

2021 Study of the Water Quality of 167 Metropolitan Area Lakes

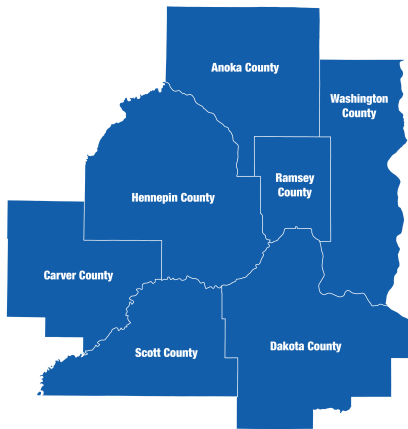


October 2022

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2021 Study of the Water Quality of 167 Metropolitan Area Lakes

Report by

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October 2022

Executive Summary

This report is the latest in a continuing series of reports summarizing results of the annual lake monitoring program of the Metropolitan Council (METC) in the Twin Cities seven-county metropolitan region (region). The METC has collected water quality data on area lakes since 1980. This report contains data from a total of 178 lake sites on 167 lakes monitored in 2021. The monitoring program in 2021 included 1 lake and 1 newly established lake site not previously monitored by the Council. There are 950 lakes in the region. The METC monitors just a subset of these lakes due to limited resources. Additional lakes are monitored by other units of government which help to further provide important regional lake water quality data, but the data collected from these other entities are not included in this report.

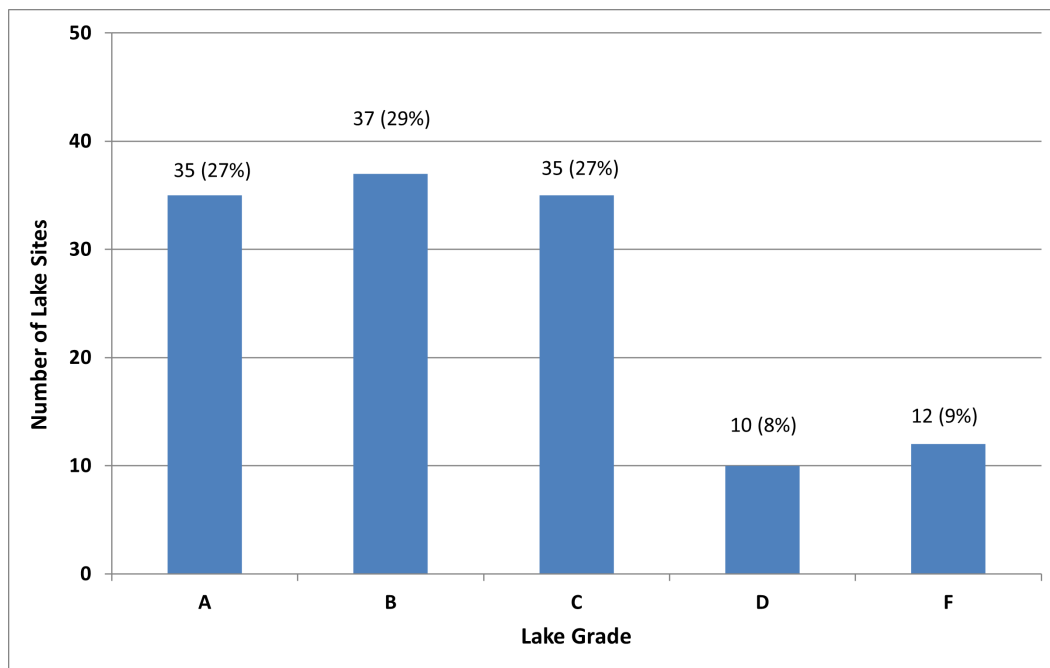
To date, the METC’s lake monitoring program (including monitoring by METC staff and volunteers) has provided an important tool for making informed lake management decisions. Data from our regional lake monitoring program are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of non-monitored lakes, examine intra-and inter-regional differences, determine potential water quality impairments, and investigate the relationships between land use and water quality.

The objectives of this program are:

1. Provide the METC and our partners water quality data and information to help effectively manage the lakes of the region.
2. Use the data to determine lake water quality conditions and water quality trends, including ranking lakes on the METC’s A - F grading system.

The year 2021 marked the 29th year that the Citizen-Assisted Monitoring Program (CAMP) was used to increase our knowledge of the water quality of the region’s lakes. CAMP volunteers visited their assigned lake on a biweekly basis from mid April to mid October. The volunteers measured surface water temperature and water transparency, documented lake and weather conditions, and collected surface water samples. The samples were analyzed for total phosphorus, total Kjeldahl nitrogen, and chlorophyll-a by the Metropolitan Council Environmental Services (MCES) analytical laboratory located at the Metropolitan Wastewater Treatment Plant in St. Paul, MN. CAMP volunteers are sponsored by a local partner. In 2021, there were 26 sponsors who consisted of a mix of municipalities, watershed management organizations (WMOs), watershed districts (WDs), and counties.

Most lakes were given a lake grade which was calculated on the basis of three parameters: total phosphorus, chlorophyll-a (trichromatic), and Secchi depth (water clarity). Not all lake sites received a lake grade because of an insufficient quantity of data during the summer-time period of May through September. The distribution of lake grades for all the lake sites monitored in 2021 is shown in the following figure.



Lake Grades for the 2021 Monitoring Season

In 2021, 56% of the lake sites received a grade of “A” or “B”, meaning that they had relatively good water quality. About 27% of lake sites received a water quality grade of “C”. The remaining 17% of lake sites received a water quality grade of “D” or “F”, meaning that they had relatively poor water quality. Lake grades for the lakes monitored by the Metropolitan Council in 2021 showed a notable shift towards higher grades (A’s and B’s) compared to previous years. The cause (or causes) for the grade shifts observed in 2021 is not known at this time but there are some possibilities. For example, of significance to the 2021 monitoring season was the development of the flash drought during the summer of 2021. Another possibility is that the lake population in this report may be showing the effects of water quality trends that are being driven by other factors that affect a lake’s productivity. The grade shifts and potential causes is discussed in more detail in the report.

Since 1980, 406 lakes have been monitored in the region through the METC’s lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 448 lake sites have been monitored. The data from the METC’s lake monitoring program are stored in the METC’s Environmental Information Management System (EIMS) and the Minnesota Pollution Control Agency’s Environmental Quality Information System (EQUIS). Data for all METC lake monitoring sites can be conveniently retrieved via the METC’s web-based EIMS, at: <http://es.metc.state.mn.us/eims/>. While the METC has done its best to enhance and expand the region’s lake water quality database, it is apparent that one of the most economical and efficient methods to expand knowledge of our lakes has been with the assistance of volunteers and the cooperation and financial support of local partners via the CAMP.

If you have questions pertaining to the lake data or descriptions contained in this report, inquiries about CAMP, or suggestions of lakes the METC should consider monitoring in the future, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Acknowledgments

This report represents the coordinated efforts of many individuals. The author would like to acknowledge the following people for their technical and supportive contributions to the preparation of this report:

CAMP Volunteers and Local Partners

The enthusiastic participation of local sponsors and volunteers help make the CAMP successful. A list of sponsors and volunteers is shown in Appendix C. The following volunteers and organizational staff are given added appreciation for their multiple years of service:

17 to 29 years of service

29 years of service

Diane Coderre – Sunset Lake

28 years of service

Washington CD staff – multiple lakes

26 years of service

Wargo Nature Center – George Watch Lake

24 years of service

Wally Shaver – Lac Lavon Lake

21 years of service

Gene Berwald – Pine Tree Lake

Tom Goodwin – Orchard Lake

20 years of service

Bob Coderre – Sunset Lake

Bonnie Juran – Klawitter Lake

19 years of service

Kitty Francy-Payton – Long Lake

Jim Kellogg – Cobblecrest Lake

18 years service

David Florenzano – Riley Lake

Linda Scott – St. Joe Lake

17 years of service

Carpenter Nature Center (volunteer coordinator:

Mayme Johnson) – Lake St. Croix

Jim and Roberta Harper – Lake St. Croix

Jeff Keene – O'Connor Lake

11 to 16 years of service

16 years of service

David Bluhm – White Rock Lake

Minnesota DOT staff – Rest Area Pond

15 years of service

Jim Naves – Horseshoe Lake

Dan Stanek – Scout Lake

Robert White — Northwood Lake

13 years service

Jeff Christianson – Farquar Lake

Tim and Sharon McCotter – Lucy Lake

Wally Ostlie – Comfort Lake

Joe Reithmeyer – Lake Edith

Steve Schmaltz – Forest Lake, west basin

Tim Weber – La Lake

12 years of service

Fred Fox – Little Johanna Lake

James Stowell – Sunfish Lake

Douglas Toavs – Moody Lake

11 years of service

Pat Barrett – Klawitter Lake

Paul Erdmann – Bush Lake

Lisa McIntire – Penn Lake

Jeff Sluiter – Cobblestone Lake

6 to 10 years of service

10 years service

Joe Tranchilla – Crystal Lake

9 years service

Thomas Chaklos – Haas Lake

Carolyn Dindorf – Magda Lake

Nancy Ebner – Westwood Lake

Andrew Elmquist – Karth Lake

Elizabeth Erdmann – Bush Lake

Barrie Froseth – Lost Lake

Bob Kistler – Valentine Lake

8 years service

Steve Beckey – Buck Lake

Bernie DeMaster – Twin Lake

Scott Spaeth – Hornbeam Lake

7 years service

Steven Behnke – Sunset Pond

Holly Birkeland – Lake Minnetoga

Chanhassen staff – Susan Lake

Shanna Hanson – Sweeney Lake

Hastings Environmental Protectors – Lake Rebecca

Doug Joens – Forest Lake

Joan Kettelkamp – Long Lake

David Parker – Parkers Lake

Mark Vierling – Thole Lake

6 years service

Brian & Gabrielle Gallagher – Lake Marion

Eric Klingbeil – Twin Lake

Anne Pfankuch – Thompson Lake

3 to 5 years of service

5 years service

Amy Baudler – Sweeney Lake

Jennel Bilek – Twin Lake

Sig Birkeland – Minnetoga Lake

Leslie Pilgrim – Lemay Lake

Paula Thomsen – Cates Lake

David Wallace – Red Rock Lake

Robert Weierke – McMahon Lake

Julie Woolsey – Lemay Lake

Kevin Zahler – Minnewashta Lake

4 years service

Eric Campbell – Duck Lake

David DeKraker – Alimagnet Lake

Jon Haferman – Fish Lake

Jim & Nancy Norlen – Earley Lake

Prior Lake — Spring Lake WD staff – multiple lakes

David Short – Little Johanna Lake

3 years service

Frank Bastyr – Long Lake

Tom Bucher – Lake Demontreville and Olson Lake

Steve Donen – Lotus Lake

Gary Fields – Lake Demontreville and Olson Lake

Joel Jensen – Edith Lake

Randy Koenig – Keller Lake

Karen & Paul Richtman – Brewer Pond

David Rossmiller – Rogers Lake

LeighAnn Singleton – Cedar Lake

Steve Treichel – Augusta Lake

Max Wallin – Seidl Lake

Metropolitan Council Staff

- The MCES Laboratory Services Section, for laboratory analysis of the lake samples.
- Shana Neumann for creation of the lake maps.
- The MCES Electronic Lake Monitoring Report Team for the continued improvement of the automation of the annual lake report.

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Introduction

This 2021 report continues a series of annual lake reports from 1980 to present. Since 1980, 406 lakes in the Twin Cities seven-county metropolitan region (region) have been monitored through the Metropolitan Council's (METC) lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 448 lake sites have been monitored. This report contains data from 178 lake sites on 167 lakes that were monitored in 2021, including 1 lakes and 1 lake sites that have not been previously monitored by the METC lake monitoring program. Figure 1 shows the location of the lakes monitored in 2021 by volunteers of the Citizen-Assisted Monitoring Program. A list of lakes that have been monitored by the METC's monitoring program is shown in Appendix A. Refer to Appendix B for morphology and other lake characteristic data.

There are 950 lakes in the region. The METC monitors just a subset of these lakes due to limited resources. Additional lakes are monitored by other units of government which help to further provide important regional lake water quality data, but the data collected from these other entities are not included in this report.

METC lake monitoring data are available via:

- the METC's Environmental Information Management System (EIMS), at <https://eims.metc.state.mn.us>
- the Minnesota Pollution Control Agency's (MPCA) Environmental Data Access (EDA) system, at <http://www.pca.state.mn.us/index.php/data/surface-water.html>
- The U.S. EPA's national water quality data repository, at <https://www.epa.gov/waterdata/water-quality-data>

The objectives of the METC lake monitoring program are:

1. Provide the METC and our partners water quality data and information to help effectively manage the lakes of the region.
2. Use the data to determine lake water quality conditions and water quality trends, including ranking lakes on the METC's A - F grading system.

The long-term goal of the METC lake monitoring program is to provide a comprehensive database to enable our partners (cities, counties, watershed management organizations (WMOs), watershed districts (WDs), conservation districts) to better manage the region's lakes. The Council believes that without such comprehensive lake data, the foundation of lake and watershed management plans is weakened. While the METC has provided a commendable lake monitoring program, monitoring by other organizations is also encouraged (Osgood 1989a).

To date, the METC lake monitoring program has been an important tool for making informed lake management decisions. The majority of the lakes have been visited on a rotating schedule, so as to develop an historical database to help lake and watershed managers in decision making. Data from the METC lake monitoring program are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of non-monitored lakes, examine intra-and interregional differences, and investigate the relationships between land use and water quality. A comprehensive regional lake monitoring program should ensure adequate spatial and temporal representation of water quality. However, due to cost and logistical problems, ground-based monitoring programs usually sacrifice spatial coverage (fewer lakes) in favor of more frequent sampling.

As is the case throughout the United States, the majority of lakes in the region suffer from this lack of water quality data. Area lakes and watershed managers need a broad, comprehensive water quality database for regulatory and decision-making purposes. Because of the lack of public funding and the high ratio of area lakes to monitoring staff, very little data exist for the majority of the region's lakes, and local decision-makers are forced to make management decisions lacking adequate information.

The METC addressed this lack of adequate lake water quality data by initiating a citizen-assisted monitoring program (CAMP) in 1993. The purpose of the CAMP is to provide a more complete and improved water quality database for the region's lakes. This database gives local decision makers a better idea of the water quality of their lakes, thereby assisting them in decision making on water quality issues. The METC's goal for the CAMP is to provide a means to gather as much information on the region's lakes as is economically possible.

Questions and comments pertaining to the information contained in this report and inquiries about CAMP can be directed to Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us.

2021 Monitored Lakes

- Monitored by CAMP
- Monitored by MCES Staff

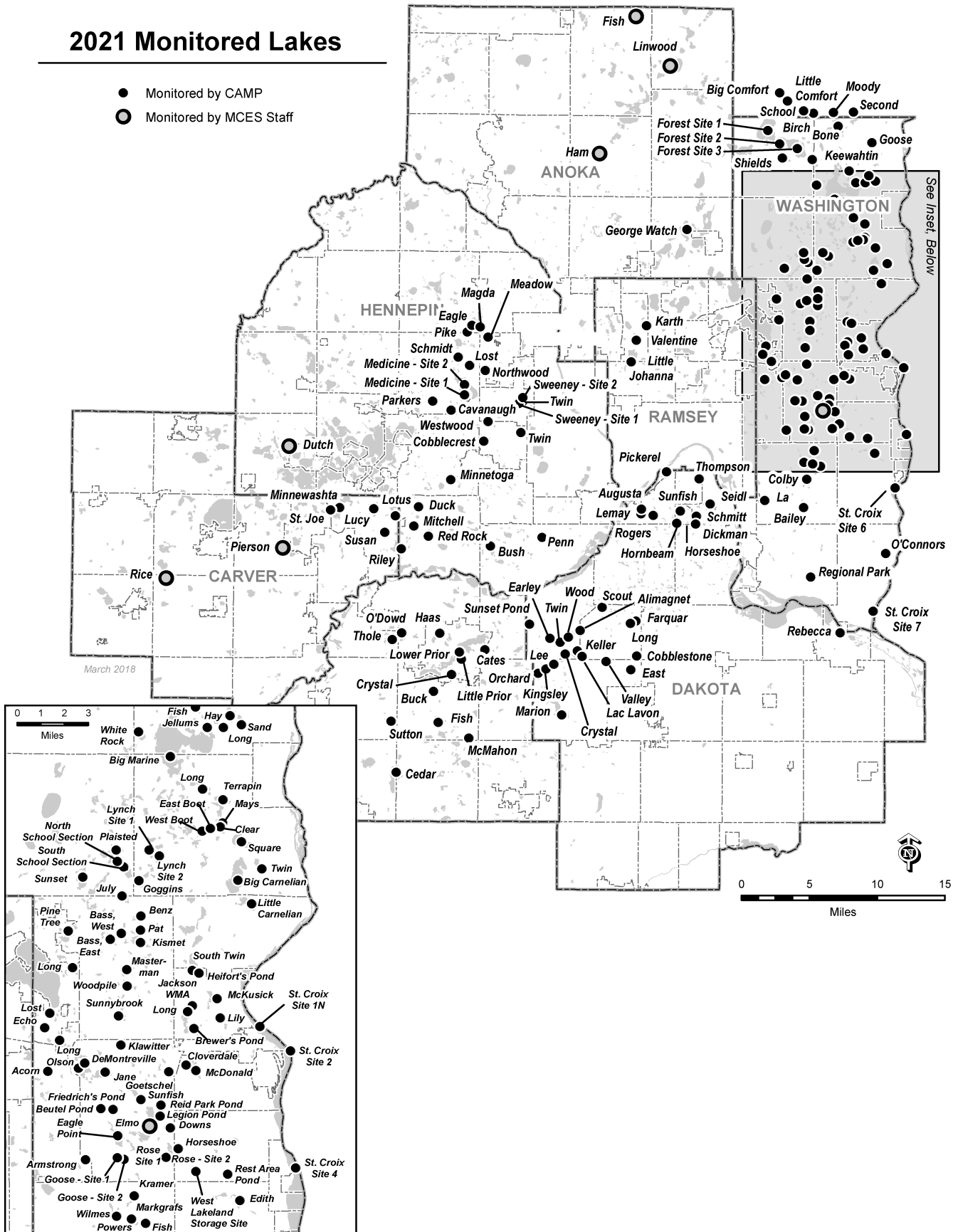


Figure 1. 2021 Monitored Lakes

METC Staff Monitoring Program

Metropolitan Council staff monitored 7 sites on 7 lakes in 2021.

- Dutch Lake
- Lake Elmo
- Fish Lake (Anoka County)
- Ham Lake
- Linwood Lake
- Piersons Lake
- Rice Lake (Carver County)

The following section describes the methods and results of that monitoring effort.

Methods

Metropolitan Council staff monitored lake sites during the open water season of May through October. The lake monitoring sites were located generally over the deepest spot of the lake basin or a central location of a sub-basin. A hand-held Global Positioning System (GPS) receiver was used to determine the coordinates of a lake site, and to aid in relocating lake sites during subsequent monitoring events. Time, water surface conditions, weather, lake depth, and water transparency were recorded on an electronic monitoring form. Water transparency was measured using a 20 cm black-and-white Secchi disk. Temperature, dissolved oxygen (DO), pH, specific conductivity, turbidity, and oxidation reduction potential (redox) were measured at one-meter intervals throughout the water column. For depths below 10 m, the sampling interval was increased to every 2 m. These parameters were measured using a YSI EXO2 multi-parameter sonde that was connected to a YSI EXO data logger.

The sonde probes for DO and pH were calibrated before each field trip. The calibration for the pH probes was checked the same day after returning from the field. The conductivity probe was calibrated on a weekly schedule. The turbidity and redox probes were calibrated on a monthly schedule.

Water was collected from the lake surface using a two-meter or one-meter vertical integrated sampler (PVC pipe and rubber plug) with a two-liter and one-liter capacity, respectively. Two surface samples were collected and mixed together in a 4-liter plastic jug. The surface sample was then decanted into an opaque polyethylene bottle. If the lake was too shallow to sample with an integrated sampler, the surface sample was collected by submerging a 4-liter plastic jug to forearm depth. Subsurface samples were collected using a 2-liter Van Dorn sampler. All water samples were transported on ice in a dark cooler and processed and preserved within 18 hours of collection.

The surface and subsurface samples were analyzed for the standard parameters as shown in Table 1. Chlorophyll was not analyzed in the subsurface samples. Samples that were analyzed for filtered matrices were filtered through a 0.45 μm membrane filter and then analyzed. Chemical analyses were performed at the Metropolitan Council Environmental Services laboratory. Some samples from Fish Lake, Piersons Lake, and Rice Lake were sub-contracted to Pace Analytical for total phosphorus analysis.

The chlorophyll analysis results were reported by the laboratory according to two different equations: the trichromatic equation and the monochromatic equation. The trichromatic equation gives the following chlorophyll parameters:

- chlorophyll-a (CLA),
- chlorophyll-b,
- chlorophyll-c.

The monochromatic equation gives the following parameters:

- chlorophyll-a corrected for pheophytin,
- pheophytin-a.

The chlorophyll data in this report are reported as trichromatic CLA. However all the analytical results from the trichromatic and monochromatic equations can be accessed via the monitoring data databases as provided in the Introduction section.

Table 1. Summary of Analytical Methods

Parameters	Analytical Method
Alkalinity	EPA Method 310.2 Rev. 1974
Ammonia Nitrogen	U.S. EPA, Method 350.1, Rev. 2.0
Chloride	Standard Methods for the Examination of Water and Wastewater, Method 4500-Cl ⁻ E-2011
Chlorophyll	ASTM Method D3731-87
Hardness	Standard Methods for the Examination of Water and Wastewater, Method 2340 B-2011
Kjeldahl Nitrogen, total (TKN)	U.S. EPA Method 351.2, Rev. 2.0

Parameters	Analytical Method
Metals: Calcium, Magnesium, and Iron	U.S. EPA, Method 200.7, Revision 4.4
Nitrate/Nitrite	Standard Methods for the Examination of Water and Wastewater, Method 4500-NO ₃ - F-2011
Organic Carbon, Total	Standard Methods for the Examination of Water and Wastewater, Method 5310 C-2011
Ortho Phosphate	Standard Methods for the Examination of Water and Wastewater, Method 4500-P F-2011
Phosphorous, total (TP) and dissolved (TDP).	U.S. EPA Method 365.4
Sulfate	U.S. EPA, Method 300.0, Rev 2.1

Results

The water quality of each staff-monitored lake is discussed in the following section. Each lake report includes a description of the lake's water quality condition and the year's water quality data shown in tables and figures. The water quality grades from 1980 through 2021 are shown for lake sites that were monitored for trophic status.

For data of samples collected at depth and of depth profile measurements, please refer to the METC's Environmental Information Management System (EIMS) at <http://es.metc.state.mn.us/eims/> to access this additional data.

Any questions about the 2021 METC lake monitoring data should be directed to Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Dutch Lake (27–0181) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Dutch Lake is located in the cities of Minnetrista and Mound (Hennepin County). The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2010. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	22	83	C
CLA (µg/l)	20	3.3	53	B
Secchi (m)	>2.2	0.5	4.6	C
TKN (mg/l)	1.28	1.00	1.80	
			Lake Grade	C

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of C this year. The last time the Council monitored Dutch Lake was in 1984, receiving a lake grade of C. Although both years received C lake grades, the mean values for Secchi, CLA, and TP showed improvements in 2021 compared to 1984.

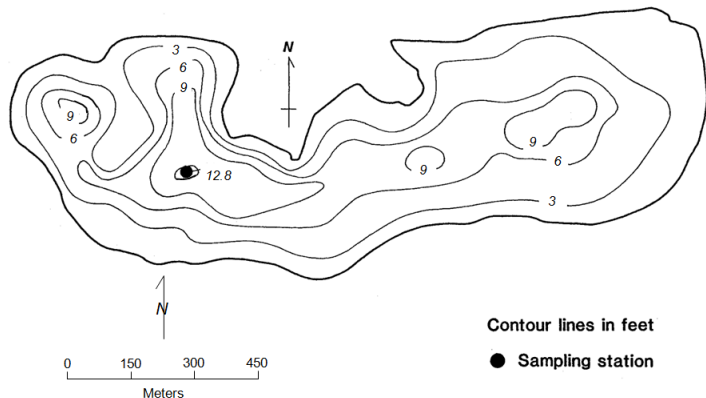
Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Dutch Lake
 Minnetrista/Mound, Hennepin Co.

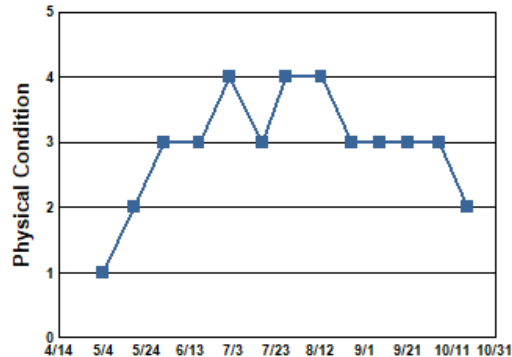
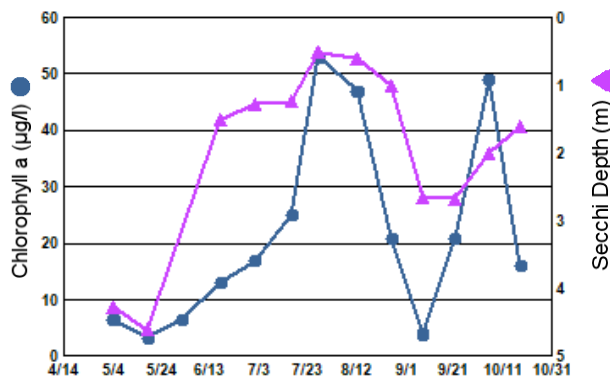
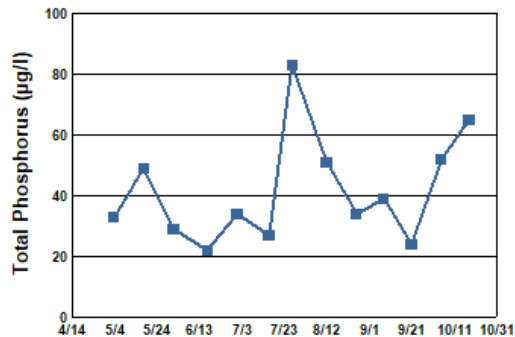
Lake ID: 270181-00



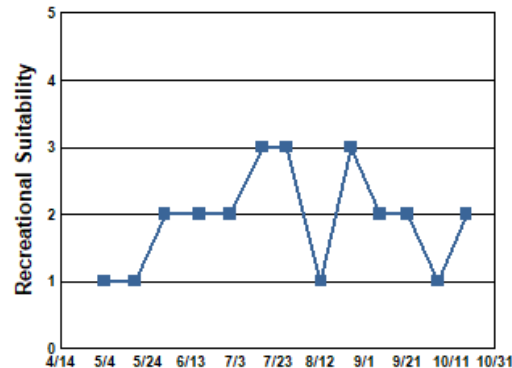
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/04/21	12.9	10.7	6.4	33	4.3	1	1
05/18/21	19.2	10.2	3.3	49	4.6	2	1
06/01/21	19.5	10.0	6.4	29	>3.4	3	2
06/17/21	26.4	9.0	13	22	1.5	3	2
07/01/21	26.4	10.3	17	34	1.3	4	2
07/16/21	25.0	10.3	25	27	1.2	3	3
07/27/21	27.1	11.0	53	83	0.5	4	3
08/12/21	24.8	8.0	47	51	0.6	4	1
08/26/21	24.3	7.2	21	34	1.0	3	3
09/08/21	21.5	4.6	4.0	39	2.7	3	2
09/21/21	19.9	6.9	21	24	2.7	3	2
10/05/21	19.4	11.5	49	52	2.0	3	1
10/18/21	14.9	4.0	16	65	1.6	2	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
 2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
 3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C							
CLA					C							
Secchi					C							
Lake Grade					C							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						C
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake Elmo (82–0106) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Lake Elmo is located in Lake Elmo (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The 284-acre lake has a maximum depth of 41.7 m (137 ft) which is the deepest lake in the region.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) and aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue). The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	15	6	22	A
CLA (µg/l)	3.8	1.0	8.2	A
Secchi (m)	3.7	2.4	4.7	A
TKN (mg/l)	0.50	0.43	0.60	
			Lake Grade	A

The lake received a lake grade of A which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

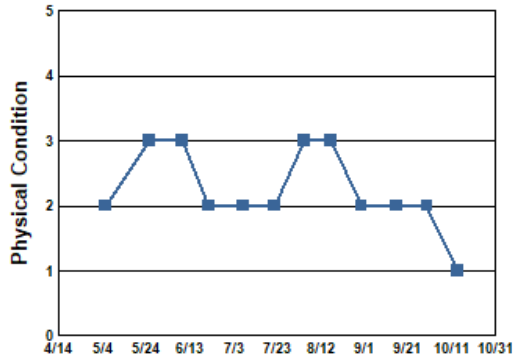
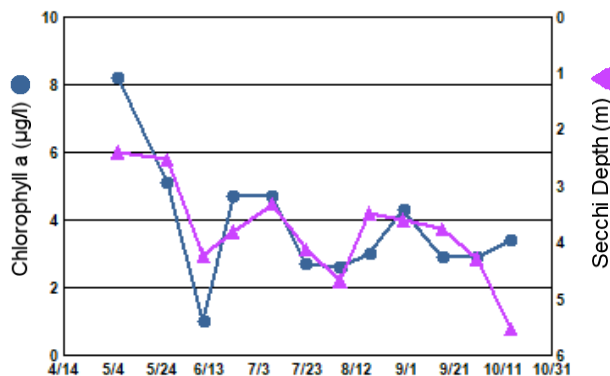
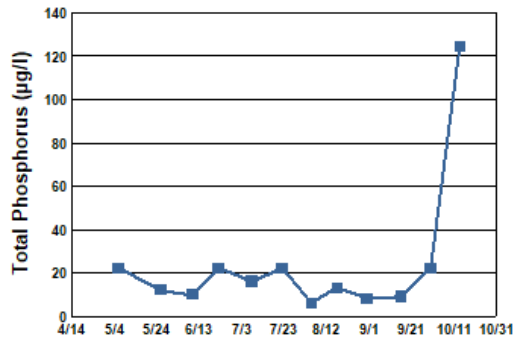
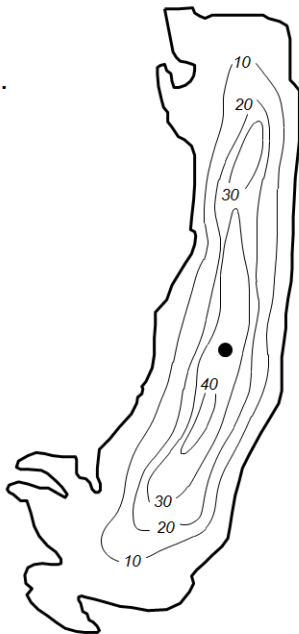
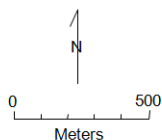
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

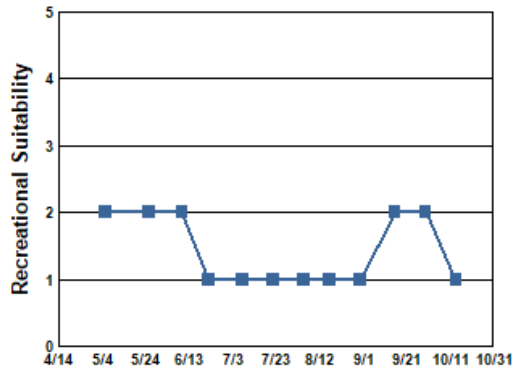
Lake Elmo
Lake Elmo, Washington Co.

Lake ID: 820106-00

● Sampling site
Contours in meters



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/06/21	12.2	12.0	8.2	22	2.4	2	2
05/26/21	20.7	10.3	5.1	12	2.5	3	2
06/10/21	28.1	9.0	1.0	10	4.2	3	2
06/22/21			4.7	22	3.8	2	1
07/08/21	24.7	8.9	4.7	16	3.3	2	1
07/22/21	26.4	9.2	2.7	22	4.1	2	1
08/05/21	24.9	8.7	2.6	6	4.7	3	1
08/17/21	24.7	9.0	3.0	13	3.5	3	1
08/31/21	24.5	8.9	4.3	8	3.6	2	1
09/16/21	21.1	9.1	2.9	9	3.8	2	2
09/30/21	19.9	9.5	2.9	22	4.3	2	2
10/14/21	17.8	8.8	3.4	124	5.6	1	1

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	A	B		B				B			A
CLA	B	A	B		A				A			A
Secchi	C	B	C		B	A	B	B	A	A	A	A
Lake Grade	B	A	B		B				A			A

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			A									
CLA			A									
Secchi	A	A	A									
Lake Grade			A									

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		A	A	A	A	A	A	C	A	A	A	
CLA		A	A	A	A	A	A	A	A	A	A	
Secchi		A	A	A	A	A	A	A	A	A	A	
Lake Grade		A	A	A	A	A	A	B	A	A	A	

Year	2016	2017	2018	2019	2020	2021
TP	B	B			A	A
CLA	A	A			A	A
Secchi	A	A			A	A
Lake Grade	A	A			A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Fish Lake (02–0065) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Fish Lake is located in East Bethel (Anoka County). It is a shallow lake with a surface area of 334 acres with a maximum depth of about 4.5 meters. The lake is defined as a shallow lake because of the dominance of the littoral zone. Much of the lake's shoreline is within the University of Minnesota's Cedar Creek Ecosystem Science Reserve. The lake is considered a Priority Water by the Metropolitan Council.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	11	19	A
CLA (µg/l))	3.3	1.8	5.3	A
Secchi (m)	+3.1	2.3	4.2	A
TKN (mg/l)				
			Lake Grade	A

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake is clear and shallow with stands of aquatic macrophytes. The water clarity is exceptionally clear as shown by average summer-time Secchi depth of greater than 3.2 meters. The lake typically receives a lake grade of A.

Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

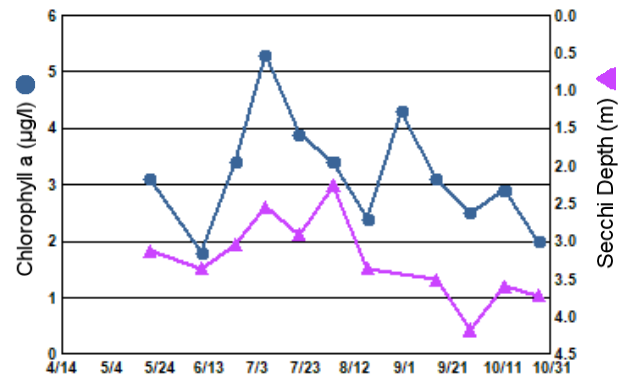
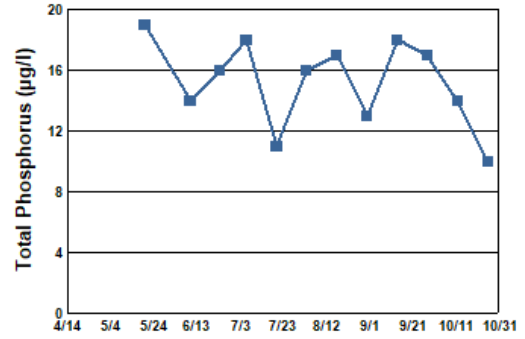
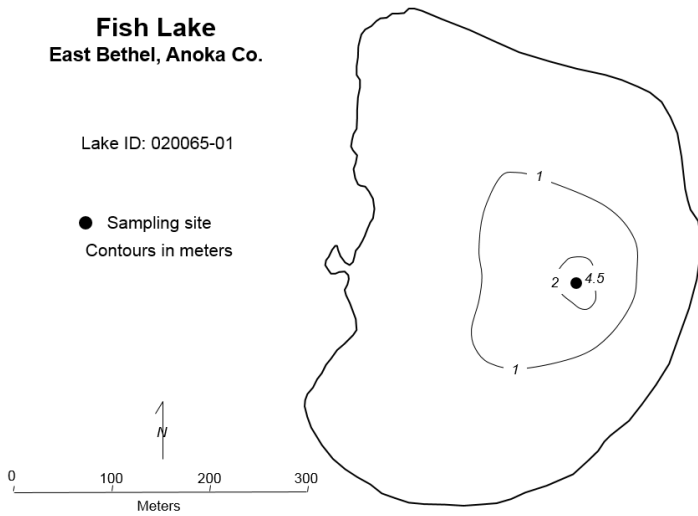
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Fish Lake
East Bethel, Anoka Co.

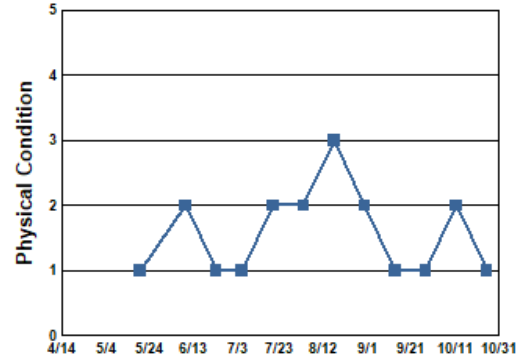
Lake ID: 020065-01

● Sampling site
Contours in meters

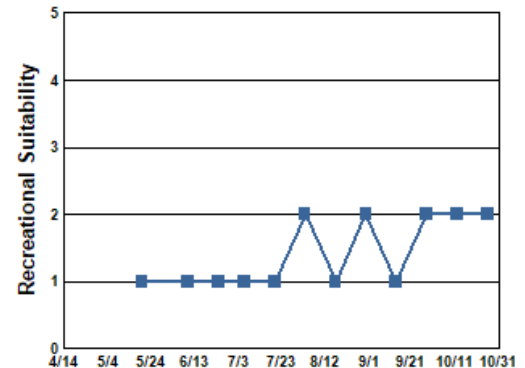


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/20/21	20.4	8.6	3.1	19	3.1	1	1
06/10/21	28.5	9.4	1.8	14	3.4	2	1
06/24/21	24.3	8.9	3.4	16	3.0	1	1
07/06/21	27.6	8.9	5.3	18	2.6	1	1
07/20/21	26.8	9.8	3.9	11	2.9	2	1
08/03/21	23.8	8.0	3.4	16	2.3	2	2
08/17/21	23.7	8.3	2.4	17	3.4	3	1
08/31/21	22.7	8.5	4.3	13	+3.2	2	2
09/14/21	19.8	8.3	3.1	18	3.5	1	1
09/28/21	17.1	9.8	2.5	17	4.2	1	2
10/12/21	17.8	8.3	2.9	14	3.6	2	2
10/26/21	8.3	11.3	2.0	10	3.7	1	2



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2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
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+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		A		A		A
CLA		A		A		A
Secchi		A		A		A
Lake Grade		A		A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Ham Lake (02–0530) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Ham Lake is located in the city of Ham Lake (Anoka County). The lake is considered a Priority Water by the Metropolitan Council. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	17	76	C
CLA (µg/l))	13	2.8	35	B
Secchi (m)	2.2	1.3	3.4	C
TKN (mg/l)	0.83	0.62	1.00	
			Lake Grade	C

The lake received a lake grade of C this year which indicates lower water quality compared to the As and Bs received in the 1980s and 1990s.

Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

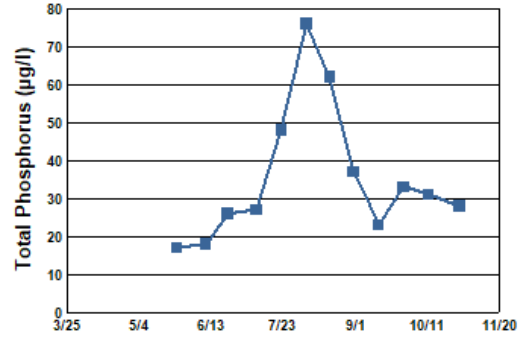
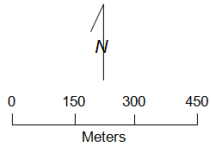
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Ham Lake
Ham Lake, Anoka Co.

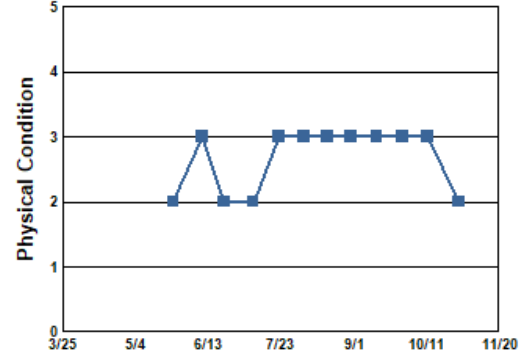
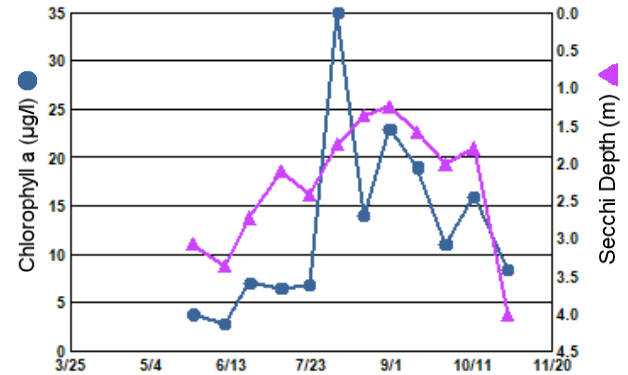
Lake ID: 20053-00

● Sampling site
Contours in meters

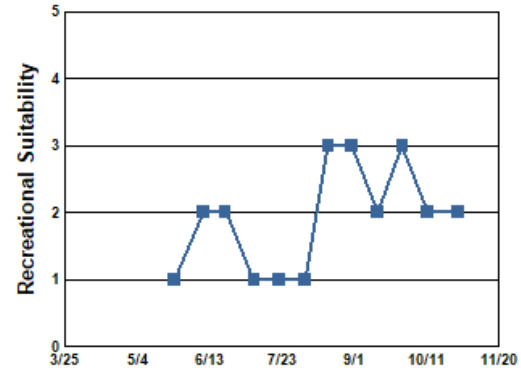


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/25/21	22.8	8.7	3.8	17	3.1	2	1
06/10/21	28.8	9.1	2.8	18	3.4	3	2
06/22/21	22.3	7.6	7.1	26	2.7	2	2
07/08/21	24.1	6.9	6.5	27	2.1	2	1
07/22/21	26.1	8.4	6.8	48	2.4	3	1
08/05/21	24.8	6.8	35	76	1.8	3	1
08/18/21	25.3	8.3	14	62	1.4	3	3
08/31/21	23.9	8.0	23	37	1.3	3	3
09/14/21	20.6	8.0	19	23	1.6	3	2
09/28/21	18.8	9.4	11	33	2.0	3	3
10/12/21	18.4	7.6	16	31	1.8	3	2
10/29/21	9.9	10.0	8.4	28	4.0	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					B							
CLA					B							
Secchi					C							
Lake Grade					B							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		A	C		A	A	B					
CLA		A	A		A	A	A					
Secchi		B	B		B	A	B					
Lake Grade		A	B		A	A	B					

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						C
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Linwood Lake (02–0026) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Linwood Lake is located in Linwood Township (Anoka County). The lake is considered a Priority Water by the Metropolitan Council. The lake is defined as a shallow lake because of the dominance of the littoral zone. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2018 and aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	18	85	C
CLA (µg/l)	19	7.4	42	B
Secchi (m)	1.2	0.7	2.0	D
TKN (mg/l)	0.95	0.60	1.30	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its historical water quality database.

Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

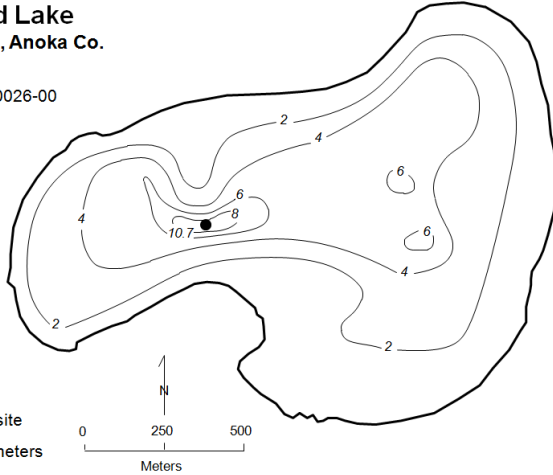
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Linwood Lake
Linwood Twp., Anoka Co.

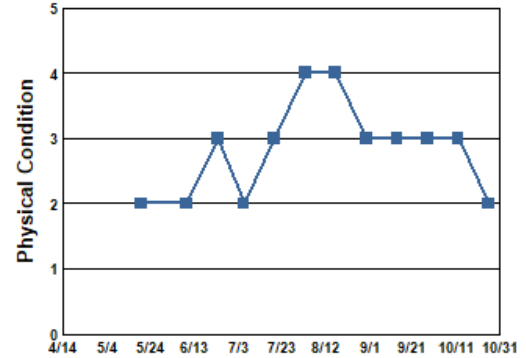
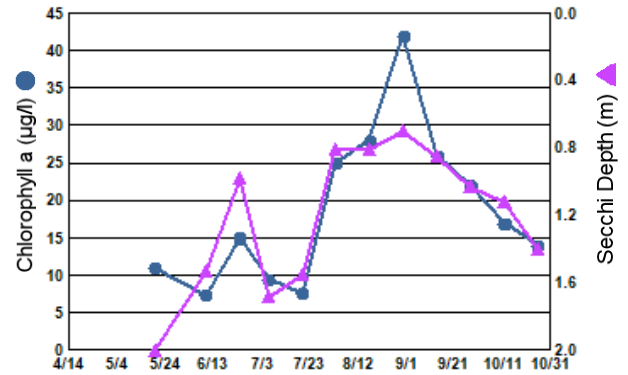
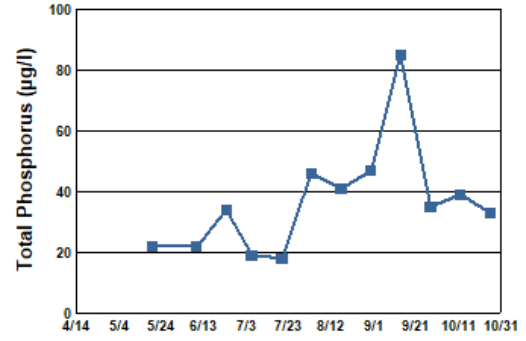
Lake ID: 20026-00

● Sampling site
Contours in meters

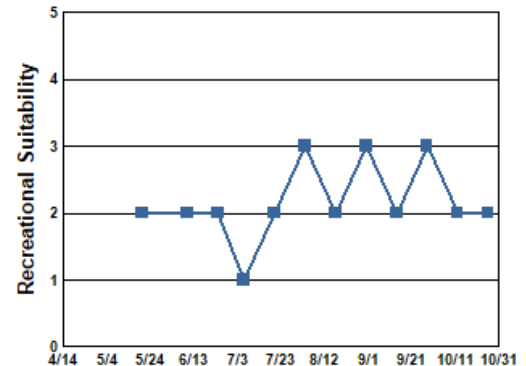


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/20/21	19.8	9.4	11	22	2.0	2	2
06/10/21	29.0	10.0	7.4	22	1.5	2	2
06/24/21	25.0	9.8	15	34	1.0	3	2
07/06/21	27.0	8.8	9.5	19	1.7	2	1
07/20/21	27.4	10.0	7.6	18	1.6	3	2
08/03/21	24.9	7.1	25	46	0.8	4	3
08/17/21	24.3	9.3	28	41	0.8	4	2
08/31/21	23.1	9.0	42	47	0.7	3	3
09/14/21	20.4	8.4	26	85	0.9	3	2
09/28/21	18.5	9.9	22	35	1.0	3	3
10/12/21	18.3	7.1	17	39	1.1	3	2
10/26/21	10.5	9.5	14	33	1.4	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	B		C						C		
CLA	B	C		C						C		
Secchi	C	C		C		D			D	C		
Lake Grade	B	C		C						C		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C			C	C	C	C	C		C
CLA			B			C						
Secchi			C	D	D	D	D	D	C	C		C
Lake Grade			C			C						

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C		C	C							
CLA					C							
Secchi		C			D							
Lake Grade					C							

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						D
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Piersons Lake (10–0053) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Piersons Lake is located in Laketown Township (Carver County). The lake is considered a Priority Water by the Metropolitan Council. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995 and zebra mussels (*Dreissena polymorpha*) in 2020.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

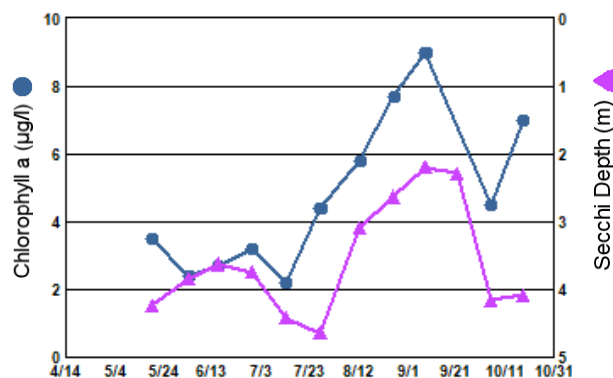
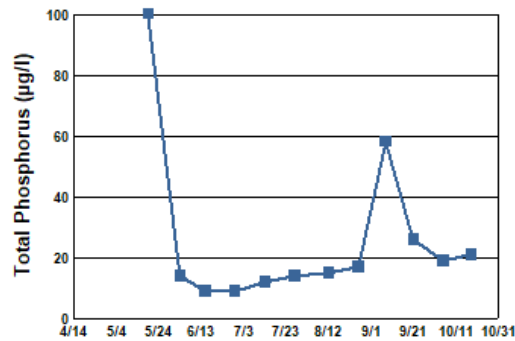
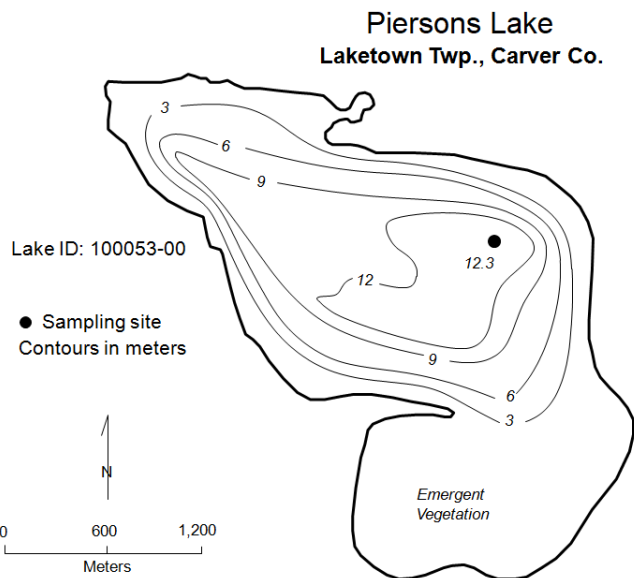
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	9	100	B
CLA (µg/l))	4.5	2.2	9.0	A
Secchi (m)	3.5	2.2	4.6	A
TKN (mg/l)				
			Lake Grade	A

The lake received a lake grade of A this year. The lake has varied in the A to B range over the past 42 years according to its historical water quality database.

Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

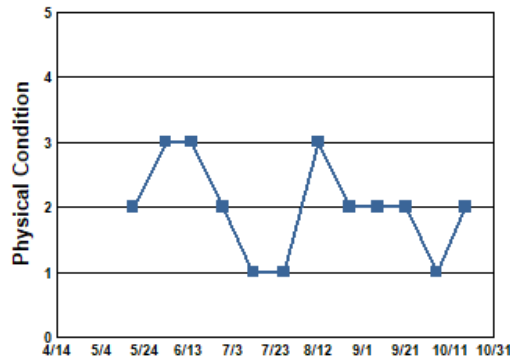
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

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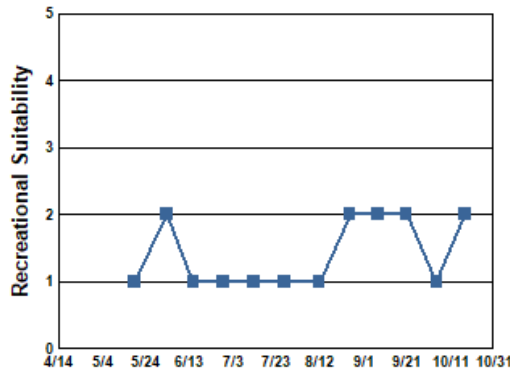


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/19/21	18.5	10.4	3.5	100	4.2	2	1
06/03/21	21.3	10.1	2.4	14	3.9	3	2
06/15/21	26.0	8.7	2.7	9	3.6	3	1
06/29/21	24.6	8.7	3.2	9	3.8	2	1
07/13/21	26.1	8.7	2.2	12	4.4	1	1
07/27/21	27.5	8.4	4.4	14	4.6	1	1
08/12/21	25.1	8.4	5.8	15	3.1	3	1
08/26/21	24.3	8.4	7.7	17	2.6	2	2
09/08/21	21.8	8.2	9.0	58	2.2	2	2
09/21/21	20.2	7.9		26	2.3	2	2
10/05/21	19.8	9.0	4.5	19	4.2	1	1
10/18/21	15.6	7.3	7.0	21	4.1	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	A	A							A		
CLA	B	A	B							A		
Secchi	B	A	B							B		
Lake Grade	B	A	A							A		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				A						B	A	A
CLA				B						B	B	B
Secchi				B						C	C	B
Lake Grade				B						B	B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			B									
CLA			B									
Secchi			C									
Lake Grade			B									

Year	2016	2017	2018	2019	2020	2021
TP						B
CLA						A
Secchi						A
Lake Grade						A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Rice Lake (10–0078) Metropolitan Council Environmental Services

Monitoring Personnel: Metropolitan Council staff

Rice Lake is located in Benton Township (Carver County). The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, oxidation reduction potential, and turbidity were made during each site visit. The surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

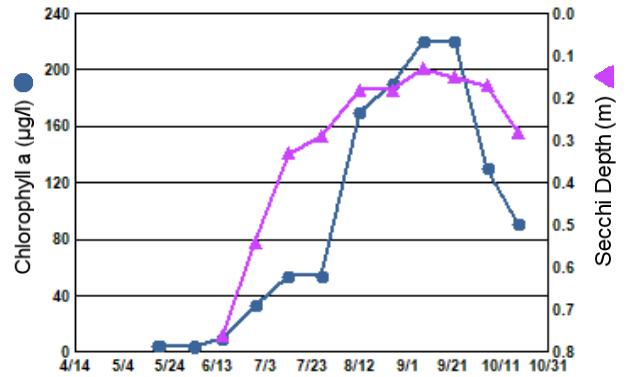
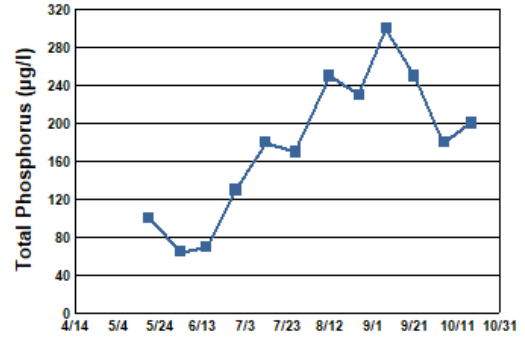
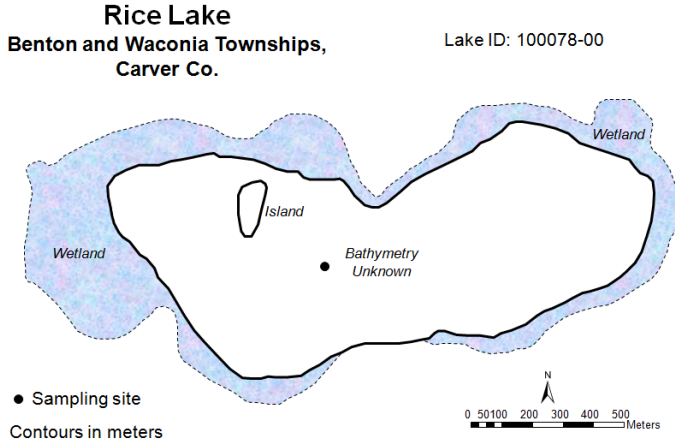
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	175	65	300	F
CLA (µg/l))	96	4.1	220	F
Secchi (m)	+0.4	0.1	+1.0	F
TKN (mg/l)				
			Lake Grade	F

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received a lake grade of F this year which is a degradation in water quality (D grades) observed in 2019 but similar to water quality (F grades) observed in 2015.

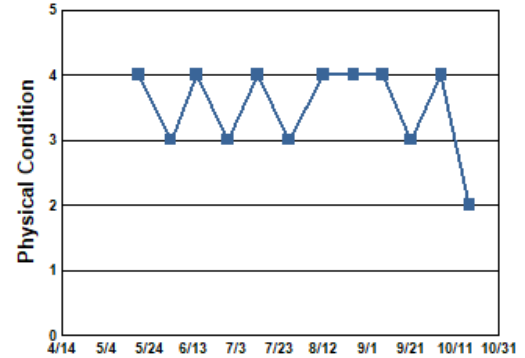
Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

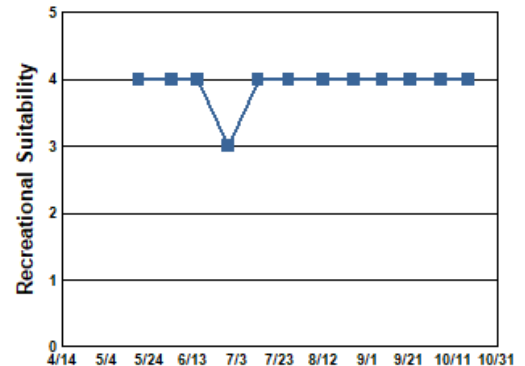


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/19/21	20.6	7.7	4.3	100	+0.9	4	4
06/03/21	22.9	12.1	4.1	65	+1.0	3	4
06/15/21	25.9	10.7	9.9	70	0.8	4	4
06/29/21			33	130	0.5	3	3
07/13/21	26.5	13.6	54	180	0.3	4	4
07/27/21	27.0	7.4	54	170	0.3	3	4
08/12/21	23.4	8.8	170	250	0.2	4	4
08/26/21	23.6	8.6	190	230	0.2	4	4
09/08/21	19.6	8.7	220	300	0.1	4	4
09/21/21	16.6	7.7	220	250	0.2	3	4
10/05/21	19.3	9.8	130	180	0.2	4	4
10/18/21	12.1	11.8	91	200	0.3	2	4



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												F
CLA												F
Secchi												F
Lake Grade												F

Year	2016	2017	2018	2019	2020	2021
TP				D		F
CLA				D		F
Secchi				F		F
Lake Grade				D		F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Citizen-Assisted Monitoring Program (CAMP)

Topics Covered in this Chapter

- ◆ [CAMP Overview](#)
- ◆ [Acknowledgments](#)
- ◆ [CAMP Methods](#)

The following section describes an overview of the CAMP, methods, and results.

CAMP Overview

The year 2021 marked the 28th year of the CAMP since the program began in 1993. The CAMP monitored 171 lake-sites on 160 lakes in 2021, including 7 lakes that have not been previously monitored by the METC (Figure 1). The CAMP is jointly funded by the METC and local sponsors such as WDs, WMOs, counties, and cities.

The main purpose of the CAMP is to provide lake and watershed managers with water quality data that can support them in properly managing water resources, and also provide much needed historical data to help document water quality changes and trends. Previous volunteer monitoring programs conducted throughout the United States have shown that, with proper equipment and instructions, volunteers can be trained to produce credible water quality data. Because most of the volunteers live near the lakes they are monitoring, they are very interested in determining any trends and/or changes in local water quality (Nichols 1992). An additional benefit of the monitoring program is the volunteer's increased awareness of the lake's condition and workings throughout the summer, which may foster grass-roots initiatives to protect lakes and promote support for lake management.

Prior to the inception of the CAMP in 1993, the METC conducted a pilot study in 1991 to assure that the data collection methods used by citizen volunteers would be credible. Results of the pilot study showed that the volunteer monitoring methods, as used in the CAMP, yielded results comparable to monitoring methods used by METC staff (Hartsoe and Osgood 1991).

CAMP volunteers collect surface water samples that are analyzed for total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll-a (CLA). In addition, they measure surface water temperature and water transparency, and record user perceptions. Some lakes are monitored for dissolved oxygen. Most lakes are visited biweekly from April through October (fourteen sampling dates), and are sampled over the lake's deepest open-water location. In 2021, some of the lakes were not monitored on each of the desired 14 sampling weeks. The reasons for the missed sampling dates varied. However, the majority of the lakes, even with the missed sampling dates, were sampled adequately and often enough to provide an annual overview of the water quality of each lake. Water samples were submitted to METC staff and then analyzed at the MCES laboratory in St. Paul, MN.

Acknowledgments

The successful performance of the 2021 CAMP would not have been possible without the greatly appreciated work performed by monitoring volunteers, and the support of the organizations that enrolled lakes in the program. The enrolling organizations, which included 11 cities, 13 watershed management organizations and watershed districts, 1 county, and 1 conservation district were involved in volunteer recruitment, training, and occasional follow up on the progress of their volunteer lake monitors. Without this help, the program would not have been as successful.

Those deserving the greatest appreciation are the volunteers themselves. Their efforts have made this program successful. A list of the 2021 CAMP volunteers is shown in Appendix C. The METC and the local sponsors thank them for their sustained efforts, including their quality work.

CAMP Methods

Recruiting Volunteers

Active recruitment of lakes and interested volunteers for the CAMP began in the winter months prior to the monitoring season. Potential sponsors were solicited for their list of lakes that they wished to enroll in the CAMP. The sponsors were encouraged to recruit volunteers for each lake they enrolled in the program. If there were problems finding willing volunteers, the METC assisted with the search; however, the belief was that the supervising organization would benefit in the long run by having direct contact with the volunteers it recruited. This contact would hopefully open a two-way communication line between concerned citizens and local partners.

Training Volunteers

Starting in 2020, volunteers were trained through an on-line training course that volunteers accessed by a personal computer or mobile device. This was a significant change from the in-person training done in previous years. The course is a combination of timed slides containing audio, video, and quizzes (with instructional feedback) to enable the volunteer to learn about the CAMP and the program's methods and procedures. As part of taking the course, the volunteers are required to take and pass a final assessment to demonstrate that they learned the content. The on-line course provides more efficient training by allowing volunteers to attend the course on their own schedule. Another version of the course is available as an on-demand reference for those who passed the exam and veteran volunteers. Volunteers are also given a handbook in their monitoring kit as a reference document. The handbook describes the program, methods, and discusses the basic biology and ecology of lake systems (Anhorn 2003a).

Monitoring Methods

Volunteers were instructed to monitor their designated lake site(s) on a biweekly basis from mid-April to mid-October, including 14 possible sampling periods. The monitoring methods are detailed in the following paragraphs.

First, during pre-arranged sampling weeks, volunteers located and anchored their boat at pre-determined monitoring locations (typically the deep open-water area of the lake). Once at the monitoring location, lake and weather conditions were recorded on a field data sheet (Figure 2). The form also provides space to record natural and cultural observations which may have influenced what was happening in the lake (e.g. heavy rains prior to monitoring, application of herbicide, etc.), and includes an area to document general perceptions of the lake's physical condition and suitability for recreation.

The volunteers measured water transparency (also called water clarity) by lowering a Secchi disk on the shady side of the boat to the point at which it disappeared. After the disk disappeared, the disk was slowly raised until at the point where the disk reappeared. The point at which the disk reappeared was defined as the Secchi depth (also called the Secchi transparency). The Secchi depth was recorded on the field data sheet.

The next lake monitoring step involved the collection of the surface water sample. The surface water sample was collected in a clean one-gallon plastic (HDPE) jug. The volunteer pre-rinsed the jug three times with lake water. After rinsing, the jug was filled with lake water by submerging it upside down to forearm depth and turning it upright while submerged. The filled jug was returned to the boat, wherein immediately the volunteer measured the water temperature in the jug. After the temperature was measured, aliquots were poured from the jug for laboratory analysis. These aliquots were decanted either while the volunteer was in the boat, or the jug was taken to shore where the aliquots were decanted. The collection methods for each parameter are given as follows:

- **Temperature:** Surface water temperature was measured in the volunteer's sampling jug using a digital thermometer that reads to 0.1°C. The temperature was measured immediately following sample collection. Special care was taken to keep the sample out of direct sunlight in order to minimize temperature change.
- **Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN):** Duplicate samples were decanted from the volunteer's jug into their respective triple pre-rinsed, pre-labeled 50 milliliter (ml) vials. These samples were then immediately placed in the volunteer's freezer. The samples were stored there until they were picked up and delivered to the laboratory for analysis.

- **Chlorophyll.** Chlorophyll samples from the volunteer's jug were filtered in the field, out of direct sunlight, using a field filtration apparatus (called a filter holder) and a hand pump. Water from the sampling jug was measured using a graduated cylinder, and then poured into the reservoir of the filter holder. The reservoir holds approximately 250 ml. By squeezing the handle of the pump, the sample water was forced through a 1 micrometer (μm) glass-fiber filter, and the suspended planktonic algae were trapped on the filter. The filtered water was discarded. If possible, this process was repeated until a total of 1,000 ml of sample water was allowed to pass through the filter. However, if the water sample contained much suspended material, and the filter became clogged without allowing more water to pass through, the amount of water that did pass through the filter was recorded on the field data sheet and the sample label. The filter was then removed from the filter holder with a tweezers, and placed in a Petri dish. The Petri dish was then labeled, wrapped in aluminum foil to keep the sample in the dark, and frozen until pick-up and delivery to the laboratory for analysis.

The frozen samples were typically picked up by METC staff within approximately 15-75 days from sample collection, and were delivered to the MCES laboratory for analysis. For some CAMP lakes, sub-surface samples were also collected for analysis of TP, TKN, chloride, orthophosphate, and/or total iron. These sub-surface samples were usually collected near the bottom of the lake using a Van Dorn sampler. Vertical profiles of dissolved oxygen and temperature measurements were also obtained on some lakes. However, subsurface samples and vertical profiles were done only by staff of local partner organizations, whose staff were monitoring via the CAMP.

CAMP Monitoring Form
Metropolitan Council Environmental Services

Lake Name: _____
 DNR ID#: _____

Site #: _____

Sampling Date: _____

Time: _____ (military time)
 (Use the same time on the sample labels.)

Name(s) of Volunteer(s):

Quantity of samples collected: _____
 Nutrient: _____
 CLA: _____

SECCHI DISK DEPTH: _____ meters

Check the box if the disk is visible on the bottom of the lake:

Check the circle if the visibility of the disk is completely blocked by vegetation:

SURFACE TEMPERATURE: _____ °C

VOLUME OF FILTERED LAKE WATER (CLA): _____ ml

GENERAL OBSERVATIONS
 (Circle the one best choice)

Water Color

Clear Yellow
 Green Gray
 Brown Blue-Green
 Comment:

Odor of Water

None Rotten Egg-like
 Fishy Septic-like
 Musty Other: _____
 Comment:

Wind Conditions

Calm Light Breezy Strong
 North South East West

(Choose one principal direction that the wind is mainly coming from.)

Water Surface

Calm Moderate Waves
 Ripple Whitecaps
 Small Waves
 Comment:

Cloud Cover

0% 75%
 25% 100%
 50%

Lake Level

Above Normal
 Normal
 Below Normal
 Staff Gage Reading _____

Amount of Aquatic Plants

None Moderate
 Minimal Substantial
 Slight

Air Temperature (°F)

< 40 81-90
 41-60 > 90
 61-80

Unusual Conditions

in the past week: (e.g. storms, high winds, temp. extremes, fish kills, chemical applications, harvesting of vegetation, etc.)

Physical Condition

Crystal Clear (1)
 Some Algae Present (2)
 Definite Algae Present (3)
 High Algal Color (4)
 Severe Bloom (5)
 (Odor, Scum)

Suitability for Recreation

Beautiful (1)
 Minor Aesthetic Problem (2)
 Swimming Slightly Impaired (3)
 No Swimming / Boating OK (4)
 No Aesthetics Possible (5)

Figure 2. CAMP Field Data Sheet

Laboratory Analytical Methods

The chemical analyses of CAMP samples were performed at the MCES laboratory according to the methods shown in Table 1. CAMP samples were typically analyzed just for TP, TKN, and chlorophyll but some samples from a few lakes were analyzed for additional parameters upon request from the CAMP sponsor. The results for those extra analyses are not shown in this report but are available on METC's EIMS <https://eims.metc.state.mn.us>. Samples that were analyzed for filtered matrices were filtered through a 0.45 µm membrane filter and then analyzed. Chlorophyll samples collected by the CAMP volunteers were analyzed according to the method shown in Table 1, except that the samples were not preserved with magnesium carbonate (MgCO₃). The CAMP chlorophyll samples were preserved instead by freezing.

The chlorophyll analysis results were reported by the laboratory according to two different equations: the trichromatic equation and the monochromatic equation. The trichromatic equation gives the following chlorophyll parameters:

- chlorophyll-a (CLA),
- chlorophyll-b,
- chlorophyll-c.

The monochromatic equation gives the following parameters:

- chlorophyll-a corrected for pheophytin,
- pheophytin-a.

The chlorophyll data in this report are reported as trichromatic CLA. However all the analytical results from the trichromatic and monochromatic equations can be accessed via the monitoring data databases as provided in the Introduction section.

Data Management

The field data from the volunteers' field data sheets and the analytical results from the MCES laboratory were entered into the Council's Environmental Information Management System (EIMS). The EIMS is a system for providing timely and reliable information for environmental planning and decision-making. The EIMS can be accessed via the internet at <http://es.metc.state.mn.us/eims/>. If there were questions concerning the data and lake observations, METC staff contacted the volunteer. The METC maintained contact with most volunteers throughout the season by telephone, in person during sample pick-up, or through their sponsor's CAMP coordinator.

Quality Assurance

CAMP uses a quality assurance (QA) program which includes quality control (QC) activities. The purpose of the QA program is to assure that CAMP produces and reports scientifically credible water quality data. The MCES laboratory follows its own internal QA program, which employs an extensive internal and external check and balance system to ensure credible data. Documentation of their QA program and QC procedures can be obtained from the laboratory.

The CAMP QA program has several components. One important component is training, which ensures that the volunteers are familiar with the CAMP monitoring methods prior to their first monitoring season. The training also ensures that the same monitoring methods are used by all the volunteers. Another component is that the volunteers' samples are checked by METC staff prior to submitting the samples to the MCES laboratory. The samples are checked for legible and correct labeling and sample integrity (e.g. cracked vials, missing caps, torn filters, etc.). Samples with poor integrity are discarded to avoid producing potentially erroneous data.

The CAMP sample data are reviewed after receipt from the MCES laboratory. The data are reviewed for outliers and other inconsistencies. Data that are determined to be suspect are flagged as such in the database. Data determined to be erroneous are censored and excluded from the database.

QC monitoring is another important component of the CAMP QA program. The purposes of QC monitoring are:

- To verify that the monitoring methods are producing reproducible data.
- To verify the monitoring performance of the volunteers with respect to professional staff.

A METC staff member performs QC monitoring throughout the monitoring season by visiting a volunteer's lake site during a scheduled monitoring week, but not necessarily on the same day as the volunteer's visit. The METC staff member monitors the lake site using the same methods and identical type of equipment as the volunteer. After the QC samples are collected, they are handled, stored, and submitted to the laboratory in the same manner as the volunteers' samples. Occasionally, an METC staff member accompanies a volunteer in the field during the monitoring season as a check on their monitoring methods. This latter method is used less commonly than the former method.

If a problem is discovered during the course of the sample checking or QC monitoring processes, the volunteer is contacted to discuss the cause of the problem. If needed, a METC staff member visits with the volunteer to observe his/her monitoring activities, in an effort to help identify the cause of the problem. Once the cause is identified, the volunteer is given instructions on how to correct the situation. If the problem resulted in erroneous data, then the data are censored and excluded from the database.

Figures 3, 4, and 5 show the QC monitoring data in comparison to the volunteer collected data for TP, CLA, and Secchi depth, respectively. The QC and associated volunteer monitoring data are also shown in Appendix D which provides additional information such as dates of collection and TKN. There were 10 QC monitoring events on 10 lake sites in 2021. QC monitoring events were typically monitored within 4 days of the CAMP volunteer monitoring event with the exception of the event for Lac Lavon (8-day difference). This event was included in the analysis to add another lake with a lower productivity.

The QC results showed mixed agreement between CAMP and METC staff collected samples and measurements. There was poorer correlation in TP between QC and volunteer collected data this year compared to previous years as indicated by an R^2 of 0.584. CLA and Secchi results had much better correlations (R^2 of 0.876 and 0.896, respectively). The correlation with TKN was very good with an $R^2 = 0.98$ (figure not shown). The data points for the CLA comparison showed good agreement along the 1:1 relationship. The Secchi disk depth comparison had a very good 1:1 relationship.

Further analysis of the QC TP results (Appendix D) can provide some insight into the differences between the QC and volunteer results for each lake and to help explain the lower TP correlation observed in 2021. For Cedar Lake, the QC and volunteer TP results did not correspond very well but neither did the CLA and Secchi data. The TP, CLA, and Secchi QC results taken together imply a lower productivity compared to the volunteer results. However, there was rapidly increasing primary production in the lake from early July to early August as indicated by increasing TP & CLA and decreasing Secchi depth (refer to the Cedar Lake pages within this report). The volunteer monitored the lake about 2 days after the QC monitoring event. This time frame and the rapidly increasing production could explain the differences between the two events.

For Lake Demontreville and Olson Lake, the CAMP QC and volunteer TP results do not compare very well, but a comparison between the QC and volunteer results for CLA and Secchi indicates reasonable agreement. However, the Olson QC result (63 ug/L) corresponds in magnitude to the Demontreville volunteer result (54 ug/L), and similarly the Demontreville QC result (14 ug/L) corresponds in magnitude to the Olson volunteer result (22 ug/L). This analysis includes these two lakes together because they were monitored by the same volunteer and were usually monitored in the same trip as these two lakes are connected by a navigable channel. If either the QC or volunteer TP results are switched between the lakes, then the QC and volunteer results compare quite well. This could imply that the TP samples may have been mistakenly allocated to the wrong lake, that is, mislabeled. This error may have been caused by a sample labeling mistake, either in the field or at the laboratory. This is just conjecture but leaves open the possibility of a singular mistake rather than a methods error.

For Goose Lake, the QC TP result is just over double the volunteer result but the QC CLA result is also just over double the volunteer result, so this is likely a difference in lake conditions over the time span between the monitoring events. For Sunset Pond, the QC TP result is half that of the volunteer result, but the QC CLA result is also much lower than the volunteer result. So similar to Goose Lake, this is likely a difference in lake conditions over the time span between the two monitoring events.

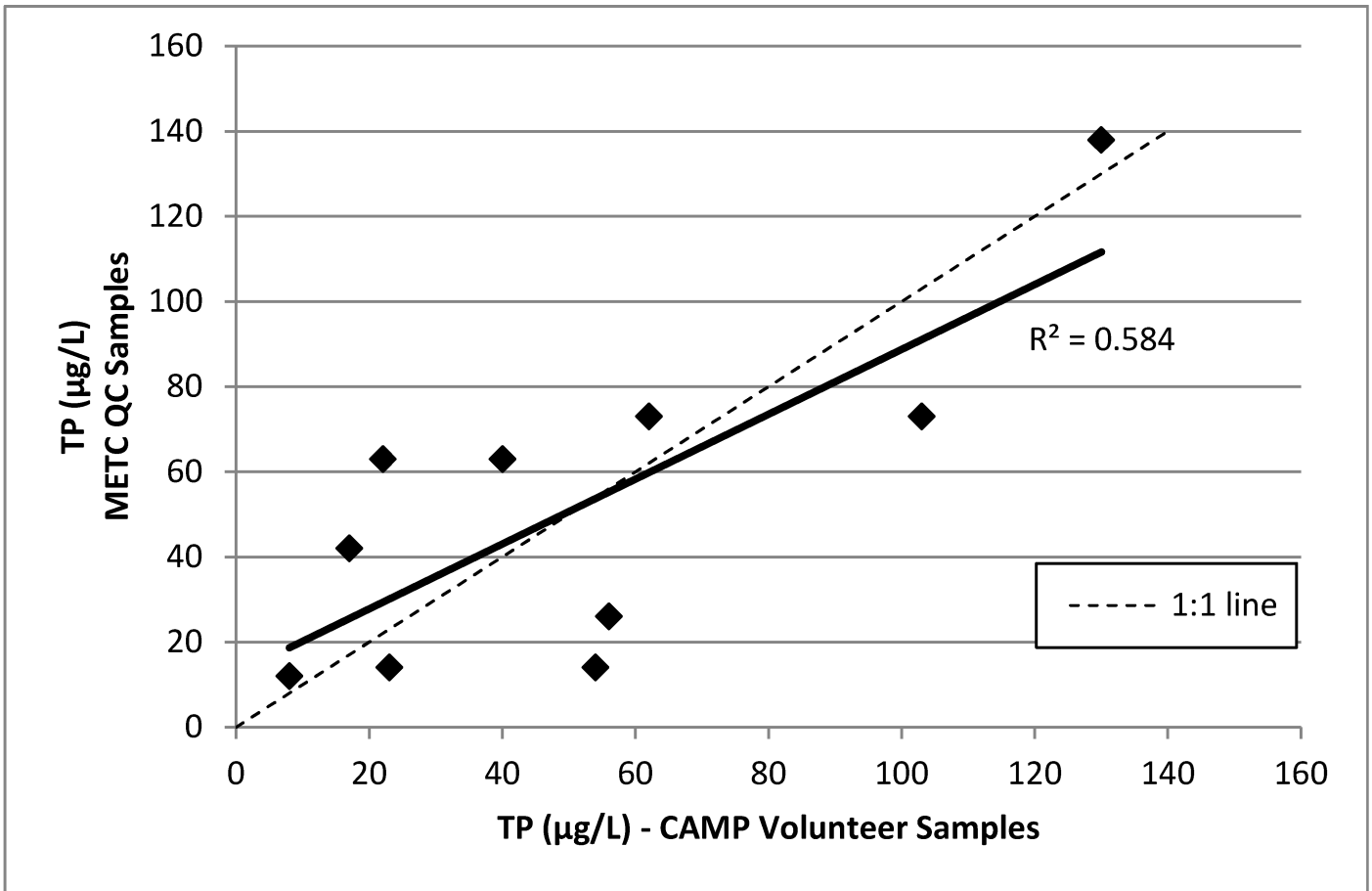


Figure 3. Total Phosphorus Quality Control Data

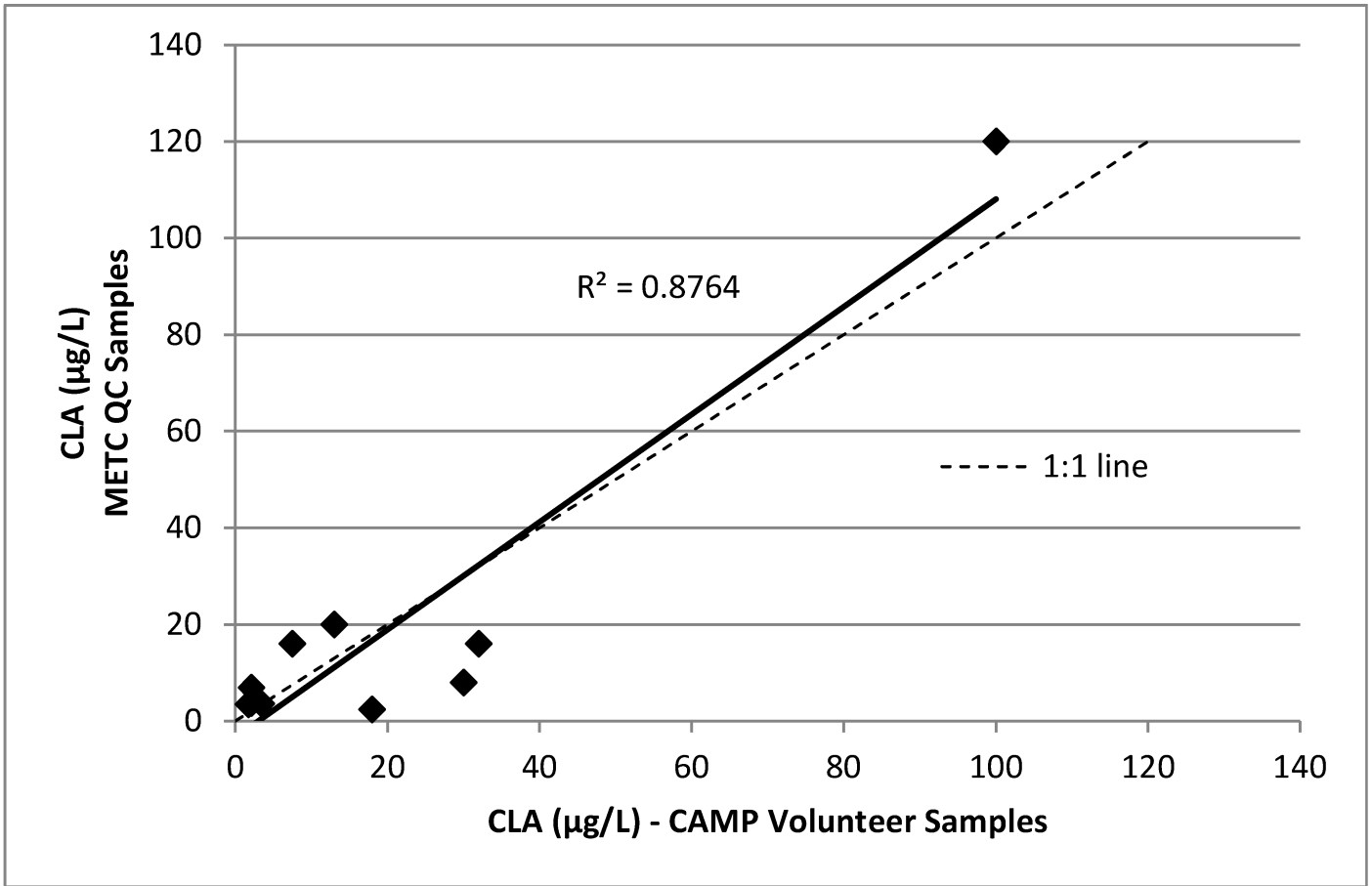


Figure 4. Chlorophyll-a Quality Control Data

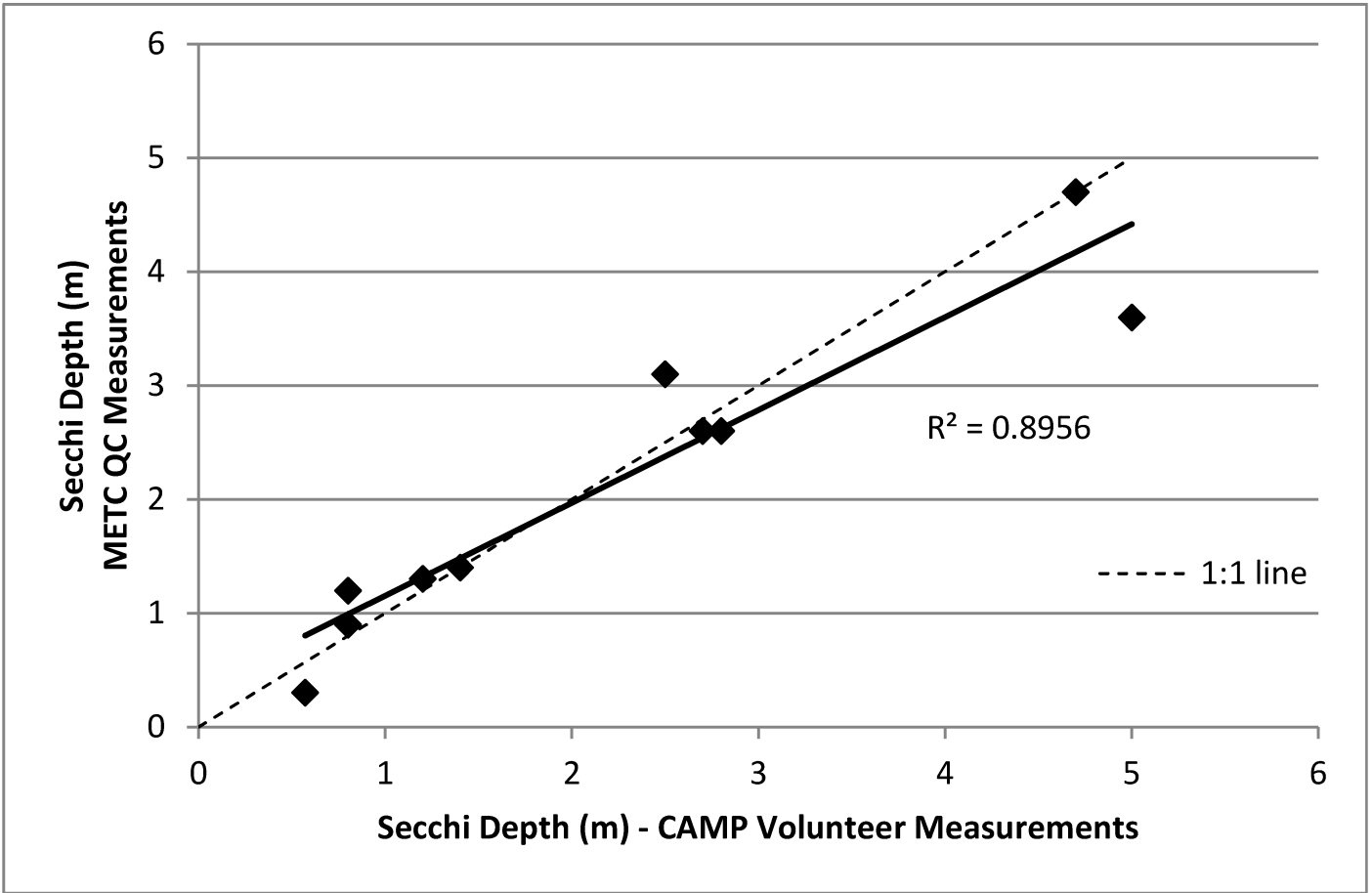


Figure 5. Secchi Depth Quality Control Data

Lake Quality Report Card

The Metropolitan Council, following its 1989 lake survey (Osgood 1989b), developed the lake quality report card. The idea is simply that lake water quality characteristics can be ranked by comparing measured values to those of other Metro Area lakes. In this way, technical information, which in the past had required professional analysis, can more easily be used by a less technical audience to visualize the water quality of their lake relative to other lakes in the region. The lake grading curve (Table 2) represents percentile ranges for three water quality indicators: the summertime (May - September) average values for total phosphorus, chlorophyll-a, and Secchi depth. These percentiles use ranked data from 120 lakes that were monitored from 1980 – 1988:

Table 2. Lake Grading Curve

Grade	Percentile	TP ($\mu\text{g/L}$)	CLA ($\mu\text{g/L}$)	Secchi (m)
A	< 10	< 23	< 10	> 3.0
B	10 — 30	23 — 32	10 — 20	2.2 — 3.0
C	30 — 70	32 — 68	20 — 48	1.2 — 2.2
D	70 — 90	68 — 152	48 — 77	0.7 — 1.2
F	> 90	> 152	> 77	< 0.7

The three variables used in the grading system (TP, CLA, Secchi depth) give an indication of the trophic status of the lake (Carlson 1977, Osgood 1982). The trophic status is the condition of the biological productivity of the lake ecosystem. The trophic status is strongly related to open-water nuisance-aspects of a lake (e.g. algal blooms, excess vegetation growth, poor water clarity), which can indicate accelerated aging (cultural eutrophication). For example, lake phosphorus concentration has been related to increased algal abundance, increased frequency of algal blooms, and to the increased abundance of blue-green algae (Osgood 1988). Chlorophyll-a, which is a pigment in plants (including algae) essential in the photosynthesis process, is used to estimate the algal abundance of a lake. Secchi depth relates to the appearance of a lake (generally the fewer algae, the better the transparency of a lake). TKN concentration was not included in the grading process because most lake nuisances in the area are related to the phosphorus concentration of the lake (Osgood 1988).

These water quality grades, however, only characterize the open-water quality of lakes. Other nuisances, such as the abundance of aquatic macrophytes, are not indicated in these grades.

The percentile curve can be used to assign individual grades for TP, CLA and Secchi depth to the monitored lakes. For example, a lake having a mean summertime Secchi depth of 1.7 m would receive a “C” grade for Secchi depth. A grade of C is considered average for lakes in the region. Lakes were also assigned a single, overall grade, called a lake grade. Lake grades were determined by averaging the individual parameter grades. A lake grade generally corresponds to descriptive rankings and recreational use conditions of the lake. Lakes receiving an “A” grade (upper 10 percentile) can be deemed as having full recreational use capability. A lake receiving a “B” lake grade is considered to have very good water quality and some recreational use impairment. Lakes receiving a “C” lake grade are considered to have average water quality but are recreationally impaired. A “D” grade lake translates to a very poor ranking with severely impaired recreational use. Lakes receiving an “F” lake grade have extremely poor water quality with little to no possible recreational use.

In 2000, the percentiles determined from the 1980-1988 water quality database of 120 lakes were compared to calculated percentiles from a more current and expanded 1980-1999 water quality database of 230 lakes. It was found that the percentiles from the expanded database were very similar to those determined from the 1980-1988 database. For this reason, and in an attempt to maintain consistency, the original 1980-1988 percentiles continued to be used for lake quality grading purposes (Anhorn 2003b).

2021 Lake Grades

Each lake monitoring site was given a lake grade if there were sufficient data to calculate the grade. At least 5 monitoring events are required to calculate a lake grade, and these 5 events must occur during the May-September (summer) period. Some lakes were not monitored sufficiently, so they did not receive a lake grade. The distribution of lake grades for lake sites monitored in 2021 is shown in Figure 6. Most lakes with an A or B lake grade have deeper maximum and mean depths, thermally stratify during the summer months, and have small contributing watersheds relative to the lake's surface area. However there are a few shallow lakes in the region that received an A or B lake grade. The majority of lakes with a D or F grade are generally shallower with higher watershed-to-lake ratios. Lakes with high watershed-to-lake ratios have a more difficult time handling larger pollutant loads than larger lakes in watersheds of similar size and land-use. Shallow lakes typically do not stratify during the summer months, allowing the potential release of phosphorus from sediments to mix through the water column and become available for plant growth during the summer season.

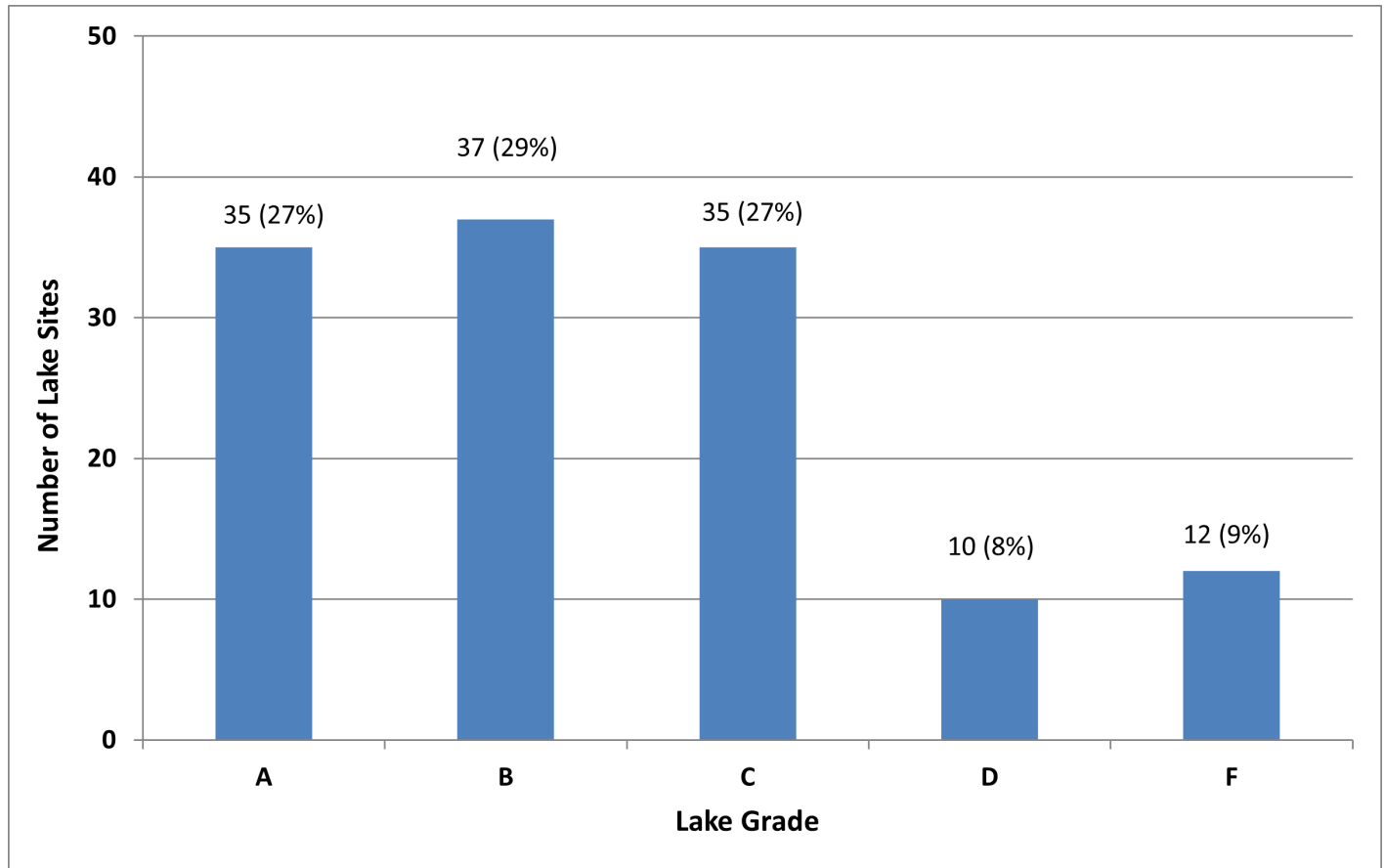


Figure 6. Distribution of 2021 Lake Grades

In 2021, 56% of the lake sites received a grade of “A” or “B”, meaning that they had relatively good water quality. Another 27% of lake sites received a water quality grade of “C”. The remaining 17% of lake sites received a water quality grade of “D” or “F”, meaning that they had relatively poor water quality. Lake grades for the lakes monitored by the Metropolitan Council in 2021 showed a notable shift towards higher grades (A’s and B’s) compared to previous years. The lake grade distribution in previous years has typically resembled a bell curve shape with a slight skew to the A to B range with C grades dominating. But in 2021, C grades were just as frequent as A grades, and B grades were higher than A and C grades, causing the curve to skew much further to the A and B range. Also, C grades have been typically about one third (30-36%) of the distribution in previous years. But in 2021, the C grades percentage was much lower at 27% of the distribution which further skews the curve compared to previous years.

We investigated further to try explaining these grade shifts from 2020 to 2021. To make a year-to-year analysis comparable, the analysis should focus on just those lake sites that were monitored in both years and had sufficient data to receive a lake grade for both years. Figure 7 shows the lake grade distributions for 2020 and 2021 that only includes lake sites that received lake grades in both 2020 and 2021. There were 102 lake sites that met this criterium. As shown in Figure 7, the increased skewing to the A to B range is still observed in the 2021 distribution compared to 2020, and the skewing appears even more pronounced in Figure 7 compared to Figure 6 because the quantity of C grades in 2021 was

lower than both A and B grades. So, by making a comparable analysis, the skewing of the lake grades appears to be even more pronounced.

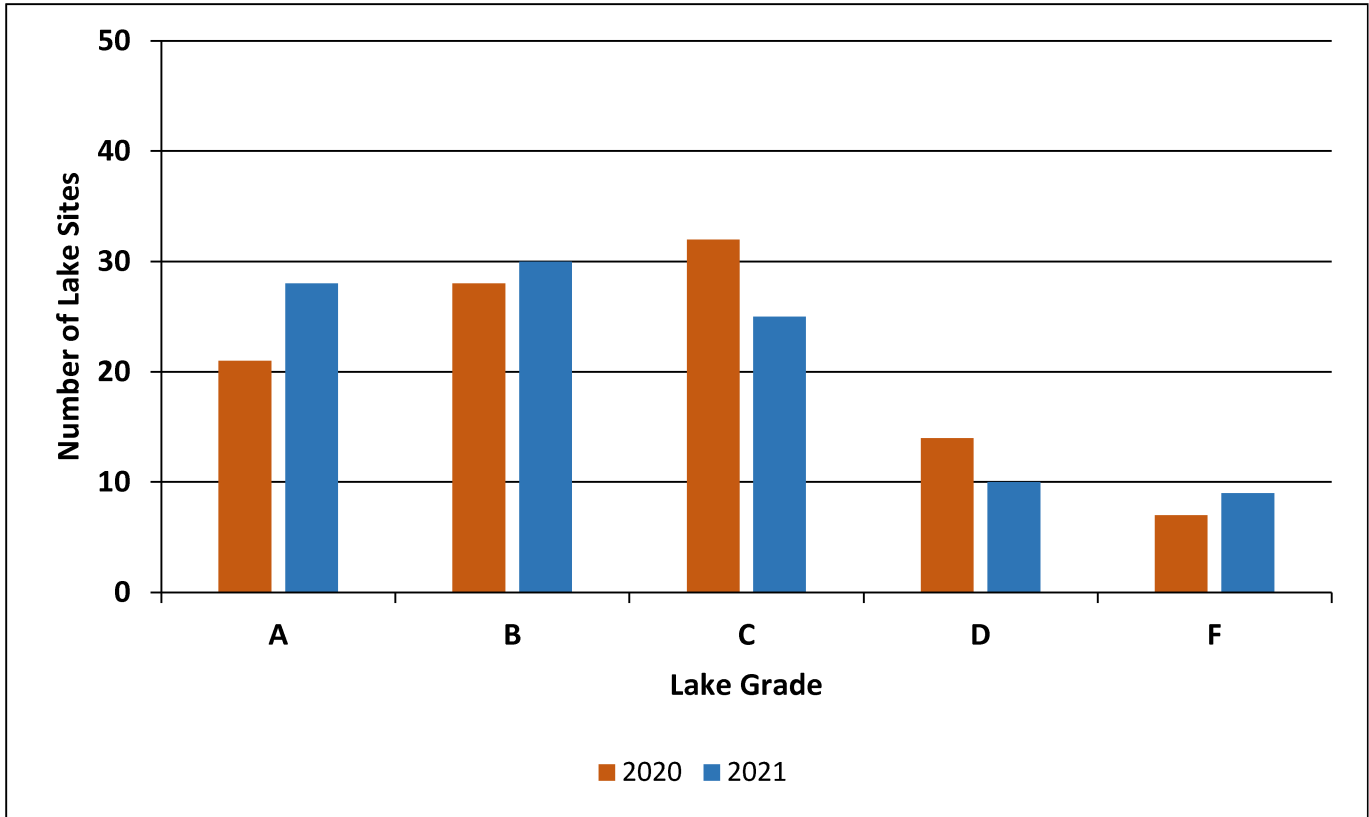


Figure 7. Lake Grade Distributions with Lake Sites Receiving Lake Grades in Both 2020 And 2021

Further analysis showed how these grades shifted from grade to grade from 2020 to 2021. Figure 8 shows the changes in lake grades, with arrows showing the direction that individual lakes’ grades changed, and the size of the arrow proportional to the number of lakes that saw that change in grade. More lakes saw an improvement in a lake grade (28) from 2020 to 2021 than saw a grade degradation (11). Sixty three lakes saw no change in their lake grade. This analysis shows that almost all lakes that had grade changes only changed by one letter grade, with most of the shifting occurring from C to B and B to A.

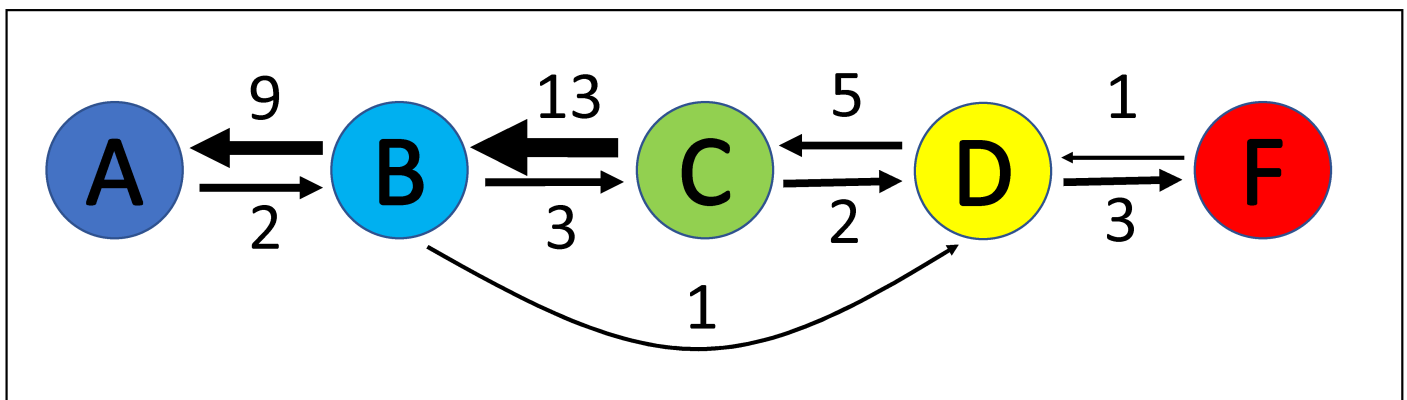


Figure 8. Lake Grade Changes for Lake Sites Receiving Lake Grades in Both 2020 and 2021

The cause (or causes) for the grade shifts observed in 2021 is not known at this time but there are some possibilities. For example, of significance to the 2021 monitoring season was the development of the flash drought during the summer of 2021. The drought may have played a role in the grade shift through reduced precipitation, which in turn caused a reduction in surface runoff. A reduction in surface runoff would have likely reduced the TP loading to the region’s lakes. The reduced TP loading then would have reduced availability of nutrients (i.e. phosphorus) and likely caused a decrease in primary production (i.e. algal production) and in-turn caused an improvement in water transparency. The effect would be improvement in the lake grade parameters and grades. This is a hypothesized generalization

for the lake population as whole. The effects of the drought on a particular lake are dependent on its specific hydrology and internal nutrient cycling characteristics. As discussed previously, some lakes saw improvements in their lake grade (28) where some, but fewer, saw decline in their grades (11). The drought may not have affected all lakes the same, but the overall effect could have been to potentially reduce primary production on the lake population as a whole and to shift the grade distribution to the A and B range.

Another possibility is that the lake population in this report may be showing the effects of water quality trends that are being driven by other factors that affect a lake's productivity. These other factors could be, for examples:

- Long-term climate changes
- Land use changes
- Implementation of stormwater BMPs in a lake's watershed
- In-lake management practices
- Aquatic invasive species effects
- Combination of these.

In the future we plan to do an in-depth analysis on the monitoring data to provide information on potential regional long-term water quality trends and assess what may be driving these trends.

Monitoring Results for CAMP Lakes 2021

The water quality of each volunteer-monitored lake is discussed in the following section. Each lake report includes a description of the lake's water quality condition, the year's water quality data, shown in tables and figures, and the water quality grades from 1980 through 2021.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Acorn Lake (82–0102) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Acorn Lake is located within City of Oakdale (Washington County). This lake is also called Mud Lake. The mean and maximum depth of the lake is 0.7 m (roughly 2.4 feet) and 3.0 m (10 feet), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. There is no public access to the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

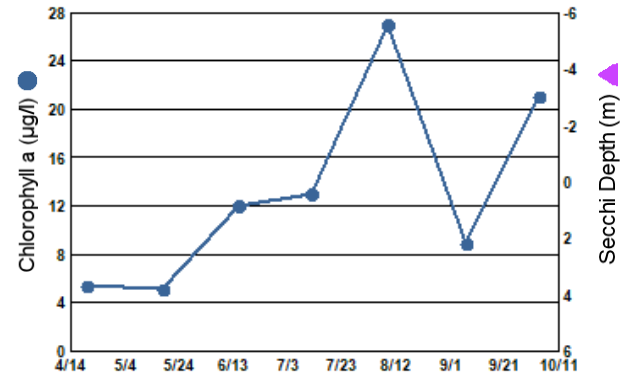
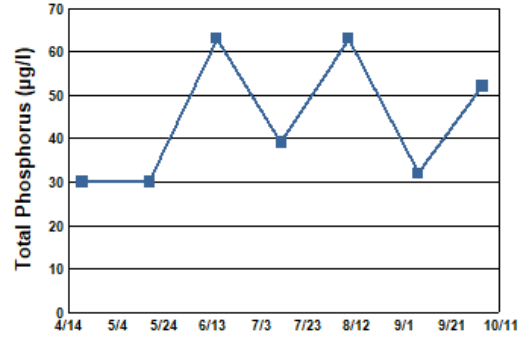
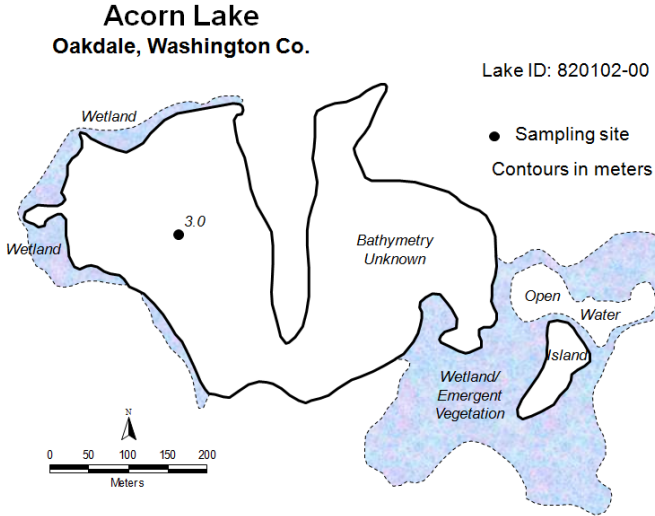
Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	45	30	63	C
CLA ($\mu\text{g/l}$)	13	5.1	27	B
Secchi (m)	>0.4	>0.2	>0.6	
TKN (mg/l)	0.95	0.72	1.10	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a TP grade of C and a CLA grade of B this year which is consistent with its varying historical water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. \

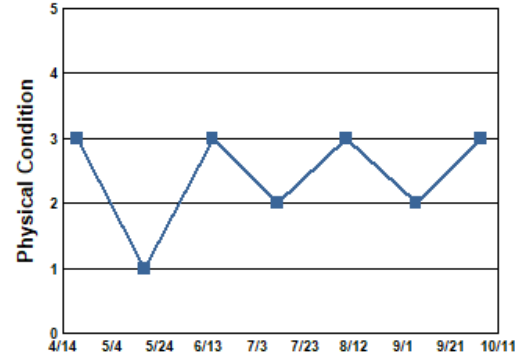
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



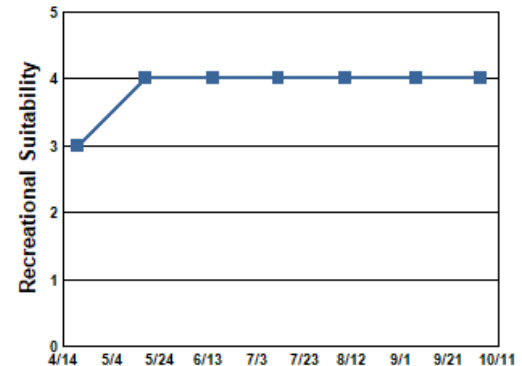
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.3	10.2	5.4	30	>0.6	3	3
05/18/21	20.7	7.0	5.1	30	>0.6	1	4
06/15/21	23.3	3.7	12	63	>0.3	3	4
07/12/21	23.2	7.9	13	39	>0.2	2	4
08/09/21	22.9	5.6	27	63	>0.2	3	4
09/07/21	20.7	6.9	8.9	32	>0.6	2	4
10/04/21	18.2	2.9	21	52	>0.3	3	4



> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C				C					
CLA			A				B					
Secchi			F				D					
Lake Grade			C				C					

Year	2016	2017	2018	2019	2020	2021
TP	C	B	C	C	D	C
CLA	B	B	B	A	C	B
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Alimagnet Lake (19–0021) City of Burnsville

Volunteer: David DeKraker

Approximately half of Alimagnet Lake's 109-acre surface area is located within the City of Apple Valley, the other half in the City of Burnsville (Dakota County). The lake has maximum and mean depths of 3.0 and 1.5 m, respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	75	38	118	D
CLA (µg/l)	49	2.2	110	D
Secchi (m)	1.1	0.5	2.6	D
TKN (mg/l)	1.39	0.80	2.00	
			Lake Grade	D

The lake received a lake grade of D this year. The lake's historic lake grades indicate that the lake fluctuates between a C and D with the occasional F.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

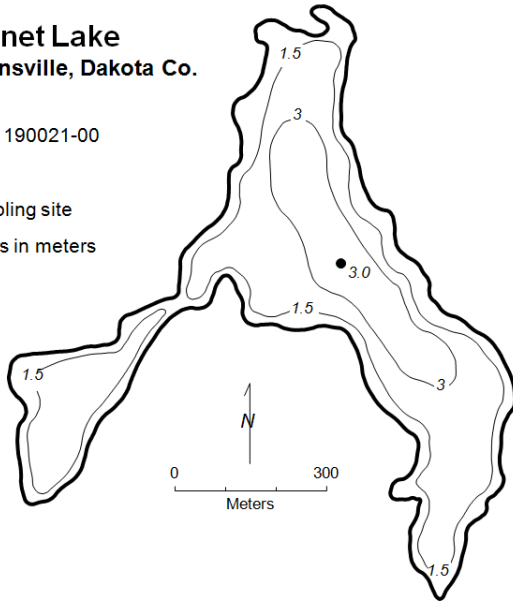
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Alimagnet Lake
Apple Valley/Burnsville, Dakota Co.

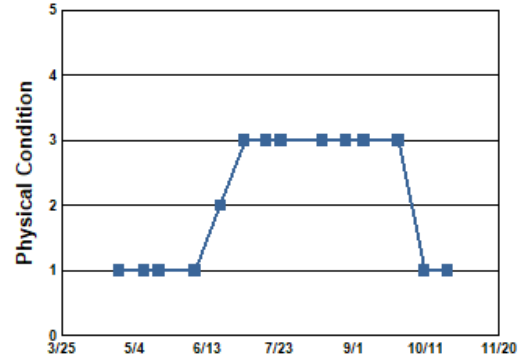
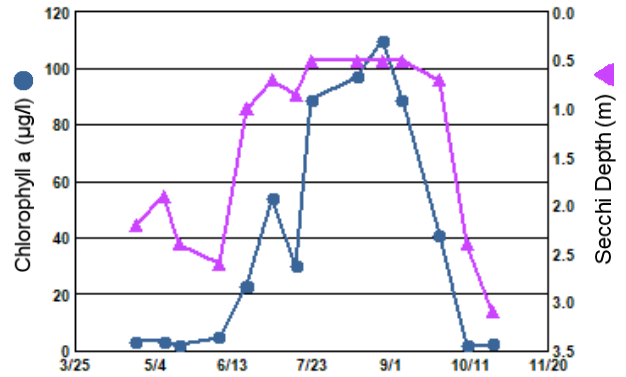
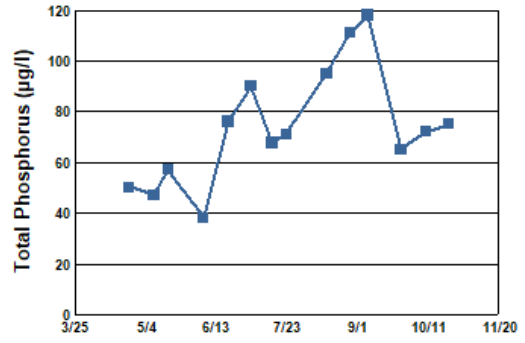
Lake ID: 190021-00

● Sampling site
Contours in meters

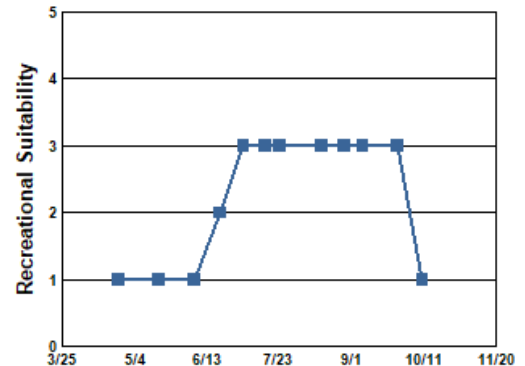


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	11.4		3.2	50	2.2	1	1
05/09/21	15.0		3.2	47	1.9	1	
05/17/21	20.0		2.2	57	2.4	1	1
06/06/21	28.0		4.8	38	2.6	1	1
06/20/21	25.5		23	76	1.0	2	2
07/03/21	25.2		54	90	0.7	3	3
07/15/21	26.2		30	68	0.9	3	3
07/23/21	27.3		89	71	0.5	3	3
08/15/21	24.8		97	95	0.5	3	3
08/28/21	24.2		110	111	0.5	3	3
09/07/21	23.1		89	118	0.5	3	3
09/26/21	22.0		41	65	0.7	3	3
10/10/21	15.7		1.8	72	2.4	1	1
10/23/21	13.0		2.4	75	3.1	1	



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	F	D									F	
CLA											D	
Secchi	F	F	D	D	C	D	F	F	F	F	D	C
Lake Grade											D	

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				D	D	C	D	F	D	D	D	D
CLA				B	C	C	C	D	D	C	C	C
Secchi	D	C	C	C	D	C	C	D	F	D	F	F
Lake Grade				C	D	C	C	D	D	D	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	F	D	D	D	C	C	D	D	D	D
CLA	D	D	D	D	D	C	C	C	C	D	D	D
Secchi	F	F	F	F	F	F	D	C	C	D	D	D
Lake Grade	D	D	F	D	D	D	C	C	C	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	F	D	D	C	C	D
Secchi	F	F	F	D	C	D
Lake Grade	F	D	D	D	C	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Armstrong Lake (82–0116) South Washington Watershed District

Monitoring Personnel: Washington Conservation District staff

The lake is located within the cities of Lake Elmo and Oakdale (Washington County). The lake has a surface area of 39 acres, and it has a mean and maximum depth of 1.0 m and 1.5 m, respectively. Because of the shallowness of the lake, its entire area is considered littoral, which is the shallow depth zone (0-15 feet) dominated by aquatic vegetation. It does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	134	60	238	
CLA ($\mu\text{g/l}$)	48	6.9	160	
Secchi (m)	>0.5	>0.2	>0.6	
TKN (mg/l)	1.93	0.83	3.90	
			Lake Grade	

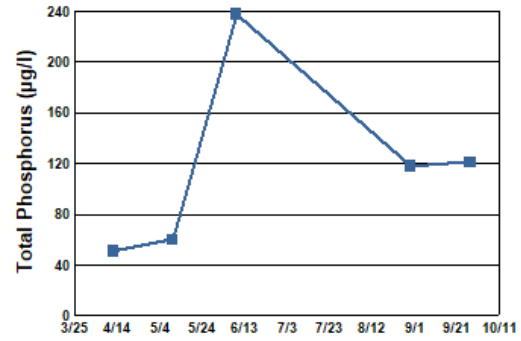
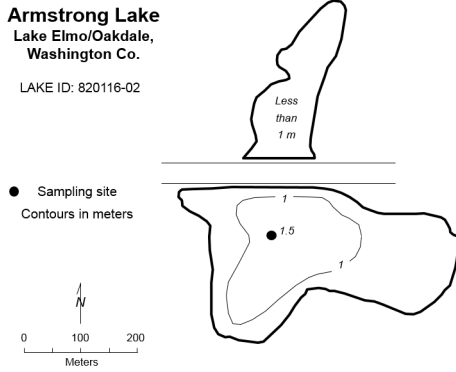
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

According to the lake's historic database, TP and Secchi grades are typically worse than the CLA grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

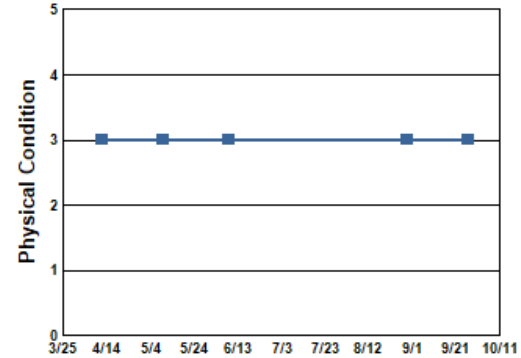
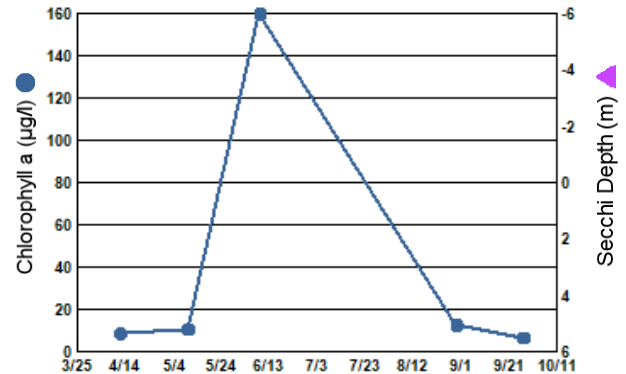
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



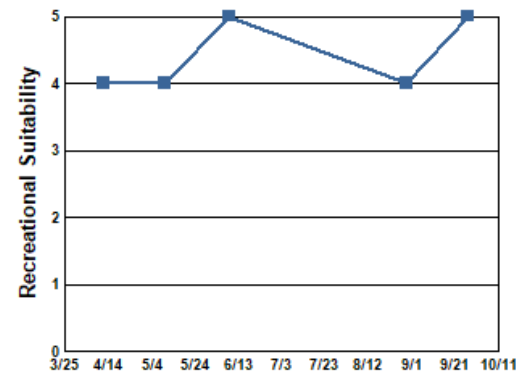
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	10.2	8.7	9.0	51	+0.9	3	4
05/10/21	13.2	9.3	11	60	>0.5	3	4
06/09/21	24.0	5.3	160	238	>0.2	3	5
08/30/21	22.7	5.1	13	118	>0.6	3	4
09/27/21	13.5	1.9	6.9	121	>0.6	3	5

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
 > indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
 2 = Some Algae Present
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 4 = High Algal Color
 5 = Severe Algal Bloom



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 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							D	F	C	D	D	D
CLA							D	C	C	C	B	B
Secchi							D	F	D	D	D	D
Lake Grade							D	D	C	D	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	D	C	C	C	C	C	C		C
CLA	A	A	B	C	A	B	A	A	A	A		B
Secchi	D	D	D	D	D	D	D	D	D			
Lake Grade	C	C	C	D	C	C	C	C	C			

Year	2016	2017	2018	2019	2020	2021
TP	C	D	C	C	C	
CLA	A	A	A	C	B	
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Augusta Lake (19–0081) Lower Mississippi River Watershed Management Organization

Volunteer: Steve Treichel

Augusta Lake is located in the city of Mendota Heights (Dakota County). The lake has a surface area of 38 acres and maximum depth of 10.1 m.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2010.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	166	90	320	F
CLA (µg/l))	170	94	230	F
Secchi (m)	0.2	0.1	0.3	F
TKN (mg/l)	3.41	2.70	4.50	
			Lake Grade	F

The lake received a lake grade of F, which is consistent with its historical water quality database.

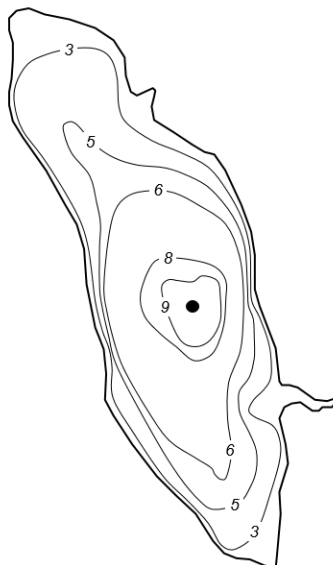
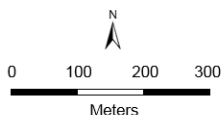
During each monitoring visit, the lake’s physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake’s data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Augusta
Mendota & Mendota Heights,
Dakota Co.

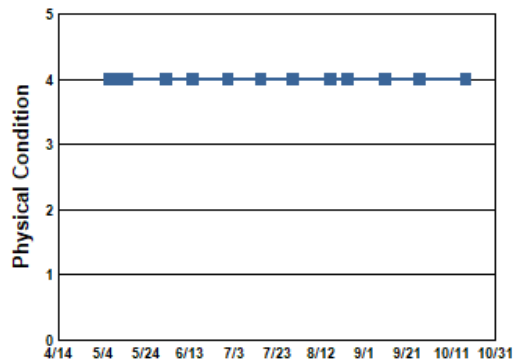
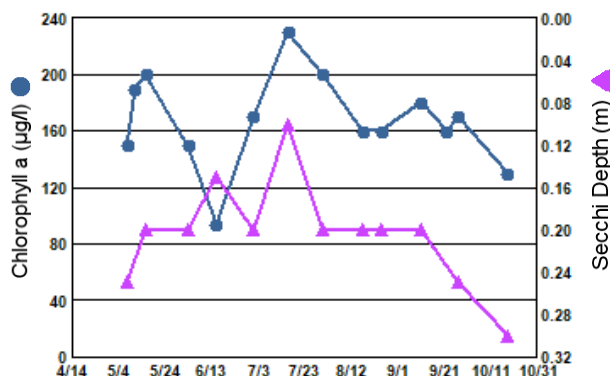
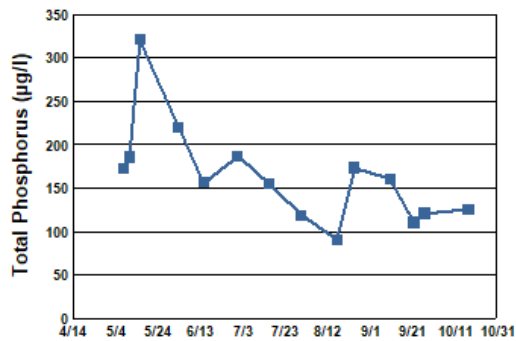
Lake ID: 190081-00
WMO: Lower Mississippi River

● Sampling site
Contours in meters

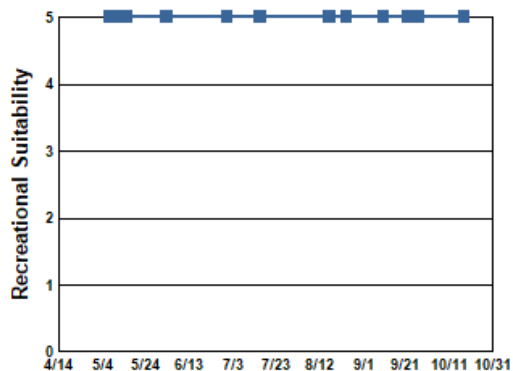


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/08/21	14.8		150	172	0.3	4	5
05/11/21	15.0		190	185		4	5
05/16/21	17.8		200	320	0.2	4	5
06/03/21	21.9		150	219	0.2	4	5
06/15/21	28.9		94	156	0.2	4	
07/01/21	27.1		170	186	0.2	4	5
07/16/21	25.9		230	154	0.1	4	5
07/31/21	26.0		200	118	0.2	4	
08/17/21	24.6		160	90	0.2	4	5
08/25/21	24.6		160	173	0.2	4	5
09/11/21	22.2		180	160	0.2	4	5
09/22/21	19.8		160	110			5
09/27/21	19.0		170	120	0.3	4	5
10/18/21	15.6		130	125	0.3	4	5



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5 = Severe Algal Bloom



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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP	F		D	D	D	F
CLA	F		F	F	F	F
Secchi	F		F	F	F	F
Lake Grade	F		F	F	F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Bailey Lake (82–0456) South Washington Watershed District

Monitoring Personnel: Washington Conservation District staff

Bailey Lake is located in the city of Woodbury (Washington County). Little morphological information is available for this lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	78	46	145	D
CLA ($\mu\text{g/l}$)	31	5.0	48	C
Secchi (m)	1.3	0.8	2.6	C
TKN (mg/l)	1.30	0.91	1.70	
			Lake Grade	C

The lake received a lake grade of C which is an improvement over the D grades received in previous years. Continued monitoring is recommended to build the water quality database.

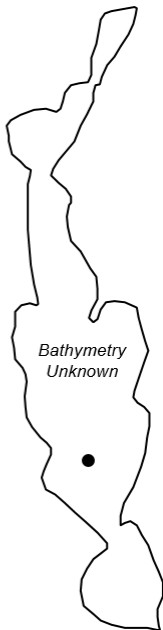
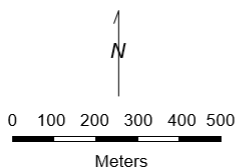
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bailey Lake
Woodbury, Washington Co.

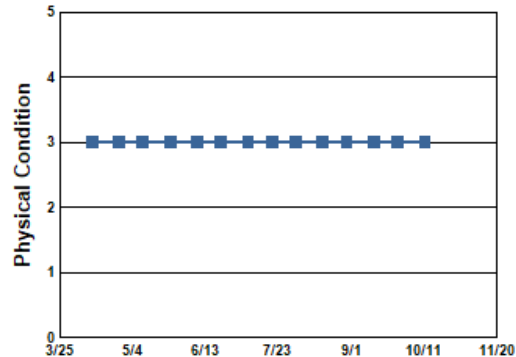
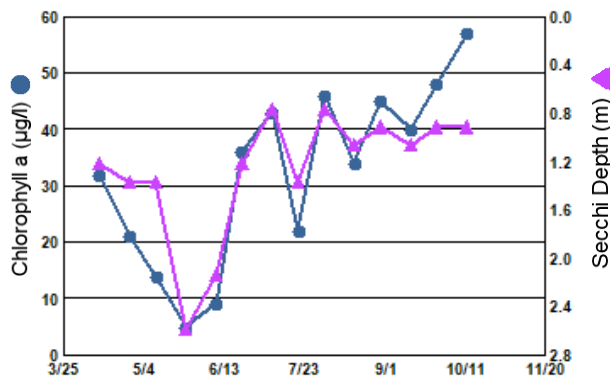
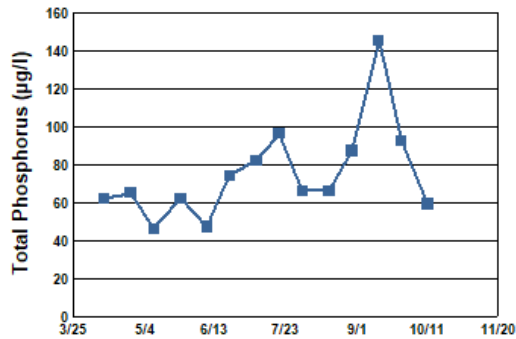
Lake ID: 82045600

● Sampling site
Contours in meters

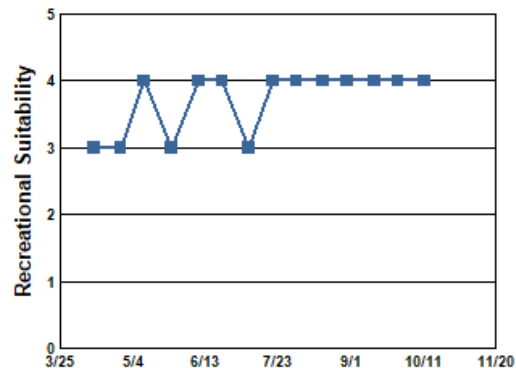


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.5	10.5	32	62	1.2	3	3
04/27/21	9.3	11.6	21	65	1.4	3	3
05/10/21	14.7	12.3	14	46	1.4	3	4
05/25/21	23.0	7.7	5.0	62	2.6	3	3
06/09/21	28.1	8.3	9.1	47	2.1	3	4
06/22/21	22.1	8.5	36	74	1.2	3	4
07/07/21	25.1	6.4	43	82	0.8	3	3
07/20/21	27.1	10.6	22	96	1.4	3	4
08/02/21	24.8	9.9	46	66	0.8	3	4
08/17/21	23.9	8.7	34	66	1.1	3	4
08/30/21	25.0	10.4	45	87	0.9	3	4
09/14/21	20.8	7.3	40	145	1.1	3	4
09/27/21	18.6	10.4	48	92	0.9	3	4
10/12/21	18.6	7.5	57	59	0.9	3	4



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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	D	D	D	D
CLA		D	D	C	C	C
Secchi		F	D	D	D	C
Lake Grade		D	D	D	D	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Bass Lake [East] (82–0124) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Bass Lake (east) is located east of Joliet Lane in Grant Township. There are few known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	23	11	30	A
CLA ($\mu\text{g/l}$)	3.4	1.2	11	A
Secchi (m)	>2.9	2.4	3.5	B
TKN (mg/l)	0.60	0.49	0.75	
			Lake Grade	A

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

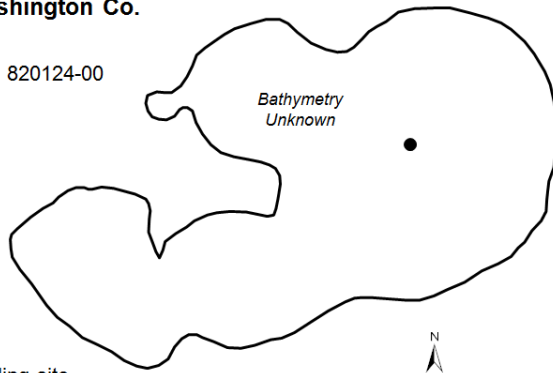
The lake received a lake grade of A this year which is consistent with its improving water quality since 2006. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bass Lake East
Grant, Washington Co.

LAKE ID: 820124-00

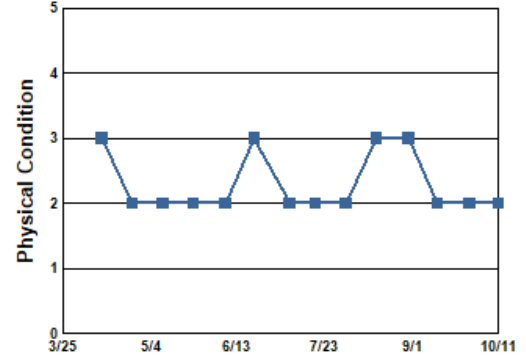
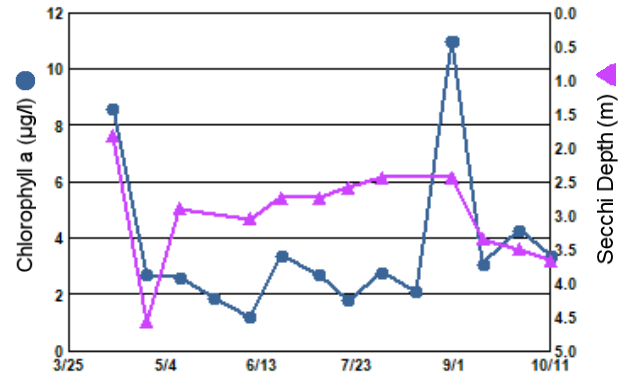
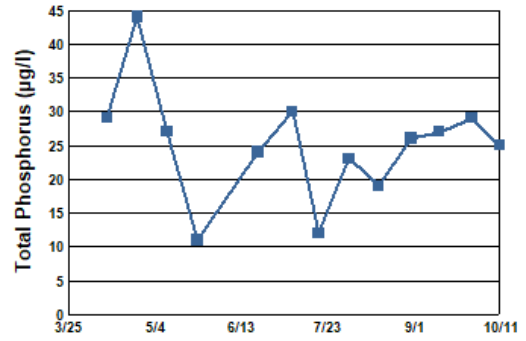


● Sampling site
Contours in meters

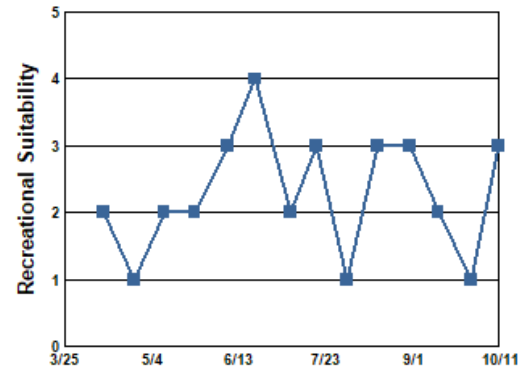
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.6	12.3	8.6	29	1.8	3	2
04/26/21	9.8	11.8	2.7	44	4.6	2	1
05/10/21	15.3	10.9	2.6	27	2.9	2	2
05/24/21	22.5	9.6	1.9	11	>3.5	2	2
06/08/21	27.4	8.9	1.2		3.0	2	3
06/21/21	24.3	6.7	3.4	24	2.7	3	4
07/07/21	25.9	7.0	2.7	30	2.7	2	2
07/19/21	27.8	8.4	1.8	12	2.6	2	3
08/02/21	25.2	6.2	2.8	23	2.4	2	1
08/16/21	25.7	7.7	2.1	19	>2.7	3	3
08/31/21	25.1	8.9	11	26	2.4	3	3
09/13/21	22.3	7.2	3.1	27	3.4	2	2
09/28/21	18.2	7.9	4.3	29	3.5	2	1
10/11/21	19.0	7.9	3.4	25	3.7	2	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C	C	C	C	C	C	C	B	B	A
CLA			B	B	C	A	A	B	A	A	A	A
Secchi			C	B	C	B	B	B	B	B		B
Lake Grade			C	B	C	B	B	B	B	B		A

Year	2016	2017	2018	2019	2020	2021
TP	C	A	A	B	A	A
CLA	A	A	A	A	A	A
Secchi	B	B	B	B	A	B
Lake Grade	B	A	A	B	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Bass Lake [West] (82–0123) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Bass Lake (west) is located west of Joliet Lane in Grant Township. There are few known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

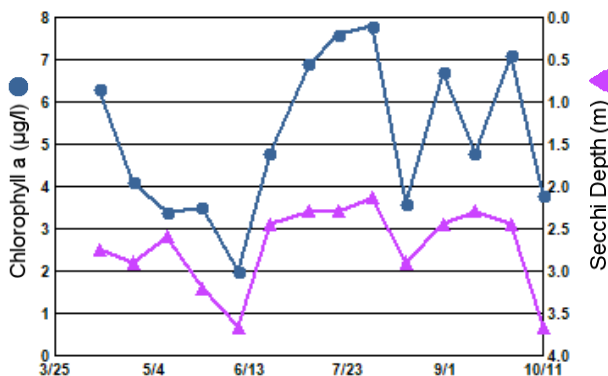
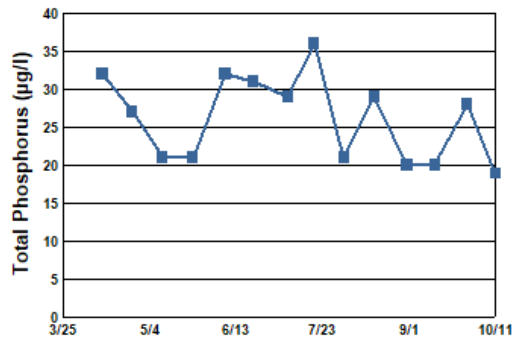
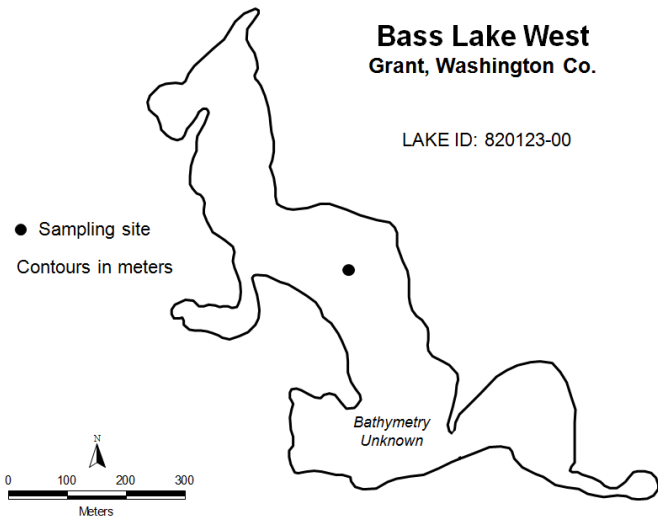
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	20	36	B
CLA (µg/l))	5.3	2.0	7.8	A
Secchi (m)	2.6	2.1	3.7	B
TKN (mg/l)	0.73	0.64	1.10	
			Lake Grade	B

The lake received a lake grade of B which is consistent with its recent historical water quality database. The lake has fluctuated in the A to B range for the past 10 years.

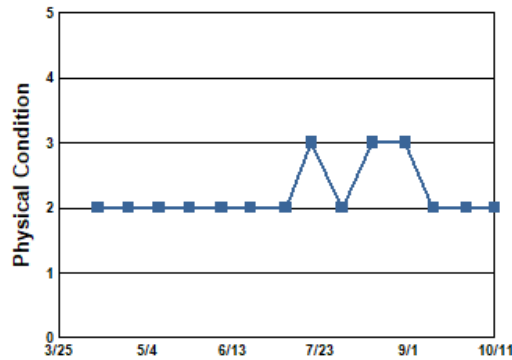
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

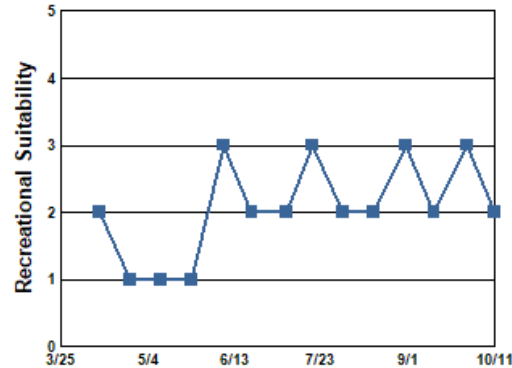


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.5	12.8	6.3	32	2.7	2	2
04/26/21	9.4	11.2	4.1	27	2.9	2	1
05/10/21	15.2	10.6	3.4	21	2.6	2	1
05/24/21	22.5	7.8	3.5	21	3.2	2	1
06/08/21	27.4	8.2	2.0	32	3.7	2	3
06/21/21	23.5	8.2	4.8	31	2.4	2	2
07/07/21	25.8	7.1	6.9	29	2.3	2	2
07/19/21	27.2	9.6	7.6	36	2.3	3	3
08/02/21	25.1	7.2	7.8	21	2.1	2	2
08/16/21	25.1	7.5	3.6	29	2.9	3	2
08/31/21	24.0	8.5	6.7	20	2.4	3	3
09/13/21	21.8	7.5	4.8	20	2.3	2	2
09/28/21	18.3	7.4	7.1	28	2.4	2	3
10/11/21	19.0	7.4	3.8	19	3.7	2	2



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
 2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
 3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			B	B	B	C	C	C	C	B	B	A
CLA			A	A	B	B	B	A	A	A	A	A
Secchi			A	B	B	C	C	B	C			
Lake Grade			A	B	B	C	C	B	B			

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	B	A	B
CLA	A	A	A	A	A	A
Secchi	B	B	A	B	A	B
Lake Grade	B	A	A	B	A	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Benz Lake (82–0120) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Benz Lake is a 36-acre lake located in Grant Township (Washington County) with a maximum depth of approximately 2.7 m (about 9 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	34	15	55	C
CLA (µg/l)	6.0	2.6	14	A
Secchi (m)	>1.1	>0.8	>1.5	
TKN (mg/l)	0.62	0.50	0.81	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

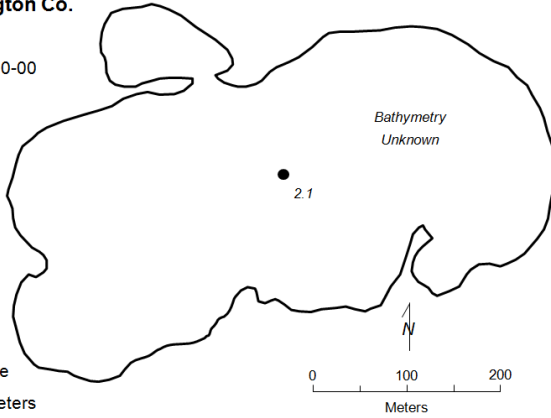
The lake received a C and A grade for TP and CLA, respectively. The lake's water quality continues to show improvement over the D and F grades that were typically received in the mid 2000's. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Benz Lake
Grant, Washington Co.

Lake ID: 820120-00

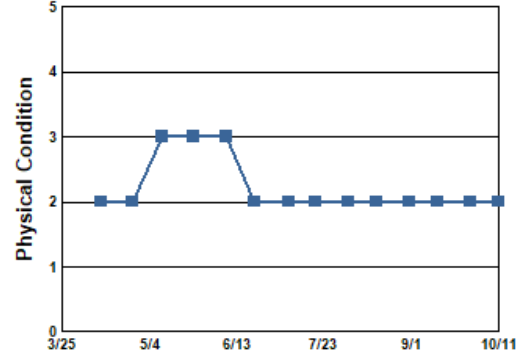
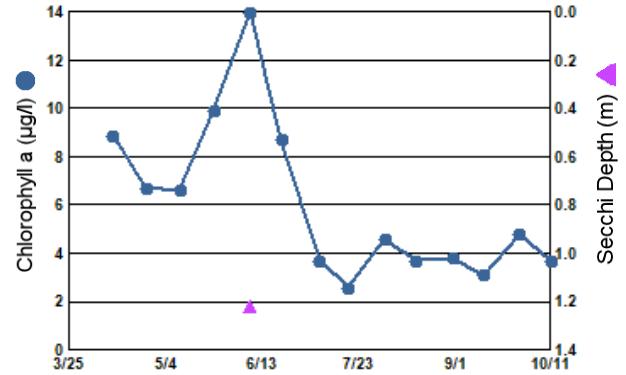
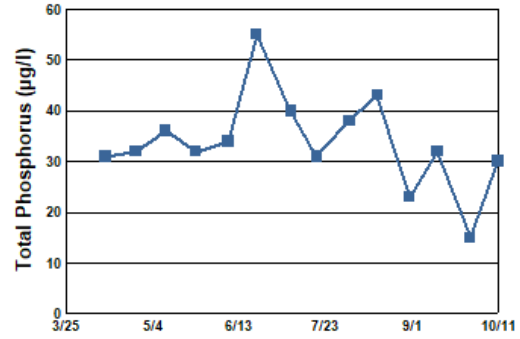


● Sampling site
Contours in meters

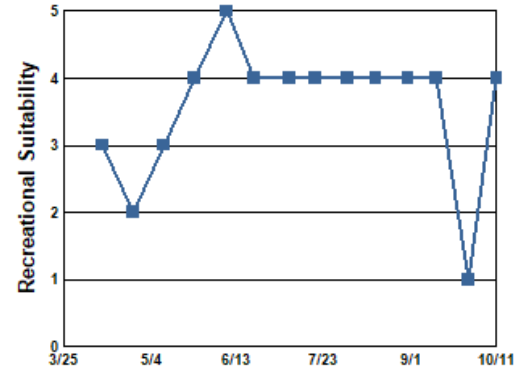
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.8	11.3	8.9	31	>1.8	2	3
04/26/21	9.5	13.1	6.7	32	>1.8	2	2
05/10/21	15.2	12.2	6.6	36	>1.1	3	3
05/24/21	22.7	9.8	9.9	32	>1.5	3	4
06/08/21	28.5	10.1	14	34	1.2	3	5
06/21/21	23.1	6.7	8.7	55	>1.2	2	4
07/07/21	25.0	6.9	3.7	40	>1.2	2	4
07/19/21	27.0	9.1	2.6	31	>1.1	2	4
08/03/21	24.0	7.7	4.6	38	>0.9	2	4
08/16/21	24.7	8.2	3.7	43	>0.8	2	4
08/31/21	24.0	12.3	3.8	23	>0.9	2	4
09/13/21	21.0	9.8	3.1	32	>0.8	2	4
09/28/21	17.9	11.7	4.8	15	>1.2	2	1
10/11/21	18.7	8.1	3.7	30	>0.6	2	4

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi							F					
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		F	F	F	D	D	D	C	D	C	D	D
CLA		F	D	F	B	C	D	B	C	B	B	C
Secchi		F	D	F	C	D	D	C	D			D
Lake Grade		F	D	F	C	D	D	C	D			D

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	B	C
CLA	A	A	A	C	A	A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Beutel Pond (82–0399) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Beutel Pond is located in Lake Elmo. The bathymetry of the lake is unknown other than that the maximum depth is 1.1 m (3.5 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	56	40	82	C
CLA ($\mu\text{g/l}$)	9.6	2.2	20	A
Secchi (m)	+0.6	>0.5	+0.9	
TKN (mg/l)	1.01	0.89	1.40	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

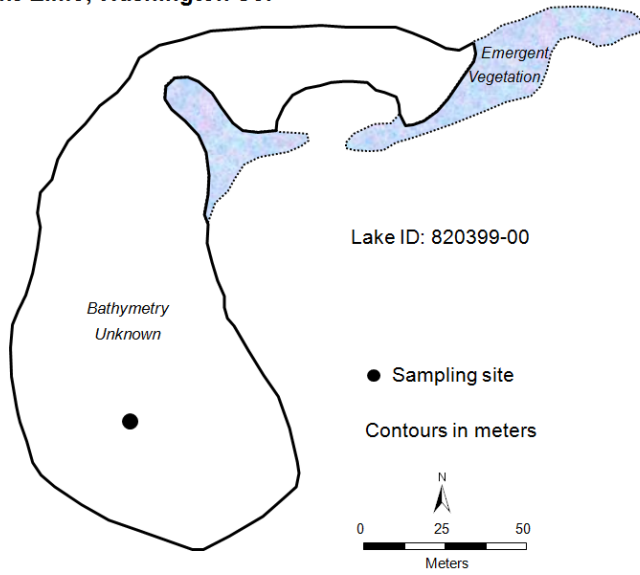
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

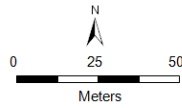
Beutel Pond
Lake Elmo, Washington Co.



Lake ID: 820399-00

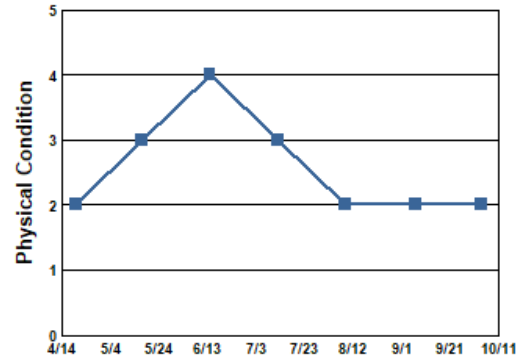
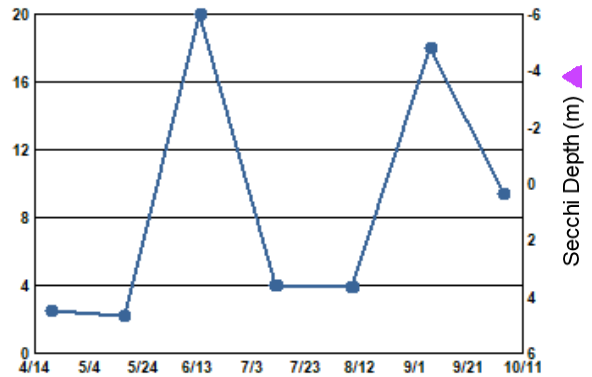
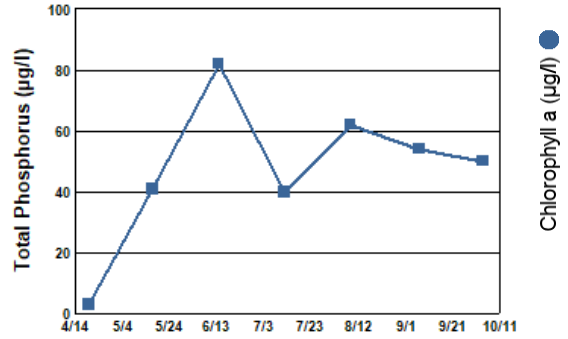
● Sampling site

Contours in meters

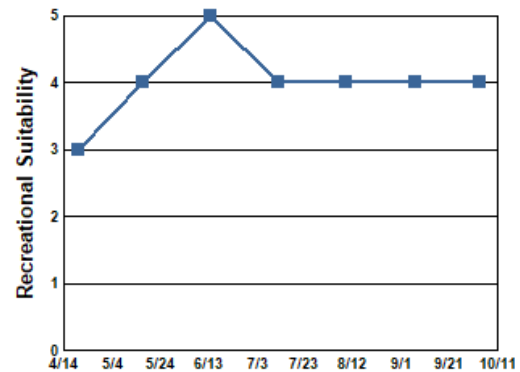


2021 Data

Date	SU- RF TE- MP (°C)	SU- RF DO (mg/ L)	CLA (µg/ l)	SU- RF TP (µg/ l)	Sec- chi (m)	PC	RS
04/ 20/ 21	7.4	9.5	2.5	3	+0.8	2	3
05/ 17/ 21	22.4	6.9	2.2	41	>0.6	3	4
06/ 14/ 21	24.0	4.5	20	82	+0.6	4	5
07/ 12/ 21	23.5	10.3	4.0	40	>0.5	3	4
08/ 09/ 21	24.5	4.4	3.9	62	>0.5	2	4
09/ 07/ 21	20.4	6.6	18	54	+0.9	2	4
10/ 04/ 21	17.9	5.7	9.4	50	>0.5	2	4



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK

2 = Minor Aesthetic Problem

5 = No Aesthetics Possible

3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					C							
CLA												
Secchi					D							
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP			C			C
CLA			A			A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Big Carnelian Lake (82–0049) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Big Carnelian Lake is located in May Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. high regional recreational value and good water quality. The lake has a surface area of approximately 455 acres. The maximum and mean depth are 20.0 m and 9.8 m, respectively. Approximately, 28 percent of the lake's area is considered littoral, the shallow (0-15 foot depth) area typically dominated by aquatic vegetation.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	15	4	27	A
CLA (µg/l)	4.0	2.4	7.1	A
Secchi (m)	>4.5	3.0	>6.1	A
TKN (mg/l)	0.56	0.46	0.97	
			Lake Grade	A

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of A, which is consistent with the historical database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

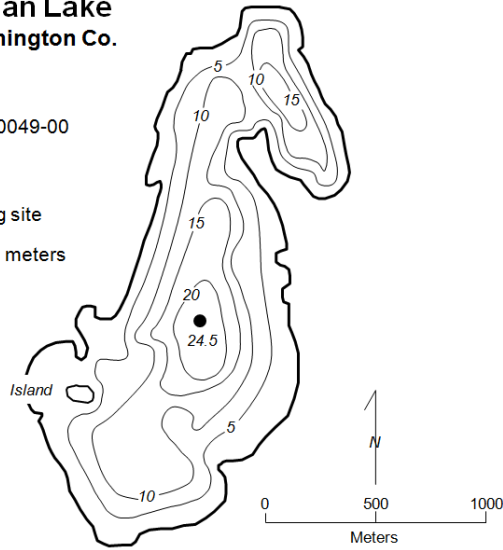
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Big Carnelian Lake
May Twp., Washington Co.

LAKE ID: 820049-00

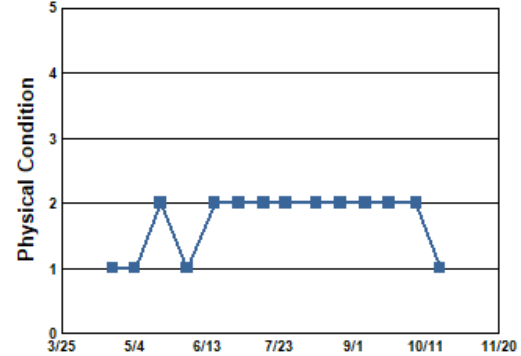
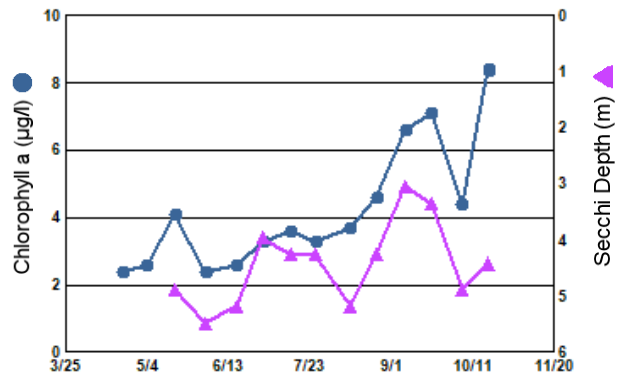
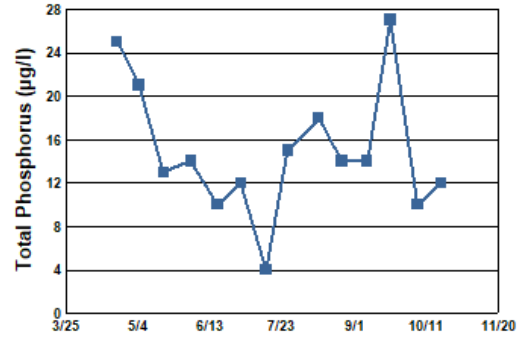
● Sampling site
Contours in meters



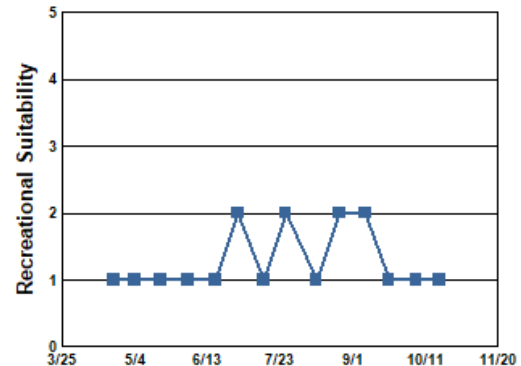
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/ 21	8.8	11.8	2.4	25	>6.1	1	1
05/04/ 21	11.6	11.4	2.6	21	>6.1	1	1
05/18/ 21	16.9	11.7	4.1	13	4.9	2	1
06/02/ 21	19.8	9.8	2.4	14	5.5	1	1
06/17/ 21	25.4	8.9	2.6	10	5.2	2	1
06/30/ 21	25.0	9.4	3.3	12	4.0	2	2
07/14/ 21	25.3	8.7	3.6	4	4.3	2	1
07/26/ 21	26.5	8.2	3.3	15	4.3	2	2
08/12/ 21	24.9	8.3	3.7	18	5.2	2	1
08/25/ 21	24.8	7.8	4.6	14	4.3	2	2
09/08/ 21	22.3	8.5	6.6	14	3.0	2	2
09/21/ 21	20.6	7.2	7.1	27	3.4	2	1
10/06/ 21	19.9	9.3	4.4	10	4.9	2	1
10/19/ 21	16.3	8.2	8.4	12	4.4	1	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	A				B					A		A
CLA	A				B					A		A
Secchi	A				B					A		B
Lake Grade	A				B					A		A

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			A		A	A	A	A	A	A	B	A
CLA			A		A	A	A	B	A	A	A	A
Secchi	B	B	B	B	B	A	A	B	A	A	A	B
Lake Grade			A		A	A	A	B	A	A	A	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	B	A			A		A	A	A	A
CLA	A	A	A	A			A		A	A	A	A
Secchi	A	A	A	A	A	A	A		A	A	A	A
Lake Grade	A	A	A	A			A		A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	B	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Big Marine Lake (82–0052) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Big Marine Lake is located in City of Scandia (Washington County). The lake is considered a Priority Water by the Metropolitan Council. high regional recreation value. The lake covers an area of 1,706 acres and has a maximum and mean depth of 15.2 m (roughly 50 feet) and 7.6 m (25 feet). Roughly 67 percent of the lake's area is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation. The approximate volume of the lake is 42,527 acre-feet (ac-ft). The lake's watershed of 2,659 acres translates to a small watershed-to-lake size ratio of 1.5:1. The larger the ratio the greater the potential stress put on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue). The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

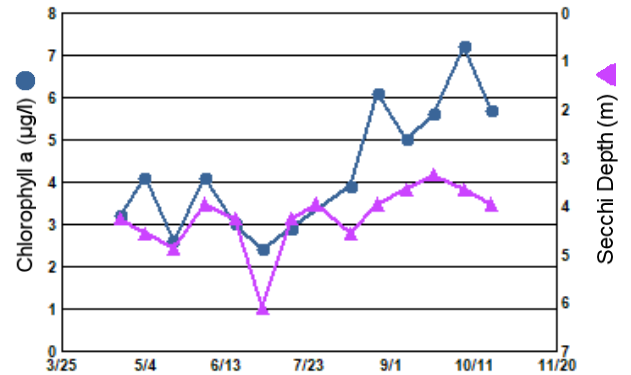
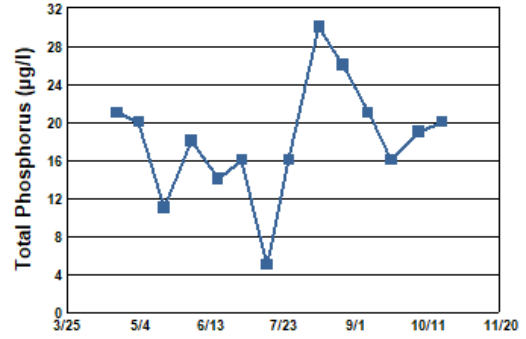
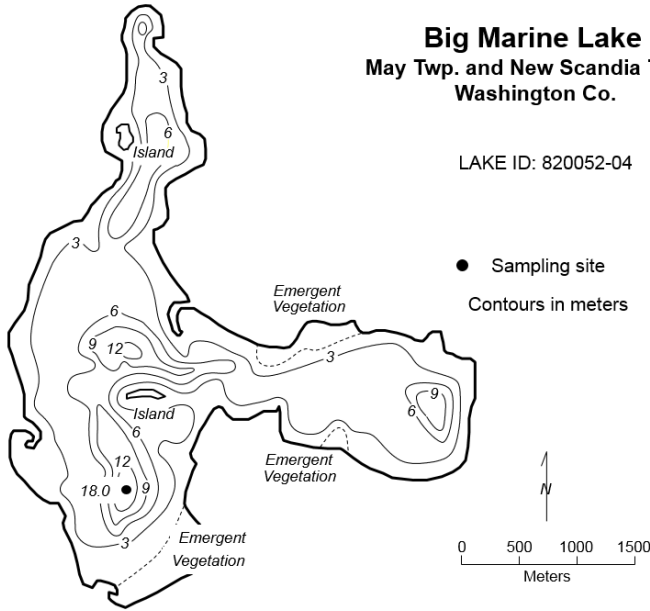
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	5	30	A
CLA (µg/l)	4.0	2.4	6.1	A
Secchi (m)	4.3	3.4	6.1	A
TKN (mg/l)	0.60	0.46	0.76	
			Lake Grade	A

The lake received a lake grade of A which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

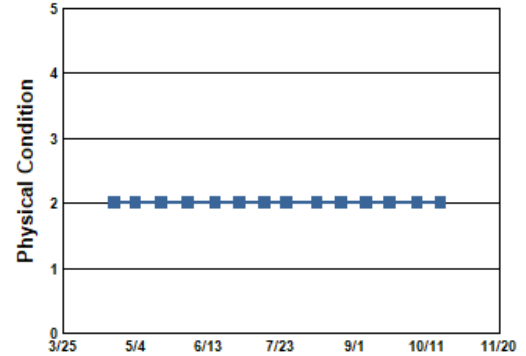
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

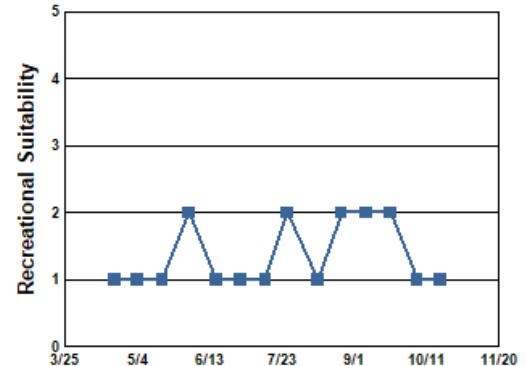


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	9.1	11.4	3.2	21	4.3	2	1
05/04/21	12.2		4.1	20	4.6	2	1
05/18/21	16.5	11.0	2.6	11	4.9	2	1
06/02/21	19.1	9.0	4.1	18	4.0	2	2
06/17/21	25.1	8.1	3.0	14	4.3	2	1
06/30/21	25.2	8.4	2.4	16	6.1	2	1
07/14/21	25.1	8.6	2.9	5	4.3	2	1
07/26/21	26.5	7.6		16	4.0	2	2
08/12/21	24.7	7.6	3.9	30	4.6	2	1
08/25/21	24.6	7.9	6.1	26	4.0	2	2
09/08/21	21.4	7.8	5.0	21	3.7	2	2
09/21/21	19.9	10.4	5.6	16	3.4	2	2
10/06/21	19.1	10.0	7.2	19	3.7	2	1
10/19/21	15.2	8.6	5.7	20	4.0	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	B			B					A		B
CLA	B	B			B					A		A
Secchi	B	B			B	B	B	B	C	A	C	B
Lake Grade	B	B			B					A		B

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			A		B	A	A	A	A	A	B	A
CLA			A		A	A	A	B	A	A	B	A
Secchi	A	A	B		A	B	A	B	A	A	B	B
Lake Grade			A		A	A	A	B	A	A	B	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	C	A				A		A	A	A
CLA	A	A	A	A				A		A	A	A
Secchi	A	A	A	A	A	A	A	A		A	A	A
Lake Grade	A	A	B	A				A		A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Birch Lake (13–0042) Comfort Lake — Forest Lake Watershed District

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Birch Lake is located in Chisago and Wyoming Townships (Chisago County). The lake has a surface area of 65 acres.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

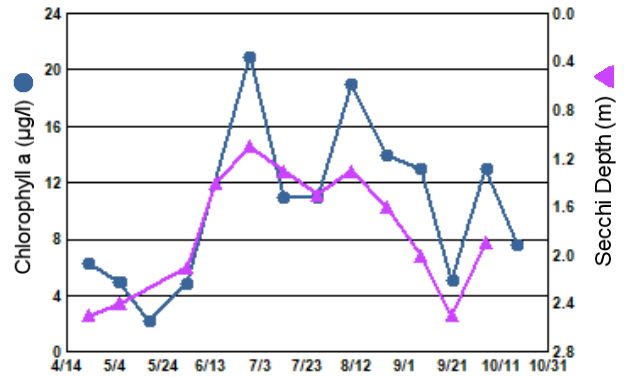
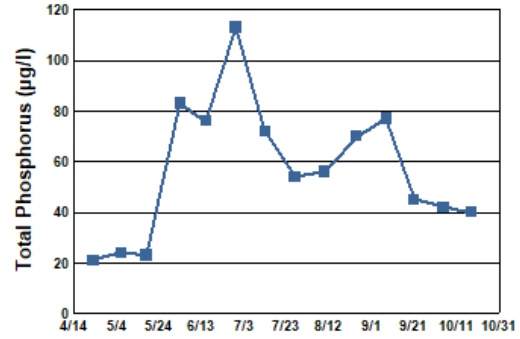
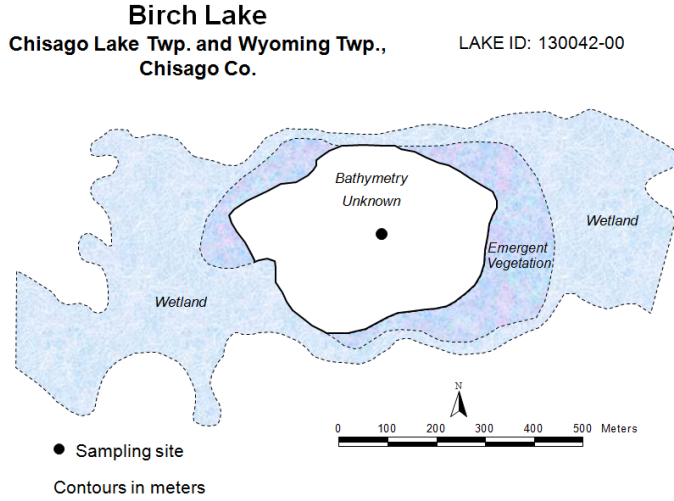
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	63	23	113	C
CLA (µg/l)	11	2.2	21	B
Secchi (m)	+1.9	1.1	+3.4	C
TKN (mg/l)	1.01	0.68	1.50	
			Lake Grade	C

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received a lake grade of C this year, which is consistent with its historical water quality database. The lake has varied in the B to D range since 2006. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

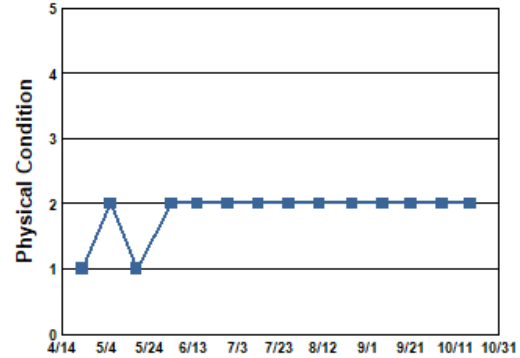
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



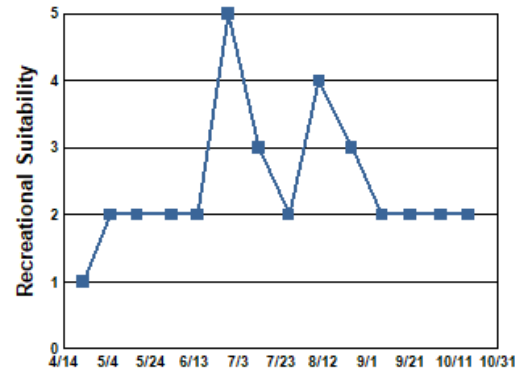
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/21	9.4		6.3	21	2.5	1	1
05/06/21	14.3		5.0	24	2.4	2	2
05/18/21	20.3		2.2	23	+3.4	1	2
06/03/21	21.1		4.9	83	2.1	2	2
06/15/21	26.2			76	1.4	2	2
06/29/21	23.1		21	113	1.1	2	5
07/13/21	23.9		11	72	1.3	2	3
07/27/21	27.6		11	54	1.5	2	2
08/10/21	24.6		19	56	1.3	2	4
08/25/21	23.2		14	70	1.6	2	3
09/08/21	20.4		13	77	2.0	2	2
09/21/21	19.6		5.1	45	2.5	2	2
10/05/21	20.0		13	42	1.9	2	2
10/18/21	14.7		7.6	40	+2.5	2	2

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	D	C							
CLA			D	C	B							
Secchi			C	C	C							
Lake Grade			D	C	C							

Year	2016	2017	2018	2019	2020	2021
TP		C	D		C	C
CLA		B	C		A	B
Secchi		C	D		C	C
Lake Grade		C	D		B	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Bone Lake (82–0054) *Comfort Lake-Forest Lake Watershed District*

Volunteer: Tom Furey

Sponsor: Comfort Lake — Forest Lake Watershed District

Bone Lake is located in the City of Scandia (Washington County). The lake has a maximum and mean depth of 9.8 m and 3.7 m (32 ft and 12 ft), respectively.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue), aquatic recreational use (nutrient/eutrophication biological indicators), and aquatic life (fish bioassessments). The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) and zebra mussels (*Dreissena polymorpha*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	17	36	B
CLA (µg/l)	9.7	6.3	20	A
Secchi (m)	2.1	1.5	2.5	C
TKN (mg/l)	0.81	0.41	1.00	
			Lake Grade	B

The lake received a lake grade of B this year, which continues the recent improvement in the lake's water quality. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

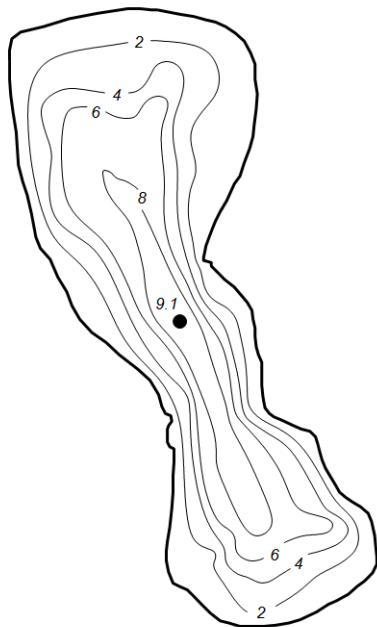
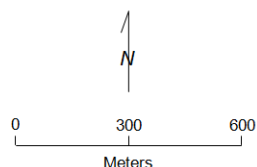
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bone Lake
Scandia, Washington Co.

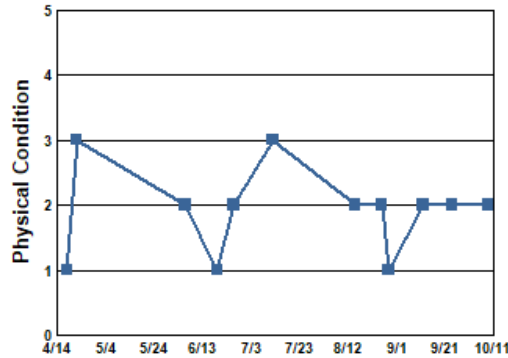
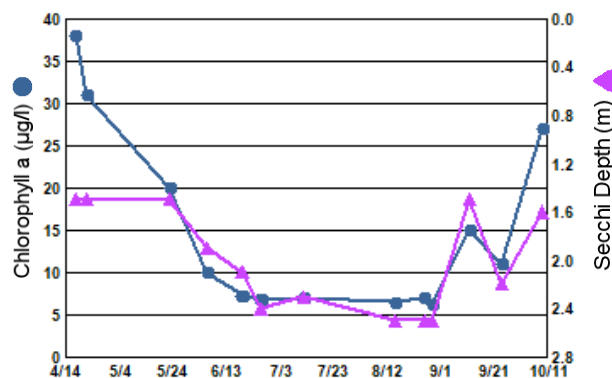
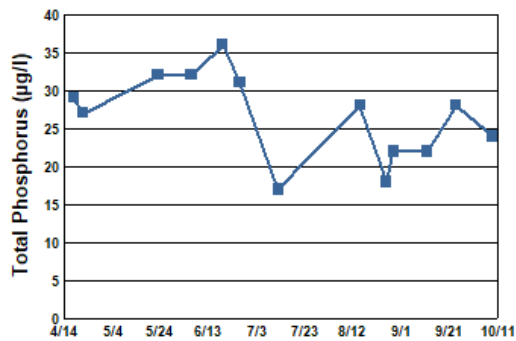
Lake ID: 820054-00

● Sampling site
Contours in meters

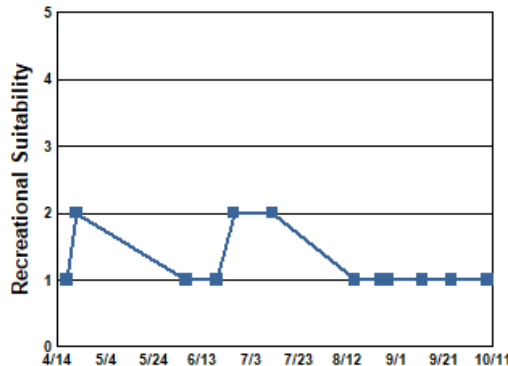


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/21	11.8		38	29	1.5	1	1
04/22/21	9.5		31	27	1.5	3	2
05/23/21	21.5		20	32	1.5		
06/06/21	24.2		10	32	1.9	2	1
06/19/21	25.5		7.3	36	2.1	1	1
06/26/21	24.7		6.8	31	2.4	2	2
07/12/21	23.4		7.0	17	2.3	3	2
08/15/21	24.7		6.5	28	2.5	2	1
08/26/21	24.2		7.0	18	2.5	2	1
08/29/21	24.6		6.3	22	2.5	1	1
09/12/21	21.4		15	22	1.5	2	1
09/24/21	18.1		11	28	2.2	2	1
10/09/21	18.9		27	24	1.6	2	1



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5 = Severe Algal Bloom



1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					D			C	C	C		D
CLA					C			B	C	C		C
Secchi					C		D	C	D	C	C	C
Lake Grade					C			C	C	C		C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C				C	C	C		C	C	D
CLA		C				B	B	C		C	C	C
Secchi		C	D	C		C	C	D		C	D	C
Lake Grade		C				C	C	C		C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	C	B	C	C	C	C
CLA	C	B	B	B	B	B	B	A	B	B	C	C
Secchi	C	C	C	C	C	C	C	C	C	C	C	D
Lake Grade	C	C	C	C	C	C	C	B	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	B	B	B	B
CLA	C	B	B	B	B	A
Secchi	C	C	C	C	C	C
Lake Grade	C	C	B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Brewers Pond (82–0022) *Brown's Creek Watershed District*

Volunteer: Karen Richtman, Paul Richtman

Brewers Pond is located in the city of Stillwater. Few morphological data are available for the pond.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	56	45	72	C
CLA ($\mu\text{g/l}$)	46	18	120	D
Secchi (m)	0.7	0.3	0.9	F
TKN (mg/l)	1.68	1.30	2.50	
			Lake Grade	D

Note that the lake grades shown in the data summary table above and the following historical grade tables were calculated from monitoring data sets from both the volunteer and Washington Conservation District staff. However, the mean, minimum, and maximum values shown in the above data summary table and the results in the data table on the following page are specific to the volunteer's monitoring data. The pond received a lake grade of D this year which is consistent with its varying historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

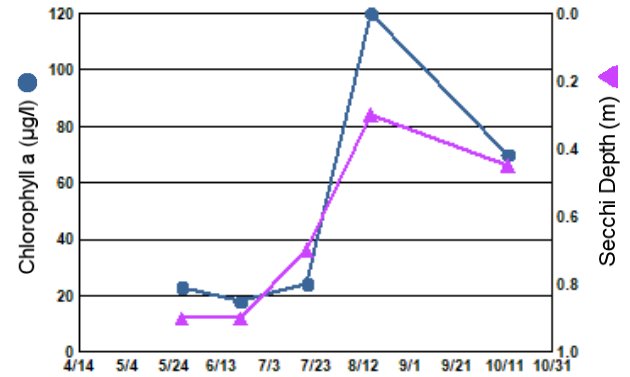
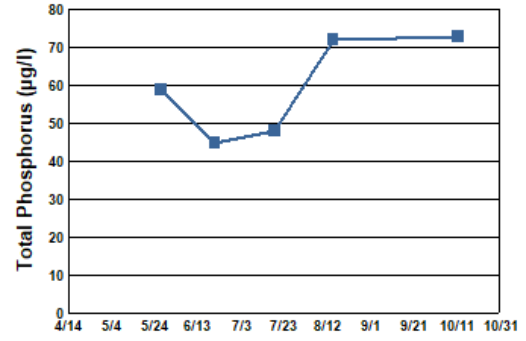
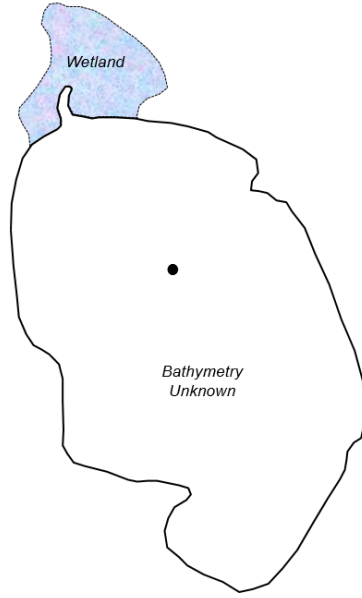
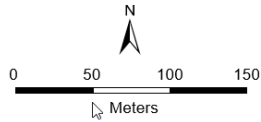
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Brewer's Pond
Stillwater, Washington Co.

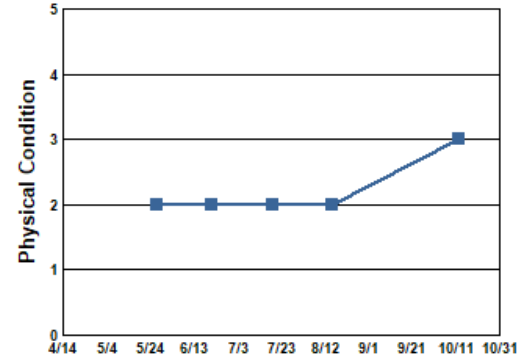
Lake ID: 82002200

- Sampling site
- Contours in meters

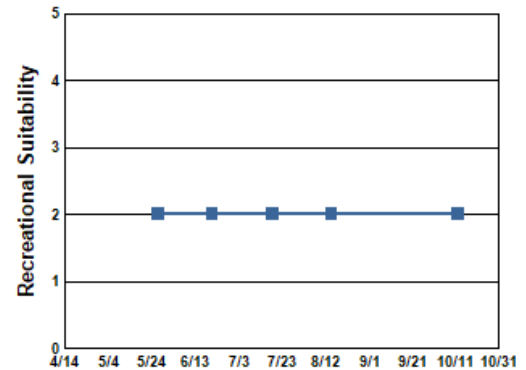


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/27/21	19.1		23	59	0.9	2	2
06/21/21	23.5		18	45	0.9	2	2
07/19/21	30.1		24	48	0.7	2	2
08/15/21	23.4		120	72	0.3	2	2
10/12/21	19.1		70	73	0.5	3	2



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- 5 = Severe Algal Bloom



- 1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	C	C	C	C
CLA		D	D	C	C	D
Secchi		F	F	F	D	F
Lake Grade		D	D	D	C	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Brewers Pond (82–0022) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Brewers Pond is located in the city of Stillwater. Few morphological data are available for the pond.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	49	33	62	C
CLA ($\mu\text{g/l}$)	57	12	110	D
Secchi (m)	0.5	0.2	1.2	F
TKN (mg/l)	2.02	1.40	2.90	
			Lake Grade	D

Note that the lake grades shown in the data summary table above were calculated from monitoring data sets from both the volunteer and Washington Conservation District (WCD) staff. However, the mean, minimum, and maximum values shown in the above data summary table and the results in the data table on the following page are specific to WCD staff monitoring data. The pond received a lake grade of D this year which is consistent with its varying historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

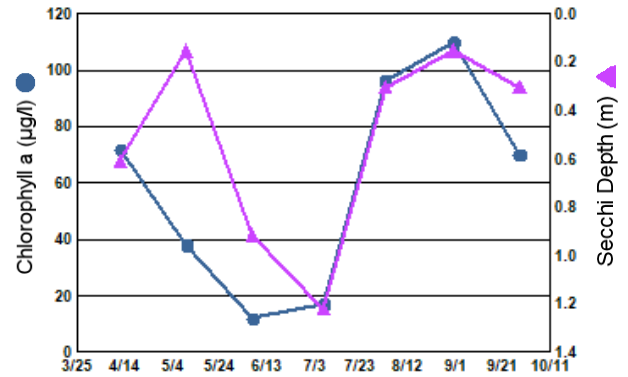
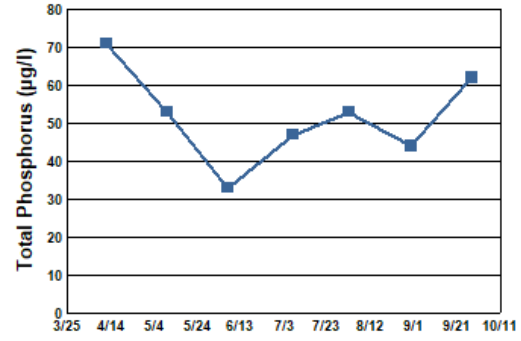
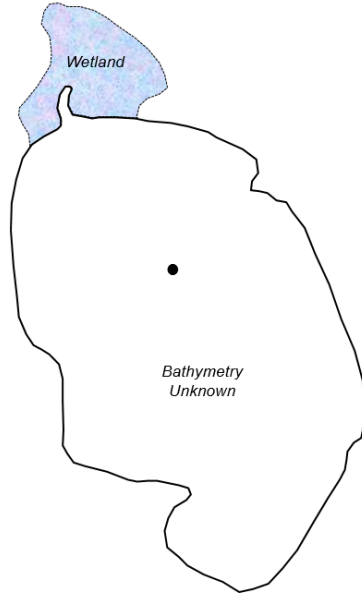
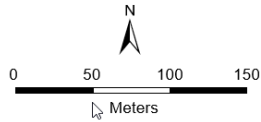
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Brewer's Pond
Stillwater, Washington Co.

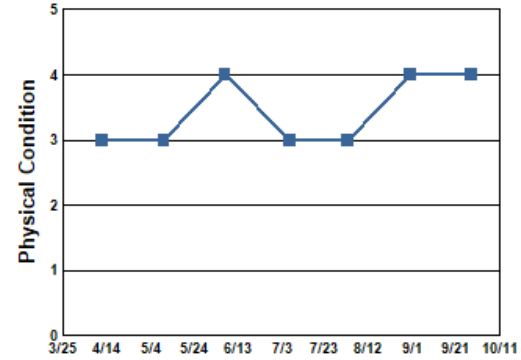
Lake ID: 82002200

- Sampling site
- Contours in meters

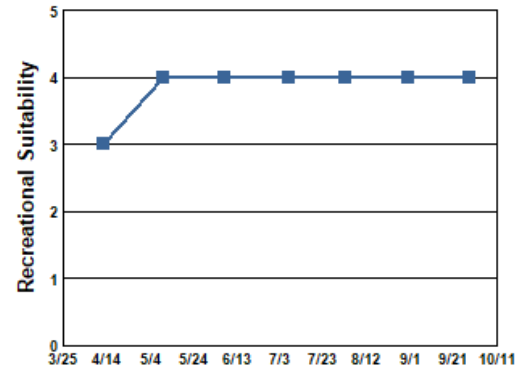


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.8	14.1	72	71	0.6	3	3
05/10/21	15.5	11.7	38	53	0.2	3	4
06/07/21	28.5	9.0	12	33	0.9	4	4
07/07/21	25.8	7.0	17	47	1.2	3	4
08/02/21	25.1	11.4	96	53	0.3	3	4
08/31/21	25.2	16.3	110	44	0.2	4	4
09/28/21	19.1	9.0	70	62	0.3	4	4



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	C	C	C	C
CLA		D	D	C	C	D
Secchi		F	F	F	D	F
Lake Grade		D	D	D	C	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Buck Lake (70–0065) Prior Lake — Spring Lake Watershed District

Volunteer: Steve Beckey

Buck Lake is located in Spring Lake Township (Scott County). It has a depth of approximately 3 m at the monitoring location, which is assumed to be the deepest point of the lake. No other bathymetric information is available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	165	74	275	F
CLA (µg/l))	19	3.5	79	B
Secchi (m)	1.2	0.5	2.0	C
TKN (mg/l)	1.42	0.81	1.90	
			Lake Grade	C

The lake received a lake grade of C this year, which is consistent with its historical water quality database. The water quality for the lake typically varies in the C to D lake grade range. The TP grade ventured into the F grade range for the first time according to its water quality database going back to 2014. Continued monitoring is recommended to build the water quality database for this lake and to determine if the TP increases are part of a longer term trend..

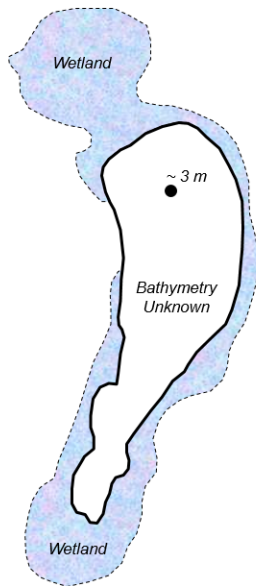
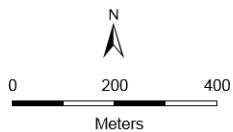
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Buck Lake
Spring Lake Twp., Scott Co.

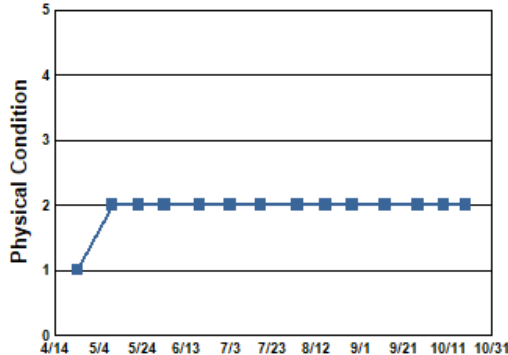
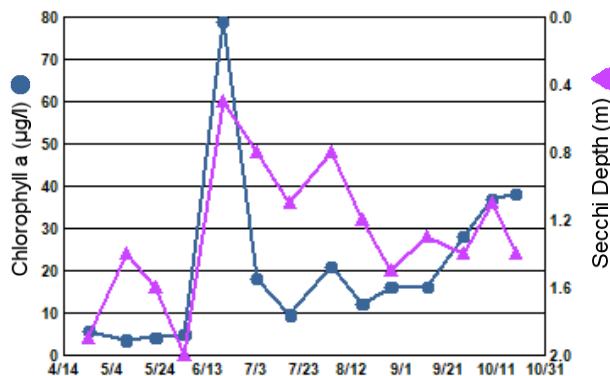
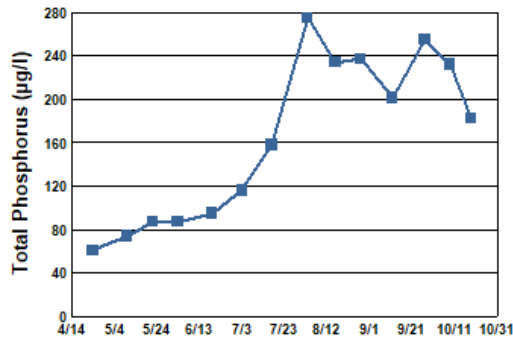
Lake ID: 700065-00
WD: Prior Lake – Spring Lake

● Sampling site
Contours in meters

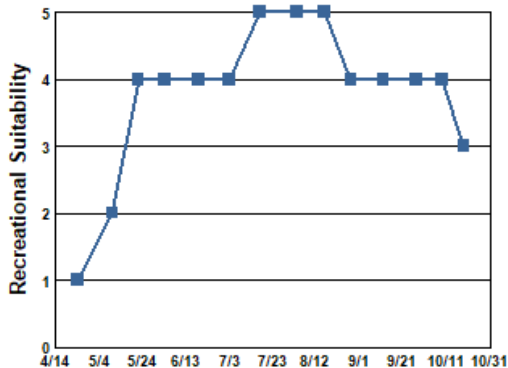


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.6		5.6	61	1.9	1	1
05/10/21	17.4		3.5	74	1.4	2	2
05/22/21	24.1		4.2	87	1.6	2	4
06/03/21	25.7		4.9	87	2.0	2	4
06/19/21	28.2		79	95	0.5	2	4
07/03/21	26.9		18	116	0.8	2	4
07/17/21	28.4		9.5	158	1.1	2	5
08/03/21	23.3		21	275	0.8	2	5
08/16/21	23.6		12	234	1.2	2	5
08/28/21	24.0		16	237	1.5	2	4
09/12/21	22.8		16	201	1.3	2	4
09/27/21	18.3		28	255	1.4	2	4
10/09/21	21.1		37	232	1.1	2	4
10/19/21	15.9		38	182	1.4	2	3



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP											D	D
CLA											A	B
Secchi												C
Lake Grade												C

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	F
CLA	C	A	C	A	C	B
Secchi	D	C	D	C	D	C
Lake Grade	D	C	D	C	D	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Bush Lake (27–0047) Nine Mile Creek Watershed District

Volunteer: Paul Erdmann, Elizabeth Erdmann

Bush Lake is located in the City of Bloomington (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue). The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	10	39	A
CLA (µg/l)	2.8	1.2	4.2	A
Secchi (m)	3.4	2.4	4.9	A
TKN (mg/l)	0.61	0.50	0.74	
			Lake Grade	A

The lake received a lake grade of A this year. The lake grades fluctuate between A and B according to its historical water quality database but with A's being more frequent.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

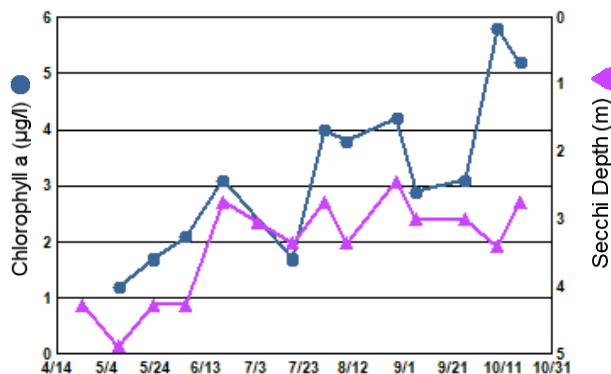
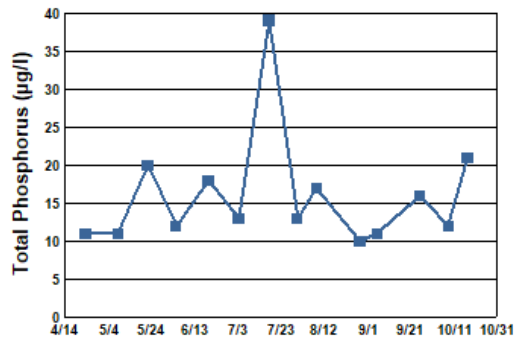
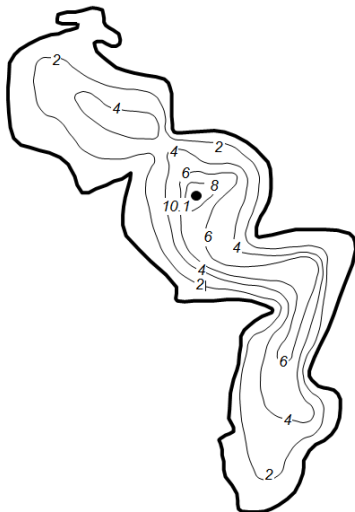
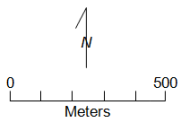
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bush Lake
Bloomington, Hennepin Co.

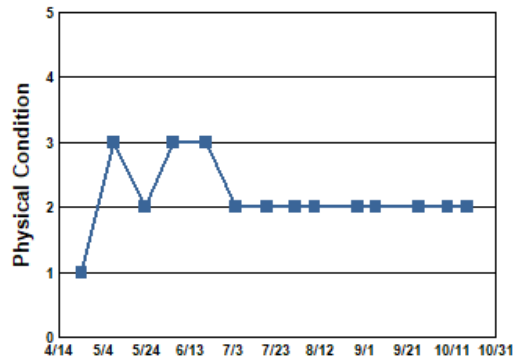
Lake ID: 270047-00

● Sampling site
Contours in meters

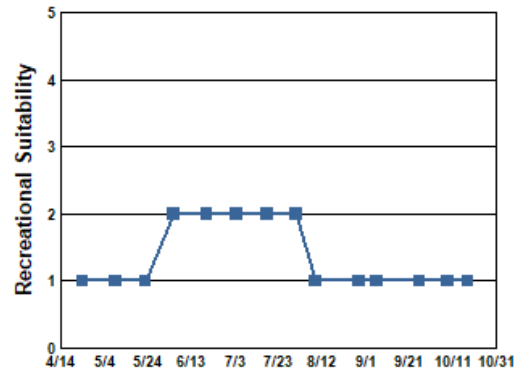


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.3			11	4.3	1	1
05/09/21	15.2		1.2	11	4.9	3	1
05/23/21	23.4		1.7	20	4.3	2	1
06/05/21	24.5		2.1	12	4.3	3	2
06/20/21	25.9		3.1	18	2.7	3	2
07/04/21	27.7			13	3.0	2	2
07/18/21	28.2		1.7	39	3.4	2	2
07/31/21	27.0		4.0	13	2.7	2	2
08/09/21	26.5		3.8	17	3.4	2	1
08/29/21	25.4		4.2	10	2.4	2	1
09/06/21	23.7		2.9	11	3.0	2	1
09/26/21	15.5		3.1	16	3.0	2	1
10/09/21	20.4		5.8	12	3.4	2	1
10/18/21	17.0		5.2	21	2.7	2	1



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP				B	A							
CLA				B	A							
Secchi				B	A	B	A	B	C			
Lake Grade				B	A							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		A	A					B		A		
CLA		A	A					B		B		
Secchi		A	B					B		A		
Lake Grade		A	A					B		A		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A		A	A	A	A	A	A	C	A	A	A
CLA	B		A	B	A	A	A	A	A	A	A	A
Secchi	B		B	B	A	A	B	B	A	A	A	A
Lake Grade	B		A	B	A	A	A	A	B	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	B	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cates Lake (70–0018) Prior Lake — Spring Lake Watershed District

Volunteer: Paula Thomsen

Cates Lake is a 27-acre lake located in the City of Savage (Scott County). The maximum depth of the lake is 4.0 m (13 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	28	100	C
CLA (µg/l)	13	3.2	42	B
Secchi (m)	>1.5	>0.4	>2.7	
TKN (mg/l)	0.80	0.58	1.40	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received TP and CLA grades of C and B, respectively in 2021. The lake broke into the B range for CLA for the first time according to its water quality database going back to 2002. This suggests a degradation of water quality compared to the typical A grades received for CLA in the past. Also C grades for TP occurred in 2020 and 2021 which also indicates a degradation in water quality compared to the A and B grades for TP that the lake usually received in the past. Continued monitoring is recommended to determine if this recent degradation in water quality is part of a longer term trend. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

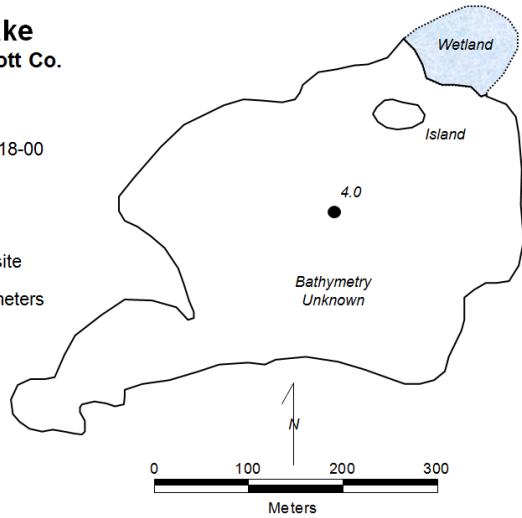
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Cates Lake
Prior Lake, Scott Co.

LAKE ID: 700018-00

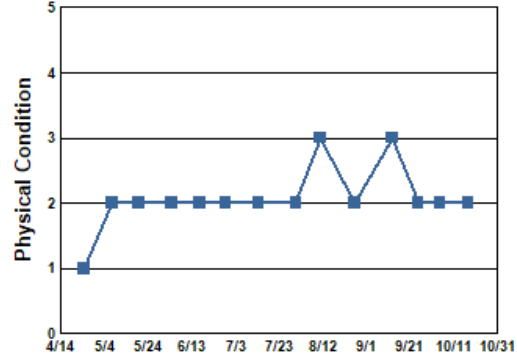
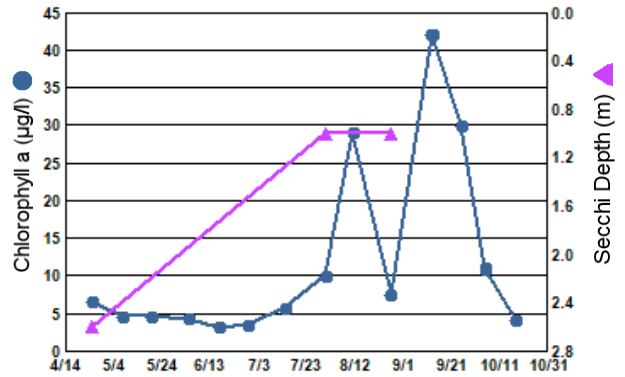
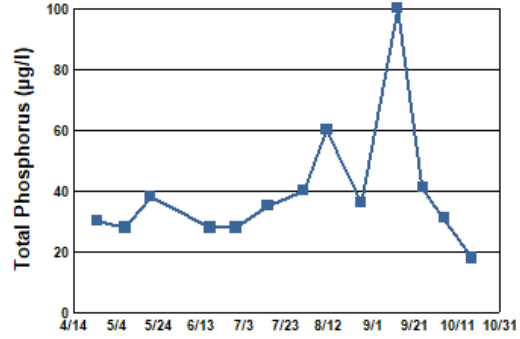
- Sampling site
- Contours in meters



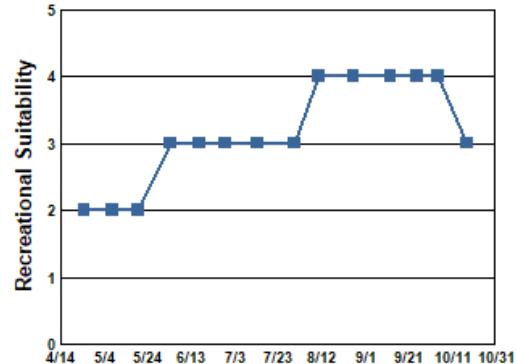
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	9.7		6.6	30	2.6	1	2
05/08/21	14.6		4.6	28	>2.7	2	2
05/20/21	20.3		4.6	38	>2.6	2	2
06/04/21	21.9		4.3		>2.3	2	3
06/17/21	27.0		3.2	28	>2.2	2	3
06/29/21	25.2		3.5	28	>1.8	2	3
07/14/21	25.6		5.8	35	>1.7	2	3
07/31/21	26.3		10	40	1.0	2	3
08/11/21	24.8		29	60	>0.4	3	4
08/27/21	22.8		7.6	36	1.0	2	4
09/13/21	21.6		42	100	>0.4	3	4
09/25/21	18.2		30	41	>0.5	2	4
10/05/21	19.1		11	31	>0.5	2	4
10/18/21	14.5		4.1	18	>2.5	2	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											A	B
CLA											A	A
Secchi											C	C
Lake Grade											B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	A	B	A	A	A	A	B	C	A		
CLA	A	A	A	A	A	A	A	A	A	A		
Secchi	C	C	C	C	C	C	B	C		C		
Lake Grade	B	B	B	B	B	B	A	B		B		

Year	2016	2017	2018	2019	2020	2021
TP		B	B	B	C	C
CLA		A	A	A	A	B
Secchi			C	C		
Lake Grade			B	B		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cavanaugh Lake (27-0110) Bassett Creek Watershed Management Commission

Volunteer: Dan Jones

Cavanaugh Lake is located in the city of Plymouth (Hennepin County). There is little bathymetric information for this shallow lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	24	41	B
CLA (µg/l)	6.9	3.6	11	A
Secchi (m)	+1.8	>0.5	+2.3	
TKN (mg/l)	0.78	0.69	0.88	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

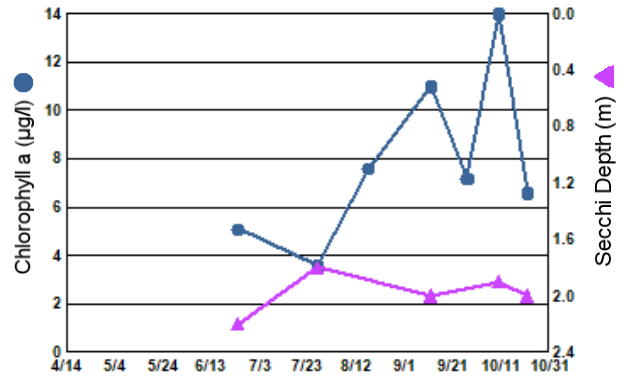
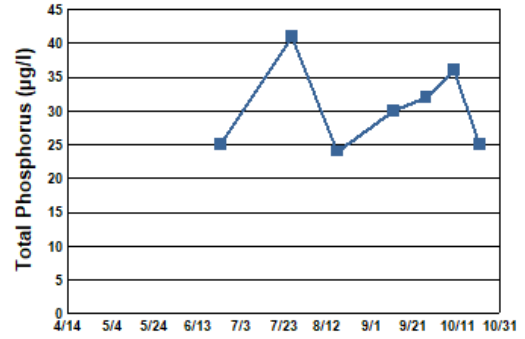
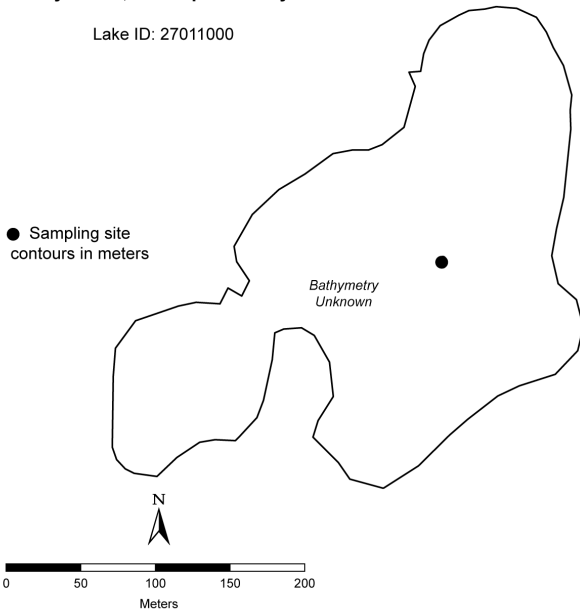
This was the second year that this lake was enrolled in CAMP. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

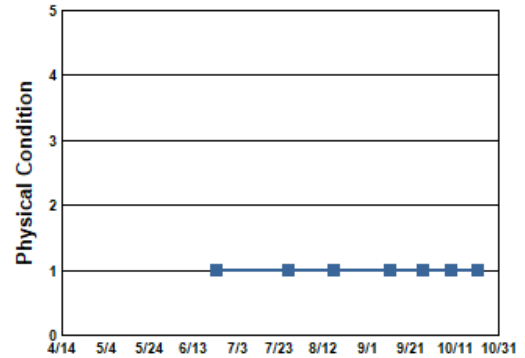
Cavanaugh Lake
Plymouth, Hennepin County

Lake ID: 27011000

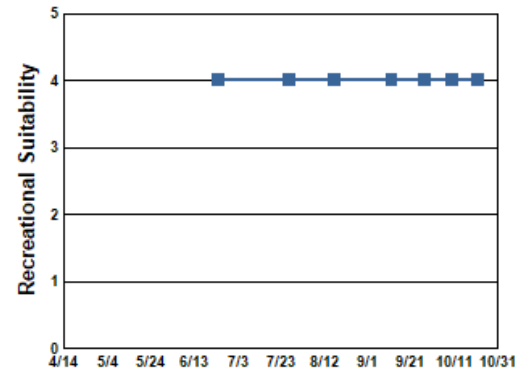


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/24/21	25.0		5.1	25	2.2	1	4
07/27/21	21.4		3.6	41	1.8	1	4
08/17/21	26.0		7.6	24	>0.5	1	4
09/12/21	22.3		11	30	2.0	1	4
09/27/21	20.1		7.2	32	+2.3	1	4
10/10/21	20.2		14	36	1.9	1	4
10/22/21	12.4		6.6	25	2.0	1	4



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					C	B
CLA					B	A
Secchi					C	
Lake Grade					C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cedar Lake (70–0091) Scott Watershed Management Organization

Volunteer: LeighAnn Singleton

Cedar Lake is located in Cedar Lake Township (Scott County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a maximum depth of 4.7 m (15 ft) and a mean depth of 2.1 m (6.9 feet). The lake has a surface area of 742 acres and watershed area of 11,104 acres, giving a watershed to lake area ratio of 15:1. The larger the ratio the greater the potential effects of runoff on the water quality of the lake. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) and aquatic recreational use (nutrient/eutrophication biological indicators).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	92	22	271	D
CLA (µg/l)	42	2.6	150	C
Secchi (m)	+1.3	0.4	+3.0	C
TKN (mg/l)	1.44	0.79	3.40	
			Lake Grade	C

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake site received a lake grade of C this year, which is an improvement in water quality compared to recent years and similar to years 2005 and 2014. The water quality of the lake has varied in the C to F range according to its water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

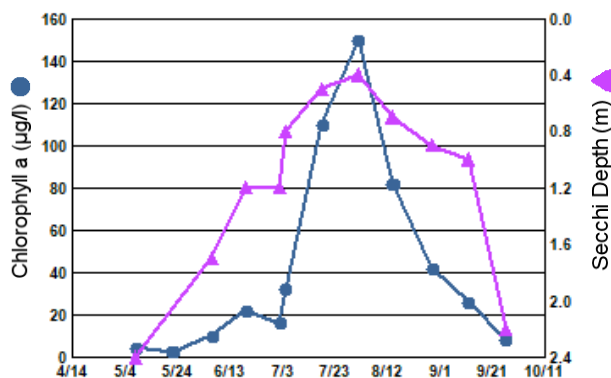
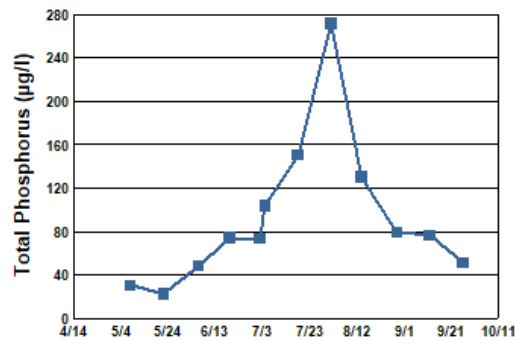
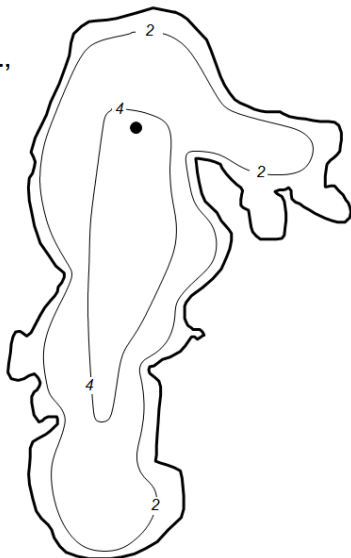
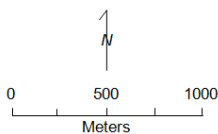
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Cedar Lake
Cedar Lake Twp./Helena Twp.,
Scott Co.

LAKE ID: 700091-00

● Sampling site

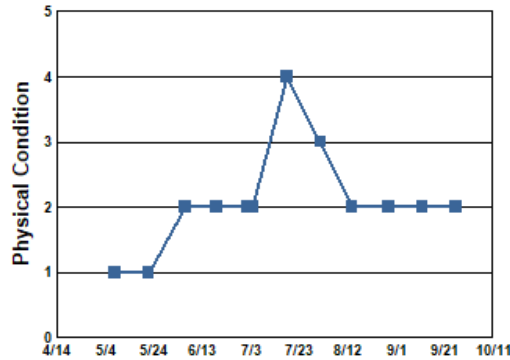
Contours in meters



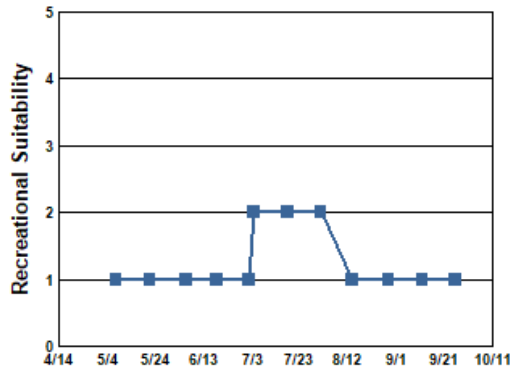
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/08/21	14.5		4.6	30	2.4	1	1
05/22/21	22.0		2.6	22	+3.0	1	1
06/06/21	24.5		10	48	1.7	2	1
06/19/21	27.1		22	74	1.2	2	1
07/02/21	27.2		16	73	1.2	2	1
07/04/21	27.6		32	103	0.8	2	2
07/18/21	29.2		110	150	0.5	4	2
08/01/21	25.8		150	271	0.4	3	2
08/14/21	25.1		82	130	0.7	2	1
08/29/21	24.7		42	79	0.9	2	1
09/12/21	22.0		26	76	1.0	2	1
09/26/21	18.6		8.1	51	2.2	2	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	F	F			F							
CLA	F	D			D						D	
Secchi	C	C	C	C	C	C				F	D	D
Lake Grade	F	D			D							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		F					F			F		
CLA		C					D			F		
Secchi	D	C					D			D		
Lake Grade		D					D			F		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	F	F	F		F	F	F	F	D	D
CLA		C	D	D	D		D	D	C	C	C	D
Secchi		C	D	D	D		D	D	D	C	C	D
Lake Grade		C	D	D	D		D	D	D	D	C	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	F	D	D	D
CLA	C	C	F	F	F	C
Secchi	D	D	D	F	D	C
Lake Grade	D	D	F	F	D	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Clear Lake (82–0045) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Clear Lake is located in May Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The maximum depth of the lake is 8.2 m (27 ft). Approximately 94 percent of the lake's surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)				
CLA ($\mu\text{g/l}$)				
Secchi (m)	3.8	3.0	5.5	A
TKN (mg/l)				
			Lake Grade	

Water sampling was not performed this year so there are no TP and CLA data to report but Secchi depth measurements were made. The lake received a Secchi grade of A this year which is consistent with its historical water quality database. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

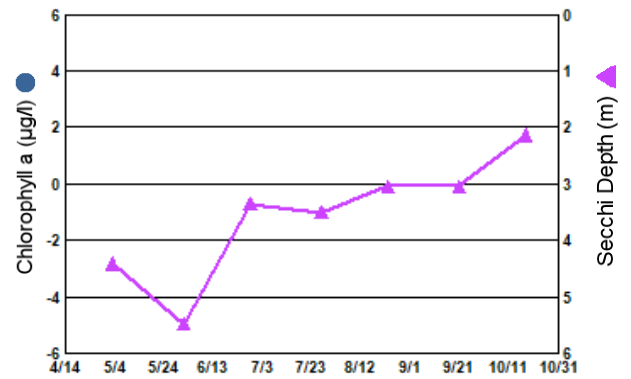
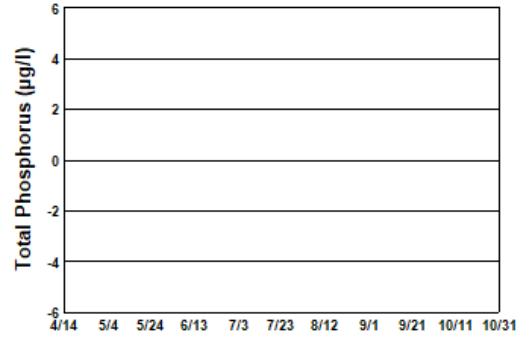
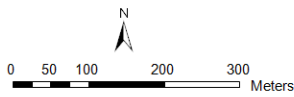
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Clear Lake
May Twp., Washington Co.

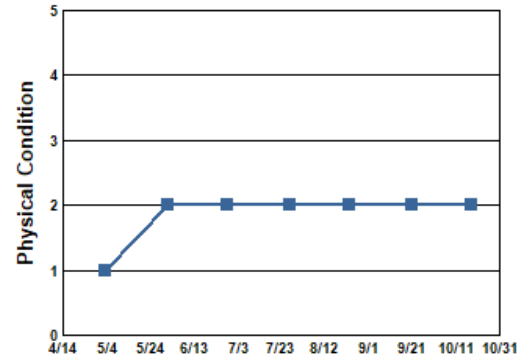
Lake ID: 820045-00

● Sampling site
Contours in meters

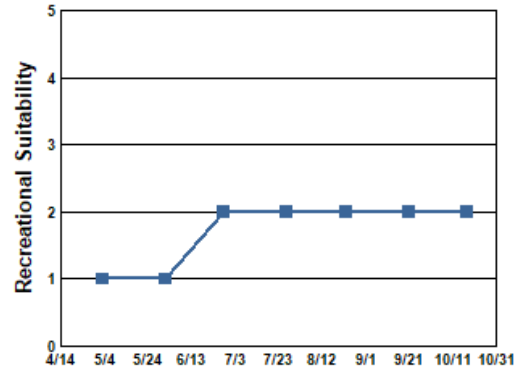


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21					4.4	1	1
06/01/21					5.5	2	1
06/28/21					3.4	2	2
07/27/21					3.5	2	2
08/23/21					3.0	2	2
09/21/21					3.0	2	2
10/18/21	15.7	7.1			2.1	2	2



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
 2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
 3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					A	A	A				A	A
CLA					A	A	A				A	A
Secchi					A	A	A	A	A	A	A	A
Lake Grade					A	A	A				A	A

Year	2016	2017	2018	2019	2020	2021
TP			A	A		
CLA			A	A		
Secchi			A	A	A	A
Lake Grade			A	A		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cloverdale Lake (82–0009) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Cloverdale Lake is located in Baytown Township (Washington County). The mean and maximum depth of the lake is 3.0 m (10 ft) and 8.5 m (28 ft), respectively. The lake has a surface area of 45 acres, and a watershed area of 819 acres, giving a large watershed to lake area ratio of 18:1. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	24	17	35	B
CLA ($\mu\text{g/l}$)	8.0	2.7	14	A
Secchi (m)	3.2	2.0	5.0	A
TKN (mg/l)	0.65	0.58	0.78	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its historical database. According to its historical database, the lake has received mainly lake grades of B with the occasional A.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

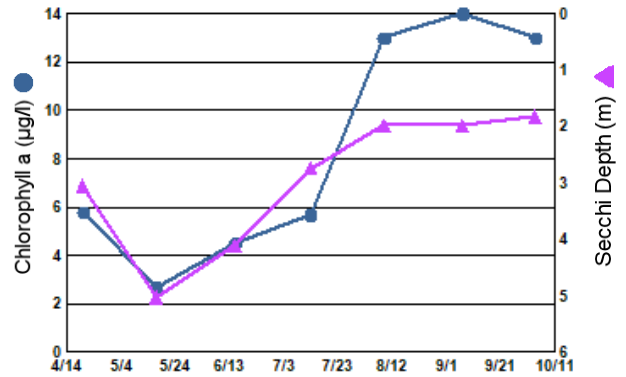
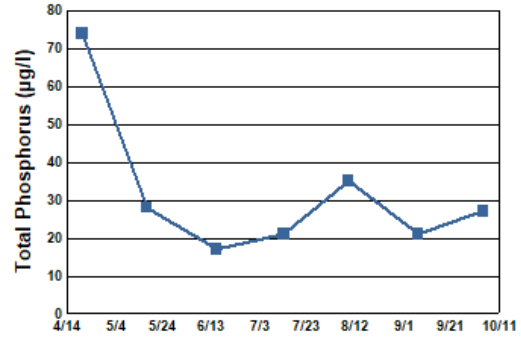
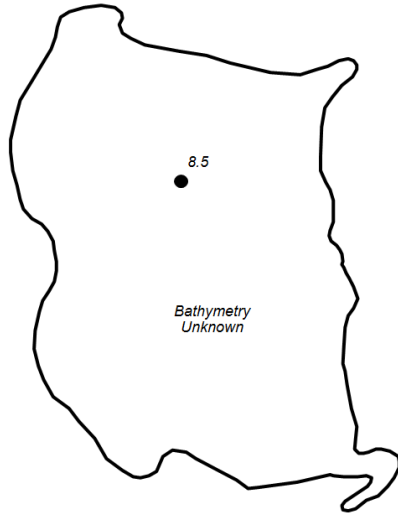
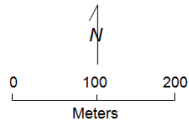
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Cloverdale Lake
Lake Elmo, Washington Co.

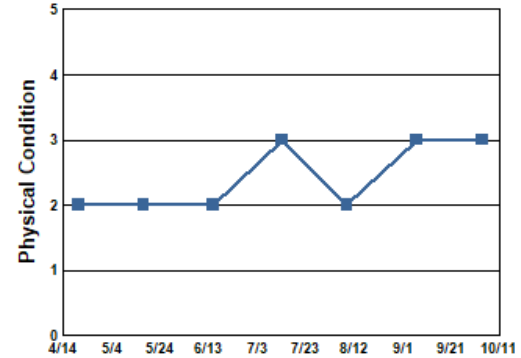
Lake ID: 820009-00

● Sampling site
Contours in meters

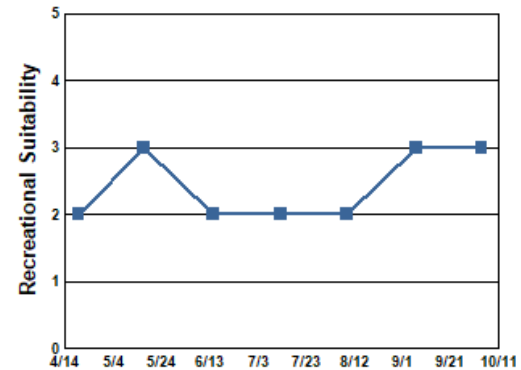


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.6	12.2	5.8	74	3.0	2	2
05/17/21	16.7	10.2	2.7	28	5.0	2	3
06/15/21	25.9	8.4	4.5	17	4.1	2	2
07/13/21	26.5	9.8	5.7	21	2.7	3	2
08/09/21	25.9	9.1	13	35	2.0	2	2
09/07/21	22.9	8.9	14	21	2.0	3	3
10/04/21	20.8	10.7	13	27	1.8	3	3



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP										C	C	C
CLA										B	B	B
Secchi										C	B	B
Lake Grade										C	B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	B	B	B	B	C	C	B	C	A		
CLA	B	A	B	A	B	A	B	A	A	A		
Secchi	A	A	A	B	B	B	B	A	B	A		
Lake Grade	B	A	B	B	B	B	B	A	B	A		

Year	2016	2017	2018	2019	2020	2021
TP	C			B		B
CLA	B			B		A
Secchi	A			B		A
Lake Grade	B			B		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cobblecrest Lake (27–0053) *City of St. Louis Park*

Volunteer: Jim Kellogg

Cobblecrest Lake is a small shallow lake located within City of St. Louis Park (Hennepin County). There is little known morphological data available for the lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

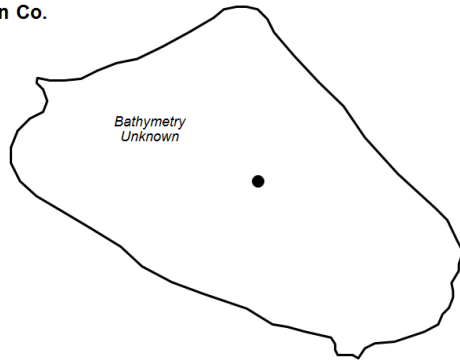
There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

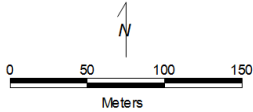
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Cobblecrest Lake
St. Louis Park, Hennepin Co.

Lake ID: 270053-00

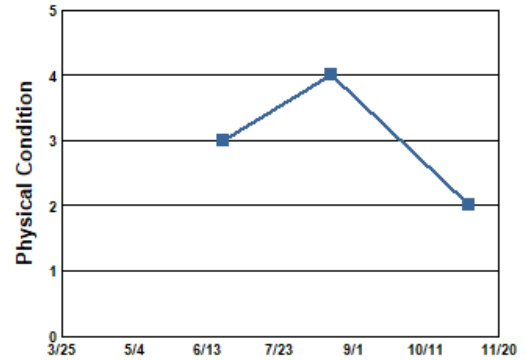
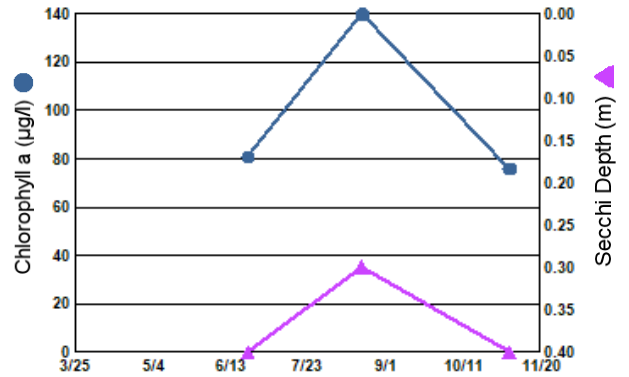
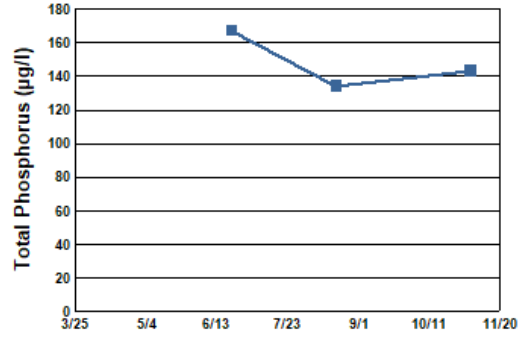


● Sampling site
Contours in meters

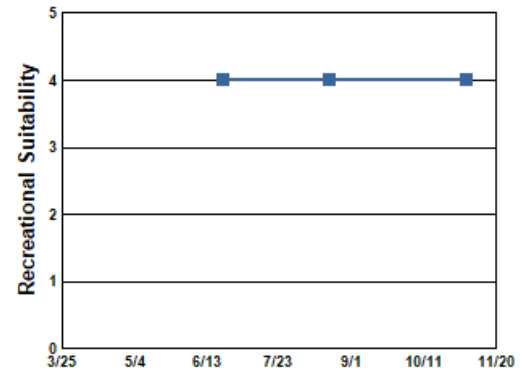


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/22/21	22.0		81	167	0.4	3	4
08/20/21	25.1		140	134	0.3	4	4
11/04/21	9.0		76	143	0.4	2	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											C	
CLA											C	
Secchi											C	
Lake Grade											C	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	F	D	F	F	F	D	D		C		
CLA	F	F	F	F	F	F	F	C		C		
Secchi	F	F	F	F	F	F	F	F		F		
Lake Grade	F	F	F	F	F	F	F	D		D		

Year	2016	2017	2018	2019	2020	2021
TP						
CLA						
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Cobblestone Lake (19–0456) City of Apple Valley

Volunteer: Jeff Sluiter

Cobblestone Lake is located in the City of Apple Valley (Dakota County). The lake has a surface area of 37 acres, and a maximum depth of 6 meters. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

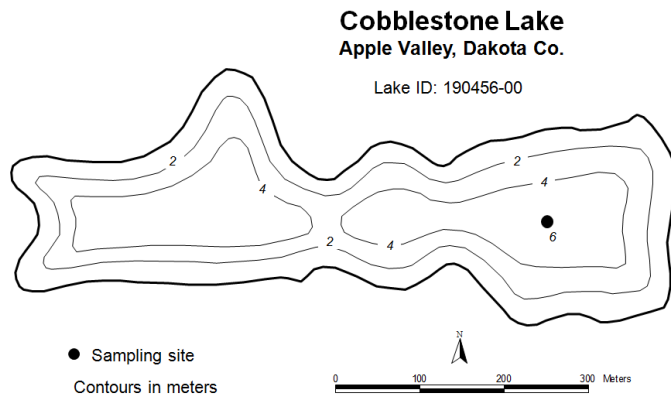
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	20	35	
CLA (µg/l))	9.4	3.5	18	
Secchi (m)	1.2	1.1	1.2	
TKN (mg/l)	0.88	0.80	1.00	
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

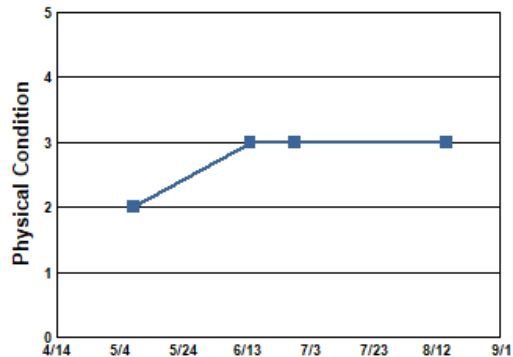
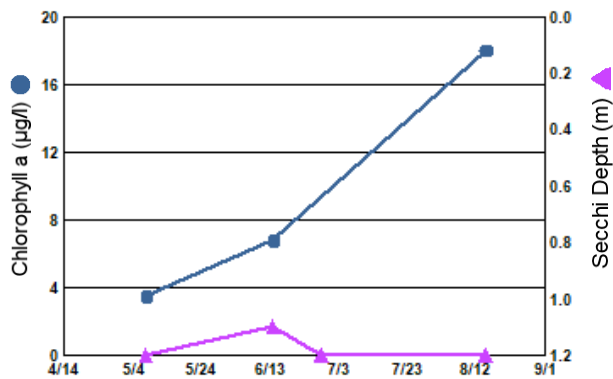
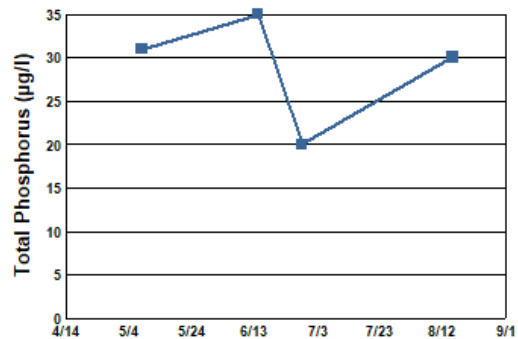
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

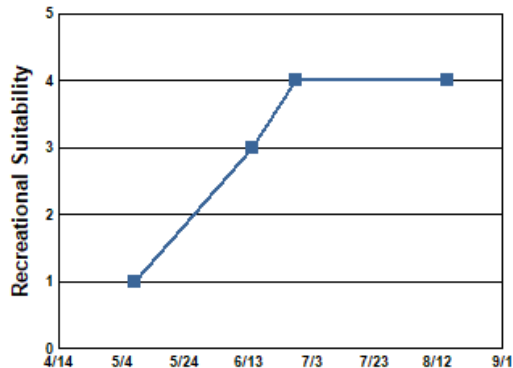


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/08/21	13.7		3.5	31	1.2	2	1
06/14/21	26.2		6.8	35	1.1	3	3
06/28/21	24.1			20	1.2	3	4
08/15/21	24.3		18	30	1.2	3	4



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	C	C	C	C	C	C	C	C	C	C
CLA		D	C	C	C	B	C	C	C	B	C	D
Secchi		F	D	D	D	D	D	D	D	C	D	D
Lake Grade		D	C	C	C	C	C	C	C	C	C	D

Year	2016	2017	2018	2019	2020	2021
TP		C	C	C	C	
CLA		C	C	B	C	
Secchi		D	D	D	D	
Lake Grade		C	C	C	C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Colby Lake (82–0094) City of Woodbury

Monitoring Personnel: Washington Conservation District staff

Colby Lake is located in the City of Woodbury in Washington County. The lake has a surface area of 71 acres and a maximum depth of 3.4 m (11 ft). The lake has a watershed area of 8,088 acres which gives a large watershed to lake area ratio of 114:1. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	103	74	146	D
CLA (µg/l)	30	4.5	62	C
Secchi (m)	>1.3	>0.8	2.1	
TKN (mg/l)	1.20	0.95	1.50	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The lake received a TP grade of D and a CLA grade of C this year which are consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

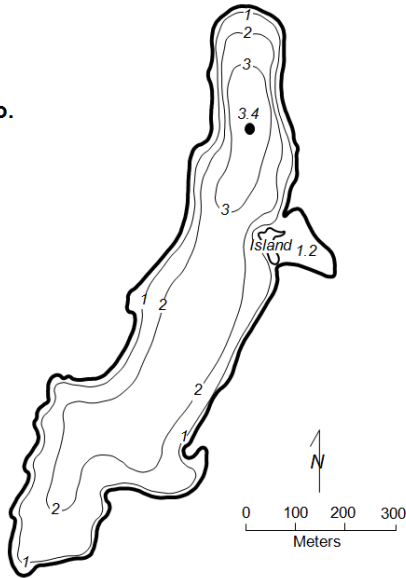
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Colby Lake
Woodbury, Washington Co.

Lake ID: 820094-00

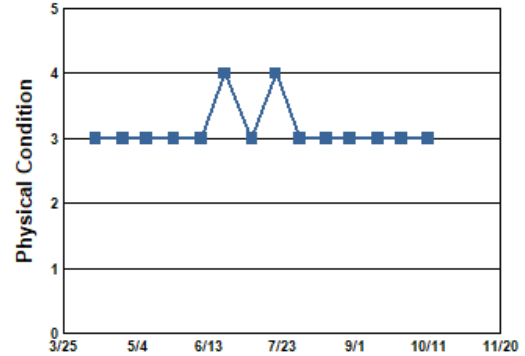
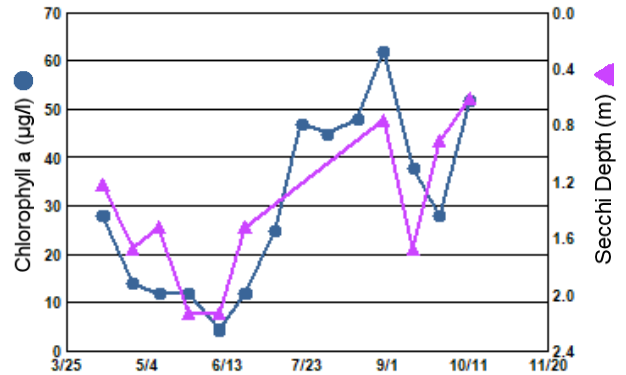
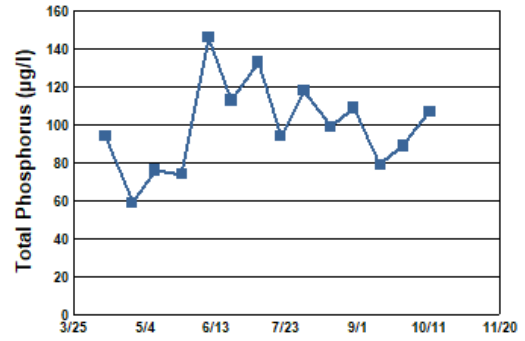
● Sampling site
Contours in meters



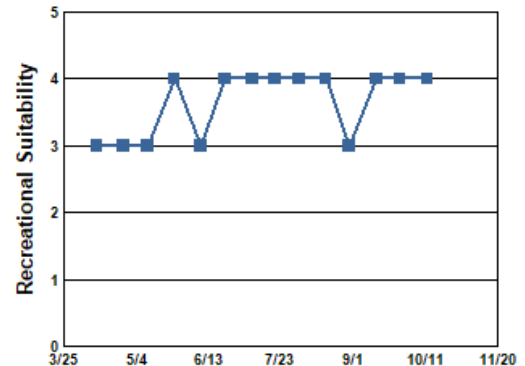
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	12.1	8.9	28	94	1.2	3	3
04/27/21	9.6	11.0	14	59	1.7	3	3
05/10/21	15.6	12.0	12	76	1.5	3	3
05/25/21	23.7	8.8	12	74	2.1	3	4
06/09/21	28.8	8.4	4.5	146	2.1	3	3
06/22/21	22.2	6.5	12	113	1.5	4	4
07/07/21	24.4	4.4	25	133	>1.2	3	4
07/20/21	26.7	9.7	47	94	>1.1	4	4
08/02/21	24.2	5.9	45	118	>0.8	3	4
08/17/21	24.5	9.9	48	99	>0.9	3	4
08/30/21	25.8	10.0	62	109	0.8	3	3
09/14/21	20.8	8.2	38	79	1.7	3	4
09/27/21	18.2	9.3	28	89	0.9	3	4
10/12/21	18.4	6.6	52	107	0.6	3	4

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			D	D	F	F	F	D	D	F	F	F
CLA			D	F	F	C	F	F	D	F	C	D
Secchi			F	F	F	F	F	D	D	D	F	F
Lake Grade			D	F	F	D	F	D	D	F	D	F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	F	D	F		D	D	D	F	D	D
CLA	C	F	F	D	D		C	C	D	C	D	C
Secchi	F	D	F	F	F		D	D	D	D	D	F
Lake Grade	D	D	F	D	F		D	D	D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	C	C	D	C	C	C
Secchi	D	D	D	C	D	
Lake Grade	D	D	D	C	D	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQUIS database(s)

Comfort Lake (13–0053) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Wally Ostlie

Sponsor: Comfort Lake — Forest Lake Watershed District

Comfort Lake is located northeast of the City of Forest Lake in Chisago County. The lake has a surface area of 219 acres, and a maximum depth of 14.3 m (47 feet).

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) and aquatic recreational use (nutrient/eutrophication biological indicators). The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) and zebra mussels (*Dreissena polymorpha*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

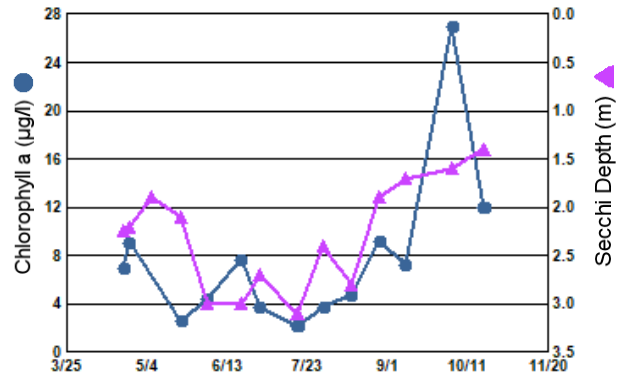
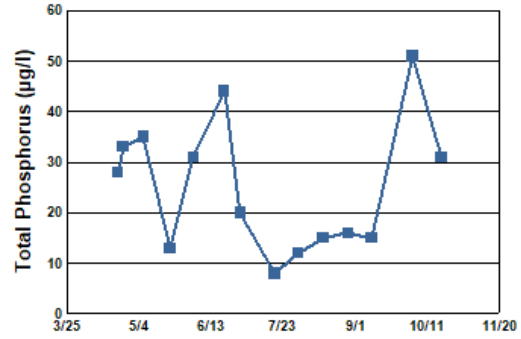
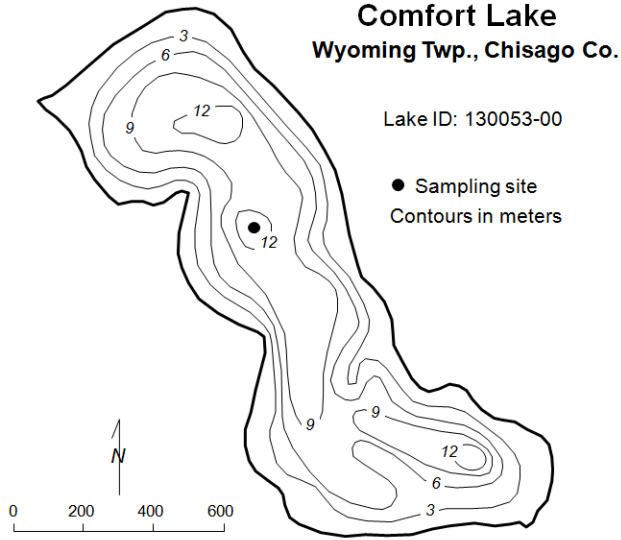
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	21	8	44	A
CLA (µg/l)	5.1	2.2	9.2	A
Secchi (m)	2.5	1.7	3.1	B
TKN (mg/l)	0.73	0.66	0.80	
			Lake Grade	A

The lake received a lake grade of A, which is the best lake grade received to date according to its water quality database going back to 1994. The lake typically receives a lake grade of B or C and a Secchi grade of C. Additional monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

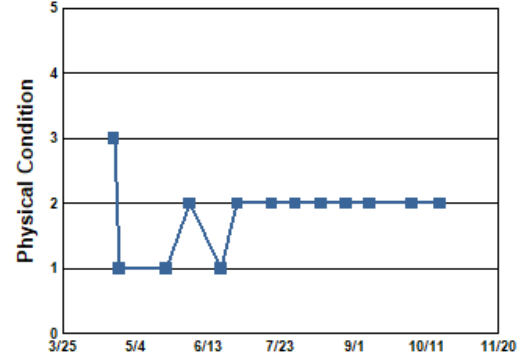
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

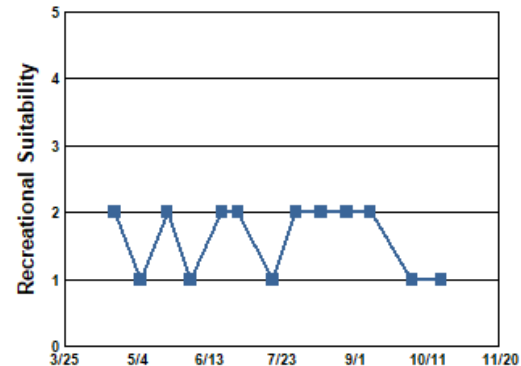


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	9.9		7.0	28	2.3	3	2
04/25/21	9.0		9.1	33	2.2	1	
05/06/21	13.7			35	1.9		1
05/21/21	20.8		2.6	13	2.1	1	2
06/03/21	23.6		4.4	31	3.0	2	1
06/20/21	24.8		7.7	44	3.0	1	2
06/29/21	27.4		3.7	20	2.7	2	2
07/18/21	28.6		2.2	8	3.1	2	1
07/31/21	27.1		3.7	12	2.4	2	2
08/14/21	29.5		4.8	15	2.8	2	2
08/28/21	25.3		9.2	16	1.9	2	2
09/10/21	21.3		7.3	15	1.7	2	2
10/03/21	21.2		27	51	1.6	2	1
10/19/21	17.6		12	31	1.4	2	1



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5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi								B	B	B		
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			D						C	B	C	C
CLA			B						C	B	C	C
Secchi			C	C		C	C		C	C	C	C
Lake Grade			C						C	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	B	C	A	B	B	B	C	C	B	C	B
CLA	B	B	B	A	A	B	B	B	B	B	B	B
Secchi	C	C	C	C	C	C	C	C	C	C	C	C
Lake Grade	C	B	C	B	B	B	B	C	C	B	C	B

Year	2016	2017	2018	2019	2020	2021
TP	B	C	B	B	B	A
CLA	B	B	B	B	B	A
Secchi	C	C	C	C	C	B
Lake Grade	B	C	B	B	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Crystal Lake [Burnsville] (19–0027) *Black Dog Watershed Management Commission*

Volunteer: Joe Tranchilla

Crystal Lake is located mainly in the City of Burnsville (Dakota County). The lake is considered a Priority Water by the Metropolitan Council. high regional recreational value. The lake has a surface area of 292 acres.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998. The lake was delisted for aquatic recreational use (nutrient/eutrophication biological indicators) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

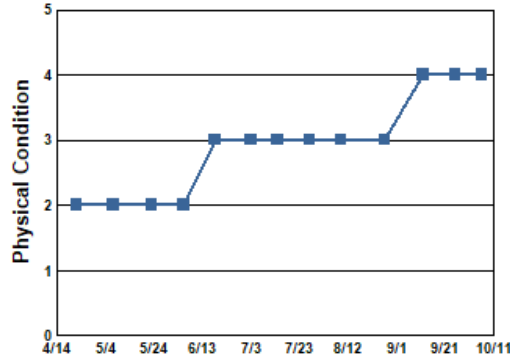
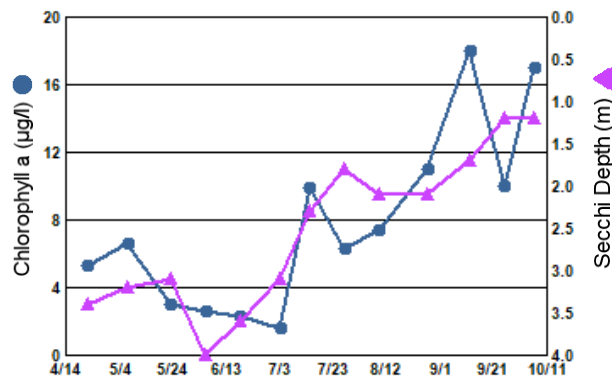
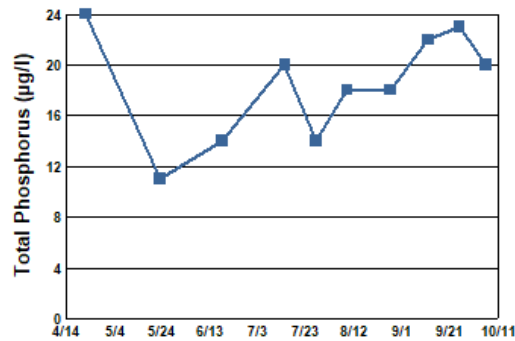
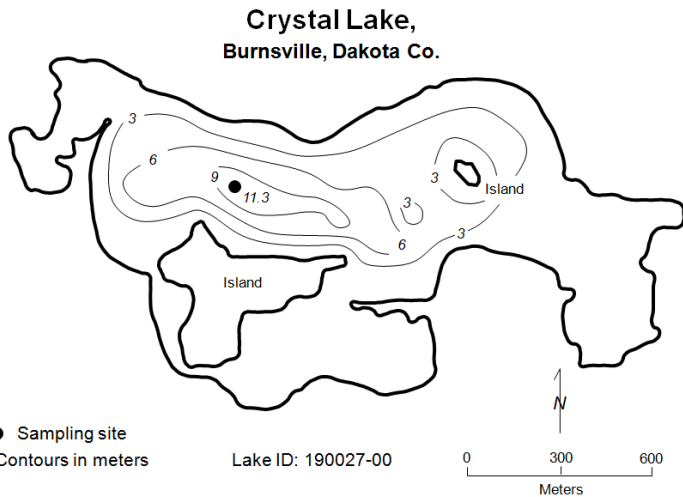
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	11	23	A
CLA (µg/l)	7.2	1.6	18	A
Secchi (m)	2.6	1.2	4.0	B
TKN (mg/l)	0.58	0.42	0.76	
			Lake Grade	A

The lake received a lake grade of A which is an improvement in water quality over recent years and similar to water quality observed in 2014.

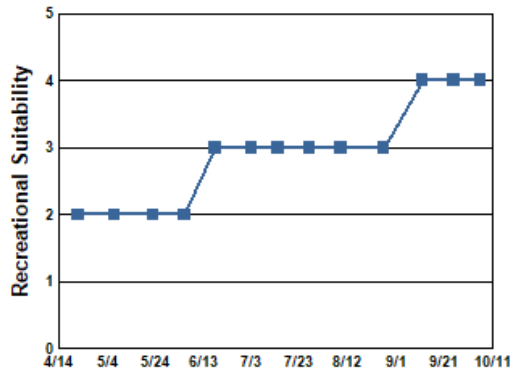
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



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 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	13.5		5.3	24	3.4	2	2
05/07/21	14.6		6.6		3.2	2	2
05/23/21	22.1		3.0	11	3.1	2	2
06/05/21	22.3		2.6		4.0	2	2
06/18/21	27.0		2.3	14	3.6	3	3
07/03/21	27.1		1.6		3.1	3	3
07/14/21	25.2		9.9	20	2.3	3	3
07/27/21	27.8		6.3	14	1.8	3	3
08/09/21	24.4		7.4	18	2.1	3	3
08/27/21	25.2		11	18	2.1	3	3
09/12/21	20.4		18	22	1.7	4	4
09/25/21	18.5		10	23	1.2	4	4
10/06/21	20.0		17	20	1.2	4	4

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C	C		C						B		
CLA	C			B				C		B		
Secchi	C	C	C	B	C	B	B	C	C	B	C	B
Lake Grade	C			B						B		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C	C	C	C	C	C	B	C	C
CLA			B	C	C	C	C	B	C	B	B	C
Secchi	B		C	C	C	C	C	C	C	C	C	C
Lake Grade			C	C	C	C	C	C	C	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	B	B	A	C	B	A	A
CLA	B	C	C	C	C	B	C	B	B	B	A	B
Secchi	C	C	C	C	C	C	C	C	C	C	B	C
Lake Grade	C	C	C	C	C	B	C	B	C	B	A	B

Year	2016	2017	2018	2019	2020	2021
TP	B	B	B	C	B	A
CLA	B	B	A	B	B	A
Secchi	C	B	B	C	B	B
Lake Grade	B	B	B	C	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Crystal Lake [Prior Lake] (70–0061) *Prior Lake — Spring Lake Watershed District*

Volunteer: Scott Thulien

Crystal Lake is located mainly in the City of Prior Lake (Scott County). The lake has a maximum depth of 7.9 m and a surface area of about 31 acres. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade. Continued monitoring is recommended to build the water quality database.

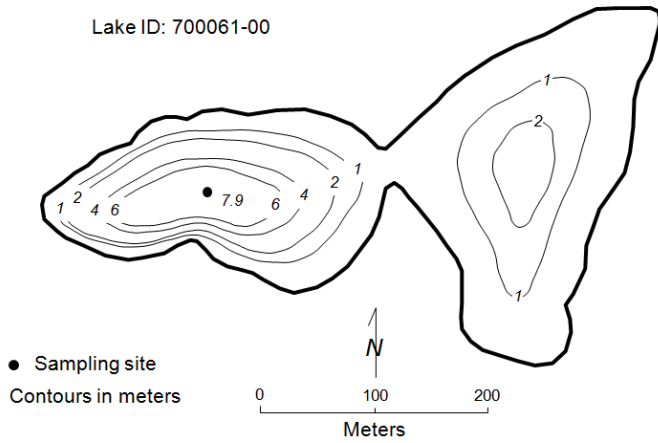
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

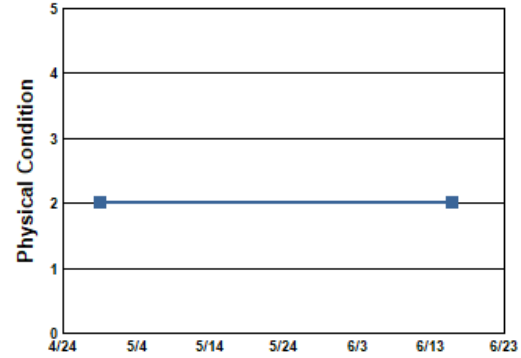
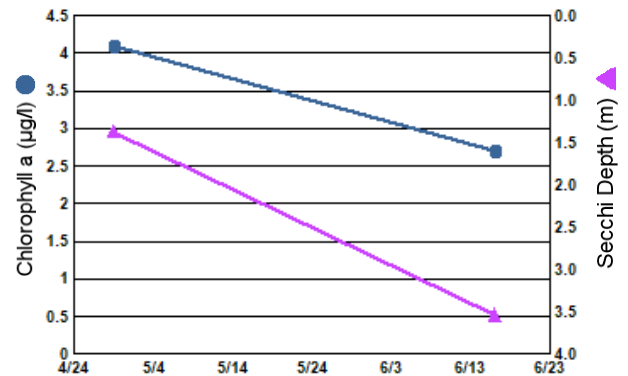
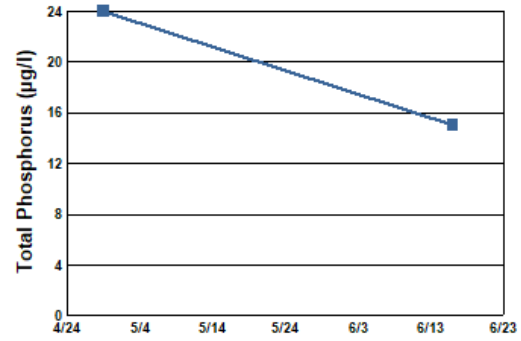
Crystal Lake
Prior Lake, Scott Co.

Lake ID: 700061-00

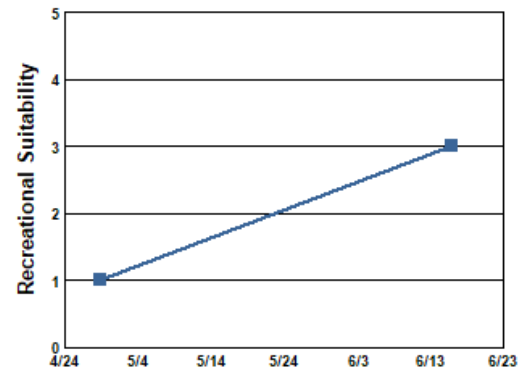


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/29/21	13.9		4.1	24	1.4	2	1
06/16/21	26.1		2.7	15	3.5	2	3



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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP						C		C				
CLA						A		B				
Secchi						C		C				
Lake Grade						B		C				

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					B	
CLA					A	
Secchi					C	
Lake Grade					B	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

DeMontreville Lake (82–0101) Valley Branch Watershed District

Volunteer: Tom Bucher, Gary Fields

Lake DeMontreville is located in Lake Elmo (Washington County). The lake is considered a Priority Water by the Metropolitan Council.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2020. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2009.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

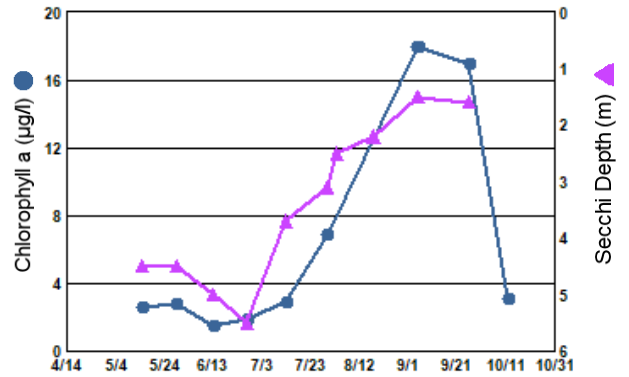
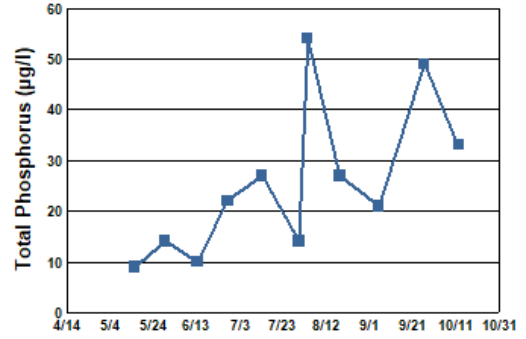
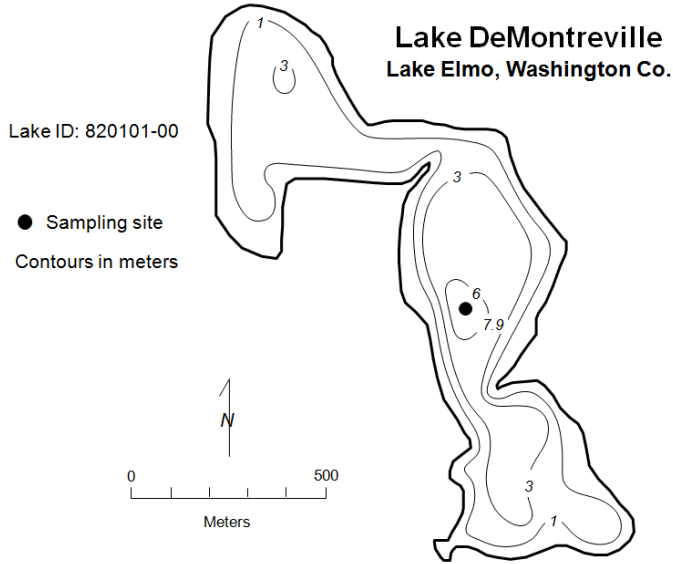
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	9	54	B
CLA (µg/l)	6.7	1.5	18	A
Secchi (m)	3.4	1.5	5.5	A
TKN (mg/l)	0.57	0.31	0.98	
			Lake Grade	A

The lake received a lake grade of A this year. The lake grades for the years 1980 through 2020 show that the quality of the lake has improved over the past 40 years but recent years has shown a decrease in water quality with grades varying in the A to B range.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

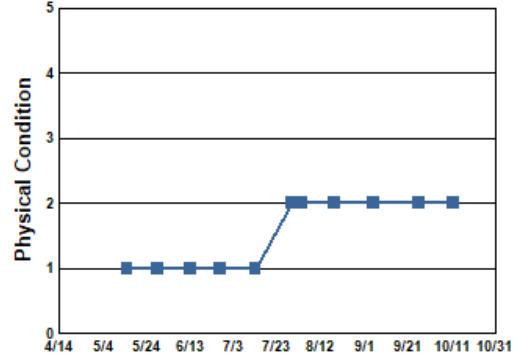
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

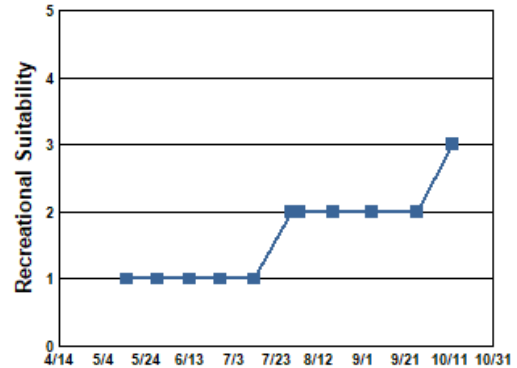


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/21	17.9		2.6	9	4.5	1	1
05/29/21	20.0		2.8	14	4.5	1	1
06/13/21	27.0		1.5	10	5.0	1	1
06/27/21	25.9		1.9	22	5.5	1	1
07/13/21	27.3		2.9	27	3.7	1	1
07/30/21	27.5		6.9	14	3.1	2	2
08/03/21				54	2.5	2	2
08/18/21	26.5			27	2.2	2	2
09/05/21	23.1		18	21	1.5	2	2
09/26/21	18.9		17	49	1.6	2	2
10/12/21	19.2		3.1	33		2	3



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C				C							B
CLA	C				C							C
Secchi	C				C	C	C		C	D		C
Lake Grade	C				C							C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B		C					A			A
CLA		A		B					A			B
Secchi		B		B					A			A
Lake Grade		B		B					A			A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	B	C	B	A	B	C	A	B	A	A	A
CLA	A	B	B	C	A	A	B	A	A	A	A	A
Secchi	B	A	B	C	A	B	A	A	A	A	B	A
Lake Grade	A	B	B	C	A	B	B	A	A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	B	B
CLA	A	A	B	A	B	A
Secchi	A	A	B	A	B	A
Lake Grade	A	A	B	A	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Dickman Lake (19–0046) Lower Mississippi River Watershed Management Organization

Volunteer: Lisa Povolny

Dickman Lake is located in the city of Inver Grove Heights (Dakota County). There is little bathymetric information available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

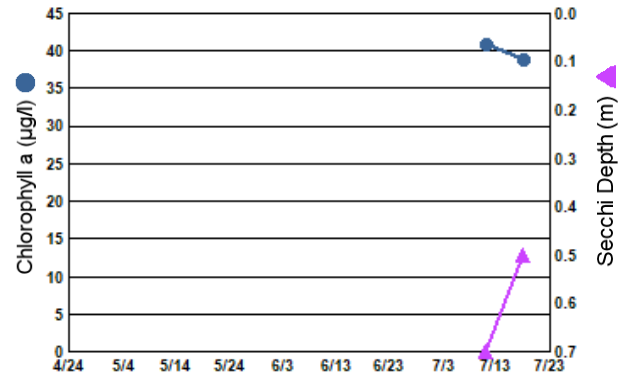
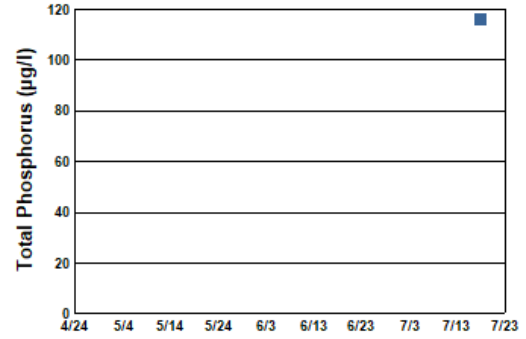
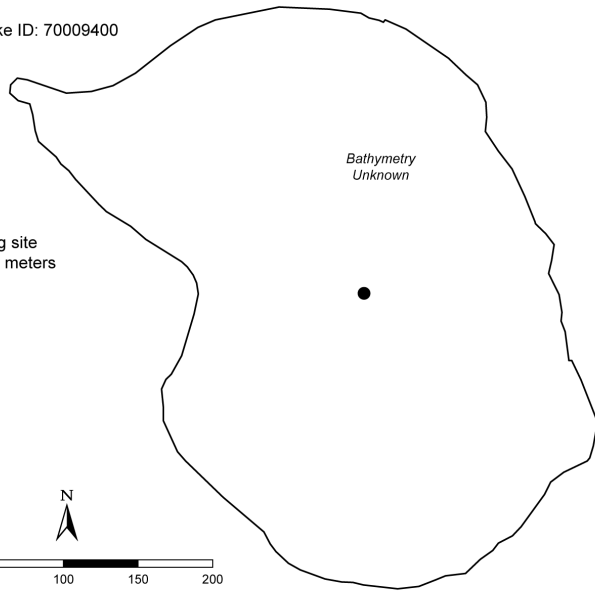
There were insufficient data to calculate a lake grade this year.

During each monitoring visit, the lake’s physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake’s data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

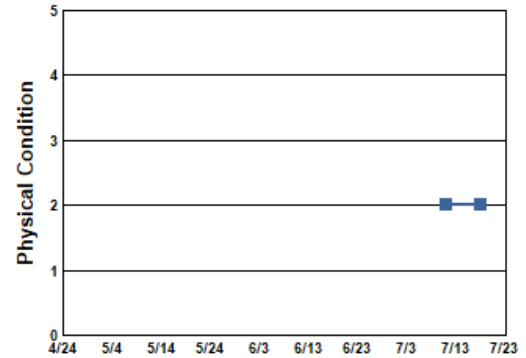
Dickman Lake
Sunfish Lake, Dakota County

Lake ID: 70009400

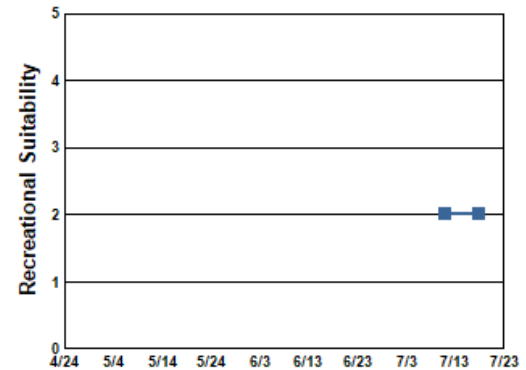


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
07/11/21	28.1		41		0.7	2	2
07/18/21	30.3		39	116	0.5	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					D	
CLA					D	
Secchi					F	
Lake Grade					D	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Downs Lake (82–0110) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Downs Lake is located in Lake Elmo (Washington County). The mean and maximum depths of the 35-acre lake are 1.5 m (5 feet) and 2.1 m (7 feet), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's 2,400-acre watershed translates to a large watershed-to-lake size ratio of 69:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	132	58	203	D
CLA (µg/l)	69	5.5	140	D
Secchi (m)	+1.0	0.3	+2.1	
TKN (mg/l)	1.90	0.99	2.80	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The lake received TP and CLA grades of D which indicate a similar water quality that was observed in 2019.

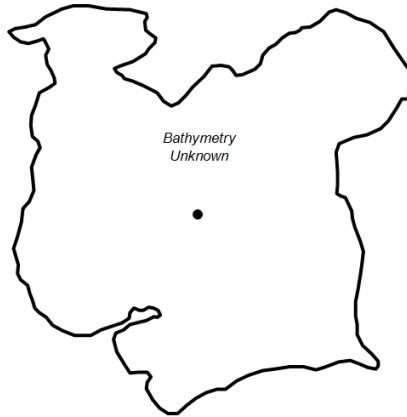
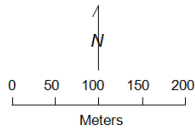
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Downs Lake
Lake Elmo, Washington Co.

Lake ID: 820110-00

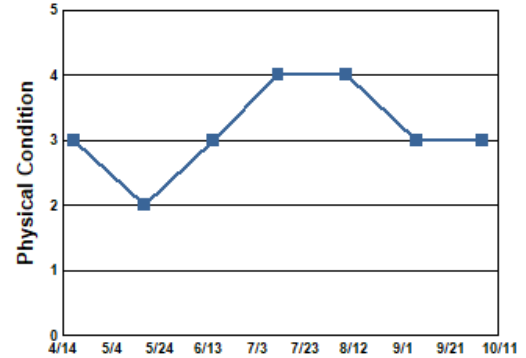
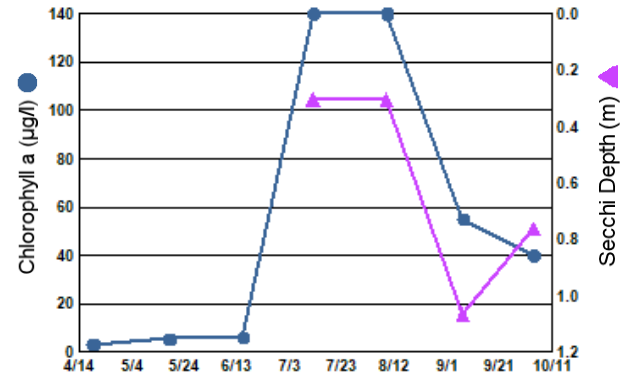
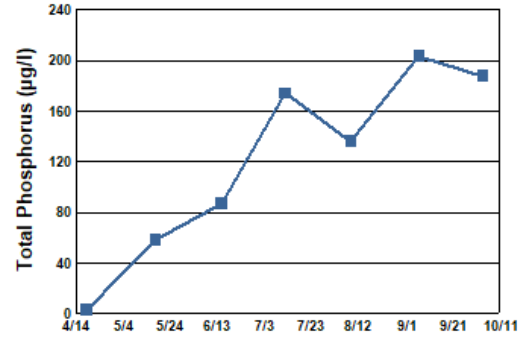
● Sampling site
Contours in meters



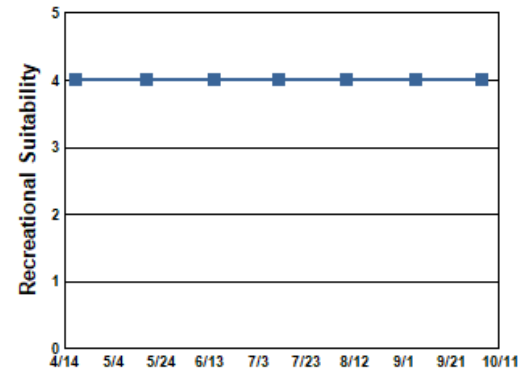
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.7	8.7	3.3	3	+2.4	3	4
05/18/21	20.2	9.7	5.5	58	+2.1	2	4
06/15/21	26.9	9.4	6.1	87	>1.4	3	4
07/12/21	26.0	13.5	140	174	0.3	4	4
08/09/21	26.1	14.0	140	136	0.3	4	4
09/07/21	22.1	7.6	55	203	1.1	3	4
10/04/21	20.1	11.4	40	188	0.8	3	4

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								D		D	F	D
CLA								D		F	F	C
Secchi								D		F	F	F
Lake Grade								D		F	F	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	D	F	F		F			F	F	D	F
CLA	D	D	F	F		D			F	F	F	F
Secchi	F	F	F	F		F			F	F	D	F
Lake Grade	F	D	F	F		F			F	F	D	F

Year	2016	2017	2018	2019	2020	2021
TP	F	D	F	D	D	D
CLA	F	F	D	D	C	D
Secchi	F	F	F	F	C	
Lake Grade	F	F	F	D	C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Duck Lake (27–0069) City of Eden Prairie

Volunteer: Eric Campbell

Duck Lake is located in the city of Eden Prairie (Hennepin County). The lake has a surface area of 46 acres, and a maximum depth of about 2.6 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's watershed has an area of 200 acres, giving a relatively small watershed to lake surface area ratio of 4.4. The higher the ratio, the greater the influence that the watershed has on the lake's water quality.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2020.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	44	25	61	C
CLA (µg/l)	10	2.4	23	B
Secchi (m)	>1.6	>1.1	>2.1	
TKN (mg/l)	0.82	0.64	1.20	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The TP and CLA grades of C and B, respectively, indicate a degradation in water quality compared to previous years. The lake had been receiving A and B grades for TP and A grades for CLA since CAMP monitoring began in 2014.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The lake has been occasionally stocked with various panfish and bass. Information on the stocking can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP											A	B
CLA											A	A
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	B	B	C
CLA	A	A	A	A	A	B
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Eagle Lake (27–0111–01) Shingle Creek Watershed Management Commission

Volunteer: Patrice Carlson

Eagle Lake is located in Young America Township in Carver County. The lake is considered a Priority Water by the Metropolitan Council.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2008 and aquatic consumption (mercury in fish tissue) in 1998. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	19	153	C
CLA (µg/l)	13	2.5	34	B
Secchi (m)	2.3	1.0	3.6	B
TKN (mg/l)	0.91	0.73	1.30	
			Lake Grade	B

The lake received a lake grade of B this year. The lake grades have fluctuated between B and C since 1980.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

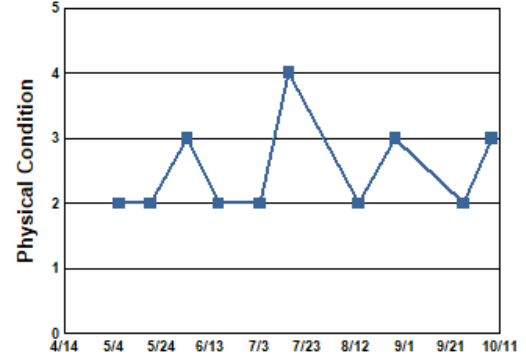
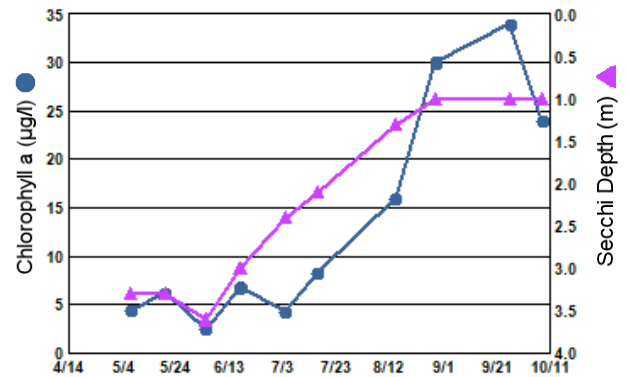
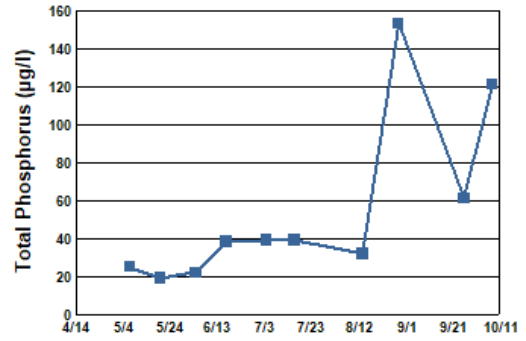
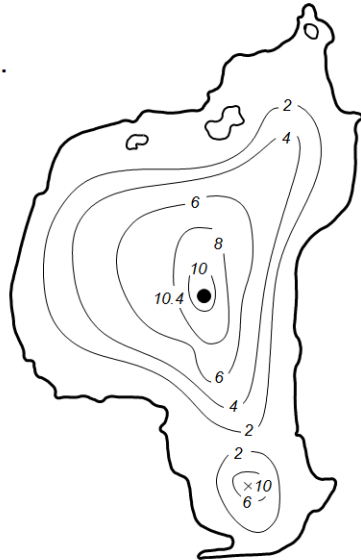
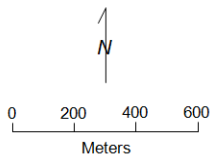
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Eagle Lake,
Maple Grove, Hennepin Co.**

Lake ID: 270111-01

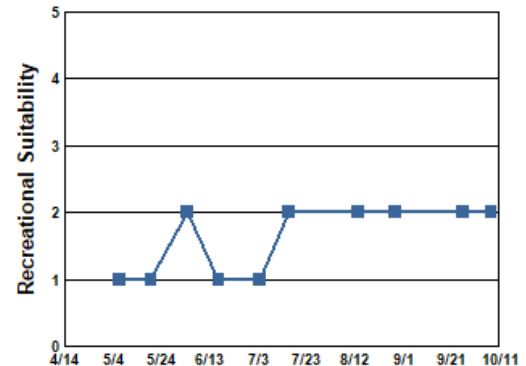
● Sampling site
Contours in meters



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/07/21	14.6		4.4	25	3.3	2	1
05/20/21	20.9		6.2	19	3.3	2	1
06/04/21	23.9		2.5	22	3.6	3	2
06/17/21	27.6		6.8	38	3.0	2	1
07/04/21	27.3		4.3	39	2.4	2	1
07/16/21	28.5		8.3	39	2.1	4	2
08/14/21	26.0		16	32	1.3	2	2
08/29/21	25.0		30	153	1.0	3	2
09/26/21	19.8		34	61	1.0	2	2
10/08/21	21.6		24	121	1.0	3	2



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C			C			C	C				C
CLA	D			C			B	C				C
Secchi	D			C			C	C				C
Lake Grade	D			C			C	C				C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B			B	B	B		C		C	
CLA		B			B	A	B		A		A	
Secchi		B			C	C	C		B		D	
Lake Grade		B			B	B	B		B		C	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C				B			D			
CLA		B				B			C			
Secchi		B				A			C			
Lake Grade		B				B			C			

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						B
Lake Grade						B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Eagle Point Lake (82–0109) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Eagle Point Lake is located within the City of Lake Elmo (Washington County). It has a surface area of approximately 120-acres. The mean and maximum depths of the lake are 0.9 m (3 feet) and 1.8 m (roughly 6 feet), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's 11,502-acre watershed translates to a relatively large watershed-to-lake size ratio of 96:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	44	26	61	C
CLA (µg/l)	12	9.4	20	B
Secchi (m)	+0.6	>0.5	>0.9	
TKN (mg/l)	1.14	0.92	1.40	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

This year saw the continued improvement in water quality since 2006. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		F										
CLA												
Secchi		F										
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			F	F				D	F	D	C	D
CLA			F	A				D	F	C	B	C
Secchi			F	D				D	F			
Lake Grade			F	C				D	F			

Year	2016	2017	2018	2019	2020	2021
TP	D	D	C	C		C
CLA	B	C	A	B	A	B
Secchi		F				
Lake Grade		D				

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Earley Lake (19–0033) City of Burnsville

Volunteer: Nancy Norlen, Jim Norlen

Earley Lake is located within the City of Burnsville in Dakota County. The 29-acre lake receives flow from Crystal Lake (Burnsville) and the Earley Lake watershed. Most of its 1,629-acre watershed is either parkland or open space. The watershed-to-lake size ratio is a rather large 56:1. The greater the ratio, the greater the potential stress on the lake from surface runoff. Earley Lake drains at its west end to Sunset Pond.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	56	29	111	C
CLA (µg/l)	6.8	3.4	12	A
Secchi (m)	+2.1	1.6	+2.5	
TKN (mg/l)	0.62	0.50	0.74	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

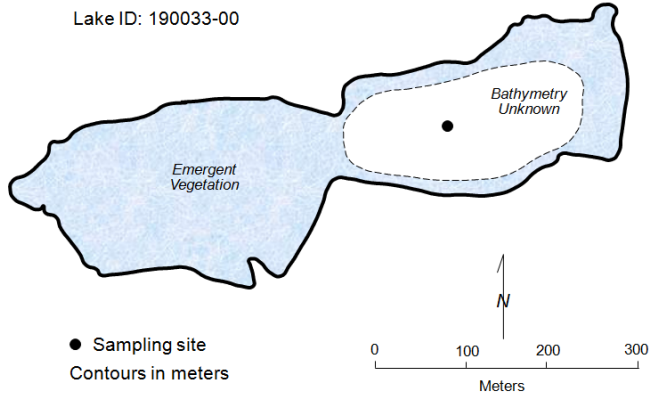
The lake received TP and CLA grades of C and A this year, which is consistent with its historical water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Earley Lake
Burnsville, Dakota Co.

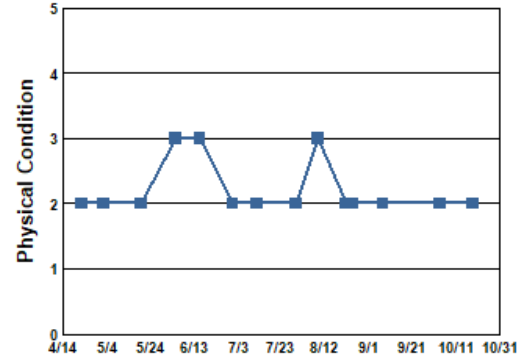
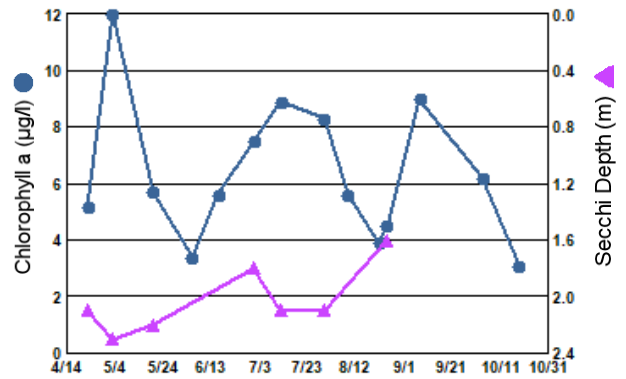
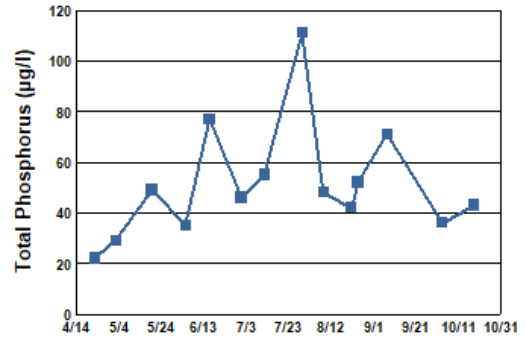
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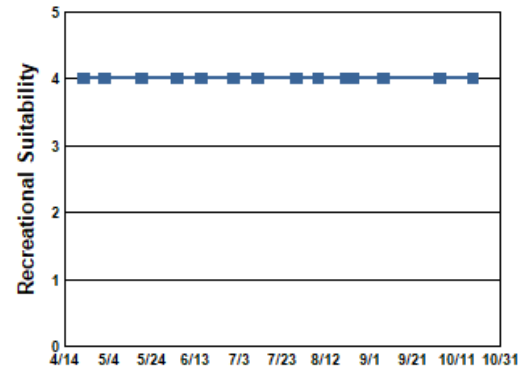
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/21	11.0		5.2	22	2.1	2	4
05/03/21	15.0		12	29	2.3	2	4
05/20/21	22.0		5.7	49	2.2	2	4
06/05/21	23.0		3.4	35	+2.4	3	4
06/16/21	25.5		5.6	77	+2.5	3	4
07/01/21	26.0		7.5	46	1.8	2	4
07/12/21	24.0		8.9	55	2.1	2	4
07/30/21	26.5		8.3	111	2.1	2	4
08/09/21	27.5		5.6	48	>1.7	3	4
08/22/21			3.9	42	+2.4	2	4
08/25/21	25.0		4.5	52	1.6	2	4
09/08/21	21.5		9.0	71	+2.5	2	4
10/04/21	19.0		6.2	36	+2.5	2	4
10/19/21	13.0		3.1	43	+2.3	2	4

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C	C	C	C	C	C	C	C	C
CLA			B	B	B	B	B	B	B	B	B	B
Secchi			C	C	C	C	C	C	C	C	C	C
Lake Grade			C	C	C	C	C	C	C	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	C	B	C	C	C	B
CLA	B	B	A	B	A	A	B	A	A	B	A	A
Secchi	C	C	C	C	C	C	C	C	C	C	C	C
Lake Grade	C	C	B	C	B	B	C	B	B	C	B	B

Year	2016	2017	2018	2019	2020	2021
TP	B	D	C	C	C	C
CLA	A	B	A	A	A	A
Secchi	C			C	C	
Lake Grade	B			B	B	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

East Lake (19–0349) *City of Lakeville*

Monitoring Personnel: Blue Water Science staff

East Lake is a small lake located in Lakeville (Dakota County). The lake is shallow, with a maximum depth of about 3.0 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

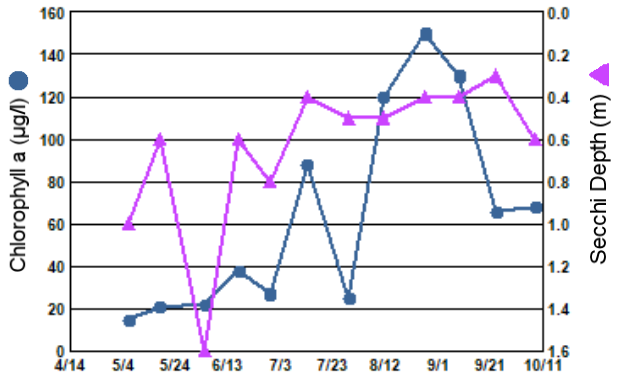
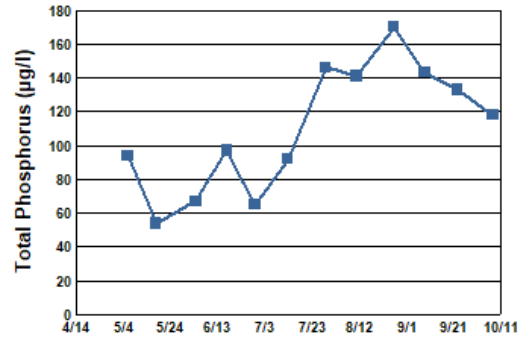
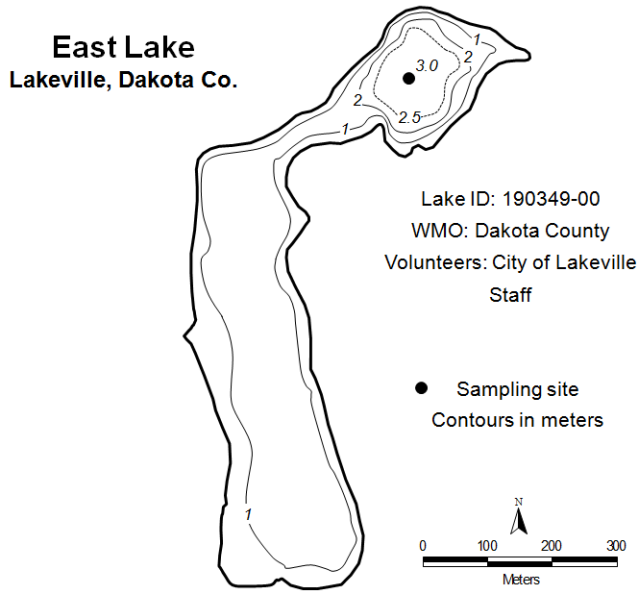
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	109	54	170	D
CLA (µg/l)	64	15	150	D
Secchi (m)	0.6	0.3	1.6	F
TKN (mg/l)	1.94	0.99	3.40	
			Lake Grade	D

The lake received a lake grade of D this year. The lake grades typically fluctuate between D and F with the occasional C.

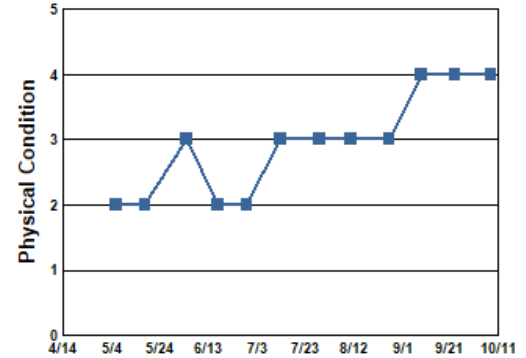
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

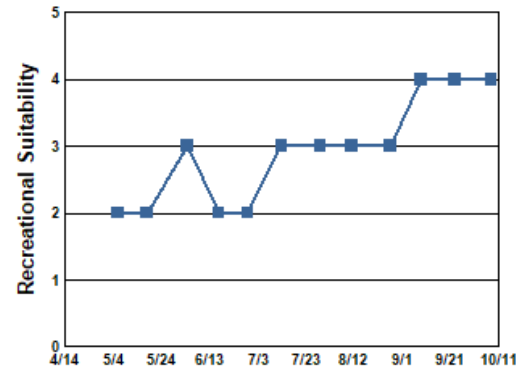


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/06/21	16.2		15	94	1.0	2	2
05/18/21	21.2		21	54	0.6	2	2
06/04/21	24.4		22	67	1.6	3	3
06/17/21	27.8		38	97	0.6	2	2
06/29/21	28.2		27	65	0.8	2	2
07/13/21	29.6		88	92	0.4	3	3
07/29/21	28.8		25	146	0.5	3	3
08/11/21	25.0		120	141	0.5	3	3
08/27/21	23.7		150	170	0.4	3	3
09/09/21	22.9		130	143	0.4	4	4
09/23/21	21.0		66	133	0.3	4	4
10/08/21	22.0		68	118	0.6	4	4



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- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		F		F	D		D	F	D	D	C	D
CLA		F		F	F		D	F	F	C	C	D
Secchi		F		F	D		F	F	F	D	D	F
Lake Grade		F		F	D		D	F	F	D	C	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	C	D	D
CLA	D	D	F	C	D	D
Secchi	F	D	F	D	D	F
Lake Grade	D	D	F	C	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

East Boot Lake (82–0034) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

East Boot Lake is located in May Township (Washington County). The maximum and mean depths of the 47-acre lake are 8.2 m (27 feet) and 0.9 m (3 feet), respectively. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. The lake's watershed area is approximately 93 acres which gives a relatively lower watershed to lake area ratio of 2.0. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	11	22	A
CLA (µg/l)	2.6	1.4	3.6	A
Secchi (m)	4.4	3.4	5.8	A
TKN (mg/l)	0.53	0.40	0.62	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with recent years in its historical database. The lake continues to achieve better water quality than it used to receive in the period from the mid 1990s and early 2000s. The lake was delisted from the impaired waters (aquatic recreation/nutrients) list by the MPCA in 2022.

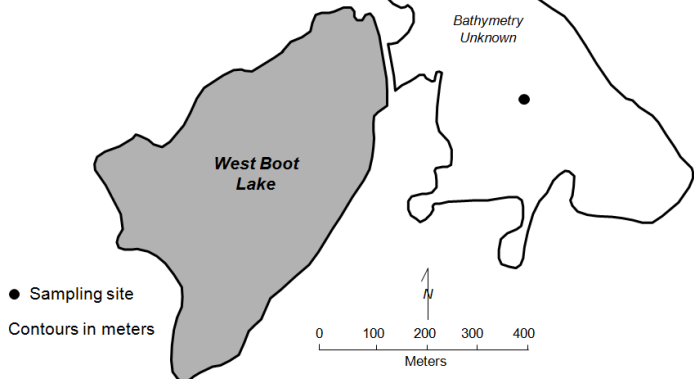
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

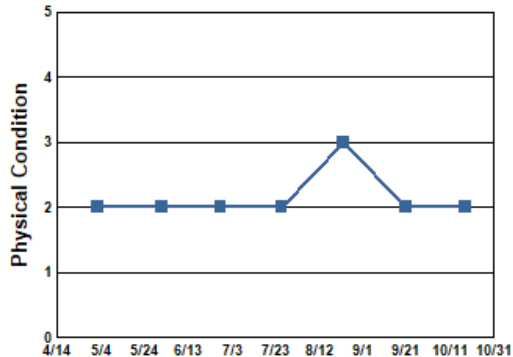
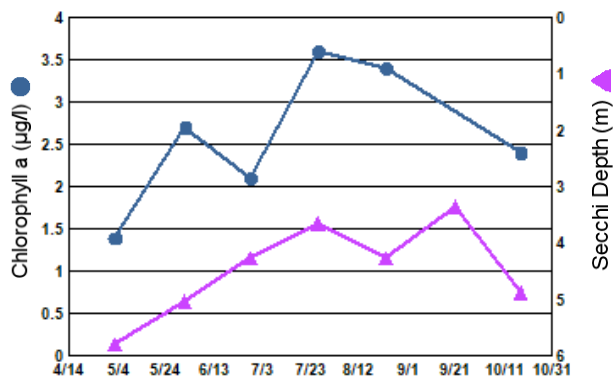
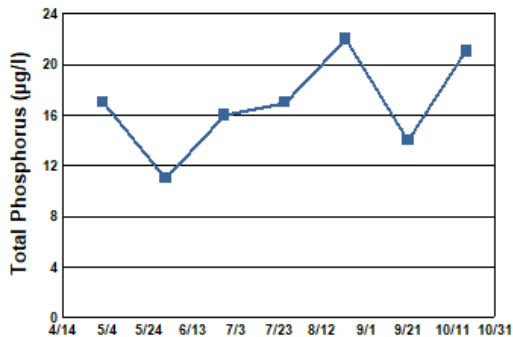
East Boot Lake
May Twp., Washington Co.

LAKE ID: 820034-00

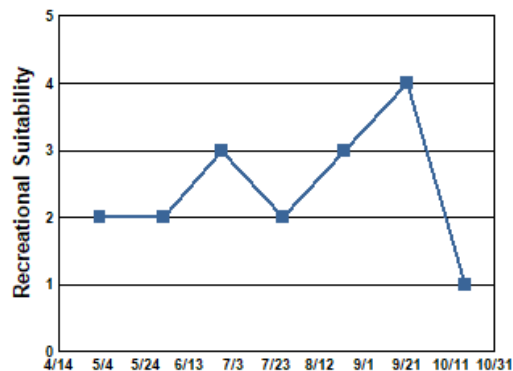


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	13.7	11.6	1.4	17	5.8	2	2
06/01/21	19.8	9.0	2.7	11	5.0	2	2
06/28/21	25.3	8.0	2.1	16	4.3	2	3
07/26/21	27.8	8.0	3.6	17	3.7	2	2
08/23/21	24.9	7.2	3.4	22	4.3	3	3
09/21/21	20.8	7.4		14	3.4	2	4
10/18/21	15.3	6.6	2.4	21	4.9	2	1



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5 = Severe Algal Bloom



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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					B	B	B	C	C	C	C	C
CLA					B	C	C	C	C	C	C	C
Secchi					B	A	B	C	C	C	B	B
Lake Grade					B	B	B	C	C	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	B	B	C	C	B	A	A
CLA	B	B	C	B	B	A	A	A	A	A	A	A
Secchi	A	A	A	A	A	A	A	A	A	A	A	A
Lake Grade	B	B	B	B	B	A	A	B	B	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP		A	A	A		A
CLA		A	A	A		A
Secchi		A	A	A		A
Lake Grade		A	A	A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Echo Lake (82–0135) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Echo Lake is a 41-acre lake located within the City of Mahtomedi (Washington County). The mean and maximum depth of the lake is 0.8 m (2.6 feet) and 1.8 m (6 feet), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. There is no public access to the lake. The lake's watershed area is 194 acres which gives watershed-to-lake area ratio of 4.7. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA delisted the impairment listing for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	31	84	C
CLA (µg/l)	13	3.6	26	B
Secchi (m)	+1.5	0.9	+2.1	
TKN (mg/l)	0.79	0.68	0.86	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The TP and CLA parameter grades received this year are consistent with grades received since 2013 which have varied in the B-C range and A-B range, respectively. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

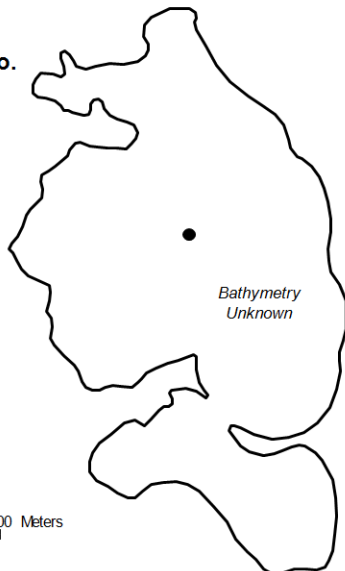
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Echo Lake
Mahtomedi, Washington Co.

LAKE ID: 820135-00

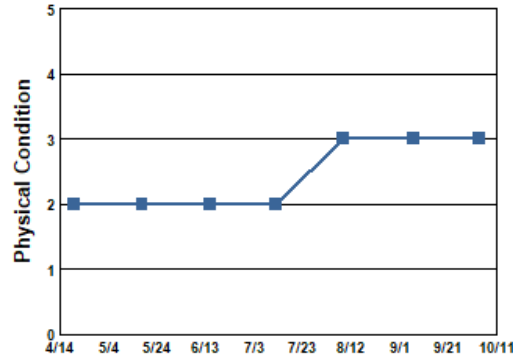
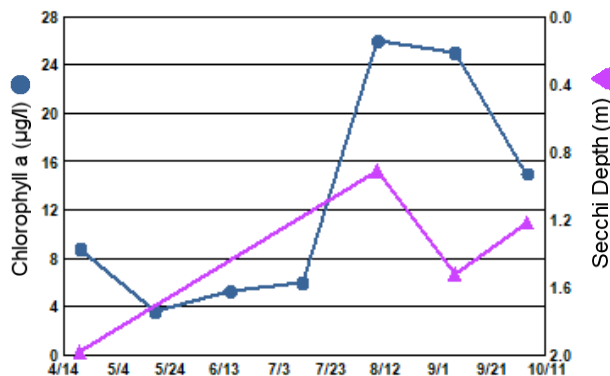
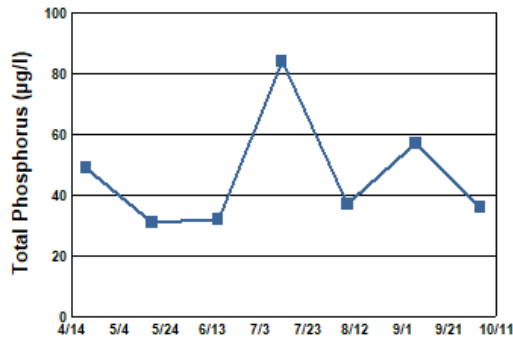
● Sampling site
Contours in meters



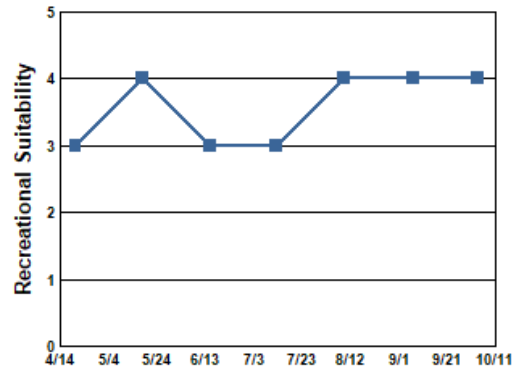
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	12.8	11.5	8.8	49	2.0	2	3
05/18/21	19.8	8.7	3.6	31	+2.1	2	4
06/15/21	26.0	7.1	5.3	32	>1.5	2	3
07/12/21	24.6	10.0	6.0	84	>1.5	2	3
08/09/21	24.2	6.2	26	37	0.9	3	4
09/07/21	21.5	7.3	25	57	1.5	3	4
10/04/21	19.5	7.4	15	36	1.2	3	4

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
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4 = High Algal Color
5 = Severe Algal Bloom



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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	D			D		D	B	C	B
CLA			C	F			C		B	A	B	B
Secchi		F	F	D			D					
Lake Grade			D	D			D					

Year	2016	2017	2018	2019	2020	2021
TP	B	B	B	C	C	C
CLA	A	A	A	B	B	B
Secchi					C	
Lake Grade					C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Edith Lake (82–0004) Valley Branch Watershed District

Volunteers: Joseph Reithmeyer, Joel Jensen

Edith Lake is a 81-acre lake located within Afton (Washington County). The lake has a maximum depth of approximately 13.0 m (43 feet).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	8	22	A
CLA (µg/l))	3.8	1.5	12	A
Secchi (m)	3.2	1.9	4.0	A
TKN (mg/l)	0.56	0.42	0.71	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its limited historical database. For the years that the lake has been monitored via the CAMP, the lake has fluctuated between a lake grade of A and B with A's dominating for the past 10 years.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		A	B	A	B	B		B	B	A	A	A
CLA		A	A	A	A	A		A	A	A	A	A
Secchi		B	C	B	C	C		B	B	B	B	B
Lake Grade		A	B	A	B	B		B	B	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	B	A	B	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Farquar Lake (19–0023) City of Apple Valley

Volunteer: Jeff Christianson

Farquar Lake is located in the City of Apple Valley (Dakota County). The lake covers an area of 67 acres and has a maximum depth of 3.0 m (10 feet). The lake's mean depth of 1.4 m (4.6 feet) and surface area translates to an approximate lake volume of 290 ac-ft. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	111	49	149	D
CLA (µg/l)	55	4.4	120	D
Secchi (m)	0.9	0.3	2.0	D
TKN (mg/l)	2.04	0.75	3.00	
			Lake Grade	D

The lake received a lake grade of D this year. The lake's water quality ranges in the D to F range with the occasional C.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

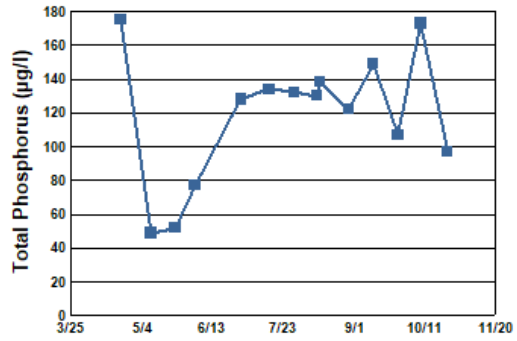
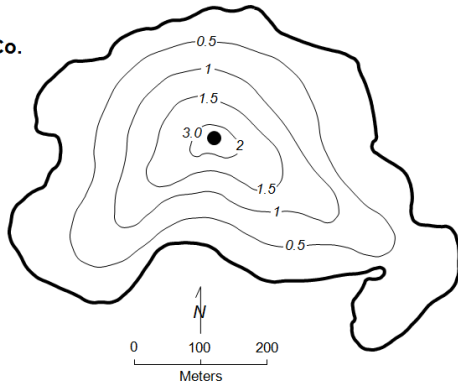
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Farquhar Lake
Apple Valley, Dakota Co.

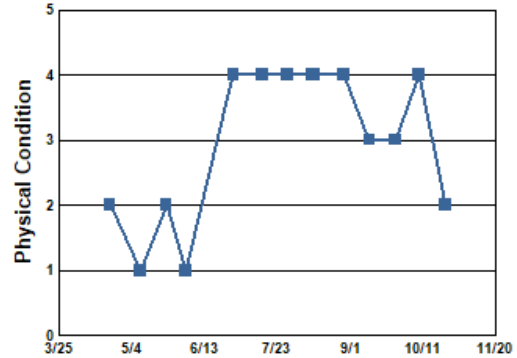
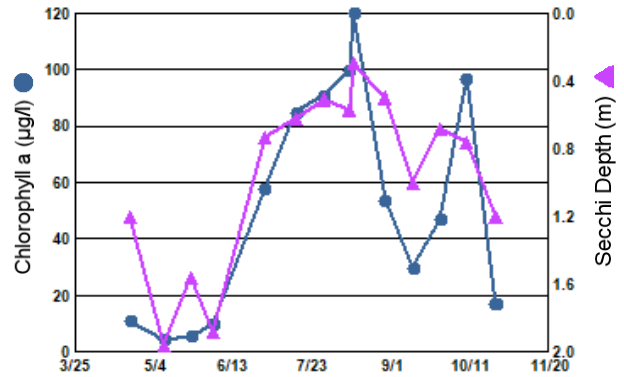
Lake ID: 190023-00

● Sampling site
Contours in meters

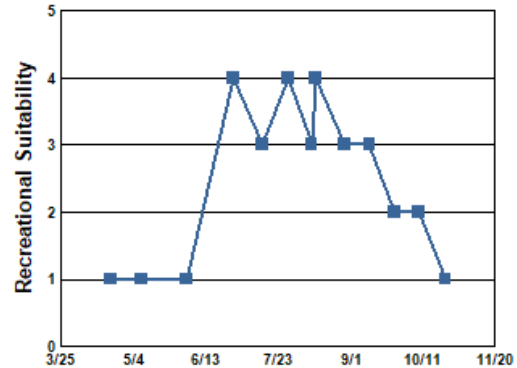


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	10.4		11	175	1.2	2	1
05/09/21	17.9		4.4	49	2.0	1	1
05/23/21	24.2		5.7	52	1.6	2	
06/03/21	24.9		10	77	1.9	1	1
06/29/21	27.3		58	128	0.7	4	4
07/15/21	27.7		85	134	0.6	4	3
07/29/21	27.3		91	132	0.5	4	4
08/11/21	26.3		100	130	0.6	4	3
08/13/21	24.6		120	138	0.3	4	4
08/29/21	26.0		54	122	0.5	4	3
09/12/21	22.7		30	149	1.0	3	3
09/26/21	20.4		47	107	0.7	3	2
10/09/21	20.3		97	173	0.8	4	2
10/24/21	11.9		17	97	1.2	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	D	D	D		F	F	F	F	D
CLA			B	C	C	D		F	F	F	F	F
Secchi			C	D	C	D		F	F	F	F	F
Lake Grade			C	D	C	D		F	F	F	F	F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	F	F	F	D	F	D	D	F	D	D	D
CLA	F	D	C	D	F	F	D	F	F	C	F	D
Secchi	F	F	F	F	D	F	F	F	F	D	D	D
Lake Grade	F	F	D	F	D	F	D	F	F	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	C	D	D	D	D
CLA	D	C	C	C	F	D
Secchi	D	C	D	C	F	D
Lake Grade	D	C	D	C	F	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Fish Lake [Spring Lake Township] (70-0069) *Prior Lake — Spring Lake Watershed District*

Volunteer: Jon Haferman

Fish Lake is located in Spring Lake Township (Scott County). The lake is considered a Priority Water by the Metropolitan Council. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) and aquatic recreational use (nutrient/eutrophication biological indicators).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	23	82	C
CLA (µg/l)	18	10	37	B
Secchi (m)	1.2	0.8	1.4	C
TKN (mg/l)	1.10	0.94	1.20	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C				D							
CLA	C				D						C	
Secchi	D				D						C	
Lake Grade	C				D							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C		C	C	C	C	C	D	C
CLA				C		C	C	C	C	B	C	C
Secchi				D		C	C	C	B	B	D	B
Lake Grade				C		C	C	C	C	B	D	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	C	B	C	C		
CLA	C	C	B	C	B	C	B	B	B	C		
Secchi	C	C	C	C	C	C	C	C	C	D		
Lake Grade	C	C	C	C	C	C	C	B	C	C		

Year	2016	2017	2018	2019	2020	2021
TP					C	C
CLA					C	B
Secchi					D	C
Lake Grade					C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Fish Lake [Washington County] (82–0064) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Fish Lake is located in City of Scandia in Washington County. The lake has a surface area of 72 acres, and a maximum and mean depth of 3.0 m (10 feet) and 1.5 m (5 feet), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	19	33	B
CLA (µg/l)	5.0	3.4	6.2	A
Secchi (m)	>1.4	>0.8	>2.1	
TKN (mg/l)	0.67	0.52	0.76	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The lake received TP and CLA grades of A and B respectively. These parameter grades are the best grades received since CAMP monitoring began in 1998 for this lake. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

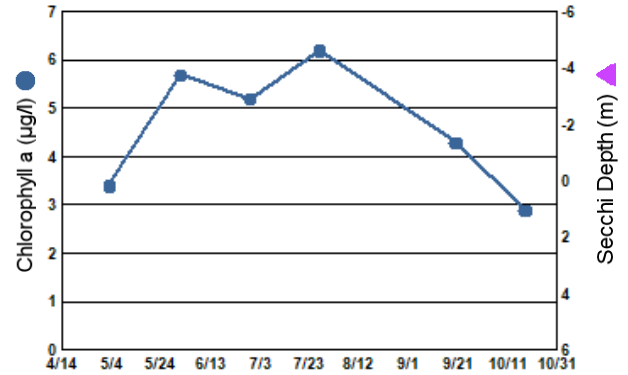
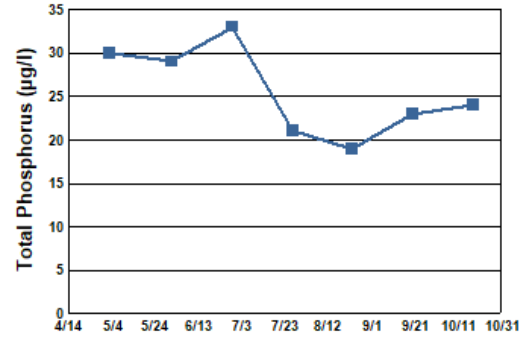
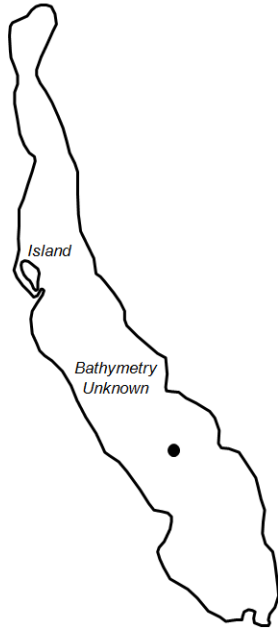
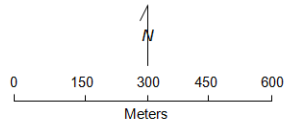
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Fish Lake
Scandia, Washington Co.

LAKE ID: 820064-00

● Sampling site
Contours in meters

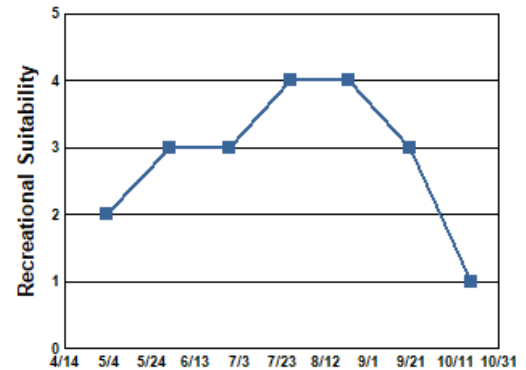
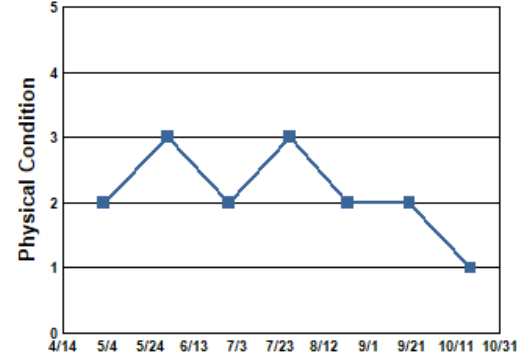


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	14.5	11.8	3.4	30	>2.1	2	2
06/01/21	23.9	9.5	5.7	29	>2.0	3	3
06/29/21	25.1	8.9	5.2	33	>1.2	2	3
07/27/21	28.3	8.8	6.2	21	>1.2	3	4
08/23/21	24.7	8.7		19	>0.8	2	4
09/20/21	20.9	8.8	4.3	23	>0.9	2	3
10/18/21	13.6	10.6	2.9	24	>0.9	1	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							F	F	D	D	D	D
CLA							D	D	F	F	D	F
Secchi							F	F	F	F	D	F
Lake Grade							F	F	F	F	D	F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	D	D	D	D	C				C
CLA	F	C	D	C	C	C	C	C				B
Secchi	D	D	D	C	C	C	C	C				
Lake Grade	D	D	D	C	C	C	C	C				

Year	2016	2017	2018	2019	2020	2021
TP	C	D		D	C	B
CLA	A	C		C	B	A
Secchi				C	C	
Lake Grade				C	C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Fish Lake [Woodbury] (82–0093) *City of Woodbury*

Monitoring Personnel: Washington Conservation District staff

Fish Lake is located in the City of Woodbury (Washington County). It has a surface area of approximately 5 acres. Little morphological information is available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	98	46	205	D
CLA ($\mu\text{g/l}$)	23	4.5	86	C
Secchi (m)	+0.6	>0.2	>1.1	
TKN (mg/l)	1.04	0.68	1.50	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The TP and CLA parameter grades are consistent with its varying historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP							F	D	F	D	D	D
CLA							F	D	F	B	D	D
Secchi							F	D	D	D		
Lake Grade							F	D	F	C		

Year	2016	2017	2018	2019	2020	2021
TP	C	C	D	D	C	D
CLA	B	B	B	B	B	C
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Forest Lake [West Basin] (82–0159) Comfort Lake — Forest Lake Watershed District

Volunteer: Steve Schmaltz

Sponsor: Comfort Lake — Forest Lake Watershed District

Forest Lake is located in the City of Forest Lake (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake is divided into three distinct basins. The entire lake has a surface area of 2,249 acres. The mean and maximum depths are 3.4 m and 11.5 m, respectively. The lake's watershed area is 4,285 acres, which gives a relatively low watershed-to-lake area ratio of 1.9. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (PCBs in fish tissue) in 2002. The lake was delisted in 2020 for aquatic consumption for mercury in fish tissue. The MN DNR designated the lake as being infested with flowering rush (*Butomus umbellatus*) in 2007, Eurasian water milfoil (*Myriophyllum spicatum*) in 2015, and zebra mussels (*Dreissena polymorpha*) in 2015.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

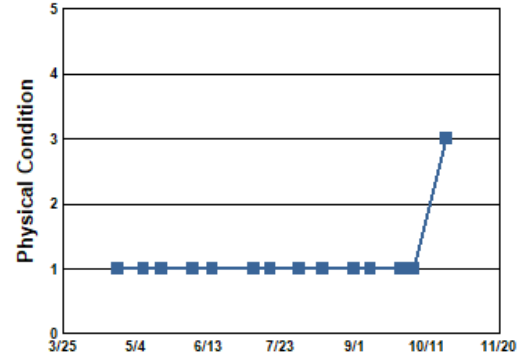
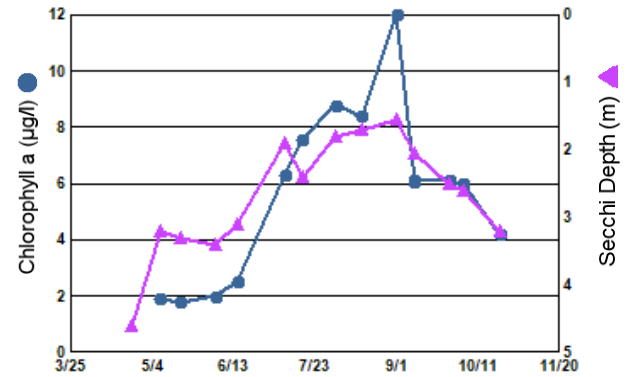
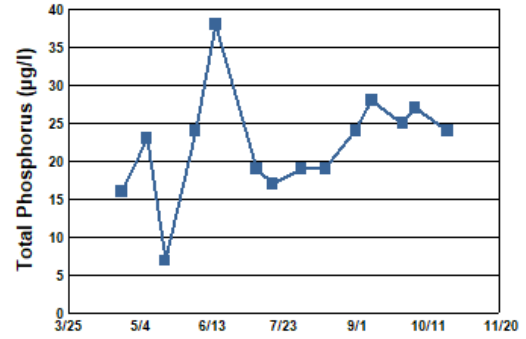
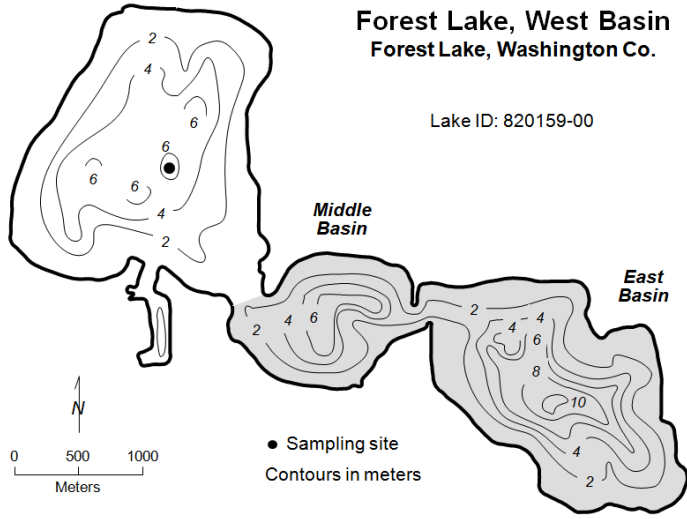
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	7	38	A
CLA (µg/l)	5.8	1.8	12	A
Secchi (m)	2.4	1.6	3.4	B
TKN (mg/l)	0.69	0.58	0.79	
			Lake Grade	A

The west basin received a lake grade of A this year which is a return to similar water quality observed in 2019. The water quality of the west basin has fluctuated between lake grades of B and C with the two recent A grades received in 2019 and 2021.

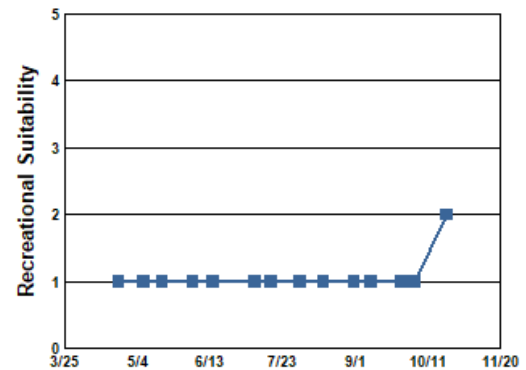
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



1 = Crystal Clear
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 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
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 5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.7			16	4.6	1	1
05/08/21	15.1		1.9	23	3.2	1	1
05/18/21	18.6		1.8	7	3.3	1	1
06/04/21	23.2		2.0	24	3.4	1	1
06/15/21	27.5		2.5	38	3.1	1	1
07/08/21	25.4		6.3	19	1.9	1	1
07/17/21	27.6		7.6	17	2.4	1	1
08/02/21	27.0		8.8	19	1.8	1	1
08/15/21	25.5		8.4	19	1.7	1	1
09/01/21	25.0		12	24	1.6	1	1
09/10/21	23.0		6.1	28	2.1	1	1
09/27/21	19.6		6.1	25	2.5	1	1
10/04/21	21.4		6.0	27	2.6	1	1
10/22/21	12.5		4.2	24	3.2	3	2

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C		C	C	C	B		C
CLA					C		C		C	B	C	B
Secchi					C		C	C	C	C	C	C
Lake Grade					C		C		C	B		C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C			C	B	B	C	C	B	C	C
CLA		B			B	B	B	B	B	B	B	B
Secchi		C			C	C	C	C	C	C	C	C
Lake Grade		C			C	B	B	C	C	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	C	C	B	B	C	C	C	B	B
CLA	A	C	B	C	A	A	B	B	B	B	B	B
Secchi	B	C	C	C	C	C	C	C	C	C	D	C
Lake Grade	B	C	C	C	B	B	B	C	C	C	C	B

Year	2016	2017	2018	2019	2020	2021
TP	C	B	C	A	B	A
CLA	B	A	B	A	A	A
Secchi	C	C	C	B	C	B
Lake Grade	C	B	C	A	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Forest Lake [Middle Basin] (82–0159) Comfort Lake — Forest Lake Watershed District

Volunteer: Doug Joens

Sponsor: Comfort Lake — Forest Lake Watershed District

Forest Lake is located in the City of Forest Lake (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake is divided into three distinct basins. The entire lake has a surface area of 2,249 acres. The mean and maximum depths are 3.4 m and 11.5 m, respectively. The lake's watershed area is 4,285 acres, which gives a relatively low watershed-to-lake area ratio of 1.9. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (PCBs in fish tissue) in 2002. The lake was delisted in 2020 for aquatic consumption for mercury in fish tissue. The MN DNR designated the lake as being infested with flowering rush (*Butomus umbellatus*) in 2007, Eurasian water milfoil (*Myriophyllum spicatum*) in 2015, and zebra mussels (*Dreissena polymorpha*) in 2015.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

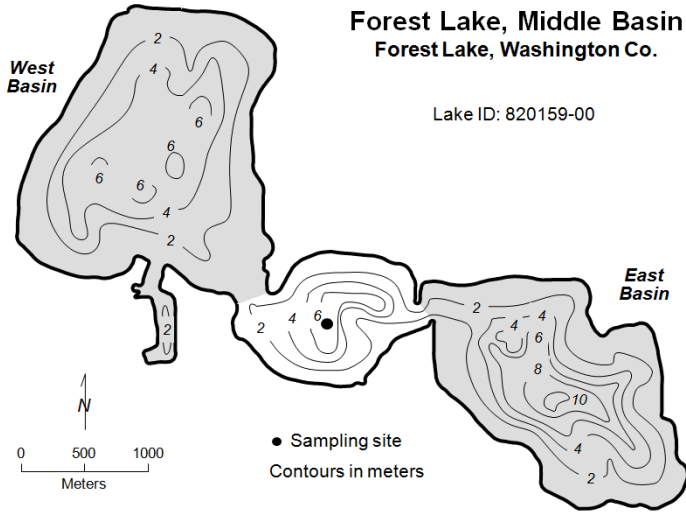
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	11	57	B
CLA (µg/l)	8.4	1.0	21	A
Secchi (m)	2.6	1.5	4.7	B
TKN (mg/l)	0.77	0.59	1.00	
			Lake Grade	B

The middle basin received a lake grade of B this year. The middle basin typically receives B and C grades according to its historical water quality database. The CLA grade in 2021 improved to an A which is the best grade received for CLA according to its water quality database going back to 1984.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

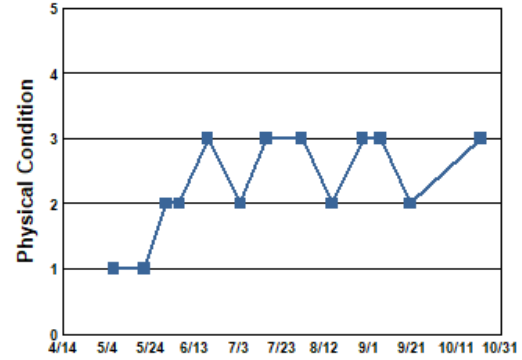
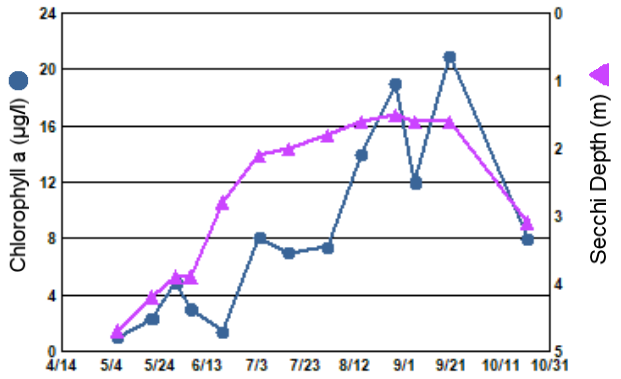
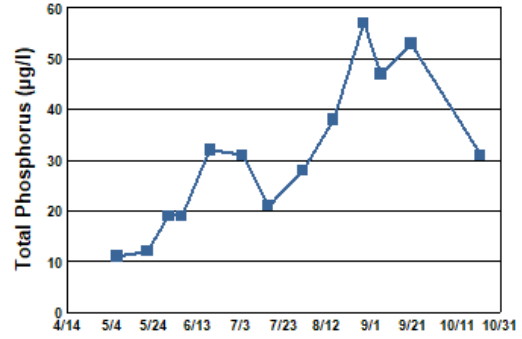
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

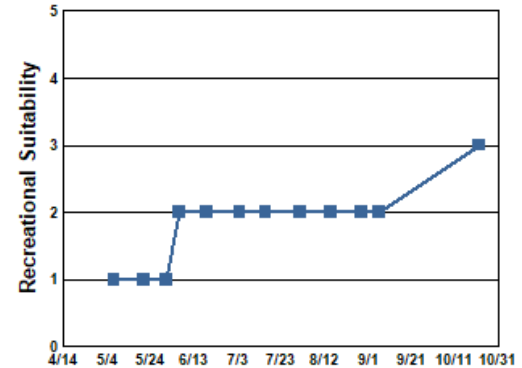


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/07/21	13.2		1.0	11	4.7	1	1
05/21/21	20.3		2.3	12	4.2	1	1
05/31/21	19.0		4.9	19	3.9	2	1
06/06/21	28.3		3.0	19	3.9	2	2
06/19/21	27.3		1.4	32	2.8	3	2
07/04/21	27.9		8.1	31	2.1	2	2
07/16/21	27.5		7.0	21	2.0	3	2
08/01/21	27.3		7.4	28	1.8	3	2
08/15/21	26.0		14	38	1.6	2	2
08/29/21	24.4		19	57	1.5	3	2
09/06/21	22.2		12	47	1.6	3	2
09/20/21	21.1		21	53	1.6	2	2
10/22/21	13.0		8.0	31	3.1	3	3



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C		C	C	C	B		C
CLA					C		C		C	B	B	B
Secchi					C		C	C	C	C	C	C
Lake Grade					C		C		C	B		C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C		B							A	
CLA		B		B							B	
Secchi		C		C							C	
Lake Grade		C		B							B	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C					C	C	B	B	B
CLA		C	B					B	B	B	B	B
Secchi		C	C			B		C	C	C	C	C
Lake Grade		C	C					C	C	B	B	B

Year	2016	2017	2018	2019	2020	2021
TP	C	C	B	C	C	B
CLA	B	B	B	B	C	A
Secchi	C	B	B	B	C	B
Lake Grade	C	B	B	B	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Forest Lake [East Basin, Site 3] (82–0159) Comfort Lake — Forest Lake Watershed District

Volunteer: Justin Verke

Sponsor: Comfort Lake — Forest Lake Watershed District

Forest Lake is located in the City of Forest Lake (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake is divided into three distinct basins. The entire lake has a surface area of 2,249 acres. The mean and maximum depths are 3.4 m and 11.5 m, respectively. The east basin is the deepest of the three basins. The lake's watershed area is 4,285 acres, which gives a relatively low watershed-to-lake area ratio of 1.9. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (PCBs in fish tissue) in 2002. The lake was delisted in 2020 for aquatic consumption for mercury in fish tissue. The MN DNR designated the lake as being infested with flowering rush (*Butomus umbellatus*) in 2007, Eurasian water milfoil (*Myriophyllum spicatum*) in 2015, and zebra mussels (*Dreissena polymorpha*) in 2015.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

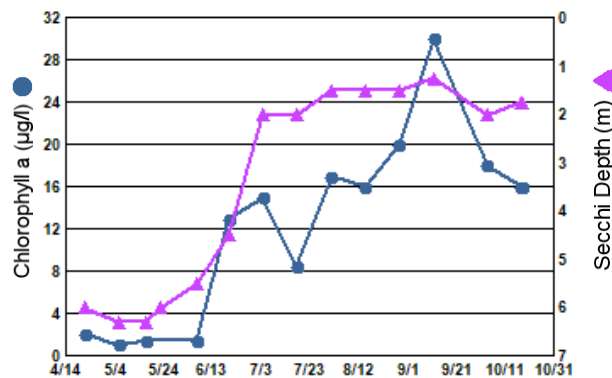
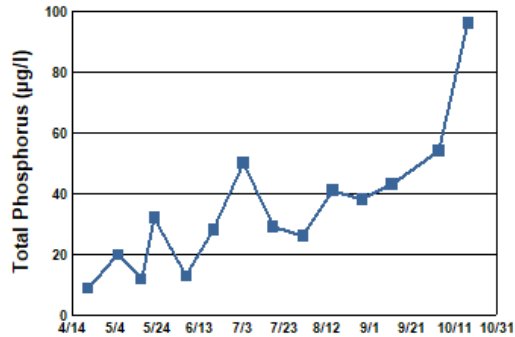
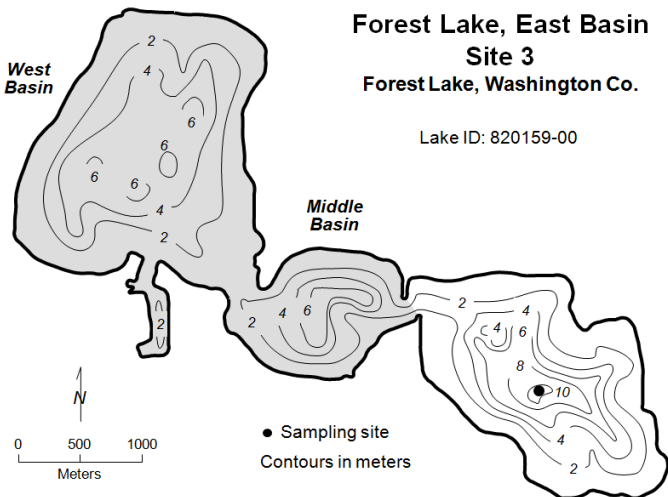
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	12	50	B
CLA (µg/l)	12	1.1	30	B
Secchi (m)	3.5	1.3	6.3	A
TKN (mg/l)	0.72	0.45	0.95	
			Lake Grade	B

The east basin received a lake grade of B this year. The east basin has typically received more B than C lake grades since 2012. Prior to 2012 the east basin received mainly C lake grades. The Secchi grade in 2021 improved to an A which is the best grade received for water clarity according to its water quality database going back to 1980. Water clarity was greatest during May and June with Secch depths ranging from 4.5 m to 6.3 m.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

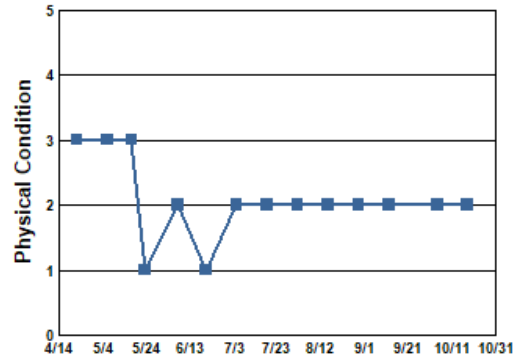
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

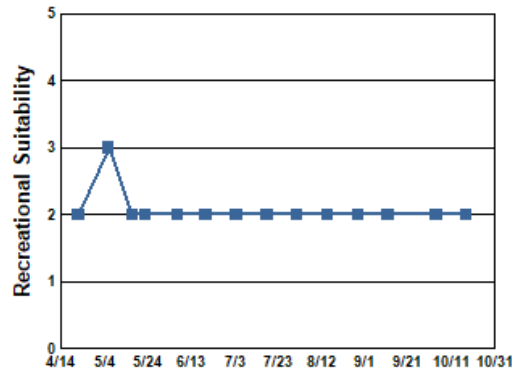


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	9.7		2.1	9	6.0	3	2
05/06/21	12.6		1.1	20	6.3	3	3
05/17/21	17.8		1.5	12	6.3	3	2
05/23/21	23.1			32	6.0	1	2
06/07/21	26.7		1.5	13	5.5	2	2
06/20/21	23.1		13	28	4.5	1	2
07/04/21	27.0		15	50	2.0	2	2
07/18/21	27.0		8.5	29	2.0	2	2
08/01/21	24.0		17	26	1.5	2	2
08/15/21	23.0		16	41	1.5	2	2
08/29/21	22.8		20	38	1.5	2	2
09/12/21	21.4		30	43	1.3	2	2
10/04/21	20.2		18	54	2.0	2	2
10/18/21	16.1		16	96	1.8	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C				C		D	C		B		B
CLA	D				C		C			B	B	C
Secchi	C				C		C	C	C	C	C	C
Lake Grade	C				C		C			B		C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C			C						B	
CLA		B			B						B	
Secchi		C			C						C	
Lake Grade		C			C						B	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C					C	C	B	B	B
CLA		C	B					C	B	B	A	B
Secchi		C	C			C	C	D	B	C	C	B
Lake Grade		C	C					C	B	B	B	B

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	B	B	B
CLA	C	B	B	B		B
Secchi	C	B	C	B	B	A
Lake Grade	C	B	C	B		B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Friedrich's Pond (82-0108) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Friedrich's Pond is located in the City of Lake Elmo (Washington County). There is little morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	69	40	102	D
CLA ($\mu\text{g/l}$)	5.4	3.0	8.4	A
Secchi (m)	+1.0	>0.5	>1.5	
TKN (mg/l)	0.90	0.78	1.10	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

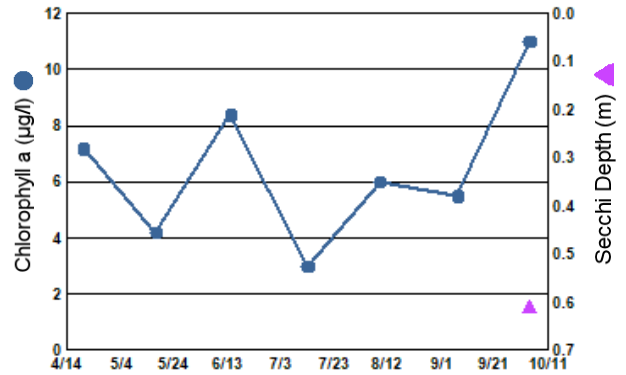
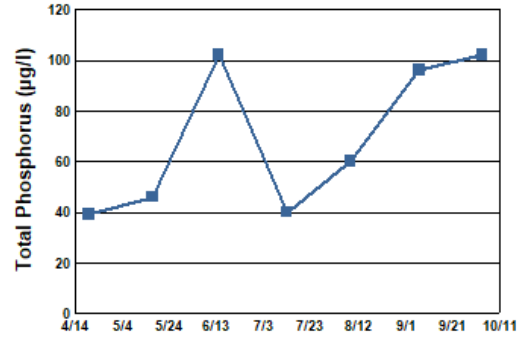
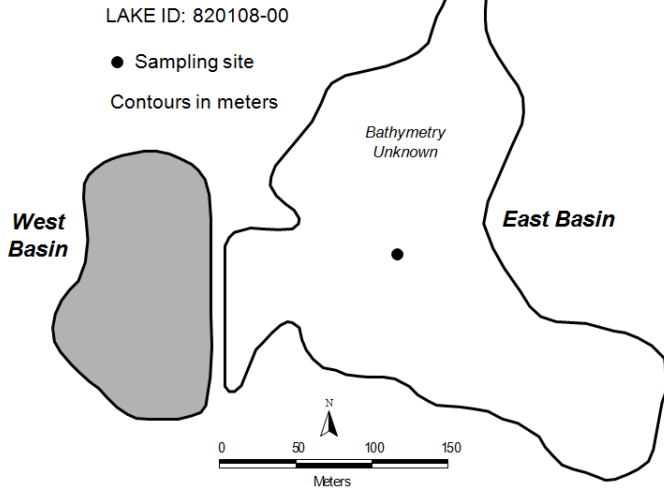
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

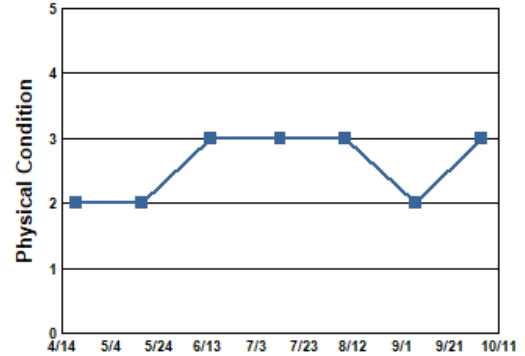
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Friedrich's Pond (East Basin)
Lake Elmo, Washington Co.



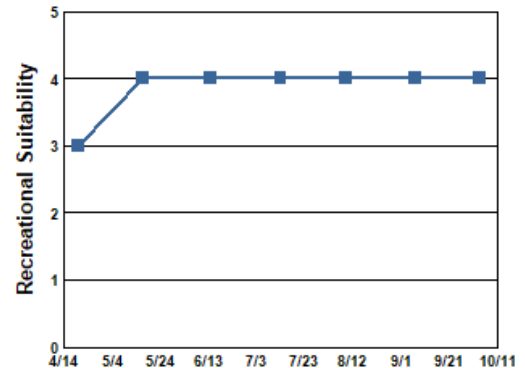
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	8.9	10.4	7.2	39	+1.2	2	3
05/17/21	21.7	9.1	4.2	46	>1.1	2	4
06/14/21	25.6	3.5	8.4	102	>0.8	3	4
07/13/21	23.0	8.5	3.0	40	>1.5	3	4
08/09/21	25.1	6.5	6.0	60	>0.5	3	4
09/07/21	22.1	6.4	5.5	96	+1.1	2	4
10/04/21	19.2	2.6	11	102	0.6	3	4



+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

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- 4 = High Algal Color
- 5 = Severe Algal Bloom



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- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			F	F	F							
CLA			F	F	C							
Secchi			F	F	F							
Lake Grade			F	F	D							

Year	2016	2017	2018	2019	2020	2021
TP			D			D
CLA			B			A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

George Watch Lake (02–0005) Rice Creek Watershed District

Volunteer: Wargo Nature Center

George Watch Lake is located in the city of Lino Lakes (Anoka County). The 528-acre lake has a mean and maximum depth of 1.5 m (5 feet) and 2.0 m (6.5 feet). The lake is considered a Priority Water by the Metropolitan Council. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The major land uses within the lake's immediate watershed are undeveloped and park land.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2016.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP		F	F	F		F		F	F	F	F	F
CLA		F	C	B		B		C	B	D	C	F
Secchi		F	D	F		F		F	F	F	D	F
Lake Grade		F	D	D		D		D	D	F	D	F

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					F	D	F	D	D	F	D	F
CLA					D	C	D	C	C	F	D	C
Secchi					F	F	F	D	F	D	F	D
Lake Grade					F	D	F	D	D	F	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	F	F	F	F	D	D	D	F	F	D	D
CLA	D	C	F	D	C	B	C	C	F	F	C	C
Secchi	F	F	F	F	F	F	F	D	F	F		F
Lake Grade	F	D	F	F	D	D	D	D	F	F		D

Year	2016	2017	2018	2019	2020	2021
TP	F	F	F			
CLA	D	C				
Secchi	F	F	F			
Lake Grade	F	D				

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Goetschel Pond (82–0313) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Goetschel Lake is located in Grant Township (Washington County). The lake has a surface area of 22-acres. The lake's mean and maximum depth of 1.2 m (4 feet) and 4.2 m (14 feet) translates to an approximate volume of 88 ac-ft. Because of the shallowness of the lake, its entire surface area is considered littoral zone, which is the 0-15 feet depth zone of the lake dominated by aquatic vegetation. The lake has a 2,812-acre watershed which yields a watershed-to-lake area ratio of 122:1. The larger the ratio the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	33	25	43	C
CLA ($\mu\text{g/l}$)	3.9	3.3	5.1	A
Secchi (m)	2.9	2.3	3.7	B
TKN (mg/l)	0.68	0.60	0.73	
			Lake Grade	B

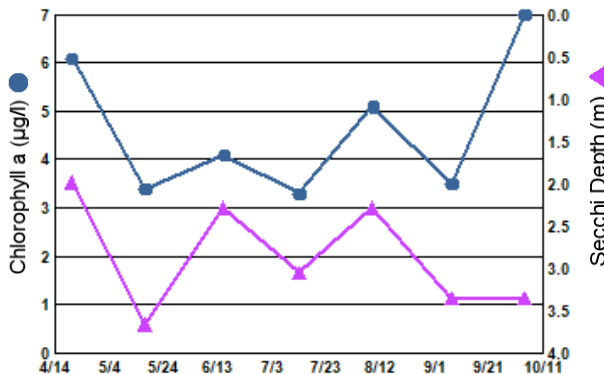
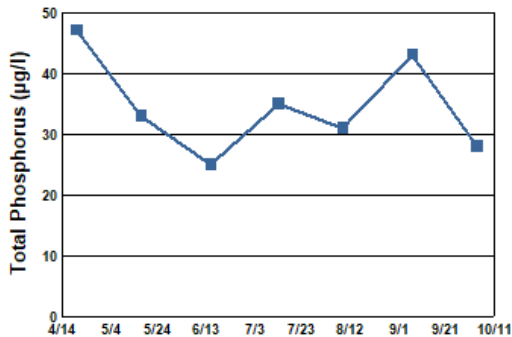
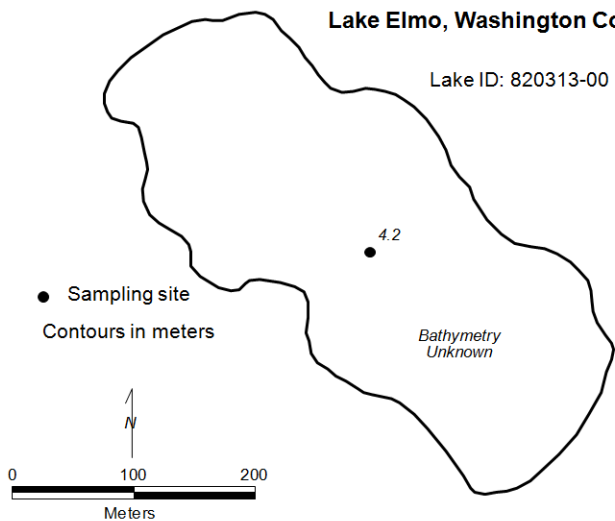
The lake received a lake grade of B this year which is consistent with its historical water quality database, and a return to the B grade range from the C grade received in 2019.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

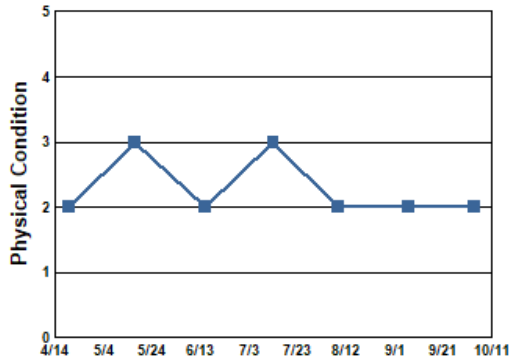
Goetschel Pond
Lake Elmo, Washington Co.

Lake ID: 820313-00

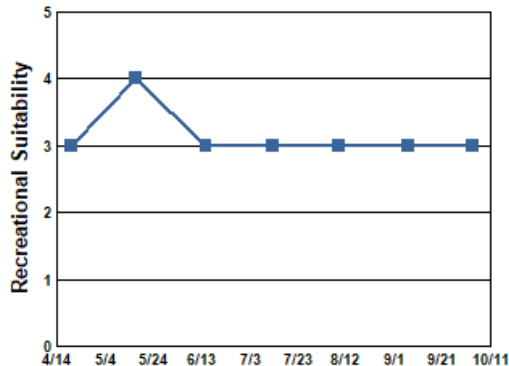


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.4	10.4	6.1	47	2.0	2	3
05/17/21	17.3	10.3	3.4	33	3.7	3	4
06/15/21	25.9	9.8	4.1	25	2.3	2	3
07/13/21	26.7	8.4	3.3	35	3.0	3	3
08/09/21	25.5	4.1	5.1	31	2.3	2	3
09/07/21	22.3	5.8	3.5	43	3.4	2	3
10/04/21	19.7	8.1	7.0	28	3.4	2	3



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											C	C
CLA											A	A
Secchi											C	B
Lake Grade											B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	B	B	C	C					
CLA	B	A	A	A	A	A	A					
Secchi	C	C	B	C	C	D	C					
Lake Grade	B	B	B	B	B	C	B					

Year	2016	2017	2018	2019	2020	2021
TP				C		C
CLA				B		A
Secchi				C		B
Lake Grade				C		B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Goggins Lake (82–0077) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Goggins Lake is located within May Township (Washington County). It has a surface area of a 11 acres. Little bathymetric information is available for the lake. The maximum depth is approximately 4.0 m (13 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	41	19	72	C
CLA (µg/l)	18	1.5	37	B
Secchi (m)	1.9	0.8	3.8	C
TKN (mg/l)	1.10	0.77	1.60	
			Lake Grade	C

The lake received a lake grade of C for this year which is consistent with those received in some previous years. The lake's water quality seems to be represented by a lake grade of C or D, depending on the year.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								D	D	D	D	C
CLA								C	C	C	C	C
Secchi								C	D	D	D	C
Lake Grade								C	D	D	D	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	D	D	D	D	D	D	C	D	C
CLA	C	C	C	D	C	C	D	C	C	C	C	C
Secchi	D	C	D	D	D	D	D	C	C	D	D	D
Lake Grade	C	C	D	D	D	D	D	C	C	C	D	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	C	B	C	B	B
Secchi	D	D	C	C	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Goose Lake [Scandia] (82–0059) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Goose Lake is located in the City of Scandia (Washington County). The lake has a surface area of 83 acres. The lake has a maximum and mean depth of 7.6 m (25 feet) and 2.4 m (8 feet), respectively.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2012 and aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	15	42	B
CLA (µg/l)	12	3.4	37	B
Secchi (m)	2.9	0.9	5.2	B
TKN (mg/l)	0.93	0.72	1.40	
			Lake Grade	B

The lake received a lake grade of B this year, which is similar to water quality received in 2014. The lake typically receives C lake grades.

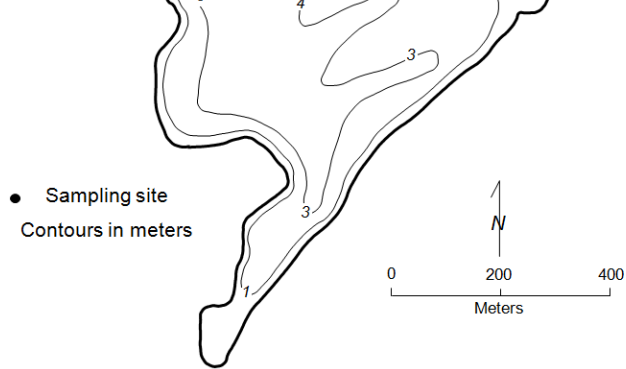
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

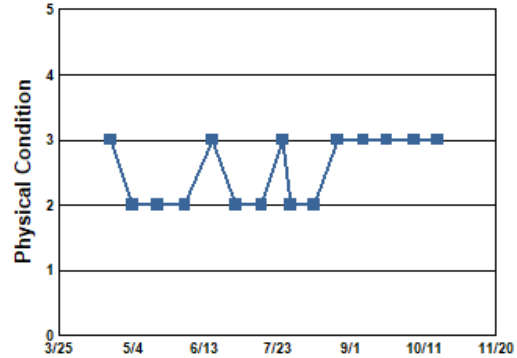
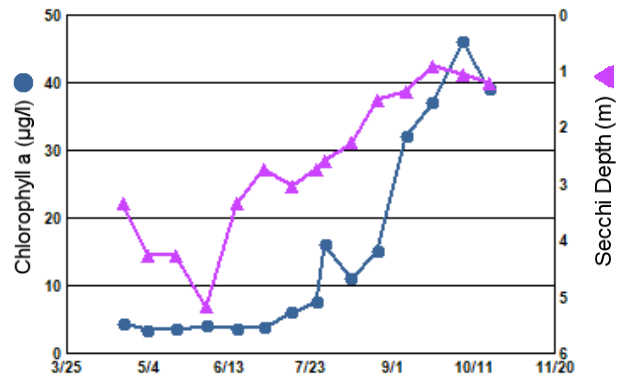
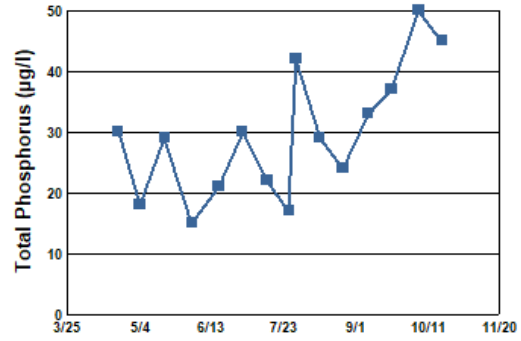
**Goose Lake,
Scandia, Washington Co.**

Lake ID: 820059-00

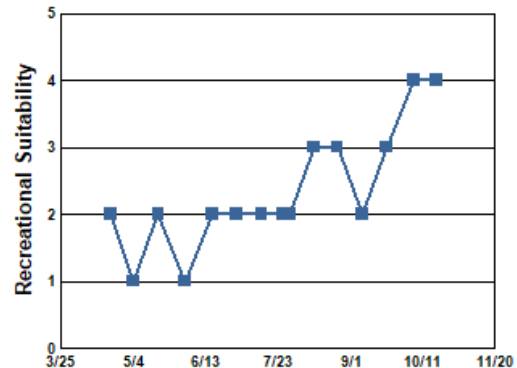


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	9.7	11.1	4.4	30	3.4	3	2
05/04/21	13.3		3.4	18	4.3	2	1
05/18/21	19.0	9.8	3.5	29	4.3	2	2
06/02/21	20.1	10.7	4.0	15	5.2	2	1
06/17/21	26.3	8.0	3.7	21	3.4	3	2
06/30/21	26.1	8.5	3.8	30	2.7	2	2
07/14/21	25.3		6.0	22	3.0	2	2
07/26/21	27.1	8.8	7.5	17	2.7	3	2
07/30/21	26.4		16	42	2.6	2	2
08/12/21	25.1	8.3	11	29	2.3	2	3
08/25/21	25.0	8.7	15	24	1.5	3	3
09/08/21	21.8	7.1	32	33	1.4	3	2
09/21/21	20.4	6.1	37	37	0.9	3	3
10/06/21	19.5	10.9	46	50	1.1	3	4
10/19/21	14.7	8.7	39	45	1.2	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	D	C	C	C					
CLA			C	B	C	C	C					
Secchi			D	C	C	C	C					
Lake Grade			C	C	C	C	C					

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	C	C	C	C	C	C	C	B	C
CLA	C	C	C	C	C	C	B	C	C	C	B	C
Secchi	B	C	C	C	C	C	C	C	C	C	B	C
Lake Grade	C	C	C	C	C	C	C	C	C	C	B	C

Year	2016	2017	2018	2019	2020	2021
TP	B	B	C	C	C	B
CLA	C	C	C	C	C	B
Secchi	C	C	C	C	B	B
Lake Grade	C	C	C	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Goose Lake [North Basin] (82–0113–01) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Goose Lake is located in the City of Lake Elmo (Washington County). The lake is split into two basins by county highway 10. Site #1 is located in the north basin. The depth of the north basin at the sampling location is 1.8 m (6 ft). There is no other bathymetric information available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

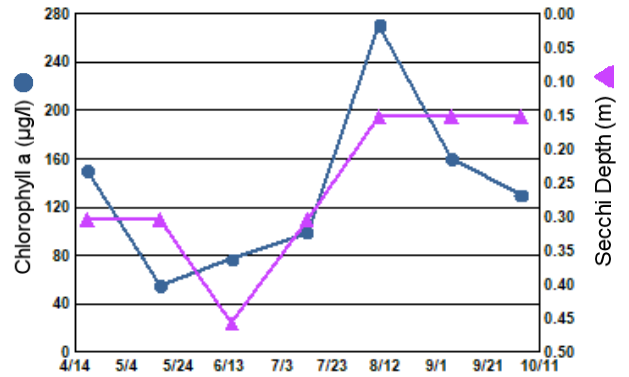
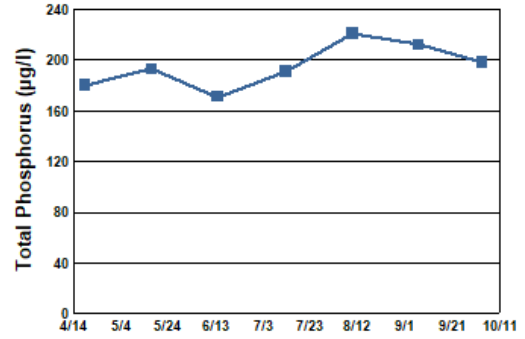
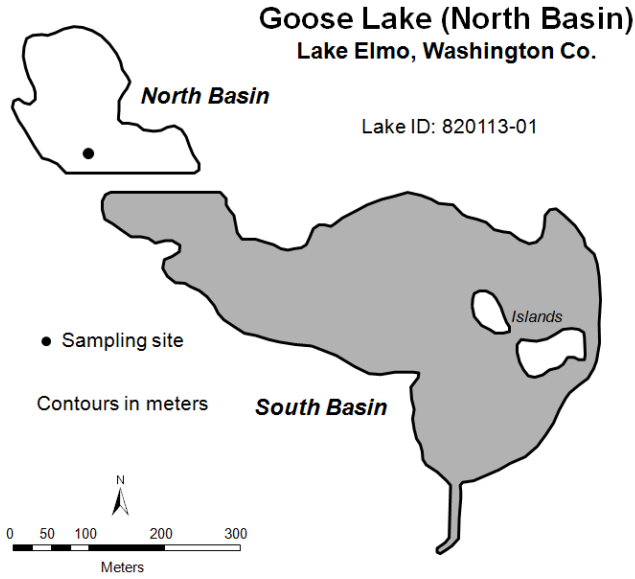
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	198	171	221	F
CLA (µg/l))	132	55	270	F
Secchi (m)	0.3	0.2	0.5	F
TKN (mg/l)	2.64	2.30	3.30	
			Lake Grade	F

The north basin received a lake grade of F this year which is consistent with its historical water quality database.

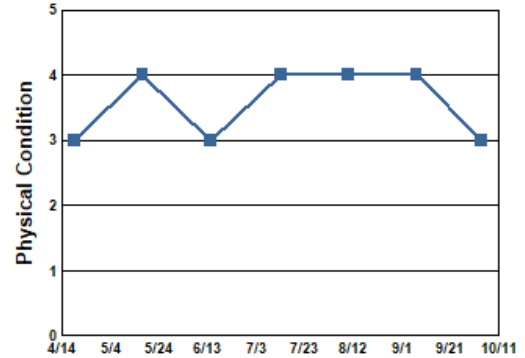
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

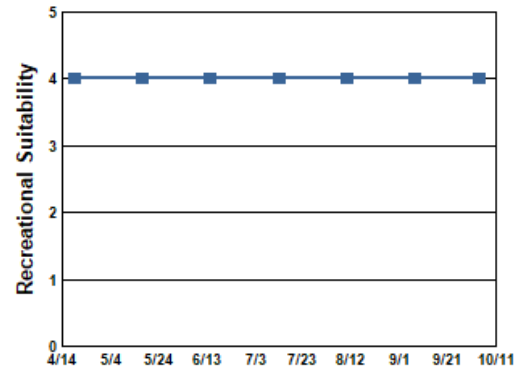


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.5	13.4	150	180	0.3	3	4
05/17/21	17.1	11.2	55	193	0.3	4	4
06/14/21	26.3	7.4	77	171	0.5	3	4
07/13/21	24.6	9.3	99	191	0.3	4	4
08/10/21	25.0	11.7	270	221	0.2	4	4
09/07/21	21.4	10.7	160	212	0.2	4	4
10/04/21	22.0	14.5	130	198	0.2	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					F	F	F		F	F	F	F
CLA					F	F	F		F	D	F	F
Secchi					F	F	F		F	F	D	F
Lake Grade					F	F	F		F	F	F	F

Year	2016	2017	2018	2019	2020	2021
TP	F	D	D	F	F	F
CLA	D	D	F	F	F	F
Secchi	F	F	F	F	F	F
Lake Grade	F	D	F	F	F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Goose Lake [South Basin] (82–0113–02) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

Goose Lake is located in the City of Lake Elmo (Washington County). The lake is split into two basins by county highway 10. Site #2 is located in the south basin. The depth of the south basin at the sampling location is 2.1 m (7 ft). There is no other bathymetric information available for the lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

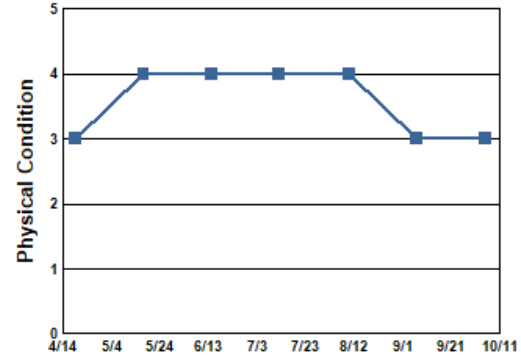
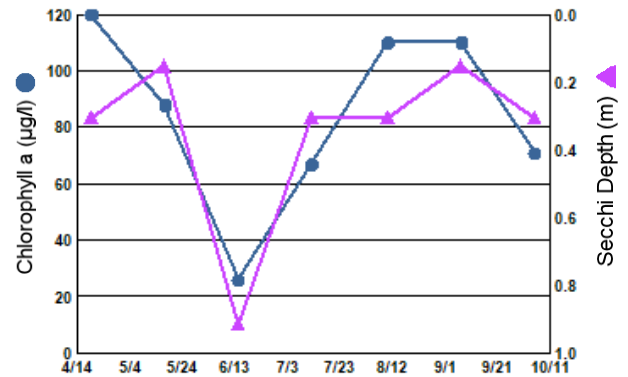
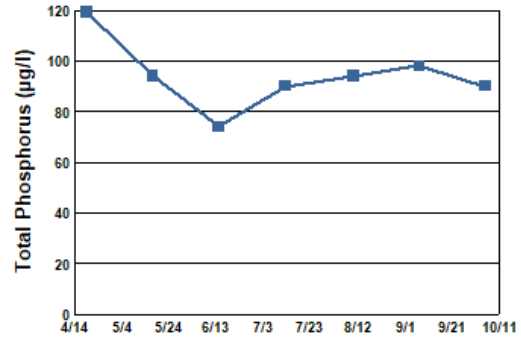
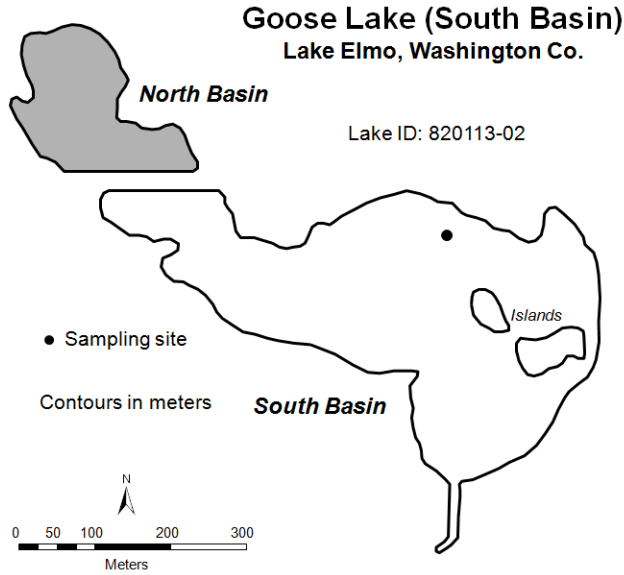
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	90	74	98	D
CLA (µg/l)	80	26	110	F
Secchi (m)	0.4	0.2	0.9	F
TKN (mg/l)	2.30	2.10	2.70	
			Lake Grade	F

The south basin received a lake grade of F this year which is consistent with its historical water quality database. The water quality has varied in the D to F range since 2008.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

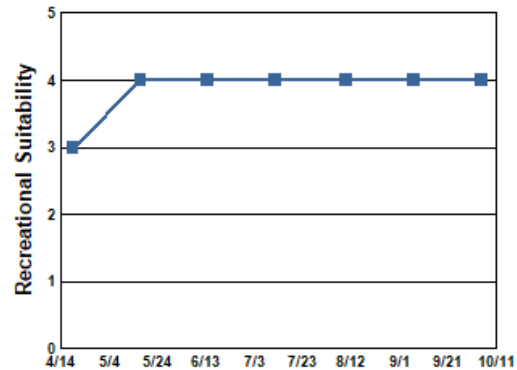
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.8	13.3	120	119	0.3	3	3
05/17/21	17.2	10.0	88	94	0.2	4	4
06/14/21	25.9	6.3	26	74	0.9	4	4
07/12/21	24.6	12.4	67	90	0.3	4	4
08/10/21	25.5	10.8	110	94	0.3	4	4
09/07/21	21.9	10.6	110	98	0.2	3	4
10/05/21	20.9	10.5	71	90	0.3	3	4

- 1 = Crystal Clear
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- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					F	F	F		F	D	C	D
CLA					F	F	F		F	D	C	D
Secchi					F	F	F		F	F	D	F
Lake Grade					F	F	F		F	D	C	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D		D
CLA	F	D	D	D	D	F
Secchi	F	F	D	F	F	F
Lake Grade	F	D	D	D		F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Haas Lake (70–0078) Prior Lake — Spring Lake Watershed District

Volunteer: Thomas Chaklos

Haas Lake is located in the city of Prior Lake (Scott County). It has a surface area of 32 acres. No other morphological data are available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	33	24	44	
CLA (µg/l)	6.0	3.7	7.7	A
Secchi (m)	>0.5	>0.2	>1.5	
TKN (mg/l)	0.72	0.63	0.83	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of TP results to calculate a TP grade. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	D	
CLA	D	A	B	A		A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Hay Lake (82–0065) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Hay lake is located in the City of Scandia (Washington County). The lake has a surface area of 33 acres. It has a maximum depth of 6.1 m (20 feet).

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	13	31	A
CLA (µg/l)	5.8	2.9	11	
Secchi (m)	+1.5	>0.9	+2.0	
TKN (mg/l)	0.61	0.45	0.68	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. There was an insufficient quantity of valid chlorophyll-a results to determine a CLA grade. A lake grade was not given because all three parameter grades are required to issue a lake grade. Summer time mean concentrations for TP and CLA have decreased in recent years in comparison to those in the late 1990s and 2000s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

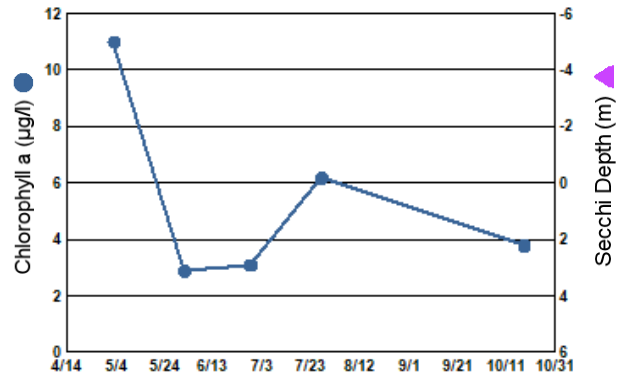
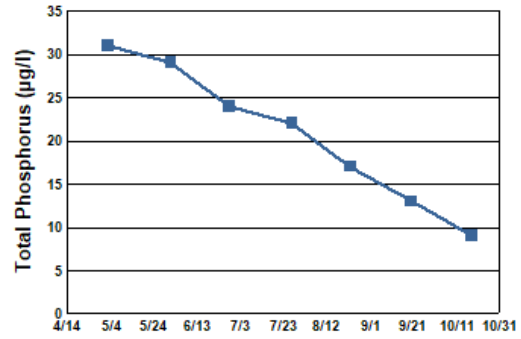
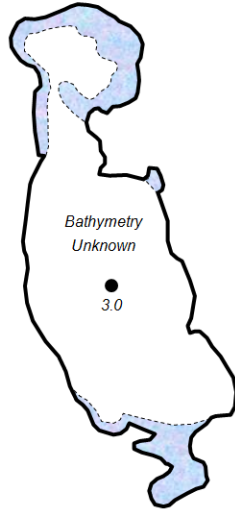
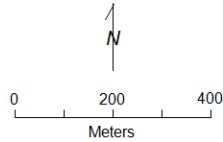
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Hay Lake
Scandia, Washington Co.

LAKE ID: 820065-00
WMO: Marine-on-St. Croix

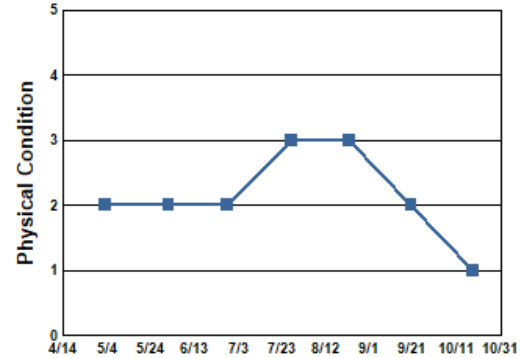
● Sampling site
Contours in meters



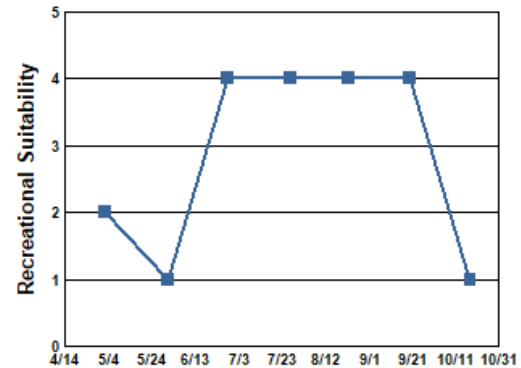
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	14.9	10.4	11	31	>1.8	2	2
06/01/21	21.4	8.4	2.9	29	+2.0	2	1
06/28/21	25.6	6.8	3.1	24	>1.5	2	4
07/27/21	26.6	6.6	6.2	22	>0.9	3	4
08/23/21	24.8	6.6		17	>1.4	3	4
09/20/21	20.6	7.4		13	+1.7	2	4
10/18/21	13.1	7.2	3.8	9	>1.2	1	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							D	D	D	D		D
CLA							F	F	F	F		C
Secchi							D	D	D	D		C
Lake Grade							D	D	D	D		C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	D	C	C	C	C		C	C	C
CLA	D	F	B	C	C	C	B	C		A	B	B
Secchi	D	D	C	C	C	C	C	C				
Lake Grade	D	D	C	C	C	C	C	C				

Year	2016	2017	2018	2019	2020	2021
TP	C	B	B	B	C	A
CLA	A	B	A	A	A	
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Heifort's Pond (82-0485) *Brown's Creek Watershed District*

Volunteer: Steve Seeman

Heifort's Pond is small pond located in Stillwater Township (Washington County). Few morphological data are available for the pond.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	83	56	99	D
CLA ($\mu\text{g/l}$)	91	25	160	F
Secchi (m)	0.6	0.3	0.8	F
TKN (mg/l)	2.68	2.00	3.30	
			Lake Grade	F

Note that the lake grades shown in the data summary table above were calculated from monitoring data sets from both the volunteer and Washington Conservation District staff. The mean, minimum, and maximum values shown in the above data summary table and the results in the data table on the following page are specific to the volunteer's monitoring data. The pond received a lake grade of F this year which is consistent with its historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

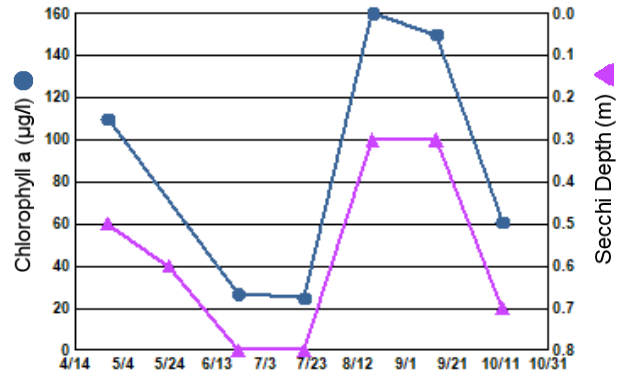
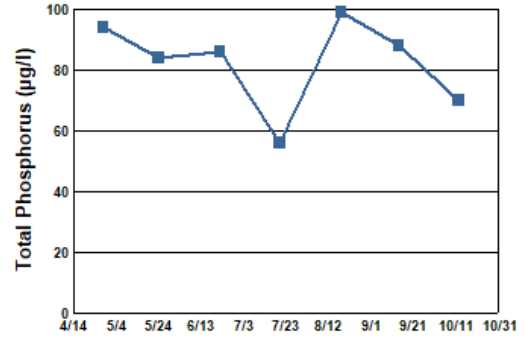
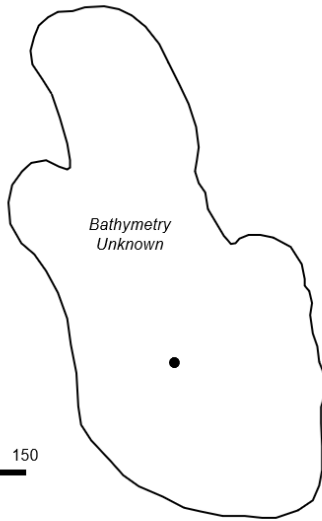
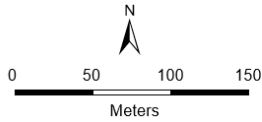
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Heifort's Pond
Stillwater, Washington Co.

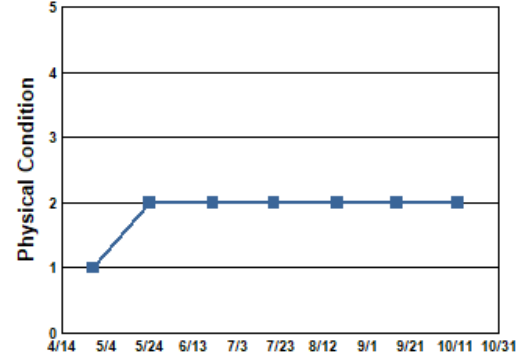
Lake ID: 82048500

- Sampling site
- Contours in meters

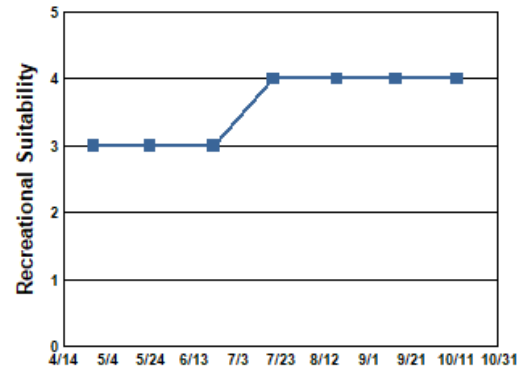


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/28/21	12.4		110	94	0.5	1	3
05/24/21	23.3			84	0.6	2	3
06/22/21	23.3		27	86	0.8	2	3
07/20/21	29.1		25	56	0.8	2	4
08/18/21	25.6		160	99	0.3	2	4
09/14/21	20.6		150	88	0.3	2	4
10/12/21	18.5		61	70	0.7	2	4



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	D	D	D	D
CLA		F	F	D	D	F
Secchi		F	F	F	F	F
Lake Grade		F	F	D	D	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Heifort's Pond (82–0485) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Heifort's Pond is small pond located in Stillwater Township (Washington County). Few morphological data are available for the pond.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	81	53	97	D
CLA ($\mu\text{g/l}$)	85	10	160	F
Secchi (m)	0.3	0.1	0.6	F
TKN (mg/l)	2.52	2.00	3.00	
			Lake Grade	F

Note that the lake grades shown in the data summary table above were calculated from monitoring data sets from both the volunteer and Washington Conservation District (WCD) staff. The mean, minimum, and maximum values shown in the above data summary table and the results in the data table on the following page are specific to WCD staff monitoring data. The pond received a lake grade of F this year which is consistent with its historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

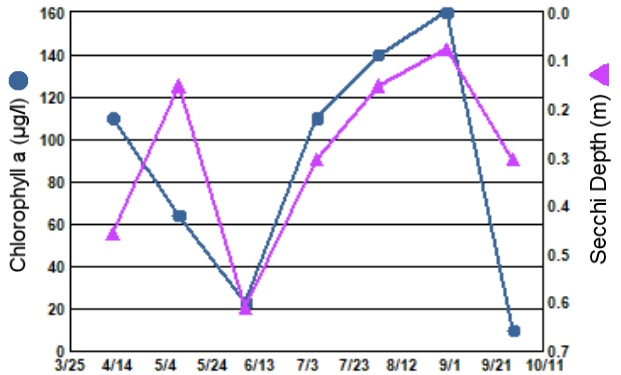
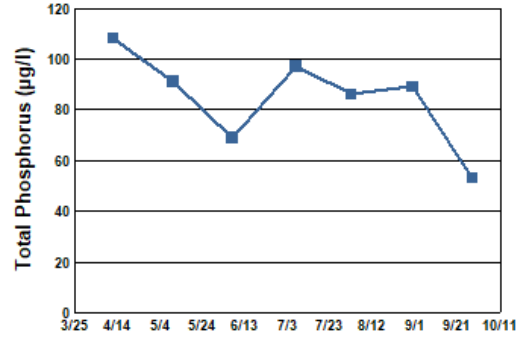
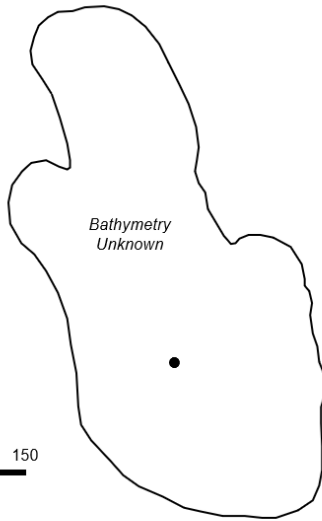
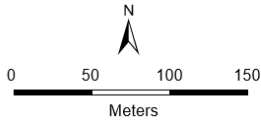
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Heifort's Pond
Stillwater, Washington Co.

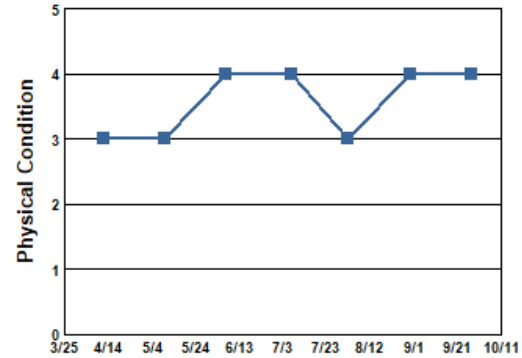
Lake ID: 82048500

- Sampling site
- Contours in meters

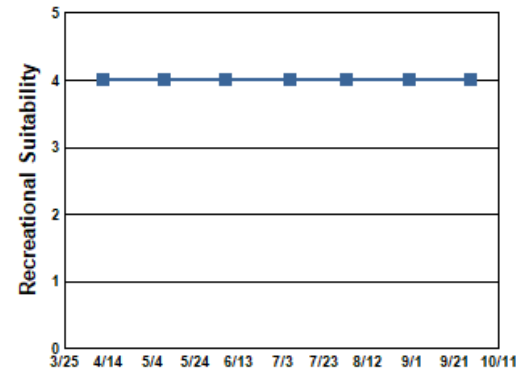


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.4	12.3	110	108	0.5	3	4
05/10/21	15.7	11.8	64	91	0.2	3	4
06/07/21	28.5	9.1	23	69	0.6	4	4
07/07/21	24.3	6.5	110	97	0.3	4	4
08/02/21	25.8	7.4	140	86	0.2	3	4
08/31/21	24.8	14.3	160	89	0.1	4	4
09/28/21	18.0	10.1	10	53	0.3	4	4



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	D	D	D	D
CLA		F	F	D	D	F
Secchi		F	F	F	F	F
Lake Grade		F	F	D	D	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Hornbeam Lake (19–0047) *City of Sunfish Lake*

Volunteer: Scott Spaeth

Hornbeam Lake is located within the City of Sunfish Lake (Dakota County). It has an area of approximately 22-acres. There are few morphological data available for the lake other than the depth at the sampling point is approximately 3.5 m. The lake is referred officially as Hornbeam Lake in the Minnesota Public Waters Inventory, which according to local residents and older reference documents is a typological error. The USGS performed a water quality study on the lake in 1975 and 1976.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

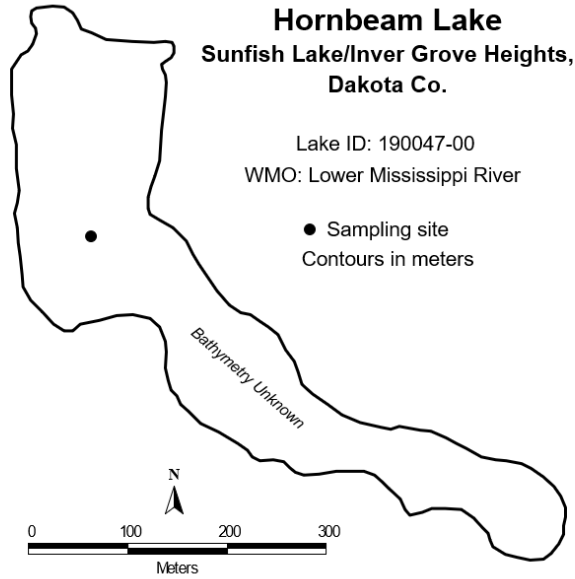
Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	49	32	81	C
CLA ($\mu\text{g/l}$)	7.2	4.6	8.8	
Secchi (m)	+2.3	1.8	+3.0	B
TKN (mg/l)	1.24	0.82	2.10	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The TP grade of C and Secchi grade of B are consistent with its historical water quality database. There was an insufficient quantity of valid chlorophyll-a results to determine a CLA grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

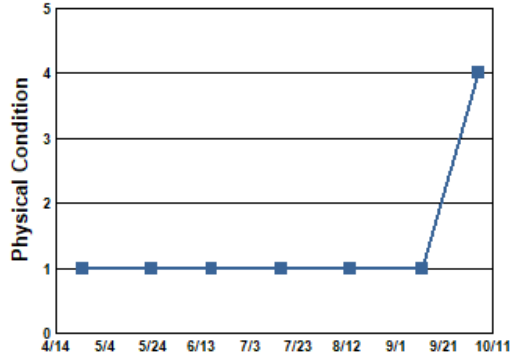
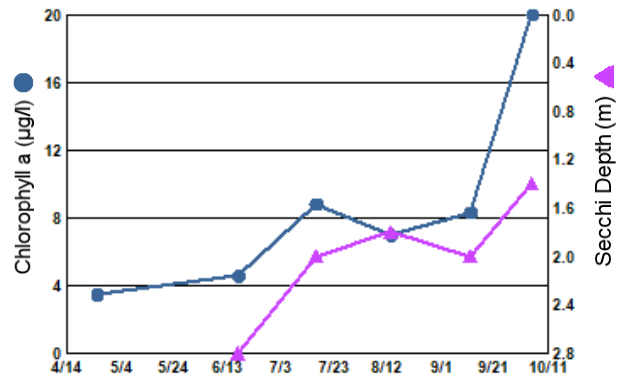
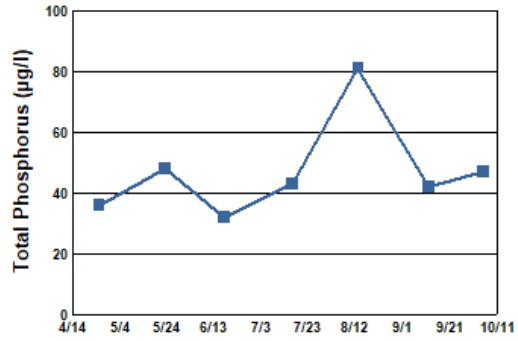
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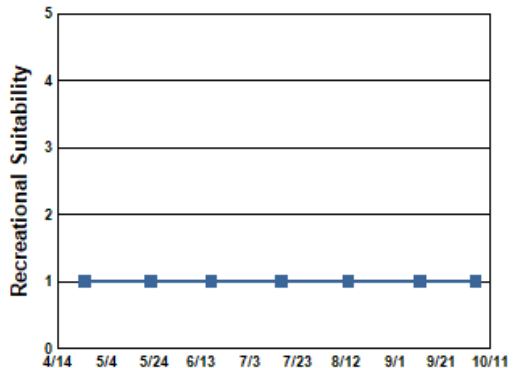
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	9.2		3.5	36	+3.2	1	1
05/23/21	24.5			48	+3.0	1	1
06/17/21	28.7		4.6	32	2.8	1	1
07/16/21	26.1		8.8	43	2.0	1	1
08/13/21	24.2		7.0	81	1.8	1	1
09/12/21	21.1		8.3	42	2.0	1	1
10/05/21	20.4		20	47	1.4	4	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C	C	C						C	C
CLA			B	C	A						C	C
Secchi			C	C	B							D
Lake Grade			C	C	B							C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	B	C	B	C
CLA	C	B	A	A	A	
Secchi	D	C	B	C	B	B
Lake Grade	C	C	B	B	B	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Horseshoe Lake [Sunfish Lake] (19–0051) *City of Sunfish Lake*

Volunteer: Jim Nayes

Horseshoe Lake is a 16-acre lake located within the City of Sunfish Lake (Dakota County). There is little morphological information available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	27	81	C
CLA (µg/l))	8.8	2.4	16	A
Secchi (m)	+3.0	+2.6	>3.1	A
TKN (mg/l)	0.60	0.49	0.85	
			Lake Grade	B

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of A this year, which is consistent with its historical water quality database. The lake typically varies in the A to B range.

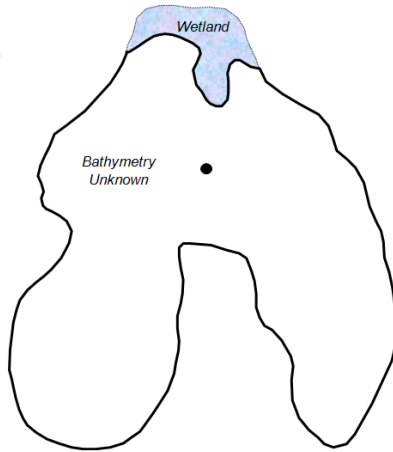
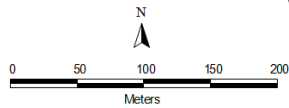
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Horseshoe Lake
Sunfish Lake, Dakota Co.

Lake ID: 190051-00

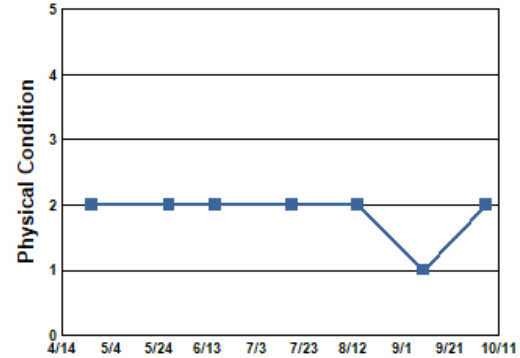
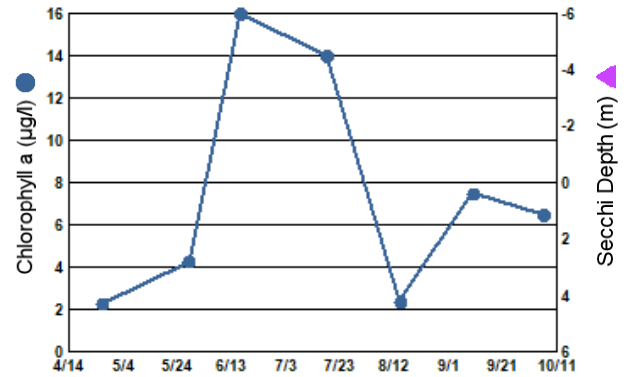
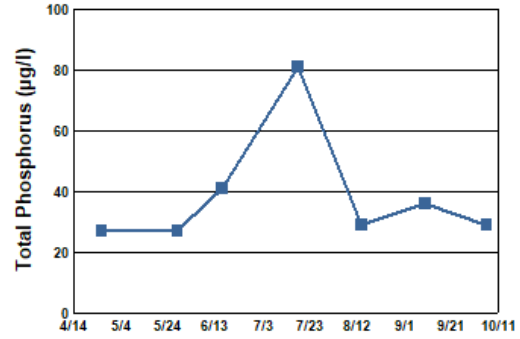
● Sampling site
Contours in meters



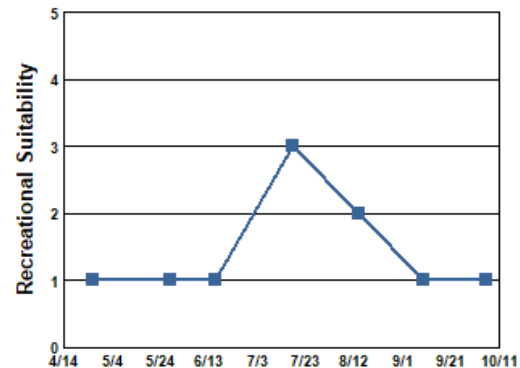
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/26/21	10.0		2.3	27	>3.1	2	1
05/28/21	20.8		4.3	27	>3.1	2	1
06/16/21	28.3		16	41	>3.1	2	1
07/18/21	27.4		14	81	>3.0	2	3
08/14/21	24.4		2.4	29	>3.1	2	2
09/10/21	21.6		7.5	36	+2.6	1	1
10/06/21	19.6		6.5	29	+2.6	2	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C	C	A	B	C	A	C	B	B	C
CLA			A	A	A	A	A	A	B	A	A	B
Secchi			C	C	C	B	B	A				
Lake Grade			B	B	B	B	B	A				

Year	2016	2017	2018	2019	2020	2021
TP	B	C	B		B	C
CLA	A	A	A		A	A
Secchi	A	A	A		A	A
Lake Grade	A	B	A		A	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Horseshoe Lake [Site 3] (82–0074) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Horseshoe Lake is located in the City of Lake Elmo and West Lakeland Township (Washington County). The lake has a surface area of 53 acres and a maximum depth 3.4m (11 ft).

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2013.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

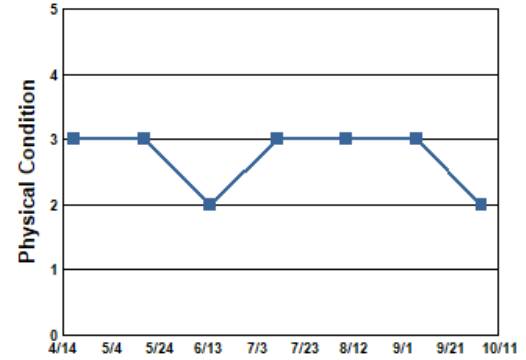
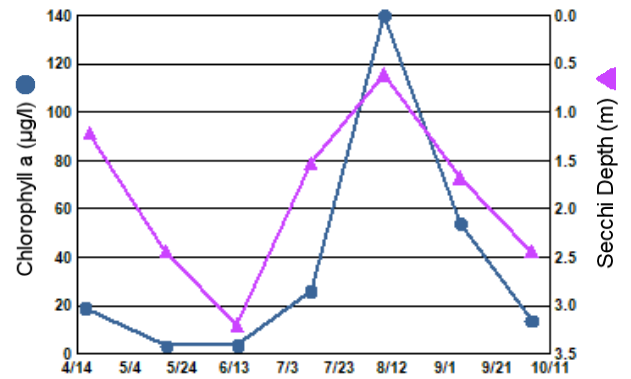
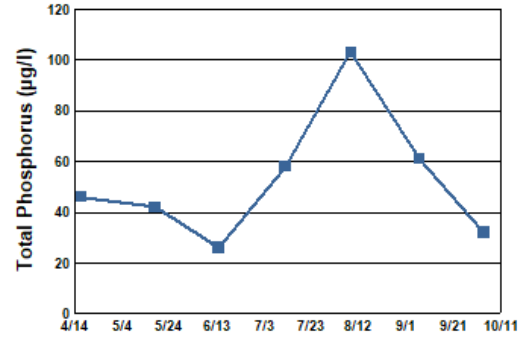
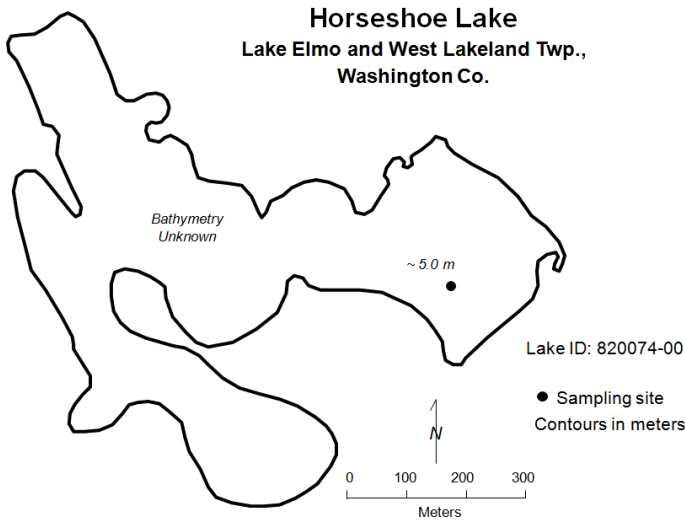
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	58	26	103	C
CLA (µg/l)	45	3.4	140	C
Secchi (m)	1.9	0.6	3.2	C
TKN (mg/l)	0.97	0.62	1.60	
			Lake Grade	C

The lake site received a lake grade of C this year which is consistent with its historical database. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

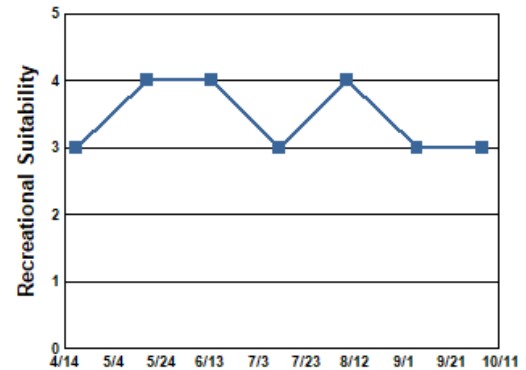
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/17/21			19	46			
04/19/21	10.4	12.0			1.2	3	3
05/18/21	18.5	9.2	3.4	42	2.4	3	4
06/14/21	27.3	8.4	3.7	26	3.2	2	4
07/12/21	26.3	11.0	26	58	1.5	3	3
08/09/21	26.3	10.4	140	103	0.6	3	4
09/07/21	22.7	7.7	54	61	1.7	3	3
10/04/21	20.6	10.7	14	32	2.4	2	3

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 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP						C	C	C	D	C	C	B
CLA						B	C	B	B	C	B	B
Secchi						C	D	C	C	D	C	D
Lake Grade						C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	C	B	C	B	C
Secchi	D	D	C	C	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Jackson Wildlife Management Area Wetland (82–0305) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

The Jackson Wildlife Management Area (WMA) wetland is located in the City of Stillwater (Washington County). The wetland has a surface area of 14.3 acres. There are no other available bathymetric data available for the lake. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	25	85	C
CLA (µg/l)	5.0	3.3	9.0	A
Secchi (m)	>1.6	>0.9	>2.3	
TKN (mg/l)	0.76	0.63	0.86	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The wetland received TP and CLA grades of C and A, respectively, which are consistent with its historical water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

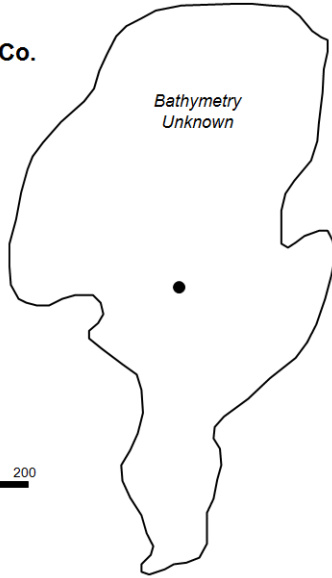
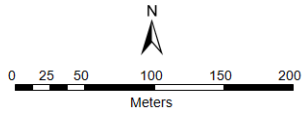
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Jackson WMA
Stillwater, Washington Co.

Lake ID: 820305-00

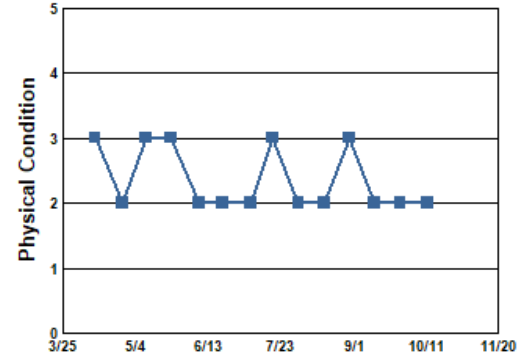
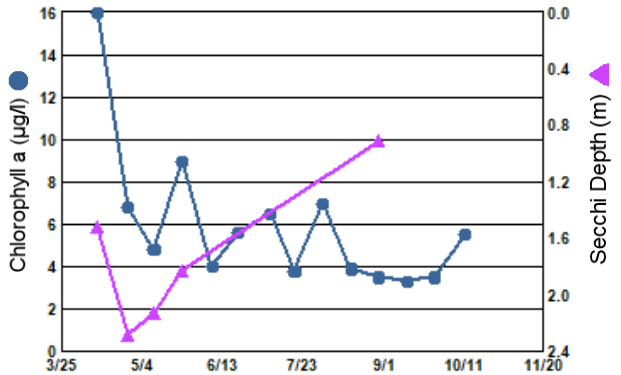
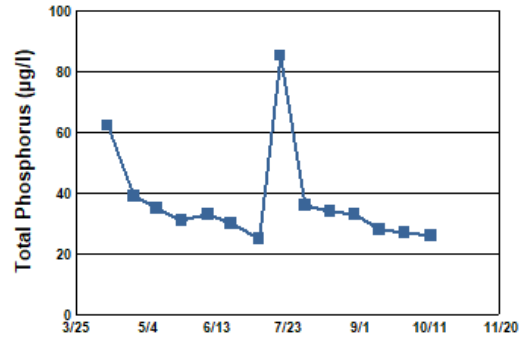
● Sampling site
Contours in meters



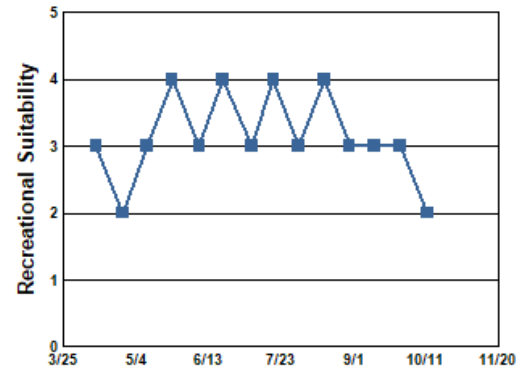
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	12.0	8.3	16	62	1.5	3	3
04/27/21	9.4	9.5	6.8	39	2.3	2	2
05/10/21	15.8	10.5	4.8	35	2.1	3	3
05/24/21	23.8	8.3	9.0	31	1.8	3	4
06/08/21	30.3	8.2	4.0	33	>1.8	2	3
06/21/21	24.1	7.7	5.6	30	>1.4	2	4
07/07/21	25.6	6.9	6.5	25	>1.5	2	3
07/19/21	28.2	10.8	3.8	85	>1.8	3	4
08/02/21	24.9	5.2	7.0	36	>0.9	2	3
08/16/21	25.7	9.2	3.9	34	>1.1	2	4
08/30/21	23.9	7.1	3.5	33	0.9	3	3
09/13/21	21.9	8.3	3.3	28	>1.8	2	3
09/27/21	17.8	9.7	3.5	27	>2.3	2	3
10/12/21	18.7	6.7	5.5	26	>2.0	2	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP							C	C	D	C	C	C
CLA							B	B	B	A	D	C
Secchi							C	C	C	C	C	D
Lake Grade							C	C	C	B	C	C

Year	2016	2017	2018	2019	2020	2021
TP	D	C	C	C	C	C
CLA	F	B	A	C	A	A
Secchi	F	D				
Lake Grade	F	C				

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Jane Lake (82–0104) Valley Branch Watershed District

Volunteer: Sophia Meisterling

Lake Jane is located in the northwest corner of the City of Lake Elmo (Washington County). It has a surface area of 155 acres. The mean and maximum depths are 3.7 m and 12.0 m, respectively. The lake is considered a Priority Water by the Metropolitan Council.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2006 and aquatic life (fish bioassessments) in 2022. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2012.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	20	9	31	A
CLA (µg/l)	2.3	1.2	3.7	A
Secchi (m)	4.8	3.6	5.5	A
TKN (mg/l)	0.54	0.44	0.71	
			Lake Grade	A

The lake received a lake grade of A this year, which consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

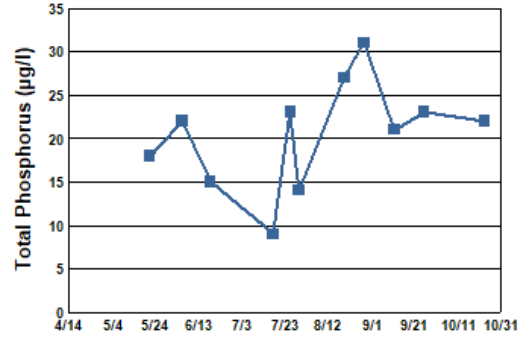
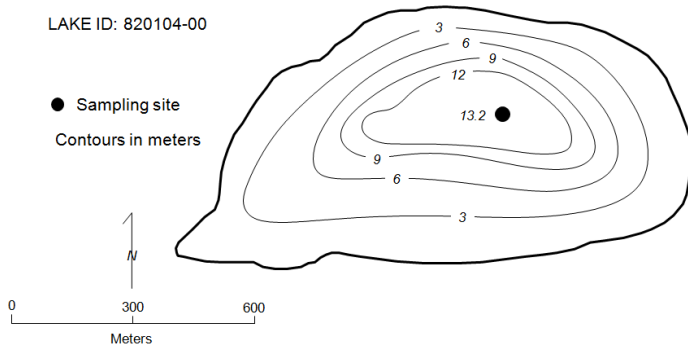
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Jane
Lake Elmo, Washington Co.

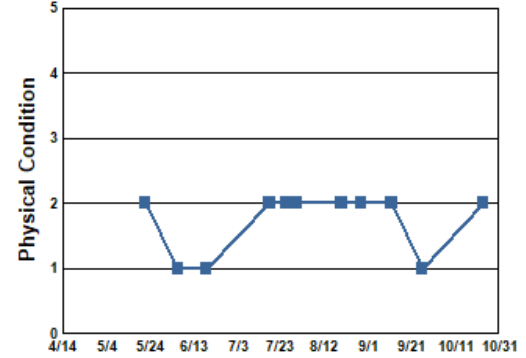
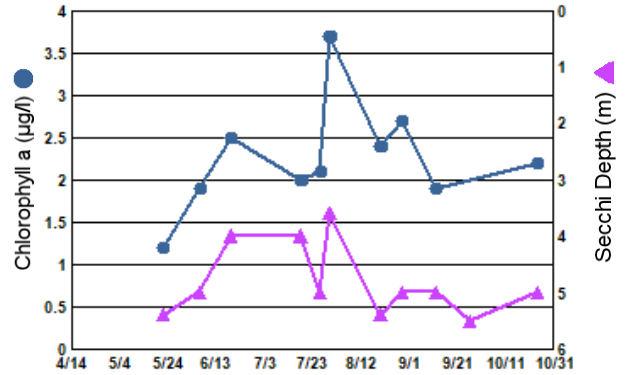
LAKE ID: 820104-00

● Sampling site
Contours in meters

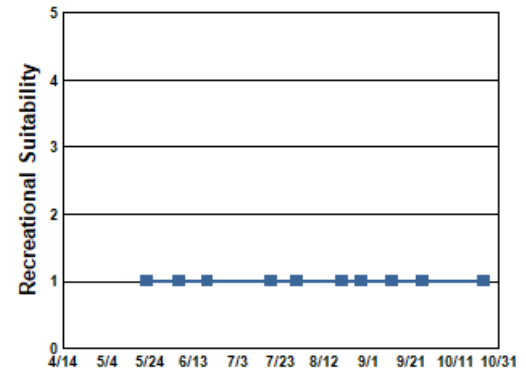


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/22/21	23.0		1.2	18	5.4	2	1
06/06/21	28.3		1.9	22	5.0	1	1
06/19/21	27.1		2.5	15	4.0	1	1
07/18/21	28.0		2.0	9	4.0	2	1
07/26/21	28.1		2.1	23	5.0	2	
07/30/21	27.5		3.7	14	3.6	2	1
08/20/21	27.1		2.4	27	5.4	2	1
08/29/21	24.8		2.7	31	5.0	2	1
09/12/21	22.5		1.9	21	5.0	2	1
09/26/21	20.3			23	5.5	1	1
10/24/21	12.7		2.2	22	5.0	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	B			C		B	B				B
CLA					C		B	B				B
Secchi	A	A	A	A	B	B	B	B	B	B	B	B
Lake Grade					C		B	B				B

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			A						A			
CLA			A						A			
Secchi	C	B	B						A			
Lake Grade			A						A			

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	A	A	A	A	A				A
CLA	A	A	A	A	A	A	A	A				A
Secchi	A	A	A	A	A	A	A	A				A
Lake Grade	A	A	A	A	A	A	A	A				A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Jellum's Bay [Site-1] (82-0052-02) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Jellum's Bay is located in the City of Scandia in Washington County. It has a surface area of 72 acres. The maximum depth of the lake is 4.9 m (16 feet). Therefore the majority of the surface area of the lake is considered littoral zone, which is the 0-15 feet depth zone that is dominated by aquatic vegetation. The lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column.

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	33	28	44	C
CLA ($\mu\text{g/l}$)	16	8.2	25	B
Secchi (m)	1.2	0.6	2.1	C
TKN (mg/l)	0.95	0.70	1.20	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its water quality database since 2015 and an improvement to water quality observed during the 1990s and 2000s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

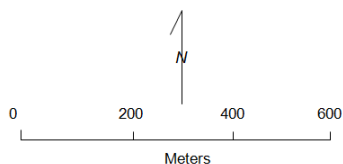
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Jellum's Lake, Site 1
Scandia, Washington Co.

LAKE ID: 820052-02

● Sampling site

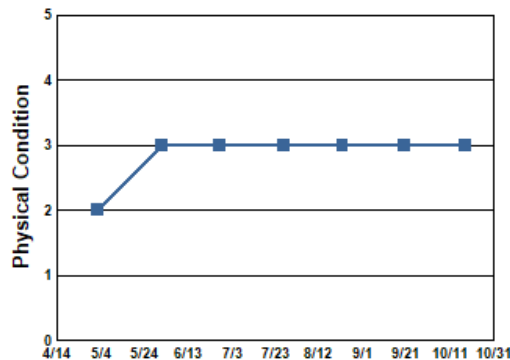
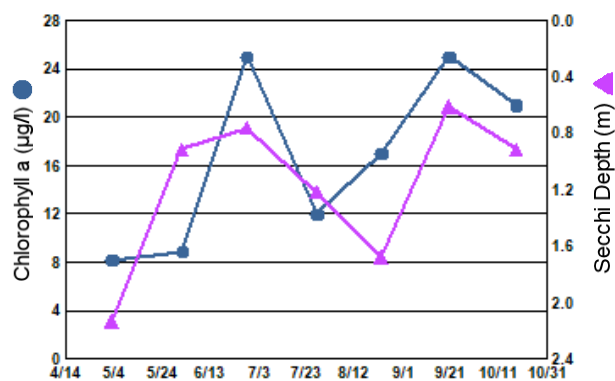
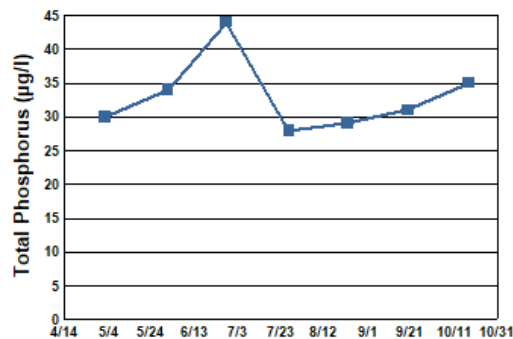
Contours in meters



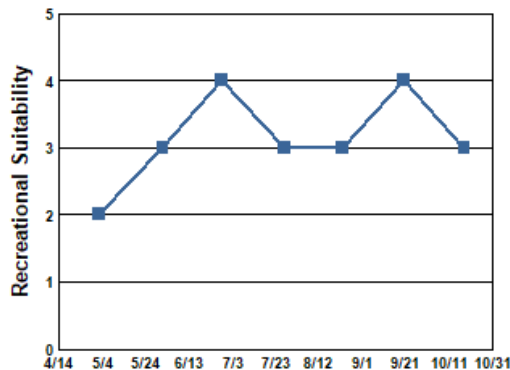
Bathymetry
Unknown

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	14.5	10.9	8.2	30	2.1	2	2
06/01/21	23.2	9.7	8.9	34	0.9	3	3
06/28/21	25.4	9.4	25	44	0.8	3	4
07/27/21	27.5	8.0	12	28	1.2	3	3
08/23/21	24.7	8.4	17	29	1.7	3	3
09/20/21	20.6	8.8	25	31	0.6	3	4
10/18/21	14.7	9.4	21	35	0.9	3	3



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
 2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
 3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					F	D	D	D	D	D	C	D
CLA					D	D	D	D	F	D	D	F
Secchi					D	D	F	F	F	D	D	D
Lake Grade					D	D	D	D	F	D	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	C	C	C	C	D				C
CLA	C	D	C	C	C	A	C	C				B
Secchi	D	D	D	C	C	B	C	C				C
Lake Grade	D	D	D	C	C	B	C	C				C

Year	2016	2017	2018	2019	2020	2021
TP	C	B		C	C	C
CLA	B	B		B	C	B
Secchi	C	C		C	D	C
Lake Grade	C	B		C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

July Lake (82–0318) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

July Lake is a small lake located in Washington County. There are few known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	117	78	152	D
CLA ($\mu\text{g/l}$)	107	9.0	220	F
Secchi (m)	0.3	0.1	0.9	F
TKN (mg/l)	3.28	1.60	4.70	
			Lake Grade	F

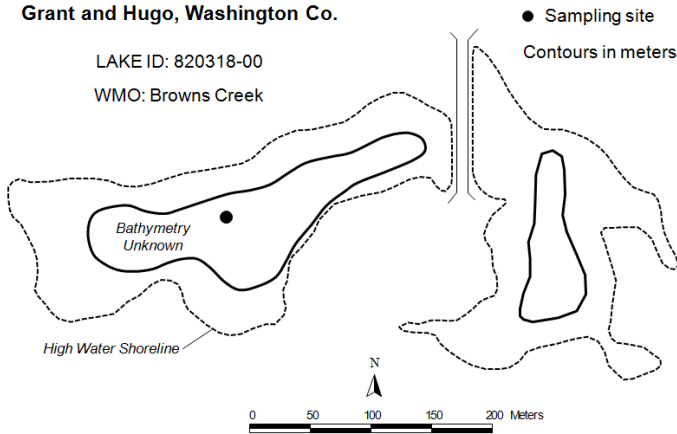
The lake received a lake grade of F this year, which is a return to similar water quality observed in the mid 2000s. The lake has received lake grades ranging from C to F since 2006 with Ds being more common recently.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

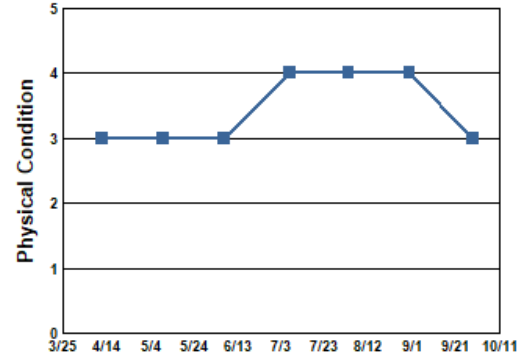
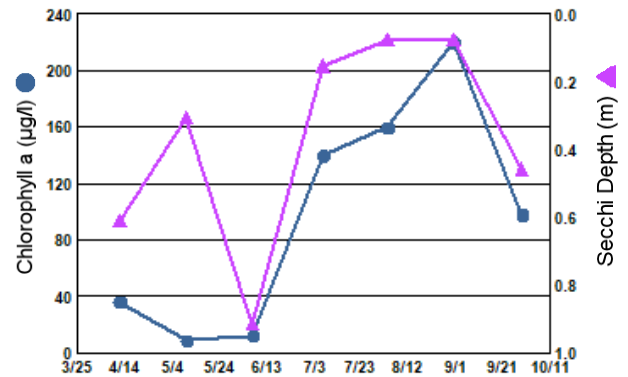
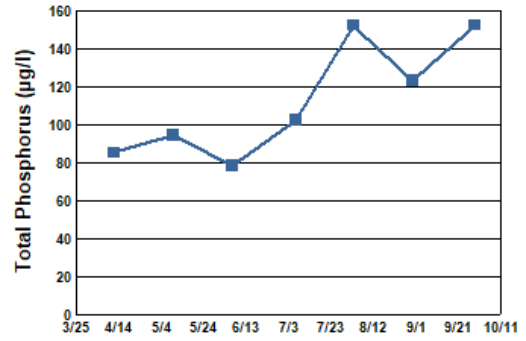
July Lake
Grant and Hugo, Washington Co.

LAKE ID: 820318-00
WMO: Browns Creek

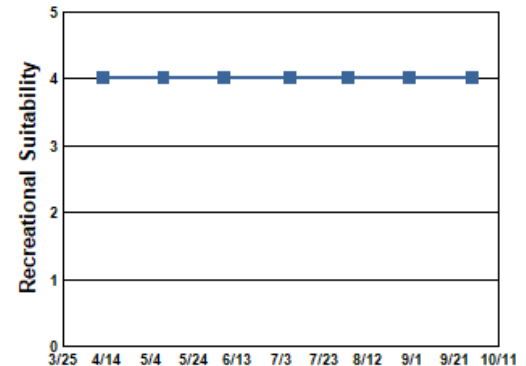


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.5	11.5	36	85	0.6	3	4
05/10/21	15.0	9.6	9.0	94	0.3	3	4
06/07/21	27.8	8.2	12	78	0.9	3	4
07/07/21	24.1	5.2	140	102	0.2	4	4
08/03/21	23.9	9.5	160	152	0.1	4	4
08/31/21	23.1	10.4	220	123	0.1	4	4
09/29/21	18.0	7.3	98	152	0.5	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			F	F	C			D	D	D	D	D
CLA			F	F	B			D	D	C	C	D
Secchi			F	F	C			C	D	D	D	F
Lake Grade			F	F	C			D	D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	C	D	D	D	D
CLA	D	D	D	D	D	F
Secchi	F	F	F	D	F	F
Lake Grade	D	D	D	D	D	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Karth Lake (62–0072) Rice Creek Watershed District

Volunteer: Andrew Elmquist, Renee Marino

Karth Lake is located in the city of Arden Hills. There is little bathymetric information available for this lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

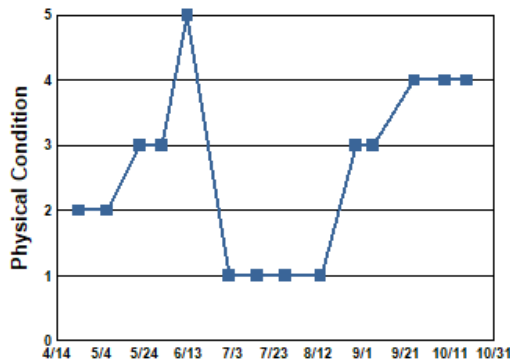
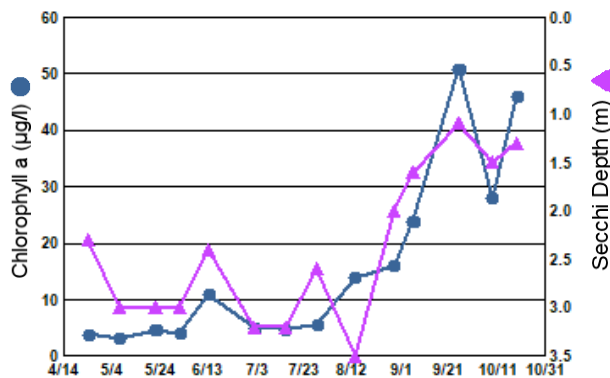
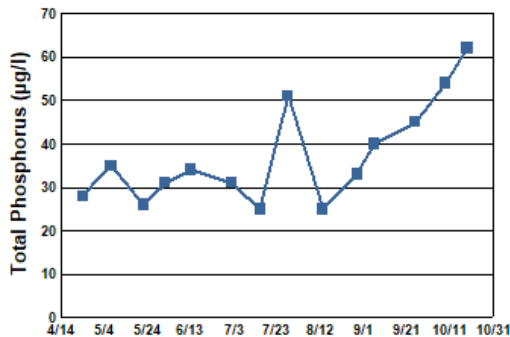
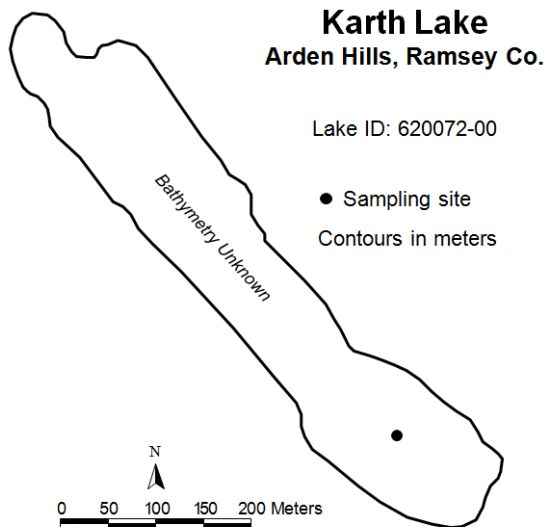
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	34	25	51	C
CLA (µg/l))	13	3.1	51	B
Secchi (m)	2.6	1.1	3.5	B
TKN (mg/l)	0.87	0.63	1.50	
			Lake Grade	B

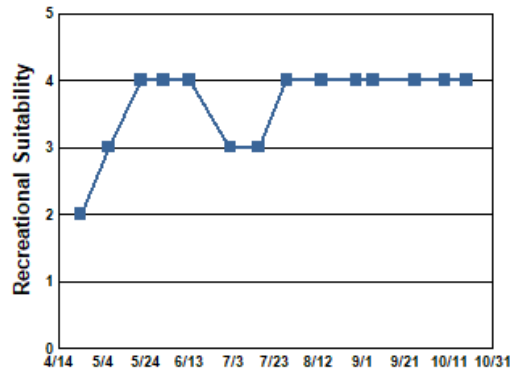
The lake received a lake grade of B this year which is consistent with its water quality database. Recent water quality trends shows the lake typically receiving B lake grades with the occasional C.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



1 = Crystal Clear 4 = High Algal Color
 2 = Some Algae Present 5 = Severe Algal Bloom
 3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
 2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
 3 = Swimming Impaired

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.5		3.9	28	2.3	2	2
05/07/21	14.7		3.1	35	3.0	2	3
05/22/21	22.5		4.7	26	3.0	3	4
06/01/21	23.0		4.1	31	3.0	3	4
06/13/21	27.0		11	34	2.4	5	4
07/02/21	28.3		5.1	31	3.2	1	3
07/15/21	27.3		4.8	25	3.2	1	3
07/28/21	28.8		5.6	51	2.6	1	4
08/13/21	25.8		14	25	3.5	1	4
08/29/21	24.2		16	33	2.0	3	4
09/06/21	23.5		24	40	1.6	3	4
09/25/21	19.2		51	45	1.1	4	4
10/09/21	20.5		28	54	1.5	4	4
10/19/21	16.4		46	62	1.3	4	4

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				C	C	C	C	C	C	B	B	B
CLA				C	C	C	C	B	A	A	B	B
Secchi				D	C	D	C	B	C	B	C	C
Lake Grade				C	C	C	C	B	B	B	B	B

Year	2016	2017	2018	2019	2020	2021
TP	C	B	B	C	C	C
CLA	B	B	A	B	B	B
Secchi	C	B	B	B	C	B
Lake Grade	C	B	B	B	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Keewahtin Lake (82—0080) Comfort Lake – Forest Lake Watershed District

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Keewahtin Lake (formerly Sylvan Lake) is a 75-acre lake located in the city of Forest Lake (Washington County).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	13	8	18	A
CLA (µg/l)	3.1	1.5	6.1	A
Secchi (m)	4.7	4.1	5.6	A
TKN (mg/l)	0.54	0.38	0.76	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its historical water quality database. The historic water quality database indicates that the lake has maintained its high quality over the past 20+ years.

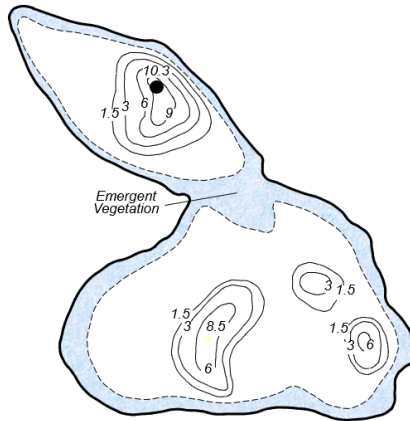
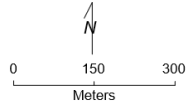
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Keewahtin Lake
Forest Lake/Scandia,
Washington Co.

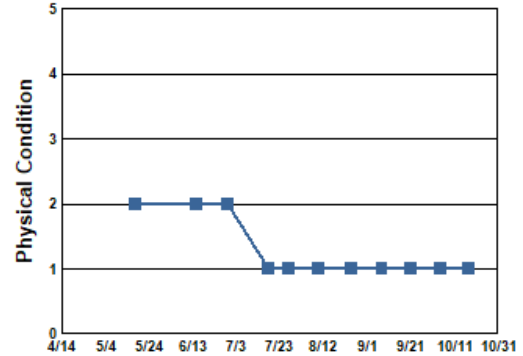
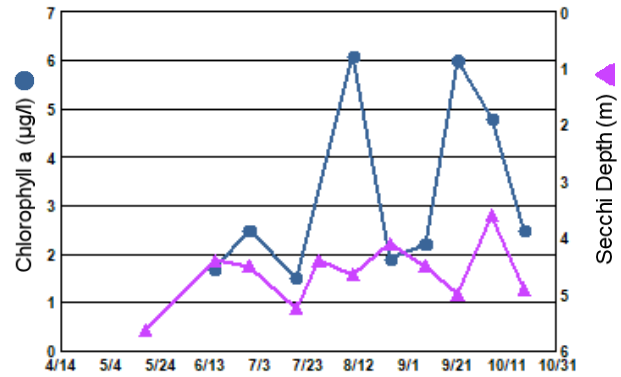
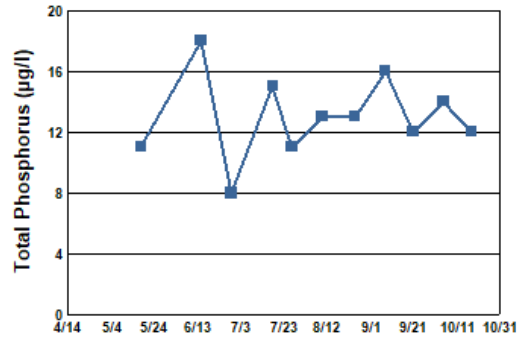
LAKE ID: 820080-00

● Sampling station
Contours in meters

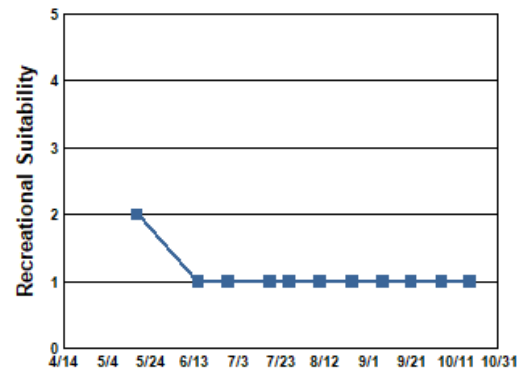


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/18/21	19.1			11	5.6	2	2
06/15/21	26.7		1.7	18	4.4	2	1
06/29/21	24.4		2.5	8	4.5	2	1
07/18/21	25.1		1.5	15	5.3	1	1
07/27/21	27.5			11	4.4	1	1
08/10/21	25.3		6.1	13	4.7	1	1
08/25/21	23.6		1.9	13	4.1	1	1
09/08/21	20.5		2.2	16	4.5	1	1
09/21/21	18.9		6.0	12	5.0	1	1
10/05/21	19.4		4.8	14	3.6	1	1
10/18/21	14.4		2.5	12	4.9	1	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	A					C	B	A	A		A
CLA							B	A	A	A		A
Secchi	A	A	A	A	A	A	A	A	A	A	A	A
Lake Grade							B	A	A	A		A

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		A			A		A	A	A	A	A	A
CLA		A			A		A	A	A	A	A	A
Secchi	A	A			A		A	A	A	A	A	A
Lake Grade		A			A		A	A	A	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A		A	A	A	A	A	A	A	A	A
CLA	A	A		A	A	A	A	A	A	A	A	A
Secchi	A	A		A	A	A	A	A	A	A	A	A
Lake Grade	A	A		A	A	A	A	A	A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Keller Lake [Burnsville] (19–0025) *Black Dog Watershed Management Commission*

Volunteer: Randy Koenig

Keller Lake is located in the cities of Apple Valley and Burnsville (Dakota County). The surface area of the lake is 55 acres. It has a maximum depth of 3.0 m (10 feet) and a mean depth of 1.1 m (3.7 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	11	91	C
CLA (µg/l)	15	2.2	26	B
Secchi (m)	+1.4	0.8	2.1	C
TKN (mg/l)	0.89	0.46	1.20	
			Lake Grade	C

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received a lake grade of C this year, which is consistent with its water quality database. The water quality of the lake has varied between Bs and Ds since 1996.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

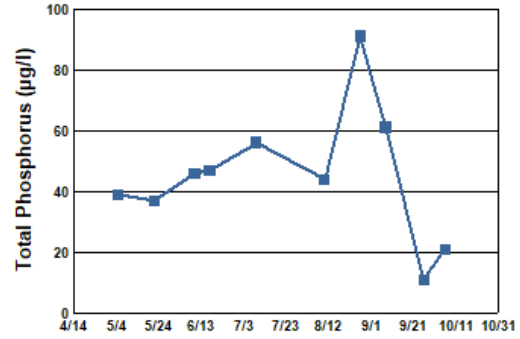
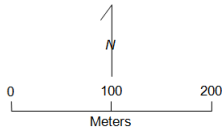
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Keller Lake
Burnsville, Dakota Co.

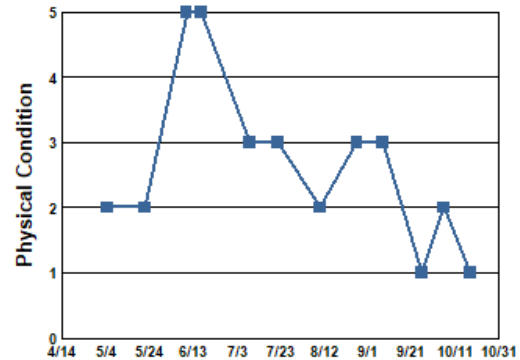
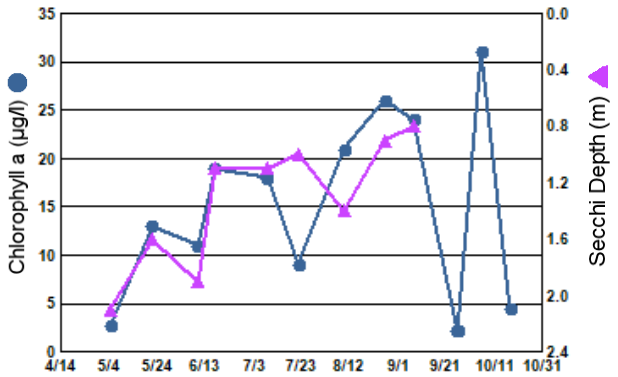
Lake ID: 190025-00

● Sampling site
Contours in meters

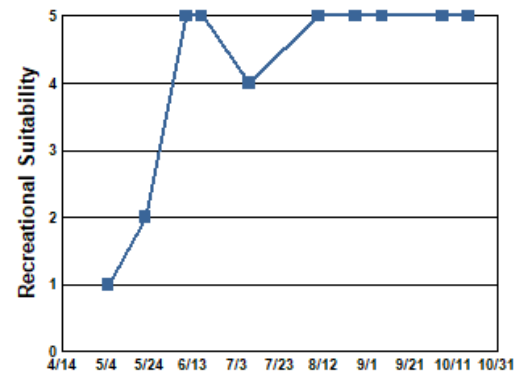


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/05/21	18.2		2.7	39	2.1	2	1
05/22/21	26.2		13	37	1.6	2	2
06/10/21	28.7		11	46	1.9	5	5
06/17/21	29.6		19	47	1.1	5	5
07/09/21			18	56	1.1	3	4
07/22/21			9.1		1.0	3	
08/10/21	26.8		21	44	1.4	2	5
08/27/21	17.1		26	91	0.9	3	5
09/08/21	19.1		24	61	0.8	3	5
09/26/21	16.7		2.2	11	+2.0	1	
10/06/21	13.4		31	21	+1.9	2	5
10/18/21	10.9		4.5		+1.9	1	5



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					D	D	C	D	D	D	C	D
CLA					F	C	A	C	C	C	B	C
Secchi					D	D	C	D	D	D	D	D
Lake Grade					D	D	B	D	D	D	C	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	D	C	D	D	D	D	D	D	D
CLA	B	B	D	B	A	F	D	D	D	D	D	D
Secchi	C	C	D	C	C	D	F	D	F	F	D	F
Lake Grade	C	C	D	C	B	D	D	D	D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	C	D	C	C	C
CLA	C	B	C	B	C	B
Secchi	D	D	F	C	D	C
Lake Grade	D	C	D	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Kingsley Lake (19–0030) *Black Dog Watershed Management Commission*

Monitoring staff: City of Lakeville contractor (Blue Water Science)

Kingsley Lake is located in the northwestern corner of the City of Lakeville in Dakota County. The lake has a surface area of 44 acres, and a maximum depth of 4.0 m (13 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	8	28	A
CLA (µg/l))	2.2	1.7	2.8	A
Secchi (m)	+1.9	+1.3	>2.2	A
TKN (mg/l)	0.47	0.42	0.55	
			Lake Grade	A

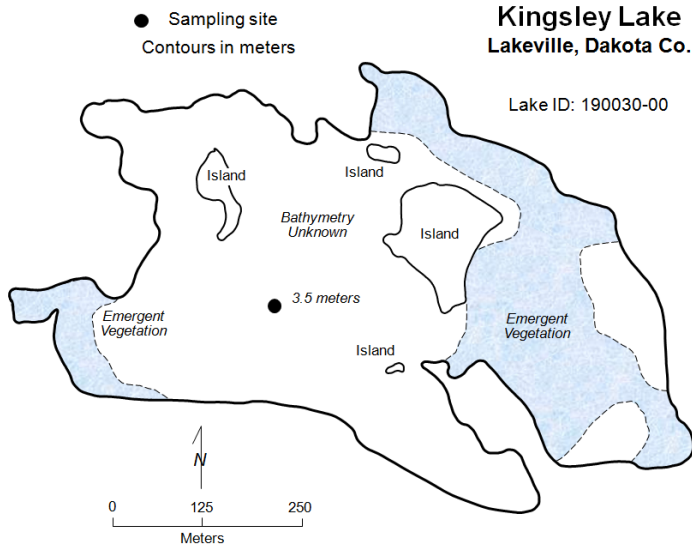
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of A this year. Similar to past years, the lake's excessive submergent macrophyte growth obscured the Secchi disk. According to the monitoring personnel's judgement, the Secchi depths in these instances would have likely been in excess of 3 meters (if the measurement were not already in excess of 3 meters). Also, the other two water quality parameter received A grades.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

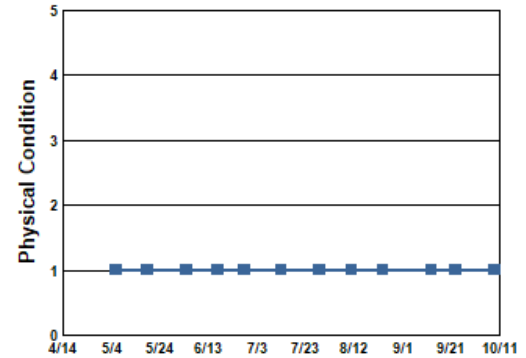
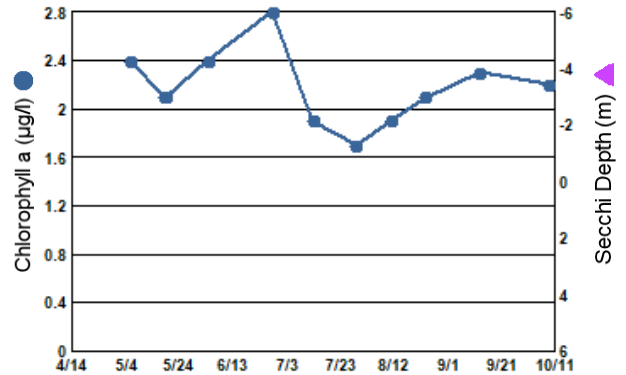
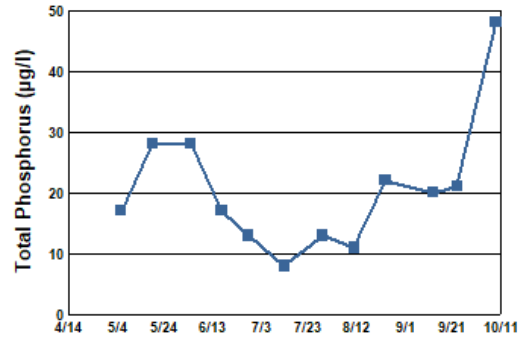
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



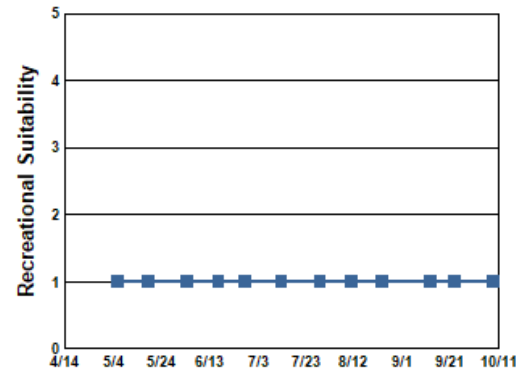
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/06/21	17.1		2.4	17	+1.3	1	1
05/19/21	22.2		2.1	28	+1.7	1	1
06/04/21	23.3		2.4	28	+1.4	1	1
06/17/21	27.9			17	+2.0	1	1
06/28/21	25.2		2.8	13	>2.2	1	1
07/13/21	27.2		1.9	8	>2.2	1	1
07/29/21	27.8		1.7	13	>2.1	1	1
08/11/21	25.5		1.9	11	+2.0	1	1
08/24/21	23.8		2.1	22	+2.0	1	1
09/13/21	21.1		2.3	20	+2.0	1	1
09/23/21	22.0			21	+2.0	1	1
10/09/21	22.0		2.2	48	+1.9	1	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B		B	A	A			A	A	A	B
CLA		A		A	A	A			A	A	A	A
Secchi		A		B	B	B			B	C	B	B
Lake Grade		A		B	A	A			A	B	A	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	B	A	A	A	A	A	A	A	A	A
CLA	A	A	A	A	A	A	A	A	A	A	A	A
Secchi	B	B	B	B	B	A	A	A			A	A
Lake Grade	A	A	B	A	A	A	A	A			A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A		A
CLA	A	A	A	A		A
Secchi	B	A	A	A		A
Lake Grade	A	A	A	A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Kismet Lake (82–0333) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Kismet Lake is located in Washington County. This relatively small lake has a maximum depth of approximately 3.7 m (12 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	28	11	55	B
CLA ($\mu\text{g/l}$)	20	2.4	97	C
Secchi (m)	>1.7	>1.1	>2.3	
TKN (mg/l)	0.65	0.49	1.10	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

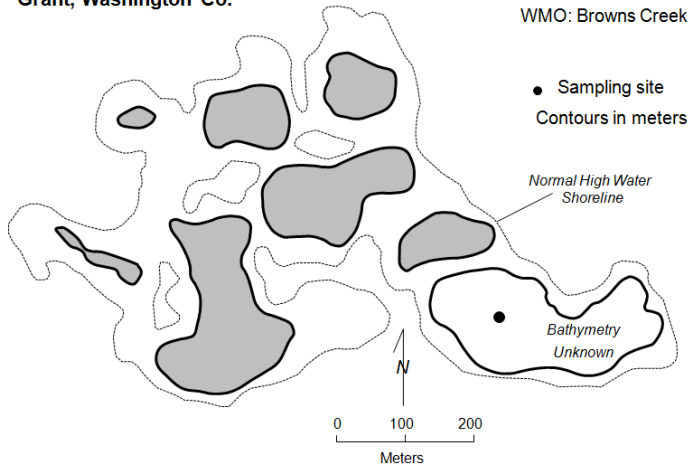
There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Kismet Lake
Grant, Washington Co.

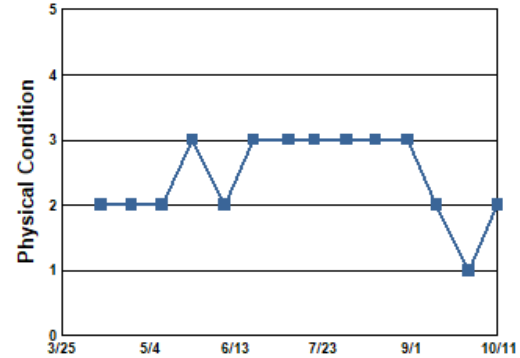
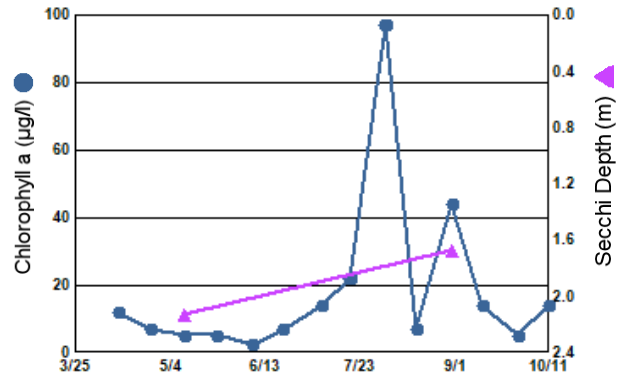
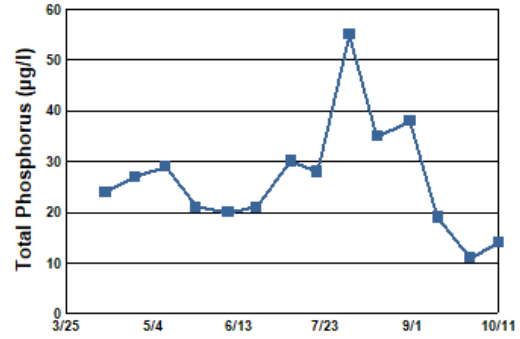
Lake ID: 820334-00
WMO: Browns Creek



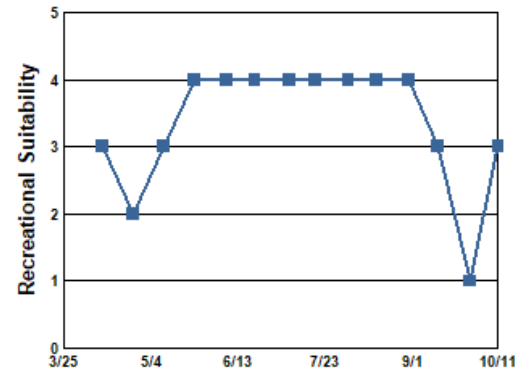
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.4	11.4	12	24	>2.1	2	3
04/26/21	9.7	11.6	6.8	27	>1.8	2	2
05/10/21	15.9	9.6	5.2	29	2.1	2	3
05/24/21	22.8	8.5	5.1	21	>2.0	3	4
06/08/21	27.4	8.5	2.4	20	>1.5	2	4
06/21/21	23.1	4.8	7.0	21	>2.0	3	4
07/07/21	25.0	5.9	14	30	>1.4	3	4
07/19/21	26.1	8.5	22	28	>1.4	3	4
08/03/21	23.5	6.0	97	55	>1.1	3	4
08/16/21	24.0	6.5	7.2	35	>1.1	3	4
08/31/21	23.6	9.0	44	38	1.7	3	4
09/13/21	20.1	4.6	14	19	>1.8	2	3
09/28/21	17.4	8.2	5.1	11	>2.3	1	1
10/11/21	18.3	8.1	14	14	>1.2	2	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							C	C	D	C	C	B
CLA							C	C	C	B	B	B
Secchi							C	C	C	C	C	B
Lake Grade							C	C	C	C	C	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	C	C	C	C	C	C	A	C	A
CLA	A	B	C	C	D	A	C	B	B	A	C	A
Secchi	B	C	C	C	C	D	C	C				
Lake Grade	B	C	C	C	C	C	C	C				

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	A	B	B
CLA	A	A	A	A	A	C
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Klawitter Pond (82–0368) *Valley Branch Watershed District*

Volunteer: Bonnie Juran, Pat Barrett

Klawitter Pond is a 4.5-acre lake located within the City of Lake Elmo (Washington County). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's surface area and watershed area of 168 acres translate to a 37:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	125	43	192	D
CLA (µg/l))	33	20	52	D
Secchi (m)	0.6	0.6	0.8	F
TKN (mg/l)	1.85	1.50	2.20	
			Lake Grade	D

The lake received a lake grade of D this year, which is similar to previous years' lake grades.

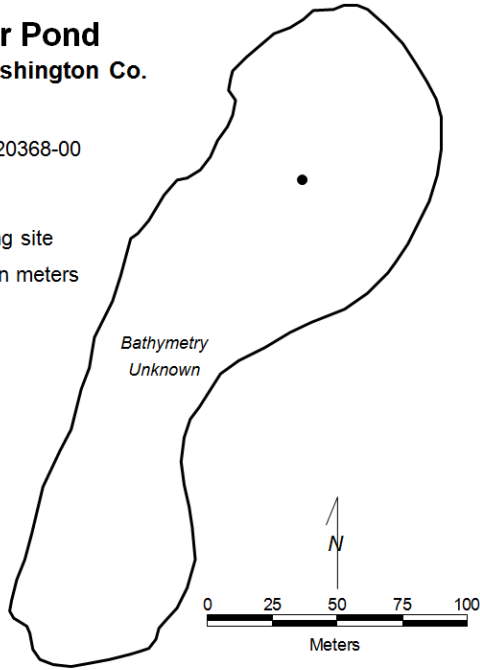
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Klawitter Pond
Lake Elmo, Washington Co.

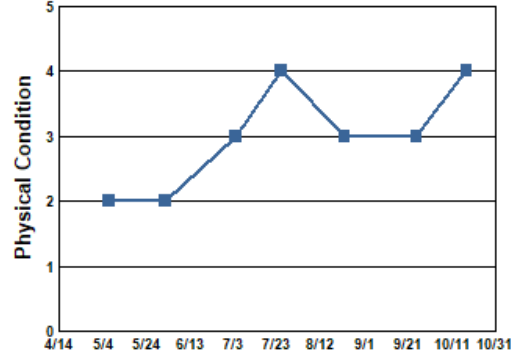
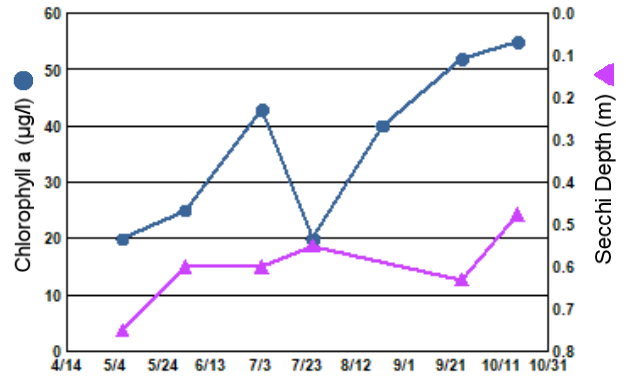
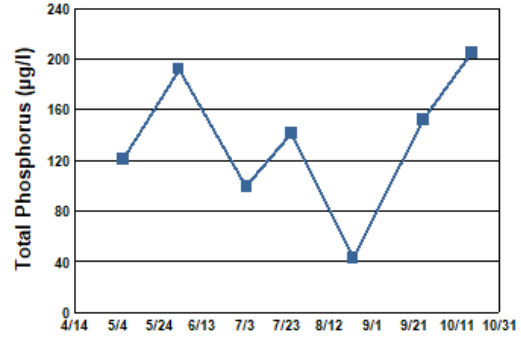
Lake ID: 820368-00

- Sampling site
- Contours in meters

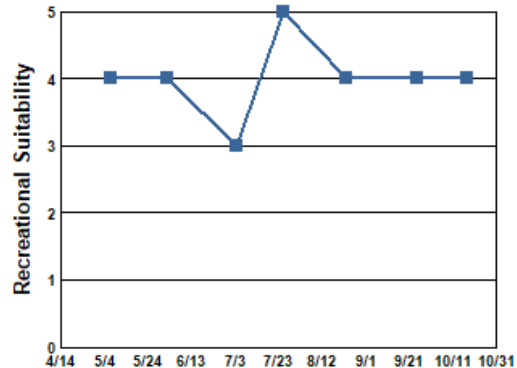


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/07/21	15.5		20	121	0.8	2	4
06/02/21	23.2		25	192	0.6	2	4
07/04/21	29.8		43	99	0.6	3	3
07/25/21	30.1		20	141	0.6	4	5
08/23/21	27.1		40	43		3	4
09/25/21	18.5		52	152	0.6	3	4
10/18/21	16.1		55	205	0.5	4	4



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											D	D
CLA											B	C
Secchi											D	F
Lake Grade											C	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	D	D	D	D	D	D	C	D	D
CLA	C	C	C	C	C	D	D	C	C	C	C	D
Secchi	D	D	F	F	F	F	F	D	D	D	D	F
Lake Grade	D	D	D	D	D	D	D	D	D	C	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	C	C	C	C	C	D
Secchi	D	D	F	D	F	F
Lake Grade	D	D	D	D	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Klawitter Pond (82–0368) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Klawitter Pond is a 4.5-acre lake located within the City of Lake Elmo (Washington County). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's surface area and watershed area of 168 acres translate to a 37:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	114	48	170	D
CLA (µg/l))	68	33	130	D
Secchi (m)	0.4	0.3	0.8	F
TKN (mg/l)	1.67	0.83	2.10	
			Lake Grade	D

The lake received a lake grade of D this year, which is similar to previous years' lake grades.

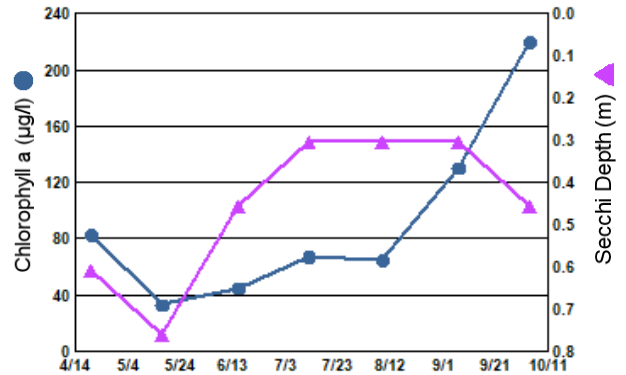
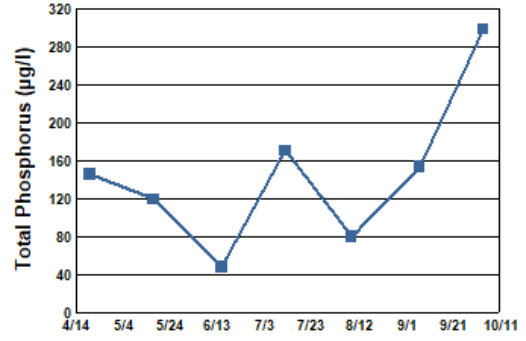
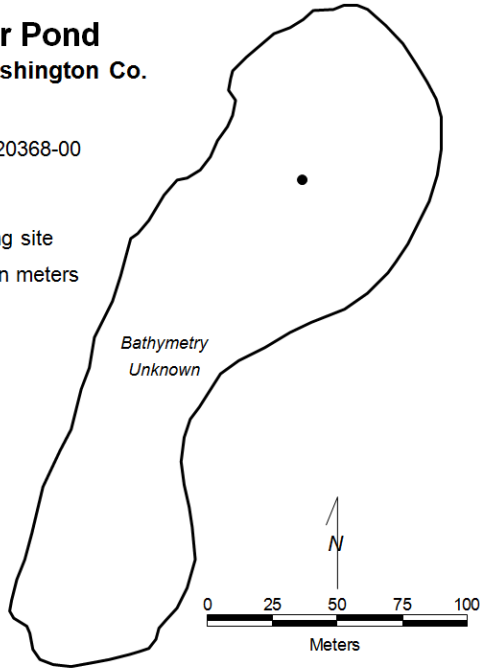
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Klawitter Pond
Lake Elmo, Washington Co.

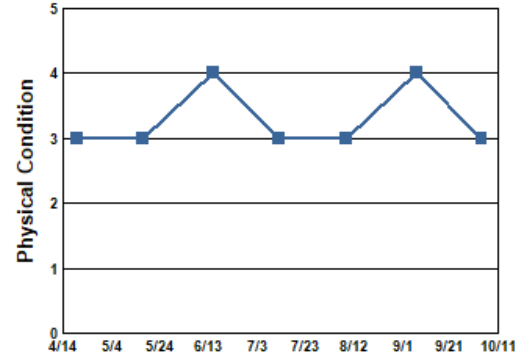
Lake ID: 820368-00

● Sampling site
Contours in meters

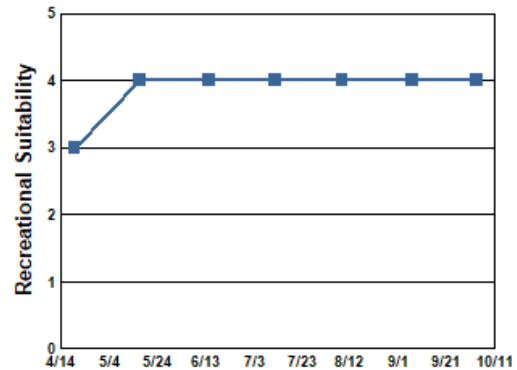


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	11.0	10.9	83	145	0.6	3	3
05/17/21	18.2	10.6	33	119	0.8	3	4
06/15/21	24.9	9.9	45	48	0.5	4	4
07/12/21	24.4	10.6	67	170	0.3	3	4
08/09/21	24.6	9.0	65	80	0.3	3	4
09/07/21	22.7	10.2	130	153	0.3	4	4
10/04/21	18.6	10.4	220	298	0.5	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											D	D
CLA											B	C
Secchi											D	F
Lake Grade											C	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	D	D	D	D	D	D	C	D	D
CLA	C	C	C	C	C	D	D	C	C	C	C	D
Secchi	D	D	F	F	F	F	F	D	D	D	D	F
Lake Grade	D	D	D	D	D	D	D	D	D	C	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	C	C	C	C	C	D
Secchi	D	D	F	D	F	F
Lake Grade	D	D	D	D	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

La Lake (82–0097) City of Woodbury

Volunteer: Tim Weber

La Lake is located in the City of Woodbury (Washington County). The lake has a surface area of approximately 35 acres and a maximum depth of 3.5 m (11 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	38	27	55	C
CLA (µg/l)	8.4	3.0	21	A
Secchi (m)	2.1	1.6	2.8	C
TKN (mg/l)	0.74	0.44	1.10	
			Lake Grade	B

The lake received a lake grade of B this year, which is consistent with its historical database. Water quality for the lake has experienced intra-annual variability in which the lake grades have varied from Bs and Cs. CLA concentrations were lower than usual in 2017 through 2021 compared to previous years since 1995. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C	D	D	C	D	D	D	D	C
CLA			B	A	B	C	B	C	C	C	B	C
Secchi			C	B	C	C	B	C	C	C	C	B
Lake Grade			C	B	C	C	B	C	C	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	D	D	D	D	D	D	D	C	C	C
CLA		B	C	D	B	C	C	B	C	B	C	B
Secchi		C	C	D	C	C	C	B	C	C		C
Lake Grade		C	C	D	C	C	C	C	C	C		C

Year	2016	2017	2018	2019	2020	2021
TP	C	B	C	B	C	C
CLA	B	A	A	A	A	A
Secchi	C	C	C	B	C	C
Lake Grade	C	B	B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lac Lavon Lake (19–0446) *Black Dog Watershed Management Commission*

Volunteer: Wally Shaver

Lac Lavon is located within the City of Apple Valley (Dakota County). The lake is considered a Priority Water by the Metropolitan Council. The lake is an abandoned gravel pit maintained by groundwater (MDNR 1996).

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995 and brittle naiad (*Najas minor*) in 2007.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

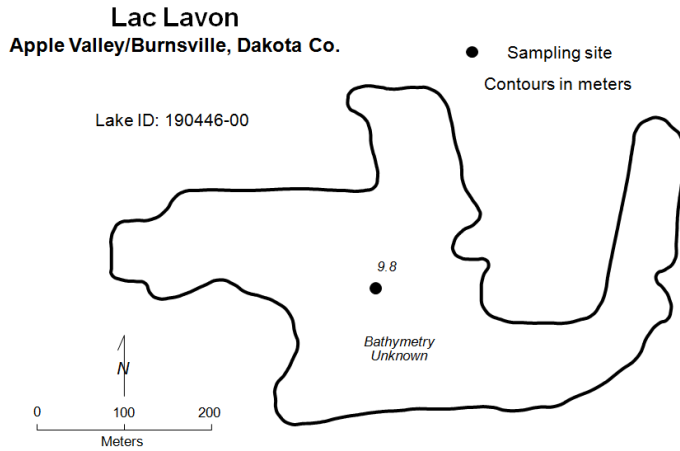
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	15	8	32	A
CLA (µg/l)	2.7	1.7	3.8	A
Secchi (m)	4.2	2.4	4.7	A
TKN (mg/l)	0.54	0.46	0.66	
			Lake Grade	A

The lake received a lake grade of A this year which is consistent with its overall historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

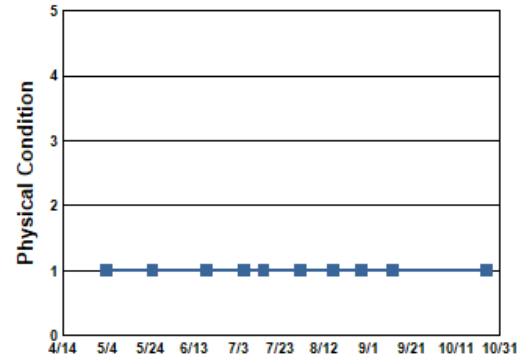
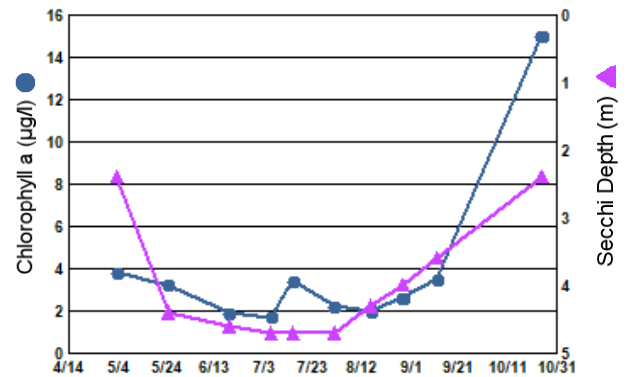
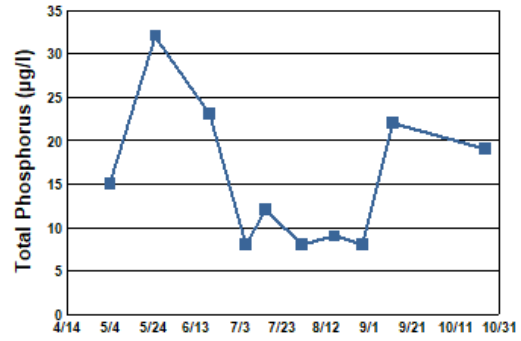
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

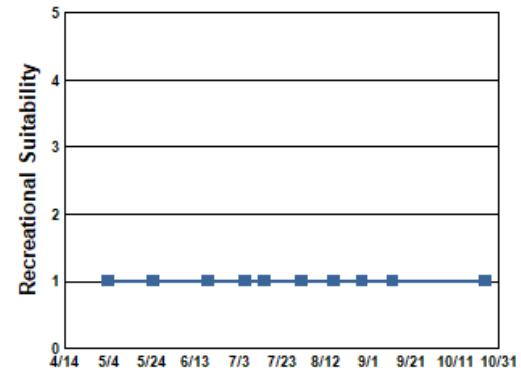


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/04/21	14.5		3.8	15	2.4	1	1
05/25/21	22.8		3.2	32	4.4	1	1
06/19/21	24.5		1.9	23	4.6	1	1
07/06/21	25.1		1.7	8	4.7	1	1
07/15/21	25.0		3.4	12	4.7	1	1
08/01/21	25.8		2.2	8	4.7	1	1
08/16/21	25.6		2.0	9	4.3	1	1
08/29/21	24.5		2.6	8	4.0	1	1
09/12/21	22.1		3.5	22	3.6	1	1
10/25/21	13.8		15	19	2.4	1	1



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2 = Some Algae Present
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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi										A	A	A
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP						A	A	A	A	B	A	A
CLA						A	A	A	A	A	A	A
Secchi						A	A	A	A	A	A	A
Lake Grade						A	A	A	A	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	A	C	A	A	C	A	A	A	A
CLA	A	A	A	A	A	A	A	A	A	A	A	A
Secchi	A	A	A	A	A	A	A	A	A	A	A	A
Lake Grade	A	A	A	A	B	A	A	B	A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lee Lake (19–0029) *City of Lakeville*

Volunteer: Natalie Walker

Lee Lake is located in Lakeville (Dakota County). The lake has a surface area of 25 acres with a maximum depth of 5.2 m (17 ft). The lake is landlocked with no natural outlet. Curlyleaf pond weed has been a continuing problem in the lake (McComas and Stuckert 2008). Not only is it an aesthetic and recreational problem, but the decaying of these plants in late-summer contributes to algal blooms. Barley straw has been added to this lake in the past to study the potential inhibition of algal populations within the lake (McComas and Stuckert 2009a).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	41	22	59	C
CLA ($\mu\text{g/l}$)	9.3	3.5	33	A
Secchi (m)	1.4	0.3	2.9	C
TKN (mg/l)	1.00	0.68	1.40	
			Lake Grade	B

The lake received a lake grade of B this year. The lake grades have varied from A to C over the past 10 years. Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

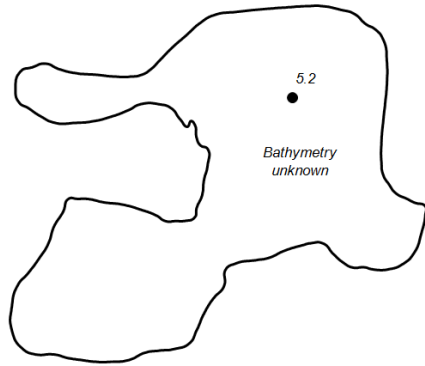
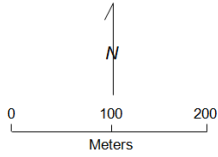
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lee Lake
Lakeville, Dakota Co.

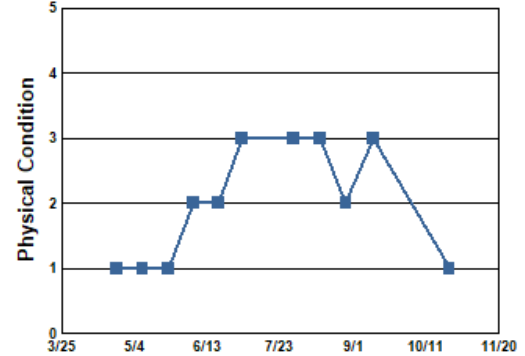
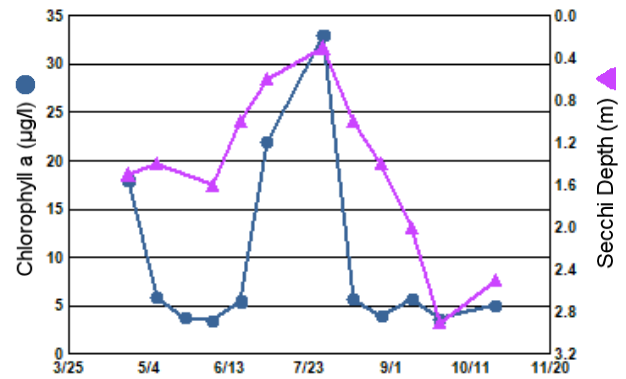
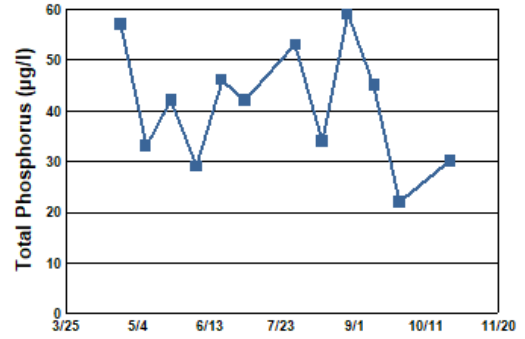
Lake ID: 190029-00

● Sampling site
Contours in meters

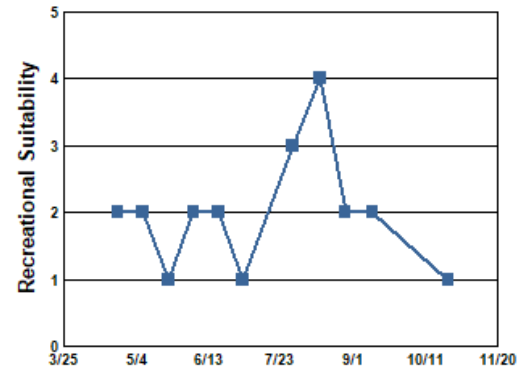


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	11.6		18	57	1.5	1	2
05/08/21	18.0		5.9	33	1.4	1	2
05/22/21	25.2		3.8	42		1	1
06/05/21	31.8		3.5	29	1.6	2	2
06/19/21	26.1		5.5	46	1.0	2	2
07/02/21	27.5		22	42	0.6	3	1
07/30/21	27.4		33	53	0.3	3	3
08/14/21	21.7		5.7	34	1.0	3	4
08/28/21	26.2		4.0	59	1.4	2	2
09/12/21	25.5		5.7	45	2.0	3	2
09/26/21	20.1		3.7	22	2.9		
10/24/21	12.2		5.1	30	2.5	1	1



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 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C	C	C			D	C	C	C
CLA			C	B	B	B			C	B	B	C
Secchi			C	C	C	C			D	C	C	C
Lake Grade			C	C	C	C			D	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	C	C	A	B	C	C	B	A	C
CLA	C	B	B	C	B	A	A	A	B	A	A	B
Secchi	D	C	C	C	C	A	A	B	C	C		C
Lake Grade	C	C	C	C	C	A	A	B	C	B		C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	B	C	C
CLA	B	B	B	A	B	A
Secchi	C	C	C	B	C	C
Lake Grade	C	C	C	B	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Legion Pond (82–0462) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Legion Pond is located in the city of Lake Elmo (Washington County). There is little known bathymetric information available for the pond.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	42	33	52	C
CLA ($\mu\text{g/l}$)	9.8	1.6	21	A
Secchi (m)	+1.8	0.9	+2.3	
TKN (mg/l)	0.75	0.65	0.86	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received TP and CLA parameters of C and A, respectively. These grades are an improvement in water quality compared to those grades received in the mid-2000s. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

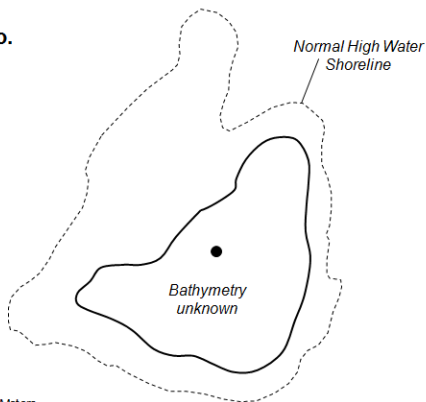
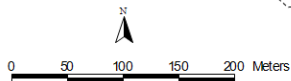
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Legion Pond
Lake Elmo, Washington Co.

Lake ID: 820462-00
WD: Valley Branch

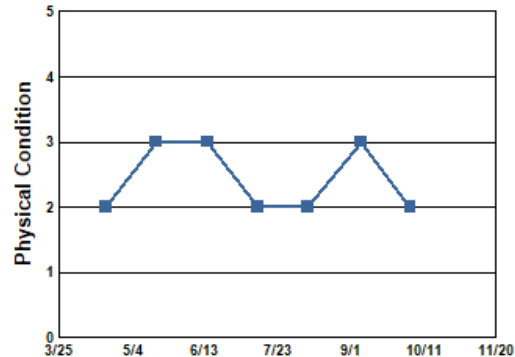
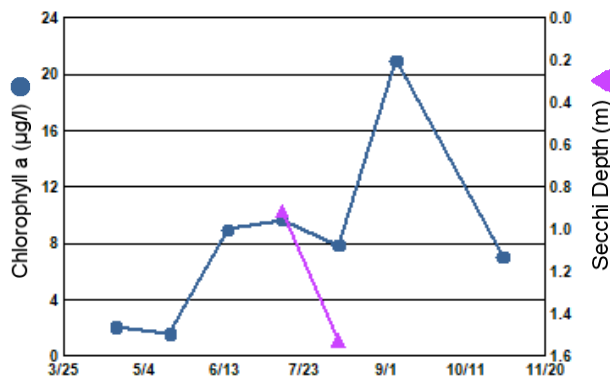
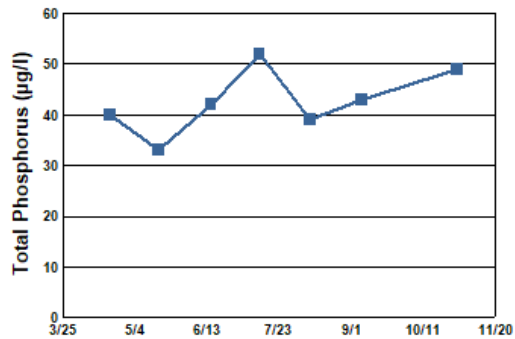
● Sampling site
Contours in meters



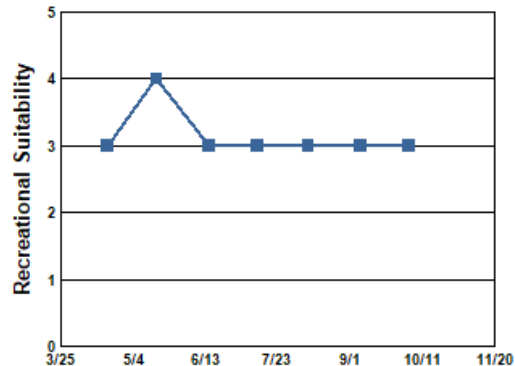
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.8	9.0	2.1	40	>2.1	2	3
05/17/21	19.2	9.6	1.6	33	>2.1	3	4
06/15/21	26.4	6.2	9.0	42	+2.3	3	3
07/12/21	26.1	8.3	9.7	52	0.9	2	3
08/09/21	26.1	7.1	7.9	39	1.5	2	3
09/07/21	22.2	8.7	21	43	+2.0	3	3
10/04/21	19.8	7.5			+2.1	2	3
10/30/21			7.1	49			

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	D		F							
CLA		C	C		D							
Secchi		D	D		D							
Lake Grade		D	D		D							

Year	2016	2017	2018	2019	2020	2021
TP		C			C	C
CLA		A			B	A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

LeMay Lake (19–0082) *City of Mendota Heights*

Volunteers: Julie Woolsey, Leslie Pilgrim, Scott Norling

LeMay Lake is located in the City of Mendota Heights. It has a surface area of 34 acres and an average depth of 1.6 m (5.1 ft). The maximum depth is 4.0 m (13 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

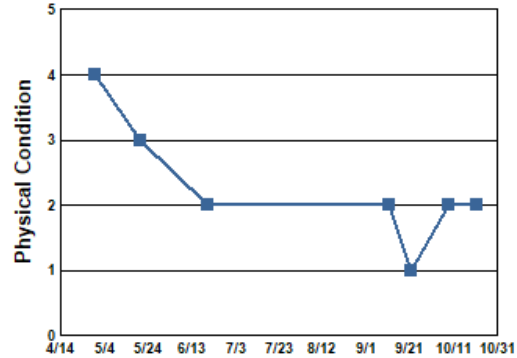
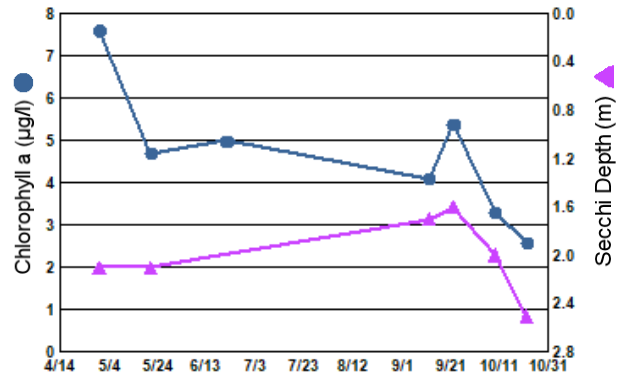
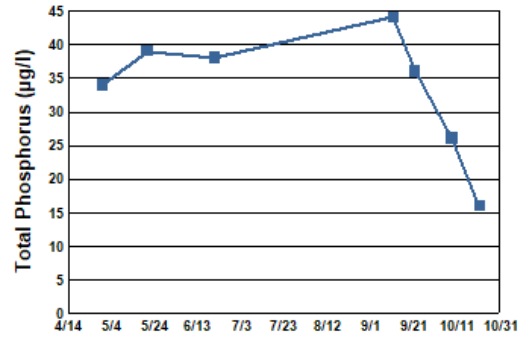
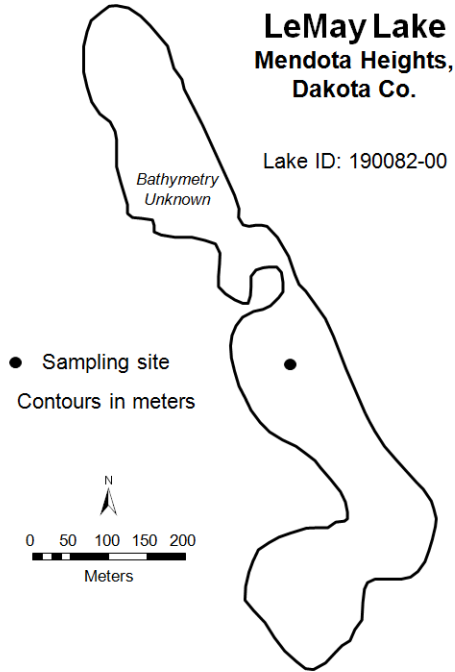
Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	39	36	44	
CLA ($\mu\text{g/l}$)	4.8	4.1	5.4	
Secchi (m)	>1.7	>1.3	2.1	
TKN (mg/l)	0.87	0.84	0.89	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

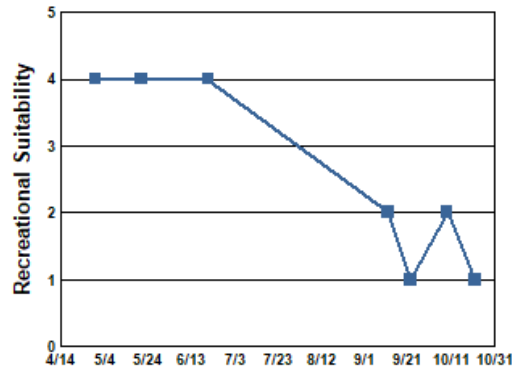


1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/30/21	16.3		7.6	34	2.1	4	4
05/21/21	22.9		4.7	39	2.1	3	4
06/21/21	23.4		5.0	38	>1.3	2	4
09/12/21	21.7		4.1	44	1.7	2	2
09/22/21	20.8		5.4	36	1.6	1	1
10/09/21	20.5		3.3	26	2.0	2	2
10/22/21	13.4		2.6	16	2.5	2	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi							F					
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				C	B	C	B	C	C	C		
CLA				B	A	A	A	A	A	A		
Secchi				D	C	C	C	C		C		
Lake Grade				C	B	B	B	B		B		

Year	2016	2017	2018	2019	2020	2021
TP		C	B	B	B	
CLA		A	A	A	A	
Secchi		C	C			
Lake Grade		B	B			

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lily Lake (82–0023) *Middle St. Croix Watershed Management Organization*

Monitoring Personnel: Washington Conservation District staff

Lily Lake is located in the City of Stillwater in Washington County. The lake has a surface area of 52 acres, and a maximum depth of 17.4 m (57 feet).

The MPCA listed the lake as impaired with respect to and aquatic consumption (mercury in fish tissue) in 2002. The MPCA delisted the lake from the impaired waters list for aquatic recreation (nutrients) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	40	25	63	C
CLA (µg/l)	17	2.8	37	B
Secchi (m)	2.4	0.9	4.3	B
TKN (mg/l)	0.88	0.69	1.30	
			Lake Grade	B

The lake received a lake grade of B this year which is consistent with its historical water quality database. The lake has varied in water quality in the B to C range according to its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

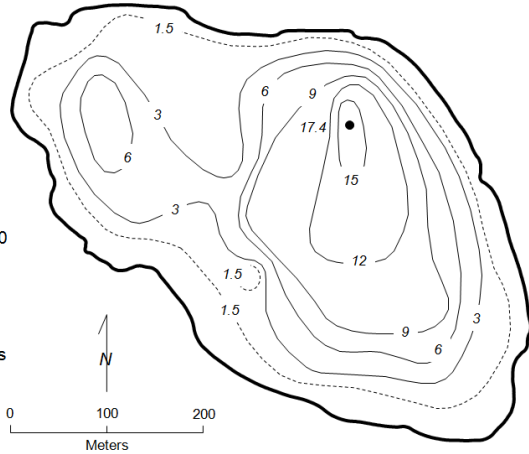
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lily Lake
Stillwater,
Washington Co.

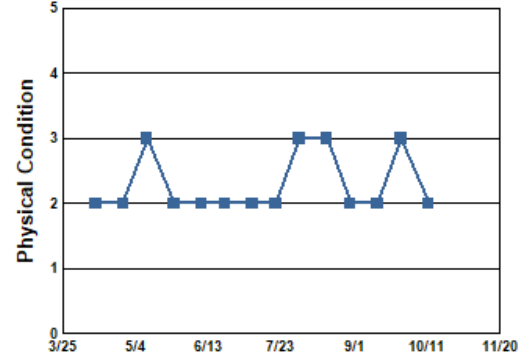
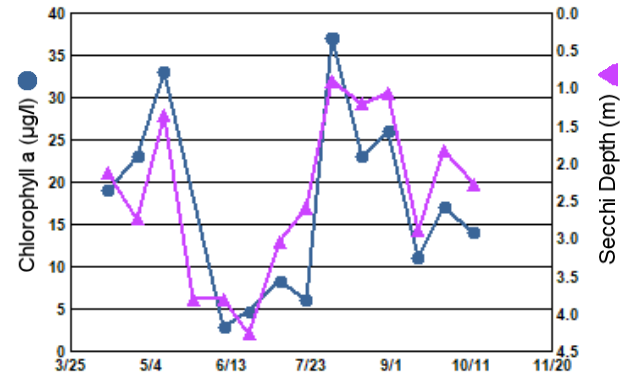
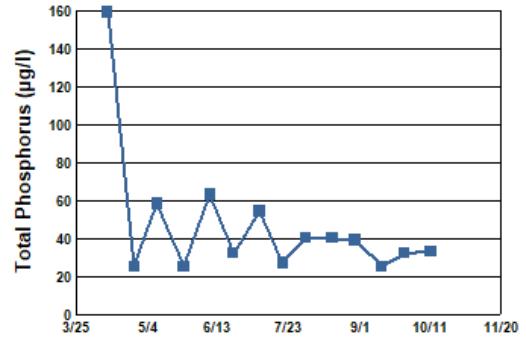
Lake ID: 820023-00

● Sampling site
Contours in meters

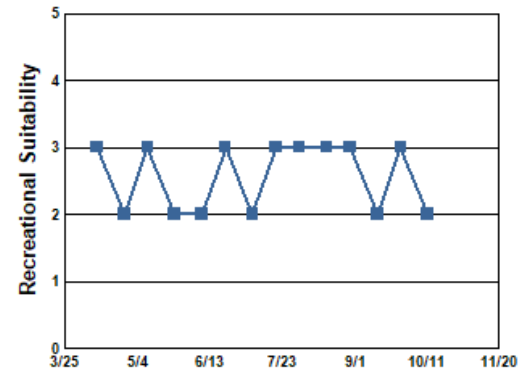


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.4	11.3	19	159	2.1	2	3
04/27/21	9.1	12.2	23	25	2.7	2	2
05/10/21	15.1	12.6	33	58	1.4	3	3
05/25/21	22.9	7.8		25	3.8	2	2
06/09/21	27.6	8.4	2.8	63	3.8	2	2
06/22/21	22.1	7.6	4.7	32	4.3	2	3
07/07/21	25.9	6.4	8.3	54	3.0	2	2
07/20/21	26.6	8.4	6.0	27	2.6	2	3
08/02/21	25.4	7.7	37	40	0.9	3	3
08/17/21	24.3	7.9	23	40	1.2	3	3
08/30/21	23.9	7.4	26	39	1.1	2	3
09/14/21	21.1	7.6	11	25	2.9	2	2
09/27/21	18.4	9.1	17	32	1.8	3	3
10/12/21	19.0	8.1	14	33	2.3	2	2



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2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi						D		C	C	C	C	C
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C	C	C	C	C	C	C	C	C
CLA				B	C	B	C	C	C	A	B	B
Secchi	B			A	B	C	C	C	C	B	C	C
Lake Grade				B	C	C	C	C	C	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	B	B		C	B	A	A
CLA	B	B	C	C	C	A	B		B	B	A	B
Secchi	C	C	C	C	C	B	C		C	C	B	B
Lake Grade	C	C	C	C	C	B	B		C	B	A	B

Year	2016	2017	2018	2019	2020	2021
TP	C	C	B	B	B	C
CLA	C	B	C	B	B	B
Secchi	B	C	C	C	B	B
Lake Grade	C	C	C	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Little Carnelian Lake (82–0014) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Little Carnelian Lake is located in Stillwater Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake's watershed has an area of 565 acres which translates to a watershed-to-lake area ratio of 3.5:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	12	3	22	A
CLA (µg/l)	2.1	1.1	3.5	A
Secchi (m)	5.5	4.1	8.2	A
TKN (mg/l)	0.47	0.42	0.55	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its historical database.

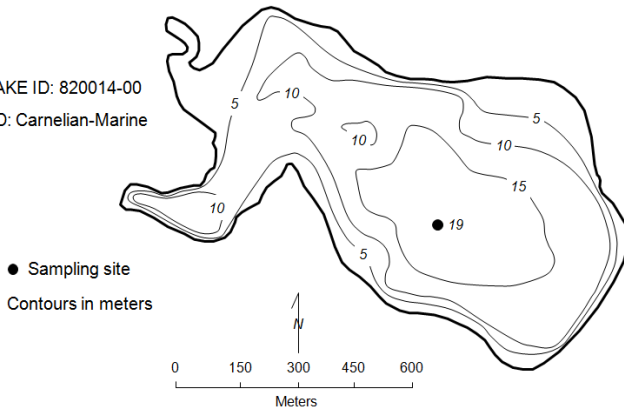
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

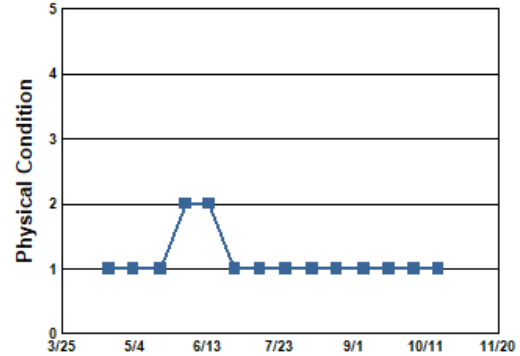
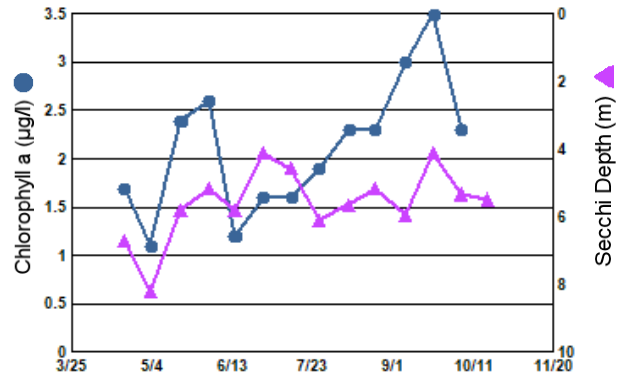
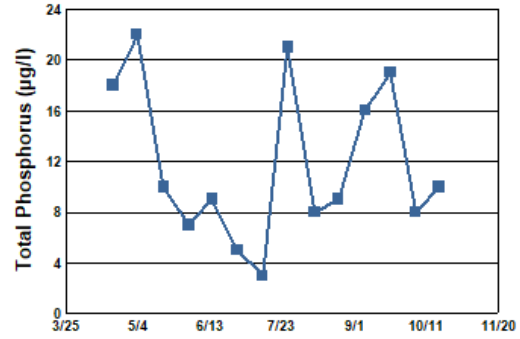
Little Carnelian Lake
Stillwater Twp., Washington Co.

LAKE ID: 820014-00
WD: Carnelian-Marine

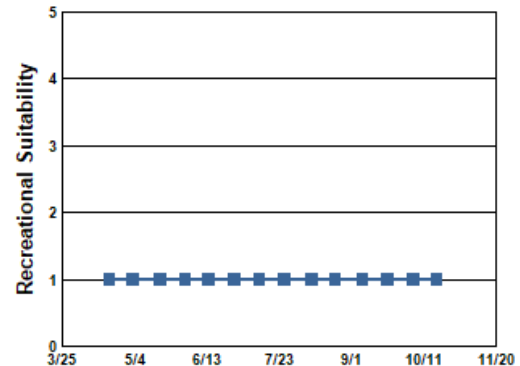


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	8.9	12.5	1.7	18	6.7	1	1
05/03/21	12.0	11.3	1.1	22	8.2	1	1
05/18/21	16.8	11.3	2.4	10	5.8	1	1
06/01/21	19.1	9.8	2.6	7	5.2	2	1
06/14/21	26.0	8.8	1.2	9	5.8	2	1
06/28/21	24.5	8.6	1.6	5	4.1	1	1
07/12/21	24.9	8.4	1.6	3	4.6	1	1
07/26/21	26.9	8.5	1.9	21	6.1	1	1
08/10/21	25.5	8.5	2.3	8	5.6	1	1
08/23/21	24.7	8.4	2.3	9	5.2	1	1
09/07/21	22.9	9.2	3.0	16	5.9	1	1
09/21/21	20.8	8.4	3.5	19	4.1	1	1
10/05/21	21.2	9.3	2.3	8	5.3	1	1
10/18/21	16.7	9.2		10	5.5	1	1



1 = Crystal Clear
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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												A
CLA												A
Secchi												A
Lake Grade												A

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP	A				A	A			A	B	A	A
CLA	A				A	A			A	A	A	A
Secchi	A	A	A	A	A	A	A		A	A	A	A
Lake Grade	A				A	A			A	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	A						A	A	A
CLA	A	A	A	A						A	A	A
Secchi	A	A	A	A	A	A	A			A	A	A
Lake Grade	A	A	A	A						A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Little Comfort Lake (13–0054) *Comfort Lake* — *Forest Lake Watershed District*

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Little Comfort Lake is located near the city of Wyoming (Chisago County). The lake has a surface area of 36 acres and a maximum depth of 17.0 m (56 feet).

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002. The MN DNR designated the lake as being infested with zebra mussels (*Dreissena polymorpha*) in 2017 and Eurasian water milfoil (*Myriophyllum spicatum*) in 2021.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	45	12	100	C
CLA (µg/l)	8.1	3.4	16	A
Secchi (m)	+2.5	1.4	3.4	B
TKN (mg/l)	0.73	0.55	0.90	
			Lake Grade	B

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received a lake grade of B this year which is consistent with water quality observed in the late 2010s and an improvement compared to more recent years. The Secchi grade in 2021 improved to a B which is the best grade received for water clarity according to its water quality database going back to 1994.

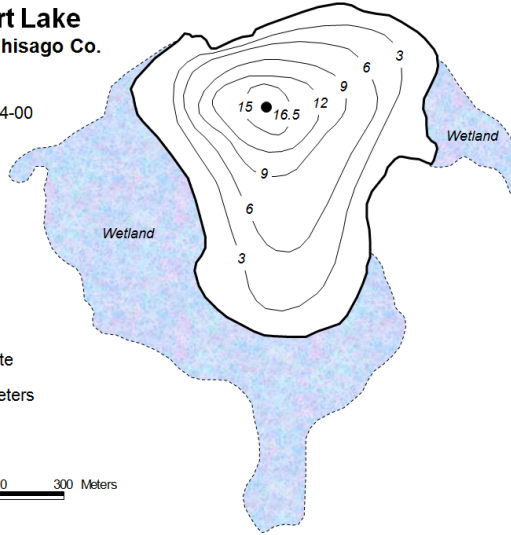
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

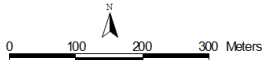
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Little Comfort Lake
City of Wyoming, Chisago Co.

LAKE ID: 130054-00



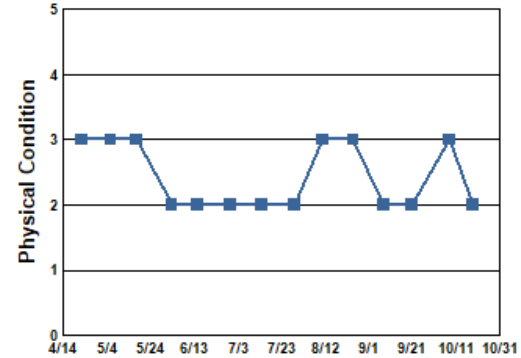
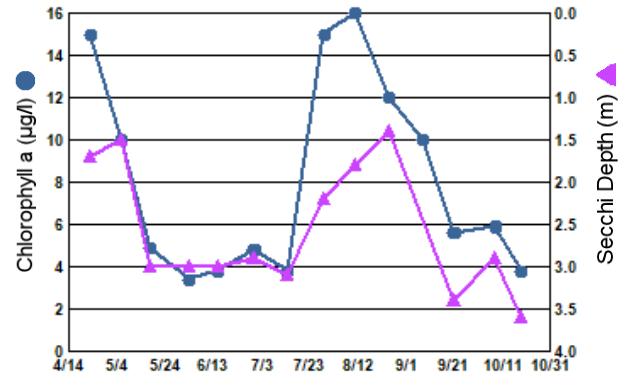
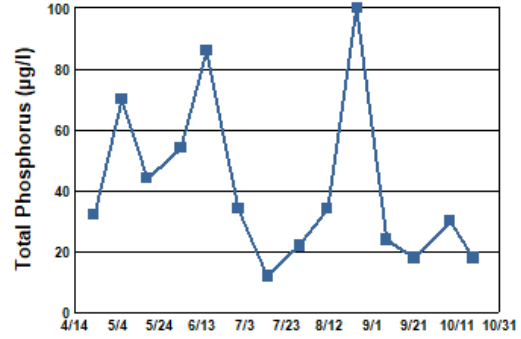
● Sampling site
Contours in meters



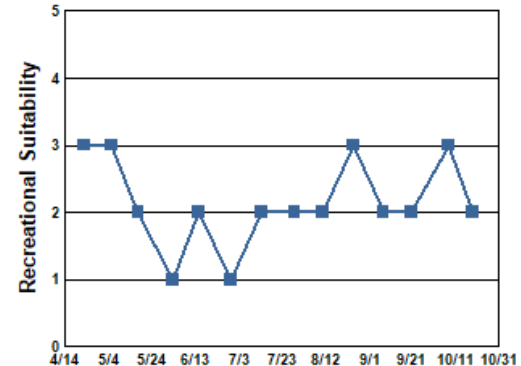
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/21	10.0		15	32	1.7	3	3
05/06/21	15.5		10	70	1.5	3	3
05/18/21	20.4		4.9	44	3.0	3	2
06/03/21	23.1		3.4	54	3.0	2	1
06/15/21	25.9		3.8	86	3.0	2	2
06/30/21	26.1		4.8	34	2.9	2	1
07/14/21	25.5		3.8	12	3.1	2	2
07/29/21	27.2		15	22	2.2	2	2
08/11/21	26.1		16	34	1.8	3	2
08/25/21	25.5		12	100	1.4	3	3
09/08/21	21.7		10	24	+2.2	2	2
09/21/21	21.2		5.6	18	3.4	2	2
10/08/21	19.8		5.9	30	2.9	3	3
10/19/21	17.1		3.8	18	3.6	2	2

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C									
CLA			C									
Secchi			C									
Lake Grade			C									

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	C	C	A	B	C	C	C	C	C
CLA			C	A	B	A	B	B	B	B	B	C
Secchi			C	C	C	C	C	C	C	C	C	C
Lake Grade			C	B	C	B	B	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	B	C	C		A
Secchi	C	C	C	C	C	B
Lake Grade	C	C	C	C		B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Little Johanna Lake (62–0058) Rice Creek Watershed District

Volunteer: Fred Fox, Dave Short

Little Johanna Lake is located on the boundary between the cities of Arden Hills and Roseville (Ramsey County). The lake has a surface area of 18 acres and a maximum depth of 12.0 m (39 feet). The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004, aquatic consumption (Per-fluorooctane Sulfonate (PFOS) in fish tissue) in 2012, and aquatic life (chloride) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	57	38	110	C
CLA ($\mu\text{g/l}$)	11	1.4	37	B
Secchi (m)	1.9	0.8	2.7	C
TKN (mg/l)	0.76	0.62	0.94	
			Lake Grade	C

The lake received a lake grade of C this year, which is which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

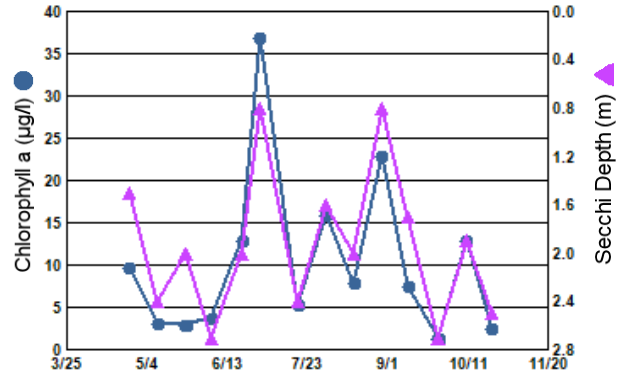
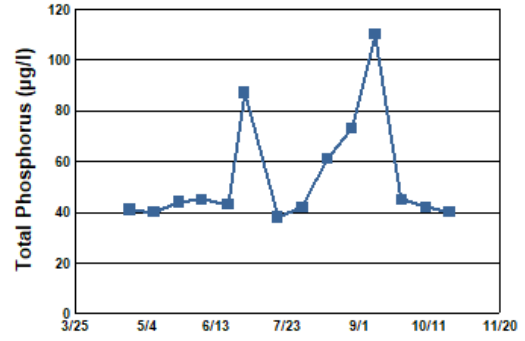
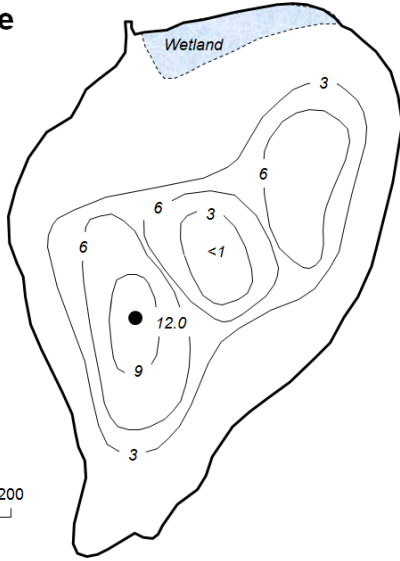
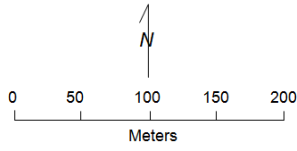
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Little Johanna Lake
Arden Hills/Roseville,
Ramsey Co.

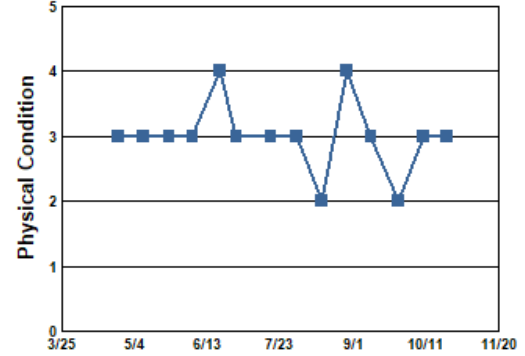
Lake ID: 620058-00

● Sampling site
Contours in meters

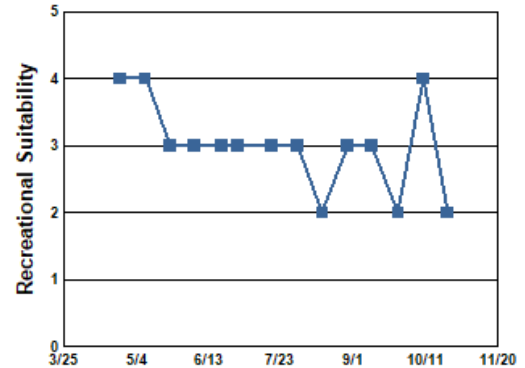


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	9.8		9.8	41	1.5	3	4
05/09/21	16.7		3.2	40	2.4	3	4
05/23/21	24.6		3.0	44	2.0	3	3
06/05/21	27.2		3.8	45	2.7	3	3
06/20/21	25.2		13	43	2.0	4	3
06/29/21	28.7		37	87	0.8	3	3
07/18/21	30.1		5.3	38	2.4	3	3
08/01/21	26.0		16	42	1.6	3	3
08/15/21	25.7		7.9	61	2.0	2	2
08/29/21	25.2		23	73	0.8	4	3
09/11/21	23.6		7.6	110	1.7	3	3
09/26/21	19.8		1.4	45	2.7	2	2
10/10/21	20.3		13	42	1.9	3	4
10/23/21	13.1		2.5	40	2.5	3	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP										C	D	D
CLA										C	C	C
Secchi										C	C	C
Lake Grade										C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D		C	C	C	C	C	C		D
CLA	B	C	C		B	B	C	B	B	B		C
Secchi	C	C	C		C	C	D	C	C	C		C
Lake Grade	C	C	C		C	C	C	C	C	C		C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	B	A	A	B	B	B
Secchi	C	C	C	C	C	C
Lake Grade	C	B	B	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Little Prior Lake (70–0169) *Prior Lake — Spring Lake Watershed District*

Monitoring Personnel: Prior Lake — Spring Lake Watershed District staff

Little Prior Lake is located in the City of Prior Lake (Scott County). There is little bathymetric information available for the lake. The lake has a maximum depth of nearly 3 meters.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	109	28	478	D
CLA (µg/l))	22	1.2	64	C
Secchi (m)	+0.9	>0.2	+1.7	
TKN (mg/l)	1.13	0.58	2.80	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					C	D
CLA					A	C
Secchi					C	
Lake Grade					B	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [Apple Valley] (19–0022) *City of Apple Valley*

Volunteer: Joan Kettelkamp

Long Lake is located in the City of Apple Valley (Dakota County). It has a surface area of 36 acres and a maximum depth of 1.5 m (5 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

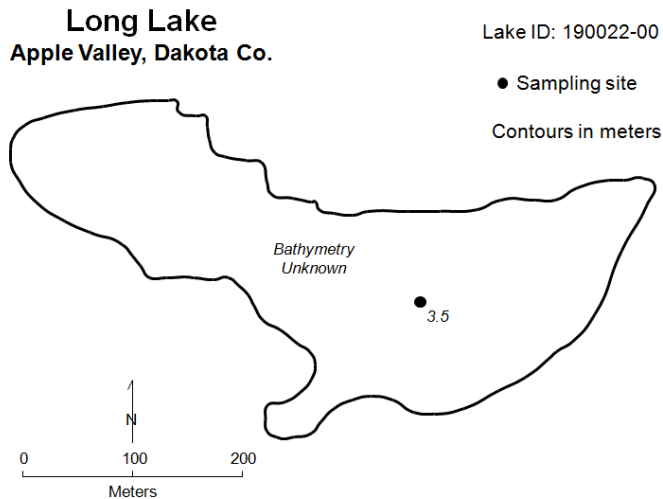
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	258	95	379	F
CLA (µg/l)	212	13	450	F
Secchi (m)	+0.3	0.2	+0.6	F
TKN (mg/l)	4.46	1.60	7.00	
			Lake Grade	F

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received an F lake grade this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

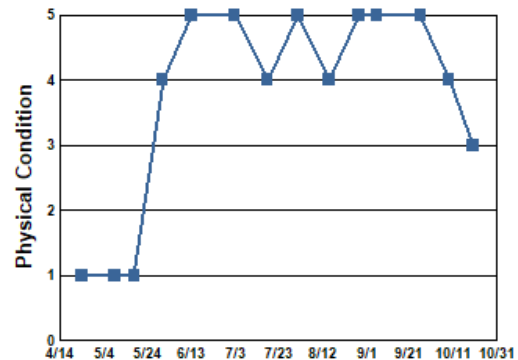
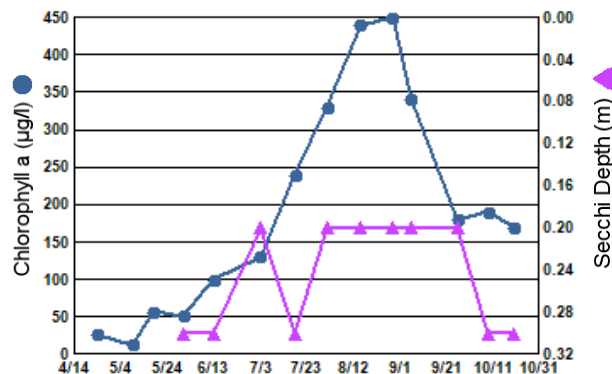
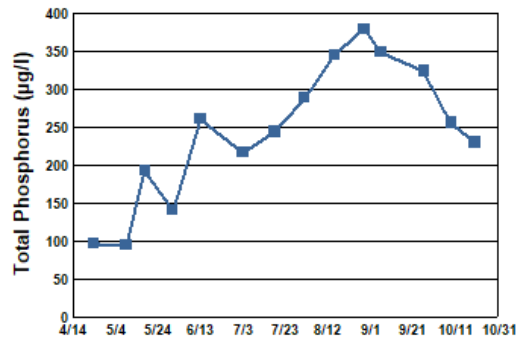
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



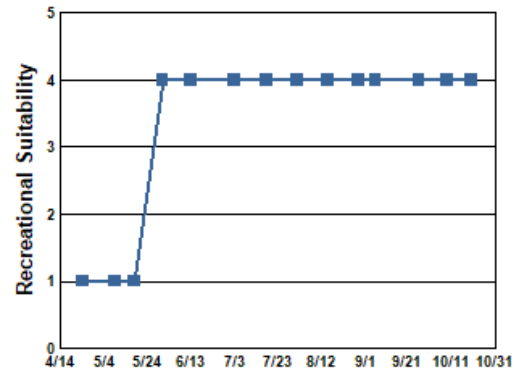
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.9		26	97	+0.6	1	1
05/09/21	16.6		13	95	+0.6	1	1
05/18/21	21.8		57	193	+0.5	1	1
05/31/21	23.4		51	141	0.3	4	4
06/13/21	25.7		100	261	0.3	5	4
07/03/21	27.3		130	217	0.2	5	4
07/18/21	25.5		240	244	0.3	4	4
08/01/21	25.4		330	289	0.2	5	4
08/15/21	22.9		440	345	0.2	4	4
08/29/21	23.2		450	379	0.2	5	4
09/06/21	20.6		340	349	0.2	5	4
09/26/21	16.3		180	324	0.2	5	4
10/09/21	20.8		190	256	0.3	4	4
10/20/21	13.7		170	230	0.3	3	4

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP						D					F	F
CLA						D					F	F
Secchi						F					F	F
Lake Grade						D					F	F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	F	F	F	F	F	F	F	F	F	F	F
CLA	F	F	F	F	F	F	D	F	F	F	F	F
Secchi	F	F	F	F	F	F	F	F	F	F	F	F
Lake Grade	F	F	F	F	F	F	F	F	F	F	F	F

Year	2016	2017	2018	2019	2020	2021
TP	F	D	F	D	F	F
CLA	F	F	D	D	F	F
Secchi	F	F	F		F	F
Lake Grade	F	F	F		F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [Site 1, North Basin] [Stillwater] (82–0021) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Long Lake is located on the western boundary of the City of Stillwater (Washington County). It has a surface area of 96 acres, and its maximum depth is 6.7 m (22 feet). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002 and aquatic life (chloride) in 2022. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2009.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	50	28	131	C
CLA (µg/l)	6.6	2.2	18	A
Secchi (m)	2.2	1.4	3.0	B
TKN (mg/l)	0.82	0.71	0.92	
			Lake Grade	B

Lake site #1 received a lake grade of B this year. The lake has experienced varying lake grades from D to B since 2004 with water quality in the C grade range for the most recent years. Prior to 2004 the lake grades were in the D and F range.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

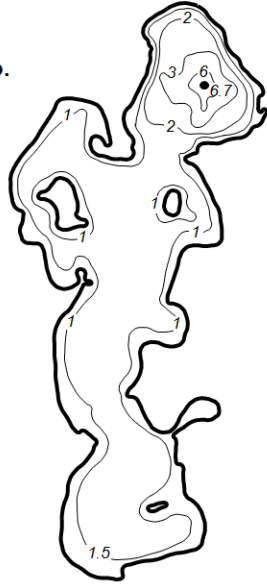
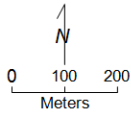
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Long Lake,
Stillwater, Washington Co.**

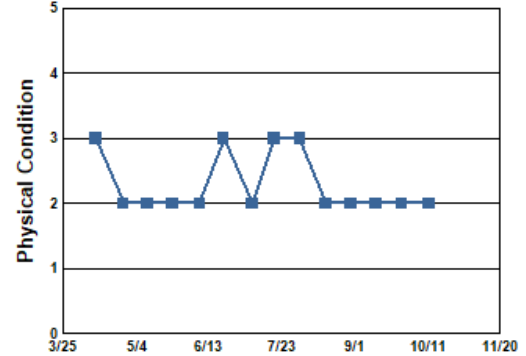
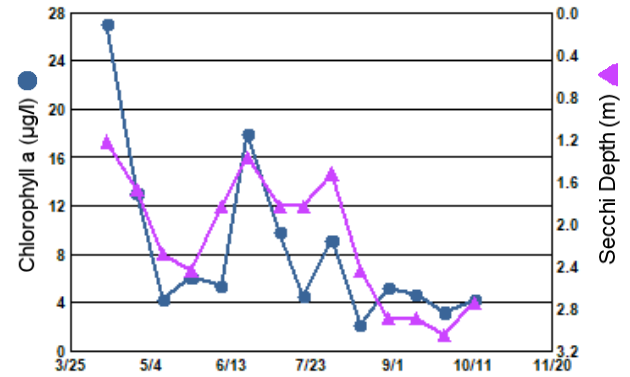
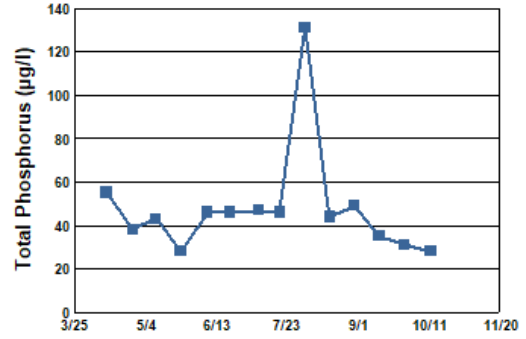
Lake ID: 820021-00

● Sampling site
Contours in meters

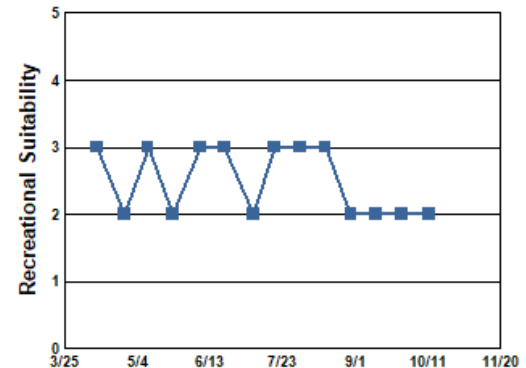


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.9	10.1	27	55	1.2	3	3
04/27/21	9.4	9.9	13	38	1.7	2	2
05/10/21	15.6	10.7	4.3	43	2.3	2	3
05/24/21	23.4	8.2	6.1	28	2.4	2	2
06/08/21	28.7	8.6	5.4	46	1.8	2	3
06/21/21	23.7	6.8	18	46	1.4	3	3
07/07/21	25.7	7.0	9.8	47	1.8	2	2
07/19/21	28.7	8.9	4.5	46	1.8	3	3
08/02/21	25.4	7.4	9.2	131	1.5	3	3
08/16/21	25.5	8.0	2.2	44	2.4	2	3
08/30/21	24.0	7.4	5.2	49	2.9	2	2
09/13/21	22.3	7.8	4.7	35	2.9	2	2
09/27/21	19.7	8.3	3.2	31	3.0	2	2
10/12/21	18.7	7.9	4.2	28	2.7	2	2



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3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi								F		D		F
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				D	D		D	D	F	D	D	D
CLA				D	D		F	F	F	F	D	D
Secchi	F	F	F	F	D		F	F	F	F	F	F
Lake Grade				D	D		F	F	F	F	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	C	C	C	C	C	C	C	C	B
CLA	C	D	C	C	B	B	B	C	C	B	C	B
Secchi	C	D	D	D	C	C	B	C	C	C	C	C
Lake Grade	C	D	D	C	C	C	B	C	C	C	C	B

Year	2016	2017	2018	2019	2020	2021
TP	D	C	C	C	C	C
CLA	F	B	A	C	B	A
Secchi	F	D	B	C	C	B
Lake Grade	F	C	B	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [May Township] (82–0030) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Long Lake is located in May Township (Washington County). It has a surface area of 88 acres. The maximum depth is 3.7 m (12 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2016.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

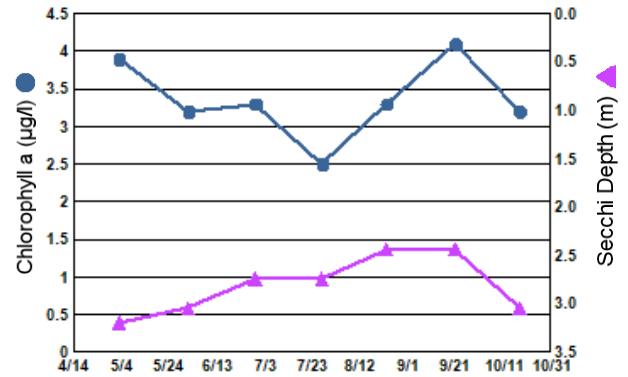
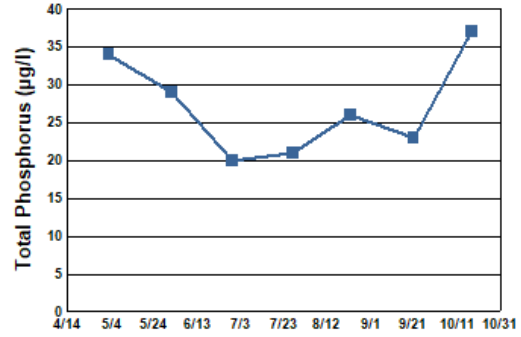
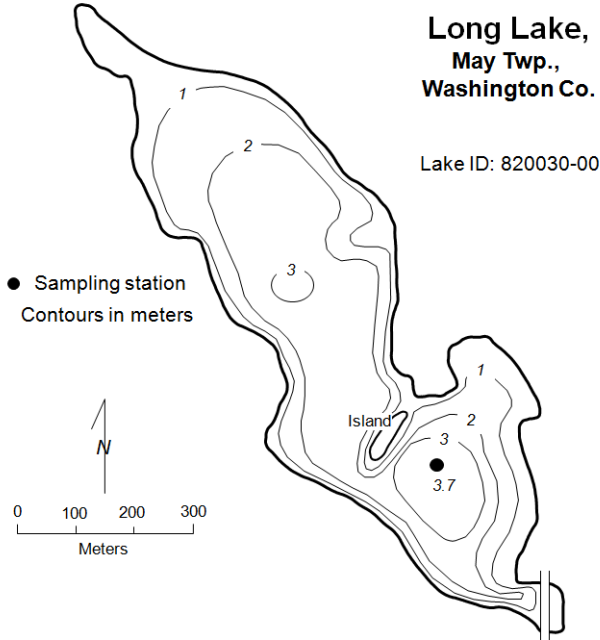
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	20	34	B
CLA (µg/l)	3.4	2.5	4.1	A
Secchi (m)	2.8	2.4	3.2	B
TKN (mg/l)	0.66	0.60	0.76	
			Lake Grade	B

The lake received a Secchi grade of B this year, which is consistent with its historical water quality database since 2003.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

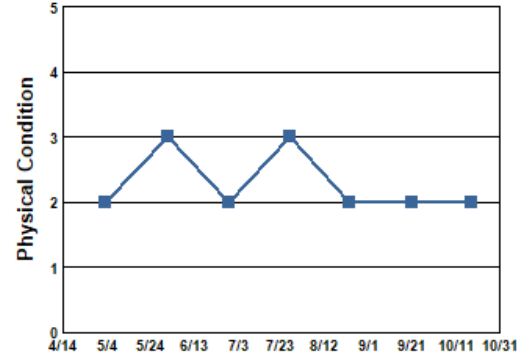
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

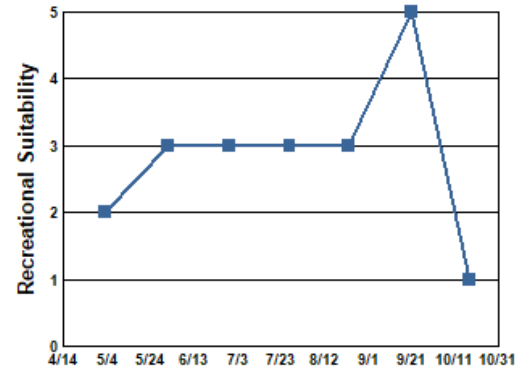


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	14.6	11.0	3.9	34	3.2	2	2
06/01/21	22.5	8.9	3.2	29	3.0	3	3
06/29/21	24.2	9.3	3.3	20	2.7	2	3
07/27/21	28.0	9.5	2.5	21	2.7	3	3
08/23/21	25.9	6.3	3.3	26	2.4	2	3
09/21/21	19.6	6.4	4.1	23	2.4	2	5
10/18/21	14.5	5.5	3.2	37	3.0	2	1



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C	C	C	C	C		C	C	C	C	C
CLA		C	C	C	B	C		B	B	B	B	A
Secchi		B	C	C	C	C		C	B	B	C	B
Lake Grade		C	C	C	C	C		C	B	B	C	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	C	C	B	B	C			C	B
CLA	A	B	A	B	A	A	A	A			B	A
Secchi	B	B	B	C	B	B	B	B		B	C	C
Lake Grade	B	B	B	C	B	B	B	B			C	B

Year	2016	2017	2018	2019	2020	2021
TP			B	B	C	B
CLA			A	A	A	A
Secchi			B	B	C	B
Lake Grade			B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [Washington County] (82–0068) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Long Lake is located within the City of Scandia (Washington County). The lake has a surface area of 35 acres. The maximum and mean depths are 2.1 m (6.9 ft) and 1.1 m (3.6 ft), respectively. The entire lake is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. Since the lake is relatively shallow, it does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

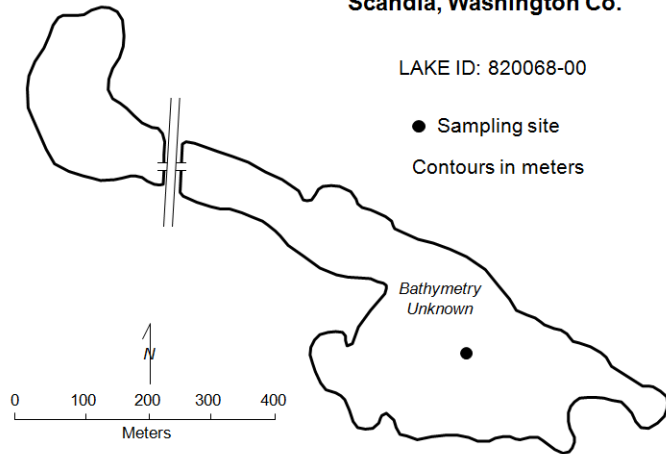
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	75	45	107	D
CLA (µg/l)	54	9.3	140	D
Secchi (m)	0.5	0.1	1.2	F
TKN (mg/l)	2.23	1.10	3.90	
			Lake Grade	D

The lake received a lake grade of D this year. The lake grades have fluctuated in the range of F to B to D/C since 1998. However, the F grades were received prior to 2004, suggesting that the lake's water quality is better than it was during the late 1990s and early 2000s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

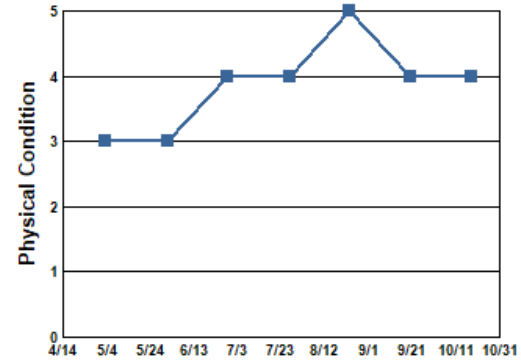
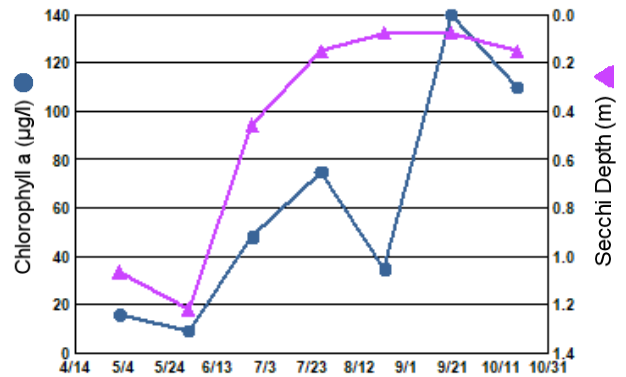
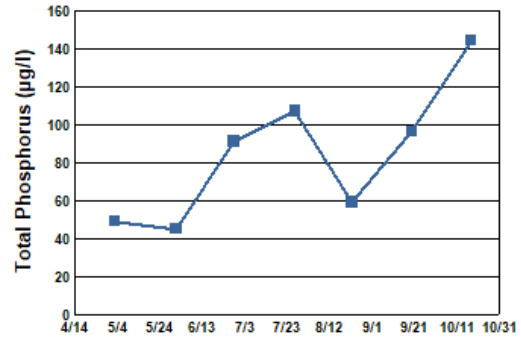
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Long Lake
Scandia, Washington Co.

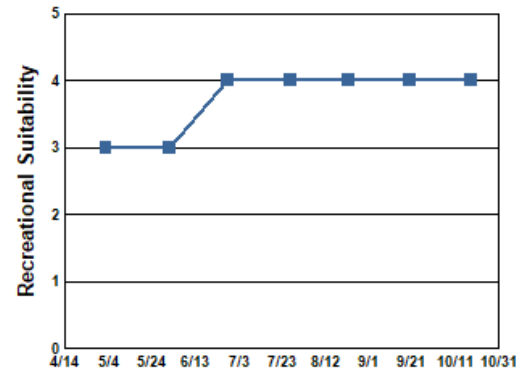


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	15.2	10.1	16	49	1.1	3	3
06/01/21	22.4	8.5	9.3	45	1.2	3	3
06/28/21	27.9	10.5	48	91	0.5	4	4
07/27/21	27.5	9.3	75	107	0.2	4	4
08/23/21	27.0	10.8	35	59	0.1	5	4
09/20/21	21.8	9.8	140	96	0.1	4	4
10/18/21	13.5	9.9	110	144	0.2	4	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							D	D	D	C	C	D
CLA							F	F	F	D	C	F
Secchi							F	F	F	D	D	F
Lake Grade							F	F	F	D	C	F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	D	C	C	D	C	D				C
CLA	D	C	B	C	A	C	C	C				D
Secchi	D	D	C	C	C	D	D	D				F
Lake Grade	D	D	C	C	B	D	C	D				D

Year	2016	2017	2018	2019	2020	2021
TP	D	C		C	C	D
CLA	C	B		C	D	D
Secchi	C	D		D	F	F
Lake Grade	C	C		C	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [Pine Springs] (82–0118) Valley Branch Watershed District

Volunteer: Frank Bastyr

Long Lake is located in Pine Springs Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 62 acres. The mean and maximum depths of the lake are 3.6 m (12 feet) and 10.4 m (34 feet), respectively. The lake's surface area and watershed area of 2,060 acres translates to a 33:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	9	61	B
CLA (µg/l)	7.1	1.4	20	A
Secchi (m)	3.0	2.4	4.1	A
TKN (mg/l)	0.67	0.45	0.84	
			Lake Grade	A

The lake received a lake grade of A this year. The lake grades have fluctuated between As and Cs since 2009, according to its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C							
CLA					B							
Secchi					C							
Lake Grade					C							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B										B
CLA		B										A
Secchi		C										B
Lake Grade		B										B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	B	B	A		B	B	A	A	A
CLA	B	B	C	A	A	A		A	A	A	A	A
Secchi	C	C	C	B	B	A		B	B	B	C	B
Lake Grade	C	C	C	B	B	A		B	B	A	B	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	B	B	B
CLA	A	A	A	A	B	A
Secchi	A	A	A	A	C	A
Lake Grade	A	A	A	A	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Long Lake [Mahtomedi] (82–0130) Rice Creek Watershed District

Volunteer: Kitty Francy-Payton

Long Lake is located within the City of Mahtomedi (Washington County). It has a surface area of 48 acres and a maximum depth of 7.7 m (25 feet). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2008.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

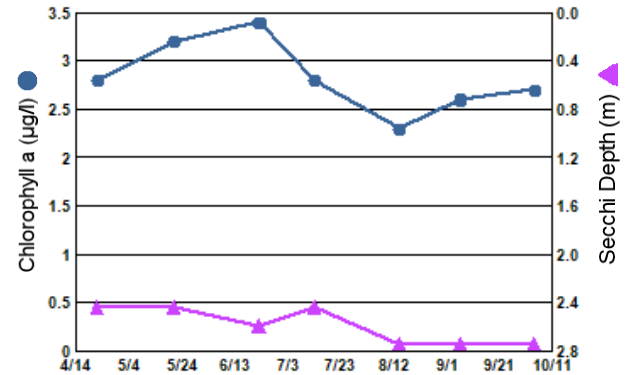
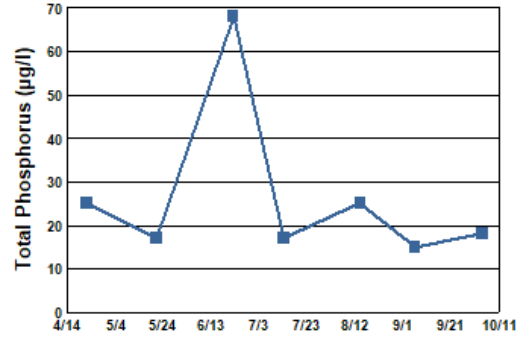
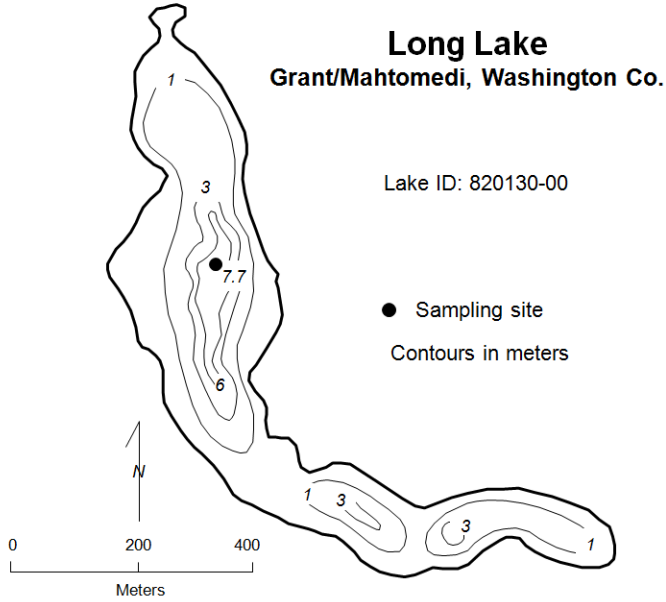
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	15	68	B
CLA (µg/l)	2.9	2.3	3.4	A
Secchi (m)	2.6	2.4	2.7	B
TKN (mg/l)	0.59	0.57	0.62	
			Lake Grade	B

The lake received a lake grade of B this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

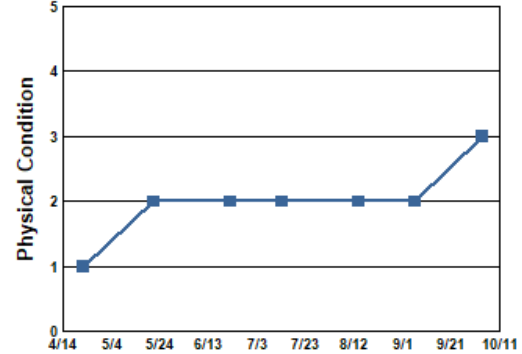
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

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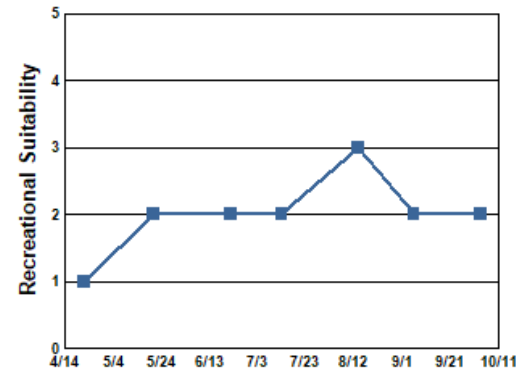


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	10.7		2.8	25	2.4	1	1
05/21/21	21.4		3.2	17	2.4	2	2
06/22/21	22.5		3.4	68	2.6	2	2
07/13/21	26.0		2.8	17	2.4	2	2
08/14/21	25.5		2.3	25	2.7	2	3
09/06/21	21.6		2.6	15	2.7	2	2
10/04/21	19.7		2.7	18	2.7	3	2



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- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												B
CLA												A
Secchi												B
Lake Grade												B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	C	B	C	A	A	A	B	B	B	C	A
CLA	A	A	A	A	A	A	A	A	C	A	C	A
Secchi	B	B	B	B	B	A	A	B	C	C	C	B
Lake Grade	A	B	B	B	A	A	A	B	C	B	C	A

Year	2016	2017	2018	2019	2020	2021
TP	B	A	B	B		B
CLA	A	A	A	A		A
Secchi	A	B	C	C		B
Lake Grade	A	A	B	B		B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lost Lake (27–0103) Bassett Creek Watershed Management Commission

Volunteer: Barrie Froseth

Lost Lake is located in the city of Plymouth (Hennepin County). The lake has a surface area of 22 acres and maximum depth of 1.8 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	114	76	126	D
CLA ($\mu\text{g/l}$)	77	38	120	F
Secchi (m)	0.6	0.4	0.9	F
TKN (mg/l)	2.91	2.40	3.50	
			Lake Grade	F

The lake received a lake grade of F this year which continues the streak of lower water quality compared to 2017–2019. Continued monitoring is recommended to determine if this recent deterioration in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP			F									
CLA			F									
Secchi			F									
Lake Grade			F									

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		F										
CLA		F										
Secchi		F										
Lake Grade		F										

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		D	D	D	D	D
CLA		C	D	D	F	F
Secchi		D	F	D	F	F
Lake Grade		D	D	D	F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lost Lake [north basin] (82–0134–01) Rice Creek Watershed District

Monitoring Personnel: Washington Conservation District staff

Lost Lake is located in the city of Mahtomedi (Washington County). The north basin is hydraulically connected to the south basin by a culvert under Highway 244 (Wildwood Road).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	65	34	105	C
CLA ($\mu\text{g/l}$)	16	2.3	35	B
Secchi (m)	>1.2	>0.6	>2.0	
TKN (mg/l)	0.91	0.70	1.20	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	C	C							
CLA			C	C	A							
Secchi			C	C	C							
Lake Grade			C	C	B							

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lotus Lake (10–0006) *City of Chanhassen*

Volunteer: Steve Donen

Lotus Lake is located within the City of Chanhassen (Carver County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 246 acres. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002, aquatic recreational use (nutrient/eutrophication biological indicators) in 2002, and aquatic life (fish bioassessments) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, brittle naiad (*Najas minor*) in 2017, zebra mussels (*Dreissena polymorpha*) in 2019.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	16	100	C
CLA (µg/l))	21	2.9	38	C
Secchi (m)	1.4	0.8	2.5	C
TKN (mg/l)	0.99	0.59	1.30	
			Lake Grade	C

The lake received a lake grade of C this year, which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP						C						
CLA						C					C	
Secchi	D					C			D	C	C	C
Lake Grade						C						

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								C	C			D
CLA								C	C			C
Secchi								C	C			D
Lake Grade								C	C			D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	B	C				
CLA	C	C	C	C	C	B	C	C				
Secchi	C	C	C	C	C	C	C	C				
Lake Grade	C	C	C	C	C	C	C	C				

Year	2016	2017	2018	2019	2020	2021
TP	C			B	C	C
CLA	C			C	C	C
Secchi	C			C	C	C
Lake Grade	C			C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lower Prior Lake [Site 2] (70–0026) *Prior Lake — Spring Lake Watershed District*

Volunteer: Amy Card

Prior Lake (lower basin) is located in the City of Prior Lake (Scott County). The lake is considered a Priority Water by the Metropolitan Council. The lower basin has a surface area of 957 acres. The maximum and mean depths of the basin are 18.3 m and 4.1 m, respectively. The lower basin has one inlet, which is the outlet from the upper basin of Prior Lake. The lower basin has one outlet via an outlet structure located at the southwestern portion of the basin. It was installed to regulate surface water elevations.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002 and aquatic life (fish bioassessments) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995 and zebra mussels (*Dreissena polymorpha*) in 2009.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	35	13	88	C
CLA (µg/l)	5.0	1.5	11	A
Secchi (m)	3.0	2.0	4.1	B
TKN (mg/l)	0.69	0.60	0.83	
			Lake Grade	B

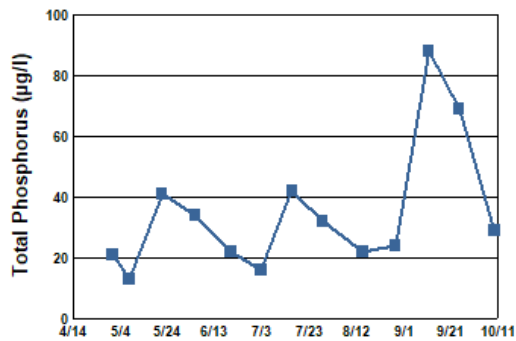
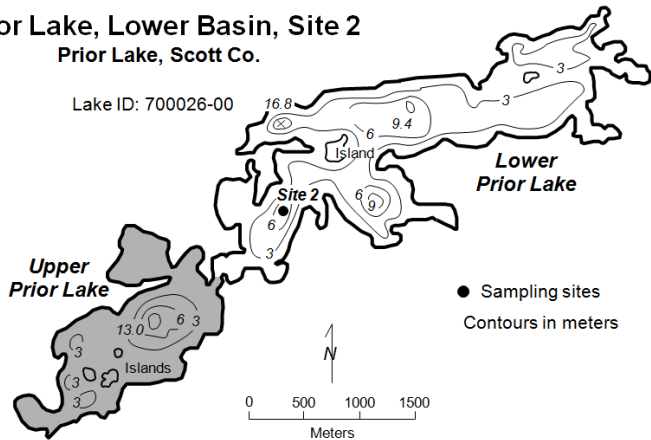
The lake site received a lake grade of B this year, which is a return to better water quality similar to that observed during the mid-2010s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

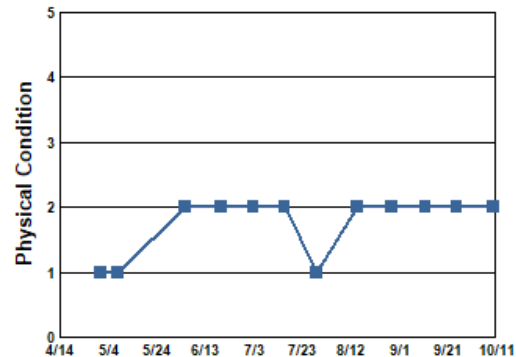
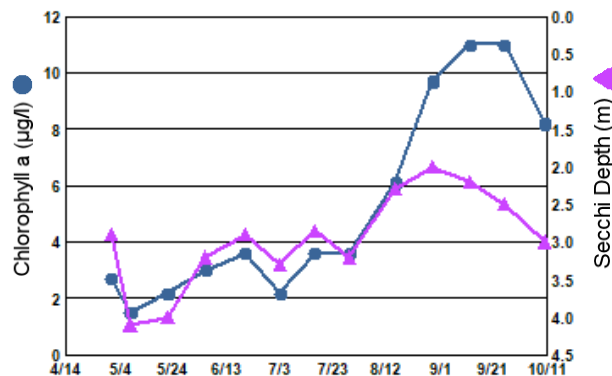
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Prior Lake, Lower Basin, Site 2
Prior Lake, Scott Co.

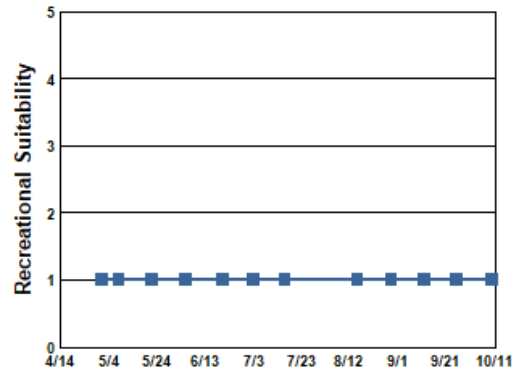


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/01/21	13.0		2.7	21	2.9	1	1
05/08/21	15.2		1.5	13	4.1	1	1
05/22/21	20.9		2.2	41	4.0		1
06/05/21	22.9		3.0	34	3.2	2	1
06/20/21	25.9		3.6	22	2.9	2	1
07/03/21	26.6		2.2	16	3.3	2	1
07/16/21	26.5		3.6	42	2.9	2	1
07/29/21	27.0		3.6	32	3.2	1	
08/15/21	24.9		6.1	22	2.3	2	1
08/29/21	24.9		9.7	24	2.0	2	1
09/12/21	22.4		11	88	2.2	2	1
09/25/21	19.6		11	69	2.5	2	1
10/10/21	20.3		8.2	29	3.0	2	1



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							B	C	B	B	C	
CLA							C	B	B	C	C	
Secchi							C	C	C	C	C	
Lake Grade							C	C	B	C	C	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP											B	B
CLA											B	B
Secchi											C	B
Lake Grade											B	B

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	C	C	C
CLA	A	A	A	C	B	A
Secchi	A	A	B	C	C	B
Lake Grade	A	A	A	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lucy Lake (10–0007) City of Chanhassen

Volunteer: Tim and Sharon McCotter

Lucy Lake is located within the City of Chanhassen (Carver County). It has a surface area of 87 acres and a maximum depth of 6.4 m (21 ft). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2007.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	49	11	76	
CLA (µg/l)	4.9	1.2	11	A
Secchi (m)	2.5	1.9	3.6	B
TKN (mg/l)	1.00	0.85	1.10	
			Lake Grade	

There was an insufficient quantity of TP values to calculate a TP grade. At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

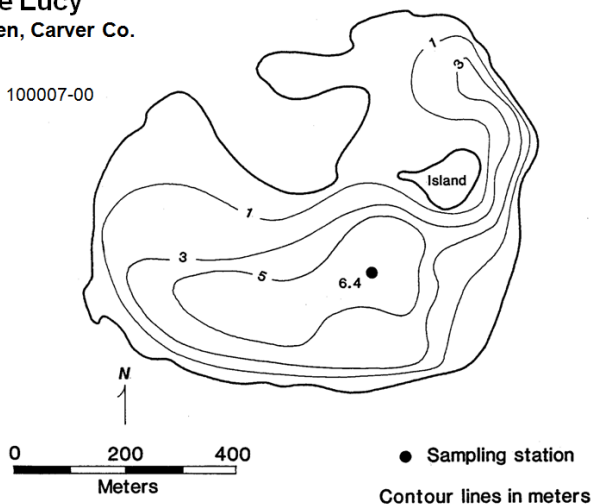
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

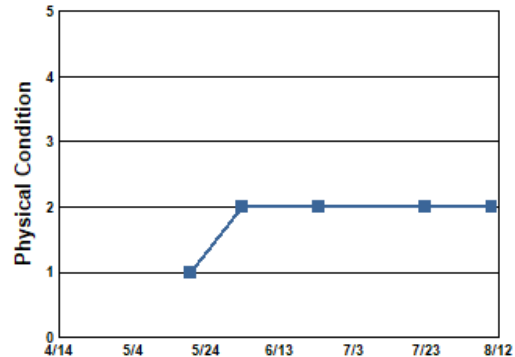
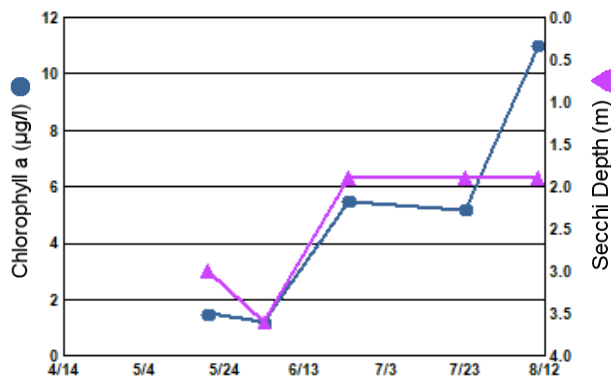
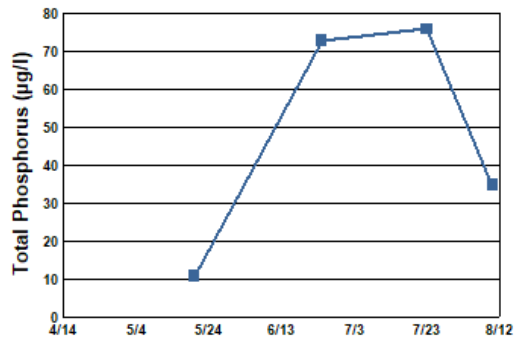
Lake Lucy
Chanhassen, Carver Co.

Lake ID: 100007-00

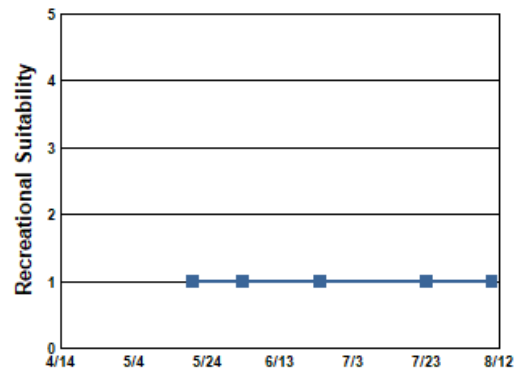


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/20/21	21.5		1.5	11	3.0	1	1
06/03/21	22.7		1.2		3.6	2	1
06/24/21	27.2		5.5	73	1.9	2	1
07/23/21	27.6		5.2	76	1.9	2	1
08/10/21	25.5		11	35	1.9	2	1



1 = Crystal Clear
2 = Some Algae Present
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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP						C						
CLA						C						
Secchi						C					C	C
Lake Grade						C						

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi	C	C	C	C	C	C	D	C	C	C	C	C
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP						C	C	C	D	C	C	C
CLA						C	C	B	C	C	B	C
Secchi	D	D	C	C	D	C	C	C	C	C	C	D
Lake Grade						C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	
CLA	C	C	C	B	B	A
Secchi	C	C	D	C	C	B
Lake Grade	C	C	C	C	C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lynch Lake [Site 1, North Basin] (82–0042) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Lynch Lake is located in Washington County. It has a surface area of 43 acres. The depth of the lake at the north basin site was approximately 0 – 2 m. There are few known morphological data available for the lake. Note that some previous Annual lake reports (2006 – 2009) erroneously placed site #1 in the south basin. The monitoring actually took place in the north basin during the 2006 – 2009 monitoring seasons.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2010.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	86	47	153	D
CLA (µg/l)	32	10	59	C
Secchi (m)	0.9	0.5	1.5	D
TKN (mg/l)	1.44	0.82	2.00	
			Lake Grade	D

The north basin received a lake grade of D this year. The lake has been in the C and D grade range since 2016. Prior to then the water quality was typically an F.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			F	F	F	F	F	F	D	D	D	D
CLA			F	F	F	F	F	D	C	F	F	F
Secchi			F	F	F	F	F	F	D	F	F	F
Lake Grade			F	F	F	F	F	F	D	F	F	F

Year	2016	2017	2018	2019	2020	2021
TP	D	C	C	D	D	D
CLA	D	C	B	D	C	C
Secchi	F	D	C	D	D	D
Lake Grade	D	C	C	D	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lynch Lake [Site 2, South Basin] (82–0042) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Lynch Lake is located in Washington County. It has a surface area of 43 acres. The depth of the lake at the south site was approximately 5 to 6 m. There are little known morphological data available for the lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2010.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

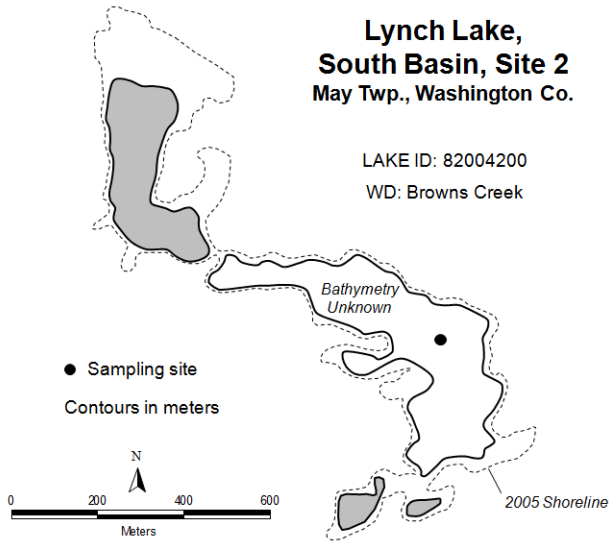
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	25	56	C
CLA (µg/l)	14	4.8	34	B
Secchi (m)	1.9	1.5	2.4	C
TKN (mg/l)	1.01	0.78	1.40	
			Lake Grade	C

The south site received a lake grade of C this year which is consistent with its historical water quality database. The lake grades for Site 2 has generally improved from Fs to Cs since 2010.

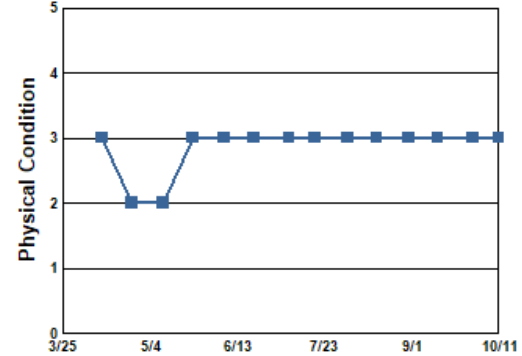
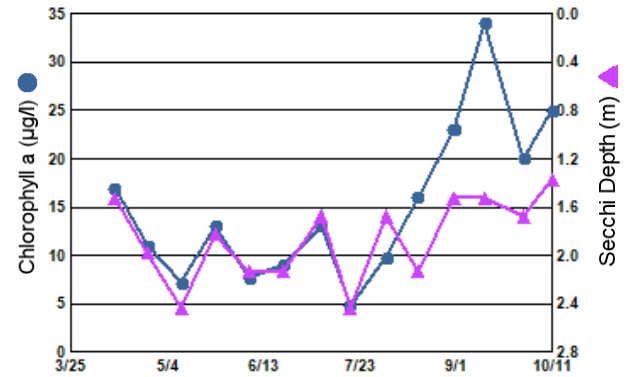
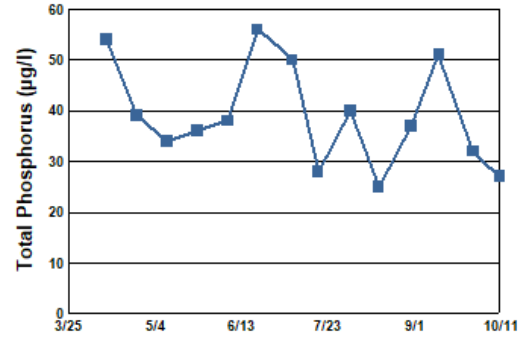
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

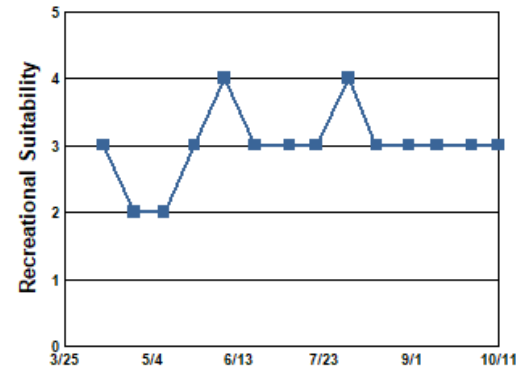


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.2	11.7	17	54	1.5	3	3
04/26/21	9.3	10.9	11	39	2.0	2	2
05/10/21	14.4	10.6	7.2	34	2.4	2	2
05/24/21	22.1	8.3	13	36	1.8	3	3
06/07/21	27.7	8.0	7.7	38	2.1	3	4
06/21/21	23.1	7.0	9.0	56	2.1	3	3
07/07/21	25.0	6.3	13	50	1.7	3	3
07/19/21	26.9	7.7	4.8	28	2.4	3	3
08/03/21	25.2	7.6	9.8	40	1.7	3	4
08/16/21	24.5	8.1	16	25	2.1	3	3
08/31/21	24.0	8.5	23	37	1.5	3	3
09/13/21	21.0	7.8	34	51	1.5	3	3
09/29/21	18.5	11.1	20	32	1.7	3	3
10/11/21	19.7	8.0	25	27	1.4	3	3



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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP							D	D	D	C	C	C
CLA							F	D	F	C	C	D
Secchi							F	D	D	D	D	F
Lake Grade							F	D	D	C	C	D

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	B	B	C	A	B
Secchi	C	D	C	C	C	C
Lake Grade	C	C	C	C	B	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Magda Lake (27–0065) Shingle Creek Watershed Management Commission

Volunteer: Carolyn Dindorf

Magda Lake is located in the City of Brooklyn Park (Hennepin County). Little morphological data are available for the lake.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2015. The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	79	34	169	D
CLA (µg/l)	14	1.4	55	B
Secchi (m)	>1.3	>0.9	1.6	
TKN (mg/l)	1.00	0.76	1.40	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The lake continues to receive D grades for total phosphorus.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								D	D			F
CLA								D	C			F
Secchi								F	F			F
Lake Grade								D	D			F

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			F			D			D			D
CLA			F			D			F			C
Secchi			F			F			F			D
Lake Grade			F			D			F			D

Year	2016	2017	2018	2019	2020	2021
TP						D
CLA						B
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Marion Lake (19–0026) *City of Lakeville*

Volunteer: Gabrielle and Brian Gallagher

Marion Lake is located in the City of Lakeville (Dakota County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of approximately 560 acres, and has a maximum depth of 6.4 m (21 feet). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1998 and zebra mussels (*Dreissena polymorpha*) in 2017.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

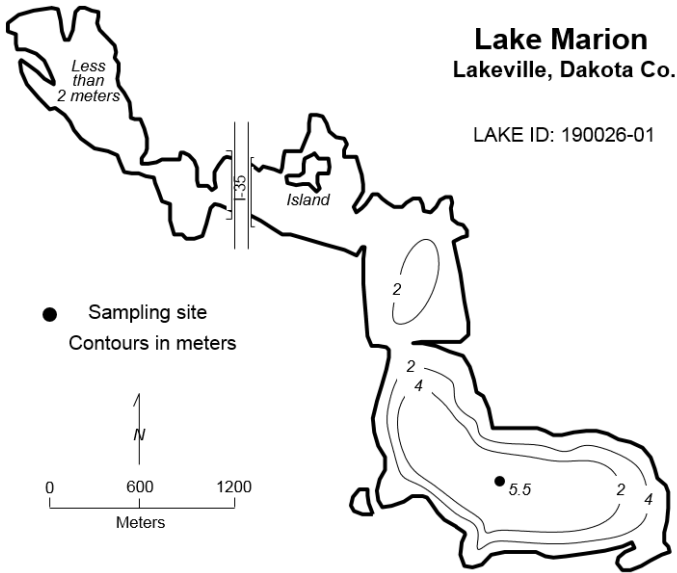
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	16	33	B
CLA (µg/l)	13	1.9	30	B
Secchi (m)	2.5	1.5	3.9	B
TKN (mg/l)	0.70	0.54	0.83	
			Lake Grade	B

The lake received a lake grade of B this year. The surface water quality of the lake has varied in the A to B range for the past 10 years according to its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

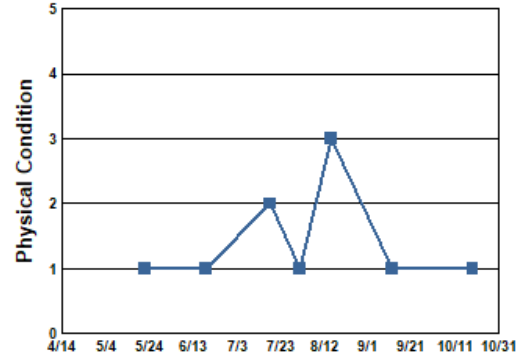
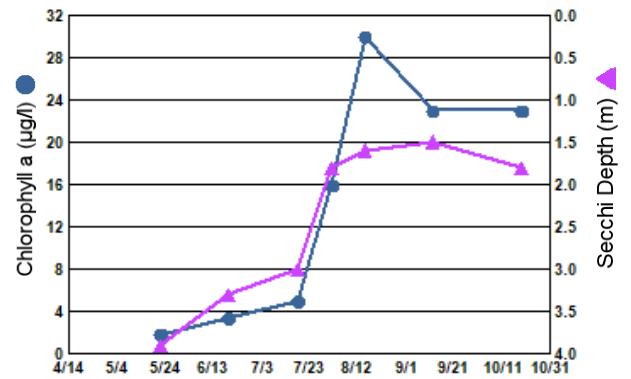
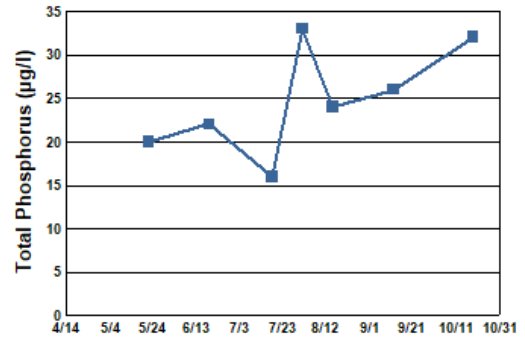
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

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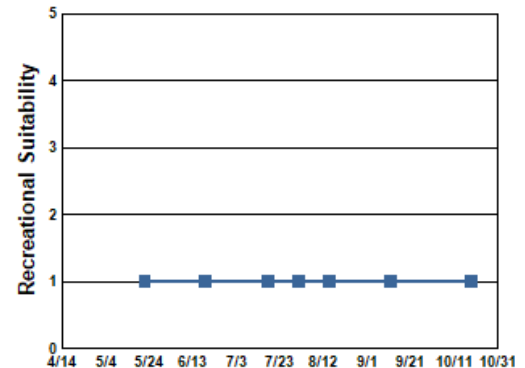


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/22/21	21.4		1.9	20	3.9	1	1
06/19/21	24.7		3.4	22	3.3	1	1
07/18/21	26.8		5.0	16	3.0	2	1
08/01/21	26.2		16	33	1.8	1	1
08/15/21	24.6		30	24	1.6	3	1
09/12/21	21.9		23	26	1.5	1	1
10/19/21	16.1		23	32	1.8	1	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C	C		C				C		C		
CLA	C	D		C				C		C		
Secchi	C	D		B				C		C	C	C
Lake Grade	C	D		C				C		C		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			B					B	B	B	C	B
CLA			A					B	A	B	B	C
Secchi			B					C	B	B	C	C
Lake Grade			B					B	B	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	C	B	B	A	A	B
CLA	C	C	C	C	C	C	C	B	B	B	A	B
Secchi	C	C	C	C	B	C	C	C	C	C	B	B
Lake Grade	C	C	C	C	C	C	C	B	B	B	A	B

Year	2016	2017	2018	2019	2020	2021
TP	B	C	A	B	C	B
CLA	B	B	A	B	B	B
Secchi	B	B	B	B	B	B
Lake Grade	B	B	A	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Markgrafs Lake (82–0089) *City of Woodbury*

Monitoring Personnel: Washington Conservation District staff

Markgrafs Lake is located within the City of Woodbury (Washington County). It has a surface area of approximately 46 acres, and a maximum depth of 2.4 m (8 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake has a piped outlet on the southern end. Downstream from the outlet is a valve that can direct the overflow to either Powers or Wilmes lakes.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	114	72	160	D
CLA (µg/l)	59	12	140	D
Secchi (m)	0.7	0.3	1.1	D
TKN (mg/l)	1.79	1.20	2.50	
			Lake Grade	D

The lake received a lake grade of D this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			D	C	D	D	F	D	D	F	F	D
CLA			C	B	B	C	F	C	C	C	C	C
Secchi			D	C	C	D	F	D	C	D	F	D
Lake Grade			D	C	C	D	F	D	C	D	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	F	D	D	F	F	D	F	D	D	D
CLA	D	C	D	D	D	F	F	D	F	D	C	D
Secchi	F	F	F	F	F	F	F	F	F	F	D	F
Lake Grade	D	D	F	D	D	F	F	D	F	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	D	C	C	C	C	D
Secchi	F	F	F	D	D	D
Lake Grade	D	D	D	D	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Masterman Lake (82–0126) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Masterman Lake is located in Grant Township (Washington County). It has a surface area of 45 acres. There is very little known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	23	14	43	B
CLA ($\mu\text{g/l}$)	3.8	1.5	9.7	A
Secchi (m)	>1.4	>0.9	>1.8	
TKN (mg/l)	0.62	0.52	0.81	
			Lake Grade	

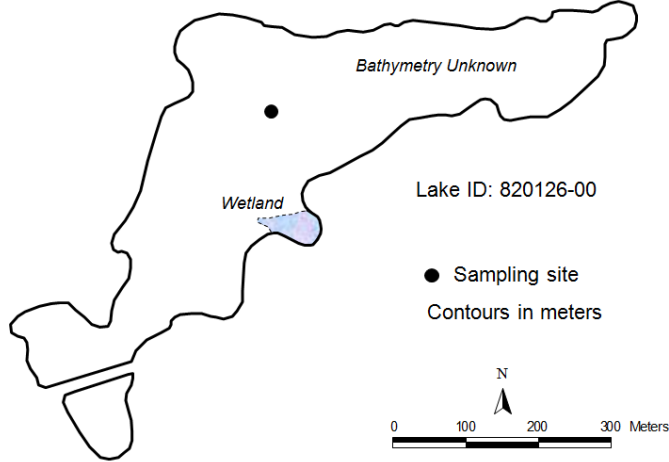
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

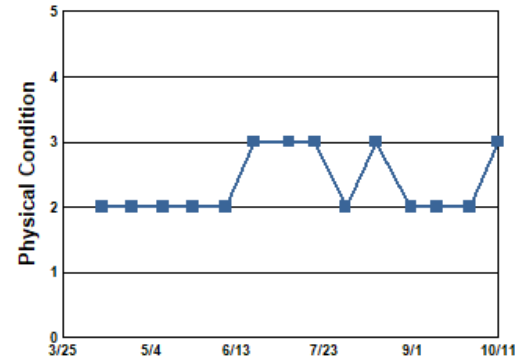
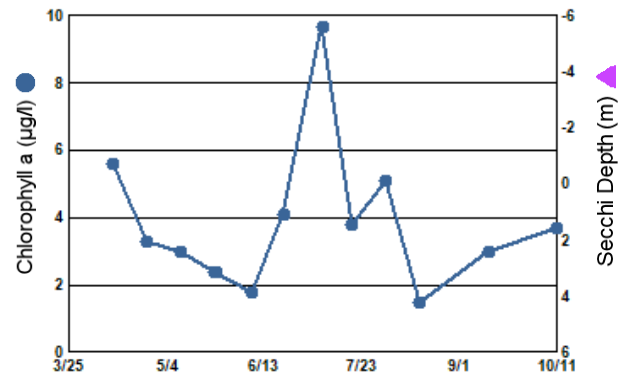
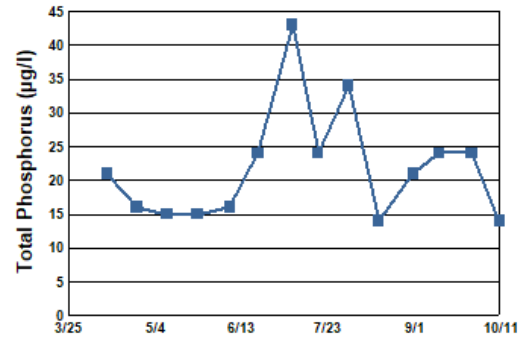
Masterman Lake
Grant, Washington Co.



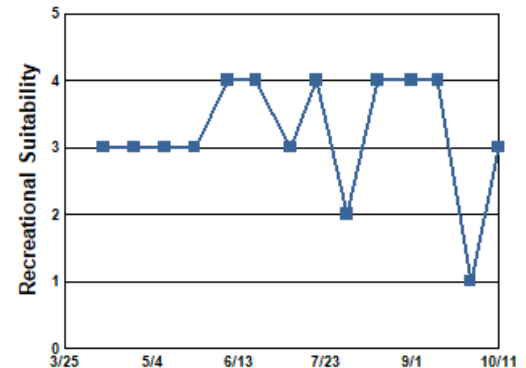
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.9	11.3	5.6	21	>1.8	2	3
04/26/21	9.5	11.9	3.3	16	>1.8	2	3
05/10/21	15.4	10.7	3.0	15	>1.8	2	3
05/24/21	23.4	8.4	2.4	15	>1.7	2	3
06/08/21	27.1	8.7	1.8	16	>1.8	2	4
06/21/21	23.5	5.8	4.1	24	>1.5	3	4
07/07/21	25.5	7.0	9.7	43	>1.5	3	3
07/19/21	27.9	8.1	3.8	24	>1.2	3	4
08/02/21	24.1	5.7	5.1	34	>1.2	2	2
08/03/21							
08/16/21	25.7	8.4	1.5	14	>0.9	3	4
09/01/21	23.3	6.8		21	>1.4	2	4
09/13/21	21.1	7.1	3.0	24	>1.2	2	4
09/28/21	17.7	9.0		24	>1.2	2	1
10/11/21	18.3	7.1	3.7	14	>1.2	3	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C	C	C	C	C	C	C	B	A	A
CLA			B	B	B	B	C	B	B	A	A	A
Secchi			C	C	C	C	C	C				
Lake Grade			C	C	C	C	C	C				

Year	2016	2017	2018	2019	2020	2021
TP	B	B	B	B	B	B
CLA	B	B	A	A	B	A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Mays Lake (82–0033) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Mays Lake is located in Mays Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	>3.5	2.7	4.0	A
TKN (mg/l)				
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a Secchi grade of A this year, which is consistent with its historical water quality database. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

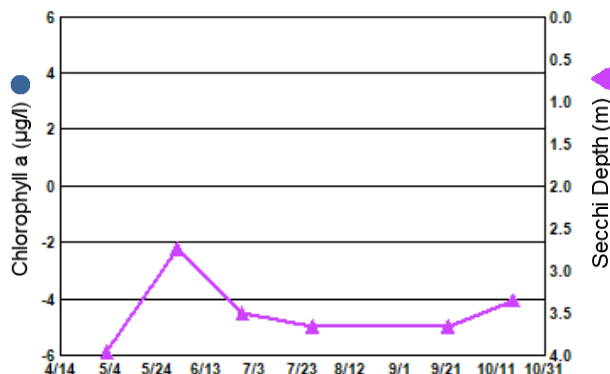
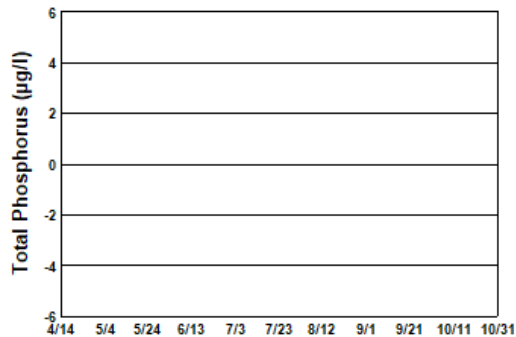
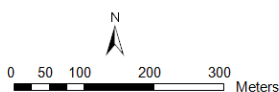
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Mays Lake
May Twp., Washington Co.

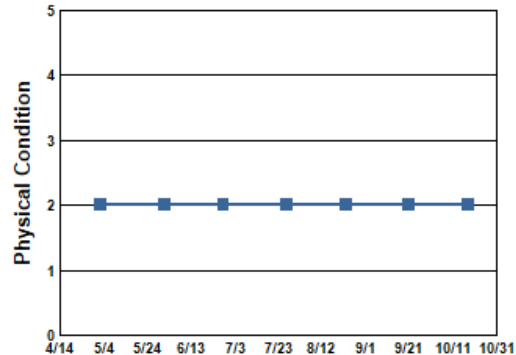
Lake ID: 820033-00

● Sampling site
Contours in meters



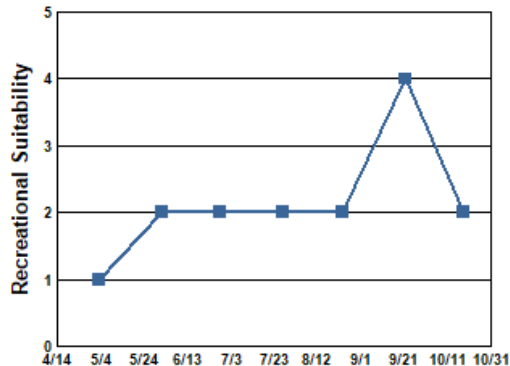
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21					4.0	2	1
06/01/21					2.7	2	2
06/28/21					3.5	2	2
07/27/21					3.7	2	2
08/23/21					>3.7	2	2
09/21/21					3.7	2	4
10/18/21	15.6	6.7			3.4	2	2



> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					A	A	A				A	A
CLA					A	A	A				A	A
Secchi					A	A	A	A	A	A	A	
Lake Grade					A	A	A				A	

Year	2016	2017	2018	2019	2020	2021
TP			A	A		
CLA			A	A		
Secchi			A	A	A	A
Lake Grade			A	A		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

McDonald Lake (82–0010) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

McDonald Lake is a 54-acre land-locked (no outlet) lake located within Baytown Township (Washington County). The mean and maximum depth of the lake is 1.8 m and 3.7 m . The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	30	82	C
CLA (µg/l)	9.4	3.6	18	A
Secchi (m)	2.1	1.4	2.7	C
TKN (mg/l)	0.89	0.72	1.00	
			Lake Grade	B

The lake received a lake grade of B this year which is the best lake grade received to date according to its historical water quality database. The B grade was driven by unusually low CLA concentrations, which translated into a CLA grade of A. Usually this lake receives C grades for CLA. Aquatic vegetation was observed to be minimal to slight at the monitoring site. Water color was observed to be brown for most of the monitoring visits so the reduced water clarity (relative to CLA) may have been due to suspended solids in the water column.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								C		C	C	C
CLA								B		C	C	C
Secchi							C	C	C	C	C	C
Lake Grade								C		C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C		D	D	C	C	D
CLA	B	B	C	F	C	B		C	C	C	C	C
Secchi	B	C	C	C	C	C		D	C	C	C	D
Lake Grade	B	C	C	D	C	C		D	C	C	C	D

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C		C
CLA	D	C	C	C	C	A
Secchi	D	F	D	C	C	C
Lake Grade	D	D	C	C		B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

McKusick Lake (82–0020) Middle St. Croix Watershed Management Organization

Monitoring Personnel: Washington Conservation District staff

McKusick Lake is located in the City of Stillwater (Washington County). The lake has surface area of 46 acres, and a maximum depth of 4.7 m (15 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

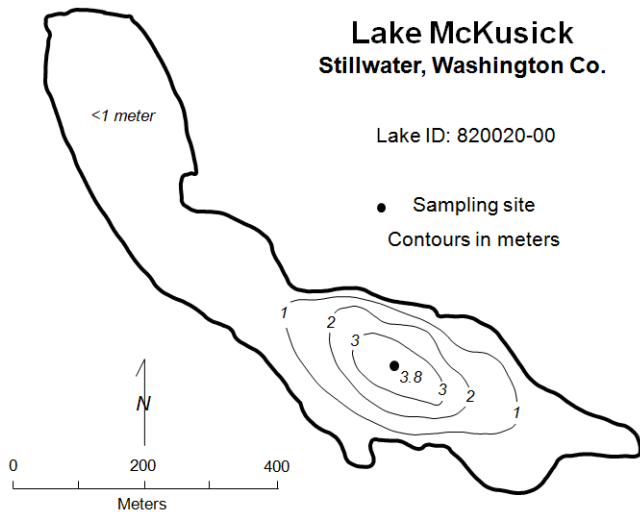
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	38	28	57	C
CLA (µg/l)	8.7	3.1	26	A
Secchi (m)	>2.0	>0.6	>3.5	
TKN (mg/l)	0.76	0.68	0.88	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a TP grade of C and a CLA grade of A this year which are consistent with its historical water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

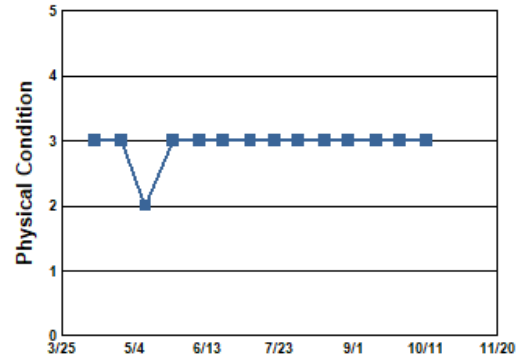
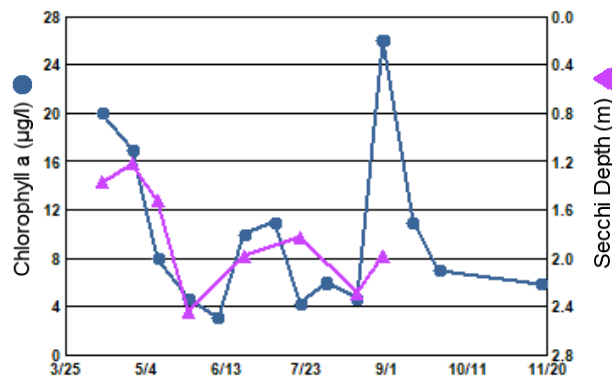
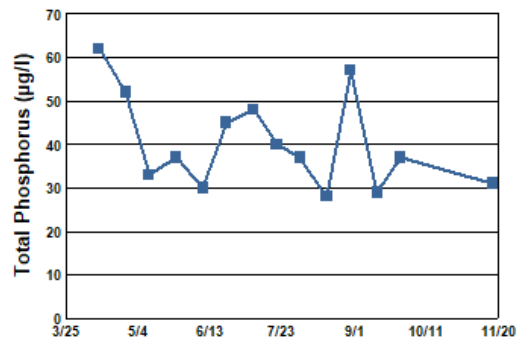
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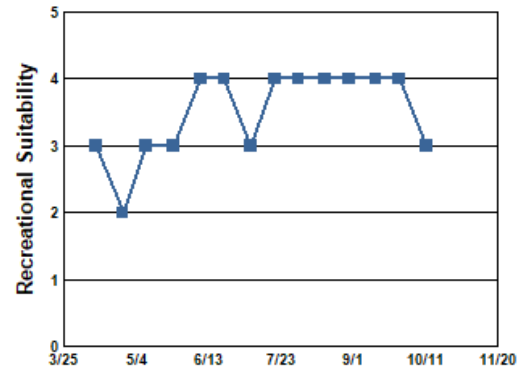
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.3	8.8	20	62	1.4	3	3
04/27/21	8.9	10.7	17	52	1.2	3	2
05/10/21	15.4	9.7	8.0	33	1.5	2	3
05/25/21	23.3	8.7	4.7	37	2.4	3	3
06/09/21	27.9	9.4	3.1	30	>3.5	3	4
06/22/21	21.9	5.3	10	45	2.0	3	4
07/07/21	24.6	3.0	11	48	>0.8	3	3
07/20/21	25.0	3.3	4.3	40	1.8	3	4
08/02/21	24.1	1.3	6.0	37	>0.6	3	4
08/17/21	23.4	5.5	4.7	28	2.3	3	4
08/30/21	22.8	6.3	26	57	2.0	3	4
09/14/21	19.8	5.7	11	29	>2.6	3	4
09/27/21	17.0	8.0	7.0	37	>2.1	3	4
10/12/21	18.3	6.0			>2.0	3	3
11/17/21			5.9	31			

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
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3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			D	D	D	C	D	D	C	C	C	C
CLA			D	C	C	C	D	D	B	B	C	B
Secchi			D	D	D	C	D	D	B	B	D	C
Lake Grade			D	D	D	C	D	D	B	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	C	C	B	C	C	C	C	C
CLA	A	B	B	B	B	A	A	C	A	B	B	C
Secchi	B	C	C	C	C	B	B	B	B	C	C	C
Lake Grade	B	C	C	C	C	B	B	C	B	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	B	B	B	A	A	A
Secchi	C	C	C		C	
Lake Grade	C	C	C		B	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

McMahon Lake (70–0050) *Scott Watershed Management Organization*

Volunteer: Robert Weierke

McMahon Lake, also known as Carl's Lake, is located in Spring Lake Township (Scott County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 110 acres and a maximum depth of 4.5 m (14 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2012. The MPCA delisted the lake for aquatic recreational use (nutrient/eutrophication biological indicators) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2007.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	50	14	75	C
CLA (µg/l)	32	1.1	69	C
Secchi (m)	1.5	0.5	4.0	C
TKN (mg/l)	1.11	0.46	1.70	
			Lake Grade	C

The lake received a lake grade of C this year, which is continuation of a string of C grades. The lake historically has been characterized as a D lake. Recent monitoring has shown improvements in water quality.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	F				D							
CLA	F				D							
Secchi	C				D							
Lake Grade	D				D							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				D			D			D		
CLA				D			D			D		
Secchi				C			D			D		
Lake Grade				D			D			D		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	C	C	D	C	C	D	C	B	C	C
CLA		F	D	C	C	C	B	C	C	C	C	C
Secchi		D	D	D	D	D	C	C	C	C	C	C
Lake Grade		D	D	C	D	C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	D	C	C	C
CLA	C	C	C	D	C	C
Secchi	C	B	C	C	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Meadow Lake (27–0057) Shingle Creek Watershed Management Commission

Volunteer: Michelle Stano, Al Stano

Meadow Lake is located in the City of New Hope (Hennepin County). It has a surface area of 11 acres. The lake has a maximum depth of 1.2 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's watershed area is about 440 acres which gives a watershed-to-lake area ratio is 40:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	162	136	193	
CLA (µg/l)	25	12	43	
Secchi (m)	>0.5	>0.3	>0.6	
TKN (mg/l)	2.43	1.90	2.90	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					F			F			F	
CLA					F			F			F	
Secchi					F			F			F	
Lake Grade					F			F			F	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		F			F			F			F	
CLA		D			F			F			F	
Secchi		F			F			F				
Lake Grade		F			F			F				

Year	2016	2017	2018	2019	2020	2021
TP					D	
CLA					C	
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Medicine Lake [Site 1, Southwest Bay] (27–0104) Bassett Creek Watershed Management Commission

Volunteer: Denny Strunc

Medicine Lake is located mainly in the City of Plymouth (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 886 acres. The maximum depth of the lake is 14.9 m (49 ft). Approximately 45 percent of the surface area of the lake is littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004 and aquatic consumption (mercury in fish tissue) in 2004. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2017, and starry stonewort (*Nitellopsis obtusa*) in 2018.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	41	23	82	C
CLA (µg/l)	18	2.3	42	B
Secchi (m)	1.9	1.0	3.5	C
TKN (mg/l)	0.85	0.57	1.10	
			Lake Grade	C

This lake site received a lake grade of C this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA				C								
Secchi				C								
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C					C				
CLA												
Secchi			C					C				
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C		C		C	C	C	C	C	C
CLA							C	C	C	C	C	C
Secchi			C		C		C	C	C	C	C	B
Lake Grade							C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	C	C	C	C	B
Secchi	C	C	C	C	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Medicine Lake [Site 2, Main Lake] (27–0104) Bassett Creek Watershed Management Commission

Volunteer: Randy Mikolai

Medicine Lake is located mainly in the City of Plymouth (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 886 acres. The maximum depth of the lake is 14.9 m (49 ft). Approximately 45 percent of the surface area of the lake is littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004 and aquatic consumption (mercury in fish tissue) in 2004. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2017, and starry stonewort (*Nitellopsis obtusa*) in 2018.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	24	72	C
CLA (µg/l)	10	1.4	26	B
Secchi (m)	2.2	1.4	3.1	B
TKN (mg/l)	0.85	0.66	1.20	
			Lake Grade	B

Site 2 received a lake grade of B this year which is an improvement in water quality compared to the C grades received in the past according to its historical water quality database. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP		C		C							C	C
CLA		D		C							D	C
Secchi		C		C							C	C
Lake Grade		C		C							C	C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C				C				
CLA												
Secchi			C	C				C				
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C		C	C	C	C	C	C	C	C	C	C
CLA								C	B	C	B	
Secchi	C		C	C	C	C	C	C	C	C	C	B
Lake Grade								C	C	C	C	

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	C	C	C	B	B
Secchi	C	C	C	C	B	B
Lake Grade	C	C	C	C	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Minnetoga Lake (27–0088) *Nine Mile Creek Watershed District*

Volunteer: Holly Birkeland, Sig Birkeland

Lake Minnetoga is located in Minnetonka, Hennepin County. The lake has a surface area of 14.4 acres, and an average depth of 3.9 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	49	23	111	C
CLA (µg/l)	7.2	2.5	12	A
Secchi (m)	1.5	0.7	2.1	C
TKN (mg/l)	0.92	0.69	1.10	
			Lake Grade	B

The lake received a lake grade of B this year. The lake grades have varied in the B to C range since 2007. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

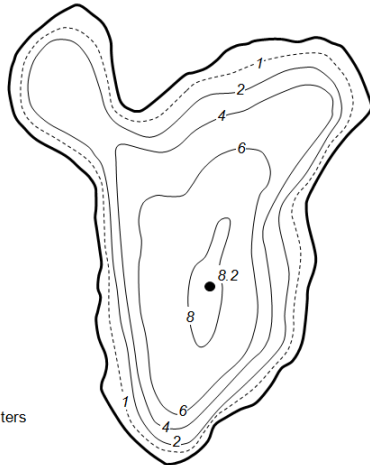
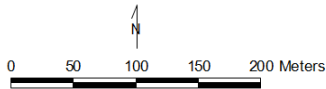
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Minnetoga
Minnetonka, Hennepin Co.

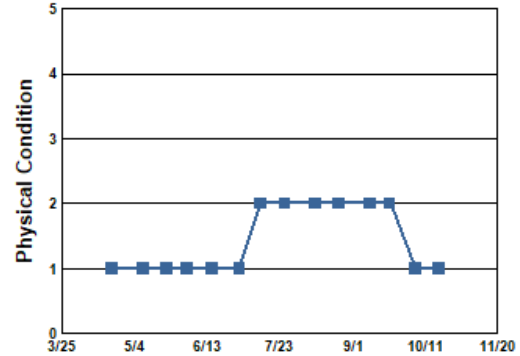
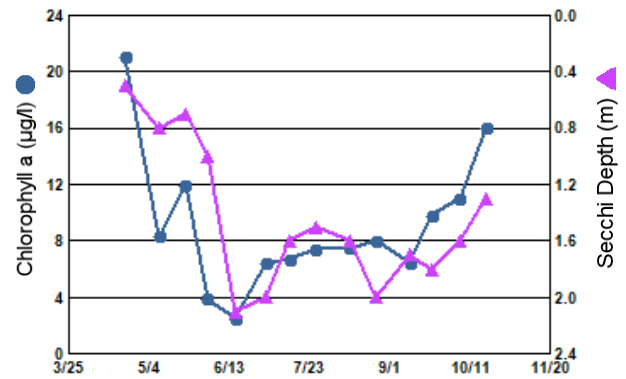
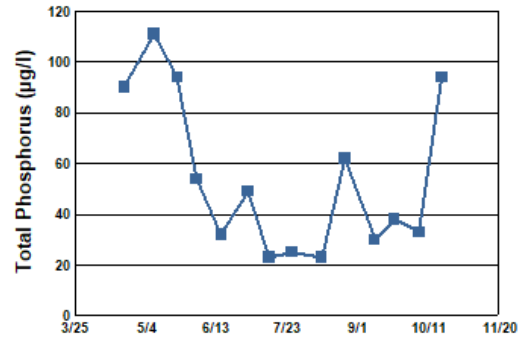
Lake ID: 270088-00

● Sampling site
Contours in meters

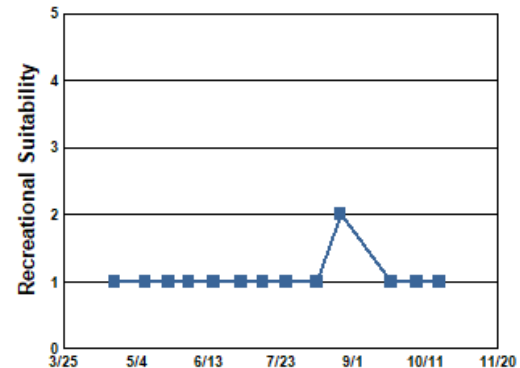


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	11.2		21	90	0.5	1	1
05/09/21	15.5		8.3	111	0.8	1	1
05/22/21	22.5		12	94	0.7	1	1
06/02/21	18.9		3.9	54	1.0	1	1
06/16/21	27.1		2.5	32	2.1	1	1
07/01/21	25.8		6.4	49	2.0	1	1
07/13/21	27.0		6.7	23	1.6	2	1
07/26/21	30.2		7.4	25	1.5	2	1
08/12/21	25.8		7.5	23	1.6	2	1
08/25/21	25.4		8.0	62	2.0	2	2
09/11/21			6.5	30	1.7	2	
09/22/21	21.4		9.8	38	1.8	2	1
10/06/21	19.7		11	33	1.6	1	1
10/19/21	15.6		16	94	1.3	1	1



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				C	B		B	C	B	C	B	B
CLA				C	A		A	B	A	C	B	A
Secchi				C	B		B	C	B	B	C	C
Lake Grade				C	B		B	C	B	C	B	B

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	A	A	A	A	A	A
Secchi	C	C	C	C	C	C
Lake Grade	B	B	B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Minnewashta Lake [Site-1] (10-0009) City of Chanhassen

Volunteer: Kevin Zahler

Minnewashta Lake is located in the city of Chanhassen (Carver County). The lake is considered a Priority Water by the Metropolitan Council. . It is a relatively large lake with a surface area of 677 acres. The maximum depth of the lake is 21.3 m (70 feet).

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2004. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995 and zebra mussels (*Dreissena polymorpha*) in 2016.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	20	10	32	A
CLA (µg/l)	2.1	1.0	3.9	A
Secchi (m)	3.5	2.2	5.0	A
TKN (mg/l)	0.65	0.57	0.71	
			Lake Grade	A

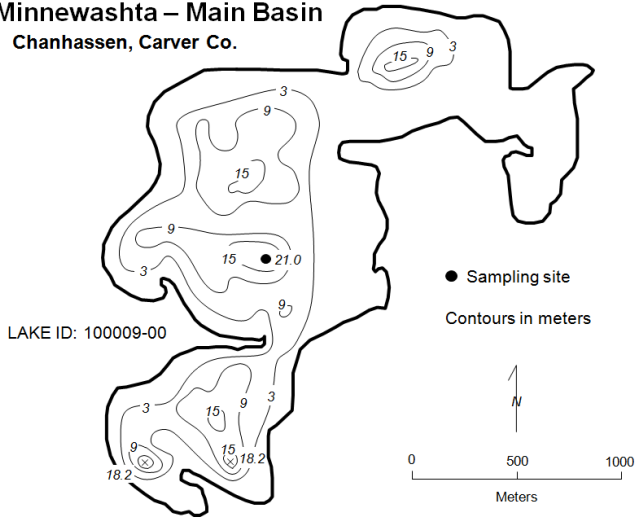
Site 1 received a lake grade of A this year which is consistent with its historical water quality database.. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

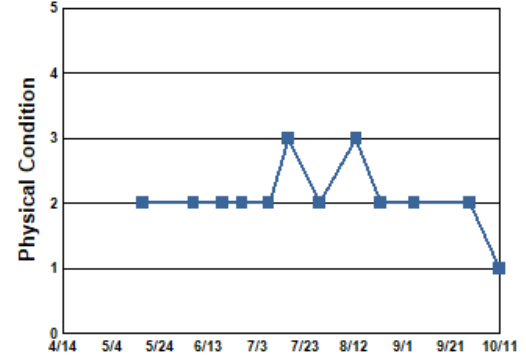
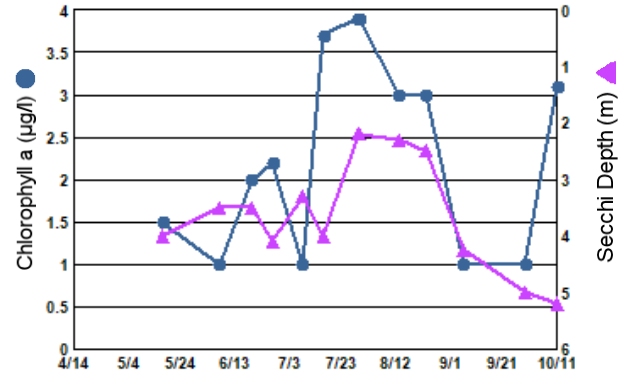
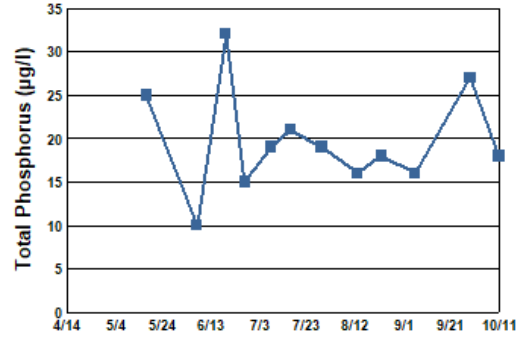
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Minnewashta – Main Basin
Chanhassen, Carver Co.

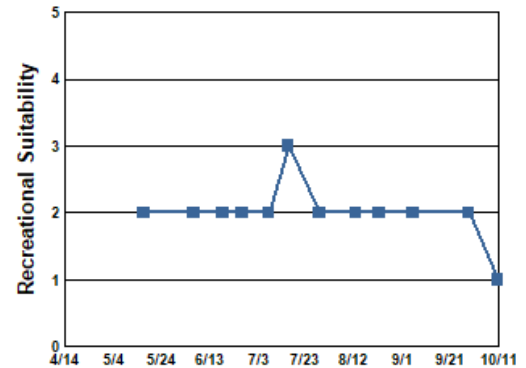


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/17/21	18.3		1.5	25	4.0	2	2
06/07/21	26.0		1.0	10	3.5	2	2
06/19/21	25.4		2.0	32	3.5	2	2
06/27/21	25.3		2.2	15	4.1	2	2
07/08/21	24.6		1.0	19	3.3	2	2
07/16/21	24.6		3.7	21	4.0	3	3
07/29/21	26.7		3.9	19	2.2	2	2
08/13/21	24.2		3.0	16	2.3	3	2
08/23/21	24.2		3.0	18	2.5	2	2
09/06/21	22.0		1.0	16	4.3	2	2
09/29/21	19.2		1.0	27	5.0	2	2
10/11/21	18.4		3.1	18	5.2	1	1



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					A						A	
CLA					A						A	
Secchi					A						A	
Lake Grade					A						A	

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		A				A	A	A			A	A
CLA		A				A	A	A			B	A
Secchi		A				A	A	B			B	B
Lake Grade		A				A	A	A			B	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP			A	A	A	A
CLA			A	A	A	A
Secchi			C	B	B	A
Lake Grade			B	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Mitchell Lake (27–0070) City of Eden Prairie

Volunteers: Debbie Olson, Douglas Olson

Mitchell Lake is located in the City of Eden Prairie (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 112 acres. The maximum depth of the lake is 5.8 m (19 feet). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2004.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	54	26	76	C
CLA (µg/l)	20	2.2	42	B
Secchi (m)	1.5	0.5	3.3	C
TKN (mg/l)	1.01	0.32	1.60	
			Lake Grade	C

The lake received a lake grade of C which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

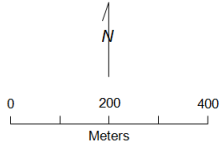
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Mitchell
Eden Prairie, Hennepin Co.

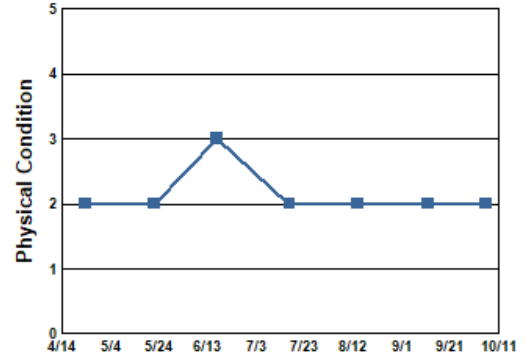
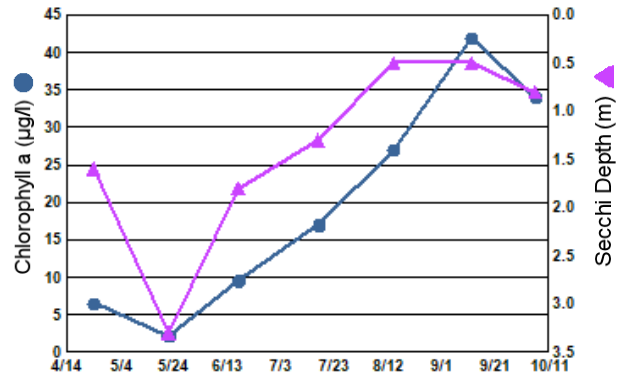
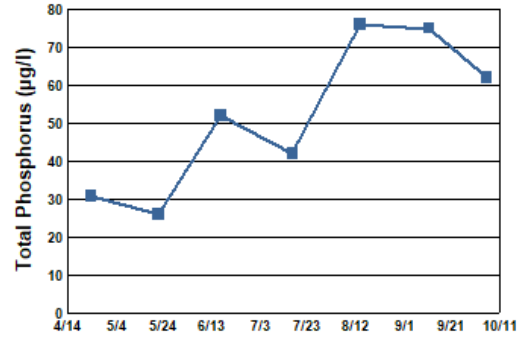
Lake ID: 270070-00

● Sampling site
Contours in meters

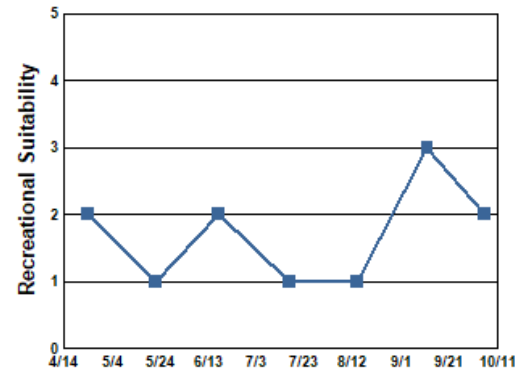


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	10.5		6.6	31	1.6	2	2
05/22/21	22.1		2.2	26	3.3	2	1
06/17/21	27.9		9.6	52	1.8	3	2
07/17/21	28.6		17	42	1.3	2	1
08/14/21	25.9		27	76	0.5	2	1
09/12/21	22.3		42	75	0.5	2	3
10/06/21	20.9		34	62	0.8	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												D
CLA												C
Secchi												C
Lake Grade												C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C				D	D			D
CLA				C				D	D			D
Secchi				C				D	C			C
Lake Grade				C				D	D			D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	C	C	C	C	C	C	C	C	C
CLA	C	C	C	C	B	C	C	B	B	B	B	C
Secchi	C	C	D	C	C	C	C	C	C	C	C	C
Lake Grade	C	C	D	C	C	C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	B	C	C	C	B
Secchi	C	B	C	C	C	C
Lake Grade	C	B	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Moody Lake (13–0023) Comfort Lake — Forest Lake Watershed District

Volunteers: Douglas Toavs, Amy Vislisel

Sponsor: Comfort Lake — Forest Lake Watershed District

Moody Lake is a 35-acre lake located near Chisago City (Chisago County). The lake has a maximum depth of approximately 14.6 m (48 feet). Roughly 63 percent of the lake's surface area is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2008.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	32	11	62	C
CLA (µg/l)	4.8	2.1	8.4	A
Secchi (m)	2.9	2.2	4.2	B
TKN (mg/l)	0.77	0.65	0.84	
			Lake Grade	B

The lake received a B lake grade which continues the recent improvement in water quality in comparison to the D grades received in the past. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

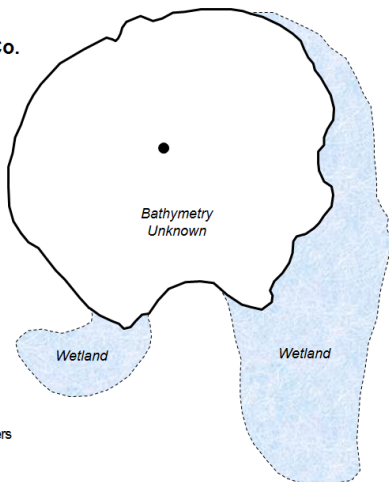
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Moody Lake
Chisago Lake Twp., Chisago Co.

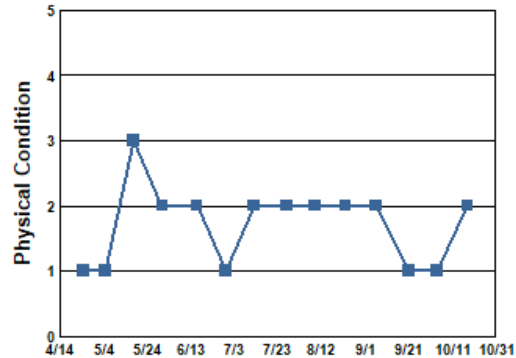
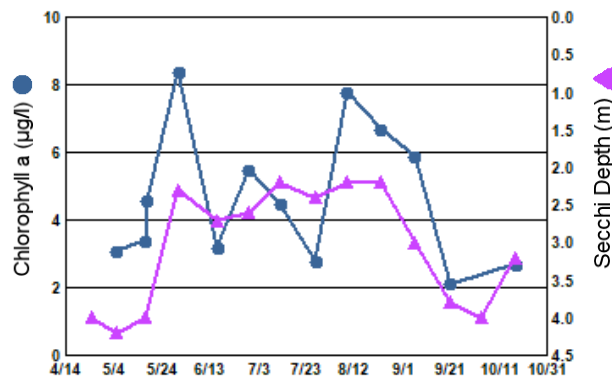
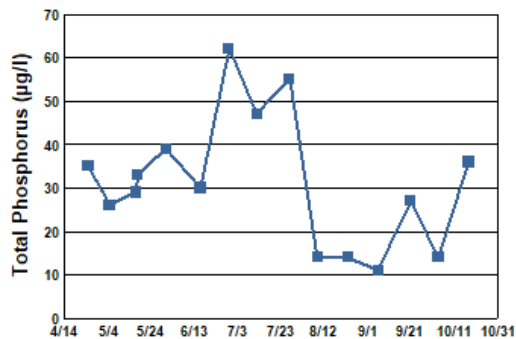
LAKE ID: 130023-00

● Sampling site
Contours in meters

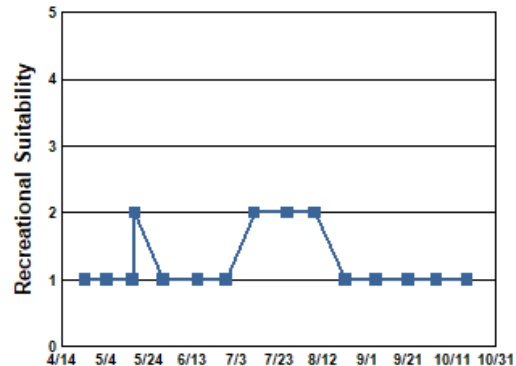


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	11.4			35	4.0	1	1
05/05/21	14.1		3.1	26	4.2	1	1
05/17/21	20.0		3.4	29	4.0		1
05/18/21	19.2		4.6	33		3	2
05/31/21	17.9		8.4	39	2.3	2	1
06/16/21	25.5		3.2	30	2.7	2	1
06/29/21	24.8		5.5	62	2.6	1	1
07/12/21	25.9		4.5	47	2.2	2	2
07/27/21	27.3		2.8	55	2.4	2	2
08/09/21	26.8		7.8	14	2.2	2	2
08/23/21	24.5		6.7	14	2.2	2	1
09/06/21	21.7		5.9	11	3.0	2	1
09/21/21	20.4		2.1	27	3.8	1	1
10/04/21	20.5			14	4.0	1	1
10/18/21	14.0		2.7	36	3.2	2	1



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3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	D				D	D	D	D	D	D
CLA		D	C				D	F	D	C	C	D
Secchi		D	D				D	D	D	D	D	D
Lake Grade		D	D				D	D	D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	C	C	C
CLA	C	C	D	C	C	A
Secchi	D	D	D	D	D	B
Lake Grade	D	D	D	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

North School Section Lake (82–0149) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

North School Section Lake is located in the city of Hugo (Washington County). There are few morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	32	24	40	C
CLA ($\mu\text{g/l}$)	16	2.7	41	B
Secchi (m)	>2.0	0.8	3.8	C
TKN (mg/l)	1.00	0.61	1.90	
			Lake Grade	C

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

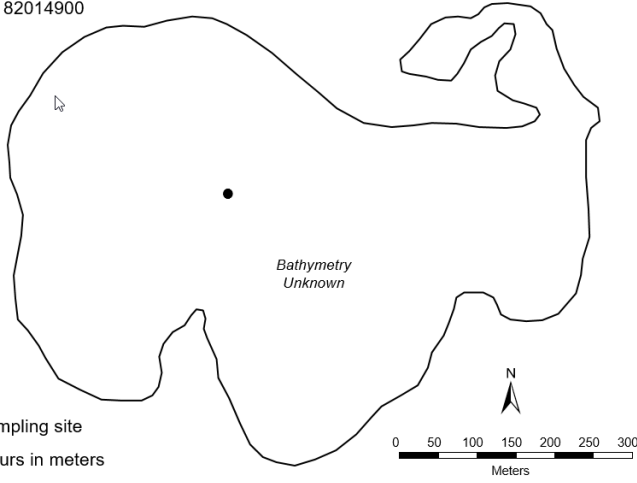
The lake received a lake grade of C this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

North School Section Lake
Hugo, Washington Co.

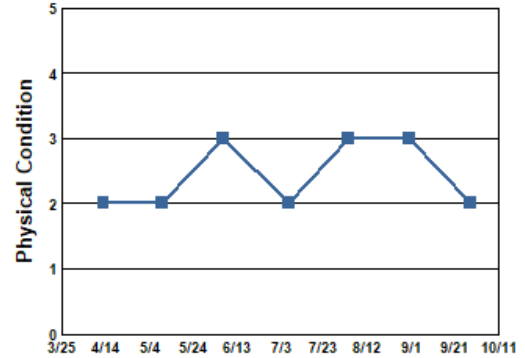
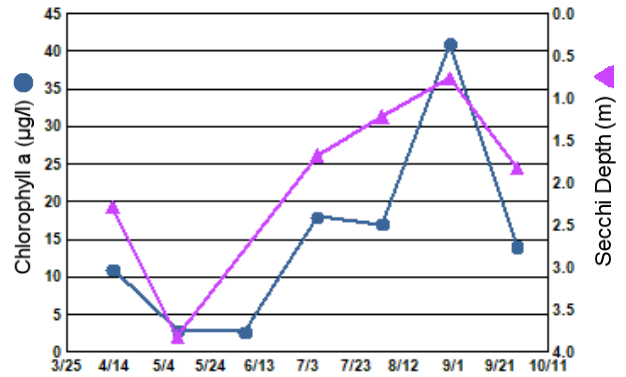
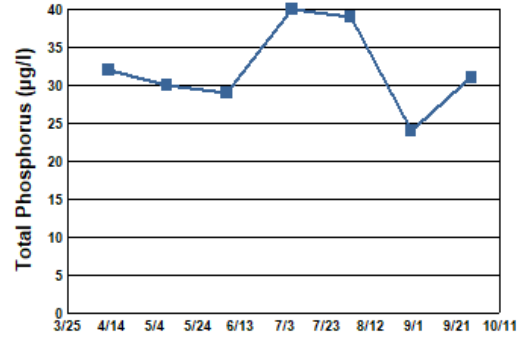
Lake ID: 82014900



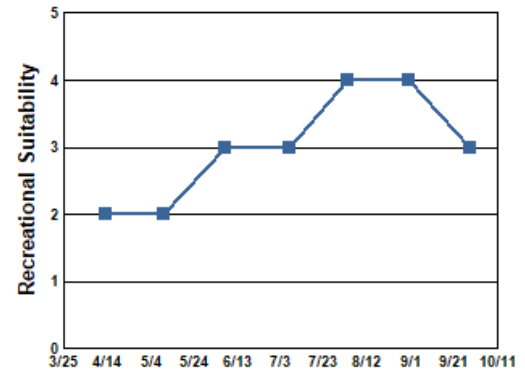
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/13/21	9.9	11.2	11	32	2.3	2	2
05/10/21	13.7	10.3	2.9	30	3.8	2	2
06/07/21	25.0	8.6	2.7	29	>2.4	3	3
07/07/21	25.0	6.5	18	40	1.7	2	3
08/03/21	24.9	7.0	17	39	1.2	3	4
08/31/21	23.3	7.5	41	24	0.8	3	4
09/28/21	18.6	8.4	14	31	1.8	2	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP		C	C	C	C	C
CLA		C	C	C	A	B
Secchi		C	C	C	B	C
Lake Grade		C	C	C	B	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Northwood Lake (27–0627) Bassett Creek Watershed Management Organization

Volunteer: Robert White

Northwood Lake is a 15-acre lake located within the City of New Hope (Hennepin County). The mean and maximum depths of the lake are 0.8 m (2.5 ft) and 1.5 m (4.9 ft), respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake's 1,341-acre immediate watershed translates to a large watershed-to-lake area ratio of 89:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

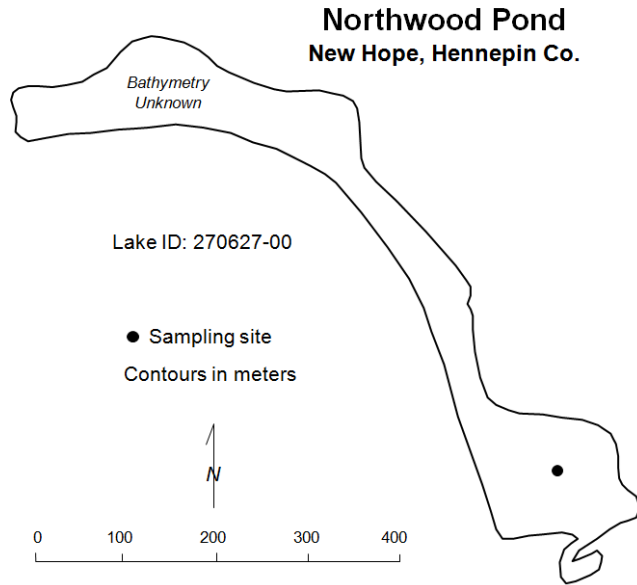
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	189	58	292	F
CLA (µg/l)	100	9.5	230	F
Secchi (m)	>0.6	0.3	>1.1	F
TKN (mg/l)	1.69	0.83	2.80	
			Lake Grade	F

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received an F lake grade this year. All three parameter grades were F grades as well, indicating that 2021 was one of the worst water quality years since 2000 according to its water quality database. Continued monitoring is recommended to determine if this recent deterioration in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

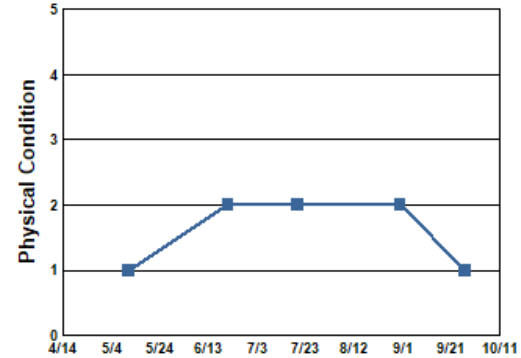
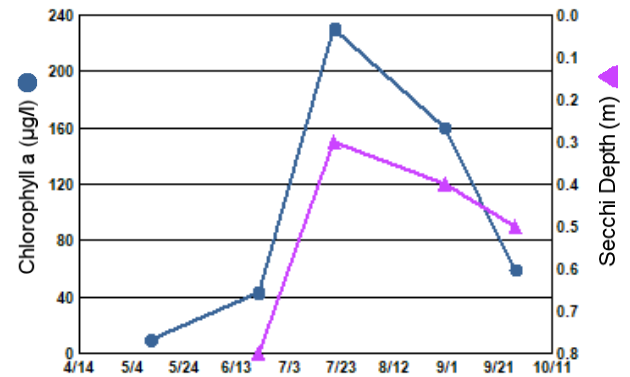
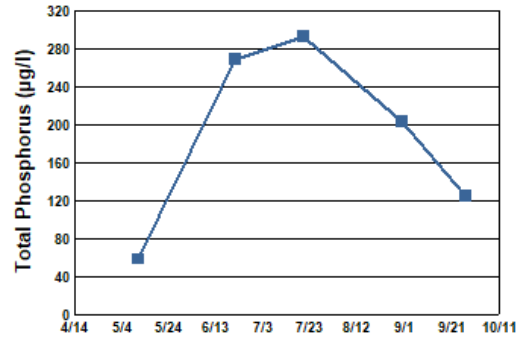
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



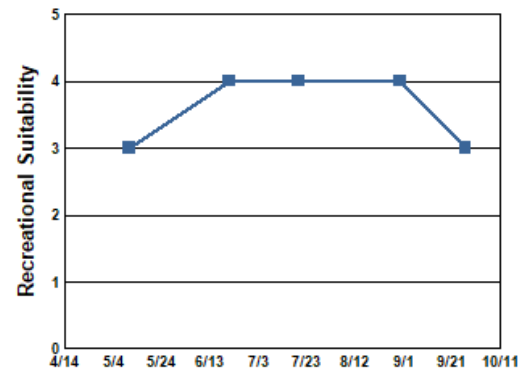
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/11/21	18.4		9.5	58	>1.1	1	3
06/21/21	21.8		43	268	0.8	2	4
07/20/21	27.7		230	292	0.3	2	4
08/31/21	23.5		160	203	0.4	2	4
09/27/21	22.2		59	124	0.5	1	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



- 1 = Crystal Clear
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- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP									F	F	D	F
CLA									B	C	B	C
Secchi									D	D	D	D
Lake Grade									D	D	C	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	D	F	F	D	F	D	F	F	F	D	F
CLA	B	B	B	C	C	B	C	C	C	C	A	C
Secchi	D	D	D	D	D	D	D	D	D	D		
Lake Grade	C	C	D	D	D	D	D	D	D	D		

Year	2016	2017	2018	2019	2020	2021
TP	D	F	F	D	F	F
CLA	C	D	D	C	F	F
Secchi	D	D	F		F	F
Lake Grade	D	D	F		F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

O'Connor Lake (82-0002) *South Washington Watershed District*

Volunteer: Jeff Keene

O'Connor Lake is a 38-acre lake located within Denmark Township (Washington County). There are few known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), chlorophyll including chlorophyll-a (CLA), and chloride. Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages. For the chloride data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

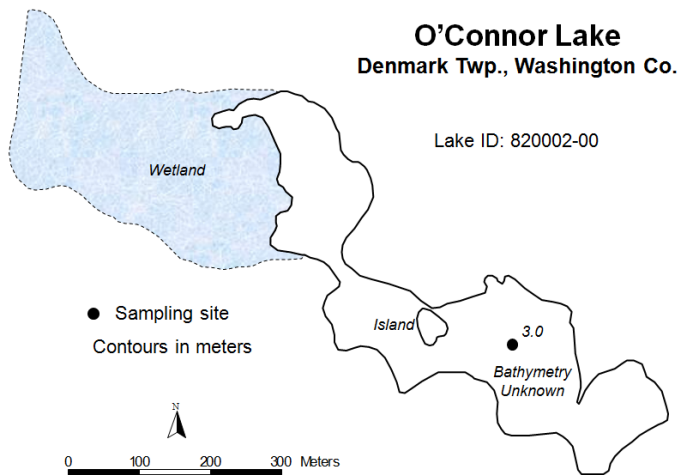
Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	58	38	78	C
CLA ($\mu\text{g/l}$)	28	3.3	53	C
Secchi (m)	+2.2	0.7	+6.3	C
TKN (mg/l)	1.11	0.63	1.40	
			Lake Grade	C

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

The lake received a Secchi grade of C this year, which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

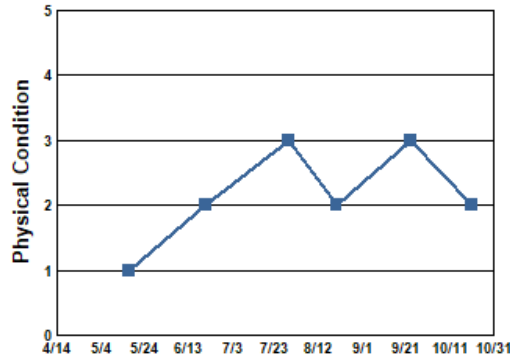
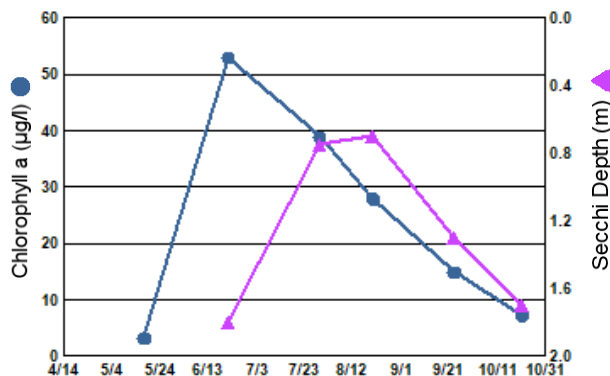
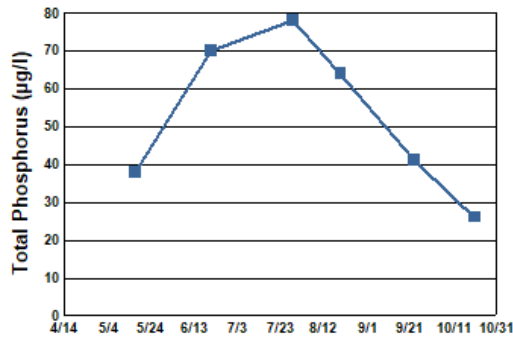
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



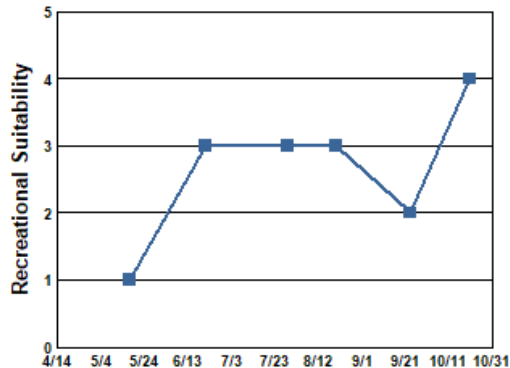
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/17/21	20.3		3.3	38	+6.3	1	1
06/21/21	25.7		53	70	1.8	2	3
07/29/21	27.2		39	78	0.8	3	3
08/20/21	23.9		28	64	0.7	2	3
09/23/21	21.4		15	41	1.3	3	2
10/21/21	13.3		7.3	26	1.7	2	4

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C	C	C	D	D	B		B	A	C
CLA		B	A	A	B	D	C	A		B	A	C
Secchi		C	C	F	C	D	D	C		C		C
Lake Grade		C	B	C	C	D	D	B		B		C

Year	2016	2017	2018	2019	2020	2021
TP	B	C	C			C
CLA	C	B	C			C
Secchi		C	C		C	C
Lake Grade		C	C			C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

O'Dowd Lake (70–0095) City of Shakopee

Volunteer: Maxine Hughes

O'Dowd Lake is located in both Louisville Township and the City of Shakopee (Scott County). The lake is considered a Priority Water by the Metropolitan Council. The lake's surface area is 258 acres and has a maximum depth of 6.7 m (roughly 22 feet). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998 and aquatic life (fish bioassessments) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	9	52	B
CLA (µg/l)	13	1.7	24	B
Secchi (m)	2.1	1.0	4.0	C
TKN (mg/l)	0.86	0.50	1.30	
			Lake Grade	B

The lake received a lake grade of B this year, which is an improvement over the C grades received over the past few years.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

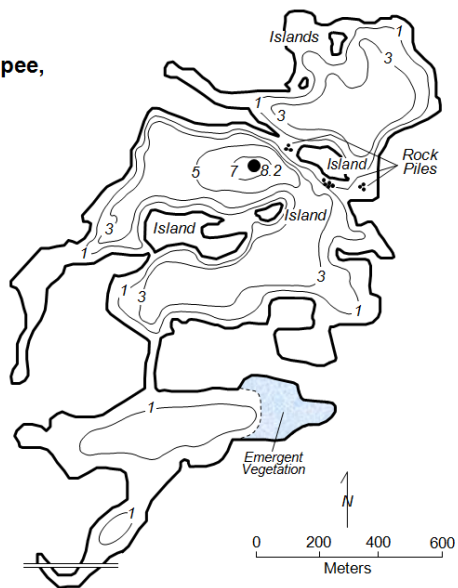
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

O'Dowd Lake
Louisville Twp./Shakopee,
Scott Co.

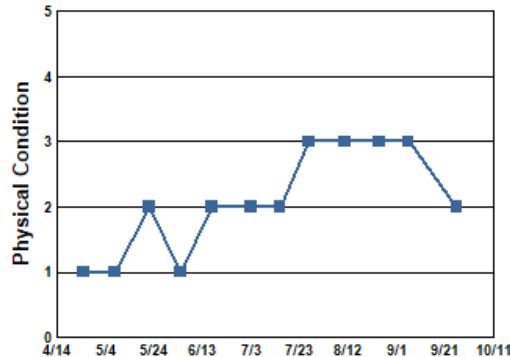
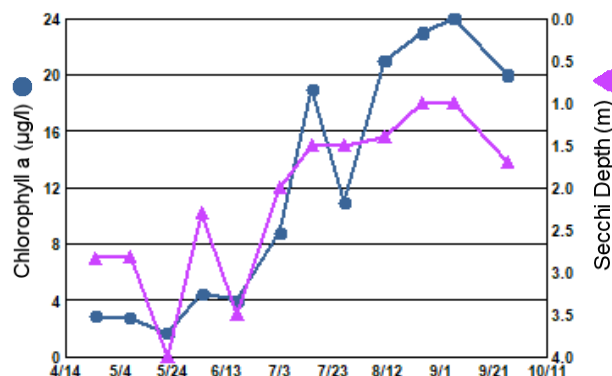
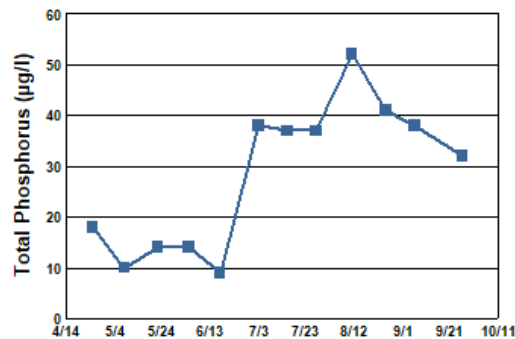
LAKE ID: 700095-00

● Sampling site
Contours in meters

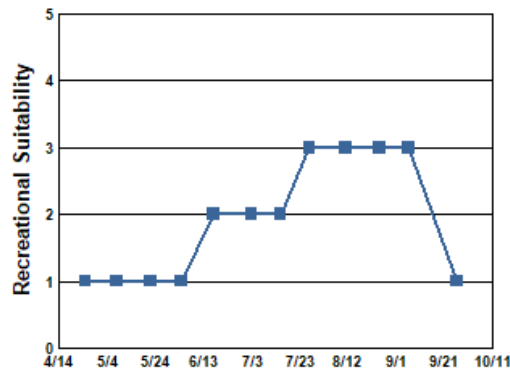


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	9.4		2.9	18	2.8	1	1
05/08/21	14.4		2.8	10	2.8	1	1
05/22/21	23.0		1.7	14	4.0	2	1
06/04/21			4.5	14	2.3	1	1
06/17/21	27.0		4.0	9	3.5	2	2
07/03/21	28.0		8.8	38	2.0	2	2
07/15/21	25.0		19	37	1.5	2	2
07/27/21	30.5		11	37	1.5	3	3
08/11/21	26.5		21	52	1.4	3	3
08/25/21	26.0		23	41	1.0	3	3
09/06/21	24.0		24	38	1.0	3	3
09/26/21	19.0		20	32	1.7	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C							
CLA					C							
Secchi					C							
Lake Grade					C							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C			C			C		D	
CLA			D			C			C		D	
Secchi			C			C			C		C	
Lake Grade			C			C			C		D	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	D	C	C	C	C	C	C	B	A	C
CLA		D	C	D	C	C	C	C	C	C	B	C
Secchi		C	D	C	C	C	C	C	C	C	C	C
Lake Grade		C	D	C	C	C	C	C	C	C	B	C

Year	2016	2017	2018	2019	2020	2021
TP	C	B	B	B	C	B
CLA	C	C	C	C	C	B
Secchi	C	C	C	C	C	C
Lake Grade	C	C	C	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Olson Lake (82–0103) Valley Branch Watershed District

Volunteers: Tom Bucher, Gary Fields

Olson Lake is located in the City of Lake Elmo (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 89 acres and a mean and maximum depth of 2.1 (6.9 feet) and 4.5 m (14.8 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2009.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	11	63	B
CLA (µg/l)	3.0	1.1	6.5	A
Secchi (m)	3.9	2.0	6.0	A
TKN (mg/l)	0.64	0.49	0.87	
			Lake Grade	A

The lake received a lake grade of A this year. This grade is consistent with much of its recent historical water quality database. Also, the historical water quality database indicates that the lake grades have improved since the 1980's. The lake received a lake grade of C in 1984, as well as receiving Secchi grades of C in 1984-1986, and 1988-1990. Lake Grades of B were received in 1991, 1993, and 1995. Between 2000 and 2012, the lake has recorded lake grades varying between A and B. Since 2013 the lake has received A lake grades.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

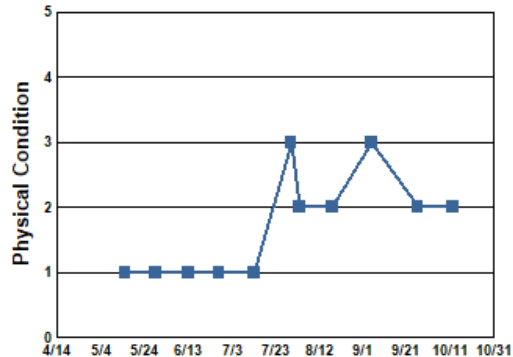
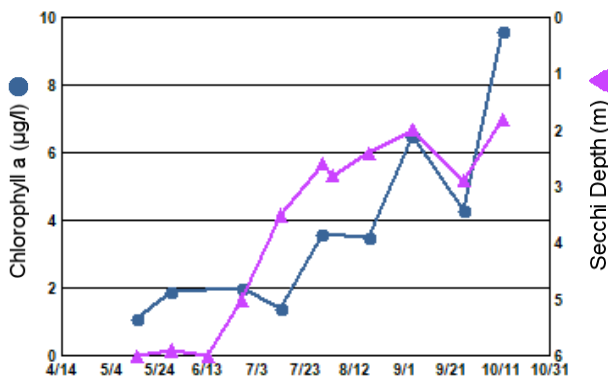
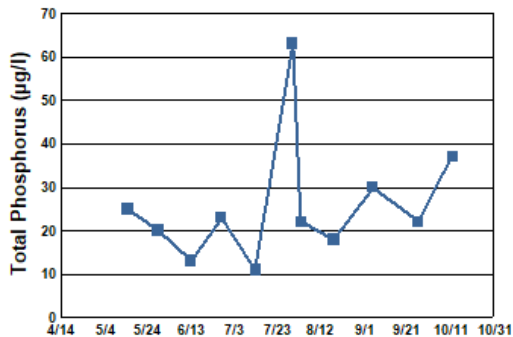
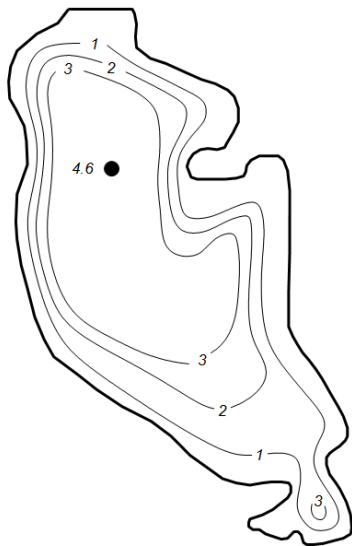
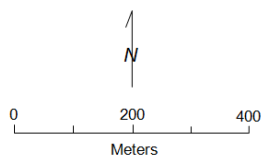
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Olson
Lake Elmo, Washington Co.

Lake ID: 820103-00

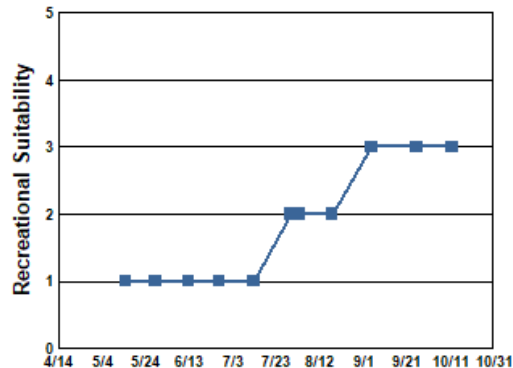
- Sampling site
- Contours in meters



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/21	18.1		1.1	25	6.0	1	1
05/29/21	20.5		1.9	20	5.9	1	1
06/13/21	26.8			13	6.0	1	1
06/27/21	26.2		2.0	23	5.0	1	1
07/13/21	28.4		1.4	11	3.5	1	1
07/30/21	27.6		3.6	63	2.6	3	2
08/03/21	28.9			22	2.8	2	2
08/18/21	26.7		3.5	18	2.4	2	2
09/05/21	23.2		6.5	30	2.0	3	3
09/26/21	18.6		4.3	22	2.9	2	3
10/12/21	19.3		9.6	37	1.8	2	3



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					C							B
CLA					C							B
Secchi					C	C	C		C	C	C	B
Lake Grade					C							B

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B		C					A			A
CLA		A		B					A			B
Secchi		B		B					A			A
Lake Grade		B		B					A			A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	B	C	B	A	A	B	A	A	A	A	A
CLA	A	B	B	A	A	A	B	A	B	A	A	A
Secchi	A	B	B	B	A	A	B	A	B	A	A	A
Lake Grade	A	B	B	B	A	A	B	A	B	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	B
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Orchard Lake (19–0031) *Black Dog Lake Watershed Management Organization*

Volunteers: Tom Goodwin, Blue Water Science staff

Orchard Lake is located in the City of Lakeville (Dakota County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 250 acres. Its maximum and mean depths are 10 m and 3 m respectively.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2017.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	21	11	35	A
CLA ($\mu\text{g/l}$)	5.7	1.0	10	A
Secchi (m)	2.9	1.8	5.9	B
TKN (mg/l)	0.67	0.59	0.81	
			Lake Grade	A

The lake received a lake grade of A this year. The overall water quality has improved overall in comparison to years prior dating back to 1980, as given by the shift in lake grades from the C to A range.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

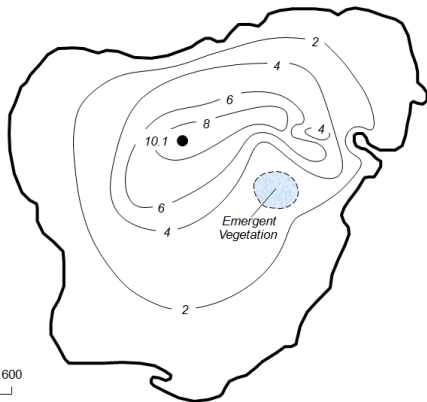
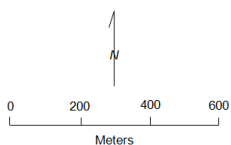
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Orchard Lake
Lakeville, Dakota Co.

LAKE ID: 190031-00

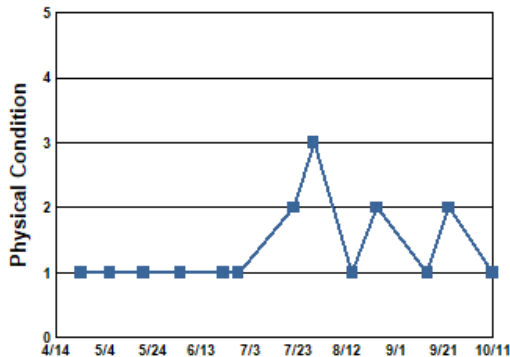
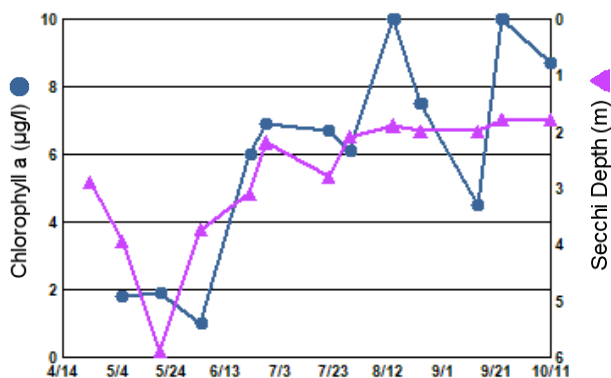
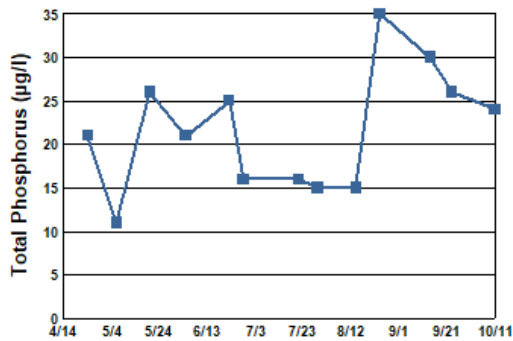
● Sampling site

Contours in meters

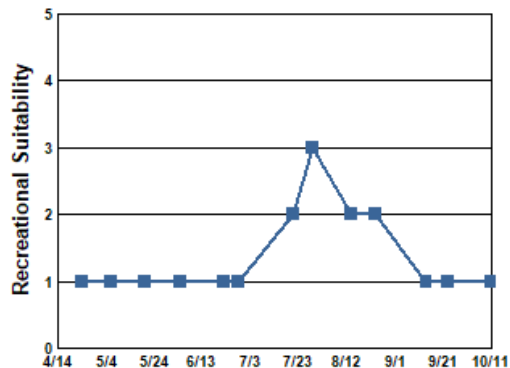


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	9.4			21	2.9	1	1
05/06/21	14.3		1.8	11	4.0	1	1
05/20/21	20.1		1.9	26	5.9	1	1
06/04/21	22.8		1.0	21	3.8	1	1
06/22/21	22.8		6.0	25	3.1	1	1
06/28/21	24.5		6.9	16	2.2	1	1
07/21/21	26.7		6.7	16	2.8	2	2
07/29/21	27.8		6.1	15	2.1	3	3
08/14/21	23.8		10	15	1.9	1	2
08/24/21	23.9		7.5	35	2.0	2	2
09/14/21	20.3		4.5	30	2.0	1	1
09/23/21	21.0		10	26	1.8	2	1
10/11/21	19.1		8.7	24	1.8	1	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C	B		B						B		
CLA	B	B		B						B		
Secchi	C	B		B				C	C	C	D	C
Lake Grade	C	B		B						B		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C					C	C	C	B		C
CLA		B					C	C	C	B		C
Secchi		C					C	C	C	B		C
Lake Grade		C					C	C	C	B		C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	B	C	C	A	A	B	B	B	A	A	A
CLA	B	B	B	C	B	A	A	A	A	A	A	A
Secchi	B	B	B	C	A	A	A	B	B	A	B	B
Lake Grade	B	B	B	C	A	A	A	B	B	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	A	B	A
CLA	A	A	A	A	A	A
Secchi	B	B	B	B	C	B
Lake Grade	B	A	A	A	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Parkers Lake (27–0107) Bassett Creek Watershed Management Organization

Volunteer: David Parker

Parkers Lake is located in the City of Plymouth (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 97 acres. The mean and maximum depths of the lake are 3.7 m (12 ft) and 11.3 m (37 ft), respectively. The lake's size and mean depth result in an approximate lake volume of 1,164 ac-ft. Approximately 70 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The lake's 950-acre immediate watershed translates to a moderate watershed-to-lake area ratio of 10:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998 and aquatic life (chloride) in 2014. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	17	32	A
CLA (µg/l)	5.4	1.0	11	A
Secchi (m)	3.6	2.2	5.0	A
TKN (mg/l)	0.58	0.49	0.72	
			Lake Grade	A

The lake received a lake grade of A this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C											
CLA	C										B	
Secchi	C										B	
Lake Grade	C											

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C				C	A		A	B
CLA				B				B	A		A	B
Secchi				C				C	B		A	B
Lake Grade				C				C	A		A	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	B	B	C	A		C			A
CLA	A	B	A	A	A	A	A		A			B
Secchi	C	B	A	B	B	B	B		B			A
Lake Grade	B	B	B	B	B	B	A		B			A

Year	2016	2017	2018	2019	2020	2021
TP	B	A	B	A	B	A
CLA	B	B	A	A	A	A
Secchi	A	A	B	A	B	A
Lake Grade	B	A	B	A	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Pat Lake (82–0125) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Pat Lake is a small 13-acre lake located in Washington County. There are few known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	34	15	46	C
CLA ($\mu\text{g/l}$)	7.6	2.1	19	A
Secchi (m)	2.8	1.7	4.3	B
TKN (mg/l)	0.72	0.45	1.10	
			Lake Grade	B

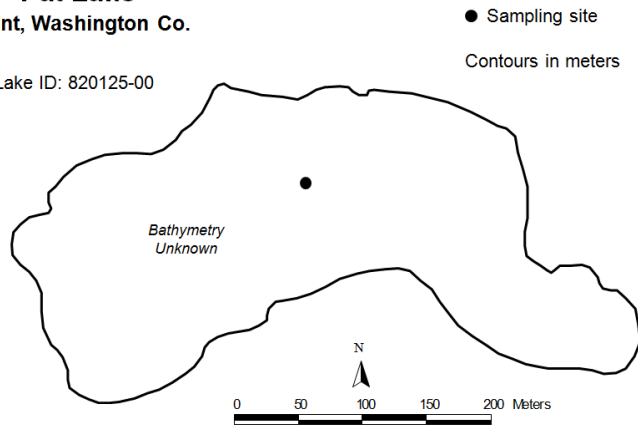
The lake received a lake grade of B this year, which is consistent with its recent historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

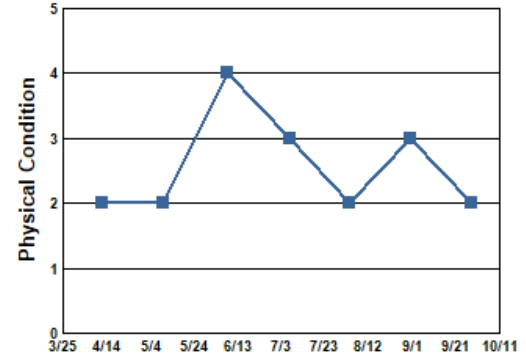
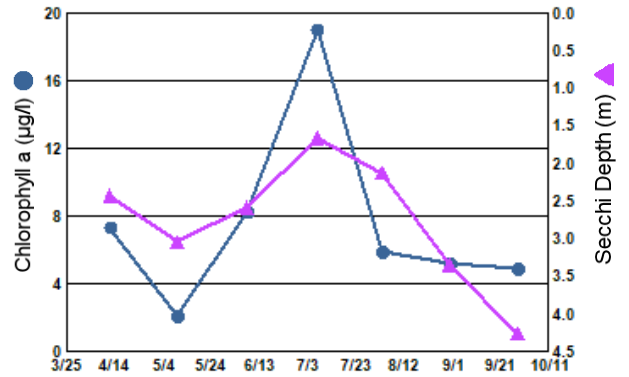
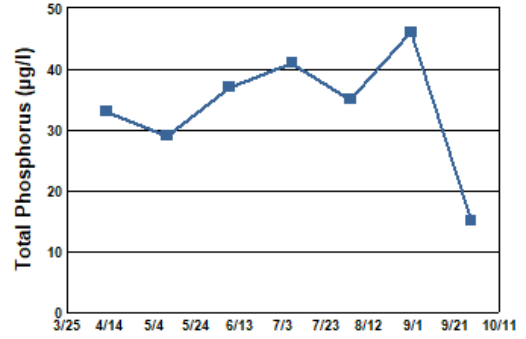
Pat Lake
Grant, Washington Co.

Lake ID: 820125-00

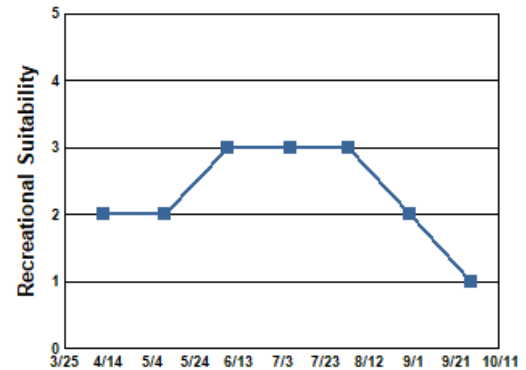


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.7	12.7	7.3	33	2.4	2	2
05/10/21	15.4	11.2	2.1	29	3.0	2	2
06/08/21	28.6	8.4	8.2	37	2.6	4	3
07/07/21	25.0	7.1	19	41	1.7	3	3
08/03/21	24.9	6.7	5.9	35	2.1	2	3
08/31/21	24.3	8.9	5.2	46	3.4	3	2
09/28/21	18.2	9.7	4.9	15	4.3	2	1



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	C	C	C	C	C	C	C	C	C
CLA			C	A	B	B	B	B	B	B	B	B
Secchi			C	C	C	C	C	B	B	C	B	C
Lake Grade			C	B	C	C	C	B	B	C	B	C

Year	2016	2017	2018	2019	2020	2021
TP	C	B	C	C	B	C
CLA	B	A	B	B	A	A
Secchi	C	B	C	C	B	B
Lake Grade	C	B	C	C	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Penn Lake (27–0004) *Nine Mile Creek Watershed District*

Volunteer: Lisa McIntire

Penn Lake is located in the City of Bloomington (Hennepin County). It has a maximum depth of 2.1 m (7.0 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2018.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	119	59	204	D
CLA (µg/l)	62	21	120	D
Secchi (m)	0.3	0.2	0.5	F
TKN (mg/l)	1.82	0.95	2.90	
			Lake Grade	D

The lake received a lake grade of D this year, which is similar to water quality observed since 2013.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

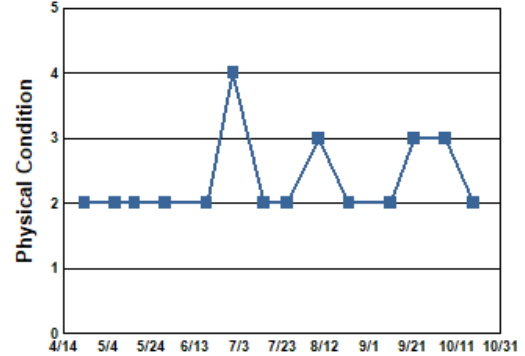
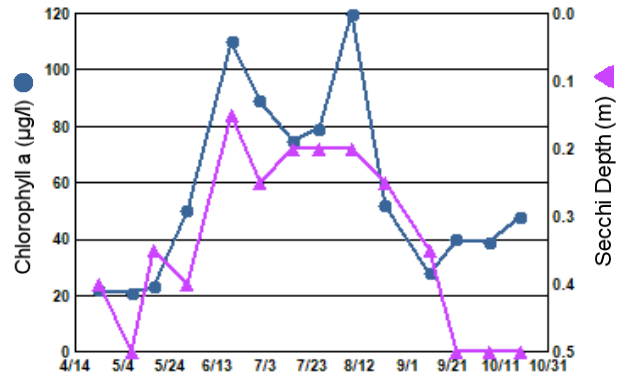
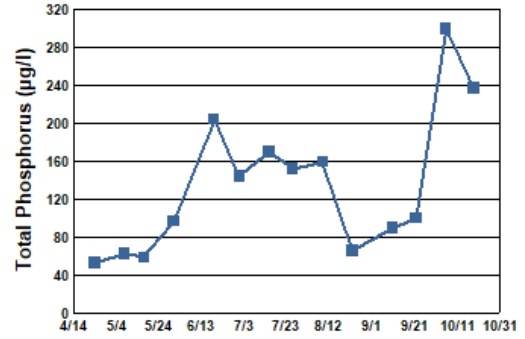
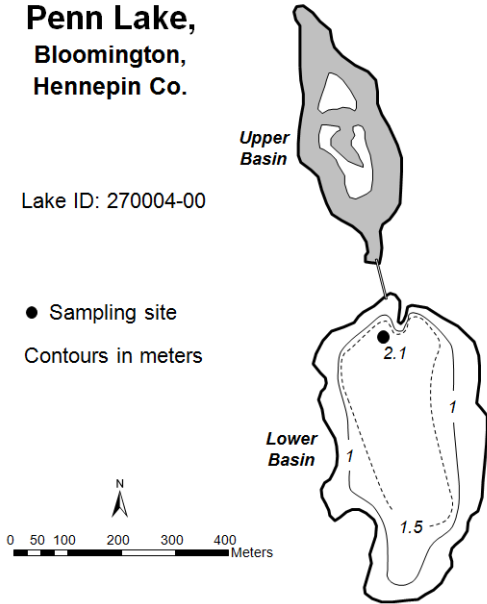
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Penn Lake,
Bloomington,
Hennepin Co.**

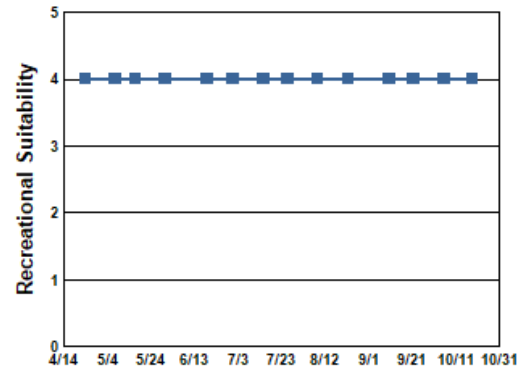
Lake ID: 270004-00

● Sampling site

Contours in meters



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	9.5		22	53	0.4	2	4
05/08/21	16.8		21	63	0.5	2	4
05/17/21	21.8		23	59	0.4	2	4
05/31/21	18.3		50	97	0.4	2	4
06/19/21	29.2		110	204	0.2	2	4
07/01/21	30.4		89	144	0.3	4	4
07/15/21	27.2		75	170	0.2	2	4
07/26/21	30.2		79	152	0.2	2	4
08/09/21	25.7		120	159	0.2	3	4
08/23/21	32.3		52	66	0.3	2	4
09/11/21	24.0		28	90	0.4	2	4
09/22/21	22.3		40	100	0.5	3	4
10/06/21	20.3		39	299	0.5	3	4
10/19/21	14.9		48	237	0.5	2	4

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP						F	F	D	F	D	D	D
CLA						F	F		D	D	C	D
Secchi	F					F	F	F	F	D		F
Lake Grade						F	F		F	D		D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	D	D	D	D	D	D
Secchi	F	F	D	F	F	F
Lake Grade	D	D	D	D	D	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Pickerel Lake (19–0079) Lower Mississippi River Watershed Management Organization

Volunteer: Keegan Lund

Pickerel Lake is located in the city of Lilydale (Dakota County). The lake has a surface area of 114 ac and a maximum depth of 3.4 m. The lake is located in the floodplain of the Mississippi River.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2010.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)				
CLA ($\mu\text{g/l}$)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

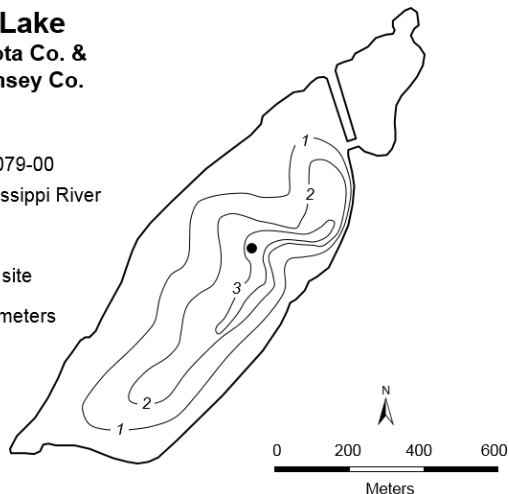
Pickereel Lake
Lilydale, Dakota Co. &
St. Paul, Ramsey Co.

Lake ID: 190079-00

WMO: Lower Mississippi River

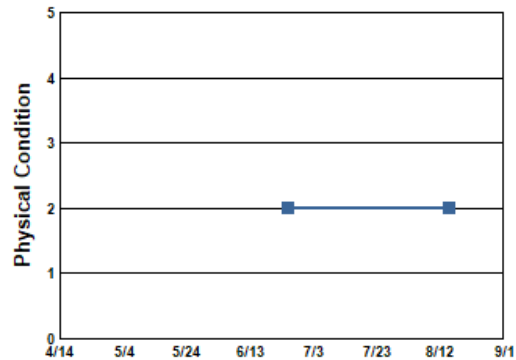
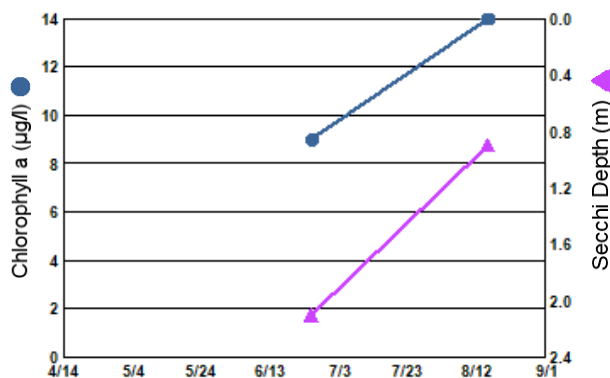
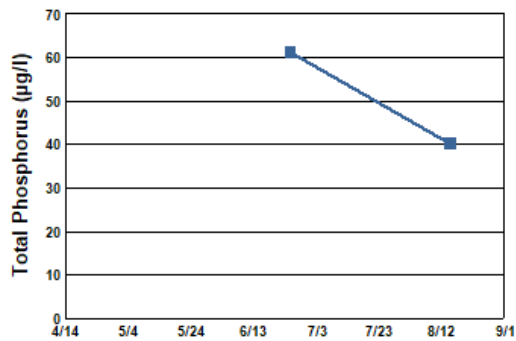
● Sampling site

Contours in meters

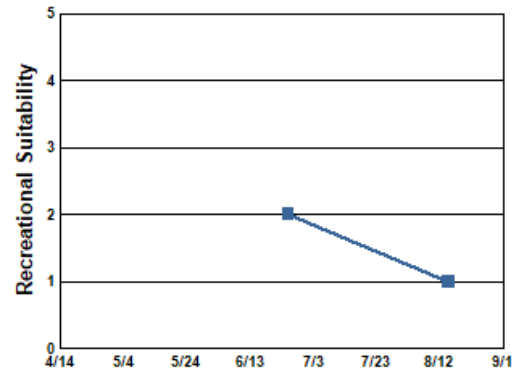


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/25/21	26.7		9.0	61	2.1	2	2
08/15/21	23.6		14	40	0.9	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												C
CLA												C
Secchi												D
Lake Grade												C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C			
CLA	D		B			
Secchi	D	C	C			
Lake Grade	D		C			

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Pike Lake (27–0111–02) Shingle Creek Watershed Management Commission

Volunteer: Shari Lundstrom

Pike Lake is located in the Cities of Maple Grove and Plymouth (Hennepin County). It has a maximum depth of 6.7 m (22 feet). Most of the lake is considered littoral zone, which is the shallow 0 –15 feet depth zone that is typically dominated by aquatic plants.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002 and aquatic consumption (mercury in fish tissue) in 1998. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	35	98	C
CLA (µg/l)	14	4.2	33	B
Secchi (m)	1.6	0.9	2.3	C
TKN (mg/l)	1.11	0.89	1.60	
			Lake Grade	C

The lake received a lake grade of C, which is consistent with its historical water quality database over the previous twenty years. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

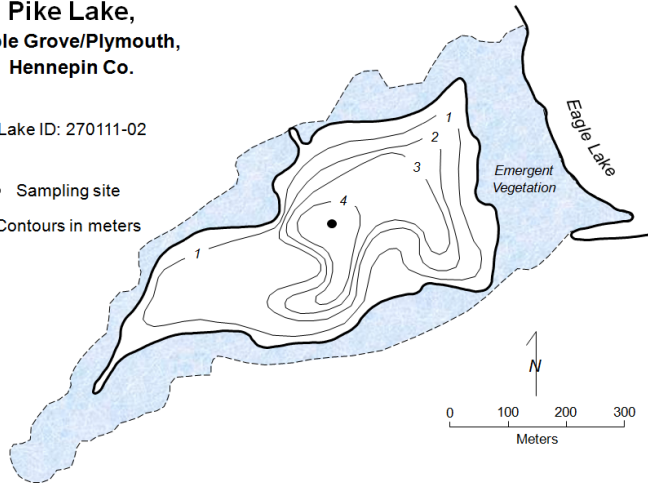
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Pike Lake,
Maple Grove/Plymouth,
Hennepin Co.**

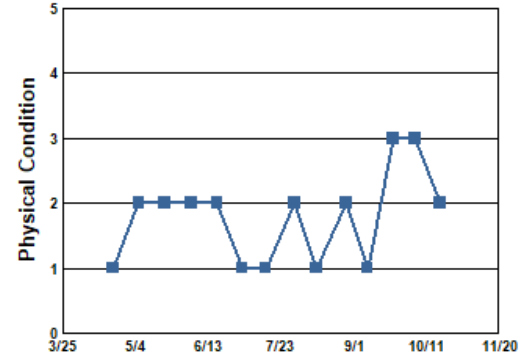
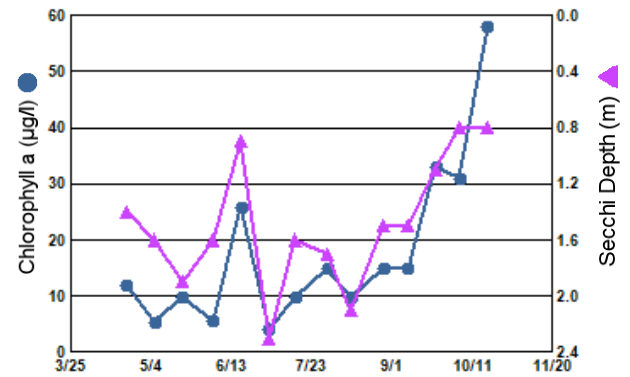
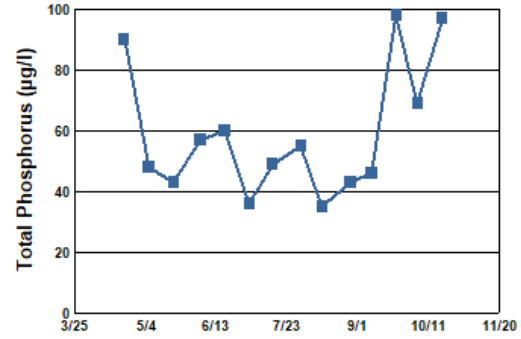
Lake ID: 270111-02

- Sampling site
- Contours in meters

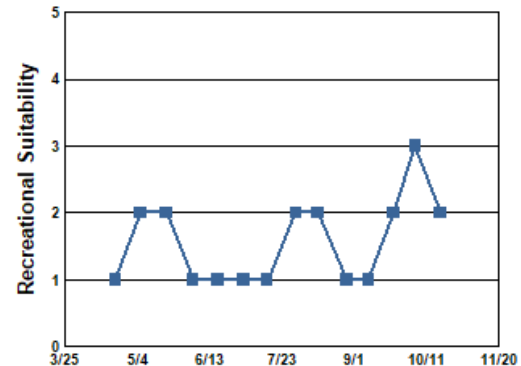


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	11.1		12	90	1.4	1	1
05/06/21	15.9		5.5	48	1.6	2	2
05/20/21	21.6		9.8	43	1.9	2	2
06/04/21	25.5		5.7	57	1.6	2	1
06/18/21	27.6		26	60	0.9	2	1
07/02/21	30.7		4.2	36	2.3	1	1
07/15/21	27.5		9.8	49	1.6	1	1
07/31/21	28.2		15	55	1.7	2	2
08/12/21	26.7		9.9	35	2.1	1	2
08/28/21	24.1		15	43	1.5	2	1
09/09/21	22.8		15	46	1.5	1	1
09/23/21	22.0		33	98	1.1	3	2
10/05/21	21.1		31	69	0.8	3	3
10/19/21	15.9		58	97	0.8	2	2



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					C	D	D		C			
CLA					C	C	C		B			
Secchi				D	D	C	D		C			
Lake Grade					C	C	D		C			

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				C		D		C				
CLA				B		C		B				
Secchi				D		D		C				
Lake Grade				C		D		C				

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						C
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Pine Tree Lake (82–0122) Rice Creek Watershed District

Volunteer: Gene Berwald

Pine Tree Lake, located on the eastern edge of the City of Dellwood (Washington County), covers an area of 174 acres. It has a maximum depth of 7.9 m (26 feet), and a mean depth of 3.0 m (10 feet).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	13	21	A
CLA (µg/l))	3.1	1.9	4.6	A
Secchi (m)	2.8	2.1	4.0	B
TKN (mg/l)	0.72	0.62	0.95	
			Lake Grade	A

The lake received a lake grade of A, which is consistent with its historical water quality database. The water quality of the lake tends to vary in the A to B range.

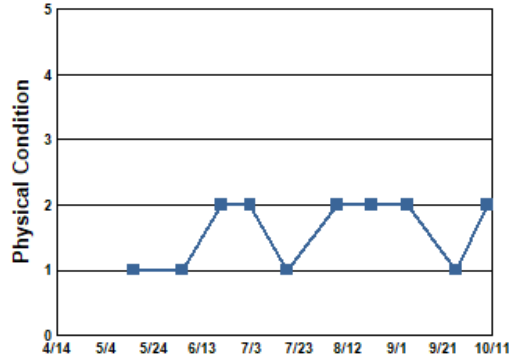
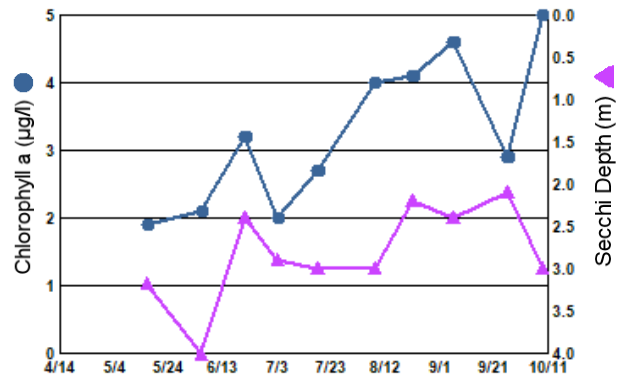
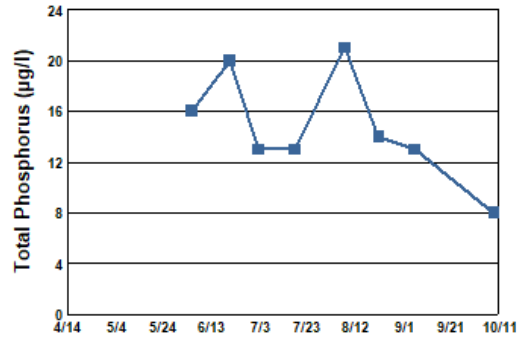
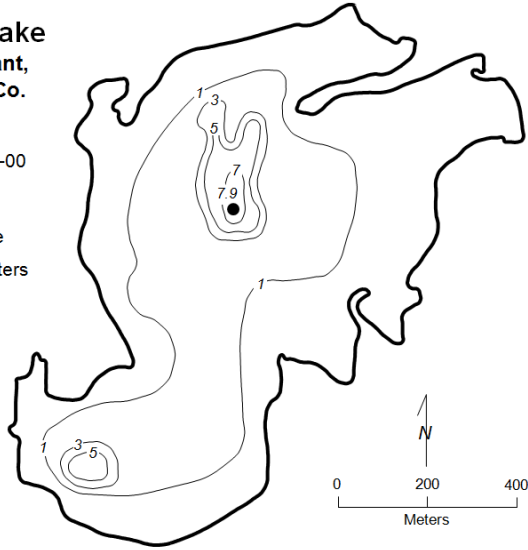
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

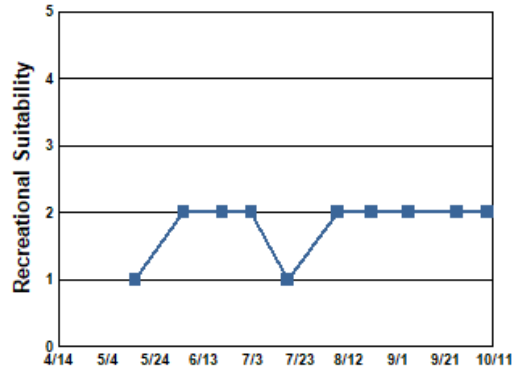
Pine Tree Lake
Dellwood/Grant,
Washington Co.

Lake ID: 820122-00

● Sampling site
Contours in meters



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/16/21	18.5		1.9		3.2	1	1
06/05/21	23.4		2.1	16	4.0	1	2
06/21/21	22.3		3.2	20	2.4	2	2
07/03/21	27.6		2.0	13	2.9	2	2
07/18/21	28.7		2.7	13	3.0	1	1
08/08/21	25.2		4.0	21	3.0	2	2
08/22/21	25.6		4.1	14	2.2	2	2
09/06/21	22.6		4.6	13	2.4	2	2
09/26/21	19.5		2.9		2.1	1	2
10/09/21	19.4		5.0	8	3.0	2	2

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP						C						
CLA						D						
Secchi						D						
Lake Grade						D						

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		B	B	C	C	B	B	B	C	C	C	C
CLA		A	A	C	B	A	B	B	A	A	B	C
Secchi		C	B	C	C	B	C	C	A	B	C	C
Lake Grade		B	B	C	C	B	B	B	B	B	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	B	C	B	B	A	A	B	A	A	C	A
CLA	A	B	A	A	B	A	A	A	A	A	A	A
Secchi	B	B	B	B	B	A	A	B	B	B	B	B
Lake Grade	B	B	B	B	B	A	A	B	A	A	B	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	B	B	A
CLA	A	A	A	A	A	A
Secchi	B	B	B	B	B	B
Lake Grade	A	A	A	B	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Plaisted Lake (82–0148) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Plaisted Lake is located in the City of Hugo (Washington County). Little morphological data is available for the lake.

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	21	14	30	A
CLA (µg/l)	3.7	2.0	6.4	A
Secchi (m)	>2.2	>1.2	>3.4	
TKN (mg/l)	0.54	0.41	0.76	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received parameters grades of A for TP and CLA. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The lake has shown improvement in water quality since CAMP monitoring began in 2008.

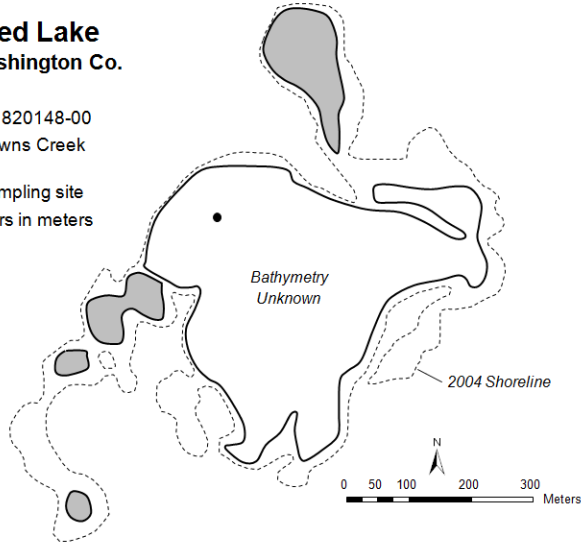
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Plaisted Lake
Hugo, Washington Co.

Lake ID: 820148-00
WD: Browns Creek

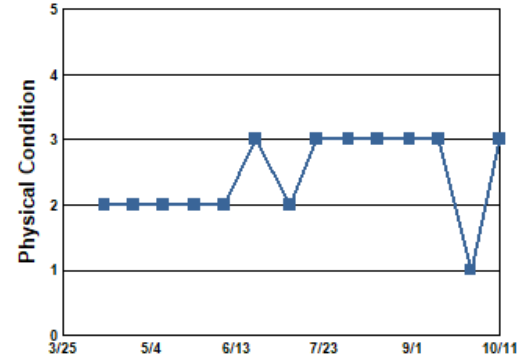
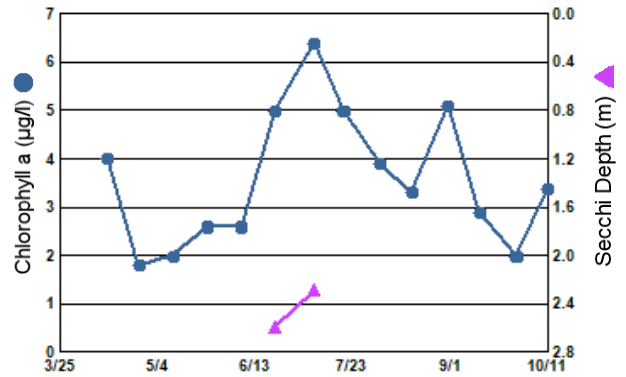
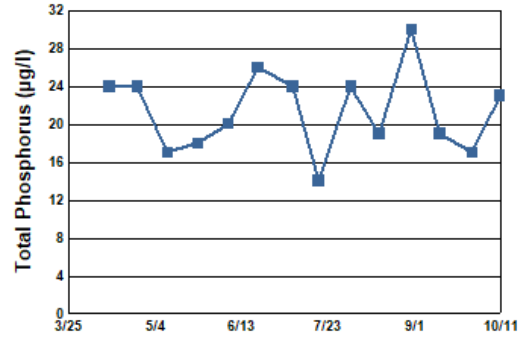
● Sampling site
Contours in meters



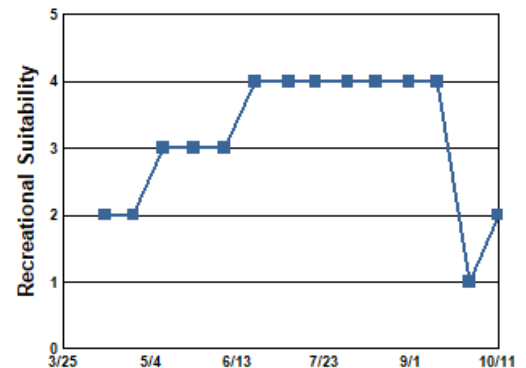
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/13/21	10.3	10.9	4.0	24	>3.2	2	2
04/26/21	9.3	11.2	1.8	24	>3.4	2	2
05/10/21	14.2	11.4	2.0	17	>3.2	2	3
05/24/21	22.0	9.2	2.6	18	>3.4	2	3
06/07/21	26.5	9.4	2.6	20	>3.0	2	3
06/21/21	24.0	7.9	5.0	26	2.6	3	4
07/07/21	25.8	7.0	6.4	24	2.3	2	4
07/19/21	26.3	9.6	5.0	14	>1.7	3	4
08/03/21	24.9	6.8	3.9	24	>1.5	3	4
08/16/21	24.2	6.9	3.3	19	>1.7	3	4
08/31/21	23.6	8.3	5.1	30	>1.7	3	4
09/13/21	20.8	6.8	2.9	19	>1.2	3	4
09/28/21	18.8	8.1	2.0	17	>2.0	1	1
10/11/21	19.3	7.5	3.4	23	>2.4	3	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					D	D	D	D	D	C	B	B
CLA					C	C	C	C	C	B	A	A
Secchi					C	C	C	C	C	C		
Lake Grade					C	C	C	C	C	C		

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	B	A	A
CLA	B	A	A	A	A	A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Powers Lake (82–0092) *City of Woodbury*

Monitoring Personnel: Washington Conservation District staff

Powers Lake is located within the city of Woodbury (Washington County). It has a surface area of approximately 57 acres and a maximum depth of 12.5 m (41.0 feet). The lake has no surface outlet.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1998.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

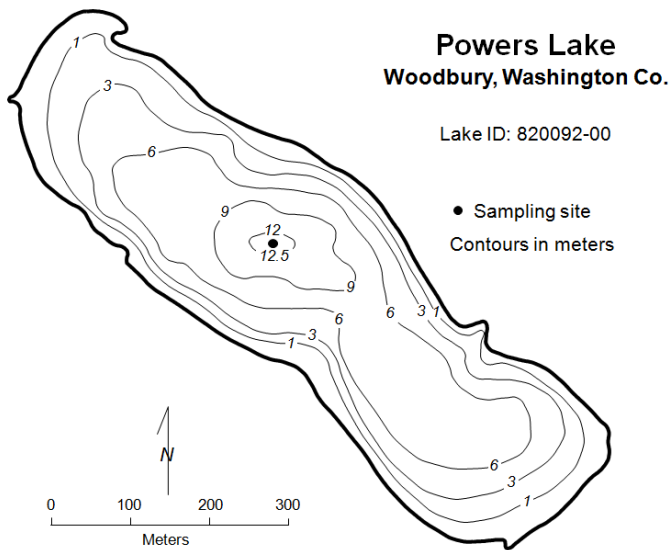
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	12	43	B
CLA (µg/l)	12	3.9	26	B
Secchi (m)	2.4	1.7	3.4	B
TKN (mg/l)	0.75	0.64	0.84	
			Lake Grade	B

The lake received a lake grade of B this year which is consistent with its historical water quality database. The lake has varied in the A to C grade range since 1994.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

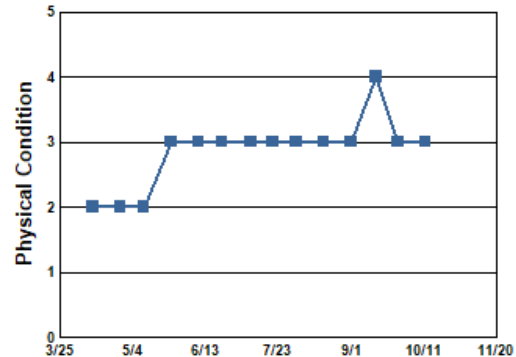
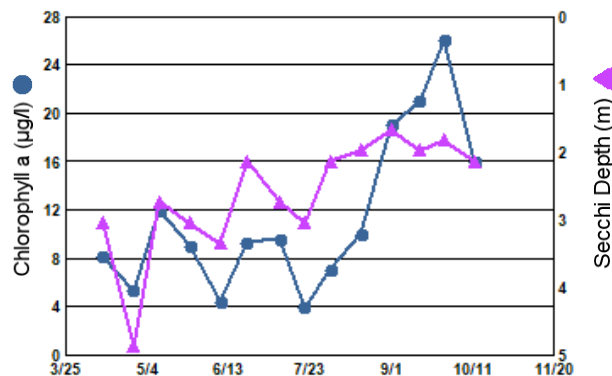
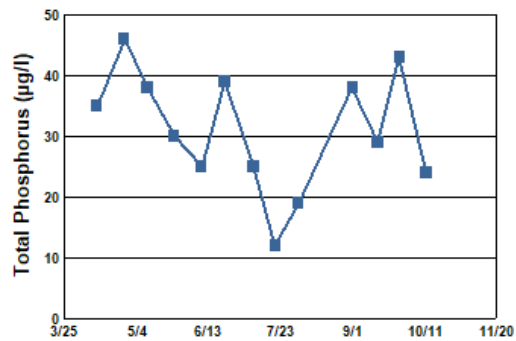
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

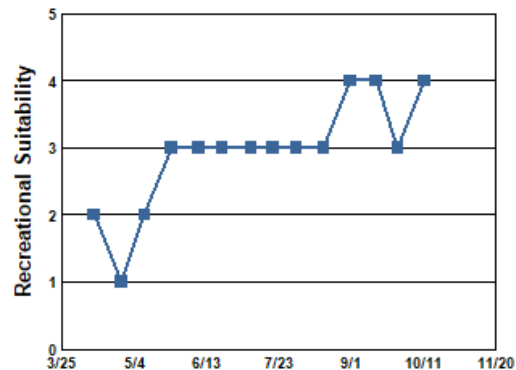


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	10.7	10.5	8.1	35	3.0	2	2
04/27/21	9.2	10.8	5.3	46	4.9	2	1
05/10/21	14.6	11.5	12	38	2.7	2	2
05/11/21							
05/25/21	24.3	9.3	9.0	30	3.0	3	3
06/09/21	29.2	7.9	4.4	25	3.4	3	3
06/22/21	23.5	9.4	9.3	39	2.1	3	3
07/08/21	24.9	10.9	9.6	25	2.7	3	3
07/20/21	27.5	9.1	3.9	12	3.0	3	3
08/02/21	26.2	9.9	7.1	19	2.1	3	3
08/17/21	25.1	9.8	10		2.0	3	3
09/01/21	24.4	9.4	19	38	1.7	3	4
09/15/21	21.0	9.1	21	29	2.0	4	4
09/27/21	20.7	9.5	26	43	1.8	3	3
10/12/21	19.2	8.2	16	24	2.1	3	4



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			B	B	A	A	C	A	B	C	B	C
CLA			A	B	A	B	C	B	B	C	C	B
Secchi			A	B	A	C	C	A	B	C	C	B
Lake Grade			A	B	A	B	C	A	B	C	C	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	C	B	B	C	C	B	B	B	B
CLA	C	C	C	B	B	C	C	C	A	A	B	B
Secchi	C	C	C	C	B	B	C	B	A	A	B	C
Lake Grade	C	C	C	C	B	B	C	C	A	A	B	B

Year	2016	2017	2018	2019	2020	2021
TP	B	C	A	B	C	B
CLA	B	C	A	B	B	B
Secchi	C	C	A	A	B	B
Lake Grade	B	C	A	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake Rebecca (19–0003) City of Hastings

Volunteer: Hastings Environmental Protectors

Lake Rebecca is located in the city of Hastings (Dakota County), and is in the floodplain of the Mississippi River. The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 58 acres and a maximum depth of 4.6 m. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MN DNR designated the lake as being infested with zebra mussels (*Dreissena polymorpha*) in 2009. The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998 and aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

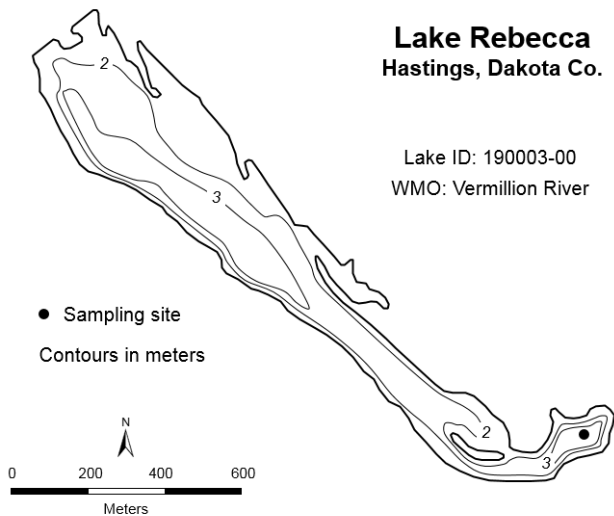
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	118	30	249	D
CLA (µg/l)	108	19	230	F
Secchi (m)	0.7	0.3	1.3	F
TKN (mg/l)	1.65	0.62	3.20	
			Lake Grade	F

The lake received a lake grade of F in year which is consistent with its historical water quality database. The water quality of the lake has varied in the D to F range. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

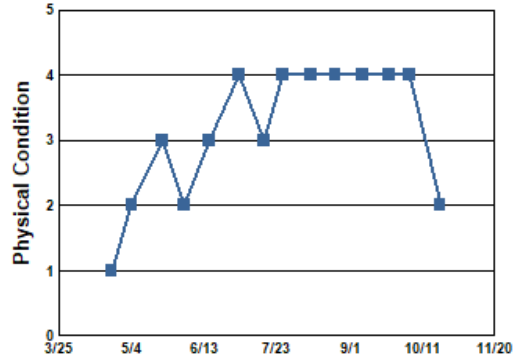
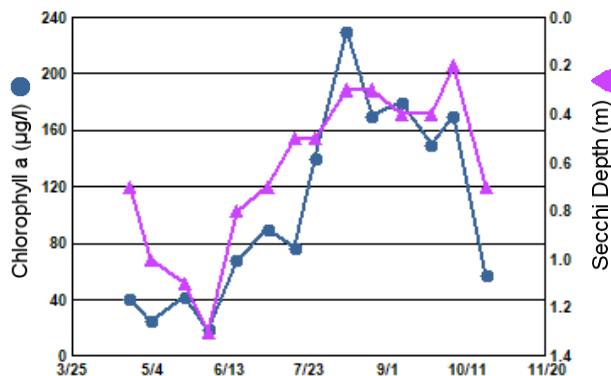
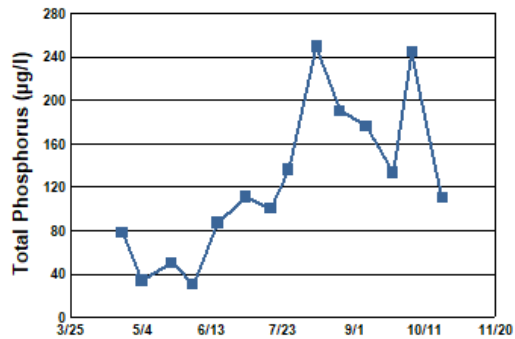
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

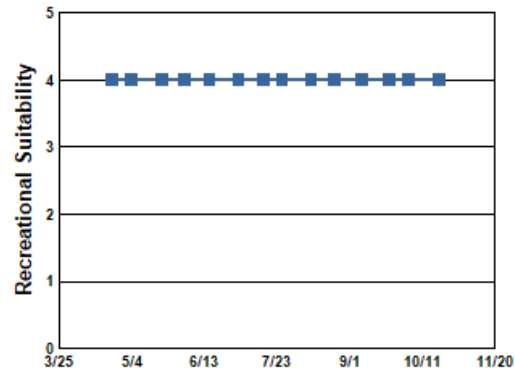


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/21	11.3		41	78	0.7	1	4
05/04/21	18.0		25	34	1.0	2	4
05/21/21	20.0		42	50	1.1	3	4
06/02/21	21.3		19	30	1.3	2	4
06/16/21	24.6		68	87	0.8	3	4
07/02/21	27.1		90	111	0.7	4	4
07/16/21	23.9		77	100	0.5	3	4
07/26/21	27.1		140	136	0.5	4	4
08/11/21	25.0		230	249	0.3	4	4
08/24/21	23.8		170	190	0.3	4	4
09/08/21	20.9		180	176	0.4	4	4
09/23/21	21.4		150	133	0.4	4	4
10/04/21	22.4		170	244	0.2	4	4
10/21/21	12.9		57	110	0.7	2	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												F
CLA												D
Secchi												D
Lake Grade												D

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	D	F	D	D	D	F
Secchi	C	F	D	D	D	F
Lake Grade	D	F	D	D	D	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Red Rock Lake (27–0076) *City of Eden Prairie*

Volunteer: David Wallace

Red Rock Lake is located within the City of Eden Prairie (Hennepin County). The maximum depth of the lake is 4.9 m. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

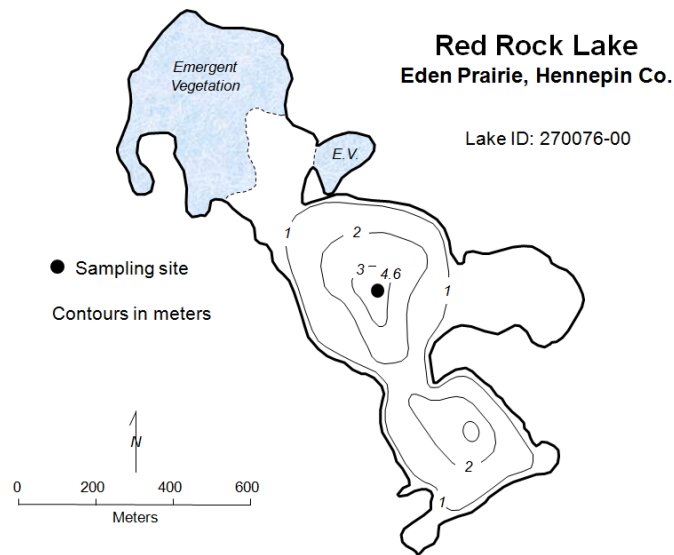
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	42	21	62	C
CLA (µg/l)	24	2.5	75	C
Secchi (m)	1.9	0.6	3.2	C
TKN (mg/l)	1.16	0.62	1.90	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with water quality conditions since 2014. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

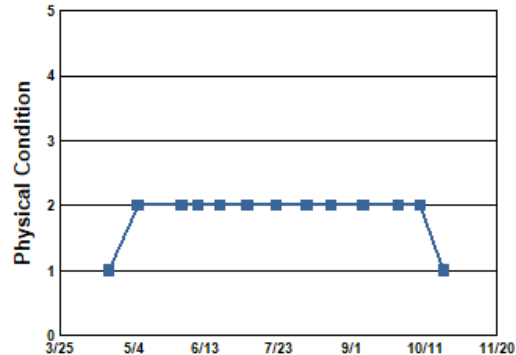
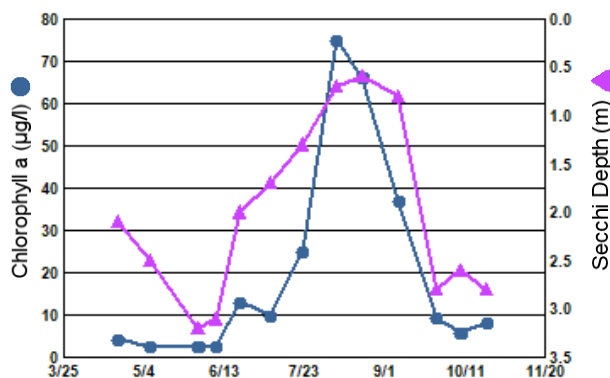
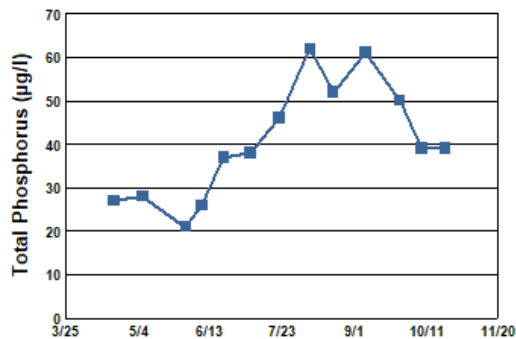
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

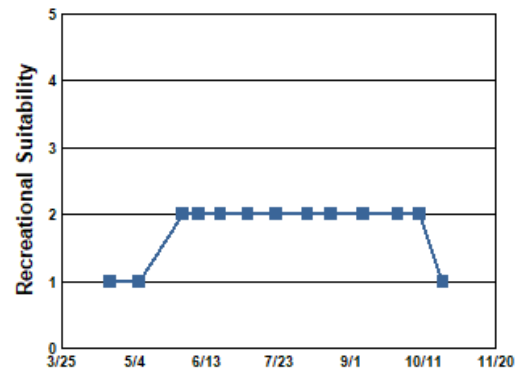


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/21/21	9.7		4.2	27	2.1	1	1
05/07/21	14.8		2.5	28	2.5	2	1
05/31/21	23.0		2.5	21	3.2	2	2
06/09/21	31.4		2.7	26	3.1	2	2
06/21/21	23.8		13	37	2.0	2	2
07/06/21	29.4		9.8	38	1.7	2	2
07/22/21	28.1		25	46	1.3	2	2
08/08/21	25.4		75	62	0.7	2	2
08/21/21	26.3		66	52	0.6	2	2
09/08/21	22.3		37	61	0.8	2	2
09/27/21	20.2		9.3	50	2.8	2	2
10/09/21	21.3		5.8	39	2.6	2	2
10/22/21	14.0		8.0	39	2.8	1	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								D	D			D
CLA								D	C			D
Secchi								C	C			C
Lake Grade								C	C			D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D		D								C	C
CLA	D		D								B	C
Secchi	C		D								C	C
Lake Grade	D		D								C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	B	C	C	C	C
Secchi	C	C	C	D	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Regional Park Lake (82–0087) South Washington Watershed District

Monitoring Personnel: Washington Conservation District staff

Regional Park Lake is a 16-acre lake located within the City of Cottage Grove (Washington County). The maximum depth of the lake is 5.8 m. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	77	34	116	D
CLA (µg/l)	41	1.4	67	C
Secchi (m)	1.6	0.6	4.3	C
TKN (mg/l)	1.52	0.90	2.10	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

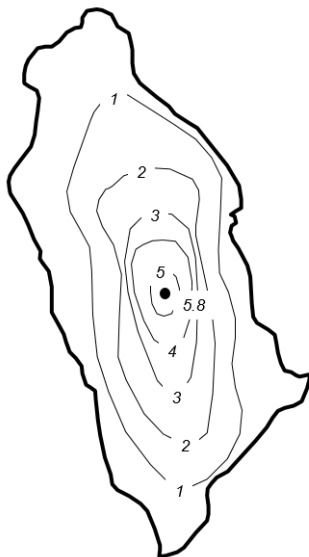
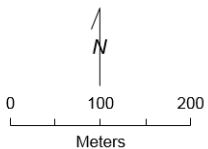
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Regional Park Lake
Cottage Grove, Washington Co.

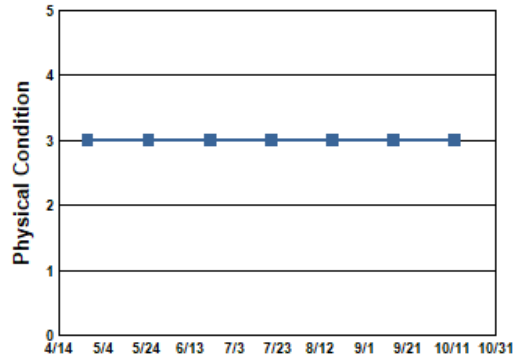
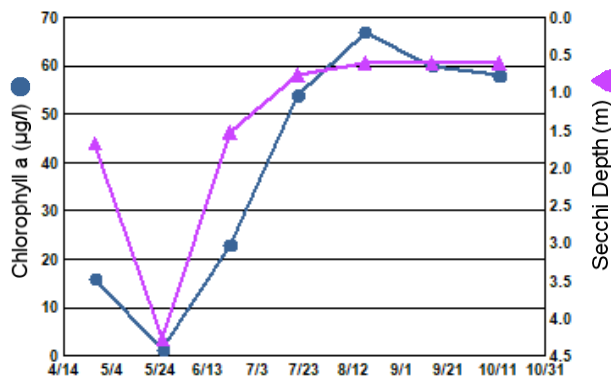
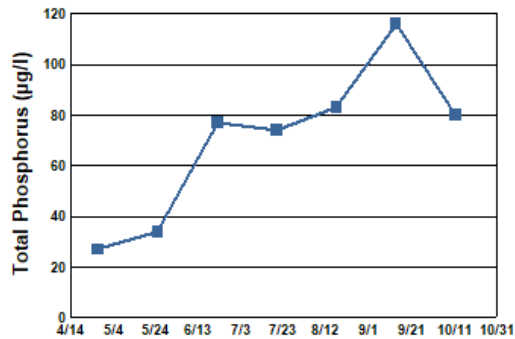
Lake ID: 820087-00

● Sampling site
Contours in meters

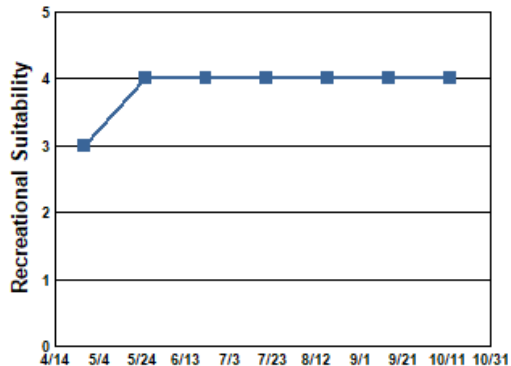


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/27/21	9.2	15.8	16	27	1.7	3	3
05/25/21	22.2	8.4	1.4	34	4.3	3	4
06/22/21	20.7	7.6	23	77	1.5	3	4
07/20/21	25.3	19.1	54	74	0.8	3	4
08/17/21	23.5	14.6	67	83	0.6	3	4
09/14/21	19.9	8.3	60	116	0.6	3	4
10/12/21	17.6	9.6	58	80	0.6	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP							F	C	D	D	D	D
CLA							B	B	C	C	D	C
Secchi							F	D	F	F	F	F
Lake Grade							D	C	D	D	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	C	D	C	C	C	D	C	C	C
CLA	C	C	C	B	C	B	C	C	F	C	C	C
Secchi	D	C	C	C	C	B	C	B	C	C	B	B
Lake Grade	C	C	C	C	C	B	C	C	D	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C		D	C	C	D
CLA	C		C	C	C	C
Secchi	C		C	C	C	C
Lake Grade	C		C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Reid Park Pond (82–0460) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

Reid Park Pond is located within the City of Lake Elmo (Washington County). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	35	19	44	C
CLA ($\mu\text{g/l}$)	9.5	2.5	16	A
Secchi (m)	>1.4	0.8	>2.6	
TKN (mg/l)	0.76	0.68	0.82	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

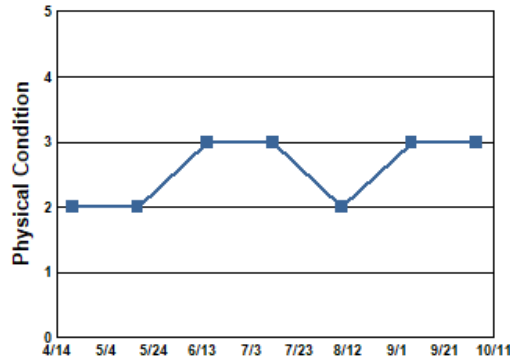
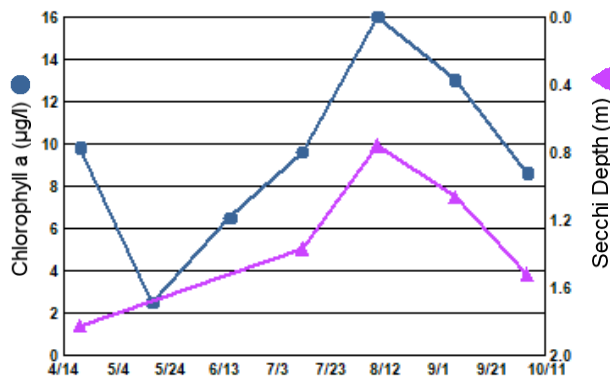
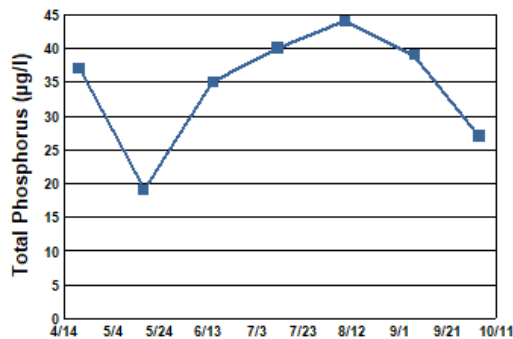
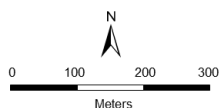
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Reid Park Pond
Lake Elmo, Washington Co.

Lake ID: 82046000

Bathymetry
Unknown

● Sampling site
Contours in meters

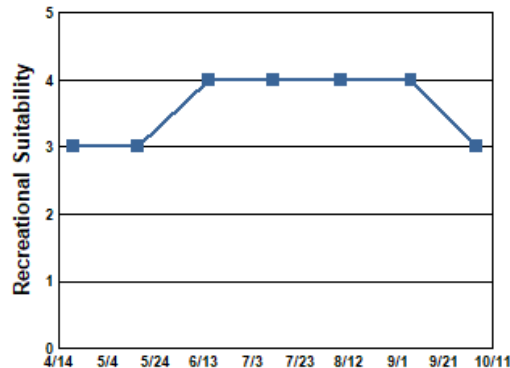


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.5	8.9	9.8	37	1.8	2	3
05/17/21	17.8	8.5	2.5	19	>2.6	2	3
06/15/21	26.4	7.8	6.5	35	>1.4	3	4
07/12/21	24.2	6.3	9.6	40	1.4	3	4
08/09/21	26.6	6.2	16	44	0.8	2	4
09/07/21	21.2	5.0	13	39	1.1	3	4
10/04/21	18.8	5.9	8.6	27	1.5	3	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Rest Area Pond (82–0514) Valley Branch Watershed District

Monitoring Personnel: Minnesota Department of Transportation staff

Rest Area Pond is a 12.6-acre lake located within West Lakeland Township (Washington County). There are few morphological information for the pond. The pond's surface area and watershed area (17,781 acres) translates to a large 157:1 watershed-to-pond area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	79	16	175	D
CLA ($\mu\text{g/l}$)	23	3.0	68	C
Secchi (m)	1.2	0.2	2.3	D
TKN (mg/l)	1.09	0.46	2.10	
			Lake Grade	D

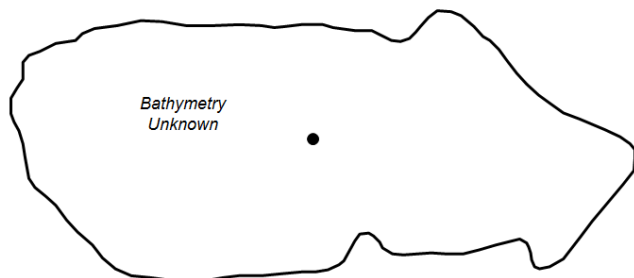
The pond received a lake grade of D which is consistent with its historical water quality database. The pond has received lake grades ranging from B to F since 2006..

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

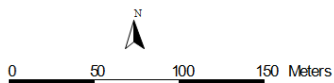
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Rest Area Pond West Lakeland Twp., Washington Co.

Lake ID: 820514-00

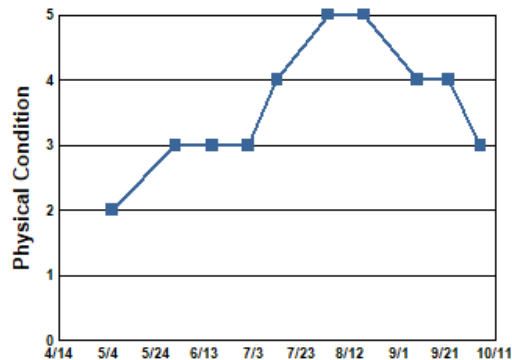
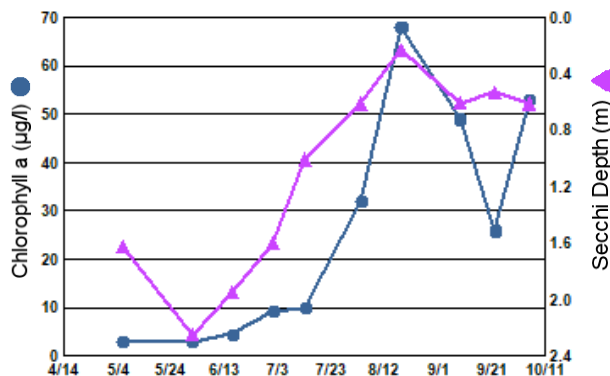
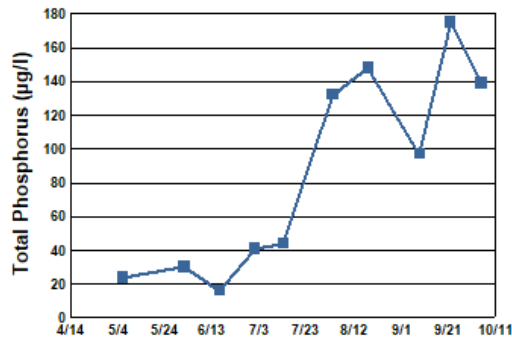


● Sampling site
Contours in meters

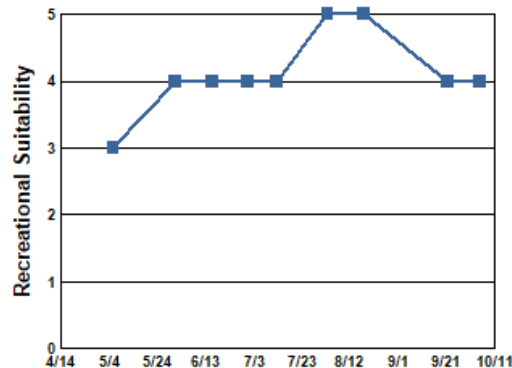


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/06/21	14.2		3.2	24	1.6	2	3
06/01/21	21.2		3.0	30	2.3	3	4
06/16/21	26.1		4.6	16	2.0	3	4
07/01/21	27.1		9.3	41	1.6	3	4
07/13/21	25.6		10	44	1.0	4	4
08/03/21	26.0		32	132	0.6	5	5
08/18/21	26.8		68	148	0.2	5	5
09/09/21	21.6		49	97	0.6	4	4
09/22/21	20.2		26	175	0.5	4	4
10/05/21	20.0		53	139	0.6	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	F	F	F	F	D	F	D	C	F
CLA			D	C	F	F	C	B	C	C	B	F
Secchi			D	F	F	F	F	D	D	D	D	F
Lake Grade			D	D	F	F	D	C	D	D	C	F

Year	2016	2017	2018	2019	2020	2021
TP	D	C	D	C	B	D
CLA	C	C	C	B	A	C
Secchi	D	D	D	C	C	D
Lake Grade	D	C	D	C	B	D

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Riley Lake (10—0002) *City of Chanhassen/City of Eden Prairie*

David Florenzano

Riley Lake is located with the cities of Chanhassen and Eden Prairie (Carver and Hennepin counties). The lake is considered a Priority Water by the Metropolitan Council. The maximum and mean depths are 15.0 m and 6.6 m, respectively. The lake received alum treatments in 2016 and 2020.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002, aquatic consumption (mercury in fish tissue) in 2002, and aquatic life (fish bioassessments) in 2018. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995 and zebra mussels (*Dreissena polymorpha*) in 2018.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

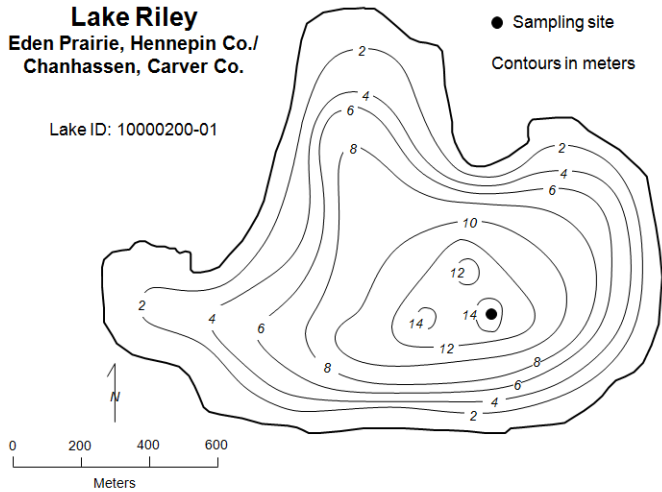
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	13	41	B
CLA (µg/l)	2.5	1.5	4.8	A
Secchi (m)	5.2	3.5	7.1	A
TKN (mg/l)	0.69	0.62	0.82	
			Lake Grade	A

The lake received a lake grade of A this year similar to 2019 and 2020. Water quality has improved with the shift from C to B to A grades over the past decade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

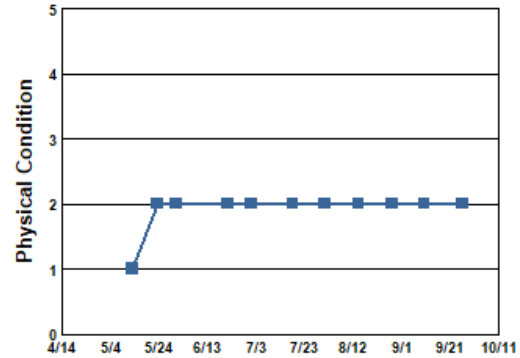
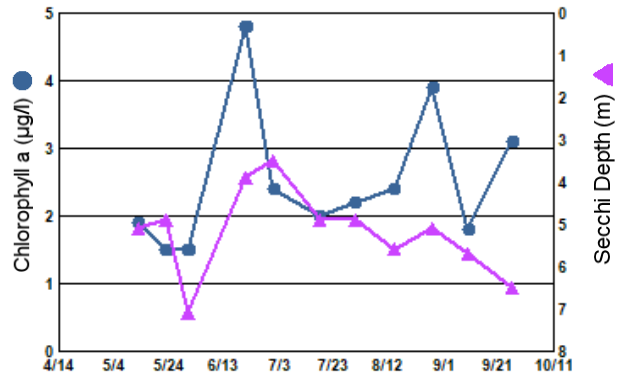
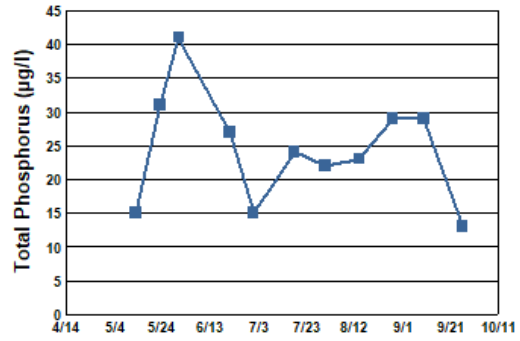
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

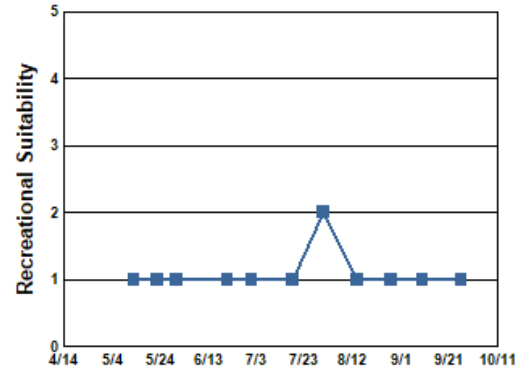


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/13/21	15.6		1.9	15	5.1	1	1
05/23/21	21.7		1.5	31	4.9	2	1
05/31/21	18.6		1.5	41	7.1	2	1
06/21/21	23.8		4.8	27	3.9	2	1
07/01/21	28.3		2.4	15	3.5	2	1
07/18/21	27.6		2.0	24	4.9	2	1
07/31/21	26.9		2.2	22	4.9	2	2
08/14/21	24.9		2.4	23	5.6	2	1
08/28/21	24.3		3.9	29	5.1	2	1
09/10/21	22.2		1.8	29	5.7	2	1
09/26/21	19.3		3.1	13	6.5	2	1



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4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	C	B	C	C	C	C	C	C				C
CLA	C	C	C	C	C	C	C	D			C	C
Secchi	C	C	C	C	C	C	C	C	C		C	C
Lake Grade	C	C	C	C	C	C	C	C				C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C				C			C		C	C
CLA		C				C			C		C	D
Secchi		C				C			C		C	C
Lake Grade		C				C			C		C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	B	C	C	C	C	C	C	C	C
CLA	C	C	B	B	B	B	C	C	C	B	C	C
Secchi	B	C	B	C	C	C	C	B	C	C	C	B
Lake Grade	C	C	B	B	C	C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	B	C	B	B	A	B
CLA	B	B	A	A	A	A
Secchi	A	B	B	A	A	A
Lake Grade	B	B	B	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Rogers Lake (19–0080) *City of Mendota Heights*

Volunteer: David Rossmiller

Rogers Lake lies within the city of Mendota Heights. The lake has a surface area of 94 acres and a maximum depth of 2.4 m (7.9 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	46	28	67	C
CLA ($\mu\text{g/l}$)	8.1	2.9	17	A
Secchi (m)	>1.7	1.0	>2.3	
TKN (mg/l)	1.00	0.79	1.20	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

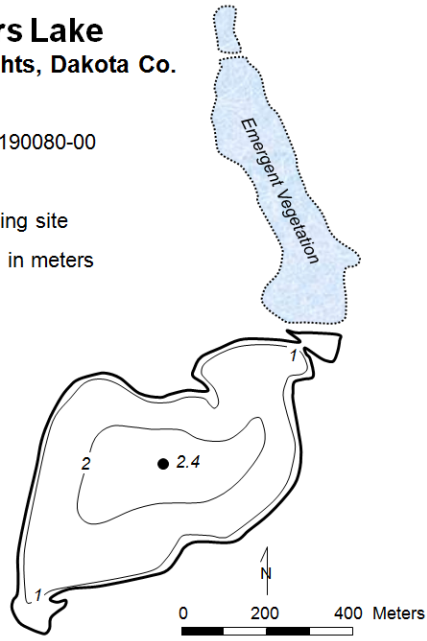
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Rogers Lake Mendota Heights, Dakota Co.

Lake ID: 190080-00

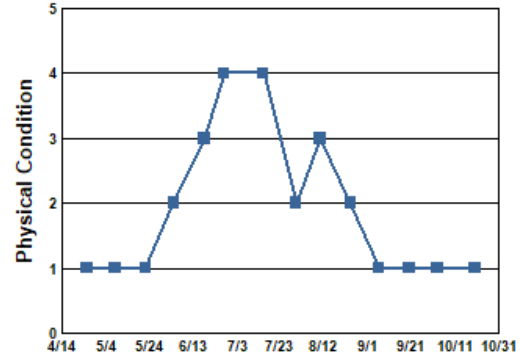
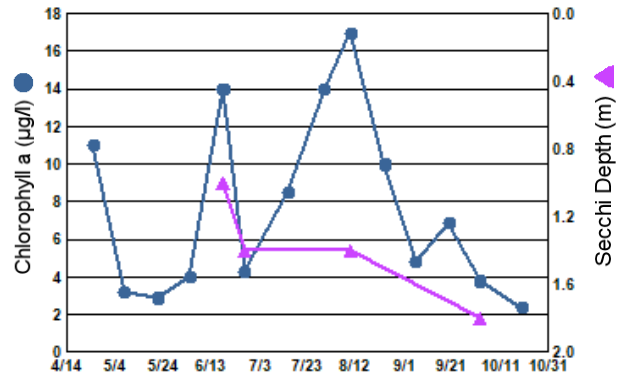
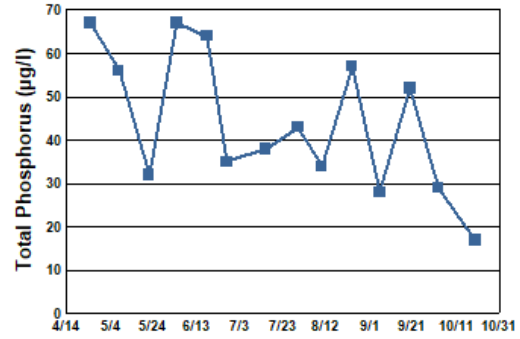
- Sampling site
- Contours in meters



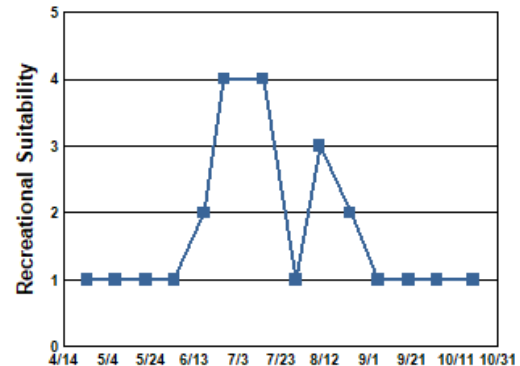
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	10.2		11	67	+2.1	1	1
05/08/21	16.4		3.2	56	>2.1	1	1
05/22/21	24.4		2.9	32	>2.3	1	1
06/04/21	28.8		4.0	67	>1.8	2	1
06/18/21	28.5		14	64	1.0	3	2
06/27/21	26.8		4.3	35	1.4	4	4
07/15/21	28.0		8.5	38	>1.3	4	4
07/30/21	27.0		14	43	>1.5	2	1
08/10/21	27.1		17	34	1.4	3	3
08/24/21	25.2		10	57	>1.6	2	2
09/06/21	23.7		4.8	28	>1.9	1	1
09/20/21	20.5		6.9	52	>1.9	1	1
10/03/21	22.0		3.8	29	1.8	1	1
10/20/21	14.7		2.4	17	>1.8	1	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



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- 5 = Severe Algal Bloom



- 1 = Beautiful
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- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				C	B	C	C	C	C	A	A	B
CLA				A	A	A	A	A	A	A	A	A
Secchi				D	C	C	C	C				
Lake Grade				C	B	B	B	B				

Year	2016	2017	2018	2019	2020	2021
TP	B	A		B	C	C
CLA	A	A		A	A	A
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Rose Lake [North Basin] (82-0112) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Rose Lake is a small lake located in the City of Lake Elmo (Washington County). There is very little known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	39	27	62	C
CLA ($\mu\text{g/l}$)	37	6.4	110	C
Secchi (m)	1.5	0.9	1.8	C
TKN (mg/l)	0.79	0.73	0.95	
			Lake Grade	C

The north basin received a lake grade of C this year which is an improvement in water quality compared to the F grades received in the late 2000s. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

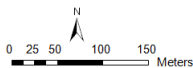
Rose Lake (North Basin)

Lake Elmo, Washington Co.

Lake ID: 820112-00

● Sampling site

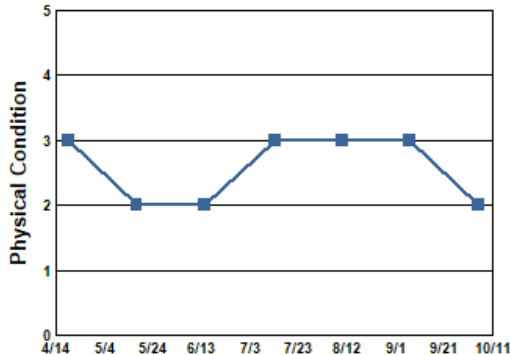
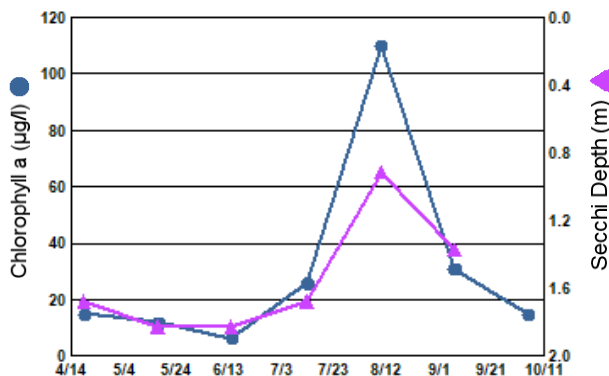
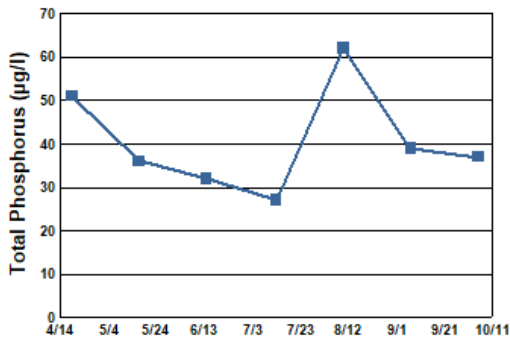
Contours in meters



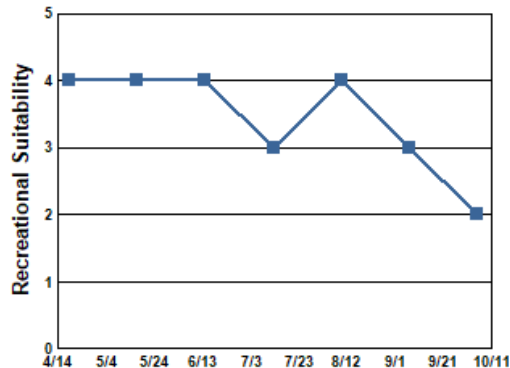
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.7	9.9	15	51	1.7	3	4
05/17/21	17.5	10.2	12	36	1.8	2	4
06/14/21	26.5	7.7	6.4	32	1.8	2	4
07/13/21	24.8	8.8	26	27	1.7	3	3
08/10/21	25.4	8.6	110	62	0.9	3	4
09/07/21	21.9	9.4	31	39	1.4	3	3
10/05/21	21.5	8.2	15	37	>1.4	2	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



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- 4 = High Algal Color
- 5 = Severe Algal Bloom



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- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					D	F	F					
CLA					F	F	F					
Secchi					F	F	F					
Lake Grade					F	F	F					

Year	2016	2017	2018	2019	2020	2021
TP			C			C
CLA			B			C
Secchi						C
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Rose Lake [South Basin] (82-0112) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Rose Lake is a small lake located in the City of Lake Elmo (Washington County). There is very little known morphological data available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	158	83	323	F
CLA ($\mu\text{g/l}$)	77	10	180	D
Secchi (m)	0.5	0.2	0.8	F
TKN (mg/l)	2.02	1.20	3.10	
			Lake Grade	F

The south basin received a lake grade of F this year which is a return to the poorer water quality as observed in the late 2000s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

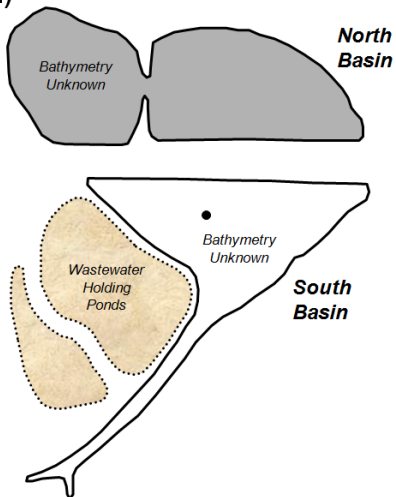
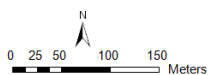
Rose Lake (South Basin)

Lake Elmo, Washington Co.

Lake ID: 820112-00

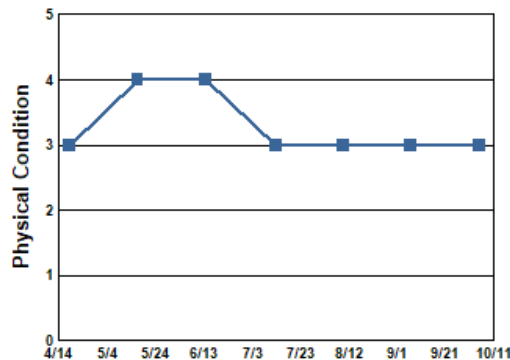
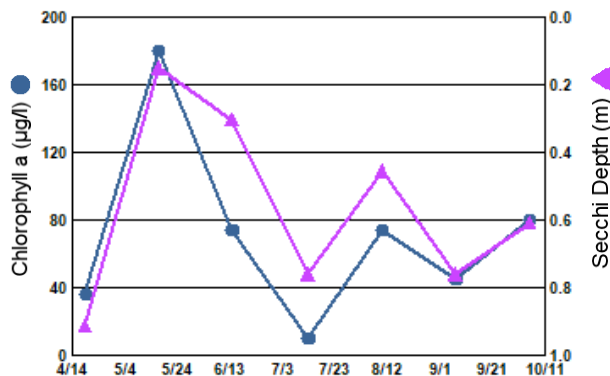
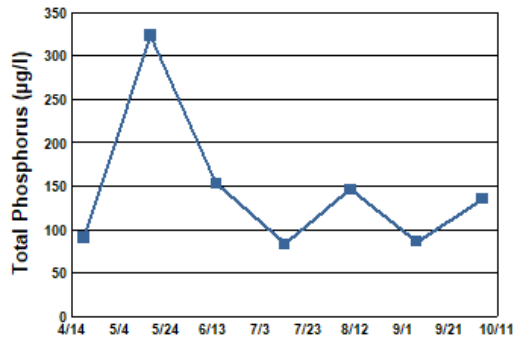
● Sampling site

Contours in meters

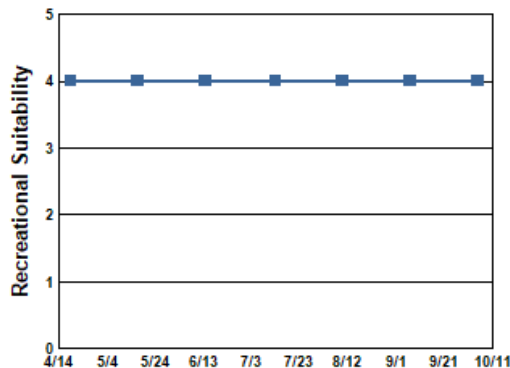


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.0	11.8	36	91	0.9	3	4
05/17/21	16.7	11.1	180	323	0.2	4	4
06/14/21	26.0	12.1	74	153	0.3	4	4
07/13/21	24.7	12.3	10	83	0.8	3	4
08/10/21	25.6	10.2	74	146	0.5	3	4
09/07/21	22.0	9.1	45	86	0.8	3	4
10/05/21	20.6	11.4	80	135	0.6	3	4



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					D	F	F					
CLA					F	F	F					
Secchi					F	F	F					
Lake Grade					F	F	F					

Year	2016	2017	2018	2019	2020	2021
TP			D			F
CLA			D			D
Secchi			F			F
Lake Grade			D			F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sand Lake (82–0067) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Sand Lake is located within the City of Scandia (Washington County). The lake has a surface area of 46 acres. It has a maximum and mean depths of 5.5 m and 2.4 m, respectively. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	24	14	37	B
CLA ($\mu\text{g/l}$)	10	1.5	25	B
Secchi (m)	2.0	0.9	3.4	C
TKN (mg/l)	0.76	0.60	1.00	
			Lake Grade	B

The received a lake grade of B this year, which is consistent with its historical water quality database. The lake has varied in the B to C range since the early 2000s.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C	C	C	C						C	C
CLA		C	C	B	C						B	C
Secchi		D	D	C	C						C	C
Lake Grade		C	C	C	C						C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	C	B	C	C	C	C			C	C
CLA	B	C	B	B	C	B	B				C	C
Secchi	C	C	C	B	C	A	C	C		C	C	C
Lake Grade	B	C	C	B	C	B	C				C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	B	B	C	C	B
CLA	B	B	B	C	C	B
Secchi	C	C	C	D	C	C
Lake Grade	C	B	B	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Schmidt Lake (27–0102) Shingle Creek Watershed Management Commission

Volunteer: Joel Scalzo

Schmidt Lake is located within the City of Plymouth (Hennepin County). It has a maximum depth of 7.6 m. Most of the surface area is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. The lake has been designated as infested with Eurasian Water Milfoil (*Myriophyllum spicatum*). In an attempt to reduce the lake's algal population and improve the lake's water quality, an experimental bacterial treatment took place on Schmidt Lake in 2004 and 2005.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	59	22	157	C
CLA (µg/l))	6.2	1.0	14	A
Secchi (m)	2.5	1.2	4.7	B
TKN (mg/l)	0.83	0.54	1.30	
			Lake Grade	B

The lake received a lake grade of B this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

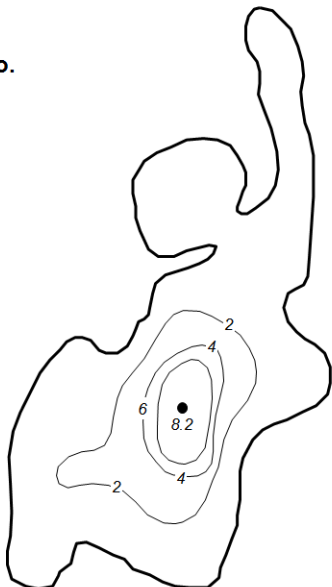
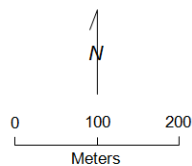
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Schmidt Lake
Plymouth, Hennepin Co.

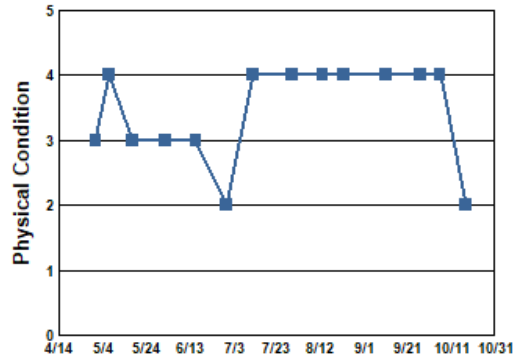
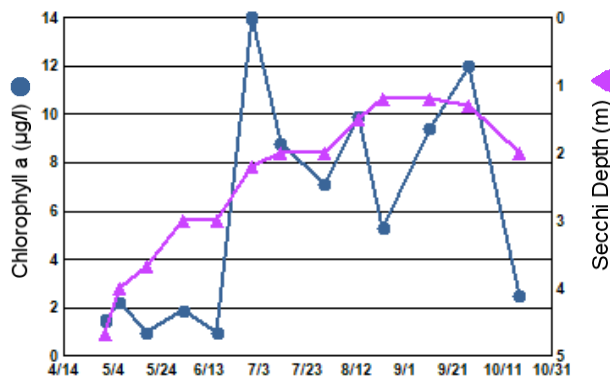
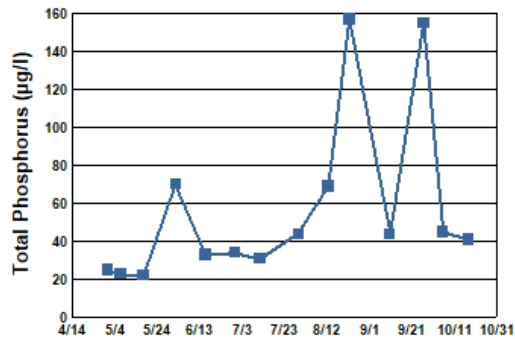
Lake ID: 270102-00

● Sampling site
Contours in meters

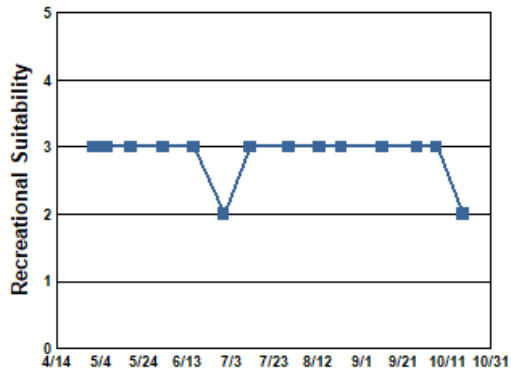


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/01/21	15.7		1.5	25	4.7	3	3
05/07/21	13.8		2.2	23	4.0	4	3
05/18/21	19.6		1.0	22	3.7	3	3
06/02/21	20.8		1.9	70	3.0	3	3
06/16/21	27.0		1.0	33	3.0	3	3
06/30/21	27.2		14	34	2.2	2	2
07/12/21			8.8	31	2.0	4	3
07/30/21	27.5		7.1	44	2.0	4	3
08/13/21	26.0		9.9	69	1.5	4	3
08/23/21	27.4		5.3	157	1.2	4	3
09/11/21	23.2		9.4	44	1.2	4	3
09/27/21	19.6		12	155	1.3	4	3
10/06/21	20.7			45		4	3
10/18/21	15.3		2.5	41	2.0	2	2



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C			C		C	C		
CLA				B			C		C	C		
Secchi			C	C			C		C	D		
Lake Grade				C			C		C	C		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C		B				B				
CLA	B	B		A				A				
Secchi	C	C		B				A				
Lake Grade	C	C		B				A				

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						A
Secchi						B
Lake Grade						B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Schmitt Lake (19–0052) Lower Mississippi River Watershed Management Organization

Volunteer: Debra James

Schmitt Lake is located within the City of Inver Grove Heights (Dakota County). Little bathymetric information is available for this lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	65	30	116	C
CLA (µg/l)	32	3.9	74	
Secchi (m)	>1.1	>0.8	1.4	D
TKN (mg/l)	1.05	0.68	1.50	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

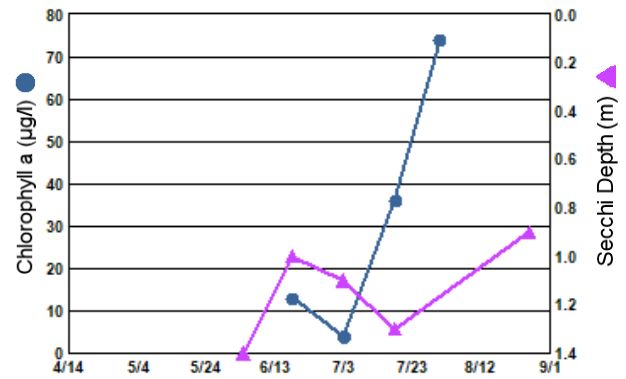
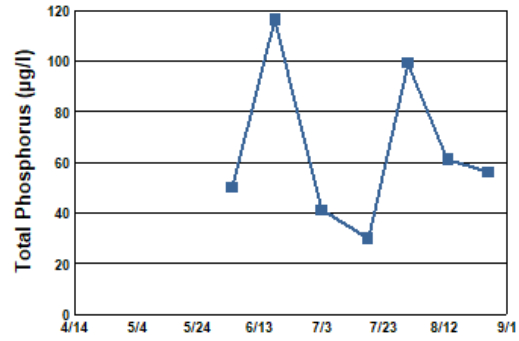
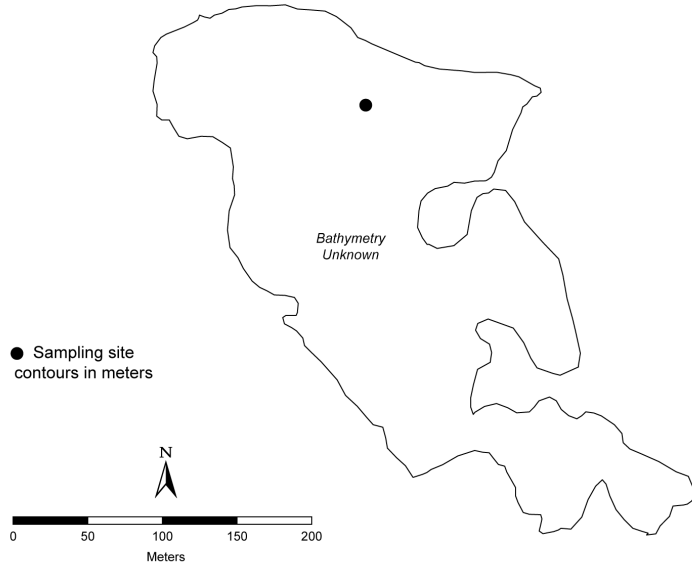
There was an insufficient quantity of CLA values to calculate a CLA grade. At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

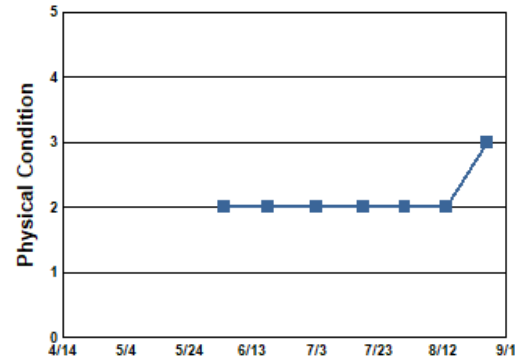
Schmitt Lake
Inver Grove Heights, Dakota County

Lake ID: 19005200



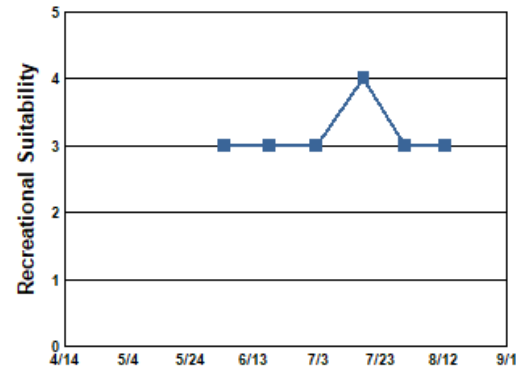
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/04/21	23.2			50	1.4	2	3
06/18/21	27.2		13	116	1.0	2	3
07/03/21	26.8		3.9	41	1.1	2	3
07/18/21	29.2		36	30	1.3	2	4
07/31/21	24.6		74	99	>0.8	2	3
08/13/21	24.0			61	>1.1	2	3
08/26/21	24.1			56	0.9	3	



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					C	C
CLA					B	
Secchi					D	D
Lake Grade					C	

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

School Lake (13–0057) Comfort Lake — Forest Lake Watershed District

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

School Lake is located in Wyoming Township (Chisago County). There are few morphological data available for the lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2008.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

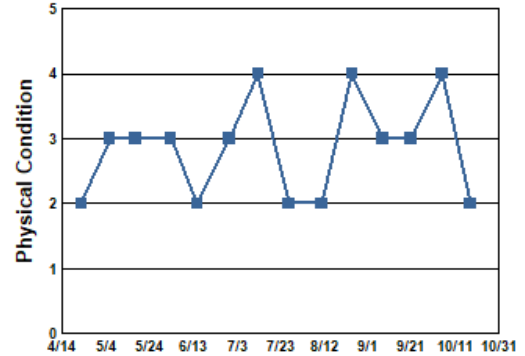
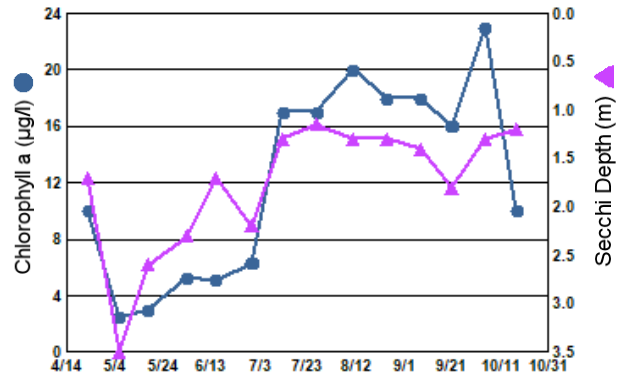
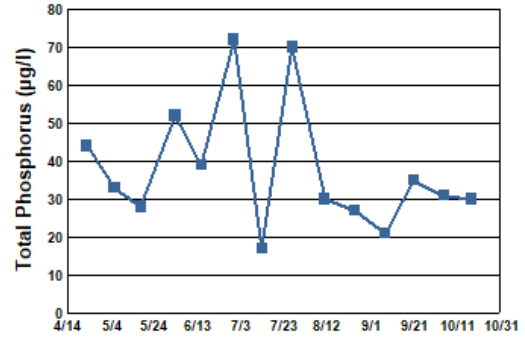
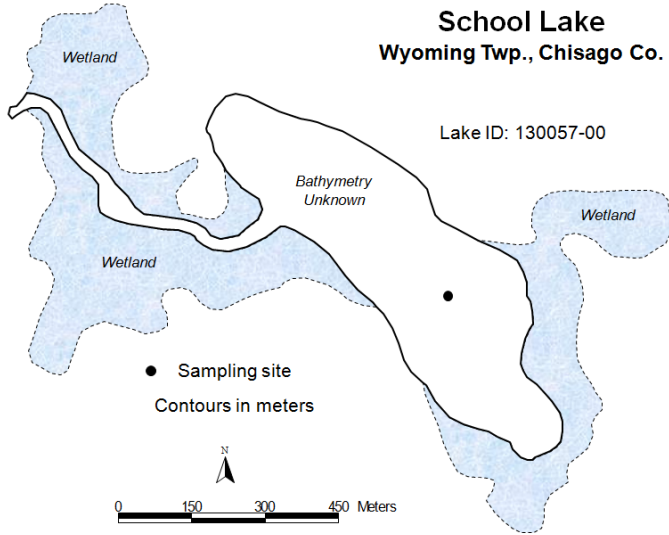
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	17	72	C
CLA (µg/l)	12	2.5	20	B
Secchi (m)	1.9	1.2	3.5	C
TKN (mg/l)	0.72	0.59	0.89	
			Lake Grade	C

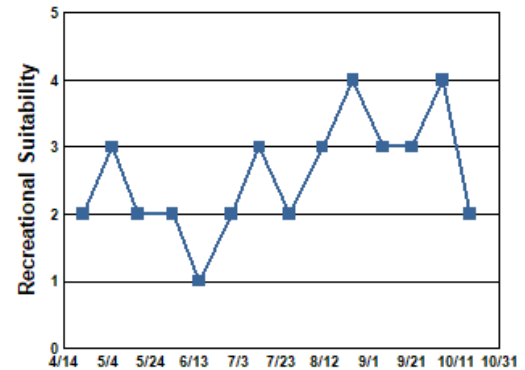
The lake received a lake grade of C this year which is consistent with its historical water quality database. The CLA grade in 2021 improved to a B which is the best grade received for CLA according to its water quality database going back to 2005.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/21	10.8		10	44	1.7	2	2
05/06/21	14.9		2.5	33	3.5	3	3
05/18/21	20.0		3.0	28	2.6	3	2
06/03/21	21.2		5.3	52	2.3	3	2
06/15/21	27.0		5.1	39	1.7	2	1
06/30/21	25.1		6.3	72	2.2	3	2
07/13/21	26.6		17	17	1.3	4	3
07/27/21	28.8		17	70	1.2	2	2
08/11/21	25.7		20	30	1.3	2	3
08/25/21	24.8		18	27	1.3	4	4
09/08/21	20.9		18	21	1.4	3	3
09/21/21	20.3		16	35	1.8	3	3
10/05/21	21.0		23	31	1.3	4	4
10/18/21	15.7		10	30	1.2	2	2

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	D	C		C						
CLA		C	C	C		C						
Secchi		C	C	C		C						
Lake Grade		C	C	C		C						

Year	2016	2017	2018	2019	2020	2021
TP		C	C			C
CLA		C	C			B
Secchi		D	D			C
Lake Grade		C	C			C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Scout Lake (19-0198) *City of Apple Valley*

Volunteer: Dan Stanek

Scout Lake is a small lake located in Apple Valley. Little information is available on the morphology of the lake. The maximum depth of the lake is 2.9 m (9.5 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	116	61	240	D
CLA ($\mu\text{g/l}$)	104	12	260	F
Secchi (m)	0.6	0.2	1.4	F
TKN (mg/l)	3.32	1.70	5.30	
			Lake Grade	F

The lake received a lake grade of F this year. The lake grades have varied between C and F since CAMP monitoring began in 2007.

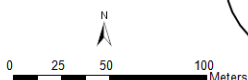
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Scout Lake
Apple Valley, Dakota Co.

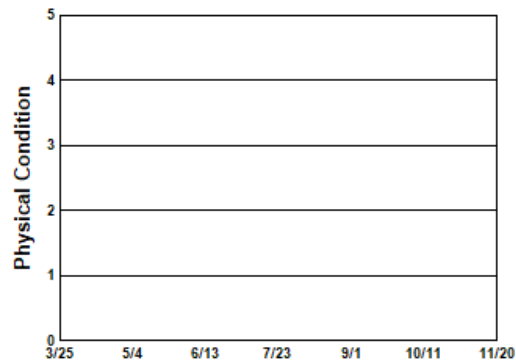
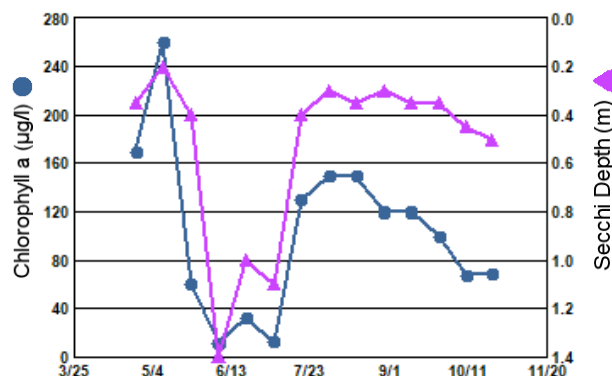
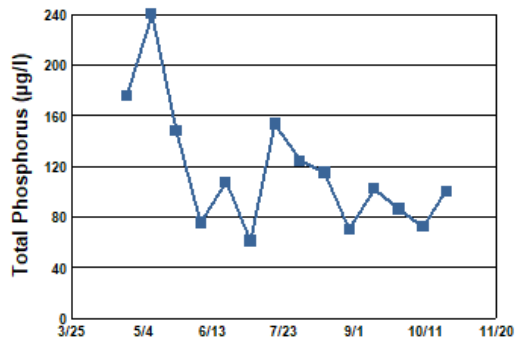
Lake ID: 190198-00

● Sampling site
Contours in meters

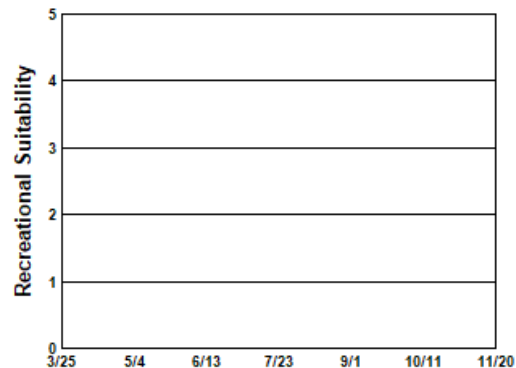


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/21	9.7		170	175	0.4		
05/09/21	18.9		260	240	0.2		
05/23/21	26.3		60	148	0.4		
06/06/21	28.3		12	75	1.4		
06/20/21	22.7		32	107	1.0		
07/04/21	31.2		13	61	1.1		
07/18/21	29.3		130	153	0.4		
08/01/21	25.9		150	124	0.3		
08/15/21	26.4		150	115	0.4		
08/29/21	26.6		120	70	0.3		
09/12/21	21.5		120	102	0.4		
09/26/21	18.4		100	86	0.4		
10/10/21	13.4		68	72	0.5		
10/23/21	12.2		69	100	0.5		



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP				D	C	D	D	F	D	C	D	D
CLA				C	C	C	D	F	D	C	F	F
Secchi				F	C	D	D	F	F	D	D	F
Lake Grade				D	C	D	D	F	D	C	D	F

Year	2016	2017	2018	2019	2020	2021
TP	D	D	D	D	D	D
CLA	F	F	F	D	F	F
Secchi	F	F	F	F	F	F
Lake Grade	F	F	F	D	F	F

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Second Lake (13–0025) Comfort Lake — Forest Lake Watershed District

Volunteer: Michael Eggert

Sponsor: Comfort Lake — Forest Lake Watershed District

Second Lake is located in Chisago Lake Township (Chisago County). There are few morphological data available for the lake.

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

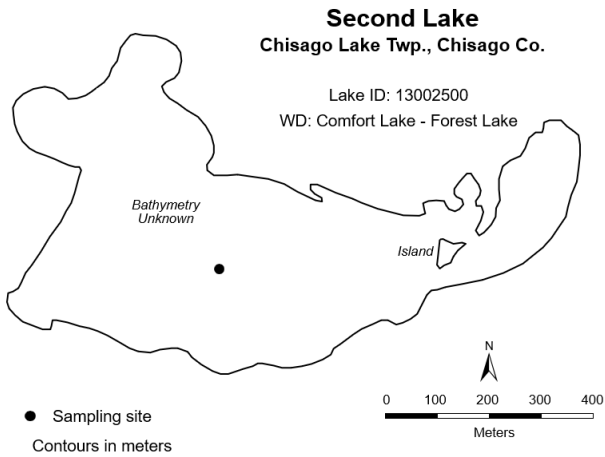
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	19	61	B
CLA (µg/l)	5.5	2.2	9.2	A
Secchi (m)	>2.7	>2.0	4.0	B
TKN (mg/l)	0.67	0.59	0.74	
			Lake Grade	B

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of B this year, similar to previous years. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

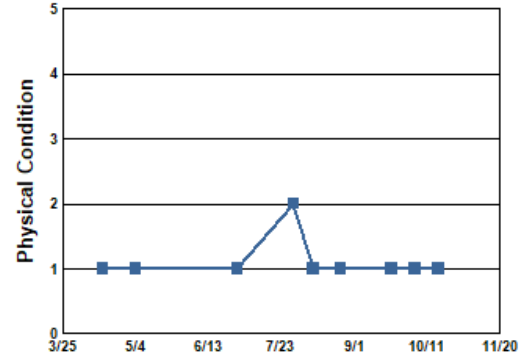
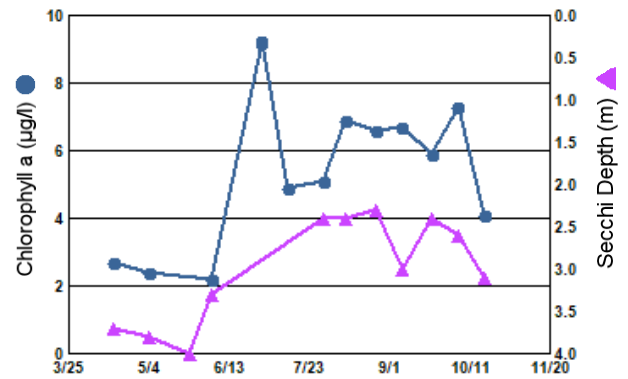
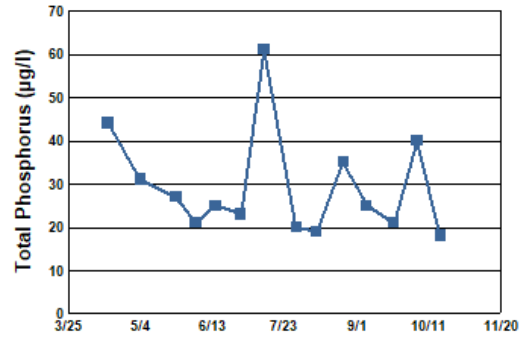
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



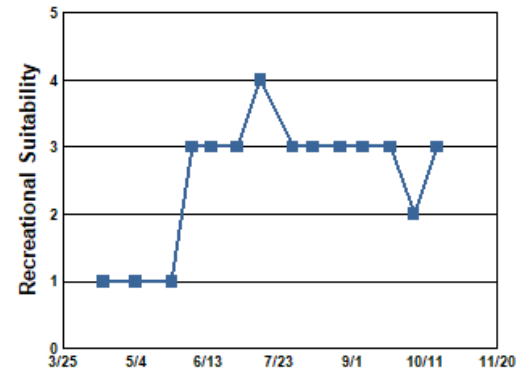
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/16/21	9.5		2.7	44	3.7	1	1
05/04/21	13.2		2.4	31	3.8	1	1
05/24/21	21.8			27	4.0		1
06/04/21	22.3		2.2	21	3.3		3
06/15/21	25.8			25	>2.3		3
06/29/21	26.6		9.2	23	>2.2	1	3
07/12/21	25.8		4.9	61	>2.0		4
07/30/21	27.1		5.1	20	2.4	2	3
08/10/21	25.6		6.9	19	2.4	1	3
08/25/21	24.9		6.6	35	2.3	1	3
09/07/21	22.0		6.7	25	3.0		3
09/22/21	19.6		5.9	21	2.4	1	3
10/05/21	19.9		7.3	40	2.6	1	2
10/18/21	13.8		4.1	18	3.1	1	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP			B	B	B	B
CLA			A	A	B	A
Secchi			C	B	B	B
Lake Grade			B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Seidls Lake (19-0095) Lower Mississippi River Watershed Management Organization

Volunteer: Max Wallin

Seidl Lake is a 14-acre lake located in the City of Inver Grove Heights (Dakota County). The lake receives inflow from five inlets. The maximum depth of the lake is approximately 5.0 m. Few morphological data are available. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	32	27	41	B
CLA ($\mu\text{g/l}$)	7.8	2.8	17	A
Secchi (m)	2.0	1.3	2.6	C
TKN (mg/l)	0.70	0.58	0.80	
			Lake Grade	B

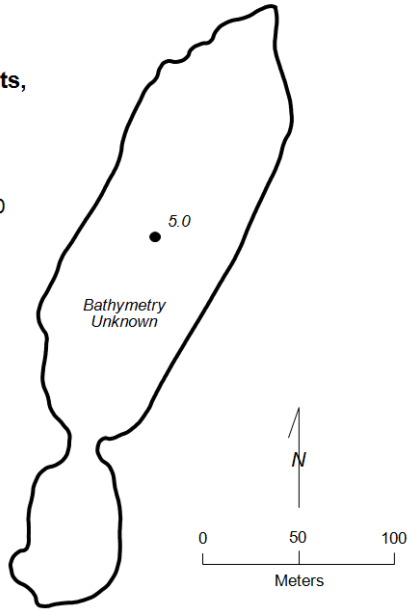
The lake received a lake grade of B this year which is an improvement over the C grades received in 2019 and 2020.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Seidl Lake
Inver Grove Heights,
Dakota Co.

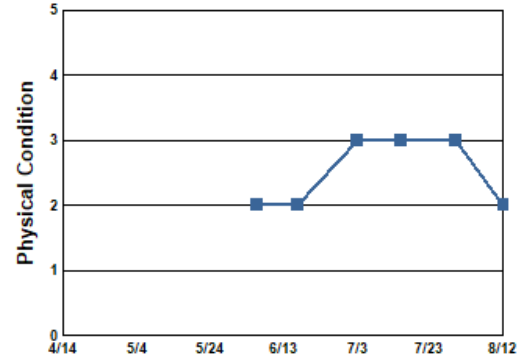
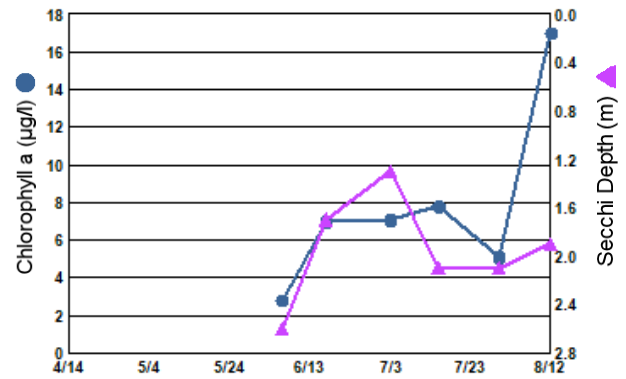
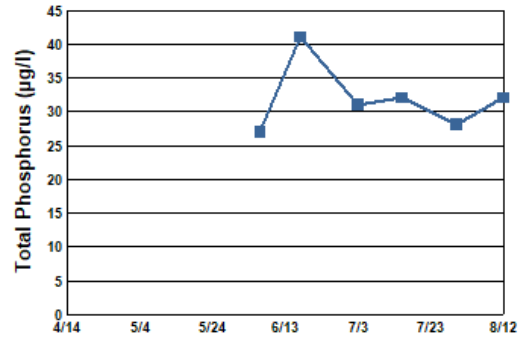
Lake ID: 190095-00



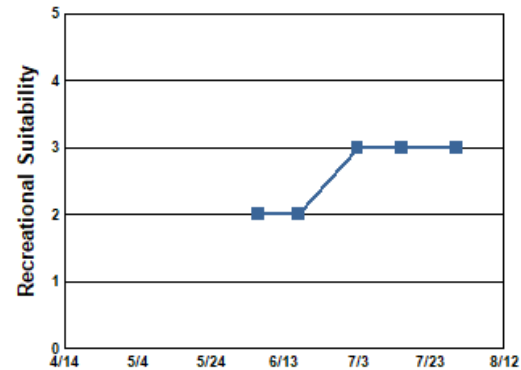
● Sampling site
Contours in meters

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/06/21	26.5		2.8	27	2.6	2	2
06/17/21	28.1		7.0	41	1.7	2	2
07/03/21	28.8		7.1	31	1.3	3	3
07/15/21	27.0		7.8	32	2.1	3	3
07/30/21	27.3		5.1	28	2.1	3	3
08/12/21	26.3		17	32	1.9	2	



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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												C
CLA												C
Secchi												D
Lake Grade												C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C	C	C	C	D	C	C	D	C
CLA				A	B	B	C	C	C	C	C	B
Secchi		D	D	B	B	C	D	D	C	C	D	D
Lake Grade				B	B	C	C	D	C	C	D	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D	C	D	D			C	D				
CLA	B	C	C	C			C	D				
Secchi	C	D	F	F			D	D			D	
Lake Grade	C	C	D	D			C	D				

Year	2016	2017	2018	2019	2020	2021
TP				C	C	B
CLA				B	B	A
Secchi				C	C	C
Lake Grade				C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Shields Lake (82–0162) Comfort Lake — Forest Lake Watershed District

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Shields Lake is located in the city of Forest Lake (Washington County). It has a surface area of 27 acres and a maximum depth of 8.2 m.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	23	139	C
CLA (µg/l)	6.5	1.6	16	A
Secchi (m)	2.5	0.8	4.4	B
TKN (mg/l)	0.98	0.86	1.20	
			Lake Grade	B

The lake received a lake grade of B this year, which is an improvement over the typical D grades received over the past 20 years and an improvement over the C grade received in 2020. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP									F	D		D
CLA									D	D		C
Secchi											F	C
Lake Grade												C

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		F	D	F	F	F	F	F	F	F	F	F
CLA		C	C	C	B	A	C	C	C	C	C	C
Secchi		C	C	B	B	B	C	C	C	C	C	C
Lake Grade		D	C	C	C	C	D	D	D	D	D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	F	F	F					F	F	F	F
CLA	C	D	D	C					C	D	C	D
Secchi	C	D	C	C					C	D	D	D
Lake Grade	D	D	D	D					D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	F	F	F	D	C	C
CLA	D	D	D	C	C	A
Secchi	D	D	D	D	D	B
Lake Grade	D	D	D	D	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

South School Section Lake (82–0151) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

South School Section Lake is located in southeastern Hugo Township in Washington County. The 125-acre lake has a maximum depth of 8.0 m (26 feet).

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	19	79	B
CLA (µg/l)	15	3.0	61	B
Secchi (m)	2.6	0.8	4.1	B
TKN (mg/l)	0.87	0.63	1.40	
			Lake Grade	B

The lake received a lake grade of B this year for the second year in a row which is an improvement over the typical C grades it has received in the past. All three parameter grades were Bs as well, which emphasizes the improvement further. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

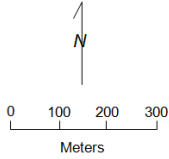
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

South School Section Lake,
Hugo, Washington Co.

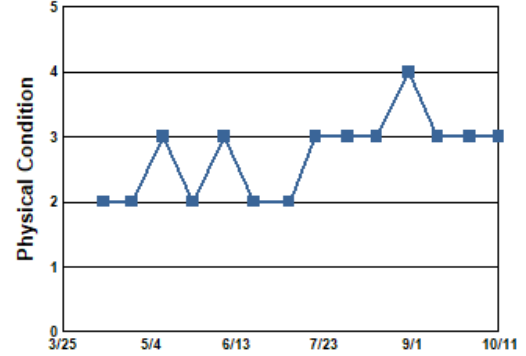
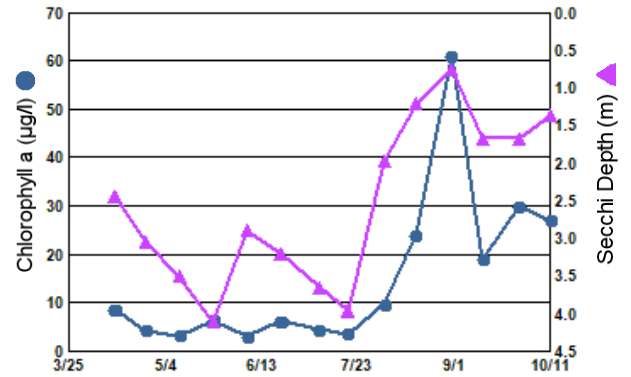
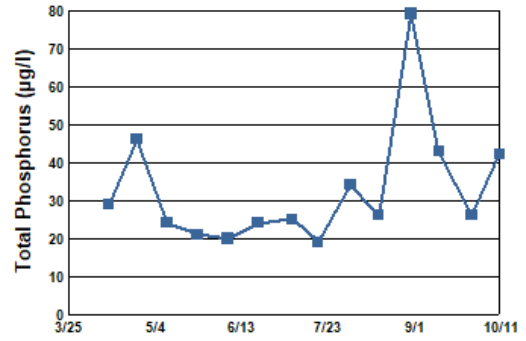
Lake ID: 820151-00

● Sampling site
Contours in meters

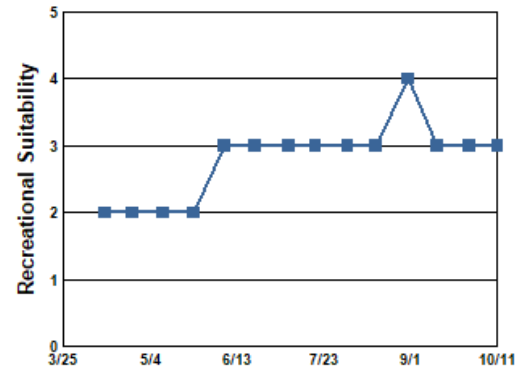


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/13/21	9.7	12.8	8.6	29	2.4	2	2
04/26/21	9.0	12.0	4.2	46	3.0	2	2
05/10/21	13.0	11.4	3.2	24	3.5	3	2
05/24/21	21.0	8.6	6.3	21	4.1	2	2
06/07/21	24.6	9.2	3.0	20	2.9	3	3
06/21/21	22.8	8.5	6.2	24	3.2	2	3
07/07/21	25.4	6.8	4.5	25	3.7	2	3
07/19/21	26.2	8.3	3.5	19	4.0	3	3
08/03/21	25.3	8.7	9.7	34	2.0	3	3
08/16/21	24.4	8.7	24	26	1.2	3	3
08/31/21	23.7	9.5	61	79	0.8	4	4
09/13/21	21.2	6.8	19	43	1.7	3	3
09/28/21	19.3	9.6	30	26	1.7	3	3
10/11/21	19.7	7.9	27	42	1.4	3	3



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5 = Severe Algal Bloom



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4 = No Swimming; Boating OK
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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				C	C		C					
CLA				C	C		C					
Secchi				C	C		C					
Lake Grade				C	C		C					

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C	C	C	C	C	C	C	C	C	C
CLA		C	C	C	B	B	C	C	B	C	B	B
Secchi		B	C	C	C	B	C	C	C	C		C
Lake Grade		C	C	C	C	B	C	C	C	C		C

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	B	B
CLA	C	C	D	C	B	B
Secchi	C	D	D	C	B	B
Lake Grade	C	C	D	C	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

South Twin Lake (82–0019) *Carnelian-Marine Watershed District*

Monitoring Personnel: Washington Conservation District staff

South Twin Lake is a 54-acre lake located within Stillwater Township (Washington County). The maximum and mean depths of the lake are 4.0 m and 2.0 m, respectively. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	18	31	B
CLA (µg/l)	4.4	1.2	7.7	A
Secchi (m)	>2.0	>1.4	2.6	
TKN (mg/l)	0.68	0.65	0.70	
			Lake Grade	

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

Water quality has improved in comparison to water quality observed in the 1990s and 2000s. The water quality historically was in the C to D range for TP and CLA. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

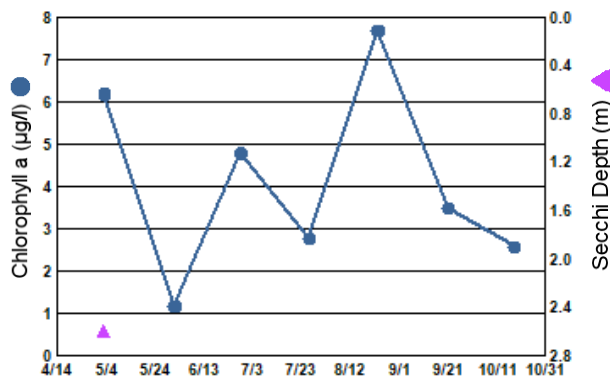
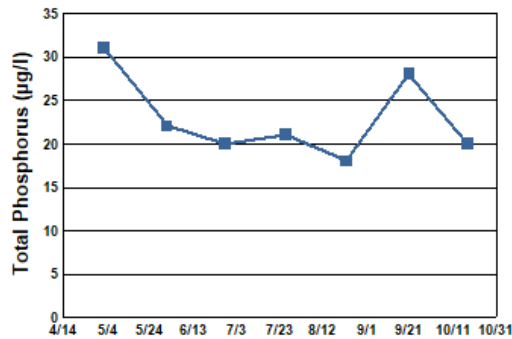
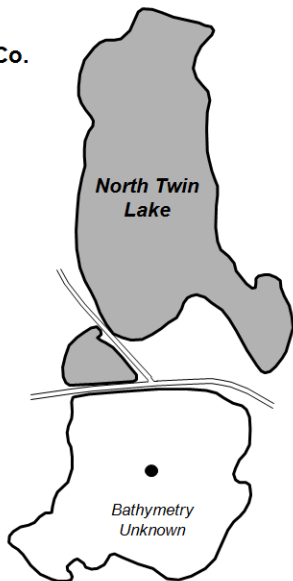
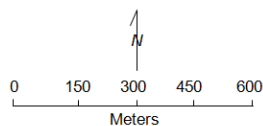
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

South Twin Lake
Stillwater Twp., Washington Co.

LAKE ID: 820019-00

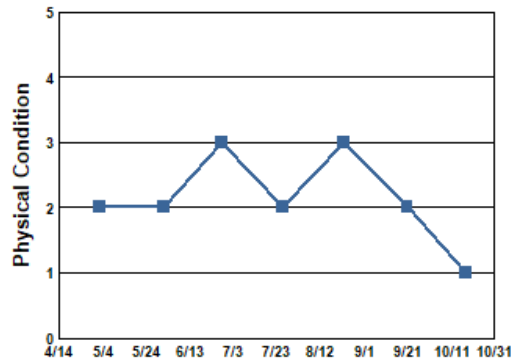
● Sampling site
Contours in meters



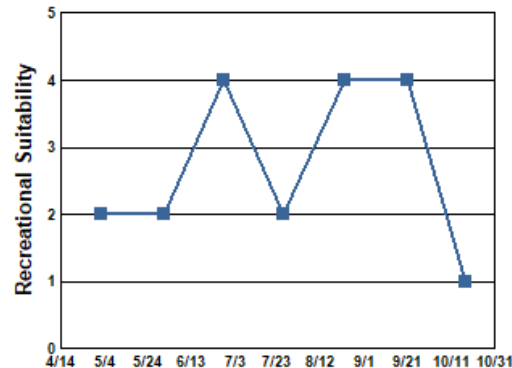
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	13.9	12.0	6.2	31	2.6	2	2
06/01/21	20.7	10.9	1.2	22	>2.4	2	2
06/28/21	24.9	9.7	4.8	20	>1.8	3	4
07/26/21	28.1	10.0	2.8	21	>1.4	2	2
08/23/21	24.2	7.7	7.7	18	>2.0	3	4
09/21/21	20.1	6.9	3.5	28	>1.8	2	4
10/18/21	14.9	9.9	2.6	20	>2.1	1	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					C	C	D	D	C	D		
CLA					D	D	D	F	C	D		
Secchi					D	D	F	F	D	F	D	C
Lake Grade					D	D	D	F	C	D		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	D	D	C	C	D				
CLA	B	C	C	C	C	B	A	C				
Secchi	C	C	D	D	D	C	B	C				
Lake Grade	C	C	D	D	D	C	B	C				

Year	2016	2017	2018	2019	2020	2021
TP	C	C	B		A	B
CLA	B	B	A		A	A
Secchi	C	C				
Lake Grade	C	C				

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Square Lake (82-0046) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Square Lake is located in May Township (Washington County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 193 acres, and a maximum and mean depth of 20.7 m and 9.0 m, respectively.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 2002.

The lake was managed as a trout fishery, and it was stocked regularly with rainbow trout by the Mn DNR (MDNR 1996) up through 2012. A research project was started on the lake in 2013 to study the influences of reduced trout predation on the zooplankton population, and resulting effects of potential changes of zooplankton grazing pressure upon the algal community, and the correlating effects on lake water clarity. As part of the study, a 3-year moratorium on trout stocking began in 2013. The study continued through 2015 along with the stocking moratorium. The study was led by the Carnelian — Marine — St. Croix Watershed District in collaboration with the Mn DNR and Hamline University. The stocking moratorium continues to be in place. The lake was last stocked with rainbow trout in the spring of 2012 according to the MDNR's stocking report on their LakeFinder website.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	9	4	16	A
CLA ($\mu\text{g/l}$)	2.9	1.3	4.0	A
Secchi (m)	>5.1	4.0	>6.1	A
TKN (mg/l)	0.46	0.31	0.69	
			Lake Grade	A

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

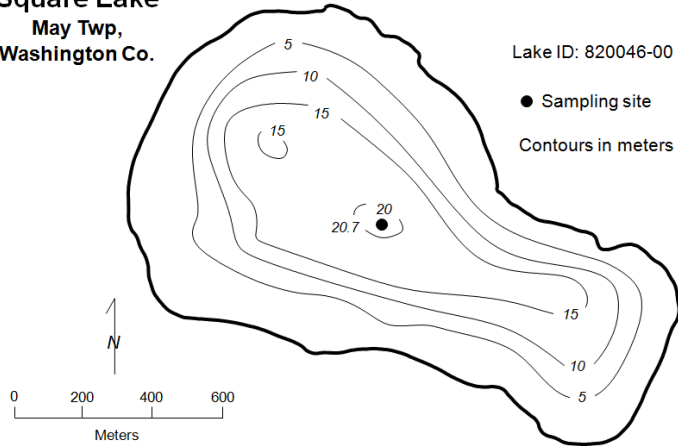
The lake continues to receive A lake grades. Continued monitoring is recommended to determine water quality changes (or not) in response to the trout stocking moratorium.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

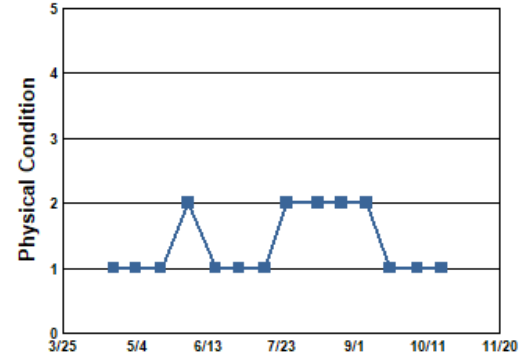
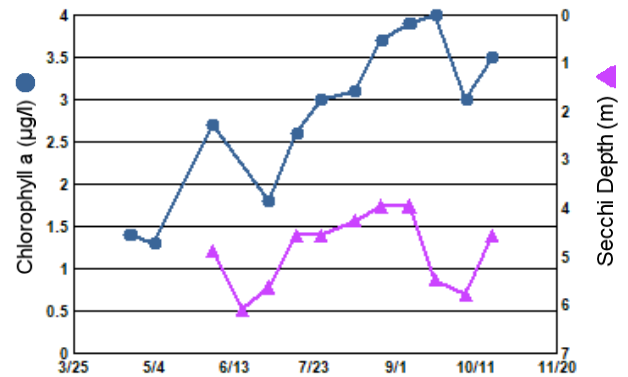
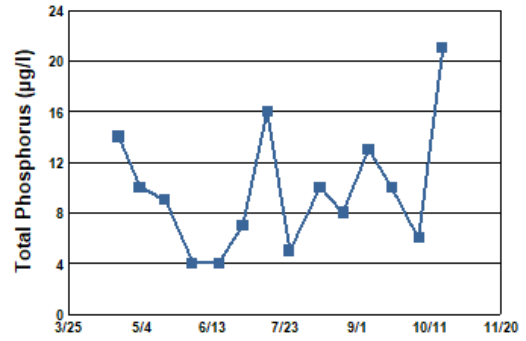
Square Lake
May Twp,
Washington Co.



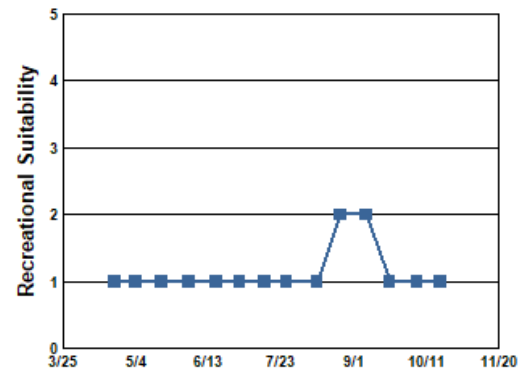
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	8.7	12.1	1.4	14	>6.1	1	1
05/04/21	12.1	11.3	1.3	10	>6.1	1	1
05/18/21	17.0	11.9		9	>6.1	1	1
06/02/21	19.7	9.8	2.7	4	4.9	2	1
06/17/21	25.8	8.8		4	6.1	1	1
06/30/21	25.3	8.9	1.8	7	5.6	1	1
07/14/21	25.6	9.6	2.6	16	4.6	1	1
07/26/21	26.2	8.1	3.0	5	4.6	2	1
08/12/21	25.3	8.9	3.1	10	4.3	2	1
08/25/21	25.1	8.2	3.7	8	4.0	2	2
09/08/21	22.2	8.7	3.9	13	4.0	2	2
09/21/21	20.5	7.6	4.0	10	5.5	1	1
10/06/21	19.6	9.4	3.0	6	5.8	1	1
10/19/21	16.1	8.5	3.5	21	4.6	1	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	B	A	A	A	A	A				A		
CLA	A	A	A	A	A	A				A		
Secchi	A	A	A	A	A	A	A	A	A	A	A	
Lake Grade	A	A	A	A	A	A				A		

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		A	A	A	A	A	A	A	A	A	A	A
CLA		A	A	A	A	A	A	A	A	A	A	A
Secchi		A	A	A	A	A	A	A	A	A	A	A
Lake Grade		A	A	A	A	A	A	A	A	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	A			A	A	A	A	A	A
CLA	A	A	A	A			A	A	A	A	A	A
Secchi	A	A	A	A	A	A	A	A	A	A	A	A
Lake Grade	A	A	A	A			A	A	A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	A	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake St. Croix [Bayport Pool - Site 1N] (82–0001) Metropolitan Council Environmental Services

Volunteer: Jim and Roberta Harper, Kent Johnson

Lake St. Croix is a natural impoundment of the St. Croix River. It is located along the border with Wisconsin and borders many communities in Minnesota and Wisconsin. The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 8,393 acres and a maximum depth of 23.7 m. The original site 1 was in the area of the construction of the new bridge spanning St. Croix Lake. Site 1N was established in 2012 as a replacement for site 1. Site 1N is just upstream of site 1.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998, aquatic consumption (PCBs in fish tissue) in 2006, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2001, bighead carp (*Hypophthalmichthys nobilis*) (2012), silver carp (*Hypophthalmichthys molitrix*) (2012), and grass carp (*Ctenopharyngodon idella*) (2015).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	53	28	83	C
CLA (µg/l)	24	9.7	41	C
Secchi (m)	1.4	0.9	2.1	C
TKN (mg/l)	0.77	0.53	1.10	
			Lake Grade	C

This lake site received a lake grade of C this year, which is consistent with its historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP									C	C	C	C
CLA									C	B	C	B
Secchi									D	C	D	
Lake Grade									C	C	C	

Year	2016	2017	2018	2019	2020	2021
TP			C	C	C	C
CLA			C	C	C	C
Secchi			D	C	D	C
Lake Grade			C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake St. Croix [Bayport Pool-Site 2] (82-0001) Metropolitan Council Environmental Services

Volunteer: Jim and Roberta Harper, Kent Johnson

Lake St. Croix is a natural impoundment of the St. Croix River. It is located along the border with Wisconsin and borders many communities in Minnesota and Wisconsin. The lake is considered a Priority Water by the Metropolitan Council.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998, aquatic consumption (PCBs in fish tissue) in 2006, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2008 and The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2001, bighead carp (*Hypophthalmichthys nobilis*) (2012), silver carp (*Hypophthalmichthys molitrix*) (2012), and grass carp (*Ctenopharyngodon idella*) (2015).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	26	63	C
CLA (µg/l)	26	14	38	C
Secchi (m)	1.6	1.2	2.2	C
TKN (mg/l)	0.84	0.69	1.10	
			Lake Grade	C

Site 2 received a lake grade of C this year, which is similar to lake grades received in the past.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											D	
CLA											C	
Secchi											D	
Lake Grade											D	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C	C	C	C	C	C	C	C	C	C
CLA		C	C	C	B	C	B	B	C	B	C	B
Secchi		C	C	C	C	C	D	D	D	D	D	D
Lake Grade		C	C	C	C	C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP			C	C	C	C
CLA			C	B	C	C
Secchi			C	C	C	C
Lake Grade			C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake St. Croix [Troy Beach Pool-Site 4] (82–0001) Metropolitan Council Environmental Services

Volunteer: Jim and Roberta Harper, Kent Johnson

Lake St. Croix is a natural impoundment of the St. Croix River. It is located along the border with Wisconsin and borders many communities in Minnesota and Wisconsin. The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 8,393 acres and a maximum depth of 23.7 m.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998, aquatic consumption (PCBs in fish tissue) in 2006, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2001, bighead carp (*Hypophthalmichthys nobilis*) (2012), silver carp (*Hypophthalmichthys molitrix*) (2012), and grass carp (*Ctenopharyngodon idella*) (2015).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	35	25	42	C
CLA (µg/l)	25	12	32	C
Secchi (m)	1.7	1.6	2.0	C
TKN (mg/l)	0.68	0.62	0.72	
			Lake Grade	C

Lake site 4 received a lake grade of C this year which is consistent with its historical water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

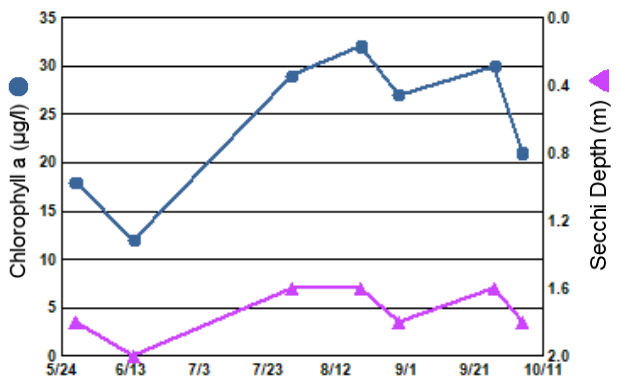
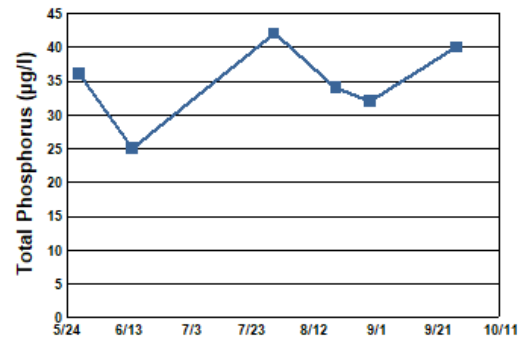
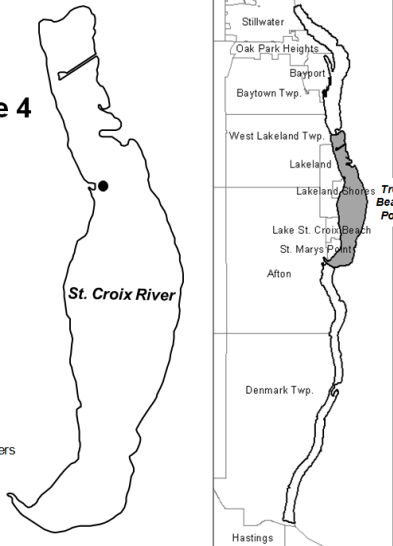
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Lake St. Croix,
Troy Beach Pool, Site 4
Minnesota/Wisconsin**

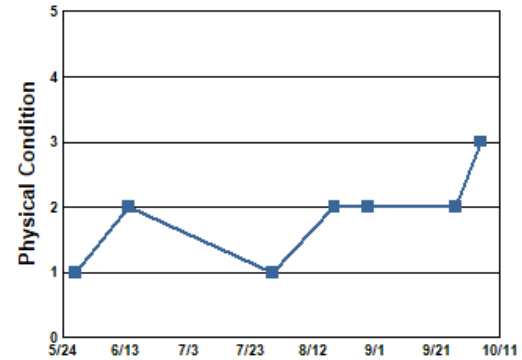
Lake ID: 820001-00

● Sampling site
Contours in meters

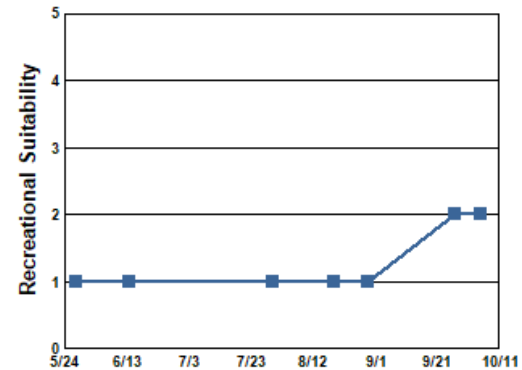


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/28/21	20.7		18	36	1.8	1	1
06/14/21	27.3		12	25	2.0	2	1
07/30/21	26.6		29	42	1.6	1	1
08/19/21	27.1		32	34	1.6	2	1
08/30/21	25.1		27	32	1.8	2	1
09/27/21	20.1		30	40	1.6	2	2
10/05/21	19.9		21		1.8	3	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											D	
CLA											C	
Secchi											D	
Lake Grade											D	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C	C	C	B	C	C	C	C		C
CLA		B	B	C	B	C	B	B	B	C		B
Secchi		C	C	C	C	C	C	C	C	C		C
Lake Grade		C	C	C	C	C	C	C	C	C		C

Year	2016	2017	2018	2019	2020	2021
TP			C			C
CLA			C			C
Secchi			D			C
Lake Grade			C			C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake St. Croix [Black Bass Pool-Site 6] (82–0001) Metropolitan Council Environmental Services

Volunteer: Jim and Roberta Harper, Kent Johnson

Lake St. Croix is a natural impoundment of the St. Croix River. It is located along the border with Wisconsin and borders many communities in Minnesota and Wisconsin. The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 8,393 acres and a maximum depth of 23.7 m.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998, aquatic consumption (PCBs in fish tissue) in 2006, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2001, bighead carp (*Hypophthalmichthys nobilis*) (2012), silver carp (*Hypophthalmichthys molitrix*) (2012), and grass carp (*Ctenopharyngodon idella*) (2015).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	16	38	B
CLA (µg/l)	13	6.9	18	B
Secchi (m)	2.5	1.9	3.2	B
TKN (mg/l)	0.66	0.54	0.73	
			Lake Grade	B

Site 6 received a lake grade of B this year and all 3 parameter grades were B grades as well. These grades indicate the best water quality to date for this site since 2005. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

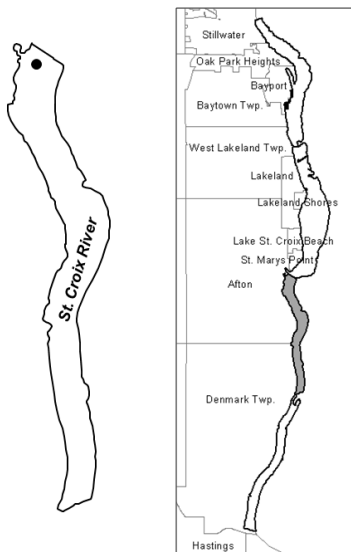
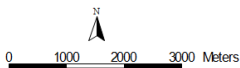
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Lake St. Croix,
Black Bass Pool, Site 6
Minnesota/Wisconsin**

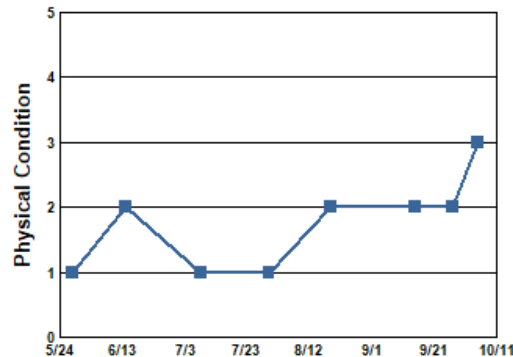
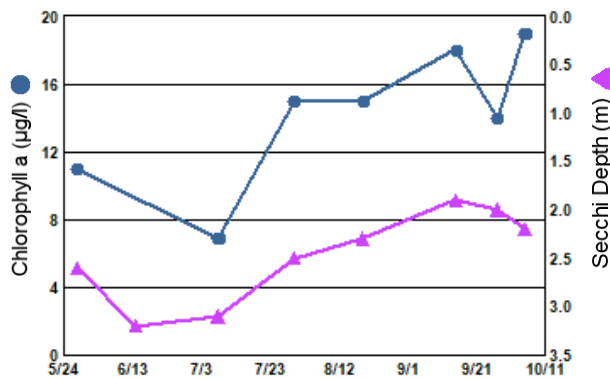
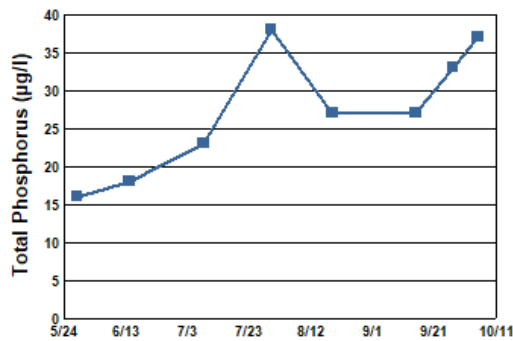
Lake ID: 820001-00

● Sampling site
Contours in meters

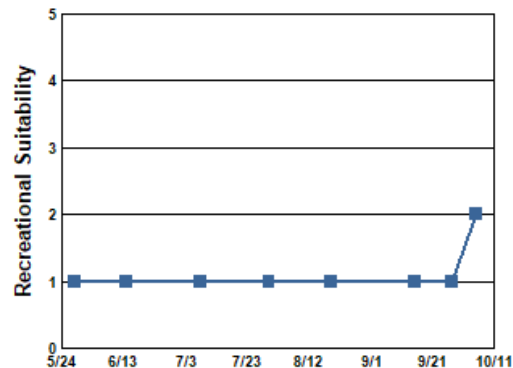


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/28/21	19.6		11	16	2.6	1	1
06/14/21	26.0			18	3.2	2	1
07/08/21	25.0		6.9	23	3.1	1	1
07/30/21	26.7		15	38	2.5	1	1
08/19/21	25.4		15	27	2.3	2	1
09/15/21	21.8		18	27	1.9	2	1
09/27/21	19.9		14	33	2.0	2	1
10/05/21	20.1		19	37	2.2	3	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											C	
CLA											C	
Secchi											C	
Lake Grade											C	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C	C	C	A	C	C	C	C	C	C
CLA		B	B	C	B	B	B	B	B	B	B	B
Secchi		C	C	C	C	C	C	C	C	C	C	C
Lake Grade		C	C	C	C	B	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP			C	C	C	B
CLA			B	B	B	B
Secchi			C	C	C	B
Lake Grade			C	C	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Lake St. Croix [Kinnickinnic Pool-Site-7] (82-0001) Metropolitan Council Environmental Services

Volunteer: Carpenter Nature Center (volunteer coordinator: Mayme Johnson)

Lake St. Croix is a natural impoundment of the St. Croix River. It is located along the border with Wisconsin and borders many communities in Minnesota and Wisconsin. The lake is considered a Priority Water by the Metropolitan Council. It has a surface area of 8,393 acres and a maximum depth of 23.7 m.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998, aquatic consumption (PCBs in fish tissue) in 2006, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1995, zebra mussels (*Dreissena polymorpha*) in 2001, bighead carp (*Hypophthalmichthys nobilis*) (2012), silver carp (*Hypophthalmichthys molitrix*) (2012), and grass carp (*Ctenopharyngodon idella*) (2015).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	6	54	B
CLA (µg/l)	19	12	31	B
Secchi (m)	2.3	1.7	2.8	B
TKN (mg/l)	0.65	0.51	0.82	
			Lake Grade	B

Site 7 received a lake grade of B this year and all 3 parameter grades were B grades as well. These grades indicate the best water quality to date for this site since 2005. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

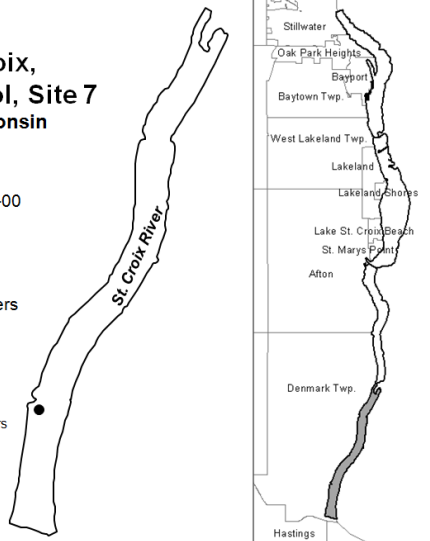
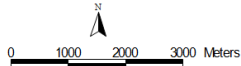
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Lake St. Croix,
Kinnickinnic Pool, Site 7
Minnesota/Wisconsin**

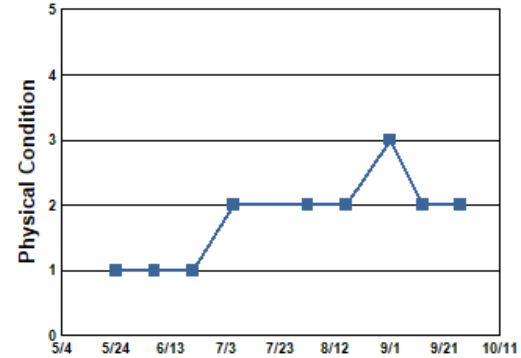
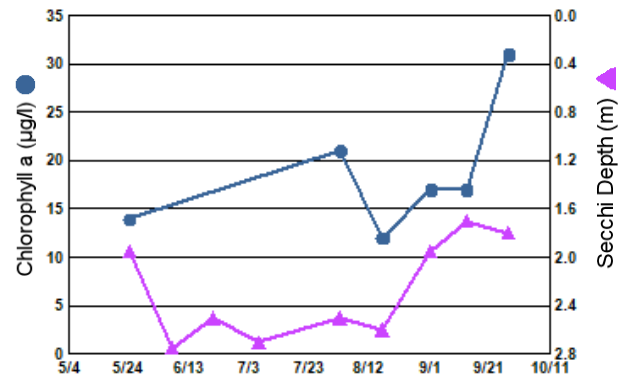
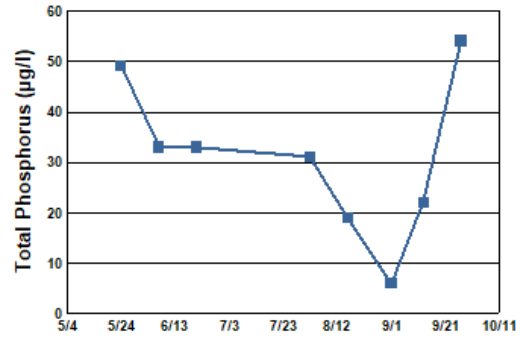
Lake ID: 820001-00

● Sampling site
Contours in meters

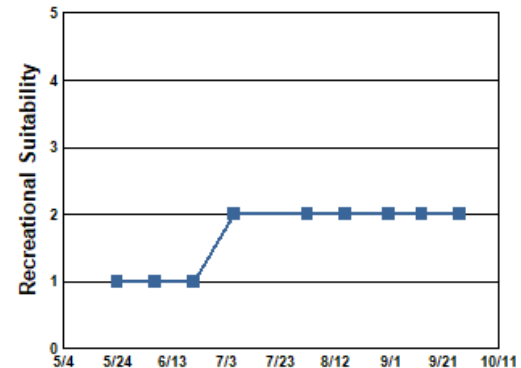


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/24/21	19.2		14	49	2.0	1	1
06/07/21	22.3			33	2.8	1	1
06/21/21	24.6			33	2.5	1	1
07/06/21	27.2				2.7	2	2
08/02/21	25.3		21	31	2.5	2	2
08/16/21	24.8		12	19	2.6	2	2
09/01/21	25.4		17	6	2.0	3	2
09/13/21	22.7		17	22	1.7	2	2
09/27/21	22.4		31	54	1.8	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		B	B	B	C	A	C		C	C	C	C
CLA		B	B	B	B	B	B	A	B	C	C	B
Secchi		C	C	C	C	C	C	C	C	C	C	C
Lake Grade		B	B	B	C	B	C		C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP			C	B	C	B
CLA			B	B	B	B
Secchi			C	C	C	B
Lake Grade			C	B	C	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

St. Joe Lake (10–0011) City of Chanhassen

Volunteer: Linda Scott

St. Joe Lake is a 14-acre lake located within the City of Chanhassen (Carver County). It has a maximum depth of 15.9 m (52 ft).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	10	81	B
CLA (µg/l))	3.1	1.6	6.7	A
Secchi (m)	3.7	2.7	4.4	A
TKN (mg/l)	0.73	0.64	0.85	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its historical water quality database.

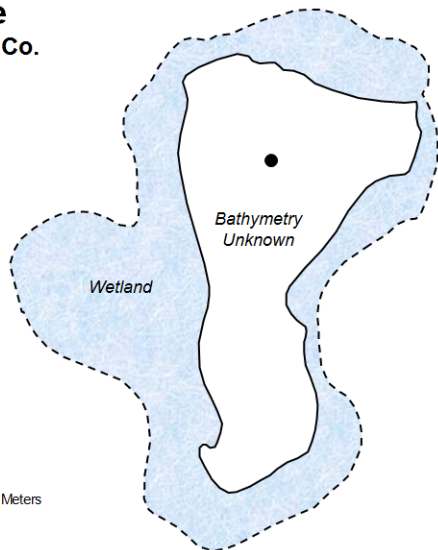
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

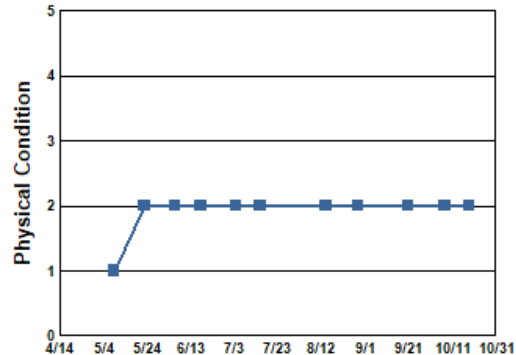
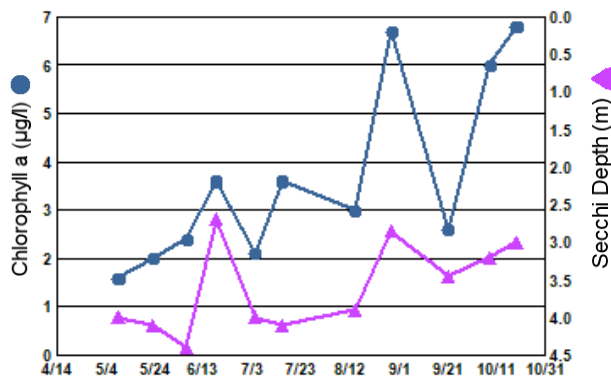
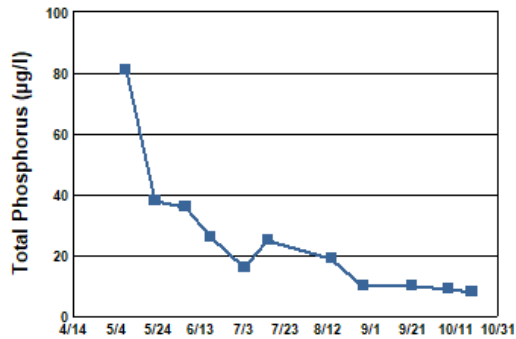
St. Joe's Lake
Chanhassen, Carver Co.

LAKE ID: 100011-00

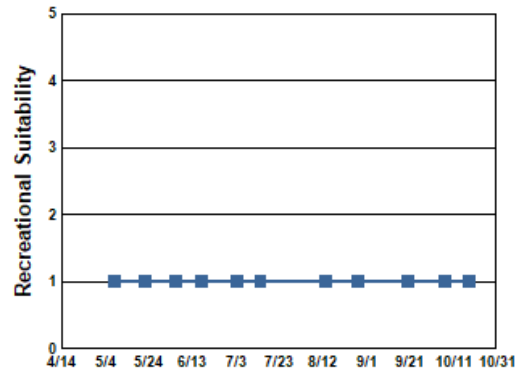


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/09/21	14.5		1.6	81	4.0	1	1
05/23/21	24.0		2.0	38	4.1	2	1
06/06/21	24.2		2.4	36	4.4	2	1
06/18/21	27.9		3.6	26	2.7	2	1
07/04/21	27.7		2.1	16	4.0	2	1
07/15/21	26.2		3.6	25	4.1	2	1
08/14/21	25.0		3.0	19	3.9	2	1
08/29/21	24.5		6.7	10	2.9	2	1
09/21/21	20.8		2.6	10	3.5	2	1
10/08/21	20.4		6.0	9	3.2	2	1
10/19/21	15.7		6.8	8	3.0	2	1



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi			C		B							
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	C	A	A	C	A	A	A		A	A
CLA	A	A	A	A	A	A	A	A	A		A	A
Secchi	B	A	B	A	B	A	B	B	B		B	B
Lake Grade	A	A	B	A	A	B	A	A	A		A	A

Year	2016	2017	2018	2019	2020	2021
TP	B	A	A	A	A	B
CLA	A	A	A	A	A	A
Secchi	B	B	C	B		A
Lake Grade	B	A	B	A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sunfish Lake (19–0050) *City of Sunfish Lake*

Volunteer: James Stowell

Sunfish Lake is located in the City of Sunfish Lake (Dakota County). The lake has a surface area of 49 acres and a maximum depth of 9.8 m (32 ft).

The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2022.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	17	12	27	A
CLA (µg/l)	2.4	1.0	3.6	A
Secchi (m)	4.2	3.1	6.3	A
TKN (mg/l)	0.50	0.42	0.67	
			Lake Grade	A

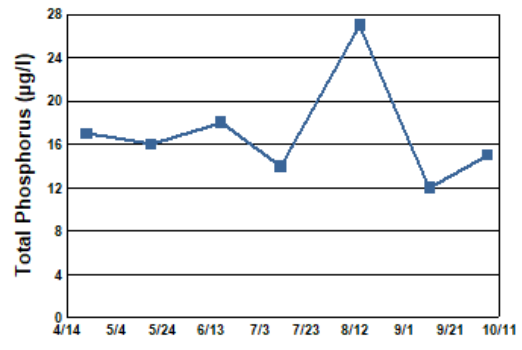
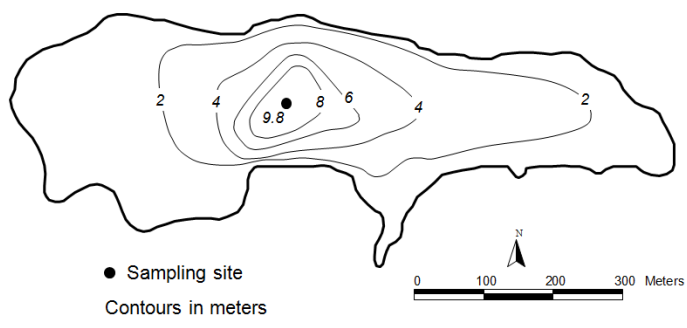
The lake received a lake grade of A this year. The rapid improvement in water quality is attributed to the alum treatments that the lake received in 2017. Continued monitoring is recommended to monitor the lake's response to the alum treatments.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

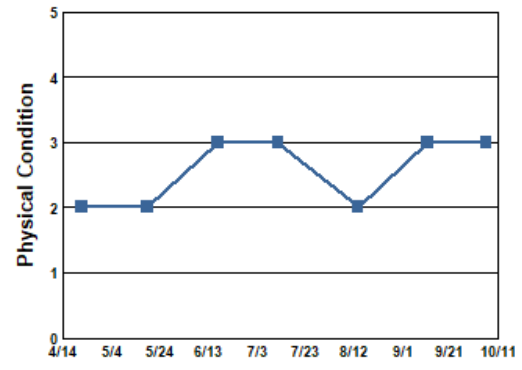
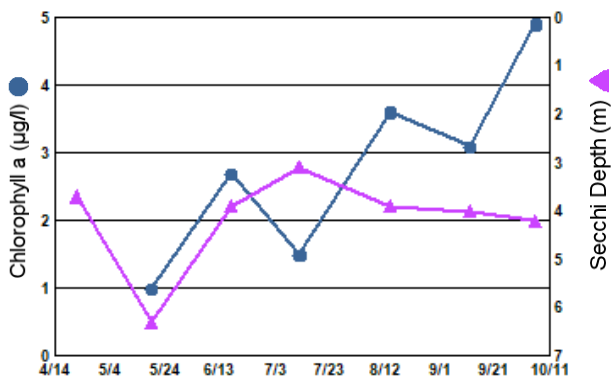
Sunfish Lake
Sunfish Lake, Dakota Co.

Lake ID: 190050-00

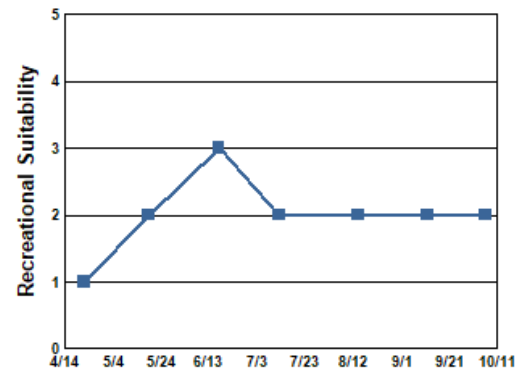


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	9.4			17	3.7	2	1
05/19/21	18.9		1.0	16	6.3	2	2
06/17/21	29.6		2.7	18	3.9	3	3
07/12/21	26.7		1.5	14	3.1	3	2
08/14/21	24.9		3.6	27	3.9	2	2
09/12/21	22.1		3.1	12	4.0	3	2
10/06/21	19.8		4.9	15	4.2	3	2



- 1 = Crystal Clear
- 2 = Some Algae Present
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- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi					C	C	C					C
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			C	C	C	B	C	B	C	B	B	C
CLA			C	C	C	B	C	B	B	C	C	C
Secchi			D	C	C	B	B	A	B	C	C	B
Lake Grade			C	C	C	B	C	B	B	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	A	A	A	A	A
CLA	C	A	A	A	A	A
Secchi	C	A	B	A	A	A
Lake Grade	C	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sunfish Lake [Lake Elmo] (82–0107) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Sunfish Lake is a 50-acre lake located in the city of Lake Elmo (Washington County). The lake has a maximum depth of approximately 3.4 m (11 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2019.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

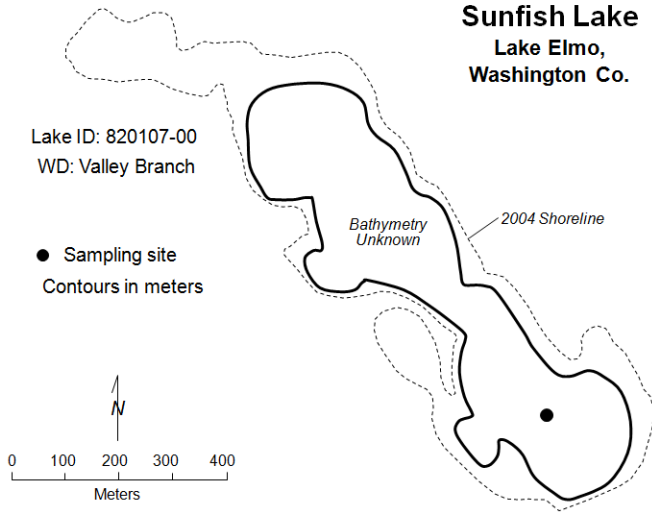
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	16	29	A
CLA (µg/l)	3.4	1.8	5.8	A
Secchi (m)	>3.6	2.7	4.7	A
TKN (mg/l)	0.66	0.61	0.75	
			Lake Grade	A

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of A this year and TP and Secchi grades of A which indicate the best water quality to date and continuing the improvement in grades starting in 2019. The lake typically received lake grades varying from C's to D's from 2000 through 2018. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

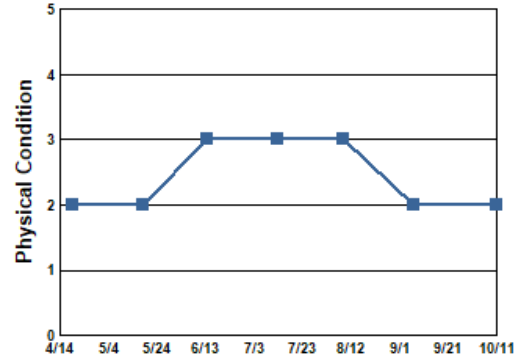
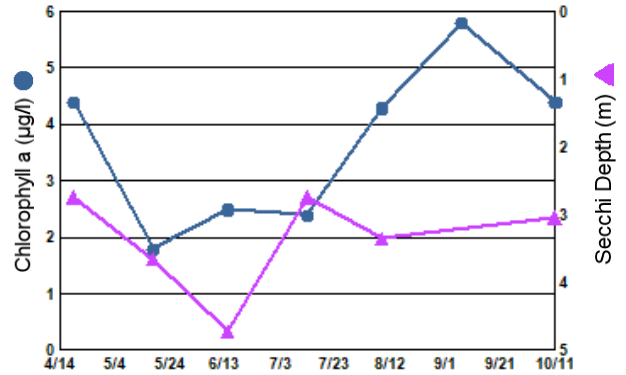
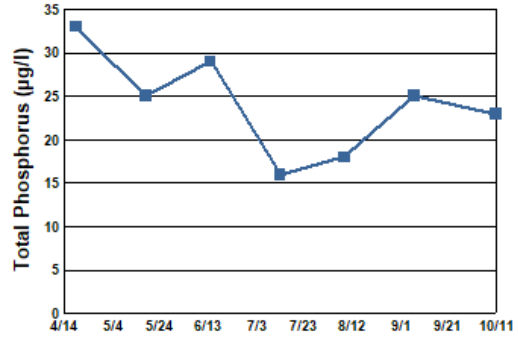
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



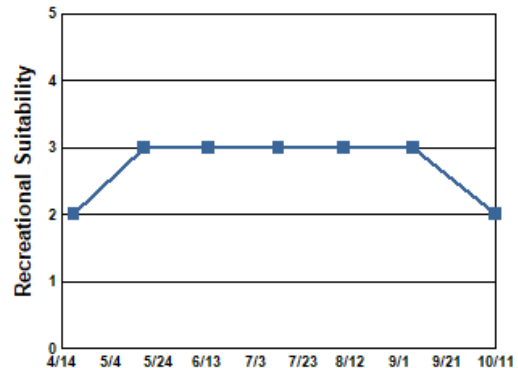
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/19/21	10.6	11.7	4.4	33	2.7	2	2
05/18/21	18.2	11.5	1.8	25	3.7	2	3
06/14/21	27.0	9.6	2.5	29	4.7	3	3
07/13/21	26.5	9.9	2.4	16	2.7	3	3
08/09/21	25.7	6.2	4.3	18	3.4	3	3
09/07/21	22.6	5.4	5.8	25	>3.4	2	3
10/11/21	20.0	8.0	4.4	23	3.0	2	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP									C			
CLA									C			
Secchi									D			
Lake Grade									C			

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	C		D			C	C	C	C	C
CLA		C	C		C			C	C	D	C	C
Secchi		F	F		F			C	D	F	D	D
Lake Grade		D	D		D			C	C	D	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	B	C	C	B	A
CLA	C	B	C	A	A	A
Secchi	D	D	D	C	B	A
Lake Grade	C	C	C	B	B	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sunnybrook Lake (82-0133) Valley Branch Watershed District

Monitoring Personnel: Washington Conservation District staff

Sunnybrook Lake is a 16-acre lake located within Grant Township (Washington County). The maximum and mean depths of the lake are 6.1 and 2.0 m (20.0 and 6.5 feet), respectively. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2019.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	27	32	B
CLA (µg/l)	7.4	2.1	16	A
Secchi (m)	3.0	1.8	3.8	B
TKN (mg/l)	0.79	0.68	0.88	
			Lake Grade	B

The lake grades have varied between A and B since 2001. Continued monitoring is suggested to help determine the trend direction, if any, of the varying water quality of this lake.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

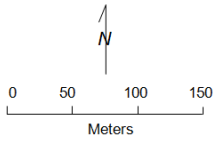
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sunnybrook Lake
Grant, Washington Co.

Lake ID: 820133-00

Bathymetry
Unknown

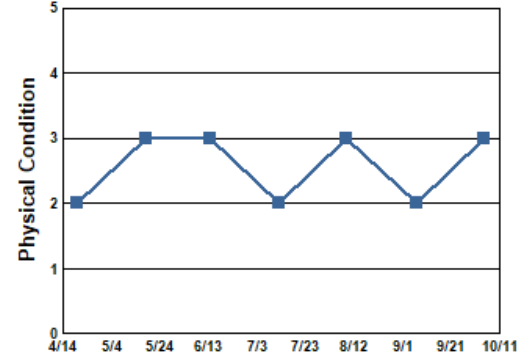
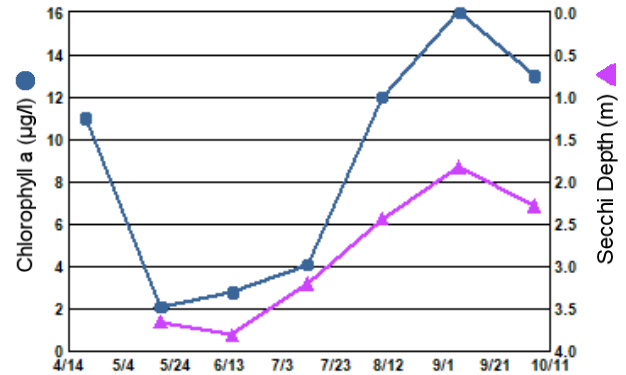
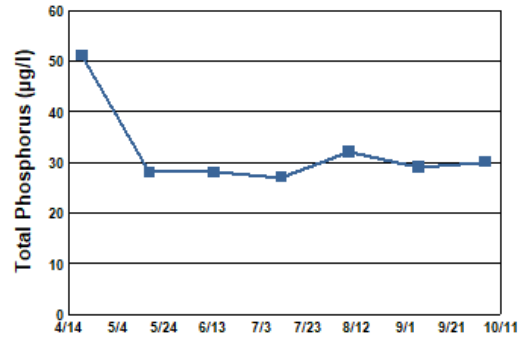
● Sampling site
Contours in meters



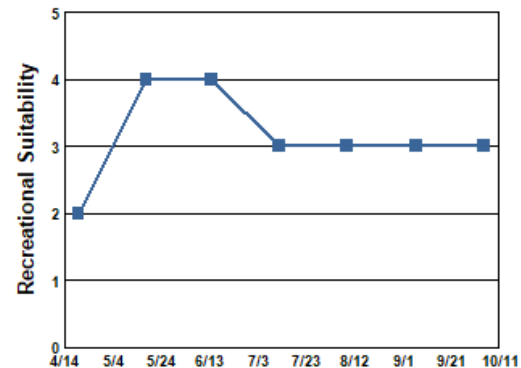
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.5	11.5	11	51	>1.7	2	2
05/18/21	19.9	9.7	2.1	28	3.7	3	4
06/14/21	26.7	9.0	2.8	28	3.8	3	4
07/12/21	24.3	7.9	4.1	27	3.2	2	3
08/09/21	25.0	7.4	12	32	2.4	3	3
09/07/21	22.3	6.8	16	29	1.8	2	3
10/05/21	20.9	9.5	13	30	2.3	3	3

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



- 1 = Crystal Clear
- 2 = Some Algae Present
- 3 = Definite Algal Presence
- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								C		B	B	C
CLA								B		A	A	A
Secchi								C		B	B	C
Lake Grade								C		B	B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	C	B	B	A	A	A	C	A			
CLA	A	B	A	A	A	A	A	A	A		A	A
Secchi	B	B	B	B	B	B	B	B	B		B	B
Lake Grade	B	B	B	B	A	A	A	B	A			

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	B	B	B
CLA	A	A	A	A	A	A
Secchi	A	B	A	C	C	B
Lake Grade	A	A	A	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sunset Lake (82-0153) Rice Creek Watershed District

Volunteers: Diane Coderre, Bob Coderre

Sunset Lake is located in the southern portion of the City of Hugo (Washington County). It has a surface area of 124 acres and a maximum depth of 5.2 m (17 ft). More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2001.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	11	56	B
CLA (µg/l)	2.4	1.6	4.9	A
Secchi (m)	>3.1	>2.5	4.2	A
TKN (mg/l)	0.55	0.45	0.71	
			Lake Grade	A

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a lake grade of A this year. According to the historical water quality database, the water quality of the lake has improved over the past +30 years, as demonstrated by the shift from mostly C lake grades received in the period 1984 - 1999 to A lake grades. Water clarity has improved over this same time period as well. Secchi grades in the 1980s were in the C to D range but in recent years they have been in the A range.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

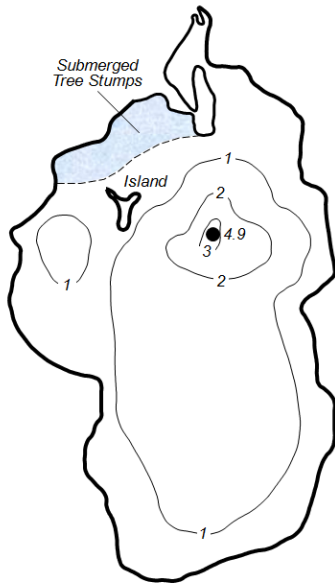
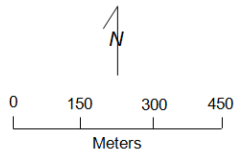
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sunset Lake
Hugo, Washington Co.

Lake ID: 820153-00

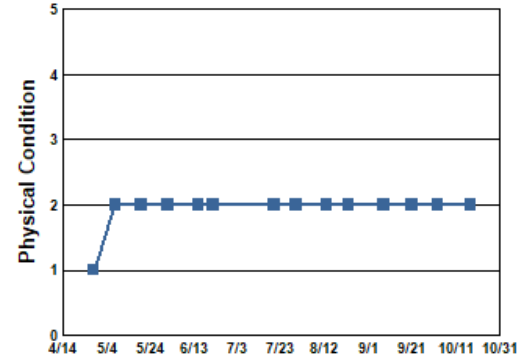
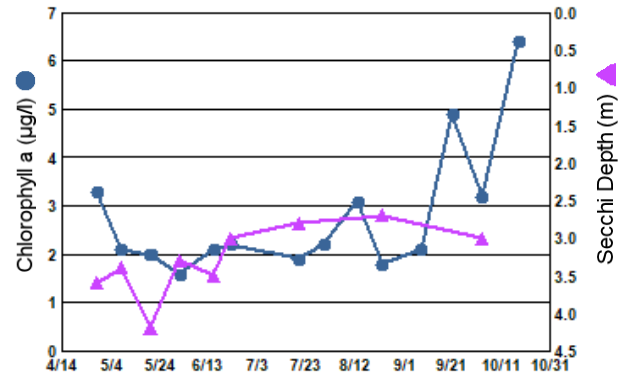
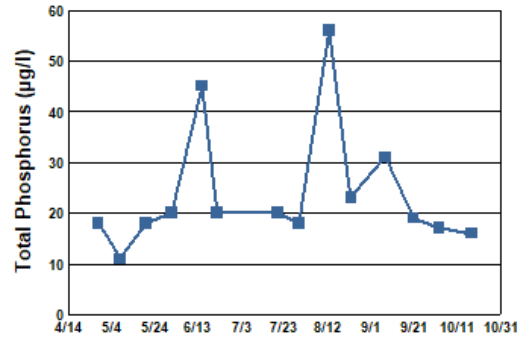
● Sampling site
Contours in meters



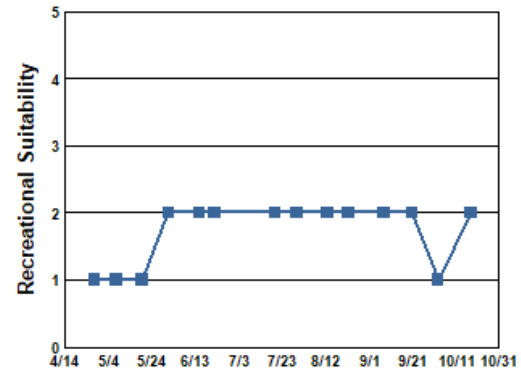
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/28/21	3.6		3.3	18	3.6	1	1
05/08/21	14.9		2.1	11	3.4	2	1
05/20/21	21.2		2.0	18	4.2	2	1
06/01/21	23.4		1.6	20	3.3	2	2
06/15/21	27.5		2.1	45	3.5	2	2
06/22/21	24.9		2.2	20	3.0	2	2
07/20/21	28.7		1.9	20	2.8	2	2
07/30/21	27.2		2.2	18	>2.5	2	2
08/13/21	25.7		3.1	56	>3.0	2	2
08/23/21	27.0		1.8	23	2.7	2	2
09/08/21	21.7		2.1	31	>2.8	2	2
09/21/21	20.2		4.9	19	>3.0	2	2
10/03/21	19.6		3.2	17	3.0	2	1
10/18/21	15.0		6.4	16	>2.9	2	2

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



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5 = Severe Algal Bloom



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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					D							
CLA					C							
Secchi					C	D	C	D	D	C	C	
Lake Grade					C							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C	B	C	C	C	C	C	B	A	A	A
CLA		B	B	B	C	C	B	B	A	A	A	A
Secchi		C	B	C	B	C	C	C	B	A	A	A
Lake Grade		C	B	C	C	C	C	C	B	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	A	A	A	A	B	B	A	A	A
CLA	A	A	A	A	A	A	A	A	A	A	A	A
Secchi	A	A	A	B	A	B		B	A	B	A	A
Lake Grade	A	A	A	A	A	A		B	A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	A	A	A	A	A	B
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	B	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sunset Pond (19–0451) City of Burnsville

Volunteer: Steve Behnke

Sunset Pond, a 60-acre man-made lake, is located in the City of Burnsville (Dakota County). The pond has a normal maximum depth of 3.7m (12 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The pond collects drainage from a portion of the cities of Burnsville's and Savage's storm water conveyance systems, including outflow from Crystal and Earley lakes. Because the lake was created to detain storm water, the pond can experience extreme bounce in its water level during runoff conditions.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2004.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	61	26	121	C
CLA (µg/l)	9.3	2.4	18	A
Secchi (m)	+1.7	>1.4	>2.2	
TKN (mg/l)	0.90	0.62	1.40	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received TP and CLA grades of C and A respectively, which are consistent with its historical water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

T

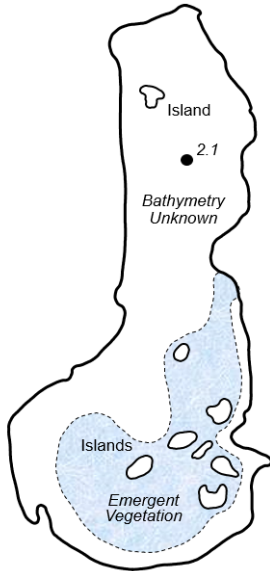
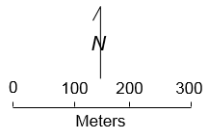
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sunset Pond
Burnsville, Dakota Co.

Lake ID: 190451-00
WMO: Black Dog Lake

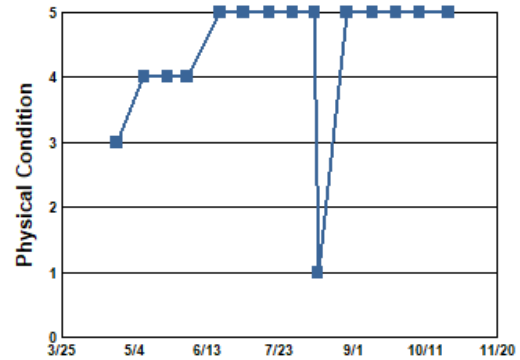
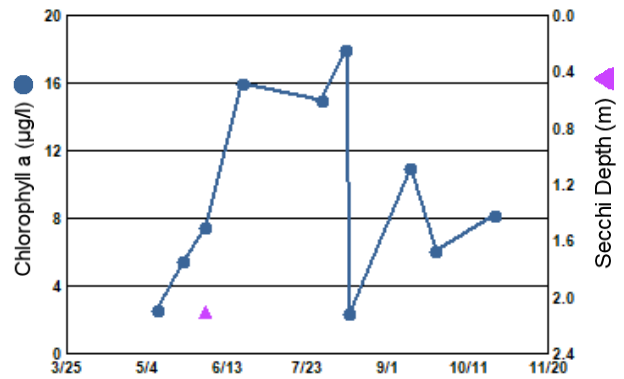
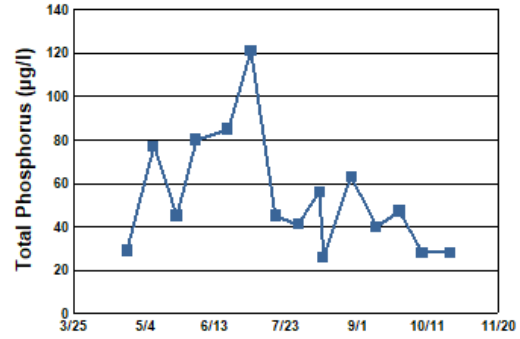
● Sampling site
Contours in meters



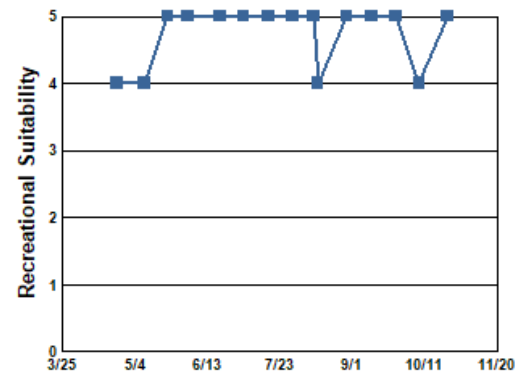
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	16.5			29	>2.1	3	4
05/09/21	16.9		2.6	77	>2.2	4	4
05/22/21	22.3		5.5	45	>2.1	4	5
06/02/21	25.4		7.5	80	2.1	4	5
06/20/21	25.4		16	85	>1.5	5	5
07/03/21	26.8			121	>1.7	5	5
07/17/21	28.7			45	>1.6	5	5
07/30/21	30.1		15	41	>1.6	5	5
08/11/21	27.6		18	56	>1.4	5	5
08/13/21	23.6		2.4	26	+1.4	1	4
08/29/21	23.5			63	>1.5	5	5
09/12/21	17.3		11	40	>1.5	5	5
09/25/21	20.2		6.1	47	>1.6	5	5
10/08/21	20.5			28	>1.4	5	4
10/24/21	8.3		8.2	28	>1.4	5	5

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> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



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1 = Beautiful
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	C	C	C	C		C	C	C	D
CLA			A	B	B	B	A		A	A	A	B
Secchi			C	C	C	C	C		C	B	B	C
Lake Grade			B	C	C	C	B		B	B	B	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	D		D	C	C	C	C	C	C	C	C	C
CLA	A		B	A	A	A	A	A	A	A	A	B
Secchi	B		C	C	C	C	C	C	C	C	B	
Lake Grade	B		C	B	B	B	B	B	B	B	B	

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C		C
CLA	B	A	B	A		A
Secchi		B				
Lake Grade		B				

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Susan Lake (10–0013) City of Chanhassen

Monitoring Personnel: City of Chanhassen staff

Susan Lake is located in the City of Chanhassen (Carver County). The lake is considered a Priority Water by the Metropolitan Council. More than 80 percent of the surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation.

The MPCA listed the lake as impaired with respect to aquatic consumption (mercury in fish tissue) in 1998 and aquatic recreational use (nutrient/eutrophication biological indicators) in 2010. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2005 and brittle naiad (*Najas minor*) in 2019.

Susan Lake has been involved in a study on the common carp (*Cyprinus carpio*), which is an invasive, nonnative fish species, originally from central Asia. The study is being lead by Dr. Peter Sorensen of the the University of Minnesota. The purpose of the study is to develop an integrated management plan for the Riley chain-of-lakes (including Susan Lake) so as to improve the water quality of the lake chain. The activity and feeding behavior of the common carp can wreak havoc on the water quality and ecology of lakes by causing a litany of problems including reduced water clarity, decreased abundance of rooted aquatic vegetation, increase in algal populations, resuspension of sediment, increased internal loading of phosphorus, and negative changes in native fish populations. The long-term goal of the study is to develop a carp management strategy that can be applied to other lakes beyond the study lakes. For more information on this project, please refer to Dr. Sorensen's website at: <http://sorensenlab.cfans.umn.edu/home/research/>

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	62	26	97	C
CLA (µg/l))	45	4.9	120	C
Secchi (m)	1.3	0.3	3.0	C
TKN (mg/l)	1.44	0.58	2.10	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its historical water quality database. The water quality of the lake has varied in the C to D range with C grades more common.

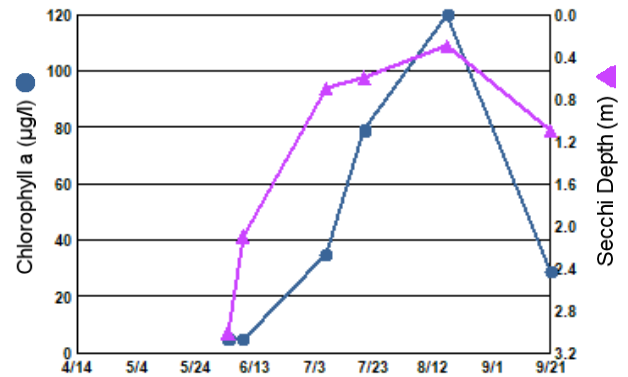
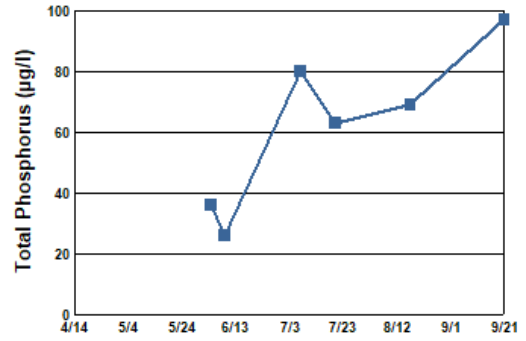
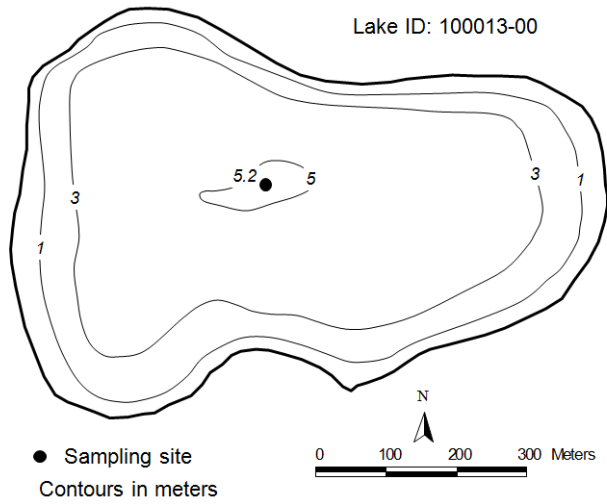
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

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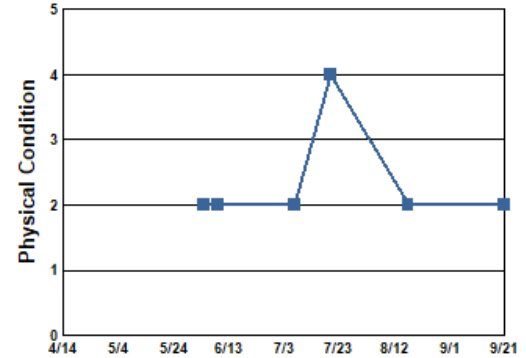
Lake Susan Chanhassen, Carver Co.

Lake ID: 100013-00

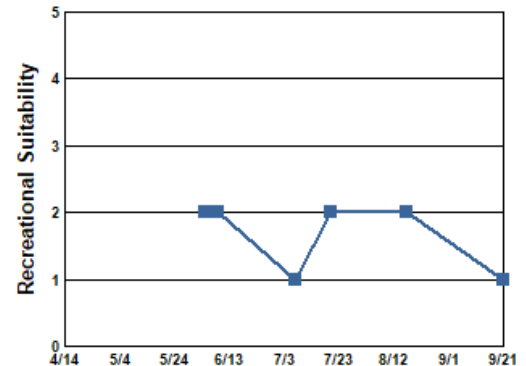


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/04/21	28.8		4.9	36	3.0	2	2
06/09/21	30.1		4.9	26	2.1	2	2
07/07/21	26.2		35	80	0.7	2	1
07/20/21	28.7		79	63	0.6	4	2
08/17/21	25.8		120	69	0.3	2	2
09/21/21	20.9		29	97	1.1	2	1



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Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	C	F	D	C	C	D	C	C	
CLA			C	C	D	C	C	C	C	C	C	
Secchi			C	C	D	C	C	C	D	C	C	
Lake Grade			C	C	D	C	C	C	D	C	C	

Year	2016	2017	2018	2019	2020	2021
TP	C	D		C		C
CLA	D	D		C		C
Secchi	C	D		C		C
Lake Grade	C	D		C		C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sutton Lake (70–0094) Prior Lake — Spring Lake Watershed District

Monitoring Personnel: Prior Lake — Spring Lake Watershed District staff

Sutton Lake is located in Sand Creek Township and Spring Lake Township (Scott County). There is little bathymetric information available for the lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	120	64	215	
CLA (µg/l))	9.2	1.1	31	
Secchi (m)	+0.4	>0.1	+0.6	
TKN (mg/l)	1.23	1.00	1.50	
			Lake Grade	

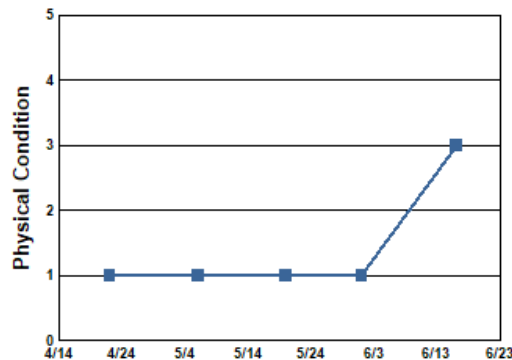
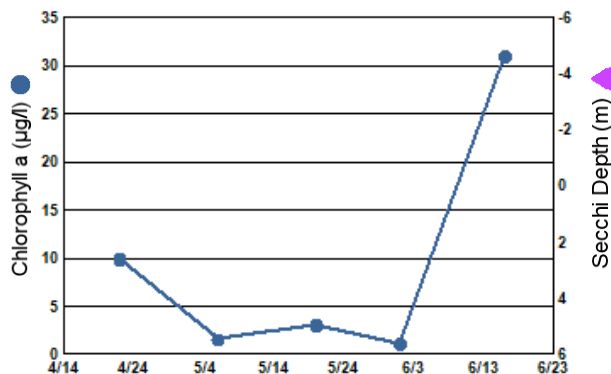
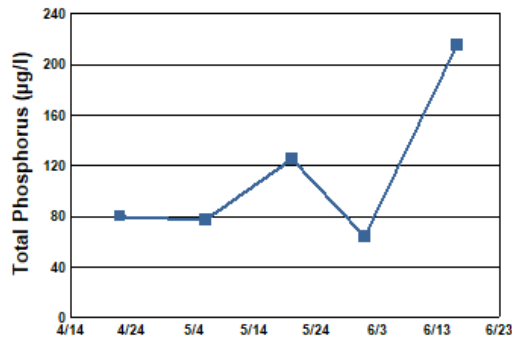
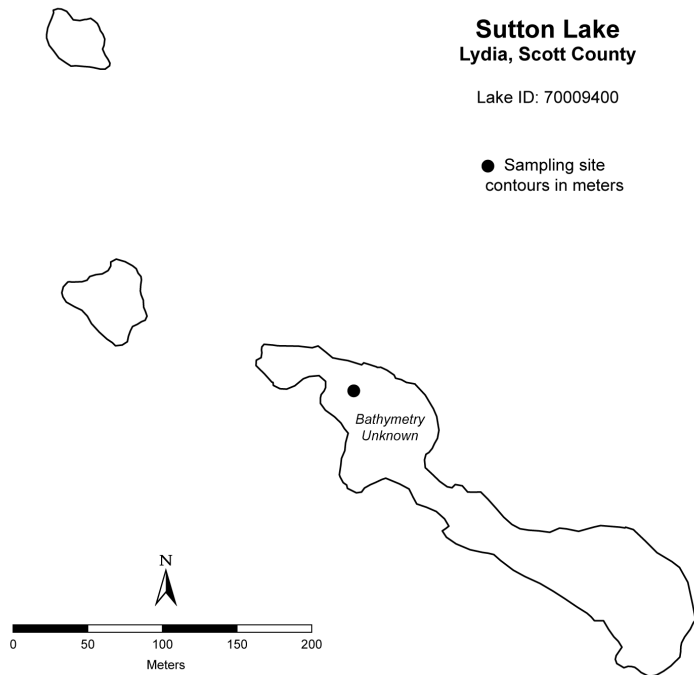
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

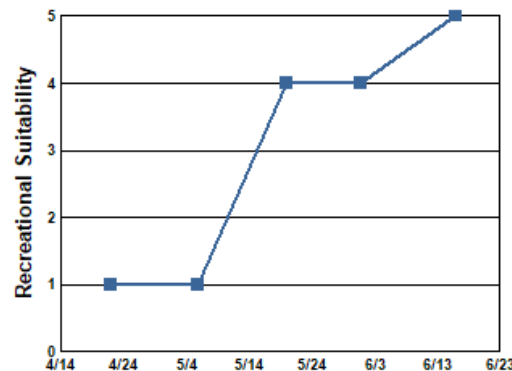
There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/21	13.5		9.9	80	>0.7	1	1
05/06/21	16.7		1.6	77	+0.5	1	1
05/20/21	22.2		3.1	125	+0.6	1	4
06/01/21	19.5		1.1	64	+0.4	1	4
06/16/21	26.0		31	215	>0.1	3	5

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
 > indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP					F	
CLA					F	
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sweeney Lake [Site-1, South Site] (27-0035–01) Bassett Creek Watershed Management Commission

Volunteer: Shanna Hanson

Sweeney Lake is located in the City of Golden Valley (Hennepin County). The lake has a surface area of 66 acres and mean and maximum depths of 3.6 m (12 ft) and 8.0 m (26 ft), respectively. The lake's surface area and a watershed area of 2,400 acres give a large watershed-to-lake area ratio of 36:1. The greater the ratio, the greater the potential stress on the lake from surface runoff. The Sweeney Lake branch of Bassett Creek flows into the lake on the south end and discharges at the north end over a dam. Sweeney Lake is connected to Twin Lake during periods of high water levels by a channel. The surface elevations of the two lakes are about the same.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004 and aquatic life (chloride) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)				
CLA ($\mu\text{g/l}$)				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP									C	C	C	C
CLA									C	B	B	B
Secchi									D	C	C	C
Lake Grade									C	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	C	C	C	C	C	C	C	C	C
CLA	B	C	C	B	B	C	B	B	B	B	C	C
Secchi	C	C	D	D	C	C	C	C	D	D	C	C
Lake Grade	C	C	D	C	C	C	C	C	C	C	C	C

Year	2016	2017	2018	2019	2020	2021
TP	C	C		B		
CLA	C	B		A		
Secchi	C	C		C	C	
Lake Grade	C	C		B		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Sweeney Lake [Site-2, North Site] (27-0035-01) Bassett Creek Watershed Management Commission

Volunteer: Amy Baudler

Sweeney Lake is located in the City of Golden Valley (Hennepin County). The lake has a surface area of 66 acres and mean and maximum depths of 3.6 m (12 ft) and 8.0 m (26 ft), respectively. The lake's surface area and a watershed area of 2,400 acres give a large watershed-to-lake area ratio of 36:1. The greater the ratio, the greater the potential stress on the lake from surface runoff. The Sweeney Lake branch of Bassett Creek flows into the lake on the south end and discharges at the north end over a dam. Sweeney Lake is connected to Twin Lake during periods of high water levels by a channel. The surface elevations of the two lakes are about the same.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2004 and aquatic life (chloride) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	20	8	37	A
CLA ($\mu\text{g/l}$)	4.5	2.0	13	A
Secchi (m)	2.1	1.1	2.5	C
TKN (mg/l)	0.56	0.45	0.68	
			Lake Grade	B

This lake site received a lake grade of B this year which is the third year in a row for site 2 according to its historical water quality database, indicating an improvement in water quality. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP									C	C		
CLA									C	C		
Secchi									D	C		
Lake Grade									C	C		

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP							C					
CLA							C	B				
Secchi							C	D				
Lake Grade							C					

Year	2016	2017	2018	2019	2020	2021
TP			C	B	B	A
CLA		B	B	B	A	A
Secchi		C	C	C	C	C
Lake Grade			C	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Terrapin Lake (82—0031) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

Terrapin Lake is located in May Township (Washington County). It has a surface area of 86 acres and a maximum depth of 4.6 m (15 ft). The lake is considered a Priority Water by the Metropolitan Council. The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	>3.2	>1.8	4.0	A
TKN (mg/l)				
			Lake Grade	

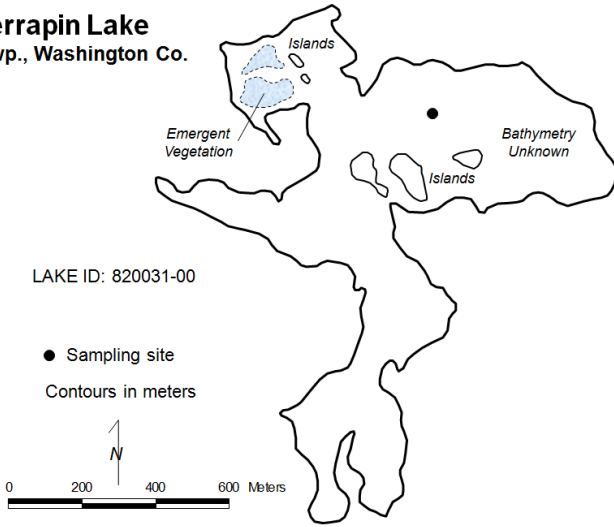
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a Secchi grade of A this year which is consistent with its historical water quality database. Samples were not collected for TP and CLA analysis. A lake grade was not given because all three parameter grades are required to issue a lake grade.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

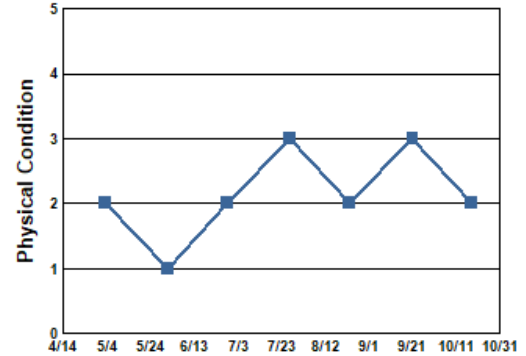
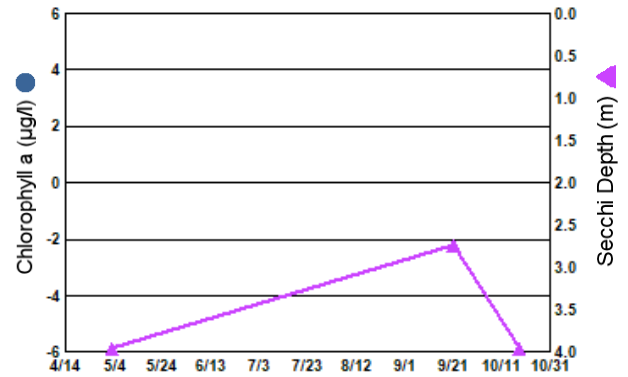
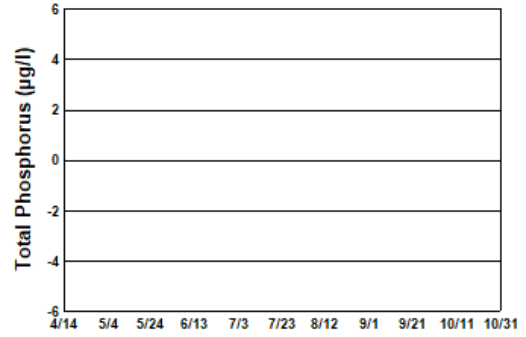
Terrapin Lake
May Twp., Washington Co.



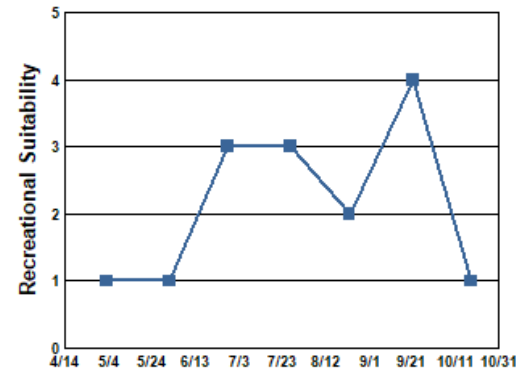
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21					4.0	2	1
06/01/21					>3.7	1	1
06/28/21					>3.4	2	3
07/27/21					>3.7	3	3
08/23/21					>1.8	2	2
09/21/21					2.7	3	4
10/18/21	14.7	5.0			4.0	2	1

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



- 1 = Crystal Clear
- 2 = Some Algae Present
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- 4 = High Algal Color
- 5 = Severe Algal Bloom



- 1 = Beautiful
- 2 = Minor Aesthetic Problem
- 3 = Swimming Impaired
- 4 = No Swimming; Boating OK
- 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	B	A	C	B			A				A	A
CLA	A	A	A	A			A				A	A
Secchi	A	A	A	B	A	A		A			A	
Lake Grade	A	A	B	B							A	

Year	2016	2017	2018	2019	2020	2021
TP			A	A		
CLA			A	A		
Secchi				A	A	A
Lake Grade				A		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Thole Lake (70–0120) Scott Watershed Management Organization

Volunteer: Mark Vierling

Thole Lake is located in the Louisville Township (Scott County). The entire lake is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. Since the lake is relatively shallow, it does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002, and aquatic consumption (mercury in fish tissue) in 2008. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2002.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	69	27	146	D
CLA (µg/l))	45	1.6	120	C
Secchi (m)	1.3	0.4	2.9	C
TKN (mg/l)	1.57	0.81	2.50	
			Lake Grade	C

The lake received a lake grade of C this year. The historical water quality database shows that the lake grades for this lake vary in the C and D range.

Throughout the monitoring period, METC staff ranked the lake's physical condition and recreational suitability on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					D							
CLA					D							
Secchi					D							
Lake Grade					D							

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			F			D			D		D	
CLA			D			C			D		D	
Secchi			D			C			C		D	
Lake Grade			D			C			D		D	

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		D	D					D				C
CLA		F	D					C				D
Secchi		C	D					C				C
Lake Grade		D	D					C				C

Year	2016	2017	2018	2019	2020	2021
TP	D	C	C	C	D	D
CLA	D	C	D	C	C	C
Secchi	D	C	C	C	C	C
Lake Grade	D	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Thompson Lake (19–0048) Lower Mississippi River Watershed Management Organization

Volunteer: Anne Pfankuch

Thompson Lake is located in the city of West St. Paul (Dakota County). It is a small 8 acre lake with a maximum depth of 2.4 m.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) and aquatic life (chloride) in 2014. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2021.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	71	49	103	D
CLA ($\mu\text{g/l}$)	12	5.7	26	B
Secchi (m)	1.2	0.5	1.8	C
TKN (mg/l)	0.71	0.54	0.82	
			Lake Grade	C

The lake received a lake grade of C this year which is consistent with its historical water quality database. Continued monitoring is recommended to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP	C	D	C	C	C	D
CLA	B	B	B	B	B	B
Secchi	D	C	C	C	D	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Twin Lake [Burnsville] (19–0028) *City of Burnsville*

Volunteer: Bernie DeMaster

Twin Lake is an 11-acre lake located in the City of Burnsville (Dakota County). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Few morphological data are available for the lake.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 1997.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	26	51	C
CLA (µg/l)	7.4	1.7	28	A
Secchi (m)	1.5	0.7	2.5	C
TKN (mg/l)	0.72	0.60	0.94	
			Lake Grade	B

The lake received a lake grade of B this year. The water quality of this lake has varied in the B to C range since 1999.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP								D		C	C	C
CLA								B		A	A	A
Secchi								D		C	C	C
Lake Grade								C		B	B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP		C	D	C	C	C	C	B	B	B	A	A
CLA		A	C	A	B	B	C	A	A	A	A	A
Secchi		C	C	C	C	C	C	B		C		C
Lake Grade		B	C	B	C	C	C	B		B		B

Year	2016	2017	2018	2019	2020	2021
TP	B	A	B	B	C	C
CLA	A	A	A	A	A	A
Secchi	C	C	C	C	C	C
Lake Grade	B	B	B	B	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Twin Lake [Golden Valley] (27–0035–02) Bassett Creek Watershed Management Commission

Volunteer: Jennell Bilek

Twin Lake is located in the City of Golden Valley (Hennepin County). The surface area of the lake is 19 acres. Approximately 42 percent of the surface is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. The lake has a maximum depth of approximately 17 m (56 ft).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	17	6	32	A
CLA (µg/l)	1.9	1.0	2.4	A
Secchi (m)	3.3	2.7	5.2	A
TKN (mg/l)	0.59	0.52	0.66	
			Lake Grade	A

The lake received a lake grade of A this year which is consistent with its historical water quality database. Continued monitoring is recommended to continue to build the water quality database.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP							A			A	A	A
CLA							A	A		B	A	A
Secchi							A	B		A	A	A
Lake Grade							A			A	A	A

Year	2016	2017	2018	2019	2020	2021
TP	B	A	B	A	A	A
CLA	A	A	A	A	A	A
Secchi	A	A	A	A	B	A
Lake Grade	A	A	A	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Twin Lake [May Township] (82–0048) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Twin Lake is located in May Township (Washington County). The south basin has a maximum depth of 10 m. Few other morphological data are available for this lake. The lake receives inflow from Square Lake.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

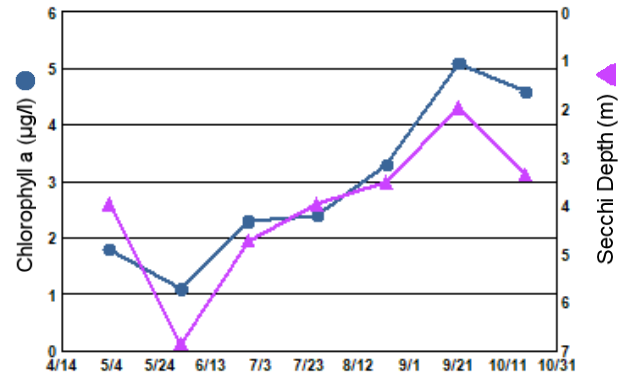
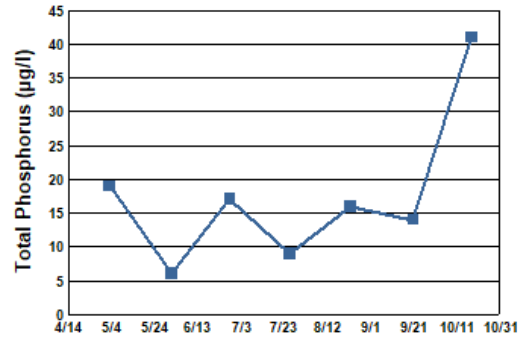
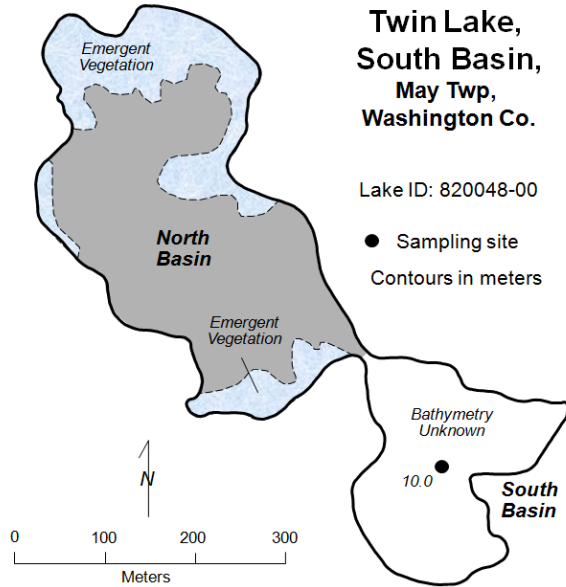
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	14	6	19	A
CLA (µg/l)	2.7	1.1	5.1	A
Secchi (m)	4.2	2.0	6.9	A
TKN (mg/l)	0.45	0.36	0.69	
			Lake Grade	A

The lake received a lake grade of A this year, which is consistent with its historical database.

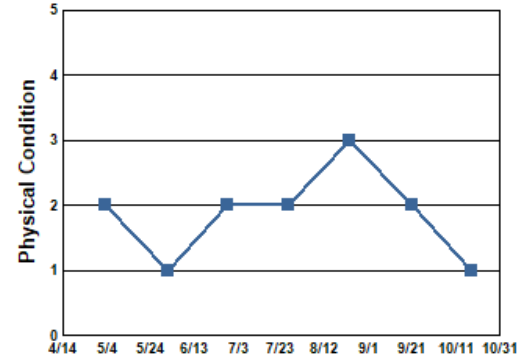
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

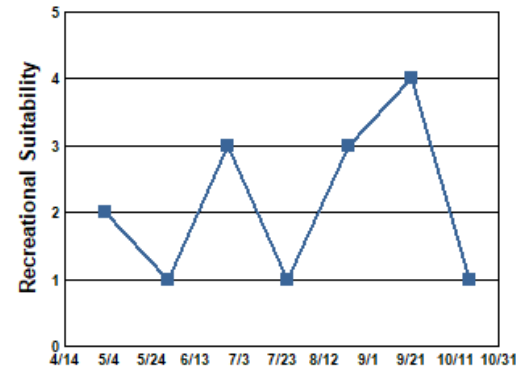


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	13.9	11.4	1.8	19	4.0	2	2
06/01/21	19.8	8.8	1.1	6	6.9	1	1
06/28/21	24.9	8.3	2.3	17	4.7	2	3
07/26/21	28.0	7.6	2.4	9	4.0	2	1
08/23/21	25.2	6.3	3.3	16	3.5	3	3
09/21/21	21.5	4.8	5.1	14	2.0	2	4
10/18/21	16.0	5.4	4.6	41	3.4	1	1



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP						A	A					
CLA						A	A					
Secchi						A	A					
Lake Grade						A	A					

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP					A	A				A	A	A
CLA					A	A				A	A	A
Secchi					A	A	A	A	A	A	A	A
Lake Grade					A	A				A	A	A

Year	2016	2017	2018	2019	2020	2021
TP			A	A		A
CLA			A	A		A
Secchi			A	A		A
Lake Grade			A	A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Twin Lake [St. Louis Park] (27–0656) City of St. Louis Park

Volunteer: Eric Klingbeil

Twin Lake is a small shallow lake located within the city of St. Louis Park (Hennepin County). The lake has a surface area of approximately 12.4 acres. Few morphological data are available for this lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

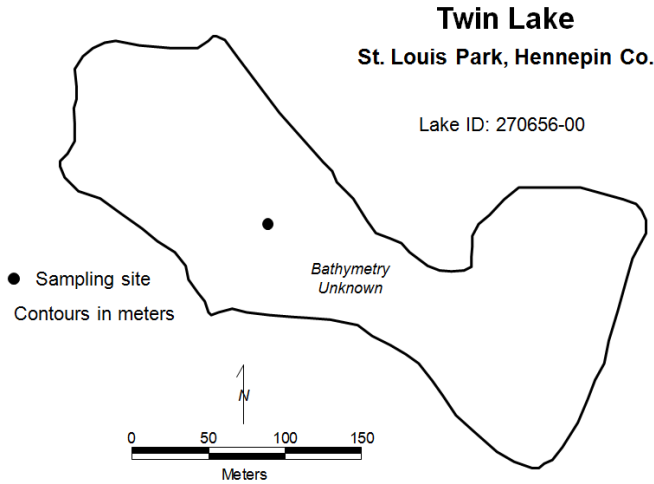
2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	173	101	258	
CLA (µg/l)	22	7.1	35	
Secchi (m)	0.6	0.5	0.7	
TKN (mg/l)	1.21	0.82	1.80	
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

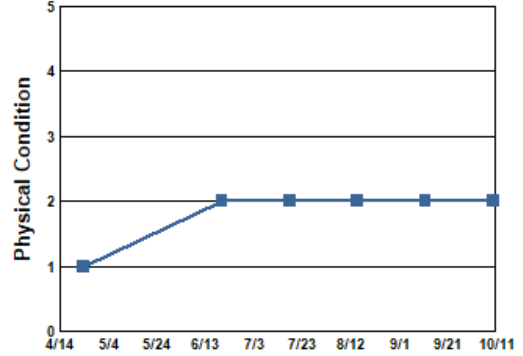
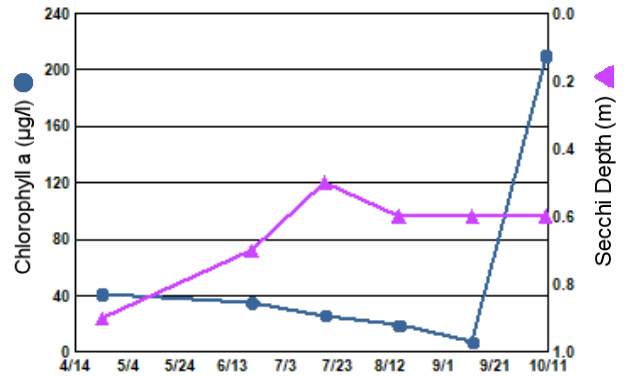
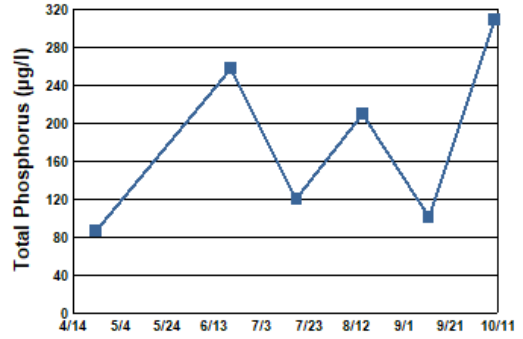
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

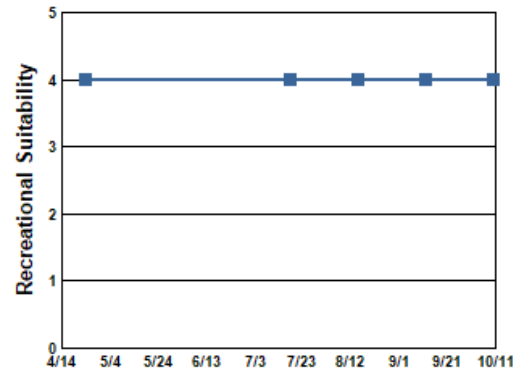


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/21	23.6		41	87	0.9	1	4
06/20/21	21.7		35	258	0.7	2	
07/18/21	27.6		26	121	0.5	2	4
08/15/21	28.0		19	210	0.6	2	4
09/12/21	25.1		7.1	101	0.6	2	4
10/10/21	24.7		210	309	0.6	2	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP											F	F
CLA											B	C
Secchi											D	D
Lake Grade											D	D

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	F	F	D	F	D	F	D	F	F	D	D	D
CLA	D	C	C	D	D	F	D	F	D	D	C	D
Secchi	D	F	F	F	F	F	F	F	D	F	D	D
Lake Grade	D	D	D	F	D	F	D	F	D	D	D	D

Year	2016	2017	2018	2019	2020	2021
TP	D	D		D		
CLA	D	C		D		
Secchi	D	D		D		
Lake Grade	D	D		D		

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Valentine Lake (62–0071) *Rice Creek Watershed District*

Volunteer: Bob Kistler

Valentine Lake is located in the city of Arden Hills (Ramsey County). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column. The lake is defined as a shallow lake because of the dominance of the littoral zone.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2002 and aquatic life (chloride) in 2014.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	28	66	C
CLA (µg/l)	19	3.1	50	B
Secchi (m)	1.6	0.9	2.9	C
TKN (mg/l)	1.21	0.70	1.60	
			Lake Grade	C

The lake received a lake grade of C this year which is an improvement over the D grades received in recent years. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

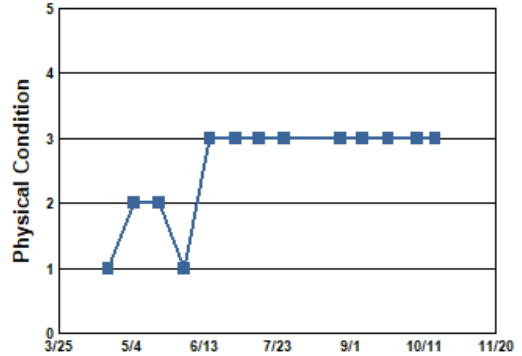
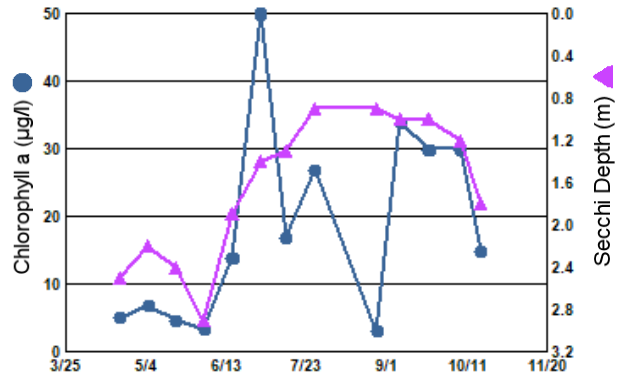
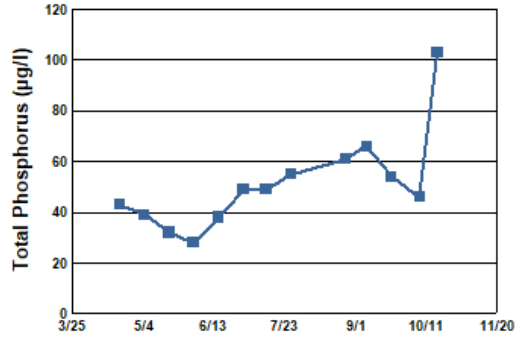
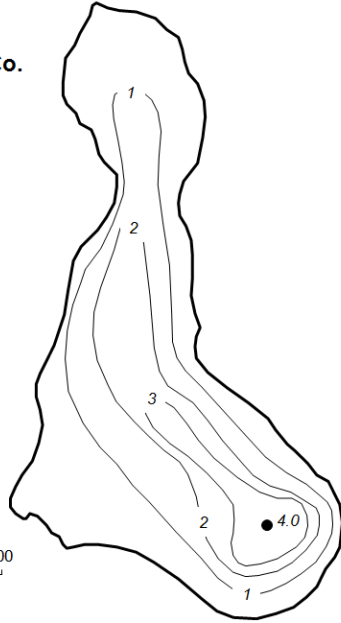
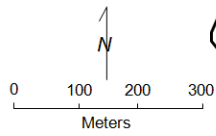
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

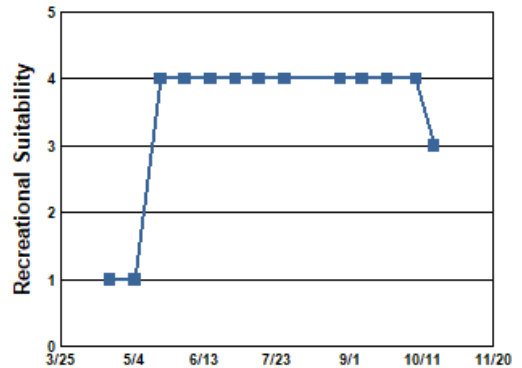
Valentine Lake
Arden Hills, Ramsey Co.

Lake ID: 620071-00

● Sampling site
Contours in meters



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/21/21	8.8		5.1	43	2.5	1	1
05/05/21	15.0		6.9	39	2.2	2	1
05/19/21	20.3		4.7	32	2.4	2	4
06/02/21	20.7		3.4	28	2.9	1	4
06/16/21	26.2		14	38	1.9	3	4
06/30/21	26.6		50	49	1.4	3	4
07/13/21	25.7		17	49	1.3	3	4
07/27/21	28.0		27	55	0.9	3	4
08/27/21	23.1		3.1	61	0.9	3	4
09/08/21	21.5		34	66	1.0	3	4
09/22/21	19.7		30	54	1.0	3	4
10/08/21	20.2		30	46	1.2	3	4
10/18/21	14.3		15	103	1.8	3	3

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP										C	C	C
CLA										B	B	C
Secchi										C	C	D
Lake Grade										C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	C	D	C							
CLA	C	C	B	C	B							
Secchi	C	C	C	C	C							
Lake Grade	C	C	C	C	C							

Year	2016	2017	2018	2019	2020	2021
TP			D	D	D	C
CLA			C	C	C	B
Secchi			D	D	D	C
Lake Grade			D	D	D	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Valley Lake (19–0348) City of Lakeville

Monitoring Personnel: Blue Water Science staff

Valley Lake is located in the city of Lakeville (Dakota County). The lake has a surface area of 8 acres and a maximum depth of 3.2 m (10 ft).

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2006.

The lake has been involved in a project in which barley straw or crushed corn was added to the lake in an attempt to inhibit algal populations. CAMP data were used to evaluate the effectiveness of these additions. Refer to McComas and Stuckert (2009b) for details on the project.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	51	37	74	C
CLA (µg/l)	26	4.1	65	C
Secchi (m)	1.3	0.8	2.5	C
TKN (mg/l)	1.00	0.70	1.20	
			Lake Grade	C

The lake received a lake grade of C this year. The lake grades have typically varied in the range of B to D.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

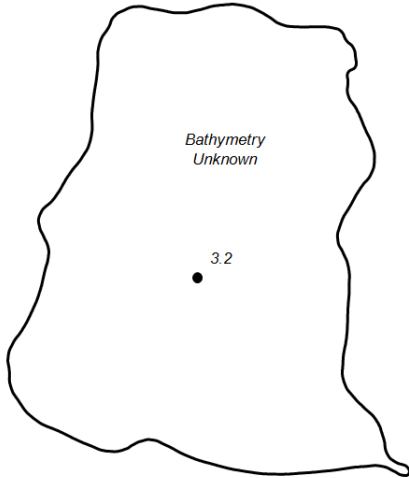
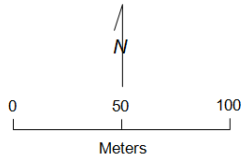
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Valley Lake
Lakeville, Dakota Co.

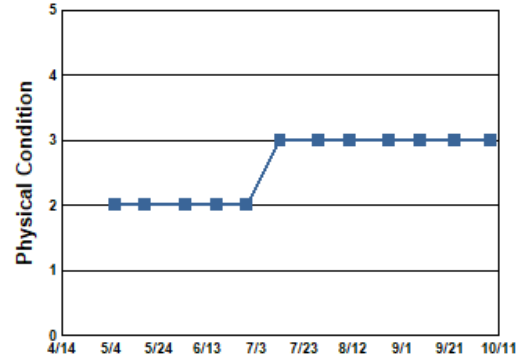
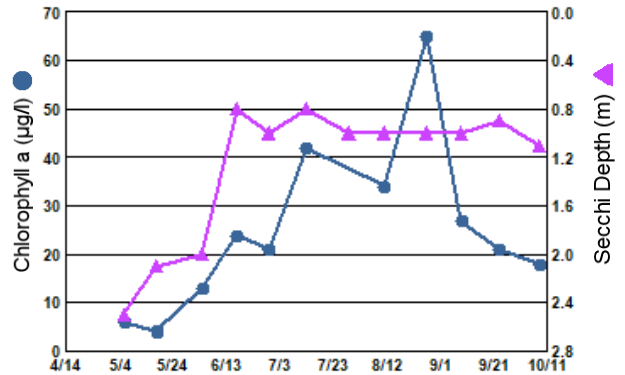
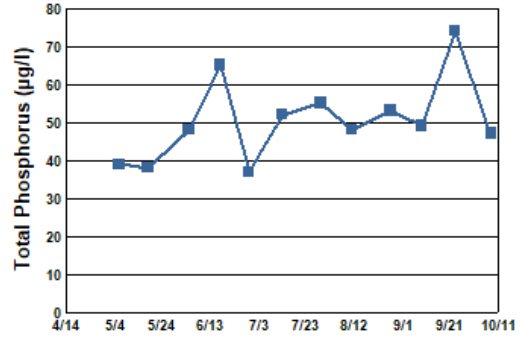
Lake ID: 190348-00

● Sampling site
Contours in meters

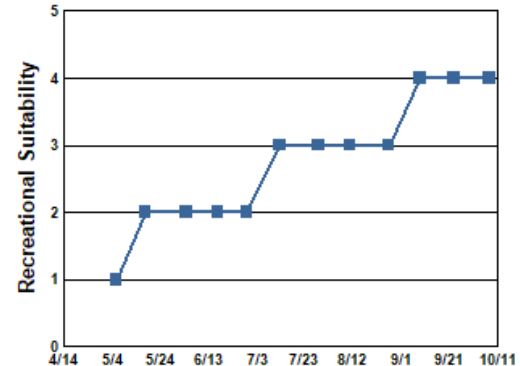


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/06/21	17.0		5.9	39	2.5	2	1
05/18/21	19.6		4.1	38	2.1	2	2
06/04/21	22.6		13	48	2.0	2	2
06/17/21	27.9		24	65	0.8	2	2
06/29/21	27.6		21	37	1.0	2	2
07/13/21	28.8		42	52	0.8	3	3
07/29/21	28.5			55	1.0	3	3
08/11/21	25.0		34	48	1.0	3	3
08/27/21	24.1		65	53	1.0	3	3
09/09/21	23.1		27	49	1.0	3	4
09/23/21	22.0		21	74	0.9	3	4
10/08/21	21.1		18	47	1.1	3	4



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP				D	D	C			C	C	C	C
CLA				C	C	C		C	B	A	A	B
Secchi				D	D	D		D	C	C	B	B
Lake Grade				D	D	C			C	B	B	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	D	C	C	D	D	D	F	D	D
CLA	C	C	D	C	C	A	D	C	C	F	C	D
Secchi	C	C	D	C	C	B	C	C	C	D	C	F
Lake Grade	C	C	D	C	C	B	D	C	C	F	C	D

Year	2016	2017	2018	2019	2020	2021
TP	C	C	D	D	D	C
CLA	C	B	D	D	C	C
Secchi	C	C	F	F	D	C
Lake Grade	C	C	D	D	D	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

West Boot Lake (82–0044) Carnelian — Marine — St. Croix Watershed District

Monitoring Personnel: Washington Conservation District staff

West Boot Lake is located in May Township (Washington County). The lake has a surface area of 110 acres and mean and maximum depths of 5.9 m (19 feet) and 11.9 m (39 feet), respectively. The lake's 209-acre immediate watershed translates to a 2:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	19	9	35	A
CLA (µg/l)	2.9	2.5	3.6	A
Secchi (m)	3.1	2.4	4.6	A
TKN (mg/l)	0.49	0.41	0.54	
			Lake Grade	A

The lake received a lake grade of A this year which is consistent with its historical database.

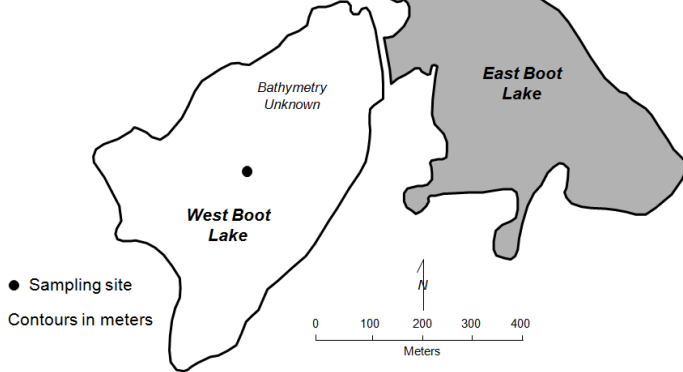
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

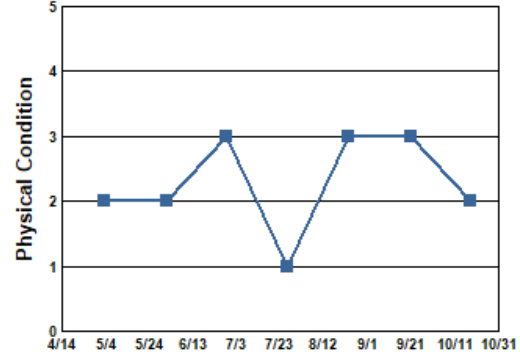
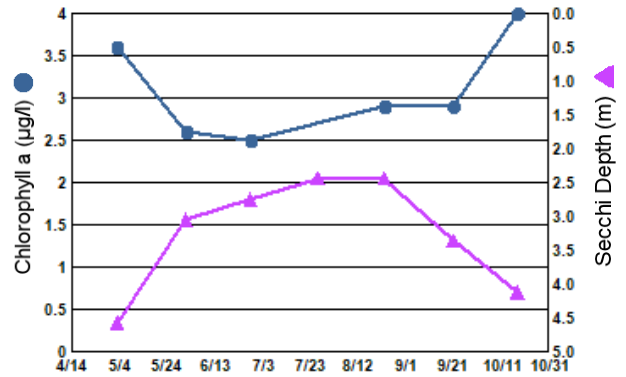
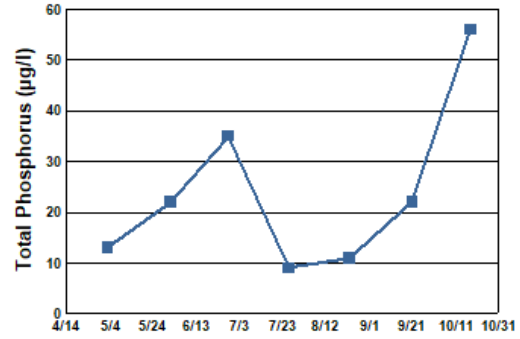
West Boot Lake
May Twp., Washington Co.

LAKE ID: 820044-00

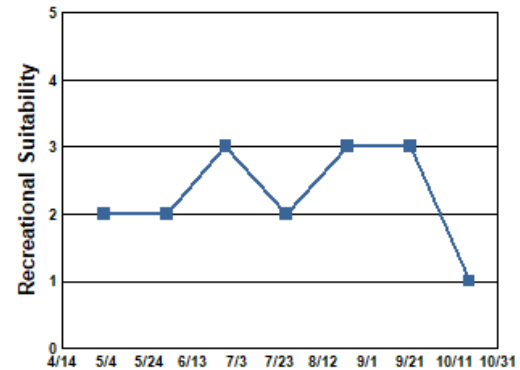


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/21	14.1	10.3	3.6	13	4.6	2	2
06/01/21	21.3	7.5	2.6	22	3.0	2	2
06/28/21	25.3	7.4	2.5	35	2.7	3	3
07/26/21	27.2	5.9		9	2.4	1	2
08/23/21	24.4	4.9	2.9	11	2.4	3	3
09/21/21	20.9	6.6	2.9	22	3.4	3	3
10/18/21	14.4	5.7	4.0	56	4.1	2	1



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												C
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					B	C	A	A	A	A	A	B
CLA					A	B	C	A	A	A	A	A
Secchi					B	C	B	A	A	A	A	A
Lake Grade					B	C	B	A	A	A	A	A

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	A	A	A	B					B	B	A	A
CLA	A	A	A	A					A	A	A	A
Secchi	A	A	A	A	A	A	A		A	A	A	A
Lake Grade	A	A	A	A					A	A	A	A

Year	2016	2017	2018	2019	2020	2021
TP			B	A		A
CLA			A	A		A
Secchi			A	A		A
Lake Grade			A	A		A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

West Lakeland Storage Site [south basin] (no DNR ID) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

The West Lakeland Storage Site is located in West Lakeland Township (Washington County). The storage site consists of three basins: north, middle, and south. The south basin has a maximum depth of 4.6 m (15 ft). Other bathymetric information for the basin is unknown.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

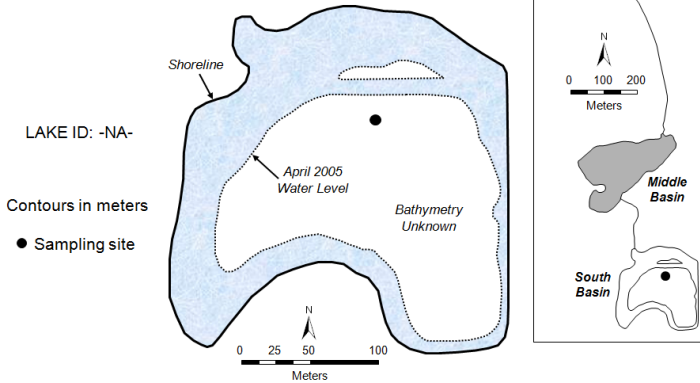
Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	37	21	63	C
CLA ($\mu\text{g/l}$)	12	3.3	29	B
Secchi (m)	1.8	0.8	2.6	C
TKN (mg/l)	0.80	0.65	1.10	
			Lake Grade	C

The south basin received a lake grade of C this year. The last time the south basin was monitored by the CAMP was in 2008. There were insufficient data to calculate grades in 2008.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

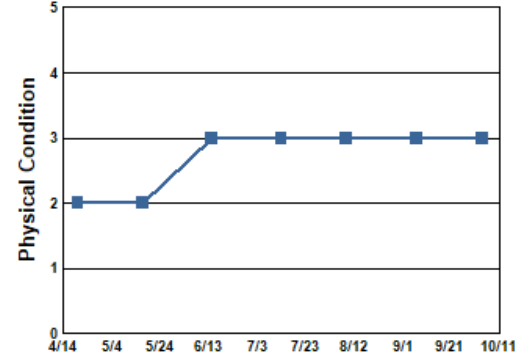
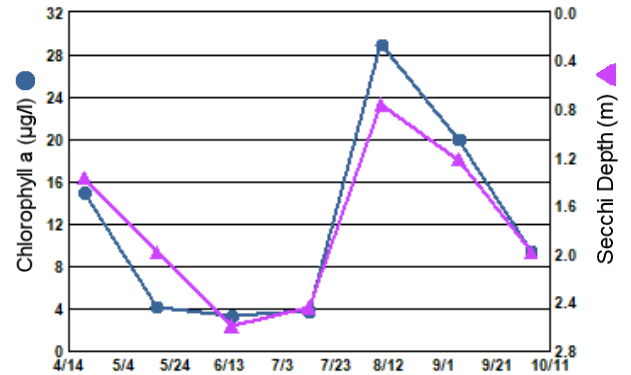
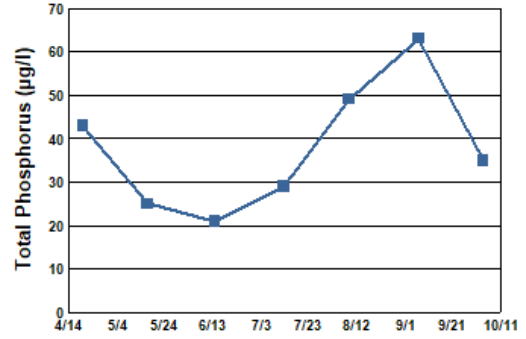
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**West Lakeland Storage Site
(South Basin)**
West Lakeland Twp., Washington Co.

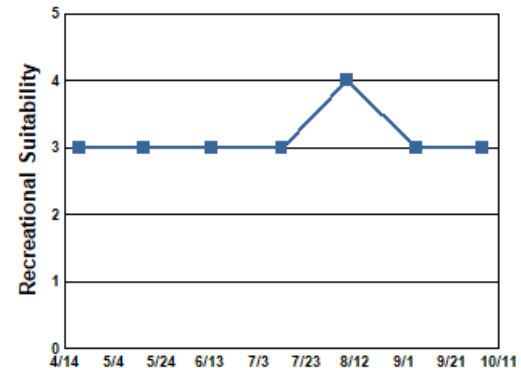


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/20/21	9.6	12.2	15	43	1.4	2	3
05/17/21	17.4	8.7	4.2	25	2.0	2	3
06/14/21	27.0	7.7	3.3	21	2.6	3	3
07/13/21	25.7	8.4	3.8	29	2.4	3	3
08/09/21	27.9	9.1	29	49	0.8	3	4
09/07/21	22.5	8.6	20	63	1.2	3	3
10/04/21	20.9	9.5	9.4	35	2.0	3	3



1 = Crystal Clear
 2 = Some Algae Present
 3 = Definite Algal Presence
 4 = High Algal Color
 5 = Severe Algal Bloom



1 = Beautiful
 2 = Minor Aesthetic Problem
 3 = Swimming Impaired
 4 = No Swimming; Boating OK
 5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021
TP						C
CLA						B
Secchi						C
Lake Grade						C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Westwood Lake (27–0711) Bassett Creek Watershed Management Organization

Volunteers: Nancy Ebner, Dan Decker

Westwood Lake is located in the city of St. Louis Park (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. The lake has a surface area of 41 acres and a maximum depth of 2.0 m (6.6 ft). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	27	34	
CLA (µg/l)	5.4	2.6	7.7	
Secchi (m)	+1.1	>1.0	+1.2	
TKN (mg/l)	1.00	0.79	1.30	
			Lake Grade	

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. A lake grade was not given because all three parameter grades are required to issue a lake grade. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP			F									
CLA			C									
Secchi			D									
Lake Grade			D									

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP		C							B	B	C	C
CLA		C							B	C	B	A
Secchi		C							C	C	C	C
Lake Grade		C							B	C	C	B

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	C	B	C	A	C	D	C	B	A
CLA	A	C	B	B	A	B	A	A	A	A	A	A
Secchi	C	C	C	C	D	D	C	D	C			
Lake Grade	B	C	C	C	B	C	B	C	C			

Year	2016	2017	2018	2019	2020	2021
TP	B		A	B	C	
CLA	A		A	A	A	
Secchi						
Lake Grade						

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

White Rock Lake (82–0072) Rice Creek Watershed District

Volunteer: David Bluhm

White Rock Lake is a 65-acre lake located in Washington County. There are few other morphological data for the lake.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2010.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	33	20	59	C
CLA (µg/l)	9.0	4.5	17	A
Secchi (m)	+2.7	1.6	+4.0	A
TKN (mg/l)	0.79	0.48	1.00	
			Lake Grade	B

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

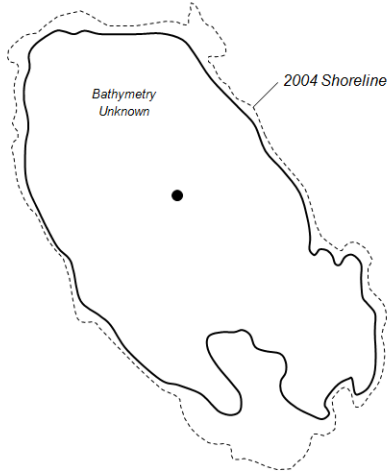
The lake received a lake grade of B this year. Water quality continues to improve as compared to the C and D grades received in the past. Water quality in recent years appears to be improving compared to water quality observed in the mid to late 2000's. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

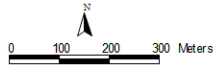
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

White Rock Lake,
New Scandia Twp.,
Washington Co.

Lake ID: 820072-00
WD: Rice Creek
Volunteer: David Bluhm



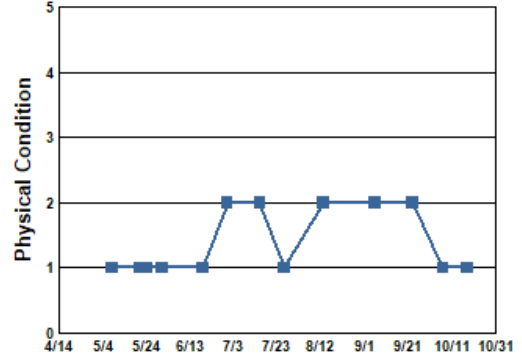
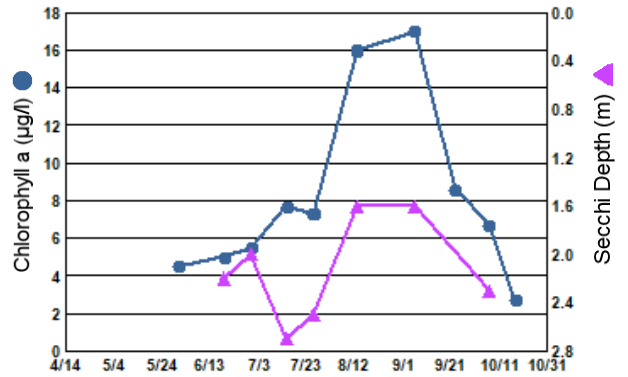
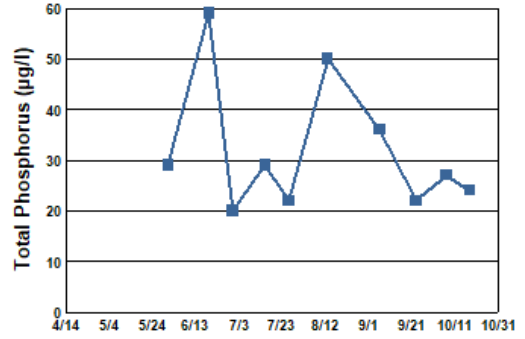
● Sampling station
Contours in meters



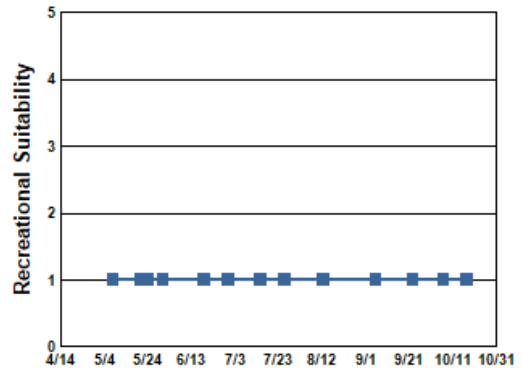
2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/08/21	14.5				>3.6	1	1
05/21/21	21.0				+4.0	1	1
05/24/21					+4.0	1	1
05/31/21	20.9		4.5	29	>3.5	1	1
06/19/21	26.3		5.0	59	2.2	1	1
06/30/21	27.6		5.5	20	2.0	2	1
07/15/21	26.9		7.7	29	2.7	2	1
07/26/21	27.9		7.3	22	2.5	1	1
08/13/21	23.6		16	50	1.6	2	1
09/06/21	22.0		17	36	1.6	2	1
09/23/21	20.8		8.6	22	>1.8	2	1
10/07/21	19.6		6.7	27	2.3	1	1
10/18/21	15.0		2.7	24	+3.4	1	1

+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.



1 = Crystal Clear 4 = High Algal Color
2 = Some Algae Present 5 = Severe Algal Bloom
3 = Definite Algal Presence



1 = Beautiful 4 = No Swimming; Boating OK
2 = Minor Aesthetic Problem 5 = No Aesthetics Possible
3 = Swimming Impaired

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	D	D	D	C	C	D	C	C	C
CLA			C	C	C	C	C	C	C	B	A	C
Secchi			F	F	D	D	D	C	C	C		C
Lake Grade			D	D	D	D	C	C	C	C		C

Year	2016	2017	2018	2019	2020	2021
TP	D	C	C	C	B	C
CLA	C	B	C	B	B	A
Secchi	C	C	C	C	C	A
Lake Grade	C	C	C	C	B	B

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Wilmes Lake (82–0090) City of Woodbury

Monitoring Personnel: Washington Conservation District staff

Wilmes Lake is located in the city of Woodbury (Washington County). The lake has a surface area of 41 acres and a maximum depth of 5.5 m (18 feet). The lake has a watershed area of 2,247 acres which gives a large watershed-to-lake area ratio of 55:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2006. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2007.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	67	36	116	C
CLA (µg/l)	27	3.8	63	C
Secchi (m)	1.5	0.8	2.6	C
TKN (mg/l)	1.12	0.82	1.40	
			Lake Grade	C

The lake received a lake grade of C this year. The water quality of the lake varies between a lake grade of C and D, with C's dominating since 2006.

The 1994 and 1995 CAMP monitoring was performed in the northern basin of Wilmes Lake.

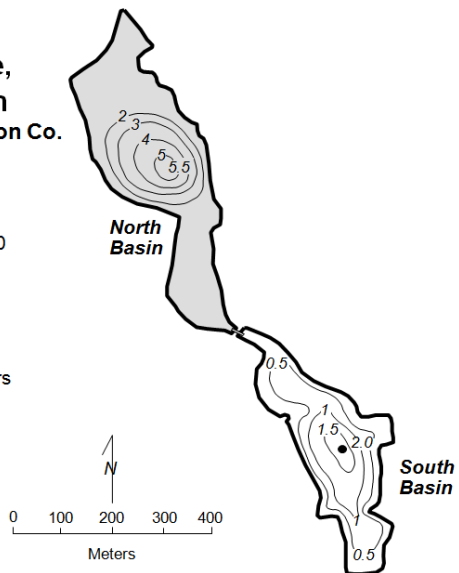
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

**Wilmes Lake,
South Basin**
Woodbury, Washington Co.

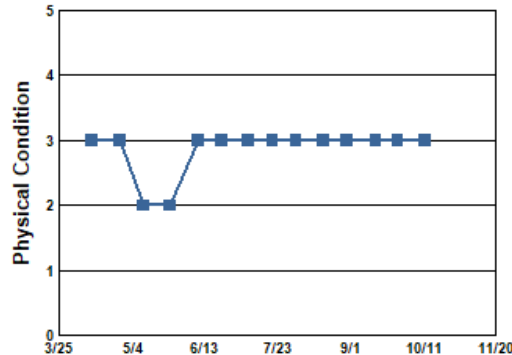
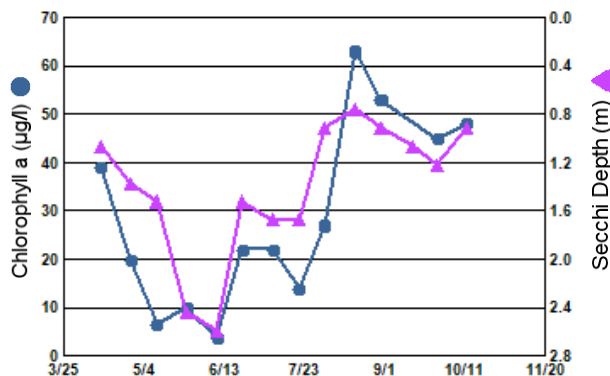
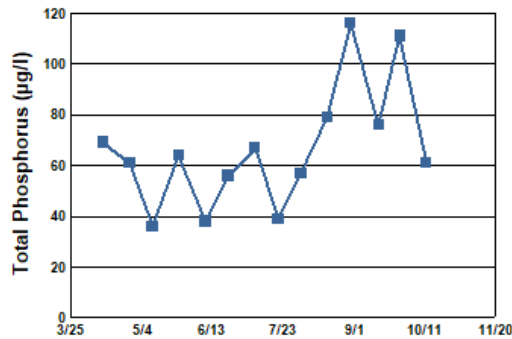
Lake ID: 820090-00

● Sampling site
Contours in meters

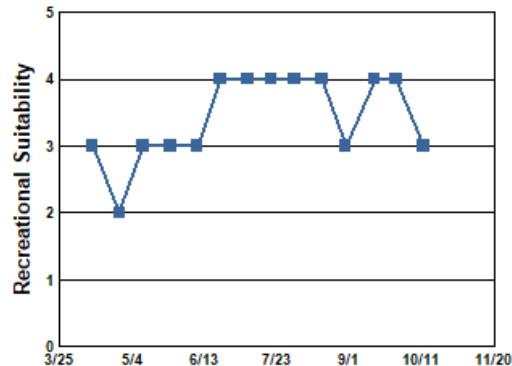


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.6	11.9	39	69	1.1	3	3
04/27/21	9.3	10.7	20	61	1.4	3	2
05/10/21	15.2	11.6	6.6	36	1.5	2	3
05/25/21	23.9	8.7	10	64	2.4	2	3
06/09/21	29.2	8.5	3.8	38	2.6	3	3
06/22/21	22.3	10.0	22	56	1.5	3	4
07/07/21	24.9	7.2	22	67	1.7	3	4
07/20/21	26.7	8.9	14	39	1.7	3	4
08/02/21	25.6	9.4	27	57	0.9	3	4
08/17/21	24.2	10.0	63	79	0.8	3	4
08/30/21	24.4	10.2	53	116	0.9	3	3
09/15/21	20.2	7.8		76	1.1	3	4
09/27/21	20.1	10.5	45	111	1.2	3	4
10/12/21	18.5	7.6	48	61	0.9	3	3



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP			C	D	D	D	D	D	D	D	D	D
CLA			B	B	C	C	C	C	C	C	D	C
Secchi			B	C	C	D	D	C	C	D	D	C
Lake Grade			B	C	C	D	D	C	C	D	D	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	D	D	D	C	C	D	C	D	C	C	D
CLA	C	C	C	C	C	C	C	B	C	C	C	C
Secchi	C	D	C	C	D	C	C	C	C	D	D	F
Lake Grade	C	D	C	C	C	C	C	C	C	C	C	D

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	C	C	C
CLA	C	C	B	B	C	C
Secchi	C	D	C	C	C	C
Lake Grade	C	C	C	C	C	C

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Wood Lake (19–0024) City of Burnsville

Volunteer: Chris Pritchard

Wood Lake is located in the city of Burnsville (Dakota County). The lake has a surface area of 9 acres. The maximum depth of the lake is 4.5 m (14.8 feet). The entire surface area is considered littoral zone, which is the 0 — 15 feet depth zone typically dominated by aquatic vegetation. Since the lake is relatively shallow, it does not permanently stratify and maintain a thermocline which is a density gradient caused by changing water temperatures throughout portions of the water column.

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	21	12	35	A
CLA ($\mu\text{g/l}$)	5.9	1.8	15	A
Secchi (m)	2.9	1.5	4.5	B
TKN (mg/l)	0.66	0.56	0.92	
			Lake Grade	A

The lake received a lake grade of A this year which is the second A grade received according to its historical water quality database. The previous A was received in 2020. Prior to 2019 the lake received lake grades of C with the occasional B. Recent water quality appears to be improving. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at <http://www.dnr.state.mn.us/lakefind/>.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP					C	C	B	C	C	C	C	C
CLA					B	B	B	B	B	C	C	B
Secchi					C	C	C	C	C	C	C	C
Lake Grade					C	C	B	C	C	C	C	C

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP	C	C	D	C	C	C	C	C	D	C	C	C
CLA	B	C	C	B	B	B	C	A	C	A	B	B
Secchi	C	C	C	C	C	C	B	C	D	C	C	B
Lake Grade	C	C	C	C	C	C	C	B	D	B	C	B

Year	2016	2017	2018	2019	2020	2021
TP	C	C	C	A	A	A
CLA	C	D	C	B	A	A
Secchi	C	C	D	C	B	B
Lake Grade	C	C	C	B	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

Wood Pile Lake (82–0132) *Brown's Creek Watershed District*

Monitoring Personnel: Washington Conservation District staff

Woodpile Lake is located in Washington County. It has a surface area of 19 acres. The maximum depth of the lake is 8.2 m (27 ft).

On each sampling day surface samples were collected for laboratory analysis of total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll including chlorophyll-a (CLA). Secchi transparency was measured during each site visit. Depth profiles of dissolved oxygen and temperature were also made. The resulting surface data are summarized in tables and figures on the following pages. For depth profile data, please refer to the METC's EIMS system at <https://eims.metc.state.mn.us>.

2021 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP ($\mu\text{g/l}$)	21	14	32	A
CLA ($\mu\text{g/l}$)	5.1	1.9	12	A
Secchi (m)	3.4	2.4	4.9	A
TKN (mg/l)	0.68	0.57	0.82	
			Lake Grade	A

The lake received a lake grade of A this year. All three parameter grades have generally improved since 2006. TP grades have changed from D to A; CLA grades have changed from the B and C range to A; and Secchi grades have changed from the B and C range to A. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

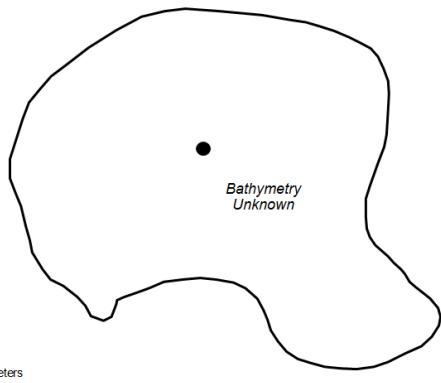
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Woodpile Lake
Grant, Washington Co.

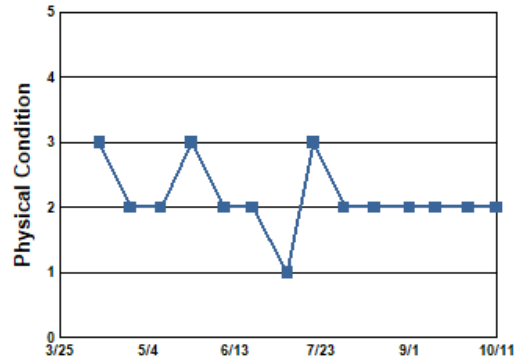
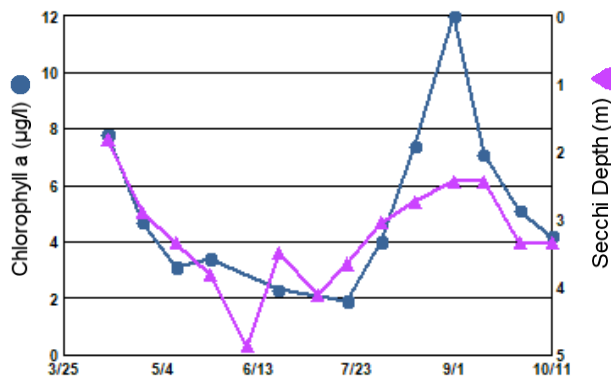
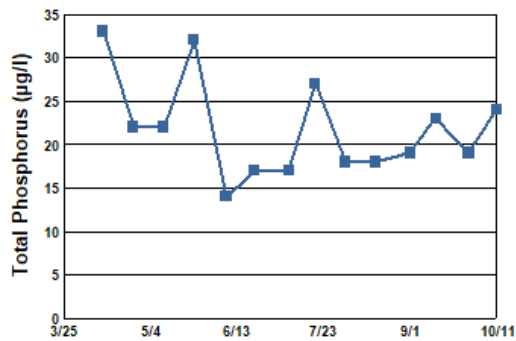
Lake ID: 820132-00

● Sampling site
Contours in meters

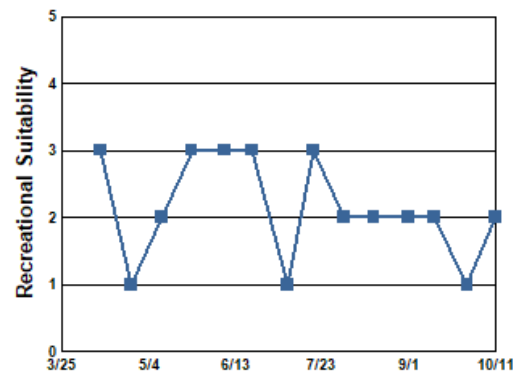


2021 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/12/21	11.2	11.5	7.8	33	1.8	3	3
04/26/21	9.1	11.8	4.7	22	2.9	2	1
05/10/21	14.3	11.4	3.1	22	3.4	2	2
05/24/21	22.5	9.3	3.4	32	3.8	3	3
06/08/21	26.6	8.4		14	4.9	2	3
06/21/21	23.2	8.1	2.3	17	3.5	2	3
07/07/21	25.4	6.5		17	4.1	1	1
07/19/21	26.9	7.2	1.9	27	3.7	3	3
08/02/21	24.8	4.9	4.0	18	3.0	2	2
08/16/21	25.1	6.4	7.4	18	2.7	2	2
09/01/21	23.6	5.9	12	19	2.4	2	2
09/13/21	21.8	6.2	7.1	23	2.4	2	2
09/28/21	18.4	7.5	5.1	19	3.4	2	1
10/11/21	18.8	6.2	4.2	24	3.4	2	2



1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP												
CLA												
Secchi												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TP												
CLA												
Secchi												
Lake Grade												

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TP			D	C	C	C	C	C	C	B	B	B
CLA			B	B	C	B	C	C	A	A	A	A
Secchi			C	B	C	B	C	A	A	A	B	B
Lake Grade			C	B	C	B	C	B	B	A	B	B

Year	2016	2017	2018	2019	2020	2021
TP	C	B	B	B	A	A
CLA	A	A	A	A	A	A
Secchi	B	B	B	A	A	A
Lake Grade	B	B	B	A	A	A

Source: Metropolitan Council, EPA STORET, and/or MPCA EQuIS database(s)

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Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21				
Birch Lake	62002400	1	2																								v14																					
Bluebill Bay Lake	19044900	1																	v8																													
Bone Lake	82005400	1					5					13				v7		v14	v14	v14	v14		v14	v14	v14	v14	v14	13	v10	v15	v12	v11	v15	v13	v25	v22	v26	v27	v27	v19	v19	v8	v13					
Brand Lake	10011000	1																			v1																											
Braunworth Lake	10010700	1																			v1																											
Brewers Pond	82002200	1																																														
Brick Pond	82030800	1																												v7	v6	v7	v7	v6	v6													
Brickyard Clayhole Lake	10022500	1																							v14	v13	v14	v14	v14	v13	v14	v15	v14	v14	v14	v13	v13	v13	v13	v13	v13	v12						
Bryant Lake	27006700	1	2	5	16		5					13	13	12																																		
Buck Lake	70006500	1																																														
Burandt Lake	10008400	1																			v7	v13	v9			v18	v22			v4	v14	v14	v14	v13	v12	v14	v11	v9	v8									
Bush Lake	27004700	1					5									13	13				13		13			13	v13	v15	v13	v13	v13	v12	v13	v12	v12	v14	v14	v13	v13	v13	v10	v14						
Byllesby Lake	19000600	1														v14	v14	v13																														
Byllesby Lake	19000600	2																																														
Byllesby Lake	19000600	3																																														
Byllesby Lake	19000600	4																																														
Bde Maka Ska	27003100	1		5			5																																									
Campbell Lake	10012700	1																			v2	v14		v10			v14	v14																				
Capaul Pond	82036500	1																																														

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21				
Cloverdale Lake	82000900	1																						v10	v10	v11	v13	v12	v11	v10	v9	v11	v10	v9	v9	v8			v7		v7		v7					
Cobblecrest Lake	27005300	1																							v4		v14	v16	v13	v13	v13	v10	v9	v6	v4	v7	v4	v7	v4	v4	v2	v5	v3	v3				
Cobblestone Lake	19045600	1																										v14	v14	v12	v14	v13	v14	v14	v13	v12	v10	v5	v5	v14	v10	v10	v8	v4				
Cody Lake	66006100	1																												v3																		
Colby Lake	82009400	1															v13	v14	v13	v13	v12	v12	v9	v10	v10	v10	v10	v6	v7	v7	v9	v3	v9	v14	v14	v13	v12	v14	v14	v14	v14	v12	v13	v12	v14			
Coon Lake	2004200	1	4				5										13			13												2																
Cornelia Lake	27002800	1																								v7		v11	v14	v14	v13	v14					v5	v6	v7									
Courthouse Lake	10000500	1																	v2	v14	v13	v13	v14	v14	v14	v14	v14	v14	v14	v13	v13	v14	v14	v14	v14	v14	v14	v13	v13	v13	v13	v13	v12					
Cowley Lake	27016900	1																	v12										v10	v1		v4	v6							v6								
Crane Lake	27073400	1															v9																															
Crooked Lake	2008400	1				5							13				v15	v15	v14	v14	v12	v14	v14																									
Crystal Lake	19002700	1	2			5							13				13	13	13	13	13	v12	v10	v14	v15	v15	v15	v16	v14	v14	v14	v14	v14	1 & v14	4 & v14	4 & v14	2 & v13	v13	v15	v15	v14	v13	v16	v13	v13			
Crystal Lake	27003400	1								17	19	19					v15			v11					v8			v7			v7		v8					v5		v10								
Crystal Lake	70006100	1																		v12		v11																						v6	v2			
Cynthia Lake	70005200	1	2																																													
Dan Patch Lake	70001600	1																			v15																											
Dean Lake	70007400	1																								v7	v7	v6	v7	v8	v9	v10	v12	v8	v3													
Deeg Lake	19011700	1																																														
Deep Lake	62001800	1																																														

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21							
Gables Lake	82008200	1																		v8	v5																														
Gaystock Lake	10003100	1																				v2	v14	v14				v14	v14																						
George Lake	2009100	1	4	5	16			5					13								13										v14																				
George Watch Lake	2000500	1																	v14	v12	v11	v11	v6	v7	v8	v9	v10	v12	v7	v8	v12	v14	v14	v14	v12	v8	v9	v11	v12	v9	v6		v3	v2							
German Lake	82005600	1																							v7	v7	v7	v7	v7	v7	v7	v7	v7			v7			v12	v14	v14	v9		v13							
Gervais Lake	62000700	1						5																																											
Glen Lake	27009300	1																												v13	v7	v4																			
Goetschel Lake	82031300	1																							v11	v9	v4	v15	v9	v5	v7	v7	v7												v7		v7				
Goggins Lake	82007700	1																				v13	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v13	v12	v15	v14	v14	v14	v12	v13	v12	v14					
Golden Lake	2004500	1	2										12			14			v13	v11	v15	v13	v13	v12	v11	v11	v10	v11	v11	v10	v11	v11	v10	v9	v13	v12															
Goose Lake	10008900	1																	v9	v7	v15	v15	v14	v11	v14	v14	v14	v14	v14	v14	v13	v14	v14	v14	v14	v14	v13	v13	v14	v13	v13	v11									
Goose Lake	19036000	1																	v13	v13																															
Goose Lake	82005900	1																	v15	v15	v13	v13	v15					v7	v7	v7	v7	v14	v7	v7	v7	v7	v12	v12	v14	v14	v14	v14	v12	v13	v13	v15					
Goose Lake	82011301	1																													v7	v7	v7			v7	v7	v6	v7	v7	v7	v6	v7	v6	v7	v6	v7				
Goose Lake	82011302	2																													v7	v7	v7			v7	v7	v6	v7	v7	v7	v6	v7	v6	v7	v6	v7				
Grace Lake	10021800	1																							v11	v14	v14		v14		v14	v14	v14	v14	v14	v14	v14	v14	v12	v14	v13	v13	v12								
Grass Lake	27068100	1																			v12																														
Haas Lake	70007800	1																																																	
Hafften Lake	27019900	1																																																	

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21										
Ham Lake	2005300	1						5								v15	v13		v13	v9	v14																							12										
Harriet Lake	27001600	1					5																																															
Hart Lake	2008100	1																								v6	v4	v8																										
Harvey Lake	27067000	1																								v10																												
Haughey Lake	27018700	1																						v4																														
Hawkes Lake	27005600	1																																																				
Hay Lake	82006500	1																			v14	v13	v14	v14	v4	v7	v7	v7	v7	v7	v14	v7	v7	v7		v12	v12	v14	v14	v14	v14	v14	v12	v13	v6	v7								
Hazeltine Lake	10001400	1																			v1	v14	v14				v14	v14		v14	v14	v14	v14	v14	v13	v12	v14	v13	v12	v12														
Heifort's Pond	82048500	1																																																				
Heims Lake	13005600	1																																																				
Henry Lake	27017500	1																v10									v11	v11	v6	v7	v7	v5	v10																					
Herber Pond	82001501	1																								v14	v14	v7	v7																									
Hidden Lake	27069300	1																																																				
Highland Lake	2007900	1																						v13	v11	v13	v12	v12	v14	v14	v14	v12																						
Holland Lake	19006500	1				10	16	15				20																																										
Hornbeam Lake	19004700	1																										v11	v8	v7	v5	v2																						
Horseshoe Lake	19003200	1																v11	v10											v1																								
Horseshoe Lake	19005100	1																											v11	v11	v8	v14	v13	v10	v11	v11	v13	v12	v14	v14	v14	v6	v6	v6	v7									
Horseshoe Lake	82007400	1																																																				

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21					
Kismet Lake	82033400	1																			v14	v13	v14	v14	v14	v14	v14	v13	v14	v14	v14	v14	v14	v14	v14	v12	v12	v15	v14	v14	v12	v13	v12	v14					
Klawitter Pond	82036800	1																							v13	v13	v14	v13	v12	v12	v13	v14	v11	v12	v13	v11	v10	v12	v13	v14	v13	v12	v11	v14					
Kohlman Lake	62000600	1						5																																									
Kramer Pond	82011700	1																												v7	v7	v7		v7	v7	v6								v6					
La Lake	82009700	1														v13	v11	v13	v11	v10	v10	v8	v6	v5	v6	v3	v13	v12	v14	v11	v12	v10	v10	v11	v10	v9	v11	v10	v12	v12	v9	v6	v10						
Lac Lavon Lake	19044600	1																		v11	v10	v10	v9	v2	v7	v12	v12	v12	v13	v12	v14	v13	v13	v14	v13	v13	v12	v13	v12	v12	v12	v11	v8	v11					
Laddie Lake	2007200	1	4													v13	v14	v12					v13	v13	v14	v10																							
Lake Forest	82018700	1																												v12	v11																		
Lake of the Isles	27004000	1						5																																									
Lake Minnetonka	27013302	1	4	5																																													
Lake Minnetonka	27013305	1	2	5																																													
Langdon Lake	27018200	1						5																																									
Langton Lake	62004900	1																									v14	v7	v13	v13	v13	v13	v13	v12	v10		v12	v14	v12	v11	v7								
Langton Lake	62004900	2																									v14	v13	v13	v13																			
Langton Lake	62020400	1																									v14																						
Laura Lake	27012300	1																																			v12	v3	v3	v8									
Lee Lake	19002900	1															v14	v15	v14	v13			v12	v13	v11	v9	v15	v9	v14	v14	v13	v14	v14	v12	v13	v11	v12	v13	v13	v11	v11	v12	v16	v12					
Legion Pond	82046200	1																									v14	v10		v7	v2												v6			v6	v7		
Lemay Lake	19008200	1																												v11	v11	v9	v11	v10	v5	v7	v3	v1	v3	v11	v8	v9	v8	v7					

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21								
Long Lake	82002100	1																v14	v7		v14	v13	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v14	v13	v12	v14	v14	v14	v12	v13	v12	v14									
Long Lake	82002100	2																																																		
Long Lake	82002100	3																																																		
Long Lake	82003000	1															v14	v14	v14	v13	v14		v14	v14	v14	v14	v7	v7	v7	v7	v7	v7	v7	v7	v7	v7	v7		v12	v12	v14			v12	v13	v6	v7					
Long Lake	82006800	1																						v5	v14	v7	v7	v7	v7	v7	v7	v8	v6	v7	v7							v15	v15	v14		v13	v6	v7				
Long Lake	82011800	1																																																		
Long Lake	82013000	1																																																		
Loon Lake	82001502	1																																																		
Lost Lake	27010300	1																																																		
Lost Lake	82013401	1																																																		
Lotus Lake	10000600	1																																																		
Louise Lake	82002500	1																																																		
Lucy Lake	10000700	1																																																		
Lynch Lake	82004200	1																																																		
Lynch Lake	82004200	2																																																		
MacDonald Lake	82006200	1																																																		
Magda Lake	27006500	1																																																		
Maple Marsh Lake	82003800	1																																																		
Marcott (Rosenberg) Lake	19004100	1																																																		

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21						
Prior Lake - Lower	70002600	1					5						13						13	v15	v14	v13	v9	v14	v16	v13	v12	v12	v12	v12	v14	v14	v12	v14	v6															
Prior Lake - Lower	70002600	2																		v14	v13	v9	v14	v15										v5	v9	v13	v13	v11	v8	v9	v11	v13								
Prior Lake - Upper	70007200	1	4	5			5						13						13	v15	v14	v13	v9	v14	v12	v13	v10	v9	v9	v5	v11	v14	v14	v13	v11	v9														
Prior Lake - Upper	70007200	2																							v12																									
Raven Lake	19036900	1																	v13	v6	v8																													
Rebecca Lake	19000300	1																																																
Rebecca Lake	27019200	1				10	12	12																																										
Red Rock Lake	27007600	1																				12	13			13	13		13																					
Regional Park Lake	82008700	1																				v12	v14	v12	v13	v14	v15	v15	v14	v7	v7	v7	v7	v7	v7	v7	v7	v7	v6	v7	v10	v6	v6	v7	v6	v7				
Reid Park Pond	82046000	1																																																
Reitz Lake	10005200	1						5					12			13							v15	v13	v7	v13	v14	v14	15	v14	v14	v11	v11	v12	v11	v14	v12	v12	v13	v12	v14	v13								
Reshanau Lake	2000900	1	2																										v13	v9	v7	v9	v11	v10	v10	v7	v2													
Rest Area Pond	82051400	1																											v13	v10	v13	v12	v10	v9	v14	v12	v14	v14	v14	v15	v14	v11	v9	v6	v10					
Rice Lake	10007800	1	2																																															
Rice Lake	27011600	1																																																
Riley Lake	10000200	1	2	5	16			5	17	18			13	12		13																																		
Rogers Lake	19008000	1																																																
Rose Lake	27009200	1																																																
Rose Lake	82011200	1																																																

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21							
Swede Lake	10009500	1	2																13					13	v14	v16	v13	v14	v14	v13	v 14	v 14	v 14	v 14	v 14	v 13	v 14	v 12	v 14	v 12	v 10										
Sweeney Lake	27003501	1																					v11	v9	v14	v13	v14	v11	v10	v15	v 12	v 13	v 14	v 12	v 9	v 9	v 14	v 5	v 10	v 15	v 4	v 5	v 5	v 1							
Sweeney Lake	27003501	2																					v11	v9								v 10	v 9							v 6	v 9	v 10	v 6	v 11							
Sylvan Lake	27017100	1																												v 10				v 14	v 13	v 10															
Keewahtin Lake	82008000	1																																																	
Tamarack Lake	10001000	1																																																	
Tanners Lake	82011500	1	2																																																
Teal Lake	27027500	1																																																	
Terrapin Lake	82003100	1																																																	
Third Lake	13002400	1																																																	
Thole Lake	70012001	1						5																																											
Thomas Lake	19006700	1	2																																																
Thompson Lake	19004800	1																																																	
Tiger Lake	10010800	1																																																	
Turtle Lake	62006100	1	4	5		5																																													
Turtle Lake	82003600	1																																																	
Twin Lake	19002800	1																																																	
Twin Lake	27003502	1																																																	
Twin Lake	27004201	1																																																	

Lake	DNR ID	Site	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21				
Whaletail Lake	27018400	1																								13	13				3																	
Whaletail Lake	27018400	2	4				5													13			13			13	13			3																		
White Bear Lake	82016700	1	4	5			5																																									
White Rock Lake	82007200	1																										v11	v14	v13	v15	v14	v15	v14	v13	v13	v14	v13	v14	v13	v14	v12	v13	v9	v13			
Wilmes Lake	82009002	1															v14	v15	v14	v15	v15	v14	v13	v13	v10	v12	v12	v10	v12	v11	v11	v11	v11	v11	v11	v13	v13	v12	v15	v14	v14	v12	v13	v12	v14			
Windsor Lake	27008200	1																									v12	v14																				
Wing Lake	27009100	1																										v14	v14	v12	v9	v14	v11	v9	v9	v11	v12	v11	v11	v11	v9	v10						
Winkler Lake	10006600	1																			v8	v6	v6		v13		v14		v13	v13		v13	v13															
Wolsfeld Lake	27015700	1	4																																													
Wood Lake	19002400	1																	v10	v14	v15	v15	v14	v13	v14	v14	v14	v14	v13	v13	v12	v9	v13	v12	v13	v12	v13	v12	v10	v6	v7	v10	v10	v12	v9	v11		
Woodpile Lake	82013200	1																										v7	v7	v15	v14	v14	v14	v14	v14	v12	v12	v14	v14	v14	v12	v13	v12	v14				
Young America Lake	10010500	1																				v1																										
Zumbra Lake	10004100	1					5						13																																			

Appendix B

Lake Characteristics

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Acorn Lake	82010200		44	296	6.7	3.0	0.7	101.0239999-99999999	100	Y	N
Alice Lake	82028700		28	2,806	100.2	2.7			100	Y	Y
Alimagnet Lake	19002100		109	1,094	10.0	3.0	1.5	545	100	Y	
Anderson Pond	19009400		2								
Ann Lake	10001200		116	1,247	10.8	13.7			41		Y
Ardmore Lake	27015300		10.1			6.1	2.4	78	89	Y	N
Armstrong Lake	82011602		39			1.5	1.0	128	100	Y	N
Auburn Lake	10004400		287	8,027	28.0	25.6			56		Y
Augusta Lake	19008100		38			10.1			56		Y
Bailey Lake	82045600		51								
Baldwin Lake	2001300		220			1.5			100	Y	N
Barker Lake	82007600		45	823	18.3	9.0	4.4	648			N
Bass Lake	27001500	St. Louis Park	95								
Bass Lake	27009800	Plymouth	194	3,100	16.0	9.4	3.1	1,979	82	Y	N
Bass Lake	82003500	May Township	81			4.3			100	Y	N
Bass Lake	82012300	Grant Township	47						100		N
Bass Lake	82012400	Grant Township	23.5						100		N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Battle Creek Lake	82009100		105	4,264	40.6	4.6			100	Y	Y
Bavaria Lake	10001900		200	711	3.6	18.3	5.6	3,674	40		Y
Bay Pond	82001100		10.1999999-99999999	849	83.2	1.1				Y	
Benton Lake	10006900		115	322	2.8	2.0			100	Y	N
Benz Lake	82012000		36			2.7			100	Y	N
Beutel Pond	82039900		1.3			1.1				Y	
Big Carnelian Lake	82004900		455	1,900	4.2	20.0	9.8	14,560	28		Y
Big Comfort Lake	13005300		219			14.3			41		Y
Big Marine Lake	82005200		1,706	2,659	1.6	15.2	7.6	42,527	67		Y
Big Woods Lake	10024900		33	1,421	43.1	2.5				Y	N
Birch Lake	13004200		65								
Bone Lake	82005400		212	5,177	24.4	9.8	3.7	2,820	59		Y
Brewer's Pond	82002200		13.3								N
Brick Pond	82030800		10.6			1.5				Y	
Brickyard Clayhole Lake	10022500		17			13.1			35		N
Bryant Lake	27006700		176			13.7			36		Y
Buck Lake	70006500		65	3,925	60.4						N
Burandt Lake	10008400		96			7.3			70		N
Bush Lake	27004700		172			8.5			64		Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Byllesby Lake	19000600		1,368.5	733,166	535.7	15.2			71		Y
Campbell Lake	10012700		72			2.0			100	Y	N
Carol Lake	82001700		63	375	6.0	1.8	0.9	186	100	Y	N
Cates Lake	70001800		27			4.0			100	Y	N
Cavanaugh Lake	27011000		13.5								N
Cedar Island Lake	27011900		80	800	10.0	2.1	1.4	368	100	Y	N
Cedar Lake	70009100		742	11,104	15.0	4.7	2.1	5,194	100	Y	Y
Cenaiko Lake	2065400		29			9.1			40		N
Centerville Lake	2000600		473	1,640	3.5	5.8			58		Y
Christmas Lake	27013700		268	741	2.8	26.5			29		Y
Clear Lake	82004500		31			8.2			94	Y	N
Clear Lake	82009900		24.1								N
Clear Lake	82016300		400			8.5	3.7	4,800	67		Y
Cloverdale Lake	82000900		45	819	18.2	8.5	3.0	450	86	Y	N
Cobblecrest Lake	27005300		10								N
Cobblestone Lake	19045600		37			6.0					
Cody Lake	66006100		256			3.7	2.4	78		Y	
Colby Lake	82009400		71	8,088	113.9	3.4			100	Y	N
Cornelia Lake	27002800		52			2.0				Y	N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Courthouse Lake	10000500		10			17.4			30		N
Cowley Lake	27016900		44.4								
Crane Lake	27073400		43.8			1.5			100	Y	N
Crystal Lake	19002700	Burnsville	292	2,001	6.9	11.3	3.1	2,920	72		Y
Crystal Lake	27003400	Robbinsdale	76	1,272	16.7	10.4	3.7	917	68		Y
Crystal Lake	70006100	Prior Lake	31.4			7.9			91.08280-2547770-711	Y	N
Dean Lake	70007400		128						100		N
DeMontreville Lake	82010100		160	1,108	6.9	7.3	2.4	1,280	90	Y	Y
Dickman Lake	19004600		23								N
Downs Lake	82011000		35	2,400	68.6	2.1	1.5	175	100	Y	N
Dubay Lake	27012900		16.6000000-00000001								N
Duck Lake	27006900		45.6	199.8	4.4	2.6			100	Y	Y
Dutch Lake	27018100		172.7			13.7			48.19976-7711962-835		Y
Eagle Lake	10012100	Carver	186	1,050	5.6	4.3	2.5	1,500	100	Y	Y
Eagle Lake	27011101	Maple Grove	291	3,220	11.1	10.4	3.8	3,667	68		Y
Eagle Point Lake	82010900		120	11,502	95.9	1.8	1.0	360	100	Y	N
Earley Lake	19003300		29	1,629	56.2						N
East Boot Lake	82003400		47	93	2.0	8.2	0.9	282	84	Y	Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
East Lake	19034900		40								
Echo Lake	82013500		41	194	4.7	1.8	0.8	107	100	Y	N
Edina Lake	27002900		23.9			1.0			100	Y	N
Edith Lake	82000400		81	1,576	19.5	13.0					
Elmo Lake	82010600		284	1,191	4.2	41.7			22		Y
Elwell Lake	82007900		18	229	12.7	2.1				Y	N
Farquar Lake	19002300		63	353	5.6	3.0	1.4	290	100	Y	N
Fireman's Clayhole Lake	10022600		8			7.0			88	Y	
Fish Lake	2006500		334	1,619	4.8	4.4	0.9	1,000	100	Y	Y
Fish Lake	70006900	Scott	171	660	3.9	8.5	4.4	2,468	43		Y
Fish Lake	82006400	Scandia	72	683	9.5	3.0	1.5	360	100	Y	N
Fish Lake	82009300	Woodbury	5.2								
Fish Lake	82013700	Grant Township	21			10.4			67		
Forest Lake	82015900		2,249	4,285	1.9	11.5	3.4	24,986	68		Y
Fourth Lake	13002200		33.2999999-99999997	1,918	57.6	2.0			100	Y	N
French Lake	27012700		352	870	2.5	1.0				Y	Y
Friedrich's Pond	82010800		14.5	360	24.8						
Gaystock Lake	10003100		105			5.0			100	Y	N
George Lake	2009100		488			9.8			80	Y	

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
George Watch Lake	2000500		528			2.0	1.5	2,587	100	Y	Y
German Lake	82005600		109								
Glen Lake	27009300		98			7.6			91	Y	N
Goetschel Lake	82031300		22	2,812	127.8	4.2	1.2	88	100	Y	N
Goggins Lake	82007700		11						100		N
Golden Lake	2004500		57	7,680	134.7	7.3	2.5	463	90	Y	Y
Goose Lake	10008900	Waconia	407	1,100	2.7	3.0	1.5	2,035	100	Y	
Goose Lake	82005900	Scandia	83			7.6	2.4	664	55		Y
Grace Lake	10021800		22			6.7			79		
Haas Lake	70007800		32.2000000-00000003								N
Hafften Lake	27019900		43						60		Y
Ham Lake	2005300		154.6	853	5.5	6.7	1.8	927.6	76.39068-5640362-221		Y
Hart Lake	2008100		8						100		N
Harvey Lake	27067000		5.9			0.7			100	Y	N
Hawkes	27005600		6.7								
Hay Lake	82006500		33								N
Hazeltine Lake	10001400		236			2.0			100	Y	N
Heifort's Pond	82048500		11.2								
Heims Lake	13005600		81								

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Henry Lake	10017500		77			1.5			100	Y	N
Herber's Pond	82001501	part of Loon Lake				2.0			100	Y	N
Hidden Lake	27069300		9			8.5			56		N
Highland Lake	2007900		22			1.0			100	Y	N
Holland Lake	19006500		38			18.8			59		Y
Hornbean Lake	19004700		22								N
Horseshoe Lake	19005100		16								N
Horseshoe Lake	82007400	West Lakeland Twp.	53			3.4				Y	
Hydes Lake	10008800		215	430	2.0	5.5	3.0	2,150	88	Y	Y
Island Lake	2002200		67			6.7			87	Y	N
Jackson WMA	82030500		14.3								
Jane Lake	82010400		155	1,402	9.0	12.0	3.7	1,860	72		Y
Jellum's Lake	82005202		72	333	4.6	4.9	2.4	569	100	Y	N
Jonathon Lake	10021700		24.2								N
Jubert Lake	27016500		93			12.5			53		N
July Lake	82031800		14.3								N
Karth Lake	62007200		17								
Keewahtin Lake	82008000		75	303	4.0	10.3	1.7	420	67		N
Keller Lake	19002500	Burnsville	51	1,387	27.2	3.0	1.8	300	100	Y	N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Kingsley Lake	19003000		44	193	4.4	4.0			100	Y	N
Kismet Lake	82033300		39.7999999-99999997								N
Klawitter Lake	82036800		4.5	168	37.3				100		
Kramer Lake	82011700		13								
La Lake	82009700		35			3.5			100	Y	N
Lac Lavon	19044600		55	306	5.6	9.8			47		N
Lake of the Isles	27004000		114			9.5			79		Y
Langton Lake	62004900		30	257	8.6	1.5	1.2	120	100	Y	
Laura Lake	27012300		33.4	312	9.3	2.9			100	Y	N
Lee Lake	19002900		25	324	13.0	5.2			100	Y	N
Legion Pond	82046200		16	224	14.0						
LeMay Lake	27008500		34			4.0	1.6	173		Y	
Lendt Lake	13010300		57.3	456.2	8.0	2.5			100	Y	N
Levander Pond	19008800		2.5								
Libbs Lake	27008500		23			2.1			100	Y	N
Lilly Lake	19008400		7								N
Lily Lake	82002300		52			17.4			73		Y
Linwood Lake	2002600		572.1	7,122	12.4	12.8	3.4	6,293.1	83	Y	Y
Little Carnelian Lake	82001400		162	565	3.5	21.3	10.7	5,686			N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Little Comfort Lake	13005400		36			17.0			44		N
Little Johanna Lake	62005800		35			12.0			67		N
Little Long Lake	27017900		108			23.2			49		Y
Little Prior Lake	70016900		14.2			1.8			85.91549-2957746-48	Y	N
Little Prior Lake	70016900		14.2			2.9			85.91549-2957746-48	Y	N
Lochness Lake	2058400		5.3			4.9					
Lone Lake	27009400		22			8.2			18		Y
Long Lake	19002200	Appley Valley	36			1.5			100	Y	N
Long Lake	82002100	Stillwater	71			6.7			96	Y	N
Long Lake	82003000	May Township	88			3.7			100	Y	Y
Long Lake	82006800	Scandia	35	381	10.9	2.1	1.1	126	100	Y	N
Long Lake	82011800	Pine Springs	62	2,060	33.2	10.4	3.6	744	55		N
Long Lake	82013000	Mahtomedi	48			7.7			92	Y	N
Loon Lake	82001502		64	407	6.4	4.9	2.4	206	100	Y	N
Lost Lake	27010300	Plymouth	22			1.8			100	Y	N
Lost Lake	82013400	Mahtomedi	32.2999999-99999997			7.9			34		Y
Lotus Lake	10000600		246	1,033	4.2	8.8	4.3	3,500	74		Y
Louise Lake	82002500		48	616	12.8	3.7	1.8	283	100	Y	N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Lower Prior Lake	70002600		827	19,560	23.7	18.3	4.1	11,120	46		Y
Lucy Lake	10000700		87			6.4			99	Y	N
Lynch Lake	82004200		43								
MacDonald Pond	82006200		12			2.7			100	Y	N
Magda Lake	27006500		15								
Maple Marsh Lake	82003800		38	148	3.9	3.4	1.7	212	100	Y	N
Marcott Lake (Ohmans Lake)	19004200		34			10.1					N
Marcott Lake (Rosenberg Lake)	19004100		20			8.2			90	Y	N
Maria Lake	10005800		169			1.0			100	Y	Y
Marion Lake	19002600		560			6.4			81	Y	Y
Markgrafs Lake	82008900		46	413	9.0	2.4			100	Y	N
Markley Lake	70002100		27			3.7			100	Y	N
Masterman Lake	82012600		45								
McDonald Lake	82001000		54	1,051	19.5	3.7	1.8	324	100	Y	N
McKnight Lake	10021600		29.7								N
McKusick Lake	82002000		46			4.7			100	Y	N
McMahon Lake	70005000		110			4.5			100	Y	Y
Meadow Lake	27005700		11	121	11.0	1.2			100	Y	N
Medicine Lake	27010400		886			14.9			45		Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Medina Lake	27014600		28						100		N
Mergen's Pond	82048200		12	1,383	115.3	1.3			100	Y	N
Miller Lake	10002900		145	16,701	115.2	4.3	3.1	1,479	100	Y	N
Minnetoga Lake	27008800		14.4			8.2	3.9	183			
Minnewashta Lake	10000900		677			21.3			55		Y
Mitchell Lake	27007000		112			5.8			97	Y	Y
Moody Lake	13002300		35			14.6			63		N
Mud Lake	82002602		62	899	14.5	2.1	1.1	224	100	Y	N
Nielson Lake	82005500		50.4								N
Normandale Lake	21104500		103			3.7			100	Y	
North School Section Lake	82014900		105								N
North Twin Lake	82001800		69	187	2.7	1.8	0.9	207	100	Y	N
Northwood Lake	27062700		15	1,341	89.4	1.5	0.8	41	100	Y	N
O'Connor Lake	82000200		38								N
O'Dowd Lake	70009500		258			6.7			91	Y	Y
Oak Lake	10009300		339			3.4			100	Y	N
Olson Lake	82010300		89	200	2.2	4.5	2.1	623	100	Y	Y
Oneka Lake	82014000		381			2.1	1.2	1,524	100	Y	N
Orchard Lake	19003100		250	2,012	8.0	10.0	3.0	2,500	75		Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Pamela Lake	27067500		18			1.5			100	Y	N
Parkers Lake	27010700		97	950	9.8	11.3	3.7	1,164	70		Y
Pat Lake	82012500		13								
Peltier Lake	2000400		174	68,082	391.3	4.9	2.1	3,255	100	Y	Y
Penn Lake	27000400		31			2.1			100	Y	Y
Pepin Lake	40002800		326			3.4	1.1	1,150		Y	Y
Peter Lake	27014700		46			20.7			35		N
Pickerel Lake	2013000	Nowthen	246	616	2.5	1.5	1.5	369	100	Y	Y
Pickerel Lake	19007900	Lilydale	114			3.4			100	Y	Y
Piersons Lake	10005300		266.899999-99999998	1,178	4.4	12.2			44.58598-7261146-499		Y
Pike Lake	27011102	Maple Grove	59	919	15.6	6.7	2.0	395	95	Y	Y
Pike Lake	62006900	New Brighton	35			4.9	2.1	252	100	Y	N
Pike Lake	70007600	Prior Lake	57	1,991	34.9	2.7			100	Y	N
Pine Tree Lake	82012200		174			7.9	3.0	1,740	91	Y	N
Pleasant Lake	70009800		300			1.5			100	Y	Y
Pomerleau Lake	27010000		27			7.9	2.7	243	73		N
Powers Lake	82009200		57	1,238	21.7	12.5			57		N
Priebe Lake	62003600		5.7			1.5			100	Y	N
Rebecca	19000300	Hastings	58			4.6			100	Y	Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Red Rock Lake	27007600		96.9			4.9			94	Y	Y
Regional Park Lake	82008700		16	600	37.5	5.8			100	Y	N
Reid Park Pond	82046000		4.2	80	19.0	3.0			100	Y	N
Reitz Lake	10005200		79	3,711	47.0	11.0	4.0	1,027	58		Y
Reshnanau Lake	2000900		330								N
Rest Area Pond	82051400		12.6	17,781	1,411.2						
Rice Lake	10007800		354	8,534	24.1	1.5			100	Y	Y
Rice Lake	27011600		252			3.4	1.9	1,570		Y	Y
Riley Lake	10000200		297	4,796	16.1	15.0	6.6	6,429	34		Y
Rogers Lake	19008000		94			2.4	1.3	393		Y	Y
Rose Lake	27009200		17								
Ryan Lake	27005800		20	5,510	275.5	10.7	64.8	312	56		N
Sanborn Lake	40002700		295			1.2	0.9			Y	Y
Sand Lake	82006700		46			5.5	2.4	368	91	Y	N
Schmidt Lake	27010200		37	190	5.1	9.1	1.5	207	92	Y	N
Schmitt Lake	19005200		56								N
School Lake	13005700		48								
Schroeder Pond	82030100		47			3.0			100	Y	N
Schutz Lake	10001800		105	943	9.0	15.0	6.0	2,100	27		N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Scout Lake	19019800		8.69999999-99999993			2.9				Y	N
Second Lake	13002500		86								N
Seidl's Lake	19009500		14	415	29.6	5.0			100	Y	N
Shady Oak Lake	27008900		85			10.7			66		Y
Shaver Lake	27008600		11								N
Shields Lake	82016200		27			8.2			74		N
Silver Lake	62000100		72			5.5			99	Y	Y
Silver Lake	82001600		98	455	4.6	3.4	1.7	549	100	Y	N
Simley Lake	19003700		14			5.2					Y
Smetana Lake	27007300		48.2			3.7			90	Y	N
South Oak Lake	27066100		3								Y
South Rice Lake	27064500		3.2	63	19.7	2.5	0.5	5.4	100	Y	N
South School Section Lake	82015100		125			8.0			41		
South Twin Lake	82001900		54	63	1.2	4.0	2.0	356	100	Y	N
Spring Lake	19000501	Nininger Township	1,839	23,780,000	12,930.94072865687-8	5.2			100	Y	Y
Spring Lake	70005400	Prior Lake	630	13,500	21.4	11.3	5.6	11,500	50		Y
Square Lake	82004600		193	782	4.1	20.7	9.0	5,694	65		Y
St. Croix Lake	82000100		8,600	4,918,790	572.0	23.8					Y
St. Joe Lake	10001100		14			15.9			46		Y

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Staples Lake	82002800		24	127	5.3	4.3	2.1	165	100	Y	N
Success Lake	27063400		7.7								
Sunfish Lake	19005000		49			9.8					N
Sunfish Lake	82010700		50	526	10.5						N
Sunnybrook Lake	82013300		16	630	39.4	6.1	2.0	104			N
Sunset Lake	82015300		124			5.2			100	Y	N
Sunset Pond	19045100		60			3.7			100	Y	N
Susan Lake	10001300		93			5.2			81	Y	Y
Sutton Lake	70009400		72								N
Swede Lake	10009500		376			4.0			100	Y	Y
Sweeney Lake	27003501		66	2,400	36.4	8.0	3.6	790	52		N
Sylvan Lake	27017100		134			4.0			100	Y	N
Tamarack Lake	10001000		24			20.0			41		N
Teal Lake	27027500		8.9								N
Terrapin Lake	82003100		86			4.6			100	Y	N
Third Lake	13002400		61.9	196.8	3.2	2.5			100	Y	N
Thole Lake	70012000		105			3.7			100	Y	Y
Thompson Lake	19004800		8.1			2.4			88	Y	Y
Turtle Lake	82003600		44	699	15.9	2.4	1.2	172	100	Y	N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Twin Lake	19002800	Burnsville	11						100		
Twin Lake	27003502	Golden Valley	19			17.0			42		N
Twin Lake	27065600	St. Louis Park	12.4								N
Twin Lake	82015700	Forest Lake	20	654	32.7	2.1				Y	N
Twin Lake, lower	27004200	Robbinsdale	35.6	5,322	149.5	6.7	2.3	340	83	Y	Y
Twin Lake, middle	27004200	Crystal	56.9	4,053	71.2	13.4	4.9	918	57		Y
Twin Lake, upper	27004200	Brooklyn Park	120.3	3,657	30.4	2.4	0.9	397	100	Y	N
Upper Prior Lake	70007200		340	16,460	48.4	15.2	3.1	3,460	93	Y	Y
Valentine Lake	62007100		60	2,237	37.3	4.0	1.5	300	100	Y	
Valley Lake	19034800		8	117	14.6	3.2			100	Y	N
Virginia Lake	10001500		110	772	7.0	10.4	3.3	1,210	88	Y	Y
Waconia Lake	10005900		3,000	7,880	2.6	11.3	4.0	38,632	53		Y
Weber Lake	82011900		7.5	1.4	0.2	1.5			100	Y	N
West Boot Lake	82004400		110	209	1.9	11.9	5.9	2,090	56		Y
West Lakeland Storage Site	82048800		27	1,139	42.2	5.8					N
West Lakeland Storage Site	NA					4.6					N
Westwood Lake	27071100		41			2.0			100	Y	N
White Rock Lake	82007200		65								
Wilmes Lake	82009000		41	2,247	54.8	5.5					Y
Windsor Lake	27008200		14								N

Lake	DNR ID	Location	Surface Area (ac)	Watershed Area (ac)	Watershed to Surface Area Ratio	Max Depth (m)	Mean Depth (m)	Volume (ac-ft)	% Littoral	Shallow Lake	Public Access
Wing Lake	27009100		11								
Winkler Lake	10006600		129	2,758	21.4						
Wood Lake	19002400		9	157	17.4	4.5			100	Y	N
Woodpile Lake	82013200		19								
Zumbra-Sunny	10004100		277			17.7	4.3	3,907	33		Y

Appendix C

2021 CAMP Volunteers and Monitoring Organization Staff

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Apple Valley, City of	Cobblestone Lake	19045600	Jeff Sluiter
Apple Valley, City of	Farquar Lake	19002300	Jeff Christianson
Apple Valley, City of	Long Lake	19002200	Joan Kettelkamp
Apple Valley, City of	Scout Lake	19019800	Dan Stanek
Basset Creek WMO	Cavanaugh Lake	27011000	Dan Jones
Basset Creek WMO	Lost Lake	27010300	Barrie Froseth
Basset Creek WMO	Medicine Lake, site 1	27010400	Denny Strunc
Basset Creek WMO	Medicine Lake, site 2	27010400	Randy Mikolai
Basset Creek WMO	Northwood Lake	27062700	Robert White
Basset Creek WMO	Parkers Lake	27010700	David Parker
Basset Creek WMO	Sweeney Lake, site 1	27003501	Shanna Hanson
Basset Creek WMO	Sweeney Lake, site 2	27003501	Amy Baudler
Basset Creek WMO	Twin Lake	27003502	Jennell Bilek
Basset Creek WMO	Westwood Lake	27071100	Nancy Ebner, Dan Decker
Black Dog WMO	Crystal Lake	19002700	Joe Tranchilla
Black Dog WMO	Keller Lake	19002500	Randy Koenig
Black Dog WMO	Kingsley Lake	19003000	Blue Water Science
Black Dog WMO	Lac Lavon Lake	19044600	Wally Shaver
Black Dog WMO	Orchard Lake	19003100	Tom Goodwin, Blue Water Science
Burnsville, City of	Alimagnet Lake	19002100	David DeKraker
Burnsville, City of	Earley Lake	19003300	Nancy Norlen, Jim Norlen
Burnsville, City of	Sunset Pond	19045100	Steve Behnke
Burnsville, City of	Twin Lake	19002800	Bernie DeMaster
Burnsville, City of	Wood Lake	19002400	Chris Pritchard
Chanhassen, City of	Lotus Lake	10000600	Steve Donen
Chanhassen, City of	Lucy Lake	10000700	Tim McCotter, Sharon McCotter
Chanhassen, City of	Minnewashta Lake	10000900	Kevin Zahler
Chanhassen, City of	Riley Lake	10000200	David Florenzano
Chanhassen, City of	St. Joe Lake	10001100	Linda Scott
Chanhassen, City of	Susan Lake	10001300	Chanhassen staff
CLFLWD	Birch Lake	13004200	CLFLWD staff
CLFLWD	Bone Lake	82005400	Tom Furey
CLFLWD	Comfort Lake	13005300	Wally Ostlie

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
CLFLWD	Forest Lake, site 1	82015900	Steve Schmaltz
CLFLWD	Forest Lake, site 2	82015900	Doug Joens
CLFLWD	Forest Lake, site 3	82015900	Justin Verke
CLFLWD	Keewahtin Lake	82008000	CLFLWD staff
CLFLWD	Little Comfort Lake	13005400	CLFLWD staff
CLFLWD	Moody Lake	13002300	Douglas Toavs, Amy Vislisel
CLFLWD	School Lake	13005700	CLFLWD staff
CLFLWD	Second Lake	13002500	Michael Eggert
CLFLWD	Shields Lake	82016200	CLFLWD staff
Eden Prairie, City of	Duck Lake	27006900	Eric Campbell
Eden Prairie, City of	Mitchell Lake	27007000	Debbie Olson, Douglas Olson
Eden Prairie, City of	Red Rock Lake	27007600	Dave Wallace
Eden Prairie, City of	Riley Lake	10000200	David Florenzano
Hastings, City of	Rebecca Lake	19000300	Hastings Environmental Protectors
Lakeville, City of	East Lake	19034900	Blue Water Science
Lakeville, City of	Lee Lake	19002900	Natalie Walker
Lakeville, City of	Marion Lake	19002601	Gabrielle Gallagher, Brian Gallagher
Lakeville, City of	Valley Lake	19034800	Blue Water Science
Lower Mississippi River WMO	Augusta Lake	19008100	Steve Treichel
Lower Mississippi River WMO	Dickman Lake	19004600	Lisa Povolny
Lower Mississippi River WMO	Pickrel Lake	19007900	Keegan Lund
Lower Mississippi River WMO	Schmitt Lake	19005200	Deb James
Lower Mississippi River WMO	Seidl Lake	19009500	Max Wallin
Lower Mississippi River WMO	Thompson Lake	19004800	Anne Pfankuch
Mendota Heights, City of	Lemay Lake	19008200	Julie Woolsey, Leslie Pilgrim, Scott Norling
Mendota Heights, City of	Rogers Lake	19008000	David Rossmiller
Nine Mile Creek WD	Bush Lake	27004700	Paul Erdmann, Elizabeth Erdmann
Nine Mile Creek WD	Minnetoga Lake	27008800	Holly Birkeland, Sig Birkeland
Nine Mile Creek WD	Penn Lake	27000400	Lisa McIntire
Prior Lake Spring Lake WD	Buck Lake	70006500	Steve Beckey
Prior Lake Spring Lake WD	Cates Lake	70001800	Paula Thomsen
Prior Lake Spring Lake WD	Crystal Lake	70006100	Scott Thulien

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Prior Lake Spring Lake WD	Fish Lake	70006900	Jon Haferman
Prior Lake Spring Lake WD	Haas Lake	70007800	Thomas Chaklos
Prior Lake Spring Lake WD	Little Prior Lake	70016900	PLSLWD staff
Prior Lake Spring Lake WD	Lower Prior Lake, site 2	70002600	Amy Card
Prior Lake Spring Lake WD	Sutton Lake	70009400	PLSLWD staff
Rice Cr WD	George Watch Lake	02000500	Wargo Nature Center
Rice Cr WD	Karth Lake	62007200	Andrew Elmquist, Renee Marino
Rice Cr WD	Little Johanna Lake	62005800	Fred Fox, Dave Short
Rice Cr WD	Long Lake	82013000	Kitty Francy-Payton
Rice Cr WD	Pine Tree Lake	82012200	Gene Berwald
Rice Cr WD	Sunset Lake	82015300	Diane Coderre, Bob Coderre
Rice Cr WD	Valentine Lake	62007100	Bob Kistler
Rice Cr WD	White Rock Lake	82007200	David Bluhm
Saint Louis Park, City of	Cobblecrest Lake	27005300	Jim Kellogg
Saint Louis Park, City of	Twin Lake	27065600	Eric Klingbeil
Scott County	Cedar Lake	70009100	LeighAnn Singleton
Scott County	McMahon Lake	70005000	Robert Weierke
Scott County	Thole Lake	70012001	Mark Vierling
Shakopee, City of	O'Dowd Lake	70009500	Maxine Hughes
Shingle Creek WMC	Eagle Lake	27011101	Patrice Carlson
Shingle Creek WMC	Magda Lake	27006500	Carolyn Dindorf
Shingle Creek WMC	Meadow Lake	27005700	Michelle Stano, Al Stano
Shingle Creek WMC	Pike Lake	27011102	Shari Lundstrom
Shingle Creek WMC	Schmidt Lake	27010200	Joel Scalzo
St Croix Basin Team	St. Croix Lake, site 1N	82000100	Jim Harper, Roberta Harper, Kent Johnson
St Croix Basin Team	St. Croix Lake, site 2	82000100	Jim Harper, Roberta Harper, Kent Johnson
St Croix Basin Team	St. Croix Lake, site 4	82000100	Jim Harper, Roberta Harper, Kent Johnson
St Croix Basin Team	St. Croix Lake, site 6	82000100	Jim Harper, Roberta Harper, Kent Johnson
St Croix Basin Team	St. Croix Lake, site 7	82000100	Mayme Johnson, Carpenter Nature Center
Sunfish Lake, City of	Hornbean Lake	19004700	Scott Spaeth
Sunfish Lake, City of	Horseshoe Lake	19005100	Jim Naves
Sunfish Lake, City of	Sunfish Lake	19005000	James Stowell
VBWD	DeMontreville Lake	82010100	Tom Bucher, Gary Fields

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
VBWD	Edith Lake	82000400	Joseph Reithmeyer, Joel Jensen
VBWD	Jane Lake	82010400	Sophia Meisterling
VBWD	Klawitter Pond	82036800	Pat Barrett, Bonnie Juran
VBWD	Long Lake	82011800	Frank Bastyr
VBWD	Olson Lake	82010300	Tom Bucher, Gary Fields
VBWD	Rest Area Pond	82051400	MnDOT staff
Woodbury, City of	Colby Lake	82009400	WCD staff
Woodbury, City of	Fish Lake	82009300	WCD staff
Woodbury, City of	La Lake	82009700	Tim Weber
Woodbury, City of	Markgrafs Lake	82008900	WCD staff
Woodbury, City of	Powers Lake	82009200	WCD staff
Woodbury, City of	Wilmes Lake	82009002	WCD staff
The following lakes are sponsored through a watershed district (WD) or watershed management organization (WMO) in partnership with the Washington Conservation District.			
Brown's Creek WD	Bass Lake	82012300	WCD staff
Brown's Creek WD	Bass Lake	82012400	WCD staff
Brown's Creek WD	Benz Lake	82012000	WCD staff
Brown's Creek WD	Brewer's Pond	82002200	Karen Richtman, Paul Richtman, WCD staff
Brown's Creek WD	Goggins Lake	82007700	WCD staff
Brown's Creek WD	Heifort's Pond	82048500	Steve Seeman, WCD staff
Brown's Creek WD	Jackson WMA	82030500	WCD staff
Brown's Creek WD	July Lake	82031800	WCD staff
Brown's Creek WD	Kismet Lake	82033400	WCD staff
Brown's Creek WD	Long Lake	82002100	WCD staff
Brown's Creek WD	Lynch Lake, site 1	82004200	WCD staff
Brown's Creek WD	Lynch Lake, site 2	82004200	WCD staff
Brown's Creek WD	Masterman Lake	82012600	WCD staff
Brown's Creek WD	North School Section Lake	82014900	WCD staff
Brown's Creek WD	Pat Lake	82012500	WCD staff
Brown's Creek WD	Plaisted Lake	82014800	WCD staff
Brown's Creek WD	South School Section Lake	82015100	WCD staff
Brown's Creek WD	Woodpile Lake	82013200	WCD staff
Carnelian-Marine-St. Croix WD	Big Carnelian Lake	82004900	WCD staff
Carnelian-Marine-St. Croix WD	Big Marine Lake	82005204	WCD staff

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Carnelian-Marine-St. Croix WD	Clear Lake	82004500	WCD staff
Carnelian-Marine-St. Croix WD	East Boot Lake	82003400	WCD staff
Carnelian-Marine-St. Croix WD	Fish Lake	82006400	WCD staff
Carnelian-Marine-St. Croix WD	Goose Lake	82005900	WCD staff
Carnelian-Marine-St. Croix WD	Hay Lake	82006500	WCD staff
Carnelian-Marine-St. Croix WD	Jellums Lake	82005202	WCD staff
Carnelian-Marine-St. Croix WD	Little Carnelian Lake	82001400	WCD staff
Carnelian-Marine-St. Croix WD	Long Lake	82003000	WCD staff
Carnelian-Marine-St. Croix WD	Long Lake	82006800	WCD staff
Carnelian-Marine-St. Croix WD	Mays Lake	82003300	WCD staff
Carnelian-Marine-St. Croix WD	Sand Lake	82006700	WCD staff
Carnelian-Marine-St. Croix WD	South Twin Lake	82001900	WCD staff
Carnelian-Marine-St. Croix WD	Square Lake	82004600	WCD staff
Carnelian-Marine-St. Croix WD	Terrapin Lake	82003100	WCD staff
Carnelian-Marine-St. Croix WD	Twin Lake	82004800	WCD staff
Carnelian-Marine-St. Croix WD	West Boot Lake	82004400	WCD staff
Middle St. Croix WMO	Lily Lake	82002300	WCD staff
Middle St. Croix WMO	McKusick Lake	82002000	WCD staff
Rice Creek WD	Lost Lake	82013401	WCD staff
South Washington WD	Armstrong Lake	82011602	WCD staff
South Washington WD	Bailey Lake	82045600	WCD staff
South Washington WD	O'Connors Lake	82000200	Jeff Keene
South Washington WD	Regional Park Lake	82008700	WCD staff
Valley Branch WD	Acorn Lake	82010200	WCD staff
Valley Branch WD	Beutel Pond	82039900	WCD staff
Valley Branch WD	Cloverdale Lake	82000900	WCD staff
Valley Branch WD	Downs Lake	82011000	WCD staff

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Valley Branch WD	Eagle Point Lake	82010900	WCD staff
Valley Branch WD	Echo Lake	82013500	WCD staff
Valley Branch WD	Friedrich's Pond	82010800	WCD staff
Valley Branch WD	Goetschel Lake	82031300	WCD staff
Valley Branch WD	Goose Lake, site 1	82011301	WCD staff
Valley Branch WD	Goose Lake, site 2	82011302	WCD staff
Valley Branch WD	Horseshoe Lake, site 3	82007400	WCD staff
Valley Branch WD	Klawitter Pond	82036800	WCD staff
Valley Branch WD	Legion Pond	82046200	WCD staff
Valley Branch WD	McDonald Lake	82001000	WCD staff
Valley Branch WD	Reid Park Pond	82046000	WCD staff
Valley Branch WD	Rose Lake, site 1	82011200	WCD staff
Valley Branch WD	Rose Lake, site 2	82011200	WCD staff
Valley Branch WD	Sunfish Lake	82010700	WCD staff
Valley Branch WD	Sunnybrook Lake	82013300	WCD staff
Valley Branch WD	West Lakeland Storage Site 2	NA	WCD staff

Appendix D

CAMP Quality Control Data 2021

Lake Name	DNR ID#	Date	Date	TP, ug/L	TP, ug/L	CLA, ug/L	CLA, ug/L	Secchi, m	Secchi , m	TKN, mg/L	TKN, mg/L
		MC QC	CAMP	MC QC	CAMP	MC QC	CAMP	MC QC	CAMP	MC QC	CAMP
Alimagnet	19002100	7/15/21	7/15/21	73	62	8	30	0.9	0.8	1.20	1.20
Cedar	70009100	7/2/21	7/4/21	73	103	16	32	1.2	0.8	1.10	1.20
Demontreville	82010100	7/30/21	8/3/21	14	54	6.9	2.1	3.1	2.5	0.64	0.57
Farquar	19002300	8/13/21	8/11/21	138	130	120	100	0.3	0.6	2.50	2.40
Fish	70006900	7/2/21	7/5/21	63	40	20	13	1.3	1.2	1.10	1.20
Goose	82005900	7/30/21	7/26/21	42	17	16	7.5	2.6	2.7	0.85	0.87
Jane	82010400	7/30/21	7/26/21	14	23	4.0	2.1	3.6	5.0	0.54	0.48
Lac Lavon	19044600	7/15/21	7/6/21	12	8.0	3.4	1.7	4.7	4.7	0.56	0.48
Olson	82010300	7/30/21	8/3/21	63	22	3.6	3.4	2.6	2.8	0.68	0.66
Sunset Pond	19045100	8/13/21	8/11/21	26	56	2.4	18	1.4 ¹	1.4 ²	0.79	0.89

MC QC = Metropolitan Council Quality Control monitoring

¹ Secchi disk visible on lake bottom at depth indicated

² Secchi disk visibility blocked by vegetation at depth indicated