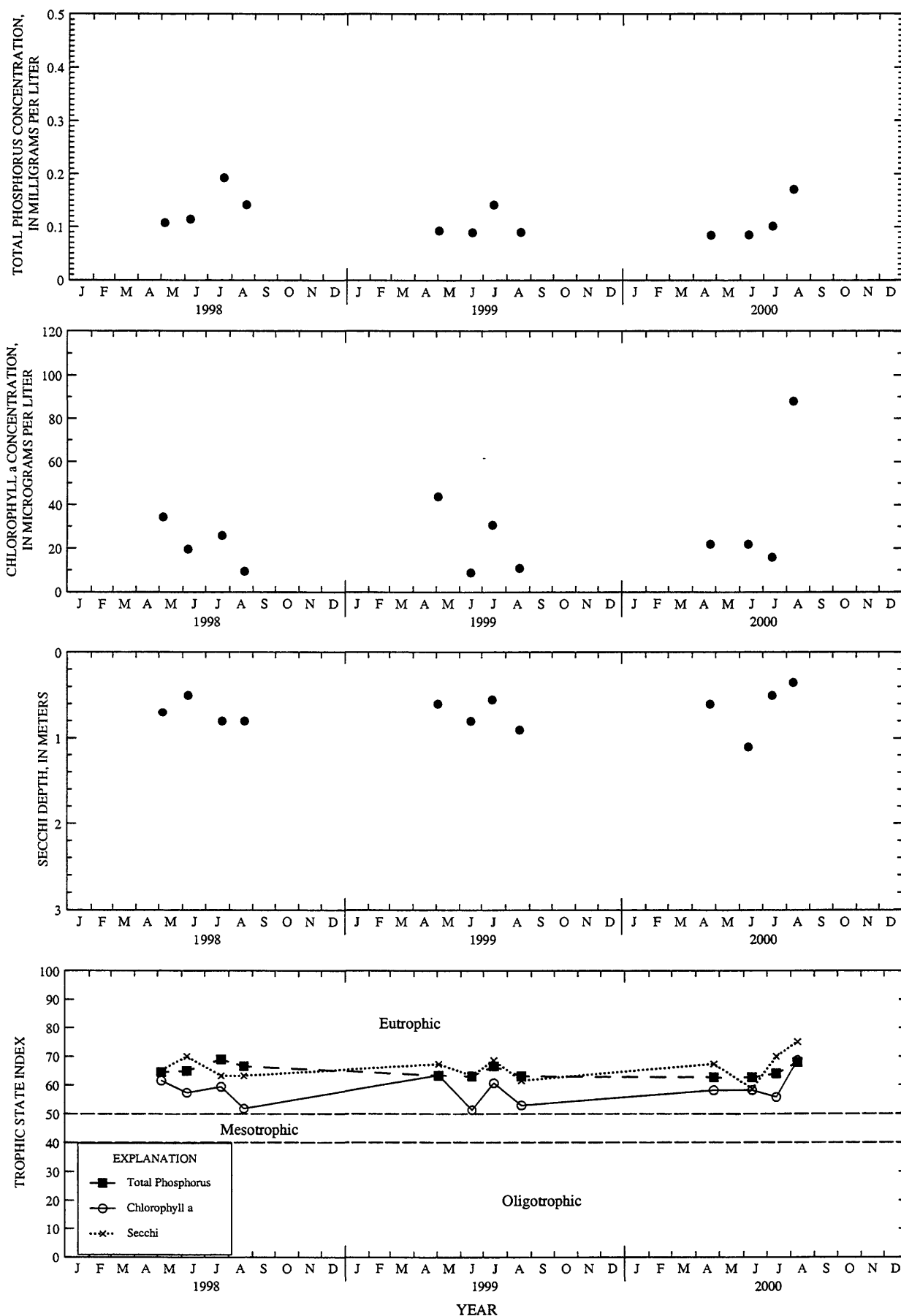


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Buffalo Lake, West Site, near Endeavor, Wisconsin.

# 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<sup>2</sup>, of which 2.3 mi<sup>2</sup> 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 S. J. Field and M. D. Duerk (1988).

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.

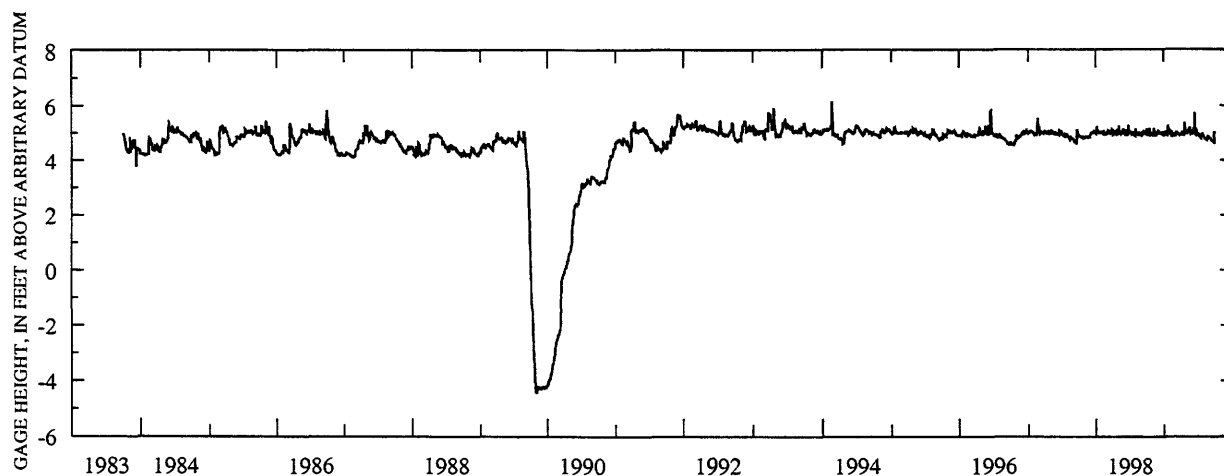
REMARKS.--Lake was ice covered from Jan. 20 to Feb. 27. Lake levels controlled by Delavan Lake Sanitary District. Gage-height telemeter at station.

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, 5.47 ft, June 2; minimum, 4.83 ft, Feb. 17, 18.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.96	4.92	4.94	4.97	4.95	4.96	4.93	4.98	5.28	5.00	5.02	4.96
2	4.96	4.91	4.93	4.98	4.94	4.95	4.94	4.99	5.46	5.01	5.02	4.96
3	4.98	4.90	4.94	4.99	4.92	4.94	4.94	4.99	5.38	5.17	5.01	4.96
4	5.01	4.90	4.96	5.01	4.92	4.94	4.94	4.99	5.26	5.12	5.00	4.95
5	5.01	4.88	5.04	5.02	4.90	4.95	4.93	4.99	5.19	5.05	5.02	4.93
6	5.00	4.88	5.04	5.01	4.89	4.96	4.92	5.00	5.09	4.99	5.10	4.91
7	5.00	4.88	5.02	5.01	4.88	4.96	4.96	5.00	5.02	4.99	5.10	4.90
8	4.99	4.88	5.00	5.01	4.87	4.96	5.00	5.01	4.98	4.99	5.09	4.90
9	5.00	4.88	4.99	5.00	4.86	4.97	4.97	5.11	4.99	4.99	5.07	4.89
10	5.00	4.88	4.99	5.01	4.85	4.96	4.96	5.24	4.99	5.15	5.05	4.91
11	5.00	4.89	4.98	5.01	4.84	4.95	4.95	5.22	5.02	5.19	5.03	4.96
12	4.99	4.89	4.96	5.00	4.84	4.94	4.94	5.17	5.12	5.12	5.01	5.12
13	4.99	4.89	4.95	5.00	4.86	4.93	4.93	5.10	5.31	5.05	5.01	5.11
14	4.98	4.90	4.95	5.00	4.87	4.93	4.93	5.02	5.38	5.02	5.01	5.12
15	4.97	4.89	4.95	4.99	4.86	4.94	4.93	4.96	5.34	5.01	5.01	5.08
16	4.99	4.89	4.95	4.97	4.85	4.96	4.93	4.97	5.25	5.01	5.00	5.02
17	4.99	4.89	4.94	4.96	4.84	4.96	4.94	4.99	5.12	5.00	5.03	4.98
18	4.99	4.89	4.93	4.96	4.86	4.95	4.93	5.09	5.02	4.99	5.04	4.96
19	4.98	4.88	4.93	4.97	4.88	4.96	4.97	5.24	4.98	4.98	5.04	4.94
20	4.97	4.89	4.93	4.99	4.87	4.99	5.27	5.21	4.97	4.97	5.02	4.96
21	4.97	4.89	4.93	5.00	4.86	4.99	5.41	5.10	4.97	4.96	5.01	4.97
22	4.96	4.89	4.93	5.01	4.86	4.99	5.29	5.05	4.95	4.96	5.01	5.00
23	4.94	4.91	4.93	5.01	4.92	4.97	5.15	5.00	4.96	4.95	5.01	5.13
24	4.93	4.93	4.94	5.01	5.03	4.97	5.03	4.95	4.98	4.94	5.02	5.10
25	4.92	4.93	4.94	5.00	5.06	4.96	4.97	4.95	5.00	4.93	5.01	5.05
26	4.91	4.93	4.94	4.99	5.05	4.94	4.96	4.96	5.00	4.92	5.00	5.04
27	4.91	4.94	4.95	4.97	5.03	4.94	4.94	5.01	4.99	4.93	5.00	5.03
28	4.91	4.94	4.95	4.97	4.98	4.94	4.95	5.06	4.98	4.94	4.99	5.02
29	4.91	4.94	4.96	4.96	4.95	4.93	4.96	5.07	5.00	4.93	4.98	5.01
30	4.91	4.94	4.96	4.97	---	4.93	4.97	5.07	5.00	4.93	4.98	5.00
31	4.91	---	4.96	4.96	---	4.93	---	5.09	---	4.97	4.97	---
MEAN	4.97	4.90	4.96	4.99	4.91	4.95	4.99	5.05	5.10	5.01	5.02	5.00
MAX	5.01	4.94	5.04	5.02	5.06	4.99	5.41	5.24	5.46	5.19	5.10	5.13
MIN	4.91	4.88	4.93	4.96	4.84	4.93	4.92	4.95	4.95	4.92	4.97	4.89



# 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<sup>2</sup>, of which 2.3 mi<sup>2</sup> 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 15, 1999 TO APRIL 05, 2000 (Milligrams per liter unless otherwise indicated)

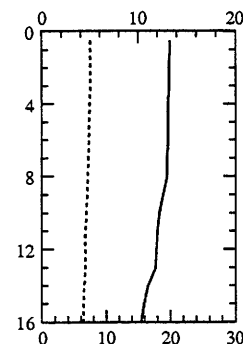
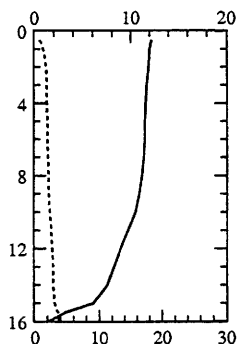
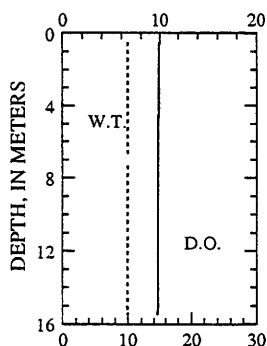
	Nov-15		Feb-8		Apr-5	
Lake stage (ft)	4.89		4.87		4.93	
Secchi-depth (m)	4.0		4.3		2.6	
Chlorophyll <i>a</i> , phytoplankton (µg/L)	3.7		0.6		6.6	
Depth of sample (m)	0.5	15.5	0.5	15.5	0.5	16.0
Water temperature (°C)	10.0	9.9	0.8	3.6	7.5	6.4
Specific conductance (µS/cm)	534	535	604	677	571	575
pH (units)	7.9	8.0	7.5	7.6	8.4	8.2
Dissolved oxygen (mg/L)	9.9	9.7	12.2	3.2	13.3	10.3
Phosphorus, total (as P)	0.069	0.068	0.068	0.116	0.051	0.069
Phosphorus, ortho, dissolved (as P)	<0.001	0.010	0.047	0.090	0.003	0.004
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.04	---	0.248	---	0.137	0.171
Nitrogen, ammonia, dissolved (as N)	0.047	---	0.124	---	<0.002	<0.002
Nitrogen, amm. + org., total (as N)	0.68	---	0.74	---	0.68	0.68
Nitrogen, total (as N)	0.72	---	0.99	---	0.81	0.85
Color (Pt-Co. scale)	---	---	---	---	20	20
Turbidity (NTU)	---	---	---	---	0.6	0.7
Hardness, (as CaCO <sub>3</sub> )	---	---	---	---	230	230
Calcium, dissolved (Ca)	---	---	---	---	39.6	39.5
Magnesium, dissolved (Mg)	---	---	---	---	31.3	31.2
Sodium, dissolved (Na)	---	---	---	---	23.7	23.5
Potassium, dissolved (K)	---	---	---	---	2.9	2.9
Alkalinity, (as CaCO <sub>3</sub> )	---	---	---	---	189	189
Sulfate, dissolved (SO <sub>4</sub> )	---	---	---	---	29.1	28.9
Chloride, dissolved (Cl)	---	---	---	---	55.7	55
Silica, dissolved (SiO <sub>2</sub> )	---	---	---	---	0.1	0.1
Solids, dissolved, at 180°C	---	---	---	---	310	310
Iron, dissolved (Fe) µg/L	---	---	---	---	<10	<10
Manganese, dissolved (Mn) µg/L	---	---	---	---	<2	2

11-15-99

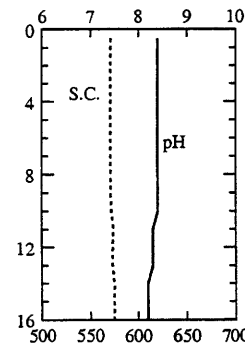
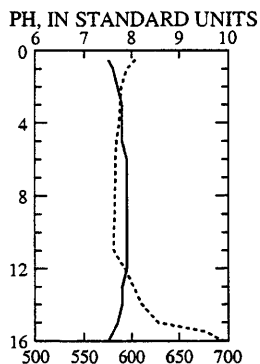
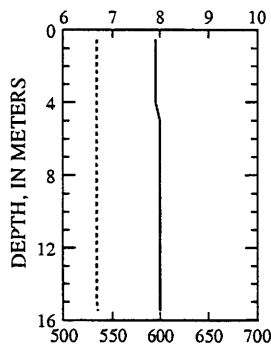
2-08-00

4-05-00

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



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



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



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

WATER-QUALITY DATA, MAY 17 TO JULY 12, 2000  
(Milligrams per liter unless otherwise indicated)

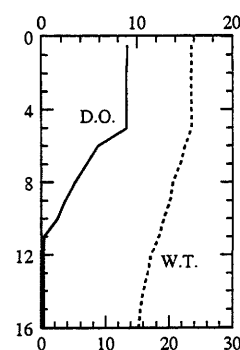
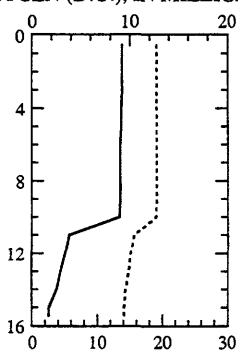
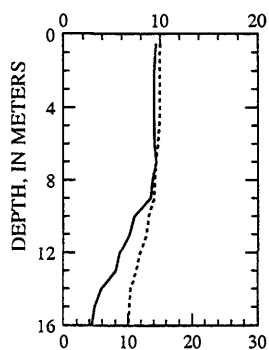
	May-17				Jun-15				Jul-12			
Lake stage (ft)	4.99				5.34				5.12			
Secchi-depth (m)	5.3				3.0				3.1			
Chlorophyll a, phytoplankton (µg/L)	1.9				15				12.4			
Depth of sample (m)	0.5	7.0	14.0	16.0	0.5	10.0	14.0	15.5	0.5	5.0	11.0	16.0
Water temperature (°C)	15.1	14.4	10.4	10.1	19.1	19.0	14.3	14.1	23.6	23.6	18.4	15.3
Specific conductance (µS/cm)	563	564	578	581	551	554	581	583	524	524	561	585
pH (units)	8.2	8.2	7.8	7.7	8.1	8.3	7.8	7.7	8.2	8.3	7.6	7.6
Dissolved oxygen (mg/L)	9.6	9.6	3.9	2.9	9.2	8.9	2.5	1.7	9.0	8.9	0.2	0.2
Phosphorus, total (as P)	0.037	0.037	0.066	0.119	0.043	0.040	0.115	0.119	0.033	0.024	0.173	0.486
Phosphorus, ortho, dissolved (as P)	0.019	0.017	0.046	0.092	<0.001	<0.001	0.026	0.058	0.001	0.001	0.084	0.376
Nitrogen, NO2 + NO3, diss. (as N)	0.203	---	---	---	0.196	---	---	---	0.021	---	---	---
Nitrogen, ammonia, dissolved (as N)	0.067	---	---	---	0.004	---	---	---	0.048	---	---	---
Nitrogen, amm. + org., total (as N)	0.62	---	---	---	0.61	---	---	---	0.76	---	---	---
Nitrogen, total (as N)	0.82	---	---	---	0.81	---	---	---	0.78	---	---	---

5-17-00

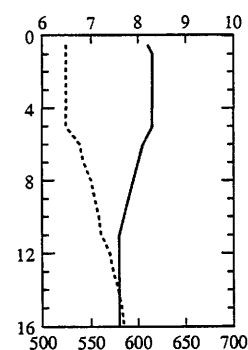
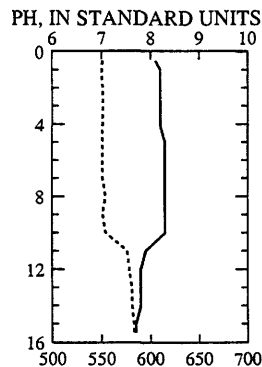
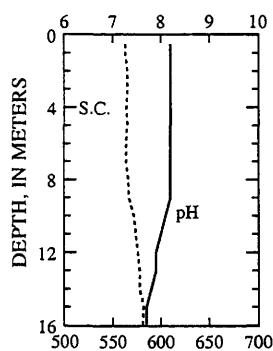
6-15-00

7-12-00

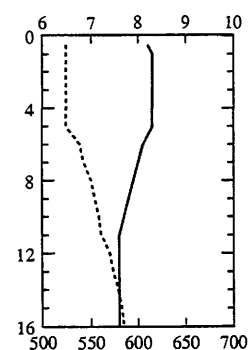
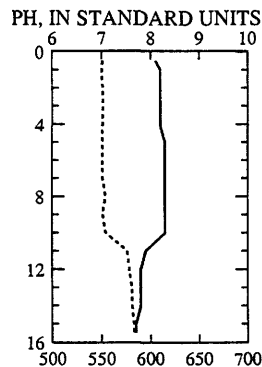
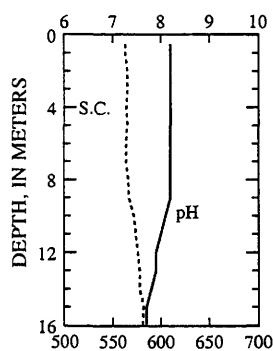
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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

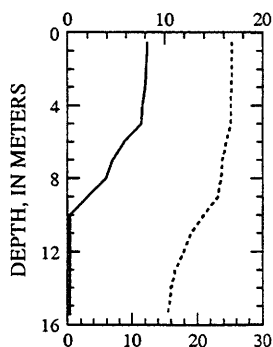


## 423556088365001 DELAVAN LAKE AT CENTER NEAR DELAVAN LAKE, WI--CONTINUED

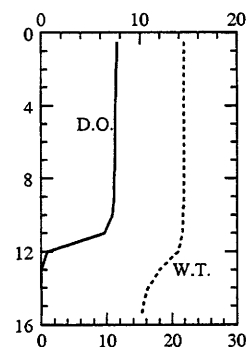
WATER-QUALITY DATA, AUGUST 15 TO SEPTEMBER 14, 2000  
(Milligrams per liter unless otherwise indicated)

	Aug-15								Sep-14			
Lake stage (ft)	5.01								5.12			
Secchi-depth (m)	2.6								2.9			
Chlorophyll a, phytoplankton (µg/L)	5.2								4.5			
Depth of sample (m)	0.5	3.0	5.0	7.0	9.0	11.0	14.0	15.5	0.5	11.0	14.0	15.5
Water temperature (°C)	25.3	25.2	25.1	23.8	23.1	19.0	16.0	15.4	21.8	21.6	16.2	15.3
Specific conductance (µS/cm)	518	520	520	528	532	571	595	603	527.0	532.0	609.0	629.0
pH (units)	8.4	8.4	8.3	8.1	7.8	7.6	7.5	7.4	8.3	8.1	7.4	7.3
Dissolved oxygen (mg/L)	8.2	8.0	7.6	4.6	2.0	0.2	0.2	0.2	7.700	6.400	0.000	0.000
Phosphorus, total (as P)	0.028	0.027	0.027	0.028	0.066	0.278	0.621	---	0.076	0.082	0.82	1.06
Phosphorus, ortho, dissolved (as P)	<0.001	---	0.001	---	---	---	0.487	---	0.015	0.02	0.721	0.964
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	<0.005	---	---	---	---	---	---	---	0.118	---	---	---
Nitrogen, ammonia, dissolved (as N)	0.038	---	---	---	---	---	---	---	0.087	---	---	---
Nitrogen, amm. + org., total (as N)	0.66	---	---	---	---	---	---	---	0.64	---	---	---
Nitrogen, total (as N)	---	---	---	---	---	---	---	---	0.76	---	---	---

8-15-00



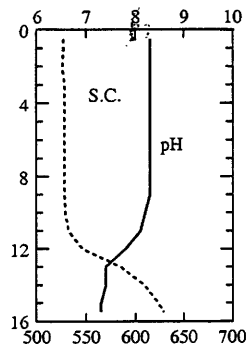
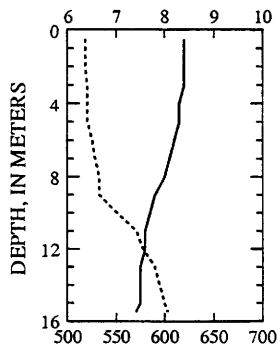
9-14-00



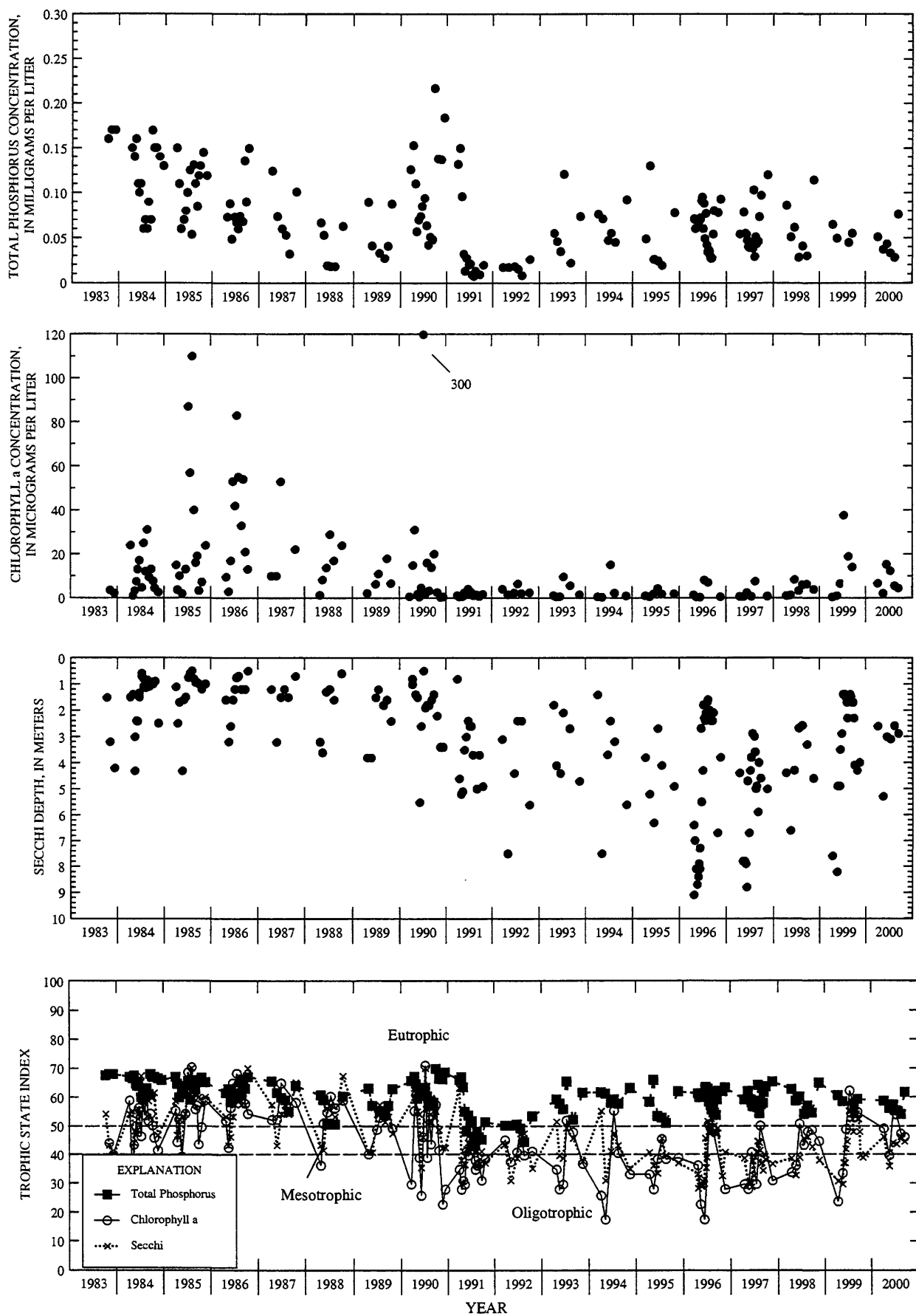
DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

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, chlorophyll a concentrations, Secchi depths, and TSI data for Delavan Lake at Center near Delavan, Wisconsin.

423556088365001 DELAVAN LAKE AT CENTER NEAR DELAVAN LAKE, WI--CONTINUED

ADDITIONAL WATER-QUALITY DATA, OCTOBER 1, 1999 TO SEPTEMBER 27, 2000  
(Milligrams per liter unless otherwise indicated)

	<u>Oct. 1</u>	<u>Oct. 6</u>	<u>Oct. 27</u>	<u>Mar. 22</u>	<u>Mar. 30</u>	<u>Apr. 18</u>
Lake stage (ft)	4.96	5.00	4.91	4.99	4.93	4.93
Secchi-depth (meters)	2.3	4.1	4.7	4.9	3.8	6.7
Depth of sample (meters)	0.5	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	17.2	15.0	12.2	6.2	6.5	7.8
Phosphorus, total (as P)	0.095	0.097	0.075	0.059	0.043	0.035

	<u>Apr. 26</u>	<u>May 2</u>	<u>May 10</u>	<u>May 26</u>	<u>June 21</u>	<u>June 28</u>
Lake stage (ft)	4.96	4.99	5.24	4.96	4.97	4.98
Secchi-depth (meters)	10.8	10.1	8.9	7.9	3.5	4.3
Depth of sample (meters)	0.5	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	10.5	13.0	16.7	16.0	20.5	22.8
Phosphorus, total (as P)	0.043	0.035	0.018	0.053	0.031	0.031

	<u>July 6</u>	<u>July 21</u>	<u>July 27</u>	<u>Aug. 3</u>	<u>Aug. 8</u>	<u>Aug. 1</u>
Lake stage (ft)	4.99	4.96	4.93	5.01	5.09	5.01
Secchi-depth (meters)	4.3	3.5	3.0	1.8	1.8	4.4
Depth of sample (meters)	0.5	0.5	0.5	0.5	0.5	0.5
Water temperature (°C)	25.0	23.9	25.0	22.8	23.9	23.3
Phosphorus, total (as P)	<0.050	0.035	0.036	0.037	0.032	0.030

	<u>Aug. 29</u>	<u>Sept. 8</u>	<u>Sept. 27</u>
Lake stage (ft)	4.98	4.90	5.03
Secchi-depth (meters)	4.9	4.3	3.7
Depth of sample (meters)	0.5	0.5	0.5
Water temperature (°C)	22.8	22.8	17.2
Phosphorus, total (as P)	0.029	0.049	0.141

**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<sup>2</sup>, of which 2.3 mi<sup>2</sup> is non-contributing.

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

**WATER-QUALITY DATA, MAY 17 TO AUGUST 15, 2000**

	May 17 -----	June 15 -----	July 12 -----	Aug. 15 -----
Secchi-depth (meters)	5.8	3.2	2.0	3.8

**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<sup>2</sup>, of which 2.3 mi<sup>2</sup> is non-contributing.

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

**WATER-QUALITY DATA, MAY 17 TO AUGUST 15, 2000**

	May 17 -----	June 15 -----	July 12 -----	Aug. 15 -----
Secchi-depth (meters)	5.5	2.9	3.7	2.4

# 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<sup>2</sup>. 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.--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, 12.04 ft, July 11, 12; minimum recorded, 8.31 ft, Feb. 9.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.40	8.99	8.70	8.50	8.44	8.58	8.48	9.03	10.18	11.38	11.56	11.13
2	9.41	8.97	8.68	8.51	8.43	8.58	8.48	9.03	11.15	11.38	11.54	11.12
3	9.40	8.95	8.69	8.51	8.43	8.57	8.46	9.02	11.24	11.43	11.51	11.11
4	9.38	8.93	8.70	8.52	8.43	8.57	8.45	9.02	11.29	11.41	11.48	11.08
5	9.36	8.91	8.69	8.52	8.42	8.56	8.44	9.01	11.38	11.38	11.49	11.04
6	9.34	8.90	8.68	8.51	8.42	8.56	8.41	9.00	11.41	11.36	11.51	11.01
7	9.33	8.89	8.67	8.50	8.41	8.55	8.42	8.99	11.41	11.33	11.49	10.97
8	9.31	8.87	8.66	8.50	8.41	8.56	8.44	8.98	11.40	11.30	11.46	10.95
9	9.31	8.86	8.65	8.49	8.40	8.57	8.42	8.96	11.39	11.32	11.44	10.93
10	9.30	8.85	8.64	8.51	8.40	8.56	8.42	8.94	11.38	11.82	11.41	10.92
11	9.28	8.84	8.64	8.51	8.39	8.55	8.41	8.93	11.37	12.03	11.38	10.96
12	9.26	8.83	8.63	8.50	8.39	8.54	8.40	8.94	11.35	12.03	11.36	10.95
13	9.25	8.82	8.62	8.50	8.41	8.54	8.40	8.94	11.35	12.01	11.35	10.92
14	9.23	8.80	8.61	8.49	8.42	8.53	8.39	8.91	11.53	11.99	11.33	10.93
15	9.21	8.79	8.61	8.49	8.42	8.53	8.38	8.89	11.59	11.96	11.31	10.90
16	9.23	8.77	8.61	8.48	8.41	8.52	8.37	8.88	11.59	11.93	11.28	10.87
17	9.21	8.76	8.60	8.47	8.41	8.51	8.37	8.91	11.57	11.90	11.31	10.84
18	9.19	8.75	8.60	8.47	8.42	8.50	8.36	9.25	11.56	11.85	11.30	10.82
19	9.18	8.74	8.60	8.47	8.43	8.50	8.38	9.39	11.54	11.81	11.27	10.80
20	9.16	8.73	8.59	8.47	8.42	8.50	8.59	9.43	11.58	11.78	11.24	10.81
21	9.14	8.72	8.57	8.47	8.42	8.50	8.75	9.44	11.59	11.74	11.21	10.78
22	9.10	8.70	8.56	8.47	8.41	8.50	8.80	9.45	11.55	11.71	11.20	10.78
23	9.07	8.78	8.56	8.46	8.42	8.50	8.92	9.45	11.53	11.68	11.20	10.80
24	9.05	8.79	8.55	8.46	8.45	8.51	8.98	9.44	11.52	11.65	11.18	10.78
25	9.04	8.78	8.55	8.45	8.48	8.51	9.01	9.42	11.52	11.62	11.16	10.75
26	9.01	8.76	8.53	8.44	8.57	8.51	9.02	9.41	11.50	11.61	11.21	10.73
27	9.01	8.75	8.53	8.44	8.58	8.52	9.03	9.41	11.47	11.60	11.23	10.70
28	8.98	8.74	8.53	8.43	8.58	8.51	9.04	9.44	11.46	11.59	11.21	10.69
29	9.01	8.72	8.52	8.43	8.58	8.50	9.04	9.43	11.44	11.60	11.19	10.66
30	9.02	8.71	8.51	8.45	---	8.49	9.04	9.44	11.41	11.59	11.17	10.64
31	9.01	---	8.51	8.45	---	8.49	---	9.51	---	11.57	11.15	---
MEAN	9.20	8.81	8.61	8.48	8.44	8.53	8.60	9.17	11.41	11.66	11.33	10.88
MAX	9.41	8.99	8.70	8.52	8.58	8.58	9.04	9.51	11.59	12.03	11.56	11.13
MIN	8.98	8.70	8.51	8.43	8.39	8.49	8.36	8.88	10.18	11.30	11.15	10.64

# 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<sup>2</sup>.

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 sampling. 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 09 TO AUGUST 16, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-9		Mar-29		Jun-8	Jul-11	Aug-16
Lake stage (ft)	9.39		9.40		9.54	9.56	9.39
Secchi-depth (m)	---		2.0		>2.5	2.5	1.5
Chlorophyll a, phytoplankton (µg/L)	---		6		1.1	2	36
Depth of sample (m)	0.5	2.0	0.5	2.0	0.5	0.5	0.5
Water temperature (°C)	1.7	4.7	9.0	8.2	21.0	27.2	28.2
Specific conductance (µS/cm)	572	667	483	474	410	475	479
pH (units)	7.8	7.3	8.2	8.2	8.1	7.9	8.0
Dissolved oxygen (mg/L)	14.9	6.6	12.1	12.4	10.2	9.2	9.7
Phosphorus, total (as P)	0.016	0.016	0.014	0.014	0.013	0.013	0.022
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.756	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.026	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.58	---	---	---	---
Nitrogen, total (as N)	---	---	1.3	---	---	---	---
Color (Pt-Co. scale)	---	---	15	---	---	---	---
Turbidity (NTU)	---	---	0.5	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	240	---	---	---	---
Calcium, dissolved (Ca)	---	---	50	---	---	---	---
Magnesium, dissolved (Mg)	---	---	29	---	---	---	---
Sodium, dissolved (Na)	---	---	7.2	---	---	---	---
Potassium, dissolved (K)	---	---	1.1	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	214	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	20.4	---	---	---	---
Chloride, dissolved (Cl)	---	---	17.9	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	4.2	---	---	---	---
Solids, dissolved, at 180°C	---	---	272	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	1.0	---	---	---	---

2-09-00

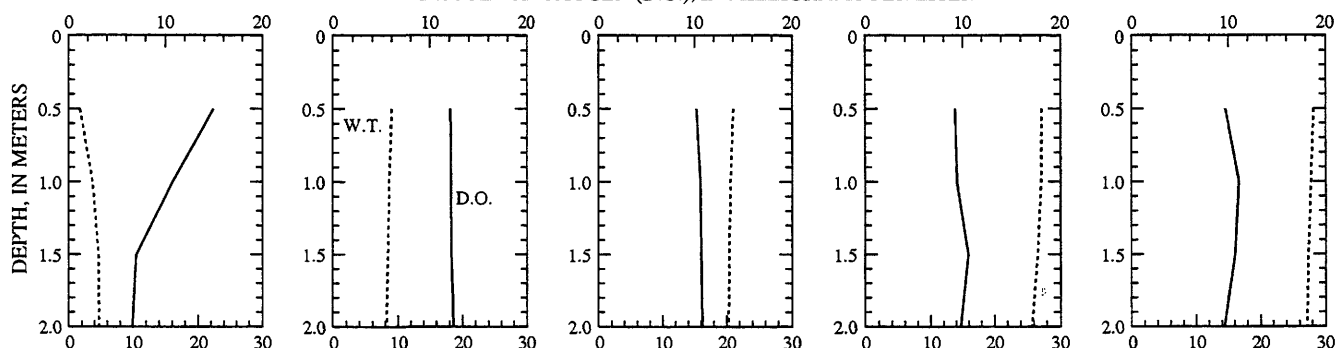
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6-08-00

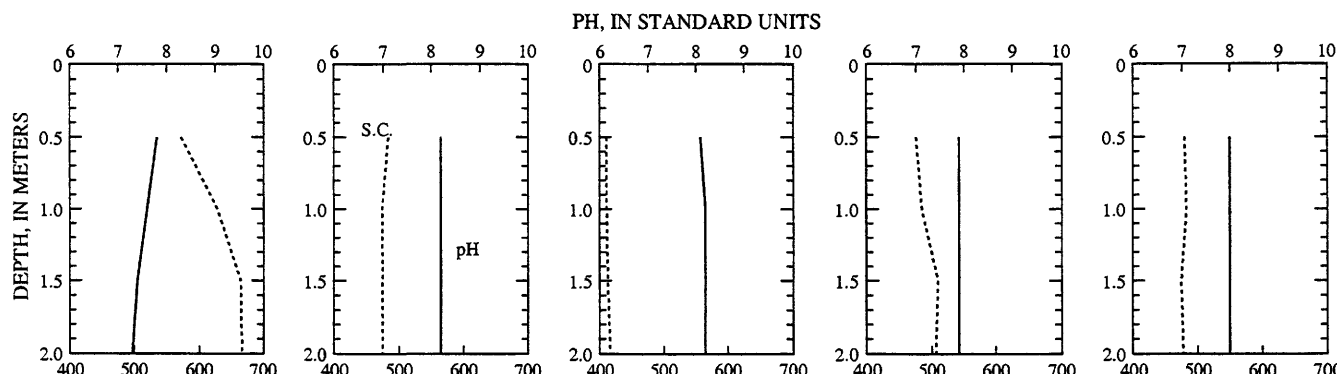
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8-16-00

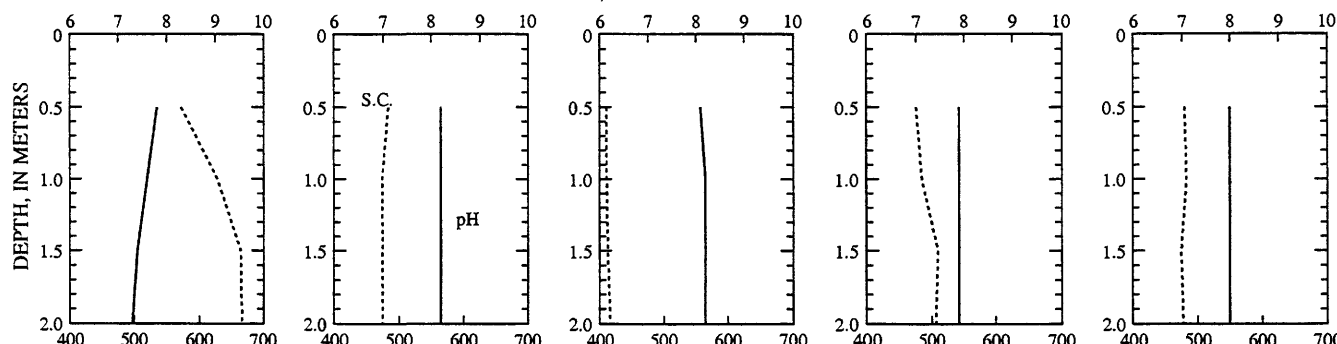
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



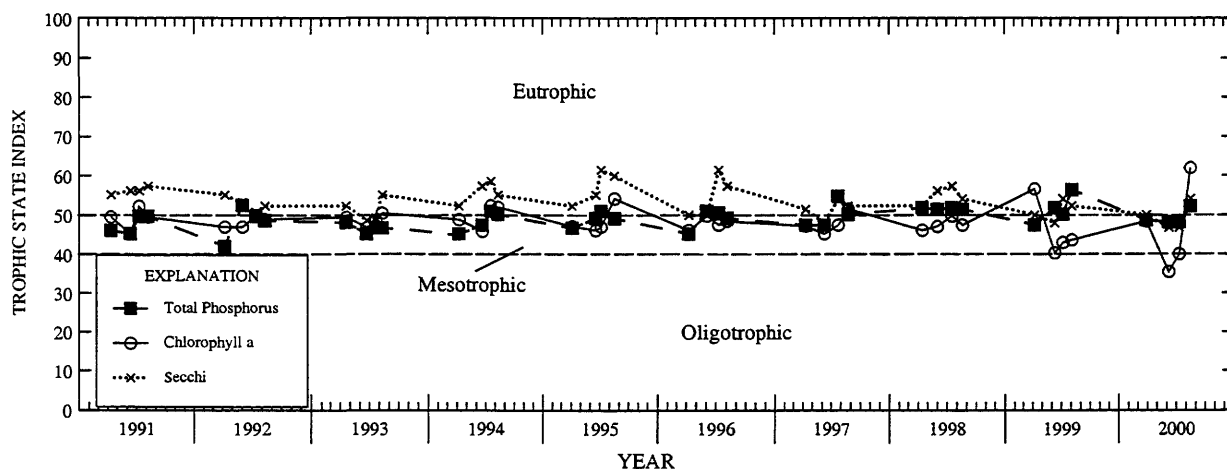
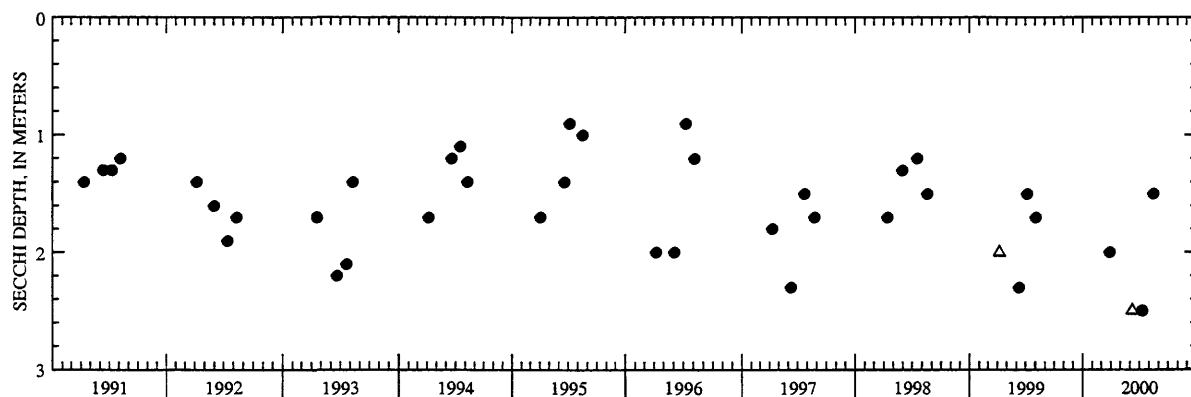
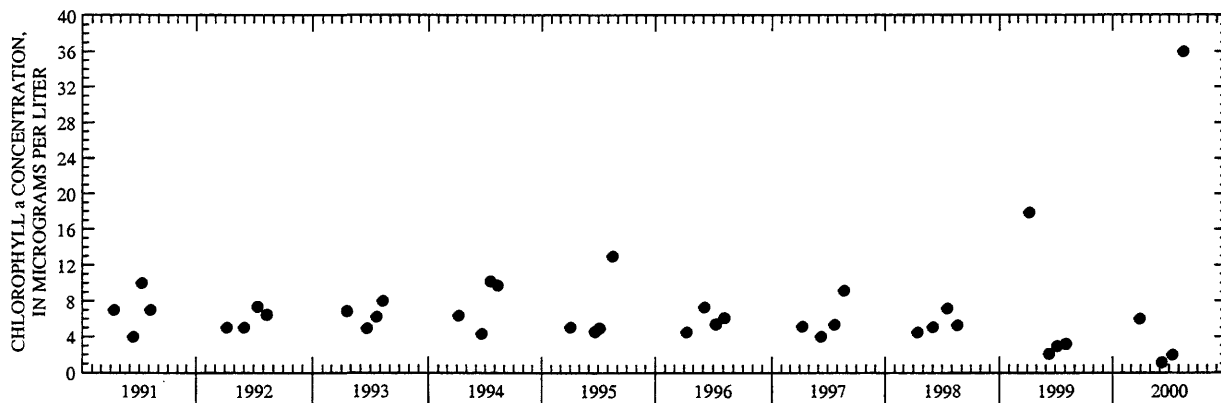
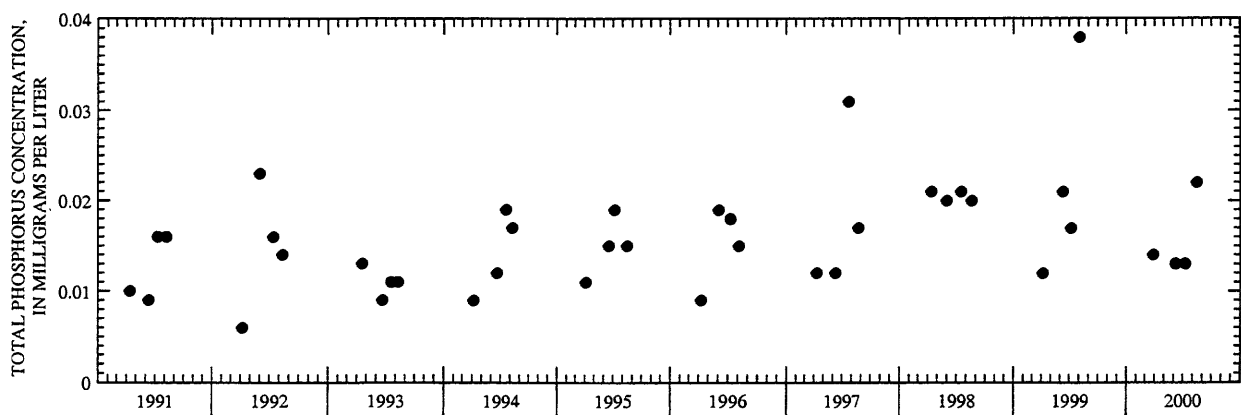
## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS



## PH, IN STANDARD UNITS



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



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

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



05406050 FISH LAKE NEAR SAUK CITY, WI

LOCATION.--Lat 43°17'27", long 89°39'09" in NE 1/4 SW 1/4 sec.3, T.9 N., R.7 E., Dane County, Hydrologic Unit 07070005, on north side of lake, 0.4 mi southwest of Crystal Lake, and 3.1 mi east of Sauk City.

DRAINAGE AREA.--2.23 mi<sup>2</sup>. 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 Nov. 22, 1996; nonrecording gage Nov. 23, 1996 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.--Nonrecording gage. Datum of gage is 848.07 ft above sea level. Prior to Oct. 23, 1990, nonrecording gage. Local observer, Richard Lillie, reads staff gage when lake is ice-free.

REMARKS.--Lake has no surface outlet.

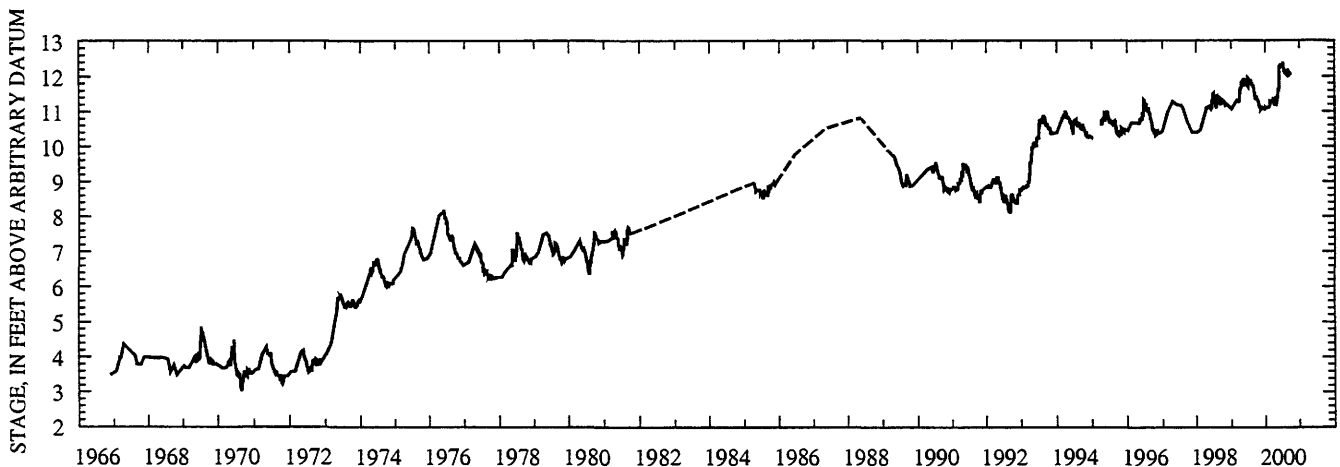
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 12.40 ft, July 10, 2000; minimum observed, 3.02 ft, Aug. 29, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 12.40 ft, July 10; minimum observed, 11.06 ft, Dec. 31.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	11.28	---	11.95	12.25	12.10	12.16
2	---	---	---	---	---	---	11.26	---	12.24	12.25	12.10	---
3	11.36	---	---	---	---	---	---	11.36	12.24	12.30	12.08	12.16
4	---	---	---	---	---	---	---	---	12.27	12.31	12.06	12.15
5	11.34	11.12	11.12	11.12	---	11.28	---	---	12.30	12.30	12.17	12.12
6	11.34	---	---	---	---	---	11.23	11.30	12.29	12.28	12.18	12.08
7	---	---	---	---	---	---	---	---	12.27	12.27	12.15	12.08
8	11.34	---	---	---	---	---	---	---	12.26	12.25	12.14	12.06
9	11.33	---	---	---	11.11	---	---	---	12.25	12.29	12.12	12.05
10	11.33	---	---	---	---	---	---	11.27	12.23	12.40	12.10	12.05
11	---	---	---	---	---	---	---	11.29	12.26	12.38	12.08	12.15
12	---	---	---	11.10	---	---	---	---	---	12.36	---	12.15
13	---	---	---	---	---	---	---	11.32	12.25	12.35	12.09	12.12
14	11.32	---	---	---	---	11.30	11.18	---	12.31	12.33	12.10	---
15	---	11.09	---	---	---	---	---	---	12.33	12.32	12.07	12.10
16	11.32	11.07	---	---	---	---	---	---	12.35	12.30	12.05	12.08
17	---	---	---	---	---	---	---	---	12.33	12.28	12.10	12.07
18	---	---	11.08	---	---	---	---	---	12.32	12.26	12.09	---
19	---	---	---	---	---	---	11.18	---	12.29	12.23	12.07	12.05
20	---	---	---	---	11.16	---	11.34	11.60	---	12.21	12.05	12.09
21	---	---	---	---	---	---	11.35	11.58	12.31	12.19	12.02	---
22	---	---	---	---	---	---	11.35	11.58	12.30	12.18	12.05	---
23	11.24	---	---	---	---	11.29	11.39	---	---	---	12.04	12.12
24	---	---	---	---	---	---	---	---	12.34	12.15	---	12.10
25	---	---	---	---	---	---	11.41	---	12.33	12.13	12.02	12.08
26	11.20	---	---	---	11.29	---	---	---	---	12.11	12.20	12.07
27	---	11.12	---	---	---	11.32	11.40	---	---	12.12	12.19	---
28	---	---	---	---	---	---	---	11.60	12.30	12.16	12.18	---
29	---	---	---	---	---	---	11.38	11.59	---	---	---	---
30	---	---	---	---	---	---	11.37	---	12.27	12.13	12.17	12.03
31	11.17	---	11.06	---	---	---	---	11.75	---	12.12	12.16	---



**423525088260400 GENEVA LAKE AT LAKE GENEVA, WI**

LOCATION.--Lat 42°35'25", long 88°26'04" in SE 1/4 NW 1/4 sec.36, T.2 N., R.17 E., Walworth County, Hydrologic Unit 07120006, at Lake Geneva dam at Center Street at Lake Geneva.

DRAINAGE AREA.--28.7 mi<sup>2</sup>. Area of Lake Geneva, 5,262 acres.

PERIOD OF RECORD.--October 1997 to current year.

GAGE.--Water-stage recorder. Datum of gage is 862.08 ft above sea level.

REMARKS.--Recording rain gage and gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 3.29 ft, June 13, 2000; minimum gage height, 1.84 ft, Sept. 27 and Nov. 19, 1999.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.29 ft, June 13; minimum gage height, 1.84 ft, Nov. 19.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.31	2.18	2.10	2.18	2.23	2.30	2.43	2.68	2.90	2.66	2.47	2.36
2	2.29	2.16	2.09	2.19	2.22	2.29	2.43	2.66	2.95	2.66	2.46	2.35
3	2.29	2.14	2.10	2.19	2.21	2.28	2.44	2.65	2.91	2.80	2.43	2.36
4	2.32	2.14	2.11	2.23	2.19	2.29	2.43	2.65	2.88	2.78	2.43	2.34
5	2.32	2.12	2.18	2.23	2.19	2.29	2.42	2.63	2.88	2.76	2.45	2.31
6	2.30	2.11	2.19	2.24	2.17	2.29	2.44	2.63	2.87	2.74	2.54	2.29
7	2.29	2.11	2.19	2.23	2.16	2.30	2.43	2.62	2.84	2.71	2.54	2.30
8	2.30	2.11	2.19	2.24	2.16	2.31	2.48	2.63	2.82	2.69	2.53	2.28
9	2.29	2.13	2.19	2.23	2.15	2.32	2.48	2.68	2.80	2.69	2.51	2.29
10	2.30	2.11	2.20	2.26	2.14	2.31	2.46	2.76	2.78	2.80	2.50	2.29
11	2.30	2.11	2.19	2.26	2.13	2.31	2.47	2.75	2.76	2.83	2.48	2.33
12	2.30	2.12	2.20	2.23	2.12	2.31	2.47	2.75	2.88	2.82	2.47	2.45
13	2.29	2.12	2.20	2.24	2.14	2.32	2.47	2.74	3.07	2.81	2.47	2.44
14	2.28	2.11	2.20	2.24	2.15	2.33	2.47	2.69	3.10	2.79	2.45	2.46
15	2.28	2.10	2.21	2.23	2.14	2.33	2.46	2.66	3.08	2.75	2.45	2.45
16	2.30	2.09	2.22	2.23	2.13	2.34	2.46	2.65	3.04	2.73	2.43	2.43
17	2.29	2.09	2.20	2.22	2.12	2.34	2.47	2.64	2.98	2.71	2.44	2.42
18	2.28	2.10	2.20	2.23	2.15	2.34	2.47	2.77	2.93	2.66	2.44	2.40
19	2.28	2.11	2.20	2.23	2.17	2.35	2.52	2.89	2.90	2.62	2.42	2.39
20	2.26	2.09	2.24	2.24	2.16	2.38	2.71	2.88	2.89	2.60	2.40	2.41
21	2.26	2.09	2.20	2.24	2.15	2.40	2.79	2.86	2.87	2.57	2.39	2.39
22	2.24	2.10	2.20	2.23	2.15	2.40	2.78	2.85	2.82	2.54	2.39	2.41
23	2.21	2.13	2.21	2.24	2.16	2.40	2.78	2.83	2.78	2.52	2.40	2.55
24	2.20	2.13	2.21	2.23	2.21	2.42	2.77	2.81	2.77	2.50	2.40	2.53
25	2.20	2.12	2.22	2.23	2.24	2.45	2.75	2.77	2.77	2.49	2.40	2.52
26	2.17	2.12	2.22	2.22	2.27	2.44	2.74	2.73	2.76	2.47	2.38	2.52
27	2.16	2.12	2.21	2.22	2.30	2.45	2.72	2.74	2.73	2.45	2.37	2.49
28	2.16	2.11	2.22	2.22	2.29	2.43	2.71	2.75	2.71	2.44	2.36	2.47
29	2.16	2.10	2.22	2.21	2.29	2.42	2.69	2.75	2.70	2.42	2.36	2.47
30	2.18	2.10	2.20	2.23	---	2.42	2.68	2.74	2.68	2.41	2.35	2.45
31	2.17	---	2.19	2.24	---	2.43	---	2.76	---	2.45	2.36	---
MEAN	2.26	2.12	2.19	2.23	2.18	2.35	2.56	2.73	2.86	2.64	2.43	2.40
MAX	2.32	2.18	2.24	2.26	2.30	2.45	2.79	2.89	3.10	2.83	2.54	2.55
MIN	2.16	2.09	2.09	2.18	2.12	2.28	2.42	2.62	2.68	2.41	2.35	2.28

# 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<sup>2</sup>.

PERIOD OF RECORD.--April 1997 to May 2000 (discontinued).

REMARKS.--Lake sampled at a depth of about 23 m. Lake ice-covered during February sampling. 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.

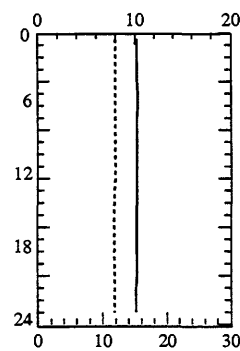
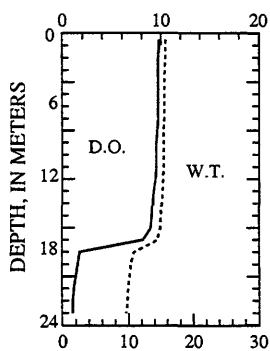
## WATER-QUALITY DATA, OCTOBER 11 TO OCTOBER 26, 1999 (Milligrams per liter unless otherwise indicated)

	Oct-11					Oct-26				
Lake stage (ft)					2.30					2.17
Secchi-depth (m)					6.4					5.9
Chlorophyll <i>a</i> , phytoplankton (µg/L)					0.8					1.3
Depth of sample (m)	0.5	8.0	17.0	20.0	23.0	0.5	10.0	15.0	20.0	23.0
Water temperature (°C)	15.7	15.4	14.4	10.1	9.6	11.9	11.9	11.8	11.8	11.8
Specific conductance (µS/cm)	493	492	494	503	503	490	490	490	490	491
pH (units)	8.2	8.2	8.1	7.4	7.4	8.2	8.2	8.2	8.2	8.2
Dissolved oxygen (mg/L)	9.8	9.6	8.1	1.3	1.0	10.2	10.2	10.2	10.2	10.1
Phosphorus, total (as P)	0.007	0.009	0.007	0.007	0.008	0.007	0.007	0.007	0.007	0.007
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, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	<0.010	<0.010	<0.010	0.17	0.185	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrogen, ammonia, dissolved (as N)	<0.013	<0.013	<0.013	0.017	0.020	0.006	0.006	0.002	0.003	0.005
Nitrogen, amm. + org., total (as N)	0.36	0.35	0.36	0.39	0.36	0.41	0.42	0.37	0.52	0.53
Nitrogen, total (as N)	---	---	---	0.56	0.55	---	---	---	---	---

10-11-99

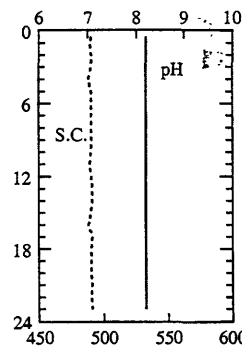
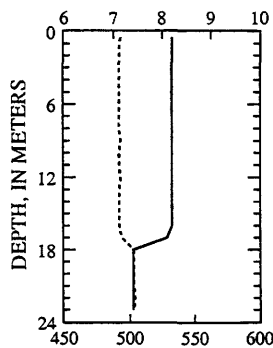
10-26-99

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



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

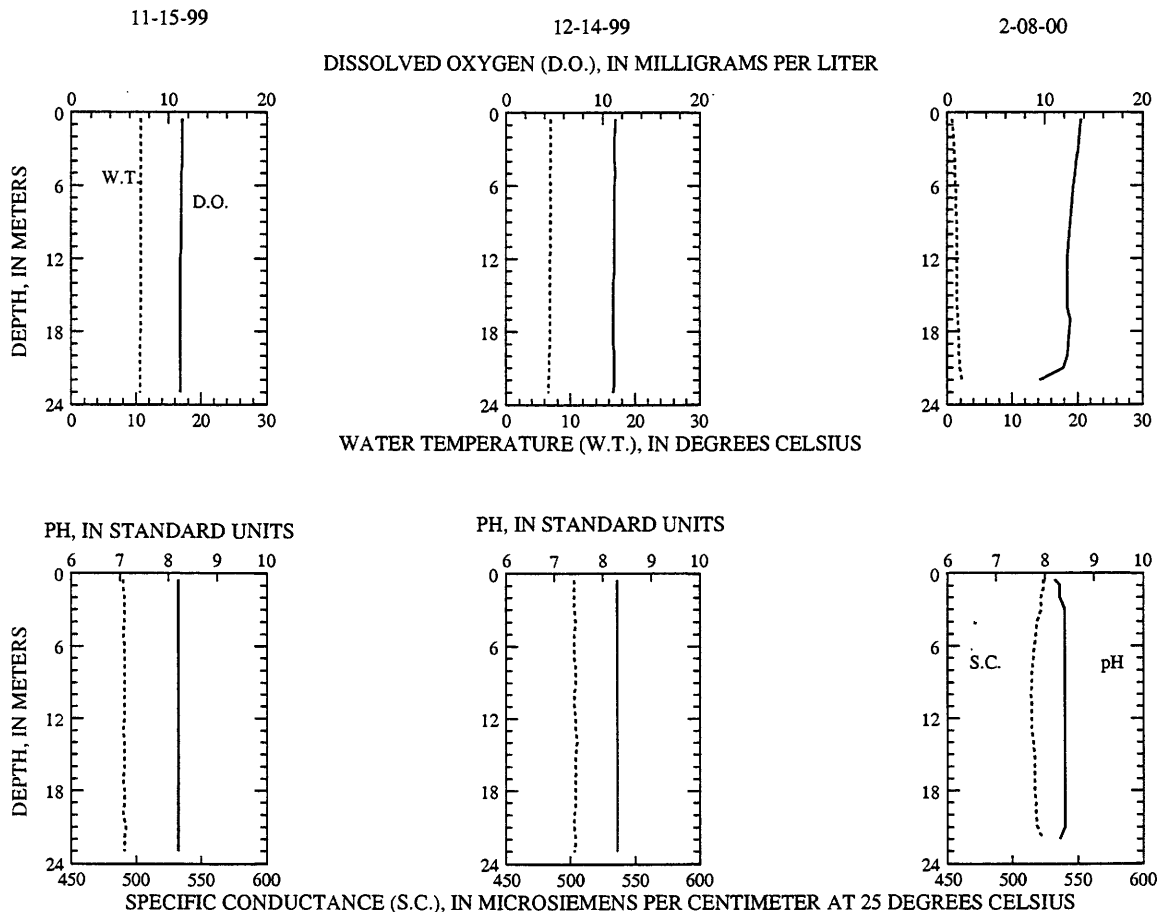
## PH, IN STANDARD UNITS



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

WATER-QUALITY DATA, NOVEMBER 15, 1999 TO FEBRUARY 08, 2000  
(Milligrams per liter unless otherwise indicated)

	Nov-15		Dec-14		Feb-8	
Lake stage (ft)	2.10		2.20		2.16	
Secchi-depth (m)	6.1		5.2		4.4	
Chlorophyll a, phytoplankton ( $\mu\text{g/L}$ )	0.8		3.2		0.9	
Depth of sample (m)	0.5	23.0	0.5	23.0	0.5	22.0
Water temperature ( $^{\circ}\text{C}$ )	10.7	10.6	6.9	6.6	0.7	2.2
Specific conductance ( $\mu\text{S/cm}$ )	490	491	503	503	524	523
pH (units)	8.2	8.2	8.3	8.3	8.2	8.3
Dissolved oxygen (mg/L)	11.4	11.2	11.3	11.1	13.7	9.5
Phosphorus, total (as P)	0.005	<0.005	0.011	0.011	0.008	0.009
Phosphorus, ortho, dissolved (as P)	<0.002	<0.002	<0.002	0.002	<0.002	<0.002
Nitrogen, $\text{NO}_2 + \text{NO}_3$ , diss. (as N)	<0.010	<0.010	0.039	0.033	0.035	0.030
Nitrogen, ammonia, dissolved (as N)	<0.013	<0.013	0.020	0.026	0.026	0.050
Nitrogen, amm. + org., total (as N)	0.58	0.45	0.47	0.54	0.61	0.60
Nitrogen, total (as N)	---	---	0.51	0.57	0.64	0.63



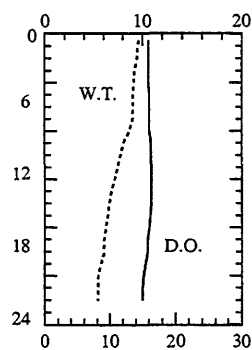
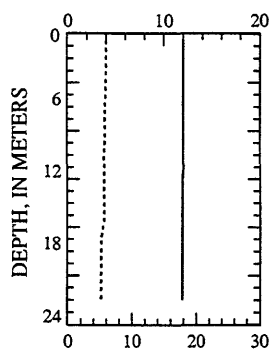
WATER-QUALITY DATA, APRIL 12 TO MAY 23, 2000  
(Milligrams per liter unless otherwise indicated)

	Apr-12		May-23				
Lake stage (ft)	2.47		2.83				
Secchi-depth (m)	5.5		6.1				
Chlorophyll a, phytoplankton (µg/L)	1.6		<1.0				
Depth of sample (m)	0.5	22.0	0.5	7.0	13.0	18.0	22.0
Water temperature (°C)	6.0	5.2	14.4	13.5	10.2	9.1	8.1
Specific conductance (µS/cm)	507	512	506	506	510	513	517
pH (units)	8.2	8.3	8.4	8.4	8.4	8.3	8.2
Dissolved oxygen (mg/L)	12.0	11.9	10.6	10.7	10.9	10.5	10.0
Phosphorus, total (as P)	0.011	0.012	0.009	0.011	0.011	0.010	0.010
Phosphorus, ortho, dissolved (as P)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.055	0.065	0.046	0.051	0.047	0.047	0.048
Nitrogen, ammonia, dissolved (as N)	0.028	0.036	0.016	0.028	0.020	0.021	0.019
Nitrogen, amm. + org., total (as N)	0.47	0.47	0.27	0.39	0.38	0.27	0.28
Nitrogen, total (as N)	0.52	0.54	0.32	0.44	0.43	0.32	0.33
Color (Pt-Co. scale)	10	---	---	---	---	---	---
Turbidity (NTU)	1.2	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	220	---	---	---	---	---	---
Calcium, dissolved (Ca)	34	---	---	---	---	---	---
Magnesium, dissolved (Mg)	33	---	---	---	---	---	---
Sodium, dissolved (Na)	17	---	---	---	---	---	---
Potassium, dissolved (K)	1.7	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	185	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	31.1	---	---	---	---	---	---
Chloride, dissolved (Cl)	36.8	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	0.6	---	---	---	---	---	---
Solids, dissolved, at 180°C	284	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	<10	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	<1	---	---	---	---	---	---

4-12-00

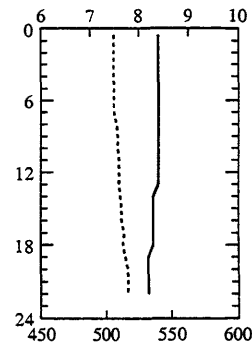
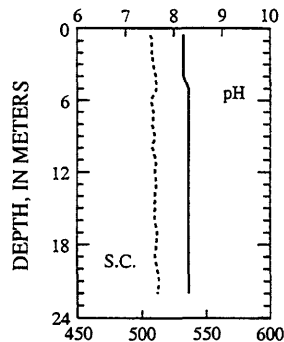
5-23-00

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

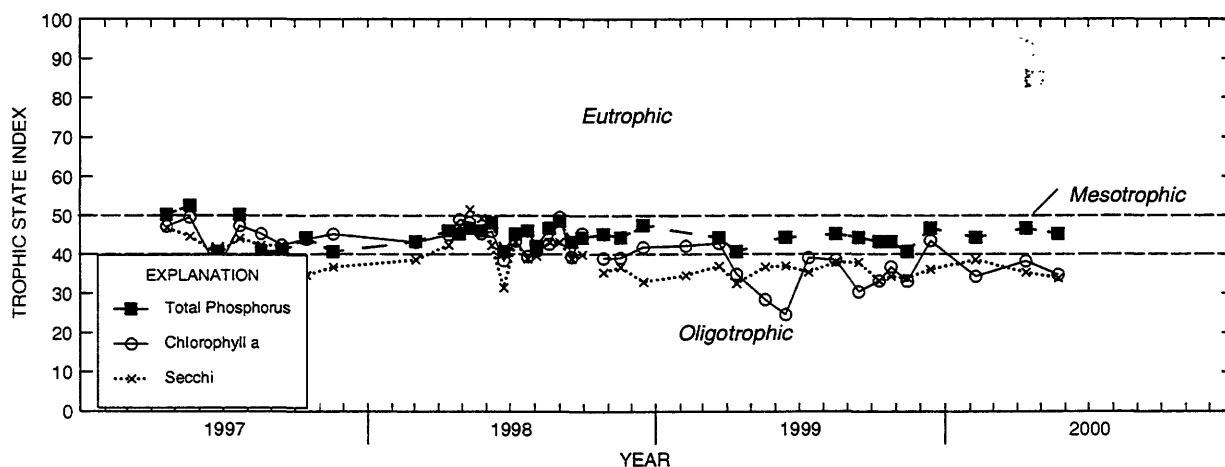
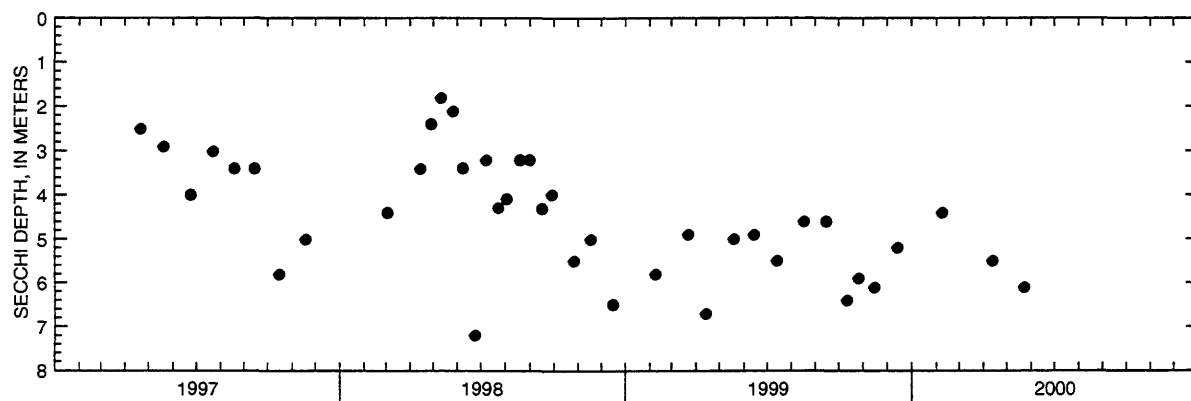
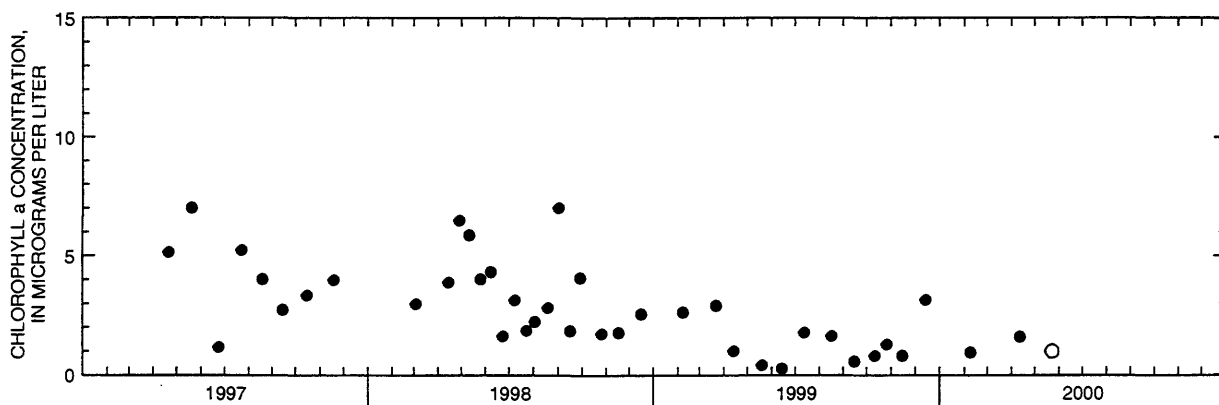
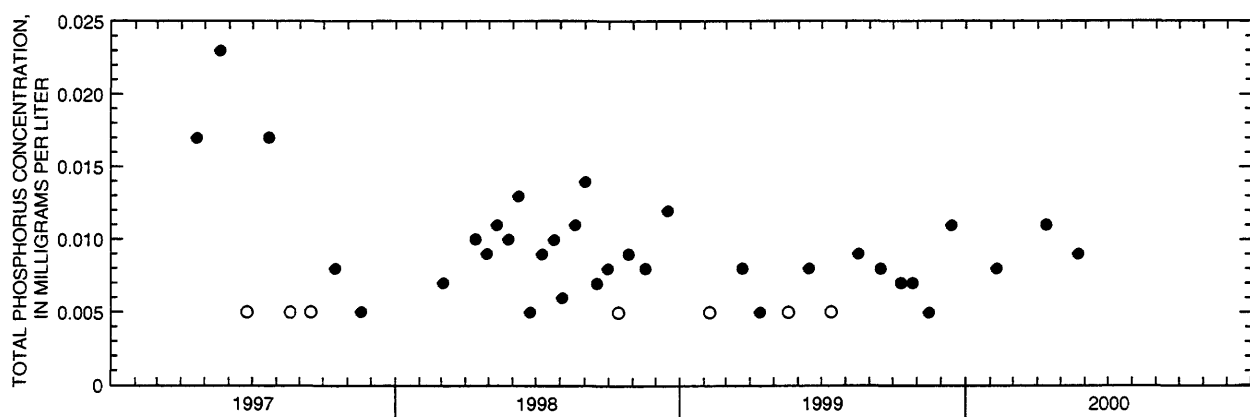


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths,  
and TSI data for Geneva Lake, East End, near Lake Geneva, Wisconsin.

(Circles on the first three plots 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<sup>2</sup>.

PERIOD OF RECORD.--April 1997 to current year.

REMARKS.--Lake sampled at deep hole at a depth of about 43 m. Lake ice-covered during February sampling. 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.

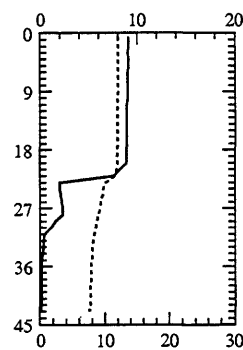
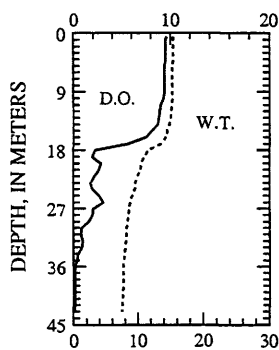
## WATER-QUALITY DATA, OCTOBER 11 TO OCTOBER 26, 1999 (Milligrams per liter unless otherwise indicated)

	Oct-11								Oct-26							
Lake stage (ft)	2.30								2.17							
Secchi-depth (m)	5.5								5.8							
Chlorophyll <i>a</i> , phytoplankton (µg/L)	1.26								2.7							
Depth of sample (m)	0.5	16.0	25.0	34.0	39.0	43.0	0.5	21.0	29.0	34.0	39.0	42.5				
Water temperature (°C)	15.4	14.3	9.1	7.9	7.7	7.5	12.0	11.8	8.7	8.0	7.7	7.6				
Specific conductance (µS/cm)	494	497	502	503	503	505	494	494	498	499	501	502				
pH (units)	8.2	8.0	7.5	7.4	7.4	7.4	8.1	8.0	7.4	7.3	7.3	7.3				
Dissolved oxygen (mg/L)	9.6	7.5	2.6	0.4	0.1	0.1	9.1	8.2	1.5	0.2	0.1	0.1				
Phosphorus, total (as P)	0.008	0.009	0.007	0.011	0.029	0.050	0.009	0.011	0.006	0.009	0.036	0.051				
Phosphorus, ortho, dissolved (as P)	<0.002	<0.002	<0.002	0.006	0.021	0.040	0.003	0.003	0.002	0.003	0.027	0.038				
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	<0.010	0.038	0.223	0.336	0.214	0.024	0.050	0.044	0.243	0.310	0.109	<0.010				
Nitrogen, ammonia, dissolved (as N)	<0.013	0.013	0.015	0.021	0.121	0.233	<0.002	0.008	0.001	0.006	0.14	0.222				
Nitrogen, amm. + org., total (as N)	0.42	0.46	0.35	0.38	0.59	0.69	0.42	0.35	0.39	0.40	0.62	0.71				
Nitrogen, total (as N)	---	0.50	0.57	0.72	0.80	0.71	0.47	0.39	0.63	0.71	0.73	---				

10-11-99

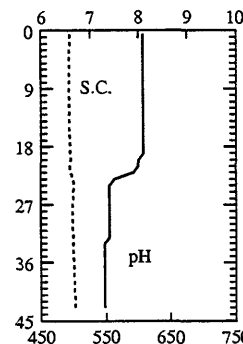
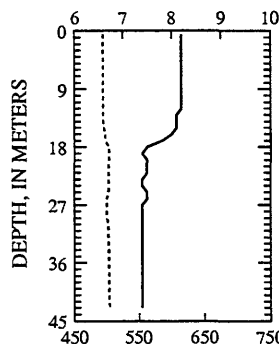
10-26-99

## 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

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

WATER-QUALITY DATA, NOVEMBER 15, 1999 TO APRIL 12, 2000  
(Milligrams per liter unless otherwise indicated)

	Nov-15				Dec-14		Feb-8		Apr-12	
Lake stage (ft)	2.10				2.20		2.16		2.47	
Secchi-depth (m)	6.7				5.9		6.7		5.6	
Chlorophyll a, phytoplankton (µg/L)	1.25				2.78		0.44		2.15	
Depth of sample (m)	0.5	26.0	35.0	43.0	0.5	43.5	0.5	41.0	0.5	43.5
Water temperature (°C)	10.6	10.5	8.0	7.8	7.5	7.3	1.4	2.6	5.2	4.9
Specific conductance (µS/cm)	492	493	499	501	503	504	516	521	510	512
pH (units)	8.0	8.0	7.4	7.4	8.1	8.2	8.3	8.2	8.2	8.3
Dissolved oxygen (mg/L)	10.6	9.6	0.1	0.1	10.7	10.4	11.7	9.1	12.2	12.0
Phosphorus, total (as P)	0.006	0.009	0.009	0.006	0.013	0.012	0.008	0.019	0.013	0.012
Phosphorus, ortho, dissolved (as P)	<0.002	<0.002	<0.002	<0.002	0.002	0.002	0.003	0.006	<0.002	<0.002
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.045	0.047	0.047	0.046	0.074	0.033	0.026	0.053	0.070	0.068
Nitrogen, ammonia, dissolved (as N)	0.016	0.014	0.016	<0.013	0.068	0.022	0.026	0.123	0.044	0.043
Nitrogen, amm. + org., total (as N)	0.50	0.51	0.40	0.51	0.47	0.59	0.60	0.81	0.92	0.51
Nitrogen, total (as N)	0.55	0.56	0.45	0.56	0.54	0.62	0.63	0.86	0.99	0.58
Color (Pt-Co. scale)	---	---	---	---	---	---	---	---	17	15
Turbidity (NTU)	---	---	---	---	---	---	---	---	1.4	0.7
Hardness, (as CaCO <sub>3</sub> )	---	---	---	---	---	---	---	---	220	220
Calcium, dissolved (Ca)	---	---	---	---	---	---	---	---	34	34
Magnesium, dissolved (Mg)	---	---	---	---	---	---	---	---	33	33
Sodium, dissolved (Na)	---	---	---	---	---	---	---	---	17	17
Potassium, dissolved (K)	---	---	---	---	---	---	---	---	1.6	1.7
Alkalinity, (as CaCO <sub>3</sub> )	---	---	---	---	---	---	---	---	185	186
Sulfate, dissolved (SO <sub>4</sub> )	---	---	---	---	---	---	---	---	31.2	31.4
Chloride, dissolved (Cl)	---	---	---	---	---	---	---	---	34.5	36.7
Silica, dissolved (SiO <sub>2</sub> )	---	---	---	---	---	---	---	---	0.6	0.7
Solids, dissolved, at 180°C	---	---	---	---	---	---	---	---	290	304
Iron, dissolved (Fe) µg/L	---	---	---	---	---	---	---	---	<10	<10
Manganese, dissolved (Mn) µg/L	---	---	---	---	---	---	---	---	<1	<1

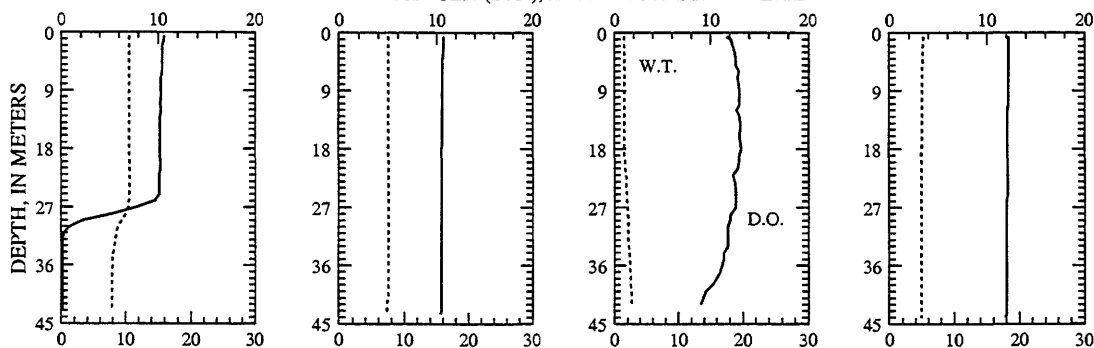
11-15-99

12-14-99

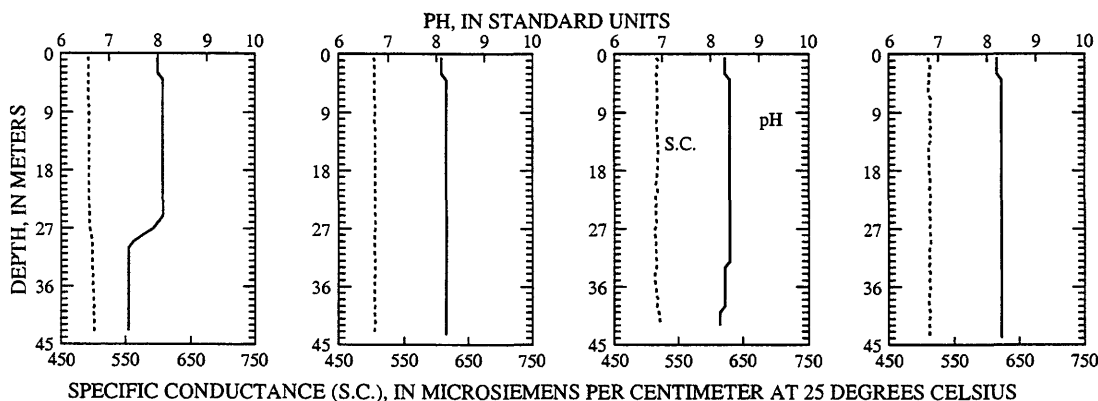
2-08-00

4-12-00

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



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



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



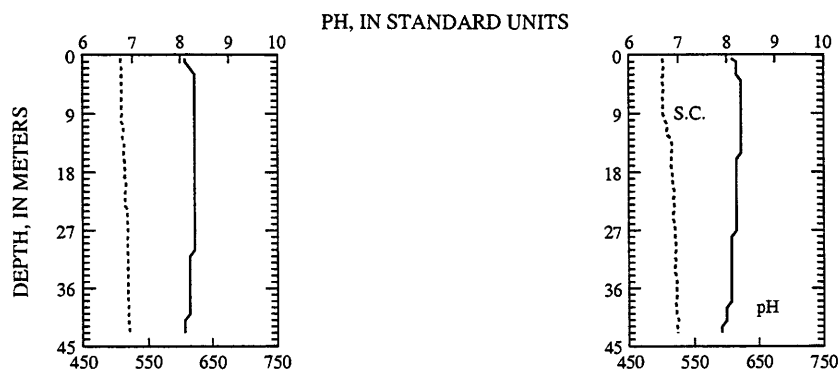
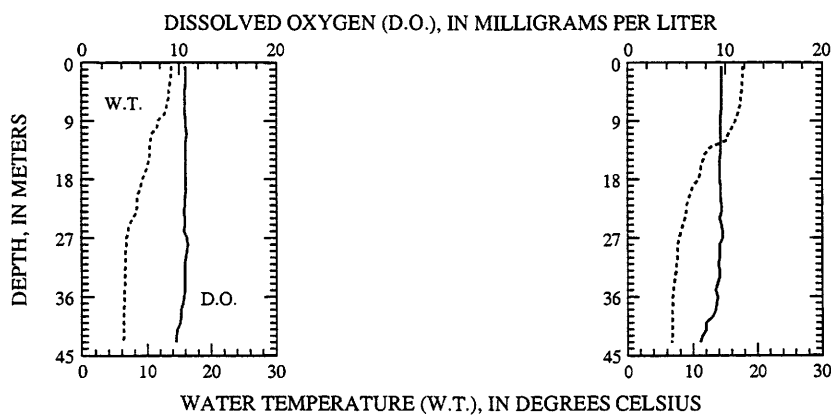
## 423329088323300 GENEVA LAKE AT WEST END NEAR WILLIAMS BAY, WI--CONTINUED

WATER-QUALITY DATA, MAY 23 TO JUNE 15, 2000  
(Milligrams per liter unless otherwise indicated)

	May-23						Jun-15					
Lake stage (ft)	2.83						3.08					
Secchi-depth (m)	8.2						4.6					
Chlorophyll a, phytoplankton ( $\mu\text{g/L}$ )	<1.0						2.2					
Depth of sample (m)	0.5	8.0	25.0	34.0	39.0	43.0	0.5	7.0	28.0	34.0	39.0	43.0
Water temperature ( $^{\circ}\text{C}$ )	13.8	12.6	7.1	6.5	6.3	6.2	17.7	17.2	7.6	7.1	6.8	6.7
Specific conductance ( $\mu\text{S/cm}$ )	507	508	517	518	519	520	502	502	520	521	522	524
pH (units)	8.1	8.3	8.3	8.2	8.2	8.1	8.1	8.3	8.1	8.1	8.0	7.9
Dissolved oxygen ( $\text{mg/L}$ )	10.6	10.6	10.6	10.6	10.2	9.7	9.6	9.6	9.4	9.2	8.7	7.4
Phosphorus, total (as P)	0.011	0.010	0.009	0.010	0.011	0.012	---	0.010	0.007	0.009	0.009	0.017
Phosphorus, ortho, dissolved (as P)	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	---	---	---	---	---
Nitrogen, $\text{NO}_2 + \text{NO}_3$ , diss. (as N)	0.060	0.047	0.054	0.055	0.054	0.050	0.05	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	0.048	0.024	0.055	0.058	0.082	0.114	0.015	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	0.31	0.31	0.42	0.33	0.47	0.38	0.39	---	---	---	---	---
Nitrogen, total (as N)	0.37	0.36	0.47	0.38	0.52	0.43	0.44	---	---	---	---	---

5-23-00

6-15-00



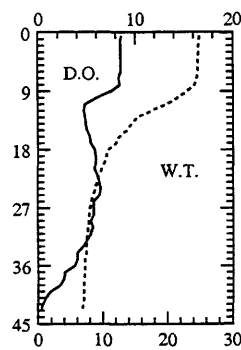
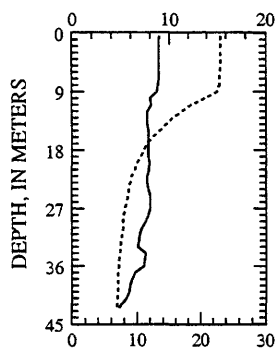
WATER-QUALITY DATA, JULY 12 TO AUGUST 15, 2000  
(Milligrams per liter unless otherwise indicated)

	Jul-12						Aug-15					
Lake stage (ft)	2.82						2.45					
Secchi-depth (m)	3.8						4.6					
Chlorophyll a, phytoplankton (µg/L)	2						<1.0					
Depth of sample (m)	0.5	8.0	21.0	34.0	38.0	42.0	0.5	8.0	27.0	34.0	38.0	43.0
Water temperature (°C)	23.2	23.0	9.7	7.3	7.0	6.9	24.9	24.2	8.0	7.4	7.1	6.9
Specific conductance (µS/cm)	485	486	513	516	517	518	486	484	520	523	523	526
pH (units)	8.3	8.3	8.2	8.0	7.9	7.8	8.4	8.3	8.0	7.8	7.6	7.5
Dissolved oxygen (mg/L)	9.0	8.8	7.9	7.5	6.1	5.0	8.6	8.4	5.7	4.0	2.6	0.3
Phosphorus, total (as P)	0.015	0.011	0.010	0.013	0.015	0.027	0.010	0.011	0.011	0.011	0.016	0.050
Phosphorus, ortho, dissolved (as P)	<0.002	---	---	---	---	---	0.002	---	---	---	---	0.038
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.01	---	---	---	---	---	<0.010	---	---	---	---	0.289
Nitrogen, ammonia, dissolved (as N)	<0.013	---	---	---	---	---	0.036	---	---	---	---	0.126
Nitrogen, amm. + org., total (as N)	0.46	---	---	---	---	---	0.44	---	---	---	---	---
Nitrogen, total (as N)	0.47	---	---	---	---	---	---	---	---	---	---	---

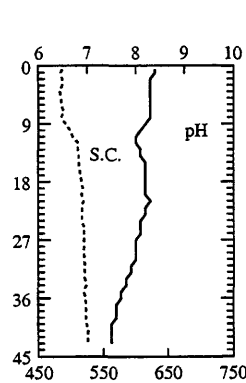
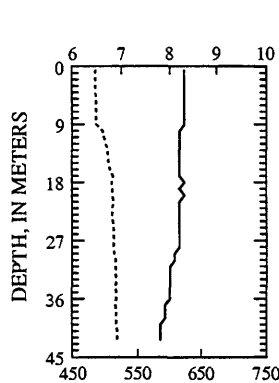
7-12-00

8-15-00

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



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



## PH, IN STANDARD UNITS

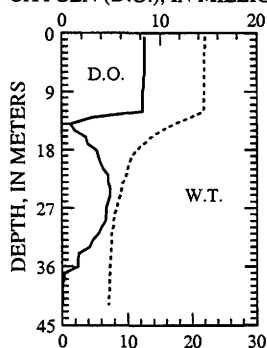
## SPECIFIC CONDUCTANCE (S.C.), IN MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS

WATER-QUALITY DATA, SEPTEMBER 14, 2000  
(Milligrams per liter unless otherwise indicated)

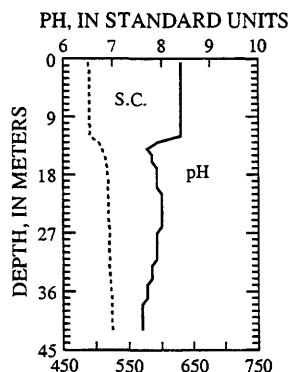
Sep-14						
Lake stage (ft)				2.46		
Secchi-depth (m)				3.6		
Chlorophyll a, phytoplankton (µg/L)				4.6		
Depth of sample (m)	0.5	12.0	24.0	33.0	38.0	42.0
Water temperature (°C)	22	21.8	9.1	7.5	7.2	7.1
Specific conductance (µS/cm)	488	490	519	521	524	525
pH (units)	8.4	8.4	8.0	7.8	7.6	7.6
Dissolved oxygen (mg/L)	8.4	8.2	4.9	2.8	0.1	0.0
Phosphorus, total (as P)	0.008	0.012	<0.005	<0.005	0.023	0.051
Phosphorus, ortho, dissolved (as P)	0.003	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.012	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	0.018	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	0.62	---	---	---	---	---
Nitrogen, total (as N)	0.63	---	---	---	---	---

9-14-00

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



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



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



**43492808855360 GREEN LAKE AT COUNTY TRUNK HIGHWAY A NEAR GREEN LAKE, WI**

LOCATION.--Lat 43°49'28", 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<sup>2</sup>.

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

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

REMARKS.--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, 6.89 ft, June 5; minimum recorded, 5.89 ft, Nov. 6-23.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.10	5.94	5.95	5.96	6.03	6.35	6.53	6.66	6.72	6.49	6.30	---
2	6.08	5.94	5.94	5.96	6.02	6.36	6.53	6.64	6.83	6.47	6.31	---
3	6.07	5.91	5.94	5.97	6.03	6.36	6.53	6.63	6.81	6.57	6.29	---
4	6.06	5.91	5.96	6.00	6.03	6.37	6.52	6.62	6.82	6.58	6.29	---
5	6.06	5.90	5.97	5.99	6.03	6.38	6.50	6.60	6.88	6.58	6.28	---
6	6.05	5.90	5.97	6.01	6.03	6.40	6.53	6.59	6.87	6.57	6.33	---
7	6.04	5.89	5.97	5.99	6.03	6.41	6.48	6.58	6.85	6.55	6.33	---
8	6.04	5.89	5.97	5.98	6.03	6.44	6.49	6.56	6.82	6.54	6.32	---
9	6.04	5.90	5.97	5.98	6.03	6.44	6.49	6.54	6.79	6.56	6.32	---
10	6.05	5.89	5.98	6.00	6.04	6.44	6.48	6.53	6.77	6.58	6.31	---
11	6.04	5.89	5.98	6.02	6.05	6.45	6.47	6.51	6.73	6.57	6.31	---
12	6.04	5.89	5.98	6.00	6.04	6.45	6.47	6.54	6.68	6.56	6.30	---
13	6.04	5.89	5.98	6.01	6.08	6.46	6.47	6.61	6.67	6.56	6.38	---
14	6.04	5.90	5.98	6.01	6.08	6.47	6.47	6.56	6.69	6.55	6.44	---
15	6.03	5.89	6.01	6.02	6.09	6.49	6.46	6.52	6.70	6.52	6.45	6.76
16	6.04	5.89	6.06	6.01	6.09	6.48	6.45	6.52	6.68	6.50	6.42	6.74
17	6.06	5.89	6.03	6.00	6.09	6.48	6.45	6.52	6.63	6.50	6.44	6.70
18	6.03	5.89	6.03	6.02	6.11	6.48	6.45	6.65	6.61	6.45	6.46	6.67
19	6.03	5.89	6.03	6.02	6.11	6.49	6.46	6.69	6.59	6.44	6.44	6.65
20	6.03	5.90	6.09	6.03	6.11	6.51	6.60	6.69	6.60	6.43	6.42	6.67
21	6.01	5.89	6.02	6.03	6.10	6.52	6.66	6.69	6.63	6.40	6.40	6.62
22	6.01	5.89	6.00	6.02	6.10	6.53	6.67	6.69	6.56	6.37	6.46	6.57
23	5.97	5.91	5.99	6.02	6.10	6.54	6.71	6.70	6.52	6.36	6.62	6.58
24	5.95	6.00	5.99	6.02	6.14	6.55	6.72	6.70	6.52	6.35	6.63	6.55
25	5.95	5.98	5.99	6.02	6.17	6.59	6.72	6.67	6.52	6.33	6.63	6.53
26	5.94	5.97	5.99	6.02	6.25	6.56	6.71	6.63	6.53	6.32	6.64	6.52
27	5.92	5.97	5.97	6.01	6.29	6.57	6.70	6.60	6.51	6.31	6.64	6.49
28	5.92	5.97	5.96	6.02	6.30	6.55	6.68	6.61	6.51	6.31	---	6.47
29	5.92	5.96	5.96	6.02	6.33	6.54	6.68	6.61	6.50	6.30	---	6.45
30	5.92	5.95	5.96	6.02	---	6.54	6.66	6.61	6.49	6.30	6.57	6.43
31	5.93	---	5.97	6.03	---	6.53	---	6.62	---	6.30	---	---
MEAN	6.01	5.92	5.99	6.01	6.10	6.48	6.56	6.61	6.67	6.46	---	---
MAX	6.10	6.00	6.09	6.03	6.33	6.59	6.72	6.70	6.88	6.58	---	---
MIN	5.92	5.89	5.94	5.96	6.02	6.35	6.45	6.51	6.49	6.30	---	---

# 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 Pottawatom Trail Bridge at Bingham Point Estates, and 4.5 mi northeast of Newville.

DRAINAGE AREA.--2,560 mi<sup>2</sup>, at lake outlet. Area of Lake Koshkonong, 16.3 mi<sup>2</sup>.

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

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

REMARKS.--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, 5.10 ft, Dec. 28, 29, 1999.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 10.99 ft, June 8; minimum recorded, 5.10 ft, Dec. 28, 29.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.37	5.61	6.27	5.19	5.23	7.20	5.98	6.96	9.77	7.53	6.22	6.23
2	6.37	5.60	6.29	5.23	5.24	7.35	5.93	6.88	10.14	7.35	6.25	6.21
3	6.35	5.53	6.31	5.26	5.26	7.44	5.91	6.80	10.42	7.32	6.27	6.22
4	6.34	5.49	6.29	5.31	5.28	7.50	5.88	6.73	10.66	7.32	6.28	6.21
5	6.33	5.49	6.30	5.34	5.31	7.53	5.77	6.63	10.84	7.38	6.30	6.16
6	6.32	5.53	6.24	5.37	5.33	7.53	5.78	6.53	10.92	7.43	6.41	6.14
7	6.28	5.57	6.21	5.38	5.36	7.53	5.69	6.43	10.95	7.43	6.48	6.14
8	6.26	5.62	6.20	5.39	5.36	7.50	5.73	6.35	10.97	7.40	6.48	6.15
9	6.28	5.67	6.21	5.39	5.35	7.49	5.73	6.33	10.92	7.38	6.45	6.13
10	6.29	5.72	6.23	5.41	5.35	7.43	5.70	6.28	10.83	7.39	6.39	6.13
11	6.26	5.76	6.20	5.43	5.34	7.38	5.75	6.24	10.74	7.35	6.31	6.15
12	6.23	5.79	6.21	5.44	5.33	7.32	5.81	6.28	10.62	7.25	6.28	6.36
13	6.25	5.82	6.20	5.44	5.36	7.27	5.87	6.39	10.53	7.17	6.27	6.35
14	6.18	5.88	6.14	5.44	5.37	7.22	5.95	6.46	10.44	7.10	6.24	6.38
15	6.16	5.88	6.08	5.44	5.38	7.16	6.01	6.54	10.35	6.99	6.21	6.37
16	6.16	5.91	6.02	5.43	5.38	7.06	6.01	6.61	10.24	6.88	6.15	6.33
17	6.11	5.93	5.92	5.43	5.38	6.91	6.03	6.63	10.12	6.81	6.16	6.30
18	6.04	5.94	5.82	5.42	5.41	6.78	6.04	6.86	9.97	6.71	6.15	6.27
19	5.99	5.98	5.75	5.40	5.42	6.68	6.05	7.42	9.80	6.63	6.16	6.25
20	5.95	6.01	5.67	5.39	5.41	6.61	6.17	7.99	9.62	6.55	6.18	6.29
21	5.92	6.01	5.62	5.36	5.39	6.53	6.33	8.56	9.48	6.47	6.19	6.35
22	5.96	6.03	5.58	5.34	5.39	6.48	6.45	8.92	9.29	6.39	6.22	6.37
23	5.89	6.09	5.51	5.31	5.43	6.42	6.66	9.24	9.10	6.32	6.25	6.52
24	5.80	6.16	5.43	5.29	5.58	6.37	6.87	9.41	8.92	6.23	6.25	6.59
25	5.77	6.17	5.36	5.27	5.77	6.38	6.99	9.46	8.76	6.15	6.24	6.65
26	5.74	6.21	5.27	5.25	6.05	6.30	7.05	9.47	8.57	6.12	6.24	6.64
27	5.70	6.26	5.18	5.23	6.37	6.28	7.07	9.51	8.34	6.12	6.24	6.62
28	5.68	6.27	5.11	5.22	6.67	6.23	7.07	9.53	8.12	6.11	6.23	6.60
29	5.65	6.29	5.11	5.21	6.98	6.15	7.05	9.50	7.93	6.11	6.24	6.56
30	5.62	6.28	5.13	5.22	---	6.09	7.00	9.47	7.71	6.13	6.23	6.54
31	5.60	---	5.16	5.22	---	6.04	---	9.51	---	6.20	6.23	---
MEAN	6.06	5.88	5.84	5.34	5.53	6.91	6.21	7.61	9.84	6.83	6.26	6.34
MAX	6.37	6.29	6.31	5.44	6.98	7.53	7.07	9.53	10.97	7.53	6.48	6.65
MIN	5.60	5.49	5.11	5.19	5.23	6.04	5.69	6.24	7.71	6.11	6.15	6.13

# 424621088335500 MIDDLE LAKE AT LAUDERDALE, WI

LOCATION.--Lat 42°46'21", long 88°33'55", in SE 1/4 SE 1/4 sec.26, T.4 N., R.16 E., Walworth County, Hydrologic Unit 07120006, at Lauderdale.

PERIOD OF RECORD.--November 1993 to November 1994, and February to August 1999.

REMARKS.--Lake sampled near east end of lake at lake depth of about 52 ft. Lake ice-covered during February sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 08, 2000 (Milligrams per liter unless otherwise indicated)

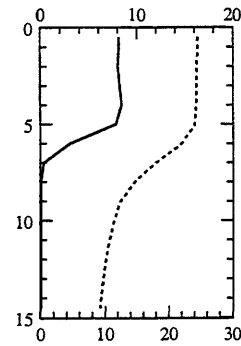
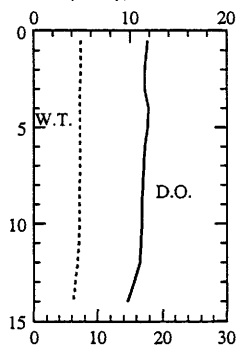
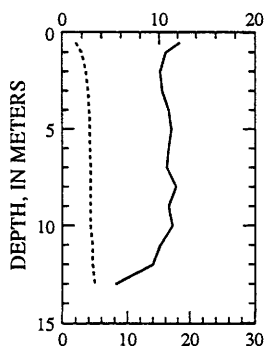
	Feb-10		Mar-29		Aug-8		
Lake stage (ft)	---		---		---		
Secchi-depth (m)	---		7.2		1.9		
Chlorophyll a, phytoplankton (µg/L)	---		0.9		7		
Depth of sample (m)	0.5	13.0	0.5	14.0	0.5	9.0	14.5
Water temperature (°C)	2.0	4.9	7.4	6.2	24.3	13.1	8.8
Specific conductance (µS/cm)	483	646	547	553	461.0	500	512
pH (units)	8.2	7.4	7.9	7.7	8.1	7.4	7.5
Dissolved oxygen (mg/L)	12.2	5.4	11.8	9.7	8.7	2.4	0.0
Phosphorus, total (as P)	0.011	0.020	0.009	0.011	0.015	0.016	0.042
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---
Nitrogen, NO2 + NO3, diss. (as N)	---	---	1.12	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.254	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.71	---	---	---	---
Nitrogen, amm + org., diss. (as N)	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	1.8	---	---	---	---
Color (Pt-Co. scale)	---	---	10.0	---	---	---	---
Turbidity (NTU)	---	---	1.3	---	---	---	---
Hardness, (as CaCO3)	---	---	270	---	---	---	---
Calcium, dissolved (Ca)	---	---	50	---	---	---	---
Magnesium, dissolved (Mg)	---	---	35	---	---	---	---
Sodium, dissolved (Na)	---	---	8.2	---	---	---	---
Potassium, dissolved (K)	---	---	1.8	---	---	---	---
Alkalinity, (as CaCO3)	---	---	222	---	---	---	---
Sulfate, dissolved (SO4)	---	---	37.8	---	---	---	---
Chloride, dissolved (Cl)	---	---	22.9	---	---	---	---
Silica, dissolved (SiO2)	---	---	5.1	---	---	---	---
Solids, dissolved, at 180°C	---	---	314	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	2	---	---	---	---

2-10-00

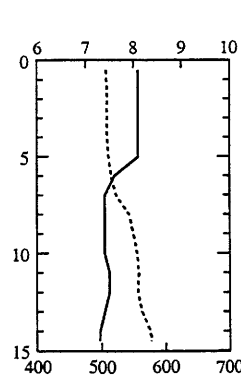
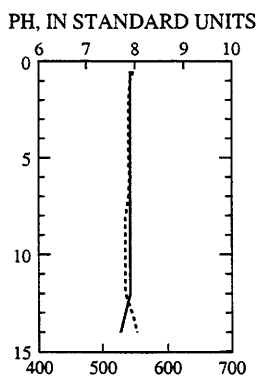
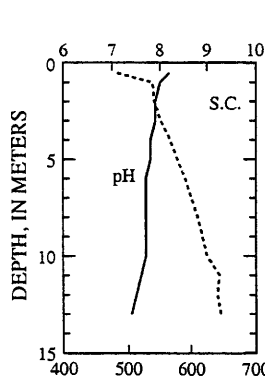
3-29-00

8-08-00

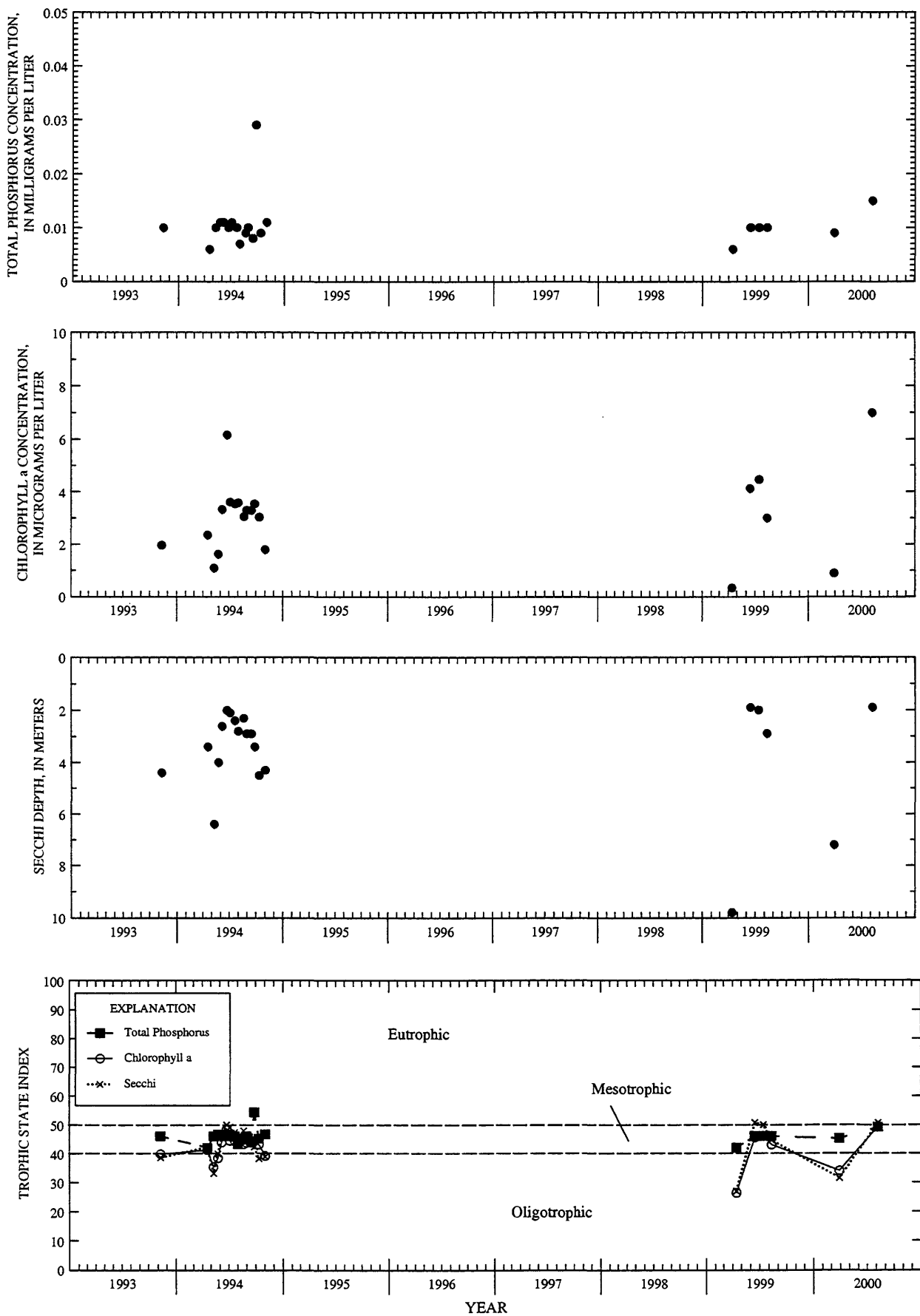
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Lauderdale Lake (Middle) near Lauderdale, Wisconsin.



**424640088341900 GREEN LAKE AUXILIARY, NUMBER 1, AT LAUDERDALE, WI**

LOCATION.--Lat 43°46'40" long 88°34'19", in NW 1/4 NW 1/4 sec.26, T.4 N., R.16 E., Walworth County, Hydrologic Unit 07120006, at Lauderdale.

PERIOD OF RECORD.--June 1999 to September 2000.

REMARKS.--Water-quality analysis done by Wisconsin State Laboratory of Hygiene.

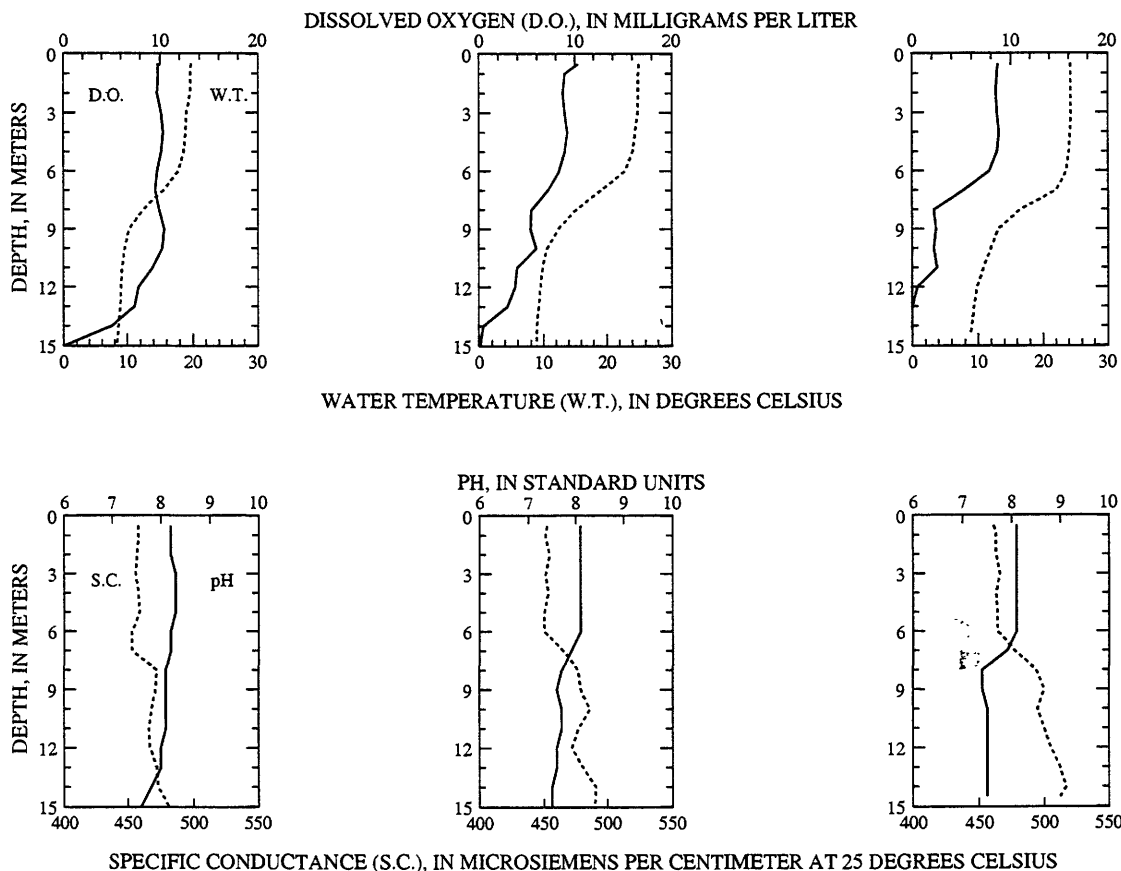
**WATER-QUALITY DATA, JUNE 08 TO AUGUST 08, 2000**  
(Milligrams per liter unless otherwise indicated)

	Jun-8		Jul-11		Aug-8		
Lake stage (ft)	---		---		---		
Secchi-depth (m)	3.9		2.1		2.2		
Chlorophyll a, phytoplankton (µg/L)	2.5		4		4.1		
Depth of sample (m)	0.5	15.0	0.5	15.0	0.5	9.0	14.5
Water temperature (°C)	19.7	8.4	25.0	8.9	24.3	13.1	8.8
Specific conductance (µS/cm)	458	481	452	490	461.0	500	512
pH (units)	8.2	7.6	8.1	7.5	8.1	7.4	7.5
Dissolved oxygen (mg/L)	9.8	0.1	10.3	0.1	8.7	2.4	0.0
Phosphorus, total (as P)	0.008	0.013	0.009	0.011	0.013	0.014	0.026

6-08-00

7-11-00

8-08-00



**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 north-east 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, 8.76 ft, July 13, 2000; minimum observed, 7.70 ft, Sept. 9, 16, and 19, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 8.76 ft, July 13; minimum observed, 7.70 ft, Sept. 9, 16, and 19.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000  
DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	7.80	---	7.76
3	7.74	---	---	---	---	---	---	7.80	7.76	---	---	---
4	---	7.78	---	---	---	7.82	---	---	---	---	---	---
5	---	---	7.76	7.80	---	7.82	7.78	---	---	---	7.78	---
6	7.76	---	---	---	7.76	---	---	---	---	7.82	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	7.80	---	7.82	7.78	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	7.70
10	---	7.78	---	---	---	---	---	7.80	7.78	7.98	---	---
11	---	---	7.76	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	7.82	---	---	---	---	7.80	---
13	7.78	7.78	---	---	7.78	---	---	---	---	8.76	---	---
14	---	---	---	7.78	---	---	---	---	---	---	---	---
15	7.78	7.78	---	---	---	---	7.80	7.78	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	7.70
17	---	---	7.76	---	---	---	---	---	7.78	---	7.88	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	7.76	7.76	---	7.78	7.80	7.82	---	7.77	---	8.72	---	7.70
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	7.82	---	7.80	---	---	---
22	---	---	---	---	---	---	7.80	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	7.78	7.78	7.78	---	---	---	7.80	---	---	---	7.74	---
25	---	---	---	---	7.84	---	---	7.77	7.80	---	---	---
26	---	---	---	7.78	7.86	7.82	---	---	---	7.97	---	7.76
27	---	---	---	---	---	---	---	---	---	---	---	---
28	7.78	7.78	---	---	7.84	---	---	---	---	---	---	---
29	---	---	---	---	---	---	7.80	---	---	---	7.74	---
30	---	---	7.78	---	---	7.80	---	---	7.80	---	---	---
31	---	---	---	7.78	---	---	---	7.76	---	---	---	---

# 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 22 TO AUGUST 10, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-22		Apr-24		Jun-12		Jul-13				Aug-10				
Lake stage (ft)	---		---		---		---				---				
Secchi-depth (m)	---		0.6		0.9		0.3				0.40				
Chlorophyll a, phytoplankton (µg/L)	---		36		30		34				133				
Depth of sample (m)	0.5	7.5	0.5	7.5	0.5	7.0	0.5	3.0	5.0	7.5	0.5	3.0	5.0	6.5	7.5
Water temperature (°C)	1.4	4.5	9.0	8.8	21.1	16.5	25.1	23.4	22.0	20.3	24.9	24.4	23.4	22.9	22.2
Specific conductance (µS/cm)	349	360	315	315	302	323	281	287	306	350	293	296	305	309	330
pH (units)	8.0	7.5	8.2	8.2	8.8	7.6	9.1	8.8	8.3	7.8	8.6	8.6	8.3	8.2	7.8
Dissolved oxygen (mg/L)	8.4	1.4	12.0	11.3	10.0	0.2	13.6	6.0	0.2	0.0	9.6	6.9	0.8	0.0	0.0
Phosphorus, total (as P)	0.080	0.133	0.095	0.125	0.085	0.185	0.185	0.201	0.288	0.839	0.272	0.256	0.245	0.324	0.496
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	<0.010	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.025	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	1.3	---	---	---	---	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	20.0	---	---	---	---	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	11	---	---	---	---	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	150	---	---	---	---	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	26	---	---	---	---	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	20	---	---	---	---	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	8.1	---	---	---	---	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	3.8	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	134	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	4.9	---	---	---	---	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	18.5	---	---	---	---	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	196	---	---	---	---	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---

2-22-00

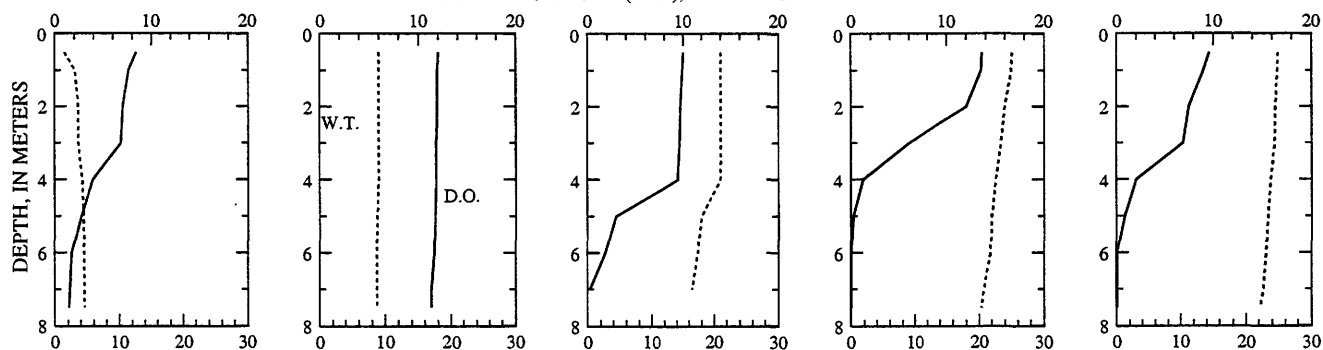
4-24-00

6-12-00

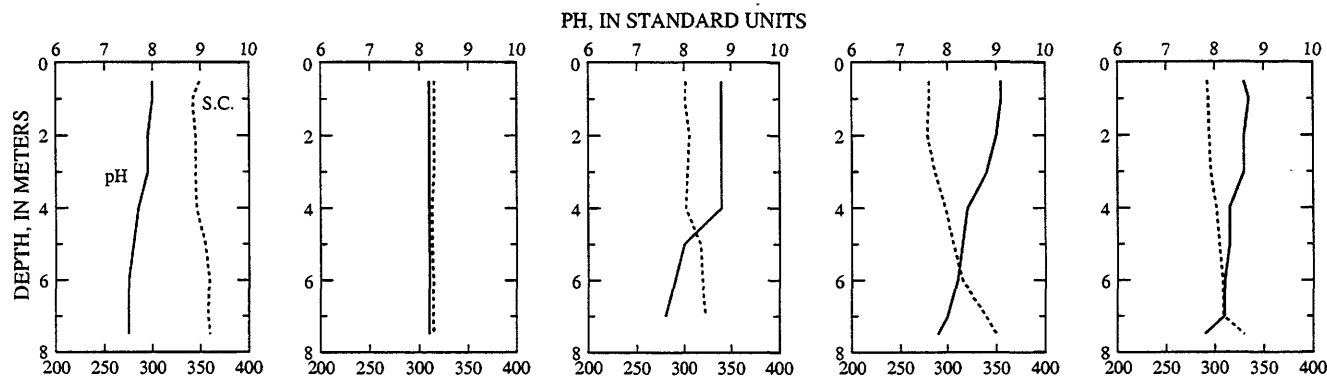
7-13-00

8-10-00

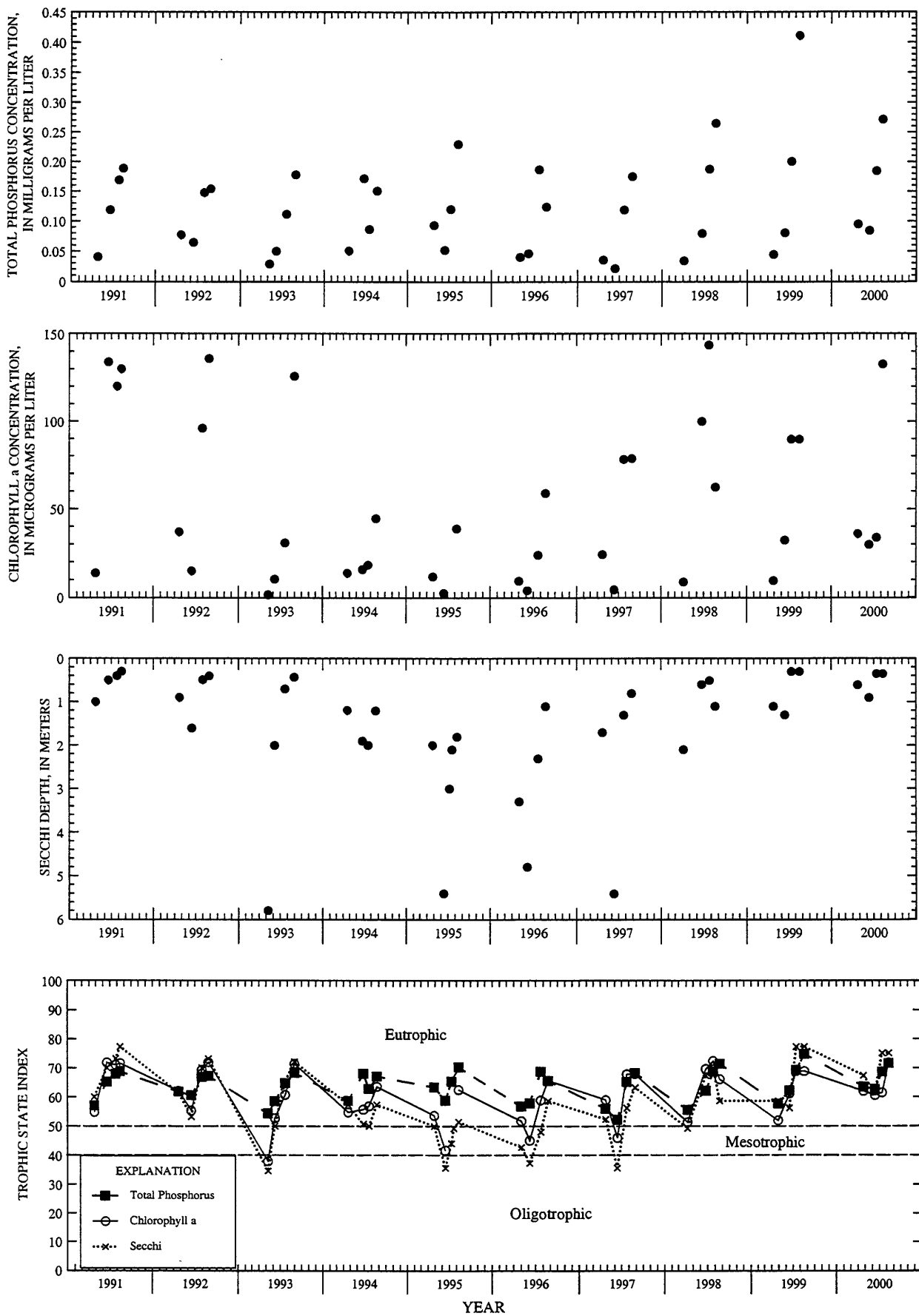
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data 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<sup>2</sup>.

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. Lake ice-covered during February sampling. An aeration system was operated from April to November for the years 1987-91. Water-quality analyses done by Wisconsin State Laboratory of Hygiene. Prior to October 1987, published under station number 425450088083500.

## WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 07, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-10		Mar-30		Jun-6		Jul-5		Aug-7				
	-----		-----		-----		-----		-----				
Lake stage (ft)	97.27		97.57		98.97		98.83		99.23				
Secchi-depth (m)	---		1.3		2.6		0.9		1.6				
Chlorophyll a, phytoplankton (µg/L)	---		16		20		8		9				
Depth of sample (m)	0.5	19.0	0.5	19.0	0.5	20.0	0.5	17.0	0.5	6.0	10.0	19.0	20.0
Water temperature (°C)	1.3	3.1	7.5	6.9	17.8	8.3	24.0	8.7	23.5	21.0	10.8	8.8	8.8
Specific conductance (µS/cm)	790	822	756	757	727	794	693	795	676	650	790	800	808
pH (units)	8.2	7.7	8.3	8.2	8.3	7.5	8.0	7.5	7.8	7.5	7.4	7.4	7.4
Dissolved oxygen (mg/L)	13.0	8.1	11.5	10.1	10.3	0.0	9.9	0.0	8.8	3.8	0.0	0.0	0.0
Phosphorus, total (as P)	0.036	0.091	0.030	0.029	0.030	0.148	0.037	0.167	0.029	0.031	0.079	0.208	0.226
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---	---	0.003	---	---	---	---
Nitrogen, NO2 + NO3, diss. (as N)	---	---	0.253	---	---	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.099	---	---	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.82	---	---	---	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	1.1	---	---	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	20	---	---	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	0.6	---	---	---	---	---	---	---	---	---	---
Hardness, (as CaCO3)	---	---	260	---	---	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	53	---	---	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	32	---	---	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	54	---	---	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.6	---	---	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO3)	---	---	196	---	---	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO4)	---	---	43.7	---	---	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	106	---	---	---	---	---	---	---	---	---	---
Silica, dissolved (SiO2)	---	---	1.8	---	---	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	434	---	---	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	0.5	---	---	---	---	---	---	---	---	---	---

2-10-00

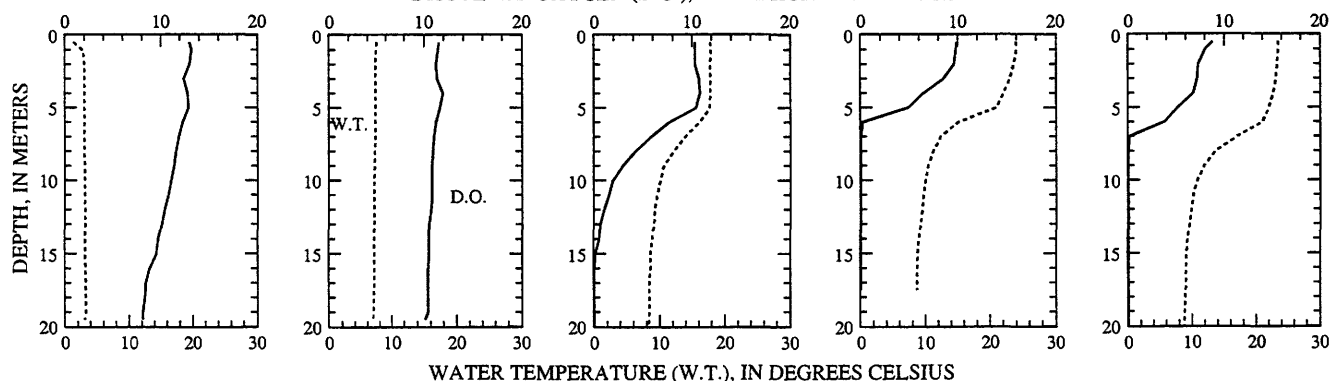
3-30-00

6-06-00

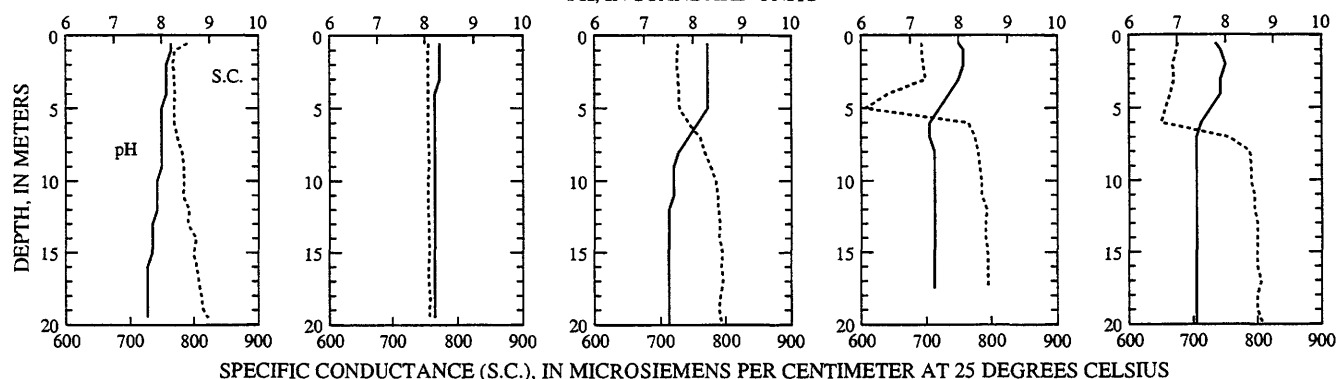
7-05-00

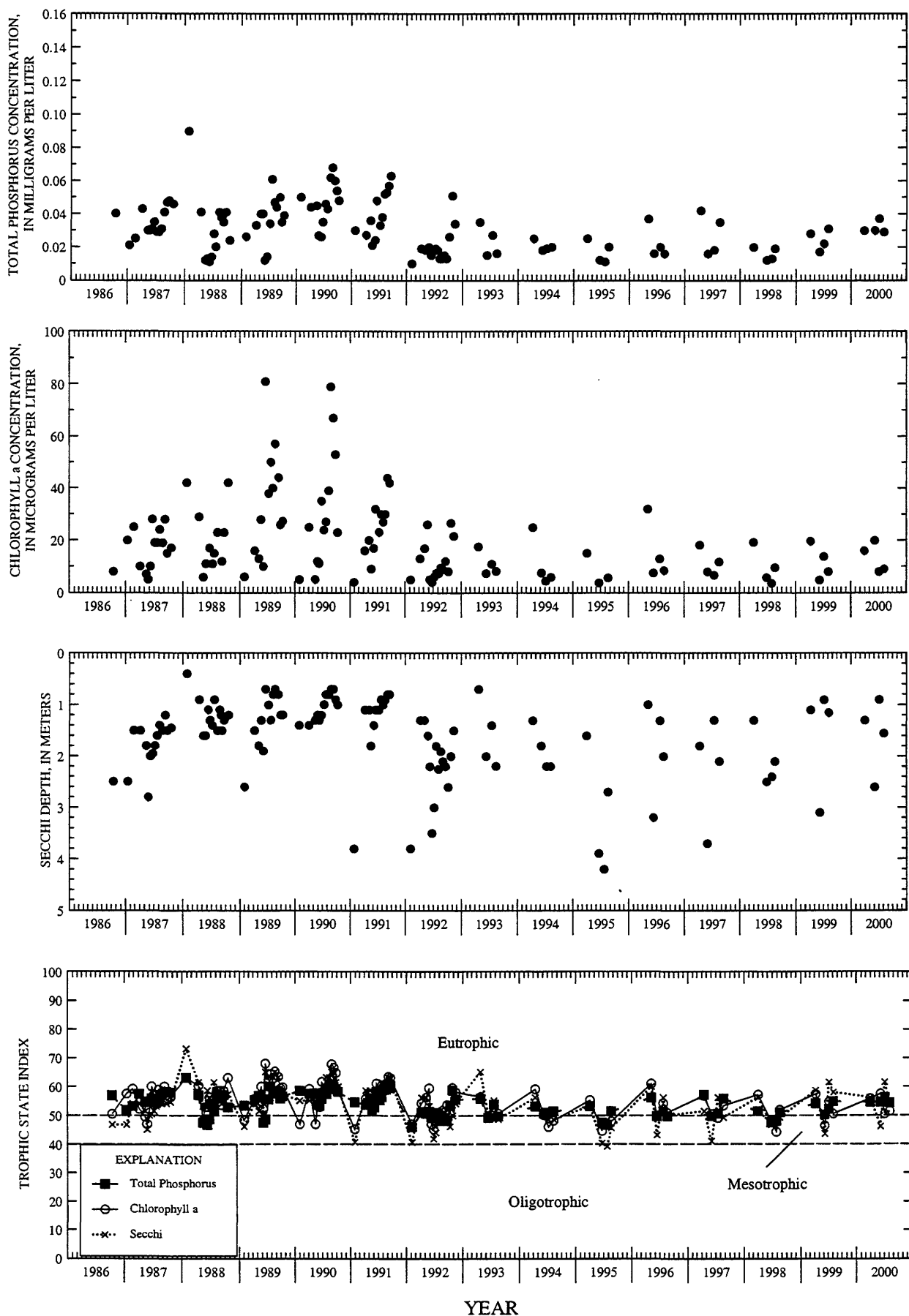
8-07-00

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



## pH, IN STANDARD UNITS





Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data 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<sup>2</sup>.

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.

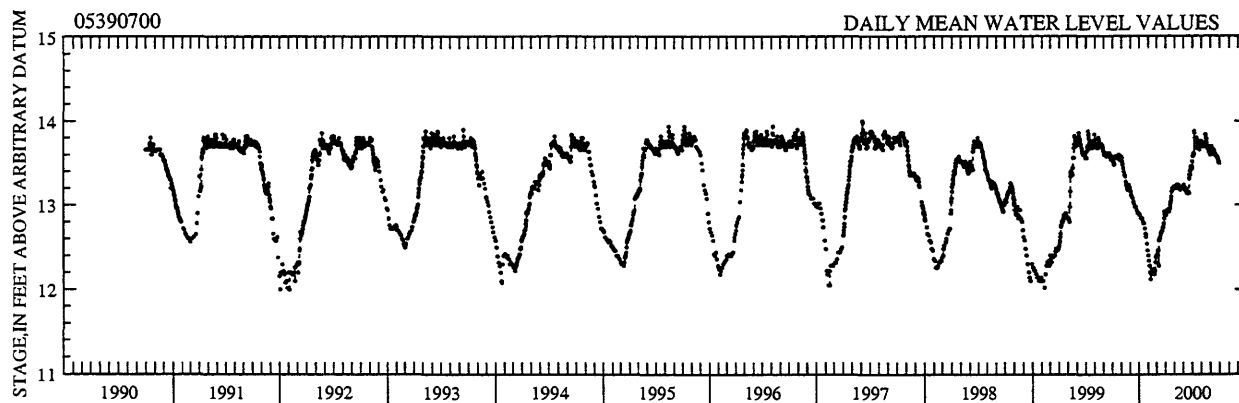
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 14.00 ft, June 6, 1997; minimum observed, 12.00 ft, Jan. 3 and Feb. 3, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 13.88, July 8; minimum observed, 12.12 ft, Feb. 10.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000.

### DAILY MEAN VALUE

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13.56	13.58	---	---	12.40	---	12.88	13.20	13.20	13.44	13.76	13.60
2	13.54	13.56	---	12.88	---	---	12.88	13.20	13.24	13.52	13.76	13.62
3	13.52	13.52	13.16	---	---	12.42	12.90	13.20	13.22	13.58	13.74	13.70
4	13.52	13.50	---	12.88	12.34	12.44	12.92	13.20	13.22	13.60	13.72	13.68
5	13.52	13.48	13.12	---	---	12.46	12.92	13.20	13.20	13.60	13.72	13.68
6	13.50	---	---	---	12.28	---	12.94	13.20	13.20	13.62	13.70	13.66
7	13.48	13.44	13.10	12.84	12.28	12.46	12.94	13.20	13.18	13.60	13.70	13.62
8	13.56	---	---	---	12.20	12.28	12.92	13.22	13.18	13.88	13.70	13.62
9	13.57	13.40	---	12.84	---	12.58	12.92	13.24	13.20	13.86	13.74	13.62
10	13.58	---	13.08	---	12.12	12.60	12.92	13.22	13.16	13.80	13.74	13.62
11	13.57	---	---	12.84	12.18	12.60	12.92	13.20	13.18	13.68	13.72	13.62
12	13.56	13.36	13.04	---	---	12.60	12.92	13.24	13.16	13.76	13.70	13.66
13	13.58	---	---	---	12.22	12.62	12.94	13.24	13.14	13.80	13.72	13.64
14	13.56	13.34	13.02	12.80	---	12.64	12.96	13.24	13.14	13.80	13.70	13.62
15	13.56	---	---	---	12.20	12.66	12.96	13.22	13.14	13.78	13.84	13.62
16	13.58	13.28	---	12.78	---	12.66	13.00	13.22	13.16	13.80	13.80	13.60
17	13.58	---	12.98	12.78	---	12.68	13.02	13.22	13.16	13.78	13.80	13.60
18	13.58	13.24	---	12.78	12.24	12.68	13.04	13.22	13.16	13.76	13.78	13.60
19	13.58	13.22	12.98	---	---	12.68	13.06	13.20	13.14	13.74	13.74	13.58
20	13.58	---	---	---	12.22	12.70	13.10	13.20	13.14	13.74	13.72	13.58
21	13.58	13.20	12.98	12.72	---	12.72	13.16	13.18	13.32	13.72	13.68	13.58
22	13.60	---	---	---	12.18	12.72	13.16	13.20	13.36	13.70	13.70	13.58
23	13.60	13.18	---	12.66	---	12.74	13.18	13.20	13.36	13.68	13.68	13.58
24	13.58	---	12.94	12.62	---	12.74	13.20	13.20	13.40	13.68	13.66	13.56
25	13.54	---	---	12.64	12.22	12.78	13.20	13.20	13.42	13.66	13.66	13.56
26	13.54	13.24	12.92	---	12.32	12.78	13.20	13.20	13.46	13.70	13.64	13.54
27	13.54	---	---	---	12.38	12.84	13.20	13.20	13.44	13.72	13.64	13.52
28	13.54	13.22	12.90	12.54	---	12.92	13.20	13.22	13.44	13.76	13.64	13.52
29	13.54	---	---	---	12.40	12.90	13.22	13.20	13.46	13.76	13.64	13.50
30	13.56	13.20	---	12.46	---	12.88	13.20	13.20	13.46	13.76	13.62	13.50
31	13.58	---	12.90	---	---	12.88	---	13.20	---	13.76	13.60	---
MEAN	13.56	---	---	---	---	---	13.03	13.21	13.25	13.71	13.71	13.60
MAX	13.60	---	---	---	---	---	13.22	13.24	13.46	13.88	13.84	13.70
MIN	13.48	---	---	---	---	---	12.88	13.18	13.14	13.44	13.60	13.50



455532089253900 LITTLE ST. GERMAIN LAKE, EAST BAY, AT ST. GERMAIN, WI

LOCATION.--Lat 45°55'32", long 89°25'39", in NE 1/4 NW 1/4 sec.25, T.40 N., R.8 E., Vilas County, Hydrologic Unit 07070001, near St. Germain.

PERIOD OF RECORD.--December 1996, January-March 1997, March 1999, and March to September 2000.

REMARKS.--Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 06 TO AUGUST 18, 2000  
(Milligrams per liter unless otherwise indicated)

	Mar-6		May-3	Jun-26		Jul-19		Aug-18	
Lake stage (ft)	12.46		13.20	13.46		13.74		13.78	
Secchi-depth (m)	---		2.5	1.6		1.3		0.9	
Chlorophyll a, phytoplankton (µg/L)	---		1.1	15		16		34	
Depth of sample (m)	0.5	3.5	0.5	0.5	4.0	0.5	3.8	0.5	4.0
Water temperature (°C)	5.0	4.5	15.1	21.1	18.0	23.4	19.2	21.4	19.5
Specific conductance (µS/cm)	78	100	73	70	74	72	87	73	90
pH (units)	7.7	6.8	7.5	8.7	6.4	8.4	6.3	7.8	6.7
Dissolved oxygen (mg/L)	2.6	0.2	10.3	10.5	0.2	9.1	0.1	7.7	1.3
Phosphorus, total (as P)	0.043	0.066	0.021	0.029	0.144	0.042	0.099	0.066	0.065
Phosphorus, ortho, dissolved (as P)	---	---	---	---	---	0.004	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	---	---	---	<0.010	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	---	---	---	<0.013	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	---	---	---	---	---	---	---
Nitrogen, amm + org., diss. (as N)	---	---	---	---	---	0.55	---	---	---

3-06-00

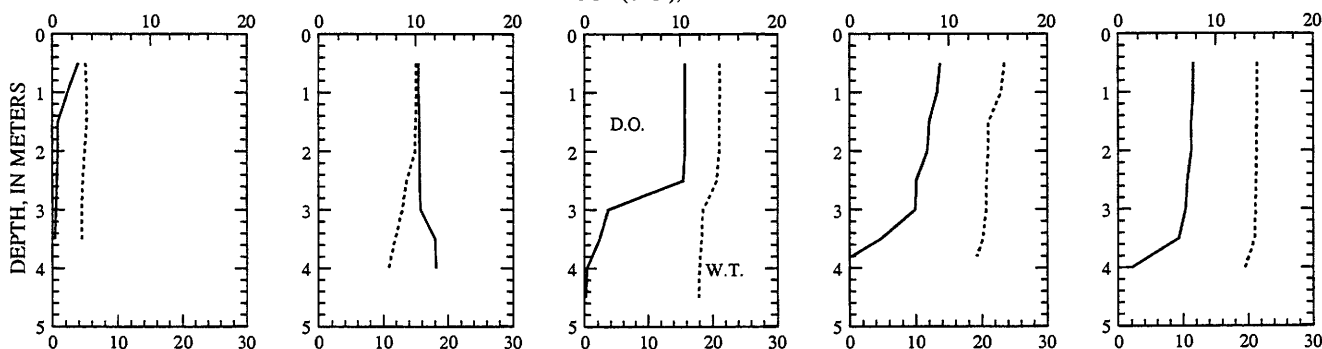
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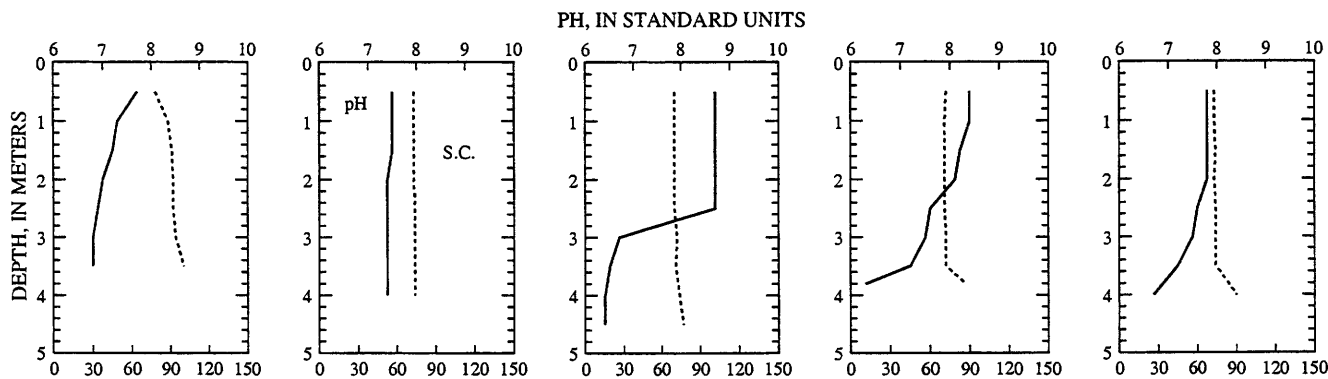
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8-18-00

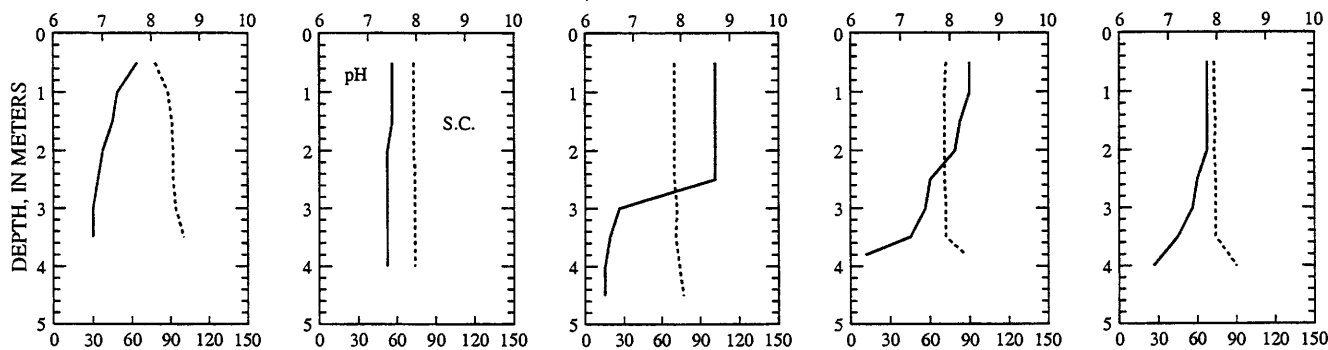
DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



PH, IN STANDARD UNITS



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



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, March 1999 to current year.

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

WATER-QUALITY DATA, MARCH 06 TO AUGUST 18, 2000  
(Milligrams per liter unless otherwise indicated)

	Mar-6	May-3	Jun-26	Jul-19	Aug-18
Lake stage (ft)	12.46	13.20	13.46	13.74	13.78
Secchi-depth (m)	---	2.0	1.4	1.0	0.6
Chlorophyll a, phytoplankton (µg/L)	---	1.6	9	29	30
Depth of sample (m)	0.5 3.7	0.5	0.5	0.5	0.5
Water temperature (°C)	5.2 4.3	14.1	21.0	23.0	21.5
Specific conductance (µS/cm)	74 91	73	68	71	73
pH (units)	6.7 6.4	7.4	8.1	8.0	8.2
Dissolved oxygen (mg/L)	5.1 0.4	10.0	9.5	9.5	7.9
Phosphorus, total (as P)	0.034 0.036	0.024	0.024	0.047	0.087
Phosphorus, ortho, dissolved (as P)	---	---	---	0.003	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	---	<0.010	---
Nitrogen, ammonia, dissolved (as N)	---	---	---	<0.013	---
Nitrogen, amm. + org., total (as N)	---	---	---	---	---
Nitrogen, amm + org., diss. (as N)	---	---	---	0.73	---

3-06-00

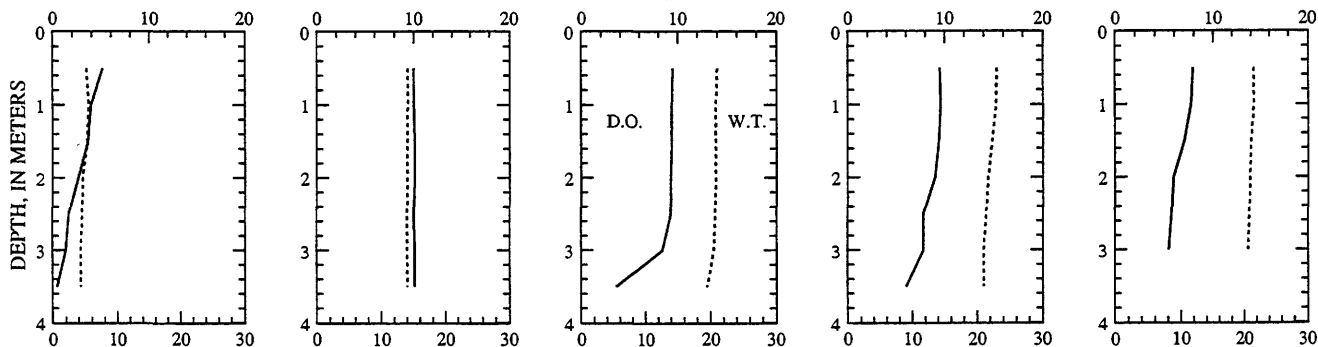
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6-26-00

7-19-00

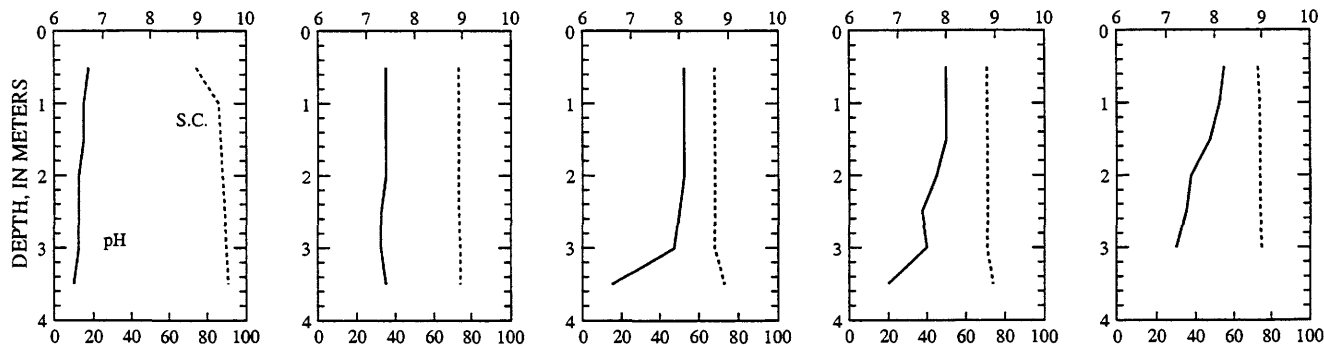
8-18-00

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

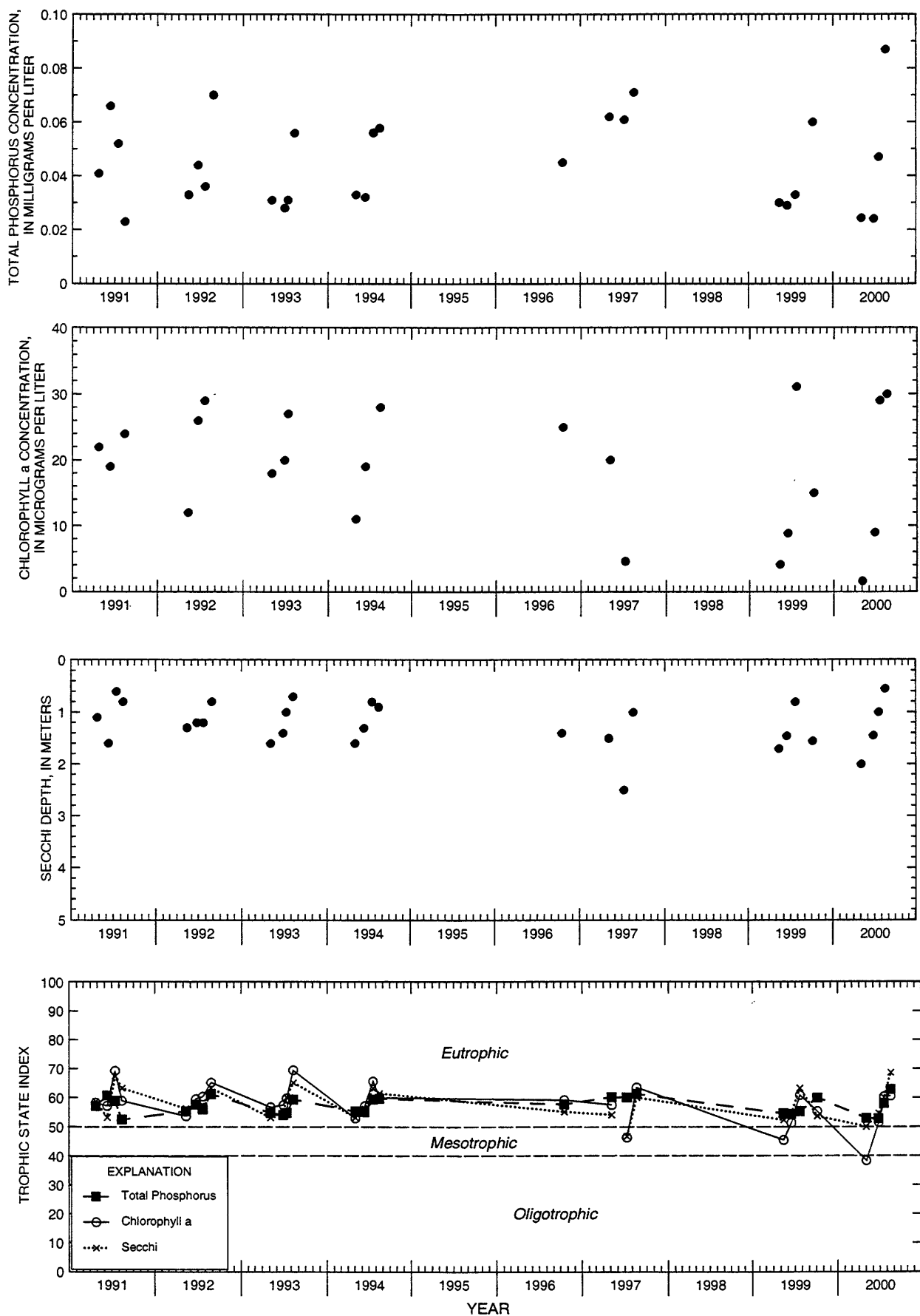


WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

pH, IN STANDARD UNITS



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



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

# 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, March 1999 to current year.

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

## WATER-QUALITY DATA, MARCH 06 TO AUGUST 18, 2000

(Milligrams per liter unless otherwise indicated)

	Mar-6	May-3	Jun-26	Jul-19	Aug-18
Lake stage (ft)	12.46	13.20	13.46	13.74	13.78
Secchi-depth (m)	---	2.7	2.7	2.2	1.3
Chlorophyll a, phytoplankton (µg/L)	---	<1	2.5	8	11
Depth of sample (m)	0.5	6.0	0.5	0.5	6.0
Water temperature (°C)	4.8	4.7	14.6	23.5	16.6
Specific conductance (µS/cm)	82	115	77	70	90
pH (units)	7.3	6.7	7.1	8.0	6.2
Dissolved oxygen (mg/L)	2.2	0.0	10.8	9.0	0.1
Phosphorus, total (as P)	0.024	0.041	0.016	0.022	0.046
Phosphorus, ortho, dissolved (as P)	---	---	---	<0.002	---
Nitrogen, NO2 + NO3, diss. (as N)	---	---	---	<0.010	---
Nitrogen, ammonia, dissolved (as N)	---	---	---	<0.013	---
Nitrogen, amm. + org., total (as N)	---	---	---	---	---
Nitrogen, amm + org., diss. (as N)	---	---	---	0.43	---

3-06-00

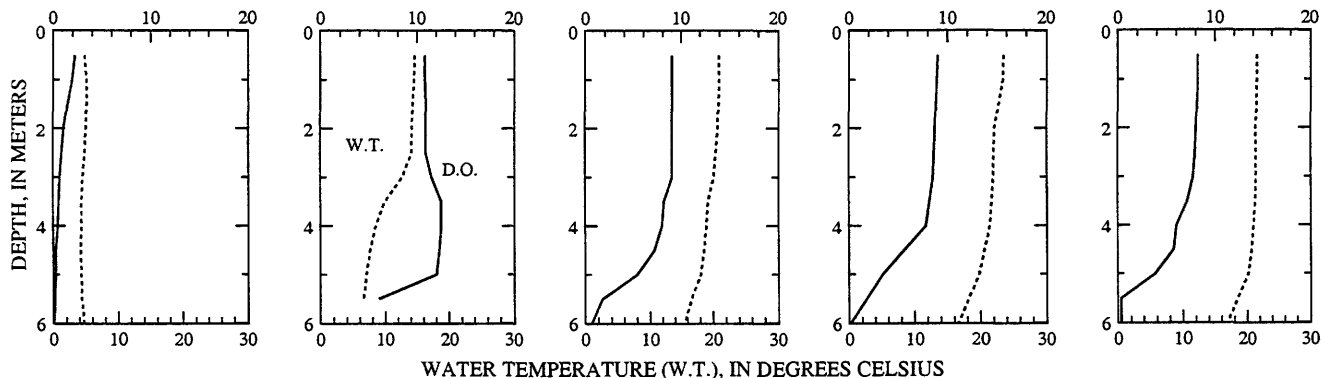
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6-26-00

7-19-00

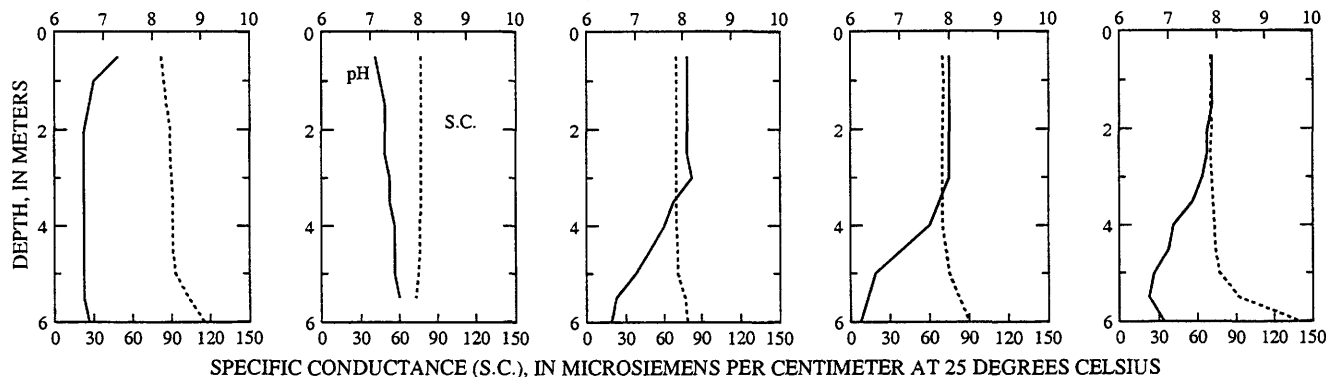
8-18-00

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

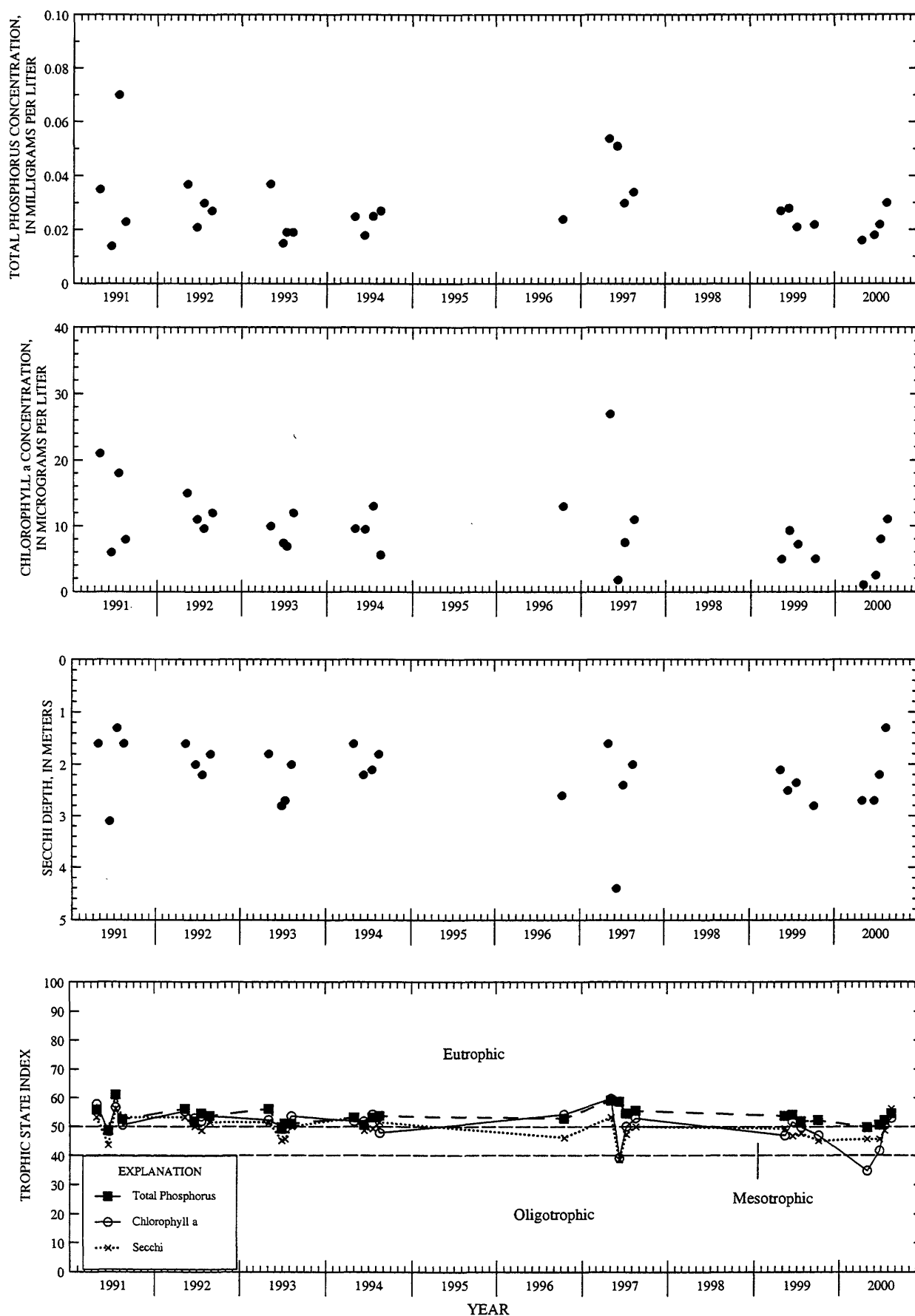


WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



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

# 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, March 1999 to current year.

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

## WATER-QUALITY DATA, MARCH 06 TO AUGUST 18, 2000 (Milligrams per liter unless otherwise indicated)

	Mar-6		May-3		Jun-26		Jul-19		Aug-18	
Lake stage (ft)	12.46		13.20		13.46		13.74		13.78	
Secchi-depth (m)	---		3.6		3.0		3.6		2.8	
Chlorophyll a, phytoplankton (µg/L)	---		1.2		3.1		3.0		2.0	
Depth of sample (m)	0.5		0.5		0.5		0.5		0.5	
Water temperature (°C)	4.0		12.0		20.3		22.9		21.9	
Specific conductance (µS/cm)	68		70		68		70		70	
pH (units)	7.8		7.0		7.6		7.4		7.8	
Dissolved oxygen (mg/L)	11.2		11.8		9.1		8.7		8.8	
Phosphorus, total (as P)	0.013		0.012		0.010		0.010		0.009	
Phosphorus, ortho, dissolved (as P)	---		---		---		<0.002		---	
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---		---		---		<0.010		---	
Nitrogen, ammonia, dissolved (as N)	---		---		---		<0.013		---	
Nitrogen, amm. + org., total (as N)	---		---		---		---		---	
Nitrogen, amm + org., diss. (as N)	---		---		---		0.38		---	

3-06-00

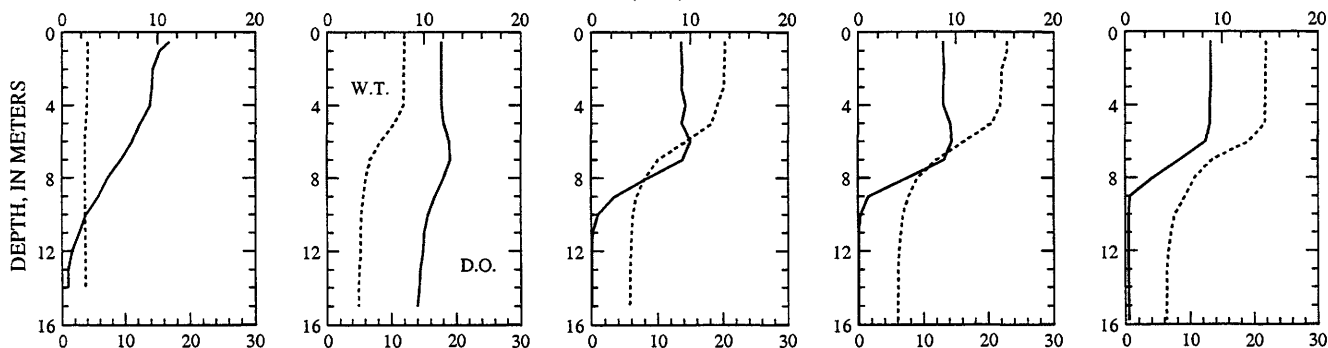
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6-26-00

7-19-00

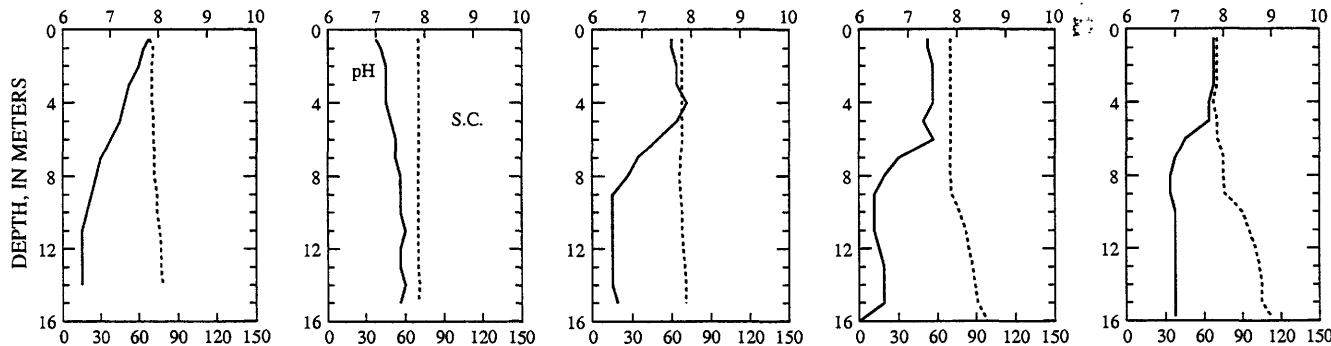
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### DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER

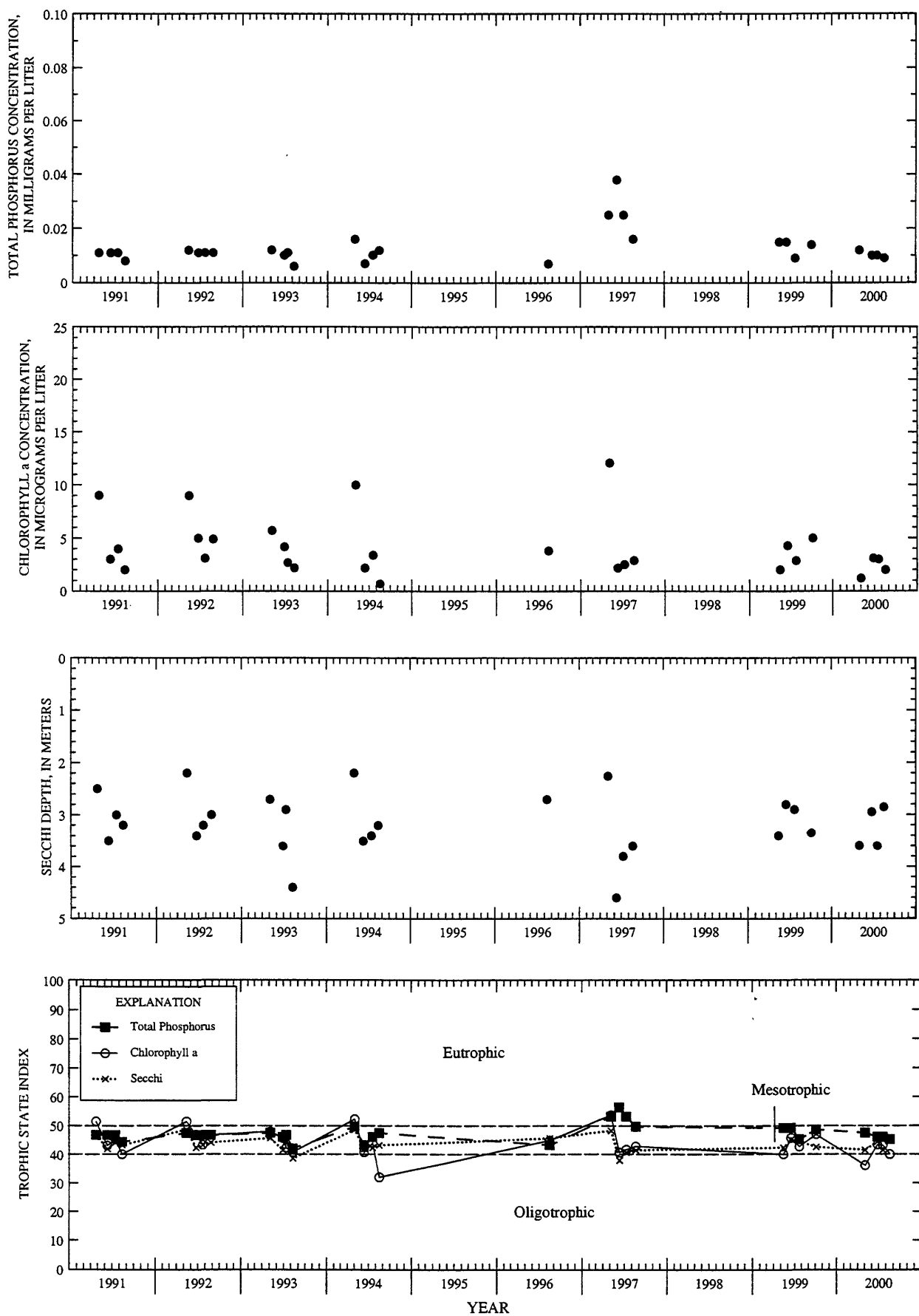


### WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

### PH, IN STANDARD UNITS



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



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

**04074651 LITTLE SAND LAKE NEAR MOLE LAKE, WI**

LOCATION.--Lat 45°28'26" long 88°54'41", 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 current year.

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

REMARKS.--Recorder removed during period of ice, Nov. 20, 1998 to Apr. 28, 1999. Gage heights are obtained from reference point during this period.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.97 ft, May 25, 1997; minimum observed, 3.78 ft, Nov. 7-9, 1999.

EXTREMES FOR CURRENT YEAR.-- Maximum gage height observed, 5.61 ft, July 11, 12; minimum observed, 4.19 ft, Nov. 10 and Dec. 9.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000  
DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.29	4.29	---	---	---	---	---	4.88	4.79	4.83	5.02	4.99
2	4.30	4.27	---	---	---	---	---	4.87	4.80	4.89	4.99	5.05
3	4.29	4.26	---	---	---	---	---	4.87	4.78	4.93	4.95	5.12
4	4.28	4.25	---	---	---	---	---	4.86	4.78	4.91	4.93	5.11
5	4.27	4.23	4.19	---	---	---	---	4.85	4.77	4.91	4.93	5.11
6	4.25	4.22	---	---	---	---	---	4.84	4.76	4.90	4.92	5.10
7	4.27	4.21	---	---	---	---	---	4.83	4.76	4.88	4.90	5.09
8	4.29	4.20	---	---	---	4.52	---	4.84	4.75	5.16	4.95	5.09
9	4.28	4.20	---	---	---	---	---	4.82	4.74	5.47	4.96	5.08
10	4.27	4.19	---	---	---	---	---	4.81	4.73	5.58	4.95	5.07
11	4.30	---	---	---	---	---	---	4.82	4.73	5.61	4.94	5.20
12	4.30	---	---	---	---	---	---	4.84	4.72	5.61	4.93	5.22
13	4.30	---	---	---	---	---	---	4.86	4.71	5.59	4.92	5.20
14	4.30	---	---	---	---	---	---	4.84	4.72	5.54	4.93	5.20
15	4.30	---	---	---	---	---	---	4.81	4.72	5.49	4.96	5.20
16	4.31	---	---	---	---	---	---	4.83	4.72	5.46	4.94	5.18
17	4.31	---	---	---	---	---	---	4.84	4.71	5.40	4.95	5.16
18	4.31	---	---	---	---	---	---	4.85	4.70	5.36	4.94	5.15
19	4.31	---	---	---	---	---	---	4.84	4.68	5.33	4.92	5.13
20	4.29	---	---	---	---	---	---	4.84	4.71	5.28	4.90	5.15
21	4.29	---	---	---	---	---	---	4.83	4.76	5.24	4.89	5.13
22	4.31	---	---	---	---	---	---	4.82	4.74	5.21	4.88	5.14
23	4.29	---	---	---	---	---	---	4.83	4.74	5.16	4.87	5.15
24	4.27	---	---	---	---	---	---	4.84	4.74	5.15	4.86	5.14
25	4.26	---	---	---	---	---	---	4.82	4.74	5.12	4.85	5.12
26	4.24	---	---	---	---	---	4.88	4.80	4.82	5.12	4.84	5.10
27	4.25	---	---	---	---	---	4.88	4.79	4.82	5.13	4.82	5.10
28	4.25	---	---	---	---	---	4.88	4.78	4.82	5.12	4.82	5.09
29	4.26	---	---	---	---	---	4.89	4.78	4.85	5.10	4.81	5.07
30	4.28	---	---	---	---	---	4.88	4.79	4.84	5.07	4.79	5.05
31	4.28	---	---	---	---	---	---	4.78	---	5.04	4.80	---
MEAN	4.28	---	---	---	---	---	---	4.83	4.75	5.21	4.91	5.12
MAX	4.31	---	---	---	---	---	---	4.88	4.85	5.61	5.02	5.22
MIN	4.24	---	---	---	---	---	---	4.78	4.68	4.83	4.79	4.99

**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<sup>2</sup>. Area of Lake Mendota, 15.2 mi<sup>2</sup>.

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.--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, 12.75 ft, June 5, 2000; minimum observed, 8.02 ft, Feb. 24 to Mar. 10, 1920, current datum.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 12.75 ft, June 5; minimum recorded, 9.15 ft, Jan. 1, 19.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.73	9.66	9.32	9.20	9.26	9.67	9.65	10.23	11.55	11.90	10.89	10.47
2	9.75	9.64	9.32	9.21	9.26	9.65	9.66	10.22	12.14	11.86	10.88	10.45
3	9.75	9.60	9.33	9.21	9.26	9.63	9.68	10.20	12.48	11.94	10.84	10.46
4	9.75	9.57	9.35	9.24	9.26	9.60	9.69	10.19	12.62	11.94	10.79	10.44
5	9.75	9.56	9.37	9.22	9.26	9.58	9.68	10.17	12.73	11.92	10.81	10.39
6	9.76	9.54	9.34	9.23	9.26	9.56	9.69	10.15	12.73	11.89	10.93	10.35
7	9.74	9.52	9.32	9.22	9.27	9.53	9.71	10.14	12.68	11.84	10.92	10.33
8	9.76	9.51	9.32	9.22	9.26	9.52	9.76	10.14	12.63	11.79	10.89	10.32
9	9.76	9.50	9.33	9.22	9.27	9.52	9.76	10.16	12.57	11.79	10.87	10.29
10	9.77	9.51	9.33	9.24	9.27	9.50	9.76	10.14	12.50	11.84	10.83	10.28
11	9.77	9.52	9.31	9.25	9.27	9.47	9.78	10.12	12.44	11.85	10.79	10.33
12	9.76	9.51	9.31	9.23	9.27	9.44	9.78	10.16	12.37	11.82	10.75	10.41
13	9.77	9.50	9.30	9.23	9.30	9.42	9.78	10.17	12.38	11.79	10.73	10.39
14	9.75	9.50	9.30	9.23	9.30	9.42	9.79	10.12	12.58	11.76	10.70	10.40
15	9.75	9.47	9.30	9.23	9.31	9.44	9.80	10.08	12.59	11.71	10.67	10.37
16	9.79	9.45	9.30	9.23	9.30	9.45	9.82	10.06	12.57	11.66	10.62	10.34
17	9.79	9.44	9.28	9.23	9.31	9.44	9.82	10.09	12.50	11.61	10.63	10.31
18	9.77	9.42	9.27	9.22	9.33	9.44	9.82	10.50	12.45	11.52	10.63	10.29
19	9.77	9.42	9.26	9.23	9.34	9.48	9.87	10.79	12.37	11.44	10.60	10.27
20	9.77	9.41	9.30	9.24	9.34	9.50	10.00	10.91	12.35	11.39	10.57	10.28
21	9.76	9.39	9.25	9.24	9.34	9.52	10.06	10.95	12.34	11.32	10.54	10.25
22	9.78	9.38	9.24	9.25	9.35	9.53	10.07	10.97	12.27	11.25	10.52	10.25
23	9.74	9.44	9.23	9.25	9.38	9.53	10.15	10.99	12.20	11.19	10.51	10.30
24	9.71	9.45	9.23	9.25	9.47	9.55	10.21	11.00	12.16	11.12	10.50	10.29
25	9.70	9.42	9.22	9.24	9.53	9.59	10.22	10.96	12.14	11.07	10.48	10.26
26	9.71	9.42	9.22	9.24	9.64	9.59	10.22	10.93	12.10	11.03	10.52	10.24
27	9.69	9.42	9.21	9.24	9.68	9.62	10.22	10.95	12.07	11.00	10.54	10.22
28	9.69	9.40	9.20	9.24	9.69	9.64	10.23	10.97	12.02	10.98	10.52	10.20
29	9.68	9.38	9.20	9.24	9.68	9.63	10.23	10.95	11.99	10.94	10.51	10.17
30	9.67	9.35	9.20	9.26	---	9.64	10.24	10.95	11.95	10.91	10.49	10.15
31	9.66	---	9.20	9.26	---	9.65	---	11.12	---	10.89	10.48	---
MEAN	9.74	9.48	9.28	9.23	9.36	9.54	9.90	10.50	12.35	11.51	10.68	10.32
MAX	9.79	9.66	9.37	9.26	9.69	9.67	10.24	11.12	12.73	11.94	10.93	10.47
MIN	9.66	9.35	9.20	9.20	9.26	9.42	9.65	10.06	11.55	10.89	10.48	10.15



# 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 15 TO AUGUST 09, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-15		Apr-13		Jun-7		Jul-5		Aug-9	
Lake stage (ft)	---		865.83		866.40		867.06		866.88	
Secchi-depth (m)	---		4.3		6.7		5.1		3.4	
Chlorophyll a, phytoplankton (µg/L)	---		<1.00		<1.00		<1.00		3	
Depth of sample (m)	0.5	11.0	0.5	12.0	0.5	11.5	0.5	11.0	0.5	12.0
Water temperature (°C)	2.5	5.1	7.4	7.3	19.3	10.6	25.0	12.0	25.6	12.7
Specific conductance (µS/cm)	421	453	407	409	413	450	411	447	410	483
pH (units)	8.4	7.4	8.2	8.2	8.1	7.6	8.0	7.7	8.2	7.4
Dissolved oxygen (mg/L)	14.5	1.0	11.8	11.4	9.0	2.9	8.6	1.1	9.5	0.0
Phosphorus, total (as P)	0.010	0.033	0.011	0.012	0.008	0.013	0.009	0.018	0.008	0.033
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.049	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.159	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.77	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	0.82	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	10	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	1.0	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	190	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	31	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	27	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	11	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	1.6	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	162	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	15.9	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	27	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.5	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	242	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---

2-15-00

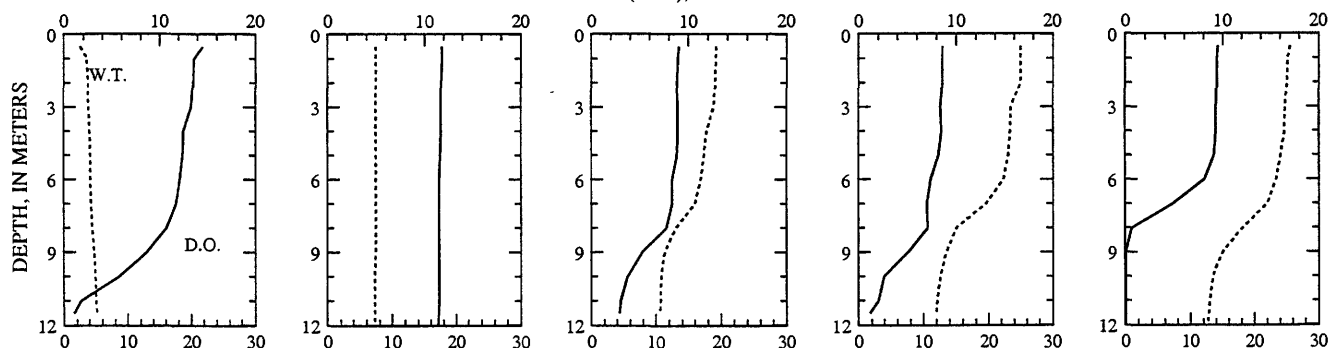
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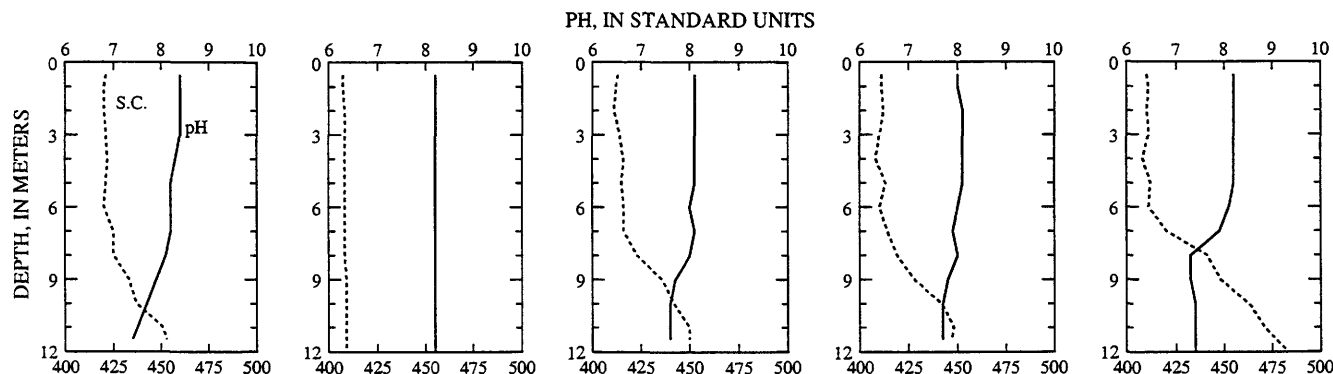
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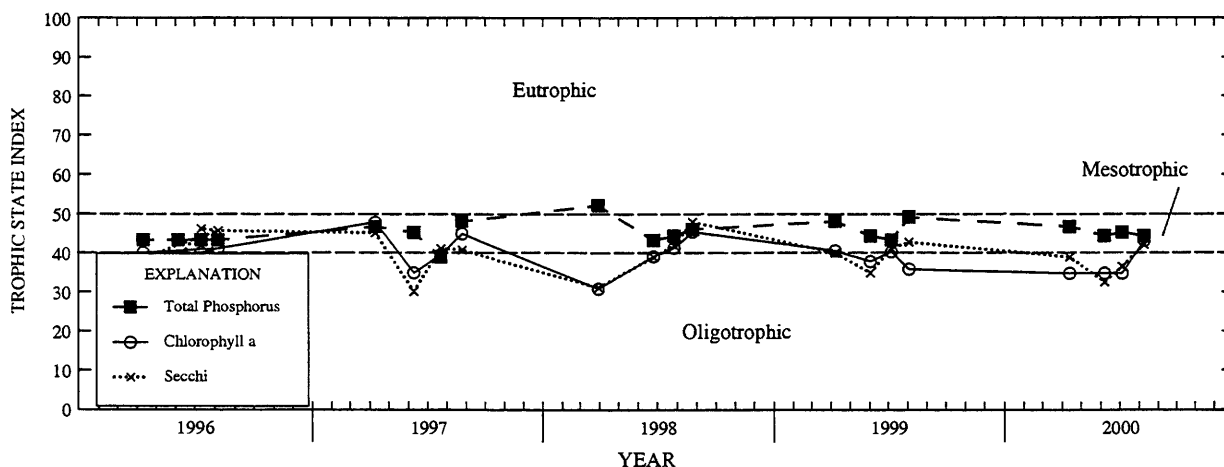
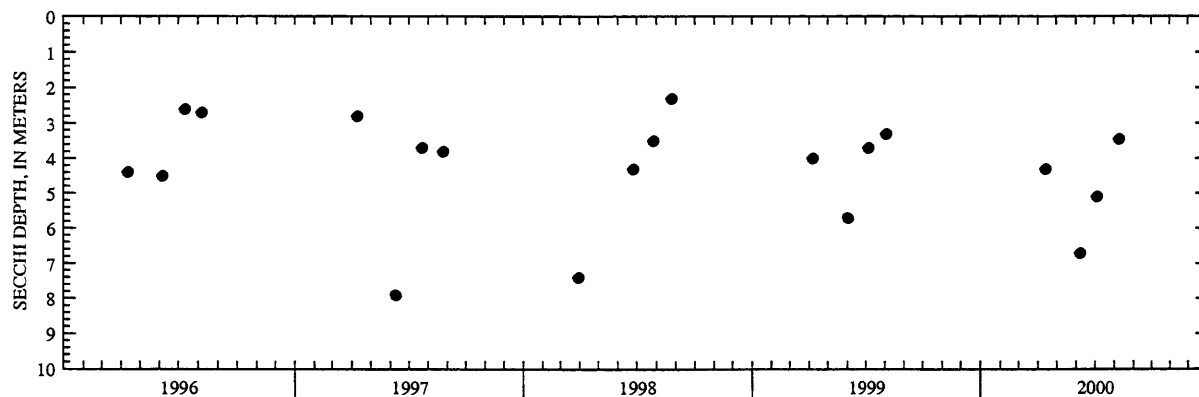
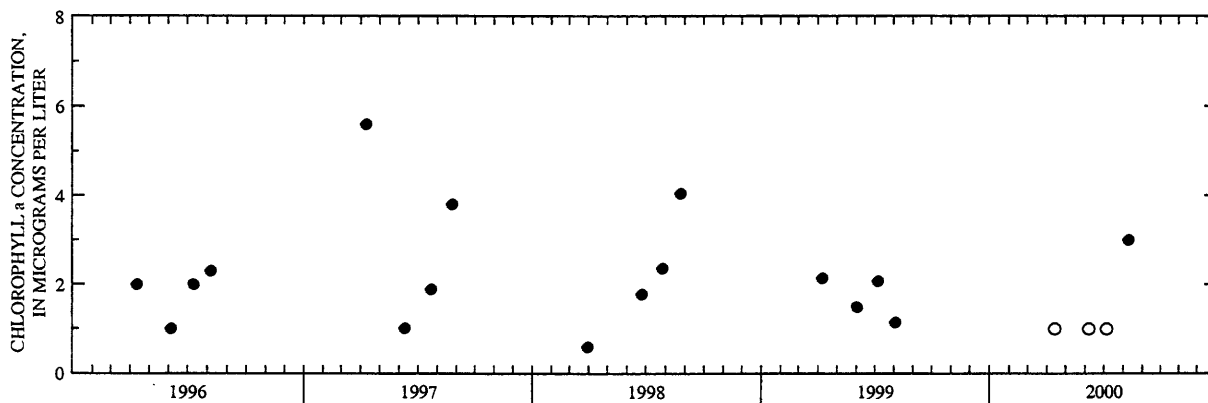
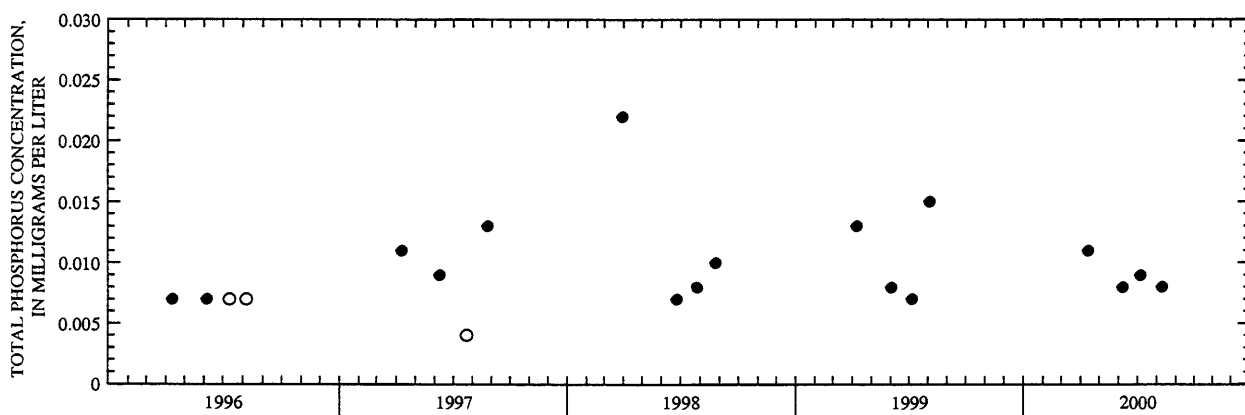
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



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

(Circles on the first three plots 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<sup>2</sup>. Area of Lake Monona, 5.3 mi<sup>2</sup>.

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.--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, 7.48 ft, June 14, 15, 2000; minimum observed, 3.22 ft, Jan. 20, 1965, current datum.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 7.48 ft, June 14, 15; minimum recorded, 3.78 ft, Feb. 11-13.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.99	4.73	4.28	3.92	3.83	4.57	4.46	5.20	6.21	7.19	6.15	5.88
2	4.96	4.73	4.27	3.92	3.83	4.59	4.48	5.19	6.67	7.19	6.14	5.86
3	4.91	4.77	4.27	3.92	3.82	4.60	4.46	5.19	6.86	7.33	6.11	5.88
4	4.87	4.81	4.28	3.93	3.81	4.62	4.43	5.18	6.94	7.31	6.08	5.87
5	4.82	4.80	4.28	3.92	3.81	4.63	4.48	5.18	7.06	7.26	6.15	5.83
6	4.79	4.76	4.27	3.91	3.81	4.64	4.44	5.17	7.10	7.21	6.32	5.80
7	4.74	4.72	4.27	3.90	3.80	4.64	4.51	5.17	7.11	7.15	6.30	5.77
8	4.70	4.67	4.26	3.90	3.80	4.65	4.53	5.17	7.12	7.08	6.27	5.76
9	4.68	4.63	4.26	3.89	3.80	4.66	4.55	5.17	7.11	7.02	6.24	5.75
10	4.65	4.62	4.25	3.90	3.79	4.66	4.58	5.18	7.09	7.08	6.20	5.74
11	4.61	4.61	4.25	3.89	3.79	4.66	4.57	5.18	7.09	7.07	6.17	5.86
12	4.59	4.57	4.24	3.89	3.78	4.66	4.58	5.23	7.08	7.01	6.14	5.97
13	4.58	4.54	4.24	3.88	3.81	4.65	4.61	5.17	7.15	6.94	6.13	5.95
14	4.58	4.50	4.23	3.87	3.81	4.57	4.60	5.14	7.44	6.89	6.11	5.94
15	4.58	4.46	4.22	3.87	3.82	4.52	4.61	5.14	7.47	6.83	6.08	5.90
16	4.61	4.44	4.18	3.86	3.81	4.47	4.62	5.14	7.45	6.77	6.05	5.86
17	4.60	4.41	4.16	3.86	3.81	4.43	4.61	5.17	7.42	6.71	6.12	5.82
18	4.61	4.40	4.13	3.85	3.83	4.42	4.61	5.69	7.40	6.67	6.09	5.79
19	4.60	4.37	4.11	3.85	3.84	4.43	4.68	5.94	7.38	6.63	6.05	5.77
20	4.59	4.35	4.07	3.86	3.83	4.44	4.84	5.93	7.43	6.59	6.02	5.74
21	4.59	4.34	4.05	3.85	3.83	4.44	4.89	5.87	7.41	6.56	5.98	5.70
22	4.55	4.32	4.04	3.86	3.83	4.44	4.96	5.81	7.38	6.53	5.95	5.72
23	4.52	4.39	4.02	3.86	3.86	4.45	5.09	5.72	7.37	6.50	5.92	5.79
24	4.55	4.40	4.01	3.85	3.98	4.46	5.14	5.61	7.37	6.47	5.91	5.76
25	4.55	4.39	4.00	3.85	4.12	4.41	5.15	5.53	7.38	6.39	5.89	5.73
26	4.55	4.37	3.98	3.84	4.35	4.44	5.16	5.50	7.37	6.33	5.93	5.69
27	4.57	4.35	3.97	3.84	4.45	4.43	5.17	5.55	7.31	6.28	5.96	5.66
28	4.59	4.33	3.96	3.83	4.50	4.42	5.18	5.54	7.28	6.24	5.93	5.63
29	4.63	4.30	3.95	3.83	4.55	4.43	5.20	5.51	7.25	6.20	5.91	5.59
30	4.67	4.29	3.94	3.83	---	4.44	5.19	5.57	7.21	6.17	5.90	5.56
31	4.71	---	3.93	3.84	---	4.45	---	5.78	---	6.15	5.88	---
MEAN	4.66	4.51	4.14	3.87	3.92	4.53	4.75	5.40	7.20	6.77	6.07	5.79
MAX	4.99	4.81	4.28	3.93	4.55	4.66	5.20	5.94	7.47	7.33	6.32	5.97
MIN	4.52	4.29	3.93	3.83	3.78	4.41	4.43	5.14	6.21	6.15	5.88	5.56

# 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 south-east of Muskego.

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

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

## WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 07, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-10		Mar-30		Jun-5		Jul-6		Aug-7		
Lake stage (ft)	11.63		11.72		12.12		11.88		11.49		
Secchi-depth (m)	---		3.1		2.7		2.3		2.0		
Chlorophyll a, phytoplankton (µg/L)	---		3.3		3.1		2.7		14		
Depth of sample (m)	0.5	7.0	0.5	6.5	0.5	7.0	0.5	7.0	0.5	3.0	5.0
Water temperature (°C)	0.9	3.7	8.4	7.6	17.5	13.0	24.8	14.8	25.0	24.0	21.6
Specific conductance (µS/cm)	627	631	605	608	549	582	533	604	504	505	503
pH (units)	7.9	7.5	8.0	7.9	7.9	7.2	8.1	7.5	8.4	8.3	7.4
Dissolved oxygen (mg/L)	10.8	4.5	10.1	9.3	9.1	0.2	8.5	0.0	9.3	8.0	0.3
Phosphorus, total (as P)	0.032	0.040	0.026	0.029	0.027	0.084	0.024	0.253	0.031	0.039	0.054
Phosphorus, ortho, dissolved (as P)	---	---	0.002	---	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.177	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.017	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.74	---	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	0.92	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	20	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	1.7	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	53	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	1.6	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	28	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	26	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.8	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	177	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	59.2	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	57.2	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	1.4	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	354	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	1.6	---	---	---	---	---	---	---	---

2-10-00

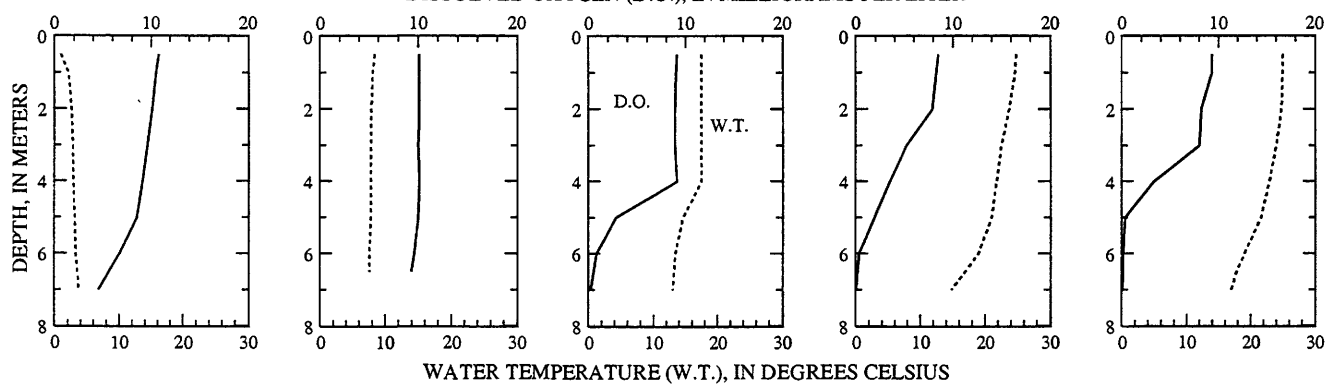
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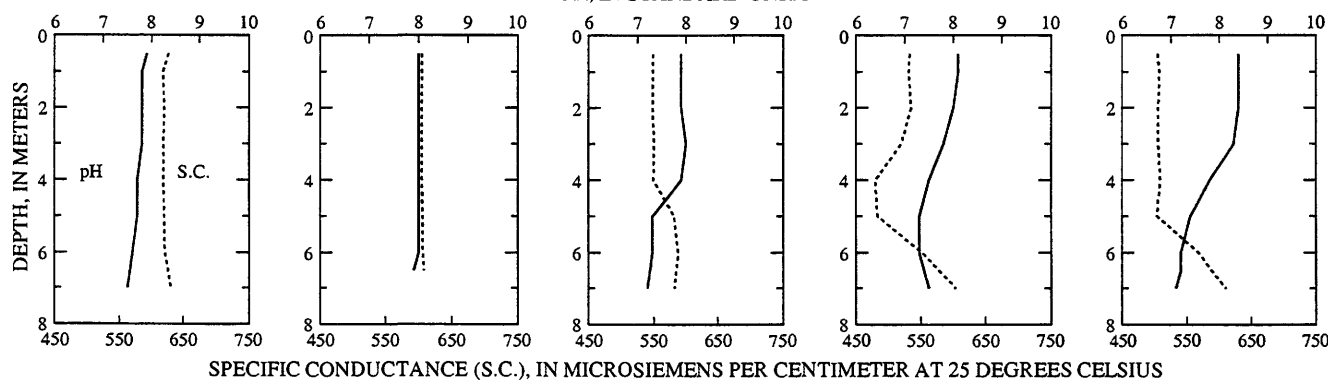
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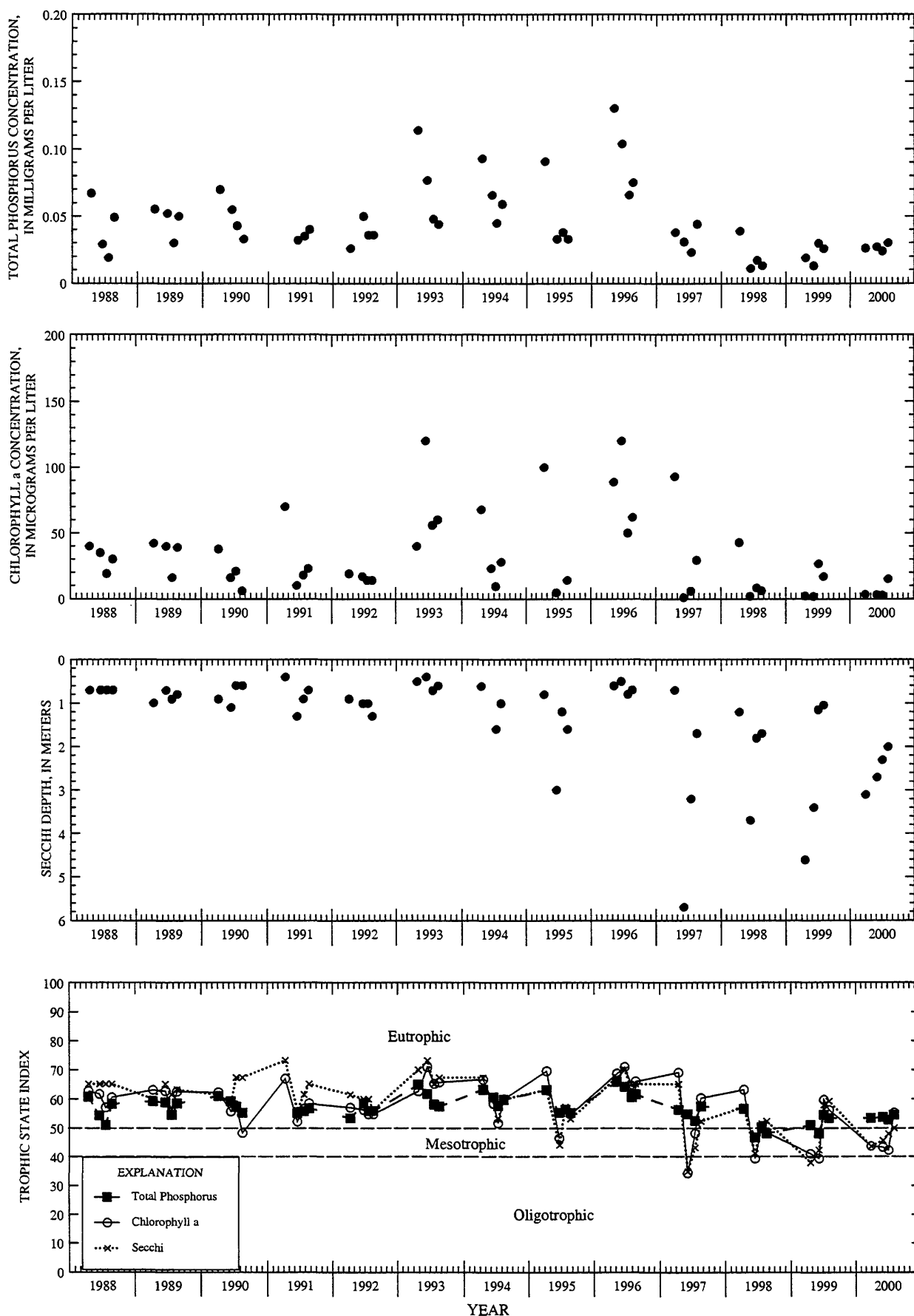
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



## pH, IN STANDARD UNITS



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



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

# **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<sup>2</sup>.

**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.**--Lake levels regulated by concrete dam with one 5-ft lift gate. 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, 12.20 ft, May 19, 20; minimum observed, 11.06 ft, July 2.

## **GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

### **DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.53	11.41	11.44	11.61	11.65	11.86	11.70	11.84	12.01	11.12	11.28	11.42
2	11.55	11.44	11.44	11.62	11.65	11.86	11.70	11.82	12.16	11.17	11.32	11.42
3	11.57	11.41	11.44	11.62	11.65	11.85	11.70	11.80	12.15	11.63	11.35	11.43
4	11.59	11.39	11.48	11.64	11.65	11.84	11.69	11.76	12.12	11.81	11.32	11.46
5	11.56	11.39	11.57	11.64	11.65	11.85	11.65	11.76	12.12	11.89	11.34	11.41
6	11.60	11.40	11.54	11.64	11.64	11.83	11.64	11.73	12.03	11.88	11.47	11.38
7	11.58	11.40	11.53	11.63	11.64	11.81	11.79	11.73	11.96	11.82	11.49	11.35
8	11.57	11.38	11.54	11.63	11.64	11.81	11.73	11.72	11.92	11.77	11.50	11.37
9	11.59	11.36	11.56	11.64	11.64	11.85	11.70	11.87	11.86	11.74	11.50	11.34
10	11.59	11.46	11.58	11.65	11.64	11.84	11.72	11.93	11.82	11.73	11.46	11.36
11	11.59	11.44	11.57	11.65	11.63	11.82	11.72	11.94	11.87	11.69	11.45	11.42
12	11.56	11.42	11.57	11.65	11.63	11.79	11.71	11.97	11.89	11.62	11.40	11.64
13	11.60	11.41	11.57	11.65	11.66	11.77	11.69	11.91	11.85	11.56	11.36	11.66
14	11.56	11.44	11.58	11.65	11.66	11.75	11.68	11.89	11.80	11.65	11.34	11.76
15	11.55	11.42	11.60	11.65	11.66	11.77	11.73	11.86	11.78	11.64	11.35	11.78
16	11.59	11.43	11.60	11.64	11.65	11.78	11.75	11.83	11.73	11.59	11.36	11.73
17	11.60	11.41	11.61	11.64	11.65	11.75	11.72	11.82	11.74	11.53	11.40	11.70
18	11.59	11.39	11.60	11.65	11.67	11.72	11.67	12.02	11.67	11.50	11.44	11.66
19	11.57	11.37	11.61	11.65	11.68	11.76	11.72	12.16	11.62	11.42	11.43	11.61
20	11.58	11.42	11.61	11.66	11.67	11.78	11.94	12.18	11.55	11.34	11.42	11.61
21	11.55	11.42	11.61	11.66	11.67	11.76	12.03	12.15	11.50	11.34	11.41	11.62
22	11.56	11.42	11.61	11.66	11.68	11.76	11.97	12.10	11.47	11.34	11.41	11.61
23	11.55	11.40	11.61	11.66	11.71	11.76	11.99	12.06	11.43	11.30	11.44	11.77
24	11.49	11.43	11.61	11.66	11.77	11.75	12.00	11.99	11.38	11.28	11.44	11.85
25	11.44	11.45	11.61	11.65	11.82	11.73	11.97	11.93	11.33	11.27	11.43	11.84
26	11.45	11.44	11.61	11.65	11.84	11.73	11.93	11.88	11.28	11.24	11.44	11.76
27	11.43	11.45	11.61	11.65	11.85	11.73	11.91	11.89	11.25	11.28	11.46	11.71
28	11.43	11.45	11.61	11.65	11.85	11.75	11.90	11.92	11.23	11.30	11.43	11.63
29	11.42	11.45	11.61	11.65	11.84	11.73	11.89	11.87	11.21	11.31	11.44	11.55
30	11.40	11.45	11.61	11.65	---	11.72	11.84	11.84	11.16	11.29	11.44	11.52
31	11.43	---	11.61	11.66	---	11.70	---	11.86	---	11.30	11.40	---
MEAN	11.54	11.42	11.57	11.65	11.69	11.78	11.79	11.90	11.70	11.50	11.41	11.58
MAX	11.60	11.46	11.61	11.66	11.85	11.86	12.03	12.18	12.16	11.89	11.50	11.85
MIN	11.40	11.36	11.44	11.61	11.63	11.70	11.64	11.72	11.16	11.12	11.28	11.34

# 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<sup>2</sup>.

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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

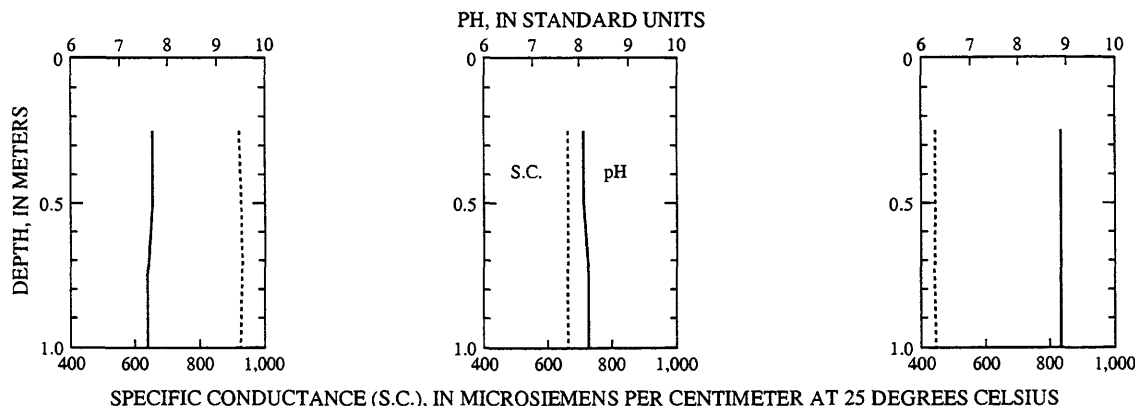
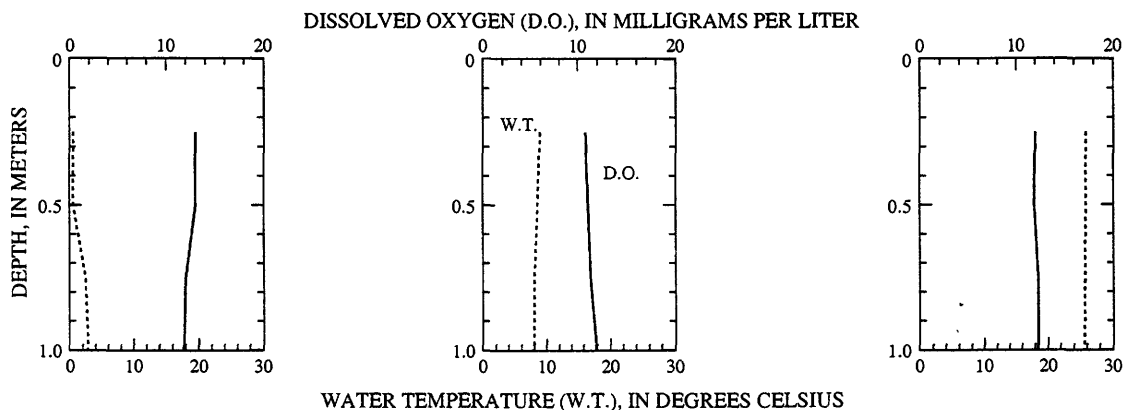
## WATER-QUALITY DATA, FEBRUARY 10 TO AUGUST 07, 2000 (Milligrams per liter unless otherwise indicated)

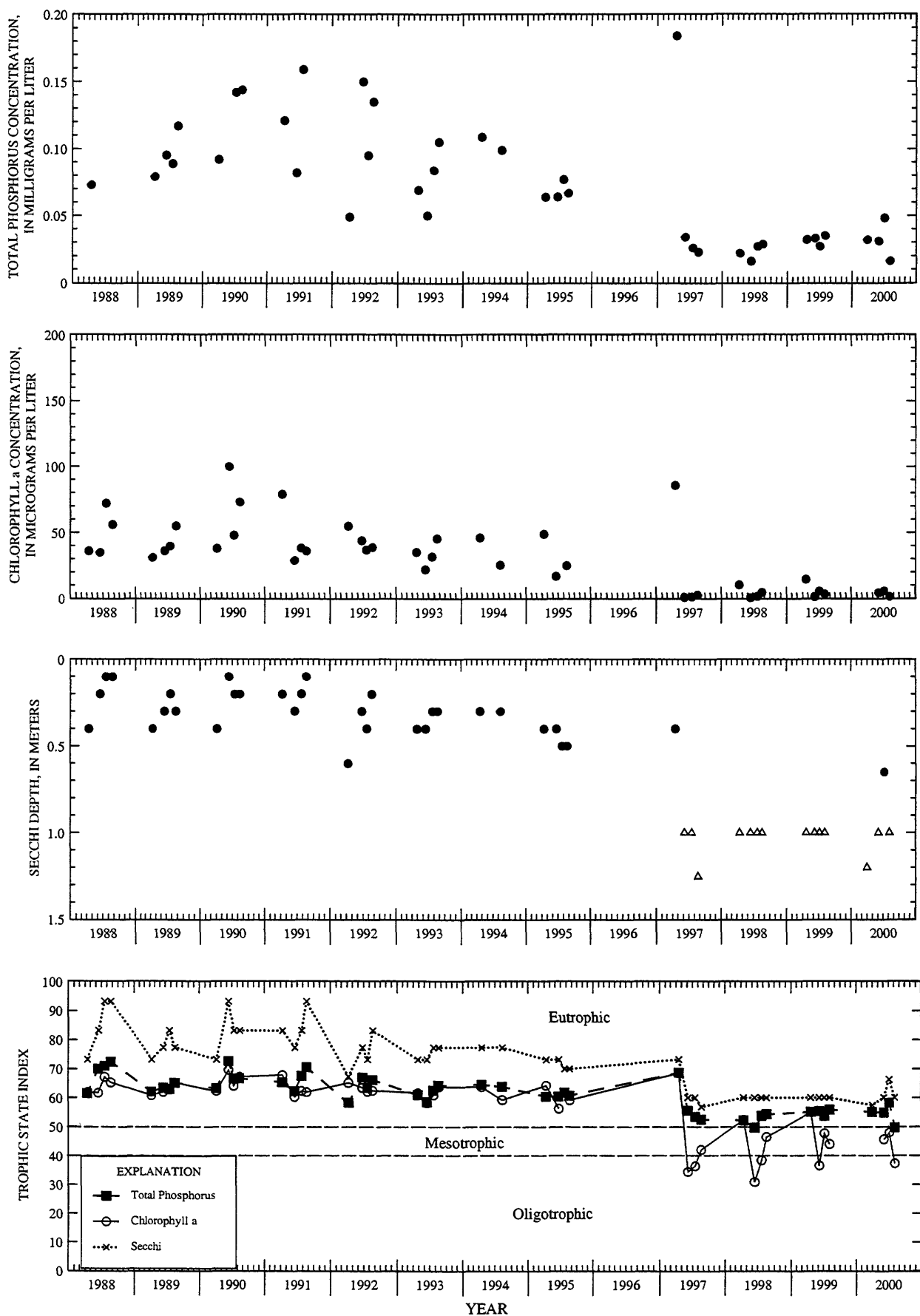
	Feb-10	Mar-30	Aug-7
Lake stage (ft)	11.63	11.72	11.49
Secchi-depth (m)	---	1.2	>1
Chlorophyll a, phytoplankton (mg/L)	0.015	---	1.4
Depth of sample (m)	0.2	1.0	0.5
Water temperature (°C)	0.5	2.8	8.5
Specific conductance (µS/cm)	921	926	665
pH (units)	7.7	7.6	8.1
Dissolved oxygen (mg/L)	13.0	11.8	11.0
Phosphorus, total (as P)	0.015	0.015	0.032
Phosphorus, ortho, dissolved (as P)	---	---	<0.002
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	<0.010
Nitrogen, ammonia, dissolved (as N)	---	---	0.016
Nitrogen, amm. + org., total (as N)	---	---	1
Nitrogen, amm + org., diss. (as N)	---	---	---
Nitrogen, total (as N)	---	---	1.02
Color (Pt-Co. scale)	---	---	30.0
Turbidity (NTU)	---	---	3.3
Hardness, (as CaCO <sub>3</sub> )	---	---	270
Calcium, dissolved (Ca)	---	---	60
Magnesium, dissolved (Mg)	---	---	28
Sodium, dissolved (Na)	---	---	37
Potassium, dissolved (K)	---	---	2.6
Alkalinity, (as CaCO <sub>3</sub> )	---	---	214
Sulfate, dissolved (SO <sub>4</sub> )	---	---	34.7
Chloride, dissolved (Cl)	---	---	71.9
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.3
Solids, dissolved, at 180°C	---	---	392
Iron, dissolved (Fe) µg/L	---	---	<10
Manganese, dissolved (Mn) µg/L	---	---	4

2-10-00

3-30-00

8-07-00





Surface total phosphorus, chlorophyll *a* concentrations, Secchi depths, and TSI data 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.)



425329088054000 MUSKEGO LAKE, AUXILIARY NUMBER 1, NEAR MUSKEGO, WI

LOCATION.--Lat 42°53'29", long 88°05'40", in SE 1/4 NW 1/4 sec.14, T.5 N., R.20 E., Waukesha County, Hydrologic Unit 0404003, near Muskego.

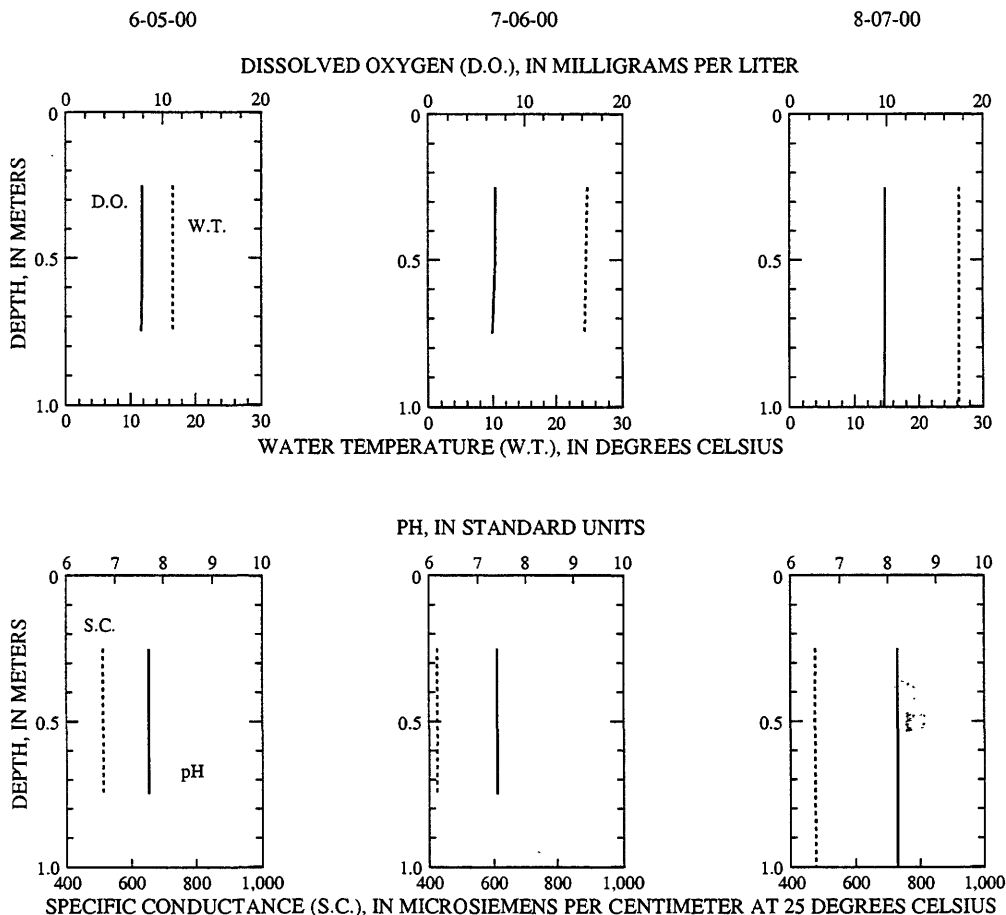
PERIOD OF RECORD.--June 1996 to current year.

REMARKS.--Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, JUNE 05 TO AUGUST 07, 2000

(Milligrams per liter unless otherwise indicated)

	Jun-5	Jul-6	Aug-7
Lake stage (ft)	12.22	11.88	11.49
Secchi-depth (m)	1.0	0.7	1.0
Chlorophyll a, phytoplankton (µg/L)	4.2	5.7	1.4
Depth of sample (m)	0.3	0.5	0.3
Water temperature (°C)	16.6	24.6	26.3
Specific conductance (µS/cm)	512	424	476
pH (units)	7.7	7.4	8.2
Dissolved oxygen (mg/L)	7.9	6.7	9.8
Phosphorus, total (as P)	0.031	0.048	0.022



# 455700089224900 MUSKELLUNGE LAKE NEAR EAGLE RIVER, WI

LOCATION.--Lat 45°57'00", long 89°22'49", in SE 1/4 NW 1/4 sec.16, T.40 N., R.9 E., Vilas County, Hydrologic Unit 07070001, 7 mi north-west of Eagle River.

PERIOD OF RECORD.--June to September 2000.

REMARKS.--Lake ice-covered during February sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, JUNE 26 TO AUGUST 18, 2000 (Milligrams per liter unless otherwise indicated)

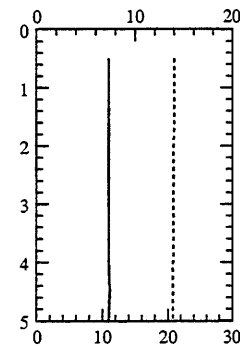
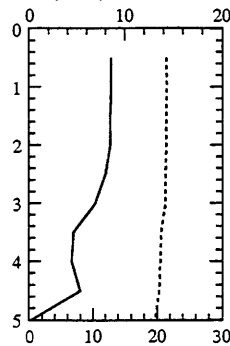
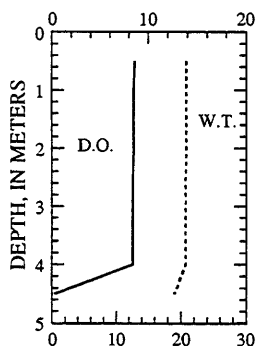
	Jun-26		Jul-20		Aug-18	
Lake stage (ft)	---		---		---	
Secchi-depth (m)	1.8		1.1		0.9	
Chlorophyll a, phytoplankton (µg/L)	5.5		11		6.5	
Depth of sample (m)	0.5	4.0	0.5	5.0	0.5	5.0
Water temperature (°C)	20.8	19.0	21.4	19.7	21.0	20.8
Specific conductance (µS/cm)	81	93	86	96	85	85
pH (units)	7.3	6.5	7.4	6.2	7.3	7.2
Dissolved oxygen (mg/L)	8.6	0.2	8.6	0.2	7.3	7.3
Phosphorus, total (as P)	0.027	0.028	0.035	0.067	0.057	0.051
Phosphorus, ortho, dissolved (as P)	---	---	0.002	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	<0.010	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	<0.013	---	---	---
Nitrogen, amm. + org., diss (as N)	---	---	0.53	---	---	---

6-26-00

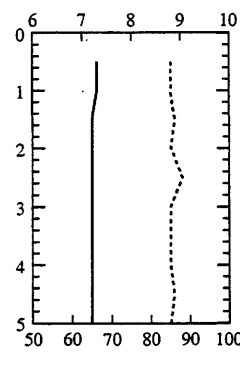
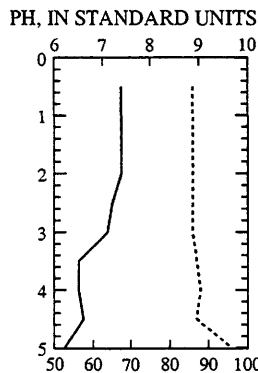
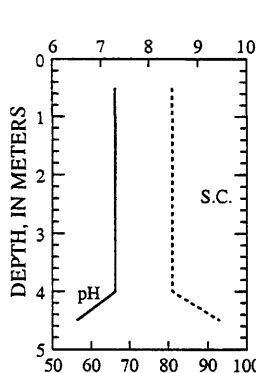
7-20-00

8-18-00

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



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



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

## 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 15 TO AUGUST 16, 2000  
(Milligrams per liter unless otherwise indicated)

	Feb-15		Apr-12		Jun-15		Jul-12		Aug-16		
Lake stage (ft)	7.05		7.88		8.20		8.24		8.18		
Secchi-depth (m)	---		7.6		3.1		3.9		2.5		
Chlorophyll a, phytoplankton (µg/L)	---		1.07		3		<1.00		1.4		
Depth of sample (m)	0.5	16.0	0.5	18.0	0.5	18.0	0.5	18.0	0.5	12.0	18.0
Water temperature (°C)	1.3	2.6	6.6	6.4	20.5	7.6	24.4	7.7	26.3	9.1	7.7
Specific conductance (µS/cm)	561	590	557	555	534	576	522	563	501	561	580
pH (units)	8.2	7.9	8.0	8.0	8.1	7.7	8.3	7.3	8.1	7.6	7.4
Dissolved oxygen (mg/L)	12.8	10.5	11.6	11.3	8.9	1.6	8.4	0.0	8.8	1.6	0.1
Phosphorus, total (as P)	0.010	0.009	0.012	0.012	0.013	0.039	0.032	0.020	0.009	0.023	0.034
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.225	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.09	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.64	---	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	0.87	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	15	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	0.6	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	250	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	46	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	34	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	17	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	1.7	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	215	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	27.1	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	36.8	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	6.2	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	324	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---	---

2-15-00

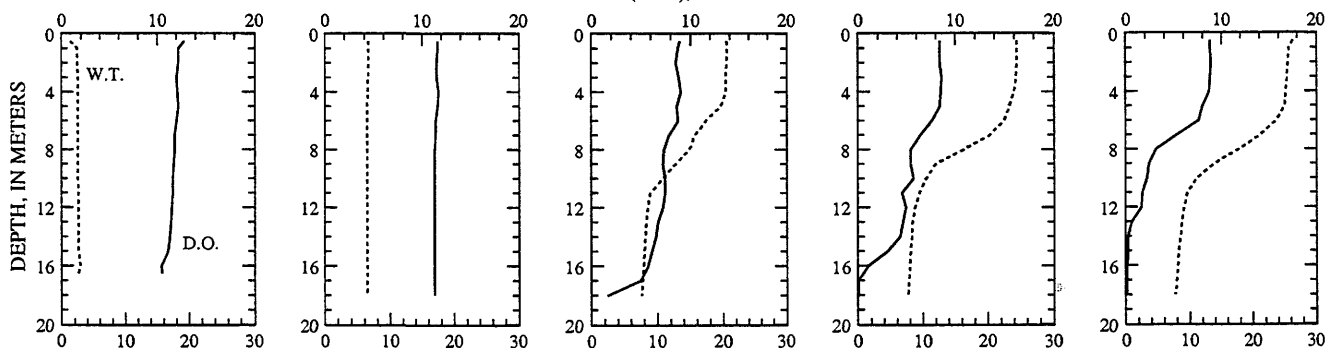
4-12-00

6-15-00

7-12-00

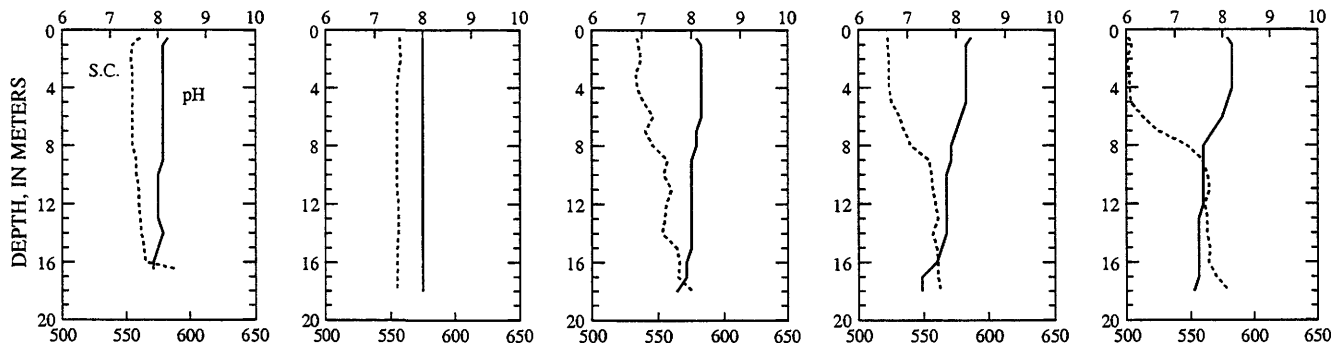
8-16-00

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

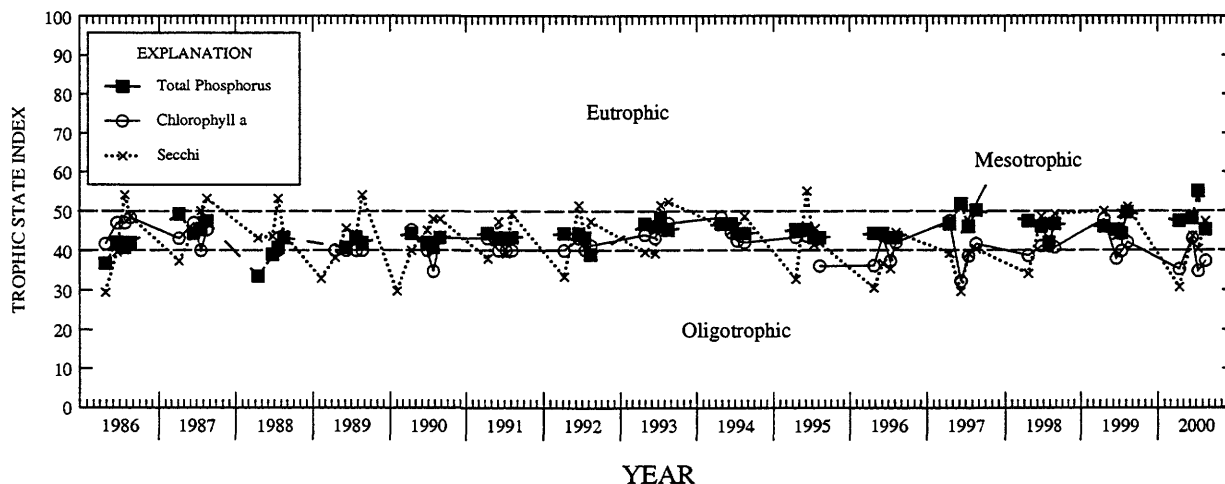
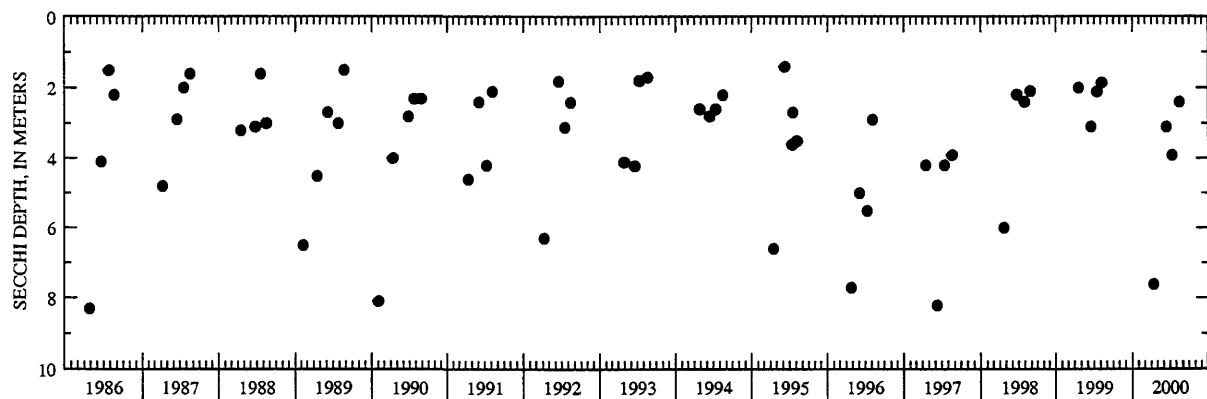
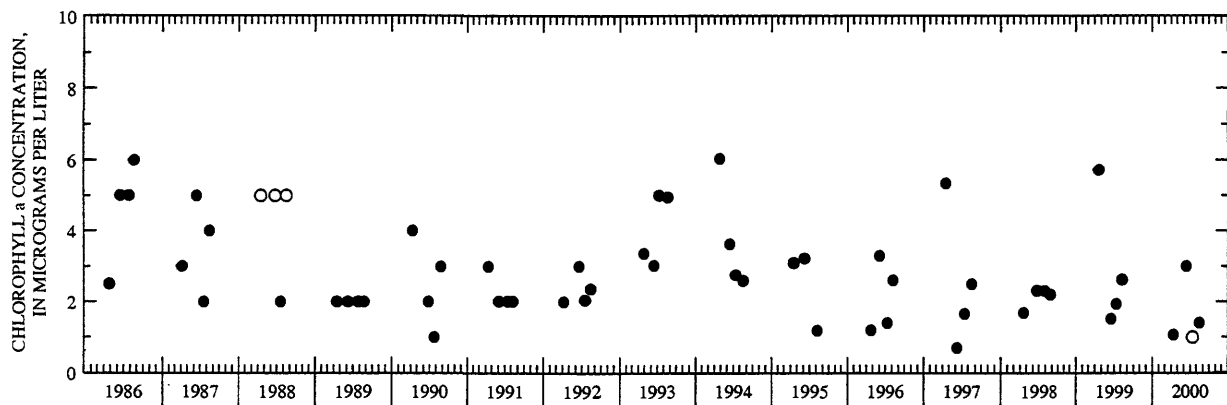
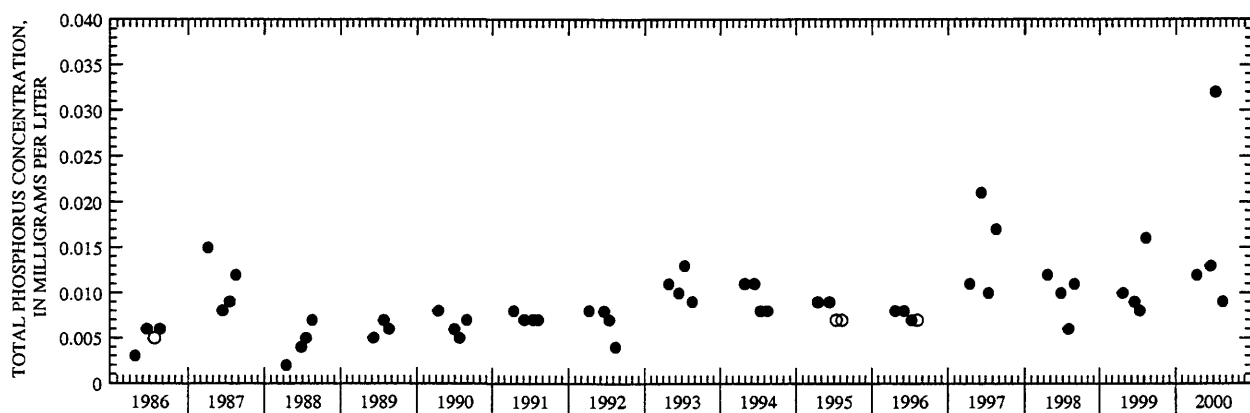


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



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

(Circles on the first three plots 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

**WATER-QUALITY DATA, FEBRUARY 15 TO AUGUST 16, 2000**  
(Milligrams per liter unless otherwise indicated)

	Feb-15		Apr-12		Jun-15		Jul-12		Aug-16		
Lake stage (ft)	7.05		7.88		8.20		8.24		8.18		
Secchi-depth (m)	---		7.8		2.7		3.5		2.5		
Chlorophyll a, phytoplankton (µg/L)	---		<1.00		3		<1.00		2.6		
Depth of sample (m)	0.5	14.0	0.5	14.0	0.5	14.5	0.5	14.5	0.5	10.0	14.5
Water temperature (°C)	1.4	4.2	7.1	6.8	21.1	8.0	8.0	8.0	26.5	9.6	8.2
Specific conductance (µS/cm)	606	660	595	593	563	610	610	610	549	604	625
pH (units)	8.1	7.4	8.0	8.0	8.3	7.6	7.4	7.4	8.1	7.5	7.3
Dissolved oxygen (mg/L)	13.0	4.3	11.4	11.1	8.8	0.0	0.0	0.0	8.7	0.2	0.0
Phosphorus, total (as P)	0.009	0.014	0.012	0.013	0.014	0.095	<0.005	0.061	0.008	0.020	0.091

2-15-00

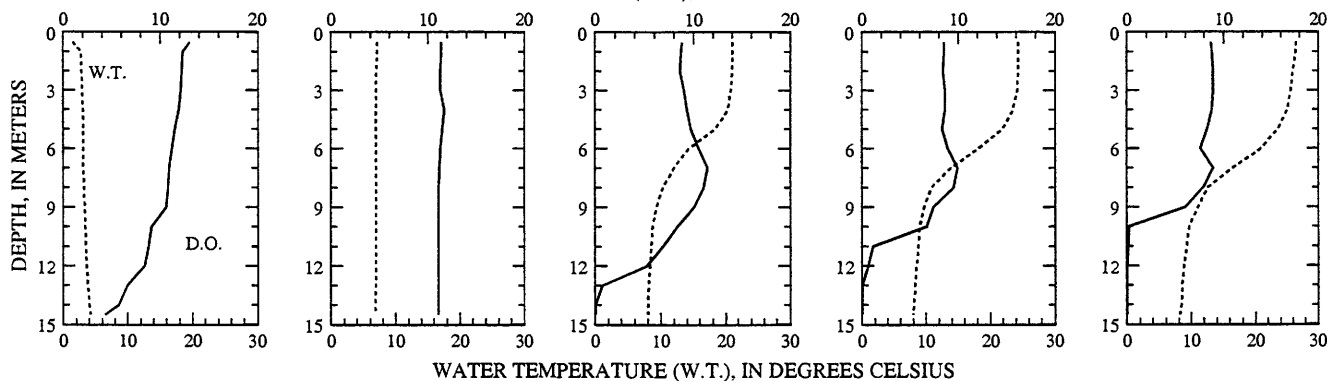
4-12-00

6-15-00

7-12-00

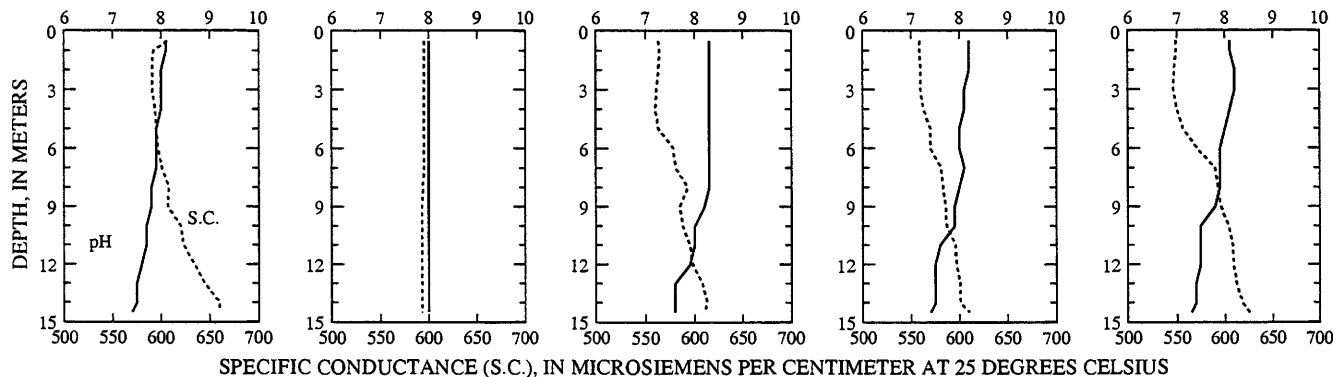
8-16-00

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

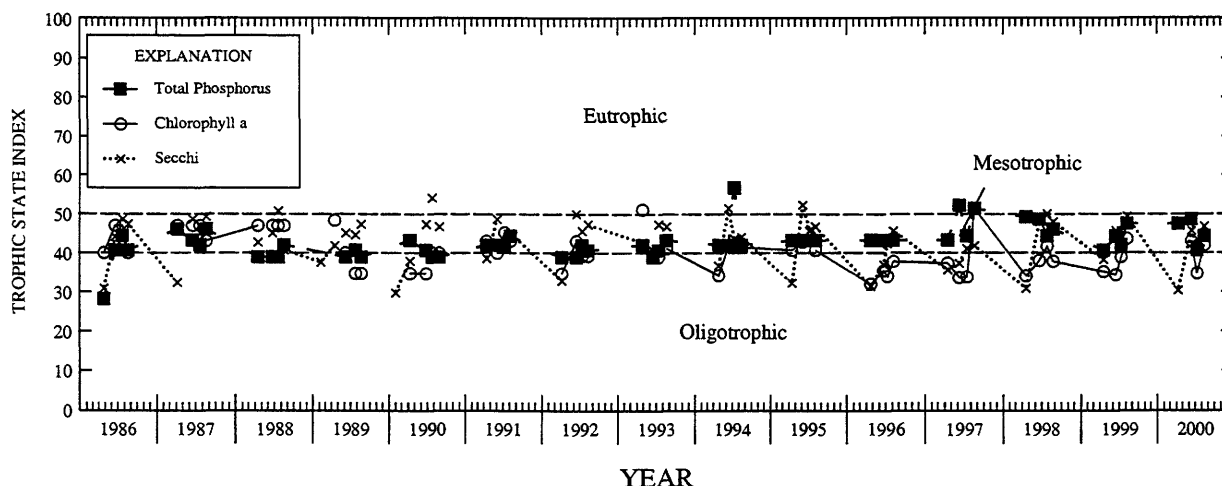
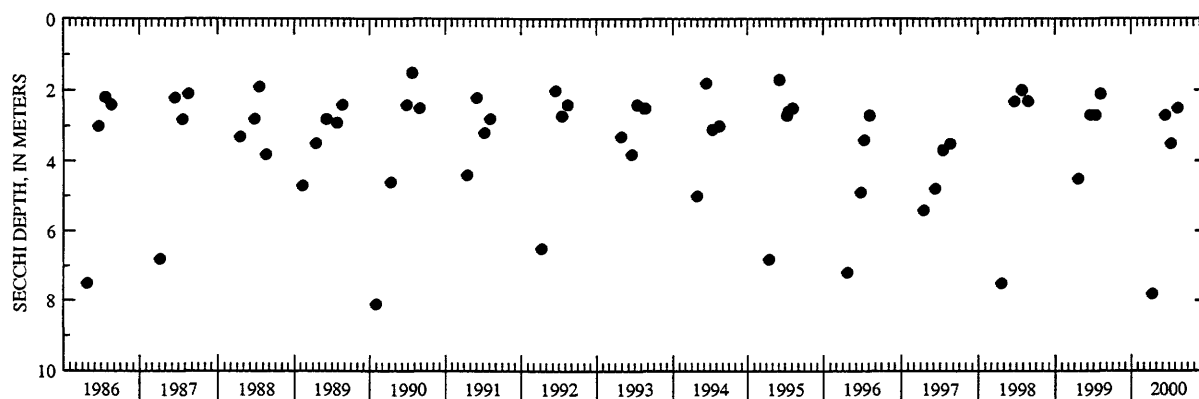
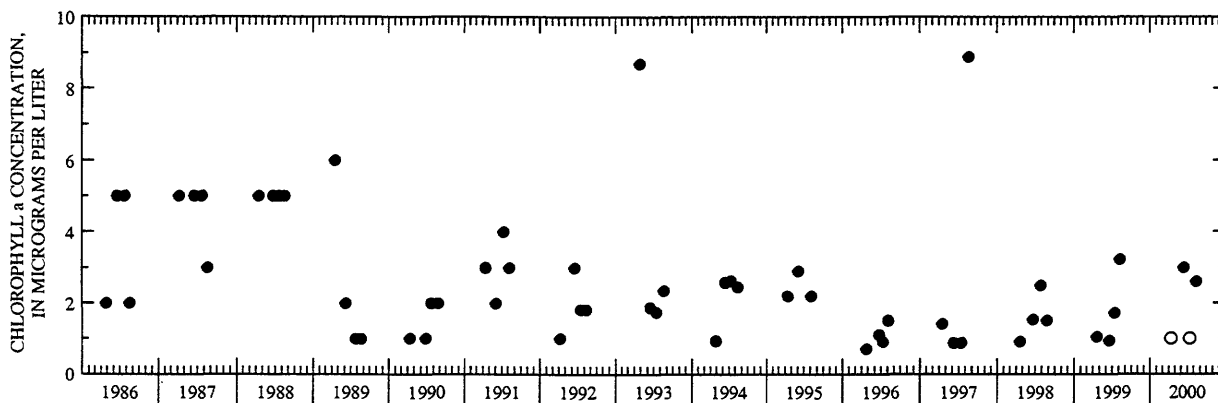
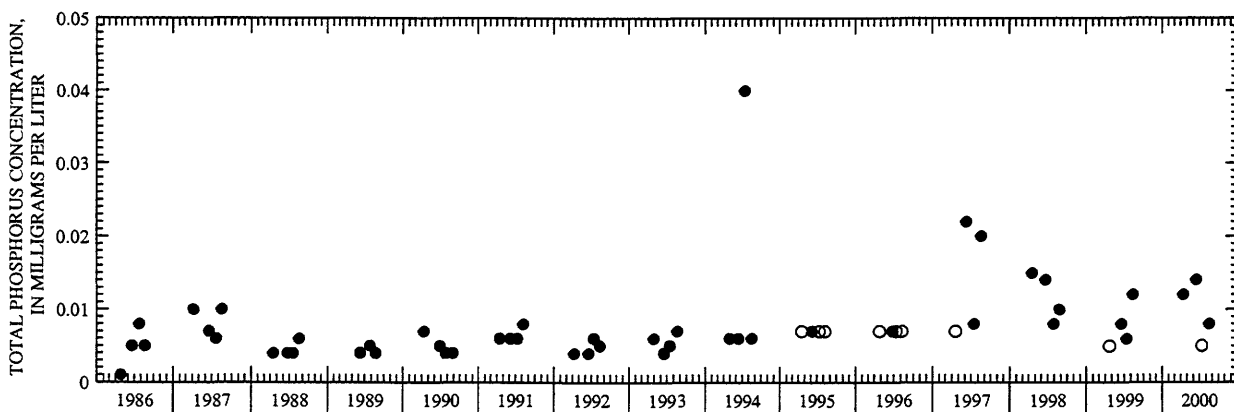


**WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS**

**pH, IN STANDARD UNITS**



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



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

(Circles on the first three plots 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<sup>2</sup>.

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

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

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

## WATER-QUALITY DATA, FEBRUARY 15 TO AUGUST 16, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-15		Apr-12		Jun-15		Jul-12		Aug-16		
Lake stage (ft)	4.17		4.74		4.59		4.67		4.65		
Secchi-depth (m)	---		3.4		2.9		2.1		0.8		
Chlorophyll a, phytoplankton (µg/L)	---		12		3		4		7		
Depth of sample (m)	0.5	27.0	0.5	27.0	0.5	28.5	0.5	26.0	0.5	13.0	28.0
Water temperature (°C)	1.0	2.0	6.1	6.0	20.1	6.8	23.8	6.9	25.3	8.7	6.8
Specific conductance (µS/cm)	556	585	557	560	534	567	521	566	490	565	580
pH (units)	8.3	7.8	8.1	8.2	8.0	7.6	8.0	7.6	8.1	7.7	7.5
Dissolved oxygen (mg/L)	14.0	8.2	12.5	11.9	8.4	0.0	8.8	0.0	8.0	1.5	0.1
Phosphorus, total (as P)	0.010	0.019	0.016	0.016	0.019	0.039	0.012	0.026	0.012	0.011	0.044
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.286	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.039	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.63	---	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	0.92	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	25	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	1.6	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	270	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	52	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	33	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	13	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	1.9	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	228	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	27.2	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	33.7	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	2.3	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	330	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---	---

2-15-00

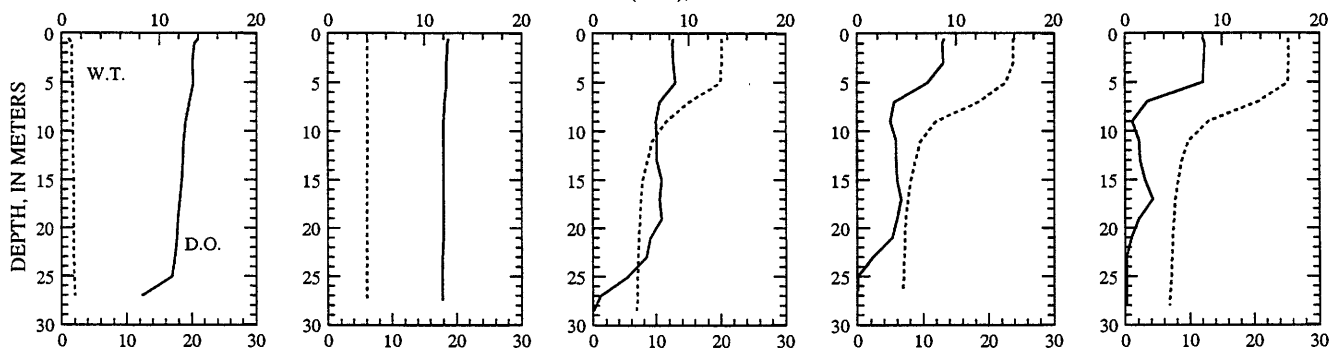
4-12-00

6-15-00

7-12-00

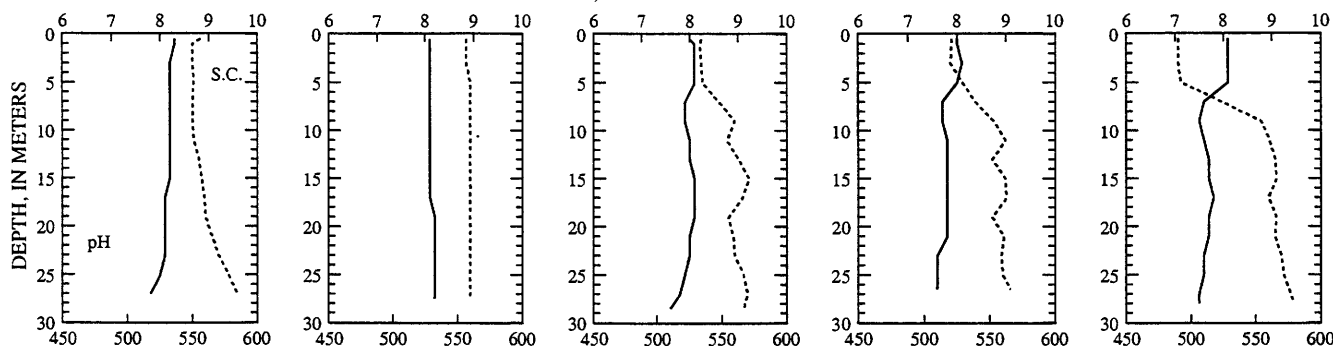
8-16-00

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

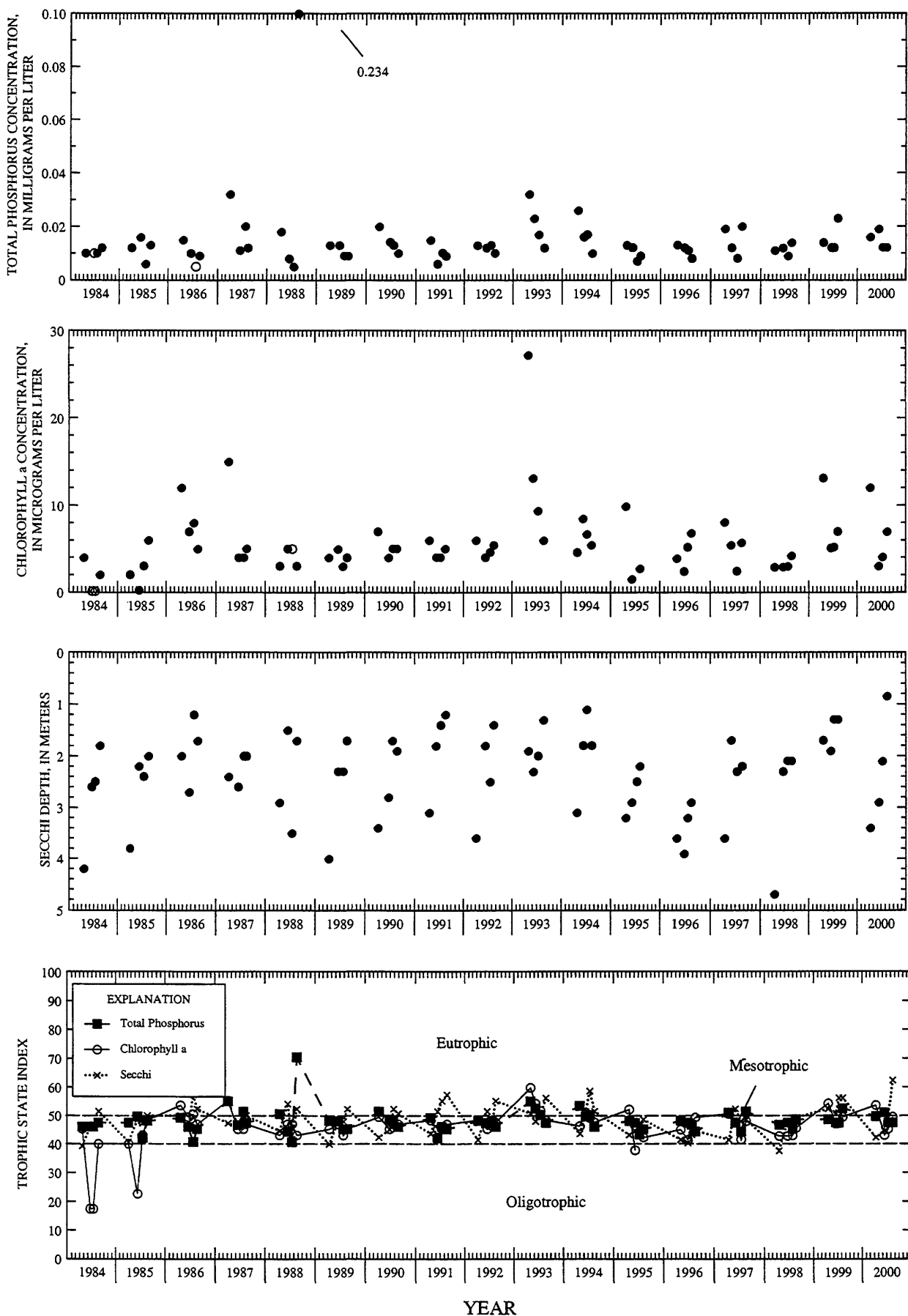


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## pH, IN STANDARD UNITS



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



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

(Circles on the first three plots 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 12 TO AUGUST 16, 2000  
(Milligrams per liter unless otherwise indicated)

	Apr-12	Jun-15	Jul-12	Aug-16
Lake stage (ft)	4.17	4.69	4.74	4.74
Secchi-depth (m)	3.1	1.7	1.0	1.0
Chlorophyll a, phytoplankton (µg/L)	10	3.3	3.4	6
Depth of sample (m)	0.5	0.5	0.5	0.5
Water temperature (°C)	6.2	20.5	23.2	25.7
Specific conductance (µS/cm)	557	532	541	492
pH (units)	8.2	8.4	8.2	8.2
Dissolved oxygen (mg/L)	12.4	8.7	8.5	8.8
Phosphorus, total (as P)	0.016	0.017	0.019	0.012

**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 12 TO AUGUST 16, 2000  
(Milligrams per liter unless otherwise indicated)

	Apr-12	Jun-15	Jul-12	Aug-16
Lake stage (ft)	4.17	4.69	4.74	4.74
Secchi-depth (m)	3.1	2.0	1.0	1.8
Chlorophyll a, phytoplankton (µg/L)	5	3.8	1.8	3
Depth of sample (m)	0.5	0.5	0.5	0.5
Water temperature (°C)	6.6	20.7	24.7	26.6
Specific conductance (µS/cm)	550	540	501	468
pH (units)	8.2	8.3	8.2	8.3
Dissolved oxygen (mg/L)	12.3	8.7	10.1	9.9
Phosphorus, total (as P)	0.016	0.018	0.012	0.015

**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 12 TO AUGUST 16, 2000**  
(Milligrams per liter unless otherwise indicated)

	Apr-12	Jun-15	Jul-12	Aug-16
	-----	-----	-----	-----
Lake stage (ft)	4.17	4.69	4.74	4.74
Secchi-depth (m)	3.1	2.0	1.0	1.4
Chlorophyll a, phytoplankton (µg/L)	7	3.6	1.6	6
Depth of sample (m)	0.5	0.5	0.5	0.5
Water temperature (°C)	6.2	20.6	25.0	25.8
Specific conductance (µS/cm)	554	525	490	460
pH (units)	8.2	8.4	8.2	8.3
Dissolved oxygen (mg/L)	12.3	8.9	9.3	9.1
Phosphorus, total (as P)	0.017	0.018	0.009	0.013

**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 12 TO AUGUST 16, 2000**  
(Milligrams per liter unless otherwise indicated)

	Apr-12	Jun-15	Jul-12	Aug-16
	-----	-----	-----	-----
Lake stage (ft)	4.17	4.69	4.74	4.74
Secchi-depth (m)	3.1	1.5	1.0	1.2
Chlorophyll a, phytoplankton (µg/L)	9	2.7	1.3	3.6
Depth of sample (m)	0.5	0.5	0.5	0.5
Water temperature (°C)	5.9	20.3	24.4	25.2
Specific conductance (µS/cm)	556	539	482	473
pH (units)	8.2	8.3	8.3	8.4
Dissolved oxygen (mg/L)	12.6	8.6	10.1	9.1
Phosphorus, total (as P)	0.016	0.018	0.009	0.013

**431835088200600 PIKE LAKE NEAR HARTFORD, WI**

LOCATION.--Lat 43°19'16", long 88°20'05", in SE 1/4 NW 1/4 NW 1/4 sec.23, T.10 N., R.18 E., Washington County, Hydrologic Unit 07090001, about 10 ft upstream of gates in outlet structure, south of State Highway 60, and about 1 mi east of Hartford.

DRAINAGE AREA.--

**LAKE-STAGE RECORD**

PERIOD OF RECORD.--December 1998 to November 2000 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 90.00 ft above datum used by the Pike Lake Advancement Association.

REMARKS.--Lake levels regulated by adjustment of two 5-ft-wide lift gates in concrete outlet structure.

EXTREMES FOR CURRENT PERIOD.--

DECEMBER 1998 TO NOVEMBER 1999.--Maximum observed gage height, 5.49 ft, July 22; minimum observed, 4.04 ft, Feb. 8.

DECEMBER 1999 TO NOVEMBER 2000.--Maximum observed gage height, 5.21 ft, May 20; minimum observed, 4.23 ft, Jan. 25.

**GAGE HEIGHT, FEET, YEAR DECEMBER 1998 TO NOVEMBER 1999**

**DAILY MEAN VALUES**

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	4.58	---	4.47	4.19	4.32	4.57	4.52	4.64	4.55	4.52	4.51	4.42
2	---	---	4.44	4.25	4.35	4.57	4.52	4.69	4.49	4.49	4.50	4.42
3	---	4.46	4.41	4.27	4.43	4.56	4.57	4.72	4.46	4.48	4.43	4.42
4	4.40	---	4.35	4.31	4.55	4.51	4.70	4.74	4.45	4.50	4.41	4.45
5	---	4.52	4.28	4.35	4.60	4.48	4.55	4.76	4.40	4.50	4.46	4.46
6	---	---	4.19	4.40	4.59	4.50	4.55	4.80	4.36	4.50	4.48	4.47
7	4.51	---	4.11	4.43	4.57	4.53	4.66	4.80	4.34	4.51	4.51	4.49
8	---	---	4.13	4.46	4.54	4.47	4.62	4.80	4.31	4.51	4.52	4.51
9	---	4.56	4.28	4.52	4.63	4.44	4.56	4.83	4.28	4.51	4.54	4.54
10	---	---	4.34	4.56	4.69	4.40	4.61	4.75	4.31	4.51	4.56	4.57
11	4.45	---	4.47	4.59	4.68	4.41	4.80	4.69	4.37	4.51	4.58	4.69
12	---	4.55	4.70	4.60	4.68	4.59	4.79	4.66	4.41	4.53	4.61	4.73
13	4.45	---	4.74	4.60	4.64	4.66	4.80	4.65	4.43	4.53	4.61	4.76
14	---	---	4.75	4.59	4.60	4.68	4.76	4.64	4.44	4.54	4.63	4.77
15	4.46	4.80	4.78	4.58	4.53	4.72	4.69	4.59	4.47	4.54	4.65	4.78
16	---	4.60	4.75	4.58	4.49	4.77	4.59	4.58	4.49	4.54	4.71	4.77
17	---	---	4.69	4.60	4.55	4.91	4.50	4.67	4.50	4.56	4.73	4.71
18	4.42	---	4.63	4.61	4.58	4.93	4.44	4.71	4.53	4.57	4.74	4.66
19	---	4.56	4.57	4.63	4.61	4.96	4.41	4.74	4.59	4.59	4.72	4.63
20	---	---	4.51	4.64	4.65	4.88	4.34	4.65	4.62	4.60	4.62	4.58
21	---	---	4.45	4.61	4.67	4.73	4.35	5.23	4.63	4.60	4.54	4.54
22	4.32	---	4.40	4.59	4.75	4.69	4.44	5.45	4.66	4.61	4.43	4.49
23	---	---	4.37	4.52	5.01	4.69	4.47	5.45	4.70	4.62	4.34	4.50
24	---	4.70	4.33	4.45	5.07	4.63	4.48	5.36	4.74	4.62	4.27	4.47
25	---	---	4.30	4.38	4.95	4.53	4.50	5.24	4.73	4.64	4.25	4.43
26	4.36	---	4.27	4.33	4.78	4.53	4.53	5.11	4.71	4.66	4.29	4.39
27	---	4.71	4.23	4.27	4.67	4.61	4.53	5.00	4.69	4.73	4.32	4.34
28	---	---	4.19	4.22	4.58	4.61	4.55	4.89	4.67	4.81	4.33	4.30
29	---	4.62	---	4.18	4.52	4.61	4.56	4.79	4.62	4.72	4.36	4.25
30	4.30	4.58	---	4.27	4.58	4.61	4.58	4.70	4.58	4.61	4.39	4.24
31	---	4.52	---	4.32	---	4.60	---	4.63	4.55	---	4.40	---

## 431835088200600 PIKE LAKE NEAR HARTFORD, WI--CONTINUED

GAGE HEIGHT, FEET, YEAR DECEMBER 1999 TO NOVEMBER 2000  
DAILY MEAN VALUES

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	4.29	4.59	4.38	4.90	4.47	4.53	4.63	4.81	4.59	4.56	---	---
2	4.30	4.62	4.40	4.82	4.46	4.50	4.83	4.84	4.55	4.58	---	---
3	4.34	4.64	4.42	4.75	4.43	4.46	4.91	4.99	4.48	4.59	---	---
4	4.39	4.67	4.44	4.68	4.42	4.45	4.90	4.95	4.45	4.57	4.52	4.60
5	4.45	4.65	4.45	4.58	4.44	4.48	4.86	4.83	4.53	4.55	---	4.62
6	4.49	4.62	4.47	4.53	4.41	4.50	4.78	4.72	4.65	4.53	---	4.62
7	4.52	4.59	4.48	4.54	4.43	4.52	4.71	4.62	4.66	4.52	---	---
8	4.52	4.56	4.50	4.55	4.47	4.56	4.64	4.55	4.64	4.53	---	---
9	4.54	4.54	4.51	4.53	4.49	4.61	4.57	4.47	4.63	4.56	4.58	4.62
10	4.55	4.54	4.53	4.52	4.51	4.66	4.54	4.46	4.62	4.57	---	4.60
11	4.51	4.53	4.54	4.50	4.52	4.69	4.48	4.49	4.61	4.61	---	---
12	4.46	4.50	4.56	4.48	4.55	4.81	4.41	4.52	4.58	4.61	---	---
13	4.42	4.47	4.60	4.47	4.57	4.81	4.42	4.53	4.58	4.58	---	---
14	4.38	4.46	4.63	4.45	4.58	4.74	4.53	4.56	4.54	4.61	---	4.54
15	4.35	4.44	4.64	4.44	4.58	4.68	4.52	4.57	4.46	4.59	---	4.53
16	4.31	4.41	4.66	4.40	4.57	4.65	4.52	4.57	4.42	4.58	4.56	4.53
17	4.28	4.39	4.67	4.38	4.58	4.63	4.52	4.58	4.52	4.59	---	4.52
18	4.31	4.37	4.71	4.35	4.55	4.90	4.55	4.57	4.55	4.61	---	4.51
19	4.34	4.35	4.73	4.33	4.53	5.10	4.58	4.56	4.56	4.62	---	4.50
20	4.37	4.35	4.74	4.34	4.62	5.18	4.63	4.57	4.57	4.63	---	4.48
21	4.38	4.32	4.75	4.36	4.70	5.18	4.64	4.57	4.58	4.62	---	4.46
22	4.40	4.31	4.74	4.40	4.74	5.08	4.63	4.58	4.59	4.61	4.60	4.44
23	4.42	4.28	4.76	4.43	4.76	4.96	4.65	4.58	4.60	4.61	---	4.43
24	4.44	4.26	4.82	4.48	4.75	4.84	4.67	4.59	4.60	4.54	4.58	4.42
25	4.46	4.25	4.83	4.52	4.72	4.71	4.71	4.60	4.57	4.54	---	4.41
26	4.48	4.26	4.89	4.56	4.70	4.61	4.73	4.60	4.56	4.59	---	4.43
27	4.50	4.28	4.98	4.58	4.67	4.53	4.74	4.61	4.55	4.60	---	4.44
28	4.52	4.29	4.98	4.55	4.63	4.49	4.75	4.64	4.53	4.62	4.54	4.43
29	4.54	4.31	4.95	4.53	4.59	4.45	4.78	4.66	4.52	---	---	4.45
30	4.55	4.34	---	4.51	4.56	4.42	4.80	4.67	4.53	---	---	4.46
31	4.57	4.37	---	4.49	---	4.44	---	4.64	4.55	---	---	---

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--February to September 2000.

REMARKS.--Lake ice-covered during February sampling. Water-quality analyses by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, FEBRUARY 16 TO AUGUST 18, 2000  
(Milligrams per liter unless otherwise indicated)

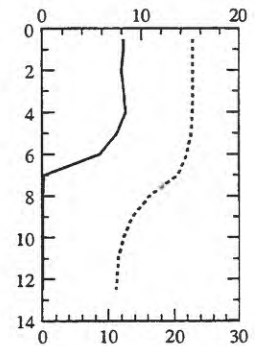
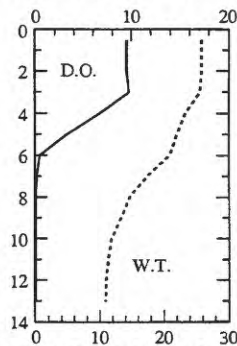
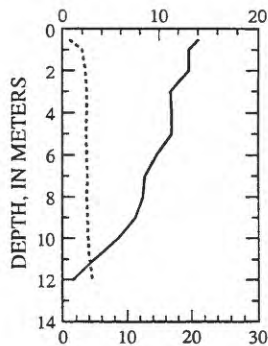
	Feb-16		Jul-17			Aug-18		
Lake stage (ft)	4.66		4.58			4.55		
Secchi-depth (m)	---		1.3			2.1		
Chlorophyll a, phytoplankton (µg/L)	---		6			6		
Depth of sample (m)	0.5	12.0	0.5	8.0	13.0	0.5	9.0	12.5
Water temperature (°C)	1.0	4.6	25.9	14.7	10.9	22.9	13.6	11.2
Specific conductance (µS/cm)	702	957	600	675	712	607	702	737
pH (units)	9.9	7.5	8.3	7.4	7.2	8.2	7.1	7.1
Dissolved oxygen (mg/L)	14.1	1.0	9.5	0.0	0.0	8.2	0.0	0.0
Phosphorus, total (as P)	---	---	0.024	0.038	0.098	0.018	0.047	0.115
Phosphorus, ortho, dissolved (as P)	---	---	0.004	---	0.051	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.021	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.023	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., diss (as N)	---	---	1.34	---	---	---	---	---

2-16-00

7-17-00

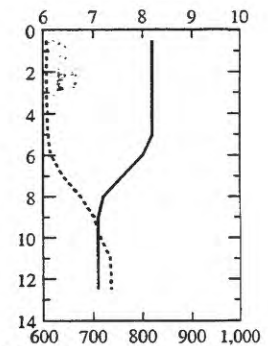
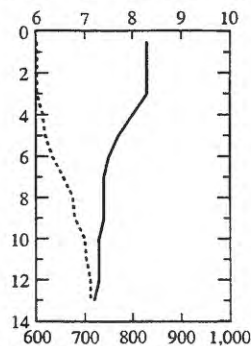
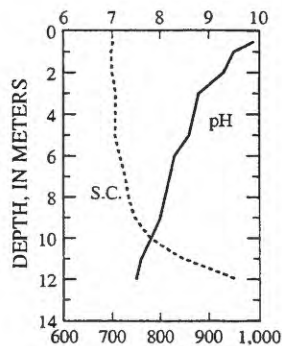
8-18-00

## 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

# 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 09 TO AUGUST 08, 2000 (Milligrams per liter unless otherwise indicated)

	Feb-9		Mar-29		Jun-8		Jul-6		Aug-8		
Lake stage (ft)	6.85		7.17		8.27		8.16		7.96		
Secchi-depth (m)	---		1.1		1.5		1.8		1.2		
Chlorophyll a, phytoplankton (µg/L)	---		18		14		13		8		
Depth of sample (m)	0.5	7.0	0.5	7.0	0.5	7.0	0.5	7.0	0.5	6.0	7.0
Water temperature (°C)	3.1	4.5	8.5	8.0	20.5	15.2	26.0	19.8	24.7	21.7	20.3
Specific conductance (µS/cm)	504	514	473	473	427	459	438	490	467	516	565
pH (units)	7.8	7.4	8.2	8.2	8.3	7.1	8.3	6.9	7.6	6.7	6.6
Dissolved oxygen (mg/L)	8.6	1.8	11.5	11.1	11.0	0.0	11.5	0.0	6.9	0.2	0.0
Phosphorus, total (as P)	0.036	0.052	0.036	0.036	0.029	0.037	0.033	0.078	0.028	0.052	0.066
Phosphorus, ortho, dissolved (as P)	---	---	0.013	---	---	---	0.016	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.045	---	---	---	0.018	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.363	---	---	---	0.031	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	1.6	---	---	---	---	---	---	---	---
Nitrogen, ammonia + org. diss. (as N)	---	---	---	---	---	---	1.14	---	---	---	---
Nitrogen, total (as N)	---	---	1.7	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	15	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	5.5	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	190	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	41	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	22	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	22	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.4	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	169	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	6.7	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	47.6	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.1	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	276	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	20	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	1.9	---	---	---	---	---	---	---	---

2-09-00

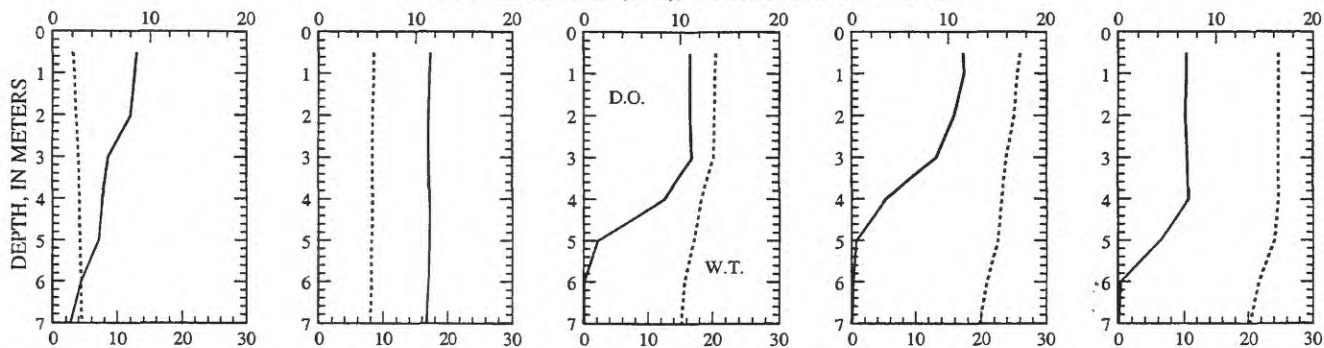
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6-08-00

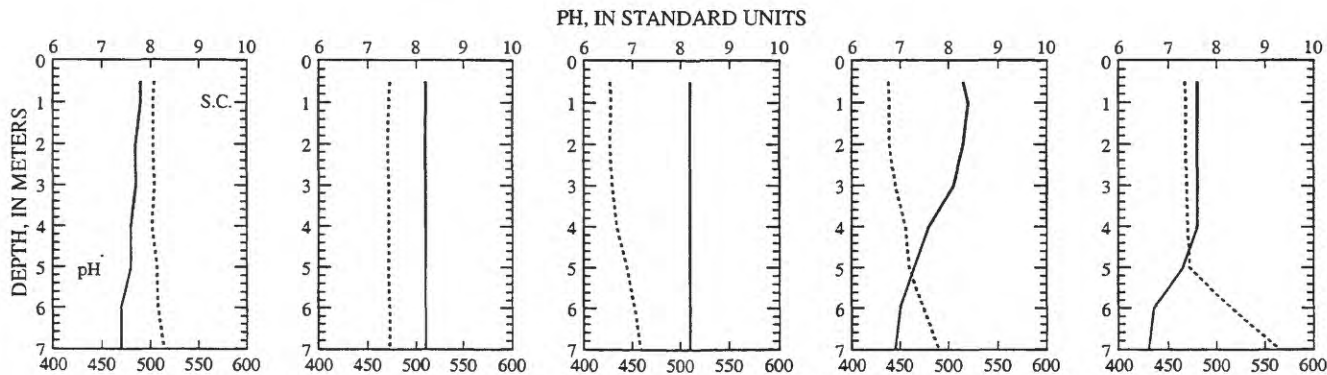
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8-08-00

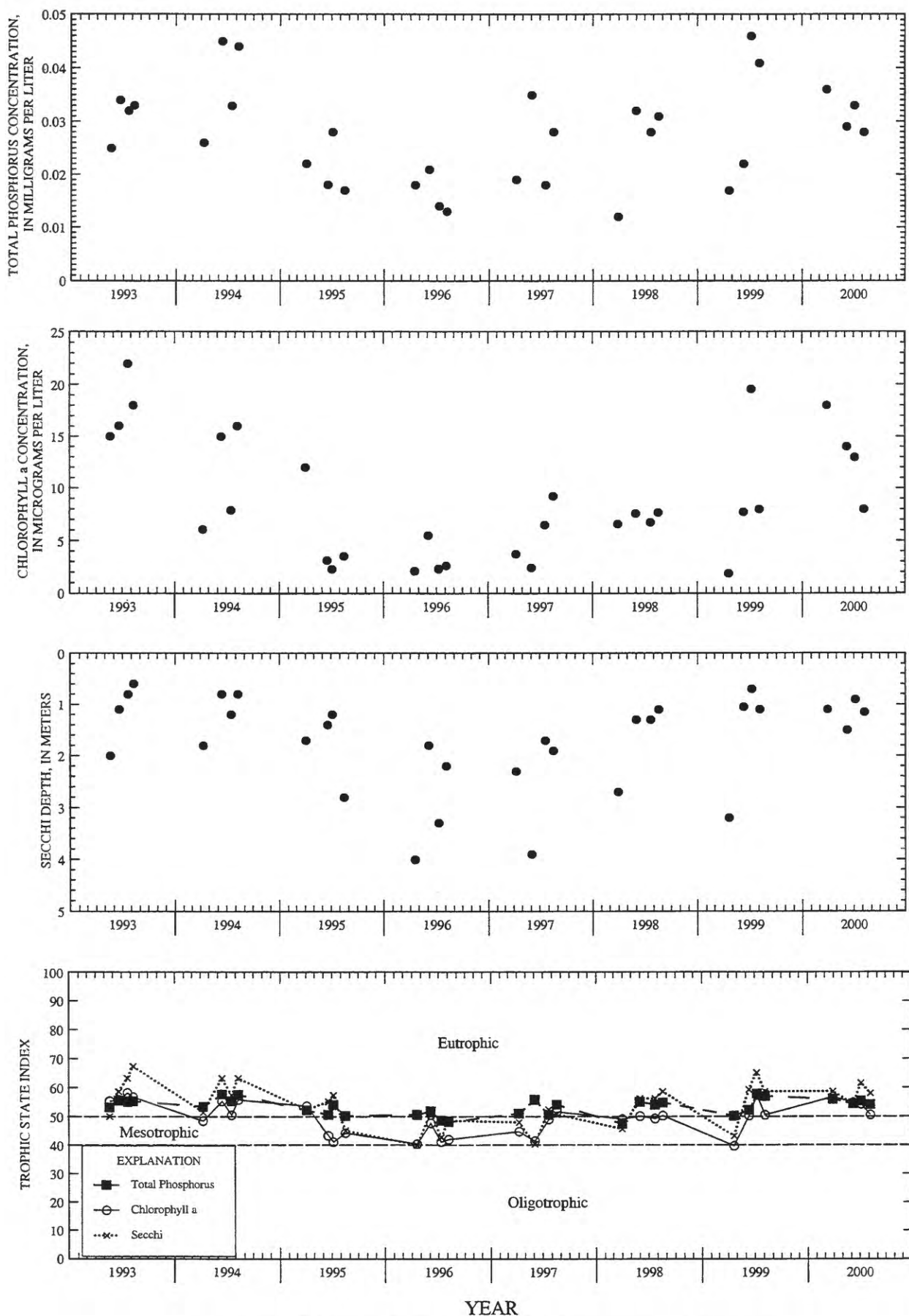
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



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

## 423246088175800 POWERS LAKE AT POWERS LAKE, WI

LOCATION.--Lat 42°32'46", long 88°17'58", in NW 1/4 SE 1/4 sec.13, T.1 N., R.18 E., Walworth County, Hydrologic Unit 07120006, at Powers Lake.

DRAINAGE AREA.--3.42 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1986 to August 1996, and April 1998 to current year.

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

WATER-QUALITY DATA, FEBRUARY 09 TO AUGUST 08, 2000  
(Milligrams per liter unless otherwise indicated)

	Feb-9		Apr-10		Jun-6		Jul-10		Aug-8		
Lake stage (ft)	9.91		9.86		10.49		10.52		10.32		
Secchi-depth (m)	---		5.6		4.1		3.4		3.4		
Chlorophyll a, phytoplankton (µg/L)	---		1.31		4		3		3.8		
Depth of sample (m)	0.5	10.0	0.5	10.0	0.5	10.0	0.5	10.0	0.5	8.0	10.0
Water temperature (°C)	0.9	4.2	7.7	7.7	19.2	13.0	24.3	14.6	25.0	20.3	15.6
Specific conductance (µS/cm)	495	508	498	500	483	514	463	517	480	502	538
pH (units)	8.2	7.7	8.2	8.2	8.1	7.4	8.0	7.3	8.1	7.3	7.2
Dissolved oxygen (mg/L)	14.3	4.6	11.1	10.7	9.8	0.1	8.4	0.0	8.9	0.5	0.0
Phosphorus, total (as P)	0.017	0.018	0.012	0.013	0.019	0.019	0.008	0.042	0.013	0.022	0.060
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	<0.002	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.04	---	---	---	<0.010	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	<0.013	---	---	---	<0.013	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.58	---	---	---	---	---	---	---	---
Nitrogen, ammonia + org. diss. (as N)	---	---	---	---	---	---	0.68	---	---	---	---
Nitrogen, total (as N)	---	---	0.62	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	13	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	1.7	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	220	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	37	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	32	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	18	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.2	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	176	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	33.3	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	38.4	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	7.2	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	282	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	<0.4	---	---	---	---	---	---	---	---

2-09-00

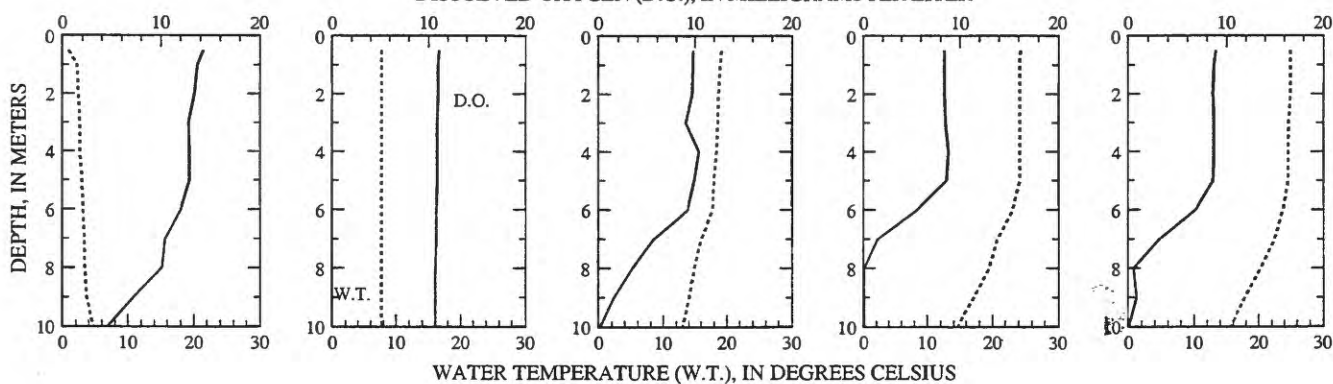
4-10-00

6-06-00

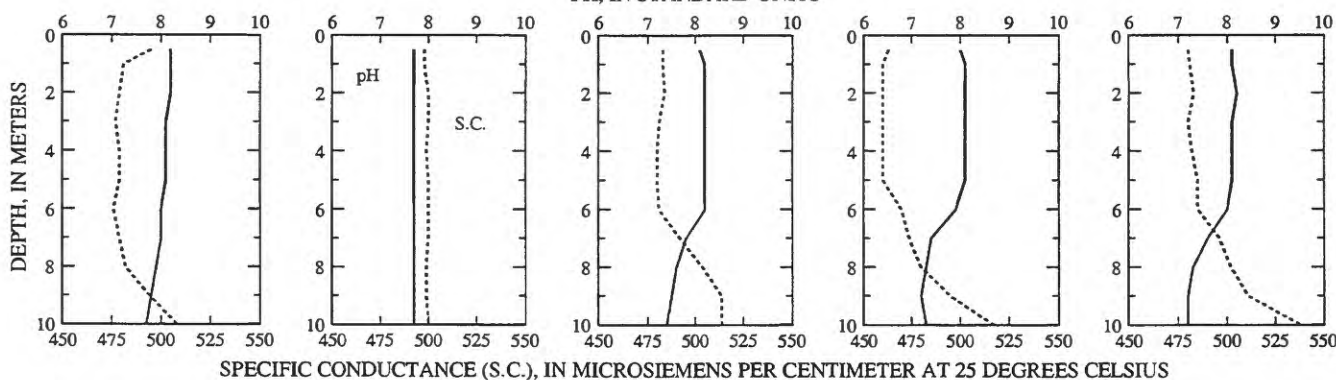
7-10-00

8-08-00

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

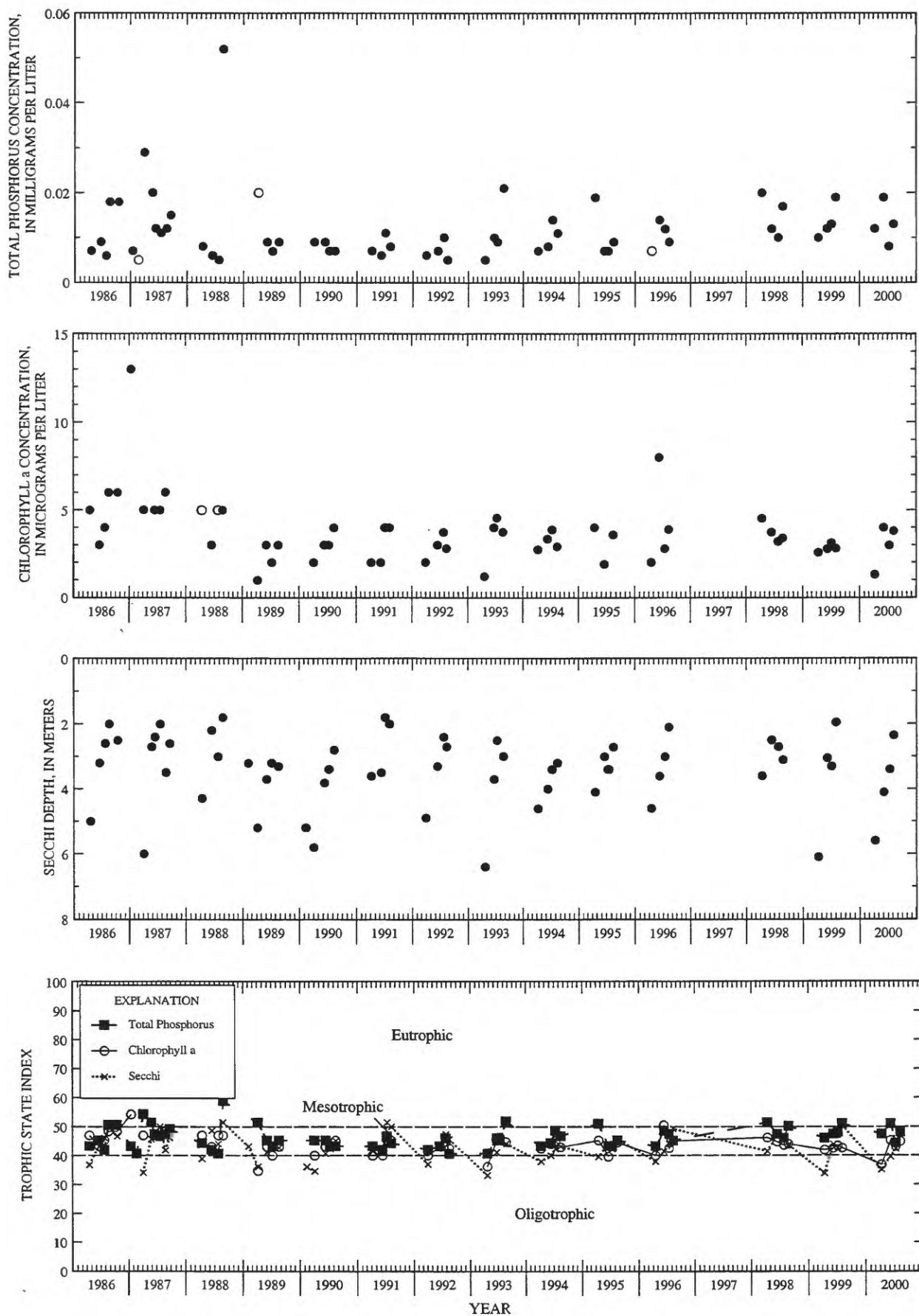


## PH, IN STANDARD UNITS



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





Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Powers Lake at Powers Lake, Wisconsin.

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

# 423153088184800 TOMBEAU LAKE NEAR POWERS LAKE, WI

LOCATION.--Lat 42°31'53", long 88°18'48", in SE 1/4 NE 1/4 sec.24, T.1 N., R.18 E., Walworth County, Hydrologic Unit 07120006, 1.5 mi southwest of Powers Lake.

PERIOD OF RECORD.--May 1998 to current year.

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

## WATER-QUALITY DATA, FEBRUARY 09 TO AUGUST 08, 2000

(Milligrams per liter unless otherwise indicated)

	Feb-9		Apr-10		Jun-7		Jul-10		Aug-8		
Lake stage (ft)	---		825.86		826.42		826.47		825.86		
Secchi-depth (m)	---		2.0		1.9		1.9		0.8		
Chlorophyll a, phytoplankton (µg/L)	---		13		6		9		37		
Depth of sample (m)	0.5	8.0	0.5	8.0	0.5	8.0	0.5	8.5	0.5	5.0	8.0
Water temperature (°C)	1.5	4.0	7.7	7.0	19.7	7.8	25.2	7.7	25.6	9.8	7.8
Specific conductance (µS/cm)	605	652	627	627	534	657	527	665	582	639	709
pH (units)	8.0	7.4	8.2	8.1	7.8	7.3	7.9	7.2	8.3	7.4	7.1
Dissolved oxygen (mg/L)	11.8	2.4	11.5	9.8	8.9	0.0	9.0	0.0	11.7	0.5	0.0
Phosphorus, total (as P)	0.028	0.052	0.061	0.047	0.023	0.300	0.023	0.533	0.030	0.053	0.860
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	<0.002	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	1.14	---	---	---	0.149	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.085	---	---	---	<0.013	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	0.95	---	---	---	---	---	---	---	---
Nitrogen, ammonia + org., diss. (as N)	---	---	---	---	---	---	0.67	---	---	---	---
Nitrogen, total (as N)	---	---	2.1	---	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	15	---	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	2.2	---	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	300	---	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	59	---	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	37	---	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	18	---	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	2.7	---	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	229	---	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	43.6	---	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	43.3	---	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	9.4	---	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	374	---	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	0.5	---	---	---	---	---	---	---	---

2-09-00

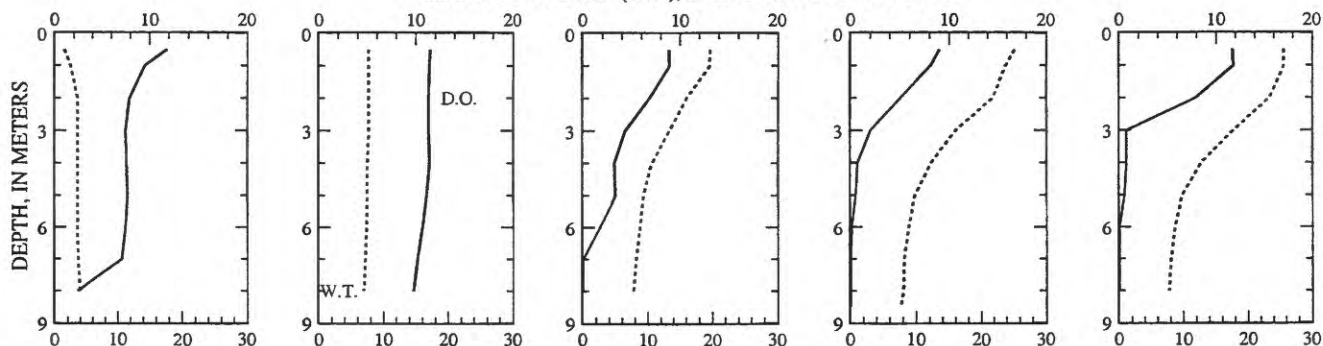
4-10-00

6-07-00

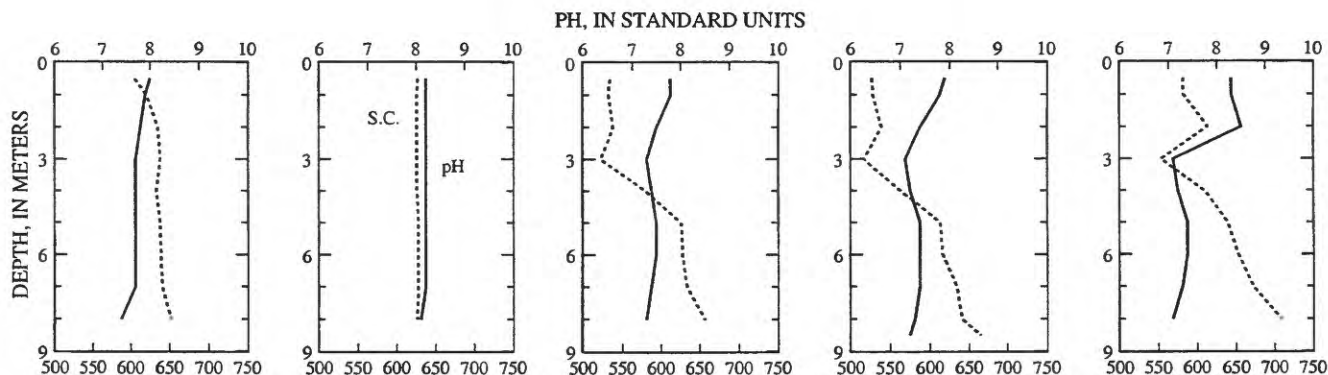
7-10-00

8-08-00

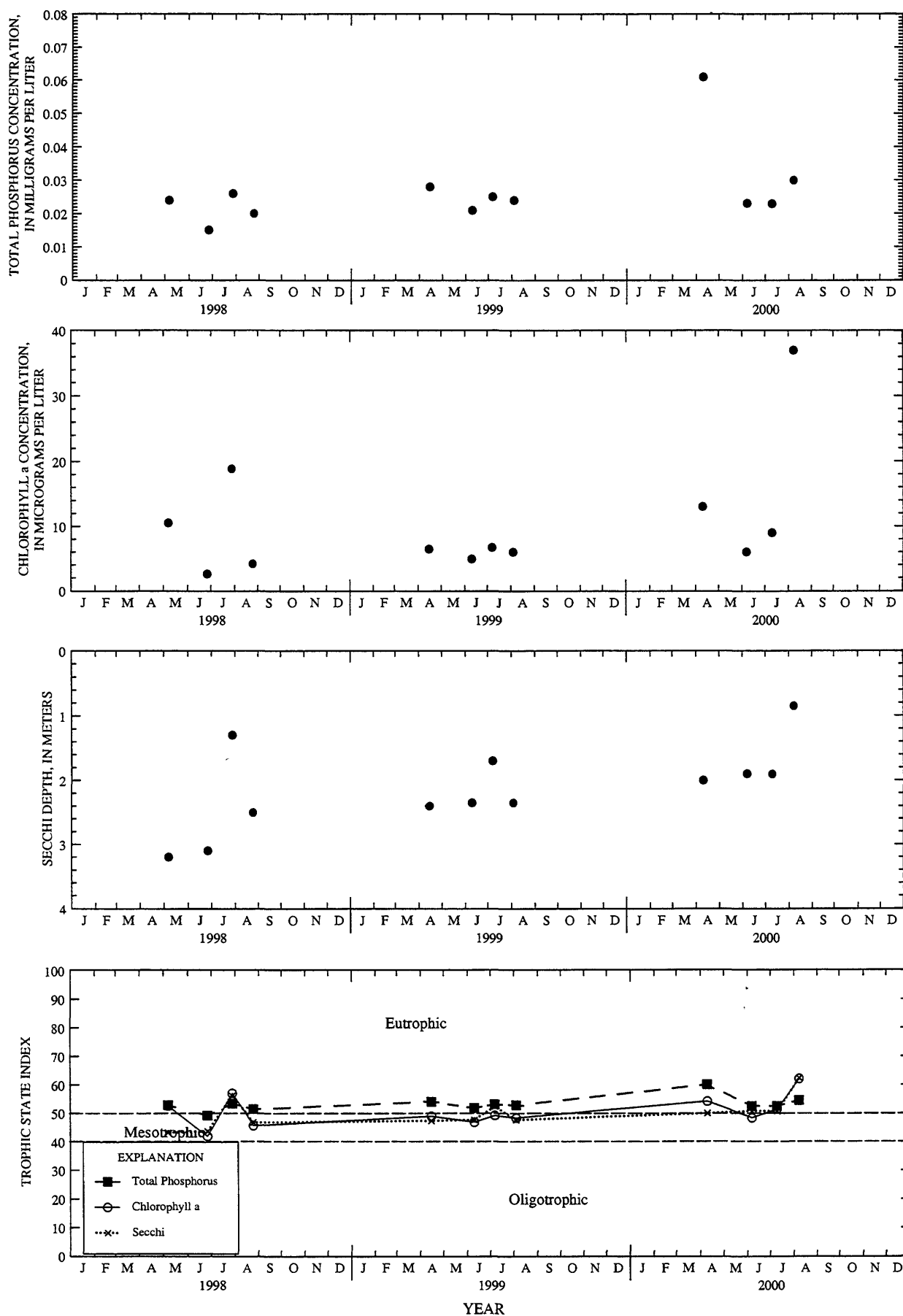
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Tombeau Lake near Powers Lake, Wisconsin.

# 441721090431700 WAZEE LAKE NEAR BLACK RIVER FALLS, WI

LOCATION.--Lat 44°17'21", long 90°43'17", in NE 1/4 NE 1/4 sec.22, T.2 N., R.3 W., Jackson County, Hydrologic Unit 07040007, 7.0 mi east of Black River Falls.

PERIOD OF RECORD.--November 1999 to September 2000.

REMARKS.--Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, NOVEMBER 23, 1999 TO AUGUST 24, 2000 (Milligrams per liter unless otherwise indicated)

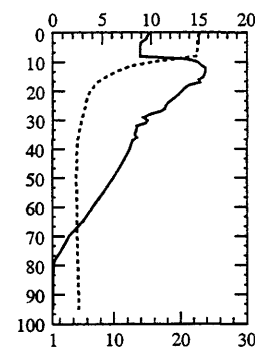
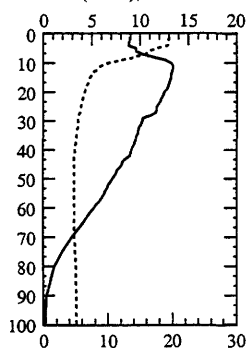
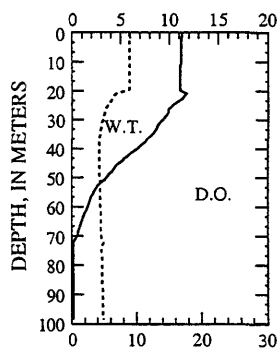
	Nov- 23	Jun-14						Aug-24
Secchi-depth (m)	12.5	---						17.1
Depth of sample (m)	0.9	0.5	20.0	40.0	60.0	70.0	80.0	1.0
Water temperature (°C)	8.9	19.5	6.4	4.9	4.8	4.9	5.0	22.7
Specific conductance (µS/cm)	237	239	248	251	265	277	287	244
pH (units)	7.8	7.6	7.8	7.1	6.9	7.0	7.0	7.6
Dissolved oxygen (mg/L)	11.3	8.9	12.5	9.1	5.2	3.0	1.1	9.7
Phosphorus, total (as P)	---	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	---
Phosphorus, ortho, dissolved (as P)	---	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	0.342	0.315	0.352	0.316	0.266	0.166	---
Nitrogen, ammonia, dissolved (as N)	---	0.022	<0.013	<0.013	<0.013	<0.013	<0.013	---
Nitrogen, amm. + org., total (as N)	---	0.18	0.22	<0.14	0.15	<0.14	<0.14	---
Nitrogen, total (as N)	---	0.522	0.535	---	0.466	---	---	---

11-23-99

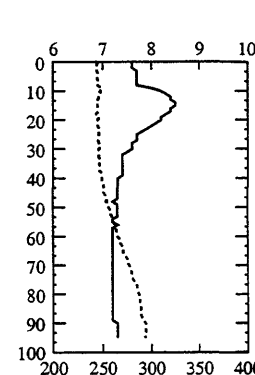
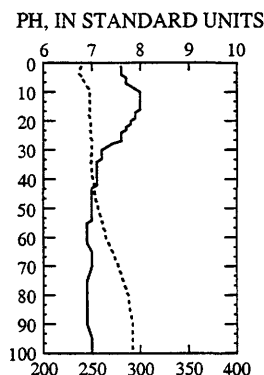
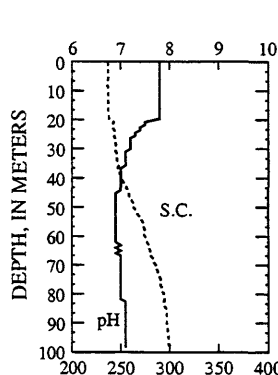
6-14-00

8-24-00

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



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



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

461321091520900 WHITEFISH LAKE, NORTH SITE, NEAR GORDON, WI

LOCATION.--Lat 46°13'21", long 91°52'09", in NW 1/4 SE 1/4 sec.9, T.43 N., R.12 W., Douglas County, Hydrologic Unit 07030002, near Gordon.

PERIOD OF RECORD.--March 1998 to current year.

REMARKS.--Lake sampled at deepest part of northern basin. Lake ice-covered during March sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA, MARCH 03 TO AUGUST 10, 2000  
(Milligrams per liter unless otherwise indicated)

	Mar-3	Apr-12	Jun-8	Jul-13		Aug-10	
Lake stage (ft)	---	4.82	4.74	4.88		4.79	
Secchi-depth (m)	---	6.6	8.0	6.6		7.5	
Chlorophyll a, phytoplankton (µg/L)	---	1.07	<1.00	1.07		1.5	
Depth of sample (m)	0.5	0.5	0.5	0.5	15.0	0.5	16.0
Water temperature (°C)	3.2	5.8	19.1	22.7	12.8	23.8	12.7
Specific conductance (µS/cm)	41	37	38	39	52	37	79
pH (units)	7.4	7.3	7.9	8.0	6.8	8.0	7.0
Dissolved oxygen (mg/L)	14.6	12.7	9.7	9.6	0.2	8.7	0.1
Phosphorus, total (as P)	0.006	0.008	<0.005	0.006	0.026	<0.005	0.044

3-03-00

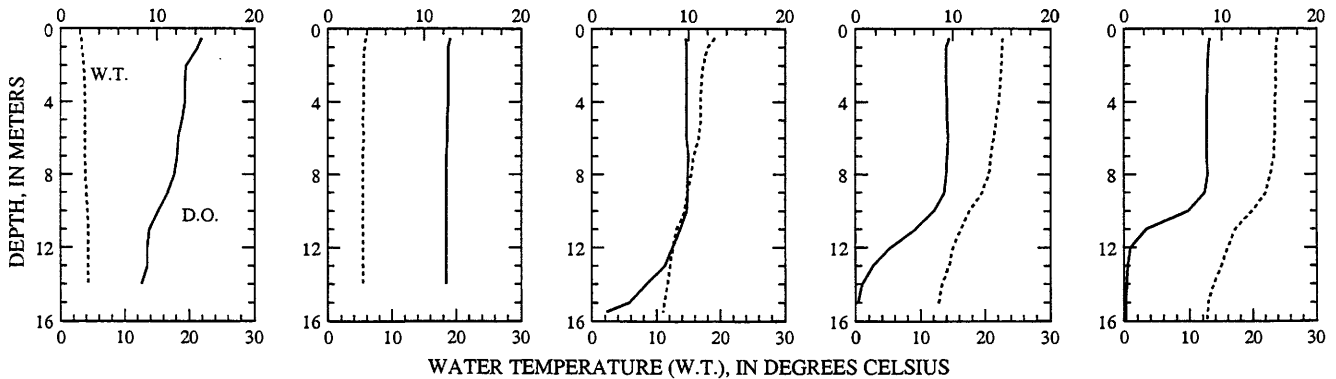
4-12-00

6-08-00

7-13-00

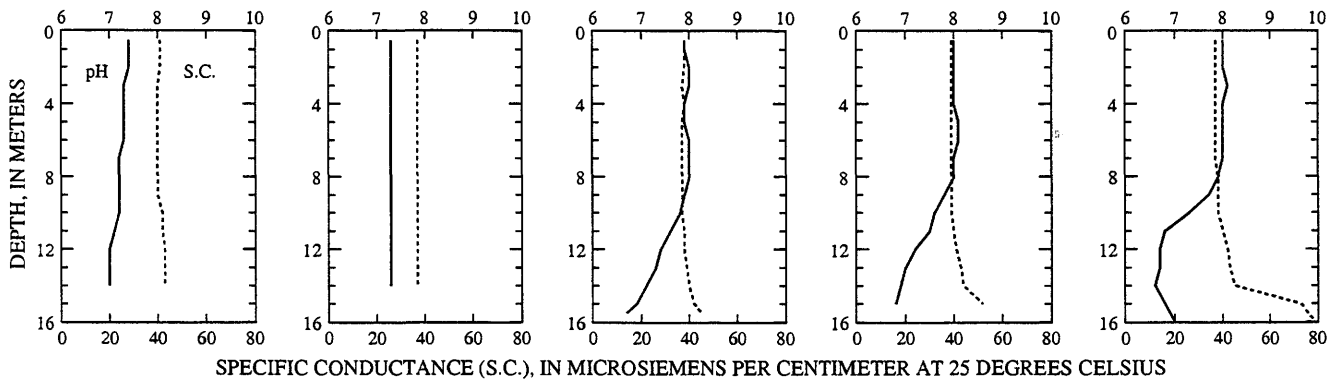
8-10-00

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

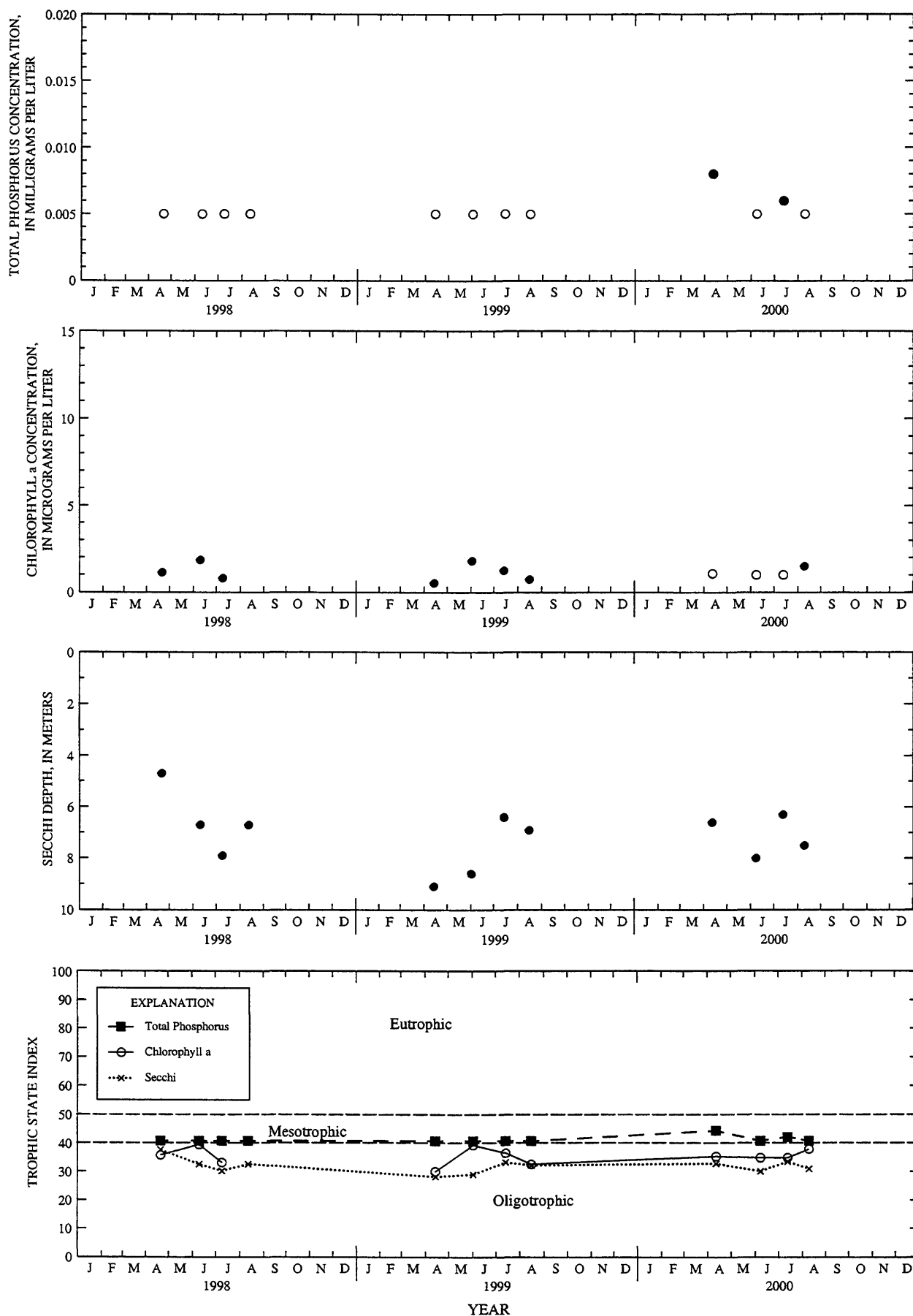


WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

pH, IN STANDARD UNITS



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Whitefish Lake, North Basin site, near Gordon, Wisconsin.

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

# 461212091523200 WHITEFISH LAKE, SOUTH BASIN, NEAR GORDON, WI

LOCATION.--Lat 46°12'12", long 91°52'32", in SE 1/4 SW 1/4 sec.16, T.43 N., R.12 W., Douglas County, Hydrologic Unit 07030002, near Gordon.

PERIOD OF RECORD.--March 1998 to current year.

REMARKS.--Lake sampled at deepest part of southern basin. Lake ice-covered during March sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, MARCH 03 TO AUGUST 10, 2000 (Milligrams per liter unless otherwise indicated)

	Mar-3		Apr-12		Jun-8		Jul-13		Aug-10	
Lake stage (ft)	---		4.82		4.74		4.88		4.79	
Secchi-depth (m)	---		6.4		8.6		8.3		7.90	
Chlorophyll a, phytoplankton (µg/L)	---		<1.00		<1.00		<1.00		1.7	
Depth of sample (m)	0.5	27.0	0.5	27.0	0.5	28.0	0.5	27.0	0.5	28.0
Water temperature (°C)	2.3	3.8	5.4	5.2	18.1	5.5	22.5	5.8	23.4	5.8
Specific conductance (µS/cm)	39	46	37	37	38	40	39	42	37	43
pH (units)	7.3	6.7	6.8	7.1	8.0	6.2	7.9	7.0	8.1	6.5
Dissolved oxygen (mg/L)	13.6	1.2	12.7	12.4	9.9	6.4	9.2	2.8	8.3	0.2
Phosphorus, total (as P)	0.007	0.163	0.010	0.009	<0.005	0.035	0.006	0.065	---	0.044
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	<0.002	---	<0.002	0.003
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.041	---	---	---	0.013	---	0.011	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.015	---	---	---	0.038	---	<0.013	---
Nitrogen, amm. + org., total (as N)	---	---	0.41	---	---	---	---	---	---	---
Nitrogen, total (as N)	---	---	0.45	---	---	---	---	---	---	---
Color (Pt-Co. scale)	---	---	15	---	---	---	---	---	---	---
Turbidity (NTU)	---	---	0.7	---	---	---	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	35	---	---	---	---	---	---	---
Calcium, dissolved (Ca)	---	---	12	---	---	---	---	---	---	---
Magnesium, dissolved (Mg)	---	---	1.3	---	---	---	---	---	---	---
Sodium, dissolved (Na)	---	---	0.9	---	---	---	---	---	---	---
Potassium, dissolved (K)	---	---	0.4	---	---	---	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	26	---	---	---	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	<4.5	---	---	---	---	---	---	---
Chloride, dissolved (Cl)	---	---	0.6	---	---	---	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.2	---	---	---	---	---	---	---
Solids, dissolved, at 180°C	---	---	26	---	---	---	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	30	---	---	---	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	4	---	---	---	---	---	---	---

3-03-00

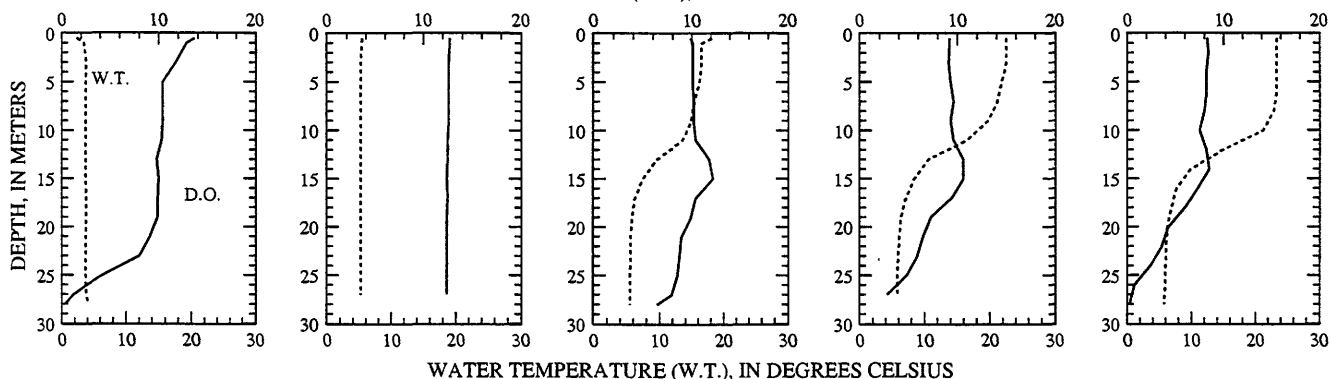
4-12-00

6-08-00

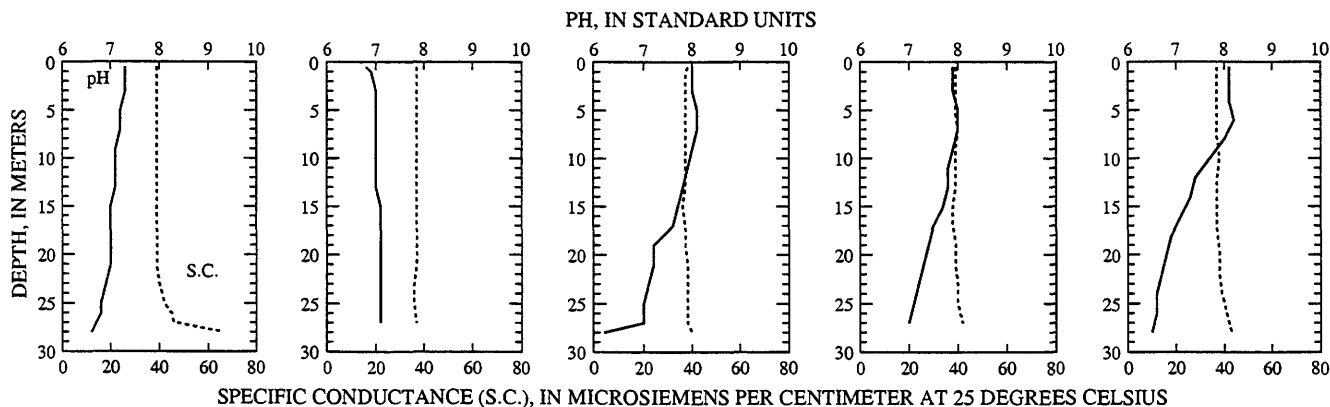
7-13-00

8-10-00

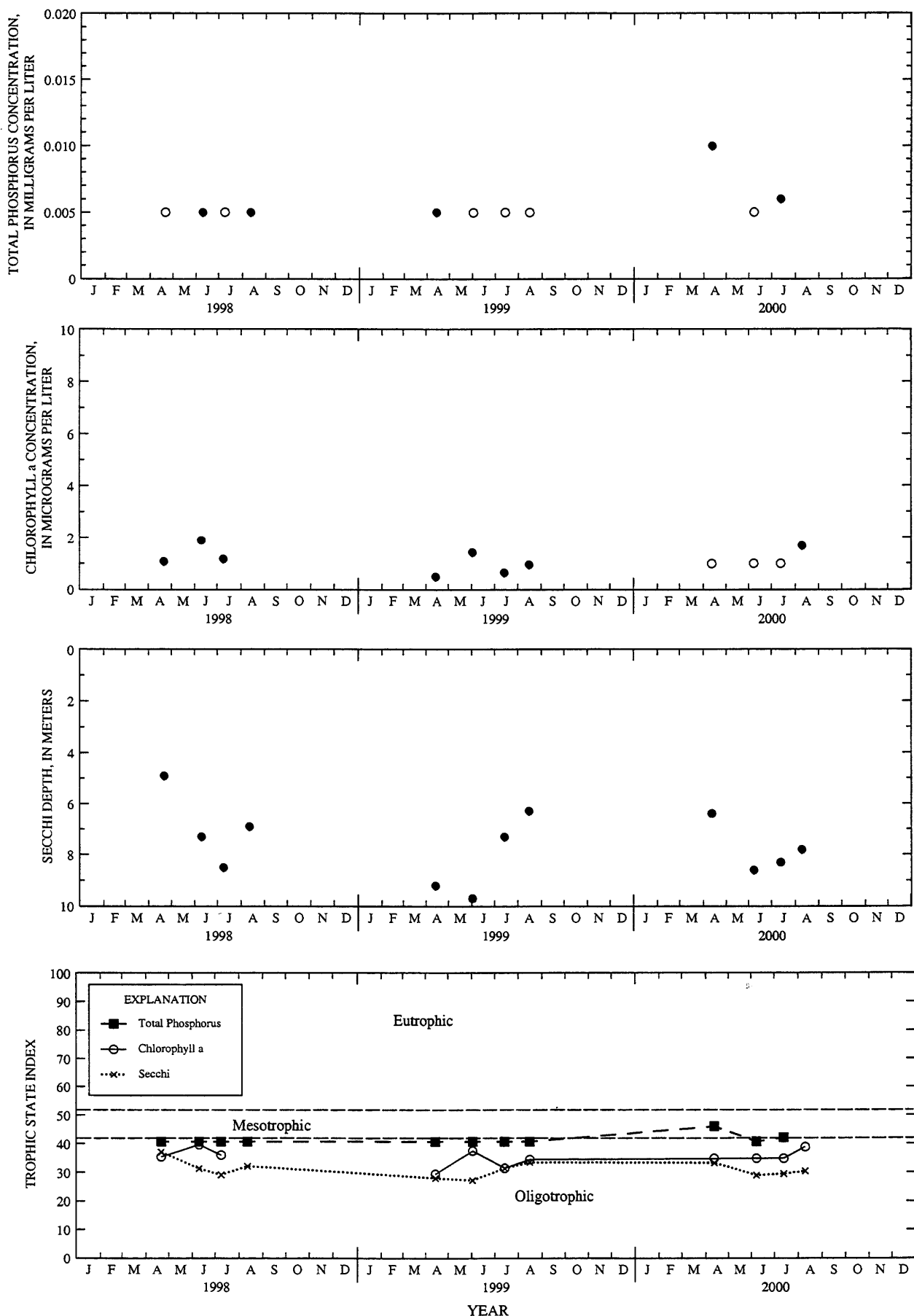
## DISSOLVED OXYGEN (D.O.), IN MILLIGRAMS PER LITER



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



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



Surface total phosphorus, chlorophyll a concentrations, Secchi depths, and TSI data for Whitefish Lake, South Basin site, near Gordon, Wisconsin.

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



# 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<sup>2</sup>, of which 8.5 mi<sup>2</sup> 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.--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.

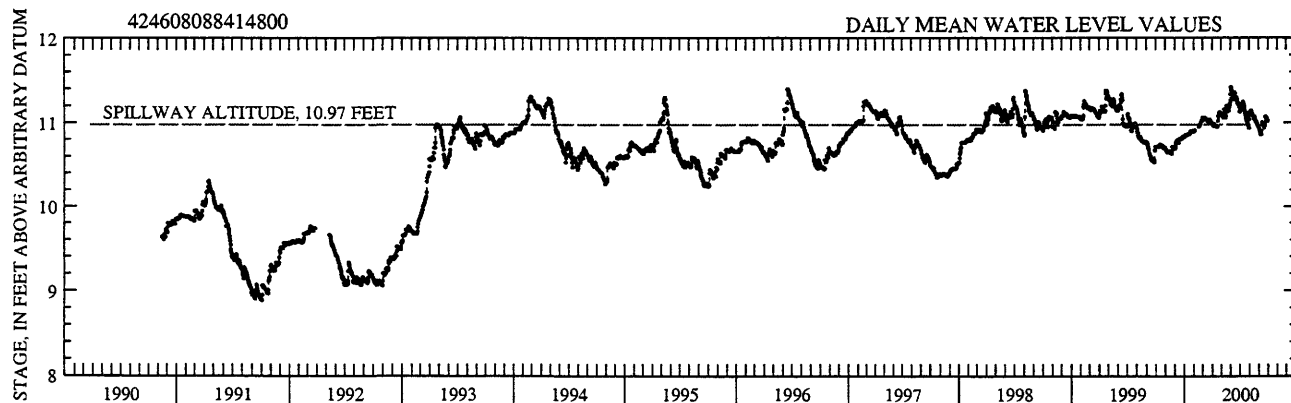
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 11.46 ft, June 1, 2000; minimum daily gage height, 8.89 ft, Oct. 2, 3, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 11.46 ft, June 1; minimum daily gage height, 10.63 ft, Nov. 20-22.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.71	10.70	10.70	10.83	10.90	11.06	10.99	11.10	11.34	11.13	11.12	10.94
2	10.71	10.68	10.69	10.83	10.90	11.06	10.99	11.10	11.42	11.15	11.12	10.93
3	10.71	10.67	10.70	10.84	10.90	11.06	10.99	11.10	11.40	11.21	11.11	10.92
4	10.71	10.67	10.71	10.85	10.91	11.05	10.98	11.10	11.38	11.20	11.09	10.91
5	10.71	10.66	10.75	10.85	---	11.05	10.97	11.10	11.34	11.17	11.10	10.89
6	10.71	10.65	10.76	10.85	---	11.05	10.96	11.09	11.34	11.06	11.14	10.88
7	10.71	10.65	10.78	10.85	---	11.06	10.96	11.06	11.32	11.18	11.14	10.87
8	10.71	10.65	10.77	10.85	---	11.04	10.98	11.07	11.28	11.19	11.13	10.86
9	10.71	10.66	10.78	10.85	---	11.04	10.97	11.10	11.29	11.19	11.12	10.86
10	10.71	10.65	10.79	10.85	---	11.05	10.97	11.16	11.29	11.23	11.11	10.86
11	10.71	10.65	10.79	10.85	---	11.04	10.97	11.16	11.28	11.25	11.10	10.90
12	10.71	10.66	10.79	10.86	---	11.04	10.97	11.16	11.31	11.23	11.08	11.00
13	10.73	10.66	10.79	10.86	---	11.04	10.97	11.15	11.34	11.22	11.08	10.98
14	10.73	10.65	10.77	10.86	---	11.04	10.96	10.91	11.36	11.21	11.07	10.99
15	10.74	10.65	10.76	10.86	---	11.04	10.96	10.92	11.35	11.19	11.06	10.99
16	10.72	10.64	10.79	10.86	---	11.03	10.96	11.06	11.32	11.16	11.04	10.98
17	10.73	10.64	10.80	10.86	10.95	11.02	10.95	11.08	11.31	11.14	11.07	10.96
18	10.73	10.64	10.81	10.87	10.96	11.02	10.95	11.20	11.30	11.12	11.07	10.96
19	10.73	10.64	10.81	10.87	10.97	11.01	10.96	11.18	11.27	11.10	11.06	10.94
20	10.73	10.63	10.81	10.89	10.97	11.02	11.02	11.09	11.29	11.08	11.03	10.96
21	10.73	10.63	10.81	10.89	10.97	11.02	11.07	11.13	11.30	11.06	11.02	10.97
22	10.73	10.63	10.81	10.89	10.98	11.01	11.08	11.17	11.26	11.04	11.01	10.98
23	10.72	10.67	10.81	10.90	10.99	11.01	11.09	11.17	11.24	11.02	11.01	11.07
24	10.72	10.71	10.81	10.90	11.00	11.03	11.10	11.17	11.23	11.01	11.01	11.07
25	10.72	10.71	10.81	10.90	11.01	11.03	11.12	11.15	11.23	11.00	11.01	11.07
26	10.70	10.71	10.82	10.90	11.02	11.02	11.12	11.14	11.24	10.98	10.99	11.06
27	10.70	10.70	10.83	10.90	11.02	11.01	11.12	11.18	11.21	10.98	10.98	11.05
28	10.70	10.70	10.83	10.89	11.02	11.00	11.12	11.20	11.06	10.97	10.97	11.03
29	10.69	10.69	10.83	10.89	11.04	11.00	11.11	11.21	11.07	10.96	10.96	11.03
30	10.70	10.69	10.83	10.90	---	11.00	11.10	11.23	11.08	10.94	10.95	11.02
31	10.70	---	10.83	10.90	---	10.99	---	11.26	---	11.04	10.95	---
MEAN	10.72	10.66	10.79	10.87	---	11.03	11.02	11.13	11.28	11.11	11.05	10.96
MAX	10.74	10.71	10.83	10.90	---	11.06	11.12	11.26	11.42	11.25	11.14	11.07
MIN	10.69	10.63	10.69	10.83	---	10.99	10.95	10.91	11.06	10.94	10.95	10.86



# 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 sampling. Water-quality analyses done by Wisconsin State Laboratory of Hygiene.

## WATER-QUALITY DATA, FEBRUARY 10 TO JUNE 06, 2000 (Milligrams per liter unless otherwise indicated)

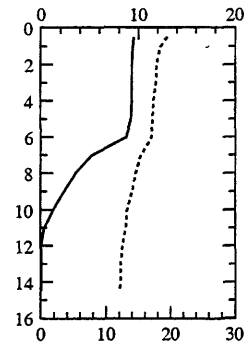
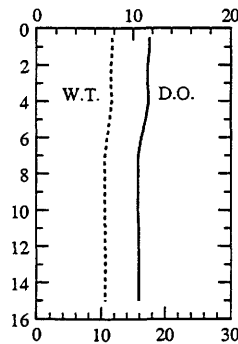
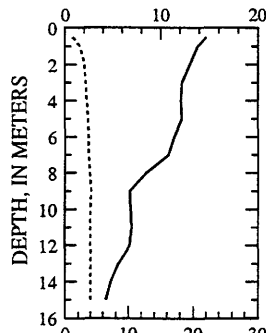
	Feb-10		Mar-30		Jun-6		
Lake stage (ft)	7.52		7.39		8.17		
Secchi-depth (m)	---		1.5		1.5		
Chlorophyll a, phytoplankton (µg/L)	---		13		13		
Depth of sample (m)	0.5	15.0	0.5	15.0	0.5	11.0	14.5
Water temperature (°C)	1.1	4.0	8.3	7.2	19.4	13.0	12.0
Specific conductance (µS/cm)	638	776	620	618	615	643	649
pH (units)	8.3	7.3	8.3	8.2	8.1	7.4	7.4
Dissolved oxygen (mg/L)	14.7	4.3	11.7	10.6	9.5	0.3	0.0
Phosphorus, total (as P)	0.020	0.042	0.040	0.026	0.031	0.056	0.090
Phosphorus, ortho, dissolved (as P)	---	---	<0.002	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	---	---	0.187	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	---	---	0.189	---	---	---	---
Nitrogen, amm. + org., total (as N)	---	---	1.3	---	---	---	---
Nitrogen, total (as N)	---	---	1.5	---	---	---	---
Color (Pt-Co. scale)	---	---	30	---	---	---	---
Turbidity (NTU)	---	---	1.0	---	---	---	---
Hardness, (as CaCO <sub>3</sub> )	---	---	240	---	---	---	---
Calcium, dissolved (Ca)	---	---	51	---	---	---	---
Magnesium, dissolved (Mg)	---	---	27	---	---	---	---
Sodium, dissolved (Na)	---	---	35	---	---	---	---
Potassium, dissolved (K)	---	---	3.1	---	---	---	---
Alkalinity, (as CaCO <sub>3</sub> )	---	---	186	---	---	---	---
Sulfate, dissolved (SO <sub>4</sub> )	---	---	36.4	---	---	---	---
Chloride, dissolved (Cl)	---	---	69.2	---	---	---	---
Silica, dissolved (SiO <sub>2</sub> )	---	---	0.1	---	---	---	---
Solids, dissolved, at 180°C	---	---	364	---	---	---	---
Iron, dissolved (Fe) µg/L	---	---	<10	---	---	---	---
Manganese, dissolved (Mn) µg/L	---	---	1.1	---	---	---	---

2-10-00

3-30-00

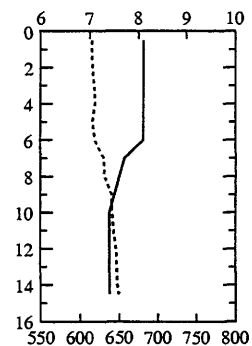
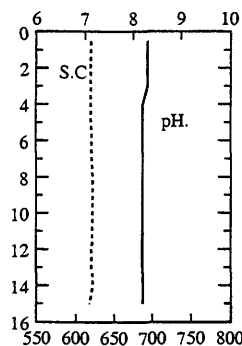
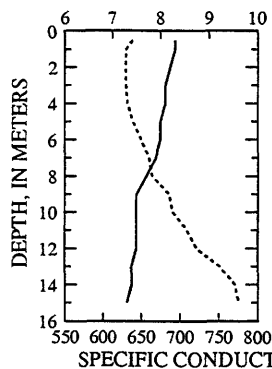
6-06-00

### 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

## 424915088083900 WIND LAKE AT WIND LAKE, WI--CONTINUED

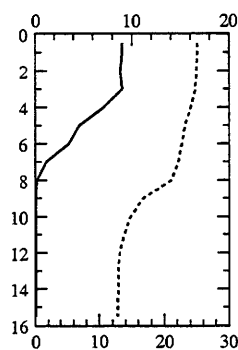
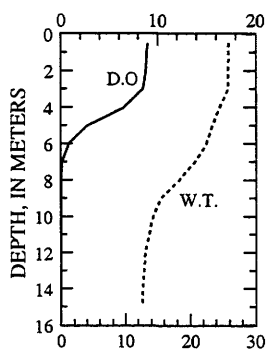
WATER-QUALITY DATA, JULY 17 TO AUGUST 09, 2000  
(Milligrams per liter unless otherwise indicated)

	Jul-17					Aug-9				
Lake stage (ft)	8.28					8.35				
Secchi-depth (m)	1.8					1.4				
Chlorophyll a, phytoplankton (µg/L)	15					17				
Depth of sample (m)	0.5	7.0	9.0	12.0	15.0	0.5	7.0	9.0	12.0	15.0
Water temperature (°C)	25.9	20.7	15.5	13.1	12.6	25.1	22.2	16.7	13.1	12.8
Specific conductance (µS/cm)	568	605	636	656	653	579	595	654	679	684
pH (units)	8.2	7.3	7.2	7.2	7.1	8.1	7.4	7.1	7.0	7.0
Dissolved oxygen (mg/L)	9.0	0.1	0.0	0.0	0.0	9.0	1.1	0.0	0.0	0.0
Phosphorus, total (as P)	0.035	0.028	0.116	0.186	0.220	0.036	0.027	0.073	0.200	0.237
Phosphorus, ortho, dissolved (as P)	<0.002	---	---	---	---	---	---	---	---	---
Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , diss. (as N)	0.013	---	---	---	---	---	---	---	---	---
Nitrogen, ammonia, dissolved (as N)	<0.013	---	---	---	---	---	---	---	---	---
Nitrogen, amm. + org., total (as N)	1.3	---	---	---	---	---	---	---	---	---

7-17-00

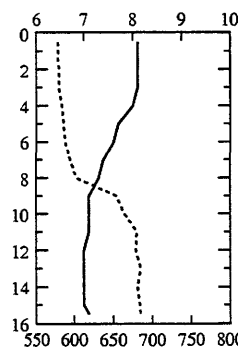
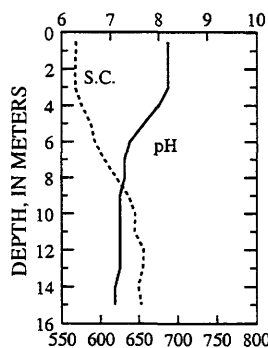
8-09-00

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

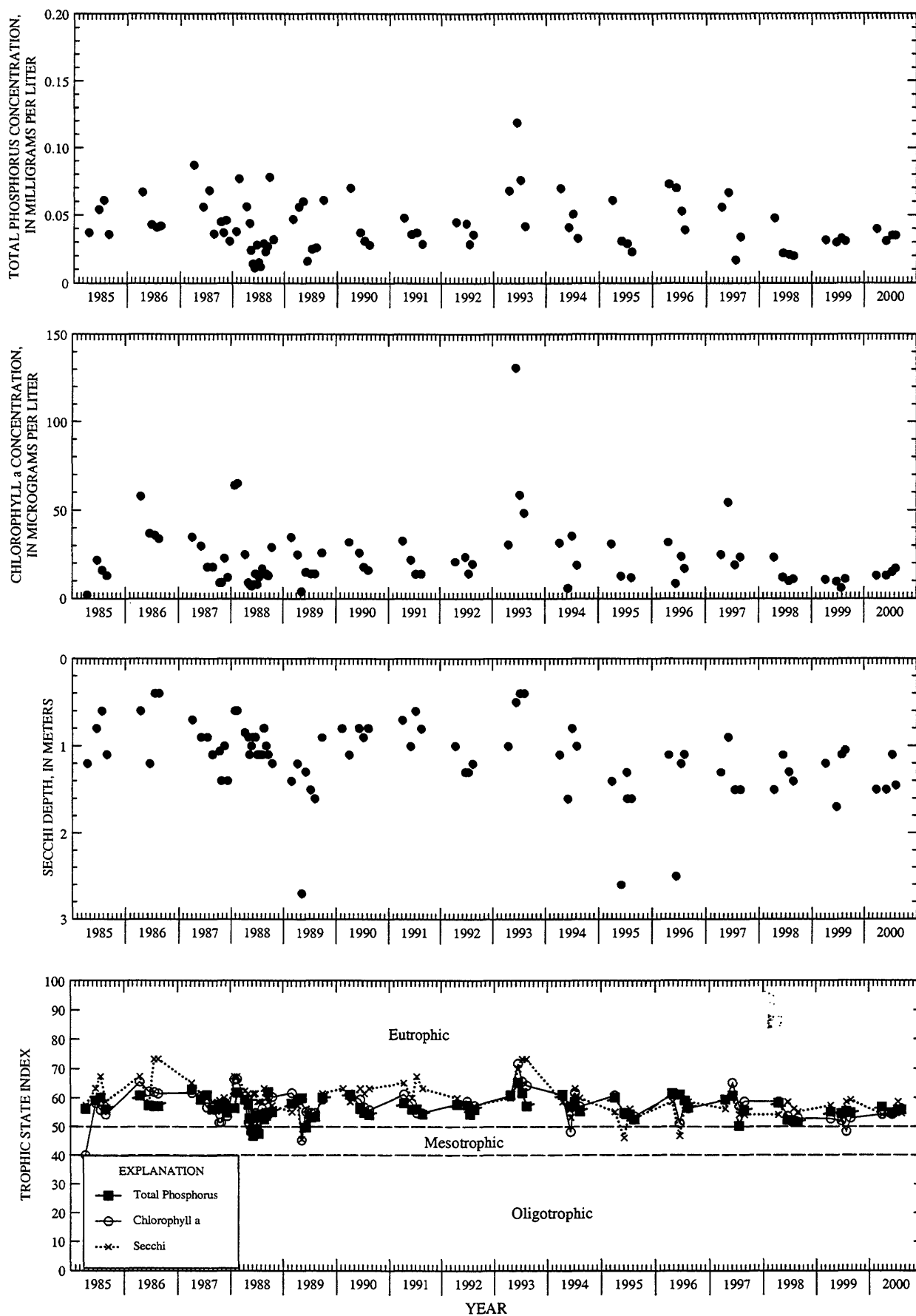


## WATER TEMPERATURE (W.T.), IN DEGREES CELSIUS

## PH, IN STANDARD UNITS



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



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

**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<sup>2</sup>.

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 level regulated by dam with two 10-foot gates at outlet. Lake ice-covered Dec. 19 to Mar. 1. Prior to October 1987, published as Wind Lake at Wind Lake, Wis.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 8.93 ft, June 15, 1999; minimum recorded, 5.95 ft, Jan. 2, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 8.60 ft, Apr. 23; minimum recorded, 7.24 ft, Dec. 11-15.

**GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.69	8.05	7.86	7.33	7.52	7.45	7.37	8.29	8.43	8.21	8.28	8.11
2	7.69	8.05	7.79	7.35	7.52	7.45	7.37	8.29	8.47	8.28	8.28	8.10
3	7.69	8.03	7.70	7.37	7.52	7.45	7.37	8.26	8.38	8.38	8.28	8.10
4	7.71	8.00	7.60	7.41	7.52	7.47	7.37	8.23	8.22	8.14	8.26	8.09
5	7.70	8.00	7.55	7.41	7.52	7.49	7.33	8.24	8.13	8.07	8.27	8.06
6	7.69	8.00	7.44	7.42	7.52	7.50	7.33	8.25	8.17	8.23	8.32	8.03
7	7.69	7.99	7.34	7.43	7.52	7.50	7.38	8.25	8.18	8.33	8.30	8.01
8	7.69	7.98	7.31	7.43	7.52	7.51	7.49	8.26	8.18	8.38	8.31	8.01
9	7.69	7.98	7.29	7.45	7.52	7.54	7.49	8.34	8.16	8.38	8.35	8.00
10	7.70	7.99	7.29	7.47	7.52	7.55	7.51	8.38	8.17	8.38	8.36	8.02
11	7.69	8.02	7.26	7.48	7.52	7.55	7.55	8.31	8.20	8.33	8.35	8.08
12	7.68	8.00	7.24	7.48	7.51	7.54	7.58	8.25	8.26	8.27	8.32	8.21
13	7.69	8.00	7.24	7.49	7.53	7.52	7.60	8.11	8.27	8.24	8.32	8.22
14	7.67	8.01	7.24	7.49	7.54	7.51	7.62	8.01	8.17	8.41	8.32	8.30
15	7.67	7.99	7.26	7.49	7.55	7.49	7.64	8.00	8.13	8.30	8.34	8.29
16	7.78	7.99	7.27	7.50	7.55	7.48	7.67	8.13	8.22	8.24	8.29	8.27
17	7.87	7.97	7.27	7.50	7.55	7.46	7.71	8.24	8.30	8.28	8.30	8.27
18	7.94	7.97	7.27	7.50	7.57	7.43	7.73	8.34	8.31	8.32	8.29	8.28
19	8.02	7.96	7.27	7.50	7.59	7.43	7.78	8.44	8.31	8.35	8.26	8.28
20	8.09	7.96	7.28	7.52	7.59	7.45	8.01	8.41	8.29	8.37	8.23	8.28
21	8.16	7.96	7.28	7.52	7.59	7.45	8.28	8.27	8.28	8.39	8.21	8.28
22	8.25	7.96	7.28	7.52	7.58	7.44	8.43	8.10	8.24	8.35	8.21	8.28
23	8.29	7.96	7.28	7.52	7.57	7.42	8.55	7.99	8.22	8.31	8.21	8.47
24	8.32	7.98	7.29	7.52	7.59	7.42	8.55	8.06	8.22	8.29	8.20	8.36
25	8.34	7.97	7.29	7.52	7.59	7.42	8.38	8.25	8.24	8.27	8.19	8.23
26	8.35	7.96	7.31	7.52	7.56	7.41	8.24	8.37	8.26	8.25	8.18	8.19
27	8.34	7.97	7.31	7.51	7.52	7.42	8.26	8.39	8.26	8.26	8.17	8.24
28	8.31	7.96	7.31	7.51	7.47	7.42	8.28	8.35	8.22	8.27	8.15	8.28
29	8.22	7.95	7.32	7.51	7.44	7.40	8.32	8.31	8.21	8.27	8.14	8.29
30	8.12	7.93	7.32	7.51	---	7.39	8.31	8.31	8.19	8.26	8.13	8.27
31	8.06	---	7.33	7.52	---	7.38	---	8.34	---	8.27	8.11	---
MEAN	7.93	7.98	7.36	7.47	7.54	7.46	7.82	8.25	8.24	8.29	8.26	8.20
MAX	8.35	8.05	7.86	7.52	7.59	7.55	8.55	8.44	8.47	8.41	8.36	8.47
MIN	7.67	7.93	7.24	7.33	7.44	7.38	7.33	7.99	8.13	8.07	8.11	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<sup>2</sup>, at lake outlet at Menasha Dam. Area of Lake Winnebago, 215 mi<sup>2</sup>.

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.--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 daily mean gage height, 3.10 ft, Sept. 4; minimum recorded, 1.59 ft, Feb. 23-25.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.75	2.70	2.59	2.13	1.86	1.84	2.76	2.87	2.83	2.88	2.95	2.90
2	2.76	2.77	2.60	2.12	1.85	1.90	2.76	2.87	2.89	2.92	2.98	3.01
3	2.78	2.76	2.59	2.11	1.83	1.94	2.72	2.83	2.94	2.97	2.95	3.06
4	2.75	2.75	2.60	2.13	1.83	1.98	2.77	2.80	2.95	2.97	2.93	3.10
5	2.74	2.74	2.59	2.11	1.82	2.02	2.76	2.80	3.04	2.98	2.91	3.07
6	2.77	2.76	2.54	2.09	1.80	2.06	2.62	2.78	3.00	2.98	2.91	3.03
7	2.73	2.76	2.49	2.09	1.79	2.10	2.83	2.77	3.02	2.96	2.92	2.96
8	2.70	2.76	2.48	2.07	1.77	2.14	2.67	2.73	3.02	2.95	2.95	2.99
9	2.75	2.76	2.47	2.07	1.76	2.23	2.67	2.75	3.02	3.04	2.95	2.97
10	2.75	2.81	2.47	2.07	1.76	2.26	2.69	2.69	2.99	3.08	2.96	2.98
11	2.76	2.78	2.48	2.07	1.76	2.30	2.64	2.67	3.04	3.04	2.95	3.05
12	2.74	2.78	2.48	2.08	1.75	2.34	2.64	2.74	3.01	2.97	2.92	3.06
13	2.78	2.77	2.48	2.08	1.76	2.39	2.60	2.70	2.98	2.91	2.98	3.04
14	2.76	2.79	2.47	2.07	1.75	2.43	2.59	2.77	2.93	2.91	3.05	3.04
15	2.76	2.78	2.42	2.05	1.74	2.46	2.64	2.78	2.91	2.91	3.01	3.04
16	2.77	2.77	2.37	2.04	1.74	2.52	2.65	2.81	2.84	2.88	3.04	2.99
17	2.77	2.75	2.39	2.02	1.73	2.54	2.59	2.85	2.88	2.85	3.08	3.00
18	2.78	2.74	2.37	2.01	1.71	2.50	2.57	3.06	2.80	2.87	3.09	2.88
19	2.74	2.70	2.35	2.01	1.69	2.58	2.60	3.00	2.77	2.85	3.07	2.78
20	2.76	2.73	2.26	2.01	1.66	2.60	2.79	3.00	2.74	2.83	3.01	2.82
21	2.72	2.71	2.31	2.00	1.64	2.62	2.69	3.02	2.68	2.86	2.95	2.86
22	2.70	2.71	2.29	1.98	1.62	2.64	2.75	3.03	2.75	2.87	2.95	2.91
23	2.78	2.71	2.27	1.97	1.61	2.66	2.77	3.02	2.79	2.87	3.00	2.83
24	2.75	2.71	2.26	1.96	1.61	2.66	2.79	2.96	2.78	2.87	2.98	e2.85
25	2.71	2.72	2.24	1.95	1.64	2.59	2.81	2.95	2.80	2.85	2.96	2.88
26	2.74	2.68	2.22	1.94	1.67	2.68	2.83	2.94	2.80	2.86	2.95	2.84
27	2.73	2.68	2.20	1.93	1.72	2.68	2.84	2.89	2.83	2.88	2.92	2.89
28	2.73	2.68	2.19	1.91	1.76	2.75	2.86	2.84	2.85	2.92	2.88	2.88
29	2.74	2.67	2.17	1.90	1.78	2.75	2.86	2.78	2.87	2.96	2.86	2.86
30	2.73	2.65	2.15	1.89	---	2.75	2.86	2.74	2.88	2.95	2.88	2.86
31	2.76	---	2.14	1.88	---	2.75	---	2.74	---	2.95	2.86	---
MEAN	2.75	2.74	2.38	2.02	1.74	2.41	2.72	2.84	2.89	2.92	2.96	2.95
MAX	2.78	2.81	2.60	2.13	1.86	2.75	2.86	3.06	3.04	3.08	3.09	3.10
MIN	2.70	2.65	2.14	1.88	1.61	1.84	2.57	2.67	2.68	2.83	2.86	2.78

e Estimated

# 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<sup>2</sup>, at lake outlet at Menasha Dam. Area of Lake Winnebago, 215 mi<sup>2</sup>.

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.--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 daily mean gage height, 3.85 ft, July 9, 11, 1993; minimum observed, 0.30 ft, Mar. 1, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum daily mean gage height, 3.09 ft, Sept. 12; minimum recorded, 1.54 ft, Feb. 24, 25.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000

### DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.78	2.77	2.62	2.06	1.82	1.82	2.73	2.81	2.80	2.92	2.93	2.80
2	2.76	2.77	2.53	2.07	1.79	1.87	2.72	2.80	2.92	2.89	2.91	2.94
3	2.68	2.75	2.53	2.06	1.79	1.91	2.74	2.77	2.90	2.91	2.90	3.00
4	2.71	2.72	2.53	2.10	1.78	1.94	2.78	2.77	2.89	2.95	2.91	2.96
5	2.73	2.74	2.49	2.07	1.77	1.99	2.73	2.76	2.90	2.95	2.90	2.99
6	2.66	2.73	2.50	2.06	1.75	2.02	2.82	2.74	2.99	2.92	2.95	2.99
7	2.64	2.71	2.47	2.05	1.74	2.05	2.53	2.73	3.01	2.92	2.97	3.01
8	2.68	2.72	2.43	2.02	1.72	2.10	2.62	2.72	3.01	2.97	2.93	2.98
9	2.69	2.73	2.42	2.01	1.72	2.10	2.69	2.68	3.02	3.05	2.94	2.96
10	2.71	2.64	2.46	2.03	1.72	2.21	2.60	2.65	3.03	3.02	2.94	2.98
11	2.71	2.70	2.43	2.03	1.72	2.27	2.59	2.60	2.98	2.97	2.91	3.04
12	2.69	2.74	2.42	2.01	1.71	2.31	2.62	2.71	2.91	2.92	2.92	3.09
13	2.68	2.75	2.41	2.03	1.72	2.37	2.55	2.94	2.92	2.92	3.00	3.08
14	2.73	2.77	2.37	2.01	1.72	2.41	2.56	2.87	2.96	2.91	3.00	3.06
15	2.71	2.76	2.39	1.99	1.70	2.42	2.48	2.76	2.98	2.87	3.05	3.00
16	2.73	2.70	2.44	1.99	1.70	2.45	2.41	2.76	2.98	2.87	3.03	3.00
17	2.77	2.71	2.34	1.97	1.68	2.44	2.45	2.75	2.87	2.89	3.04	2.95
18	2.72	2.67	2.32	1.97	1.67	2.47	2.52	2.76	2.82	2.81	3.06	2.90
19	2.75	2.70	2.30	1.96	1.65	2.48	2.47	2.88	2.77	2.82	3.00	2.88
20	2.78	2.68	2.33	1.96	1.63	2.53	2.35	2.96	2.76	2.87	2.95	2.92
21	2.76	2.64	2.27	1.95	1.60	2.58	2.57	2.99	2.87	2.84	2.91	2.88
22	2.79	2.65	2.25	1.93	1.58	2.60	2.69	3.00	2.83	2.82	2.94	2.77
23	2.76	2.71	2.22	1.93	1.57	2.61	2.71	3.01	2.77	2.85	3.00	2.78
24	2.74	2.80	2.20	1.91	1.58	2.60	2.71	3.02	2.77	2.84	2.98	2.80
25	2.73	2.71	2.18	1.90	1.60	2.77	2.75	3.00	2.79	2.85	2.96	2.83
26	2.71	2.68	2.18	1.89	1.63	2.72	2.77	2.84	2.84	2.86	2.93	2.87
27	2.66	2.70	2.15	1.87	1.69	2.79	2.78	2.72	2.86	2.87	2.87	2.82
28	2.65	2.68	2.13	1.86	1.72	2.72	2.77	2.69	2.87	2.87	2.83	2.83
29	2.67	2.64	2.11	1.85	1.74	2.71	2.77	2.73	2.89	2.86	2.82	2.88
30	2.71	2.61	2.09	1.84	---	2.70	2.80	2.70	2.91	2.87	2.81	2.87
31	2.72	---	2.08	1.83	---	2.71	---	2.69	---	2.89	2.84	---
MEAN	2.72	2.71	2.34	1.97	1.70	2.38	2.64	2.80	2.89	2.90	2.94	2.93
MAX	2.79	2.80	2.62	2.10	1.82	2.79	2.82	3.02	3.03	3.05	3.06	3.09
MIN	2.64	2.61	2.08	1.83	1.57	1.82	2.35	2.60	2.76	2.81	2.81	2.77

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## APPENDIX

### Wisconsin Lakes Team Quality-Assurance Plan

Most lake studies and monitoring programs that are conducted by the USGS Wisconsin District entail water sampling and analysis to determine water quality and biological productivity. Because all sampling and analysis is subject to error and random variability, a certain proportion of the sampling effort should include quality-assurance samples. These samples are collected and/or prepared solely for the purpose of assessing the magnitude of error and random variability so that the accuracy and precision of all data can be evaluated. The plan for this quality-assurance sampling is described below.

Three types of QA/QC samples are collected:

**blanks**

provide information about accuracy and errors due to treatment or reagents

**replicates**

provide information about precision (variability)

**standard additions (spikes)**

provide information about accuracy and matrix interferences

### Blank Sampling

B1. A **preservation blank** is prepared for each month of lake sampling. This consists of deionized water or norganic blank water, to which is added any reagents or preservatives that are normally added to natural water samples. The blank is not taken to the field, but is shipped to the laboratory for analysis along with the natural water samples.

This blank sample is analyzed for the Nutrient Group<sup>1</sup> and chlorophyll-a.

B2. At one randomly-chosen lake each month, a **field blank** is prepared. This consists of deionized water or inorganic blank water treated exactly the same as regular samples. During winter, the field blank is analyzed for total phosphorus (TP) only; during summer, it is analyzed for TP and chlorophyll-a, and in the spring, it is analyzed for the Nutrient Group and chlorophyll-a.

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<sup>1</sup> Nutrient Group = all phosphorus and nitrogen species that are commonly determined in lakes (total phosphorus, nitrate + nitrite, ammonia, total Kjeldahl nitrogen, total nitrogen)

## Replicate Sampling

R1. At all lakes in program, **triplicate samples** are taken near water surface in summer for analysis of total phosphorus and chlorophyll-a. At two of these lakes, a set of triplicate samples is also taken from near-bottom water, for analysis of total phosphorus.

R2. At three selected lakes in the spring (different lakes each year), **triplicate samples** are taken near water surface for analysis of Nutrient Group.

R3. At one lake each year, **5 replicate samples** are taken near water surface for analysis of total phosphorus and chlorophyll-a.

## Standard Addition Testing

S1. At Delavan Lake and one other lake (to be determined each year), **5 replicate samples** are taken in August for a **standard addition (spike) test**. The spike consists of addition of a prepared phosphorus solution (standard) of known volume and concentration, such that the expected result of analysis is the natural water TP concentration plus the known addition. One sample from each set will receive a low-concentration spike, one will receive a high-concentration spike, and three will receive no spike (the mean of these gives the natural water TP concentration).

Data and results of replicate sampling and field blank testing in water year 2000 are shown in Table A1.

Table A1. Analyses of (A) replicate samples and (B) field blanks from Wisconsin lakes in water year 2000. See text for procedures used. Individual sample data from sets of triplicate samples collected in August are shown, along with corresponding mean values and standard deviations. All data in micrograms per liter. Symbol "<" indicates less than given detection limit.

# A. REPLICATE ANALYSES

Total Phosphorus and Chlorophyll						Other Parameters:	
Lakes						Lakes	
	Little Green	Buffalo	Delavan	Wind	Little Muskego	Delavan	Whitefish
TOTAL P	0.272 0.276 0.272	0.134 0.138 0.136	0.028 0.029 0.027	0.036 0.031 0.031	0.029 0.029 0.028	TOTAL P (bottom)	0.044 0.046 0.042
Mean	0.273	0.136	0.028	0.033	0.029	Mean	0.044
Std. Dev.	0.002	0.002	0.001	0.003	0.001	Std. Dev.	0.002
CHLORO- PHYLL	133 64 109	24 24 25	5.2 4.4 4.4	17 18 12	9 6 9	Dissolved ORTHO-P (bottom)	0.003 0.003 0.003
Mean	102.0	24.3	4.7	15.7	8.0	Mean	0.003
Std. Dev.	35.0	0.6	0.5	3.2	1.7	Std. Dev.	0.000

Lakes					
	Bass Bay	Ocono- mowoc	Geneva	Whitefish	
TOTAL P	0.030 0.031 0.029	0.009 0.010 0.009	0.010 0.010 0.010		TOTAL KJELDAHL NITROGEN
Mean	0.030	0.009	0.010		0.66 0.69 0.69
Std. Dev.	0.001	0.001	0.000		Mean Std. Dev.
					0.680 0.017
CHLORO- PHYLL	15 18 14	1.4 3.3 3.0	<1 <1 <1	1.7 1.2 1.8	AMMONIA NITROGEN
Mean	15.7	2.6		1.6	0.038 0.015 0.008
Std. Dev.	2.1	1.0		0.3	Mean Std. Dev.
					0.020 0.016
					NITRATE + NITRATE NITROGEN
					<0.005 0.006 <0.005

# B. FIELD BLANKS

Analyses at Wisconsin State Laboratory of Hygiene				Analyses at USGS Central Laboratory
Lakes				Delavan Lake
	Pike	Wazee	Whitefish	
TOTAL P	< 0.005	< 0.005	< 0.005	< 0.008
Dissolved ORTHO-P		< 0.005		
CHLOROPHYLL	< 1		< 1	< 0.1
TOTAL KJELDAHL N		< 0.14		
NITRATE + NITRATE (as N)		< 0.01		
AMMONIA (as N)		< 0.013		