2023 Study of the Water Quality of 159 Metropolitan Area Lakes

METROPOLITAN COUNCIL

November 2024

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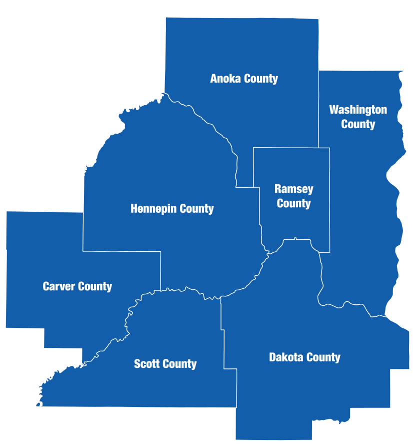

The Metropolitan Council is the regional planning organization for the seven-county Twin Cities area. The Council operates the regional bus and rail system, collects and treats wastewater, coordinates regional water resources, plans and helps fund regional parks, and administers federal funds that provide housing opportunities for low- and moderate-income individuals and families. The 17-member Council board is appointed by and serves at the pleasure of the governor.

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2023 Study of the Water Quality of 159 Metropolitan Area Lakes

Report by

Brian Johnson

Principal Environmental Scientist

Metropolitan Council Environmental Services

November 2024

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 Environmental Services division (Met Council) in the seven-county Twin Cities metro region (region). The Met Council has collected water quality data on area lakes since 1980. This report contains data from a total of 171 lake sites on 159 lakes monitored in 2023. The monitoring program in 2023 included 1 lake and 1 newly established lake site not previously monitored by the Council. There are 950 lakes in the region. The Met Council 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.

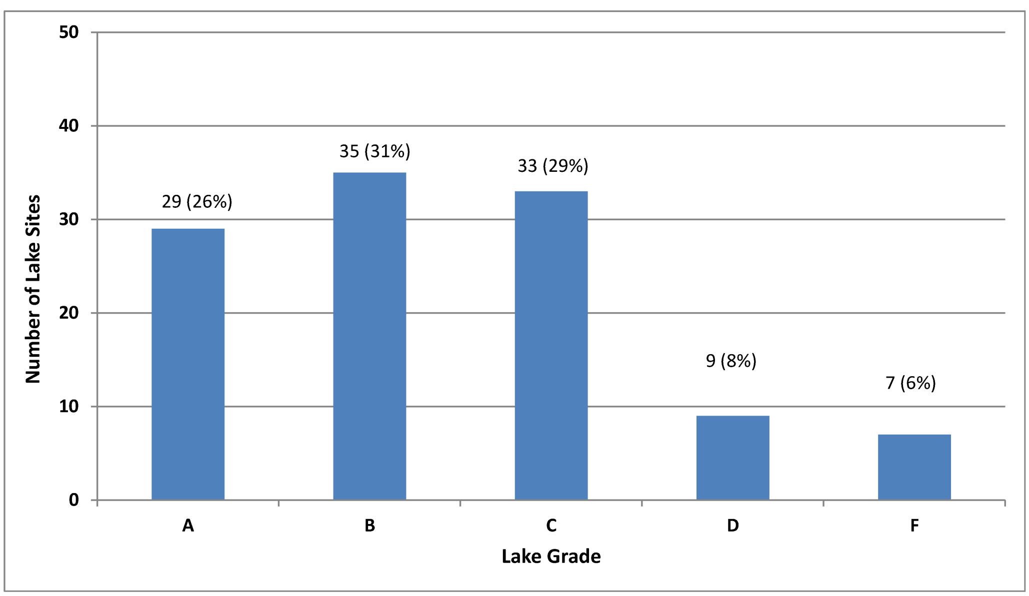
To date, the Met Council's lake monitoring program (including monitoring by Met Council staff and volunteers) has provided an important tool for making informed lake management decisions. Data from our regional lake monitoring program are frequently used to determine possible trends in lake water quality,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

The objectives of this program are:

1. Provide the Met Council 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 Met Council's A - F grading system.

The year 2023 marked the 31st 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 Met Council's analytical laboratory located at the Metropolitan Wastewater Treatment Plant in St. Paul, MN. CAMP volunteers are sponsored by a local partner. In 2023, there were 28 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 2023 is shown in the following figure.



Lake Grades for the 2023 Monitoring Season

In 2023, for those lake sites with sufficient data to calculate a lake grade, about 29% of the lake sites received a lake grade of C. The water quality of these sites is considered about average as compared to other lakes in the region. Fifty seven percent the lake sites received a grade of “A” or “B”, meaning that they had relatively good water quality. The remaining 14% of lake sites received a water quality grade of “D” or “F”, meaning that they had relatively poor water quality.

Since 1980, 411 lakes have been monitored in the region through the Met Council’s lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 454 lake sites have been monitored. The data from the Met Council’s lake monitoring program are stored in the Met Council’s Environmental Information Mangement System (EIMS) and the Minnesota Pollution Control Agency’s Environmental Quality Information System (EQuIS). Data for all Met Council lake monitoring sites can be conveniently retrieved via the Met Council’s web-based EIMS, at: http://es.metc.state.mn.us/eims/. While the Met Council 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 Met Council should consider monitoring in the future, please contact Brian Johnson of the Met 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 31 years of service

31 years of service
Diane Coderre – Sunset Lake

30 years of service
Washington CD staff – multiple lakes

28 years of service
Wargo Nature Center – George Watch Lake

23 years of service
Gene Berwald – Pine Tree Lake
Lakeville staff
Tom Goodwin – Orchard Lake

22 years of service
Bob Coderre – Sunset Lake

21 years of service
Bonnie Juran – Klawitter Pond

20 years service
David Florenzano – Riley Lake

19 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

18 years of service
David Bluhm – White Rock Lake
Minnesota DOT staff – Rest Area Pond

17 years of service
Jim Nayes – sample pickups and monitoring kit deliveries — City of Sunfish Lake
Dan Stanek – Scout Lake

11 to 16 years of service

16 years of service
John Burton — Wing Lake

15 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

14 years of service
Fred Fox – Little Johanna Lake
James Stowell – Sunfish Lake

13 years of service
Pat Barrett – Klawitter Lake
Paul Erdmann – Bush Lake
Lisa McIntire – Penn Lake

12 years of service
Joe Tranchilla– Crystal Lake

11 years service
Thomas Chaklos – Haas Lake
Andrew Elmquist – Karth Lake
Elizabeth Erdmann – Bush Lake
Barrie Froseth – Lost Lake
Bob Kistler – Valentine Lake

__6 to 10 years of service__

__10 years service__
Steve Beckey – Buck Lake
Bernie DeMaster – Twin Lake
Scott Spaeth – Hornbeam Lake

__9 years service__
Holly Birkeland – Lake Minnetoga
Chanhassen staff – Susan Lake
Hastings Environmental Protectors – Lake Rebecca
Doug Joens – Forest Lake
Joan Kettelkamp – Long Lake
David Parker – Parkers Lake
Mark Vierling – Thole Lake

__8 years service__
Brian & Gabrielle Gallagher – Lake Marion

__7 years service__
Amy Baudler – Sweeney Lake
Jennel Bilek – Twin Lake
Sig Birkeland – Minnetoga Lake
Paula Thomsen – Cates Lake
David Wallace – Red Rock Lake
Robert Weierke – McMahon Lake
Kevin Zahler – St. Joe Lake

__6 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 – Little Prior Lake

__3 to 5 years of service__

__5 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
Max Wallin – Seidl Lake

__4 years service__
Burnsville staff – Earley Lake
Amy Card — Lower Prior Lake
Comfort Lake — Forest Lake WD staff — multiple lakes
Maxine Hughes — Lake O'Dowd
Debra James — Schmitt Lake
Randy Mikolai — Medicine Lake
Lisa Povolny — Dickman Lake
Denny Strunc — Medicine Lake
Scott Thulien — Crystal Lake
Natalie Walker — Lee Lake

__3 years service__
Tom Furey – Bone Lake
Dan Jones – Cavanaugh Lake
Renee Marino – Karth Lake
Scott Norling – Lemay Lake
Steve Seeman – Heifort's Pond
Michelle Stano – Meadow Lake
Amy Vislisel – Moody Lake

Met Council Staff

- Met Council Water Resources staff for assistance with lake monitoring and the CAMP.
- Henry McCarthy for creation of the lake maps.
- The Met Council's Laboratory Services section, for laboratory analysis of the lake samples.
- The Met Council's Electronic Lake Monitoring Report Team for the continued improvement of the automation of the annual lake report.

Contents

Introduction

This 2023 report continues a series of annual lake reports from 1980 to present. Since 1980, 411 lakes in the Twin Cities seven-county metropolitan region (region) have been monitored through the Metropolitan Council Environmental Service's (Met Council) lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 454 lake sites have been monitored. This report contains data from 171 lake sites on 159 lakes that were monitored in 2023, including 1 lakes and 1 lake sites that have not been previously monitored by the Met Council lake monitoring program. Figure 1 shows the location of the lakes monitored in 2023by volunteers of the Citizen-Assisted Monitoring Program. A list of lakes that have been monitored by the Met Council's monitoring program is shown in Appendix A. Refer to Appendix B for morphometry and other lake characteristic data.

There are 950 lakes in the region. The Met Council 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.

Met Council lake monitoring data are available via:

- the Met Council'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 Met Council lake monitoring program are:

1. Provide the Met Council 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 Met Council's A - F grading system.

The long-term goal of the Met Council 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 Met Council has provided a commendable lake monitoring program, monitoring by other organizations is also encouraged (Osgood 1989a).

To date, the Met Council 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 Met Council 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 Met Council addressed this lack of adequate lake water quality data by initiating the 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 Met Council'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.

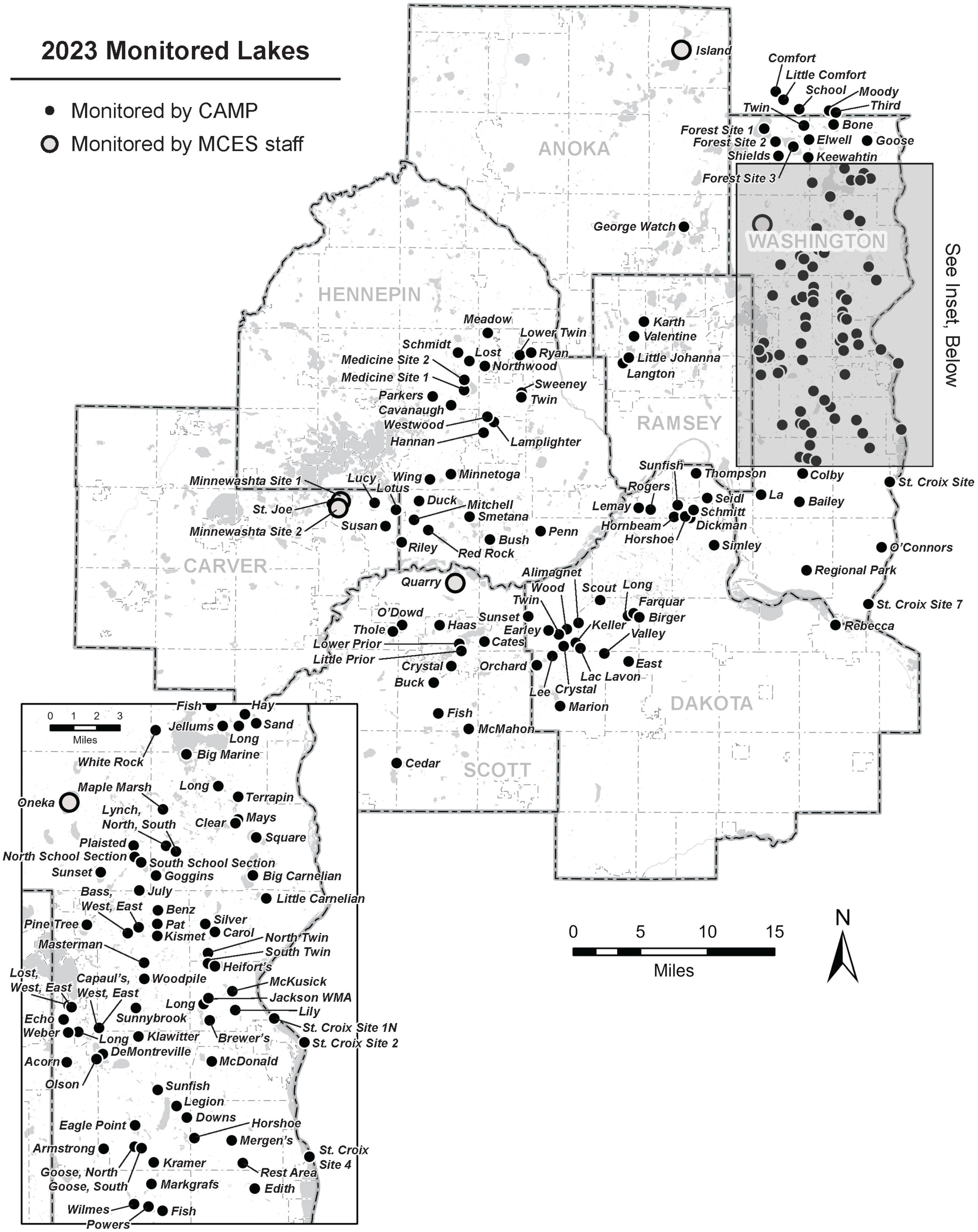


Figure 1. 2023 Monitored Lakes

Metropolitan Council Staff Lake Monitoring Program

Met Council staff monitored 5 sites on 4 lakes in 2023.

- Island Lake (Anoka County)
- Lake Minnewashta, 2 sites
- Oneka Lake
- Quarry Lake

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

Methods

Met 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 vertical Van Dorn—type 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 mainly at the Met Council Environmental Services laboratory.

However, in the fall of 2023 the Met Council laboratory was investigating repeated reporting level check standard failures and discovered that the method detection Limit (MDL) and reporting limit (RL) for a revised low-level phosphorus method implemented 6/1/2023 were calculated incorrectly. The MDL calculation did not include all the data that it should, resulting in an erroneously low MDL/RL. As a result, the MDL and RL for the Met Council laboratory's low-level phosphorus method needed to be raised – the MDL was raised from 0.005 mg/L to 0.022 mg/L and the RL raised from 0.01 mg/L to 0.05 mg/L. Samples that were not yet analyzed by the Met Council laboratory were sent to a contract lab accredited by MDH to perform total phosphorus analysis to obtain results with an RL of ~0.010 mg/L (sample volume dependent). Total phosphorus data from samples analyzed by the Met Council lab in 2023 were reported with the updated MDL/RL. Due to volume limitations, only total phosphorus was obtained on the samples sent to the contract lab, meaning no total Kjeldahl nitrogen analyses were performed on these samples.

The MCES Lab has performed a corrective action assessment and instituted corrective measures to ensure similar situations of incorrectly determined MDLs do not occur in the future. Also, the MCES Lab began work on developing a new low-level total phosphorus method utilizing EPA 365.1 which is the industry standard for labs performing low-level phosphorus work. The MCES Lab will have this method implemented/certified for analysis of samples collected during the 2024 monitoring season.

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
Metals: Calcium, Magnesium, and Iron	U.S. EPA, Method 200.8, Revision 5.4
Nitrate/Nitrite	U.S. EPA, Method 353.2, Rev. 2.0
Organic Carbon, Total	Standard Methods for the Examination of Water and Wastewater, Method 5310 C-2014.
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 (Met Council laboratory) or U. S. EPA Method 365.1 (lab contracted to the Met Council lab)
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 2023 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 Met Council's Environmental Information Management System (EIMS) at http://es.metc.state.mn.us/eims/ to access this additional data.

Any questions about the 2023 Met Council lake monitoring data should be directed to Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Island Lake [site 2] (02–0022) *Metropolitan Council Environmental Services*

Island Lake is located in Linwood Township (Anoka County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) The lake has a surface area of 67 acres and a maximum depth of 6.7 m (22 feet). Roughly 87 percent of the lake's surface area is considered littoral zone, which is the zone of aquatic plant dominance. Site 2 is located over the deepest spot of the lake. The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2022.

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, 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	~22	35	B
CLA (µg/l))	16	9.3	37	B
Secchi (m)	1.7	1.1	2.1	C
TKN (mg/l)	0.80	0.67	0.96	
			Lake Grade	B

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods section of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of 23 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

This was the first year Site 2 was monitored by the Met Council lake monitoring program, and received a lake grade of B.. Site 1, located in the central area of the lake, was previously monitored by the CAMP and typically received lake grades in the B to C range.

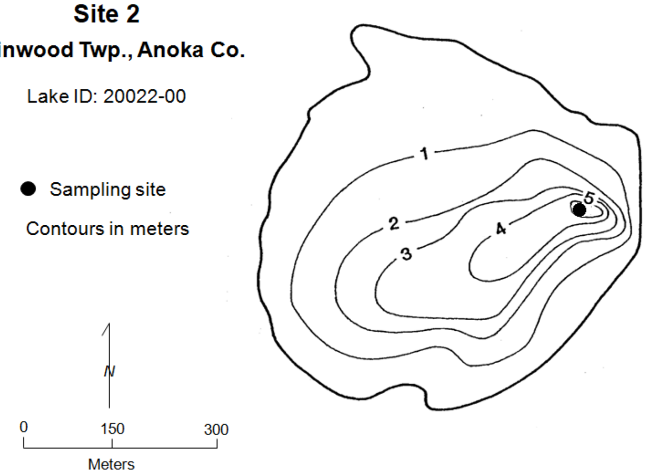
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

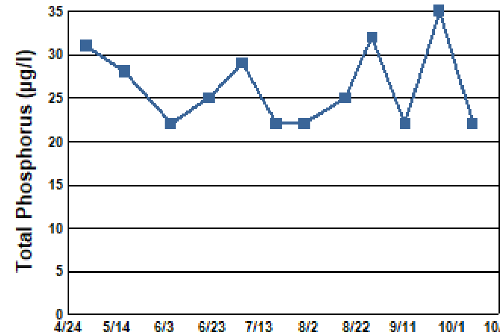
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

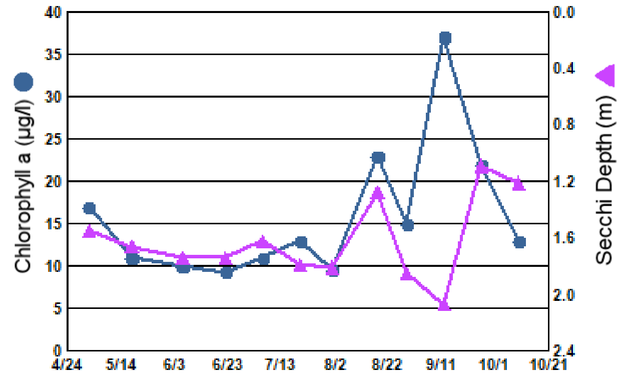
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Island Lake
Site 2
Linwood Twp., Anoka Co.

Lake ID: 20022-00

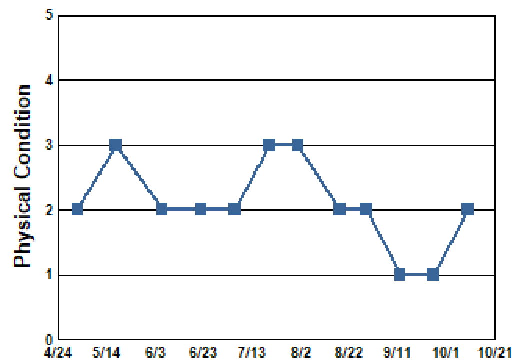




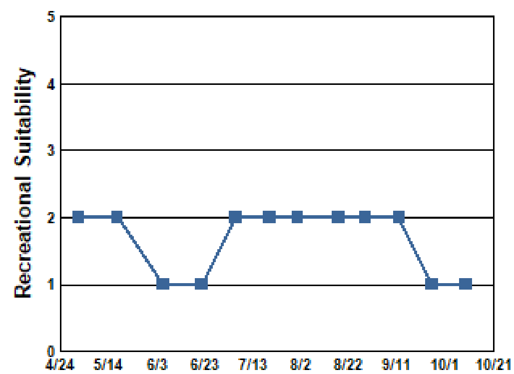


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	8.3	11.3	17	~31	1.6	2	2
05/18/23	17.9	9.1	11	~28	1.7	3	2
06/06/23	25.4	7.7	10	~22	1.7	2	1
06/22/23	26.6	8.3	9.3	~25	1.7	2	1
07/06/23	25.4	6.5	11	~29	1.6	2	2
07/20/23	23.1	7.7	13	<22	1.8	3	2
08/01/23	25.8	7.8	9.6	<22	1.8	3	2
08/18/23	22.3	7.5	23	~25	1.3	2	2
08/29/23	23.5	7.9	15	~32	1.9	2	2
09/12/23	20.0	6.9	37	<22	2.1	1	2
09/26/23	19.4	6.7	22	35	1.1	1	1
10/10/23	14.1	8.0	13	22	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

Minnewashta Lake [Site-1] (10–0009) *Metropolitan Council Environmental Services*

Minnewashta Lake is located in the city of Chanhassen (Carver County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) . 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 and aquatic life (fish bioassessments) in 2024.. 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 and near-bottom 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, 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 and near bottom sample results, please refer to the METC's EIMS system at https://eims.metc.state.mn.us.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	<22	<44	A or B
CLA (µg/l))	6.0	1.0	29	A
Secchi (m)	5.1	3.8	7.5	A
TKN (mg/l)	0.64	0.55	0.70	
			Lake Grade	A

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 16 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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/.

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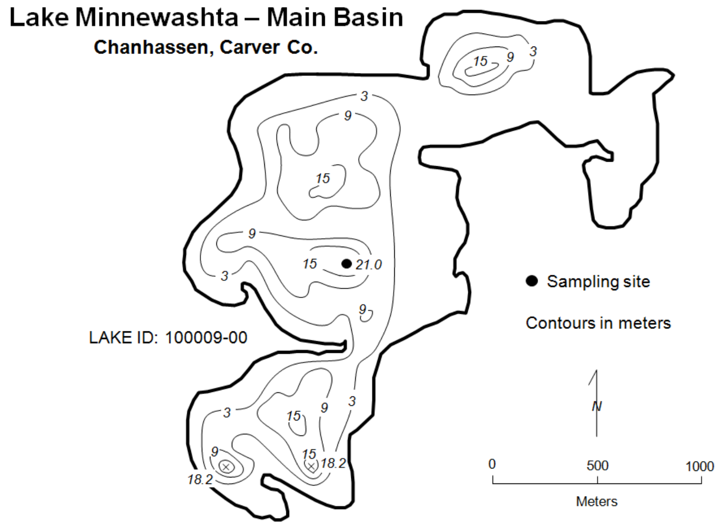
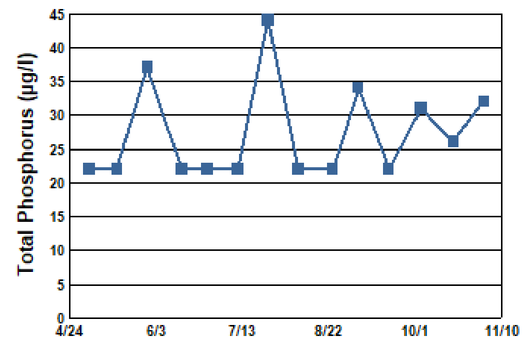
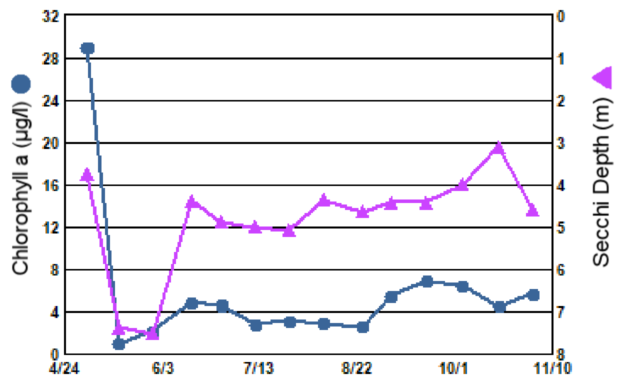
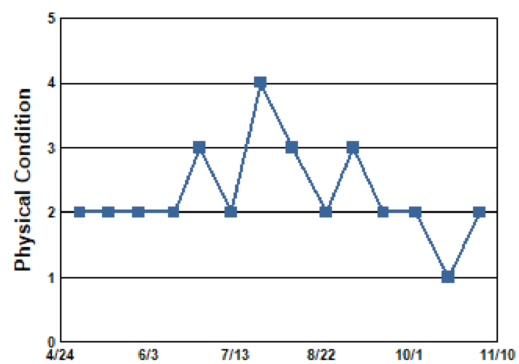




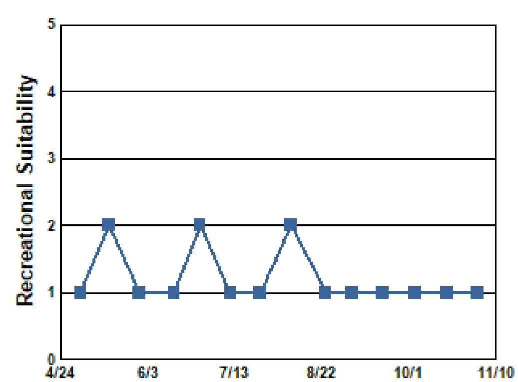
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	9.7	12.3	29	<22	3.8	2	1
05/16/23	17.5	9.8	1.0	<22	7.4	2	2
05/30/23	20.9	9.6	2.2	~37	7.5	2	1
06/15/23	22.9	8.3	4.9	<22	4.4	2	1
06/27/23	24.6	8.5	4.6	<22	4.9	3	2
07/11/23	24.1	8.4	2.8	<22	5.0	2	1
07/25/23	25.7	9.1	3.1	<44	5.1	4	1
08/08/23	26.4	8.4	2.9	~22	4.4	3	2
08/24/23	26.4	8.6	2.6	<22	4.6	2	1
09/05/23	24.2	8.2	5.5	34	4.4	3	1
09/19/23	19.9	8.4	6.9	<22	4.4	2	1
10/04/23	20.4	8.5	6.5	31	4.0	2	1
10/19/23	13.0	8.7	4.5	26	3.1	1	1
11/02/23	8.2	10.2	5.7	32	4.6	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					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	2022	2023
TP			A	A	A	A	A	
CLA			A	A	A	A	A	A
Secchi			C	B	B	A	A	A
Lake Grade			**B**	**A**	**A**	**A**	**A**	**A**

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

Minnewashta Lake [Site-2, South Bay] (10–0009) *Metropolitan Council Environmental Services*

Minnewashta Lake is located in the city of Chanhassen (Carver County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) 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 and aquatic life (fish bioassessments) in 2024. 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 and near-bottom 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, 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 and near bottom sample results, please refer to the METC's EIMS system at https://eims.metc.state.mn.us.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	<22	~30	A
CLA (µg/l))	4.0	1.3	6.5	A
Secchi (m)	4.8	3.4	7.4	A
TKN (mg/l)	0.64	0.60	0.74	
			Lake Grade	A

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. The mean value indicated in the Data Summary table is very close to the A/B grade breakpoint (within about 1 ug/L) so the maximum mean may likely be less than the grade breakpoint. A simple test was given to evaluate this possibility. The test consists of replacing the TP results that were reported below the RL/MDL with the highest possible value below the RL or MDL. For examples, < 22 ug/L was replaced with 21 ug/L, < 25 ug/l replaced with 24 ug/L. The TP summer-time mean was recalculated with these revised values. This revised mean was calculated to be 22 ug/L, and this translates to a TP grade of A. Site 2 received a lake grade of A which is similar to water quality observed in 2011 and an improvement over the B grades received since then. 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/.

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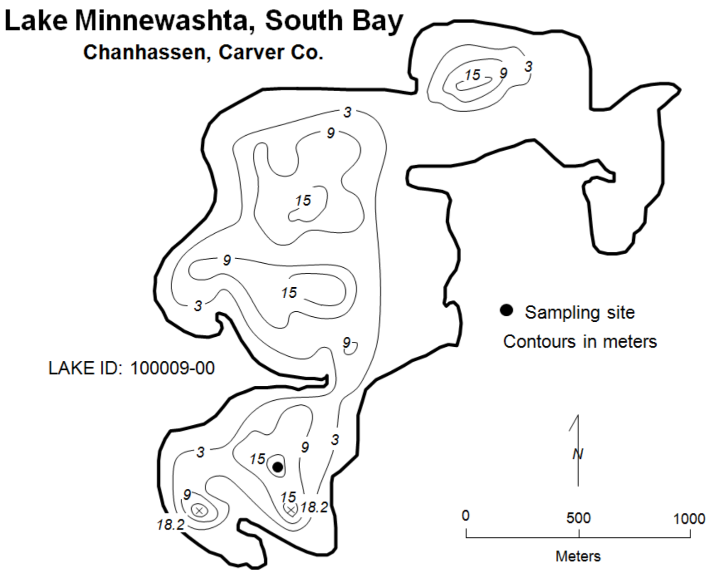

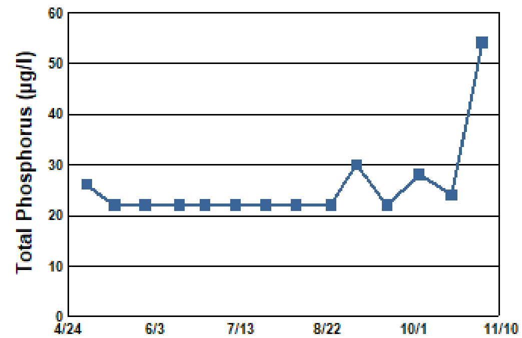

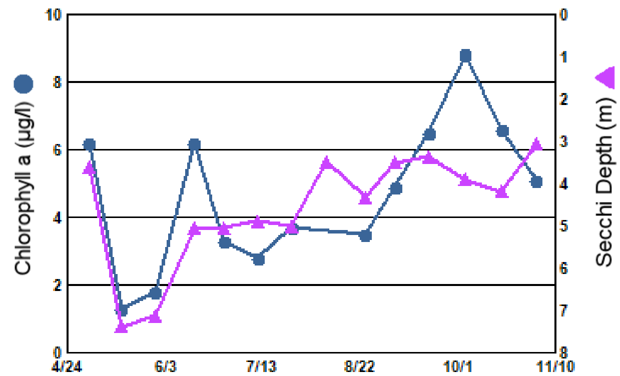

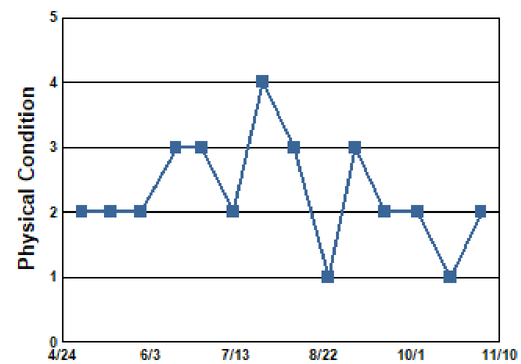

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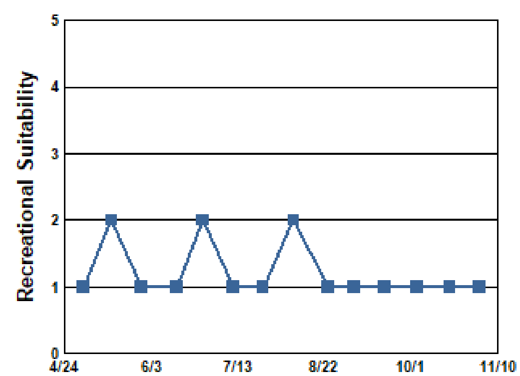
5 = Severe Algal Bloom



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

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	9.8	11.9	6.2	~26	3.6	2	1
05/16/23	17.8	9.7	1.3	<22	7.4	2	2
05/30/23	20.9	9.5	1.8	<22	7.1	2	1
06/15/23	23.2	9.2	6.2	<22	5.1	3	1
06/27/23	24.9	8.6	3.3	<22	5.1	3	2
07/11/23	24.1	8.3	2.8	<22	4.9	2	1
07/25/23	25.7	9.4	3.7	<22	5.0	4	1
08/08/23	26.6	8.7		<22	3.5	3	2
08/24/23	26.4	8.7	3.5	<22	4.3	1	1
09/05/23	24.1	8.3	4.9	~30	3.5	3	1
09/19/23	19.9	8.5	6.5	<22	3.4	2	1
10/04/23	20.3	8.5	8.8	28	3.9	2	1
10/19/23	12.8	8.6	6.6	24	4.2	1	1
11/02/23	8.3	9.2	5.1	54	3.1	2	1

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
Lake Grade												

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

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	B	A						A
CLA	B	A						A
Secchi	C	C						A
Lake Grade	**B**	**B**						**A**

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

Oneka Lake (82–0140) *Metropolitan Council Environmental Services*

Oneka Lake is located in the City of Hugo (Washingon County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) The lake has a surface area of 381 acres, and a maximum depth of 2.1 (6.9 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, total dissolved phosphorus, total Kjeldahl nitrogen, chlorophyll, and other parameters. Secchi transparency was measured, and depth profiles of dissolved oxygen, temperature, pH, specific conductivity, 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	<22	<50	A or B
CLA (µg/l))	4.6	2.0	13	A
Secchi (m)	+1.1	>0.9	+1.4	
TKN (mg/l)	1.08	0.85	1.37	
			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 TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 16 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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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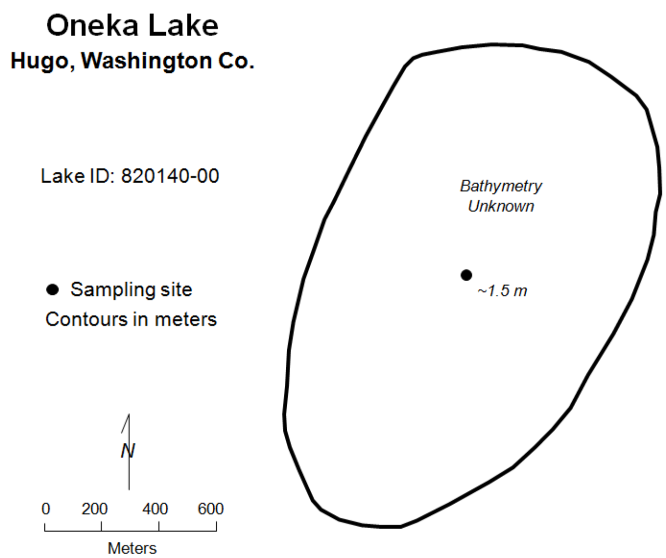
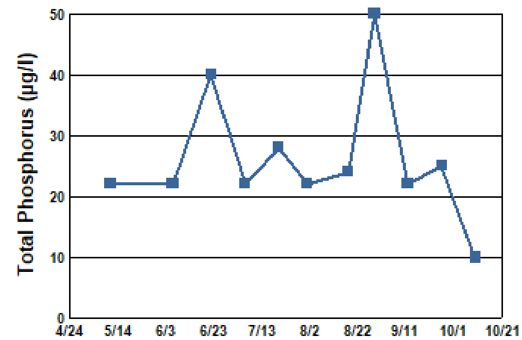
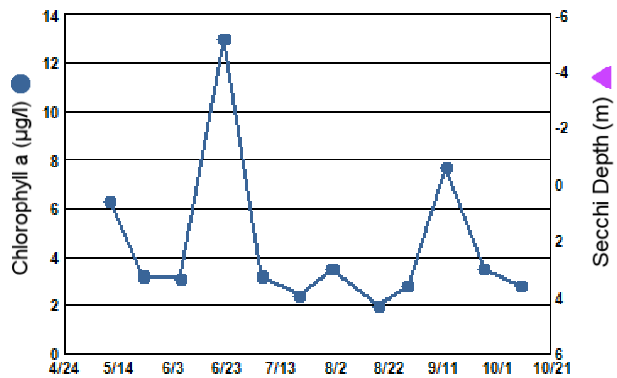


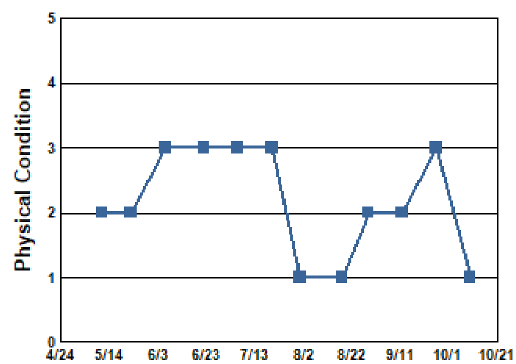
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/11/23	19.9	10.0	6.3	<22	+1.3	2	3
05/23/23	21.0	10.3	3.2		+1.4	2	2
06/06/23	25.6	7.6	3.1	<22	+1.3	3	4
06/22/23	27.2	8.2	13	~40	+1.2	3	2
07/06/23	24.3	6.8	3.2	<22	>1.2	3	4
07/20/23	22.9	8.1	2.4	~28	>1.1	3	3
08/01/23	26.0	8.6	3.5	<22	+1.0	1	2
08/18/23	20.8	8.3	2.0	~24	>1.0	1	1
08/29/23	23.4	9.2	2.8	<50	>0.9	2	2
09/12/23	18.7	9.0	7.7	<22	>1.1	2	3
09/26/23	18.2	7.0	3.5	<25	>1.0	3	4
10/10/23	10.4	10.5	2.8	<10	>1.0	1	3

+ 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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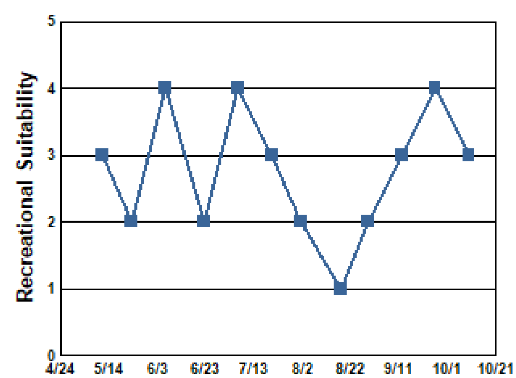

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		A	A	A				
CLA		A	B	A				A
Secchi								
Lake Grade								

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

Quarry Lake (70–0343) *Metropolitan Council Environmental Services*

Quarry Lake is located in the city of Shakopee (Scott County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) The lake is a former quarry and is managed as a trout fishery by the Minnesota DNR.

The MN DNR designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) in 2016.

On each sampling day surface samples and near-bottom 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, 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 and near bottom sample results, please refer to the METC's EIMS system at https://eims.metc.state.mn.us.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	<22	30	A
CLA (µg/l))	2.0	1.2	4.2	A
Secchi (m)	4.5	1.7	6.0	A
TKN (mg/l)	0.41	0.35	0.53	
			Lake Grade	A

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. The mean value indicated in the Data Summary table is very close to the A/B grade breakpoint (within about 1 ug/L) so the maximum mean may likely be less than the grade breakpoint. A simple test was given to evaluate this possibility. The test consists of replacing the TP results that were reported below the RL/ MDL with the highest possible value below the RL or MDL. For examples, < 22 ug/L was replaced with 21 ug/L, < 25 ug/l replaced with 24 ug/L. The TP summer-time mean was recalculated with these revised values. This revised mean was calculated to be 22 ug/L, and this translates to a TP grade of A.

The lake received a lake grade of A. 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/.

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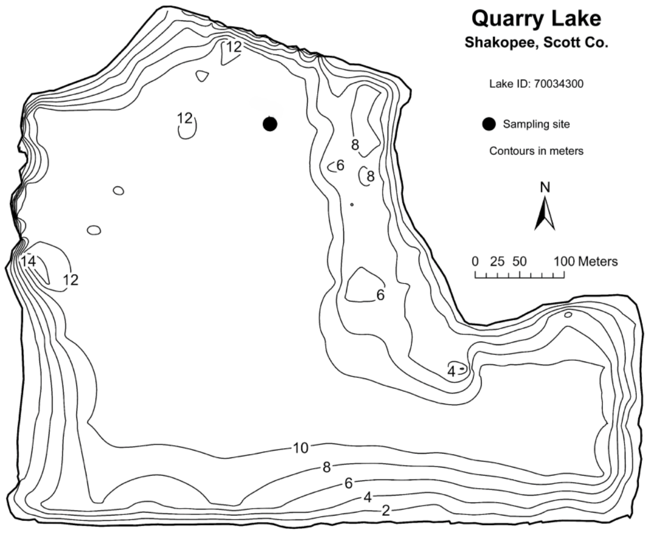
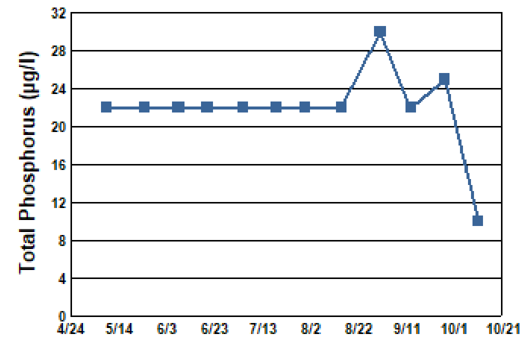
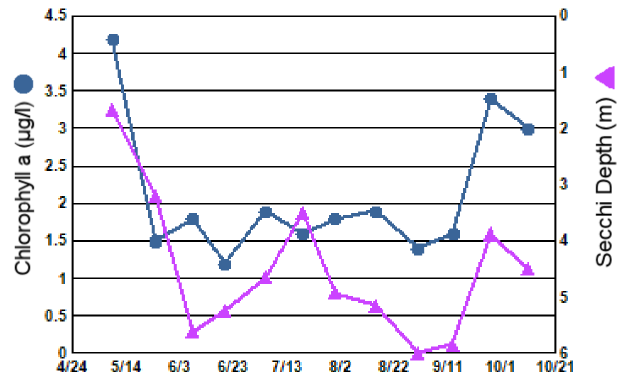
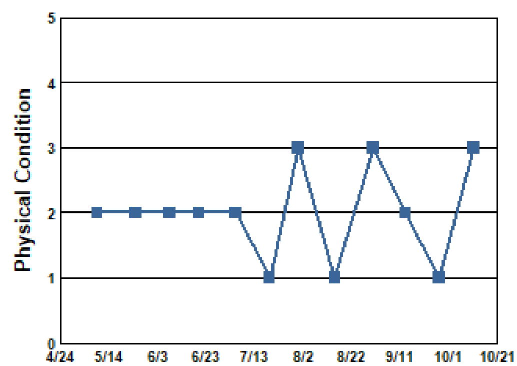






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/09/23	15.7	10.8	4.2	<22	1.7	2	1
05/25/23	19.2	9.3	1.5	<22	3.2	2	1
06/08/23	24.4	8.4	1.8	<22	5.6	2	1
06/20/23	24.5	8.5	1.2	<22	5.2	2	1
07/05/23	26.3	8.6	1.9	<22	4.7	2	1
07/19/23	23.5	8.8	1.6	<22	3.5	1	1
07/31/23	26.5	8.4	1.8	<22	4.9	3	2
08/15/23	24.5	8.7	1.9	<22	5.2	1	1
08/31/23	24.8	8.5	1.4	30	6.0	3	1
09/13/23	22.0	8.9	1.6	<22	5.8	2	1
09/27/23	20.8	8.8	3.4	<25	3.9	1	1
10/11/23	17	9.1	3.0	10	4.5	3	1



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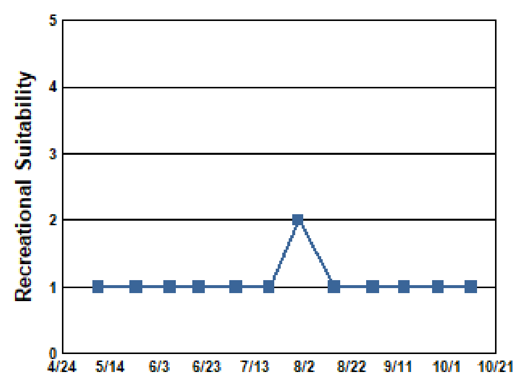
5 = Severe Algal Bloom



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

Citizen-Assisted Monitoring Program

Topics Covered in this Chapter

The following section describes an overview of the Citizen-Assisted Monitoring Program (CAMP), methods, and results.

CAMP Overview

The CAMP began 1993. The CAMP monitored 166 lake-sites on 155 lakes in 2023, including 3 lakes that have not been previously monitored by the Met Council (Figure 1). The CAMP is jointly funded by the Met Council 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 Met Council conducted a pilot study in 1991 to assure that the data collection methods used by 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 Met Council 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 2023, 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 Met Council staff and then analyzed at the Met Council laboratory in St. Paul, MN.

Acknowledgments

The successful performance of the 2023 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 including 12 cities, 14 watershed management organizations and watershed districts, 1 county, and 1 conservation district. Without their support, 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 2023 CAMP volunteers is shown in Appendix C. The Met Council 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 Met Council assisted with the search; however, the belief is 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 interested residents 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 monitoring form, either on an electronic form using Survey123 app or a paper form (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 monitoring form.

A 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. 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.** A chlorophyll sample from the volunteer's jug was 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 nominal 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 monitoring form 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 Met Council 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: ______________________ Site #: ________

DNR ID#: ______________________

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 <u>one</u> 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)

ver. 2014

Figure 2. CAMP Monitoring Form

Laboratory Analytical Methods

The chemical analyses of CAMP samples were performed at the Met Council laboratory according to the methods shown in Table 1. As discussed in the Met Council Staff Monitoring Program Methods section, and repeated here, in the fall of 2023 the Met Council laboratory was investigating repeated Reporting Level check standard failures and discovered that the Method Detection Limit (MDL) and Reporting Limit (RL) for a revised low-level phosphorus implemented 6/1/2023 were calculated incorrectly. The MDL calculation did not include all the data that it should, resulting in an erroneously low MDL/RL. As a result, the MDL and RL of the low-level phosphorus method needed to be raised – the MDL raised from 0.005 mg/L to 0.022 mg/L and RL raised from 0.01 mg/L to 0.05 mg/L. Samples that were not yet analyzed by the Met Council laboratory were sent to a contract lab accredited by MDH to perform total phosphorus analysis to obtain results with a RL of ~0.010 mg/L (sample volume dependent). Total phosphorus data from samples analyzed by the Met Council lab in 2023 were reported with the updated MDL/RL. Due to volume limitations, only total phosphorus was obtained on the samples sent to the contract lab, meaning no total Kjeldahl nitrogen analyses were performed on these samples.

The MCES Lab has performed a corrective action assessment and instituted corrective measures to ensure similar situations of incorrectly determined MDLs do not occur in the future. Also, the MCES Lab began work on developing a new low-level total phosphorus method utilizing EPA 365.1 which is the industry standard for labs performing low-level phosphorus work. The MCES Lab will have this method implemented/certified for analysis of samples collected during the 2024 monitoring season.

CAMP samples were typically analyzed just for TP 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 Met Council'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 ($MgCO_3$). 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' monitoring forms and the analytical results from the Met Council 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, Met Council staff contacted the volunteer. The Met Council maintained contact with most volunteers throughout the season by telephone, email, 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 Met Council 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 Met Council staff prior to submitting the samples to the Met Council 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 Met Council laboratory. The data are reviewed for outliers and other inconsistencies. Data that are determined to be suspect are qualified (i.e. flagged) as such in the database. Data determined to be erroneous are censored.

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.

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A Met Council 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 Met Council 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 Met Council 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 Met Council 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.

There were 7 QC monitoring events on 7 lake sites in 2023. A maximum of a 4 day difference between a QC monitoring event and an associated CAMP volunteer monitoring event was selected as the criterion for determining time comparable events and in an attempt to reduce variability in water quality due to large time differences between QC monitoring and CAMP volunteer monitoring events. A 4 day difference was also chosen because it would cover the span of one scheduled CAMP monitoring week (Monday through Sunday); for example, assuming the QC monitoring event occurred on a Thursday or Friday, the associated CAMP volunteer monitoring event would fall within the 4 day difference whether the CAMP volunteer monitoring event occurred as early as the beginning of the monitoring week (Monday) or as late as the end of it (Sunday). Given this criterion, all of the QC monitoring and volunteer monitoring events were within this time window. The QC monitoring data and associated volunteer monitoring data are shown in Table 2. Total Kjeldahl Nitrogen (TKN) analysis was not performed in 2023 as previously discussed in the methods section of this report.

Table 2. CAMP Quality Control Data 2023

Lake Name	DNR ID#	Date	Date	TP, µg/L	TP, µg/L	CLA, µg/L	CLA, µg/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
Big Carnelian	82004900	10/16/23	10/16/23	15	24	6.2	6.9	4.8	4.6	NA	NA
Little Johanna	62005800	10/3/23	10/3/23	64	68	34	21	1.3	1.3	NA	NA
Marion	19002601	10/9/23	10/9/23	18	18	8.6	6.9	2.3	2.4	NA	NA
McMahon	70005000	9/21/23	9/21/23	86	92	48	43	0.8	0.8	NA	NA
Sunfish	19005000	10/2/23	10/2/23	< 10	12	4.9	4.7	4.6	4.6	NA	NA
Valentine	62007100	9/19/23	9/19/23	90	62	12	15	1.5	1.7	NA	NA
Valley	19034800	9/19/23	9/19/23	48	84	60	68	0.7	0.0.8	NA	NA

MC QC = Met Council Quality Control monitoring; CAMP = volunteer monitoring; NA = Not analyzed

Linear regression analysis was performed on the TP, CLA, and Secchi results (Figures 3, 4, and 5, respectively) to compare Met Council quality control data and CAMP volunteer data. The regression line for the TP results shows a slope close to a 1:1 relationship with an R^2 value of 0.722 (Figure 3), indicative of some variability about the regression line at higher TP concentrations , particularly with the results from Valentine and Valley lakes. Met Council staff did not notice deviations in sample collection methodology by the CAMP volunteers, so the variability is likely related to in-lake TP concentration variability and laboratory analytical variability. The CLA results also followed closely a 1:1 relationship but with a less variability as indicated by an R^2 value of 0.922 (Figure 4). The Secchi depth regression line (Figure 5) showed a high R^2 value of 0.996 and a very close 1:1 relationship indicating very good agreement between Met Council and CAMP volunteer Secchi depths. The 2023 CAMP quality control analysis shows reasonably good agreement between QC and CAMP volunteer monitoring results.

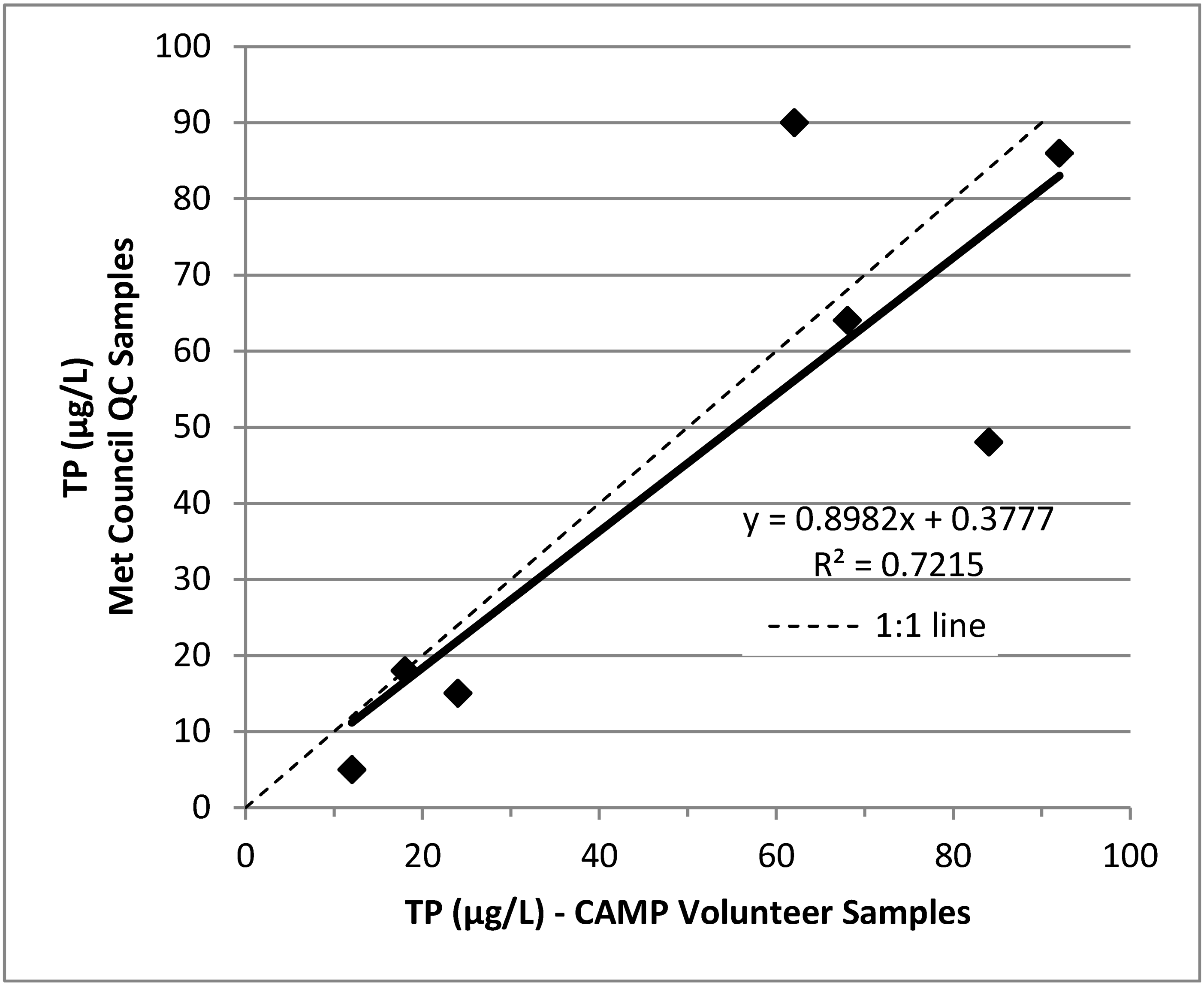


Figure 3. Total Phosphorus Quality Control Data

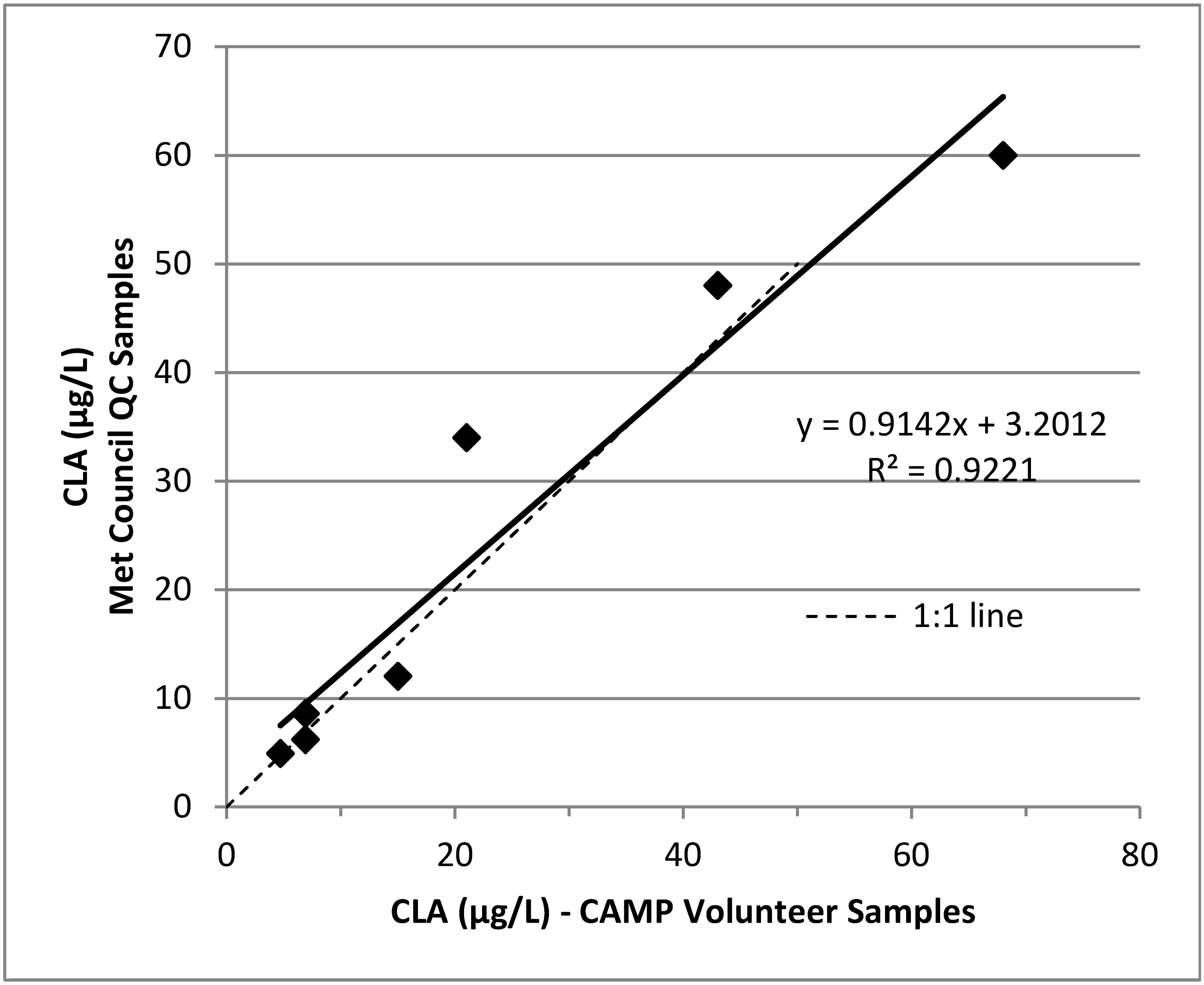


Figure 4. Chlorophyll-a Quality Control Data

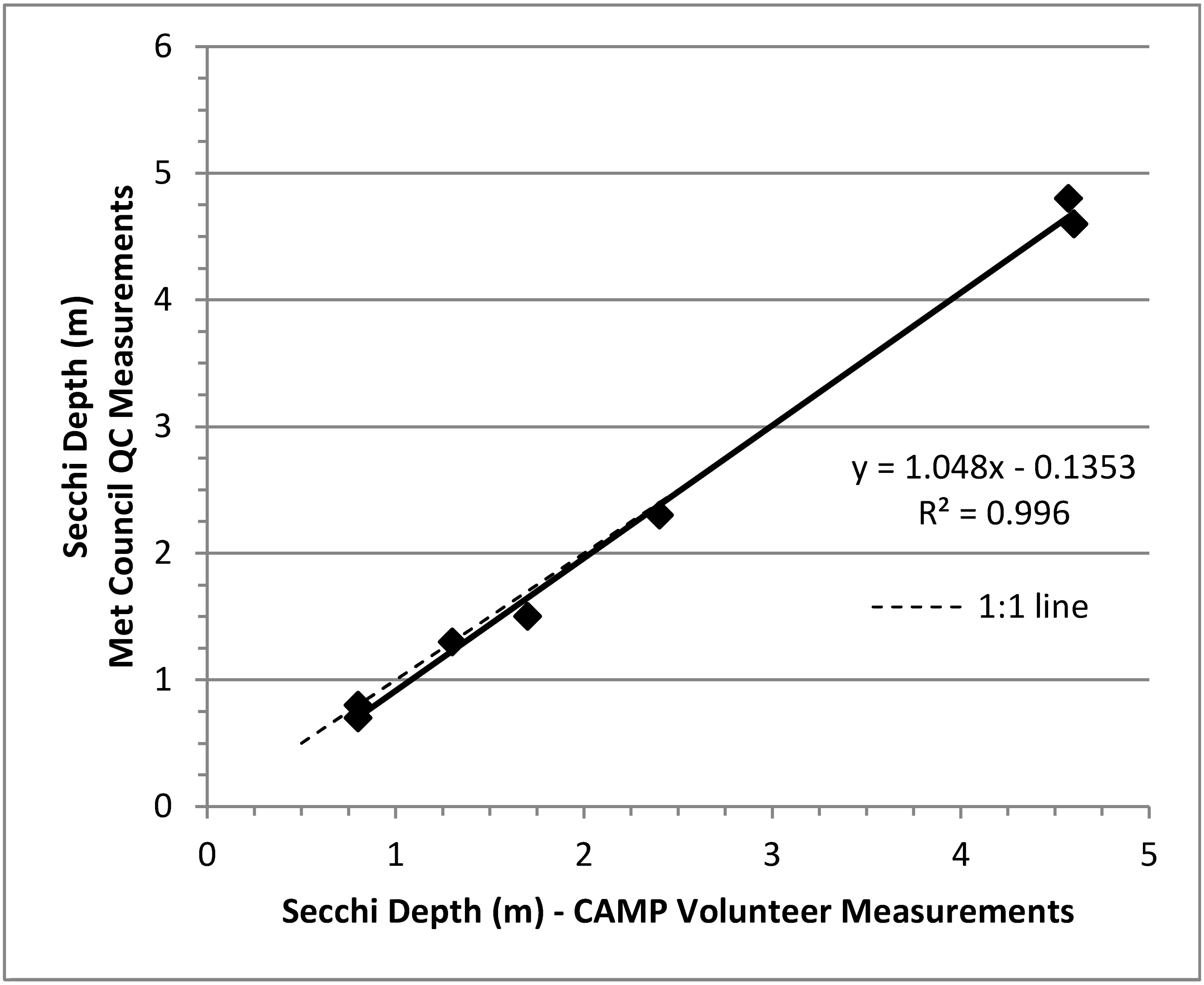


Figure 5. Secchi Depth Quality Control Data

Lake Quality Report Card

The Met 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 3. Lake Grading Curve

Grade	Percentile	TP (µg/L)	CLA (µg/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).

2023 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 2023 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 area ratios tend to receive relatively larger phosphorus loads than lakes with lower watershed to lake area ratios given similar land-use in their respective watershed. 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.

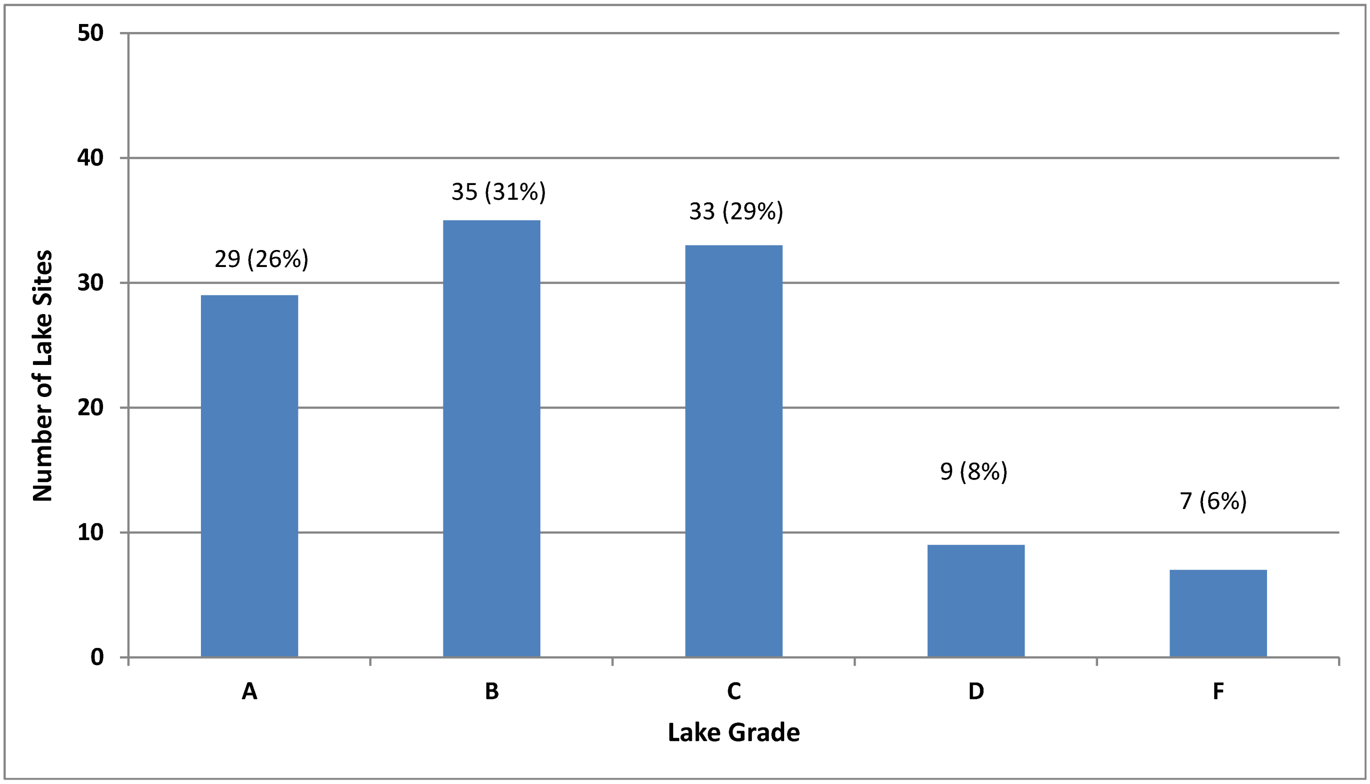


Figure 6. Distribution of 2023 Lake Grades

The 2023 lake grade distribution shows a more pronounced skewing towards the A and B range as compared to previous years, except for the 2021 monitoring season which also saw a pronounced skewing to the A and B range. An analysis of the 2023 lake grades shows that the skew shift is driven by improving water quality compared to the previous year in some individual lakes, rather than a change in the population of lakes monitored which can differ from year to year. Of the lake sites monitored both in 2022 and 2023, the lake grade changes from 2022 to 2023 were as follows:

- 27 lake sites improved by 1 grade.
- 2 lake sites improved by 2 grades.
- 8 lake sites degraded by 1 grade.
- 59 lake sites had no grade change.

The cause or causes of the shift in grades is not precisely known at this time but the grade shift may be related to the varying and episodic dry and wet conditions experienced from 2020 through 2023. November 2022 through mid-April 2023 was a snowy and wet winter but a drought quickly set in for the vast majority of Minnesota. May 15 through August 2023 was among the driest periods on record (MnDNR 2023).

The 2023 drought may have played a role in the grade shift through the process of reducing the nutrient load to the region's lakes. During the drought, precipitation was significantly reduced which would have caused a reduction in surface runoff. A reduction in surface runoff would have reduced the external TP loading to a lake. The reduction in the availability of nutrients (i.e. phosphorus) would likely reduce primary production such as algal production. Reduction in algal production would then reduce the algal population and in turn lead to an improvement in water transparency (Secchi disk depth). The effect would be improvement in the lake grade parameters and grades: lower TP, lower CLA, higher water transparency. 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 (29) where fewer lakes saw decline in their grades (8). 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.

The analysis of the 2021 lake grades showed a similar pattern in that they shifted generally towards the A and B range (METC 2022). A significant drought developed during 2021. The 2021 drought was the most severe drought since 1988 (MnDNR 2024) with gradual on set beginning in September 2020 (MnDNR 2022a, MnDNR 2022b). Here again, the TP, CLA, and water transparency grades generally improved for many lakes due to the likely effect of reduced runoff and nutrient load. Refer to the Metropolitan Council's 2021 Study of the Water Quality of 167 Metropolitan Area Lakes (METC 2022) for a more detailed discussion of the grade shift observed for 2021.

The 2022 lake grades saw a grade shift as well, but it was a return toward the distribution pattern in-line with previous years' grade distributions, where there is slight (not pronounced) skew to the A to B range. Whereas there were drought conditions during the summer of 2022, it was not nearly as severe or extensive as in 2021. The summer of 2022 was cooler than 2021 and it was preceded by 8th wettest February through May (2022) period on record. June and July 2022 were very dry, but August 2022 had near normal precipitation to wet conditions (MnDNR 2022b). The region's lakes were likely replenished with nutrients (TP) and water due to the increased runoff during the lead up to the 2022 flash drought with some additional runoff during August 2022. This likely reset the lakes so to speak to a typical grade distribution, until 2023, when the grade distribution skewed back to the A to B range much more prominently due to the more sustained drought of 2023.

Monitoring Results for CAMP Lakes 2023

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 2023. The data qualifier signs in the tables in the individual lake reports are defined as follows:

Total Phosphorus

- < indicates the result is less than the method detection limit.
- ~ indicates the result is between the method detection limit and the reporting limit.

Secchi Depth

- + 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.

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 Met 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	76	28	164	D
CLA (µg/l))	69	4.4	290	D
Secchi (m)	+0.6	>0.3	+1.2	
TKN (mg/l)	1.34	0.84	1.96	
			Lake Grade	

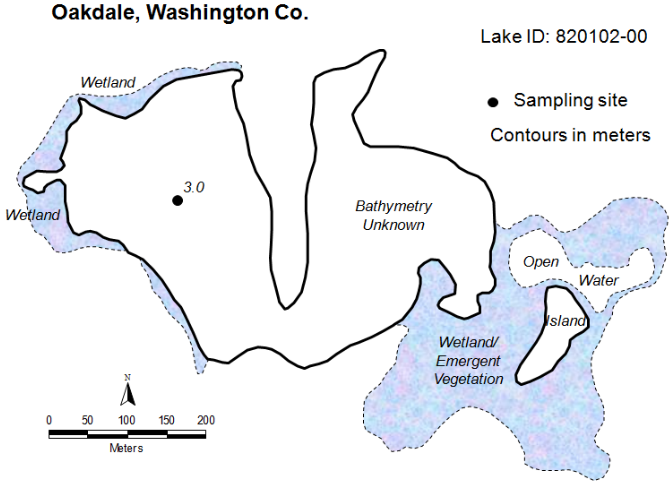
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

The lake received a TP and CLA grades of D this year which is the worst water quality received to date according to its historical water quality database. The data indicated 2 significant algal blooms in June and August 2023 that drove this deterioration in water quality. 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.

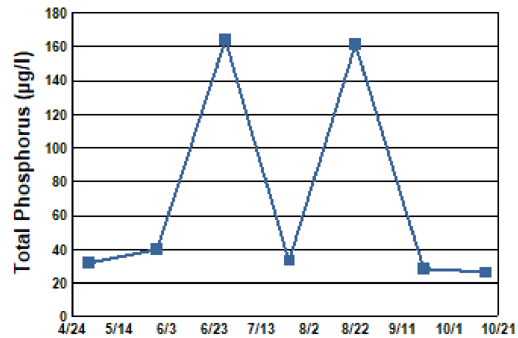
Acorn Lake
Oakdale, Washington Co.

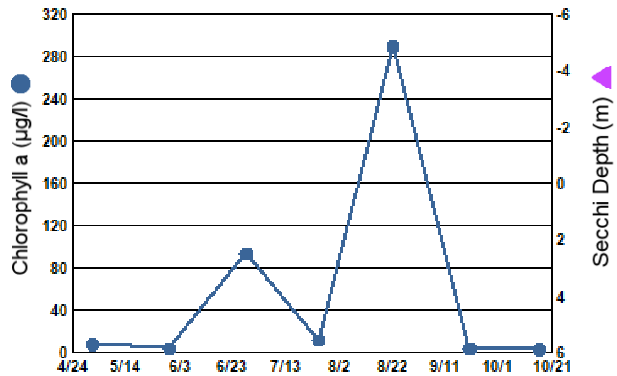


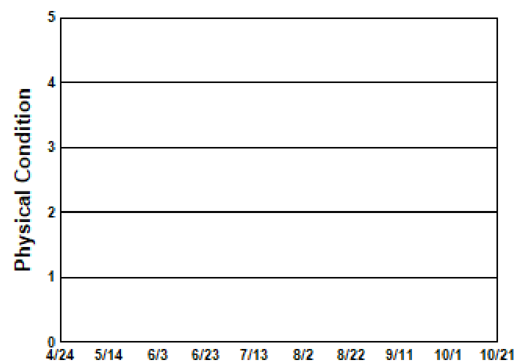
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/01/23	8.6	7.2	8.4	~32	+1.2		
05/30/23	22.9	10.3	4.5	~40	>0.9		
06/28/23	23.3	4.6	94	164	>0.6		
07/25/23	24.7	7.2	12	~33	>0.3		
08/22/23	22.1	12.1	290	161	>0.5		
09/20/23	22.3	12.2	4.4	28	>0.3		
10/16/23	9.5	11.6	3.3	26	>0.8		

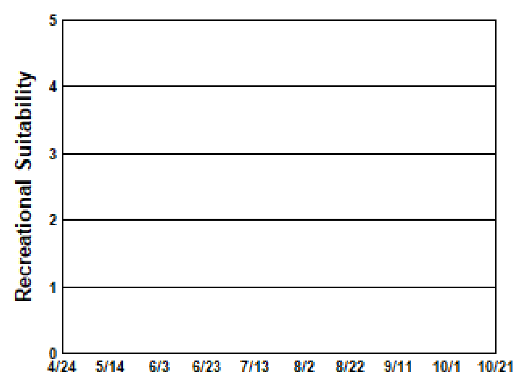
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.







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					
CLA			A				B					
Secchi			F				D					
Lake Grade			**C**				**C**					

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	C	B	C	C	D	C	C	D
CLA	B	B	B	A	C	B	B	D
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.

2023 Data summer (May - September) data summary

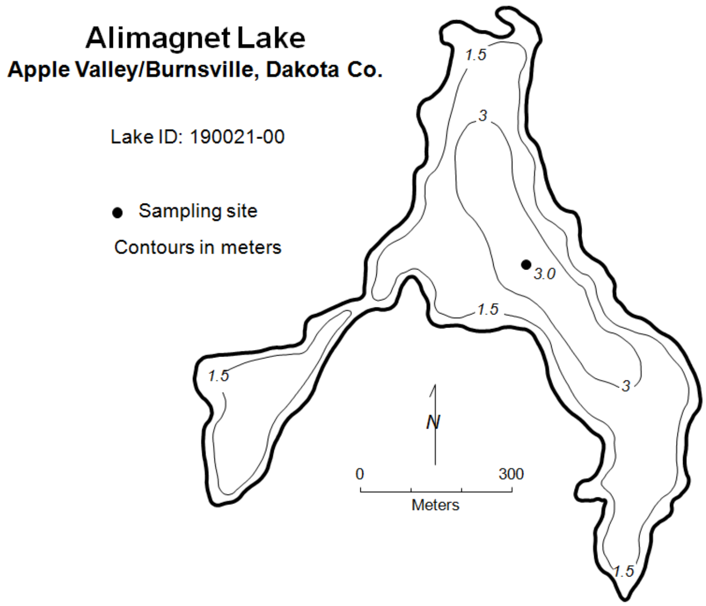
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	55	20	108	C
CLA (µg/l))	61	2.9	150	D
Secchi (m)	1.2	0.3	3.0	C
TKN (mg/l)				
			Lake Grade	C

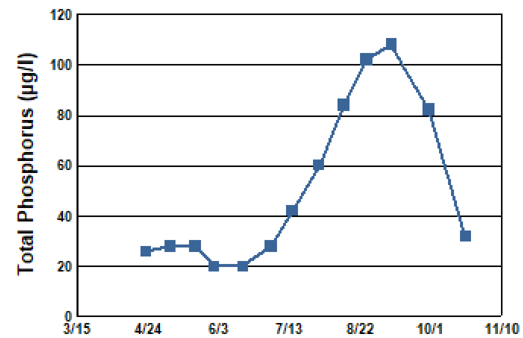
The lake received a lake grade of C this year. The lake's historic lake grades indicate that the lake fluctuates between a C and D with the occasional F.

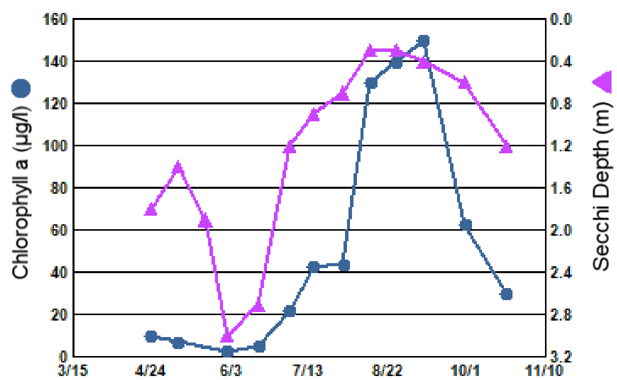
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

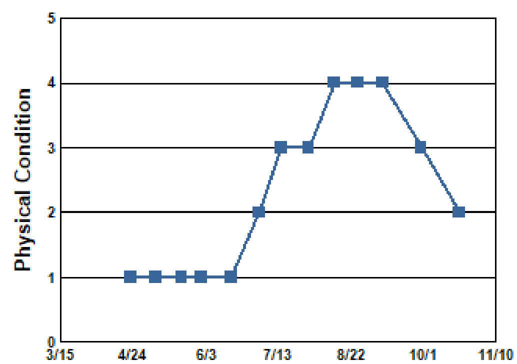




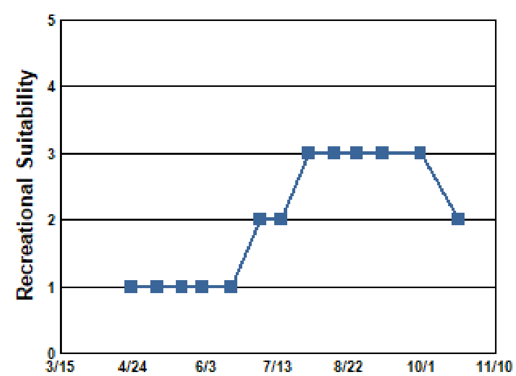


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/23	7.1		10	26	1.8	1	1
05/07/23	17.5		7.3	28	1.4	1	1
05/21/23	20.5			28	1.9	1	1
06/01/23	25.4		2.9	20	3.0	1	1
06/17/23	24.7		5.3	20	2.7	1	1
07/03/23	28.1		22	28	1.2	2	2
07/15/23	26.3		43	42	0.9	3	2
07/30/23	28.0		44	60	0.7	3	3
08/13/23	24.9		130	84	0.3	4	3
08/26/23	25.8		140	102	0.3	4	3
09/09/23	22.9		150	108	0.4	4	3
09/30/23	20.1		63	82	0.6	3	3
10/21/23	12.7		30	32	1.2	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	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	2022	2023
TP	D	D	D	D	D	D	D	C
CLA	F	D	D	C	C	D	C	D
Secchi	F	F	F	D	C	D	D	C
Lake Grade	**F**	**D**	**D**	**D**	**C**	**D**	**D**	**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l))				
Secchi (m)		> 0.6	> 0.6	
TKN (mg/l)				
			Lake Grade	

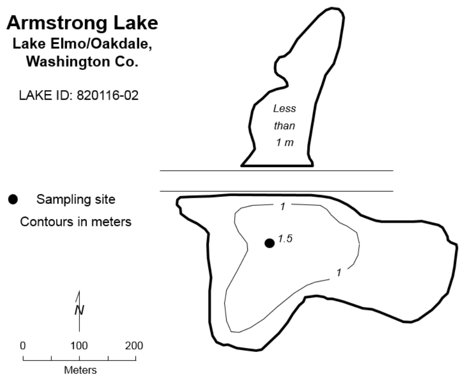
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

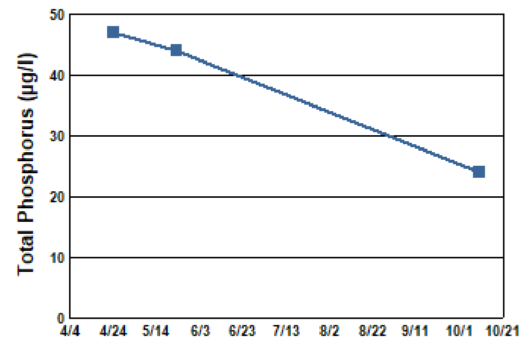
There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

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.

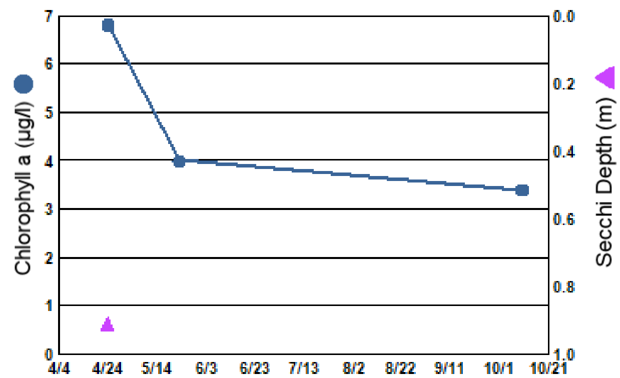


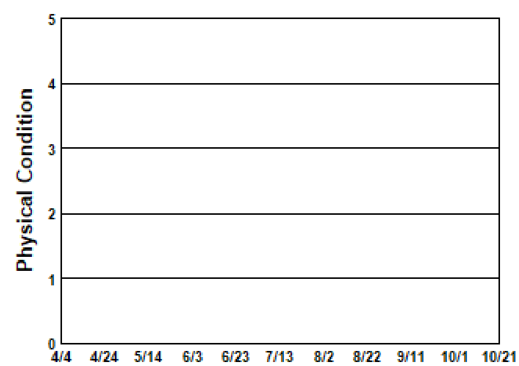


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	6.9	10.0	6.8	~47	0.9		
05/23/23	21.0	8.8	4.0	~44	>0.6		
10/10/23	10.3	8.1	3.4	24	>0.5		

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





1 = Crystal Clear
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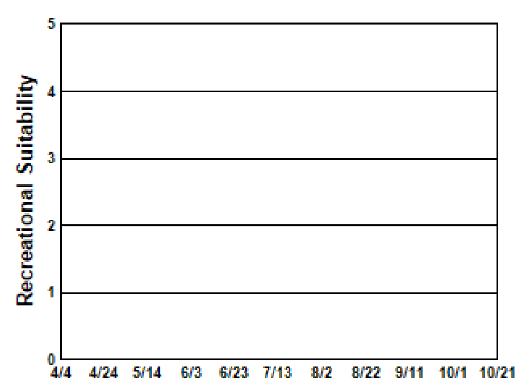
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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	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	2022	2023
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)

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.

The MPCA listed the lake as impaired with respect to aquatic recreational use (nutrient/eutrophication biological indicators) in 2024.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	<22	70	C
CLA (µg/l))	22	5.3	41	C
Secchi (m)	1.6	1.1	3.7	C
TKN (mg/l)	0.88	0.57	1.26	
			Lake Grade	C

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 46 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

The lake received a lake grade of C which indicates similar water quality as the previous two years and 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.

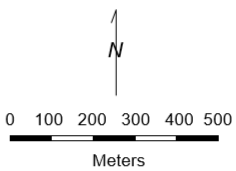
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bailey Lake
Woodbury, Washington Co.

Lake ID: 82045600

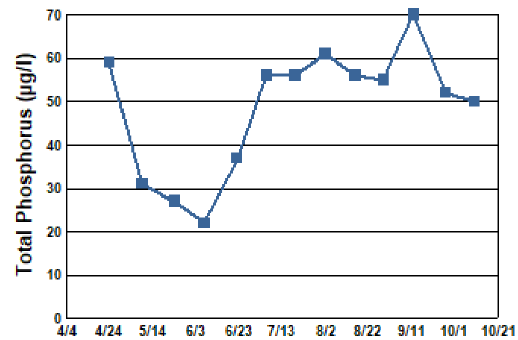
● Sampling site

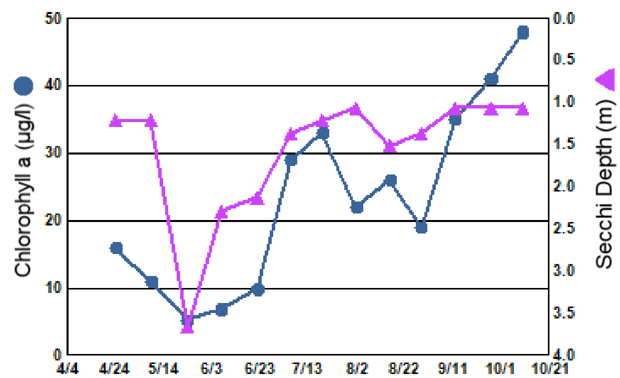
Contours in meters

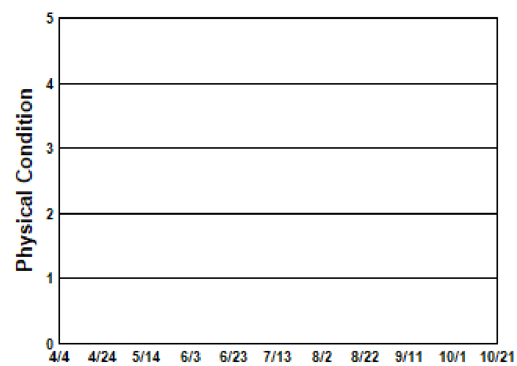


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	7.9	9.9	16	59	1.2		
05/09/23	18.0	13.8	11	~31	1.2		
05/24/23	21.1	13.3	5.3	~27	3.7		
06/07/23	26.0	12.7	6.9	<22	2.3		
06/22/23	26.0	13.7	9.9	~37	2.1		
07/06/23	25.5	12.6	29	56	1.4		
07/19/23	23.3	10.9	33	56	1.2		
08/02/23	27.1	11.6	22	61	1.1		
08/16/23	23.3	8.6	26	56	1.5		
08/29/23	24.3	12.2	19	55	1.4		
09/12/23	21.2	12.3	35	70	1.1		
09/27/23	19.5	9.2	41	52	1.1		
10/10/23	14.6	11.0	48	50	1.1		







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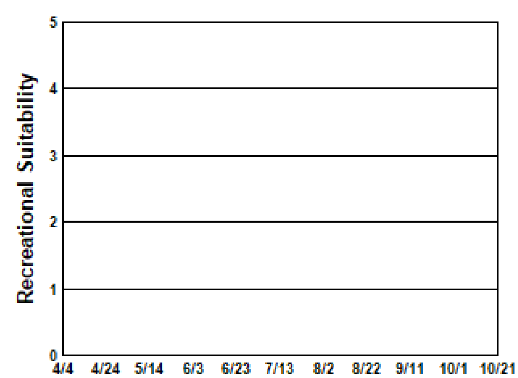


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	2022	2023
TP		D	D	D	D	D	D	C
CLA		D	D	C	C	C	C	C
Secchi		F	D	D	D	C	C	C
Lake Grade		**D**	**D**	**D**	**D**	**C**	**C**	**C**

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

Bass Lake [West] (82–0123) *Browns 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.

2023 Data summer (May - September) data summary

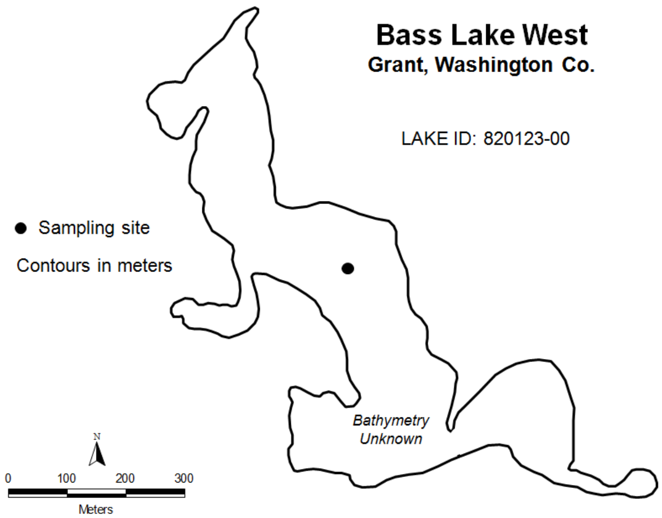
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	~22	~40	B
CLA (µg/l))	7.9	1.8	25	A
Secchi (m)	2.4	1.1	3.7	B
TKN (mg/l)	0.67	0.52	0.85	
			Lake Grade	B

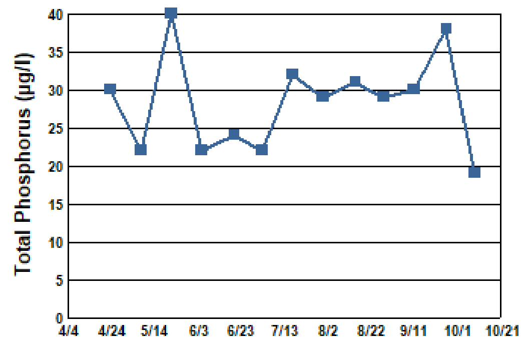
The lake received a lake grade of B which is consistent with its recent historical water quality database.

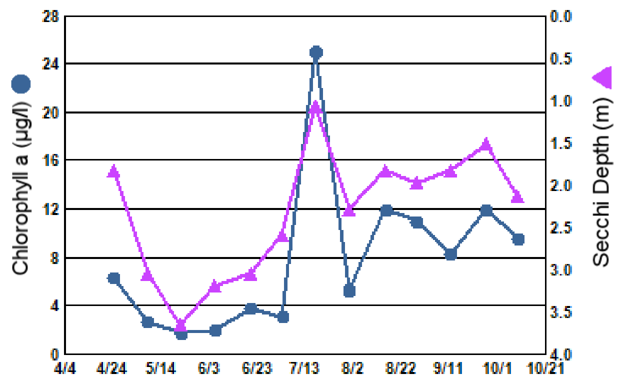
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 27 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

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.

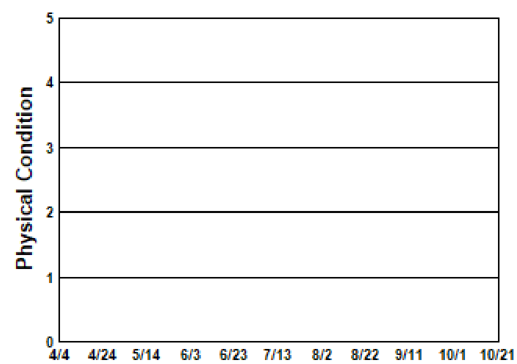




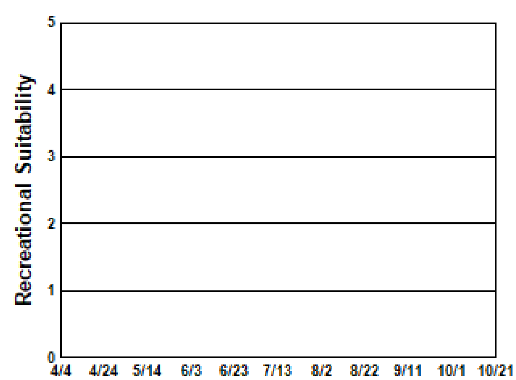


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	6.8	10.2	6.3	~30	1.8		
05/08/23	16.9	8.7	2.7	~22	3.1		
05/22/23	19.8	11.5	1.8	~40	3.7		
06/05/23	26.5	12.5	2.0	<22	3.2		
06/20/23	25.2	12.1	3.8	~24	3.1		
07/03/23	27.6	8.9	3.1	<22	2.6		
07/17/23	23.2	9.2	25	~32	1.1		
07/31/23	26.3	7.5	5.3	~29	2.3		
08/15/23	23.5	6.2	12	~31	1.8		
08/28/23	24.3	10.1	11	~29	2.0		
09/11/23	22.0	7.1	8.3	30	1.8		
09/26/23	19.7	9.1	12	38	1.5		
10/09/23	15.3	10.8	9.6	19	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			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	2022	2023
TP	B	A	A	B	A	B	B	B
CLA	A	A	A	A	A	A	A	A
Secchi	B	B	A	B	A	B	B	B
Lake Grade	**B**	**A**	**A**	**B**	**A**	**B**	**B**	**B**

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.

2023 Data summer (May - September) data summary

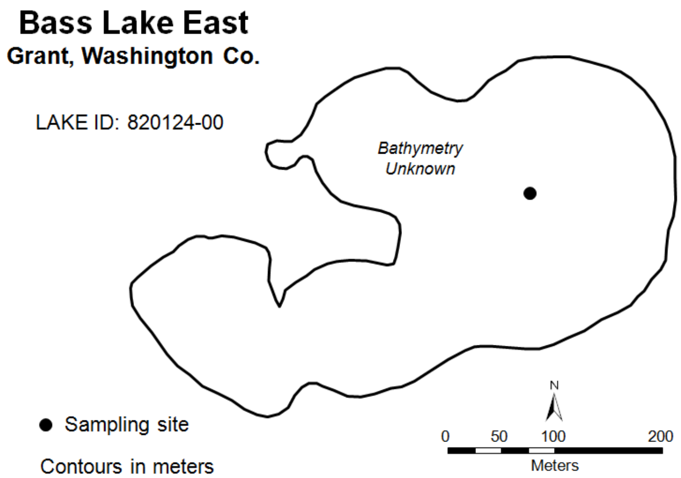
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	<22	<44	
CLA (µg/l))	3.0	1.0	5.3	A
Secchi (m)	2.4	2.0	3.4	B
TKN (mg/l)	0.59	0.50	0.66	
			Lake Grade	

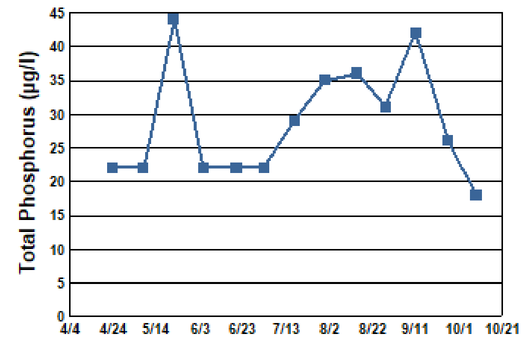
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of <23 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

The lake water quality has been in the A to B range with CLA grades of A and at least B Secchi grades 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.

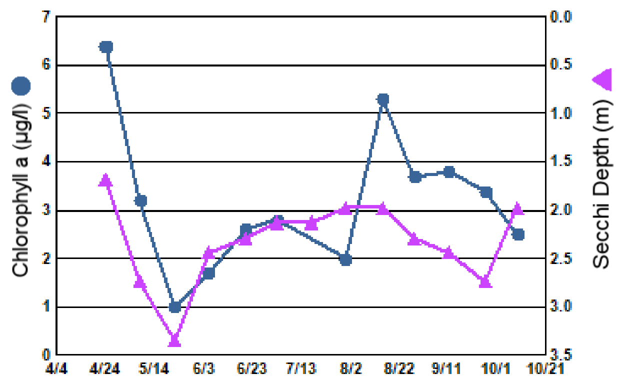
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

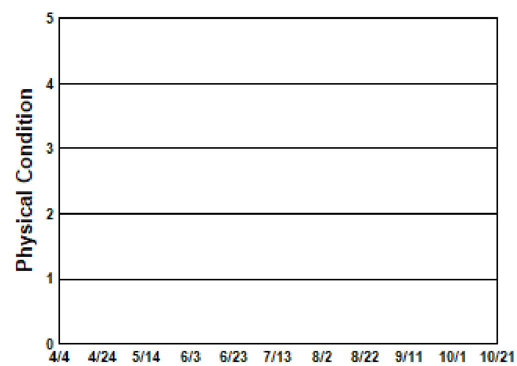




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	6.6	10.9	6.4	<22	1.7		
05/08/23	17.6	8.6	3.2	<22	2.7		
05/22/23	20.6	11.6	1.0	<44	3.4		
06/05/23	28.9	11.9	1.7	<22	2.4		
06/20/23	25.7	11.4	2.6	<22	2.3		
07/03/23	28.3	7.6	2.8	~22	2.1		
07/17/23	23.2	8.1		~29	2.1		
07/31/23	26.7	7.9	2.0	~35	2.0		
08/15/23	23.2	3.9	5.3	~36	2.0		
08/28/23	24.2	8.3	3.7	31	2.3		
09/11/23	22.1	4.5	3.8	42	2.4		
09/26/23	19.4	7.0	3.4	~26	2.7		
10/09/23	14.7	7.1	2.5	18	2.0		





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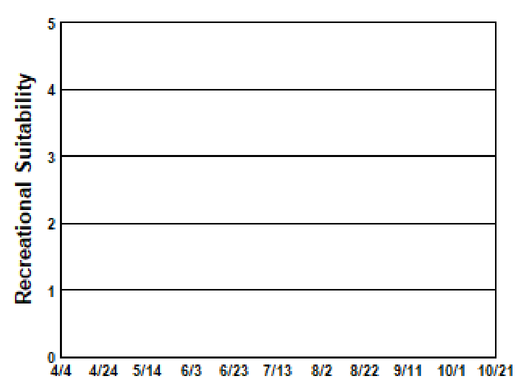
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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	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	2022	2023
TP	C	A	A	B	A	A	B	
CLA	A	A	A	A	A	A	A	A
Secchi	B	B	B	B	A	B	B	B
Lake Grade	**B**	**A**	**A**	**B**	**A**	**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.

2023 Data summer (May - September) data summary

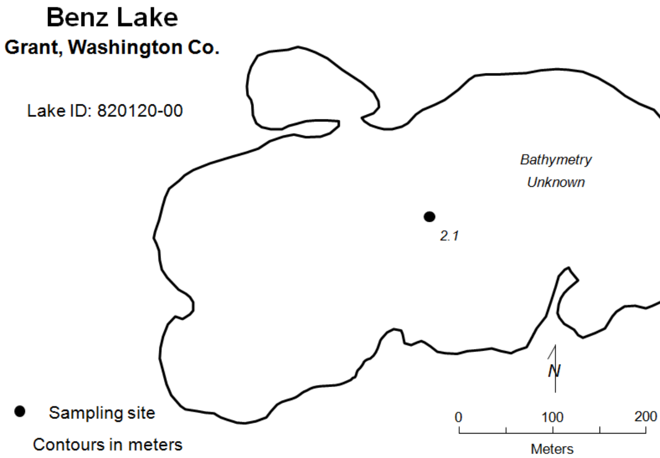
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	35	~25	64	C
CLA (µg/l))	5.2	2.9	10	A
Secchi (m)	>1.3	>0.8	1.7	
TKN (mg/l)	0.65	0.51	0.99	
			Lake Grade	

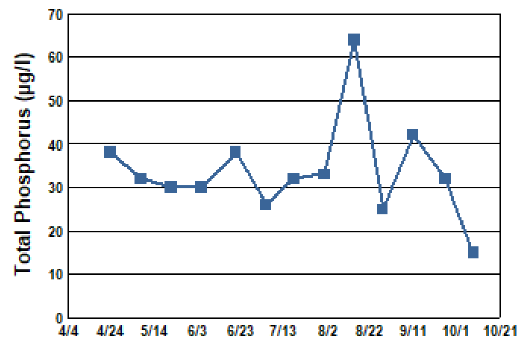
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

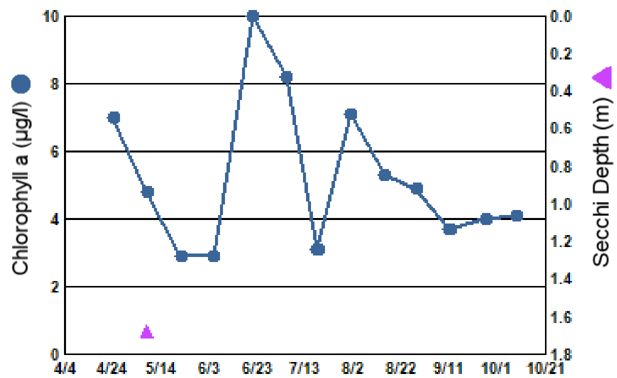
The lake received a C and A grade for TP and CLA, respectively. The lake's water quality continues to show improvement over the D and F grades that were typically received in the mid 2000's. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid 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.



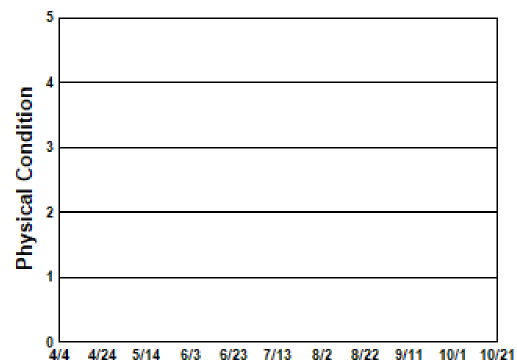




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
04/24/ 23	7.0	10.7	7.0	~38	>1.4		
05/08/ 23	17.6	9.5	4.8	~32	1.7		
05/22/ 23	21.9	11.6	2.9	~30	>1.5		
06/05/ 23	27.1	13.4	2.9	~30	>1.4		
06/21/ 23	26.8	15.6	10	~38	>1.5		
07/05/ 23	26.4	9.2	8.2	~26	>1.1		
07/18/ 23	22.6	10.3	3.1	~32	>1.2		
08/01/ 23	26.8	10.7	7.1	~33	>1.1		
08/15/ 23	23.0	6.3	5.3	64	>0.8		
08/28/ 23	23.9	11.8	4.9	~25	>1.5		
09/11/ 23	20.9	10.2	3.7	42	>1.2		
09/26/ 23	18.9	7.7	4.0	~32	>1.5		
10/09/ 23	13.6	11.0	4.1	15	>1.2		

> 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
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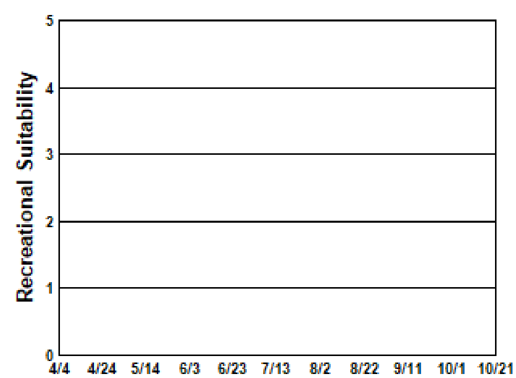


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	2022	2023
TP	C	C	C	C	B	C	B	C
CLA	A	A	A	C	A	A	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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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).The MN DNR designated the lake as being infested with zebra mussels (*Dreissena polymorpha*) in 2024.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	16	~27	A
CLA (µg/l))	2.7	1.2	4.5	A
Secchi (m)	5.1	3.7	6.1	A
TKN (mg/l)	0.59	0.46	0.82	
			Lake Grade	A

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

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered a maximum value. However, this maximum value is below the A grade break point which means that the mean translates to an A 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/.

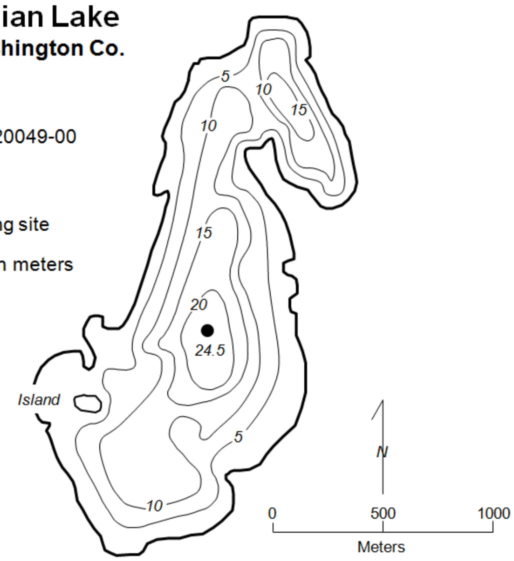
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

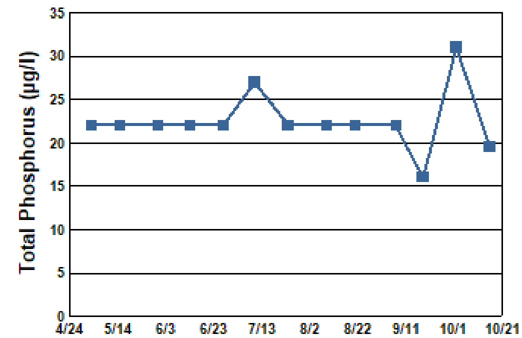
Big Carnelian Lake
May Twp., Washington Co.

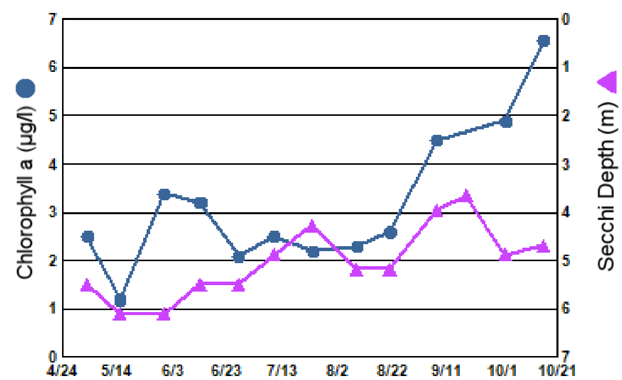
LAKE ID: 820049-00

● Sampling site

Contours in meters

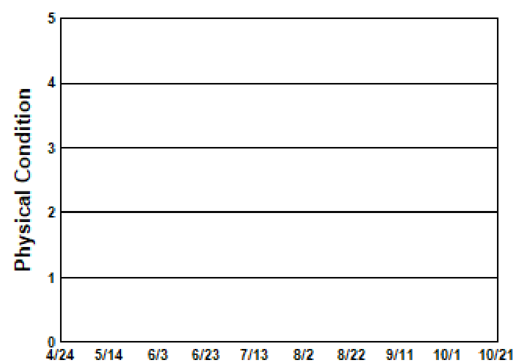






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	7.3	13.0	2.5	<22	5.5		
05/15/23	16.1	10.2	1.2	<22	6.1		
05/31/23	21.3	10.0	3.4	<22	6.1		
06/13/23	21.8	9.1	3.2	<22	5.5		
06/27/23	24.0	8.5	2.1	<22	5.5		
07/10/23	24.2	9.4	2.5	~27	4.9		
07/24/23	24.6	8.7	2.2	<22	4.3		
08/09/23	26.1	8.0	2.3	<22	5.2		
08/21/23	23.6	7.7	2.6	<22	5.2		
09/07/23	23.2	12.2	4.5	<22	4.0		
09/18/23	20.7	13.0		16	3.7		
10/02/23	20.5	14.3	4.9	31	4.9		
10/16/23	14.0	13.9	6.6	20	4.7		



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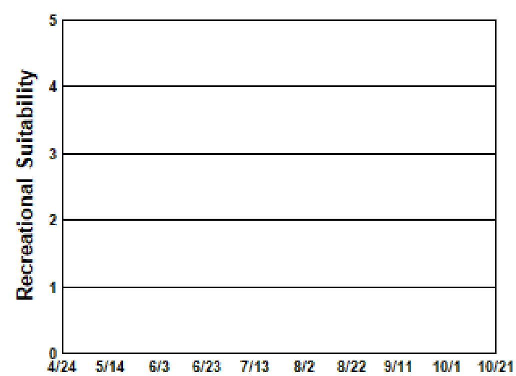


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP	A				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	2022	2023
TP	A	B	A	A	A	A	A	A
CLA	A	A	A	A	A	A	A	A
Secchi	A	A	A	A	A	A	A	A
Lake Grade	**A**	**A**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	< 23	<22	~27	A
CLA (µg/l))	3.8	2.2	6.4	A
Secchi (m)	4.4	4.0	5.2	A
TKN (mg/l)	0.63	0.46	0.75	
			Lake Grade	A

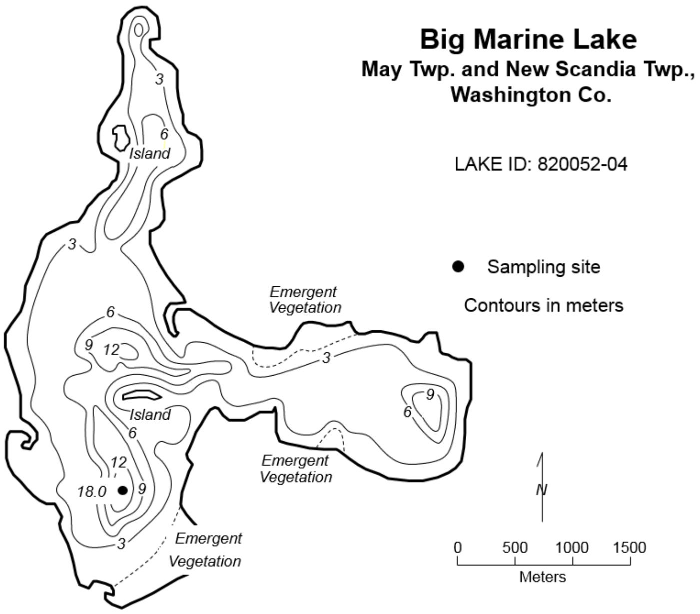
The lake received a lake grade of A which is consistent with its historical water quality database.

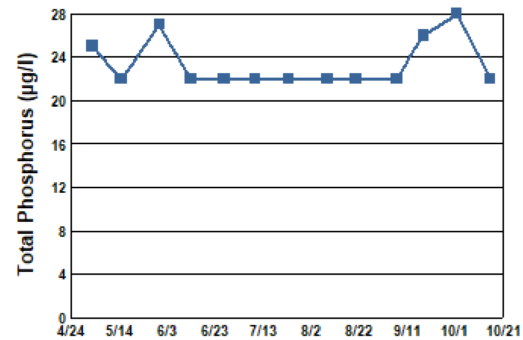
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. The mean value indicated in the Data Summary table is very close to the A/B grade breakpoint (within about 1 ug/L) so the maximum mean may likely be less than the grade breakpoint. A simple test was given to evaluate this possibility. The test consists of replacing the TP results that were reported below the RL/MDL with the highest possible value below the RL or MDL. For examples, < 22 ug/L was replaced with 21 ug/L, < 25 ug/l replaced with 24 ug/L. The TP summer-time mean was recalculated with these revised values. This revised mean was calculated to be < 23 ug/L, and this translates to a TP grade of A.

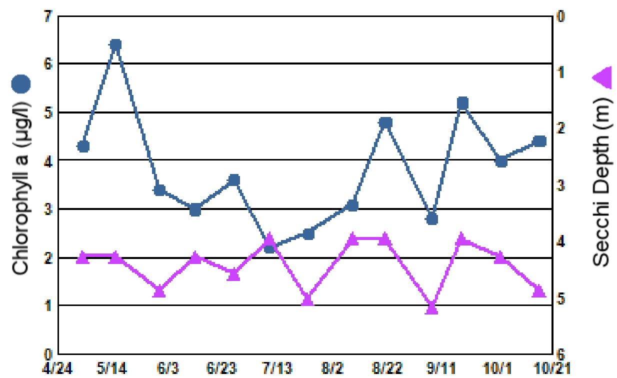
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

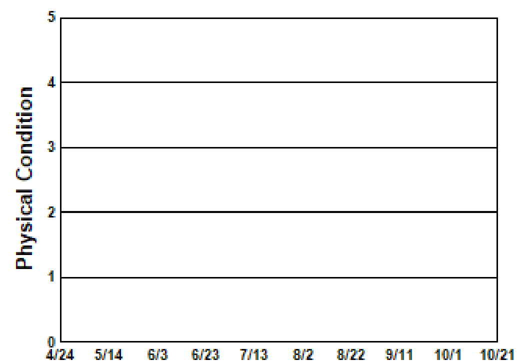




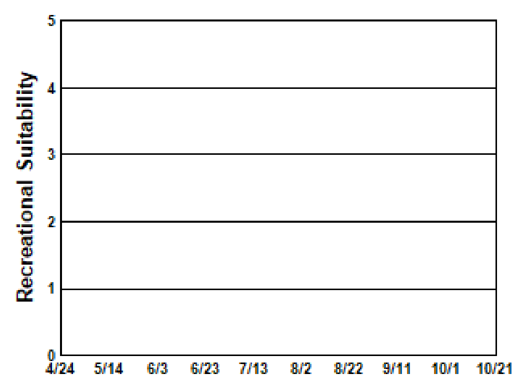


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	8.5	12.4	4.3	~25	4.3		
05/15/23	16.8	10.9	6.4	<22	4.3		
05/31/23	21.2	8.8	3.4	~27	4.9		
06/13/23	22.4	8.4	3.0	<22	4.3		
06/27/23	24.3	8.3	3.6	<22	4.6		
07/10/23	24.4	8.7	2.2	<22	4.0		
07/24/23	24.3	8.8	2.5	<22	5.0		
08/09/23	25.8	7.5	3.1	<22	4.0		
08/21/23	23.2	7.4	4.8	<22	4.0		
09/07/23	22.5	11.5	2.8	<22	5.2		
09/18/23	19.8	12.7	5.2	26	4.0		
10/02/23	19.9	13.4	4.0	28	4.3		
10/16/23	12.6	14.8	4.4	22	4.9		



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	2022	2023
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
Lake Grade	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

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

Birger Pond Lake (19–0224) *City of Rosemount*

Volunteer: Pamela Carlson

Birger Pond is located in the city of Rosemount (Dakota County). There are few morphological data available on 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.

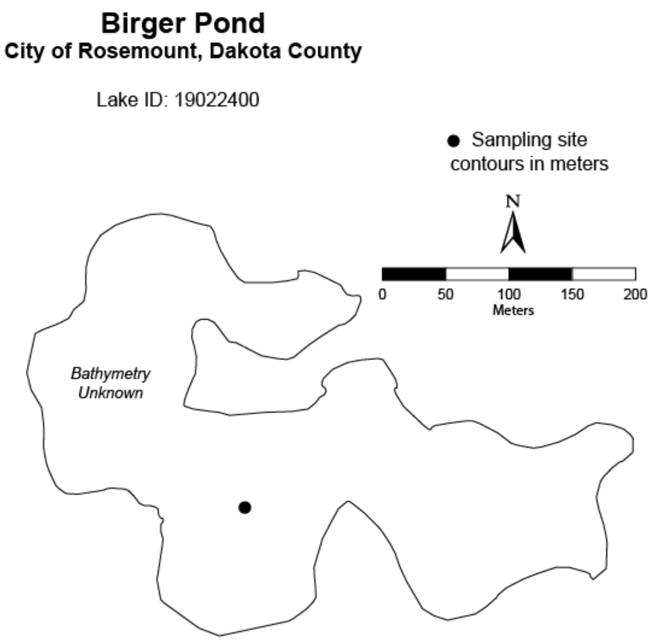
2023 Data summer (May - September) data summary

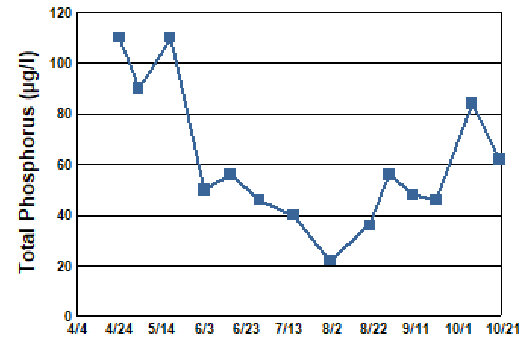
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	55	22	110	C
CLA (µg/l))	31	13	51	C
Secchi (m)	0.8	0.4	1.2	D
TKN (mg/l)				
			Lake Grade	C

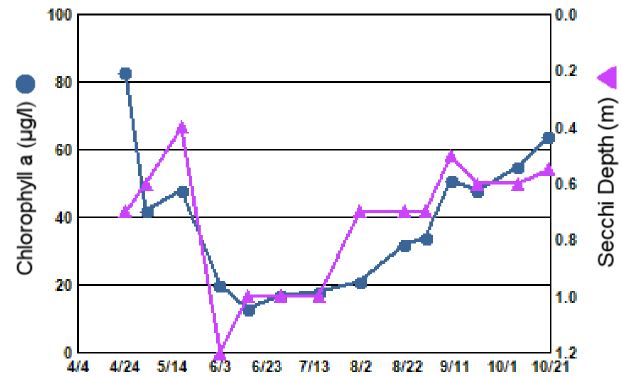
Continued monitoring is recommended to build the water quality database for this water body.

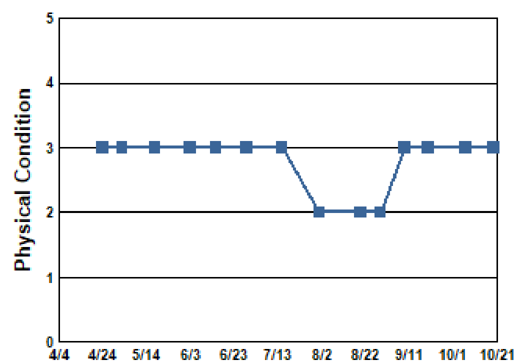
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.









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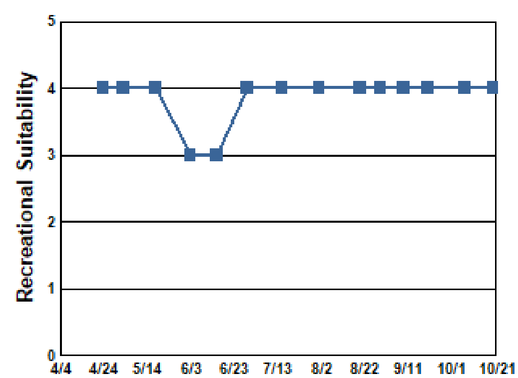
4 = High Algal Color
5 = Severe Algal Bloom



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

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
04/24/ 23	9.8		83	110	0.7	3	4
05/03/ 23	14.0		42	90	0.6	3	4
05/18/ 23	18.4		48	110	0.4	3	4
06/03/ 23	25.6		20	50	1.2	3	3
06/15/ 23	24.2		13	56	1.0	3	3
06/29/ 23	26.6		17	46	1.0	3	4
07/15/ 23	26.3		18	40	1.0	3	4
08/01/ 23	29.2		21	22	0.7	2	4
08/20/ 23	27.1		32	36	0.7	2	4
08/29/ 23	27.7		34	56	0.7	2	4
09/09/ 23	22.1		51	48	0.5	3	4
09/20/ 23	23.5		48	46	0.6	3	4

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
10/07/23	17.1		55	84	0.6	3	4
10/20/23	13.9		64	62	0.6	3	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												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP							D	C
CLA							C	C
Secchi							D	D
Lake Grade							**D**	**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) and aquatic life (fish bioassessments). The lake was delisted from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2024. 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	< 23	11	36	A
CLA (µg/l))	15	7.8	26	B
Secchi (m)	1.7	1.1	2.2	C
TKN (mg/l)	0.90	0.73	1.09	
			Lake Grade	B

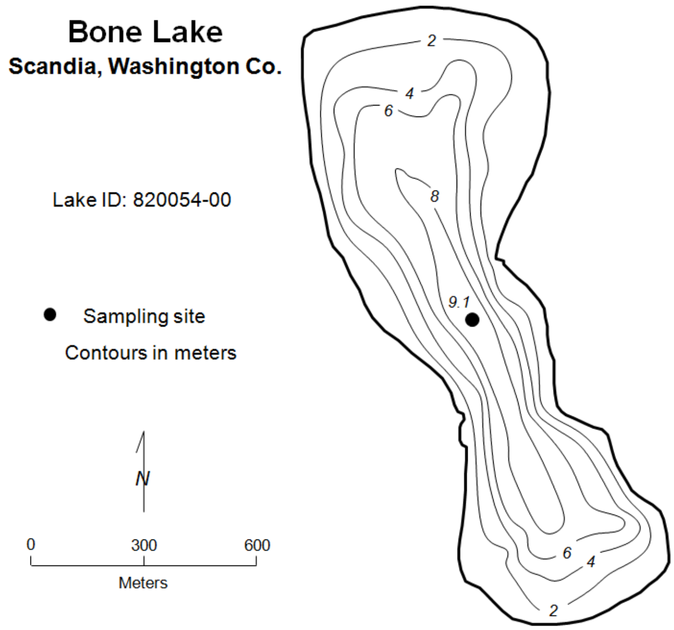
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. However, this near-maximum value is below the A grade break point which means that the mean translates to an A grade.

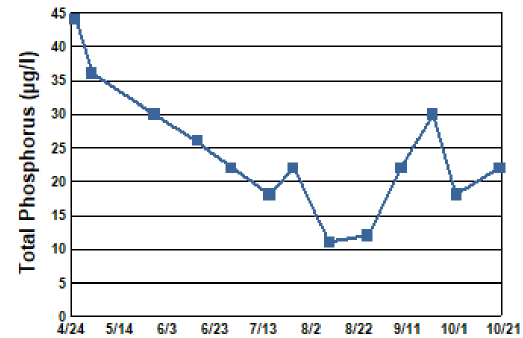
The lake received a lake grade of B this year, which continues the recent improvement in the lake's water quality. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

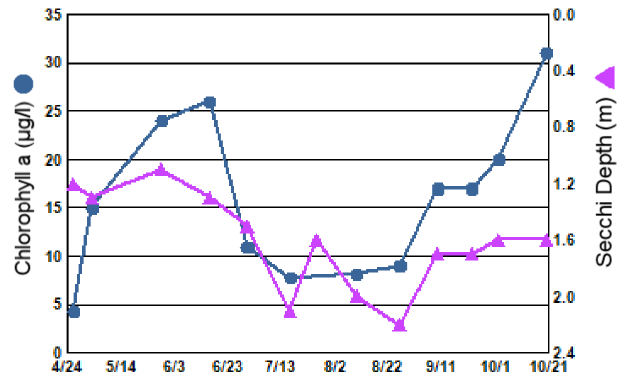
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

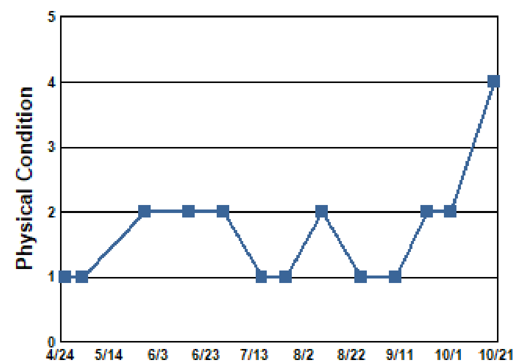






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/26/23	7.2		4.3	44	1.2	1	1
05/03/23	9.5		15	36	1.3	1	1
05/29/23	21.8		24	30	1.1	2	1
06/16/23	24.1		26	26	1.3	2	1
06/30/23	27.2		11	22	1.5	2	1
07/16/23			7.8	18	2.1	1	1
07/26/23	29.3			<22	1.6	1	1
08/10/23	25.1		8.2	11	2.0	2	2
08/26/23	24.9		9.0	12	2.2	1	1
09/09/23	22.2		17	~22	1.7	1	1
09/22/23	20.7		17	30	1.7	2	1
10/02/23	21.0		20	18	1.6	2	1
10/20/23	12.0		31	22	1.6	4	3



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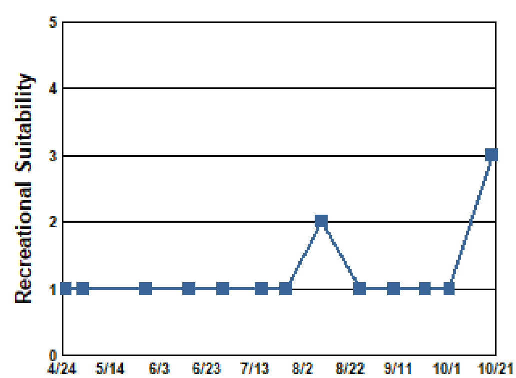


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP					D			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	2022	2023
TP	C	C	B	B	B	B	B	A
CLA	C	B	B	B	B	A	B	B
Secchi	C	C	C	C	C	C	C	C
Lake Grade	**C**	**C**	**B**	**B**	**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.

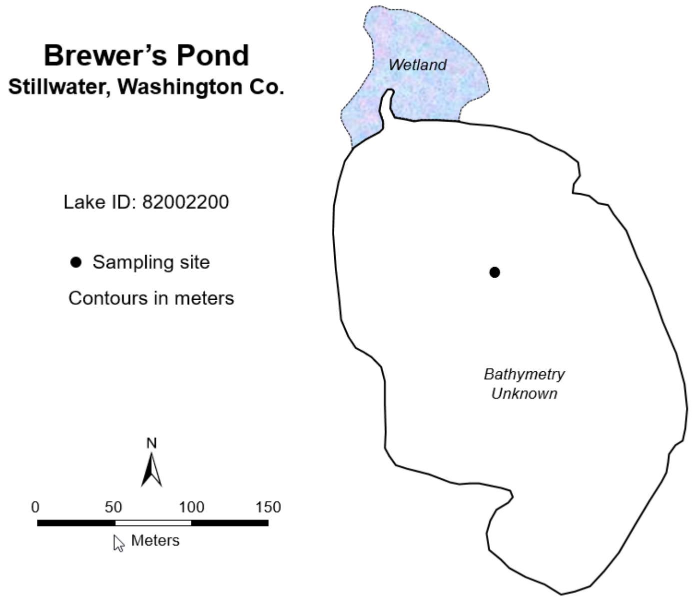
2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	38	22	50	C
CLA (µg/l))	22	6.1	38	C
Secchi (m)	0.9	0.6	1.2	D
TKN (mg/l)				
			Lake Grade	C

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 C this year which is similar to water quality observed in 2020 and an improvement over the F grade received in 2022.Continued monitoring is recommended to continue to build the water quality database.

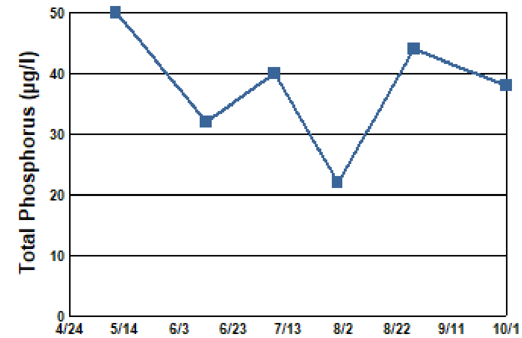
During each monitoring visit, the lake’s physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

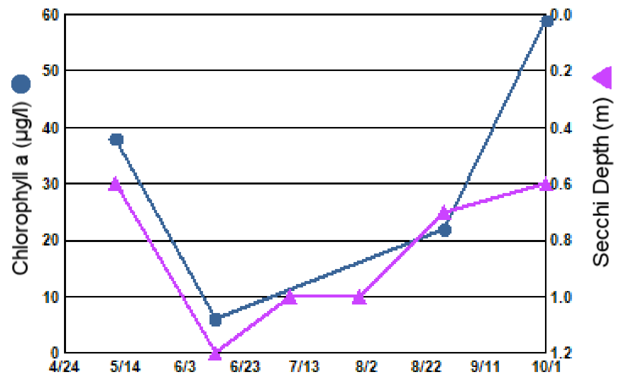
If you notice any errors in the lake’s data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

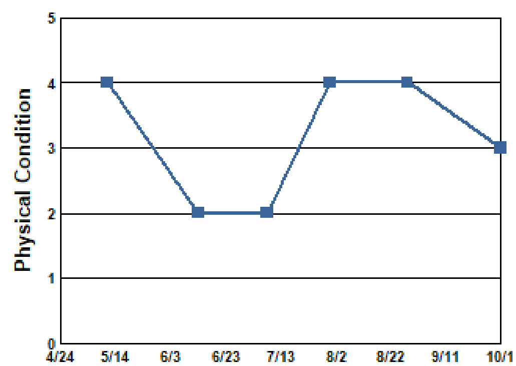


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/11/23	23.1		38	50	0.6	4	2
06/13/23	23.4		6.1	32	1.2	2	2
07/08/23	26.6			40	1.0	2	3
07/31/23	27.8			22	1.0	4	3
08/28/23	26.9		22	44	0.7	4	4
10/01/23	23.0		59	38	0.6	3	3







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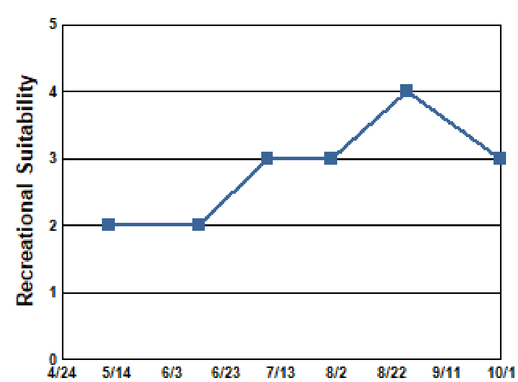

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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		D	C	C	C	C	D	C
CLA		D	D	C	C	D	F	C
Secchi		F	F	F	D	F	F	D
Lake Grade		**D**	**D**	**D**	**C**	**D**	**F**	**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	55	~37	78	C
CLA (µg/l))	29	20	38	C
Secchi (m)	0.6	0.3	1.1	D
TKN (mg/l)	2.18	1.83	2.43	
			Lake Grade	C

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 C this year which is similar to water quality observed in 2020 and an improvement over the F grade received in 2022.. 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.

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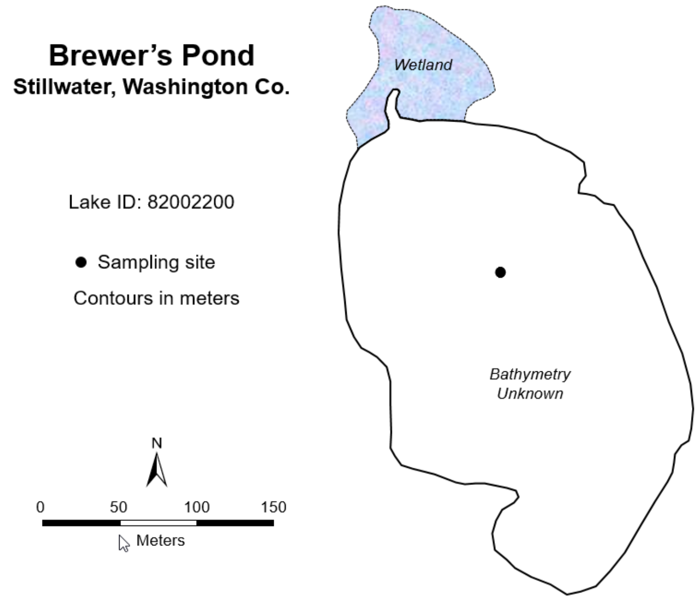
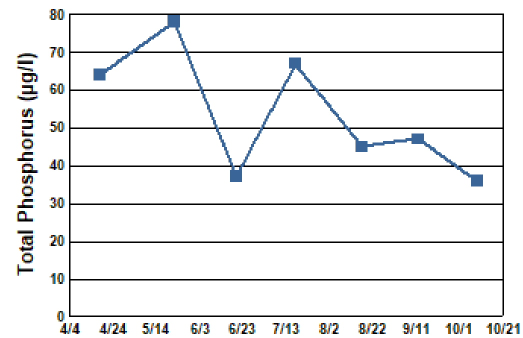
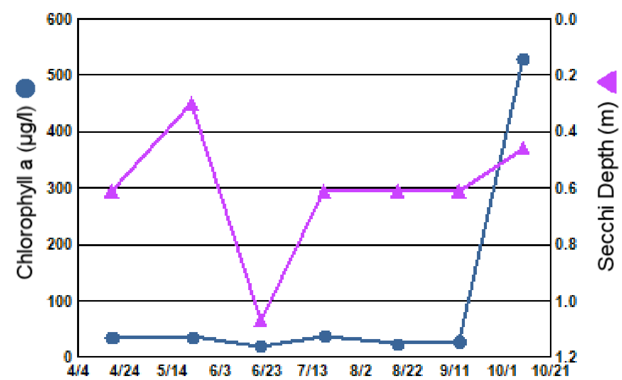
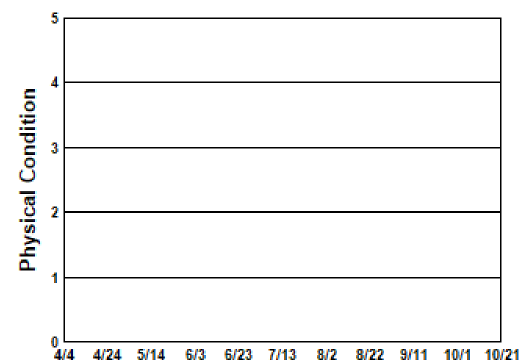




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/23	8.2	9.6	35	~64	0.6		
05/22/23	22.4	13.3	36	78	0.3		
06/20/23	27.0	14.1	20	~37	1.1		
07/17/23	23.9	12.7	38	67	0.6		
08/17/23	23.6	7.9	24	45	0.6		
09/12/23	21.0	9.3	28	47	0.6		
10/09/23	16.1	12.4	530	36	0.5		





1 = Crystal Clear
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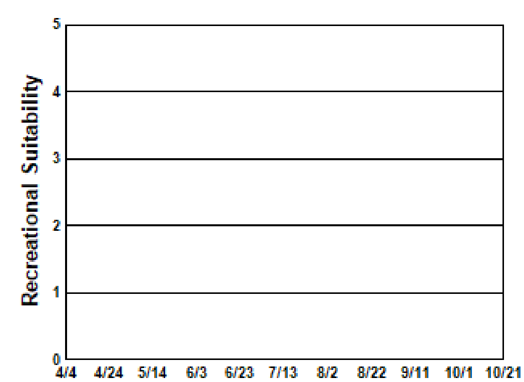
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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												
CLA												
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		D	C	C	C	C	D	C
CLA		D	D	C	C	D	F	C
Secchi		F	F	F	D	F	F	D
Lake Grade		**D**	**D**	**D**	**C**	**D**	**F**	**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	248	74	334	F
CLA (µg/l))	14	1.1	28	B
Secchi (m)	1.5	0.9	2.8	C
TKN (mg/l)				
			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 third year in a row 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.

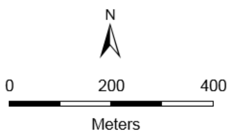
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

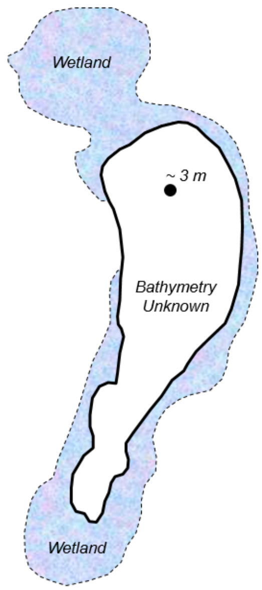
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

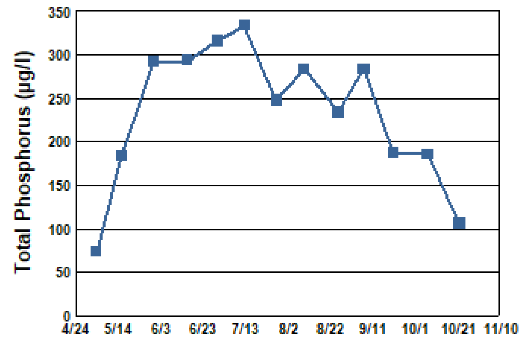
Buck Lake
Spring Lake Twp., Scott Co.

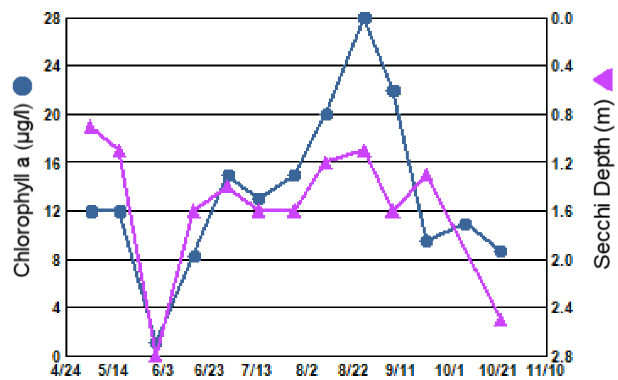
Lake ID: 700065-00
WD: Prior Lake – Spring Lake

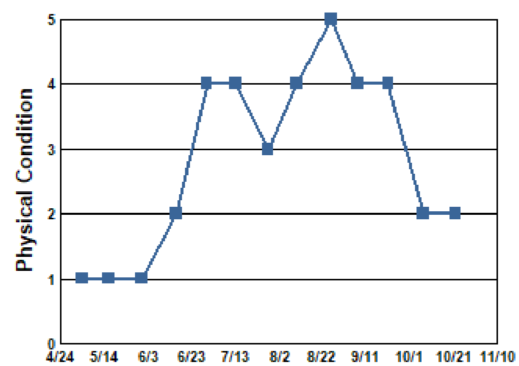
● Sampling site
Contours in meters











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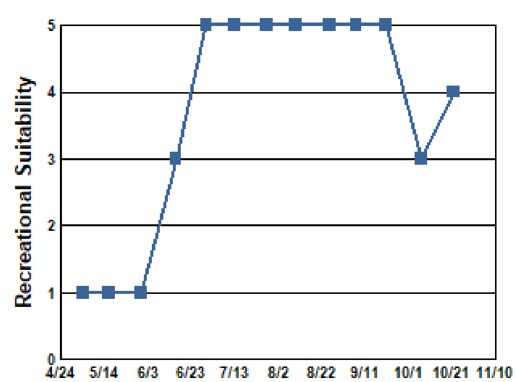
4 = High Algal Color
5 = Severe Algal Bloom



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

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/04/23	17.0		12	74	0.9	1	1
05/16/23	19.6		12	184	1.1	1	1
05/31/23	24.2		1.1	292	2.8	1	1
06/16/23	23.1		8.3	294	1.6	2	3
06/30/23	26.5		15	316	1.4	4	5
07/13/23	25.0		13	334	1.6	4	5
07/28/23	26.4		15	248	1.6	3	5
08/10/23	26.9		20	284	1.2	4	5
08/26/23	24.6		28	234	1.1	5	5
09/07/23	21.1		22	284	1.6	4	5
09/21/23	21.9		9.5	188	1.3	4	5
10/07/23	14.2		11	186	+2.7	2	3
10/22/23	12.6		8.7	106	2.5	2	4

+ 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											D	D
CLA											A	B
Secchi												C
Lake Grade												**C**

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	D	D	D	D	D	F	F	F
CLA	C	A	C	A	C	B	C	B
Secchi	D	C	D	C	D	C	D	C
Lake Grade	**D**	**C**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

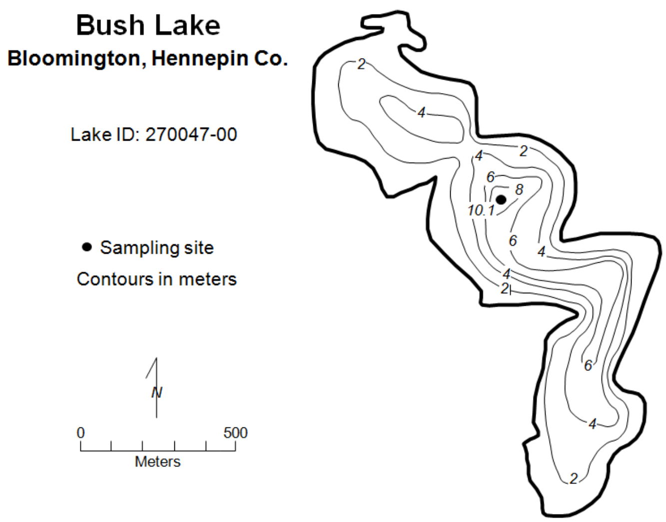
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	<10	20	A
CLA (µg/l))	2.8	1.6	4.4	A
Secchi (m)	3.5	2.7	4.3	A
TKN (mg/l)				
			Lake Grade	A

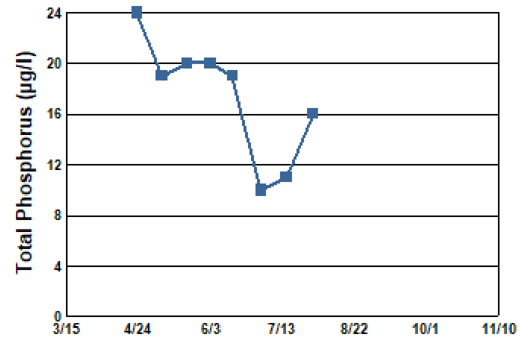
The lake received a lake grade of A this year. The lake grades fluctuate between A and B according to its historical water quality database but with A's being more frequent.

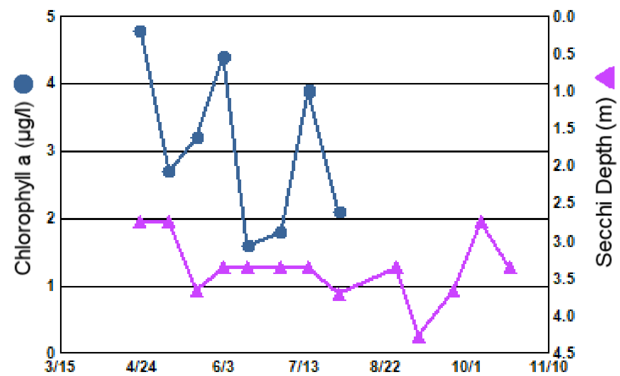
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

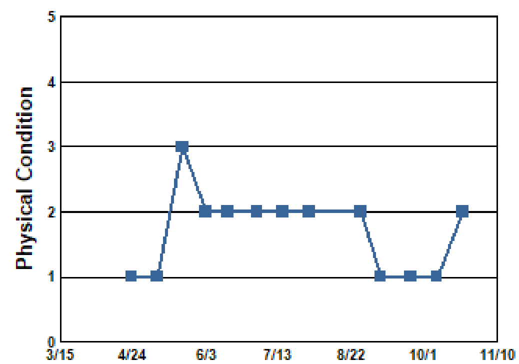






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/23	7.6		4.8	24	2.7	1	1
05/07/23	19.0		2.7	19	2.7	1	1
05/21/23	23.2		3.2	20	3.7	3	1
06/03/23	26.0		4.4	20	3.4	2	1
06/15/23	24.7		1.6	19	3.4	2	1
07/01/23	29.8		1.8	<10	3.4	2	1
07/15/23	25.7		3.9	11	3.4	2	1
07/30/23	28.7		2.1	16	3.7	2	1
08/27/23	26.4				3.4	2	1
09/07/23	23.0				4.3	1	1
09/24/23	22.0				3.7	1	1
10/08/23	18.0				2.7	1	1
10/22/23	13.7				3.4	2	1



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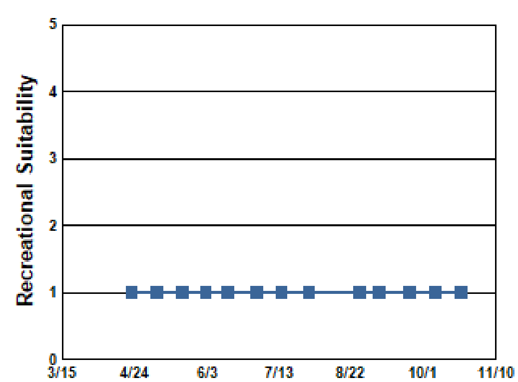
4 = High Algal Color
5 = Severe Algal Bloom



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				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	2022	2023
TP	A	A	A	A	A	A	A	A
CLA	A	A	A	A	A	A	A	A
Secchi	A	A	B	A	A	A	A	A
Lake Grade	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

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

Capaul Pond [east basin] (82–0365) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

Capaul's Pond is located in Grant Township (Washington County). There is little bathymetric information available for the east basin. The basin is to the east of the Gateway State Trail.

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.

2023 Data summer (May - September) data summary

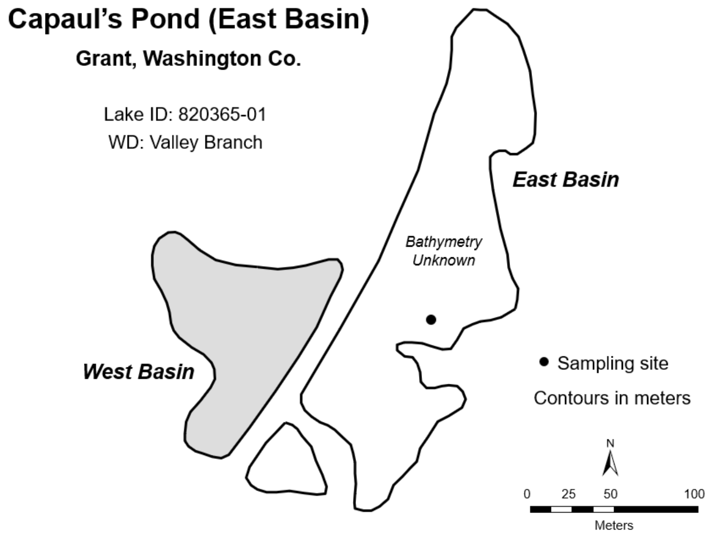
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	91	~48	180	D
CLA (µg/l))	51	16	120	D
Secchi (m)	+0.6	0.2	+1.1	F
TKN (mg/l)	1.12	0.78	1.54	
			Lake Grade	D

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

The pond received a lake grade of D this year which is a return to the D and F grades received about a decade ago.

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.

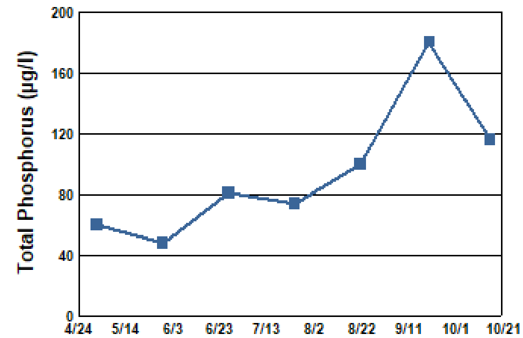
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

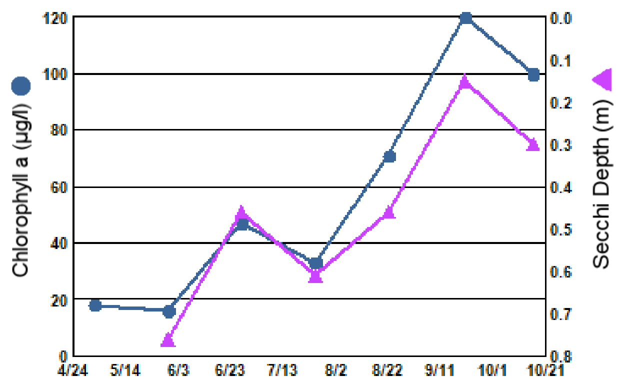


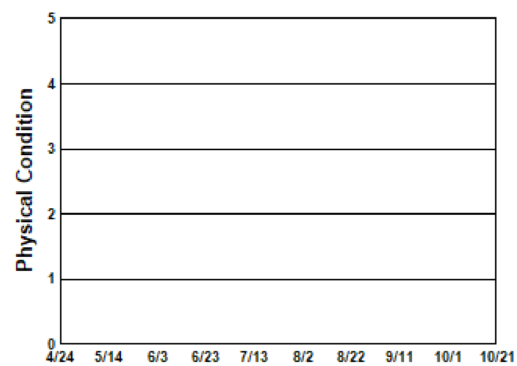
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	10.1	9.0	18	60	+1.1		
05/30/23	23.8	12.7	16	~48	0.8		
06/27/23	25.8	9.7	47	81	0.5		
07/25/23	28.8	11.3	33	74	0.6		
08/22/23	23.7	8.9	71	100	0.5		
09/20/23	23.6	19.8	120	180	0.2		
10/16/23	10.1	15.3	100	116	0.3		

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







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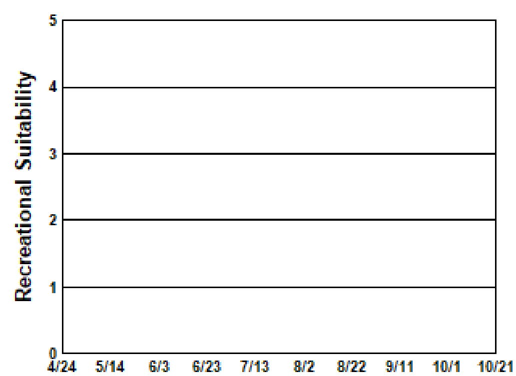

1 = Beautiful
2 = Minor Aesthetic Problem
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5 = No Aesthetics Possible

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		F					
CLA					C		F					
Secchi					D		F					
Lake Grade					**D**		**F**					

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		C			C			D
CLA		B			C			D
Secchi					D			F
Lake Grade					**C**			**D**

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

Capaul Pond [west basin] (82–0365) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

Capaul's Pond is located in Grant Township (Washington County). There is little bathymetric information available for the west basin. The basin is to the west of the Gateway State Trail.

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.

2023 Data summer (May - September) data summary

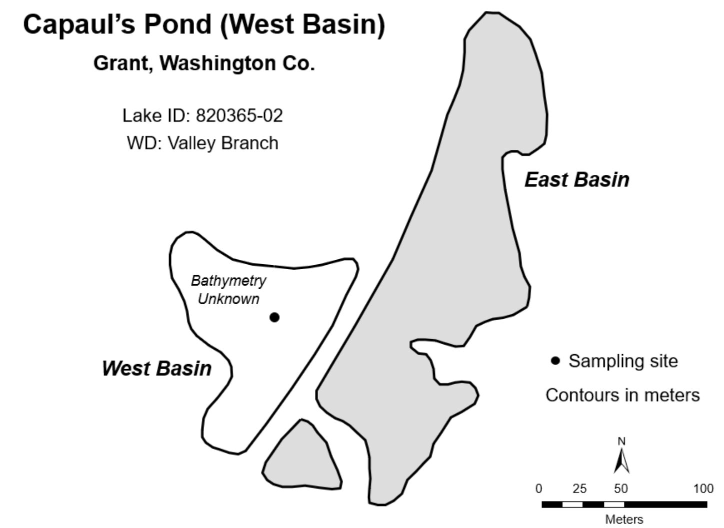
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	244	56	542	F
CLA (µg/l))	292	34	720	F
Secchi (m)	+0.3	0.1	0.6	F
TKN (mg/l)	3.83	1.43	10.50	
			Lake Grade	F

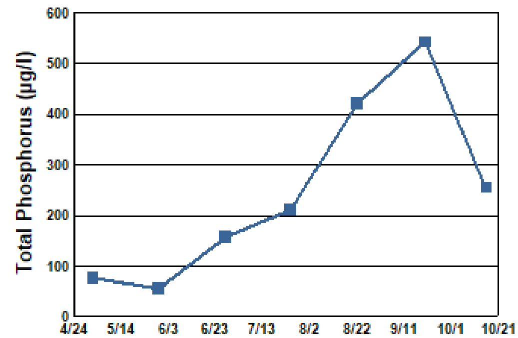
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

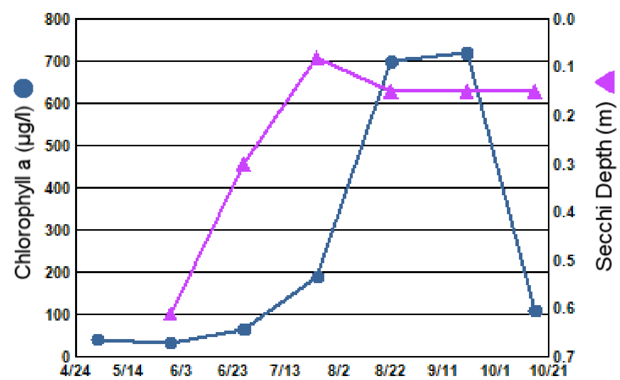
The west basin received a lake grade of F. This poor water quality continues the trend of degraded compared to 2008 and 2017. Continued monitoring is recommended to determine if this recent deterioration in water quality is part of a longer term trend.

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.



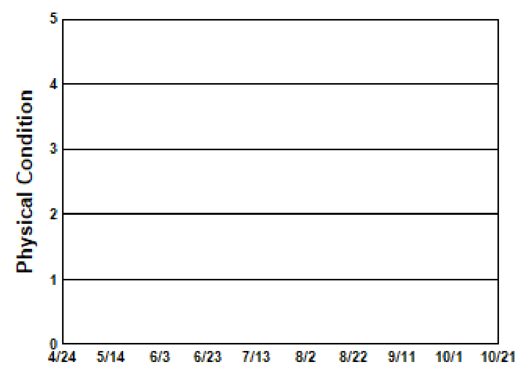




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	9.8	9.5	42	76	+0.5		
05/30/23	23.8	6.8	34	56	0.6		
06/27/23	24.2	13.5	66	157	0.3		
07/25/23	26.3	20.8	190	~211	0.1		
08/22/23	22.6	12.7	700	420	0.2		
09/20/23	24.4	21.9	720	542	0.2		
10/16/23	9.4	14.2	110	254	0.2		

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



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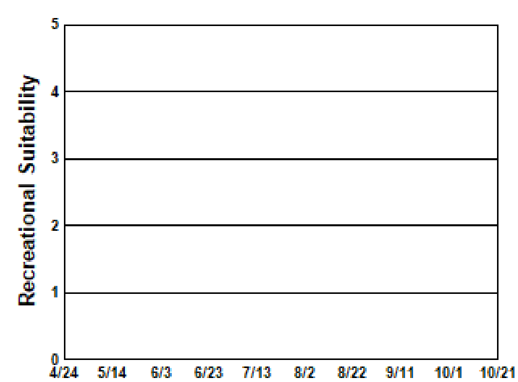

1 = Beautiful
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5 = No Aesthetics Possible

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												
CLA												
Secchi												
Lake Grade												

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		B			D			F
CLA		A			F			F
Secchi					F			F
Lake Grade					**F**			**F**

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

Carol Lake (82–0017) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Carol Lake is located in Stillwater Township (Washington County). There is little bathymetric information for this shallow lake (maximum depth of approximately 2.0 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.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	77	~29	138	D
CLA (µg/l))	16	4.9	32	B
Secchi (m)	+0.8	>0.6	+1.1	
TKN (mg/l)	1.09	0.59	1.53	
			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.

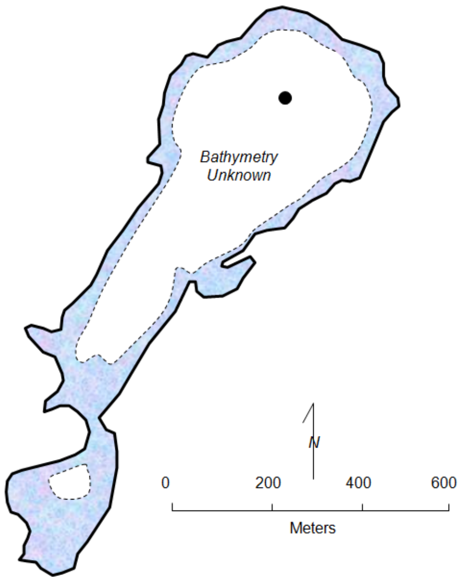
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

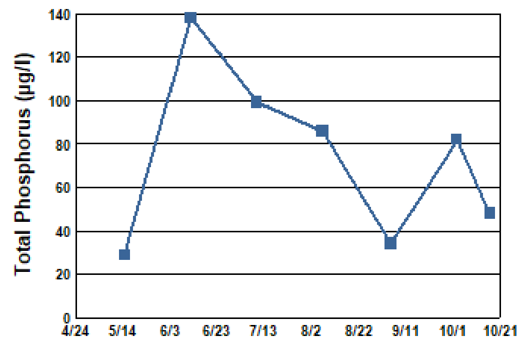
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

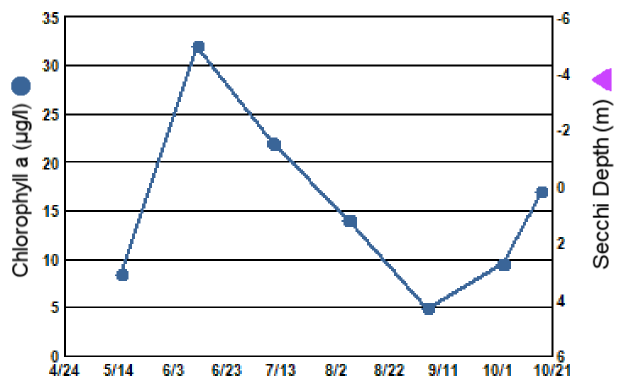
Carol Lake
Stillwater Twp., Washington Co.

LAKE ID: 820017
WD: Carnelian-Marine

● Sampling site
Contours in meters



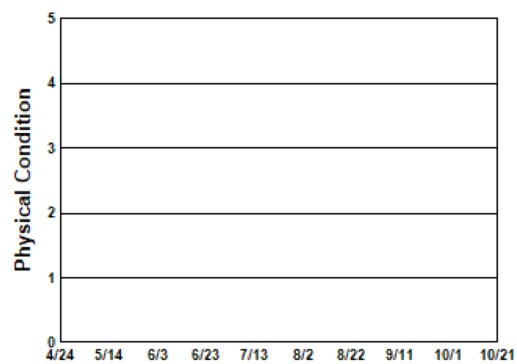




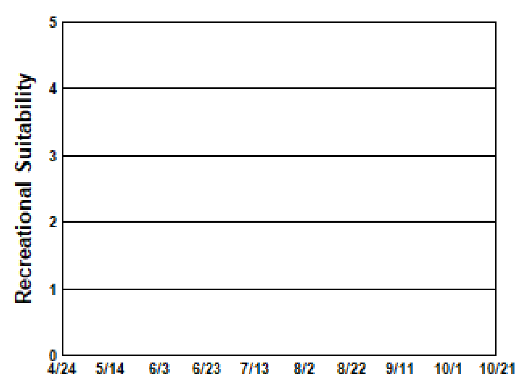
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/23	18.9	5.7	8.4	~29	>0.6		
06/12/23	16.3	8.6	32	138	>0.6		
07/10/23	20.9	1.4	22	99	+1.1		
08/07/23	21.0	1.4	14	86	>0.6		
09/05/23	22.1	1.1	4.9	~34	+1.1		
10/03/23	22.3	3.2	9.5	82	>0.8		
10/17/23	8.2	6.6	17	48	+0.9		

+ 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	A	A	A	A	B		C
CLA					B	C	C	C	A	A		B
Secchi					B	B	B	B	C	C	D	D
Lake Grade					**B**	**B**	**B**	**B**	**B**	**B**		**C**

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	C	B	C		C			D
CLA	A	A	A		B			B
Secchi								
Lake Grade								

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.

2023 Data summer (May - September) data summary

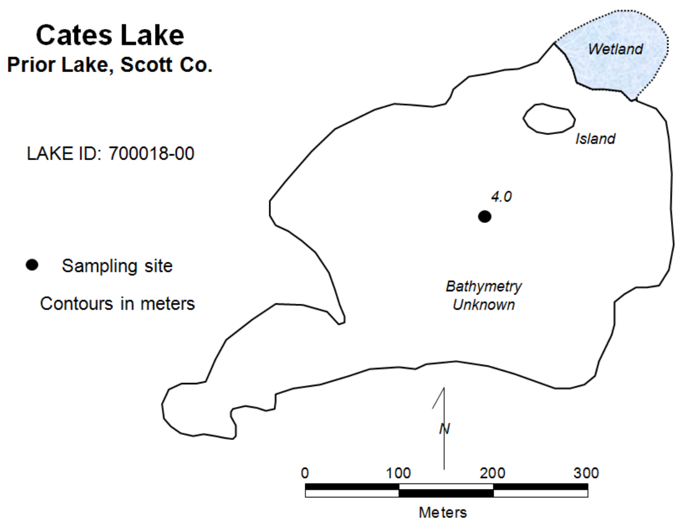
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	12	32	A
CLA (µg/l))	3.7	1.5	5.9	A
Secchi (m)	>1.7	>1.2	2.4	
TKN (mg/l)				
			Lake Grade	

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

The lake received TP and CLA grades of B and A, respectively, which is return to the better water quality conditions as observed prior to 2021. 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.

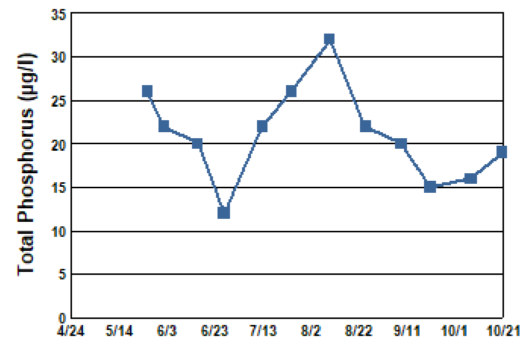
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

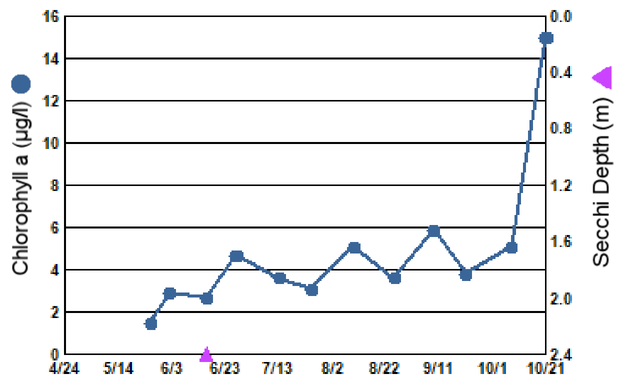


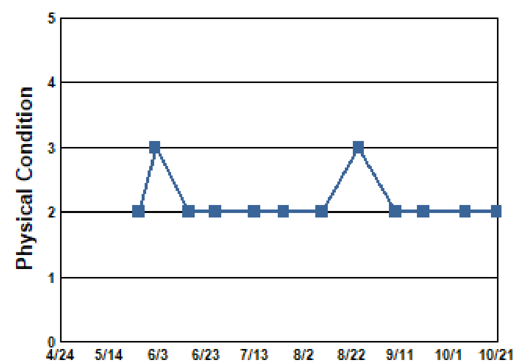
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/26/23			1.5	26	>2.3	2	3
06/02/23	24.7		2.9	22	>1.9	3	4
06/16/23			2.7	20	2.4	2	2
06/27/23	23.1		4.7	12	>1.8	2	4
07/13/23	23.0		3.6	22	>1.4	2	4
07/25/23	25.2		3.1	26	>1.6	2	4
08/10/23	25.6		5.1	32	>1.2	2	4
08/25/23	27.2		3.6	22	>1.7	3	4
09/09/23	21.0		5.9	20	>1.2	2	4
09/21/23	22.6		3.8	15	>1.5	2	4
10/08/23	15.3		5.1	16	>1.6	2	3
10/21/23	12.5		15	19	>1.8	2	4

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







1 = Crystal Clear
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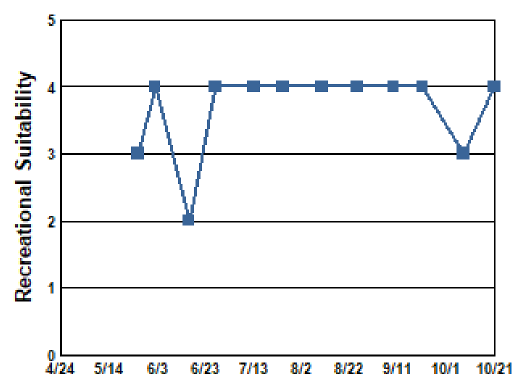
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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											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	2022	2023
TP		B	B	B	C	C	B	A
CLA		A	A	A	A	B	A	A
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.

2023 Data summer (May - September) data summary

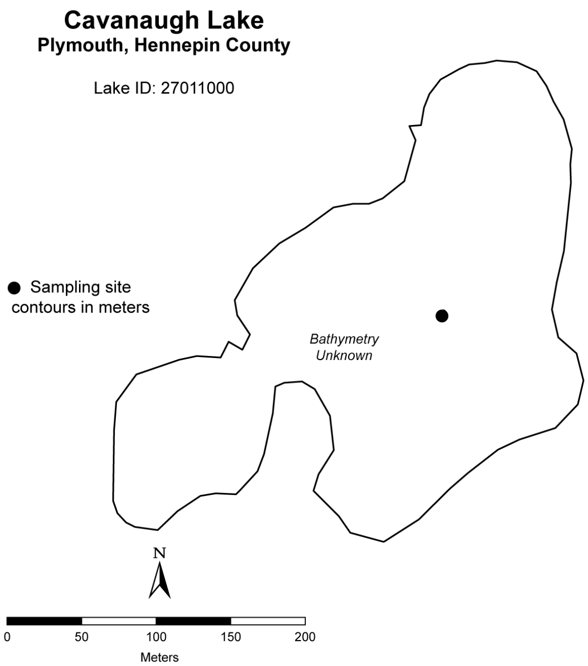
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l))				
Secchi (m)		>	>	
TKN (mg/l)				
			Lake Grade	

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

There were in sufficient number of monitoring visits to calculate parameter and 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.



2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
09/03/23	24.6		7.8	20	>1.5	1	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	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	2022	2023
TP	B	A	B	A	B	A	A	
CLA	B	B	A	A	A	A	A	
Secchi	A	A	B	A	B	A	A	
Lake Grade	**B**	**A**	**B**	**A**	**B**	**A**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	<22	<44	B or C
CLA (µg/l))	8.9	1.9	17	A
Secchi (m)	>2.2	0.9	2.6	C
TKN (mg/l)	0.82	0.45	1.33	
			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, which is consistent with its recent historical water quality database. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 27 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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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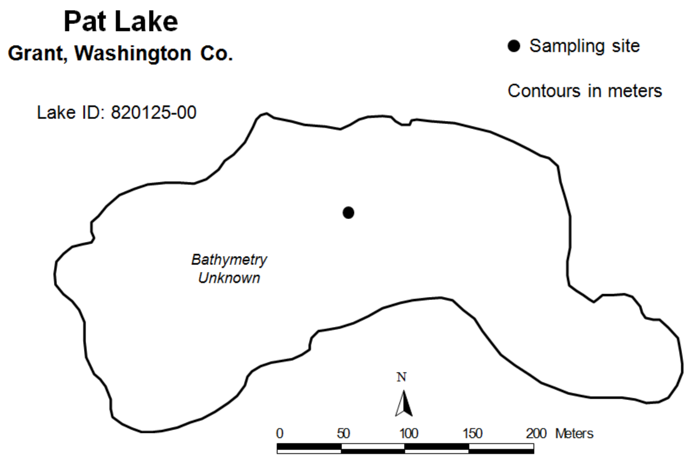
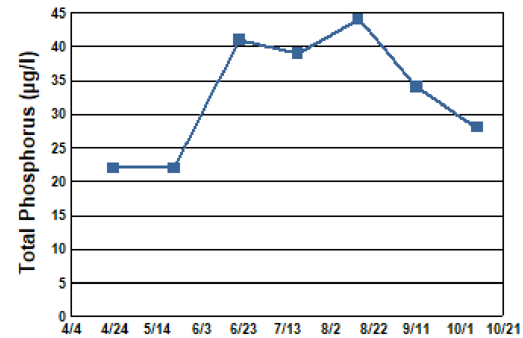
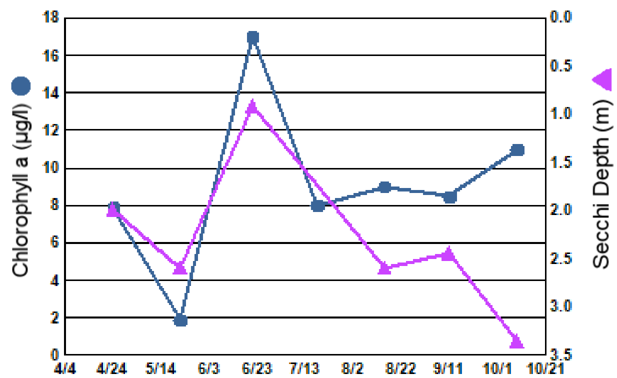


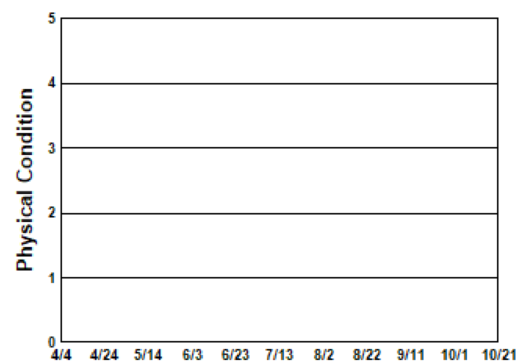


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	6.6	11.3	7.9	<22	2.0		
05/22/23	20.5	11.6	1.9	<22	2.6		
06/21/23	26.7	12.0	17	~41	0.9		
07/18/23	23.0	7.6	8.0	~39	>2.4		
08/15/23	23.2	5.3	9.0	<44	2.6		
09/11/23	21.3	4.4	8.5	34	2.4		
10/09/23	14.5	10.0	11	28	3.4		

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





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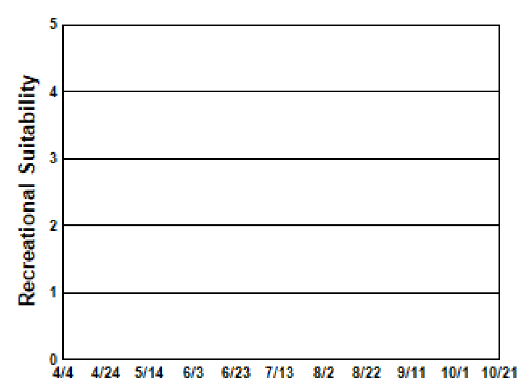

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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	2022	2023
TP	C	B	C	C	B	C	B	
CLA	B	A	B	B	A	A	A	A
Secchi	C	B	C	C	B	B	B	C
Lake Grade	**C**	**B**	**C**	**C**	**B**	**B**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	161	32	294	F
CLA (µg/l))	89	10	160	F
Secchi (m)	0.3	0.2	0.8	F
TKN (mg/l)				
			Lake Grade	F

The lake received a lake grade of F this year, which indicates worsening water quality compared to water quality in the period 2013–2022, and is a return to the poor water quality observed in the late 2010s.

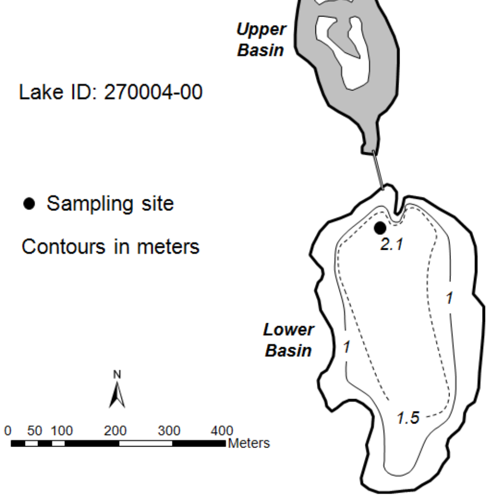
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

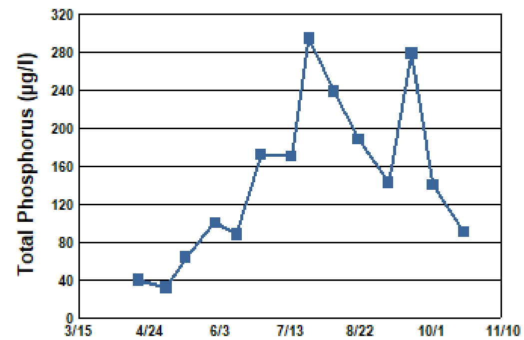
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

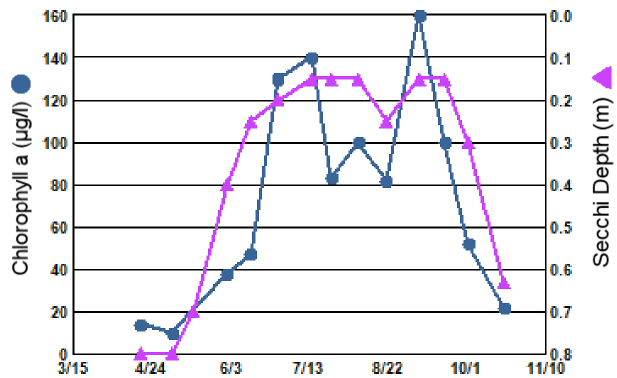
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

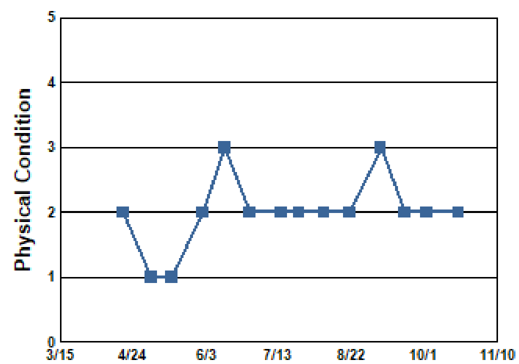
Penn Lake,
Bloomington,
Hennepin Co.

Lake ID: 270004-00









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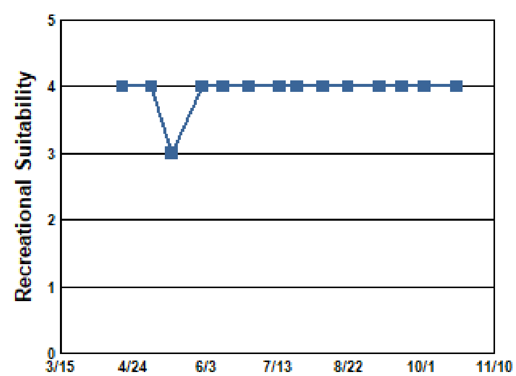

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/23	14.2		14	40	0.8	2	4
05/04/23	19.4		10	32	0.8	1	4
05/15/23	23.5			64	0.7	1	3
06/01/23	30.6		38	100	0.4	2	4
06/13/23	28.9		47	88	0.3	3	4
06/27/23	29.4		130	172	0.2	2	4
07/14/23			140	170	0.2	2	4
07/24/23	28.1		83	294	0.2	2	4
08/07/23	26.8		100	238	0.2	2	4
08/21/23	26.0		82	188	0.3	2	4
09/07/23			160	142	0.2	3	4
09/20/23	24.6		100	278	0.2	2	4
10/02/23	26.3		52	140	0.3	2	4
10/20/23	13.2		22	90	0.6	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	2022	2023
TP	D	D	D	D	D	D	F	F
CLA	D	D	D	D	D	D	F	F
Secchi	F	F	D	F	F	F	F	F
Lake Grade	**D**	**D**	**D**	**D**	**D**	**D**	**F**	**F**

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).

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.

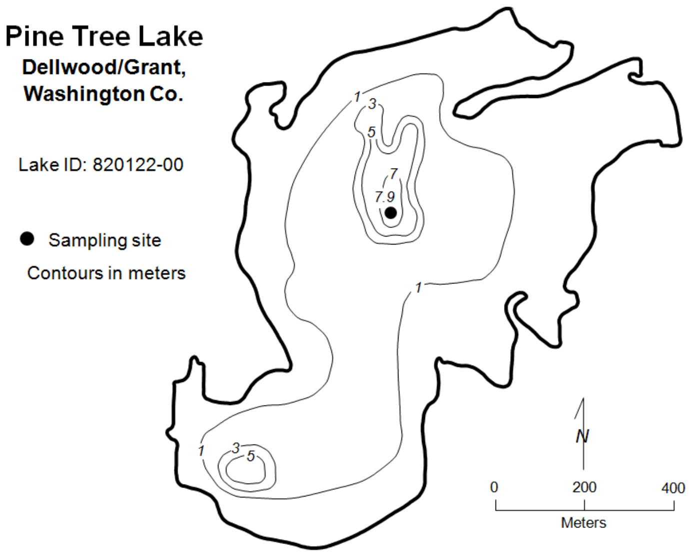
2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	13	<10	16	A
CLA (µg/l))	3.0	2.2	3.6	
Secchi (m)	3.0	2.5	3.3	B
TKN (mg/l)				
			Lake Grade	

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.

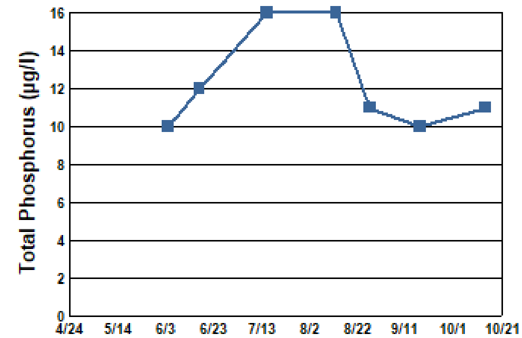
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

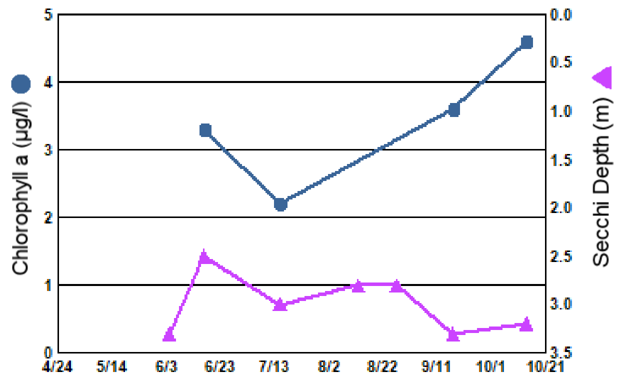
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

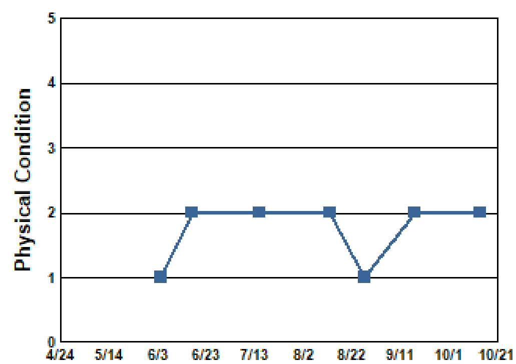


2023 Data

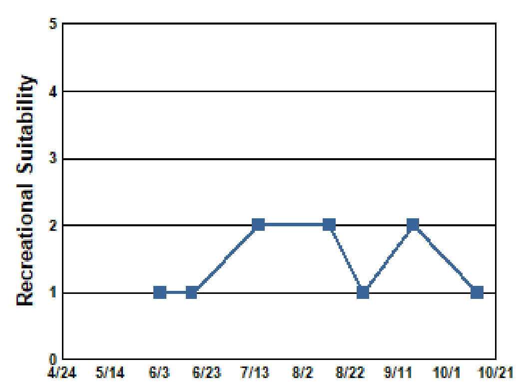
Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/04/23	28.9			<10	3.3	1	1
06/17/23	24.6		3.3	12	2.5	2	1
07/15/23	24.5		2.2	16	3.0	2	2
08/13/23	25.2			16	2.8	2	2
08/27/23	24.9			11	2.8	1	1
09/17/23	20.3		3.6	<10	3.3	2	2
10/14/23	11.4		4.6	11	3.2	2	1







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						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	2022	2023
TP	A	A	A	B	B	A	A	A
CLA	A	A	A	A	A	A	A	
Secchi	B	B	B	B	B	B	B	B
Lake Grade	**A**	**A**	**A**	**B**	**B**	**A**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	<22	<44	A or B
CLA (µg/l))	3.5	1.6	6.4	A
Secchi (m)	>2.4	>2.1	>2.7	
TKN (mg/l)	0.50	0.43	0.60	
			Lake Grade	

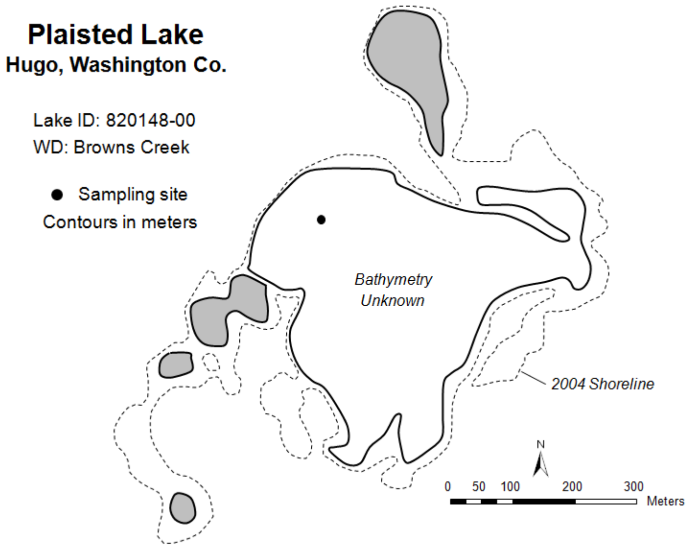
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

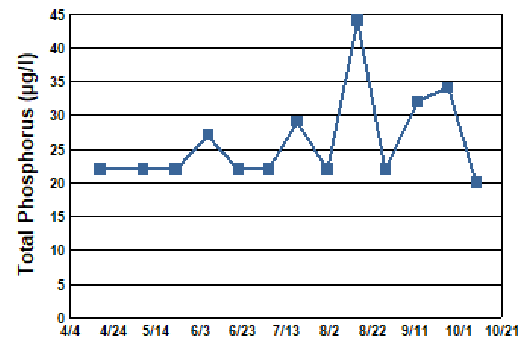
There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity 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.

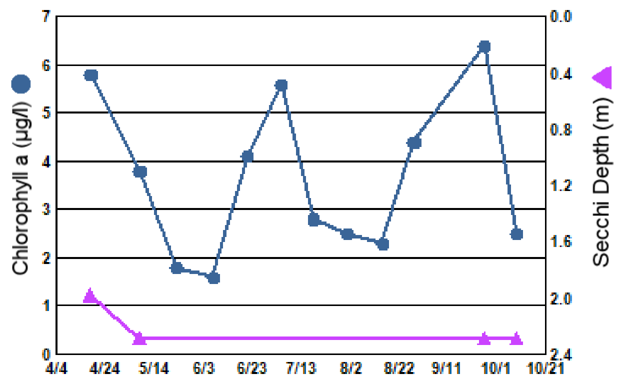
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 18 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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.



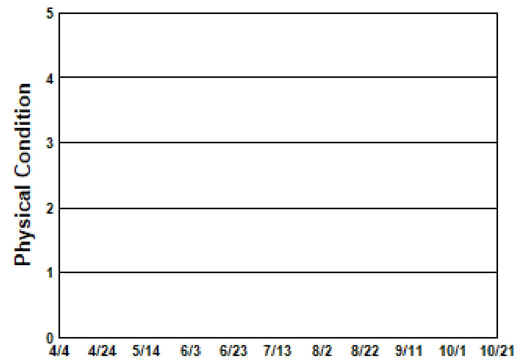




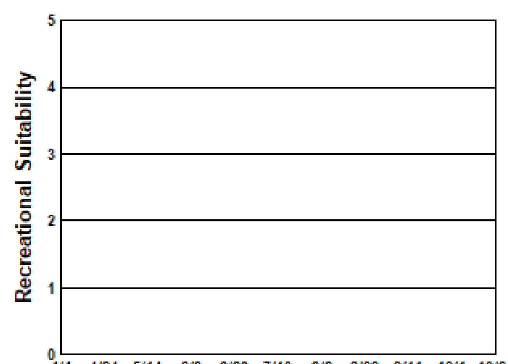
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/23	6.0	7.4	5.8	<22	2.0		
05/08/23	16.9	8.5	3.8	<22	2.3		
05/23/23	20.4	12.9	1.8	<22	>2.7		
06/07/23	26.2	13.1	1.6	~27	>2.3		
06/21/23	25.3	13.2	4.1	<22	>2.4		
07/05/23	27.1	9.5	5.6	<22	>2.3		
07/18/23	23.8	9.2	2.8	~29	>2.4		
08/01/23	26.7	8.8	2.5	<22	>2.3		
08/15/23	23.8	6.7	2.3	<44	>2.4		
08/28/23	25.0	10.9	4.4	<22	>2.1		
09/12/23	20.6	6.1		32	>2.3		
09/26/23	19.6	9.4	6.4	34	2.3		
10/09/23	15.4	8.0	2.5	20	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					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	2022	2023
TP	B	A	A	B	A	A	A	
CLA	B	A	A	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.

2023 Data summer (May - September) data summary

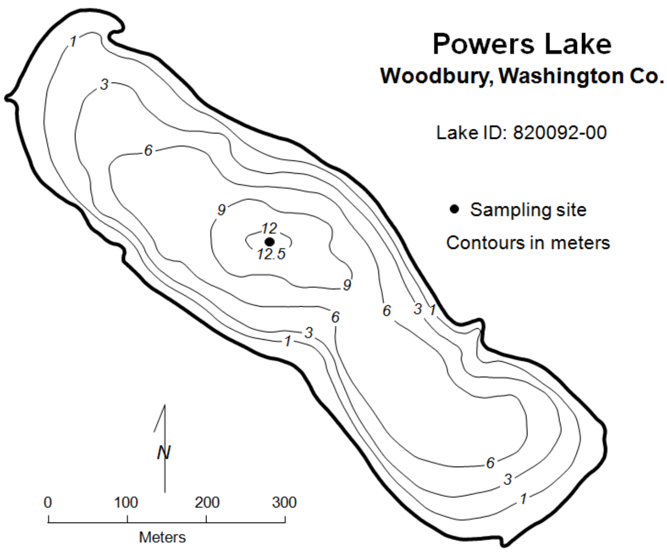
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	34	<22	65	B or C
CLA (µg/l))	9.9	3.3	18	A
Secchi (m)	2.5	1.7	3.5	B
TKN (mg/l)	0.69	0.59	0.82	
			Lake Grade	B

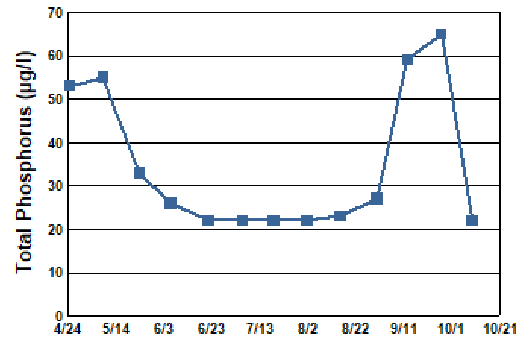
The lake received a lake grade of B this year which is consistent with its historical water quality database. The lake has varied in the A to C grade range since 1994. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 30 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

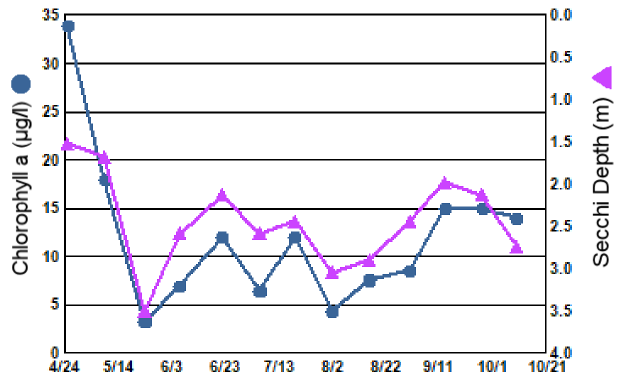
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

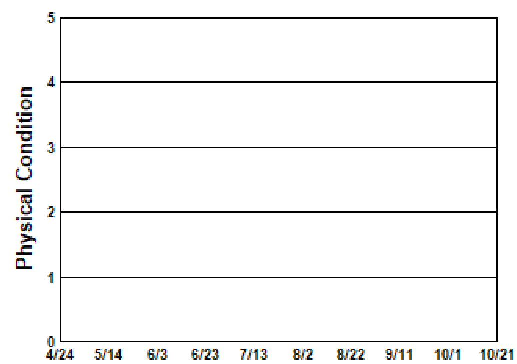






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/23	6.6	10.3	34	53	1.5		
05/09/23	16.8	15.8	18	55	1.7		
05/24/23	20.5	13.9	3.3	~33	3.5		
06/06/23	25.4	11.7	7.0	~26	2.6		
06/22/23	26.9	13.7	12	<22	2.1		
07/06/23	25.6	11.9	6.5	<22	2.6		
07/19/23	23.9	11.4	12	<22	2.4		
08/02/23	27.1	10.3	4.4	<22	3.1		
08/16/23	24.0	10.6	7.6	~23	2.9		
08/31/23	24.2	12.8	8.6	27	2.4		
09/13/23	21.2	11.9	15	59	2.0		
09/27/23	20.2	11.0	15	65	2.1		
10/10/23	16.2	10.2	14	22	2.7		



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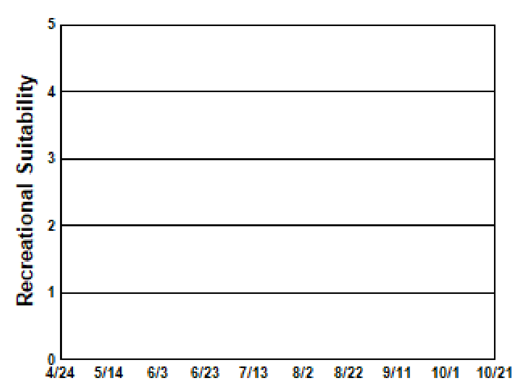


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	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	2022	2023
TP	B	C	A	B	C	B	B	
CLA	B	C	A	B	B	B	B	A
Secchi	C	C	A	A	B	B	C	B
Lake Grade	**B**	**C**	**A**	**B**	**B**	**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: Walt Popp, Kevin Smith, Dwight Smith, Phil Vieth

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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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, aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2022, and aquatic recreational use (nutrient/eutrophication biological indicators) in 2024.

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.

2023 Data summer (May - September) data summary

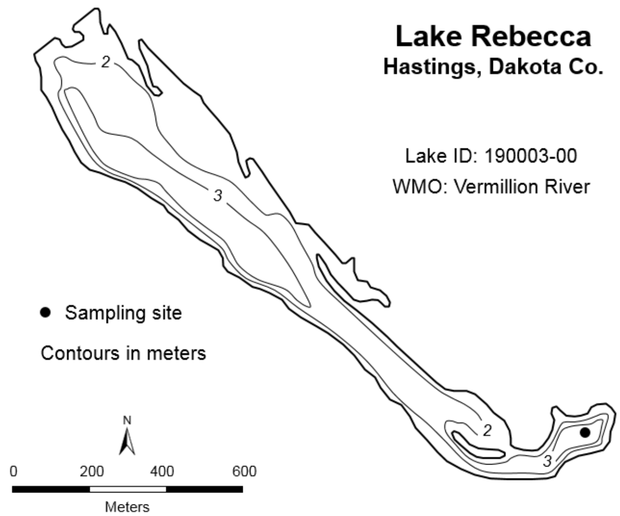
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	98	54	172	D
CLA (µg/l))	72	13	200	D
Secchi (m)	0.9	0.5	2.1	D
TKN (mg/l)				
			Lake Grade	D

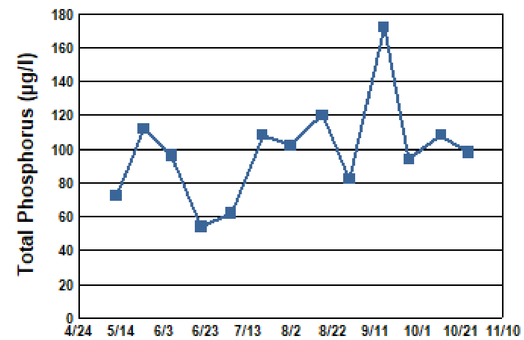
The lake received a lake grade of D this year which is consistent with its historical water quality database. The water quality of the lake has varied in the D to F range. Continued monitoring is recommended to continue to build the water quality database.

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/.

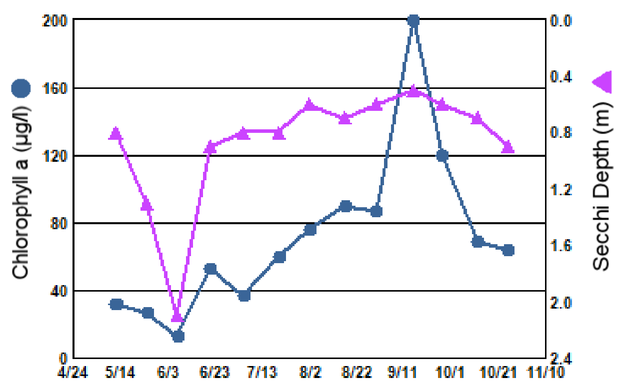
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

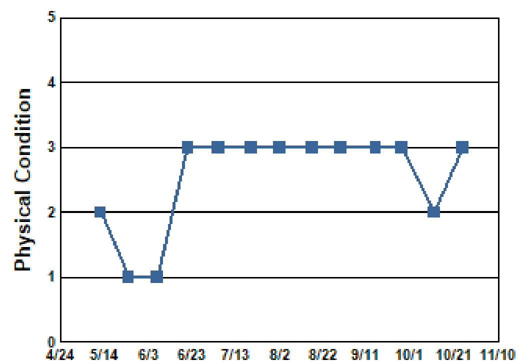




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/12/23	19.2		32	72	0.8	2	4
05/25/23	18.2		27	112	1.3	1	4
06/07/23	25.1		13	96	2.1	1	4
06/21/23	25.0		53	54	0.9	3	4
07/05/23	21.8		37	62	0.8	3	4
07/20/23	24.0		60	108	0.8	3	4
08/02/23	26.8		76	102	0.6	3	4
08/17/23	22.3		90	120	0.7	3	4
08/30/23	24.0		87	82	0.6	3	4
09/15/23	18.8		200	172	0.5	3	4
09/27/23	18.9		120	94	0.6	3	4
10/12/23	12.5		69	108	0.7	2	4
10/25/23	12.1		64	98	0.9	3	4





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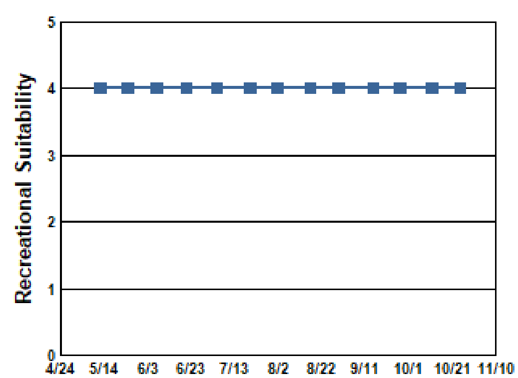
4 = High Algal Color
5 = Severe Algal Bloom



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												
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	2022	2023
TP	D	D	D	D	D	D	D	D
CLA	D	F	D	D	D	F	F	D
Secchi	C	F	D	D	D	F	D	D
Lake Grade	**D**	**F**	**D**	**D**	**D**	**F**	**D**	**D**

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. The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) 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.

2023 Data summer (May - September) data summary

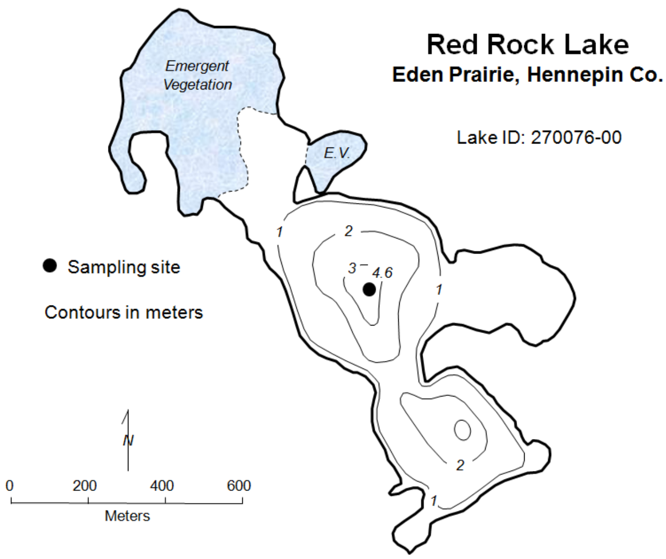
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	13	68	C
CLA (µg/l))	17	3.1	52	B
Secchi (m)	1.8	0.8	2.9	C
TKN (mg/l)				
			Lake Grade	C

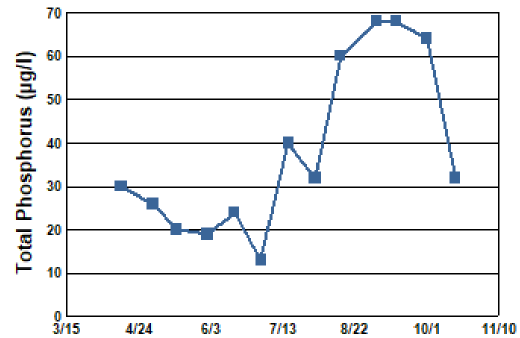
The lake received a lake grade of C this year which is consistent with water quality conditions since 2014. Continued monitoring is recommended to continue to build the water quality database.

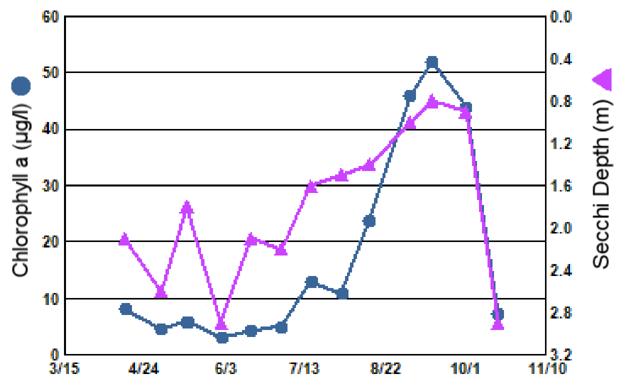
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

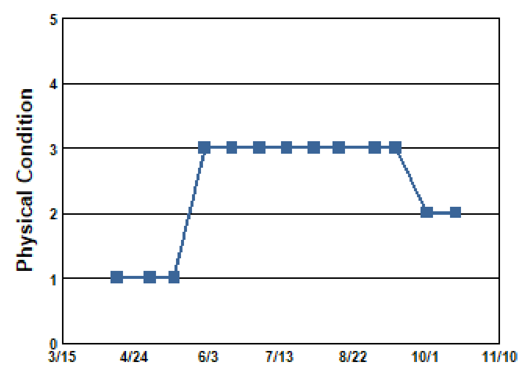






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/14/23	12.4		8.2	30	2.1	1	1
05/02/23	13.8		4.7	26	2.6	1	1
05/15/23	20.8		6.0	20	1.8	1	1
06/01/23	26.7		3.1	19	2.9	3	2
06/16/23	23.7		4.4	24	2.1	3	3
07/01/23	28.8		5.1	13	2.2	3	2
07/16/23	24.8		13	40	1.6	3	3
07/31/23	27.0		11	32	1.5	3	3
08/14/23	24.0		24	60	1.4	3	3
09/03/23	24.4		46	68	1.0	3	3
09/14/23	20.9		52	68	0.8	3	3
10/01/23	21.2		44	64	0.9	2	2
10/17/23	11.5		7.4	32	2.9	2	2



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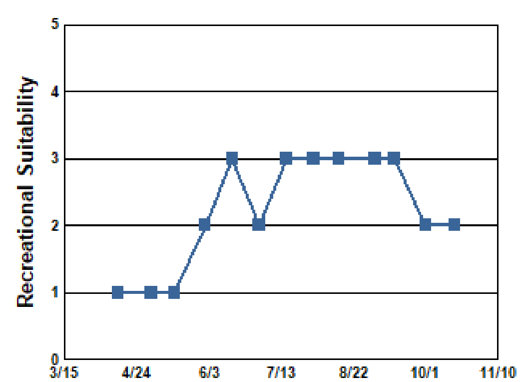
4 = High Algal Color
5 = Severe Algal Bloom



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								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	2022	2023
TP	C	C	C	C	C	C	C	C
CLA	C	B	C	C	C	C	C	B
Secchi	C	C	C	D	C	C	C	C
Lake Grade	**C**	**C**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	72	~30	120	D
CLA (µg/l))	30	2.6	44	C
Secchi (m)	1.4	0.8	2.6	C
TKN (mg/l)	1.10	0.62	1.35	
			Lake Grade	C

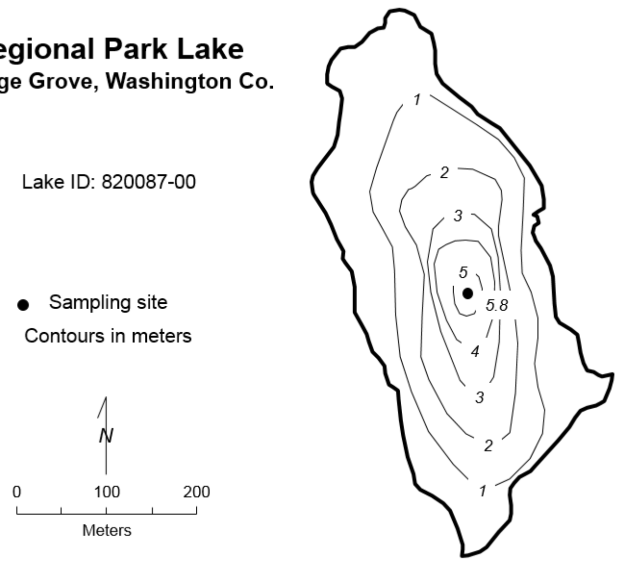
The lake received a lake grade of C which is consistent with its historical water quality database.

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/.

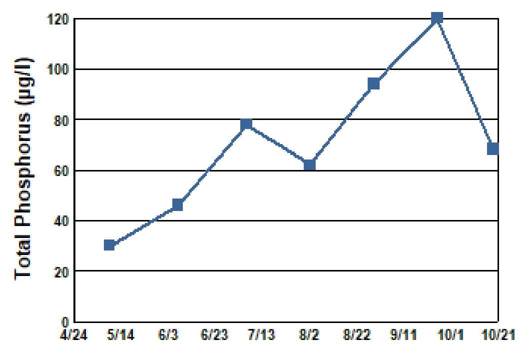
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

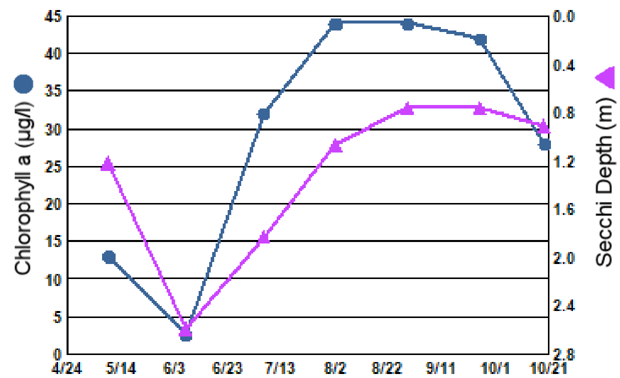
Regional Park Lake
Cottage Grove, Washington Co.

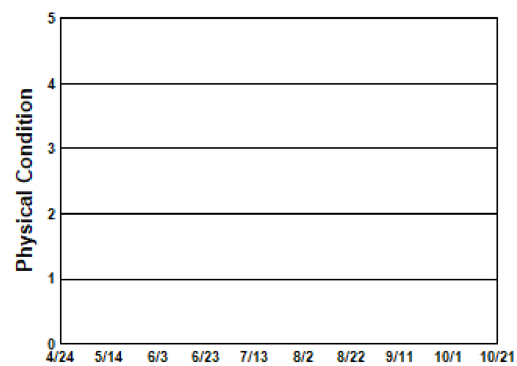


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/09/23	17.6	21.5	13	~30	1.2		
06/07/23	24.2	12.6	2.6	~46	2.6		
07/06/23	24.4	12.8	32	78	1.8		
08/02/23	26.3	18.3	44	62	1.1		
08/29/23	23.8	17.6	44	94	0.8		
09/25/23	19.9	14.4	42	120	0.8		
10/19/23	11.9	14.2	28	68	0.9		







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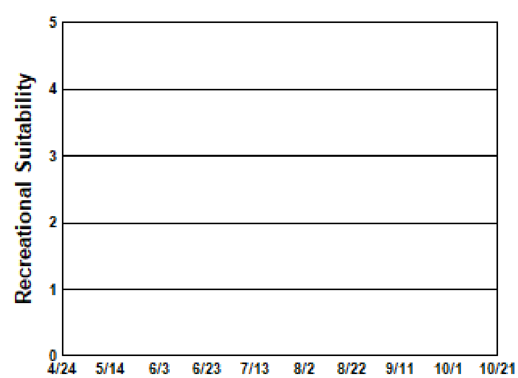
4 = High Algal Color
5 = Severe Algal Bloom



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	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	2022	2023
TP	C		D	C	C	D	D	D
CLA	C		C	C	C	C	D	C
Secchi	C		C	C	C	C	D	C
Lake Grade	**C**		**C**	**C**	**C**	**C**	**D**	**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	58	20	130	C
CLA (µg/l))	27	3.0	54	C
Secchi (m)	>0.8	0.3	>1.7	
TKN (mg/l)				
			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.

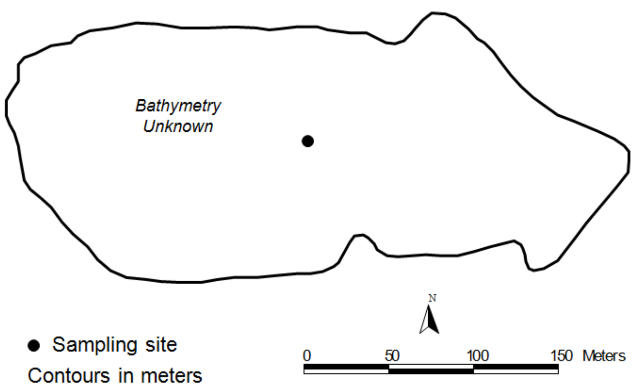
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

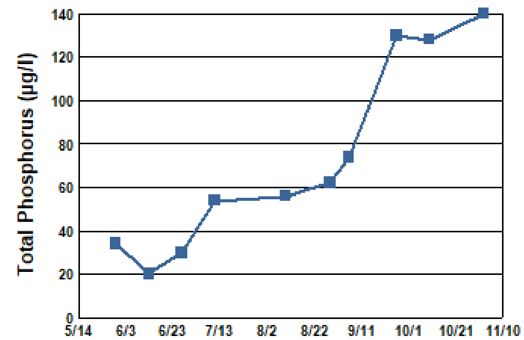
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

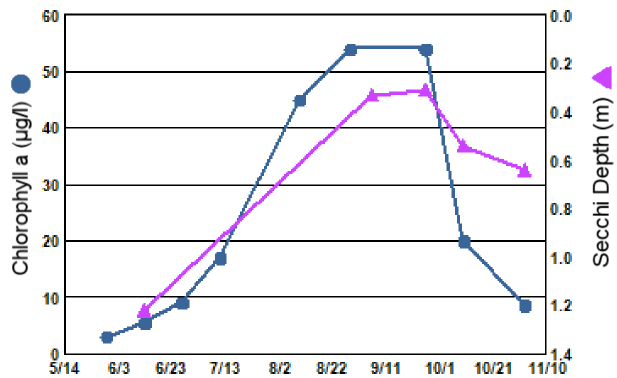
Rest Area Pond

West Lakeland Twp., Washington Co.

Lake ID: 820514-00



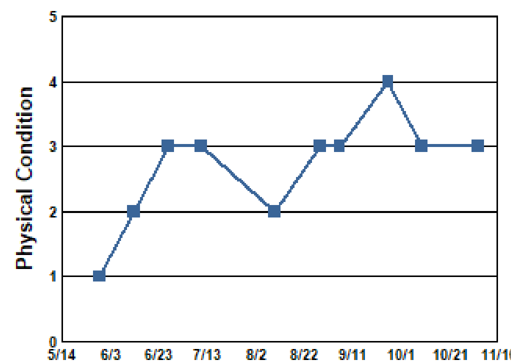




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/30/23	22.9		3.0	34	>1.7	1	4
06/13/23	22.4		5.5	20	1.2	2	4
06/27/23	25.4		9.1	30	>1.0	3	4
07/11/23	24.6		17	54	>0.7	3	4
08/10/23	24.7		45	56	>0.4	2	4
08/29/23	24.1		54	62	>0.4	3	4
09/06/23	25.2			74	0.3	3	4
09/26/23	19.8		54	130	0.3	4	4
10/10/23			20	128	0.5	3	4
11/02/23	5.1		8.6	140	0.6	3	4

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



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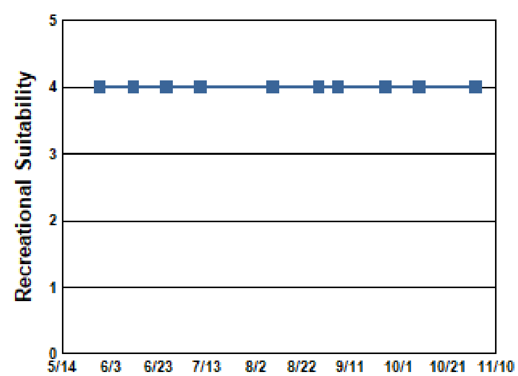
5 = Severe Algal Bloom



1 = Beautiful
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	2022	2023
TP	D	C	D	C	B	D	D	C
CLA	C	C	C	B	A	C	C	C
Secchi	D	D	D	C	C	D	D	
Lake Grade	**D**	**C**	**D**	**C**	**B**	**D**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	17	<10	30	A
CLA (µg/l))	4.4	1.7	8.6	A
Secchi (m)	3.5	2.8	5.4	A
TKN (mg/l)				
			Lake Grade	A

The lake received a lake grade of A this year which continues the string of A lake grades starting in 2019. 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/.

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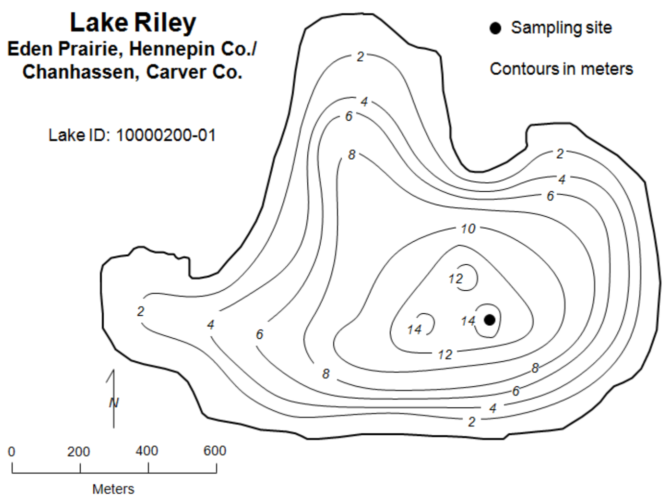

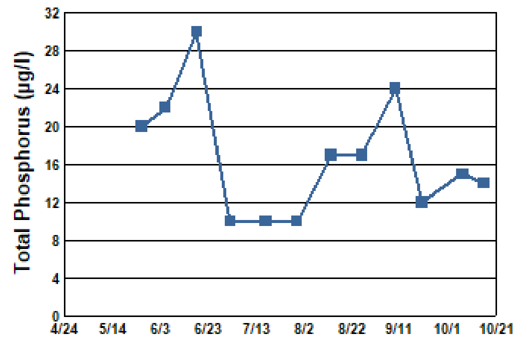

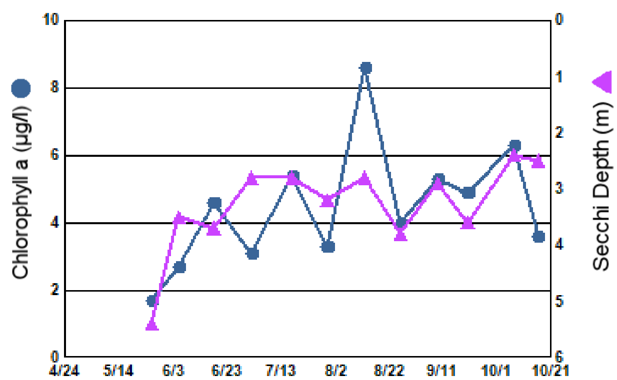

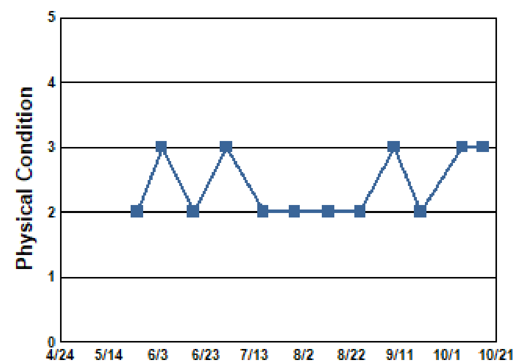

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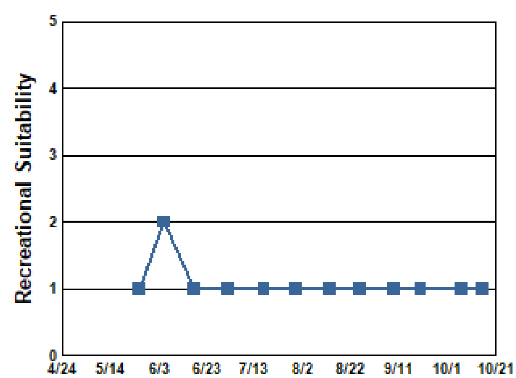


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/26/23	19.2		1.7	20	5.4	2	1
06/05/23	26.2		2.7	22	3.5	3	2
06/18/23	23.8		4.6	30	3.7	2	1
07/02/23	27.9		3.1	<10	2.8	3	1
07/17/23	23.8		5.4	<10	2.8	2	1
07/30/23	27.4		3.3	<10	3.2	2	1
08/13/23	25.4		8.6	17	2.8	2	1
08/26/23	25.6		4.0	17	3.8	2	1
09/09/23	20.0		5.3	24	2.9	3	1
09/20/23	21.7		4.9	12	3.6	2	1
10/07/23	17.8		6.3	15	2.4	3	1
10/16/23	13.3		3.6	14	2.5	3	1

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	2022	2023
TP	B	C	B	B	A	B	A	A
CLA	B	B	A	A	A	A	A	A
Secchi	A	B	B	A	A	A	A	A
Lake Grade	**B**	**B**	**B**	**A**	**A**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	16	52	B
CLA (µg/l))	5.3	3.8	10	A
Secchi (m)	+1.7	>1.5	+2.0	
TKN (mg/l)				
			Lake Grade	

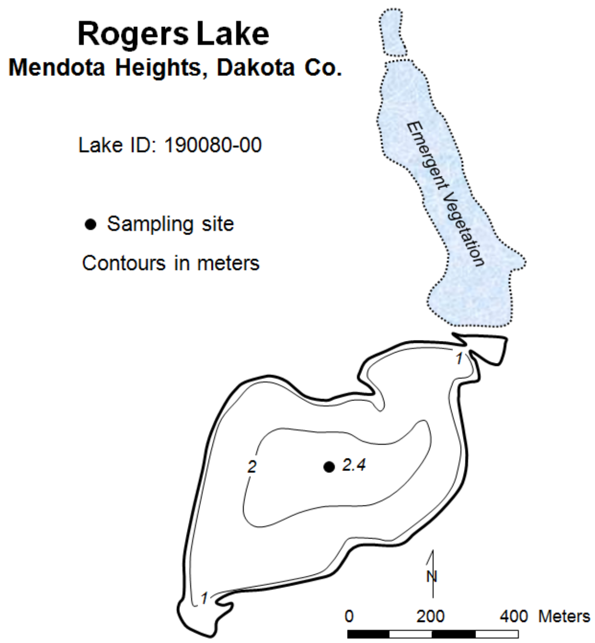
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

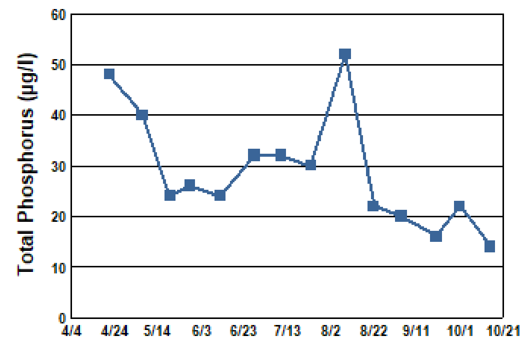
There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity 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.

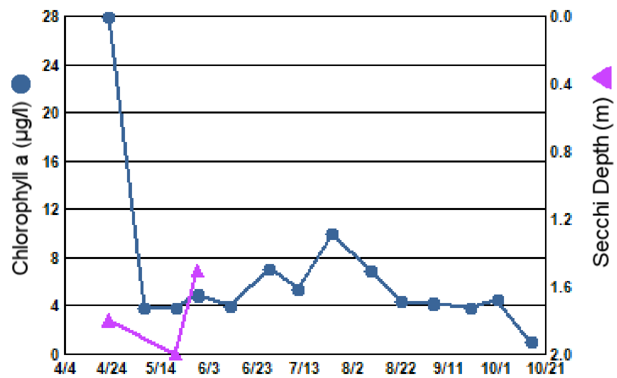
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.



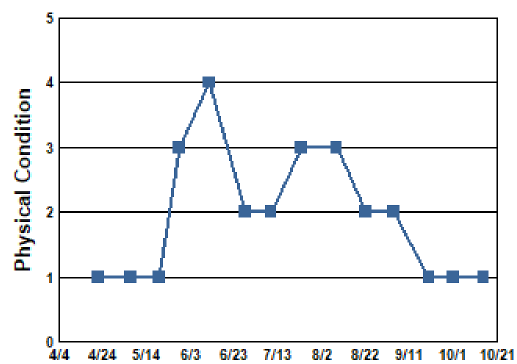




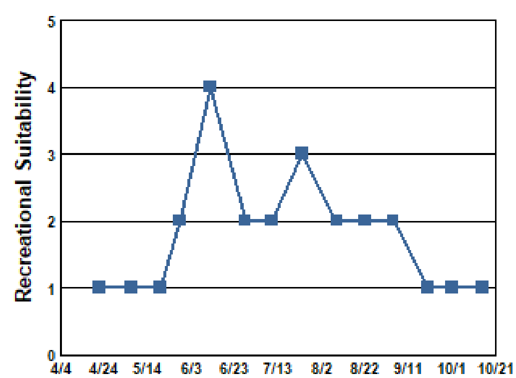
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/23	8.0		28	48	1.8	1	1
05/07/23	18.1		3.8	40	>1.9	1	1
05/20/23	20.0		3.9	24	2.0	1	1
05/29/23	24.2		4.9	26	1.5	3	2
06/12/23	24.0		4.0	24	>1.5	4	4
06/28/23	25.7		7.1	32	>1.7	2	2
07/10/23	25.8		5.4	32	>1.6	2	2
07/24/23	32.1		10	30	>1.5	3	3
08/09/23	27.3		7.0	52	>1.5	3	2
08/22/23	27.7		4.4	22	>1.7	2	2
09/04/23	26.9		4.2	20	>1.8	2	2
09/20/23	21.7		3.9	16	+2.0	1	1
10/01/23	22.0		4.5	22	>1.8	1	1
10/15/23	12.6		1.0	14	+2.2	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												
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	2022	2023
TP	B	A		B	C	C	B	B
CLA	A	A		A	A	A	A	A
Secchi								
Lake Grade								

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

Ryan Lake (27–0058) *Shingle Creek Watershed Management Commission*

Volunteer: David Wabbe

Ryan Lake is located in the City of Robbinsdale (Hennepin County). The 35-acre lake has a maximum depth of approximately 10.7 m (35 ft). The watershed for the lake has an area of 5,510 acres. The surface area of the watershed and lake translate to a watershed-to-lake area ratio of 157:1. 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	24	74	C
CLA (µg/l))	11	3.3	28	B
Secchi (m)	2.0	0.7	2.9	C
TKN (mg/l)				
			Lake Grade	C

The lake received a lake grade of C which is a lower water quality than the typical B grades received since 2002.

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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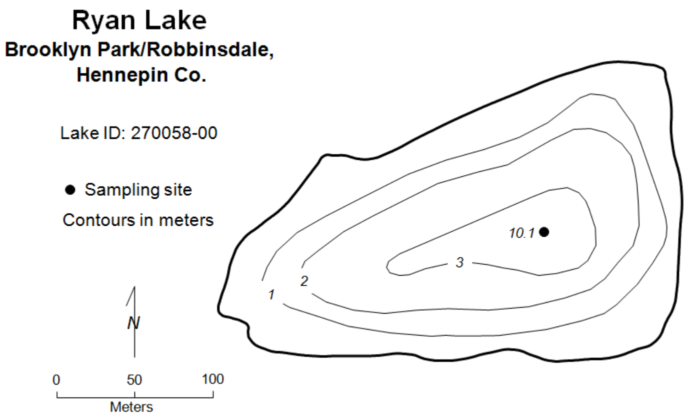
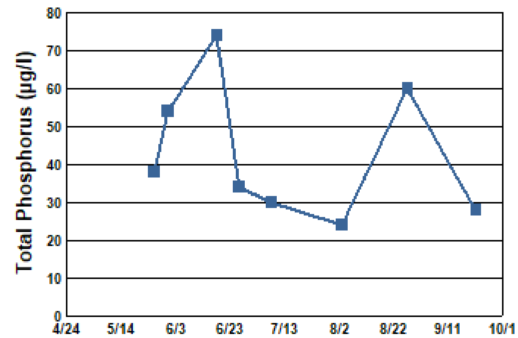
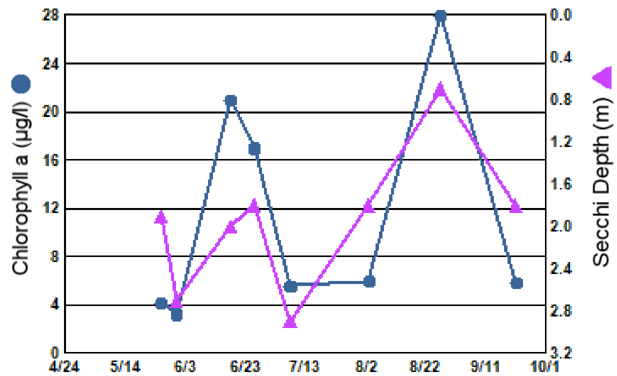
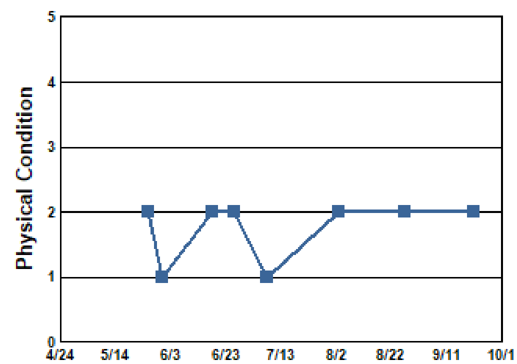




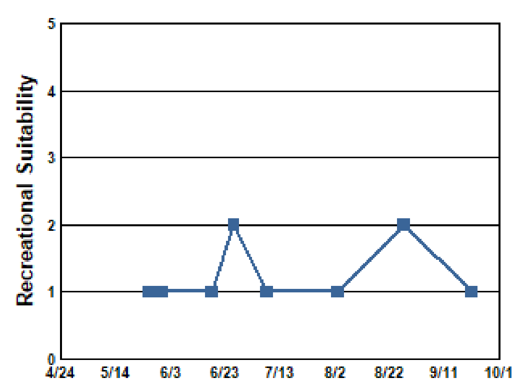


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/26/23	23.8		4.2	38	1.9	2	1
05/31/23	28.2		3.3	54	2.7	1	1
06/18/23	24.3		21	74	2.0	2	1
06/26/23	25.0		17	34	1.8	2	2
07/08/23	24.7		5.6	30	2.9	1	1
08/03/23	31.2		6.0	24	1.8	2	1
08/27/23	26.6		28	60	0.7	2	2
09/21/23	22.4		5.9	28	1.8	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		D		C	C
CLA					B		B		C		A	A
Secchi			C	C	C		B		D		C	B
Lake Grade					**C**		**B**		**D**		**B**	**B**

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP					C			C
CLA					A			B
Secchi					C			C
Lake Grade					**B**			**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	45	~33	66	C
CLA (µg/l))	28	11	59	C
Secchi (m)	1.0	0.6	1.7	D
TKN (mg/l)	1.43	1.21	1.77	
			Lake Grade	C

The received a lake grade of C, 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/.

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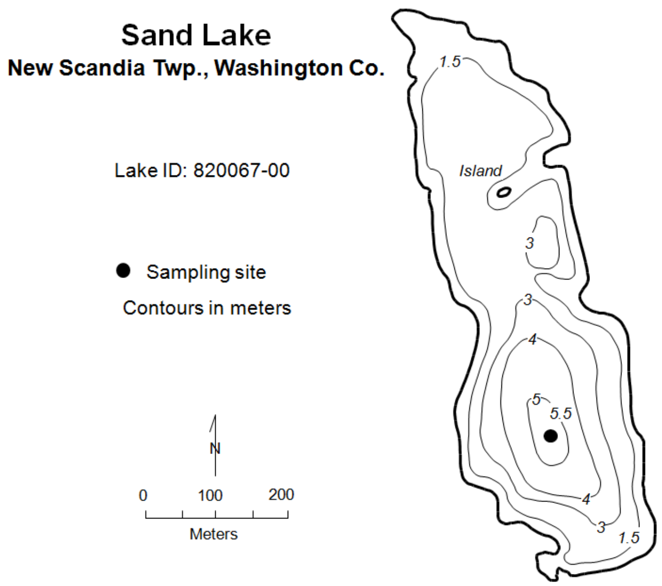
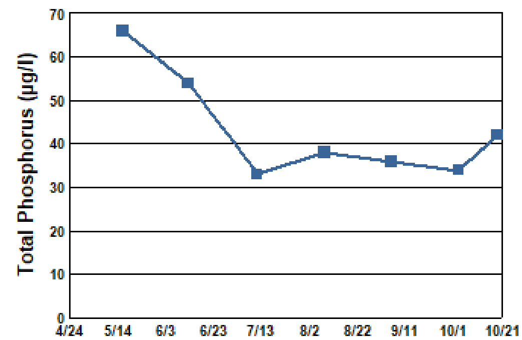
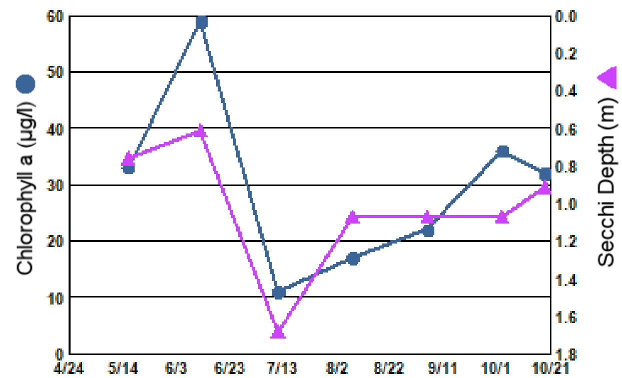
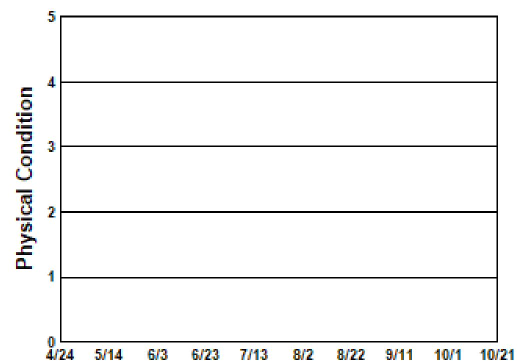






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
05/16/ 23	19.4	13.1	33	66	0.8		
06/12/ 23	22.2	12.8	59	54	0.6		
07/11/ 23	24.1	9.7	11	~33	1.7		
08/08/ 23	26.1	9.7	17	~38	1.1		
09/05/ 23	25.7	11.3	22	~36	1.1		
10/03/ 23	21.5	12.9	36	34	1.1		
10/19/ 23	12.4	12.5	32	42	0.9		



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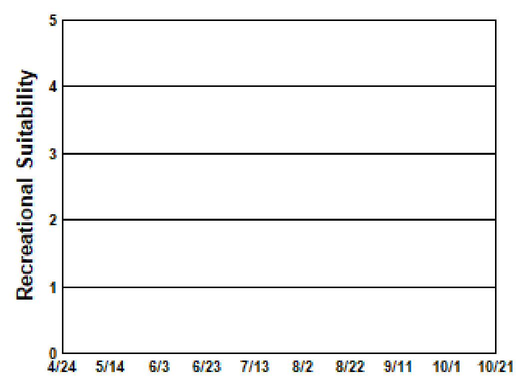
4 = High Algal Color
5 = Severe Algal Bloom



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		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	2022	2023
TP	C	B	B	C	C	B	C	C
CLA	B	B	B	C	C	B	C	C
Secchi	C	C	C	D	C	C	D	D
Lake Grade	**C**	**B**	**B**	**C**	**C**	**B**	**C**	**C**

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

Schmidt Lake (27–0102) *Shingle Creek Watershed Management Commission*

Volunteer: Stu Froelich

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	26	80	C
CLA (µg/l))	21	4.4	48	C
Secchi (m)	1.9	0.6	3.7	C
TKN (mg/l)				
			Lake Grade	C

The lake received a lake grade of C which is a return to poorer water quality last observed during the early 2000's.

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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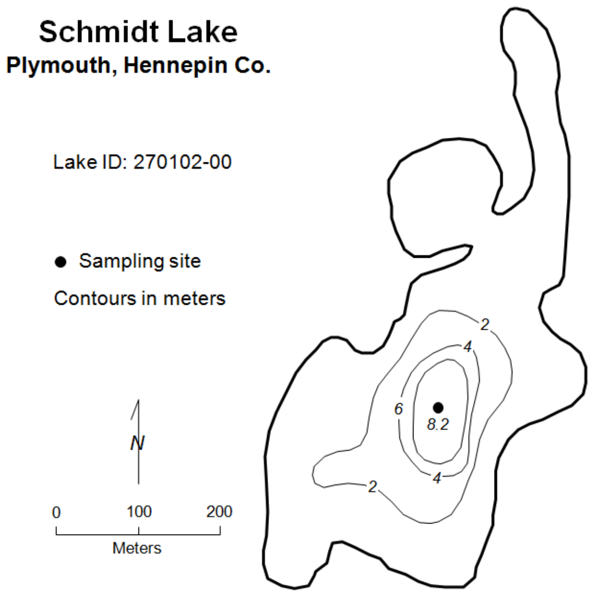
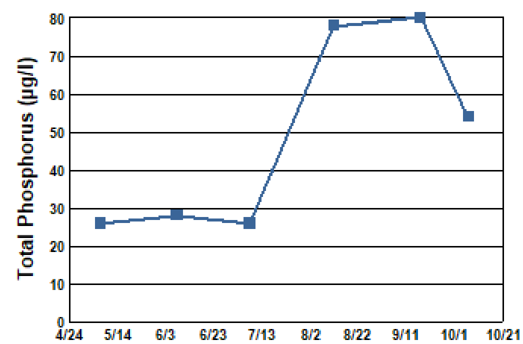
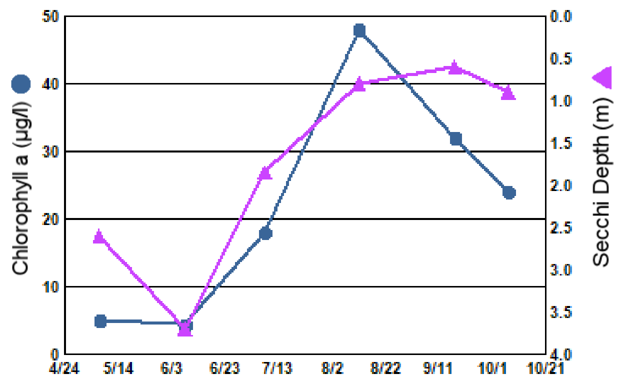
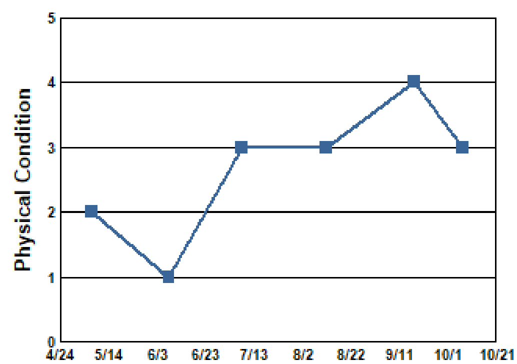


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
05/07/ 23	17.5		5.0	26	2.6	2	1
06/08/ 23	27.6		4.4	28	3.7	1	1
07/08/ 23	25.2		18	26	1.9	3	1
08/12/ 23	26.7		48	78	0.8	3	2
09/17/ 23	19.4		32	80	0.6	4	2
10/07/ 23	16.4		24	54	0.9	3	2







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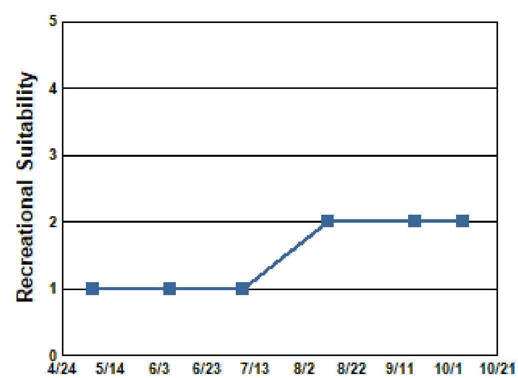

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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				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	2022	2023
TP						C		C
CLA						A		C
Secchi						B		C
Lake Grade						**B**		**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	36	56	C
CLA (µg/l))	15	7.7	22	B
Secchi (m)	1.2	1.0	1.5	D
TKN (mg/l)				
			Lake Grade	C

The lake received a lake grade of C which indicates water quality similar to that observed in 2020. 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.

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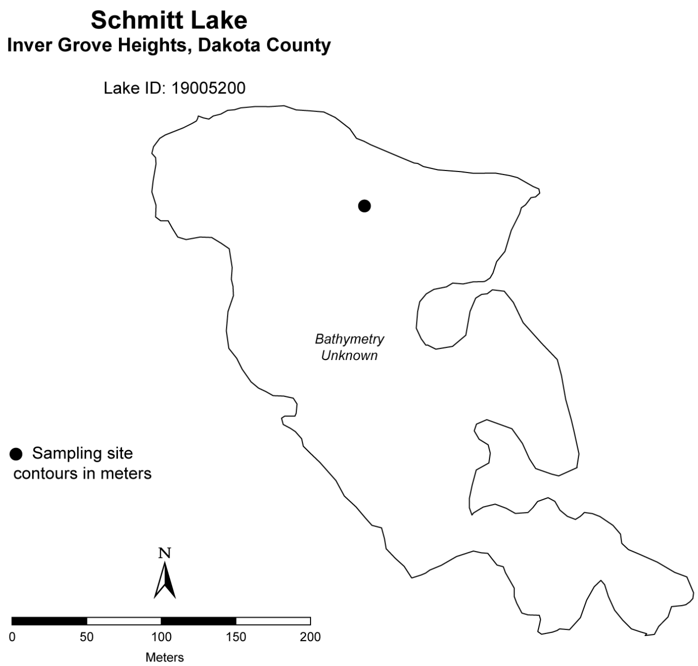
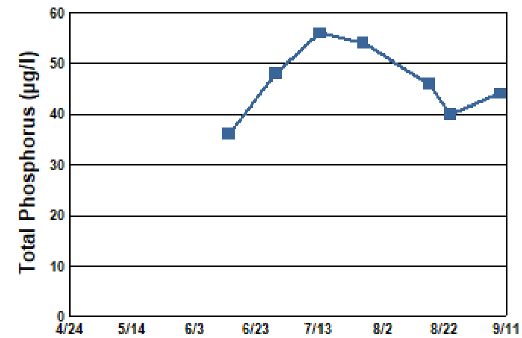
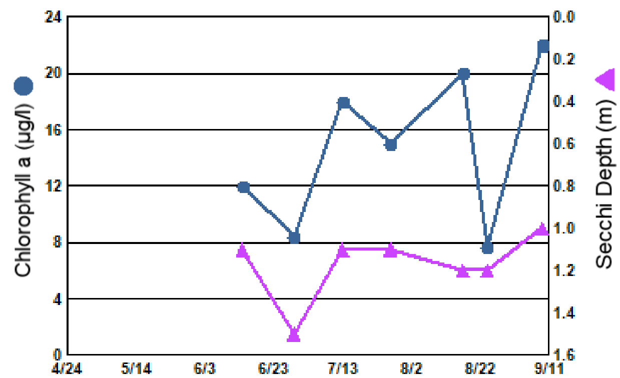
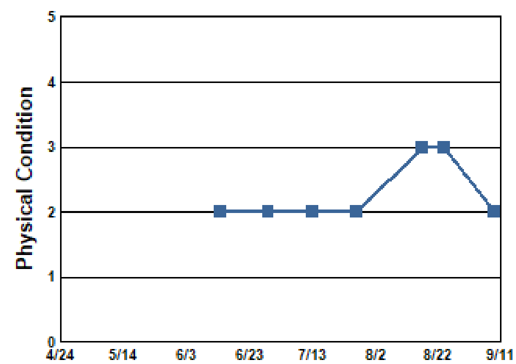




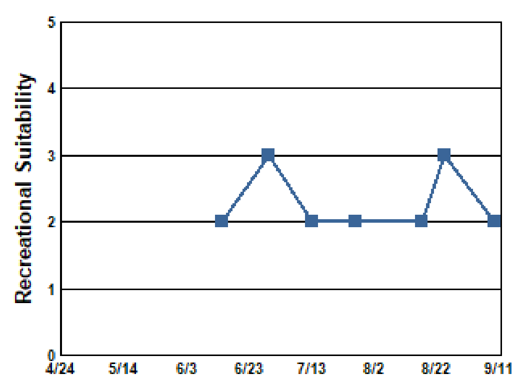


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/14/23	25.3		12	36	1.1	2	2
06/29/23	28.1		8.4	48	1.5	2	3
07/13/23	25.8		18	56	1.1	2	2
07/27/23	28.8		15	54	1.1	2	2
08/17/23	23.8		20	46	1.2	3	2
08/24/23	28.9		7.7	40	1.2	3	3
09/09/23	22.9		22	44	1.0	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												
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	2022	2023
TP					C	C	C	C
CLA					B		B	B
Secchi					D	D	D	D
Lake Grade					**C**		**C**	**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.

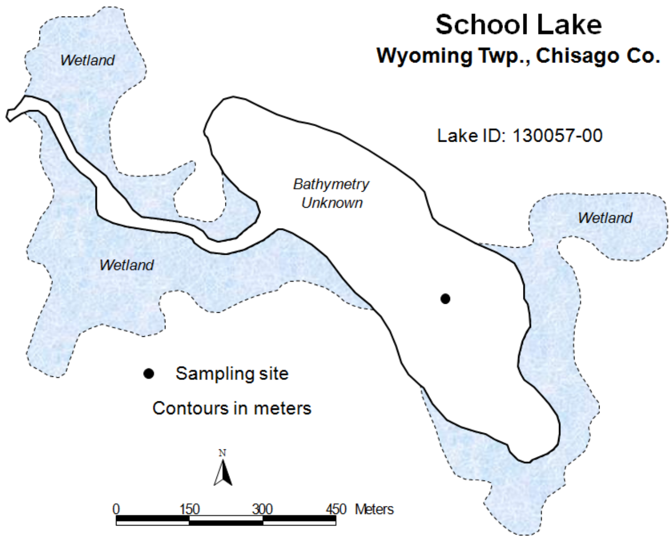
2023 Data summer (May - September) data summary

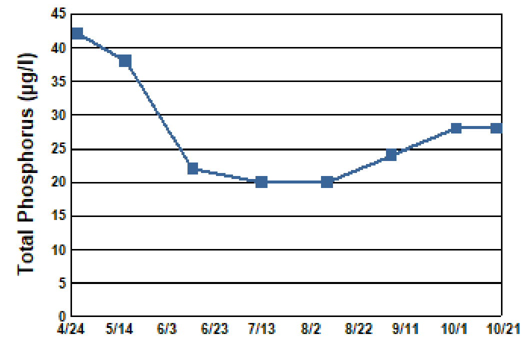
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	20	38	B
CLA (µg/l))	11	7.4	22	B
Secchi (m)	2.1	1.4	2.8	C
TKN (mg/l)	0.70	0.65	0.73	
			Lake Grade	B

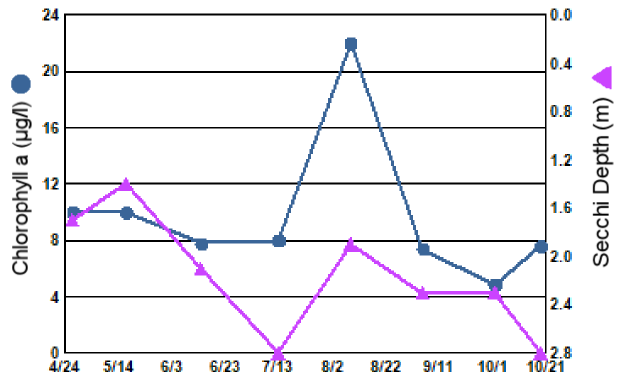
The lake received a lake grade of B this year which is a continuation of the improved water quality according to its historical water quality database. The CLA grade in 2021 improved to a B which is the best grade received for CLA, and this continued for 2022 and 2023.

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.

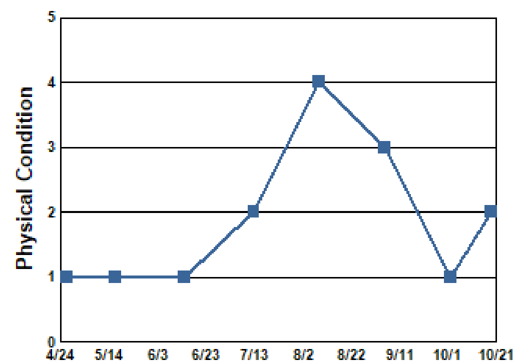




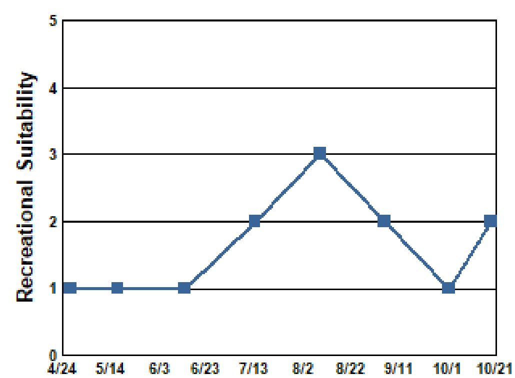


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/27/23	8.9		10	42	1.7	1	1
05/17/23	18.9		10	38	1.4	1	1
06/14/23	23.7		7.8	22	2.1	1	1
07/13/23	23.4		8.0	20	2.8	2	2
08/09/23	26.0		22	20	1.9	4	3
09/05/23	26.4		7.4	24	2.3	3	2
10/02/23	22.4		4.9	28	2.3	1	1
10/19/23	12.9		7.6	28	2.8	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		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	2022	2023
TP		C	C			C	B	B
CLA		C	C			B	B	B
Secchi		D	D			C	C	C
Lake Grade		**C**	**C**			**C**	**B**	**B**

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.

2023 Data summer (May - September) data summary

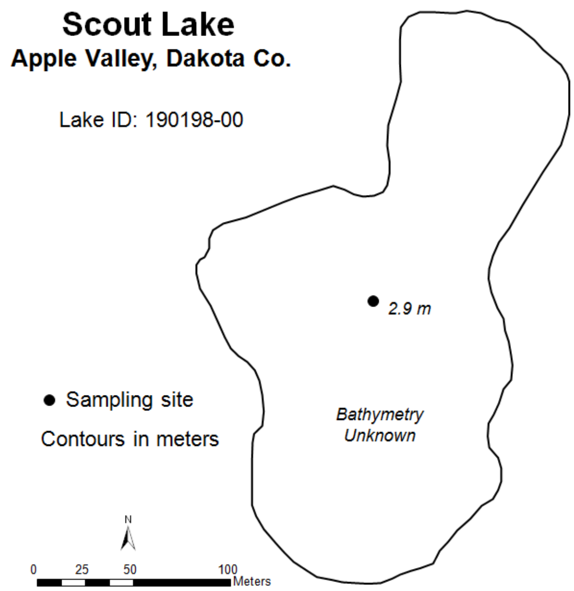
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	50	30	62	C
CLA (µg/l))	14	5.1	23	B
Secchi (m)	>1.0	0.8	1.2	D
TKN (mg/l)				
			Lake Grade	C

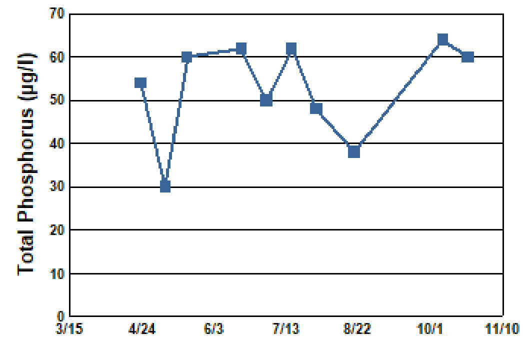
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

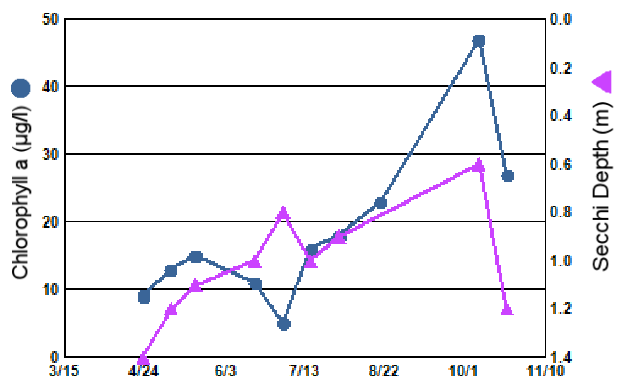
The lake received a lake grade of C. The lake grades have varied between C and F since CAMP monitoring began in 2007.

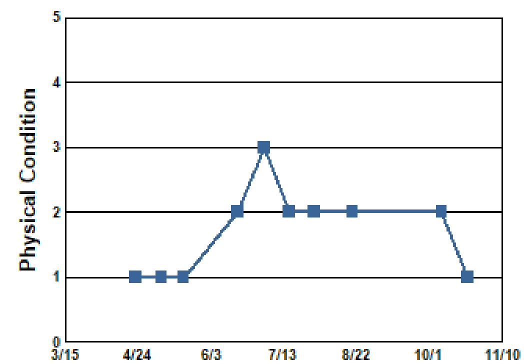
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.







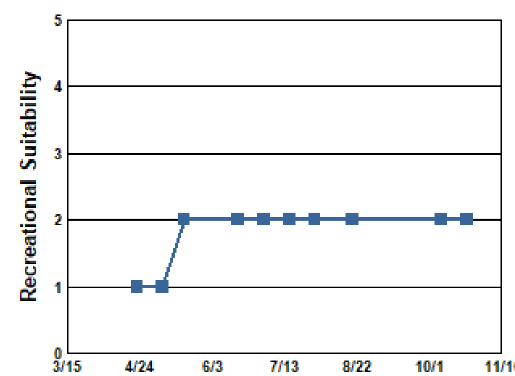


1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/23	11.4		9.1	54	1.4	1	1
05/07/23	23.2		13	30	1.2	1	1
05/19/23	20.1		15	60	1.1	1	2
06/18/23	30.1		11	62	1.0	2	2
07/02/23	30.1		5.1	50	0.8	3	2
07/16/23	23.8		16	62	1.0	2	2
07/30/23	27.1		18	48	0.9	2	2
08/20/23	25.3		23	38	>0.9	2	2
10/08/23	16.1		47	64	0.6	2	2
10/22/23	12.6		27	60	1.2	1	2

> 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				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	2022	2023
TP	D	D	D	D	D	D	D	C
CLA	F	F	F	D	F	F	C	B
Secchi	F	F	F	F	F	F	D	D
Lake Grade	**F**	**F**	**F**	**D**	**F**	**F**	**D**	**C**

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	34	64	C
CLA (µg/l))	66	30	110	
Secchi (m)	0.7	0.5	0.8	
TKN (mg/l)				
			Lake Grade	

There was an insufficient amount of CLA and Secchi data to determine CLA and Secchi parameter grades. 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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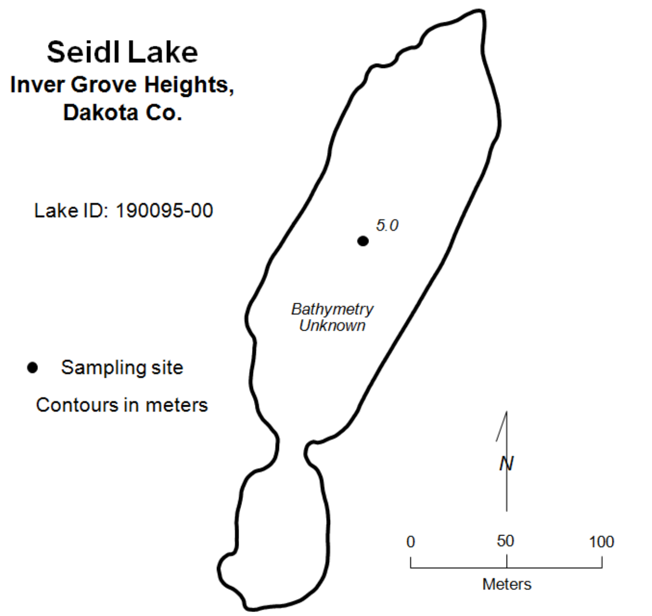
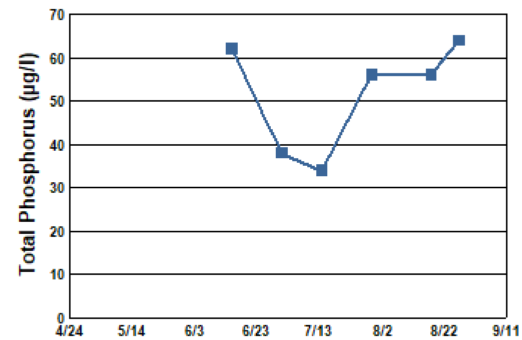
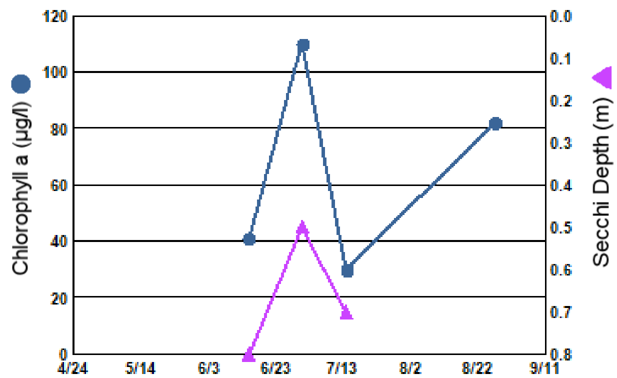
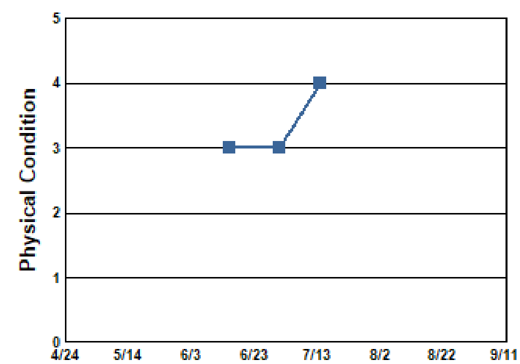




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/15/23	24.9		41	62	0.8	3	2
07/01/23	28.2		110	38	0.5	3	2
07/14/23	26.2		30	34	0.7	4	3
07/30/23				56			
08/18/23				56			
08/27/23			82	64			





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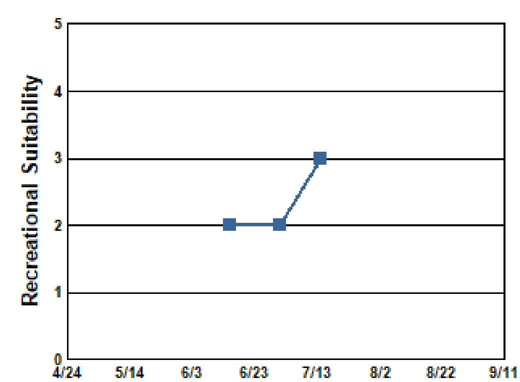

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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												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	2022	2023
TP				C	C	B		C
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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	11	58	B
CLA (µg/l))	12	2.5	43	B
Secchi (m)	1.9	1.1	2.9	C
TKN (mg/l)	1.01	0.80	1.14	
			Lake Grade	B

The lake continues to lake grades of B, which is an improvement over the typical C and D grades received over the past 20 years. Also, the lake received a TP grade of B for 2022 and 2023, which are the best TP grades received yet according to its historical water quality database going back to 1988. Prior to 2022, TP grades were predominantly F and D grades.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/.

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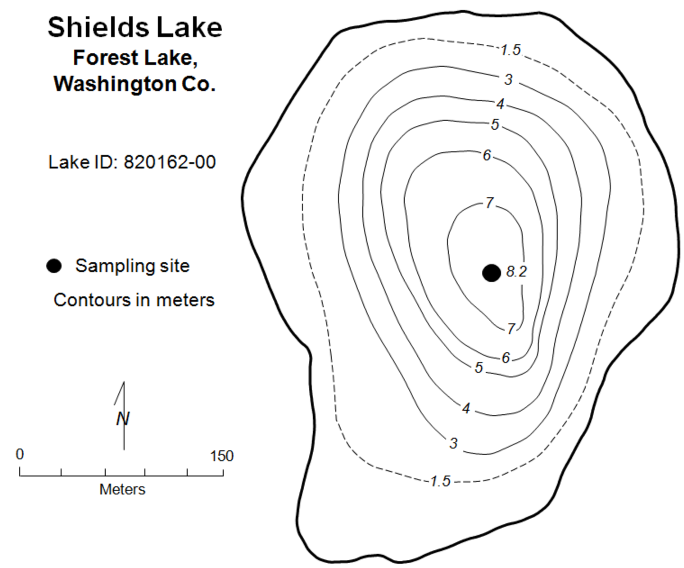
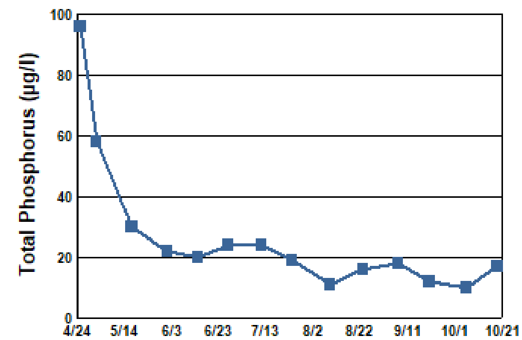
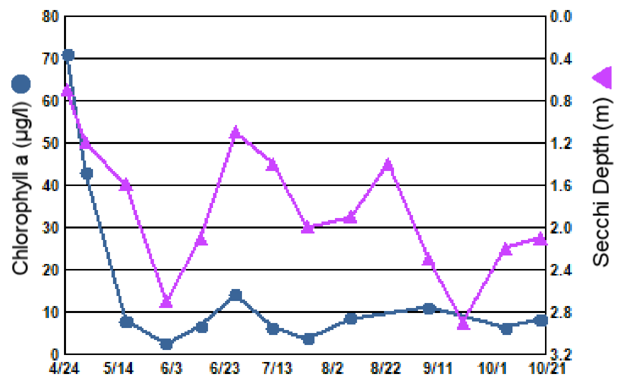
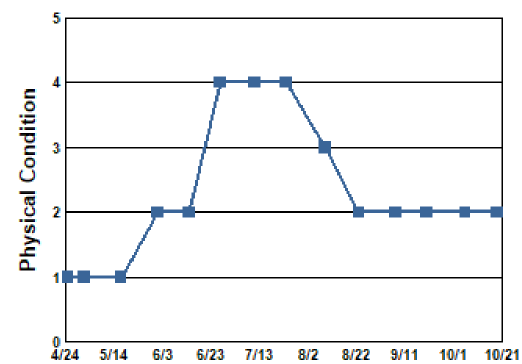






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/23	7.1		71	96	0.7	1	1
05/02/23	8.7		43	58	1.2	1	1
05/17/23	18.9		7.9	30	1.6	1	1
06/01/23	26.2		2.5	22	2.7	2	1
06/14/23	23.4		6.7	20	2.1	2	2
06/27/23	26.4		14	~24	1.1	4	3
07/11/23	24.8		6.3	24	1.4	4	4
07/24/23	25.6		3.7	19	2.0	4	3
08/09/23	26.0		8.5	11	1.9	3	2
08/23/23	27.6			16	1.4	2	2
09/07/23	22.2		11	18	2.3	2	2
09/20/23	20.7			12	2.9	2	1
10/06/23	17.6		6.2	10	2.2	2	2
10/19/23	12.5		8.2	17	2.1	2	1



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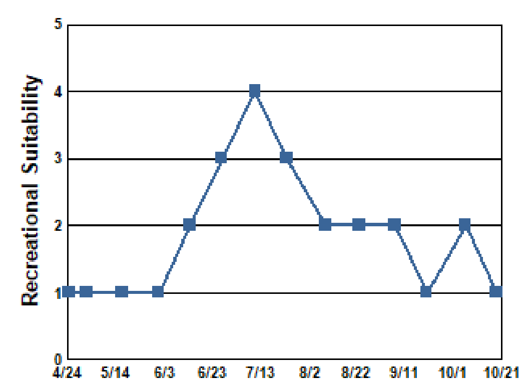

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
TP									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	2022	2023
TP	F	F	F	D	C	C	B	B
CLA	D	D	D	C	C	A	A	B
Secchi	D	D	D	D	D	B	C	C
Lake Grade	**D**	**D**	**D**	**D**	**C**	**B**	**B**	**B**

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

Silver Lake (82–0016) *Carnelian — Marine — St. Croix Watershed District*

Monitoring Personnel: Washington Conservation District staff

Silver Lake is located within Stillwater Township (Washington County). The lake has a surface are of 98 acres. The maximum and mean depths of the lake are 3.4 m and 1.7 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.

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 site visit. Depth profiles of dissolved oxygen and temperature were also made by Washington Conservation District staff during their monitoring visits. 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	<22	~46	B
CLA (µg/l))	5.2	2.4	11	A
Secchi (m)	>1.5	>1.2	>2.0	
TKN (mg/l)	0.53	0.50	0.59	
			Lake Grade	

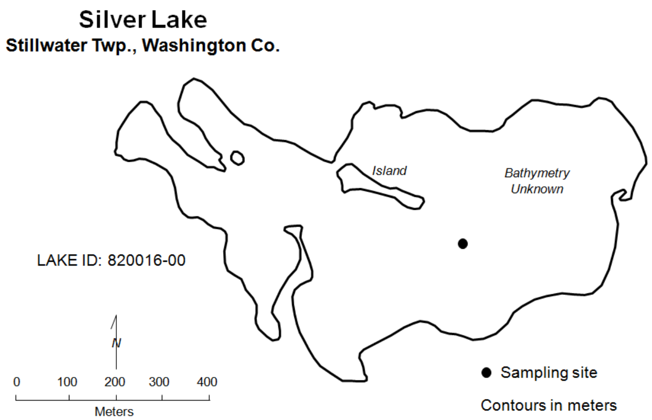
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

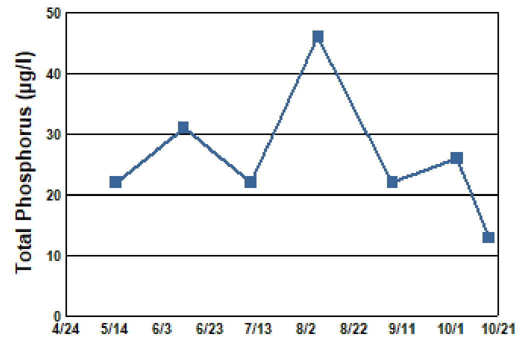
The lake received TP and CLA parameter grades of B and A respectively. Over the past 20 years, TP has varied in the A to C range, and CLA has varied in the A to B range. The relatively low CLA concentrations in combination with the observations of moderate to substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae. 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.

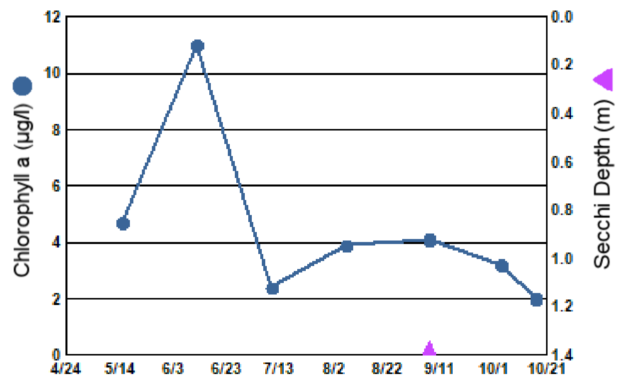
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 24 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

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.



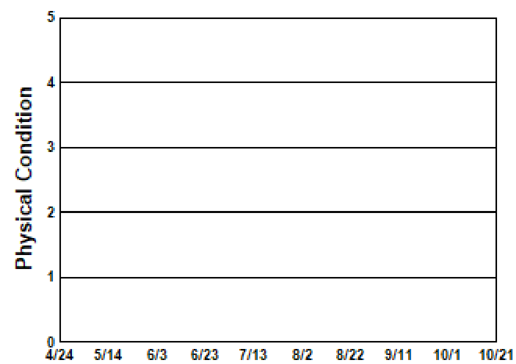




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/23	18.6	11.1	4.7	<22	>2.0		
06/12/23	22.2	10.3	11	~31	>1.2		
07/10/23	24.1	9.6	2.4	<22	>1.5		
08/07/23	25.3	6.8	3.9	~46	>1.4		
09/07/23	21.7	5.4	4.1	<22	1.4		
10/04/23	21.0	10.0	3.2	26	>1.5		
10/17/23	11.9	12.5	2.0	13	>1.7		

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



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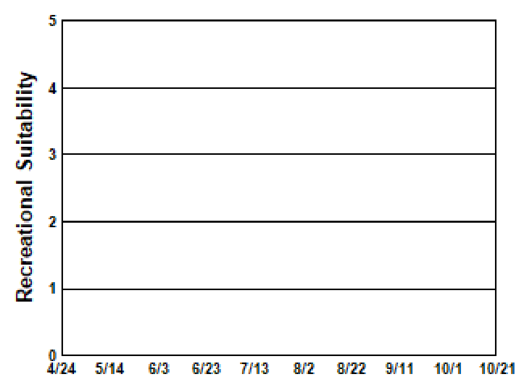
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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	D	C	C		
CLA					C	C	C	D	B	B		
Secchi					C	D	D	D	C	C	C	B
Lake Grade					**C**	**C**	**C**	**D**	**C**	**C**		

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	B	A	A		C			B
CLA	A	A	A		B			A
Secchi								
Lake Grade								

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

Simley Lake (19–0037) *City of Inver Grove Heights*

Volunteer: Dawn Gaetke, Steve Gebauer

Simley Lake is located in the city of Inver Grove Heights (Dakota County). It is small lake at a surface area of 14 acres. The maximum depth is 5.2 m. The lake does not maintain a thermocline, which is a temperature gradient caused by changing water temperature through 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	15	30	A
CLA (µg/l))	15	3.2	44	B
Secchi (m)	>1.7	>0.7	3.0	C
TKN (mg/l)				
			Lake Grade	B

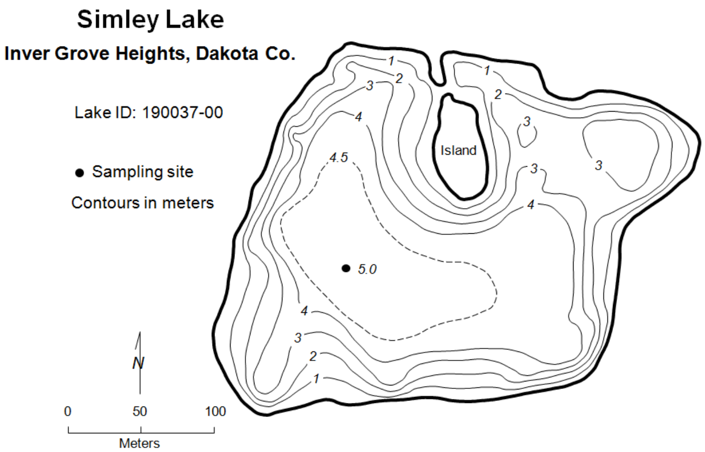
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

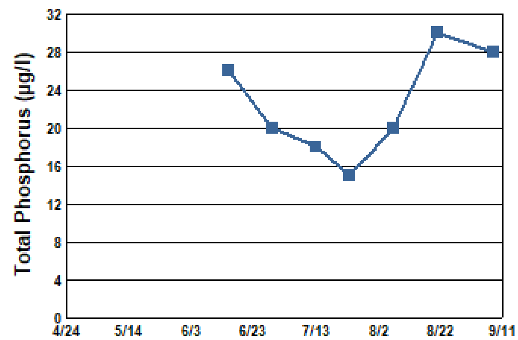
The lake received a lake grade of B. Continued monitoring is recommended to build the water quality database with more recent data.

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.

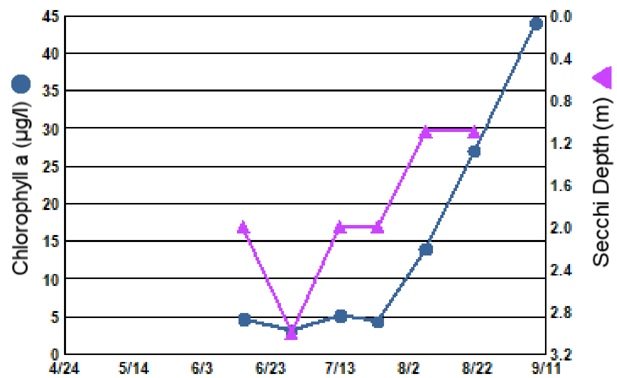


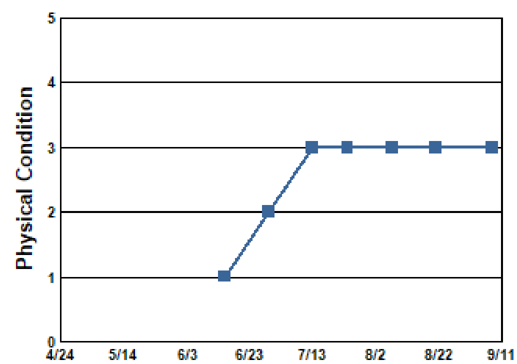


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/15/23	24.2		4.7	26	2.0	1	1
06/29/23	27.9		3.2	20	3.0	2	2
07/13/23	26.1		5.1	18	2.0	3	2
07/24/23	27.1		4.4	15	2.0	3	2
08/07/23	27.1		14	20	1.1	3	2
08/21/23	24.6		27	30	1.1	3	2
09/08/23	23.4		44	28	>0.7	3	2

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





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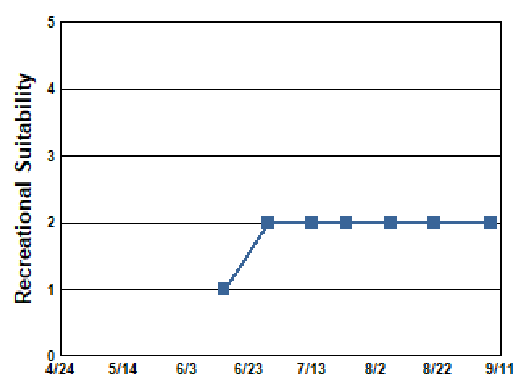
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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		C		C	C	C	C	C	C	C	C	
CLA		C		B	A	A	A	C	B	C	C	
Secchi		C		C	C	C	C	D	D	C	C	
Lake Grade		**C**		**C**	**B**	**B**	**B**	**C**	**C**	**C**	**C**	

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP								A
CLA								B
Secchi								C
Lake Grade								**B**

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

Smetana Lake (27–0073) *Nine Mile Creek Watershed District*

Volunteer: Jana Kramer

Smetana Lake is located in the city of Eden Prairie (Hennepin County). It has a surface area 48 acres and a maximum depth of 3.7 m. The lake is shallow and therefore does not maintain a thermocline, which is a density gradient caused by varying temperature throughout the water column.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	16	38	B
CLA (µg/l))	6.6	1.4	13	A
Secchi (m)	+2.1	1.7	+2.9	C
TKN (mg/l)				
			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. Continued monitoring is suggested to build the lake's 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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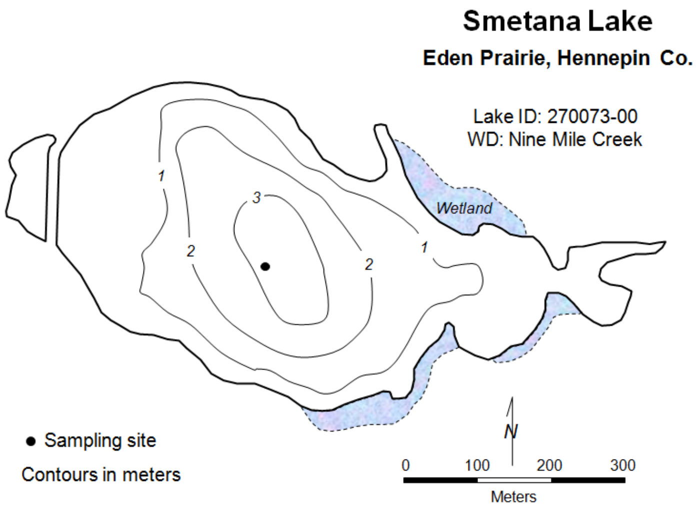
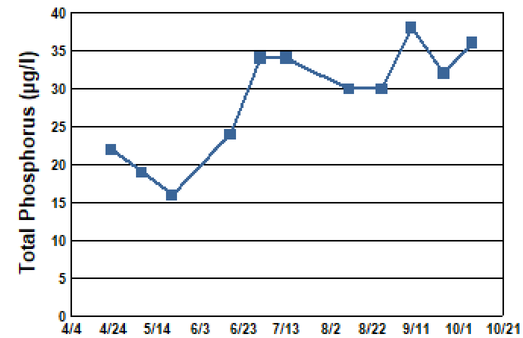
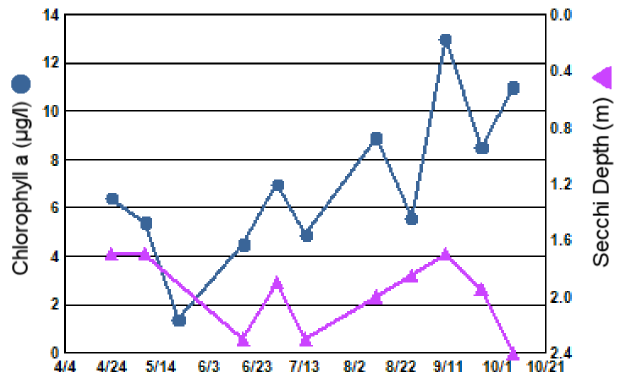


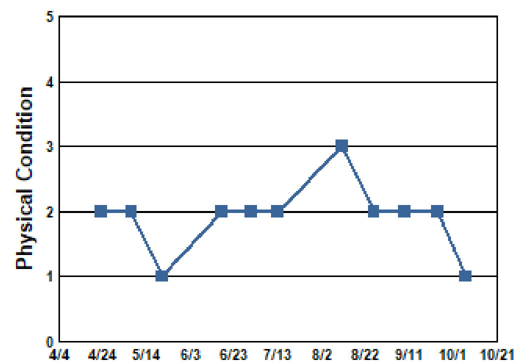
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/23/23	7.9		6.4	22	1.7	2	1
05/07/23	19.1		5.4	19	1.7	2	1
05/21/23	22.8		1.4	16	+2.9	1	1
06/17/23	25.6		4.5	24	2.3	2	3
07/01/23	30.0		7.0	34	1.9	2	3
07/13/23	26.8		4.9	34	2.3	2	2
08/11/23	26.6		8.9	30	2.0	3	2
08/26/23			5.6	30	1.9	2	3
09/09/23	22.2		13	38	1.7	2	4
09/24/23			8.5	32	2.0	2	3
10/07/23			11	36	2.4	1	2

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







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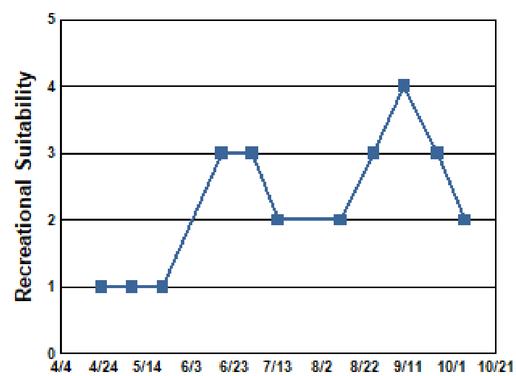
4 = High Algal Color
5 = Severe Algal Bloom



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										C		
CLA										A		
Secchi										C		
Lake Grade										**B**		

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP								B
CLA								A
Secchi								C
Lake Grade								**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	32	<22	50	B
CLA (µg/l))	15	1.4	56	B
Secchi (m)	2.8	0.9	5.9	B
TKN (mg/l)	0.71	0.50	1.35	
			Lake Grade	B

The lake continues to receive B lake grades which is an improvement over the typical C grades it has received in the past. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. The mean value indicated in the Data Summary table is very close to the A/B grade breakpoint (within about 1 ug/L) so the maximum mean may likely be less than the grade breakpoint. A simple test was given to evaluate this possibility. The test consists of replacing the TP results that were reported below the RL/MDL with the highest possible value below the RL or MDL. For examples, < 22 ug/L was replaced with 21 ug/L, < 25 ug/l replaced with 24 ug/L. The TP summer-time mean was recalculated with these revised values. This revised mean was calculated to be < 32 ug, and this would move it to the either the B or A range. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 28 ug/L, and this translates to a TP grade of B.

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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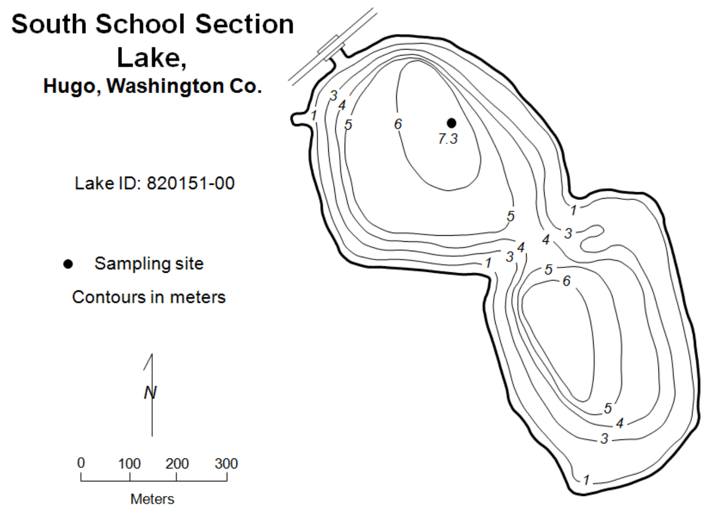
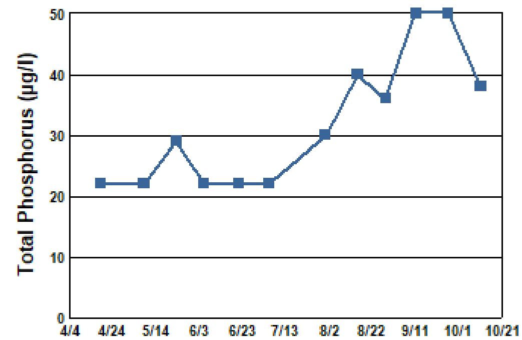
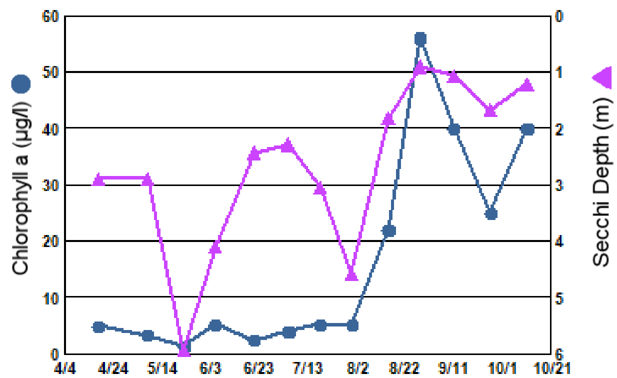
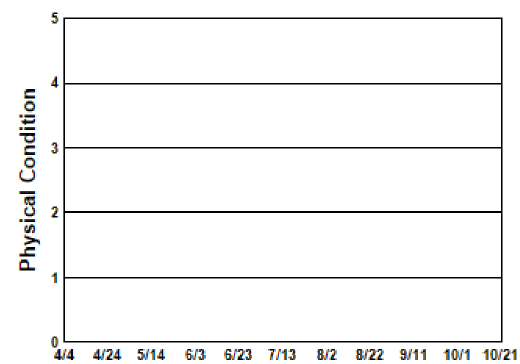






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/23	5.3	7.9	5.0	<22	2.9		
05/08/23	15.3	9.9	3.3	<22	2.9		
05/23/23	19.2	12.8	1.4	~29	5.9		
06/05/23	25.3	12.3	5.2	<22	4.1		
06/21/23	25.8	12.2	2.4	<22	2.4		
07/05/23	26.2	10.9	4.0	<22	2.3		
07/18/23	24.0	9.2	5.2		3.1		
07/31/23	27.0	9.4	5.1	~30	4.6		
08/15/23	24.7	9.4	22	~40	1.8		
08/28/23	25.1	15.2	56	~36	0.9		
09/11/23	21.9	8.7	40	50	1.1		
09/26/23	19.8	9.5	25	50	1.7		
10/11/23	15.1	11.8	40	38	1.2		



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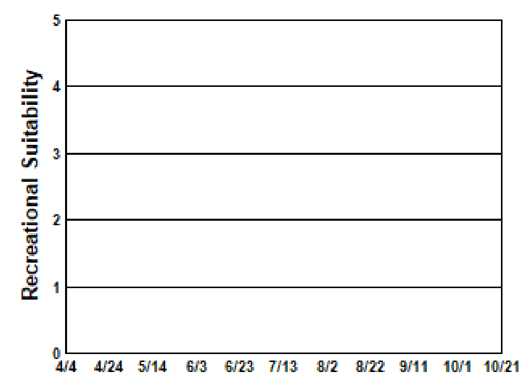


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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				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	2022	2023
TP	C	C	C	C	B	B	C	B
CLA	C	C	D	C	B	B	B	B
Secchi	C	D	D	C	B	B	B	B
Lake Grade	**C**	**C**	**D**	**C**	**B**	**B**	**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.

2023 Data summer (May - September) data summary

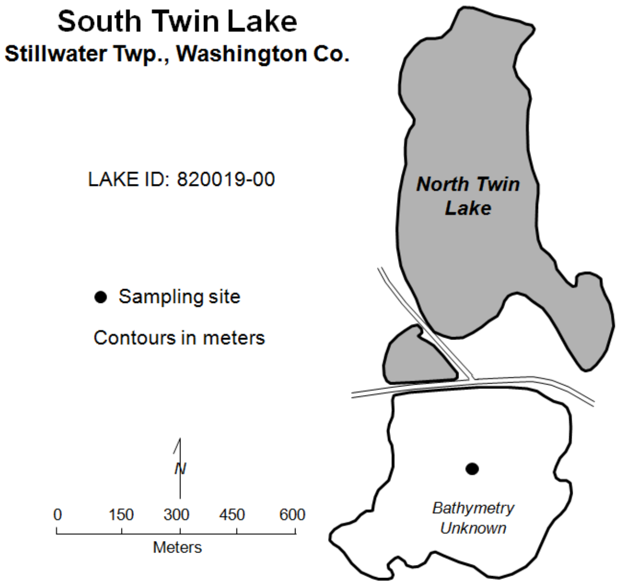
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	<22	~39	A or B
CLA (µg/l))	7.3	4.0	17	A
Secchi (m)	>2.2	>1.8	>2.4	
TKN (mg/l)	0.77	0.63	0.92	
			Lake Grade	

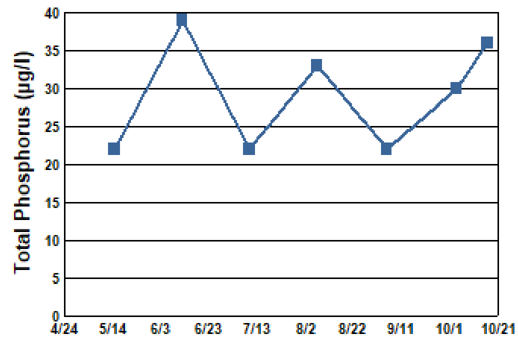
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

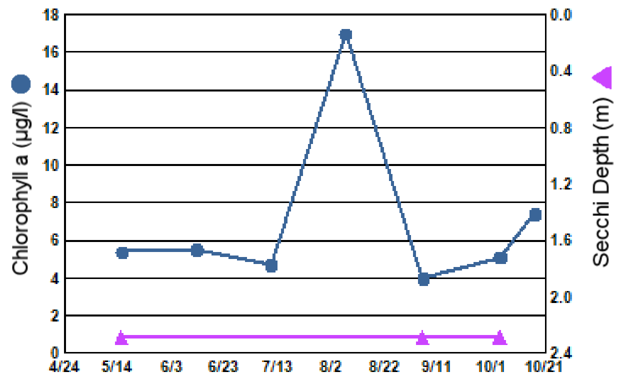
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about < 23 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap. 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.



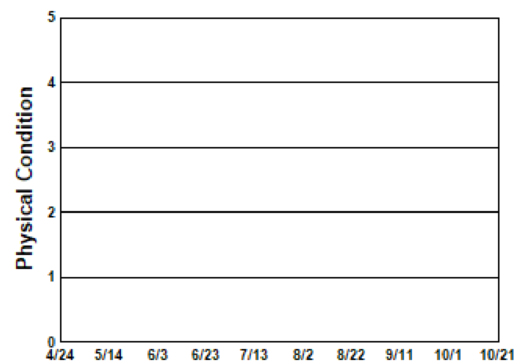




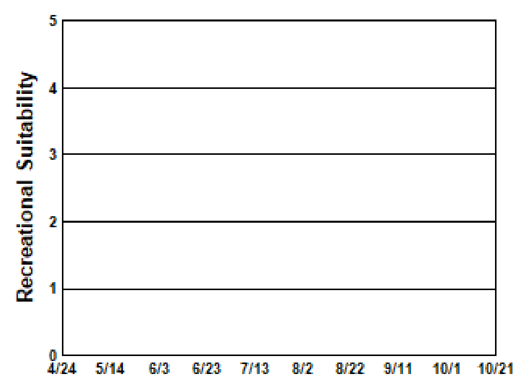
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/23	18.0	11.7	5.4	<22	2.3		
06/12/23	23.1	13.2	5.5	~39	>2.1		
07/10/23	24.2	9.2	4.7	<22	>2.4		
08/07/23	26.2	7.0	17	33	>1.8		
09/05/23	25.4	12.4	4.0	~22	2.3		
10/04/23	21.4	10.9	5.1	30	2.3		
10/17/23	11.6	14.0	7.4	36	>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	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	2022	2023
TP	C	C	B		A	B	B	
CLA	B	B	A		A	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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	16	<44	A
CLA (µg/l))	2.2	1.5	3.9	A
Secchi (m)	4.9	3.1	6.1	A
TKN (mg/l)	0.53	0.38	0.70	
			Lake Grade	A

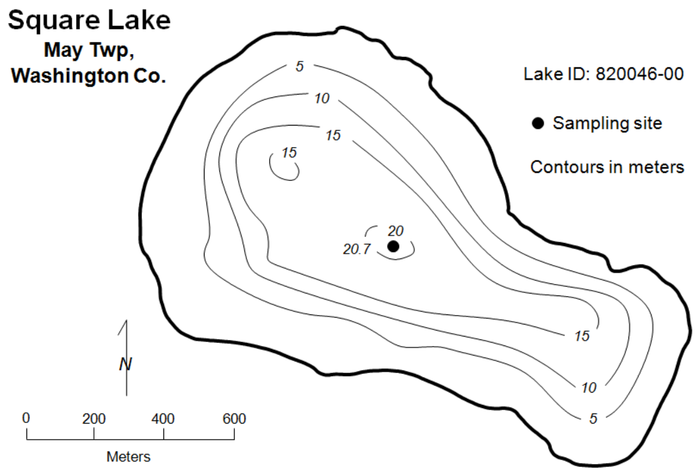
The lake continues to receive A lake grades. Continued monitoring is recommended to determine water quality changes (or not) in response to the trout stocking moratorium.

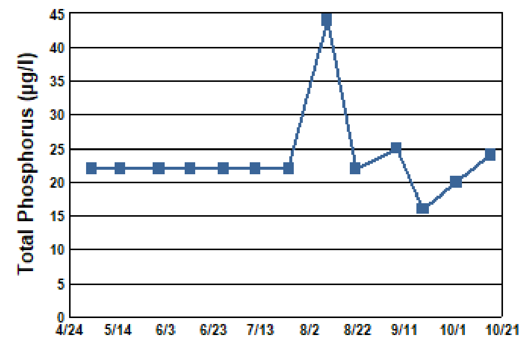
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value. The mean value indicated in the Data Summary table is very close to the A/B grade breakpoint (within about 1 ug/L) so the maximum mean may likely be less than the grade breakpoint. A simple test was given to evaluate this possibility. The test consists of replacing the TP results that were reported below the RL/MDL with the highest possible value below the RL or MDL. For examples, < 22 ug/L was replaced with 21 ug/L, < 25 ug/l replaced with 24 ug/L. The TP summer-time mean was recalculated with these revised values. This revised mean was calculated to be < 23 ug/L, and this translates to a TP grade of 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/.

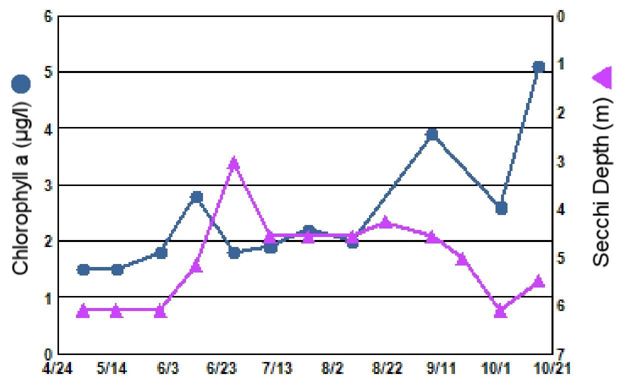
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

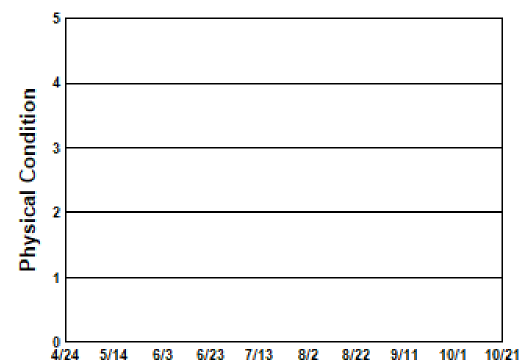




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	7.4	12.3	1.5	<22	6.1		
05/15/23	16.3	9.9	1.5	<22	6.1		
05/31/23	21.7	9.9	1.8	<22	6.1		
06/13/23	22.4	9.6	2.8	<22	5.2		
06/27/23	24.5	9.1	1.8	<22	3.1		
07/10/23	24.8	9.1	1.9	<22	4.6		
07/24/23	24.6	9.3	2.2	<22	4.6		
08/09/23	26.4	7.8	2.0	<44	4.6		
08/21/23	23.9	8.0		<22	4.3		
09/07/23	23.5	12.7	3.9	~25	4.6		
09/18/23	20.8	13.4		16	5.0		
10/02/23	21.1	14.5	2.6	20	6.1		
10/16/23	14.0	14.5	5.1	24	5.5		





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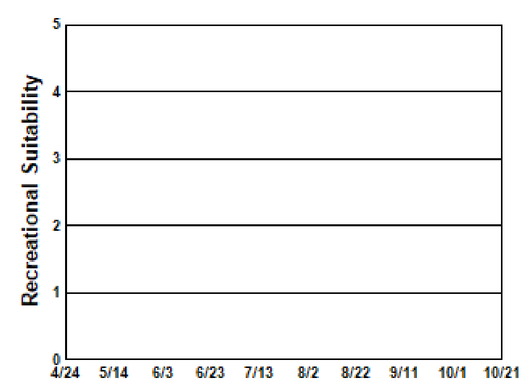
4 = High Algal Color
5 = Severe Algal Bloom



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	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	2022	2023
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
Lake Grade	**A**	**A**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	35	22	<50	C
CLA (µg/l))	23	15	28	C
Secchi (m)	1.3	1.2	1.5	C
TKN (mg/l)				
			Lake Grade	C

This lake site received a lake grade of C this year, which is consistent with its historical water quality database. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 33 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

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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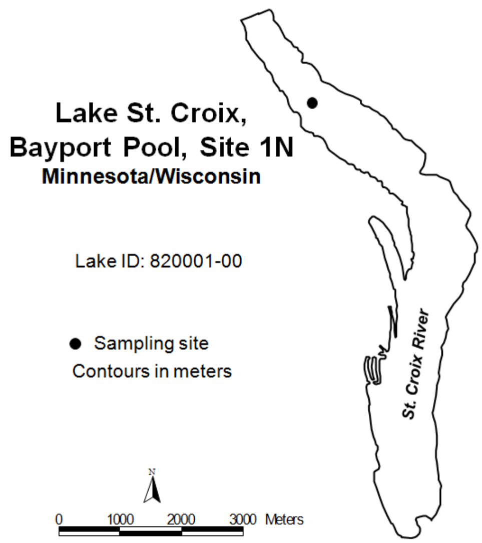
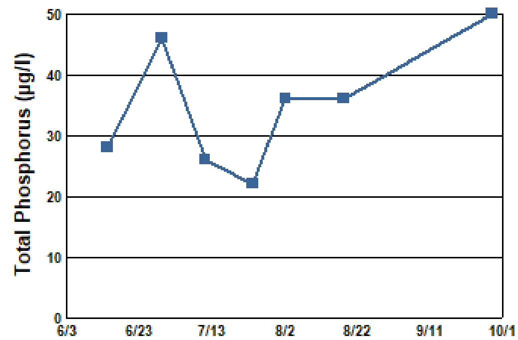
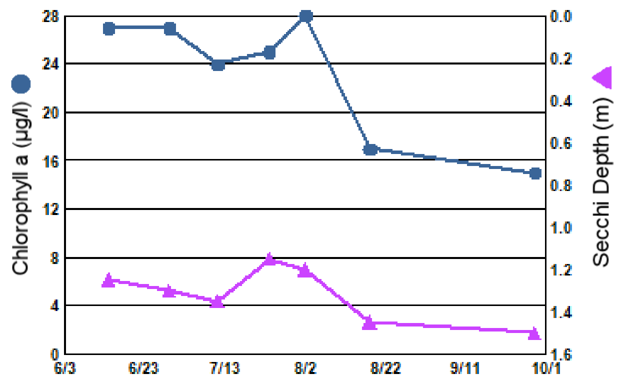
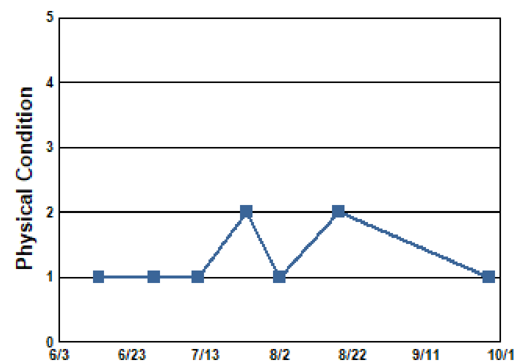




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/14/23	23.8		27	28	1.3	1	1
06/29/23	27.3		27	46	1.3	1	1
07/11/23	24.6		24	26	1.4	1	1
07/24/23	26.3		25	22	1.2	2	1
08/02/23	28.5		28	36	1.2	1	1
08/18/23	23.4		17	36	1.5	2	1
09/28/23	19.3		15	<50	1.5	1	1





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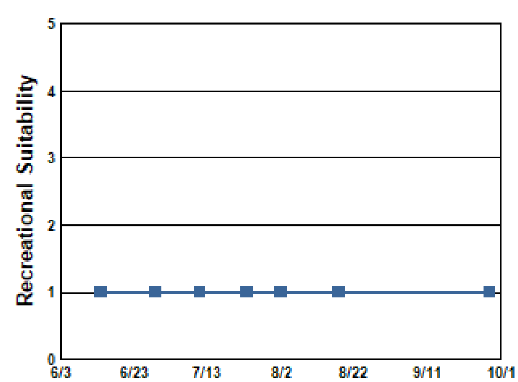

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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												
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	2022	2023
TP			C	C	C	C	C	C
CLA			C	C	C	C	C	C
Secchi			D	C	D	C	D	C
Lake Grade			**C**	**C**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org)

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	30	<50	B or C
CLA (µg/l))	19	16	24	B
Secchi (m)	1.3	1.0	1.7	C
TKN (mg/l)				
			Lake Grade	

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 26 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap. Due to the uncertainty of the TP grade, a lake grade could not be determined precisely.

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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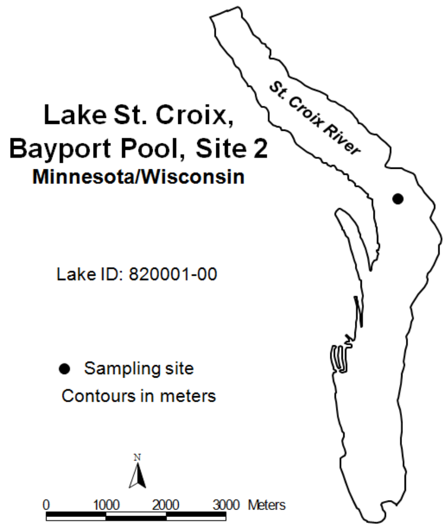
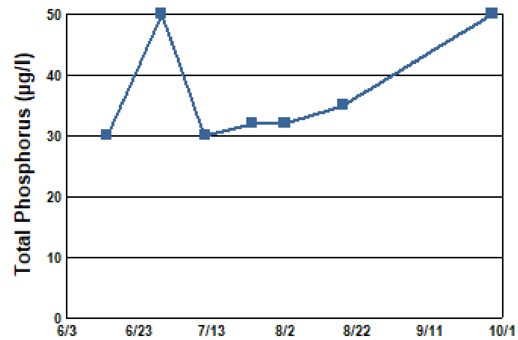
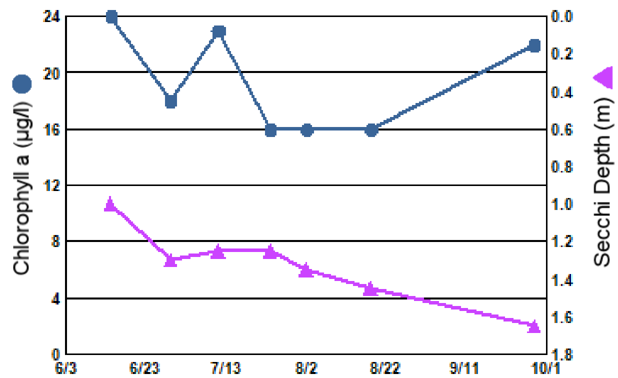
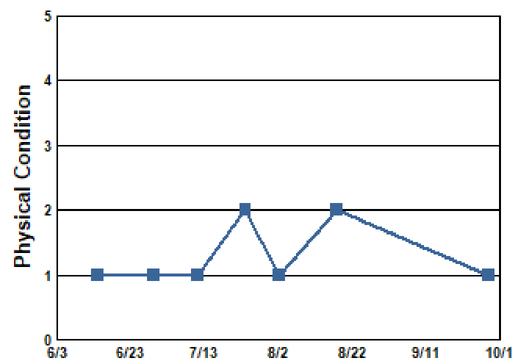


2023 Data

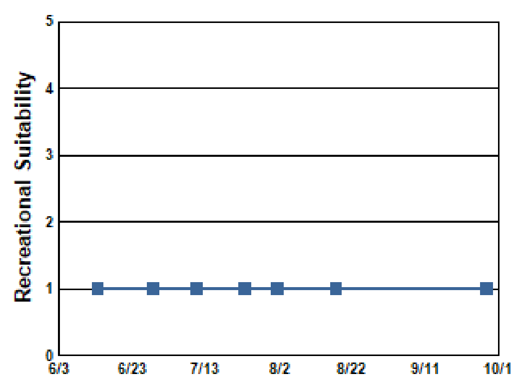
Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/14/23	26.3		24	30	1.0	1	1
06/29/23	27.0		18	<50	1.3	1	1
07/11/23	26.9		23	30	1.3	1	1
07/24/23	30.0		16	32	1.3	2	1
08/02/23	29.6		16	32	1.4	1	1
08/18/23	23.3		16	35	1.5	2	1
09/28/23	19.9		22	<50	1.7	1	1







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	
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	2022	2023
TP			C	C	C	C	C	
CLA			C	B	C	C	C	B
Secchi			C	C	C	C	C	C
Lake Grade			**C**	**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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

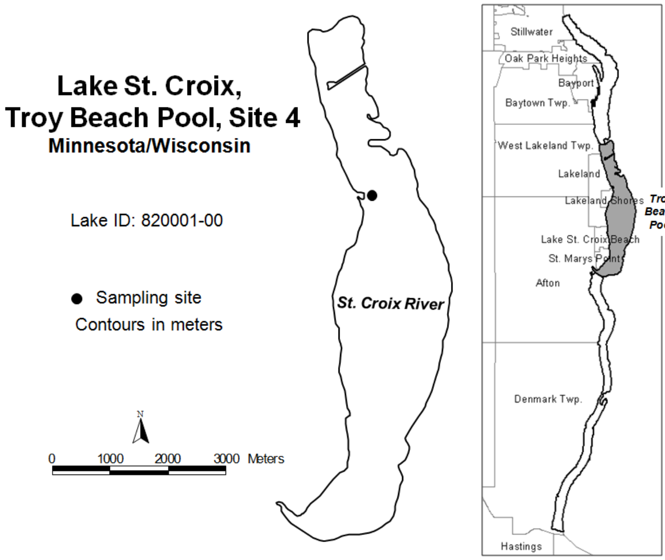
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	26	26	
CLA (µg/l))	19	16	23	
Secchi (m)	1.8	1.3	2.1	
TKN (mg/l)				
			Lake Grade	

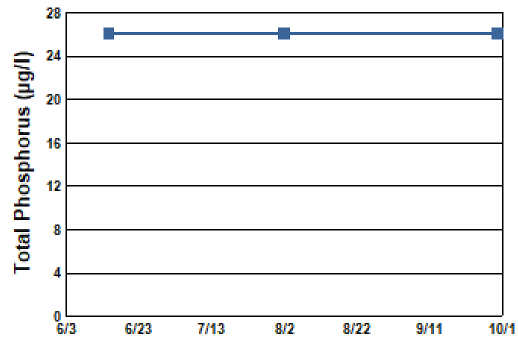
. There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

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/.

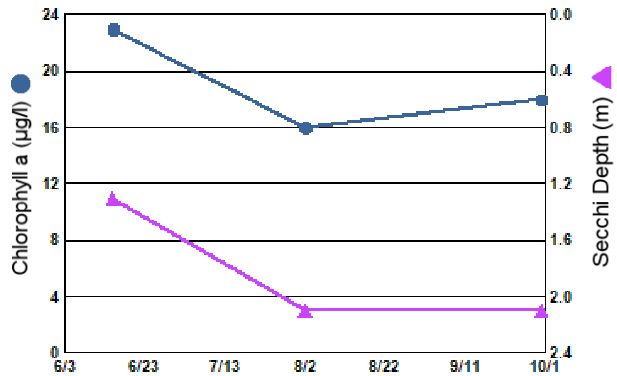
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

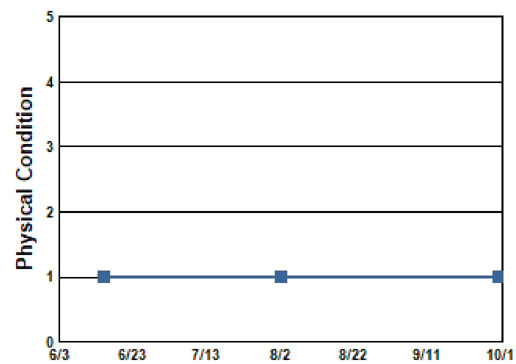




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/15/23	23.5		23	26	1.3	1	1
08/02/23	28.2		16	26	2.1	1	1
09/30/23	20.8		18	26	2.1	1	1





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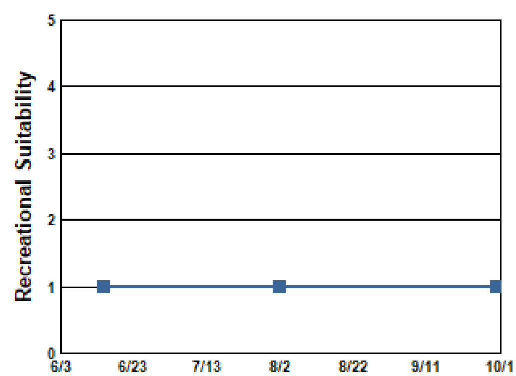
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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											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	2022	2023
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 Harper, 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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	15	28	
CLA (µg/l))	13	7.3	19	
Secchi (m)	2.1	1.6	2.6	
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/.

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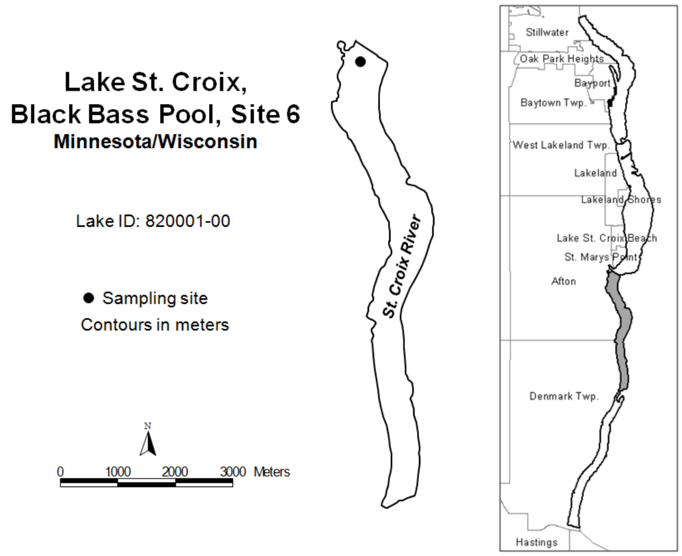
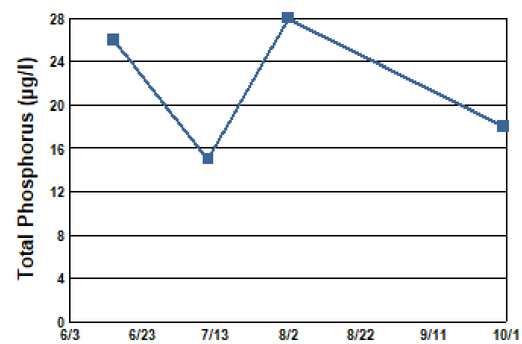
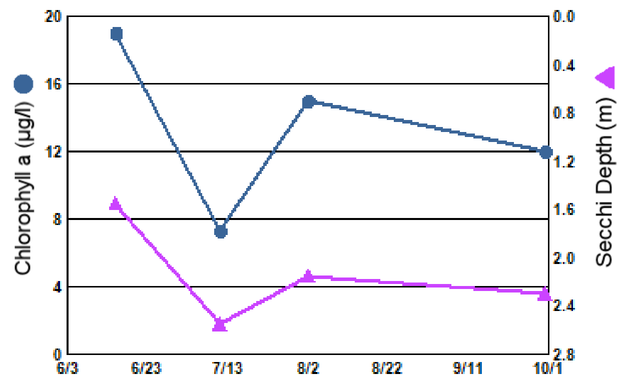
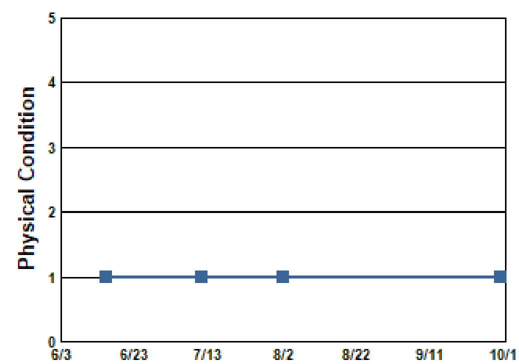


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/15/23	22.8		19	26	1.6	1	1
07/11/23	24.4		7.3	15	2.6	1	1
08/02/23	26.8		15	28	2.2	1	1
09/30/23	20.2		12	18	2.3	1	1







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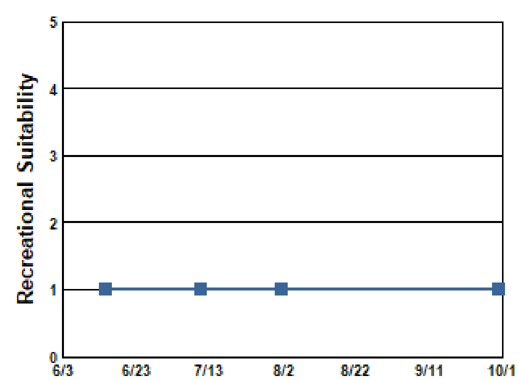
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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	
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	2022	2023
TP			C	C	C	B	C	
CLA			B	B	B	B	C	
Secchi			C	C	C	B	C	
Lake Grade			**C**	**C**	**C**	**B**	**C**	

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: Alan Maloney)

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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	33	19	50	B or C
CLA (µg/l))	13	5.3	24	B
Secchi (m)	+2.4	2.1	2.7	B
TKN (mg/l)				
			Lake Grade	B

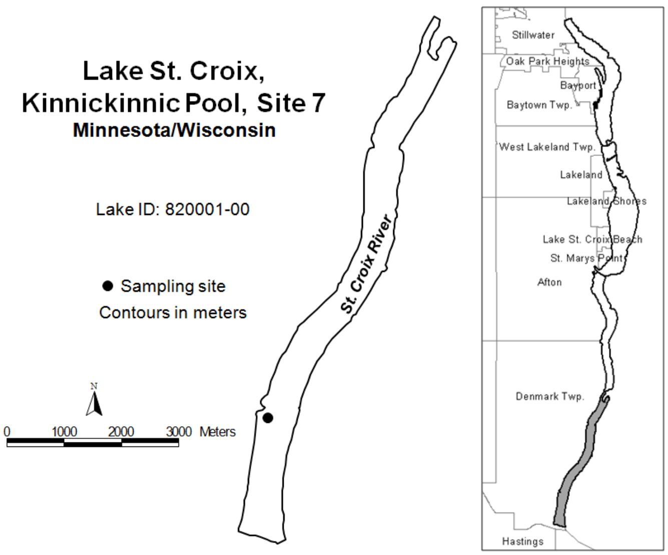
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

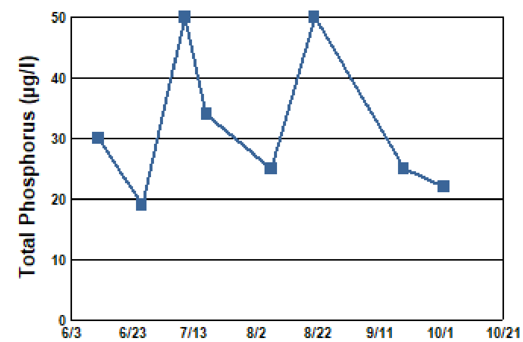
Site 7 received a lake grade of B. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 23 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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.

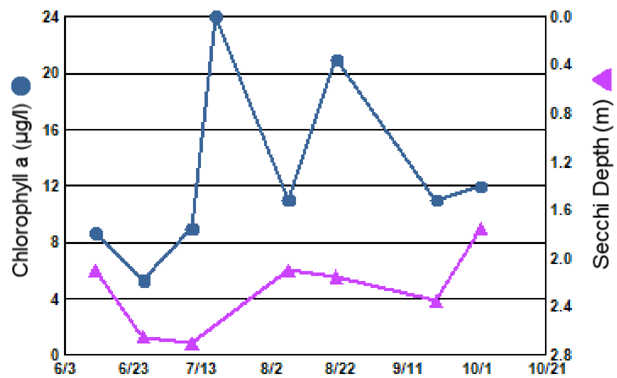


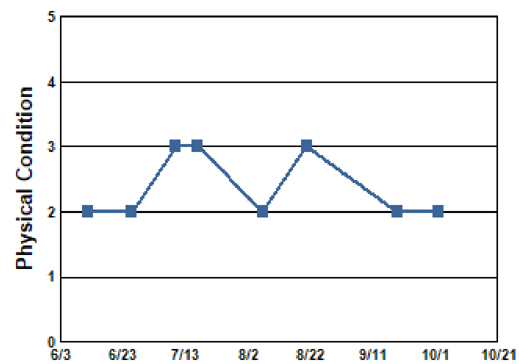


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/12/23	22.0		8.7	30	2.1	2	1
06/26/23	24.6		5.3	19	2.7	2	2
07/10/23	24.1		9.0	<50	2.7	3	2
07/17/23	24.9		24	34	+2.6	3	2
08/07/23	26.4		11	<25	2.1	2	2
08/21/23	24.0		21	50	2.2	3	2
09/19/23	21.4		11	<25	2.4	2	2
10/02/23	22.1		12	22	1.8	2	2

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





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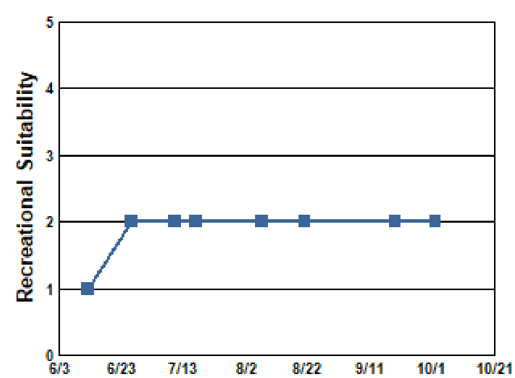
5 = Severe Algal Bloom



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												
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	2022	2023
TP			C	B	C	B	C	
CLA			B	B	B	B	C	B
Secchi			C	C	C	B	C	B
Lake Grade			**C**	**B**	**C**	**B**	**C**	**B**

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

St. Joe Lake (10–0011) *City of Chanhassen*

Volunteer: Kevin Zahler

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	13	28	
CLA (µg/l))	2.4	1.9	2.8	
Secchi (m)	2.9	2.3	3.3	
TKN (mg/l)				
			Lake Grade	

There were less than 5 monitoring events during the summer-time period (May — September) due to difficult access caused by drought-driven low water levels. 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/.

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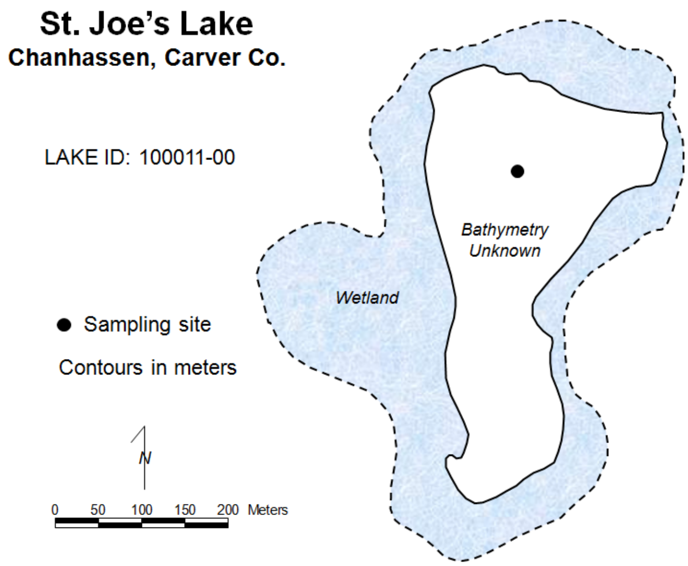
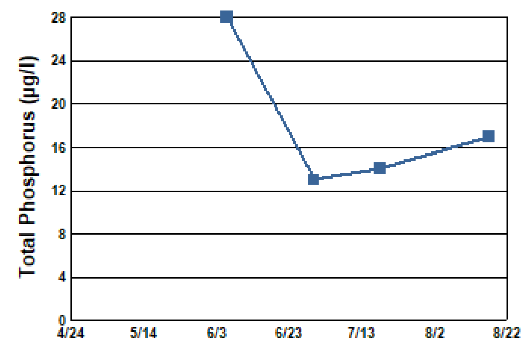
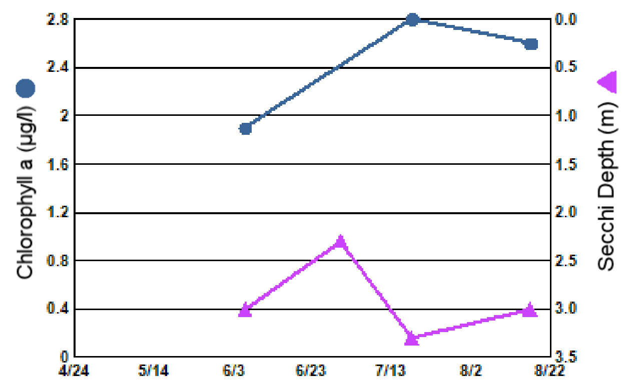
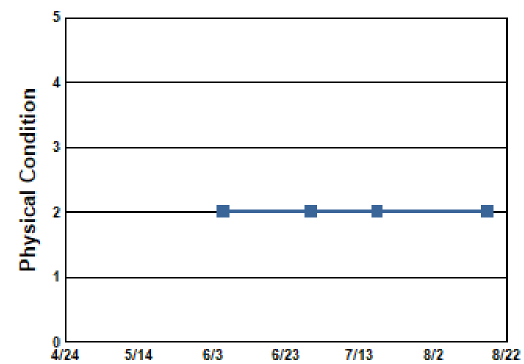






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/06/23	27.4		1.9	28	3.0	2	2
06/30/23	26.0			13	2.3	2	2
07/18/23	24.6		2.8	14	3.3	2	2
08/17/23	27.0		2.6	17	3.0	2	2



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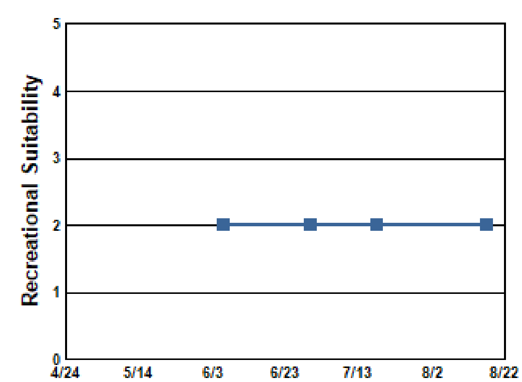


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	2022	2023
TP	B	A	A	A	A	B	A	
CLA	A	A	A	A	A	A	A	
Secchi	B	B	C	B		A	B	
Lake Grade	**B**	**A**	**B**	**A**		**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.

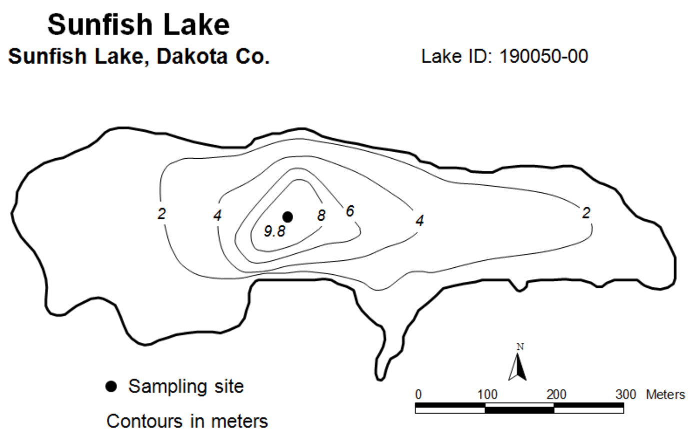
2023 Data summer (May - September) data summary

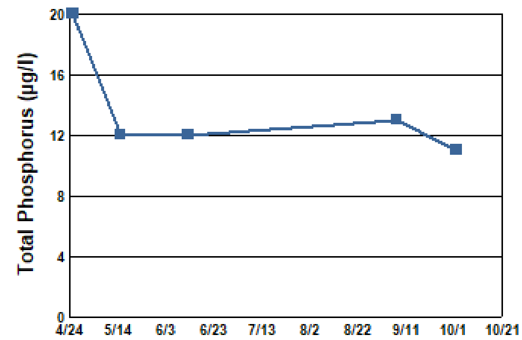
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	12	12	13	
CLA (µg/l))	3.5	1.5	6.1	
Secchi (m)	3.6	2.9	4.7	A
TKN (mg/l)				
			Lake Grade	

There were insufficient quantity of TP and CLA data to calculate their respective parameter grades. 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. 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.

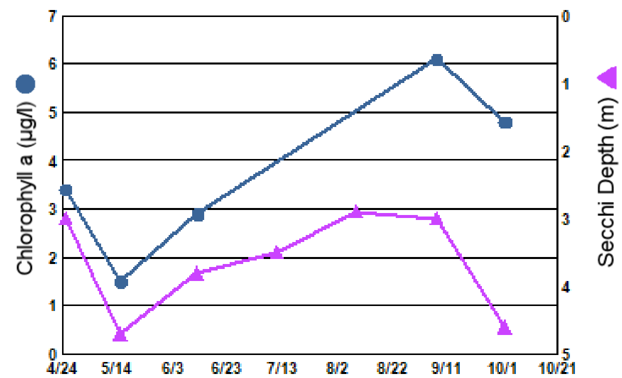
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

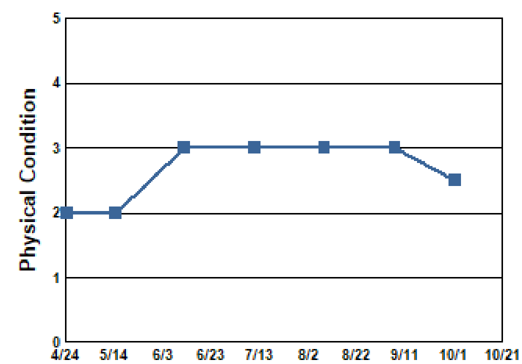




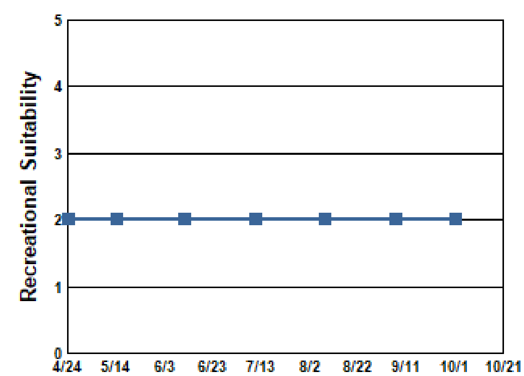
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/23	8.4		3.4	20	3.0	2	2
05/15/23	16.9		1.5	12	4.7	2	2
06/12/23	23.6		2.9	12	3.8	3	2
07/11/23	26.5				3.5	3	2
08/09/23	26.6				2.9	3	2
09/07/23	23.9		6.1	13	3.0	3	2
10/02/23	21.2		4.8	<11	4.6	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					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	2022	2023
TP	C	A	A	A	A	A	A	
CLA	C	A	A	A	A	A	A	
Secchi	C	A	B	A	A	A	A	A
Lake Grade	**C**	**A**	**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.

2023 Data summer (May - September) data summary

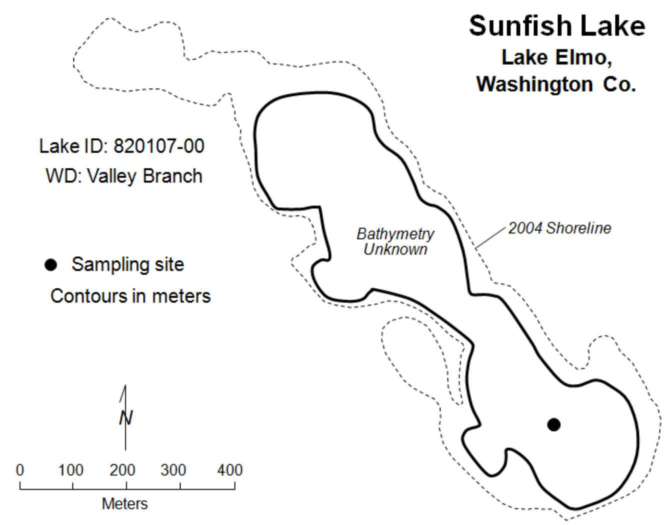
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	<22	32	A or B
CLA (µg/l))	6.9	1.8	12	A
Secchi (m)	+2.9	2.0	+4.3	B
TKN (mg/l)	0.65	0.60	0.70	
			Lake Grade	

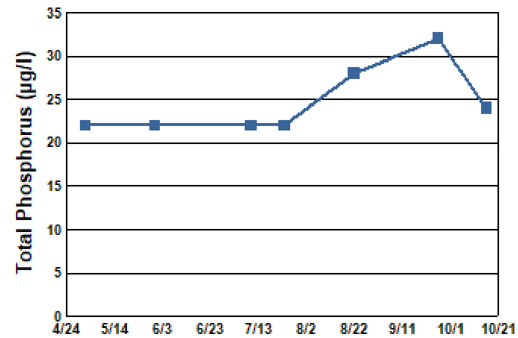
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.

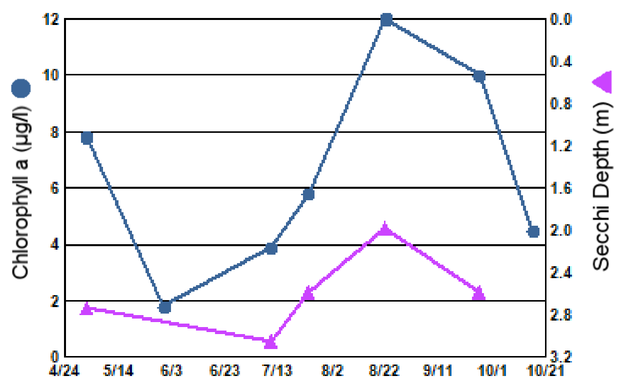
The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 17 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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.



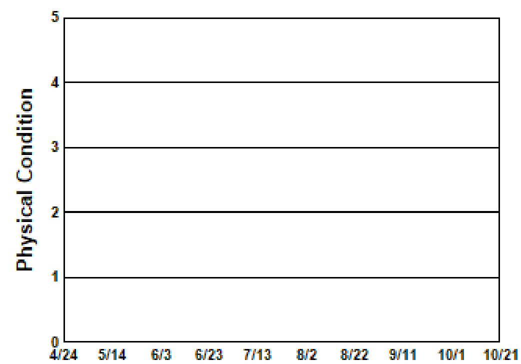




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	9.2	9.9	7.8	<22	2.7		
05/31/23	23.3	15.0	1.8	<22	+4.3		
07/10/23	26.0	8.8	3.9	<22	3.1		
07/24/23	25.3	10.3	5.8	<22	2.6		
08/22/23	24.6	10.9	12	~28	2.0		
09/26/23	20.2	7.4	10	32	2.6		
10/16/23	13.1	12.0	4.5	24	>3.1		

+ 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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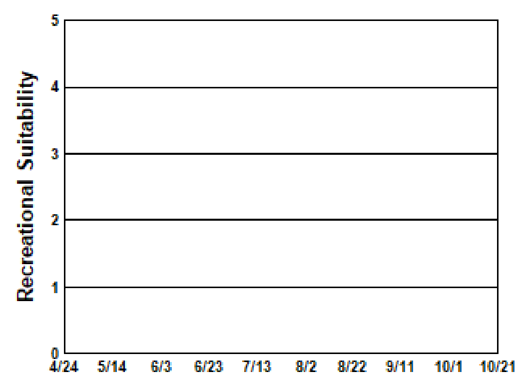
4 = High Algal Color
5 = Severe Algal Bloom



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	2022	2023
TP	C	B	C	C	B	A	B	
CLA	C	B	C	A	A	A	A	A
Secchi	D	D	D	C	B	A	A	B
Lake Grade	**C**	**C**	**C**	**B**	**B**	**A**	**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.

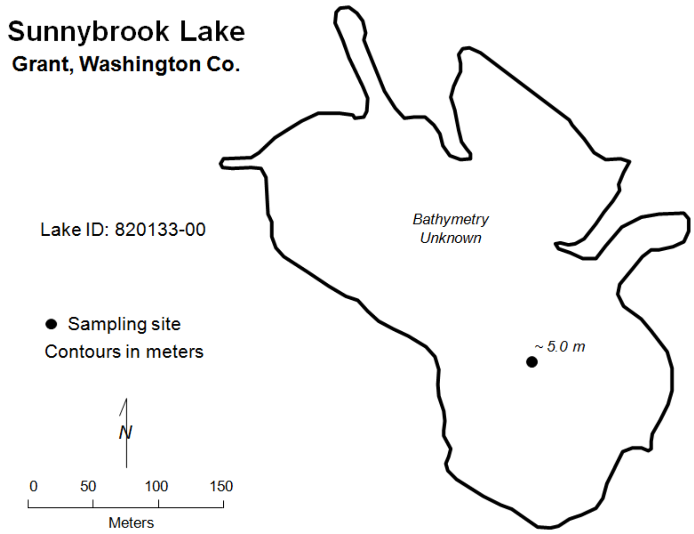
2023 Data summer (May - September) data summary

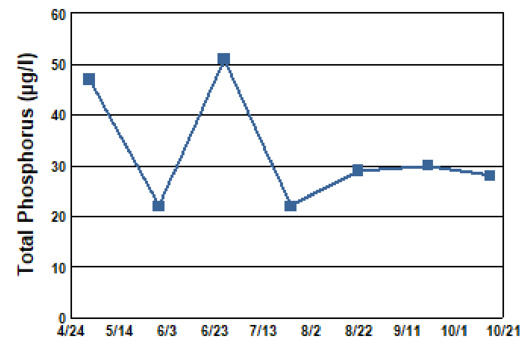
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	34	<22	51	B or C
CLA (µg/l))	6.7	2.9	13	A
Secchi (m)	2.9	1.8	4.1	B
TKN (mg/l)	0.77	0.65	0.91	
			Lake Grade	B

The lake grades have varied between A and B since 2001. The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 30 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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.

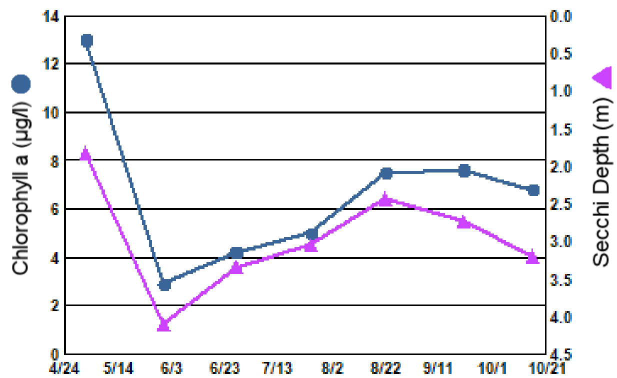
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

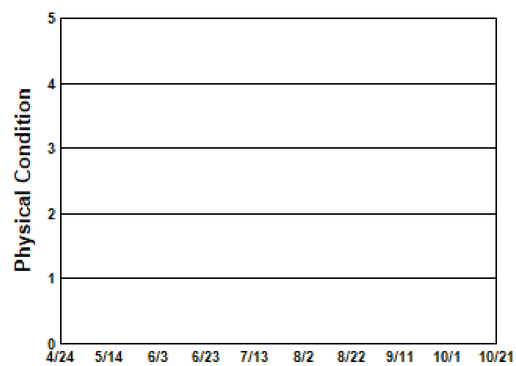




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	8.5	9.2	13	~47	1.8		
05/31/23	23.4	11.6	2.9	<22	4.1		
06/27/23	26.2	8.5	4.2	51	3.4		
07/25/23	27.1	10.3	5.0	<22	3.1		
08/22/23	23.6	10.5	7.5	29	2.4		
09/20/23	21.3	10.5	7.6	30	2.7		
10/16/23	13.3	10.0	6.8	28	3.2		





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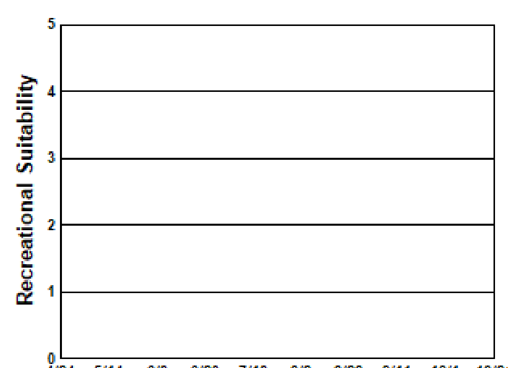
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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												
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	2022	2023
TP	A	A	A	B	B	B	B	
CLA	A	A	A	A	A	A	A	A
Secchi	A	B	A	C	C	B	B	B
Lake Grade	**A**	**A**	**A**	**B**	**B**	**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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	10	32	A
CLA (µg/l))	3.5	1.5	5.4	A
Secchi (m)	>3.0	>2.5	4.1	A
TKN (mg/l)				
			Lake Grade	A

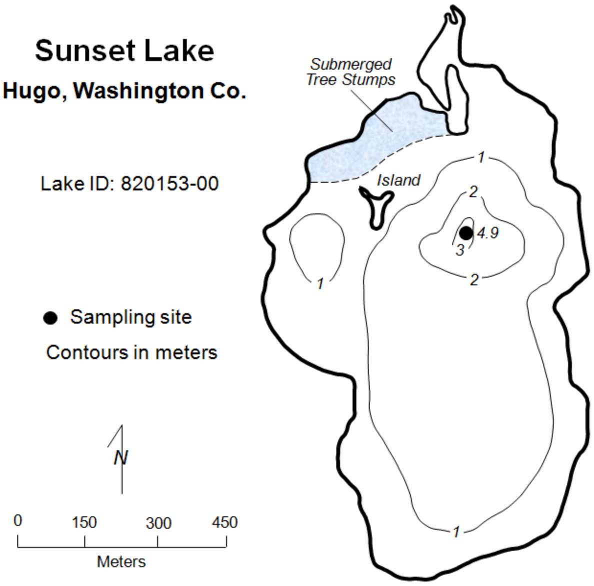
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

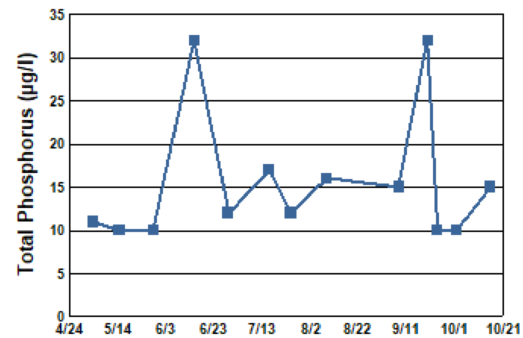
The lake received a lake grade of A. According to the historical water quality database, the water quality of the lake has improved over the past +30 years, as demonstrated by the shift from mostly C lake grades received in the period 1984 - 1999 to A lake grades. Water clarity has improved over this same time period as well. Secchi grades in the 1980s were in the C to D range but have improved to 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.

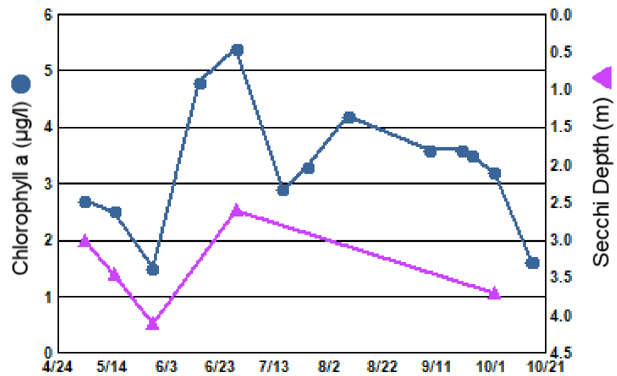


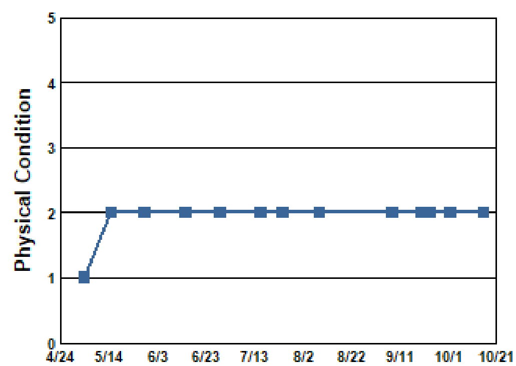


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/04/23	15.7		2.7	11	3.0	1	1
05/15/23	20.0		2.5	10	3.5	2	1
05/29/23	23.1		1.5	<10	4.1	2	2
06/15/23	23.7		4.8	32	>2.8	2	2
06/29/23	21.9		5.4	12	2.6	2	2
07/16/23	25.7		2.9	17	>2.8	2	2
07/25/23	28.1		3.3	12	>2.8	2	2
08/09/23	27.1		4.2	16	>2.7	2	2
09/08/23	23.3		3.6	15	>2.5	2	2
09/20/23	21.8		3.6	32	>3.0	2	2
09/24/23	21.2		3.5	<10	>3.3	2	2
10/02/23	22.3		3.2	<10	3.7	2	2
10/16/23			1.6	15	>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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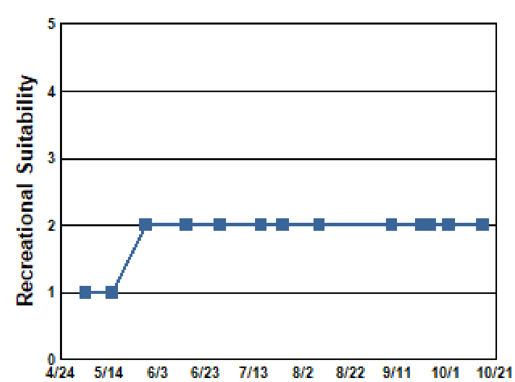


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	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	2022	2023
TP	A	A	A	A	A	B	A	A
CLA	A	A	A	A	A	A	A	A
Secchi	A	A	A	A	B	A	A	A
Lake Grade	**A**	**A**	**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: Paul Baron

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	24	108	C
CLA (µg/l))	5.3	2.4	11	A
Secchi (m)	+1.1	>0.8	>1.3	
TKN (mg/l)				
			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. Both of these grades 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. 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.

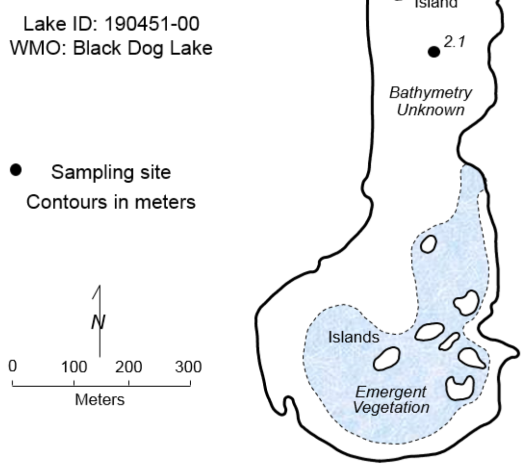
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

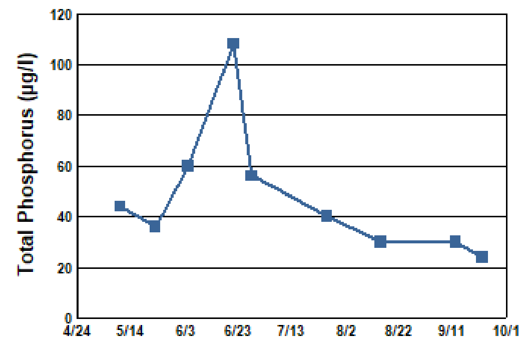
T

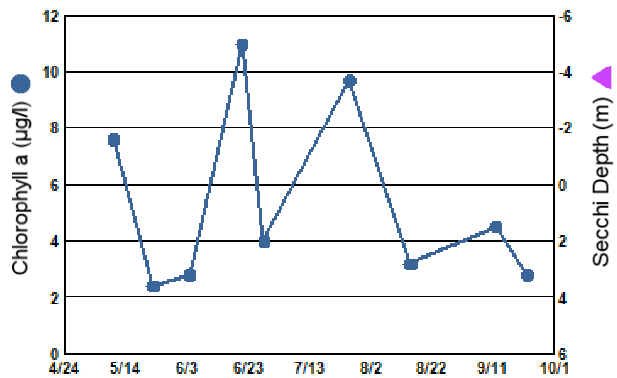
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.



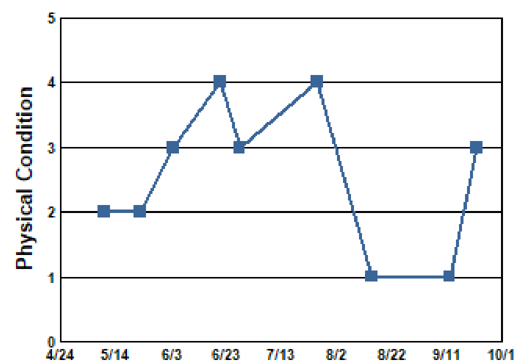




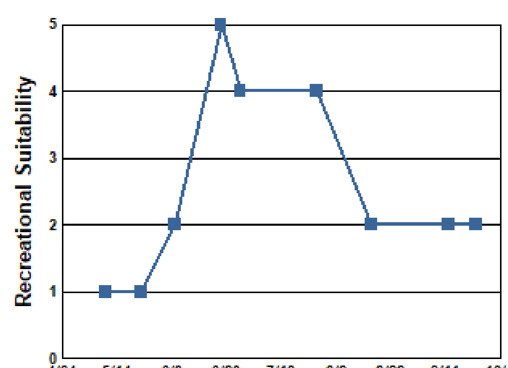
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/10/23	21.1		7.6	44	>1.1	2	1
05/23/23	25.0		2.4	36	>1.2	2	1
06/04/23	27.3		2.8	60	>1.2	3	2
06/21/23	29.1		11	108	>1.1	4	5
06/28/23	24.5		4.0	56	>0.8	3	4
07/26/23	28.9		9.7	40	>0.8	4	4
08/15/23	24.8		3.2	30	>1.3	1	2
09/12/23	20.9		4.5	30	+1.1	1	2
09/22/23	21.5		2.8	24	>1.1	3	2

+ 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	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	2022	2023
TP	C	C	C	C		C	D	C
CLA	B	A	B	A		A	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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

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.

2023 Data summer (May - September) data summary

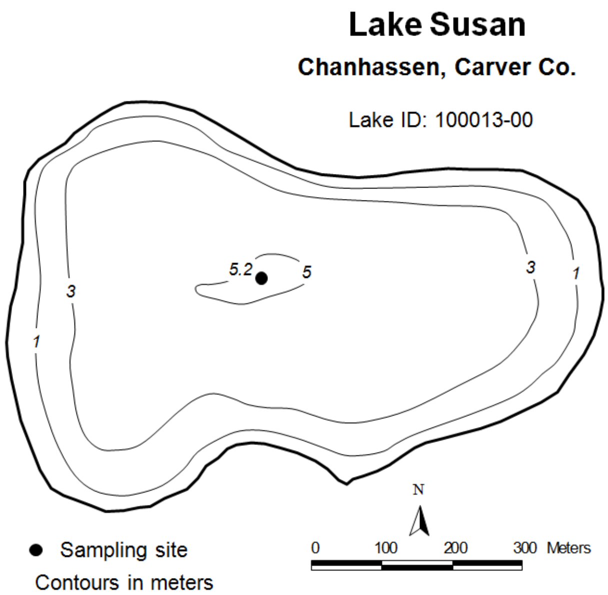
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	28	64	C
CLA (µg/l))	38	9.5	69	C
Secchi (m)	0.7	0.3	1.0	D
TKN (mg/l)				
			Lake Grade	C

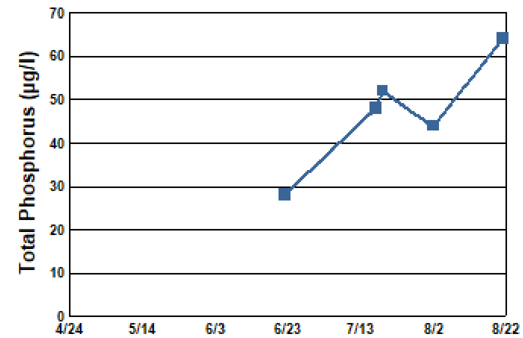
The lake received a lake grade of C this year which is consistent with its historical water quality database. The water quality of the lake has varied in the C to D range with C grades more common.

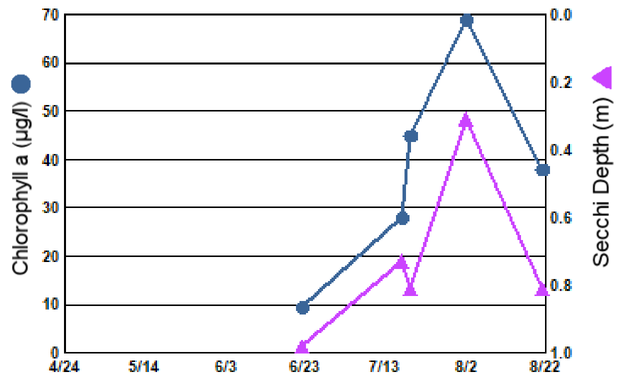
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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/.

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.

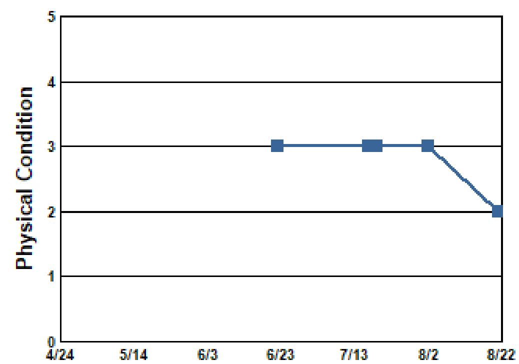




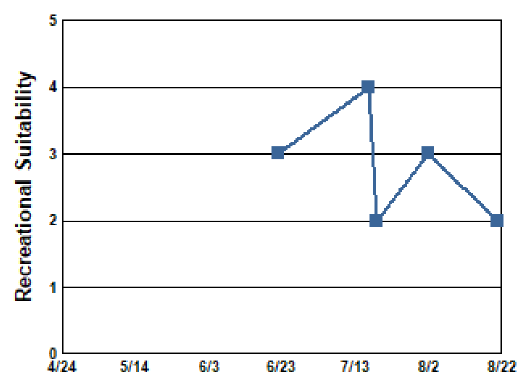


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/22/23	26.9		9.5	28	1.0	3	3
07/17/23	23.8		28	48	0.7	3	4
07/19/23	25.0		45	52	0.8	3	2
08/02/23	27.0		69	44	0.3	3	3
08/21/23	24.9		38	64	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												
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	2022	2023
TP	C	D		C		C	C	C
CLA	D	D		C		C	C	C
Secchi	C	D		C		C	C	D
Lake Grade	**C**	**D**		**C**		**C**	**C**	**C**

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. Sweeny 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 life (chloride) in 2014. The MPCA delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2024.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	15	<10	<20	
CLA (µg/l))	2.5	1.0	4.0	
Secchi (m)	3.6	3.2	3.8	
TKN (mg/l)				
			Lake Grade	

There was an insufficient quantity of monitoring events to calculate parameter grades. At least 5 monitoring events are needed during the summer-time period (May — September) to calculate a parameter grade and 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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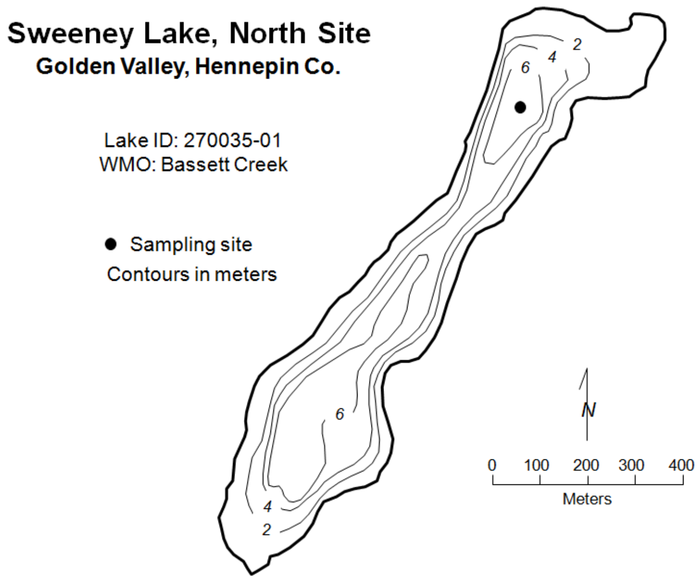
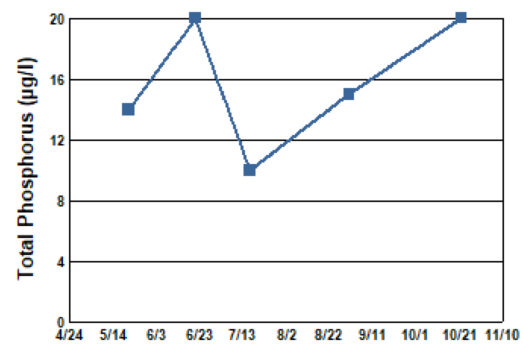
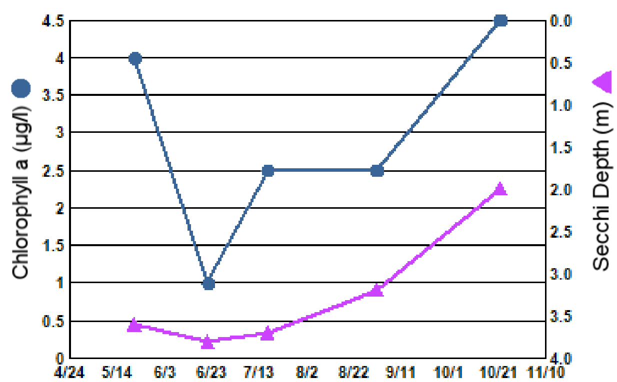
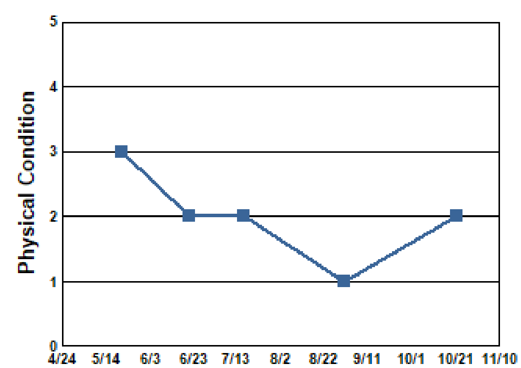






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/21/23	21.1		4.0	14	3.6	3	1
06/21/23	28.6		1.0	<20	3.8	2	1
07/16/23	24.9		2.5	<10	3.7	2	1
08/31/23	23.4		2.5	15	3.2	1	1
10/22/23	13.6		4.5	20	2.0	2	1



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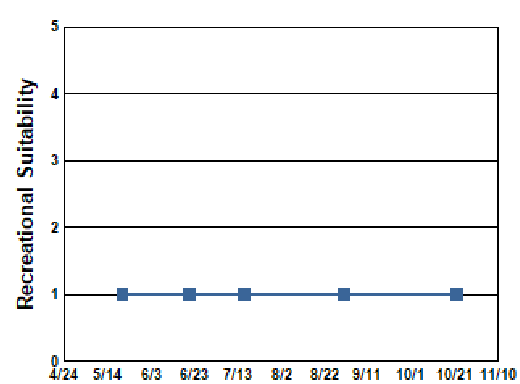
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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									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	2022	2023
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. Priority Waters List - Metropolitan Council (metrocouncil.org) 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.

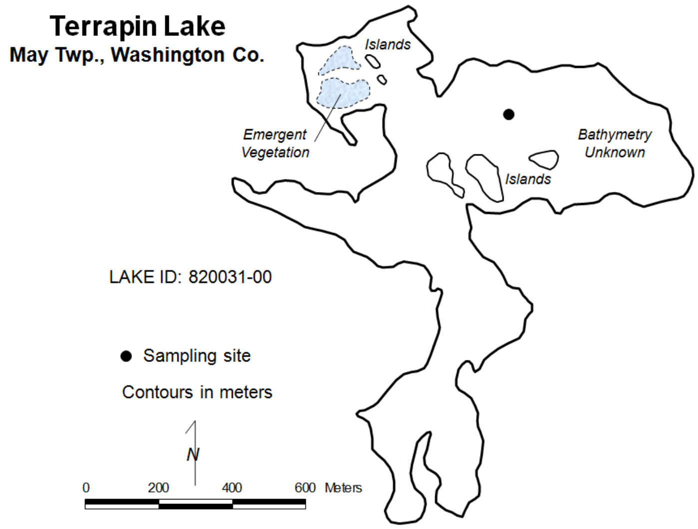
2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l))				
Secchi (m)	3.1	2.7	3.4	A
TKN (mg/l)				
			Lake Grade	

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.

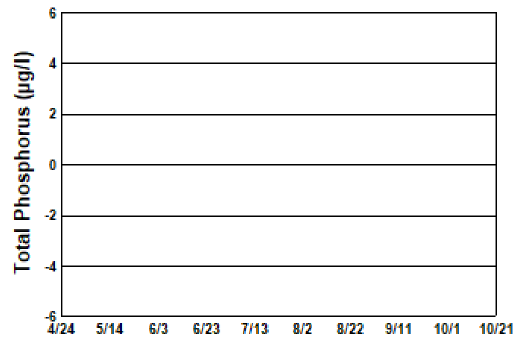
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

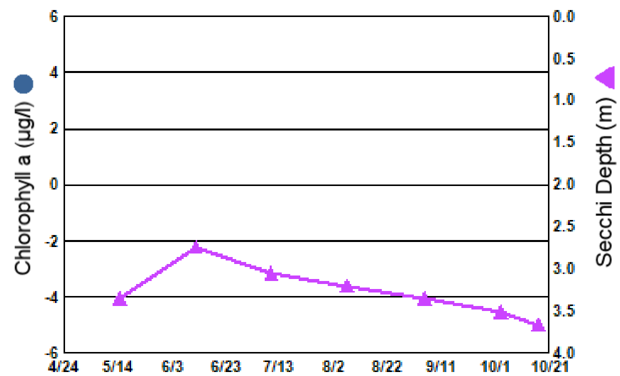
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

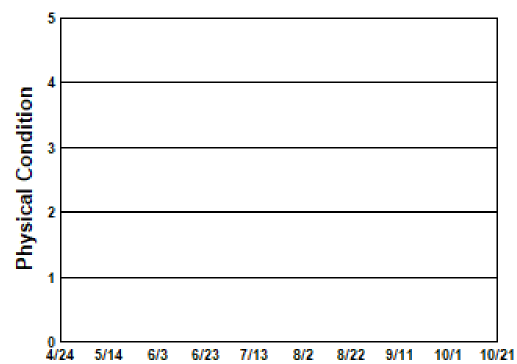


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/15/23					3.4		
06/12/23					2.7		
07/10/23					3.1		
08/07/23					3.2		
09/05/23					3.4		
10/03/23					3.5		
10/17/23					3.7		







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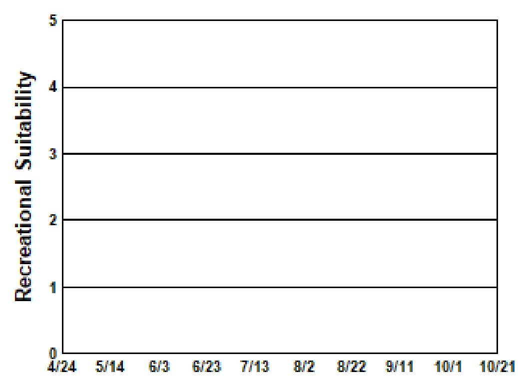
5 = Severe Algal Bloom



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												
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	2022	2023
TP			A	A				
CLA			A	A				
Secchi				A	A	A	A	A
Lake Grade				**A**				

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

Third Lake (13–0024) *Comfort Lake — Forest Lake Watershed District*

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Third Lake is located in Chisago Lake Township (Chisago County). It has a surface area of 62 acres and a maximum depth of 2.5 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 approximately 197 acres giving a relatively low watershed area to lake area ratio of 3.2. 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.

2023 Data summer (May - September) data summary

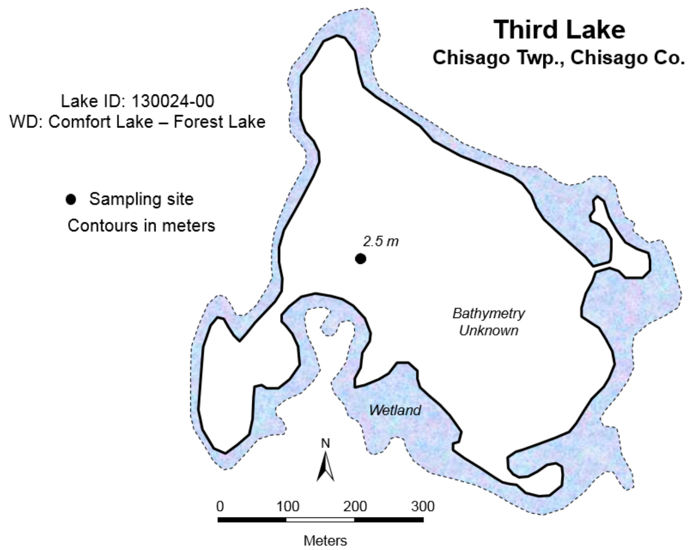
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	19	~24	
CLA (µg/l))	4.2	3.2	5.0	A
Secchi (m)	+1.6	>1.2	>1.8	
TKN (mg/l)	0.74	0.64	0.81	
			Lake Grade	

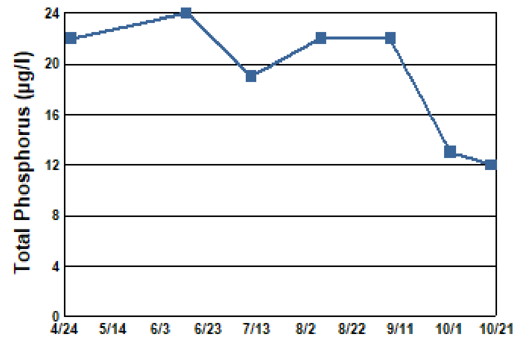
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

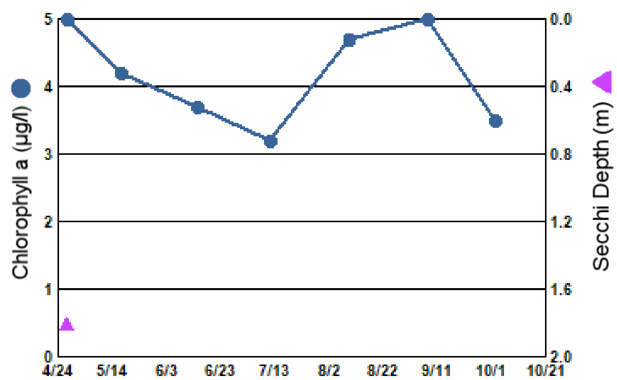
There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible on the lake bottom or the disk's visibility was blocked by aquatic vegetation. In both of these situations the water clarity would have been greater than that indicated by the measurement. Also, there was an insufficient quantity of TP values to calculate a TP grade. 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.



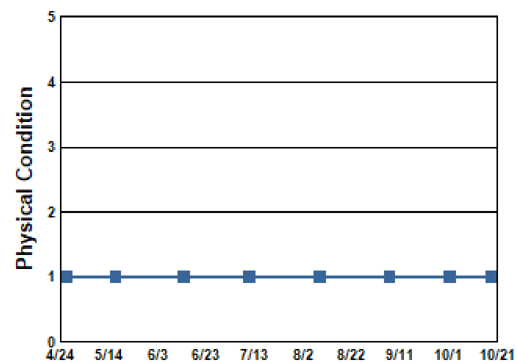




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/27/23	9.6		5.0	22	1.8	1	1
05/17/23	19.4		4.2		>1.8	1	1
06/14/23	23.9		3.7	~24	+1.8	1	1
07/11/23	26.0		3.2	19	+1.8	1	1
08/09/23	25.7		4.7	<22	>1.2	1	1
09/07/23	21.5		5.0	<22	+1.4	1	1
10/02/23	23.1		3.5	13	>1.5	1	1
10/19/23	12.5			12	>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
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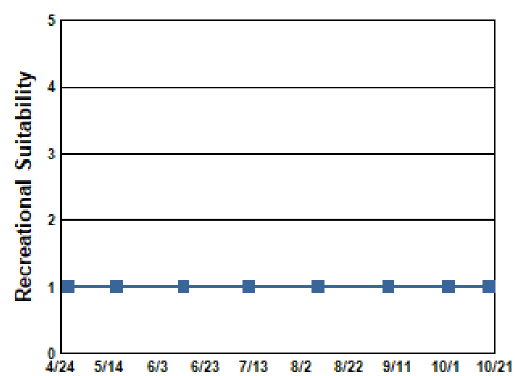
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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											B	A
CLA											A	A
Secchi												
Lake Grade												

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP				A			A	
CLA				A			A	A
Secchi								
Lake Grade								

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.

2023 Data summer (May - September) data summary

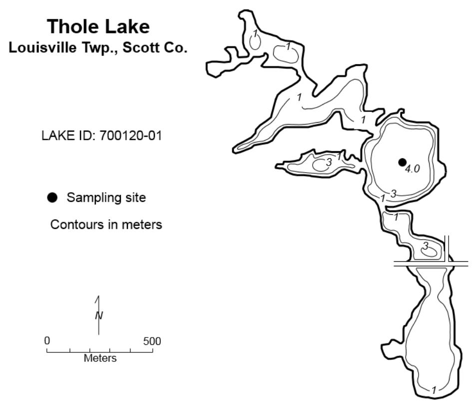
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	24	54	C
CLA (µg/l))	9.0	3.0	34	A
Secchi (m)	1.6	0.7	2.8	C
TKN (mg/l)				
			Lake Grade	B

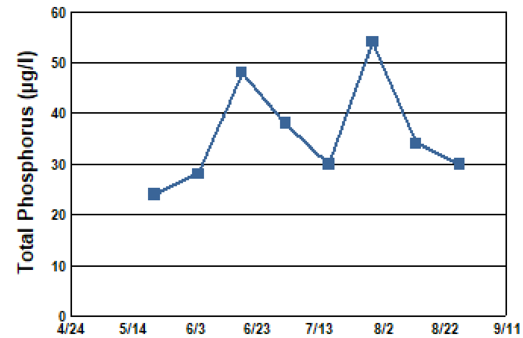
The lake received a lake grade of B, which is the best lake grade received according to its historical water quality database. The shift was driven mainly by the lower CLA concentrations observed in 2023 but without a corresponding shift in increased water clarity. Continued monitoring is suggested to determine if this change continues.

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/.

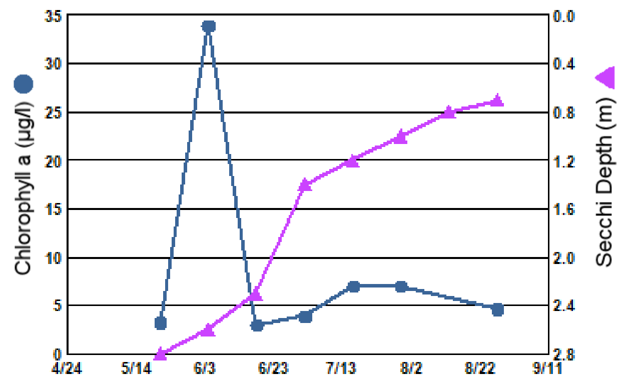
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

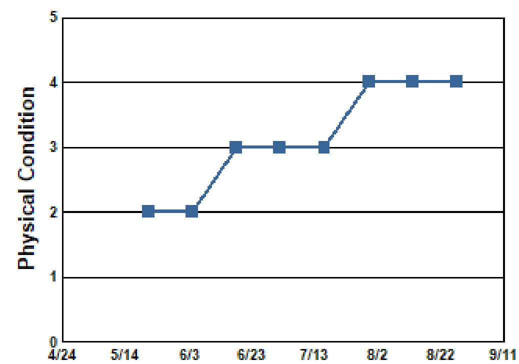




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/21/23	22.6		3.3	24	2.8	2	2
06/04/23	26.5		34	28	2.6	2	2
06/18/23	29.0		3.0	48	2.3	3	3
07/02/23	28.5		3.9	38	1.4	3	3
07/16/23	25.7		7.0	30	1.2	3	3
07/30/23	25.8		7.0	54	1.0	4	4
08/13/23	26.0			34	0.8	4	4
08/27/23	26.8		4.7	30	0.7	4	4





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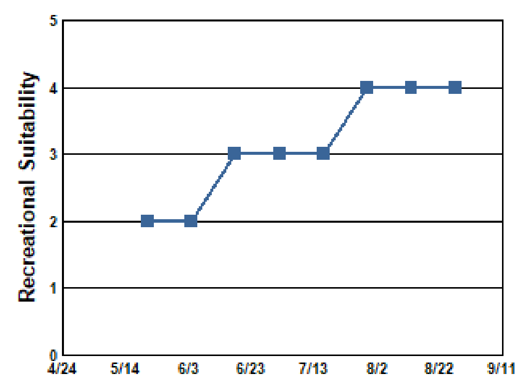
4 = High Algal Color
5 = Severe Algal Bloom



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					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	2022	2023
TP	D	C	C	C	D	D	D	C
CLA	D	C	D	C	C	C	C	A
Secchi	D	C	C	C	C	C	C	C
Lake Grade	**D**	**C**	**C**	**C**	**C**	**C**	**C**	**B**

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

Thompson Lake (19–0048) *Lower Mississippi River Watershed Management Organization*

Volunteer: Analiese Miller

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	38	66	C
CLA (µg/l))	15	7.9	24	B
Secchi (m)	1.2	1.0	1.4	C
TKN (mg/l)				
			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/.

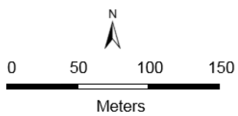
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

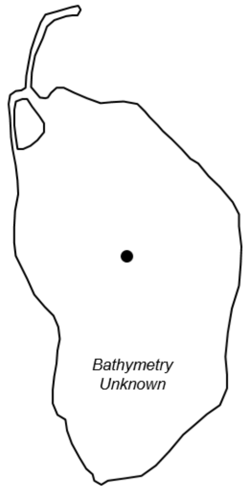
Thompson Lake
West St. Paul, Dakota Co.

Lake ID: 190048-00
WMO: Lower Mississippi River

● Sampling site

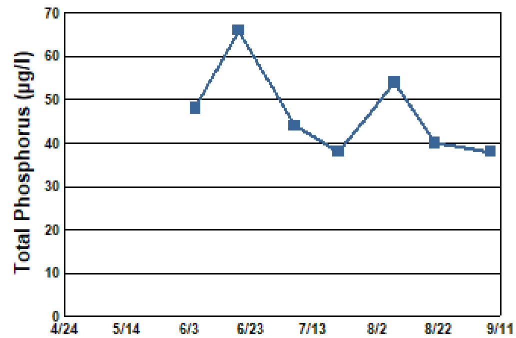
Contours in meters

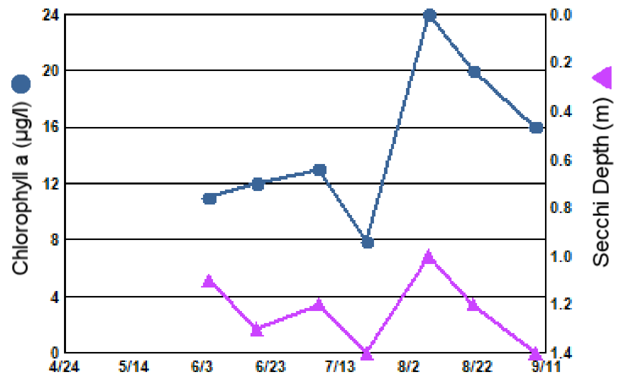


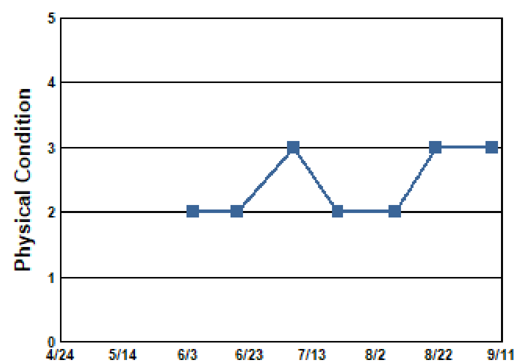


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/05/23	29.5		11	48	1.1	2	4
06/19/23	28.7		12	66	1.3	2	4
07/07/23	26.1		13	44	1.2	3	4
07/21/23	27.2		7.9	38	1.4	2	4
08/08/23	29.6		24	54	1.0	2	4
08/21/23	24.8		20	40	1.2	3	4
09/08/23	24.6		16	38	1.4	3	4







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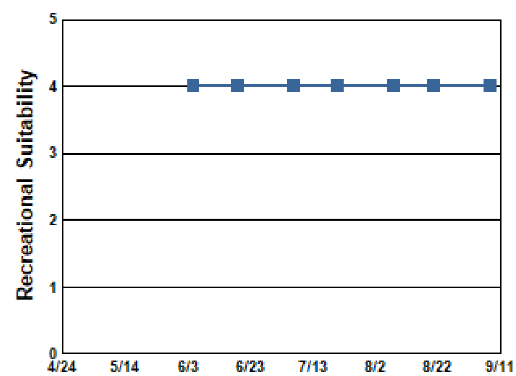
5 = Severe Algal Bloom



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												
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	2022	2023
TP	C	D	C	C	C	D	C	C
CLA	B	B	B	B	B	B	C	B
Secchi	D	C	C	C	D	C	D	C
Lake Grade	**C**	**C**	**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.

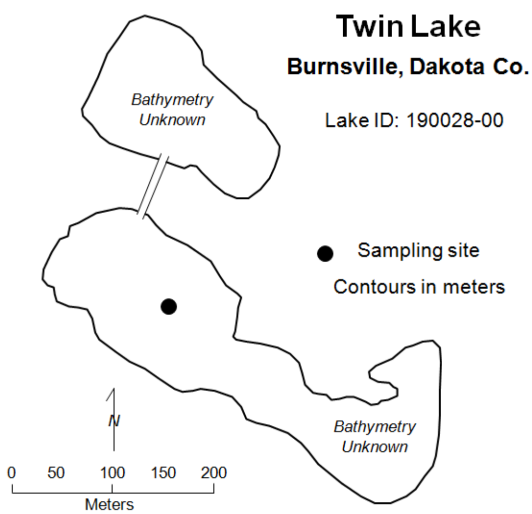
2023 Data summer (May - September) data summary

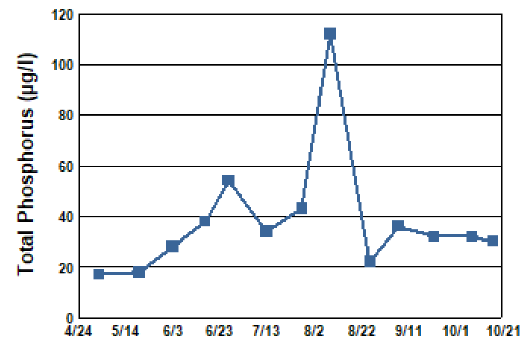
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	17	112	C
CLA (µg/l))	5.4	1.9	10	A
Secchi (m)	1.5	0.7	2.7	C
TKN (mg/l)				
			Lake Grade	B

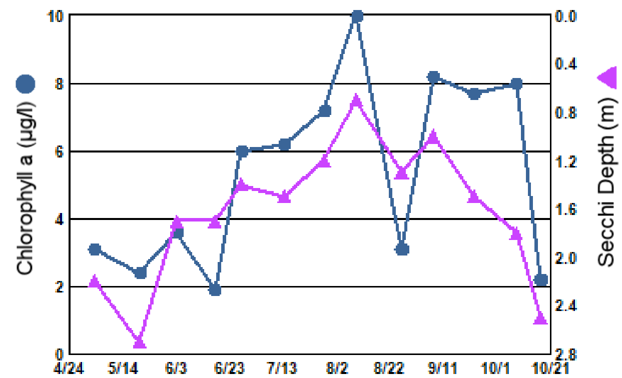
The lake received a lake grade of B this year. The water quality of this lake has varied in the B to C range since 1999.

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.

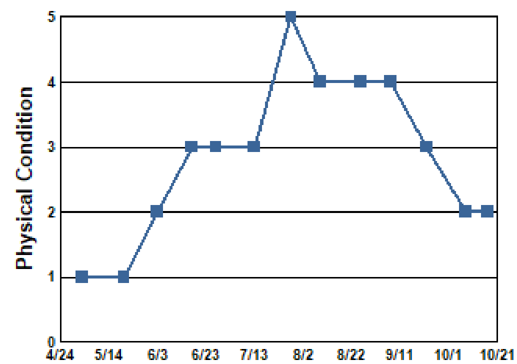






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	13.5		3.1	17	2.2	1	4
05/20/23	16.4		2.4	18	2.7	1	4
06/03/23	27.0		3.6	28	1.7	2	4
06/17/23	22.1		1.9	38	1.7	3	4
06/27/23	23.8		6.0	54	1.4	3	4
07/13/23	23.3		6.2	34	1.5	3	4
07/28/23	30.1		7.2	43	1.2	5	4
08/09/23	26.1		10	112	0.7	4	4
08/26/23	27.6		3.1	22	1.3	4	4
09/07/23	20.8		8.2	36	1.0	4	4
09/22/23	19.6		7.7	32	1.5	3	4
10/08/23	14.3		8.0	32	1.8	2	4
10/17/23	10.4		2.2	30	2.5	2	4



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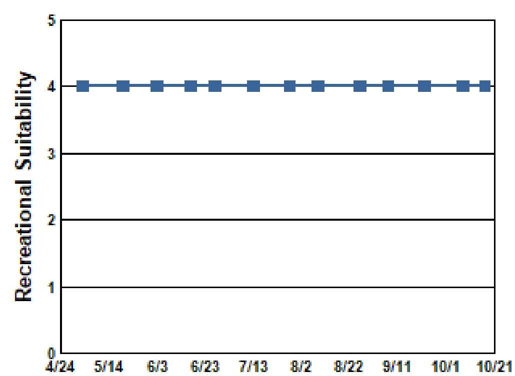

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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5 = No Aesthetics Possible

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								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	2022	2023
TP	B	A	B	B	C	C	C	C
CLA	A	A	A	A	A	A	A	A
Secchi	C	C	C	C	C	C	C	C
Lake Grade	**B**	**B**	**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 are 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.

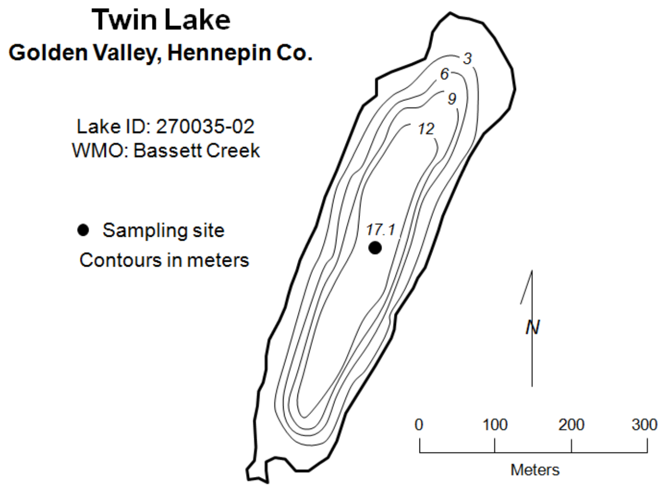
2023 Data summer (May - September) data summary

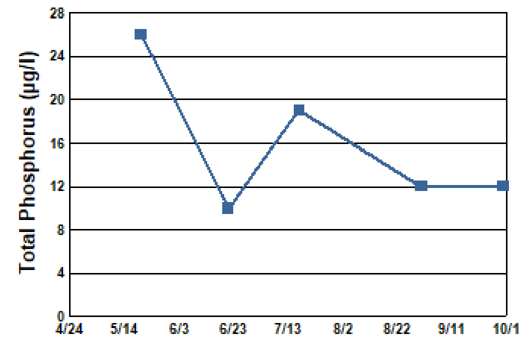
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	<10	26	A
CLA (µg/l))	1.9	1.0	2.7	A
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

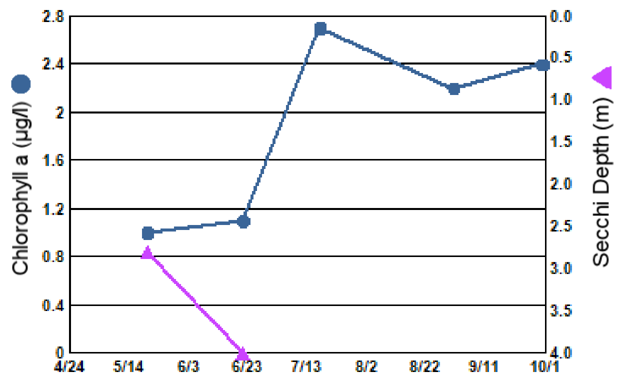
There was an insufficient quantity Secchi data to calculate its parameter grade. At least 5 results are needed during the summer-time period (May — September) to calculate a parameter grade and a lake grade.

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.

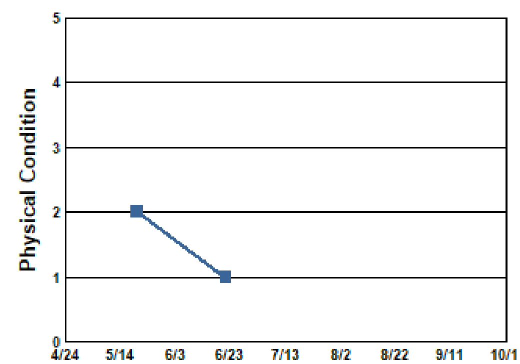






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
05/20/ 23	20.2		1.0	26	2.8	2	2
06/21/ 23	27.5		1.1	<10	4.0	1	2
07/17/ 23			2.7	19			
08/31/ 23			2.2	12			
09/30/ 23			2.4	12			



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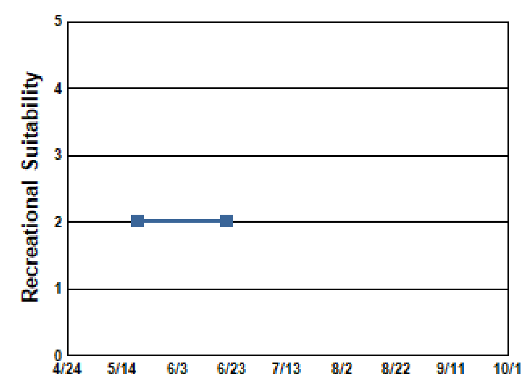


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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
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	2022	2023
TP	B	A	B	A	A	A		A
CLA	A	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 [Forest Lake] (82–0157) *Comfort Lake — Forest Lake Watershed District*

Sponsor: Comfort Lake — Forest Lake Watershed District

Monitoring Personnel: Comfort Lake — Forest Lake Watershed District staff

Twin Lake is located in the city of Forest Lake (Washington County). 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. Few 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.

2023 Data summer (May - September) data summary

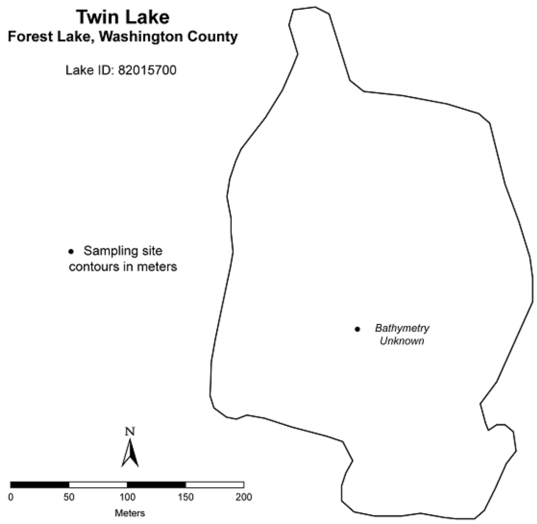
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	17	~34	
CLA (µg/l))	10	7.3	12	
Secchi (m)	+1.3	>1.0	1.5	
TKN (mg/l)	0.73	0.67	0.77	
			Lake Grade	

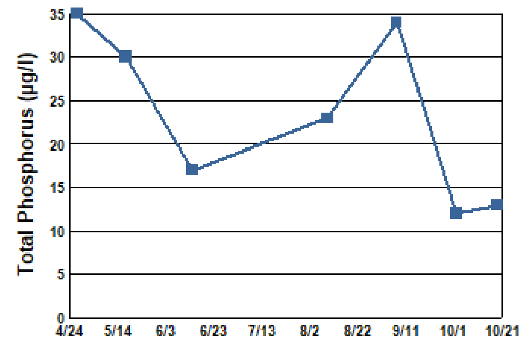
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

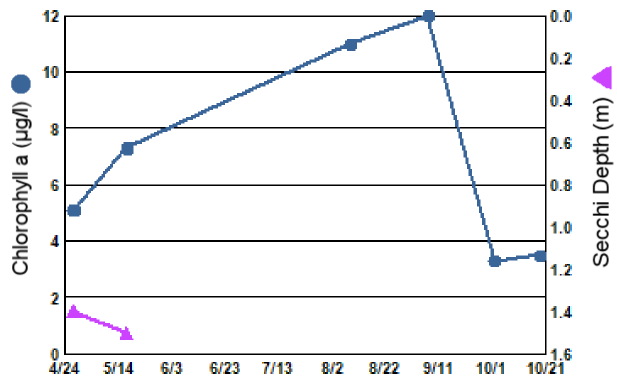
No parameter grades were given due to insufficient data. At least 5 values are needed within the summer-time period (May — September) to calculate a parameter grade.

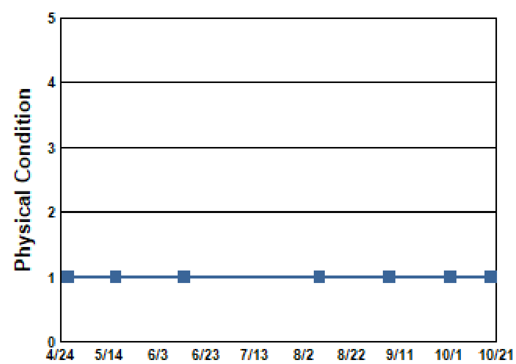
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

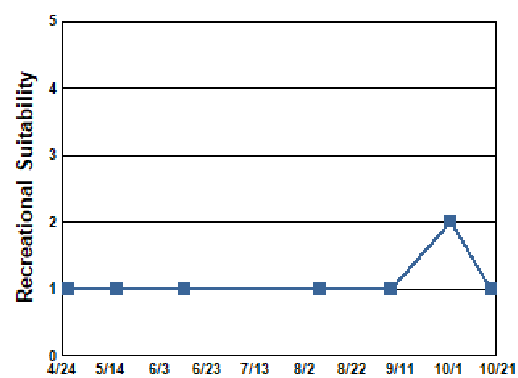








1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/27/23	11.0		5.1	~35	1.4	1	1
05/17/23	20.2		7.3	30	1.5	1	1
06/14/23	22.8			17	+1.4	1	1
08/09/23	23.8		11	~23	>1.0	1	1
09/07/23	21.0		12	~34	+1.2	1	1
10/02/23	22.2		3.3	12	>1.3	1	2
10/19/23	12.5		3.5	13	+1.1	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.

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	2022	2023
TP				B				
CLA				A				
Secchi								
Lake Grade								

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

Twin Lake [Robbinsdale, Lower Basin] (27–0042–03) *Shingle Creek Watershed Management Commission*

Volunteer: Guy Davis

The lower basin of Twin Lake is located in the city of Robbinsdale (Hennepin County). Twin Lake consists of 3 basins: upper, middle, and lower. The whole lake has a surface area of approximately 215 acres. The lower basin has a surface area of approximately 36 acres and a maximum depth of 6.7 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) n 1998, and aquatic consumption (Perfluorooctane Sulfonate (PFOS) in fish tissue) in 2010, and aquatic life (fish bioassessments) in 2024.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.

2023 Data summer (May - September) data summary

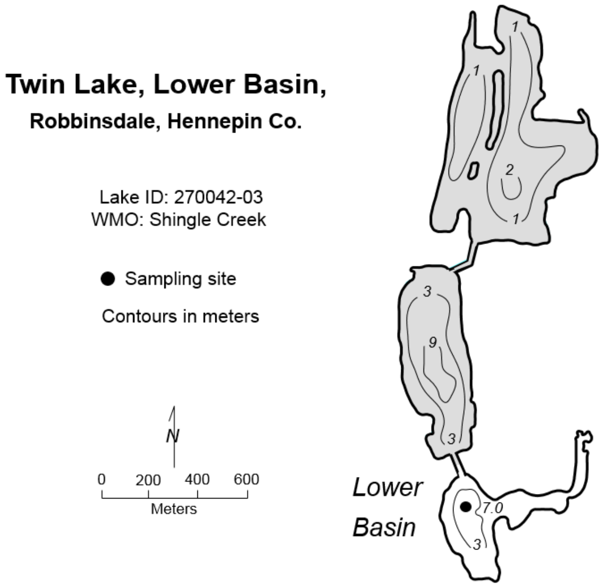
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l))				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

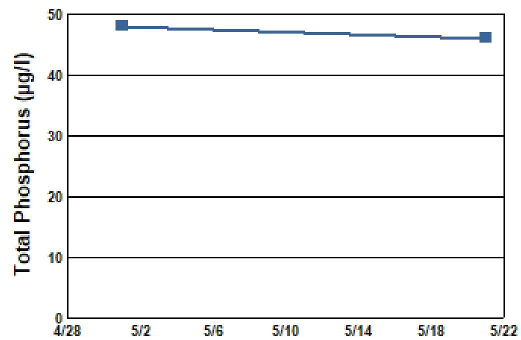
There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade.

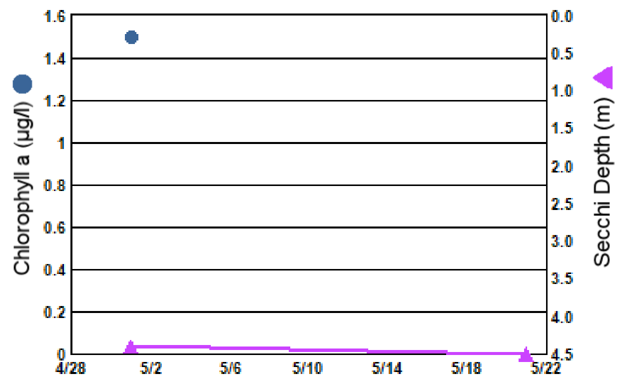
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

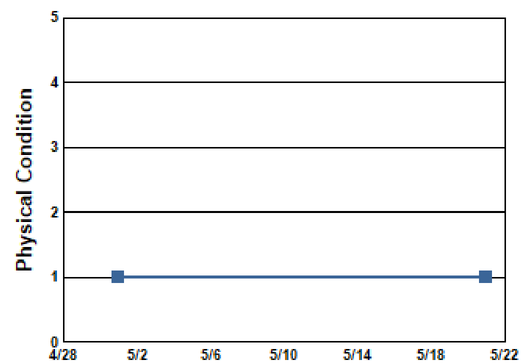




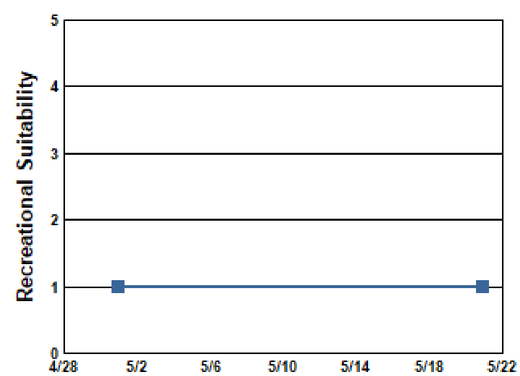


2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/01/23	10.0		1.5	48	4.4	1	1
05/21/23	21.0			46	4.5	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												D
CLA												D
Secchi												D
Lake Grade												**D**

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP					D			
CLA					C			
Secchi					F			
Lake Grade					**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.

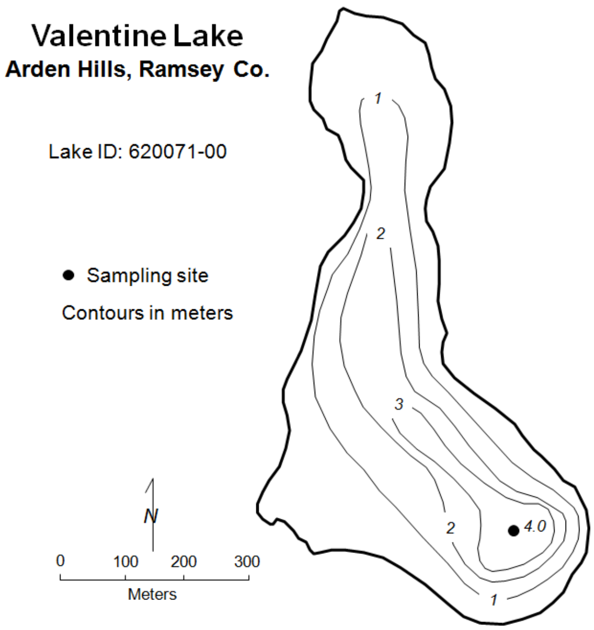
2023 Data summer (May - September) data summary

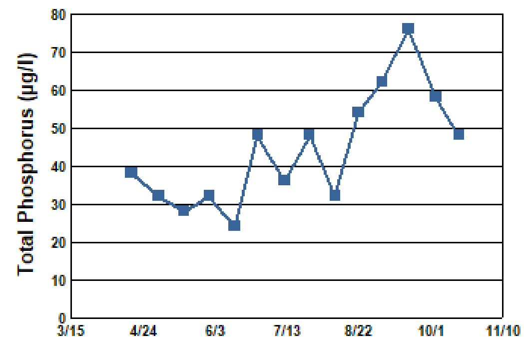
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	24	90	C
CLA (µg/l))	10	2.0	24	B
Secchi (m)	1.9	1.2	2.9	C
TKN (mg/l)				
			Lake Grade	C

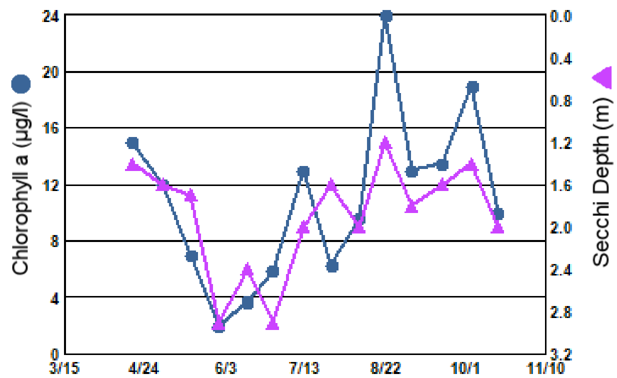
The lake received a lake grade of C again this year, which is an improvement over the D grades received in recent years. Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

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.

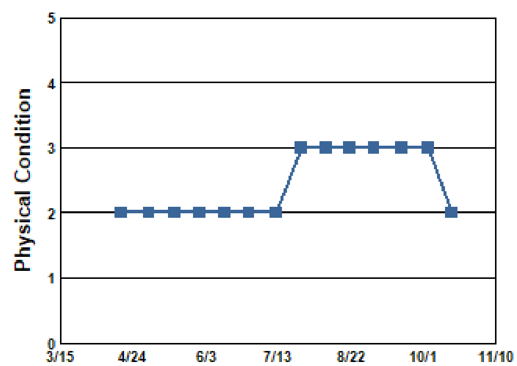






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/18/23	10.2		15	38	1.4	2	1
05/03/23	11.1		12	32	1.6	2	1
05/17/23	19.6		7.0	28	1.7	2	1
05/31/23	23.7		2.0	32	2.9	2	1
06/14/23	23.7		3.7	24	2.4	2	3
06/27/23	24.9		5.9	48	2.9	2	3
07/12/23	23.9		13	36	2.0	2	4
07/26/23	25.9		6.3	48	1.6	3	4
08/09/23	25.8		9.6	32	2.0	3	4
08/22/23	22.8		24	54	1.2	3	4
09/04/23	23.6		13	62	1.8	3	4
09/19/23	20.2		14	76	1.6	3	4
10/04/23	20.7		19	58	1.4	3	3
10/17/23	12.1		10	48	2.0	2	3



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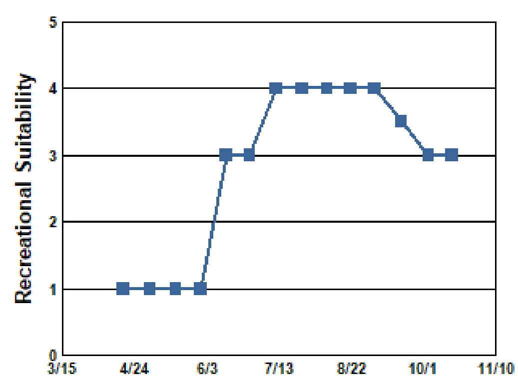

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Lake Water Quality Grades Based on Summertime Averages

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										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	2022	2023
TP			D	D	D	C	C	C
CLA			C	C	C	B	B	B
Secchi			D	D	D	C	C	C
Lake Grade			**D**	**D**	**D**	**C**	**C**	**C**

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

Valley Lake (19–0348) *City of Lakeville*

Monitoring Personnel: City of Lakeville 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.

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.

2023 Data summer (May - September) data summary

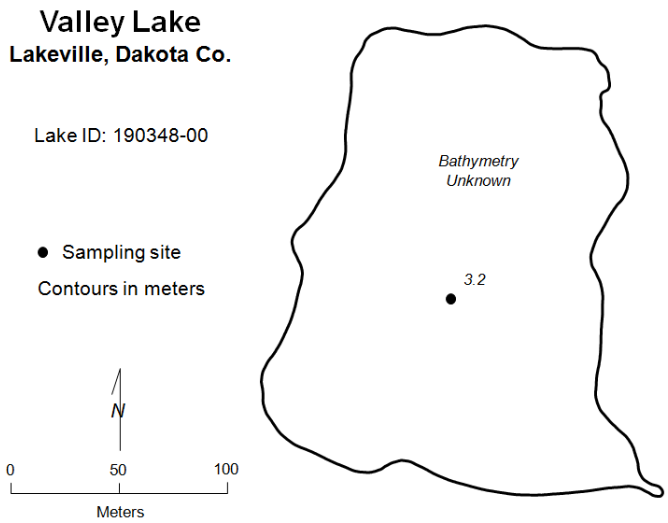
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	59	18	86	C
CLA (µg/l))	43	5.4	77	C
Secchi (m)	1.1	0.6	2.6	D
TKN (mg/l)				
			Lake Grade	C

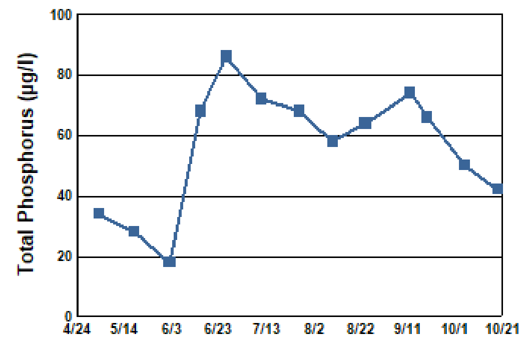
The lake received a lake grade of C this year. The lake grades have typically varied in the range of B to D.

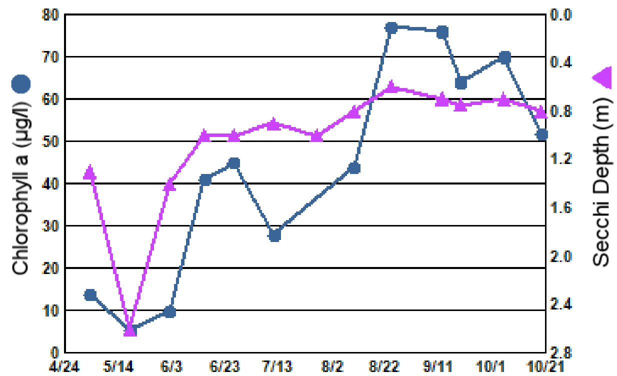
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

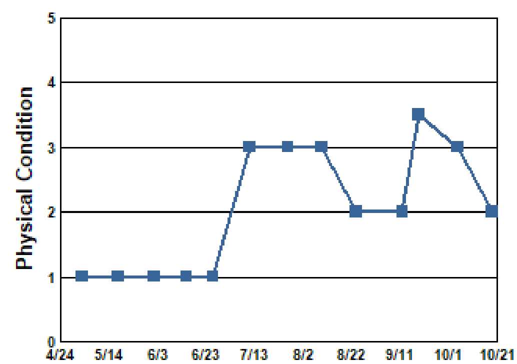






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/03/23	10.6		14	34	1.3	1	2
05/18/23	18.6		5.4	28	2.6	1	2
06/02/23	25.1		10	18	1.4	1	2
06/15/23	23.6		41	68	1.0	1	2
06/26/23	25.7		45	86	1.0	1	2
07/11/23	25.0		28	72	0.9	3	2
07/27/23	28.6			68	1.0	3	2
08/10/23	27.0		44	58	0.8	3	2
08/24/23	28.0		77	64	0.6	2	2
09/12/23	22.6		76	74	0.7	2	2
09/19/23	20.1		64	66	0.8	4	3
10/05/23	20.1		70	50	0.7	3	2
10/19/23	12.7		52	42	0.8	2	4



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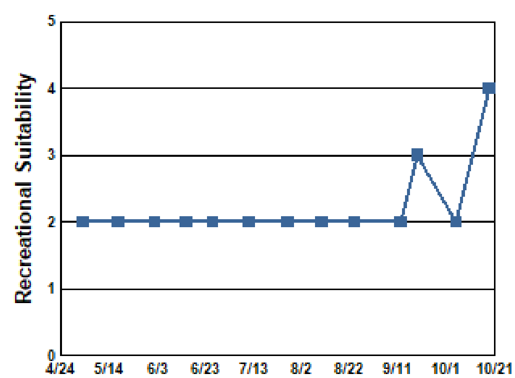
5 = Severe Algal Bloom



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												
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	2022	2023
TP	C	C	D	D	D	C	C	C
CLA	C	B	D	D	C	C	C	C
Secchi	C	C	F	F	D	C	D	D
Lake Grade	**C**	**C**	**D**	**D**	**D**	**C**	**C**	**C**

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

Weber Pond (82–0119) *Valley Branch Watershed District*

Monitoring Personnel: Washington Conservation District staff

Weber Pond is located in the City of Mahtomedi (Washington County). It has a surface area of 7.5 acres and a maximum depth of 2.0 m (6.5 ft). Few other bathymetric are available for the pond. 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.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	<22	45	B
CLA (µg/l))	9.0	3.7	15	A
Secchi (m)	+1.1	>0.8	+1.4	
TKN (mg/l)	0.77	0.47	1.06	
			Lake Grade	

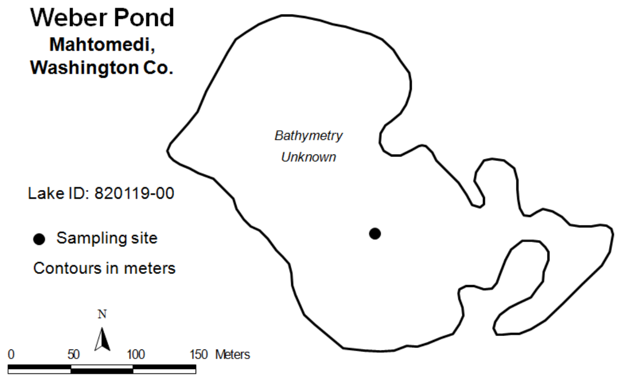
+ indicates that the Secchi disk was visible on the bottom of the lake at the depth indicated.
> indicates that the visibility of the Secchi disk was blocked by aquatic vegetation at the depth indicated.

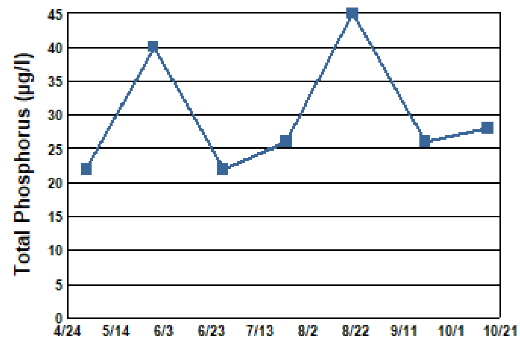
The lake received TP and CLA parameter grades of B and A this year, which is consistent with its varying water quality database. There was an insufficient quantity of valid Secchi transparency measurements to determine a Secchi grade. An invalid measurement occurred if the Secchi disk was either visible 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.

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 26 ug/L which is in the same grade range as the maximum mean value indicated in the data summary table.

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.

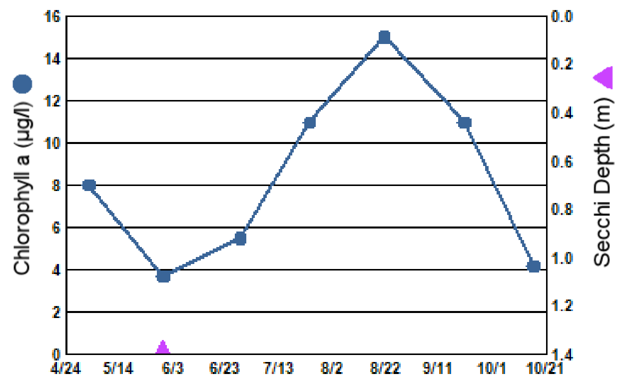


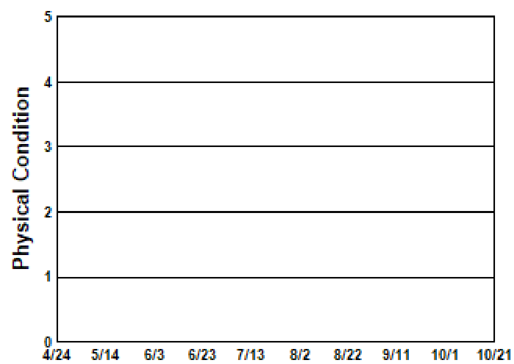


2023 Data

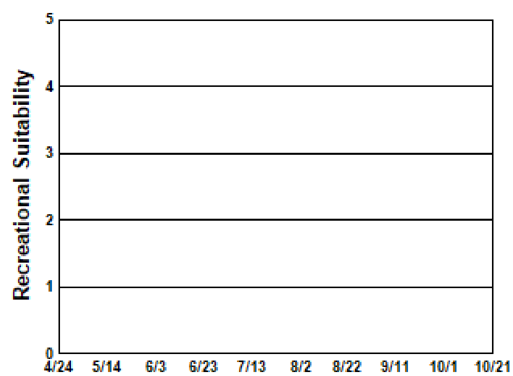
Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/02/23	9.4	8.9	8.0	<22	+1.4		
05/30/23	22.3	12.3	3.7	~40	1.4		
06/28/23	24.4	6.7	5.5	<22	>1.1		
07/24/23	24.6	6.2	11	~26	>0.9		
08/21/23	22.5	9.0	15	45	>0.8		
09/20/23	20.6	12.9	11	26	>0.9		
10/16/23	10.4	12.3	4.2	28	>1.4		

+ 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												
CLA												
Secchi												
Lake Grade												

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

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP		A			C			B
CLA		A			A			A
Secchi								
Lake Grade								

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

Westwood Lake (27–0711) *Bassett Creek Watershed Management Organization*

Volunteers: RJ Twiford

Westwood Lake is located in the city of St. Louis Park (Hennepin County). The lake is considered a Priority Water by the Metropolitan Council. Priority Waters List - Metropolitan Council (metrocouncil.org) The lake has a surface are 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.

2023 Data summer (May - September) data summary

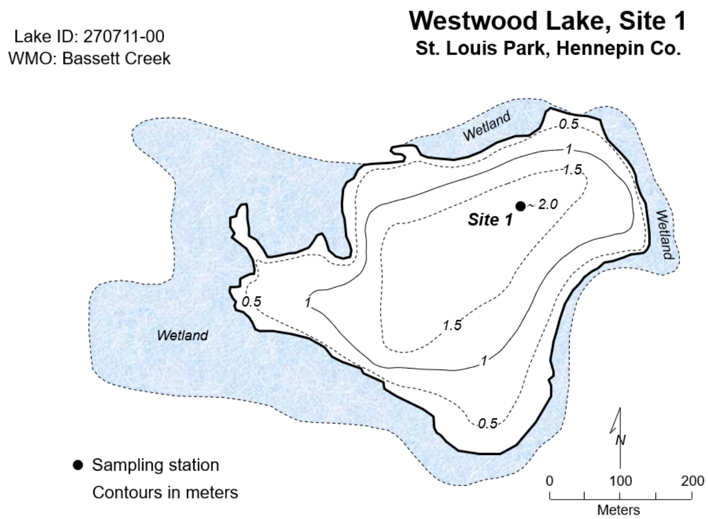
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	13	32	A
CLA (µg/l))	5.4	4.5	6.4	
Secchi (m)	+1.2	1.0	+1.6	
TKN (mg/l)				
			Lake Grade	

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

There were insufficient quantity of CLA results to calculate its parameter grade. At least 5 values are needed within the summer-time period (May — September) to calculate 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 lake received a TP grade of A which is consistent with its historical water quality database. The TP grades have fluctuated in the A to C range for the past decade. 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.

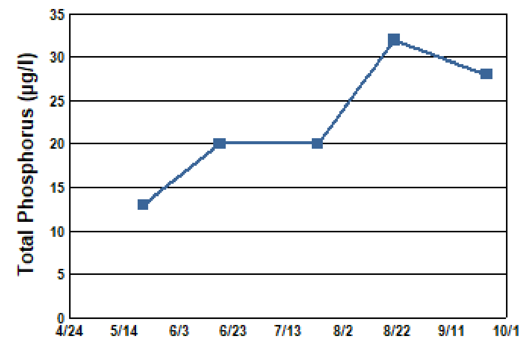
If you notice any errors in the lake’s data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

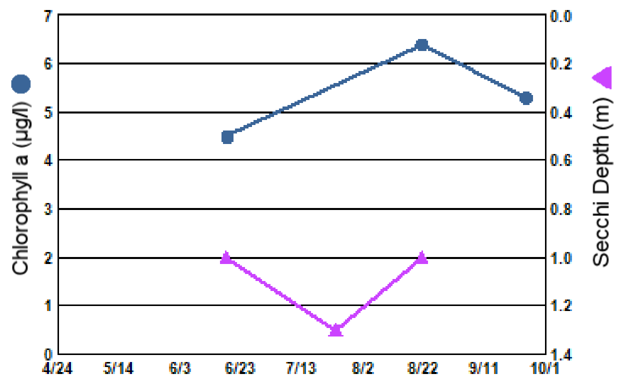


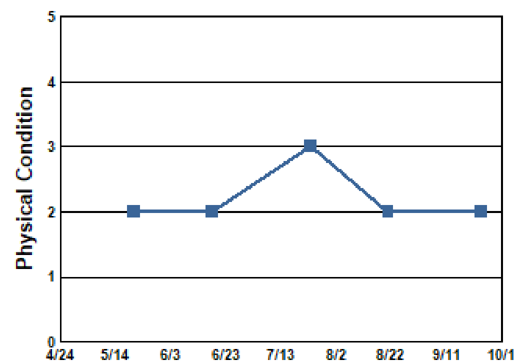
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/ l)	Secchi (m)	PC	RS
05/21/ 23	19.2			13	+1.6	2	4
06/18/ 23	24.5		4.5	20	1.0	2	4
07/24/ 23	25.3			20	1.3	3	4
08/21/ 23	24.7		6.4	32	1.0	2	4
09/24/ 23	20.9		5.3	28	+1.1	2	4

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







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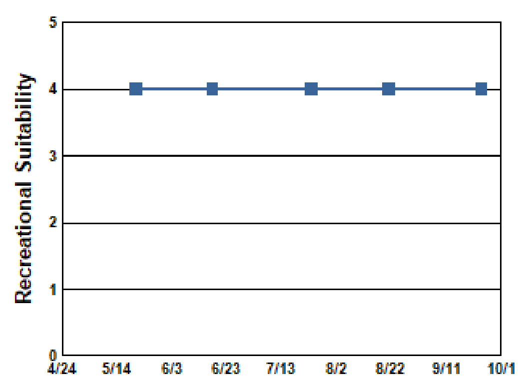
4 = High Algal Color
5 = Severe Algal Bloom



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			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	2022	2023
TP	B		A	B	C		C	A
CLA	A		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 delisted the lake from the impaired waters list for aquatic recreational use (nutrient/eutrophication biological indicators) in 2024.

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.

2023 Data summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	17	42	B
CLA (µg/l))	6.6	2.2	12	A
Secchi (m)	+2.5	+1.6	>3.1	
TKN (mg/l)				
			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 a TP and CLA grades of B and A, respectively. 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. 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.

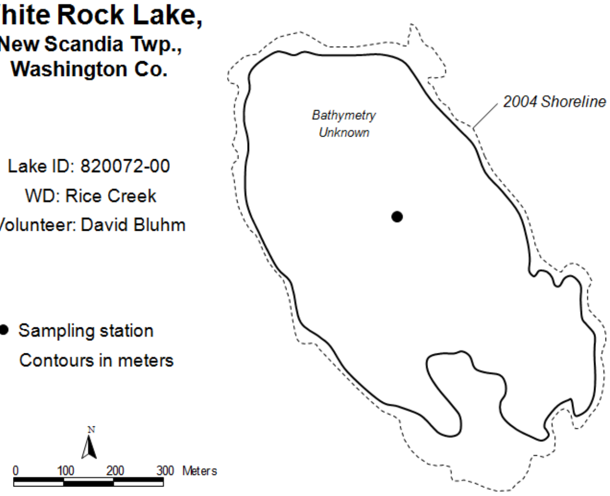
During each monitoring visit, the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

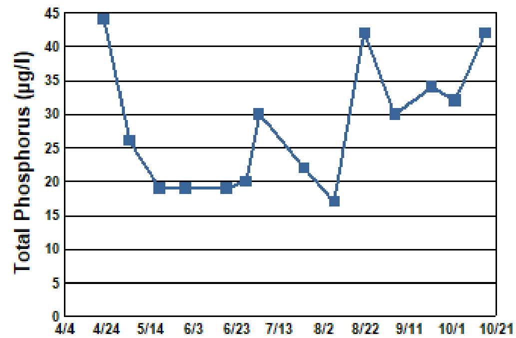
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

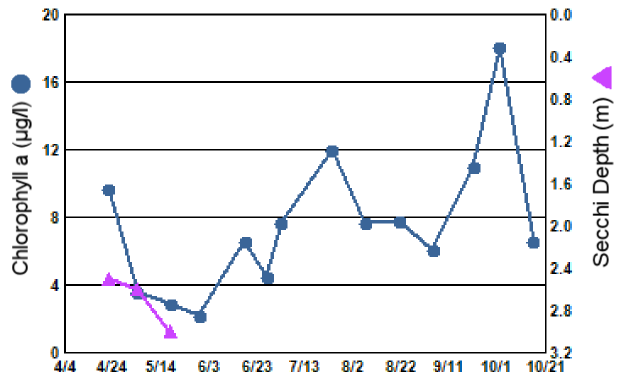
White Rock Lake,
New Scandia Twp.,
Washington Co.

Lake ID: 820072-00
WD: Rice Creek
Volunteer: David Bluhm

● Sampling station
Contours in meters



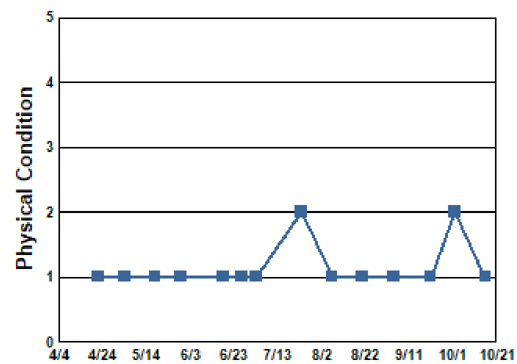




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/22/23	4.9		9.7	44	2.5	1	1
05/04/23	14.7		3.6	26	2.6	1	1
05/18/23	17.9		2.9	19	3.0	1	1
05/30/23	23.2		2.2	19	>3.1	1	1
06/18/23	24.2		6.6	19	>3.0	1	1
06/27/23	25.5		4.5	20	>3.0	1	1
07/03/23	24.8		7.7	30	>2.9	1	1
07/24/23	27.9		12	22	+1.6	2	1
08/07/23	26.5		7.7	17	>2.0	1	1
08/21/23	23.1		7.8	42	>2.0	1	1
09/04/23	26.4		6.1	30	>2.2	1	1
09/21/23	22.6		11	34	>2.0	1	1
10/02/23	21.5		18	32	>2.0	2	1
10/16/23	11.9		6.6	42	>2.0	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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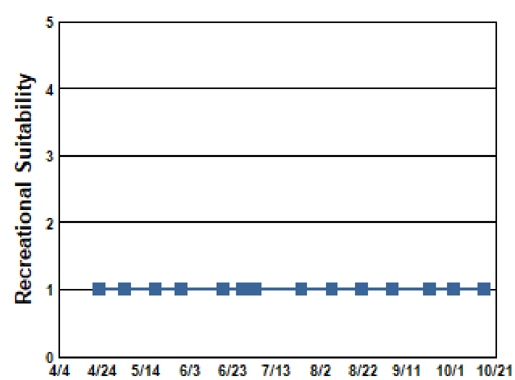


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	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	2022	2023
TP	D	C	C	C	B	C	B	B
CLA	C	B	C	B	B	A	A	A
Secchi	C	C	C	C	C	A	B	
Lake Grade	**C**	**C**	**C**	**C**	**B**	**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.

2023 Data summer (May - September) data summary

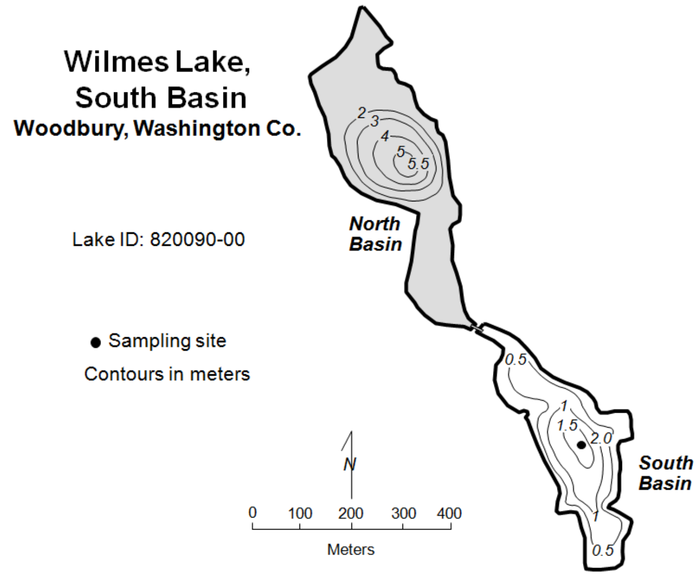
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	~22	76	C
CLA (µg/l))	19	7.3	35	B
Secchi (m)	1.5	0.9	2.1	C
TKN (mg/l)	0.94	0.60	1.29	
			Lake Grade	C

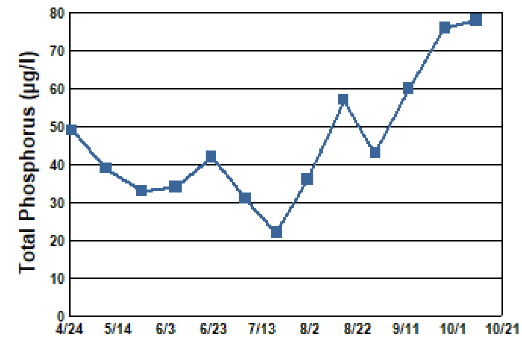
The lake received a lake grade of C this year. The water quality of the lake varies between a lake grade of C and D, with C's dominating since 2006.

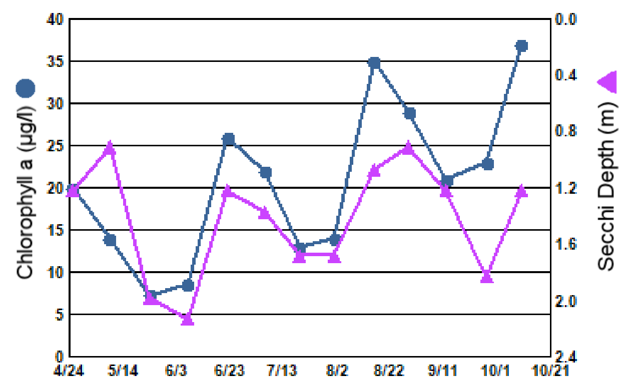
The 1994 and 1995 CAMP monitoring was performed in the northern basin of Wilmes Lake.

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.

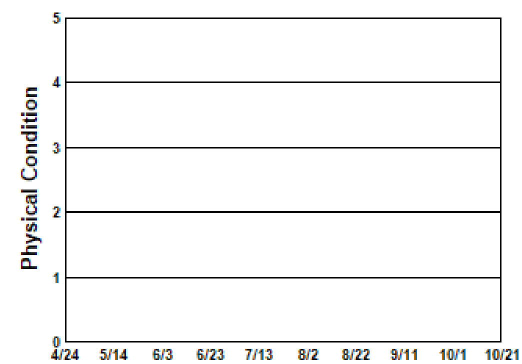






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/25/23	6.9	10.9	20	~49	1.2		
05/09/23	18.1	14.1	14	~39	0.9		
05/24/23	20.8	12.1	7.3	~33	2.0		
06/07/23	26.1	11.1	8.6	~34	2.1		
06/22/23	26.5	15.3	26	~42	1.2		
07/06/23	25.2	11.9	22	~31	1.4		
07/19/23	23.3	10.9	13	~22	1.7		
08/01/23	27.1	10.9	14	~36	1.7		
08/16/23	23.1	10.6	35	57	1.1		
08/29/23	24.5	13.0	29	~43	0.9		
09/12/23	21.4	10.4	21	60	1.2		
09/27/23	19.7	8.3	23	76	1.8		
10/10/23	15.7	8.6	37	78	1.2		



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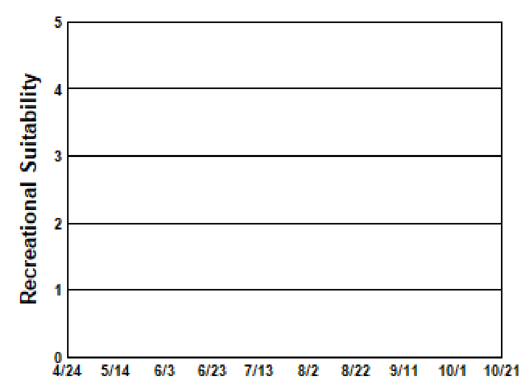


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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	2022	2023
TP	C	C	C	C	C	C	C	C
CLA	C	C	B	B	C	C	C	B
Secchi	C	D	C	C	C	C	C	C
Lake Grade	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**

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

Wing Lake (27–0091) *Nine Mile Creek Watershed District*

Volunteer: John Burton

Wing Lake is located within the City of Minnetonka (Hennepin County). It has a surface area of 11 acres. There are few 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 and surface temperature were measured during each monitoring visit. The resulting data are summarized in tables and figures on the following pages.

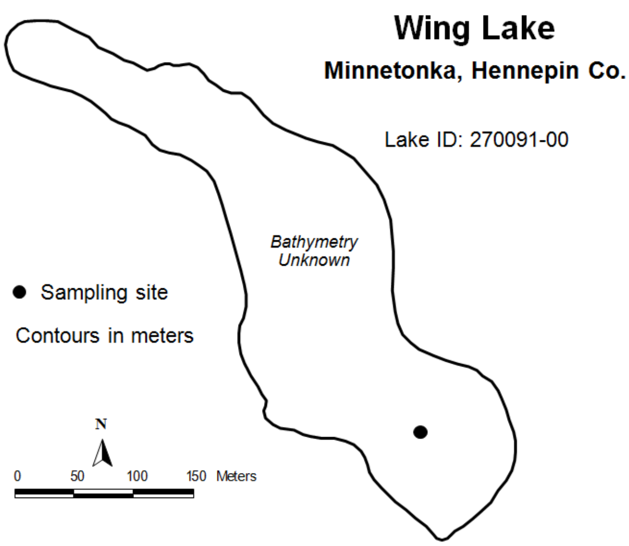
2023 Data summer (May - September) data summary

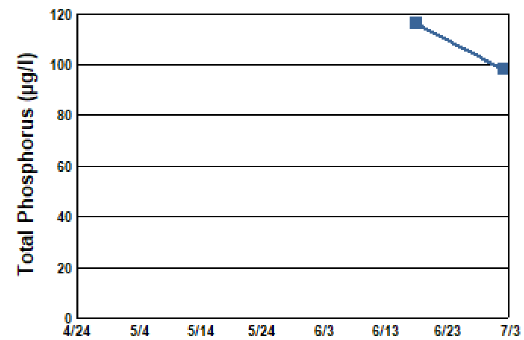
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l))				
Secchi (m)				
TKN (mg/l)				
			Lake Grade	

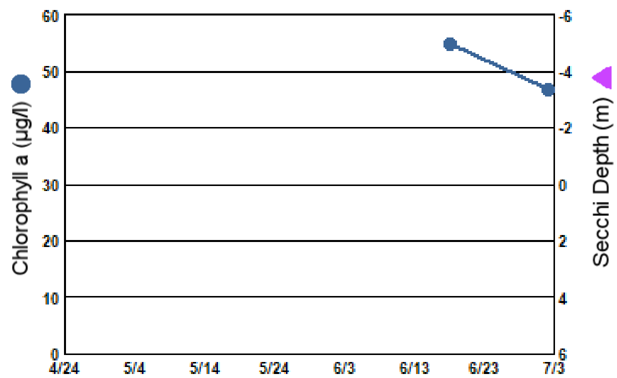
There were less than 5 monitoring events during the summer-time period (May — September). At least 5 monitoring events are required during the summer-time period to determine a parameter grade. A lake grade was not given because all three parameter grades are required to issue a lake grade.

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.

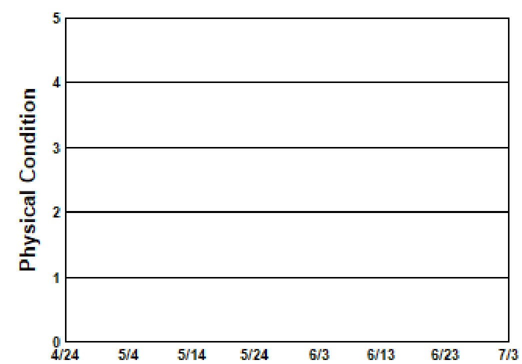






2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
06/18/23			55	116			
07/02/23			47	98			



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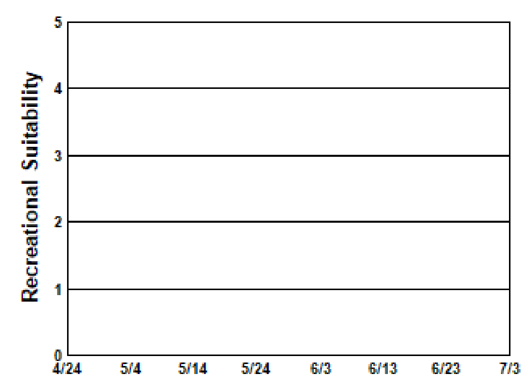

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Lake Water Quality Grades Based on Summertime Averages

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	D	D	D	D	D	F	D	D	D
CLA			C	C	C	C	D	C	C	C	C	C
Secchi			D	D	D	D	D	D	D	D		D
Lake Grade			**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**		**D**

Year	2016	2017	2018	2019	2020	2021	2022	2023
TP	D	D	D	D	D		D	
CLA	C	C	C	D	D		C	
Secchi	D		D	D	D		D	
Lake Grade	**D**		**D**	**D**	**D**		**D**	

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

Wood Lake (19–0024) *City of Burnsville*

Volunteer: Lindsey Larscheid, City of Burnsville staff

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.

2023 Data summer (May - September) data summary

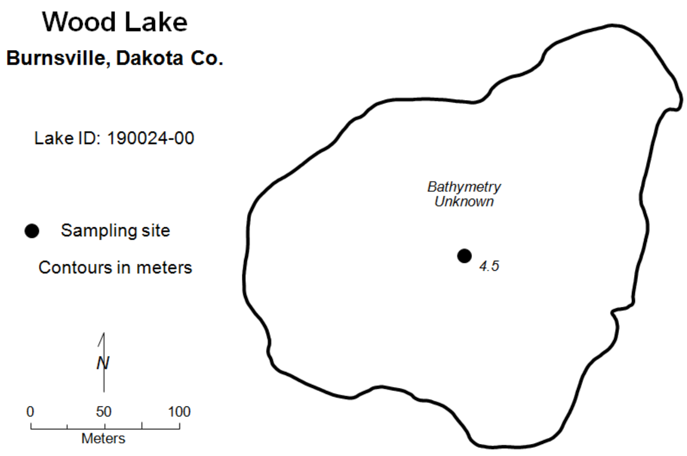
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	20	<10	32	A
CLA (µg/l))	5.9	2.8	9.7	A
Secchi (m)	1.7	0.7	2.1	C
TKN (mg/l)				
			Lake Grade	B

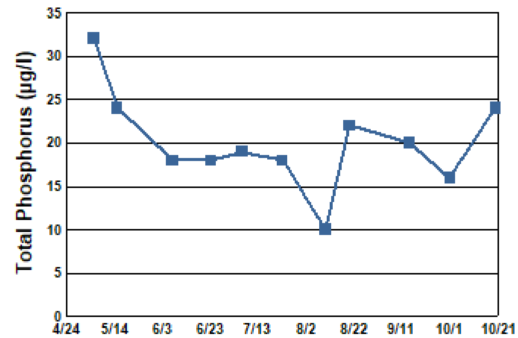
The lake received a lake grade of B. Prior to 2019 the lake received lake grades of C with the occasional B. Recent water quality appears to be improving, particularly with the reductions in the TP summer-time means since 2018.Continued monitoring is recommended to determine if this recent improvement 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.

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/.

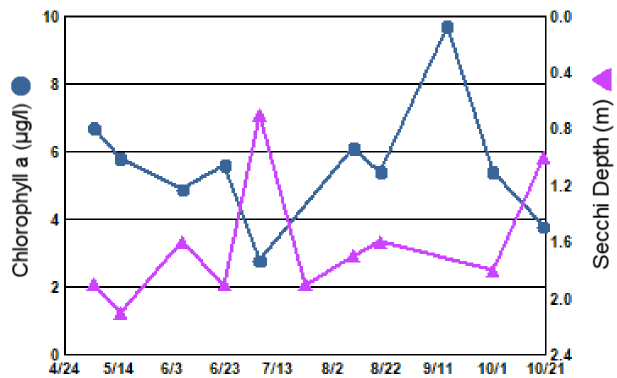
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

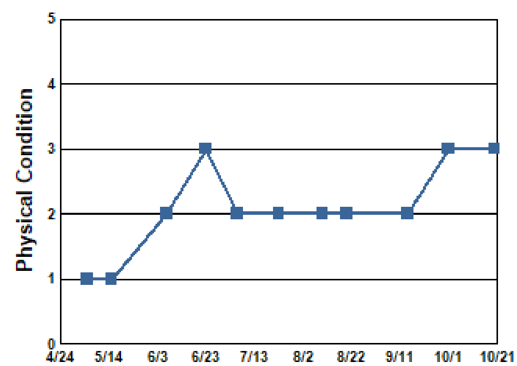




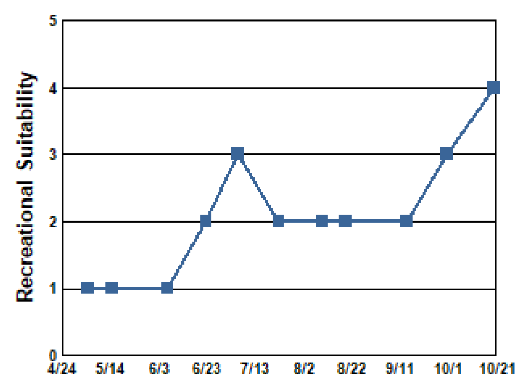
2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
05/05/23	14.1		6.7	32	1.9	1	1
05/15/23	18.6		5.8	24	2.1	1	1
06/07/23	27.3		4.9	18	1.6	2	1
06/23/23	28.0		5.6	18	1.9	3	2
07/06/23	27.1		2.8	19	0.7	2	3
07/23/23				18	1.9	2	2
08/10/23	26.9		6.1	<10	1.7	2	2
08/20/23	26.2		5.4	22	1.6	2	2
09/14/23	22.2		9.7	20		2	2
10/01/23	24.0		5.4	16	1.8	3	3
10/20/23	14.0		3.8	24	1.0	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	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	2022	2023
TP	C	C	C	A	A	A	A	A
CLA	C	D	C	B	A	A	A	A
Secchi	C	C	D	C	B	B	B	C
Lake Grade	**C**	**C**	**C**	**B**	**A**	**A**	**A**	**B**

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.

2023 Data summer (May - September) data summary

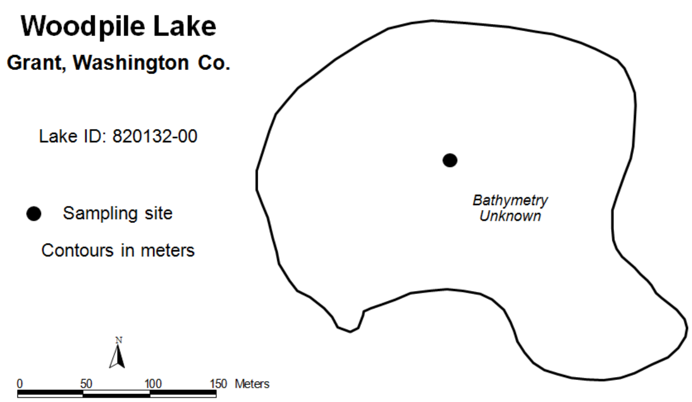
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	<22	<44	A or B
CLA (µg/l))	4.9	2.0	8.4	A
Secchi (m)	3.3	2.0	4.1	A
TKN (mg/l)	0.62	0.54	0.68	
			Lake Grade	A

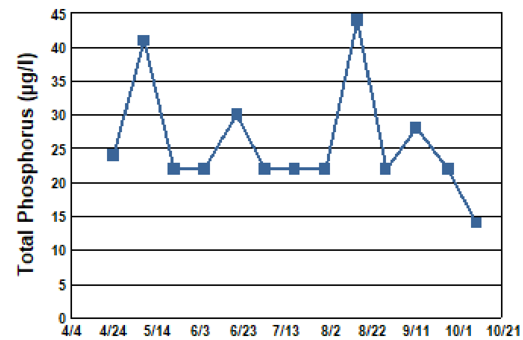
The lake received a lake grade of A. All three parameter grades have generally improved since 2006. TP grades have changed from D to A; CLA grades have changed from the B and C range to A; and Secchi grades have changed from the B and C range to A.Continued monitoring is recommended to determine if this recent improvement in water quality is part of a longer term trend.

The TP summer-time mean was calculated by using one or more TP results that were below the Met Council laboratory's method detection limit (MDL) or the contract laboratory's reporting limit (RL). This was done due to the Met Council laboratory's elevated MDL and RL and use of a contracted laboratory in 2023, as discussed in the Met Council Staff Lake Monitoring Program Methods and the CAMP Laboratory Analytical Methods sections of this report. If a TP result was below the Met Council laboratory's MDL or the contract laboratory's RL, the respective MDL or RL value was used in the mean calculation. This means that the summer-time mean value given in the data summary table should be considered close to a maximum value, but it could be less than the value indicated, meaning that the TP summer-time mean value could span over a potential range of values. To estimate the potential lower bound for the summer-time mean, the TP results that were below the Met Council laboratory's MDL or the contract laboratory's RL were replaced with the contract laboratory's lowest RL of 10 ug/L. Using this value in the mean calculation indicates a potential lower bound mean value of about 21 ug/L which is in a different grade range than the maximum mean value indicated in the data summary table. This range of potential mean values overlaps with one or more of the percentile TP grade break points. Therefore, the TP grade could not be determined with certainty due to this overlap.

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.

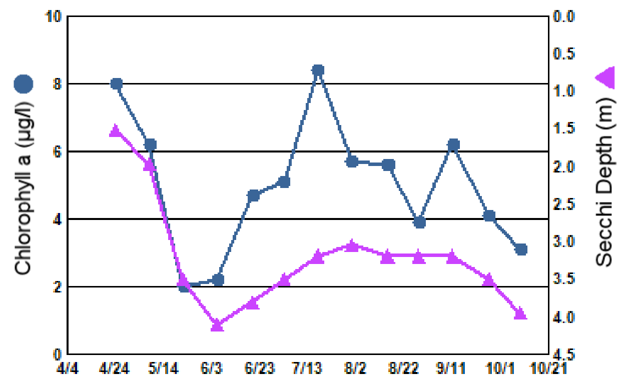
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

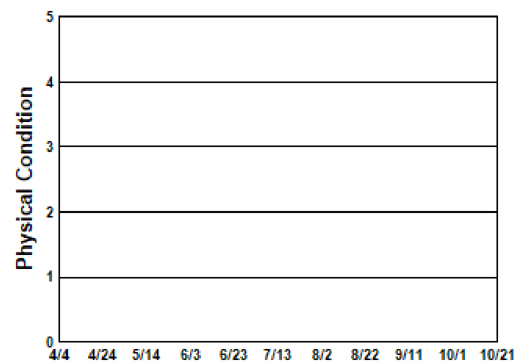




2023 Data

Date	SURF TEMP (°C)	SURF DO (mg/L)	CLA (µg/l)	SURF TP (µg/l)	Secchi (m)	PC	RS
04/24/23	6.1	9.8	8.0	~24	1.5		
05/08/23	16.6	9.1	6.2	~41	2.0		
05/22/23	19.3	11.4	2.0	<22	3.5		
06/05/23	26.4	11.9	2.2	<22	4.1		
06/20/23	25.0	12.5	4.7	~30	3.8		
07/03/23	27.2	9.1	5.1	~22	3.5		
07/17/23	23.4	11.1	8.4	<22	3.2		
07/31/23	26.0	10.9	5.7	<22	3.1		
08/15/23	23.3	7.1	5.6	<44	3.2		
08/28/23	23.9	10.6	3.9	<22	3.2		
09/11/23	21.3	8.8	6.2	28	3.2		
09/26/23	19.7	10.0	4.1	<22	3.5		
10/09/23	15.8	10.3	3.1	14	4.0		





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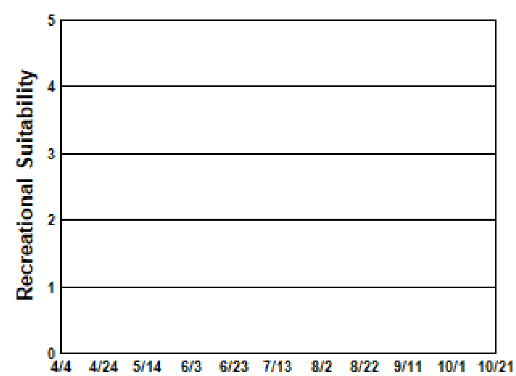

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5 = No Aesthetics Possible

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	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	2022	2023
TP	C	B	B	B	A	A	A	
CLA	A	A	A	A	A	A	A	A
Secchi	B	B	B	A	A	A	A	A
Lake Grade	**B**	**B**	**B**	**A**	**A**	**A**	**A**	**A**

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

References

APHA 1998. American Public Health Association, American Water Works Association, and Water Environment Federation. *Standard Methods for the Examination of Water and Wastewater*. 20th ed.

Anhorn, R.J. 2003a. *Handbook for the Citizen-Assisted Lake Monitoring Program*. Metropolitan Council. St. Paul, MN.

Anhorn, R.J. 2003b. A 2002 Study of the Water Quality of 137 Metropolitan Area Lakes. Metropolitan Council. Pub. no. 32-03-019.

Blue Water Science and Bonestroo, Rosene, Anderlik and Assoc. 2005. *Lake Management Plan for Alimagnet Lake, Dakota County, Minnesota*. Blue Water Science, St. Paul, MN.

Carlson, R.E. 1977. *Trophic Status Index Indicator of Lakes*. Limnology Oceanography 22:361-369.

Hartsoe, J.A. and R.A Osgood. 1991. *A 1991 Study of the Water Quality of 17 Metropolitan Area Lakes*. Metropolitan Council Publ. 590-92-006.

METC 2007. *2030 Water Resources Management Policy Plan*. Metropolitan Council. Publ. no. 32-04-065

METC 2022. *2021 Study of the Water Quality of 167 Metropolitan Area Lakes*. Metropolitan Council. October 2022.

MDNR 1996. *Report on the Status of the DNR Metro Region Trout Resources*. A Metro Region Trout Committee Report. Minnesota Department of Natural Resources. St. Paul, MN.

MnDNR 2007. *Fishery Status Report*. Minnesota Department of Natural Resources Lake Finder website. www.dnr.state.mn.us/lakefind . Jun. 2007.

MnDNR 2013. *Department of Natural Resources Designation of Infested Waters*. Minnesota Department of Natural Resources. Dec. 2013.

MnDNR 2022a. *The Drought of 2021. Minnesota Department of Natural Resources*. https://www.dnr.state.mn.us/climate/journal/drought-2021.html

MnDNR 2022b. *The Drought of 2022. Minnesota Department of Natural Resources*. https://www.dnr.state.mn.us/climate/journal/drought-2022.html

MnDNR 2023. *Extremely Dry Conditions Grip Minnesota's Growing Season Again*. Minnesota Department of Natural Resources. https://www.dnr.state.mn.us/climate/journal/extreme-dry-may-august-2023.html

MnDNR 2024. *Drought in Minnesota*. Minnesota Department of Natural Resources. https://www.dnr.state.mn.us/climate/drought/index.html

Nichols, A.B. 1992. *Citizens Monitor Water Quality*. Water Environment and Technology. March, 1993. pp.55-59.

Osgood, R.A. 1982. *Using Carlson's Trophic State Indices in Regional Water Quality Assessment*. Water Resources Bulletin 18:67-74.

Osgood, R.A. 1988. *The Limnology, Ecology and Management of Twin Cities Metropolitan Area Lakes*. Metropolitan Council Publ. No. 590-88-123.

Osgood, R.A. 1989a. *An Evaluation of Lake and Stream Monitoring Programs in the Twin Cities Metropolitan Area*. Metropolitan Council Publ. 590-89-128.

Osgood, R.A. 1989b. *A 1989 Study of the Water Quality of 20 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 590-89-129.

USGS 2002. *Response of the St. Croix River Pools, Wisconsin and Minnesota, to Various PhosphorusLoading Scenarios*. Water-Resources Investigations Report 02-4181. U.S. Geological Survey.

Appendix A

Lakes Sampled by Metropolitan Council Staff and the CAMP, 1980 - 2023. (Numbers indicate monitoring events per year. A "v" indicates monitoring performed through CAMP.)

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	22	23
Acorn Lake	82010200	1																											v14		v 6	v 6	v 7						v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Alimagnet Lake	19002100	1																v 12	v10	v10	v10	v10	v10	v8	v9	v12	v10	v10	v8	v10	v 12	v 10	v 13	v 12	v 11	v 10	v 12	v 12	v 11	v 13	v 9	v 13	v 11	v 16	v 13	v 13
Alice Lake	82028700	1																																			v 12	v 14	v 14	v 11		v 13			v 7	
Anderson Pond	19009400	1																															v 12	v 9	v 3		v 6									
Ann Lake	10001200	1						5				13													13										6											
Ardmore Lake	27015300	1																												v4	v 11	v 14	v 12													
Armstrong Lake	82011602	1																			v15	v10	v13	v14	v15	v14	v14	v14	v7	v7	v 7	v 14	v 7	v 7	v 7	v 7	v 5	v 8	v 7	v 7	v 6	v 7	v 6	v 5	v 4	v 3
Assumption Lake	10006300	1																				v1																								
Auburn Lake	10004401	1				10			17	18				12			13																													
Auburn Lake	10004402	1				10																																								
Aue Lake	10002800	1																				v1																								
Augusta Lake	19008100	1																																					v 7	v 4	v 6	v 14	v 13	v 14		
Bald Eagle Lake	62000200	1	4	5		5																					13	13																		
Bald Eagle Lake	62000200	2																									13	13																		
Bailey Lake	82045600	1																																						v 14	v 12	v 13	v 12	v 14	v 13	v 13
Baldwin Lake	2001300	1																																v 2												
Barker Lake	82007600	1																					v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7				v 12	v 12			v 15	v 12	v 13	v 6			

Barnes Lake	10010900	1																			v1																									
Bass Lake	27001500	1																						v12			v12	v2																		
Bass Lake	27009800	1	4														v16			v15		v15		v13		v9		v15		v14		v 12		v 14				v 12		v 13					v 10	
Bass Lake	82003500	1																					v14	v5	v7	v7	v7	v7	v7	v7	v 7	v 7			v 7	v 12	v 12			v 14	v 12	v 13			v 7	
Bass Lake	82012300	1																											v7	v8	v 7	v 7	v 14	v 14	v 14	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Bass Lake	82012400	1																											v7	v7	v 7	v 7	v 14	v 14	v 14	v 12	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Battle Creek Lake	82009100	1														v14	v13	v11	v13																			9								
Bavaria Lake	10001900	1				5			17	18							13		v11	v12	v15	v12	v14	v14	v14	v19	v16	v18	v16	v14	v 14	v 14	v 15	v 15	v 14	v 14	v 13	v 14	v 14	v 14	v 13					
Bay Pond	82001100	1																											v14	v14	v 11	v 7	v 7		v 6	v 7	v 6					v 7			v 7	
Benton Lake	10006900	1																				v13	v14	v14		v15		v14		v13	v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 13	v 14	v 12	v 12					
Benz Lake	82012000	1																			v8							v14	v14	v14	v 14	v 14	v 14	v 15	v 14	v 12	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Berliner Lake	10010300	1																				v1																								
Beutel Pond	82039900	1																													v 7	v 5	v 3								v 6			v 7		
Big Carnelian Lake	82004900	1					5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7	v 6	v 7	v 7		v 6	v 12	v 12	v 14	v 14	v 11	v 12	v 13	v 13	v 14	v 13	v 14
Big Comfort Lake	13005300	1																		v3			v14	v14	v14	v14	v14	v13	v14	v14	v 14	v 13	v 14	v 13	v 14	v 22	v 22	v 26	v 27	v 27	v 18	v 8	v 14	v 14	v 12	v 13
Big Marine Lake	82005204	1	4	5			5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7	v 7	v 7	4 & v 7	12		v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 13	v 14	v 13	v 13
Big Marine Lake	82005204	2																															4	11												
Big Woods Lake	10024900	1																																			v 12	v 14	v 13	v 13	v 12					
Birch Lake	13004200	1																									v10	v7	v7											v 14	v 12		v 8	v 14		
Birch Lake	62002400	1	2																								v14																			

Birger Pond	19022400	1																																											v 14	v 14
Bluebill Bay Lake	19044900	1																	v8																											
Bone Lake	82005400	1					5					13				v7		v14		v14	v14	v14		v14	v14	v14	v14	v14	13	v10	v 15	v 12	v 11	v 15	v 13	v 25	v 22	v 26	v 27	v 27	v 19	v 19	v 8	v 13	v 11	v 13
Brand Lake	10011000	1																				v1																								
Braunworth Lake	10010700	1																				v1																								
Brewers Pond	82002200	1																																					v 7	v 6	v 12	v 13	v 12	v 12	v 13
Brick Pond	82030800	1																													v 7	v 6	v 7	v 7	v 6	v 6										
Brickyard Clayhole Lake	10022500	1																							v14	v13	v14	v14	v14	v13	v 14	v 15	v 14	v 14	v 14	v 13	v 13	v 13	v 13	v 13	v 12					
Bryant Lake	27006700	1	2	5	16		5					13	13	12																					v 2											
Buck Lake	70006500	1																																			v 13	v 13	v 14	v 14	v 13	v 13	v 10	v 14	v 13	v 13
Burandt Lake	10008400	1																				v7	v13	v9			v18	v22				v 4	v 14	v 14	v 14	v 13	v 12	v 14	v 11	v 9	v 8					
Bush Lake	27004700	1					5									13	13					13		13			13		v13	v15	v 13	v 13	v 13	v 12	v 13	v 12	v 12	v 14	v 14	v 13	v 13	v 13	v 10	v 14	v 13	v 13
Byllesby Lake	19000600	1														v14	v14	v13																												
Byllesby Lake	19000600	2																																		12	11			13	11	12			13	
Byllesby Lake	19000600	3																																		12	11			13	10	11			11	
Byllesby Lake	19000600	4																																						8	9	10			9	
Bde Maka Ska	27003100	1		5			5																																							
Campbell Lake	10012700	1																				v2	v14		v10			v14	v14																	
Capaul Pond	82036500	1																													v 7	v 3	v 7							v 6			v 6			v 7
Capaul Pond	82036500	2																													v 7	v 1								v 6			v 6			v 7

Carol Lake	82001700	1																					v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 6			v 5	v 10			v 14	v 14	v 11		v 6			v 7
Carver Lake	82016600	1									20					v15	v15	v16	v9																											
Cates Lake	70001800	1																							v14	v13	v15	v13	v14	v13	v 12	v 13	v 13	v 12	v 9	v 11				v 10	v 11	v 13	v 10	v 14	v 11	v 12
Cavanaugh Lake	27011000	1																																									v 6	v 7		v 1
Cedar Island Lake	27011900	1																v13						v13		v11			v9			v 11														
Cedar Lake	27003900	1					5																																							
Cedar Lake	70009100	1	4	5			5						13			14					13			13				13	v14	v14	v 14	v 14	v 14	v 14	v 14	v 12	v 10	v 13	v 13	v 13	v 9	v 11	v 11	v 13	v 10	v 8
Cedar Lake	70009100	2																																	v 11	v 13	v 10	v 13	v 11	v 12	v 11					
Cenaiko Lake	2065400	1																		v12	v11	v13	v11	v13	v12	v12	v14	v14	v14	v12	v 13	v 13	v 13	v 13	v 14											
Centerville Lake	2000600	1	4	5		5																	13	13/ v4	v1	13	13					2														
Charley Lake	62006200	1						5																																						
Christmas Lake	27013700	1	4	5				5												13	13	13			13	13							1	4	4	2									12	
Chub Lake	19002000	1	2													v14	v14	v11															10	10							10				10	
Clear Lake	82004500	1																													v 14	v 14	v 7	v 8	v 7	v 7	v 12	v 14			v 12	v 13	v 6	v 7	v 7	v 13
Clear Lake	82009900	1																														v 4										v 7			v 7	
Clear Lake	82009900	2																														v 6													v 7	
Clear Lake	82016300	1	4				5						13			v11	v12	v12	v11	v10	v11	v10	v9	v12	v12	v12	v6		13			3														
Cleary Lake	70002200	1					5																																							
Cloverdale Lake	82000900	1																						v10	v10	v11	v13	v12	v11	v10	v 9	v 11	v 10	v 9	v 9	v 8			v 7			v 7		v 7	v 7	
Cobblecrest Lake	27005300	1																							v4		v14	v16	v13	v13	v 13	v 10	v 9	v 6	v 4	v 7	v 4	v 7	v 4	v 4	v 2	v 5	v 3	v 3	v 5	

Cobblestone Lake	19045600	1																									v14	v14	v12	v 14	v 13	v 14	v 14	v 13	v 12	v 10	v 5	v 5	v 14	v 10	v 10	v 8	v 4		
Cody Lake	66006100	1																											v3																
Colby Lake	82009400	1														v13	v14	v13	v13	v12	v12	v9	v10	v10	v10	v10	v6	v7	v7	v 9	v 3	v 9	v 14	v 14	v 13	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Coon Lake	2004200	1	4				5									13			13												2														
Cornelia Lake	27002800	1																							v7		v11	v14	v14	v 13	v 14				v 5	v 6	v 7								
Courthouse Lake	10000500	1																v2	v14	v13	v13	v14	v14	v14	v14	v14	v14	v13	v13	v 14	v 14	v 14	v 14	v 14	v 13	v 13	v 13	v 13	v 13	v 12					
Cowley Lake	27016900	1																v12										v10	v1		v 4	v 6						v 6							
Crane Lake	27073400	1													v9																					v 12									
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	v 14	v 14	1 & v 14	4 & v 14	4 & v 14	2 & v 13	v 13	v 15	v 15	v 14	v 13	v 16	v 13	v 13	v 13	v 12
Crystal Lake	27003400	1							17	19	19						v15			v11				v8				v7			v 7		v 8				v 5		v 10							
Crystal Lake	70006100	1																		v12		v11																					v 6	v 2	v 7	v 7
Cynthia Lake	70005200	1	2																																											
Dan Patch Lake	70001600	1																	v15																											
Dean Lake	70007400	1																							v7	v7	v6	v7	v8	v9	v 10	v 12	v 8	v 3												
Deeg Lake	19011700	1																					v12																						
Deep Lake	62001800	1						5																																						
Demontreville Lake	82010100	1	4				5							12		v15		14					13			13	v14	v7	v7	v11	v 20	v 12	v 14	v 20	v 14	v 12	v 14	v 14	v 16	v 15	v 12	v 10	v 9	v 12	v 10	v 18
Diamond Lake	27012500	1	2														v13										13																			
Dickman Lake	19004600	1																																									v 12	v 2	v 9	v 6

Downs Lake	82011000	1																				v14		v9	v9	v6	v7	v9	v7	v5	v 2	v 9	v 1		v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Dubay Lake	27012900	1																																	v 14	v 8	v 1									
Duck Lake	27006900	1																																			v 8	v 12	v 9	v 11	v 12	v 12	v 10	v 11	v 12	v 13
Dutch Lake	27018100	1					5																																						13		
Eagle Lake	10012100	1	4	5				5											12		v15	v14	v14	v12	v14	v14	13	v14	v14	v13	v 13	v 14	v 14	v 14	v 14	v 13	v 13	v 15	v 13	v 13	v 11					
Eagle Lake	27011101	1	4			5			17	18				11		v15			v14	v14	v14		v6		v4			v6				v 6			11										v 10		
Eagle Point Lake	82010900	1			2											v14													v5	v2	v 2	v 2		v 7	v 6	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Earley Lake	19003300	1															v10	v11	v9	v10	v10	v9	v8	v6	v10	v9	v6	v7	v9	v12	v 9	v 10	v 11	v 8	v 12	v 13	v 14	v 14	v 14	v 14	v 13	v 14	v 11	v 14	v 13	v 14
East Boot Lake	82003400	1																					v14	v14	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7	v 7	v 7	v 12	v 12	v 15		v 14	v 12	v 13		v 7		
East Lake	19034900	1																										v13	v6	v14	v 13		v 14	v 11	v 13	v 11	v 12	v 12	v 13	v 11	v 11	v 13	v 12	v 12	v 11	v 13
East Twin Lake	2013300	1	2	5		5						13						13			13											3	6													
Echo Lake	82013500	1																											v10	v8	v 4		v 7		v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Edina Lake	27002900	1																									v10	v10																		
Edith Lake	82000400	1																										v6	v12	v12	v 15	v 17		v 15	v 15	v 16	v 14	v 11	v 5	v 6	v 9	v 12	v 7	v 13	v 10	v 11
Egg Lake	82014700	1																						v3																						
Elmo Lake	82010600	1	4	5	16		5				19			12			v11											v9	v8	v8	v 18	v 9	v 19	v 9	v 9	v 6	v 6	v 6	v 11	v 10	v 4		v 7	12	v 7	
Elwell Lake	82007900	1																																								v 13			v 6	v 8
Empire Lake	19034200	1																																											9	
Fahlstrom Pond	82000500	1																													v 3	v 8	v 4									v 7			v 7	
Fahlstrom Pond	82000500	2																													v 5	v 5	v 5									v 7			v 7	

Farquhar Lake	19002300	1	4														v15	v16	v14	v15		v15	v13	v11	v13	v14	v14	v15	v13	v13	v 13	v 14	v 14	v 14	v 14	v 13	v 14	v 14	v 14	v 14	v 13	v 14	v 10	v 15	v 13	v 14
Fireman's Clayhole Lake	10022600	1																						v12	v14	v14	v14	v14	v13	v13	v 14	v 14	v 14	v 14	v 14	v 13	v 13		v 13	v 13	v 12					
Fish Lake	2006500	1																																					1	13		12		12		
Fish Lake	19005700	1										13																																		
Fish Lake	27011800	1	4	5	16			5					13																																	
Fish Lake	70006900	1	4				5						13					13		v2	v13	v8	v12	v9	v14	v13	v11	v13	v11	v13	v 11	v 12	v 11	v 10	v 14	v 13							v 9	v 14	v 10	v 11
Fish Lake	82006400	1																					v5	v14	v7	v7	v7	v7	v7	v7	v 7	v 8	v 7	v 7				v 14	v 14	v 14		v 13	v 6	v 7	v 7	v 7
Fish Lake	82009300	1																															v 14	v 14	v 14	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 13	v 13	v 13
Fish Lake	82013700	1																							v5	v5	v4							v 13	v 14	v 4		v 15	v 14		v 12		v 12		v 13	
Forest Lake	82015900	1					5						13			v7			v12	v14	v15	v14	v14	v14	v14	v14	v14	v14	13	v14	v 14	v 14	v 14	v 13	v 15	v 24	v 26	v 28	v 28	v 28	v 20	v 19	v 11	v 14	v 12	v 14
Forest Lake	82015900	2					5						13			v7			v12						13			13	13			v 11		v 12	v 14	v 24	v 25	v 25	v 27	v 27	v 19	v 18	v 8	v 13	v 11	v 13
Forest Lake	82015900	3	4				5						13			v7			v12						13			13	13			v 8	v 8	v 7	v 16	v 20	v 24	v 28	v 30	v 27	v 18	v 19	v 6	v 14	v 12	v 14
Forest Lake	82015900	4																																				v 9	v 11	v 5						
Fourth Lake	13002200	1																																			v 10	v 14				v 12				
French Lake	27012700	1																						v11	v10	v7	v7																			
Friedrich's Pond	82010800	1																											v13	v14	v 11	v 1									v 6			v 7		
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				13											v 14														
George Watch Lake	2000500	1																	v14	v12	v11	v11	v6	v7	v8	v9	v10	v12	v7	v8	v 12	v 14	v 14	v 14	v 12	v 8	v 9	v 11	v 12	v 9	v 6		v 3	v 2	v 2	v 2

German Lake	82005600	1																						v7	v7	v7	v7	v7	v7	v 7	v 7			v 7		v 12	v 14	v 14	v 9		v 13			v 7	
Gervais Lake	62000700	1						5																													11								
Glen Lake	27009300	1																										v13	v7	v 4															
Goetschel Lake	82031300	1																						v11	v9	v4	v15	v9	v5	v 7	v 7	v 7									v 7		v 7		
Goggins Lake	82007700	1																			v13	v14	v14	v14	v14	v14	v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Golden Lake	2004500	1	2											12		14			v13	v11	v15	v13	v13	v12	v11	v11	v10	v11	v11	v10	v 9	v 13	v 12												
Goose Lake	10008900	1																v9	v7	v15	v15	v14	v11	v14	v14	v14	v14	v14	v14	v13	v 14	v 14	v 14	v 14	v 14	v 13	v 13	v 14	v 13	v 13	v 11					
Goose Lake	19036000	1																v13	v13																											
Goose Lake	82005900	1															v15	v15	v13	v13	v15						v7	v7	v7	v7	v 14	v 7	v 7	v 7	v 7	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 13	v 15	v 13	v 7
Goose Lake	82011301	1																													v 7	v 7	v 7		v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Goose Lake	82011302	2																													v 7	v 7	v 7		v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Grace Lake	10021800	1																						v11	v14	v14		v14		v 14	v 14	v 14	v 14	v 14	v 14	v 12	v 14	v 13	v 13	v 12					
Grass Lake	27068100	1																		v12																									
Haas Lake	70007800	1																																	v 4	v 4	v 5	v 8	v 11	v 11	v 8	v 7	v 8	v 8	v 11
Hafften Lake	27019900	1																				13	13			13	v15	v13				v 13			v 12	v 8		v 15	v 11	v 12	v 4	v 10		v 12	
Ham Lake	2005300	1					5									v15	v13		v13	v9	v14																						12		
Hannan Lake	27005200	1																																										v 7	v 2
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																																			v 15	v 13	v 10	v 9	v 3			
Hay Lake	82006500	1																		v14	v13	v14	v14	v4	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7		v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 6	v 7	v 7	v 7
Hazeltine Lake	10001400	1																			v1	v14	v14				v14	v14			v 14	v 14	v 14	v 14	v 13	v 12	v 14	v 13	v 12	v 12					
Heifort's Pond	82048500	1																																					v 7	v 6	v 12	v 12	v 14	v 13	v 13
Heims Lake	13005600	1																													v 10					v 12	v 14							v 2	
Henry Lake	27017500	1															v10										v11	v11	v6	v 7	v 7	v 5	v 10												
Herber Pond	82001501	1																								v14	v14	v7	v7																
Hidden Lake	27069300	1																															v 9												
Highland Lake	2007900	1																			v13	v11	v13	v12	v12	v14	v14	v14	v12																
Holland Lake	19006500	1				10	16	15			20					13						13											1	4	4	2										
Hornbeam Lake	19004700	1																										v11	v8	v 7	v 5	v 2				v 11	v 14	v 14	v 14	v 7	v 7	v 6	v 7	v 7	v 7
Horseshoe Lake	19003200	1															v11	v10												v 1									v 1						
Horseshoe Lake	19005100	1																										v11	v11	v 8	v 14	v 13	v 10	v 11	v 11	v 13	v 12	v 14	v 14	v 6	v 6	v 6	v 7	v 7	v 6
Horseshoe Lake	82007400	1																			v1																								
Horseshoe Lake	82007400	2																													v 8														
Horseshoe Lake	82007400	3																													v 7	v 7	v 7	v 7	v 7	v 6	v 7	v 7	v 8	v 6	v 7	v 6	v 7	v 7	v 7
Hydes Lake	10008800	1						5						12		13			12			v11	v4	v9	v14	v15	v14	v14	v14	v13	v 13	v 14	v 14	v 14	v 14	v 13	v 13	v 14	v 13	v 12	v 11					
Independence Lake	27017600	1	4	5		5							13			v14	v15																													
Isabelle Lake	19000400	1															v14																													

Island Lake	2002200	1				7																				v12	v14	v14	v14	v13	v 13	v 14	v 14	v 14	v 14											
Island Lake	2002200	2																																												12
Jackson WMA	82030500	1																															v 14	v 14	v 14	v 13	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 14	v 13
Jane Lake	82010400	1					5		17	18				12			v12						13				v15	v13	v10	v12	v 16	v 11	v 9	v 9	v 5	v 4	v 3	v 14	v 8	12	v 12	v 9	v 9	v 12	v 10	
Jellums Lake	82005202	1																					v14	v14	v12	v14	v14	v14	v7	v7	v 7	v 7	v 7	v 7				v 14	v 14	v 14		v 13	v 6	v 7	v 7	v 7
Jellums Lake	82005202	2																							v11	v11																				
Johanna Lake	62007800	1		5				5				13																																		
Jonathan Lake	10021700	1																							v13				v14		v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 14	v 13	v 13	v 12					
Josephine Lake	62005700	1						5				13																																		
Jubert Lake	27016500	1																					v11															v 5	v 1	v 1	v 1					
July Lake	82031800	1																											v7	v7	v 7	v 5		v 14	v 14	v 13	v 12	v 15	v 14	v 7	v 6	v 7	v 7	v 7	v 7	v 7
Karth Lake	62007200	1																												v11	v 13	v 14	v 14	v 13	v 14	v 13	v 14	v 13	v 13	v 14	v 12	v 12	v 10	v 14	v 13	v 14
Keller Lake	19002500	1																	13	13	v13	v15	v14	v12	v13	v15	v15	v14	\14	v12	v 8	v 12	v 14	v 13	v 14	v 13	v 14	v 12	v 13	v 7	v 10	v 11	v 10	v 12	v 12	v 10
Keller Lake	62001000	1						5																																						
Kingsley Lake	19003000	1														5		v11	v10	v9			v14	v14	v15	v14	v15	v16	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11	v 12	v 13	v 13	v 11	v 11	v 12		v 12	v 11	
Kismet Lake	82033400	1																			v14	v13	v14	v14	v14	v14	v14	v13	v14	v14	v 14	v 14	v 14	v 14	v 14	v 12	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Klawitter Pond	82036800	1																							v13	v13	v14	v13	v12	v12	v 13	v 14	v 11	v 12	v 13	v 11	v 10	v 12	v 13	v 14	v 13	v 12	v 11	v 14	v 7	v 4
Kohlman Lake	62000600	1						5																																						
Kramer Pond	82011700	1																													v 7	v 7	v 7		v 7	v 7	v 6						v 6			v 7
La Lake	82009700	1															v13	v11	v13	v11	v10	v10	v8	v6	v5	v6	v3	v13	v12	v14	v 11	v 12	v 10	v 10	v 11	v 10	v 9	v 11	v 10	v 12	v 12	v 9	v 6	v 10	v 9	v 11

Lac Lavon Lake	19044600	1																		v11	v10	v10	v9	v2	v7	v12	v12	v12	v12	v13	v 12	v 14	v 13	v 13	v 14	v 13	v 13	v 12	v 13	v 12	v 12	v 11	v 8	v 11	v 4	v 12
Laddie Lake	2007200	1	4												v13	v14	v12					v13	v13	v14	v10																					
Lake Forest	82018700	1																												v 12	v 11															
Lake of the Isles	27004000	1					5																																							
Lake Minnetonka	27013302	1	4	5																																										
Lake Minnetonka	27013305	1	2	5																																										
Lamplighter Park Pond	27071000	1																																											v 6	v 5
Langdon Lake	27018200	1					5																																							
Langton Lake	62004901	1																									v14	v7	v13	v 13	v 13	v 13	v 13	v 12	v 10		v 12	v 14	v 12	v 11	v 7				v 5
Langton Lake	62004902	2																									v14	v13	v13	v 13															
Langton Lake	62020400	1																									v14																		
Laura Lake	27012300	1																																	v 12	v 3	v 3	v 8								
Lee Lake	19002900	1														v14	v15	v14	v13			v12	v13	v11	v9	v15	v9	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11	v 12	v 13	v 13	v 11	v 11	v 12	v 16	v 12	v 11	v 7
Legion Pond	82046200	1																									v14	v10		v 7	v 2								v 6			v 6	v 7		v 6
Lemay Lake	19008200	1																											v11	v 11	v 9	v 11	v 10	v 5	v 7	v 3	v 1	v 3	v 11	v 8	v 9	v 8	v 7	v 12	v 12
Lendt Lake	13010300	1																																		v 12	v 14				v 13			v 6	
LeVander Pond	19008800	1																														v 11	v 9	v 3		v 6									
Libbs Lake	27008500	1																								v10																			
Lily Lake	82002300	1															v15	v14	v14	v15	v13	v14	v14	v14	v7	v7	v7	v7	v7	v 14	v 12	v 9		v 11	v 12	v 14	v 12	v 14	v 14	v 12	v 13	v 12	v 14	v 14	v 13
Lilly Lake	19008400	1																																						v 1					

Linwood Lake	2002600	1	4	5		7						13					13			13											v 13														12		
Lippert Lake	10010400	1																					v1																								
Little Carnelian Lake	82001400	1																						v14	v7	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7		v 1	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Little Comfort Lake	13005400	1																												v14	v13	v 12	v 12	v 12	v 13	v 11	v 19	v 17	v 19	v 21	v 25	v 18	v 5	v 6	v 14	v 13	v 14
Little Johanna Lake	62005800	1																							v12	v16	v15	v8	v6	v3		v 14	v 13	v 12	v 10	v 14	v 11		v 12	v 11	v 12	v 11	v 13	v 9	v 14	v 13	v 13
Little Long Lake	27017901	1	4				5						13								13			13		13			v11	v2		v 13	v 14		10												
Litter Prior Lake	70016900	1																																										v 9	v 14	v 14	v 13
Lochness Lake	2058500	1																												v12	v 11	v 13	v 10	v 7	v 11	v 9	v 10	v 11	v 11	v 10	v 8	v 7					
Lone Lake	27009400	1																														v 15	v 13	v 11													
Long Lake	10001600	1																					v2		v13		v5																				
Long Lake	19002200	1																			v16					v11	v13	v12	v15	v14	v13	v 14	v 13	v 14	v 14	v 13	v 11	v 14	v 14	v 15	v 14	v 9	v 14	v 11	v 14	v 12	v 11
Long Lake	27016000	1				5																																									
Long Lake	62006700	1						5																																							
Long Lake	62006700	1						5																																							
Long Lake	82002100	1															v14	v7		v14	v13	v14	v14	v14	v14	v14	v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 10
Long Lake	82002100	2																													v 4	v 4	v 4	v 4	v 4	v 4									
Long Lake	82002100	3																													v 4	v 4	v 4	v 4	v 4	v 4									
Long Lake	82003000	1													v14	v14	v14	v13	v14		v14	v14	v14	v14	v14	v7	v7	v7	v7	v 7	v 7	v 7	v 7		v 12	v 12	v 14			v 12	v 13	v 6	v 7	v 7	v 7
Long Lake	82006800	1																				v5	v14	v7	v7	v7	v7	v7	v7	v 8	v 6	v 7	v 7				v 15	v 15	v 14		v 13	v 6	v 7	v 7	v 7
Long Lake	82011800	1													v14										13	v15	v14	v14	v14	v 14	v 14		v 21	v 14	v 13	v 14	v 14	v 16	v 14	v 13	v 12	v 10	v 10	v 12	v 11

Long Lake	82013000	1																								v11	v9	v12	v10	v10	v 10	v 10	v 9	v 9	v 8	v 10	v 10	v 8	v 9	v 9	v 9	v 8	v 3	v 7	v 7	
Loon Lake	82001502	1								2	18												v14	v14	v7	v7	v7	v7	v7	v7	v 14	v 7	v 12	v 1	v 5				v 13	v 14	v 12		v 6			
Lost Lake	27010300	1														v13																					v 3	v 4	v 5	v 2	v 6	v 12	v 14	v 10	v 12	v 12	v 12
Lost Lake	82013401	1																											v13	v13	v 11														v 14		v 14
Lost Lake	82013402	2																																												v 13	v 11
Lotus Lake	10000600	1						5					13									13	13			v5	v10	v8	v11	v9	v 11	v 10	v 11	v 8	v 2			v 3	v 7	v 4	v 1	v 7	v 7	v 10	v 6	v 9
Louise Lake	82002500	1																					v5	v5	v7	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7					v 14	v 14	v 12		v 6			
Lucy Lake	10000700	1						5																								v 13	v 12	v 13	v 12	v 10	v 10	v 13	v 11	v 9	v 7	v 9	v 7	v 5	v 9	v 9
Lynch Lake	82004200	1																												v7	v 14	v 13	v 14	v 14	v 14	v 13	v 12	v 15	v 14	v 7	v 6	v 7	v 7	v 7	v 7	v 7
Lynch Lake	82004200	2																															v 14	v 14	v 14	v 12	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
MacDonald Lake	82006200	1																									v14	v14	v7	v7																
Magda Lake	27006500	1																			v14	v13			v11			v12			v 9			v 13			v 12						v 10		
Maple Marsh Lake	82003800	1																					v5	v5	v7	v7	v7	v7	v7	v7															v 13	v 13
Marcott (Rosenberg) Lake	19004100	1															v15	v13	v10	v10	v12	v10	v6	v5										v 7	v 7										
Marcott (Ohmans) Lake	19004200	1																																v 7	v 7										
Marcott (Ohmans) Lake	19004200	2																																v 6	v 7										
Marcott Lake	19026300	1															v15																												
Maria Lake	10005800	1																			v2	v14	v14				v13							5						12					
Marion Lake	19002601	1	2	5		5						13					v15					v15	v14	v13	v14	v14	v15	v16	v15	v14	v 13	v 14	v 14	v 13	v 14	v 14	v 13	v 14	v 14	v 12	v 11	v 12	v 10	v 7	v 12	v 13
Markgraf Lake	82008900	1														v15	v11	v12	v10	v15	v10	v10	v9	v13	v14	v14	v14	v15	v14	v 14	v 13	v 14	v 13	v 11	v 13	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13

Markley Lake	70002100	1																		v11	v13	v12	v14	v13	v9	v6	v4		v10	v7																
Marsh Lake	10005400	1																				v1																								
Marshan Lake	2000700	1																v10	v13	v10	v9	v8	v7																							
Martin Lake	2003400	1				7														13										v 13																
Masterman Lake	82012600	1																										v14	v14	v 14	v 14	v 14	v 14	v 14	v 12	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Mays Lake	82003300	1																												v 14	v 14	v 7	v 8	v 7	v 7	v 12	v 14			v 12	v 13	v 6	v 7	v 7	v 13
McCarrons Lake	62005400	1					12	20	17	18	19	13	13	12		14	13	16	13			18	13	13	13		13	13																		
McDonald Lake	82001000	1																				v11		v14	v9	v12	v12	v14	v10	v9	v 15	v 7		v 8	v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
McDonough Lake	19007600	1						5														13																								
McKnight Lake	10021600	1																										v14		v 14	v 14	v 14	v 14	v 13	v 13	v 12	v 14	v 13	v 13	v 12					
McKusick Lake	82002000	1															v14	v14	v14	v14	v14	v13	v14	v14	v14	v14	v14	v14	v14	v14	v 15	v 14	v 14	v 14	v 14	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
McMahon Lake	70005000	1	2				5											13			13			13				13	v14	v10	v 11	v 10	v 11	v 9	v 9	v 10	v 10	v 12	v 11	v 8	v 10	v 10	v 10	v 10	v 9	v 10
Meadow Lake	27005700	1																	v12			v12			v9			v10			v 14			v 13			v 11					v 3	v 6	v 4		v 2
Medicine Lake	27010400	2		5		10							13	12																				v 10	v 12	v 9	v 7	v 6	v 15	v 14	v 13	v 7	v 8	v 10	v 10	v 10
Medicine Lake	27010400	1	4			9																											v 13	v 15	v 14	v 14	v 14	v 15	v 14	v 14	v 13	v 13	v 8	v 11	v 11	v 9
Medina Lake	27014600	1																																	v 7											
Mergens Pond	82048200	1																					v10			v3	v2	v6			v 6	v 1								v 6			v 6			v 7
Meuwissen Lake	10007000	1																				v1									v 11								v 13	v 12	v 12					
Miller Lake	10002900	1																v6	v13		v12	v14	v13	v13	v14	v14	v14	v12	v13	v 14	v 14	v 13	v 14	v 14	v 11	v 9	v 14	v 14	v 12	v 12					
Minnetoga Lake	27008800	1																											v14	v 12		v 14	v 13	v 13	v 9	v 11	v 12	v 14	v 14	v 13	v 13	v 11	v 14	v 13	v 14

Minnewashta Lake	10000900	1					5						13			13				13	13	13			13	13															v 9	v 11	v 10	v 12	v 11	14
Minnewashta Lake	10000900	2																															v 13	v 11	v 12	v 10	v 8	v 4	v 7	v 10	v 2					14
Minnewashta Lake	10000900	3																																							v 3					
Mitchell Lake	27007000	1																13				13	13			13	v14	v14	v14	v13	v 13	v 14	v 13	v 13	v 11	v 12	v 13	v 14	v 14	v 13	v 12	v 11	v 11	v 7	v 12	v 10
Moody Lake	13002300	1																										v14	v14	v14			v 12	v 10	v 10	v 22	v 26	v 26	v 26	v 28	v 18	v 4	v 10	v 15	v 13	v 16
Mooney Lake	27013400	1														v14	v10																													
Moore Lake	2007502	1																				v14																								
Mud Lake	82002602	1																					v5	v5	v7	v7	v7	v7	v7	v7			v 14	v 7						v 14	v 12	v 13	v 6			
Myers Lake	10006800	1																				v1																								
Nielson Lake	82005500	1																																						v 14	v 12					
Nokomis Lake	27001900	1	4				5																																							
Normandale Lake	27104500	1																											v5	v3		v 11	v 13	v 9	v 14											
North School Section Lake	82014900	1																																						v 7	v 6	v 7	v 7	v 7	v 7	v 7
North Twin Lake	82001800	1																					v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7		v 7	v 12			v 14	v 14	v 12		v 6			v 7
Northwood Lake	27062700	1																					v12	v10	v13	v12	v12	v10	v10	v10	v 9	v 11	v 11	v 12	v 11	v 11	v 12	v 12	v 10	v 12	v 11	v 10	v 10	v 5	v 7	v 7
Oak Lake	10009300	1																				v2		v14	v13	v12	v14	v14	v14		v 15															
Oak Lake	10009300	2																											v10																	
Oak Lake	10009300	3																											v10																	
O'Connor Lake	82000200	1																										v8	v15	v12	v 15	v 10	v 9	v 7	v 6	v 6	v 6	v 6	v 6	v 6	v 5	v 4	v 6	v 6	v 6	v 6
O'dowd Lake	70009500	1					5										13			13			13		13			13	v12	v13	v 14	v 14	v 14	v 14	v 14	v 13	v 14	v 13	v 13	v 14	v 12	v 14	v 11	v 12	v 12	v 12

Olson Lake	82010300	1												12		v15		14					13			13	v14	v7	v7	v11	v 19	v 13	v 12	v 18	v 13	v 11	v 11	v 12	v 14	v 14	v 13	v 11	v 9	v 12	v 10	v 11
Oneka Lake	82014000	1																				v13	v11	v11	v9	v6	v5						v 13	v 10	v 10		v 4	v 4	v 6	v 8	v 7	v 5	v 4			12
Orchard Lake	19003100	1	4	5		5						13				13					13	v15	v13	v13		v14	v14	v14	v14	v14	v 12	v 14	v 13	v 13	v 13	v 13	v 12	v 12	v 14	v 13	v 11	v 15	v 11	v 13	v 14	v 11
Otter Lake	2000300	1	2			5																																								
Owasso Lake	62005600	1	4			5																																								
Ox Yoke Lake	27017800	1																													v 1															
Pamela Lake	27067500	1																										v10																		
Parkers Lake	27010700	1	4										13					13				13	v12		v14	v15	v15	v15	v14	v14	v 13	v 14	v 13		v 10			v 16	v 15	v 14	v 10	v 13	v 11	v 10	v 5	v 1
Parley Lake	10004200	1					5		17	18				12					12			13		13		13			13																	
Pat Lake	82012500	1																											v7	v7	v 8	v 7	v 14	v 14	v 14	v 12	v 12	v 15	v 14	v 7	v 6	v 7	v 7	v 7	v 7	v 7
Patterson Lake	10008600	1																				v2																								
Peltier Lake	2000400	1				5										v14	v16	v15	v14	v14	v13	v13	v14	v13	v17	v15	v15	v16	v17	v16																
Penn Lake	27000400	1																														v 14	v 14	v 12	v 14	v 13	v 13	v 11	v 12	v 14	v 13	v 12	v 11	v 14	v 15	v 14
Pepin Lake	40002800	1																												v13																
Peter Lake	27014702	1																														v 13	v 6	v 2												
Phalen Lake	62001300	1	4	5				5																																						
Pickerel Lake	2013000	1	2															13															6	7							11	12			12	
Pickerel Lake	19007900	1																																				v 7	v 7	v 5	v 6	v 3		v 2		
Pierson Lake	10005300	1	2	5		5						13						13						13	13	13			13															12		
Pike Lake	27011102	1																	v14	v15	v13		v13							v4		v 8		v 10										v 14		

Pike Lake	62006900	1																				v14	v10	v14	v14	v14	v15	v15	v11	v14	v 13															
Pike Lake	70007600	1																		v9		v10	v9	v9	v11	v15	v15	v13																		
Pike Lake	70007600	2																							v11																					
Pine Tree Lake	82012200	1						5								v14	v14	v16	v14	v15	v15	v13	v14	v9	v12	v7	v8	v12	v10	v9	v 7	v 12	v 8	v 12	v 12	v 11	v 10	v 12	v 12	v 10	v 10	v 11	v 7	v 10	v 11	v 7
Plaisted Lake	82014800	1																													v 7	v 8	v 14	v 14	v 14	v 13	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Pleasant Lake	62004600	1						5																																						
Pleasant Lake	70009800	1														13																	5							12		12				
Pomerleau Lake	27010000	1																	v9			v10		v6		v3											v 12									
Powers Lake	82009200	1															v12	v13	v13	v12	v9	v10	v8	v5	v7	v14	v14	v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 14	v 14	v 15	v 12	v 13	v 12	v 14	v 13	v 13
Priebe Lake	62003600	1																													v 13	v 10	v 9	v 7	v 8											
Prior Lake - Lower	70002600	1					5						13						13	v15	v14	v13	v9	v14	v16	v13	v12	v12	v12	v12	v 12	v 14	v 14	v 12	v 14	v 6										
Prior Lake - Lower	70002600	2																			v14	v13	v9	v14	v15											v 5	v 9	v 13	v 13	v 11	v 8	v 9	v 11	v 13	v 11	v 9
Prior Lake - Upper	70007200	1	4	5			5						13						13	v15	v14	v13	v9	v14	v12	v13	v10	v9	v9	v5	v 11	v 14	v 14	v 13	v 11	v 9										
Prior Lake - Upper	70007200	2																							v12																					
Quarry	70034300	1																																												12
Raven Lake	19036900	1																v13	v6	v8																										
Rebecca Lake	19000300	1																																				v 12	v 15	v 9	v 14	v 12	v 10	v 14	v 13	v 13
Rebecca Lake	27019200	1				10	12	12																																						
Red Rock Lake	27007600	1																				12	13			13	13		13					v 2			v 12	v 12	v 9	v 14	v 13	v 14	v 12	v 13	v 15	v 13
Regional Park Lake	82008700	1																			v12	v14	v12	v13	v14	v15	v15	v14	v7	v7	v 7	v 7	v 7	v 7	v 7	v 7	v 6	v 7	v 10	v 6	v 6	v 7	v 6	v 7	v 7	v 7

Reid Park Pond	82046000	1																																									v 7		
Reitz Lake	10005200	1						5						12		13						v15	v13	v7	v13	v14	v14	15	v14	v14	v 11	v 11	v 12	v 11	v 14	v 12	v 12	v 13	v 12	v 14	v 13					
Reshanau Lake	2000900	1	2																			v7	v1	v6					v13	v9	v 7	v 9	v 11	v 10	v 10	v 7	v 2									
Rest Area Pond	82051400	1																											v13	v10	v 13	v 12	v 10	v 9	v 14	v 12	v 14	v 14	v 15	v 14	v 11	v 9	v 6	v 10	v 9	v 10
Rice Lake	10007800	1	2																			v1																7				12		12		
Rice Lake	27011600	1																												v10	v 10	v 12	v 14	v 12												
Riley Lake	10000200	1	2	5	16			5	17	18			13	12		13				13			13		13	v14	v15	v14	v10	v15	v 12	v 14	v 13	4 & v 11	4 & v 14	2 & v 11	v 11	v 14	v 12	v 14	v 8	v 12	v 10	v 11	v 10	v 12
Rogers Lake	19008000	1																												v12	v 9	v 11	v 11	v 9	v 11	v 9	v 9	v 11	v 10	v 10	v 4	v 15	v 10	v 14	v 13	v 14
Rose Lake	27009200	1																											v14	v13	v 13															
Rose Lake	82011200	1																													v 7	v 7	v 7								v 6			v 7		
Rose Lake	82011200	2																													v 7	v 7	v 7								v 6			v 7		
Rutz Lake	10008000	1																				v1	v14	v14	v14				v14	v7	v 5	v 8	v 5	v 7												
Ryan Lake	27005800	1																	v14		v5		v9		v4	v6					v 13		v 10		v 4								v 10			v 8
Sanborn Lake	40002700	1																												v2																
Sand Lake	82006700	1														v7	v14	v14	v13						v14	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7		v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 6	v 7	v 7	v 7
Sarah Lake	27019100	1	4			5																																								
Scheuble Lake	10008500	1																				v1																								
Schmidt Lake	27010200	1																v14			v12		v12	v9			v14	v9		v9				v 9										v 14		v 6
Schmitt Lake	19005200	1																																									v 10	v 7	v 7	v 7
School Lake	13005700	1																										v14	v7	v7		v 6								v 14	v 12		v 5	v 14	v 6	v 8

Schroeder Pond	82030100	1																								v14	v14	v7	v7																	
Schultz Lake	19007500	1					5	5														13																								
Schutz Lake	10001800	1					5																v6	v10	v6	v8	v9	v11																		
Scout Lake	19019800	1																												v14	v 14	v 14	v 14	v 14	v 14	v 14	v 14	v 14	v 14	v 14	v 12	v 14	v 11	v 14	v 13	v 10
Sea Lake	82005300	1																													v 12	v 7							v 14	v 14						
Second Lake	13002500	1																																							v 6	v 6	v 10	v 14		
Seidl Lake	19009500	1															v15	v14	v14	v15	v16	v14	v14	v15	v8	v14	v14	v14	v8	v 4	v 2	v 12	v 9	v 3		v 6					v 6	v 6	v 6	v 4	v 6
Shady Oak Lake	27008902	1																													v 12	v 11													
Shavers Lake	27008600	1																									v14	v13																	
Shavers Lake	27008600	2																										v6																	
Shields Lake	82016200	1													v6	v14	v14	v13	v13	v14	v14	v14	v14	v14	v14	v14	v14	v14	v7					v 7	v 12	v 12	v 14	v 14	v 14	v 12	v 13	v 8	v 14	v 13	v 14
Silver Lake	62000100	1																										v12																	
Silver Lake	82001600	1																				v14	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7						v 14	v 14	v 12		v 6			v 7
Simley Lake	19003700	1															v10	v16	v14	v15	v16	v14	v12	v14										v 7	v 7										v 7
Smetana Lake	27007300	1																																	v 10										v 11
Snail Lake	62007300	1	4					5																																					
South Oak Lake	27066100	1																						v12	v15			v9	v8	v 5	v 7	v 13	v 14	v 12	v 10	v 13	v 10	v 9	v 5	v 6	v 2	v 6			
South Rice Lake	27064500	1																				v9	v14	v15	v14	v14	v15	v14	v12	v 6															
South School Section Lake	82015100	1															v14	v7		v14							v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13	v 12	v 15	v 14	v 14	v 12	v 13	v 13	v 14	v 13	v 13
South Twin Lake	82001900	1																				v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7	v 7					v 14	v 14	v 12		v 6	v 7	v 7	v 7

Spring Lake	2007100	1																					v11																							
Spring Lake	19000501	2																																					1							
Spring Lake	70005400	1	4	5	16		5						13						13	v12			v6	v11	v13	v14	v14	v13	v9	v8	v 5	v 10	v 15	v 8	v 8	v 10										
Square Lake	82004600	1	4	5	16	6	7	7				13				v11	v14	v14	v13	v14	19	v14	v14	v15	v14	v14	v14	v14	v14	v14	v 7	v 7	v 14	v 14	v 14	v 12	v 12	v 12	v 14	v 14	v 12	v 13	v 13	v 14	v 13	v 13
St. Croix Lake	82000100	1																											v2				v 12	v 11	v 3											
St. Croix Lake	82000100	8																																	v 11	v 12	v 8	v 5	v 6	v 8	v 8	v 5	v 9	v 9	v 10	v 7
St. Croix Lake	82000100	2																										v10	v10	v9	v 9		v 12	v 11	v 12	v 13	v 9	v 6	v 5	v 9	v 8	v 6	v 12	v 12	v 10	v 7
St. Croix Lake	82000100	3																										v11	v9	v9	v 10		v 12	v 15	v 16	v 13	v 12	v 4	v 5	v 8	v 5	v 1				
St. Croix Lake	82000100	4																															v 6	v 6	v 6	v 7	v 4	v 5	v 5	v 8	v 5	v 2		v 7	v 4	v 3
St. Croix Lake	82000100	5																										v8	v10	v7	v 8		v 15	v 10	v 6	v 6	v 4	v 5	v 5	v 5	v 10	v 10				
St. Croix Lake	82000100	6																										v11	v10	v10	v 9		v 16	v 16	v 16	v 17	v 15	v 16	v 17	v 16	v 14	v 15	v 16	v 8	v 8	v 4
St. Croix Lake	82000100	7																										v8	v8	v10	v 5		v 13	v 6	v 12	v 11	v 7	v 11	v 3	v 8	v 8	v 8	v 9	v 9	v 7	v 8
St. Joe Lake	10001100	1																									v17	v8	v9	v9	v 9	v 5	v 7	v 9	v 7	v 3	v 7	v 8	v 11	v 9	v 9	v 9	v 9	v 11	v 8	v 4
Staples Lake	82002800	1																				v14	v5	v7	v7	v7	v7	v7	v7	v 7	v 7				v 12	v 12	v 14			v 12	v 13	v 6			
Staring Lake	27007800	1	4					5										13				13		13			13		13																	
Stieger Lake	10004500	1					12					13						13																												
Success Lake	27063400	1																	v10							v11			v11		v 10			v 14			v 12						v 9			
Sucker Lake	62002800	1						5																																						
Sullivan Lake	2008000	1														v14	v14	v15		v15	v14	v13	v11	v11	v12	v12																				
Sunfish Lake	19005000	1																											v13	v13	v 13	v 14	1 & v 15	4 & v 14	4 & v 13	2 & v 13	v 13	v 14	v 13	v 14	v 7	v 7	v 8	v 7	v 7	v 8

Sunfish Lake	82010700	1																				v10					v13	v11		v 7			v 7	v 7	v 7	v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Sunnybrook Lake	82013300	1																			v14		v13	v10	v12	v10	v16	v14	v14	v 14	v 14	v 13	v 14	v 14		v 6	v 7	v 7	v 7	v 6	v 7	v 6	v 7	v 7	v 7
Sunset Lake	82015300	1					5									v14	v14	v12	v13	v16	v12	v10	v13	v13	v18	v20	v15	v17	v12	v10	v 9	v 7	v 8	v 10	v 8	v 7	v 8	v 8	v 8	v 13	v 10	v 13	v 9	v 14	v 13	v 13
Sunset Pond	19045100	1															v14	v14	v14	v12	v10		v13	v11	v10	v12	v11		v14	v14	v 14	v 14	v 14	v 14	v 14	v 12	v 13	v 14	v 13	v 13	v 11	v 11	v 4	v 16	v 13	v 9
Susan Lake	10001300	1																											v7	v11	v 12	v 13	v 14	v 13	v 14	v 13	v 13	v 3	v 8	v 8		v 7	v 4	v 6	v 6	v 5
Sutton Lake	70009400	1																																									v 7	v 5		
Swan Lake	10008200	1																			v1																									
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	v 5	v 5
Sylvan Lake	27017100	1																												v 10				v 14	v 13	v 10									
Keewahtin Lake	82008000	1													v7			v14		v15	v14	v14	v14	v14	v14	v14	v14		v11	v 9	v 9	v 9	v 11	v 12	v 23	v 20	v 24	v 22	v 22	v 7	v 21	v 10	v 11	v 6	v 8
Tamarack Lake	10001000	1																					v10	v11	v12	v11	v11	v13	v14	v 11	v 13														
Tanners Lake	82011500	1	2								20					v14	v13	v12	v14																											
Teal Lake	27027500	1																																								v 11			
Terrapin Lake	82003100	1																								v7	v7	v7	v7	v 7	v 7	v 7	v 8	v 7	v 7	v 12	v 14			v 11	v 13	v 6	v 7	v 7	v 7
Third Lake	13002400	1																																		v 12	v 14				v 13			v 6	v 8
Thole Lake	70012001	1					5										13			13			13		13			13	v14			2	7	9				v 13	v 13	v 12	v 11	v 12	v 9	v 12	v 10	v 8
Thomas Lake	19006700	1	2																																											
Thompson Lake	19004800	1																																				v 7	v 7	v 7	v 7	v 7	v 7	v 7	v 7

Tiger Lake	10010800	1																			v1																									
Turtle Lake	62006100	1	4	5		5																																								
Turtle Lake	82003600	1																				v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7		v 7	v 12	v 12			v 14	v 12	v 13	v 6			
Twin Lake	19002800	1																			v6		v13	v11	v6	v2	v11	v8	v8	v 14	v 14	v 13	v 14	v 13	v 13	v 14	v 14	v 12	v 14	v 12	v 12	v 11	v 13	v 12	v 13
Twin Lake	27003502	1																														v 9	v 9		v 8	v 8	v 11	v 10	v 10	v 8	v 9	v 9	v 11	v 4	v 5
Twin Lake	27004201	1												12		v14			11		v15		v11		v13		v14		v13		v 12		v 12				v 11						v 4		v 4	
Twin Lake	27004202	1						5						12					13	v11		v13	13			v13		v8			v 13		v 13				v 3		v 10						v 12	
Twin Lake	27004203	1												12		v14			13		v5		13			v13		v8					v 9				v 5						v 7			v 2
Twin Lake	27065600	1																							v12	v14	v14	v11	v14	v10	v 10	v 11	v 13	v 11	v 14	v 13	v 13	v 6	v 15	v 8	v 4	v 9	v 2	v 6		
Twin Lake	82004800	1																		v13	v13										v 14	v 7	v 7	v 7	v 6	v 12	v 12	v 14			v 12	v 13		v 7		
Twin Lake	82015700	1																																							v 13			v 1	v 7
Vadnais Lake	62003801	1						5																																						
Valentine Lake	62007100	1																					v14	v13	v12	v12	v9	v10	v12	v 13										v 12	v 13	v 10	v 13	v 14	v 15
Valley Lake	19034800	1															v15	v14	v11		v8	v14	v14	v14	v14	v14	v13	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11	v 12	v 12	v 13	v 11	v 11	v 12	v 12	v 12	v 11	v 14
Virginia Lake	10001500	1																				v11	v12	v14	v12	v15	v13																		
Wabasso Lake	62008200	1	4	5		5						12																																		
Waconia Lake	10005900	1	4	5				5					13				v16	v13	v15	v17	v15	v14	v14	v14	v15	v14	12	v14	v14	v13	v 13	v 14	v 14	v 14	v 14	v 13	v 12	v 14	v 13	v 13	v 11					
Wasserman Lake	10004800	1				5			17	18							13			13	13	13			13	13			13																	
Weaver Lake	27011700	1				5			17	18																																				
Weber Lake	82011900	1																										v12		v 7	v 7	v 7							v 6			v 6			v 7

West Boot Lake	82004400	1																					v14	v14	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7		v 7	v 12	v 13	v 14			v 12	v 13		v 7		
West Lakeland Basin	99001184	2																													v 3													v 7		
West Lakeland Basin	82048800	1																					v2								v 7	v 7	v 7													
Westwood Lake	27071100	1														v13							v15	v14	v10	v9	v7	v7	v8	v8	v 7	v 7	v 10	v 9	v 6	v 13	v 11	v 10	v 8		v 9	v 9	v 10	v 5	v 9	v 5
Westwood Lake	27071100	2																																						v 9						
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	v 13	v 15	v 14	v 15	v 14	v 13	v 13	v 14	v 13	v 14	v 12	v 13	v 9	v 13	v 13	v 14
Wilmes Lake	82009002	1															v14	v15	v14	v15	v15	v14	v13	v13	v10	v12	v12	v10	v12	v11	v 11	v 11	v 11	v 11	v 13	v 13	v 12	v 15	v 14	v 14	v 12	v 13	v 12	v 14	v 13	v 13
Windsor Lake	27008200	1																									v12	v14																		

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	DNR Classification
Acorn Lake	82010200		44	296	6.7	3.0	0.7	101.0239-9999999-999	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	

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	DNR Classification
Bass Lake	82012400	Grant Township	23.5						100		N	
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	Centrarchid
Bay Pond	82001100		10.199999-999999999	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									
Birger Pond	19022400		22	137	6.2						N	
Bone Lake	82005400		212	5,177	24.4	9.8	3.7	2,820	59		Y	
Brewer's Pond	82002200		13.3			5.0			>80	Y	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	

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	DNR Classification
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	
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	Stocked w/Trout - Fishing Pier
Centerville Lake	2000600		473	1,640	3.5	5.8			58		Y	
Christmas Lake	27013700		268	741	2.8	26.5			29		Y	Trout Lake
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	Walleye
Cloverdale Lake	82000900		45	819	18.2	8.5	3.0	450	86	Y	N	
Cobblecrest Lake	27005300		10								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	DNR Classification
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	
Courthouse Lake	10000500		10			17.4			30		N	Stocked w/Trout
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	Panfish - Fishing Pier
Crystal Lake	27003400	Robbinsdale	76	1,272	16.7	10.4	3.7	917	68		Y	Centrarchid - Fishing Pier
Crystal Lake	70006100	Prior Lake	31.4			7.9			91.08280254777071 1	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		16.600000000000001								N	
Duck Lake	27006900		45.6	199.8	4.4	2.6			100	Y	Y	
Dutch Lake	27018100		172.7			13.7			48.19976771196283 5		Y	
Eagle Lake	10012100	Carver	186	1,050	5.6	4.3	2.5	1,500	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	DNR Classification
Eagle Lake	27011101	Maple Grove	291	3,220	11.1	10.4	3.8	3,667	68		Y	Centrarchid
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	
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	
Empire Lake	19034200		30	3,536	117.9	1.5			100	Y	Y	
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	MnDNR fisheries survey. 1998.
Fish Lake	70006900	Scott	171	660	3.9	8.5	4.4	2,468	43		Y	Centrarchid
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			

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	DNR Classification
Forest Lake	82015900		2,249	4,285	1.9	11.5	3.4	24,986	68		Y	
Fourth Lake	13002200		33.299999-999999997	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		
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		Natural Environment
Goose Lake	82005900	Scandia	83			7.6	2.4	664	55		Y	
Grace Lake	10021800		22			6.7			79			
Haas Lake	70007800		32.200000-000000003								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	

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	DNR Classification
Hannan	27005200		29	764	26.3	1.5			100	Y	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									
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	

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	DNR Classification
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	
Kingsley Lake	19003000		44	193	4.4	4.0			100	Y	N	
Kismet Lake	82033300		39.799999-999999997								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	Stocked w/Trout - Fishing Pier
Lake of the Isles	27004000		114			9.5			79		Y	
Lamplighter Park Pond	27071000		7.9	129	16.3	1.5	0.8	24.84800-2754820-936	100	Y	Y	
Langton Lake	62004900		30	257	8.6	1.5	1.2	120	100	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	DNR Classification
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	Centrarchid - Fishing Pier
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	
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	

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	DNR Classification
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	32.299999-999999997			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	
Lower Prior Lake	70002600		827	19,560	23.7	18.3	4.1	11,120	46		Y	Centrarchid
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	

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	DNR Classification
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	Rearing
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	
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	

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	DNR Classification
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	Wildlife
Orchard Lake	19003100		250	2,012	8.0	10.0	3.0	2,500	75		Y	Centrarchid
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	Gamefish
Penn Lake	27000400		31			2.1			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	DNR Classification
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	Floodplain lake
Piersons Lake	10005300		266.89999-999999998	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	Centrarchid
Pike Lake	62006900	New Brighton	35			4.9	2.1	252	100	Y	N	Gamefish
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	Centrarchid
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	Centrarchid
Priebe Lake	62003600		5.7			1.5			100	Y	N	
Quarry Lake	70034300		70.099999-999999994			15.2	8.6	1,976.81-9999999-9997	17.11840-2282453-641	N	Y	
Rebecca	19000300	Hastings	58			4.6			100	Y	Y	Floodplain lake
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	

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	DNR Classification
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	
Scout Lake	19019800		8.6999999-999999993			2.9				Y	N	
Second Lake	13002500		86								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	DNR Classification
Seidl's Lake	19009500		14	415	29.6	5.0			100	Y	N	Rearing
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	12,930.94072865-6878	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	Stocked w/Trout
St. Croix Lake	82000100		8,600	4,918,790	572.0	23.8					Y	
St. Joe Lake	10001100		14			15.9			46		Y	
Staples Lake	82002800		24	127	5.3	4.3	2.1	165	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	DNR Classification
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	Gamefish
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	Panfish
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	DNR Classification
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	Centrarchid
Twin Lake, middle	27004200	Crystal	56.9	4,053	71.2	13.4	4.9	918	57		Y	Centrarchid
Twin Lake, upper	27004200	Brooklyn Park	120.3	3,657	30.4	2.4	0.9	397	100	Y	N	Centrarchid
Upper Prior Lake	70007200		340	16,460	48.4	15.2	3.1	3,460	93	Y	Y	Centrarchid
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	Centrarchid
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	No DNR ID.
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	DNR Classification
Wing Lake	27009100		11									
Winkler Lake	10006600		129	2,758	21.4							
Wood Lake	19002400		9	157	17.4	4.5			100	Y	N	Panfish
Woodpile Lake	82013200		19									
Zumbra-Sunny	10004100		277			17.7	4.3	3,907	33		Y	Class 24

Appendix C

2023 CAMP Volunteers and Monitoring Organization Staff

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
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	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	Keith Bremel
Basset Creek WMO	Parkers Lake	27010700	David Parker
Basset Creek WMO	Sweeney Lake, site 2	27003501	Amy Baudler
Basset Creek WMO	Twin Lake	27003502	Jennell Bilek
Basset Creek WMO	Westwood Lake	27071100	Celeste Hill
Black Dog WMO	Crystal Lake	19002700	Joe Tranchilla
Black Dog WMO	Keller Lake	19002500	Randy Koenig
Black Dog WMO	Kingsley Lake	19003000	Lakeville staff
Black Dog WMO	Lac Lavon Lake	19044600	Wally Shaver
Black Dog WMO	Orchard Lake	19003100	Tom Goodwin
Burnsville, City of	Alimagnet Lake	19002100	David DeKraker
Burnsville, City of	Earley Lake	19003300	Nancy Norlen, Jim Norlen, Burnsville staff
Burnsville, City of	Sunset Pond	19045100	Jesse Gamble
Burnsville, City of	Twin Lake	19002800	Bernie DeMaster
Burnsville, City of	Wood Lake	19002400	Denice Gibson
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
Comfort Lake-Forest Lake WD	Bone Lake	82005400	Tom Furey
Comfort Lake-Forest Lake WD	Comfort Lake	13005300	Wally Ostlie
Comfort Lake-Forest Lake WD	Elwell Lake	82007900	CLFLWD staff
Comfort Lake-Forest Lake WD	Forest Lake, site 1	82015900	Steve Schmaltz

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Comfort Lake-Forest Lake WD	Forest Lake, site 2	82015900	Doug Joens
Comfort Lake-Forest Lake WD	Forest Lake, site 3	82015900	CLFLWD staff
Comfort Lake-Forest Lake WD	Heims Lake	13005600	CLFLWD staff
Comfort Lake-Forest Lake WD	Keewahtin Lake	82008000	CLFLWD staff
Comfort Lake-Forest Lake WD	Lendt Lake	13010300	CLFLWD staff
Comfort Lake-Forest Lake WD	Little Comfort Lake	13005400	CLFLWD staff
Comfort Lake-Forest Lake WD	Moody Lake	13002300	Amy Vislisel
Comfort Lake-Forest Lake WD	School Lake	13005700	CLFLWD staff
Comfort Lake-Forest Lake WD	Shields Lake	82016200	CLFLWD staff
Comfort Lake-Forest Lake WD	Third Lake	13002400	CLFLWD staff
Comfort Lake-Forest Lake WD	Twin Lake	82015700	CLFLWD staff
Eden Prairie, City of	Duck Lake	27006900	Eric Campbell, Deb Campbell
Eden Prairie, City of	Mitchell Lake	27007000	Zach Fetzer
Eden Prairie, City of	Red Rock Lake	27007600	Dave Wallace
Hastings, City of	Rebecca Lake	19000300	Dwight Smith, Walt Popp, Kevin Smith, Phillip Vieth
Lakeville, City of	East Lake	19034900	Lakeville staff
Lakeville, City of	Lee Lake	19002900	Natalie Walker, Lakeville staff
Lakeville, City of	Marion Lake	19002601	Gabrielle Gallagher, Brian Gallagher
Lakeville, City of	Valley Lake	19034800	Lakeville staff
Lower Mississippi River WMO	Dickman Lake	19004600	Lisa Povolny
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
MCES	St. Croix Lake, site 1N	82000100	Jim Harper, Roberta Harper
MCES	St. Croix Lake, site 2	82000100	Jim Harper, Roberta Harper
MCES	St. Croix Lake, site 4	82000100	Jim Harper, Roberta Harper

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
MCES	St. Croix Lake, site 6	82000100	Jason Johnson, Jack Armstrong, Jim Harper, Roberta Harper
MCES	St. Croix Lake, site 7	82000100	Mayme Johnson, Carpenter Nature Center
Mendota Heights, City of	Lemay Lake	19008200	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
Nine Mile Creek WD	Wing Lake	27009100	John Burton
Pionner-Sarah WMC	Hafften Lake	27019900	Tom Cook
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
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
Rice Cr WD	George Watch Lake	2000500	Lisa Gilliland, Wargo Nature Center
Rice Cr WD	Karth Lake	62007200	Andrew Elmquist, Renee Marino, John Elmquist, James Elliot
Rice Cr WD	Little Johanna Lake	62005800	Fred Fox
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
Rosemount, City of	Birger Pond	19022400	Pamela Carlson
Saint Louis Park, City of	Cobblecrest Lake	27005300	Jim Kellogg
Saint Louis Park, City of	Hannan Lake	27005200	Danielle Anastasia
Saint Louis Park, City of	Lamplighter Park Pond	27071000	Jonathan Schwartz
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	Bass Lake	27009800	Rick Budde
Shingle Creek WMC	Twin Lake	27004201	Nick Ellering

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Shingle Creek WMC	Twin Lake	27004202	Guy Davis
Sunfish Lake, City of	Hornbeam Lake	19004700	Scott Spaeth
Sunfish Lake, City of	Horseshoe Lake	19005100	Jim Nayes
Sunfish Lake, City of	Sunfish Lake	19005000	James Stowell
Valley Branch WD	DeMontreville Lake	82010100	Tom Bucher, Gary Fields
Valley Branch WD	Edith Lake	82000400	Joseph Reithmeyer, Joel Jensen
Valley Branch WD	Jane Lake	82010400	Sophia Meisterling
Valley Branch WD	Klawitter Pond	82036800	Pat Barrett, Denice Jostes
Valley Branch WD	Long Lake	82011800	Frank Bastyr
Valley Branch WD	Olson Lake	82010300	Tom Bucher, Gary Fields
Valley Branch WD	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

Sponsor	Lake	DNR ID	Volunteer / Organization Staff
Brown's Creek WD	Woodpile Lake	82013200	WCD staff
Carnelian-Marine-St. Croix WD	Alice Lake	82028700	WCD staff
Carnelian-Marine-St. Croix WD	Bass Lake	82003500	WCD staff
Carnelian-Marine-St. Croix WD	Big Carnelian Lake	82004900	WCD staff
Carnelian-Marine-St. Croix WD	Big Marine Lake	82005204	WCD staff
Carnelian-Marine-St. Croix WD	Clear Lake	82004500	WCD staff
Carnelian-Marine-St. Croix WD	Fish Lake	82006400	WCD staff
Carnelian-Marine-St. Croix WD	German Lake	82005600	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	Maple Marsh Lake	82003800	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
Middle St. Croix WMO	Lily Lake	82002300	WCD staff
Middle St. Croix WMO	McKusick Lake	82002000	WCD staff
Rice Cr WD	Fish Lake	82013700	WCD staff
Rice Cr WD	Lost Lake, site 2	82013402	WCD staff
South Washington WD	Armstrong Lake	82011602	WCD staff
South Washington WD	Bailey Lake	82045600	WCD staff

Sponsor	Lake	DNR ID	Volunteer / Organization 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	Bay Pond	82001100	WCD staff
Valley Branch WD	Clear Lake, site 1	82009900	WCD staff
Valley Branch WD	Clear Lake, site 2	82009900	WCD staff
Valley Branch WD	Cloverdale Lake	82000900	WCD staff
Valley Branch WD	Downs Lake	82011000	WCD staff
Valley Branch WD	Eagle Point Lake	82010900	WCD staff
Valley Branch WD	Echo Lake	82013500	WCD staff
Valley Branch WD	Elmo Lake	82010600	WCD staff
Valley Branch WD	Fahlstrom Pond, site 1	82000500	WCD staff
Valley Branch WD	Fahlstrom Pond, site 2	82000500	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	McDonald Lake	82001000	WCD staff
Valley Branch WD	Sunfish Lake	82010700	WCD staff
Valley Branch WD	Sunnybrook Lake	82013300	WCD staff