2013 Study of the Water Quality of 162 Metropolitan Area Lakes

April 2015

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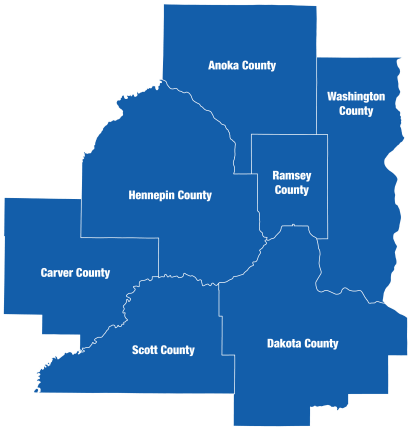

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2013 Study of the Water Quality of 162 Metropolitan Area Lakes

Report by

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Metropolitan Council Environmental Services

April 2015

Executive Summary

This report is the latest in a continuing series of reports summarizing results of the annual lake monitoring program of the Metropolitan Council (METC) in the Twin Cities seven-county metropolitan area (TCMA). The METC has collected water quality data on area lakes since 1980. This report contains data from a total of 179 lake sites on 162 lakes monitored in 2013. The monitoring program in 2013 included 3 lakes and 5 newly established lake sites not previously monitored by the Council.

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

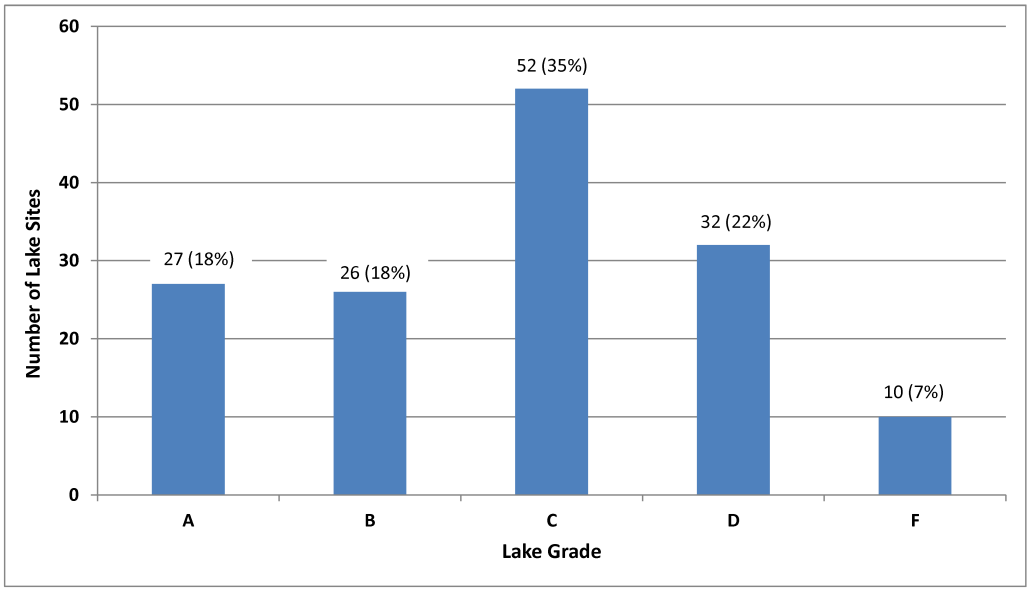
The objectives of this program are:

1. Provide lake water quality data to lake, watershed and water resource managers.
2. Advise managers of known or suspected threats to lake water quality.
3. Continue to compile a water quality database on the five area lakes that support a trout fishery.

The year 2013 marked the twenty-first year that the Citizen-Assisted Monitoring Program (CAMP) was used to increase our knowledge of the water quality of TCMA 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 METC's analytical laboratory located at the Metropolitan Wastewater Treatment Plant in St. Paul, MN. CAMP volunteers are sponsored by a local partner. In 2013, there were 24 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 2013 is shown in the following figure.

For those lake sites with sufficient data to calculate a lake grade, approximately one third of the lake sites (35%) received a lake grade of C. The water quality of these sites is considered average as compared to other lakes in the TCMA. Approximately one third of the lake sites (36%) were above average (A and B grades), and approximately one third (29%) were below average (D and F grades).



Lake Grades for the 2013 Monitoring Season

Since 1980, 377 TCMA lakes have been monitored through the METC's lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 414 lake sites have been monitored. The data from the METC's lake monitoring program are stored in the METC's Environmental Information Mangement System (EIMS), the Minnesota Pollution Control Agency's Environmental Quality Information System (EQuIS), and the U.S. EPA's national water quality data repository, called STORET (STOrage and RETrieval). Data for all METC lake monitoring sites can be conveniently retreived via the METC's web-based EIMS, at: http://es.metc.state.mn.us/eims/. While the METC has done its best to enhance and expand the region's lake water quality database, it is apparent that one of the most economical and efficient methods to expand knowledge of our lakes has been with the assistance of volunteers and the cooperation and financial support of local partners via the CAMP.

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

Acknowledgments

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

CAMP Volunteers and Local Partners

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

11 to 21 years of service

21 years of service
Diane Coderre – Sunset Lake

20 years of service
Washington CD – multiple lakes

19 years of service
Carver Co. Env. Services – multiple lakes

18 years of service
John Ritter – Lake Alimagnet
Wargo Nature Center – George Watch

16 years of service
Glen Gramse – Keller Lake
Wally Shaver – Lac Lavon Lake

15 years of service
Lakeville – multiple lakes
John Ryski – Bavaria Lake

14 years of service
Dave Hanson – Sweeney Lake

13 years of service
Gene Berwald – Pine Tree Lake
Kevin Bjork – Cloverdale Lake
Tom Goodwin – Orchard Lake

12 years of service
Bonnie Juran – Klawitter Lake
Tom and Peggy Sletta – Cates Lake

11 years of service
Kitty Francy-Payton – Long Lake
Jim Kellogg – Cobblecrest Lake

7 to 10 years of service

10 years service
Bill Feely – Long Lake
David Florenzano – Riley Lake
Wayne Hubin – Swede Lake
Sue Morgan & Linda Scott – St. Joe Lake
Gordan & Fran Warner – Mitchell Lake

9 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
Cecilia and Harry Martin – Lake St. Croix
Rick Meierotto – Lake St. Croix

8 years of service
David Bluhm – White Rock Lake
Minnesota DOT – Rest Area Pond
Dan Wallace – Sunset Pond
Joe Williamson – McMahon Lake

7 years of service
Sandy & Mike Boyce – Lake O'Dowd
John Burton – Wing Lake
Dan Freeman – Twin Lake south
Jon and Teresa Hafner – Bone Lake
Jim & Tricia Hafner – Loch Ness
Doug Hennes – Rogers Lake
Tam & Dick McGehee – Langton Lake
Lynne McMullen – Reitz Lake
Boe Meier — Olson Lake
Mendota Heights staff — Lemay Lake
Jim Nayes – Horseshoe Lake
Steve Schreiber — Little Comfort Lake
Curt Sparks – Sylvan Lake
Dan Stanek – Scout Lake
Robert White — Northwood Lake

5 to 6 years of service

6 years of service
Dan Carlson – Clear, Mays, Terrapin Lakes
Fred Fox – Little Johanna Lake
Lori Fredlund – Reshanau Lake
Todd Heruth – Armstrong Lake
Steve Iverson – DeMontreville Lake
Christy McGlocklin – Long Lake
John Twele – Minnetoga Lake
Warner Nature Center – Clear, Mays, Terrapin Lakes

5 years service
Jeff Christianson – Farquar Lake
Tim and Sharon McCotter – Lucy Lake
Mark McMullen – Reitz Lake
Wally Ostlie – Comfort Lake
Joe Reithmeyer – Lake Edith
Steve Schmaltz – Forest Lake, west basin
Tim Weber – La Lake
Jim Weninger – Spring Lake

3 to 4 years of service

4 years of service
Steve Aldritt – Lake Minnewashta
Jeff Berg – Lake Elmo
Paul Bolstad – Fish Lake
Wendy Griffin – Lake Elmo
Mock Family – Wood Lake
David and Josie Nelson – Medicine Lake
Mary Quinn – Wing Lake
James Stowell – Sunfish Lake
Douglas Toavs – Moody Lake
Jim Van Someren – Hafften Lake

3 years service
Ryan Atwell – Medicine Lake
Doug Baines – Dubay Lake
Pat Barrett – Klawitter Lake
Paul Erdmann – Bush Lake
Lisa McIntire – Penn Lake
Karl Nelson – Medicine Lake
Gary Schultz – Susan Lake
Noah Schultz – Susan Lake
Kim Silvernagel – Upper Prior Lake
Jacob Steinbauer – Benton Lake
Diane Williamson – McMahon Lake

Metropolitan Council Staff

- The MCES Laboratory Services Section, for laboratory analysis of the lake samples.
- Craig Skone for creation of the lake maps.
- The MCES Electronic Lake Monitoring Report Team for the development and implementation of the automation of the annual lake report.

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Introduction

This 2013 report continues a series of annual lake reports from 1980 to present. Since 1980, 377 lakes in the Twin Cities Metropolitan Area (TCMA) have been monitored through the Metropolitan Council's (METC) lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 414 lake sites have been monitored. This report contains data from 179 lake sites on 162 lakes that were monitored in 2013, including 3 lakes and 5 lake sites that have not been previously monitored by the METC lake monitoring program. Figure 1 shows the location of the lakes monitored in 2013 by MCES staff and by volunteers of the Citizen-Assisted Monitoring Program. A list of lakes that have been monitored by the METC's monitoring program is shown in Appendix A. Refer to Appendix B for morphometry and other lake characteristic data.

METC lake monitoring data are available via:

- the METC's Environmental Information Management System (EIMS), at http://es.metc.state.mn.us/eims/
- 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 STORET Data Warehouse, which is the U.S. EPA's national water quality data repository, at http://www.epa.gov/storet/dbtop.html

The objectives of the METC lake monitoring program are:

1. Provide lake water quality data to lake, watershed and water resource managers.
2. Advise managers of known or suspected threats to lake water quality.
3. Continue to compile a water quality database on the five area lakes that support a trout fishery.

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

To date, the METC lake monitoring program has been an important tool for making informed lake management decisions. The majority of the lakes have been visited on a rotating schedule over the past 30 years, so as to develop an historical database to help lake and watershed managers in decision making. Data from the METC lake monitoring program are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of non-monitored lakes, examine intra-and interregional differences, and investigate the relationships between land use and water quality. A comprehensive regional lake monitoring program should ensure adequate spatial and temporal representation of water quality. However, due to cost and logistical problems, ground-based monitoring programs usually sacrifice spatial coverage (fewer lakes) in favor of more frequent sampling.

As is the case throughout the United States, the majority of lakes in the TCMA 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 TCMA lakes, and local decision-makers are forced to make management decisions lacking adequate information.

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

The METC lake monitoring program, especially the use of volunteer monitors through the CAMP, has played a key role in the METC's recent efforts to use satellite images to assess annual lake water clarity for the entire TCMA. The monitoring program provides the "ground-based" measurements used to calibrate mathematical models, which in turn are used to interpret the satellite images. The use of satellite technology provides a cost-effective way to extend the analysis of the TCMA's lake water quality from just the lakes involved in our ground-based programs to all the lakes in the region. Over time, the satellite–based information can be used to detect how lake trophic conditions (especially water clarity) have changed over time and space in relation to changes in land-use and land-cover conditions.

The METC lake monitoring program began a volunteer annual ice-monitoring program in the winter of 2009 - 2010. The purpose of this program is to monitor the duration of annual ice cover on TCMA lakes over a long time period. This information is especially useful because the duration of ice cover is a good indicator of climate change.

Figure 1.

2013 Monitored Lakes

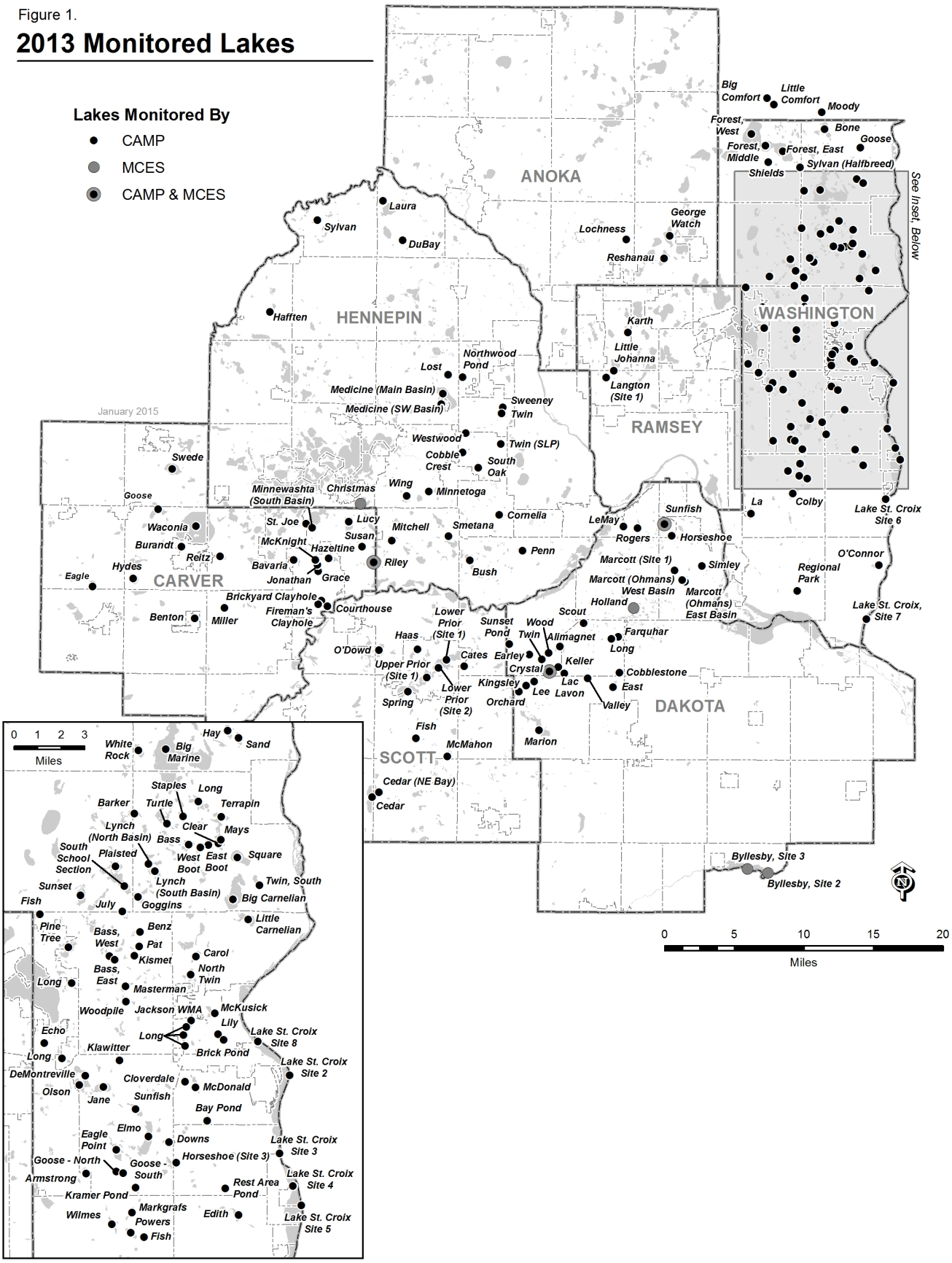


Figure 1. 2013 Monitored Lakes

METC Staff Monitoring Program

A description of the methods and results of monitoring conducted by METC staff during 2013 is provided in the following section.

Methods

Metropolitan Council staff monitored 7 lake sites on 6 lakes during 2013 (Figure 1). The staff monitoring program consisted of two projects in 2013. One project consisted of monitoring two sites on Lake Byllesby for trophic conditions. These two sites were new to the METC monitoring program in 2013. The monitoring occurred during the open water season of May through October.

The other project involved monitoring 5 specific lakes in cooperation with the Minnesota Pollution Control Agency as part of their Metro Area Chloride Monitoring Project. The monitoring for this project started in November 2010. The lakes were monitored during winter freeze up and early spring just after ice-out. The 5 lakes for this project were:

- Christmas Lake (Hennepin County)
- Crystal Lake (Dakota County)
- Holland Lake (Dakota County)
- Riley Lake (Carver County)
- Sunfish Lake (Dakota County)

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 a field data sheet. 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 reduced to every 2 m. These parameters were measured using a YSI 6920 multi-parameter sonde that was connected to a YSI 650 data logger.

The sonde probes for DO and pH were calibrated before each field trip. These probes were also calibrated again the same day after returning from the field, to check for calibration drift. 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 (0-2 m) using a two-meter PVC pipe with a two-liter capacity. Two such samples were mixed in a 4-liter plastic jug. The surface sample was then decanted into an opaque polyethylene bottle. Subsurface samples were collected using a 2-liter Van Dorn sampler. All water samples were transported on ice in a dark cooler and processed and preserved within 12 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 total dissolved phosphorus (TDP) were filtered through a 0.45 µm membrane filter and then analyzed for TP. All chemical analyses were performed at the Metropolitan Council Environmental Services - Environmental Quality Assurance Department (MCES-EQA) laboratory.

The chlorophyll analysis results are 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 annual 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[2]	U.S. EPA Method 310.2 Rev. 1974
Calcium, Iron, Magnesium; total[2]	U.S. EPA, Method 200.8, Revision 5.4, 1994 as modified
Chloride[2]	Method 4500–Cl-E, (APHA 1998)
Chlorophyll[1]	ASTM Method D3731–87
Hardness[2]	Standard Methods for the Examination of Water and Wastewater, Methd 2340 C, Online Edition
Kjeldahl Nitrogen, total (TKN)[1]	U.S. EPA Method 351.2, Rev. 2.0
Phosphorous, total (TP)[1]	U.S. EPA Method 365.4
Phosphorus, dissolved (TDP)[1]	U.S. EPA Method 365.4
Sulfate[2]	U.S. EPA Method 300.0

1. Trophic Conditions Project
2. Metro Area Chloride Monitoring Project

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 2013 are shown for lake sites that were monitored for trophic status.

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

All of the monitoring data for both projects were sent to the MPCA for inclusion in their EQuIS database, which can be accessed via their Environmental Data Access System.

Any questions about the 2013 METC lake monitoring data should be directed to Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Byllesby Lake, Site 2 (19–0006) *Metropolitan Council Environmental Services*

Lake Byllesby is located in southern Dakota County along the border with Goodhue County, and is an impoundment of the Cannon River. It has a surface area of 1,369 acres. Its watershed area is 733,156 acres, giving a very high watershed to lake area ratio of 536. The lake is listed as impaired by the MPCA for aquatic recreation (nutrient/eutrophication biological indicators) and for mercury content in fish. The lake is considered a priority lake by the Metropolitan Council for its high regional recreational value.

On each sampling day the lake was monitored for total phosphorus (TP), total dissolved phosphorus (TDP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency. A depth profile was performed which measured dissolved oxygen, termperature, pH, conductivity, oxidation reduction potential, and turbidity. Some of this data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

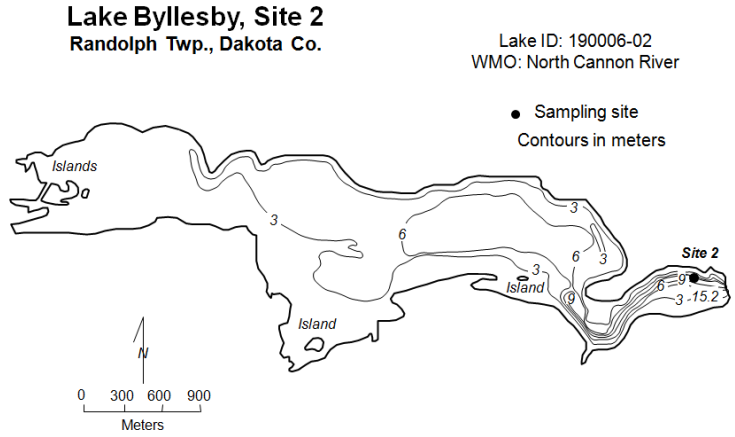
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	145	50	244	D
CLA (µg/l)	36	16	58	C
Secchi (m)	1.1	0.6	1.8	D
TKN (mg/l)	1.54	1.10	2.10	
			Lake Grade	D

Site 2 is located at the downstream end of the lake near the dam, and was first monitored in 2013. This area of the lake was also monitored by the CAMP in the mid-1990s, but at a location closer to the dam (site 1). Site 2 was chosen as a more safe distance from the edge of the dam. For comparison purposes, the historical grades for site 1 are shown in the historical grade table for site 2, since these two sites are in the same general area of the reservoir. The water quality in 2013 was poor, with low Secchi depths, high TP, and average chlorophyll-a mean concentrations. Site 2 experienced a nearly constant bloom of Aphanizomenon throughout the monitoring season.

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

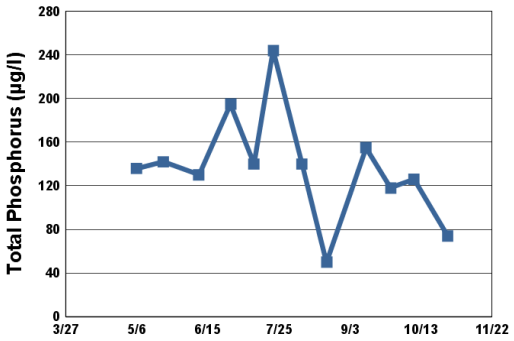
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

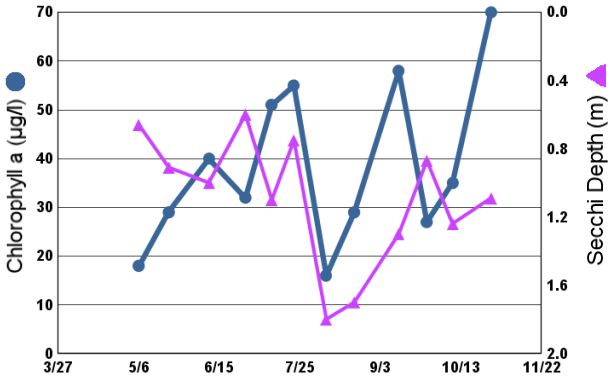
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

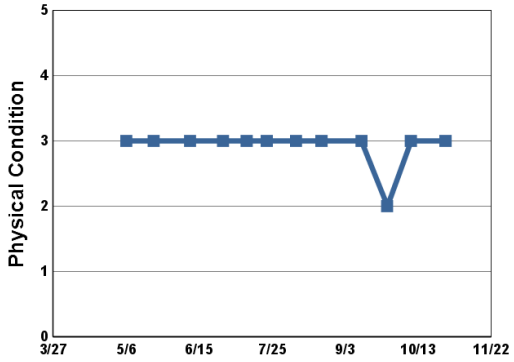


2013 Data

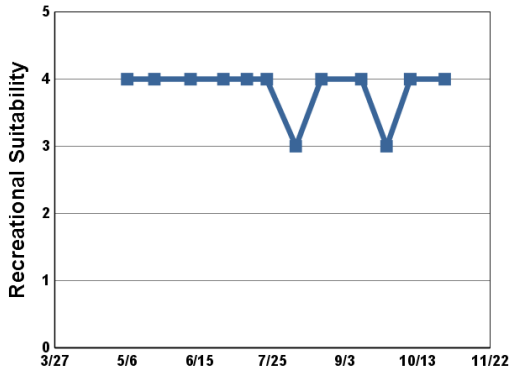
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	9.4	14.6	18	136	0.7	3	4
5/21	18.8	10.4	29	142	0.9	3	4
6/10	17.6	11.7	40	130	1.0	3	4
6/28	23.5	7.7	32	195	0.6	3	4
7/11	26.4	10.7	51	140	1.1	3	4
7/22	25.5	7.6	55	244	0.8	3	4
8/7	22.3	8.8	16	140	1.8	3	3
8/21	24.9	14.2	29	50	1.7	3	4
9/12	24.4	9.8	58	155	1.3	3	4
9/26	17.9	8.6	27	118	0.9	2	3
10/9	15.7	10.0	35	126	1.2	3	4
10/28	6.8	15.1	70	74	1.1	3	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Byllesby Lake, Site 3 (19–0006) *Metropolitan Council Environmental Services*

Lake Byllesby is located in southern Dakota County along the border with Goodhue County, and is an impoundment of the Cannon River. It has a surface area of 1,369 acres. Its watershed area is 733,156 acres, giving a very high watershed to lake area ratio of 536. The lake is listed as impaired by the MPCA for aquatic recreation (nutrient/eutrophication biological indicators) and for mercury content in fish. The lake is considered a priority lake by the Metropolitan Council for its high regional recreational value.

On each sampling day the lake was monitored for total phosphorus (TP), total dissolved phosphorus (TDP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency. A depth profile was performed which measured dissolved oxygen, termperature, pH, conductivity, oxidation reduction potential, and turbidity. Some of this data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	168	101	272	F
CLA (µg/l)	31	11	92	C
Secchi (m)	0.9	0.3	1.9	D
TKN (mg/l)	1.56	1.20	2.10	
			Lake Grade	D

Site 3 is located about midway between in the inflow of the Cannon River and the dam. This site was first monitored in 2013. The water quality in 2013 was poor, with low Secchi depths, high TP, and average chlorophyll-a mean concentrations. Like Site 2, Site 3 experienced a nearly constant bloom of Aphanizomenon throughout the monitoring season. The water quality at site 3 seems to be somewhat poorer than at site 2. Secchi depths were consistently lower at site 3 than at site 2, and TP concentrations were higher as given by the mean, min, and max. At a maximum depth of about 4.5 m, site 3 is the shallower site, which is shallow enough for sediments to be disturbed by mixing events, which can be strong given the reservoirs fetch aligning with the westerly prevailing winds, as observed during some monitoring events.

Throughout the monitoring period, the lake's physical condition and recreational suitability were ranked on a scale of 1-to-5. 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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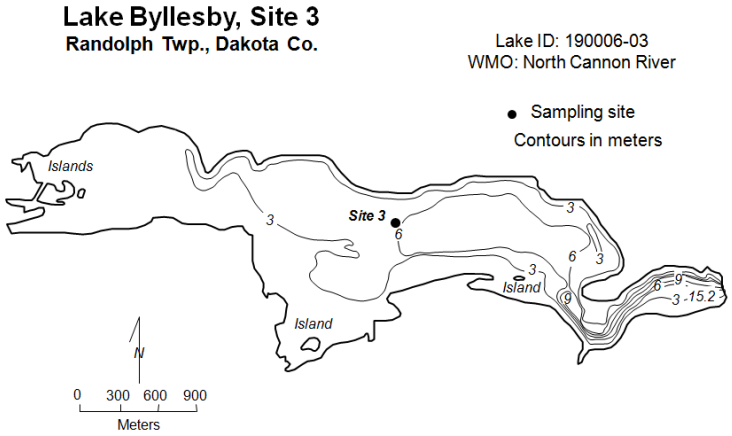
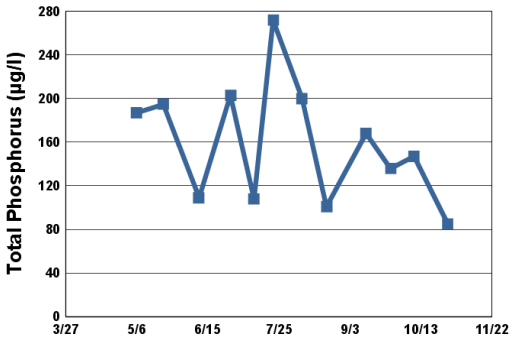
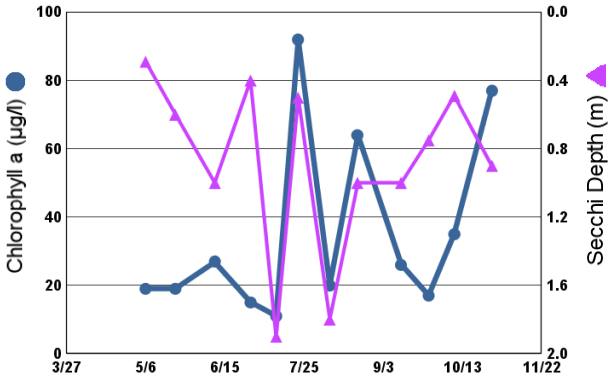
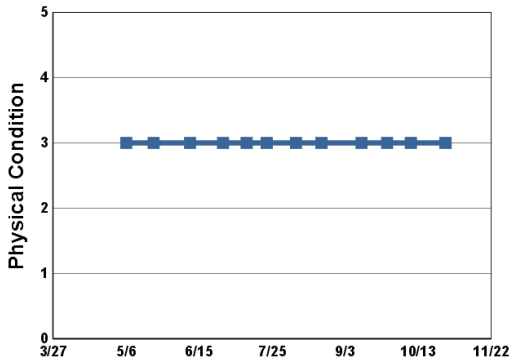


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	11.0	14.2	19	187	0.3	3	4
5/21	18.1	9.4	19	195	0.6	3	4
6/10	18.1	12.2	27	109	1.0	3	4
6/28	22.6	7.0	15	203	0.4	3	4
7/11	26.3	8.2	11	108	1.9	3	4
7/22	25.1	9.2	92	272	0.5	3	4
8/7	22.1	8.4	20	200	1.8	3	4
8/21	24.3	14.2	64	101	1.0	3	4
9/12	23.8	7.1	26	168	1.0	3	4
9/26	18.4	10.4	17	136	0.8	3	4
10/9	15.1	9.9	35	147	0.5	3	4
10/28	6.5	14.4	77	85	0.9	3	4







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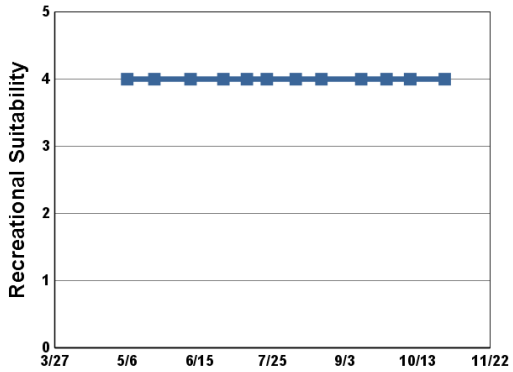

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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Christmas Lake (27–0137) *Metropolitan Council Environmental Services*

Christmas Lake is located in the cities of Chanhassen and Shorewood (Carver and Hennepin counties). The lake is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity (METC 2007). According to the Minnesota DNR, "the lake is unique because it is one of the few lakes in the Metro Region that can support a two-story fishery. This means sufficient oxygen levels and cool water temperatures in deeper portions of the lake allow the over-summer survival of cold-water species, while warm-water species inhabit the warmer water above the thermocline." The lake has been stocked with rainbow trout, and occasionally brown trout, by the Mn DNR since 1986 (MnDNR 2007).

The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*) (MnDNR 2013). The lake is listed on the MPCA's 2012 Impaired Waters List for impairments to aquatic consumption (mercury in fish tissue). Recently the lake was invaded by zebra mussels (*Dreissena spp*.), which was followed by intense in-lake treatments by the Mn DNR to try to eradicate the population.

The monitoring of Christmas Lake by MCES staff was part of the MPCA's Metro Area Chloride Monitoring Project. The typical monitoring schedule for this project was four monitoring events per year: during winter ice-cover, early spring (just after ice-out), summer, and late fall (just before ice-in). But the program ended in the spring of 2013, so just the winter and early spring events were monitored in 2013. Total phosphorus and chlorophyll samples were not collected as part of the Chloride Monitoring project. Therefore grades were not calculated for 2013.

On each sampling day the lake was monitored for chloride, alkalinity, hardness, sulfate, metals (calcium, iron, magnesium), and Secchi transparency. MCES staff also noted their perception of the lake's physical condition and recreational suitability. Some of the data are summarized in tables and figures on the following pages. For the full set of data, including at depth results, refer to Appendix E.

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/.

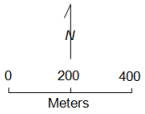
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

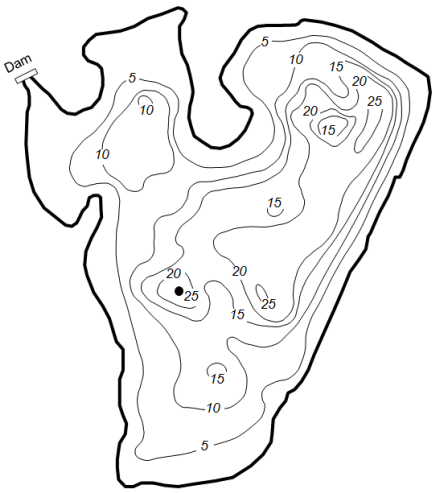
Christmas Lake
Chanhassen, Carver Co./
Shorewood, Hennepin Co.

Lake ID: 270137-00

● Sampling site

Contours in meters

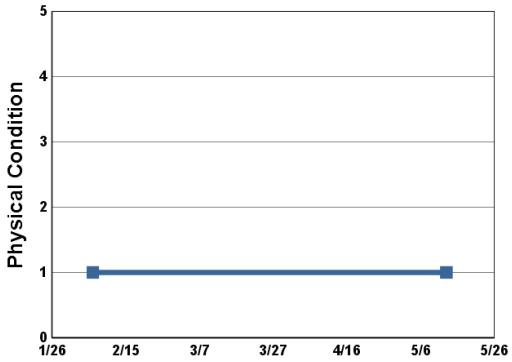




2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	SURF Cl- (mg/L)	SURF Sulfate (mg/L)	Secchi (m)	SURF Alk. (mg/L)*	SURF Hard. (mg/L)*
2/6	1.1	14.9	35.0	2.35		143	154
5/13	9.4	12.0	33.9	2.76	7.25	131	148

* = mg/L as calcium carbonate
Refer to Appendix E for the full set of 2013 data, including at depth results.



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3 = Definite Algal Presence
4 = High Algal Color
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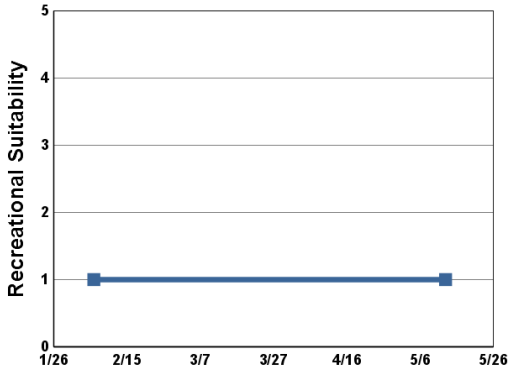

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Crystal Lake [Burnsville] (19–0027) *Metropolitan Council Environmental Services*

Crystal Lake is located mainly in the City of Burnsville (Dakota County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 292 acres. The lake is listed as infested with Eurasion water milfoil (*Myriophyllum spicatum*) (MnDNR 2013). The lake is listed on the MPCA's 2012 Impaired Waters List for impairments to aquatic consumption (mercury in fish tissue) and aquatic recreation (excessive nutrients/eutrophication).

The monitoring of Crystal Lake by MCES staff was part of the MPCA's Metro Area Chloride Monitoring Project. The typical monitoring schedule for this project was four monitoring events per year: during winter ice-cover, early spring (just after ice-out), summer, and late fall (just before ice-in). But the program ended in the spring of 2013, so just the winter and early spring events were monitored in 2013. Total phosphorus and chlorophyll samples were not collected as part of the Chloride Monitoring project. Therefore grades were not calculated for 2013.

On each sampling day the lake was monitored for chloride, alkalinity, hardness, sulfate, metals (calcium, iron, magnesium), and Secchi transparency. MCES staff also noted their perception of the lake's physical condition and recreational suitability. Some of the data are summarized in tables and figures on the following pages. For the full set of data, including at depth results, refer to Appendix E.

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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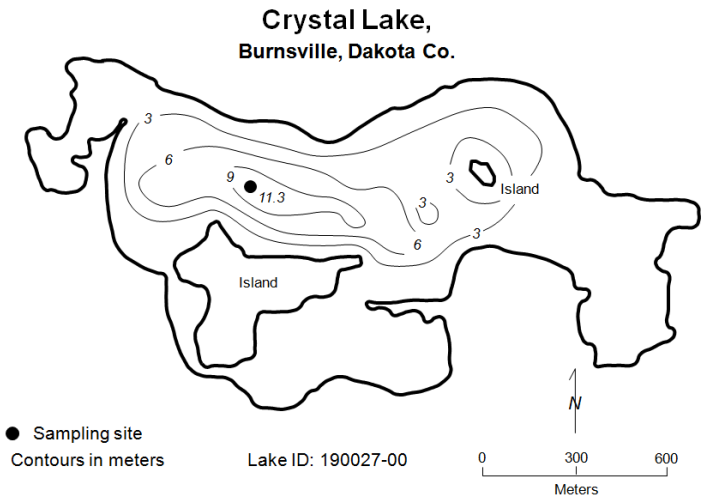
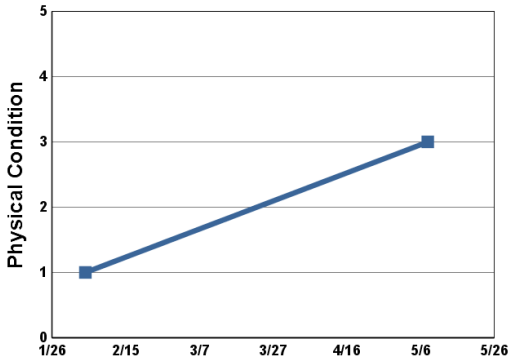


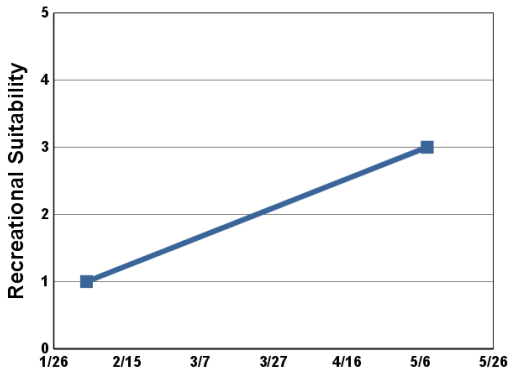


1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	SURF Cl- (mg/L)	SURF Sulfate (mg/L)	Secchi (m)	SURF Alk. (mg/L)*	SURF Hard. (mg/L)*
2/4	0.9	13.2	99.0	4.0		141	224
5/8	15.7	12.5	97.4	3.35	2.4	118	150

* = mg/L as calcium carbonate
Refer to Appendix E for the full set of 2013 data, including at depth results.



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

Holland Lake (19–0065) *Metropolitan Council Environmental Services*

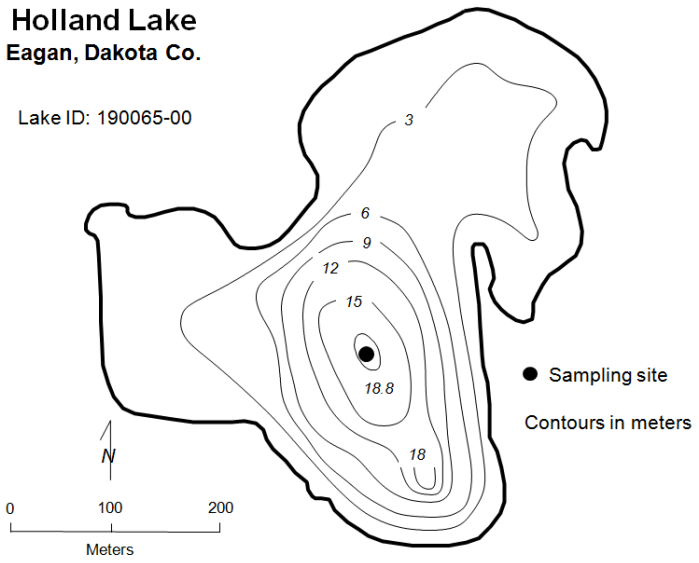
Holland Lake is located in the city of Eagan (Dakota County). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*) (MnDNR 2013).

The monitoring of Holland Lake by MCES staff was part of the MPCA's Metro Area Chloride Monitoring Project. The typical monitoring schedule for this project was four monitoring events per year: during winter ice-cover, early spring (just after ice-out), summer, and late fall (just before ice-in). But the program ended in the spring of 2013, so just the winter and early spring events were monitored in 2013. Total phosphorus and chlorophyll samples were not collected as part of the Chloride Monitoring project. Therefore grades were not calculated for 2013.

On each sampling day the lake was monitored for chloride, alkalinity, hardness, sulfate, metals (calcium, iron, magnesium), and Secchi transparency. MCES staff also noted their perception of the lake's physical condition and recreational suitability. Some of the data are summarized in tables and figures on the following pages. For the full set of data, including at depth results, refer to Appendix E.

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/.

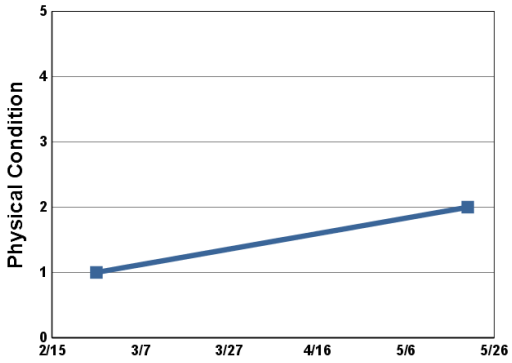
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



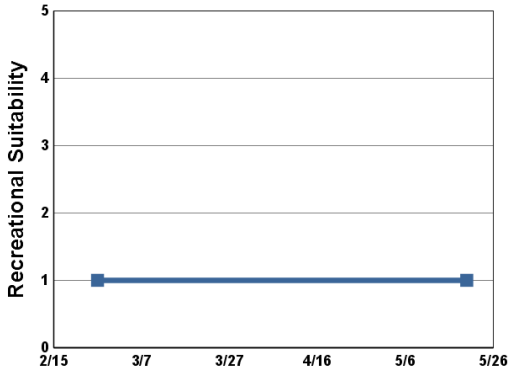
2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	SURF Cl- (mg/L)	SURF Sulfate (mg/L)	Secchi (m)	SURF Alk. (mg/L)*	SURF Hard. (mg/L)*
2/25	0.4	7.6	40.0	0.50		88	112
5/20	19.5	9.3	31.6	0.78	2.3	70	88

* = mg/L as calcium carbonate
Refer to Appendix E for the full set of 2013 data, including at depth results.



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

Riley Lake [Site 1] (10—0002) *Metropolitan Council Environmental Services*

Riley Lake is located with the cities of Chanhassen and Eden Prairie (Carver and Hennepin counties). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The maximum and mean depths are 15.0 m and 6.6 m, respectively. The MN DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) (MnDNR 2013). The lake is listed on the MPCA's 2012 Impaired Waters List for impairments to aquatic consumption (mercury in fish tissue) and aquatic recreation (excessive nutrients/eutrophication).

The monitoring of Riley Lake by MCES staff was part of the MPCA's Metro Area Chloride Monitoring Project. The typical monitoring schedule for this project was four monitoring events per year: during winter ice-cover, early spring (just after ice-out), summer, and late fall (just before ice-in). But the program ended in the spring of 2013, so just the winter and early spring events were monitored in 2013. Total phosphorus and chlorophyll samples were not collected as part of the Chloride Monitoring project. Therefore grades were not calculated for 2013.

On each sampling day the lake was monitored for chloride, alkalinity, hardness, sulfate, metals (calcium, iron, magnesium), and Secchi transparency. MCES staff also noted their perception of the lake's physical condition and recreational suitability. Some of the data are summarized in tables and figures on the following pages. For the full set of data, including at depth results, refer to Appendix E.

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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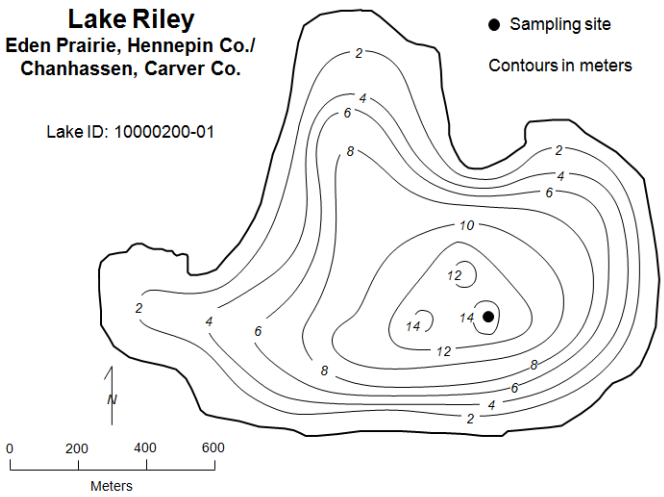
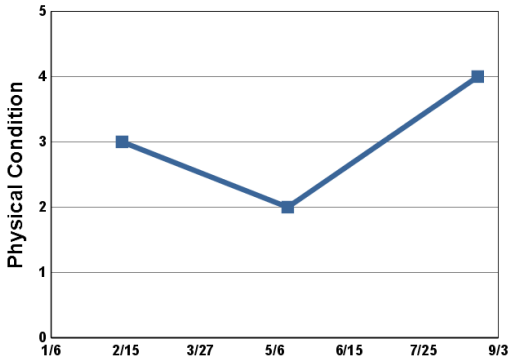


2013 Data

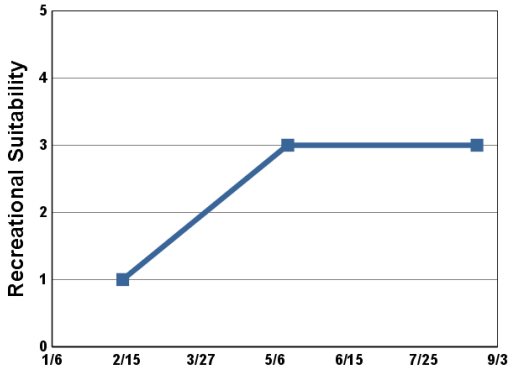
Date	SURF-TEMP (° C)	SURF DO (mg/L)	SURF Cl- (mg/L)	SURF Sulfate (mg/L)	Secchi (m)	SURF Alk. (mg/L)*	SURF Hard. (mg/L)*
2/13	0.6	13.6	108.0	2.45		128	188
5/13	10.2	13.5	111.3	2.52	1.5	120	
8/23	25.7				0.7		

* = mg/L as calcium carbonate

Refer to Appendix E for the full set of 2013 data, including at depth results.



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

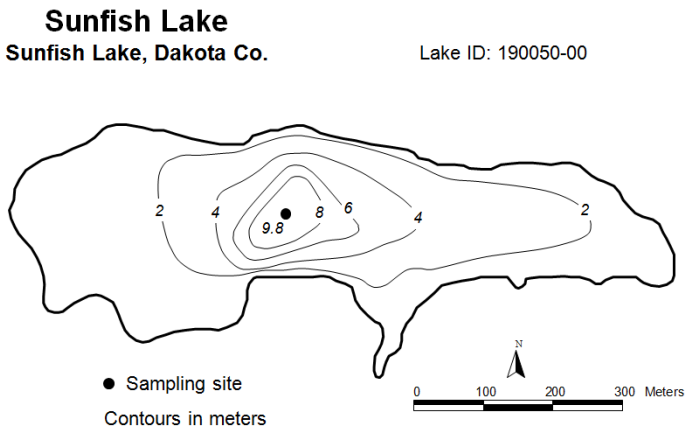
Sunfish Lake (19–0050) *Metropolitan Council Environmental Services*

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 monitoring of Sunfish Lake by MCES staff was part of the MPCA's Metro Area Chloride Monitoring Project. The typical monitoring schedule for this project was four monitoring events per year: during winter ice-cover, early spring (just after ice-out), summer, and late fall (just before ice-in). But the program ended in the spring of 2013, so just the winter and early spring events were monitored in 2013. Total phosphorus and chlorophyll samples were not collected as part of the Chloride Monitoring project. Therefore grades were not calculated for 2013.

On each sampling day the lake was monitored for chloride, alkalinity, hardness, sulfate, metals (calcium, iron, magnesium), and Secchi transparency. MCES staff also noted their perception of the lake's physical condition and recreational suitability. Some of the data are summarized in tables and figures on the following pages. For the full set of data, including at depth results, refer to Appendix E.

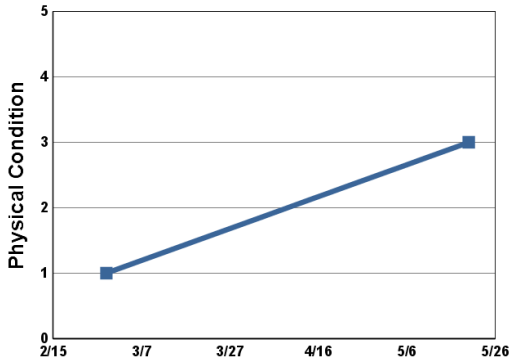
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



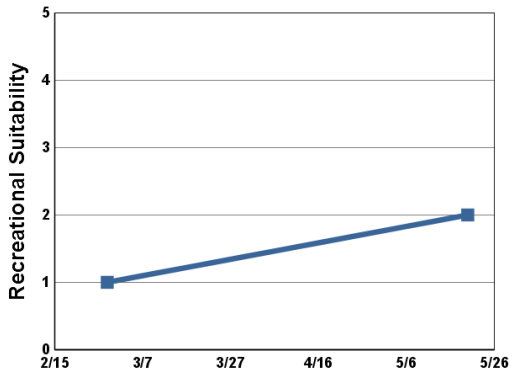
2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	SURF Cl- (mg/L)	SURF Sulfate (mg/L)	Secchi (m)	SURF Alk. (mg/L)*	SURF Hard. (mg/L)*
2/27	0.4	7.9	26.0	3.65		94	112
5/20	19.1	13.3	18.6	2.59	1.6	58	82

* = mg/L as calcium carbonate
Refer to Appendix E for the full set of 2013 data, including at depth results.



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

Citizen-Assisted Monitoring Program (CAMP)

Topics Covered in this Chapter

♦ CAMP Overview
♦ Acknowledgments
♦ CAMP Methods

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

CAMP Overview

The year 2013 marked the twenty-first year of the CAMP since the program began in 1993. The CAMP monitored 175 lake-sites on 159 lakes in 2013, including 3 lakes that have not been previously monitored by the METC (Figure 1). The CAMP is jointly funded by the METC and local sponsors such as WDs, WMOs, counties, and cities.

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

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

CAMP volunteers collect surface water samples that are analyzed for total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll-a (CLA). In addition, they measure surface water temperature and water transparency, and record user perceptions. Some lakes are monitored for dissolved oxygen. Most lakes are visited biweekly from April through October (fourteen sampling dates) and are sampled over the lake's deepest open-water location. In 2013, some of the lakes were not monitored on each of the desired 14 sampling weeks. The reasons for the missed sampling dates varied. However, the majority of the lakes, even with the missed sampling dates, were sampled adequately and often enough to provide an annual overview of the water quality of each lake. Water samples were submitted to METC staff and then analyzed at the MCES-EQA laboratory in St. Paul, MN.

Acknowledgments

The successful performance of the 2013 CAMP would not have been possible without the greatly appreciated work performed by volunteer monitors, and the support of the organizations that enrolled lakes in the program. The enrolling organizations, which included 11 cities, 9 watershed management organizations and watershed districts, 2 counties, 1 basin planning team, and 1 conservation district were involved in volunteer recruitment, training, and occasional follow up on the progress of their volunteer lake monitors. Without this help, the program would not have been as successful.

Those deserving the greatest appreciation are the volunteers themselves. Their efforts have made this program successful. A list of the 2013 CAMP volunteers is shown in Appendix C. The METC and the local sponsors thank them for their sustained efforts, including their quality work.

CAMP Methods

Recruiting Volunteers

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

Training Volunteers

Volunteer training was conducted by METC staff at various locations throughout the TCMA. Volunteer training was scheduled between early March and early April. At each training session, volunteers were given a handbook describing the program, outlining the basics in the biology and ecology of lake systems, and containing detailed written instructions for the lake monitoring and data form completion procedures (Anhorn 2003a).

At each training session, volunteers received the necessary equipment for lake monitoring. This equipment was purchased by the sponsor through the METC, and then loaned to the volunteers. At the end of the monitoring season, equipment was returned to the sponsor for use in future years. Each lake's volunteer received:

- Hand pump, flask, and filters for chlorophyll sampling
- Digital thermometer
- Map of the lake with sampling site(s)
- Field data sheets
- Sample jug
- Sample vials, Petri dishes, and labels
- Secchi disk
- Aluminum foil
- Tweezers (forceps)

During the training session, volunteers were given a brief description of limnology and lake ecology as described in their handbook, instructed on proper lake monitoring procedures, and shown how each piece of sampling equipment works. After this discussion, the volunteers received a package containing the equipment, and the proper use of each piece of equipment was again described and practiced. Finally, the volunteers were asked to sign a waiver of liability stating that they were not an employee of either the METC or the local partner enrolling the lake in the program.

Monitoring Methods

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

First, during pre-arranged sampling weeks, volunteers located and anchored their boat at pre-determined monitoring locations (typically the deep open-water area of the lake). Once at the monitoring location, lake and weather conditions were recorded on a field data sheet (Figure 2). The form also provides space to record natural and cultural observations which may have influenced what was happening in the lake (e.g.

heavy rains prior to monitoring, application of herbicide), and includes an area to document general perceptions of the lake's physical condition and suitability for recreation.

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

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

- **Temperature**: Surface water temperature was measured in the volunteer's sampling jug using a digital thermometer that reads to 0.1°C. The temperature was measured immediately following sample collection. Special care was taken to keep the sample out of direct sunlight in order to minimize temperature change.
- **Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN)**: Duplicate samples were decanted from the volunteer's jug into their respective triple pre-rinsed, pre-labeled 50 milliliter (ml) vials. These samples were then immediately placed in the volunteer's freezer. The samples were stored there until they were picked up and delivered to the laboratory for analysis.
- **Chlorophyll.** Chlorophyll samples from the volunteer's jug were filtered in the field, out of direct sunlight, using a field filtration apparatus (called a filter holder) and a hand pump. Water from the sampling jug was measured using a graduated cylinder, and then poured into the reservoir of the filter holder. The reservoir holds approximately 250 ml. By squeezing the handle of the pump, the sample water was forced through a 1 micrometer (µm) glass-fiber filter, and the suspended planktonic algae were trapped on the filter. The filtered water was then returned to the lake. If possible, this process was repeated until a total of 1,000 ml of sample water was allowed to pass through the filter. However, if the water sample contained much suspended material, and the filter became clogged without allowing more water to pass through, the amount of water that did pass through the filter was recorded on the field data sheet and the sample label. The filter was then removed from the filter holder with a tweezers, and placed in a Petri dish. The Petri dish was then labeled, wrapped in aluminum foil to keep the sample in the dark, and frozen until pick-up and delivery to the laboratory for analysis.

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

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 lake bottom: ☐

Check the circle if the visibility of the disk is 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 Breezy Strong

North South East West

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

*** Water Surface**

Calm Moderate Waves
Ripple Whitecaps
Small Waves
Comment:

*** Cloud Cover**

0% 75%
25% 100%
50%

*** Lake Level**

Above Normal
Normal
Below Normal
Staff Gage Reading _____

*** Amount of Aquatic Plants**

None Moderate
Minimal Substantial
Slight

*** Air Temperature (°F)**

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

***Unusual Conditions in the past week:**
(storms, high winds, temp. extremes):

*** Physical Condition**

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

*** Suitability for Recreation**

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

ver. 2012

Figure 2. CAMP Field Data Sheet

Laboratory Analytical Methods

The chemical analyses of CAMP water samples were performed at the MCES-EQA laboratory, according to the methods shown in Table 1. Chlorophyll samples collected by the CAMP volunteers according to the method shown in Table 1, except the samples were not preserved with magnesium carbonate ($MgCO_3$). The CAMP chlorophyll samples were preserved by freezing. Samples that were analyzed for TDP were filtered through a 0.45 µm membrane filter and then analyzed for TP.

Data Management

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

Quality Assurance

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

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

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

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

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

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

If a problem is discovered during the course of the sample checking or QC monitoring processes, the volunteer is contacted to discuss the cause of the problem. If needed, a METC staff member visits with the volunteer to observe his/her monitoring activities, in an effort to help identify the cause of the problem. Once the

cause is identified, the volunteer is given instructions on how to correct the situation. If the problem resulted in erroneous data, then the data are censored and excluded from the database.

Figures 3, 4, and 5 show the QC data for TP, CLA, and Secchi depth, respectively. The CAMP QC data shown in Appendix D provide additional information. Seven lakes were selected in 2013 for the QA program, as indicated in Appendix D. The QC results showed a reasonable agreement between CAMP volunteer and METC staff collected samples and measurements for most of these lakes. For the 6 of the 7 lakes, QC monitoring was performed within 4 days of the CAMP volunteer monitoring event. The QC monitoring for one lake (Medicine Lake) was performed concurrently with the volunteer. The monitoring results for the QC event as compared to the CAMP volunteer's data were nearly identical for Medicine Lake.

Marion Lake and Mitchell Lake experienced notable deviations between the CAMP results and the QC monitoring results in 2013. For both of these lakes, the TP concentrations were notably greater in the METC staff collected samples compared to the CAMP volunteer collected samples. Similarly, the CLA concentrations were notably greater in the METC staff collected samples compared to the CAMP volunteer samples. Even though the TP and CLA concentrations differed between the two monitoring personnel's samples, one may expect that with higher CLA concentrations that there will be a concomitant higher TP concentration as well. Secchi depth measurements were reasonably close between the two monitoring personnel's measurements.

Another notable deviation between the CAMP volunteer and the QC event data was for the CLA results for Riley Lake in August 2013. The Secchi depths and TP concentrations agreed very well between the two monitoring personnel's measurements and samples. The CAMP volunteer's CLA result seems lower than what would be expected given the relatively lower Secchi depth and higher TP concentration. The QC event's CLA result (41 ug/L) was more consistent relative to the Secchi depth and TP concentration.

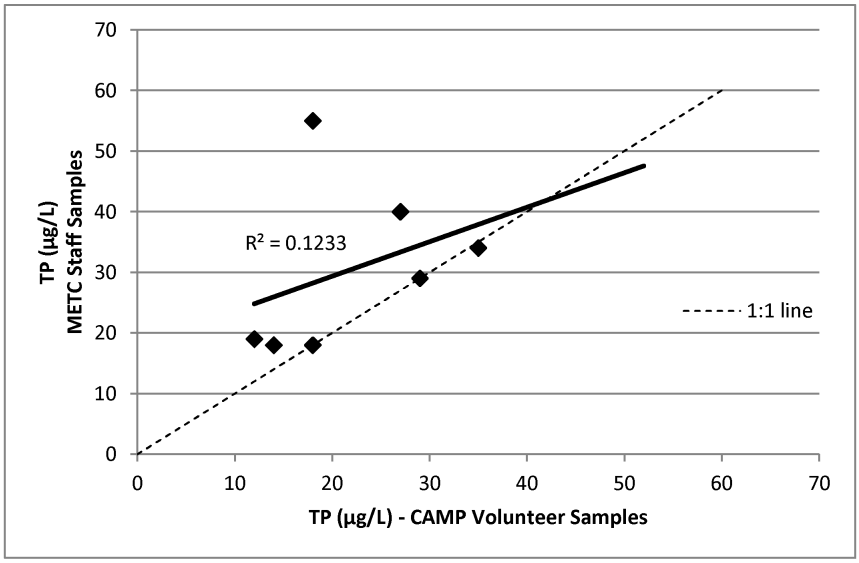


Figure 3. Total Phosphorus Quality Control Data

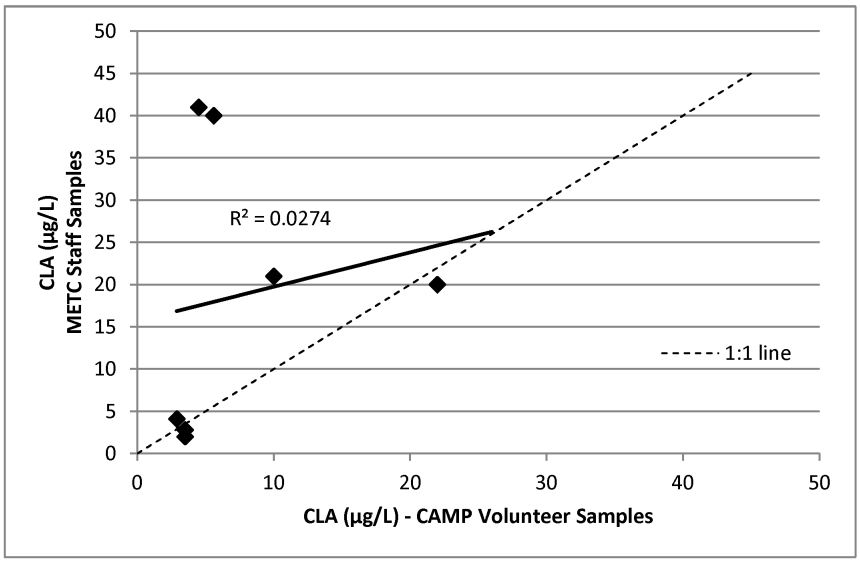


Figure 4. Chlorophyll-a Quality Control Data

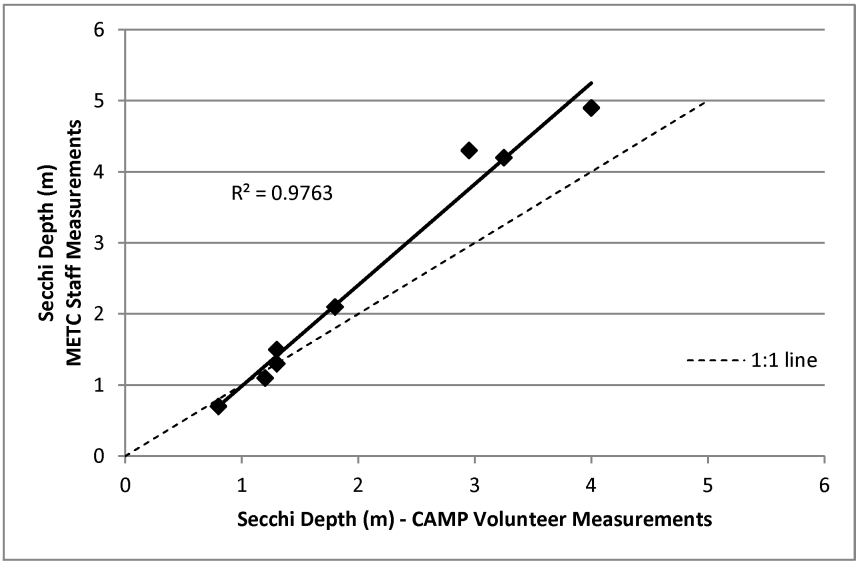


Figure 5. Secchi Depth Quality Control Data

Lake Quality Report Card

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

Table 2. Lake Grading Curve

Grade	Percentile	TP (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 TCMA lakes. 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).

2013 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. Lakes that had more than one monitored lake site received a single grade based on the average of the lake site grades. The distribution of lake grades for lake sites monitored in 2013 is shown in Figure 6.

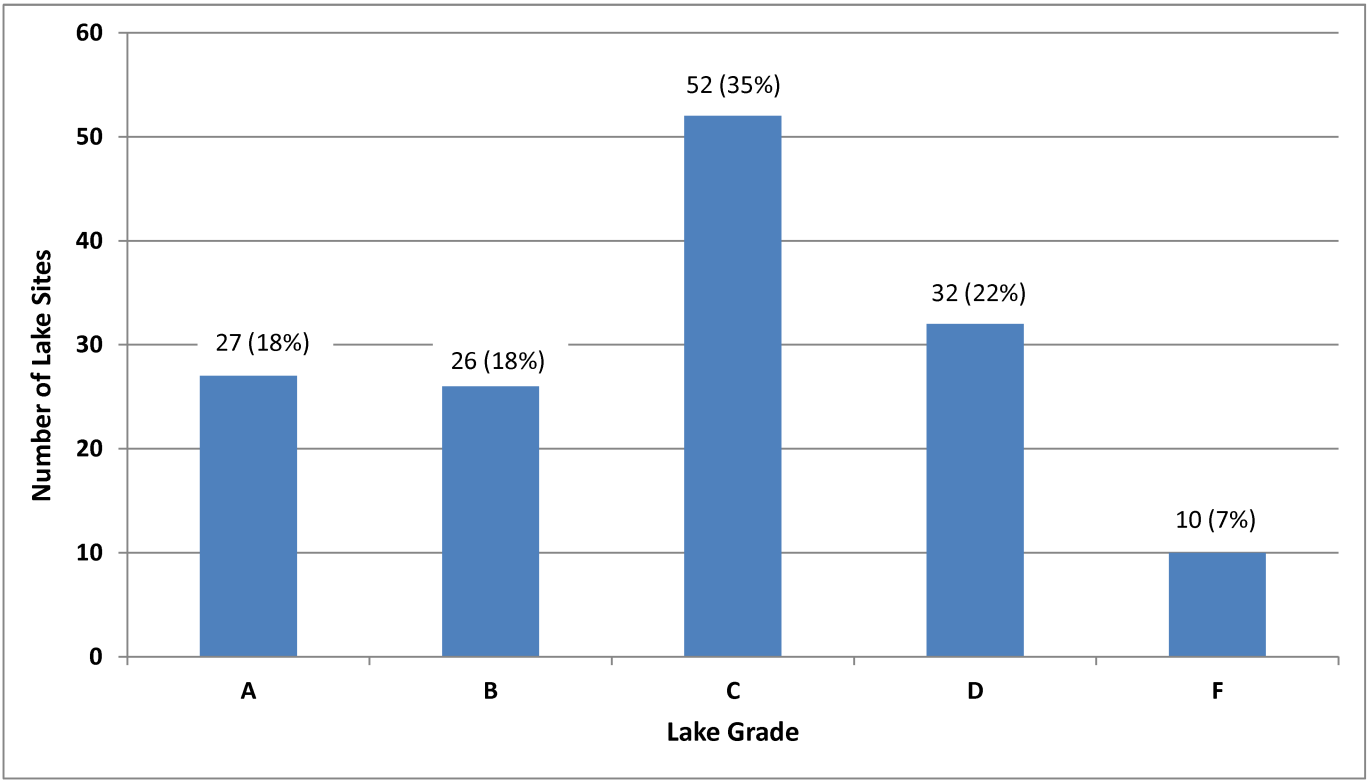


Figure 6. Distribution of 2013 Lake Grades

For those lake sites with sufficient data to calculate a lake grade, approximately one third of the lake sites (35%) received a lake grade of C. The water quality of these sites is considered average as compared to other lake sites in the TCMA. More lake sites (36%) were above average (A and B lakes) than lakes below average (D and F lakes at 29%).

Similar to past years, there is no distinct pattern as to where lakes with specific water quality were located. The lakes with below average lake grades (D's and F's) were not area specific. They were located throughout the TCMA. The majority of lakes with D and F grades are generally shallower with higher watershed-to-lake ratios. Lakes with high watershed-to-lake ratios have a more difficult time handling larger pollutant loads than larger lakes in watersheds of similar size and land-use. Shallow lakes typically do not stratify during the summer months, allowing the potential release of phosphorus from sediments to mix through the water column and become available for plant growth during the summer season.

Similarly, the lake sites with above-average grades (A's and B's) were not area specific. They were located throughout the TCMA. Common characteristics of the above-average lakes were deeper maximum and mean depths, development of a thermocline, and small contributing watersheds relative to the lake's surface area.

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

Monitoring Results for CAMP Lakes 2013

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 wateer quality data, shown in tables and figures, and the water quality grades from 1980 through 2013.

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

Alimagnet Lake (19–0021) *City of Apple Valley*

Volunteer: John Ritter

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 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 lake has a 1,094-acre watershed and a watershed-to-lake area ratio of 10:1 (Blue Water Science 2005). The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

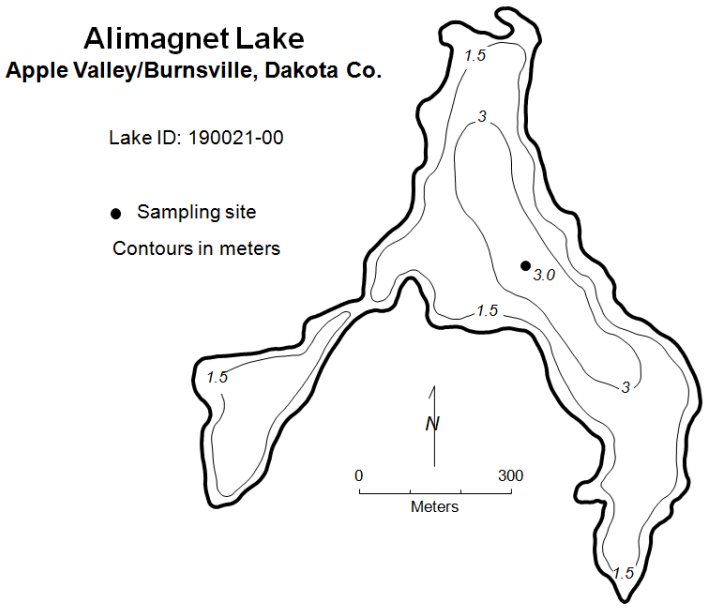
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	86	33	131	D
CLA (µg/l)	55	4.1	120	D
Secchi (m)	0.8	0.3	1.7	D
TKN (mg/l)	2.01	0.84	2.90	
			Lake Grade	D

The 2013 lake grade was a D. The lake's historic lake grades indicate that the lake fluctuates between a C and D. More recently the lake's lake grade has consistently been a D (1999-2008 excluding 2006) with C grades received in more recent years. But this year's lake grade is a return to the D grades. Continued monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

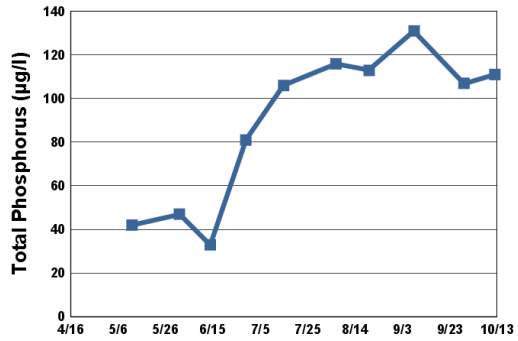
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

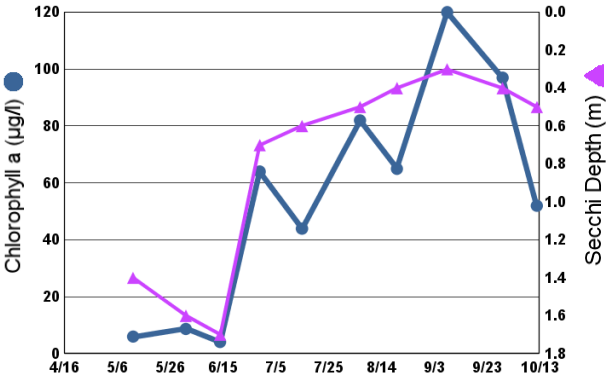
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

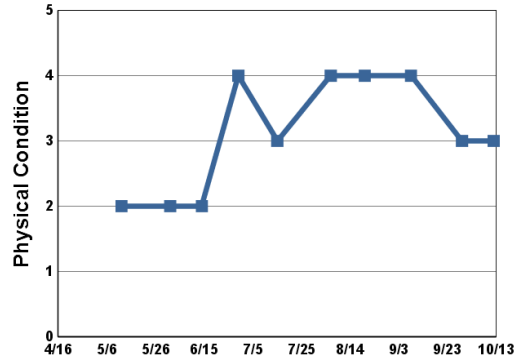


2013 Data

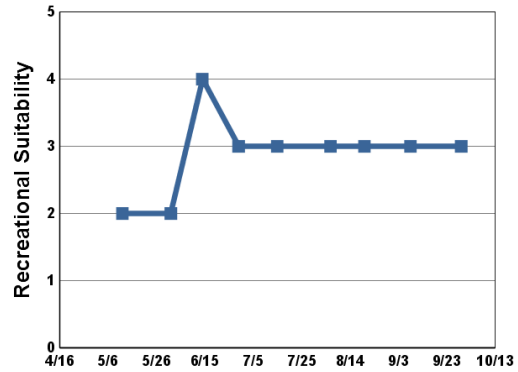
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/12	13.6		6.0	42	1.4	2	2
6/1	20.3		8.7	47	1.6	2	2
6/14	21.8		4.1	33	1.7	2	4
6/29	24.1		64	81	0.7	4	3
7/15	29.0		44	106	0.6	3	3
8/6	24.0		82	116	0.5	4	3
8/20	27.3		65	113	0.4	4	3
9/8	24.2		120	131	0.3	4	3
9/29	18.5		97	107	0.4	3	3
10/12	14.6		52	111	0.5	3	







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



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

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Armstrong Lake (82–0116) *South Washington Watershed District*

Volunteer: Todd Heruth

Armstrong Lake has been monitored through CAMP since 1998. 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	61	26	100	C
CLA (µg/l)	4.3	1.6	6.5	A
Secchi (m)				
TKN (mg/l)	0.81	0.45	1.20	
			Lake Grade	

The 2013 water quality lake grade was consistent with the historical water quality database. The lake water quality over the past decade has fluctuated between C and D, with a C being more frequent. The summer-time average water clarity remains in the D category, as it has been since 2000. The average summer-time concentration of CLA remains relatively low, giving an CLA grade of A.

According to the lake's historic database of TP, CLA, and water clarity grades, it seems that the TP and Secchi grades are worse than the CLA grade. There was no Secchi grade given in 2013 because most Secchi depths measurements were unattainable, due to either the Secchi disk being visible on the bottom of the lake (bottom limited) or the visibility of the Secchi disk being completely blocked by aquatic vegetation (vegetation limited). Without a Secchi depth, a measure of water clarity is unknown. It is possible that historic Secchi depths were affected these same ways. In 2013 the Secchi disk was either visible on the bottom of lake or blocked by vegetation, which indicates that the primary production of the lake is focused on production of aquatic macrophytes rather than algae. Thus producing the differences in the parameter grades, particularly the TP and CLA grades.

Throughout the monitoring period, the volunteer's opinions of 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.

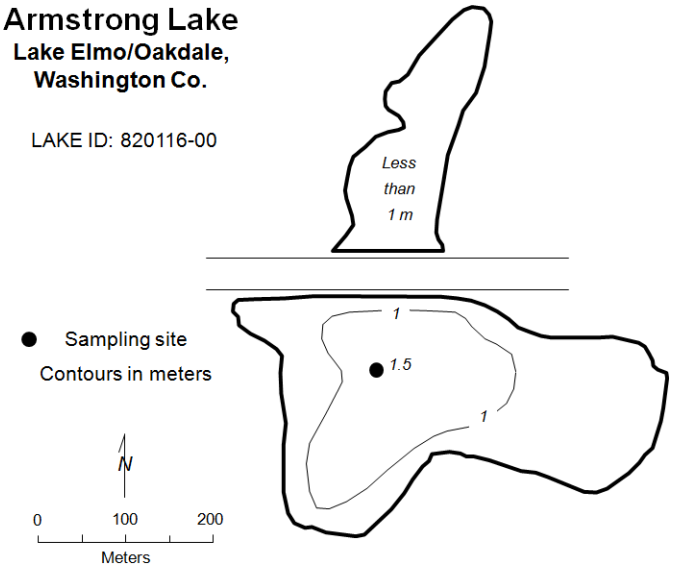
The volunteer did not record the recreational suitability ranking.

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.

Armstrong Lake

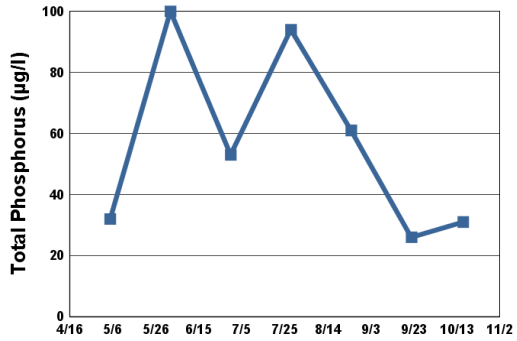
Lake Elmo/Oakdale, Washington Co.

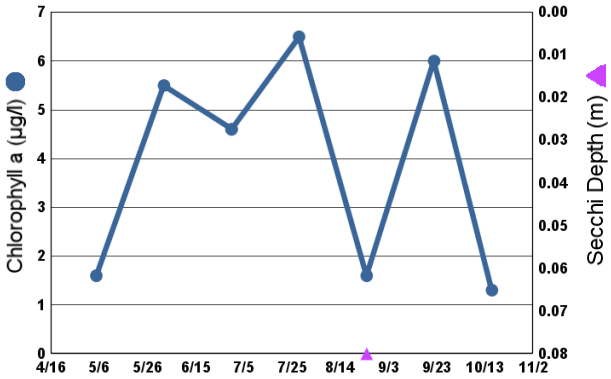
LAKE ID: 820116-00

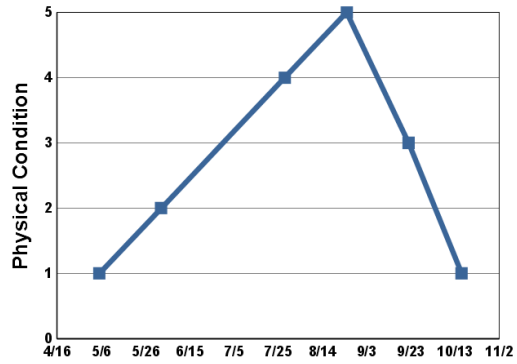


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	14.1		1.6	32		1	
6/2	19.5		5.5	100		2	
6/30	28.5		4.6	53			
7/28	28.7		6.5	94		4	
8/25	28.8		1.6	61	0.1	5	
9/22	21.4		6.0	26		3	
10/16	10.8		1.3	31		1	







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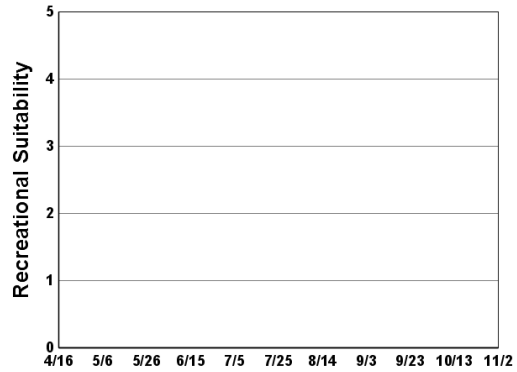

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Barker Lake (82–0076)

Volunteer: Washington Conservation District

Barker Lake is located in May Township, and has a surface area of 45 acres.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

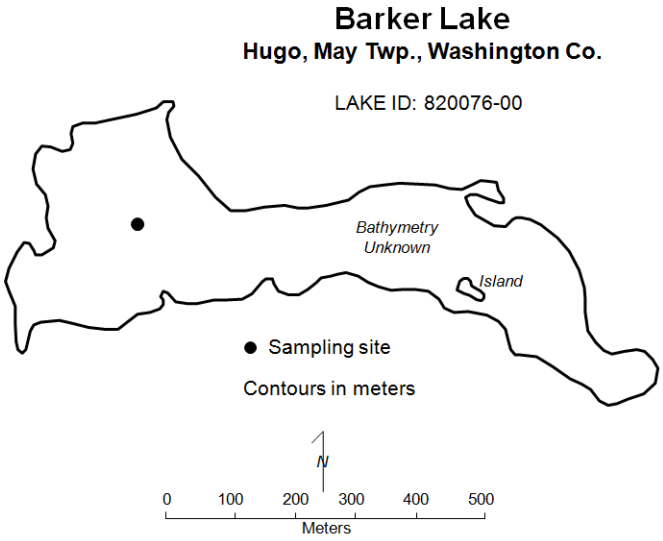
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	72	56	97	D
CLA (µg/l)	40	8.8	98	C
Secchi (m)	1.2	0.5	1.8	C
TKN (mg/l)	1.45	1.10	2.10	
			Lake Grade	C

The lake received a lake grade of C in 2013, which is consistent with its historical database.

Throughout the monitoring period, the volunteer's opinions of 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.

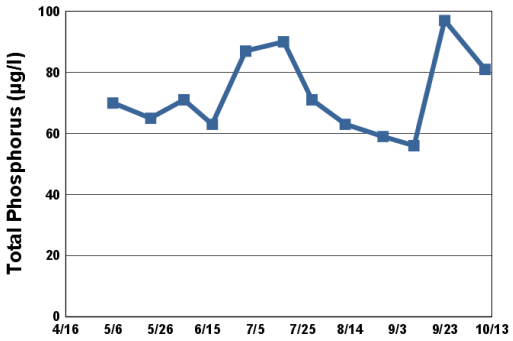
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

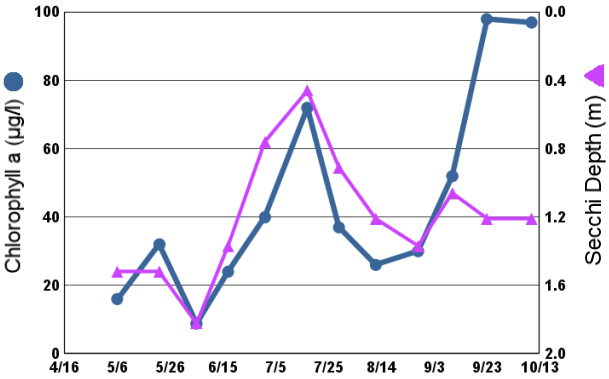
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

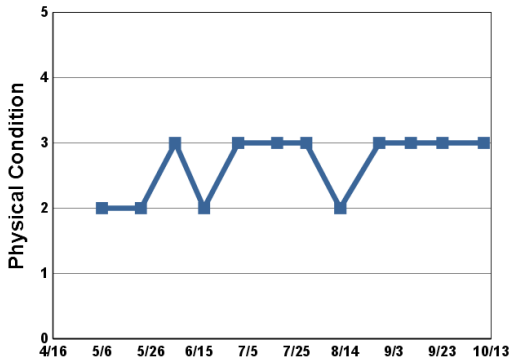


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	14.9	12.0	16	70	1.5	2	2
5/22	16.8	8.5	32	65	1.5	2	3
6/5	17.4	6.8	8.8	71	1.8	3	3
6/17	22.7	10.1	24	63	1.4	2	3
7/1	25.2	11.0	40	87	0.8	3	4
7/17	29.9	11.2	72	90	0.5	3	4
7/29	22.8	5.5	37	71	0.9	3	4
8/12	24.9	7.1	26	63	1.2	2	3
8/28	29.3	7.2	30	59	1.4	3	4
9/10	23.5	7.5	52	56	1.1	3	4
9/23	18.3	9.3	98	97	1.2	3	3
10/10	15.3	8.2	97	81	1.2	3	4







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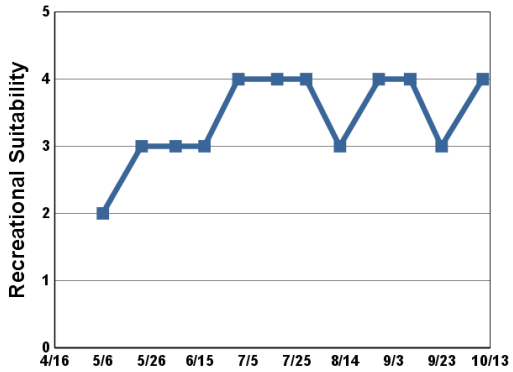

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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Bass Lake [May Township] (82–0035) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District

Bass Lake is located in May Township (Washington County). The maximum depth of the lake is 4.3 m. The entire lake is considered littoral zone, which is the shallow 0 — 15 feet depth zone that is typically dominated by aquatic vegetation. The lake does not maintain a thermocline during the warm water season because the lake's shallowness. A thermocline is a density gradient caused by varying temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

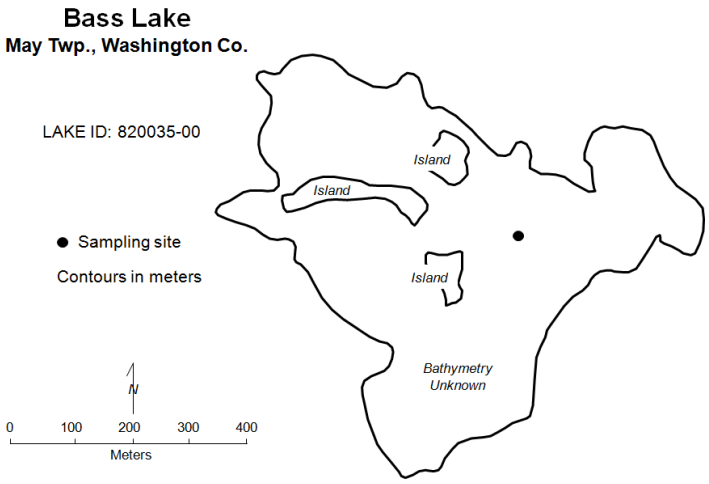
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	18	59	B
CLA (µg/l)	6.4	3.0	10	A
Secchi (m)	2.2	1.5	2.9	B
TKN (mg/l)	0.84	0.69	1.00	
			Lake Grade	B

The lake received a lake grade of B, which is consistent with grades received over the past decade. The lake has typically has received Cs and Bs in the past. Continued monitoring is suggested to determine if water quality is trending towards improved conditions.

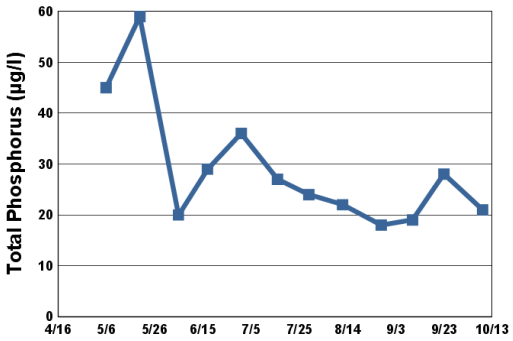
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

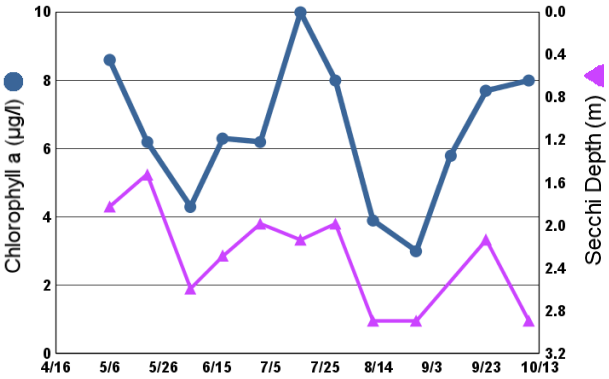
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

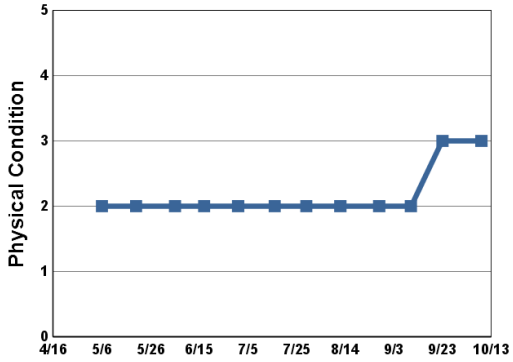


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	10.2	10.4	8.6	45	1.8	2	2
5/20	20.0	9.3	6.2	59	1.5	2	3
6/5	17.9	6.4	4.3	20	2.6	2	2
6/17	24.1	7.6	6.3	29	2.3	2	2
7/1	27.6	7.3	6.2	36	2.0	2	2
7/16	28.1	8.9	10	27	2.1	2	2
7/29	22.3	7.0	8.0	24	2.0	2	3
8/12	24.9	8.3	3.9	22	2.9	2	3
8/28	28.5	7.2	3.0	18	2.9	2	3
9/10	24.2	7.5	5.8	19		2	3
9/23	17.8	6.1	7.7	28	2.1	3	3
10/9	15.3	7.6	8.0	21	2.9	3	3







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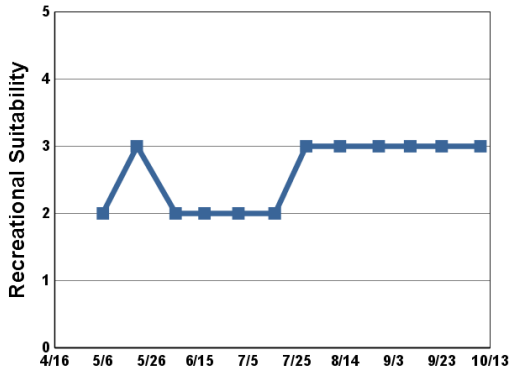


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Bass Lake [West] (82–0123) *Browns Creek Watershed District*

Volunteer: 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

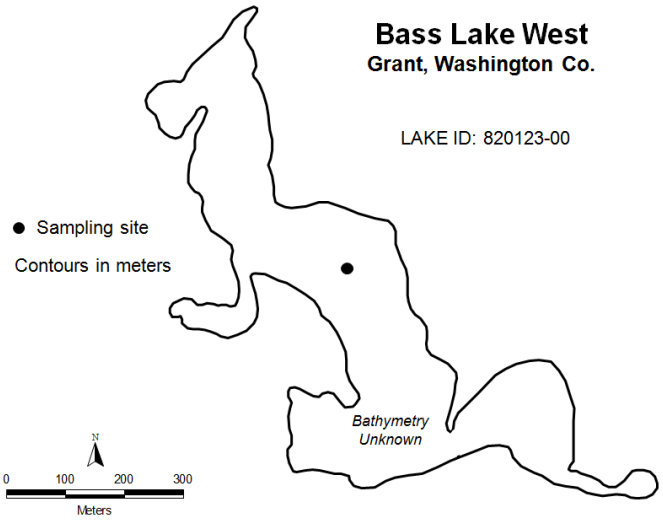
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	19	50	B
CLA (µg/l)	8.8	3.7	36	A
Secchi (m)	1.8	1.7	2.1	
TKN (mg/l)	0.84	0.69	1.10	
			Lake Grade	

There were too few Secchi depth readings available to calculate a Secchi grade in 2013. For a majority of the site visits, the Secchi disk was either visible on the lake bottom or obscured by aquatic macrophytes. The parameter grades received for TP and CLA in 2013 are consistent with the lake's limited historical database.

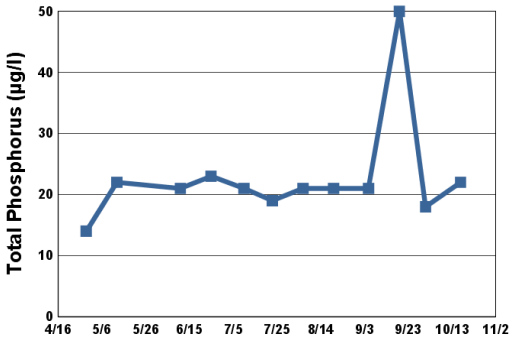
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

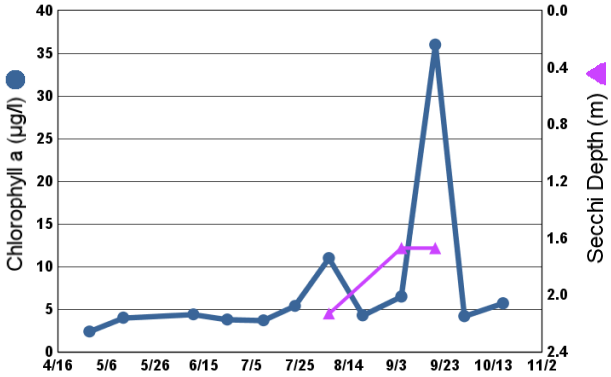
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

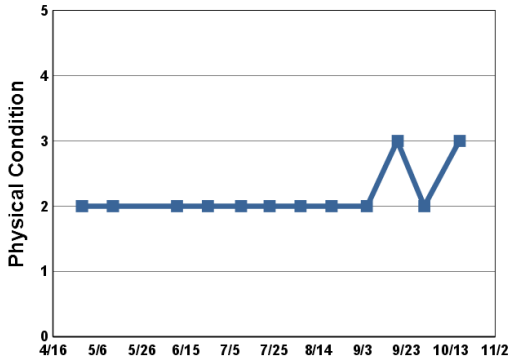


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	7.5	13.5	2.4	14		2	2
5/13	13.2	11.7	4.0	22		2	2
6/11	19.6	10.1	4.4	21		2	2
6/25	26.4	8.5	3.8	23		2	2
7/10	26.5	7.6	3.7	21		2	2
7/23	25.6	6.9	5.4	19		2	3
8/6	23.6	9.1	11	21	2.1	2	2
8/20	24.2	9.1	4.3	21		2	3
9/5	22.4	7.0	6.5	21	1.7	2	4
9/19	19.2	8.8	36	50	1.7	3	3
10/1	17.5	7.7	4.2	18		2	1
10/17	11.6	8.8	5.7	22		3	3







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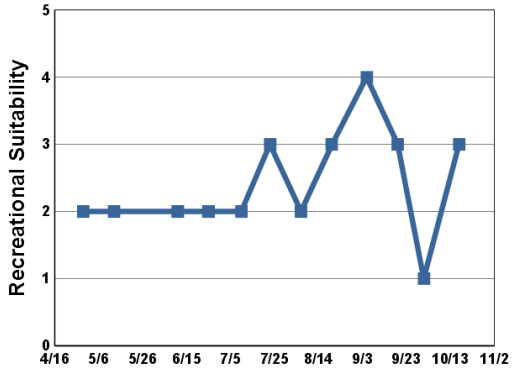


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Bass Lake [East] (82–0124) *Browns Creek Watershed District*

Volunteer: 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	18	50	B
CLA (µg/l)	5.7	2.4	8.9	A
Secchi (m)	2.7	2.1	3.2	B
TKN (mg/l)	0.84	0.69	1.00	
			Lake Grade	B

The lake received a lake grade of B for 2013, which is consistent with previous years' grades. Continued monitoring is suggested to build the database for determining water quality trends. The Secchi disk was obscured by aquatic macrophytes on a few site visits in 2013, but there were sufficient data to calculate a Secchi grade.

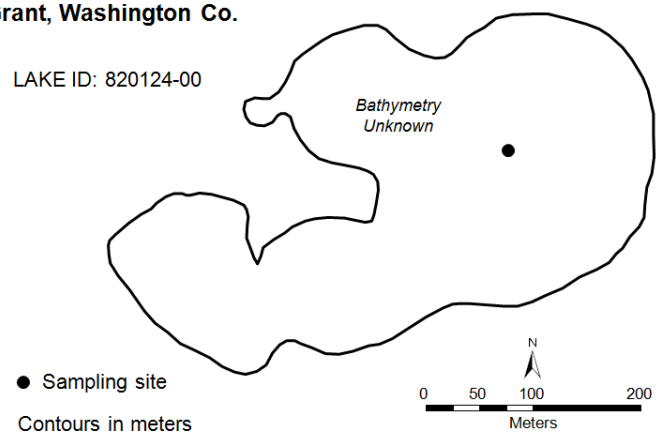
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

Bass Lake East

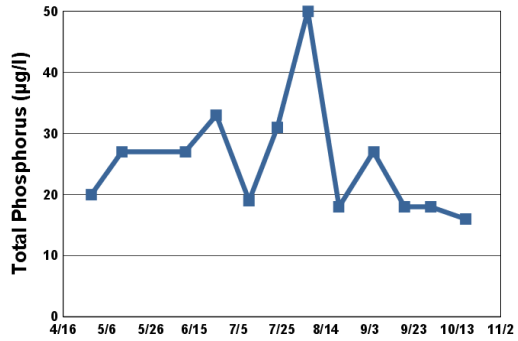
Grant, Washington Co.

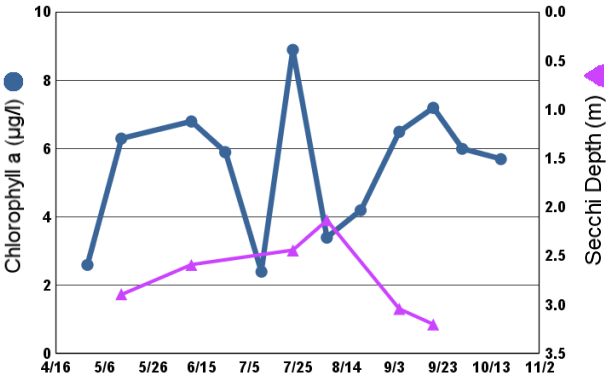
LAKE ID: 820124-00

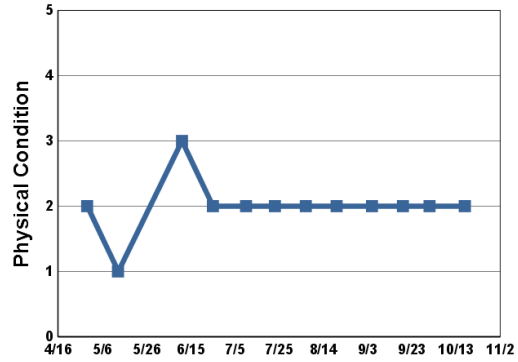


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	9.9	12.9	2.6	20		2	2
5/13	14.8	11.4	6.3	27	2.9	1	1
6/11	19.6	9.8	6.8	27	2.6	3	3
6/25	26.7	8.0	5.9	33		2	2
7/10	27.6	7.3	2.4	19		2	2
7/23	26.5	6.1	8.9	31	2.4	2	1
8/6	24.3	8.1	3.4	50	2.1	2	2
8/20	25.4	8.2	4.2	18		2	3
9/5	23.3	6.7	6.5	27	3.0	2	3
9/19	19.5	8.1	7.2	18	3.2	2	2
10/1	18.0	7.6	6.0	18		2	1
10/17	11.8	8.7	5.7	16		2	2







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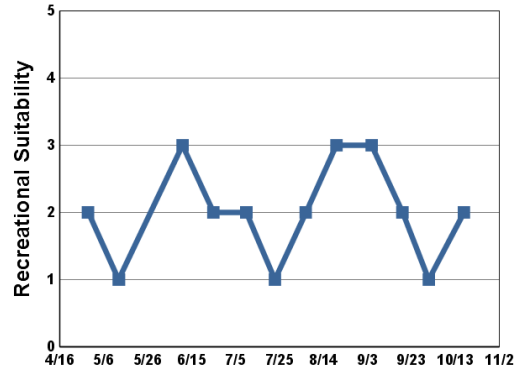
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Bavaria Lake (10–0019) *Carver County Environmental Services*

Volunteer: John Ryski

Lake Bavaria is located in the City of Chaska (Carver County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The 200-acre lake has a mean and maximum depth of 5.6 m (18 ft) and 18.3 m (60 ft), respectively. The lake has a surface area of 200 acres and a watershed area of 711 acres, giving a watershed-to-lake area ratio of 3.6:1, which is relatively low. The larger the ratio the greater the potential stress put on the lake from surface runoff. The DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*). The MPCA has listed the lake as impaired for mercury content in fish.

The lake has been enrolled in the CAMP for 14 years. The lake also has been monitored by Council staff in the past, and it has been involved in the MPCA's volunteer Secchi transparency program. Additionally, the lake was included within the MPCA's Lake Assessment Program (LAP) in 2001.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

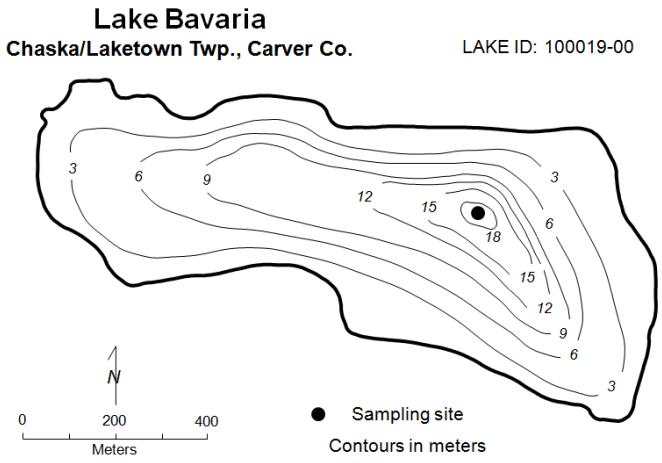
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	44	16	97	C
CLA (µg/l)	16	3.7	42	B
Secchi (m)	1.2	1.0	1.5	D
TKN (mg/l)	1.28	1.10	1.50	
			Lake Grade	C

The lake received a water quality lake grade of C for 2013 which is consistent with its historical water quality database. The historical lake grades for Bavaria Lake show that the lake water quality has fluctuated in the C to A range.

Throughout the monitoring period, the volunteer's opinions of 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.

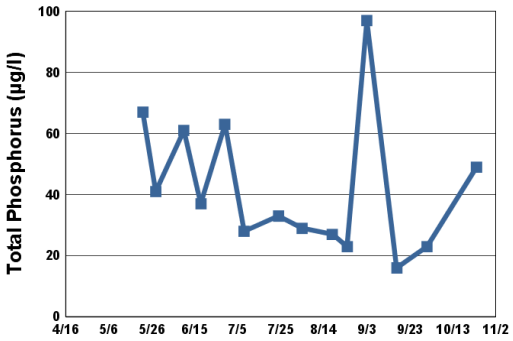
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

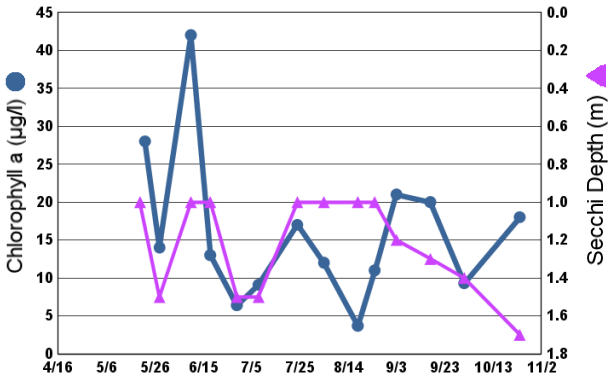
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

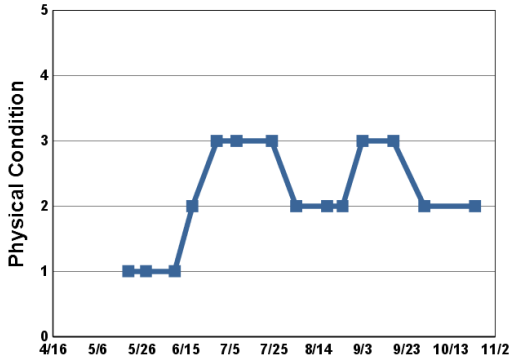


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/20	14.0				1.0	1	3
5/22			28	67			
5/28	12.0		14	41	1.5	1	2
6/10	17.0		42	61	1.0	1	3
6/18	20.0		13	37	1.0	2	3
6/29	22.0		6.4	63	1.5	3	3
7/8	26.0		9.1	28	1.5	3	3
7/24	24.0		17	33	1.0	3	3
8/4	20.0		12	29	1.0	2	3
8/18	23.0		3.7	27	1.0	2	3
8/25	24.0		11	23	1.0	2	3
9/3	24.0	6.8	21	97	1.2	3	3
9/17	20.0	8.2	20	16	1.3	3	3
10/1	17.8	8.4	9.3	23	1.4	2	2
10/24	9.2		18	49	1.7	2	2







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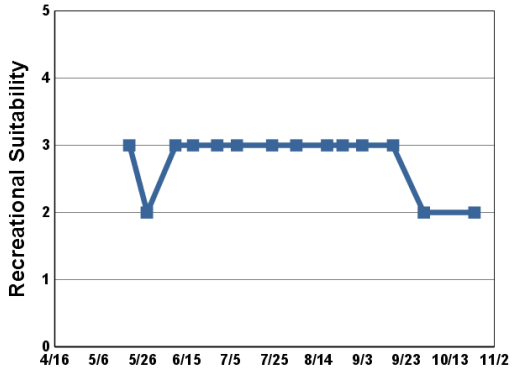

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Bay Pond (82–0011) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Bay Pond Lake is a 10-acre landlocked lake located within Baytown Township (Washington County). The mean and maximum depth of the lake is approximately 1.0 m (roughly 3.3 feet). Because of the shallowness of the lake, its entire area is considered littoral (the shallow [0-15 feet depth] area dominated by aquatic vegetation), and it never maintains a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column, through the summer months.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	201	81	445	F
CLA (µg/l)	46	2.2	150	C
Secchi (m)	1.0	0.5	1.5	D
TKN (mg/l)	2.07	1.00	3.50	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is a change from the typical F's that the lake has received. The CLA grade of C was a notable change in 2013, which typically has been a F. Continued monitoring is recommended to track potential trends in chlorophyll.

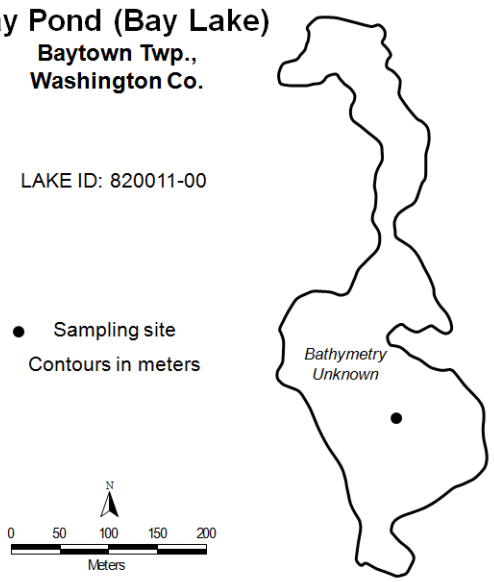
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

Bay Pond (Bay Lake)

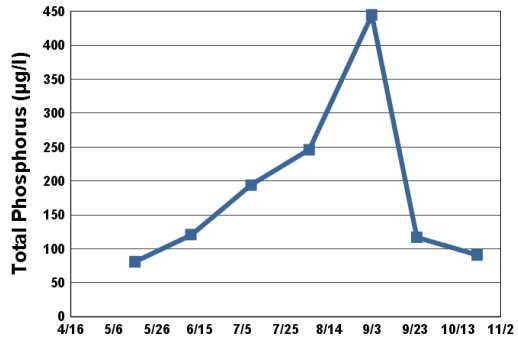
Baytown Twp.,
Washington Co.

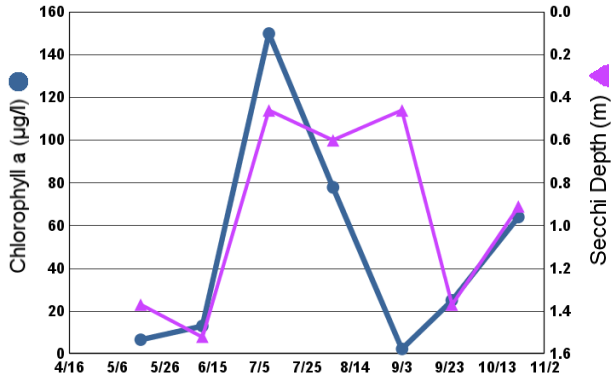
LAKE ID: 820011-00

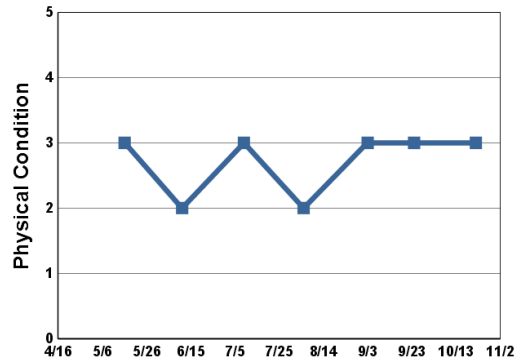


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	19.9	9.3	6.6	81	1.4	3	3
6/11	20.1	6.8	13	121	1.5	2	3
7/9	28.5	9.0	150	194	0.5	3	3
8/5	22.6	8.5	78	246	0.6	2	3
9/3	24.0	9.9	2.2	445	0.5	3	4
9/24	17.9	8.1	25	117	1.4	3	4
10/22	6.7	8.8	64	91	0.9	3	4







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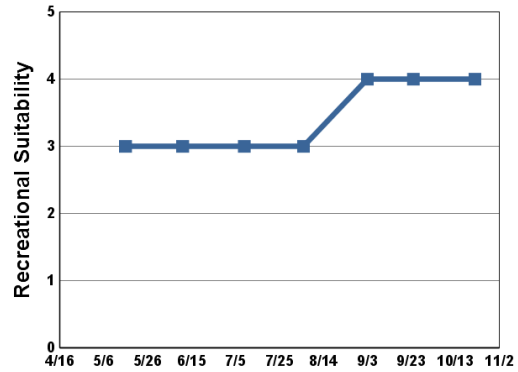


1 = Crystal Clear
2 = Some Algae Present
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom

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

Source: Metropolitan Council and STORET data

Benton Lake (10–0069) *Carver County Environmental Services*

Volunteer: Jacob Steinbauer

Benton Lake is located within Benton Township (Carver County). The maximum depth of the lake is 2.0 m (roughly 6.5 feet). Because of the shallowness of the lake, the entire area is considered littoral zone (area of aquatic plant dominance) and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

The lake has a surface area of 115 acres and a watershed of 322 acres, which gives a watershed-to-lake area ratio of 2.8:1. The larger the ratio the greater the potential stress put on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

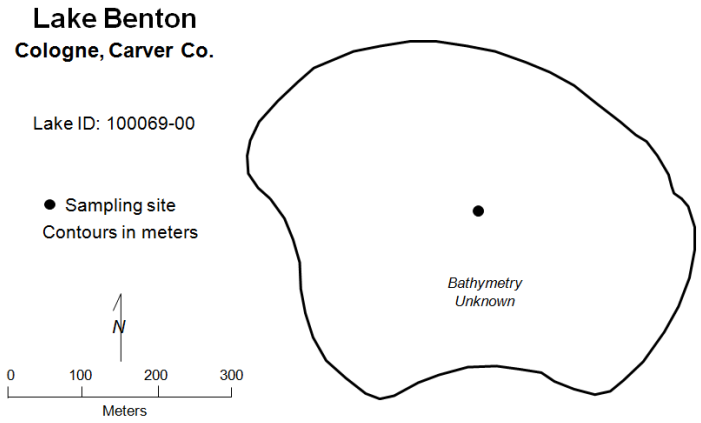
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	283	137	483	F
CLA (µg/l)	58	5.9	150	D
Secchi (m)	0.2	0.1	0.3	F
TKN (mg/l)	4.65	2.70	7.80	
			Lake Grade	F

The lake received a lake grade of F for 2013, which is consistent with its historical database.

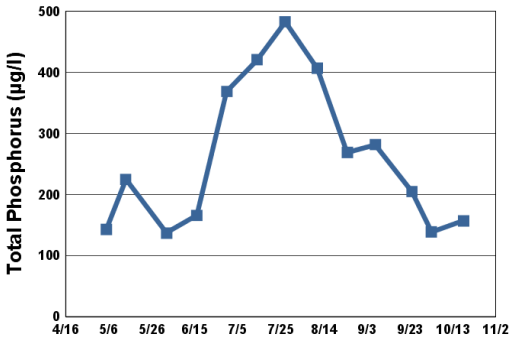
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

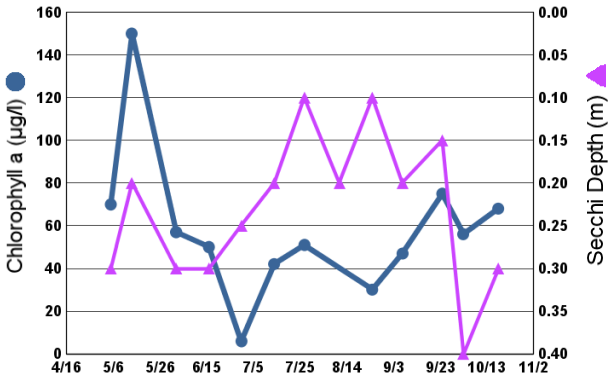
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

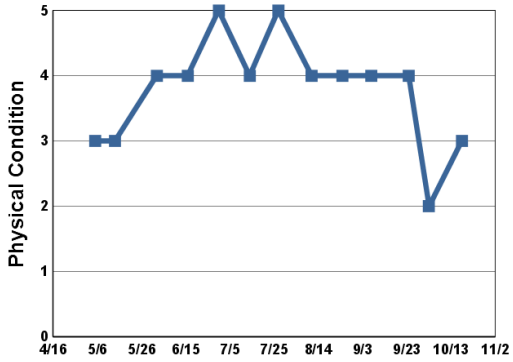


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	8.0		70	143	0.3	3	4
5/14	10.0		150	225	0.2	3	4
6/2	12.0		57	137	0.3	4	4
6/16	19.0		50	166	0.3	4	4
6/30	20.0		5.9	369	0.3	5	4
7/14	22.0		42	421	0.2	4	4
7/27	23.0		51	483	0.1	5	5
8/11	20.0			407	0.2	4	4
8/25	24.0		30	269	0.1	4	4
9/7	23.0		47	282	0.2	4	4
9/24	25.0		75	205	0.2	4	5
10/3	19.0		56	139	0.4	2	4
10/18	9.0		68	157	0.3	3	4







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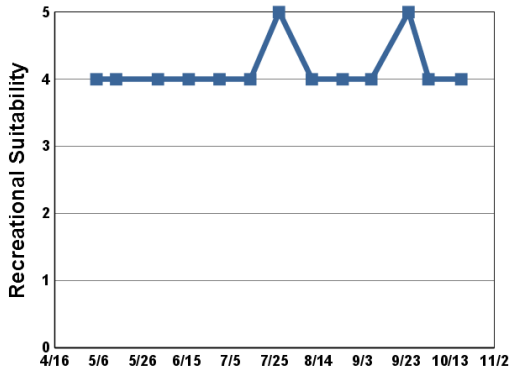

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Benz Lake (82–0120) *Browns Creek Watershed District*

Volunteer: 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 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	64	28	117	C
CLA (µg/l)	13	3.2	37	B
Secchi (m)				
TKN (mg/l)	1.22	0.98	1.50	
			Lake Grade	

There were too few Secchi depth readings available to calculate a Secchi grade in 2013. For a majority of the site visits, the Secchi disk was obscured by aquatic macrophytes. The lake grades have varied from Cs to Fs over the past 8 years. The relatively lower TP and CLA concentrations in 2013 as compared to 5 to 8 years before, seems to suggest an improving water quality trend. Additional years of monitoring are recommended to determine long term water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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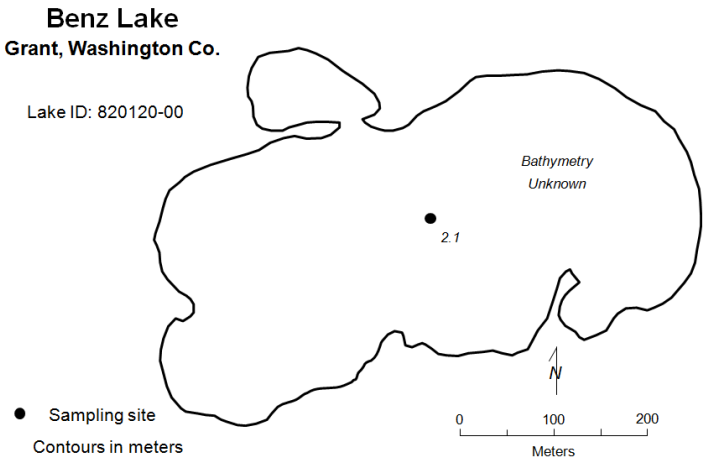
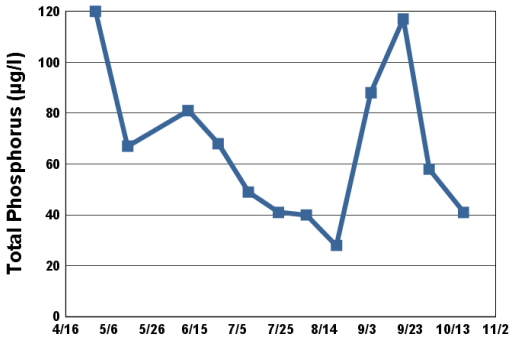
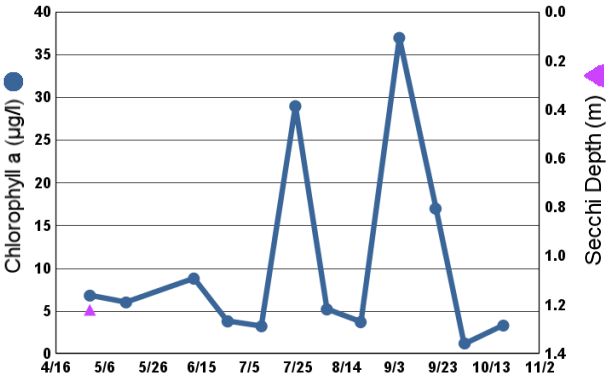
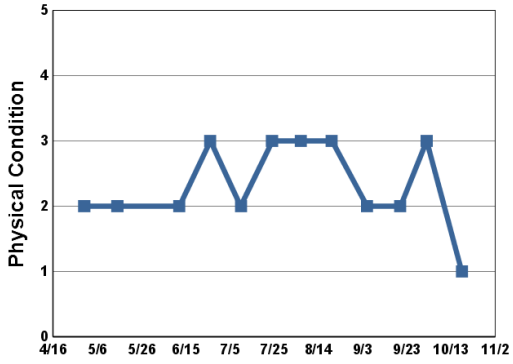


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	11.2	13.3	6.8	120	1.2	2	2
5/15	16.2	9.8	6.0	67		2	4
6/12	19.7	9.9	8.8	81		2	4
6/26	27.1	10.7	3.8	68		3	4
7/10	27.4	8.0	3.2	49		2	4
7/24	24.7	8.1	29	41		3	4
8/6	23.3	10.7	5.2	40		3	4
8/20	25.2	9.0	3.7	28		3	4
9/5	25.0	8.6	37	88		2	4
9/20	18.5	8.3	17	117		2	3
10/2	17.1	7.6	1.2	58		3	4
10/18	11.3	9.0	3.3	41		1	1







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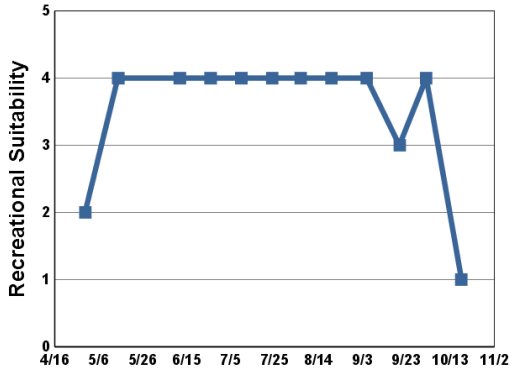

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Lake Water Quality Grades Based on Summertime Averages

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							F					
Lake Grade												

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

Source: Metropolitan Council and STORET data

Big Carnelian Lake (82–0049) *Carnelian — Marine Watershed District*

Volunteer: Washington Conservation District staff

Big Carnelian Lake is located in May Township (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity. . Roughly 28 percent of the lake's area is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	12	6	19	A
CLA (µg/l)	3.2	1.6	5.4	A
Secchi (m)	5.6	2.9	7.6	A
TKN (mg/l)	0.69	0.53	0.96	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with the historical database.

Throughout the monitoring period, the volunteer's opinions of 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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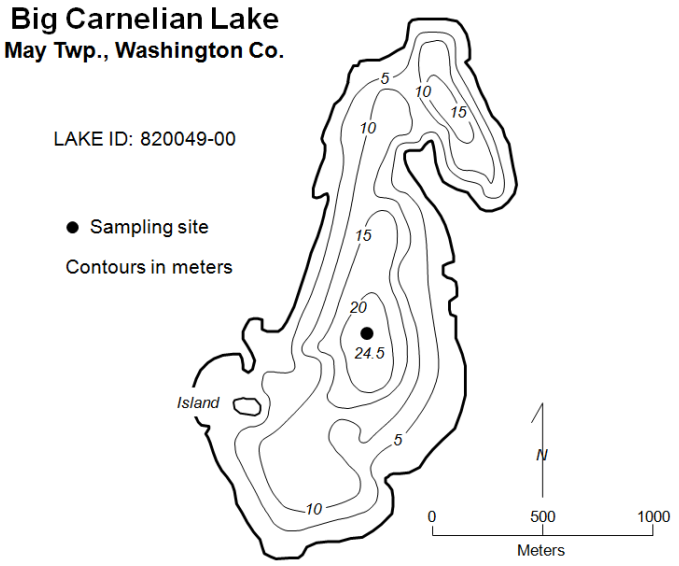
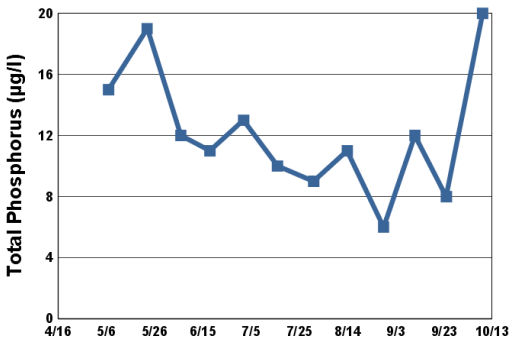
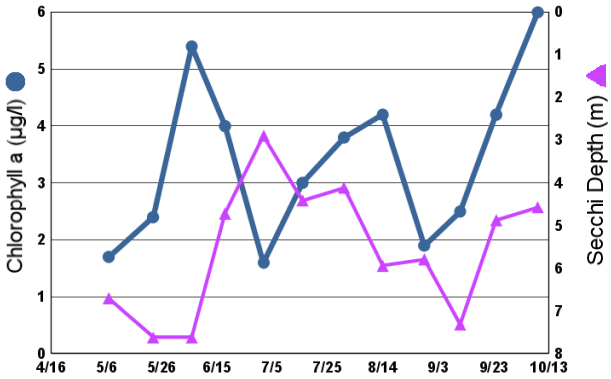
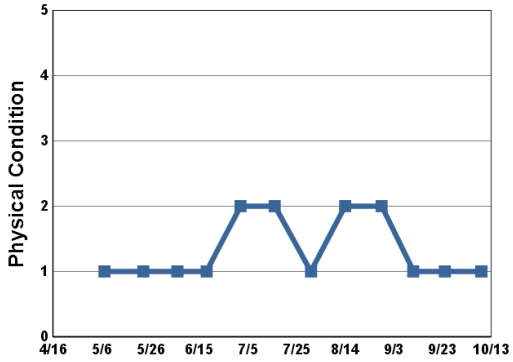


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	10.9	9.5	1.7	15	6.7	1	1
5/23	13.5	10.4	2.4	19	7.6	1	1
6/6	15.7	9.6	5.4	12	7.6	1	1
6/18	21.0	10.6	4.0	11	4.7	1	1
7/2	24.1	9.2	1.6	13	2.9	2	2
7/16	26.2	8.1	3.0	10	4.4	2	2
7/31	22.6	7.6	3.8	9	4.1	1	1
8/14	23.4	8.7	4.2	11	5.9	2	1
8/29	26.8	8.0	1.9	6	5.8	2	1
9/11	23.8	7.6	2.5	12	7.3	1	1
9/24	19.0	8.0	4.2	8	4.9	1	1
10/9	16.4	8.9	6.0	20	4.6	1	1







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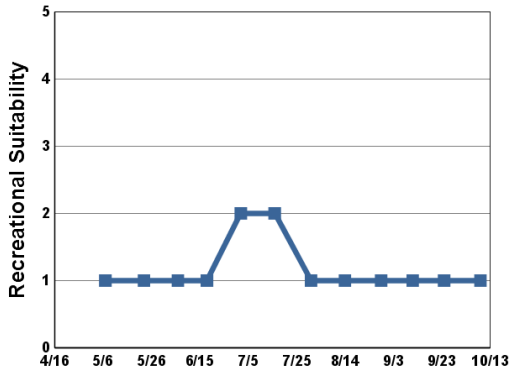

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: Wally Ostlie, Washington Conservation District staff

Big Comfort Lake is located northeast of the City of Forest Lake in Chisago County. The lake has a maximum depth of 14.3 m (47 feet). A lake assessment was performed on the lake by the MPCA in 1994, and a lake and watershed diagnostic/feasibility study was completed by BlueWater Science in the early-2000's.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	17	58	B
CLA (µg/l)	12	3.9	21	B
Secchi (m)	1.7	1.1	2.7	C
TKN (mg/l)	1.15	0.67	1.90	
			Lake Grade	B

The lake received a lake grade of B this year, which is consistent with its historical database over the past 8 years.. The lake typically receives a Secchi grade of C. Additional monitoring is recommended to determine the direction of potential trends in the water quality of the lake.

Throughout the monitoring period, the volunteer's opinions of 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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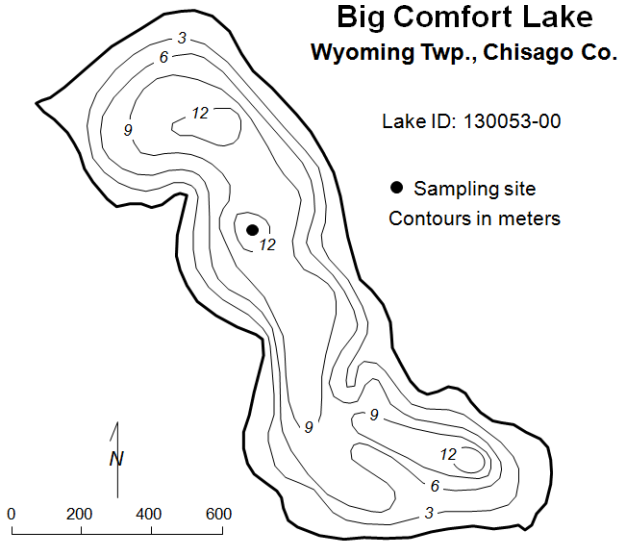
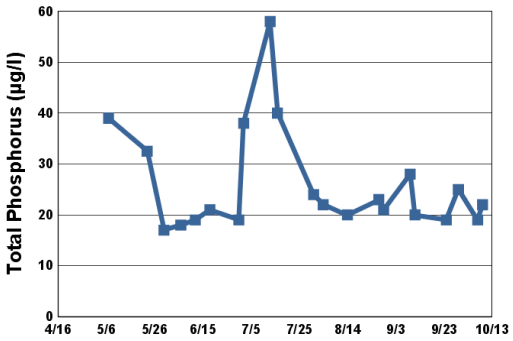
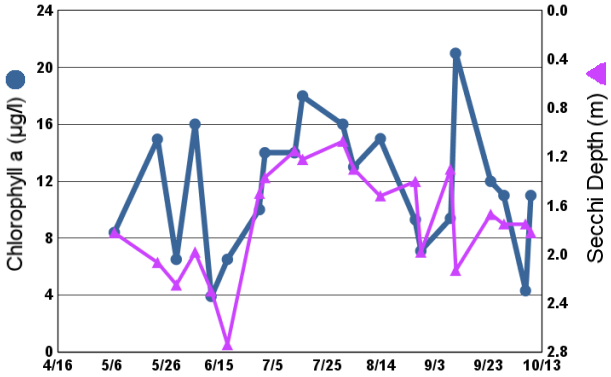
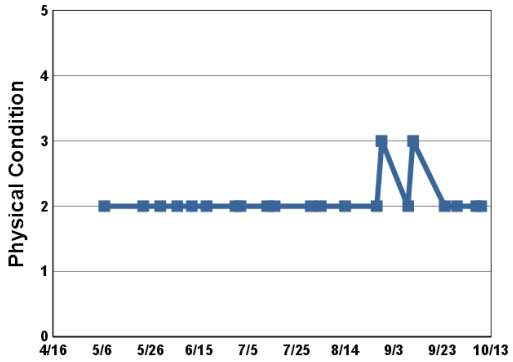


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	12.9	10.7	8.4	39	1.8	2	2
5/23	15.0	11.6	15	33	2.1	2	2
5/30	16.2		6.5	17	2.3	2	2
6/6	16.3	9.2	16	18	2.0	2	2
6/12	19.7		3.9	19	2.3	2	2
6/18	22.1	8.9	6.5	21	2.7	2	2
6/30	25.0		10	19	1.5	2	2
7/2	25.6	9.7	14	38	1.4	2	2
7/13	25.2		14	58	1.2	2	2
7/16	27.5	7.8	18	40	1.2	2	3
7/31	22.4	7.2	16	24	1.1	2	2
8/4	24.6		13	22	1.3	2	1
8/14	23.9	7.7	15	20	1.5	2	2
8/27	29.8		9.3	23	1.4	2	2
8/29	27.7	7.3	7.1	21	2.0	3	2
9/9	24.1		9.4	28	1.3	2	2
9/11	24.0	7.4	21	20	2.1	3	3
9/24	18.4	7.5	12	19	1.7	2	3
9/29	18.3		11	25	1.8	2	2
10/7	16.4		4.3	19	1.8	2	2
10/9	15.9	7.9	11	22	1.8	2	2







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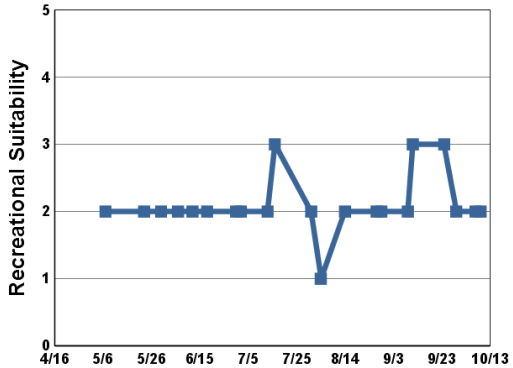


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Big Marine Lake (82–0052) *Carnelian Marine Watershed District*

Volunteer: Washington Conservation District staff

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

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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

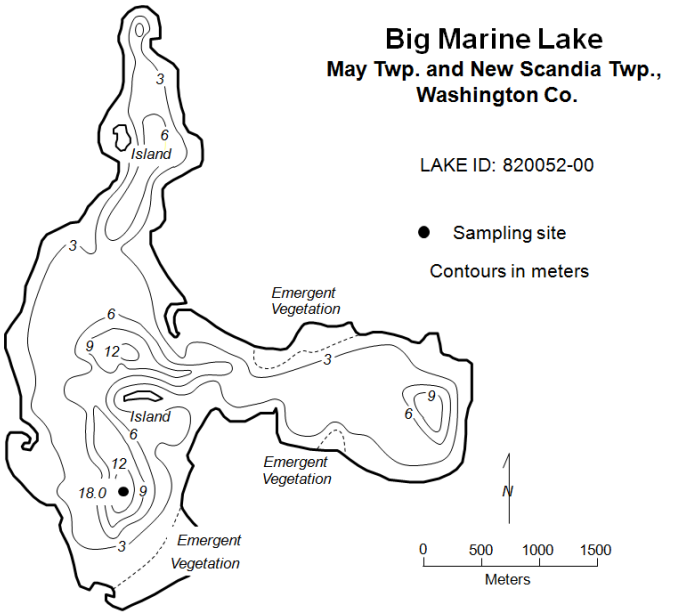
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	21	13	62	A
CLA (µg/l)	5.4	3.0	9.4	A
Secchi (m)	3.6	2.3	4.7	A
TKN (mg/l)	0.77	0.54	1.30	
			Lake Grade	A

The lake received a letter grade of A for water clarity which is consistent with the historical data. A trend analysis conducted by the MPCA on the lake's Secchi transparency data revealed a statistically significant improving trend in water clarity (MPCA 2008).

Throughout the monitoring period, the volunteer's opinions of 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.

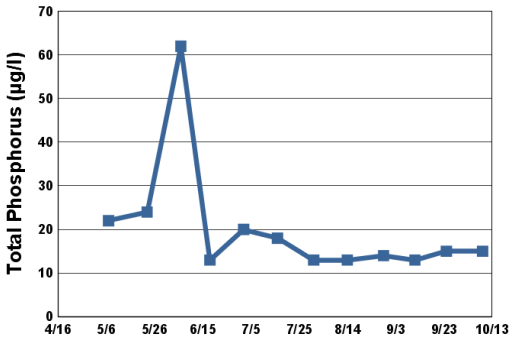
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

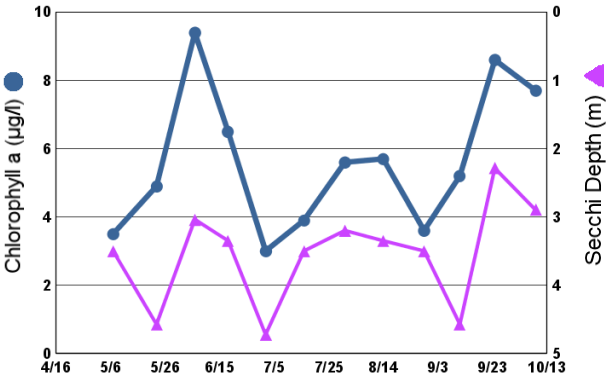
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

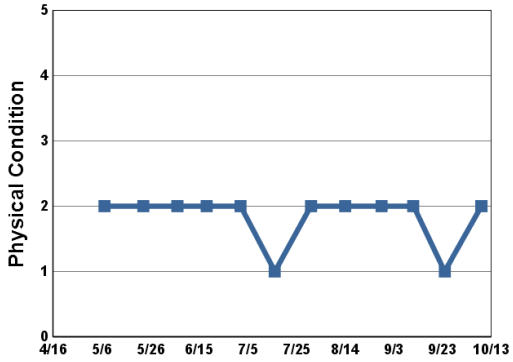


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	10.2		3.5	22	3.5	2	2
5/23	15.0		4.9	24	4.6	2	2
6/6	16.2	8.6	9.4	62	3.0	2	2
6/18	21.7	9.8	6.5	13	3.4	2	1
7/2	25.4	8.3	3.0	20	4.7	2	1
7/16	26.5	7.7	3.9	18	3.5	1	1
7/31	22.2	7.4	5.6	13	3.2	2	2
8/14	24.6	8.6	5.7	13	3.4	2	1
8/29	27.2	8.3	3.6	14	3.5	2	2
9/11	23.5	7.7	5.2	13	4.6	2	1
9/24	18.6	7.8	8.6	15	2.3	1	1
10/9	15.9	8.8	7.7	15	2.9	2	2







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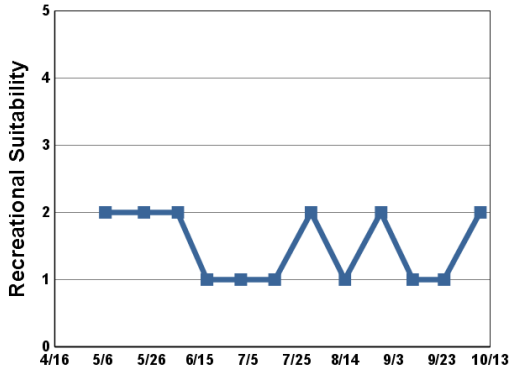


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: Jon and Teresa Hafner, Washington Conservation District staff

Bone Lake is located in the City of Scandia (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a maximum and mean depth of 9.8 m and 3.7 m (32 ft and 12 ft), respectively. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	35	21	53	C
CLA (µg/l)	18	1.2	33	B
Secchi (m)	1.2	0.9	1.5	C
TKN (mg/l)	1.30	0.89	1.80	
			Lake Grade	C

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

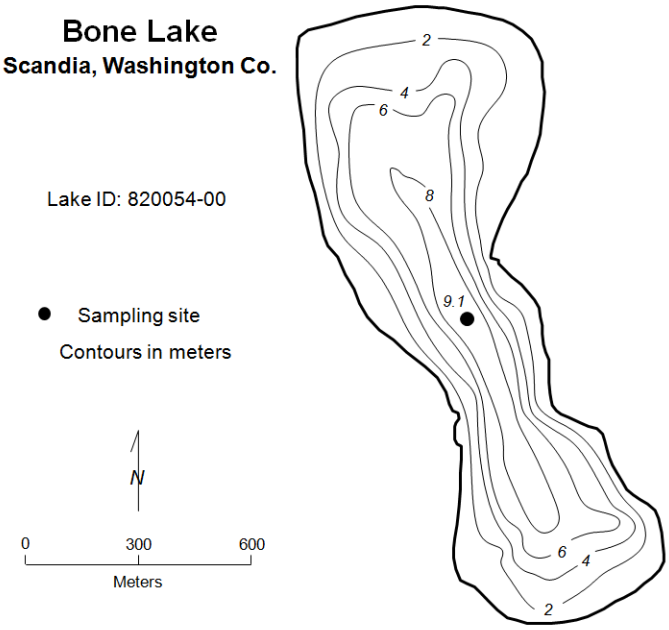
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

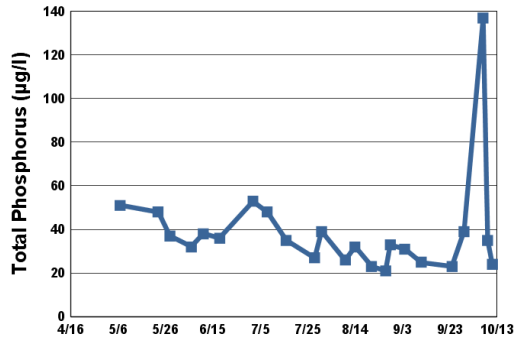
Bone Lake
Scandia, Washington Co.

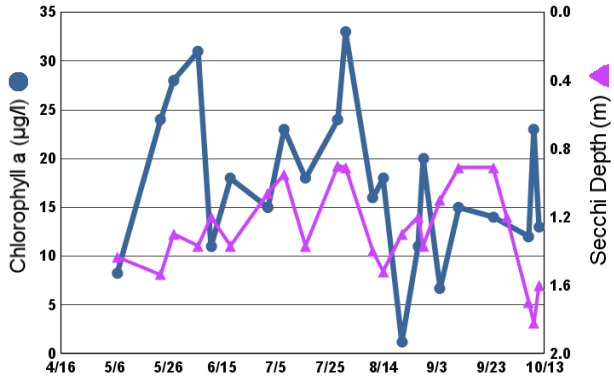
Lake ID: 820054-00

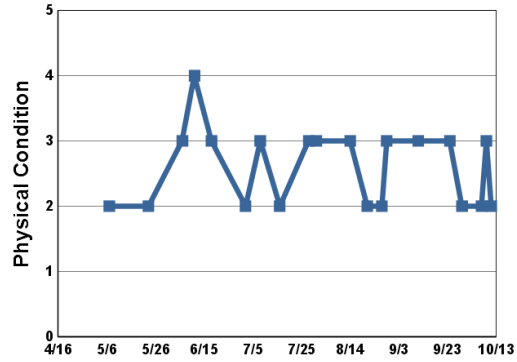


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	12.3	11.6	8.3	51	1.4	2	2
5/23	15.3	11.1	24	48	1.5	2	2
5/28	15.4		28	37	1.3		
6/6	16.5	9.5	31	32	1.4	3	2
6/11	22.6		11	38	1.2	4	3
6/18	22.9	9.9	18	36	1.4	3	3
7/2	25.9	11.1	15	53	1.1	2	3
7/8	27.2		23	48	1.0	3	3
7/16	28.2	7.9	18	35	1.4	2	3
7/28	22.7		24	27	0.9	3	3
7/31	22.4	7.6	33	39	0.9	3	3
8/10	23.8		16	26	1.4		
8/14	24.6	7.3	18	32	1.5	3	3
8/21	27.6		1.2	23	1.3	2	2
8/27	29.2		11	21	1.2	2	2
8/29	27.7	8.0	20	33	1.4	3	3
9/4	25.3		6.7	31	1.1		
9/11	23.8	8.3	15	25	0.9	3	3
9/24	18.7	5.5	14	23	0.9	3	3
9/29	18.8			39	1.2	2	2
10/7	17.2		12	137	1.7	2	2
10/9	15.9	8.9	23	35	1.8	3	3
10/11	16.5		13	24	1.6	2	2







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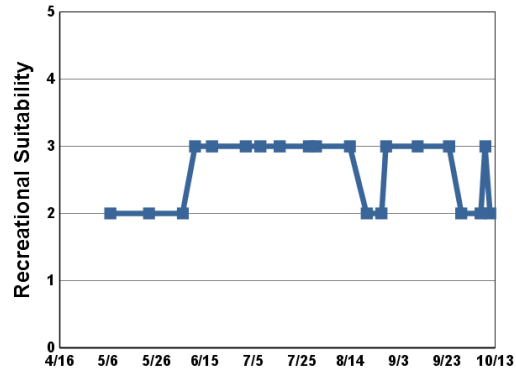
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Brick Pond (82–0308) *Middle St. Croix Watershed Management Organization*

Volunteer: Washington Conservation District staff

Brick Pond is located in the City of Stillwater (Washington County). The maximum depth of the lake is 1.5 m (5.0 ft). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	70	56	100	D
CLA (µg/l)	7.9	1.9	19	A
Secchi (m)				
TKN (mg/l)	1.17	0.86	1.40	
			Lake Grade	

The lake did not receive a lake grade in 2013 because there was no Secchi grade. During most of the monitoring visits in 2013 the Secchi disk was visible on the lake bottom. The mean TP concentration was relatively high in comparison to the CLA mean concentration. However, field notes indicated substantial aquatic macrophyte growth, indicating that primary production for this lake was focused on macrophytes rather than pelagic algal populations. Additional years of data collection are needed to determine water quality trends.

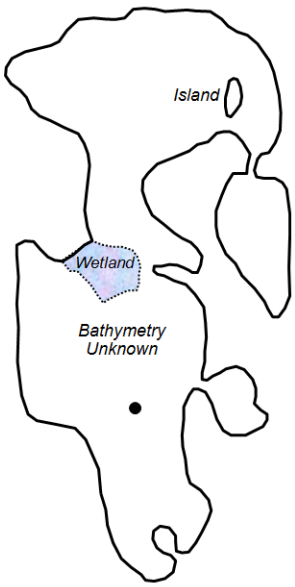
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

Brick Pond

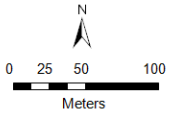
Stillwater, Washington Co.

Lake ID: 820308-00



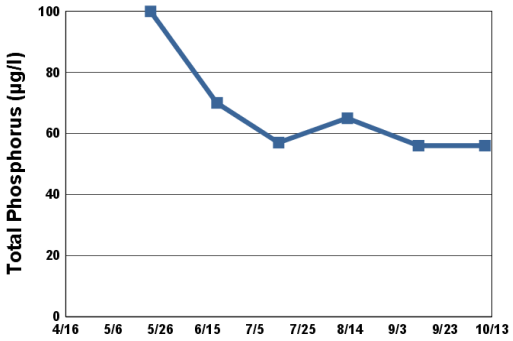
● Sampling site

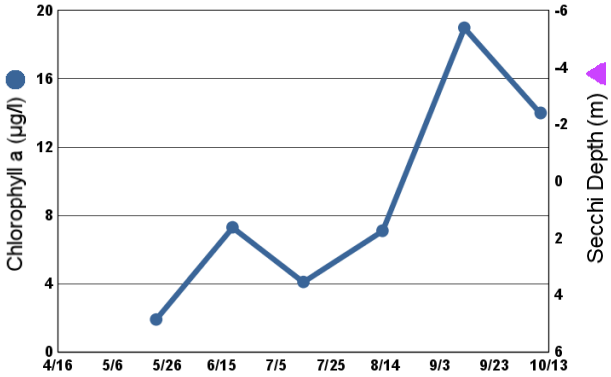
Contours in meters

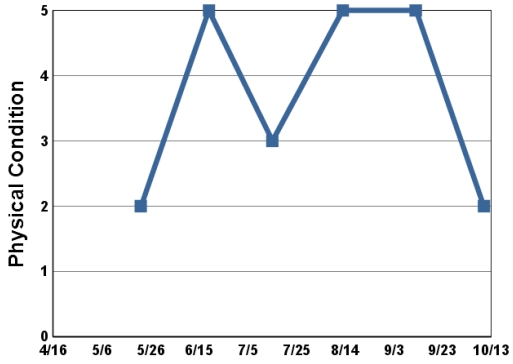


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/22	16.5	4.3	1.9	100		2	4
6/19	22.1	10.4	7.3	70		5	4
7/15	26.4	8.7	4.1	57		3	4
8/13	26.6	15.8	7.1	65		5	4
9/12	20.6	4.2	19	56		5	5
10/10	17.6	8.2	14	56		2	4







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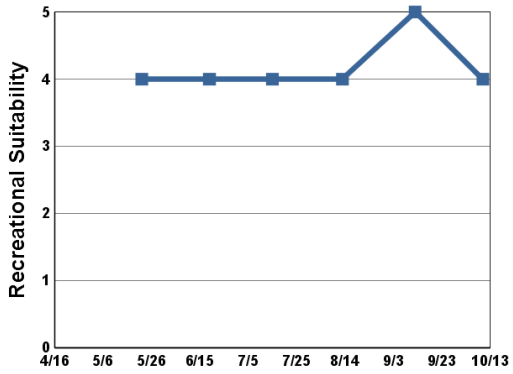

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Brickyard Clayhole Lake (10–0225) *Carver County Environmental Services*

Volunteer: Carver County staff

Brickyard Lake is a 17-acre lake located in the City of Chaska (Carver County). The maximum depth of the lake is 13.1 m (43 feet).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	17	12	27	A
CLA (µg/l)	15	1.0	49	B
Secchi (m)	4.0	1.5	5.7	A
TKN (mg/l)	0.48	0.30	0.72	
			Lake Grade	A

The lake received a lake grade of A for 2013. The lake's water quality is well represented by a lake gradeof A according to its historical water quality database. Continued monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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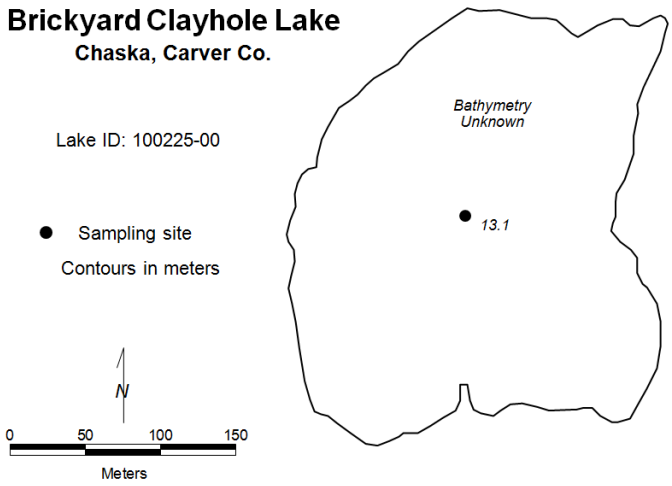
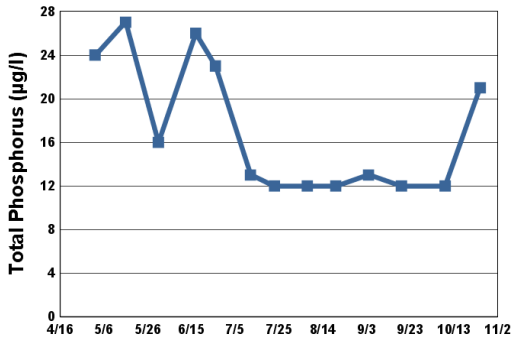
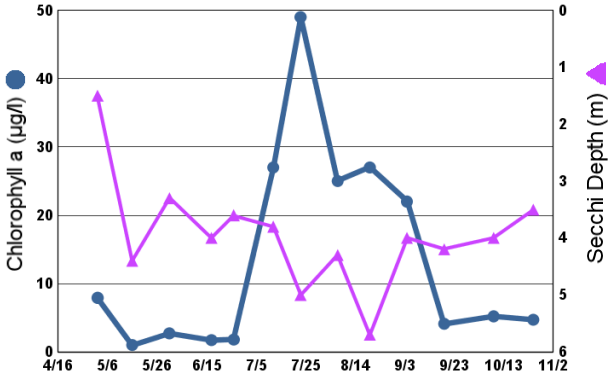
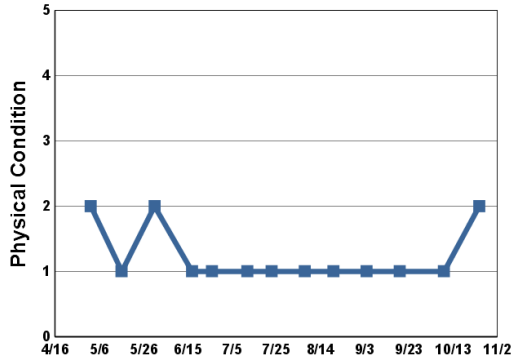


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	11.9	19.7	7.9	24	1.5	2	2
5/16	16.7	12.8	1.0	27	4.4	1	1
5/31	18.8	13.5	2.7	16	3.3	2	2
6/17	22.4	11.3	1.7	26	4.0	1	1
6/26	27.9	12.8	1.8	23	3.6	1	1
7/12	27.0	9.9	27	13	3.8	1	1
7/23	27.0	6.4	49	12	5.0	1	1
8/7	23.4	9.4	25	12	4.3	1	1
8/20	25.1	9.6	27	12	5.7	1	1
9/4	25.3	7.4	22	13	4.0	1	1
9/19	21.2	10.7	4.1	12	4.2	1	1
10/9	16.7	8.7	5.2	12	4.0	1	1
10/25	10.6		4.7	21	3.5	2	2







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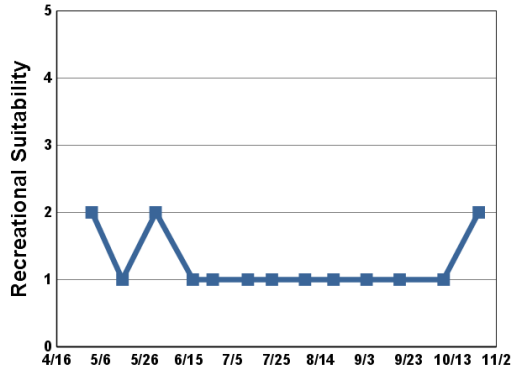
4 = High Algal Color
5 = Severe Algal Bloom



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											A	A
CLA											A	A
Secchi											A	A
Lake Grade											**A**	**A**

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

Source: Metropolitan Council and STORET data

Burandt Lake (10–0084) *Carver County Environmental Services*

Volunteer: Carver County staff

Burandt Lake is a 96-acre lake located in the City of Waconia (Carver County). The maximum depth of the lake is 7.3 m (24 feet). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

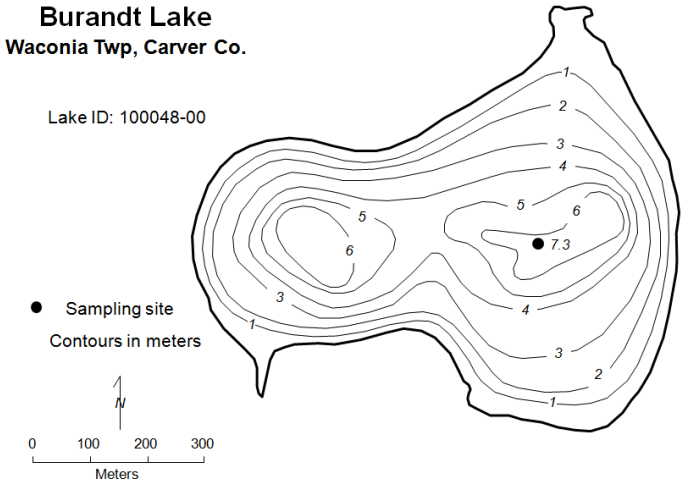
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	22	56	B
CLA (µg/l)	23	5.2	85	C
Secchi (m)	1.7	0.7	2.3	C
TKN (mg/l)	1.01	0.77	1.30	
			Lake Grade	C

The lake received a lake grade of C in 2013, which is similar to previous year's grades. Continued monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

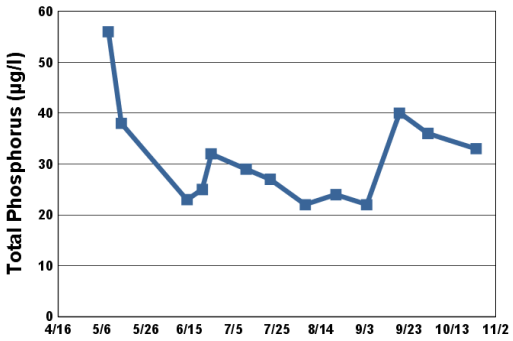
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

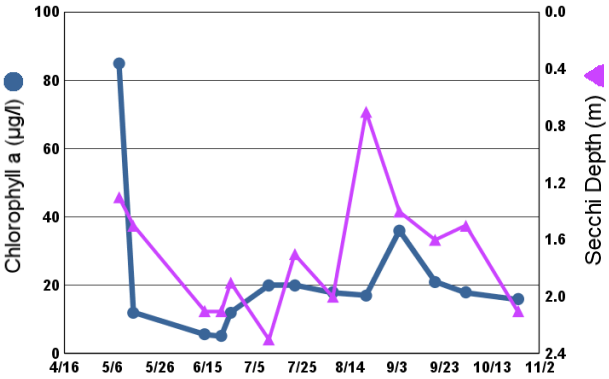
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

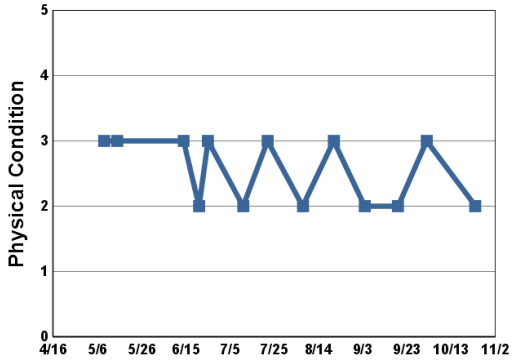


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/9	14.9	14.1	85	56	1.3	3	3
5/15	14.1	14.0	12	38	1.5	3	3
6/14			5.7	23	2.1	3	3
6/21	23.8	13.8	5.2	25	2.1	2	2
6/25	25.6	10.8	12	32	1.9	3	3
7/11	26.9	9.5	20	29	2.3	2	2
7/22	26.7	6.1	20	27	1.7	3	2
8/7	22.9	7.6	18	22	2.0	2	2
8/21	25.5	8.3	17	24	0.7	3	2
9/4	25.1	7.1	36	22	1.4	2	2
9/19	20.1	10.7	21	40	1.6	2	2
10/2	17.6	9.2	18	36	1.5	3	3
10/24	8.0		16	33	2.1	2	2







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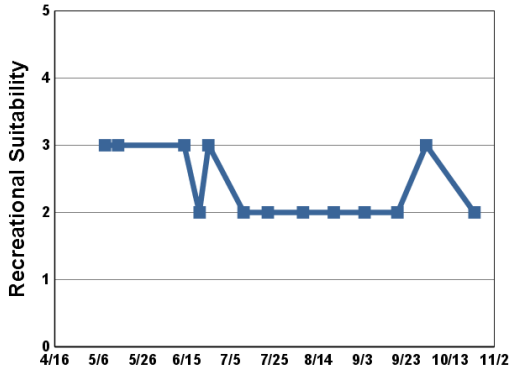
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

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). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity (METC2007). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	11	3	36	A
CLA (µg/l)	2.0	1.1	4.1	A
Secchi (m)	3.4	2.6	4.0	A
TKN (mg/l)	0.60	0.48	0.69	
			Lake Grade	A

For 2013, the lake received a lake grade of A. The lake grades appear to fluctuate between A and B on the basis of the historical database.

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

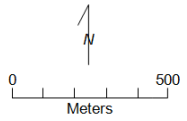
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

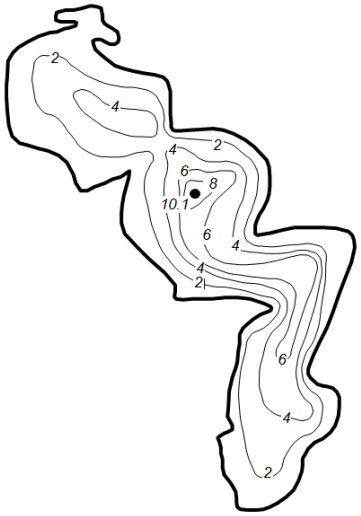
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Bush Lake
Bloomington, Hennepin Co.

Lake ID: 270047-00

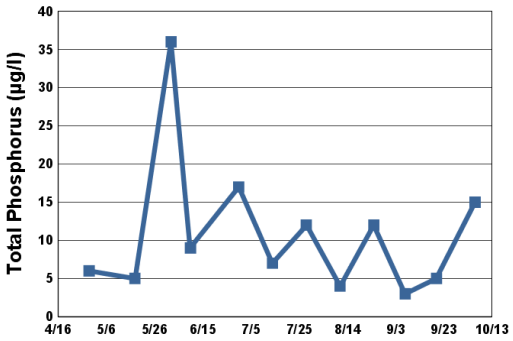
● Sampling site
Contours in meters

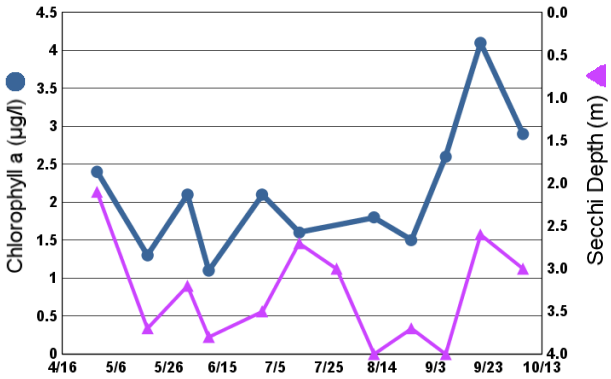


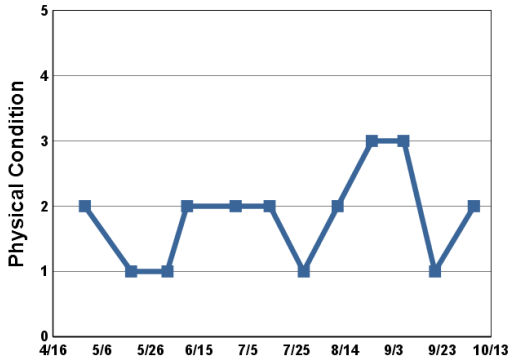


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	13.0		2.4	6	2.1	2	1
5/18	18.2		1.3	5	3.7	1	1
6/2	19.8		2.1	36	3.2	1	1
6/10	21.6		1.1	9	3.8	2	1
6/30	26.0		2.1	17	3.5	2	1
7/14	26.9		1.6	7	2.7	2	1
7/28	24.6			12	3.0	1	1
8/11	25.8		1.8	4	4.0	2	1
8/25	28.2		1.5	12	3.7	3	2
9/7	26.5		2.6	3	4.0	3	2
9/20	20.8		4.1	5	2.6	1	1
10/6	17.8		2.9	15	3.0	2	2







1 = Crystal Clear
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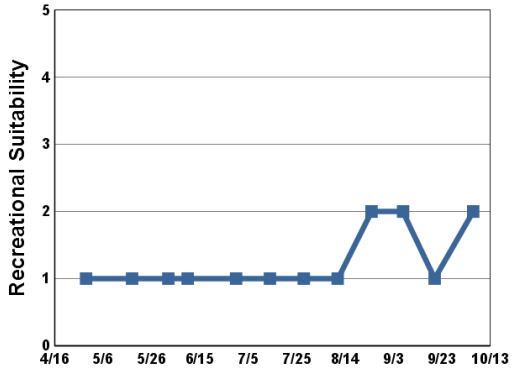


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: 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 lake is considered littoral zone, which is the shallow depth zone (0 — 15 feet) that is typically dominated by aquatic plants. The lake does not maintain a thermocline, which is a density gradient caused by a gradient in water temperature throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	15	53	B
CLA (µg/l)	6.4	2.0	20	A
Secchi (m)	1.0	0.8	1.2	
TKN (mg/l)	0.81	0.73	0.91	
			Lake Grade	

There were insufficient data to calculate grades in 2013. Secchi depths were not obtainable on most occasions because of interference with aquatic vegetation . Water quality has fluctuated over the past 20 years, with what seems as better quality than compared to the late 1990s. This shallow lake has relatively good water quality with respect to TP (a B grade). With moderate to substantial aquatic macrophyte population and low pelagic algal populations (as given by low CLA concentrations), this lake appears to be a relatively healthy shallow lake. Continued monitoring is recommended to keep an eye on water quality trends.

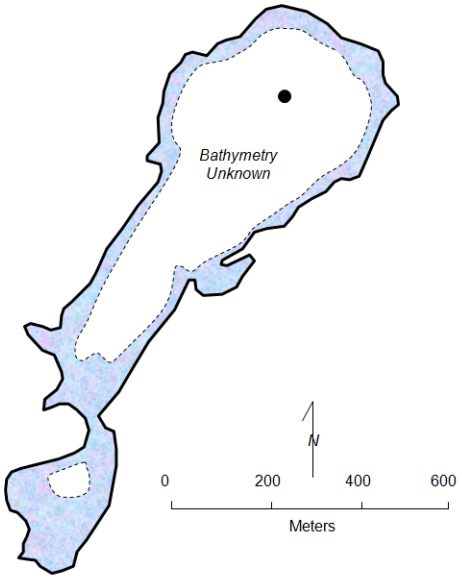
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

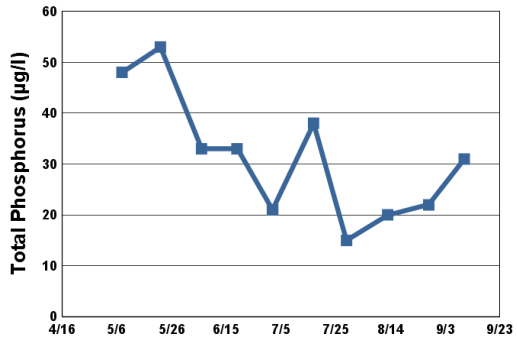
LAKE ID: 820017
WD: Carnelian-Marine

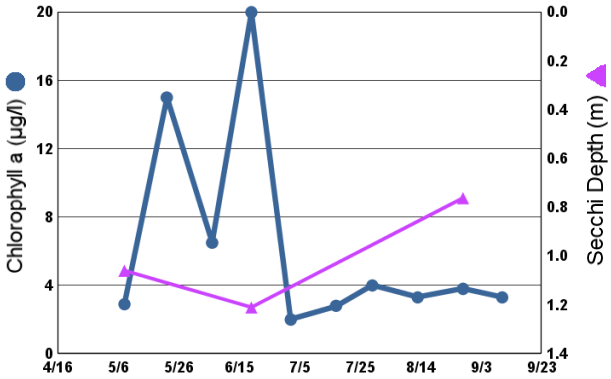
● Sampling site
Contours in meters

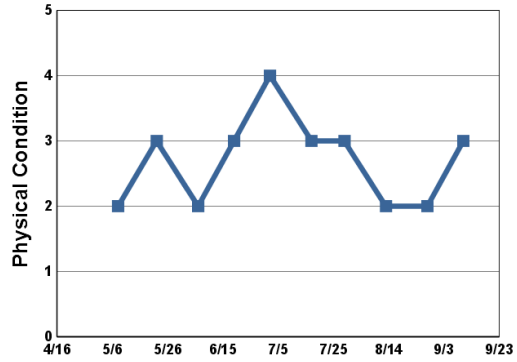


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	17.3	9.5	2.9	48	1.1	2	4
5/22	17.9	4.2	15	53		3	4
6/6	16.9	5.0	6.5	33		2	5
6/19	22.6	9.7	20	33	1.2	3	4
7/2	28.9	9.9	2.0	21		4	4
7/17	28.8		2.8	38		3	4
7/29	22.1	10.7	4.0	15		3	4
8/13	23.6	6.8	3.3	20		2	4
8/28	28.1	5.3	3.8	22	0.8	2	4
9/10	24.5	8.4	3.3	31		3	5







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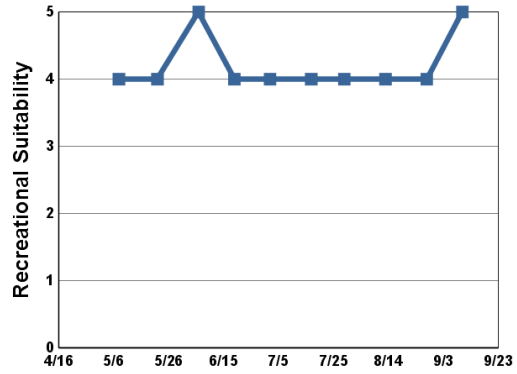

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Lake Water Quality Grades Based on Summertime Averages

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					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
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**						

Source: Metropolitan Council and STORET data

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

Volunteer: Tom and Peggy Sletta

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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	20	14	29	A
CLA (µg/l)	3.6	1.9	6.6	A
Secchi (m)	2.2	1.5	2.5	C
TKN (mg/l)	0.72	0.50	0.89	
			Lake Grade	B

The lake received a lake grade of B in 2013, which is consistent with its historical database.

Throughout the monitoring period, the volunteer's opinions of 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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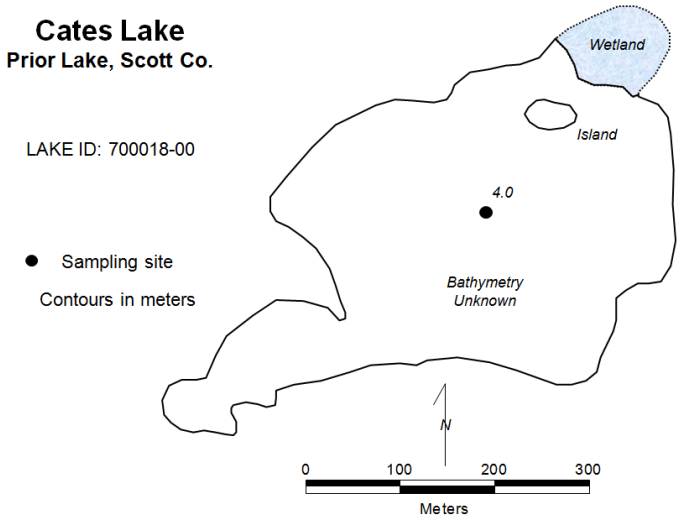
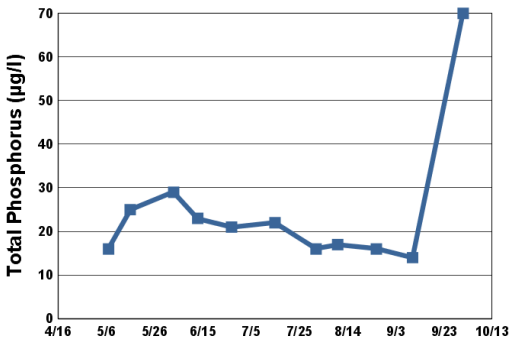
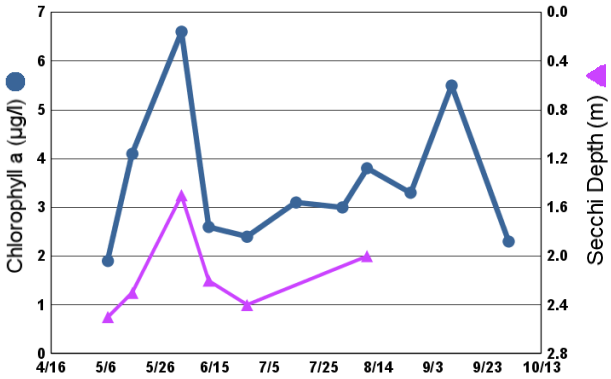
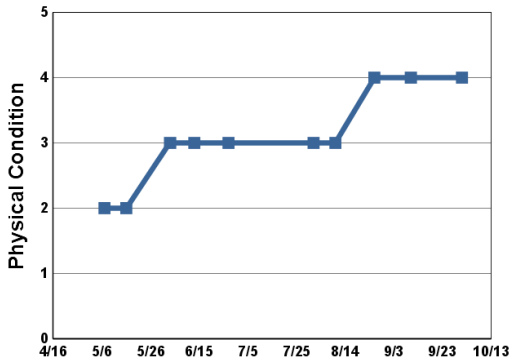


2012013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	15.4		1.9	16	2.5	2	4
5/16	18.0		4.1	25	2.3	2	4
6/3	20.1		6.6	29	1.5	3	4
6/13	19.8		2.6	23	2.2	3	4
6/27	26.7		2.4	21	2.4	3	4
7/15	25.9		3.1	22			
8/1	21.7		3.0	16		3	4
8/10	22.4		3.8	17	2.0	3	4
8/26	25.9		3.3	16		4	4
9/10	24.1		5.5	14		4	4
10/1	17.1		2.3	70		4	4







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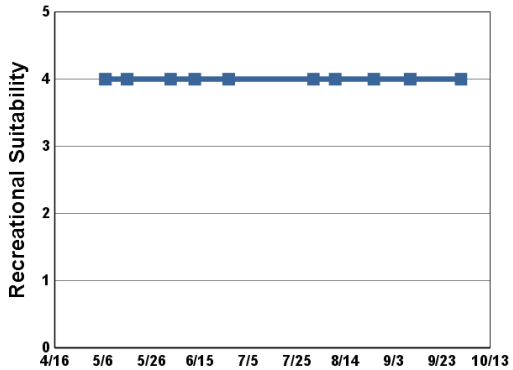
4 = High Algal Color
5 = Severe Algal Bloom



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												
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
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**

Source: Metropolitan Council and STORET data

Cedar Lake (70–0091), site 1 *Scott County Watershed Management Organization*

Volunteer: Lowell Mohn

Cedar Lake is located in Cedar Lake Township (Scott County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a maximum depth of 4.7 m (15 ft) and a mean depth of 2.1 m (6.9 feet). 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 lake has a surface area of 742 acres and watershed area of 11,104 acres, giving a watershed to lake area ratio of 15:1. The larger the ratio the greater the potential effects of runoff on the water quality of the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	210	69	375	F
CLA (µg/l)	24	4.0	61	C
Secchi (m)	1.2	0.5	3.1	C
TKN (mg/l)	2.02	1.10	3.10	
			Lake Grade	D

The lake received a lake grade of D for 2013. The lake's water quality seems to be best represented by a lake grade of D according to the historical database.

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

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

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

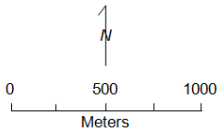
Cedar Lake

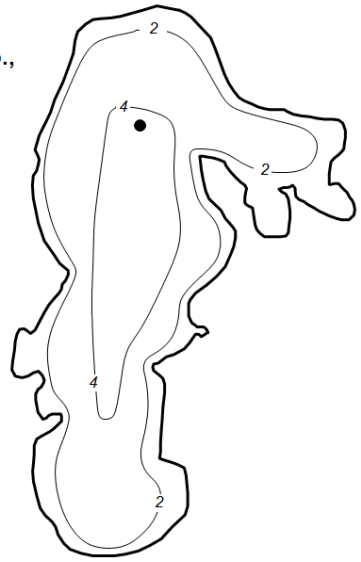
Cedar Lake Twp./Helena Twp., Scott Co.

LAKE ID: 700091-00

● Sampling site

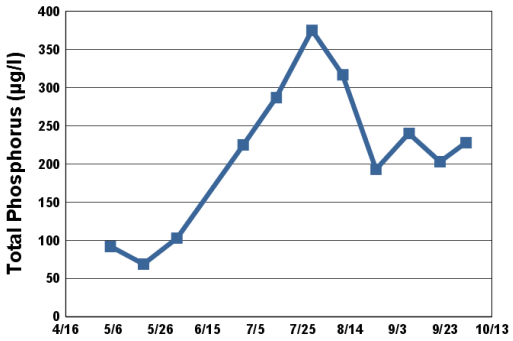
Contours in meters

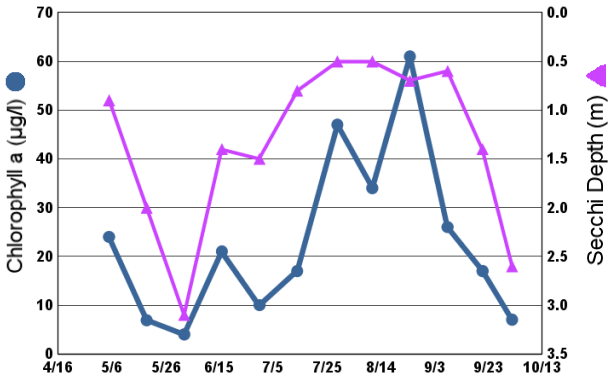


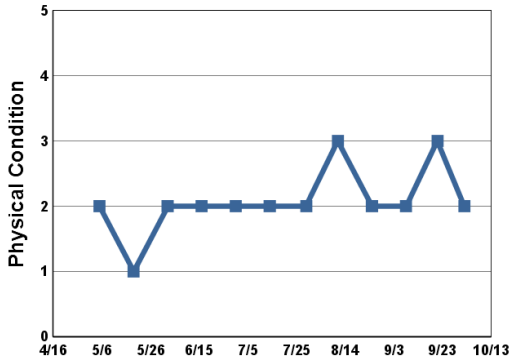


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	8.7		24	92	0.9	2	
5/19	17.6		6.9	69	2.0	1	1
6/2	18.1		4.0	103	3.1	2	1
6/16	21.7		21		1.4	2	2
6/30	24.4		10	225	1.5	2	2
7/14	25.4		17	287	0.8	2	1
7/29	23.3		47	375	0.5	2	2
8/11	24.6		34	317	0.5	3	3
8/25	25.5		61	193	0.7	2	2
9/8	24.9		26	240	0.6	2	2
9/21	18.9		17	203	1.4	3	2
10/2	17.2		7.0	228	2.6	2	







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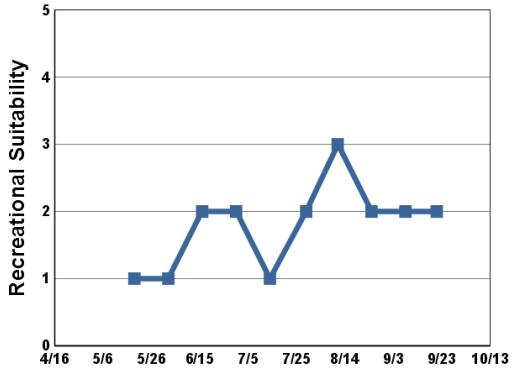
4 = High Algal Color
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

Cedar Lake (70–0091), site 2 *Scott County Watershed Management Organization*

Volunteer: Lowell Mohn

Cedar Lake is located in Cedar Lake Township (Scott County). Site 2 is located in the northeast bay of the lake, and this is the first year the site has been monitored via the CAMP. The lake is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a maximum depth of 4.7 m (15 ft) and a mean depth of 2.1 m (6.9 feet). 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 lake has a surface area of 742 acres and watershed area of 11,104 acres, giving a watershed to lake area ratio of 15:1. The larger the ratio the greater the potential effects of runoff on the water quality of the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	221	130	328	F
CLA (µg/l)	23	3.3	59	C
Secchi (m)	1.0	0.6	1.6	D
TKN (mg/l)	1.73	1.20	2.30	
			Lake Grade	D

Site 2 received a lake grade of D for 2013, which is consistent with the grade received for site 1. The mean Secchi depth at site 2 appears to be slightly less than site 1 for 2013. Continued monitoring is suggested to build an historical database for this lake site.

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

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

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

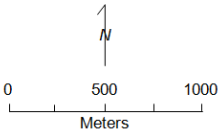
Cedar Lake, Site 2

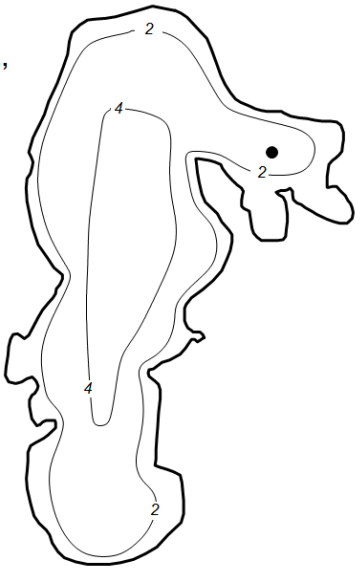
Cedar Lake Twp./Helena Twp., Scott Co.

SITE ID: 70009100-02

● Sampling site

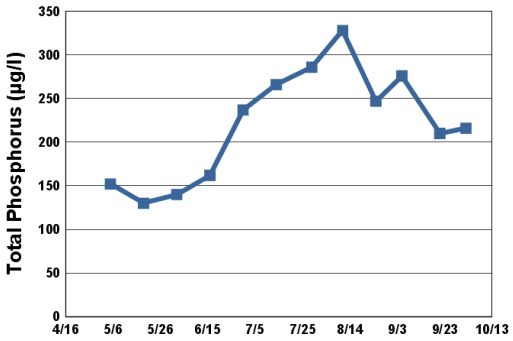
Contours in meters

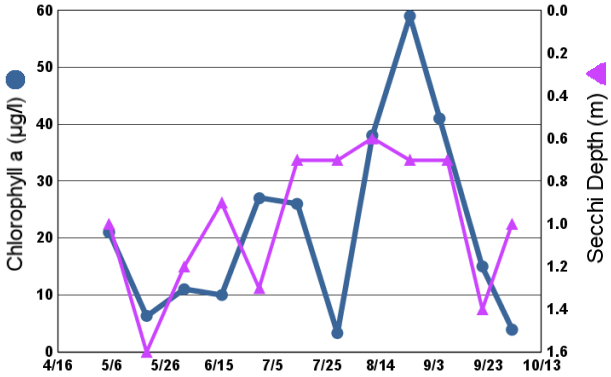


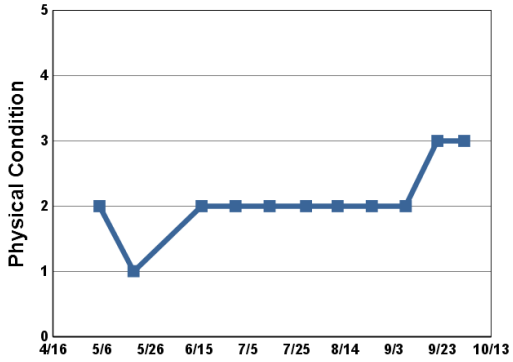


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	8.8		21	152	1.0	2	1
5/19	17.7		6.3	130	1.6	1	1
6/2	18.2		11	140	1.2		1
6/16	21.9		10	162	0.9	2	3
6/30	24.4		27	237	1.3	2	2
7/14	25.5		26	266	0.7	2	1
7/29	23.5		3.3	286	0.7	2	2
8/11	23.4		38	328	0.6	2	3
8/25	25.5		59	247	0.7	2	2
9/5			41	276			
9/8	24.9				0.7	2	2
9/21	18.4		15	210	1.4	3	2
10/2	17.4		3.9	216	1.0	3	







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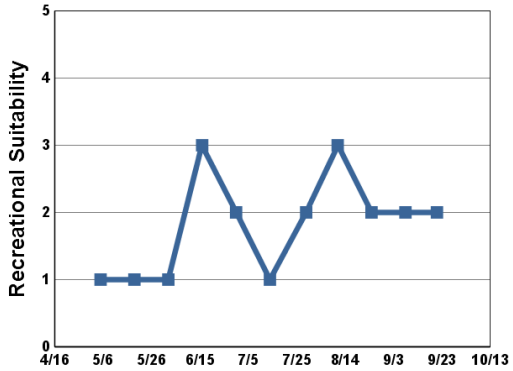

1 = Beautiful
2 = Minor Aesthetic Problem
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5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

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

Volunteer: Dan Carlson, Warner Nature Center

Clear Lake is located in May Township (Washington County). The maximum depth of the lake is 8.2 m (27 ft). Approximately 94 percent of the lake's surface area is considered littoral (the 0-15 feet depth zone of aquatic vegetation dominance).

On each sampling day the lake was monitored for secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	5.5	4.9	6.2	A
TKN (mg/l)				
			Lake Grade	

The lake received a Secchi grade of A for 2013. TP, TKN, and CLA were not monitored in 2013. To better understand the lake's water quality and determine potential trends, additional years of data collection are needed.

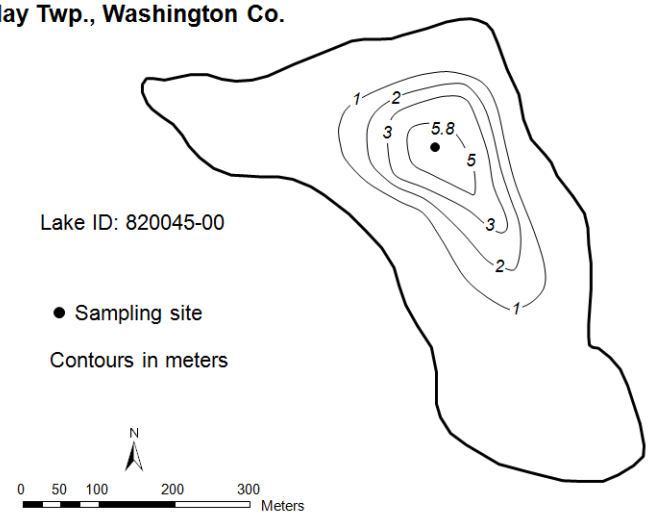
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

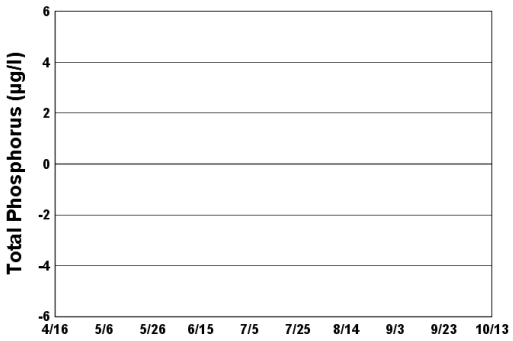
Clear Lake

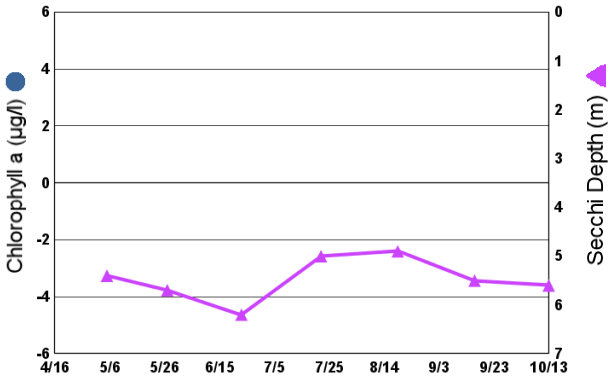
May Twp., Washington Co.

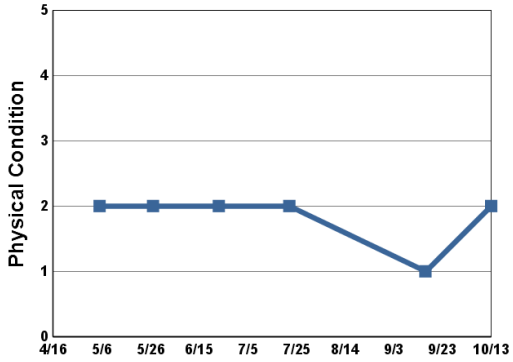


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	6.5				5.4	2	1
5/27	16.2				5.7	2	1
6/23	24.2				6.2	2	1
7/22	27.5				5.0	2	1
8/19	24.9				4.9		1
9/16	20.6				5.5	1	1
10/13	14.9				5.6	2	1







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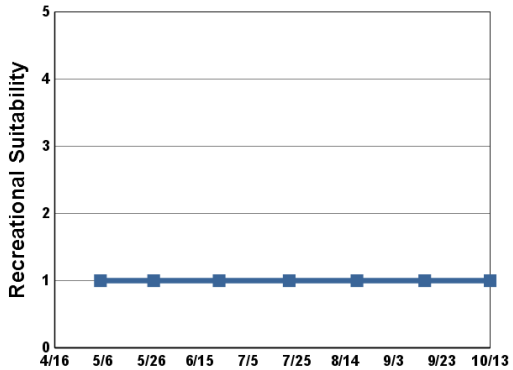

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Lake Water Quality Grades Based on Summertime Averages

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
TP					A	A	A			
CLA					A	A	A			
Secchi					A	A	A	A	A	A
Lake Grade					**A**	**A**	**A**			

Source: Metropolitan Council and STORET data

Cloverdale Lake (82–0009) *Valley Branch Watershed District*

Volunteer: Dr. Kevin Bjork

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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	20	11	32	A
CLA (µg/l)	2.5	1.0	5.3	A
Secchi (m)	3.2	1.9	5.1	A
TKN (mg/l)	0.72	0.59	0.83	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with its historical database. According to its historical database, the lake has received mainly lake grades of B with the occasional C and A. This was the first year in its monitoring history that the lake received A grades for all three parameters.

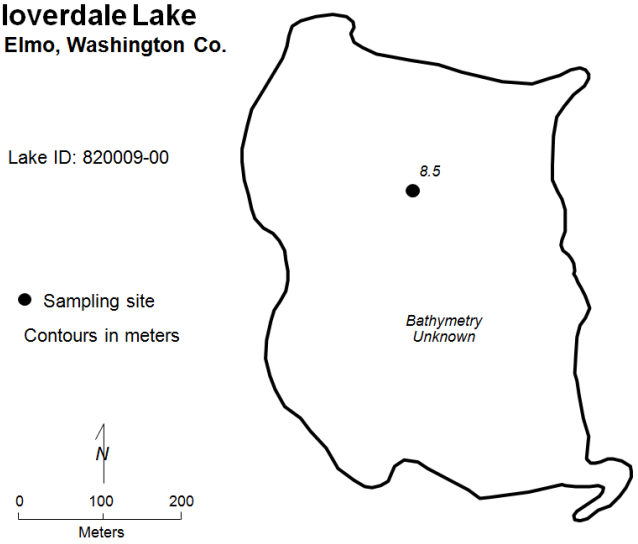
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

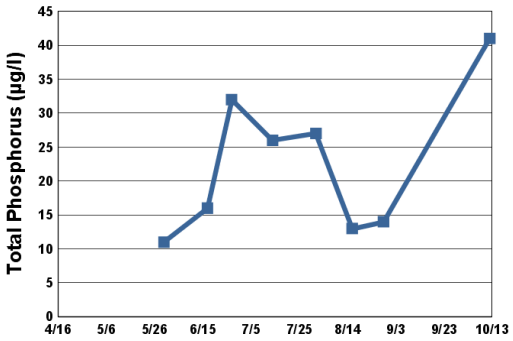
Cloverdale Lake
Lake Elmo, Washington Co.

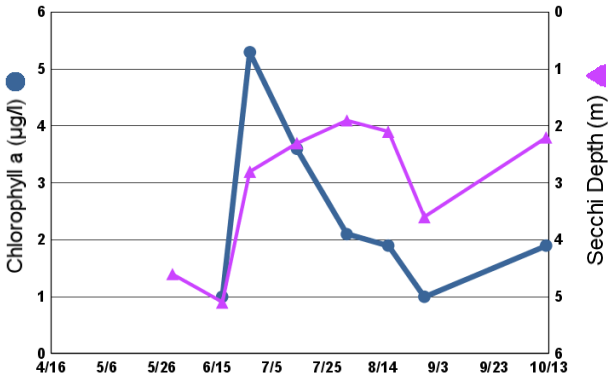
Lake ID: 820009-00

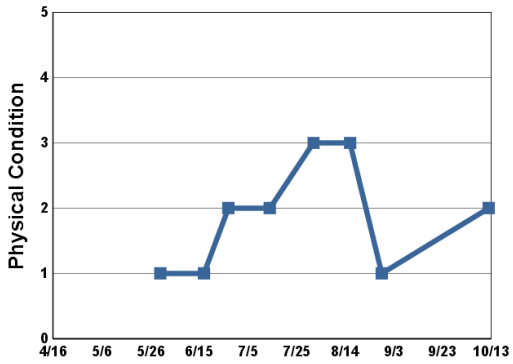


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/30	17.6			11	4.6	1	1
6/17	22.6		1.0	16	5.1	1	1
6/27	26.3		5.3	32	2.8	2	2
7/14	24.9		3.6	26	2.3	2	2
8/1	23.8		2.1	27	1.9	3	3
8/16	23.7		1.9	13	2.1	3	2
8/29	27.9		1.0	14	3.6	1	1
10/12	15.4		1.9	41	2.2	2	1







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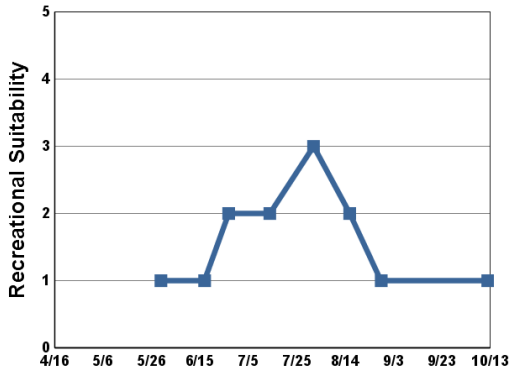
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

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

Volunteer: Jim Kellogg

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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

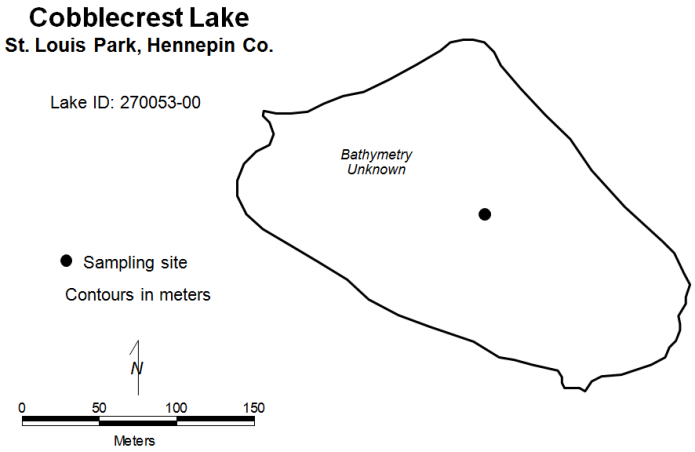
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	55	40	70	C
CLA (µg/l)	31	15	44	C
Secchi (m)	0.6	0.5	0.9	F
TKN (mg/l)	1.20	1.10	1.40	
			Lake Grade	D

The water quality in 2013 was similar to that of 2011, as indicated by the TP and CLA data. Water quality in 2013 and 2011 also improved as compared to years prior to 2010 in which many F grades were received. Continued monitoring is recommended to determine if there is an emerging improving water quality trend for this lake.

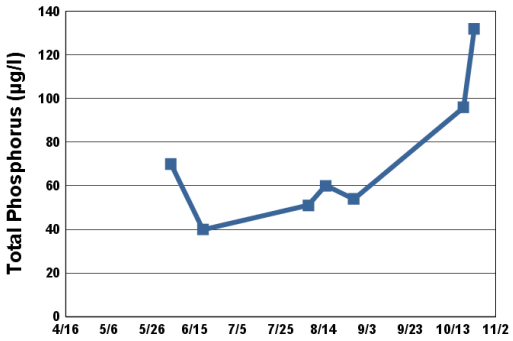
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

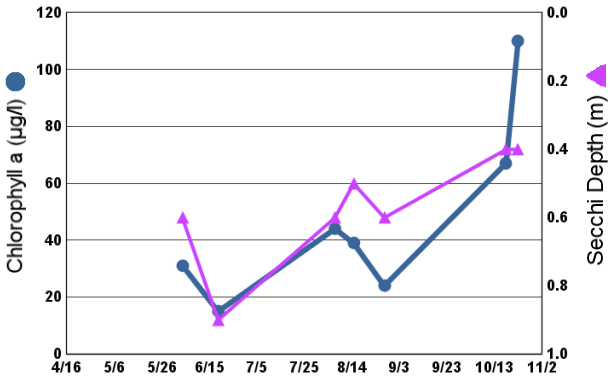
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

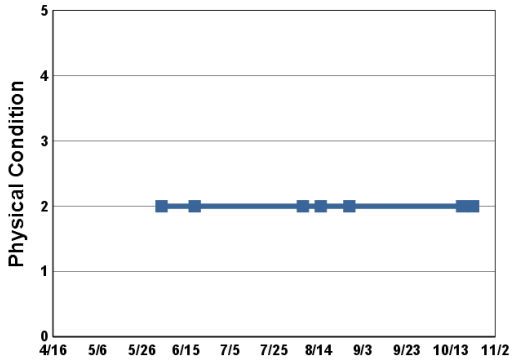


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/4	18.8		31	70	0.6	2	4
6/19	23.4		15	40	0.9	2	4
8/7	25.6		44	51	0.6	2	4
8/15	23.3		39	60	0.5	2	4
8/28	27.0		24	54	0.6	2	4
10/18	10.0		67	96	0.4	2	4
10/23	8.6		110	132	0.4	2	4







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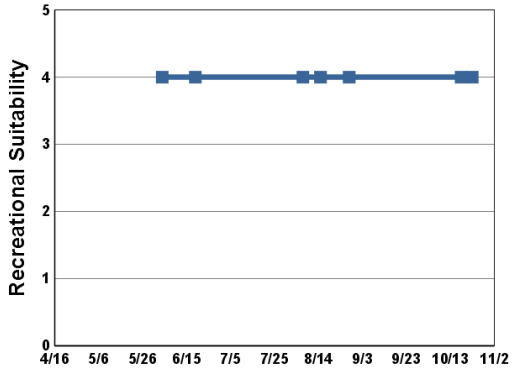

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Lake Water Quality Grades Based on Summertime Averages

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	
CLA											C	
Secchi											C	
Lake Grade											**C**	

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

Source: Metropolitan Council and STORET data

Cobblestone Lake (19–0456) *City of Apple Valley*

Volunteer: city of Apple Valley staff

Cobblestone Lake is located in the City of Apple Valley (Dakota County). The lake has a surface area of 37 acres, and a maximum depth of 6 meters.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	19	88	C
CLA (µg/l)	11	1.1	30	B
Secchi (m)	1.3	0.9	2.0	C
TKN (mg/l)	1.17	0.77	2.70	
			Lake Grade	C

The lake received a lake grade of C for 2013 which is similar to the lake grades received for the previous 7 years. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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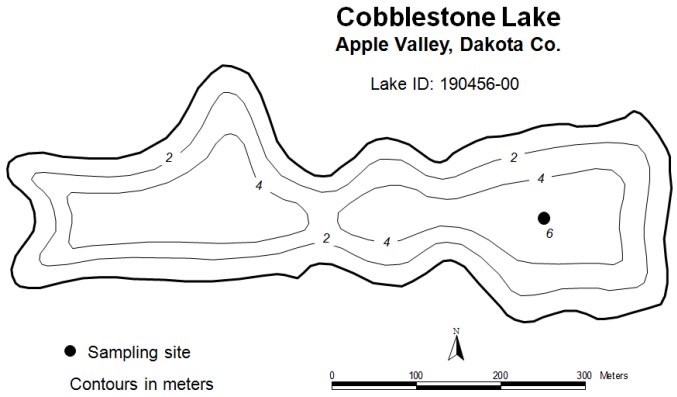
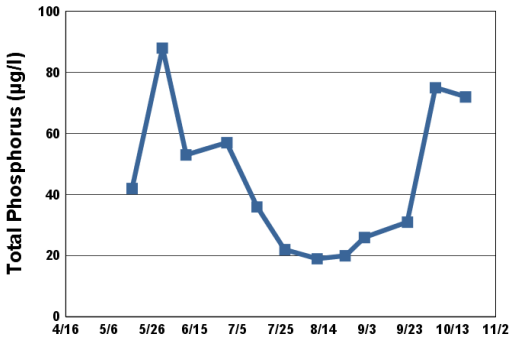
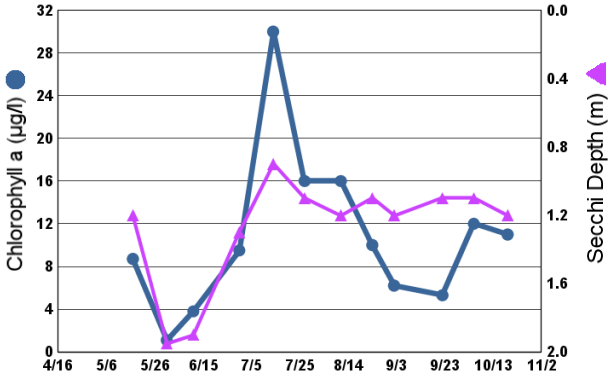
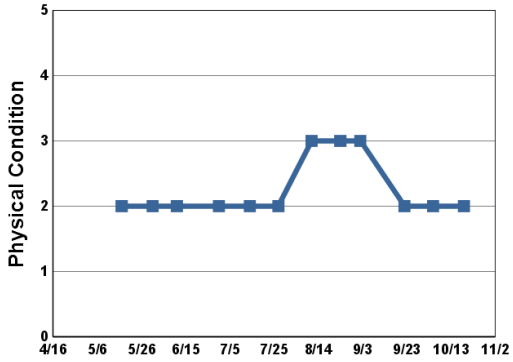


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/17	15.3		8.7	42	1.2	2	2
5/31	17.8		1.1	88	2.0	2	2
6/11	18.8		3.8	53	1.9	2	2
6/30	21.8		9.5	57	1.3	2	2
7/14	23.4		30	36	0.9	2	2
7/27	21.2		16	22	1.1	2	2
8/11	22.3		16	19	1.2	3	3
8/24	24.1		10	20	1.1	3	3
9/2	23.5		6.2	26	1.2	3	3
9/22	17.1		5.3	31	1.1	2	2
10/5	16.2		12	75	1.1	2	2
10/19	11.8		11	72	1.2	2	2







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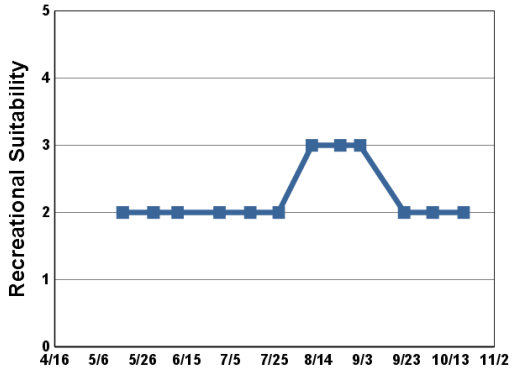
4 = High Algal Color
5 = Severe Algal Bloom



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												
CLA												
Secchi												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Colby Lake (82–0094) *City of Woodbury*

Volunteer: Washington Conservation District staff

Colby Lake is located in the City of Woodbury in Washington County. The lake has a surface area of 71 acres and a maximum depth of 3.4 m (11 ft). The 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 lake has a watershed area of 8,088 acres which gives a large watershed to lake area ratio of 114:1. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	156	56	272	F
CLA (µg/l)	35	19	75	C
Secchi (m)	0.7	0.3	1.4	D
TKN (mg/l)	1.99	1.50	2.80	
			Lake Grade	D

The lake received a water quality lake grade of D for 2013, which is consistent with the historical database. The lake's water quality seems well represented by an overall water quality grade of D or F.

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

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

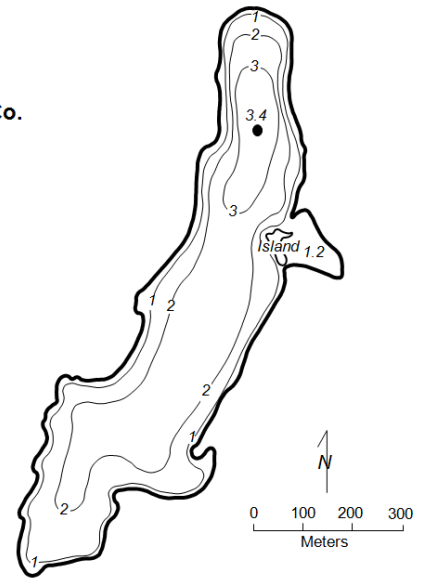
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Colby Lake
Woodbury, Washington Co.

Lake ID: 820094-00

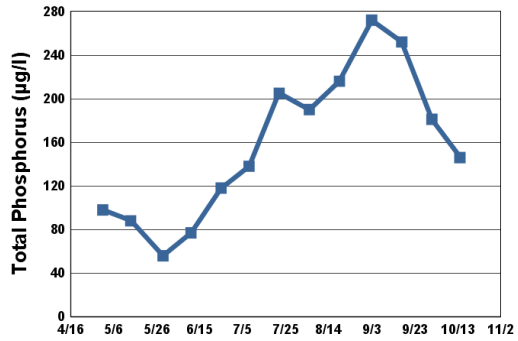
● Sampling site

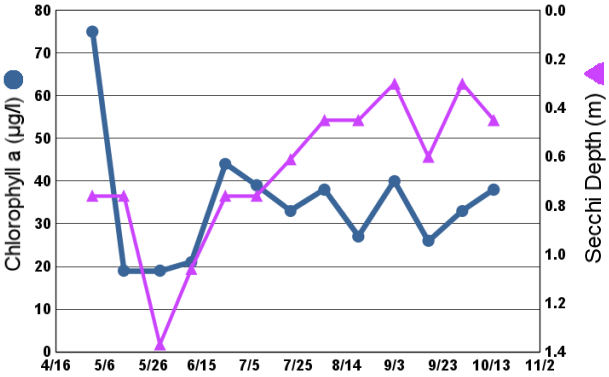
Contours in meters

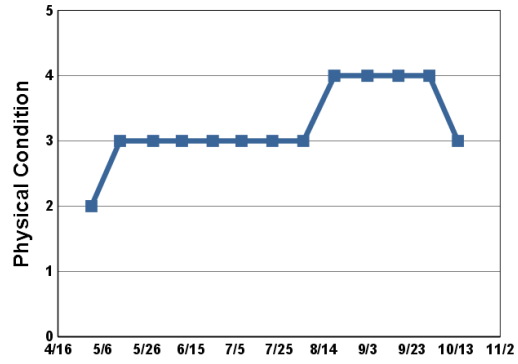


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/1	12.5	14.2	75	98	0.8	2	2
5/14	14.5	10.0	19	88	0.8	3	3
5/29	16.7	7.6	19	56	1.4	3	4
6/11	19.4	11.1	21	77	1.1	3	4
6/25	24.5	9.3	44	118	0.8	3	3
7/8	26.2	10.6	39	138	0.8	3	4
7/22	28.9	9.0	33	205	0.6	3	4
8/5	22.2	9.5	38	190	0.5	3	4
8/19	23.7	9.6	27	216	0.5	4	4
9/3	23.0	6.0	40	272	0.3	4	4
9/17	18.6	7.9	26	252	0.6	4	4
10/1	18.4	9.6	33	181	0.3	4	4
10/14	13.9	10.6	38	146	0.5	3	4







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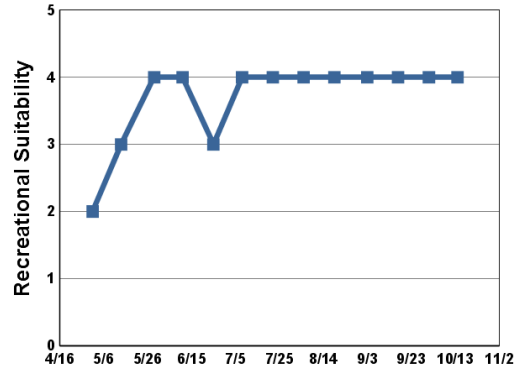

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Cornelia Lake (27–0028–02)

Volunteer: Stephen Sando

Lake Cornelia is located in the City of Edina (Hennepin County). The lake has a surface area of approximately 52 acres, and has a maximum depth of 2.0 meters. The entire lake is considered littoral zone, which is the shallow 0 — 15 feet depth zone that is typically dominated by aquatic plants. The lake does not maintain a thermocline, which is density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	127	49	266	D
CLA (µg/l)	17	10	31	
Secchi (m)	0.5	0.2	0.9	
TKN (mg/l)	1.60	1.10	1.90	
			Lake Grade	

There were insufficient data to calculate parameter grades for CLA and Secchi depth. The TP concentrations in 2013 were similar in magnitude as observed in 2008 and 2009.

Throughout the monitoring period, the volunteer's opinions of 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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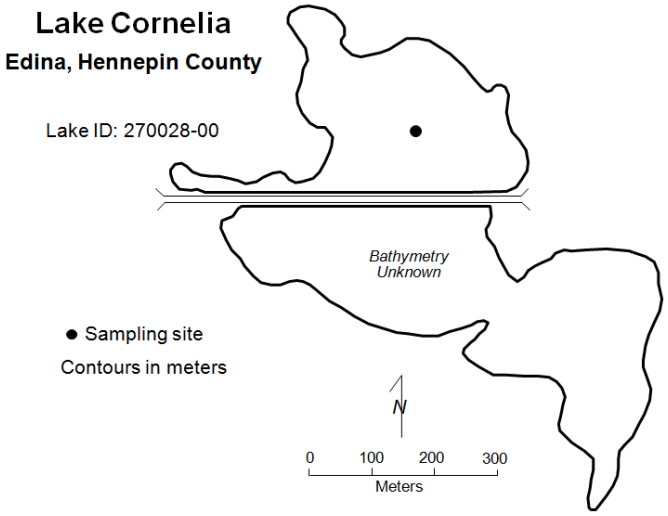
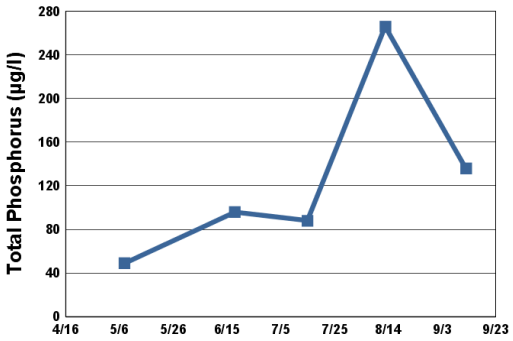
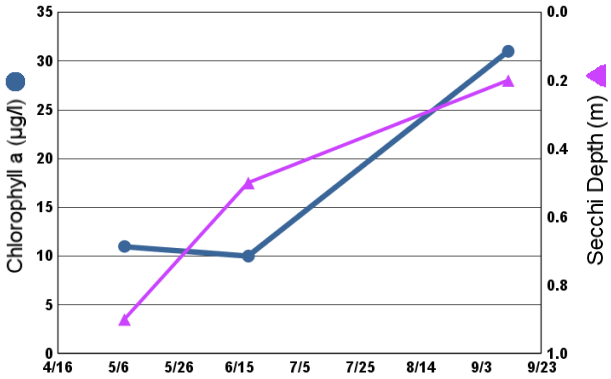
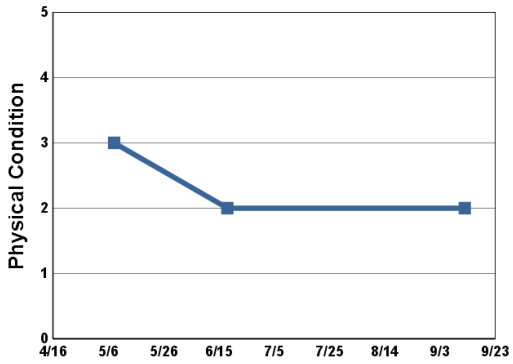


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	17.7		11	49	0.9	3	4
6/18	24.9		10	96	0.5	2	4
7/15				88			
8/13				266			
9/12	22.6		31	136	0.2	2	4







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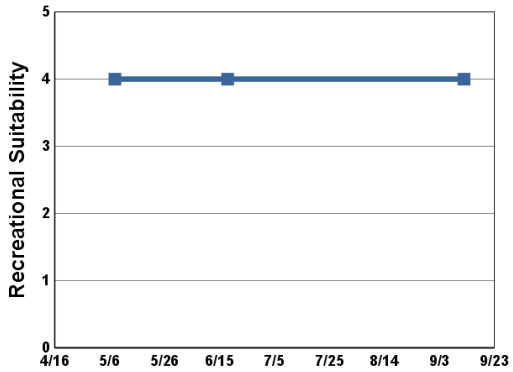

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Lake Water Quality Grades Based on Summertime Averages

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												F
CLA												F
Secchi												F
Lake Grade												**F**

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

Source: Metropolitan Council and STORET data

Courthouse Lake (10–0005) *Carver County Environmental Services*

Volunteer: Carver County staff

Courthouse Lake, located in the City of Chaska (Carver County) is a trout lake that is stocked with rainbow trout. The 10-acre lake has a maximum depth of 17.4 m (57 feet). The lake's level is maintained by groundwater. It has a very small watershed that is completely publicly owned (MDNR 1996).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	9	61	A
CLA (µg/l)	24	1.2	77	C
Secchi (m)	3.8	1.3	6.1	A
TKN (mg/l)	0.75	0.52	1.20	
			Lake Grade	B

The lake received a lake grade of B for 2013. Historically the lake's water quality is typically an A lake grade. The mean chlorophyll concentration was higher than usual in 2013, which was driven by two notable bloom events in August and September, plus two other elevated chlorophyll events in July. Sechhi depth correlated poorly with the most extreme chlorophyll event. Continued monitoring is suggested to determine if these summer time bloom events continue in future years.

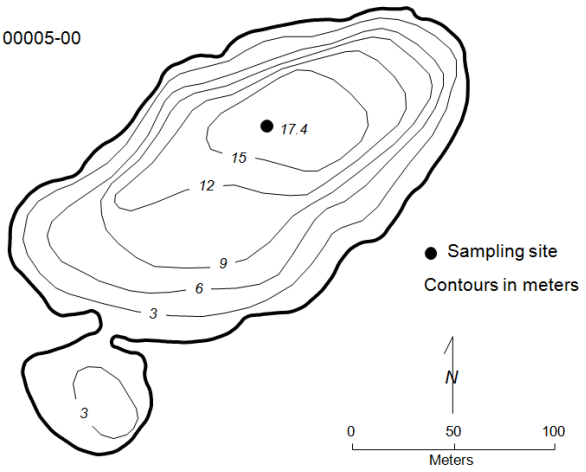
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

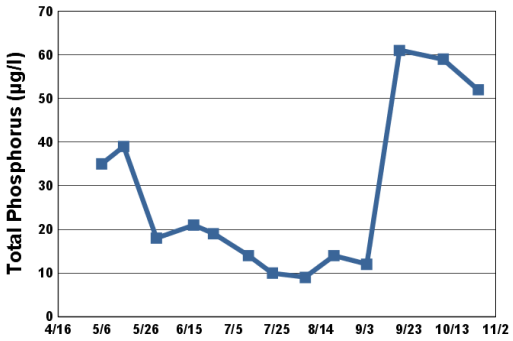
Courthouse Lake
Chaska, Carver Co.

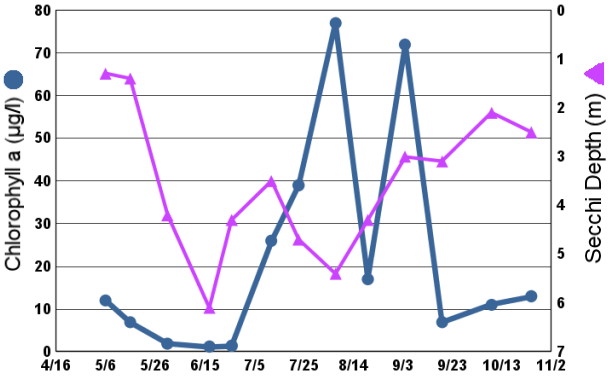
Lake ID: 100005-00

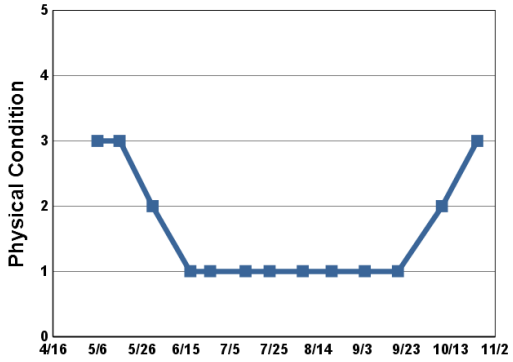


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	12.7	22.9	12	35	1.3	3	3
5/16	17.5	17.5	6.9	39	1.4	3	3
5/31	19.5	13.3	1.9	18	4.2	2	2
6/17	22.8	10.2	1.2	21	6.1	1	1
6/26	27.2	12.5	1.4	19	4.3	1	1
7/12	28.4	10.2	26	14	3.5	1	1
7/23	28.2	6.5	39	10	4.7	1	1
8/7	24.5	6.1	77	9	5.4	1	1
8/20	26.1	10.1	17	14	4.3	1	1
9/4	26.1	8.8	72	12	3.0	1	2
9/19	17.8	7.4	6.9	61	3.1	1	1
10/9	16.7	5.7	11	59	2.1	2	1
10/25	12.4		13	52	2.5	3	3







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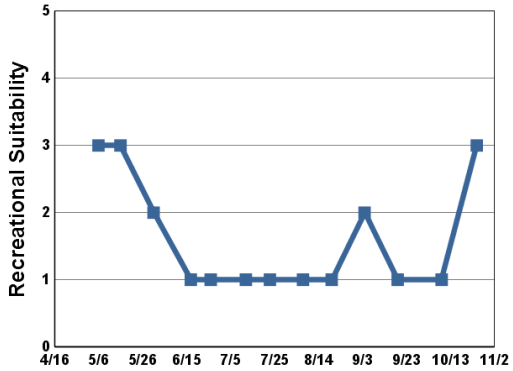
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

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

Volunteer: Joe Tranchilla

Crystal Lake is located mainly in the City of Burnsville (Dakota County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 292 acres. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*) (MnDNR 2013). The MPCA has listed the lake as impaired for aquatic consumption (mercury content in fish).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

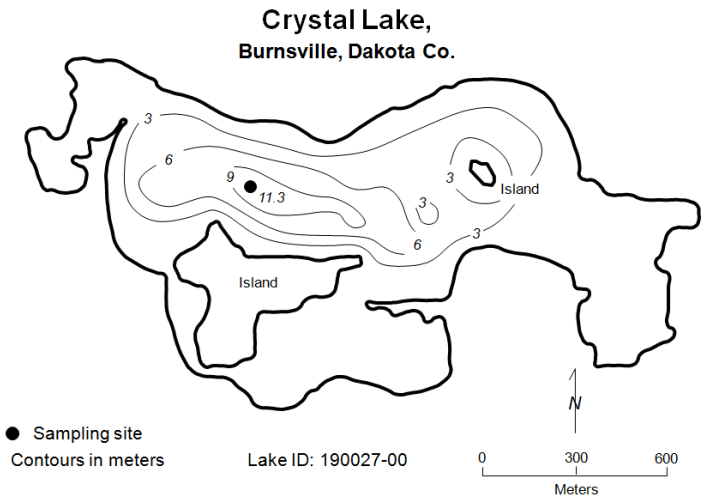
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	18	52	B
CLA (µg/l)	14	2.7	38	B
Secchi (m)	1.8	0.9	3.1	C
TKN (mg/l)	0.74	0.55	1.10	
			Lake Grade	B

The lake received a lake grade of C for 2013. The lake typically receives a C lake grade, or the occasional B, according to its historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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.

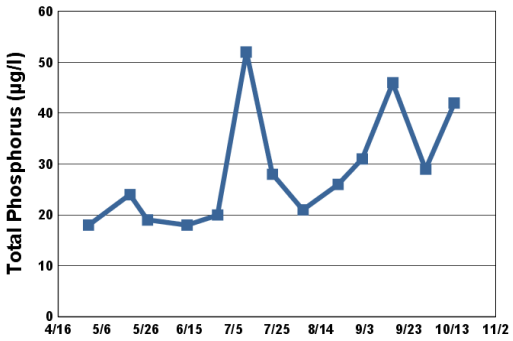
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

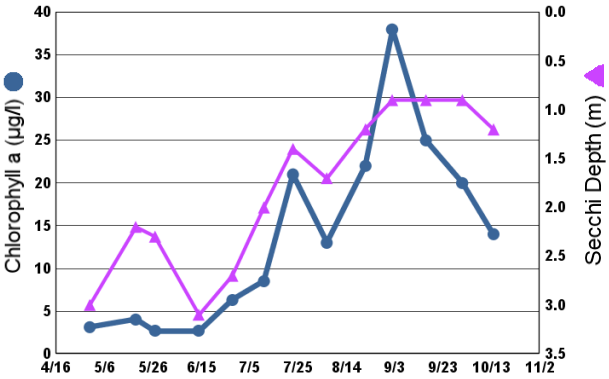
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

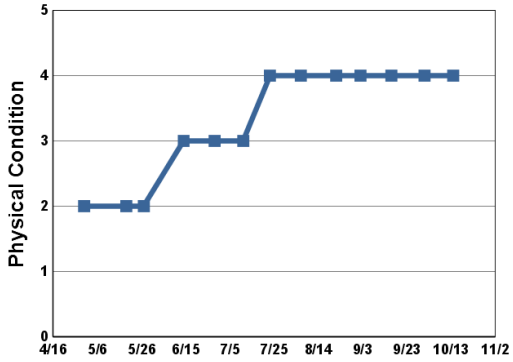


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	10.4		3.1	18	3.0	2	2
5/19	16.1		4.0	24	2.2	2	2
5/27	15.5		2.7	19	2.3	2	2
6/14	17.6		2.7	18	3.1	3	2
6/28	25.1		6.3	20	2.7	3	3
7/11	26.0		8.5	52	2.0	3	3
7/23	25.6		21	28	1.4	4	3
8/6	22.4		13	21	1.7	4	3
8/22	24.8		22	26	1.2	4	3
9/2	25.1		38	31	0.9	4	4
9/16	20.5		25	46	0.9	4	3
10/1	18.1		20	29	0.9	4	4
10/14	14.8		14	42	1.2	4	4







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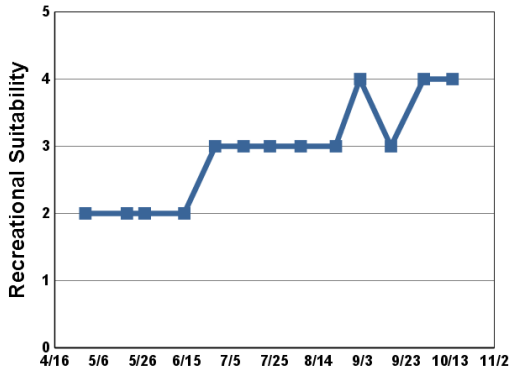
4 = High Algal Color
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

DeMontreville Lake (82–0101) *Valley Branch Watershed District*

Volunteer: Steve Iverson

Lake DeMontreville is located in Lake Elmo (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity (METC 2007).The 160-acre lake has a mean and maximum depth of 2.4 m (~8 feet) and 7.3 m (24 feet). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

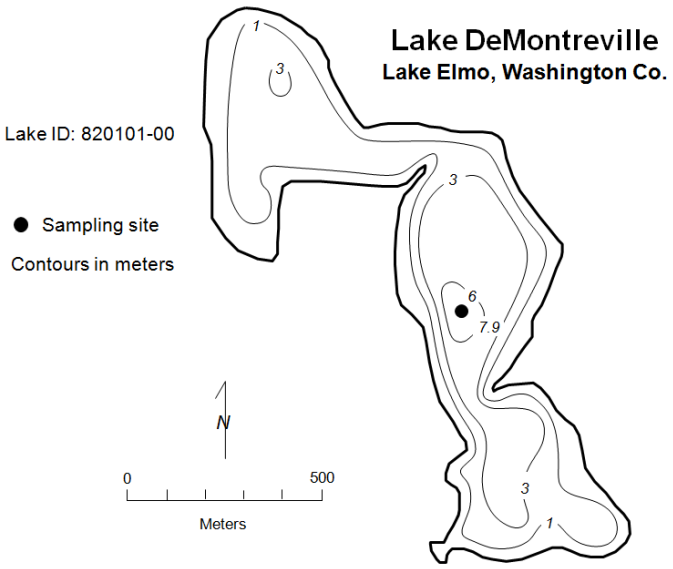
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	14	10	21	A
CLA (µg/l)	4.2	1.0	6.9	A
Secchi (m)	3.6	2.6	5.0	A
TKN (mg/l)	0.61	0.37	0.88	
			Lake Grade	A

The lake received a lake grade of A for 2013. Historically, the lake grades for the years 1980 through 2010 show that the quality of the lake has improved over the past 30 years. The lake has been fluctuating between an A and B grades since the early 1990s, except for 2007.

Throughout the monitoring period, the volunteer's opinions of 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.

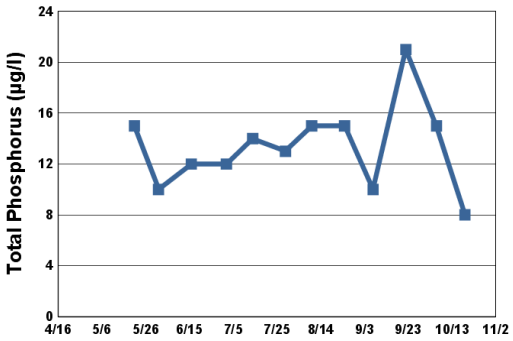
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

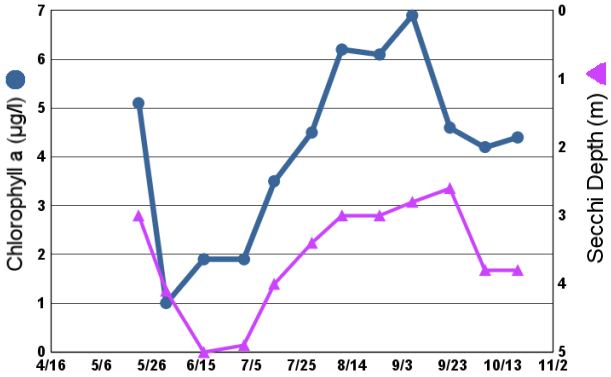
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

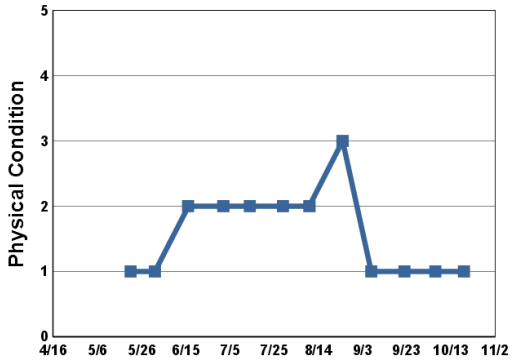


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/21	18.0		5.1	15	3.0	1	1
6/1	21.6		1.0	10	4.1	1	1
6/16	22.6		1.9	12	5.0	2	1
7/2	26.5		1.9	12	4.9	2	1
7/14	26.8		3.5	14	4.0	2	1
7/29	24.0		4.5	13	3.4	2	1
8/10	24.9		6.2	15	3.0	2	1
8/25	26.8		6.1	15	3.0	3	1
9/7	26.4		6.9	10	2.8	1	1
9/22	20.0		4.6	21	2.6	1	1
10/6	17.5		4.2	15	3.8	1	1
10/19	13.5		4.4	8	3.8	1	1







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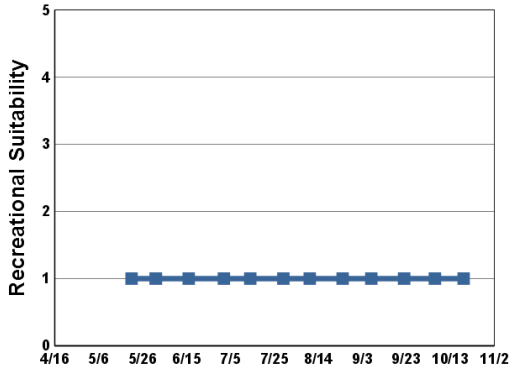

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Downs Lake (82–0110) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Downs Lake is located in Lake Elmo (Washington County). The mean and maximum depths of the 35-acre lake are 1.5 m (5 feet) and 2.1 m (7 feet), respectively. The lake's size and mean depth results in an approximate lake volume of 175 ac-ft. Because of the shallowness of the lake, the entire lake is considered littoral zone (area of aquatic plant dominance) and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake's 2,400-acre watershed translates to a large watershed-to-lake size ratio of 69:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	179	107	234	F
CLA (µg/l)	152	40	300	F
Secchi (m)	0.4	0.2	0.9	F
TKN (mg/l)	3.82	1.60	5.30	
			Lake Grade	F

The lake received a lake grade of F for 2013, which is consistent with its historical database.

Throughout the monitoring period, the volunteer's opinions of 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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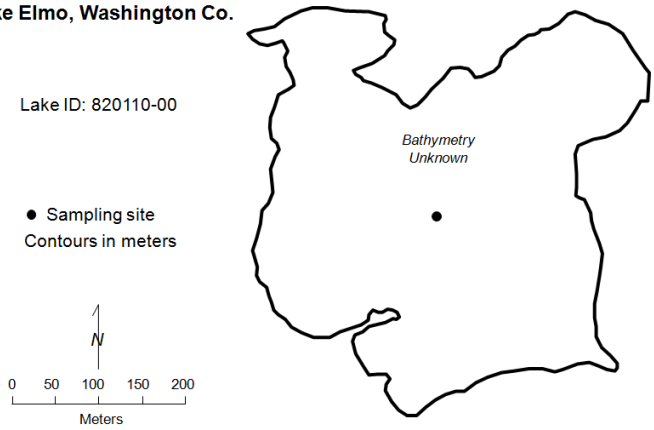
Downs Lake

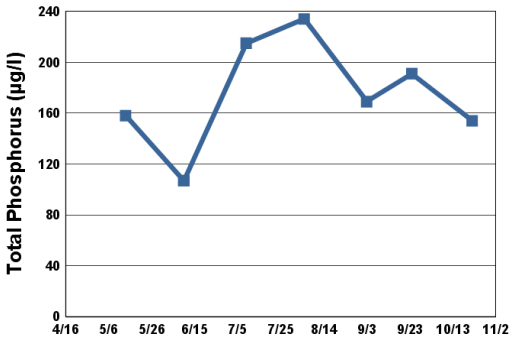
Lake Elmo, Washington Co.

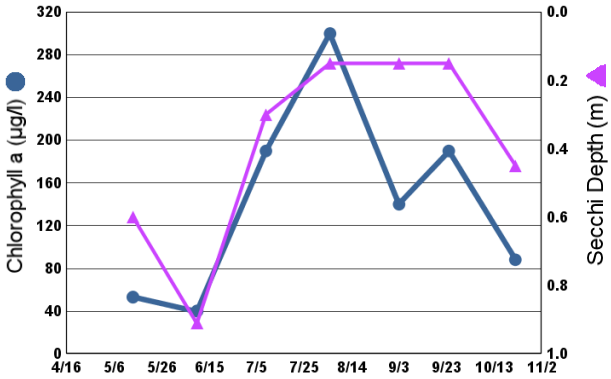
Lake ID: 820110-00

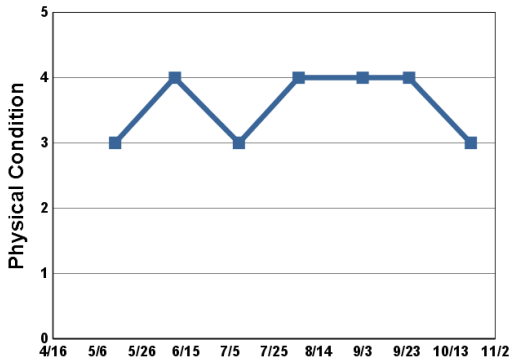


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	14.7	13.3	53	158	0.6	3	3
6/10	18.1	9.7	40	107	0.9	4	4
7/9	27.3	6.3	190	215	0.3	3	4
8/5	22.4	11.5	300	234	0.2	4	4
9/3	23.6	6.9	140	169	0.2	4	4
9/24	18.7	12.1	190	191	0.2	4	4
10/22	7.4	10.8	88	154	0.5	3	4







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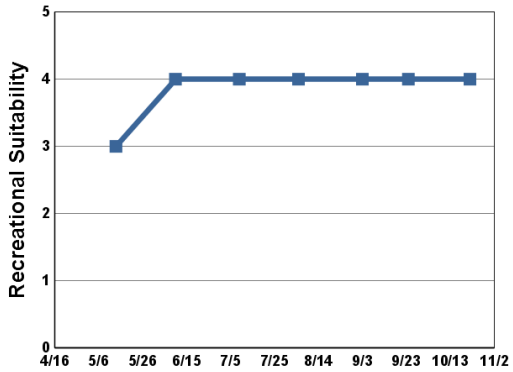

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Dubay Lake (27–0129) *Elm Creek Watershed Management Commission*

Volunteer: Doug Baines

Dubay Lake is located in the city of Dayton (Hennepin County). There is little bathymetric information available for this lake. It is surrounded by private property.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

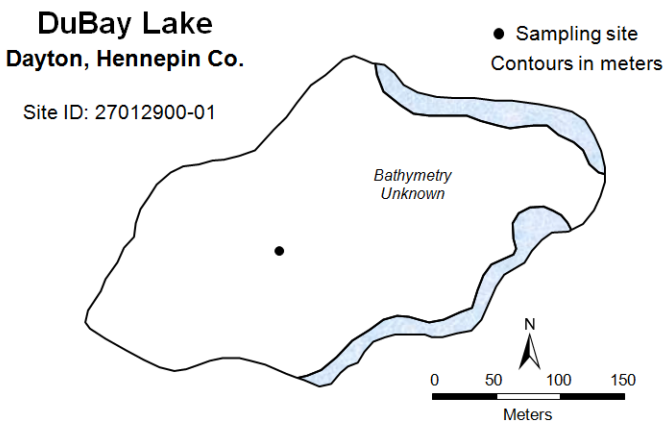
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	43	50	C
CLA (µg/l)	5.1	1.0	9.3	A
Secchi (m)	2.5	1.2	3.1	B
TKN (mg/l)	0.93	0.83	1.20	
			Lake Grade	B

This is the second year the lake has been monitored via the CAMP, and second year it has received a B lake grade. Continued monitoring is recommended to build the water quality database for this lake.

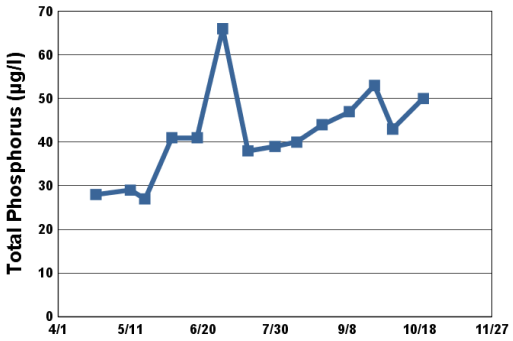
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

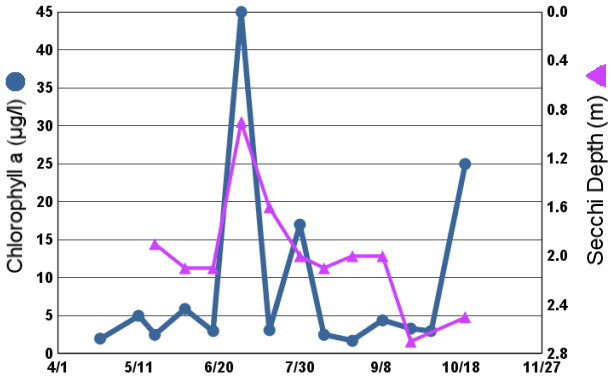
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

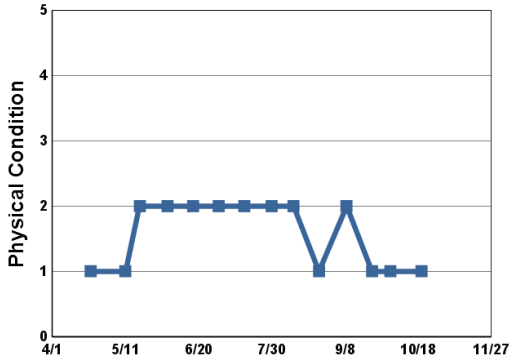


2013 Data

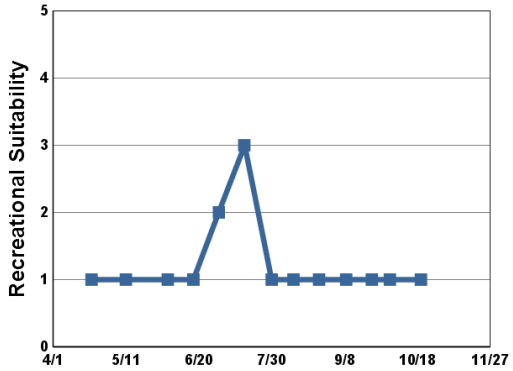
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	14.2		8.5	50		2	1
6/1	21.5		1.0	47	3.0	2	1
6/15	23.1		3.8	45	2.8	1	1
7/5	27.0		3.4	45	3.1	2	2
7/28	23.0		2.4	50	1.2	2	1
8/19	25.9		9.3	43	2.7	2	1
9/15	20.0		7.4	43	2.3	2	1
10/14	12.9		12	22	2.8	1	1







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Eagle Lake (10–0121) *Carver County Environmental Services*

Volunteer: Carver County staff

Eagle Lake is located in Young America Township in Carver County. The lake is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 186 acres and a maximum 4.0 m (14 feet). 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 DNR has designated the lake as being infested with Eurasian Water Milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	180	65	303	F
CLA (µg/l)	40	3.2	150	C
Secchi (m)	0.6	0.4	1.0	F
TKN (mg/l)	2.34	0.99	3.50	
			Lake Grade	D

The lake received a lake grade of D for 2013. The lake grades have fluctuated between D and F since 1980. The frequency of F grades appears to have increased since 2006, however this year's D grade has provided a recent break from this pattern.

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

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

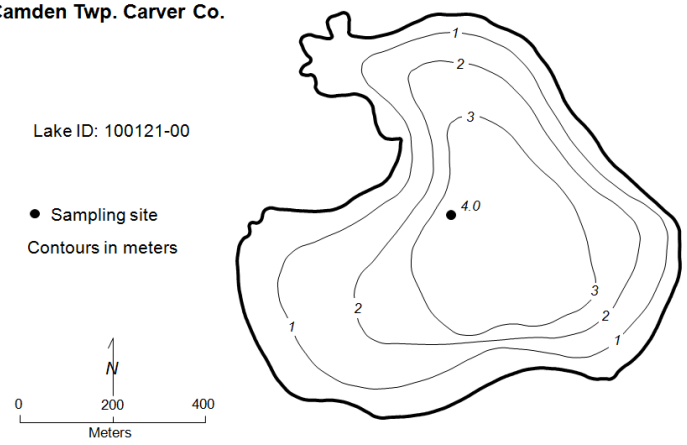
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Eagle Lake,
Camden Twp. Carver Co.

Lake ID: 100121-00

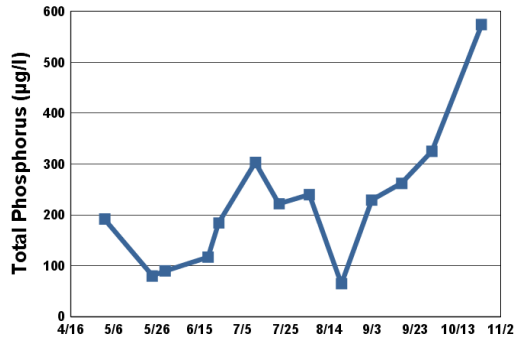
● Sampling site

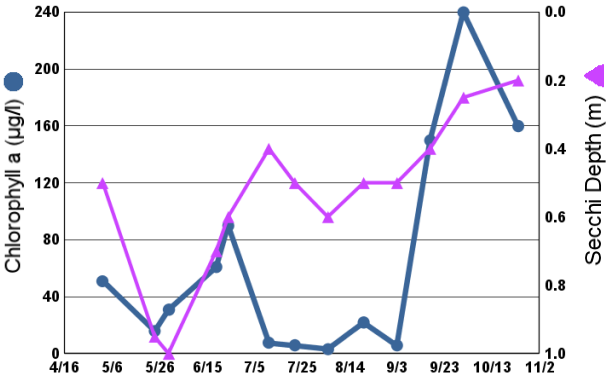
Contours in meters

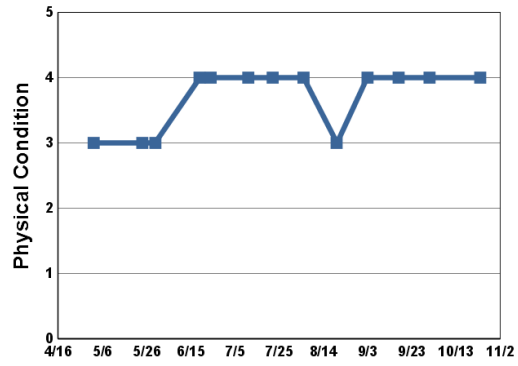


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	8.3	13.2	51	192	0.5	3	3
5/24	16.1	11.1	16	80	1.0	3	3
5/30	16.8	12.4	31	90	1.0	3	3
6/19	22.5	20.4	61	117	0.7	4	4
6/24	24.1	24.7	90	184	0.6	4	4
7/11	25.5	12.5	7.7	303	0.4	4	4
7/22	26.2	6.3	5.9	222	0.5	4	4
8/5	22.9	8.5	3.2	240	0.6	4	4
8/20	24.2	4.4	22	65	0.5	3	3
9/3	23.5	5.8	5.8	229	0.5	4	4
9/17	18.8	11.2	150	262	0.4	4	4
10/1	17.3	20.4	240	325	0.3	4	4
10/24	6.4		160	574	0.2	4	4







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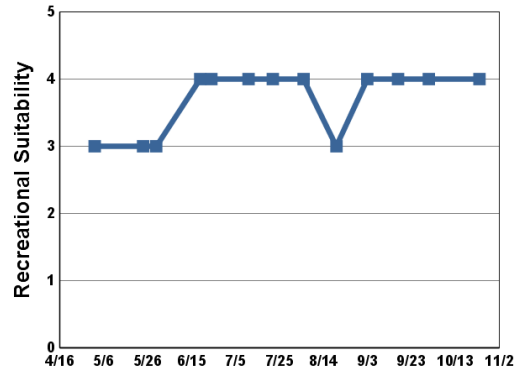
4 = High Algal Color
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

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

Volunteer: Washington Conservation District staff

Eagle Point Lake is located within the City of Lake Elmo (Washington County). It has a surface area of approximately 120-acres. The mean and maximum depths of the lake are 0.9 m (3 feet) and 1.8 m (roughly 6 feet), respectively. The entire 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 lake's 11,502-acre watershed translates to a large watershed-to-lake size ratio of 96:1, which is a large ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	102	56	168	D
CLA (µg/l)	32	11	62	C
Secchi (m)	0.6	0.3	0.9	
TKN (mg/l)	1.70	1.20	2.40	
			Lake Grade	

There were insufficient quantity of Secchi data to calculate a grade. For many of the site visits, the Secchi disk was visible on the lake bottom or obscured by aquatic macrophytes. There are insufficient data to determine trends in the lake's water quality. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

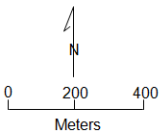
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

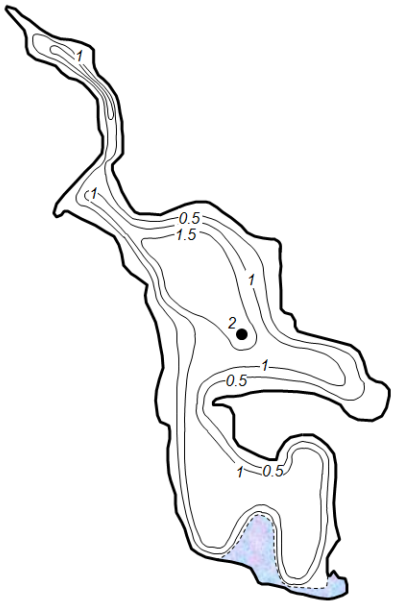
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Eagle Point Lake
Lake Elmo, Washington Co.

Lake ID: 820109
WD: Valley Branch

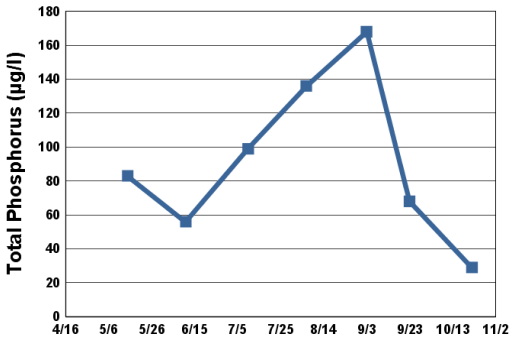
● Sampling station
Contours in meters

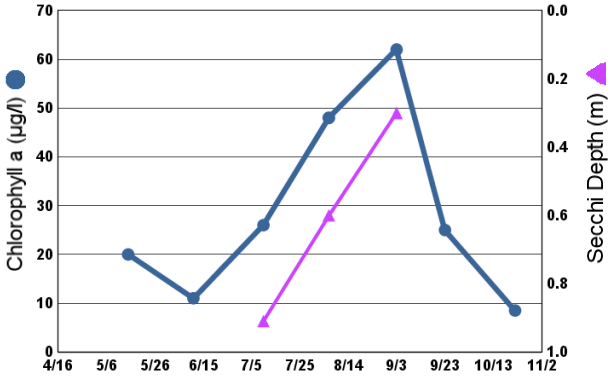


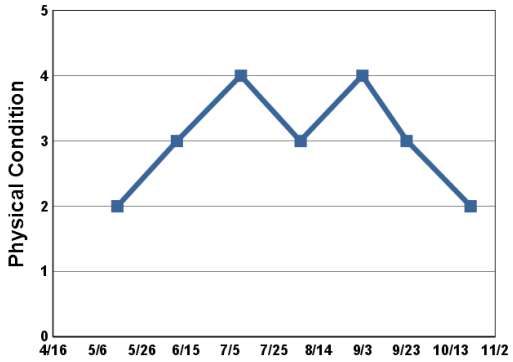


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/15	18.0	12.8	20	83		2	4
6/11	18.8	8.5	11	56		3	4
7/10	26.8	9.5	26	99	0.9	4	4
8/6	22.0	7.2	48	136	0.6	3	4
9/3	22.5	10.3	62	168	0.3	4	4
9/23	18.5	10.7	25	68		3	4
10/22	3.8	10.6	8.5	29		2	3







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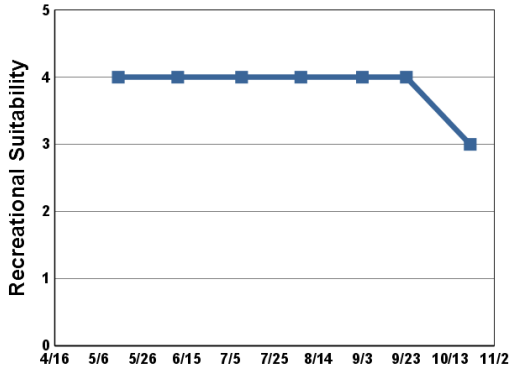


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Earley Lake (19–0033) *Black Dog Watershed Management Commission*

Volunteer: Mike Zytkovicz

Earley Lake is located within the City of Burnsville in Dakota County. The 29-acre lake receives flow from Crystal Lake (Burnsville) and the Earley Lake watershed. Most of its 1,629-acre watershed is either parkland or open space. The watershed-to-lake size ratio is a rather large 56:1. Generally, the larger the ratio the greater the potential stress on the lake from surface runoff. Earley Lake outlets at its west end to Sunset Pond. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

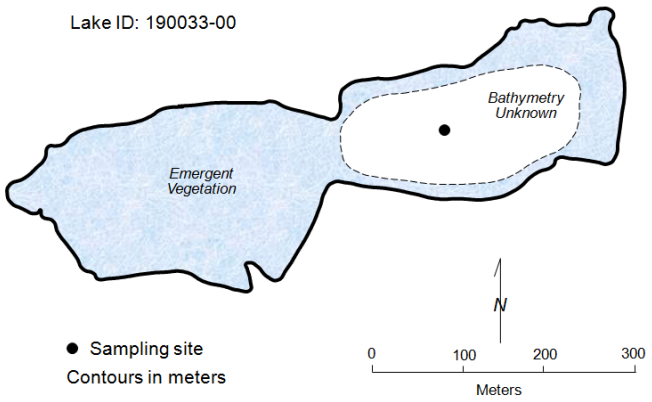
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	32	22	44	C
CLA (µg/l)	10	4.2	20	B
Secchi (m)	1.6	1.0	2.2	C
TKN (mg/l)	0.81	0.65	1.10	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with the lake's water quality database.

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

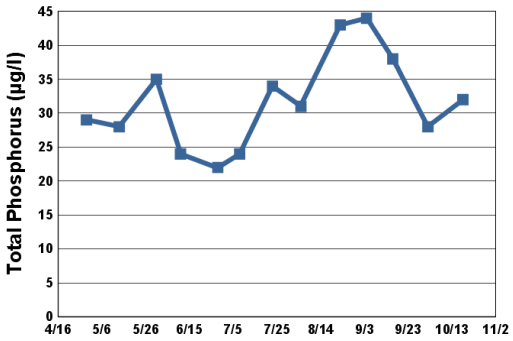
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

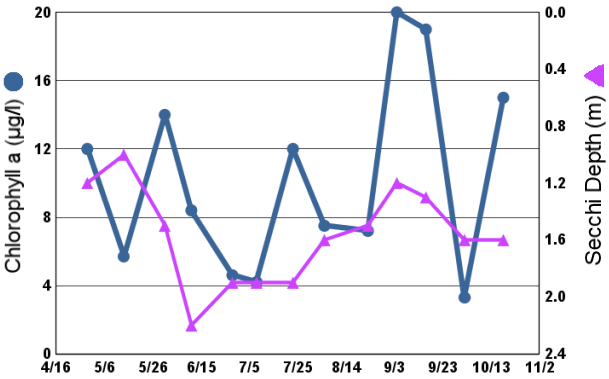
Earley Lake
Burnsville, Dakota Co.

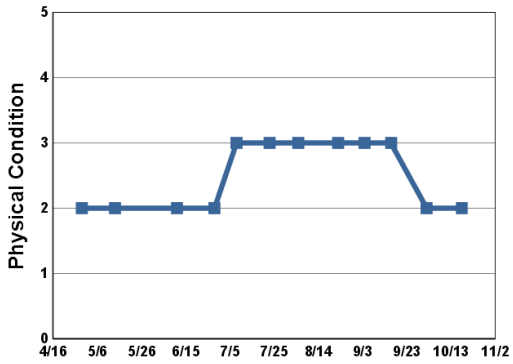


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	14.5		12	29	1.2	2	1
5/14	14.5		5.7	28	1.0	2	1
5/31	18.3		14	35	1.5		1
6/11	20.0		8.4	24	2.2	2	2
6/28	25.6		4.6	22	1.9	2	2
7/8	30.0		4.2	24	1.9	3	2
7/23	24.6		12	34	1.9	3	2
8/5	22.1		7.5	31	1.6	3	2
8/23	23.9		7.2	43	1.5	3	2
9/4	21.9		20	44	1.2	3	3
9/16	17.7		19	38	1.3	3	3
10/2	16.4		3.3	28	1.6	2	2
10/18	11.1		15	32	1.6	2	2







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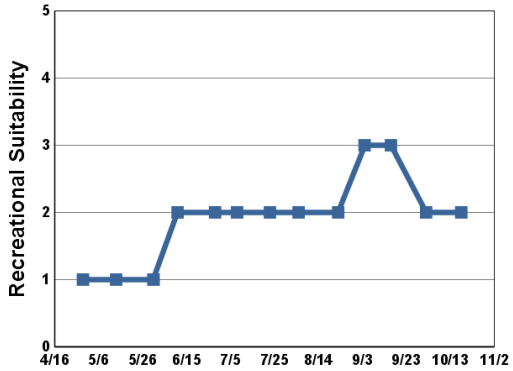


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

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

City of Lakeville staff

East Lake is a small lake located in Lakeville (Dakota County). The lake is shallow, with a maximum depth of about 3.0 m.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

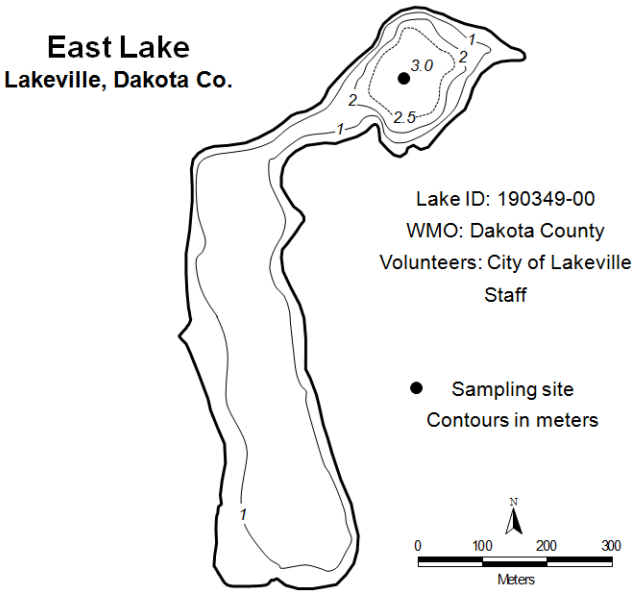
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	82	40	194	D
CLA (µg/l)	47	2.9	170	C
Secchi (m)	0.9	0.2	2.1	D
TKN (mg/l)	1.39	0.70	2.90	
			Lake Grade	D

The lake received a lake grade of D for 2013. The lake grades for this have fluctuated between D and F. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

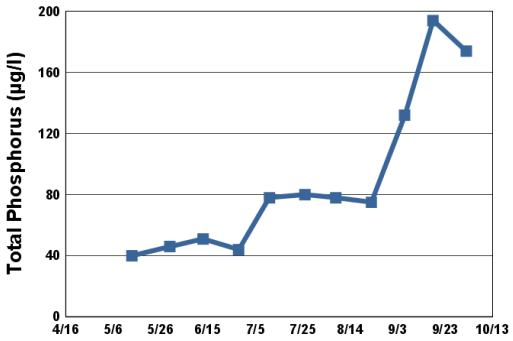
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

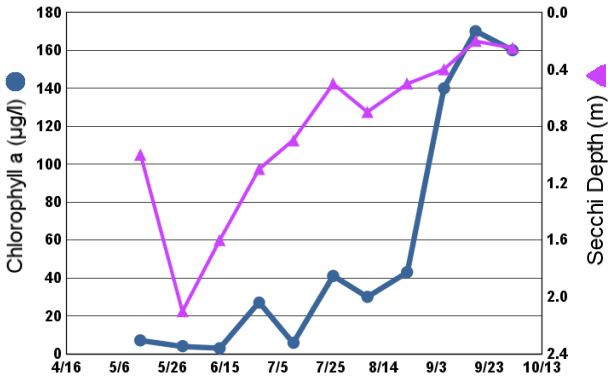
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

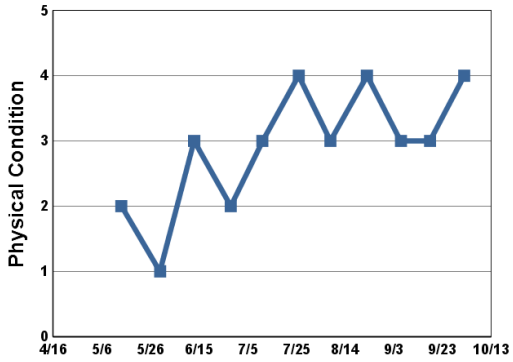


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	16.0		7.0	40	1.0	2	1
5/30	16.0		4.0	46	2.1	1	1
6/13	22.0		2.9	51	1.6	3	3
6/28	25.3		27	44	1.1	2	2
7/11	28.0		5.8	78	0.9	3	4
7/26	24.9		41	80	0.5	4	4
8/8	24.5		30	78	0.7	3	4
8/23	25.0		43	75	0.5	4	4
9/6	24.6		140	132	0.4	3	4
9/18	19.7		170	194	0.2	3	5
10/2	17.0		160	174	0.3	4	4







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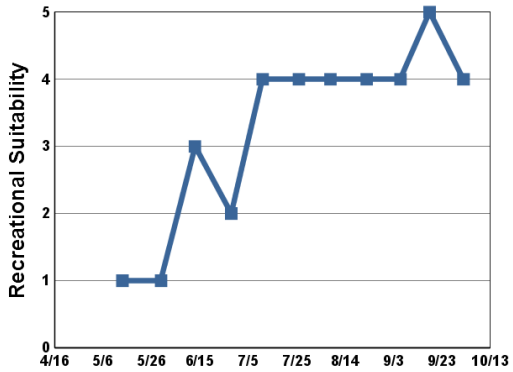

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: Washington Conservation District staff

East Boot Lake is located in May Township (Washington County). The mean and maximum depths of the 47-acre lake are 8.2 m (27 feet) and 0.9 m (3 feet), respectively.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	12	73	B
CLA (µg/l)	4.3	1.4	7.1	A
Secchi (m)	3.8	2.1	5.6	A
TKN (mg/l)	0.80	0.71	0.94	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with recent years in its historical database. The lake continues to achieve better water quality than it used to receive in the period from the mid 1990s and early 2000s. Additional monitoring is suggested to help determine if the lake continues to improve.

Throughout the monitoring period, the volunteer's opinions of 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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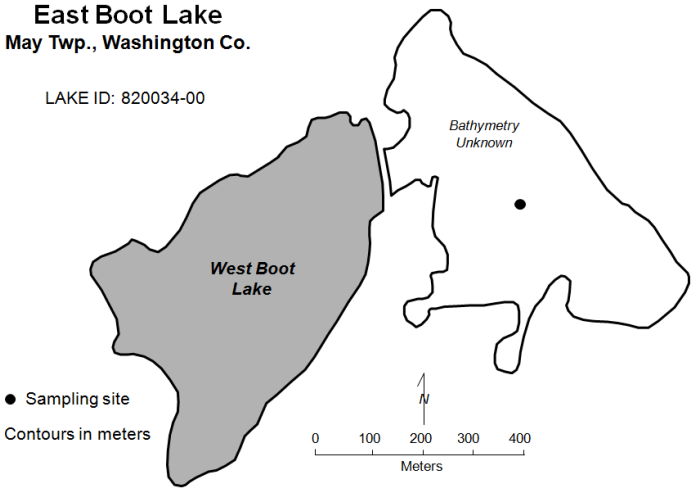
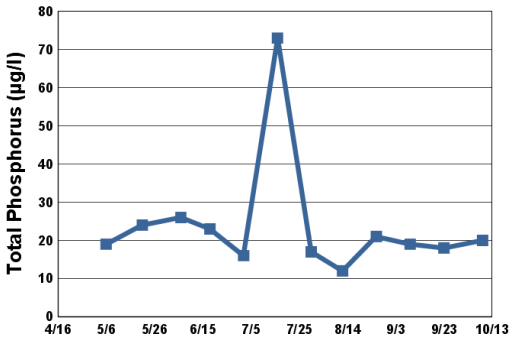
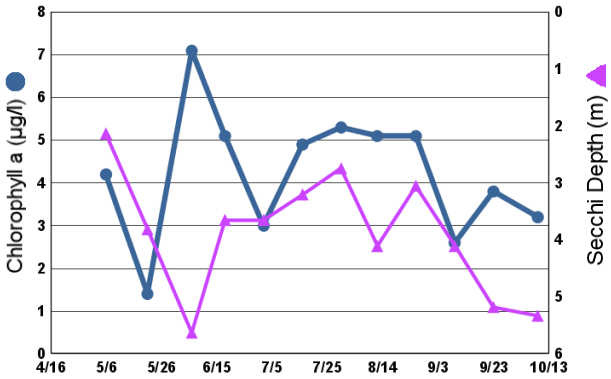
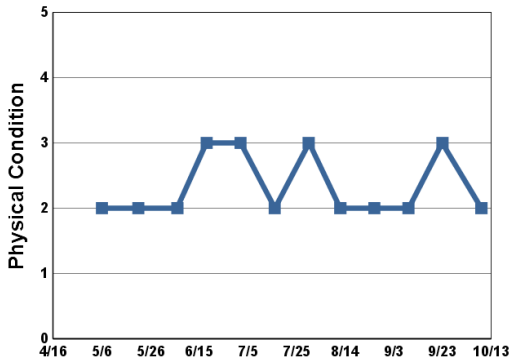


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	9.0		4.2	19	2.1	2	4
5/21	18.9		1.4	24	3.8	2	2
6/6	17.4	9.0	7.1	26	5.6	2	4
6/18	22.6	10.1	5.1	23	3.7	3	3
7/2	25.3	9.2	3.0	16	3.7	3	2
7/16	27.8	9.0	4.9	73	3.2	2	3
7/30	22.5	8.0	5.3	17	2.7	3	3
8/12	23.9	8.3	5.1	12	4.1	2	3
8/26	26.9	7.3	5.1	21	3.0	2	4
9/9	23.6	5.9	2.6	19	4.1	2	4
9/23	18.2	7.4	3.8	18	5.2	3	3
10/9	15.7	8.1	3.2	20	5.3	2	2







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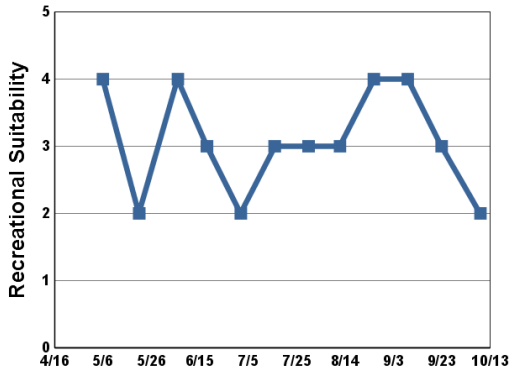

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Echo Lake (82–0135) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Echo Lake is a 41-acre lake located within the City of Mahtomedi (Washington County). The mean and maximum depth of the lake is 0.8 m (2.6 feet) and 1.8 m (6 feet), respectively. Because of the shallowness of the lake, its entire area is considered littoral (the shallow [0-15 foot depth] area dominated by aquatic vegetation), and it never maintains a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column) through the summer months. The lake's surface area and mean depth translate to a volume of roughly 107 ac-ft. There is no public access to the lake.

The lake's surface area and watershed size (194 acres) translates to a 4.7:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	19	39	B
CLA (µg/l)	9.0	4.8	19	A
Secchi (m)	1.8	1.7	2.0	
TKN (mg/l)	1.03	0.78	1.40	
			Lake Grade	

There was an insufficient quantity of data to determine a Secchi grade for 2013. For a majority of the site visits, the Secchi disk was either visible on the lake bottom or obscured by aquatic macrophytes. There was notable reduction in the means for TP and CLA in 2013 compared to previous years. There is an insufficient quantity of data to determine water quality trends for this lake, therefore, to better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Throughout the monitoring period, the volunteer's opinions of 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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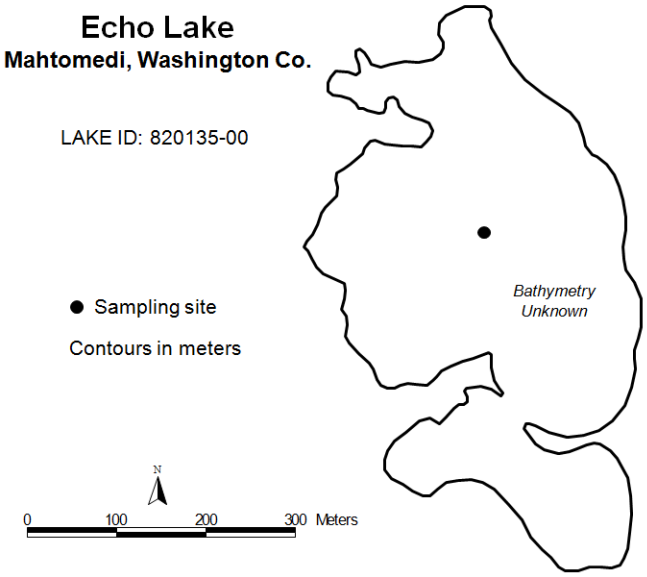
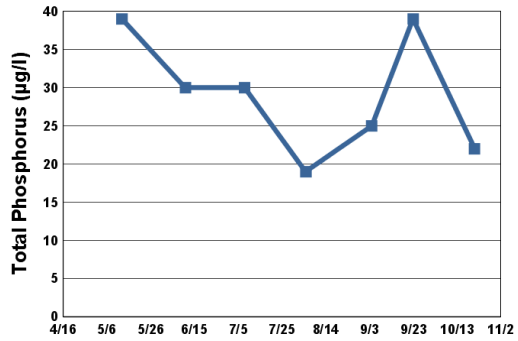
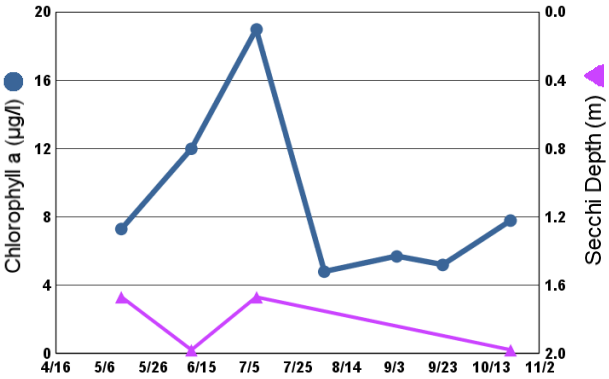
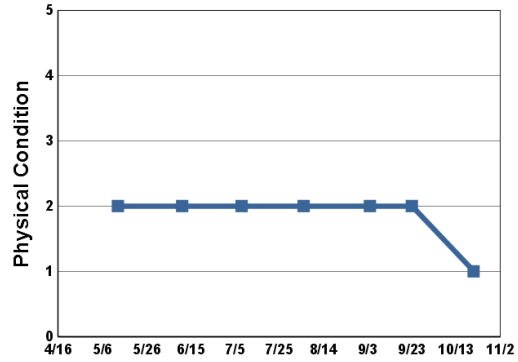


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	13.6	9.5	7.3	39	1.7	2	2
6/11	20.5	10.1	12	30	2.0	2	3
7/8	27.9	9.6	19	30	1.7	2	3
8/5	22.7	7.9	4.8	19		2	3
9/4	22.1	5.4	5.7	25		2	4
9/23	17.7	9.1	5.2	39		2	4
10/21	8.3	7.6	7.8	22	2.0	1	1







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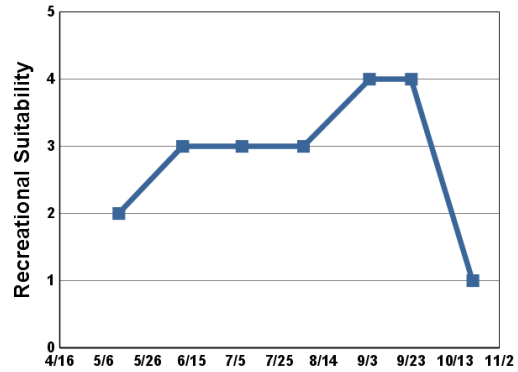

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Edith Lake (82–0004) *Valley Branch Watershed District*

Joseph Reithmeyer; Washington Conservation District staff

Edith Lake is a 81-acre lake located within Afton (Washington County). The lake has a maximum depth of approximately 13.0 m (43 feet). Roughly 42 percent of the lake's surface area is considered littoral zone (the 0-15 foot depth area of aquatic plant dominance). The lake has a watershed of 1,576 acres, which gives a watershed-to-lake area ratio of 19:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	3	49	A
CLA (µg/l)	6.9	1.9	32	A
Secchi (m)	2.3	0.9	5.0	B
TKN (mg/l)	0.66	0.43	1.00	
			Lake Grade	A

\

The lake received a lake grade of A for 2013, which is consistent with its limited historical database. For the years that the lake has been monitored via the CAMP, the lake has fluctuated between a lake grade of A and B. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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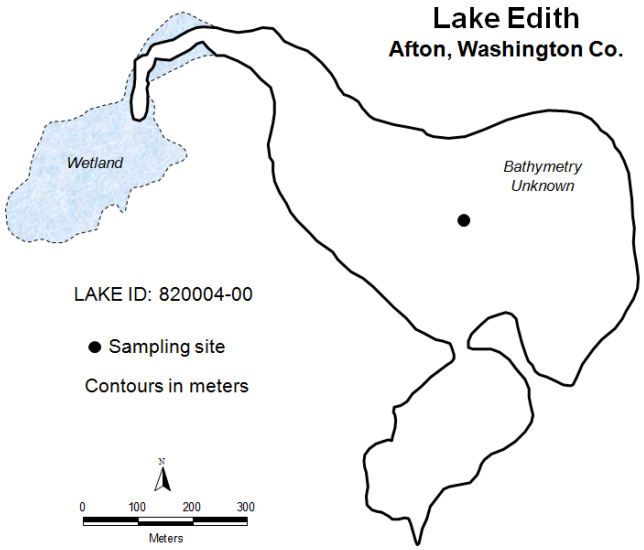
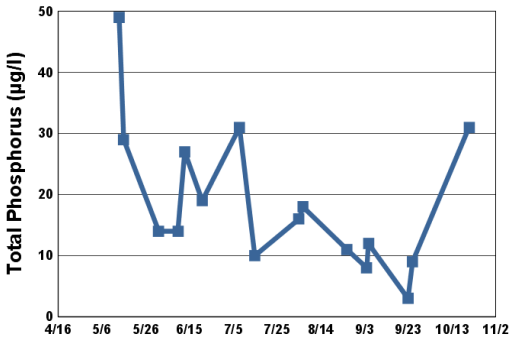
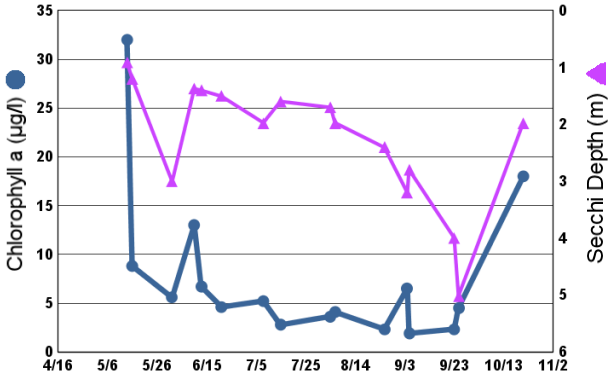
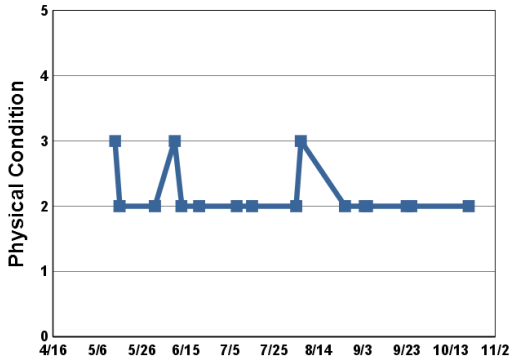


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	13.3	16.7	32	49	0.9	3	4
5/16	18.2		8.8	29	1.2	2	2
6/1	20.8		5.6	14	3.0	2	2
6/10	20.4	11.3	13	14	1.4	3	3
6/13	22.1		6.7	27	1.4	2	2
6/21	25.3		4.6	19	1.5	2	2
7/8	26.8	8.9	5.2	31	2.0	2	3
7/15	29.3		2.8	10	1.6	2	2
8/4	22.8		3.6	16	1.7	2	2
8/6	22.2	9.9	4.1	18	2.0	3	3
8/26	28.4		2.3	11	2.4	2	2
9/4	24.2	8.4	6.5	8	3.2	2	3
9/5	24.5		1.9	12	2.8	2	2
9/23	18.5		2.3	3	4.0	2	2
9/25	18.2	8.7	4.5	9	5.0	2	2
10/21	10.7	8.6	18	31	2.0	2	1







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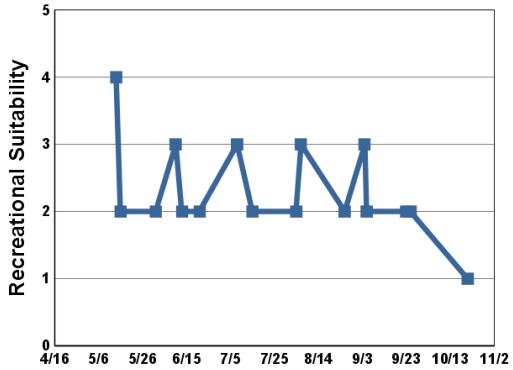

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Lake Elmo (82–0106) *Valley Branch Watershed District*

Volunteer: Wendy Griffin, Jeff Berg

Lake Elmo is located in Lake Elmo (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity (METC 2007).The 284-acre lake has a maximum depth of 41.7 m (137 ft) which is the deepest lake in the TCMA. The MN DNR has designated the lake as being infested with Eurasion water milfoil (Myriophyllumspicatum). The MPCA has listed the lake as impaired for perfluorooctane (PFO) content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	8	31	A
CLA (µg/l)	2.4	1.4	3.3	A
Secchi (m)	5.7	2.8	7.0	A
TKN (mg/l)	0.60	0.44	1.00	
			Lake Grade	A

The lake received a lake grade of A for 2013. The lake has typically received A lake grades since the late 1980s. Continued monitoring is suggested to continue to watch potential TP changes in the lake.

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

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

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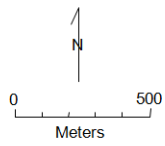
Lake Elmo

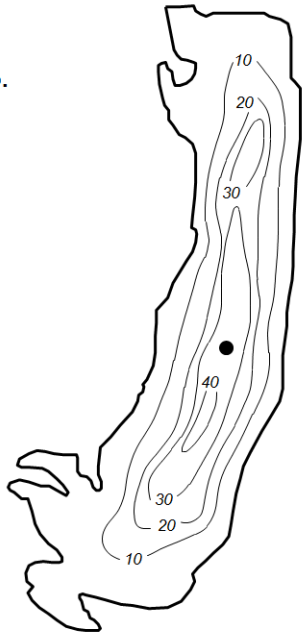
Lake Elmo, Washington Co.

Lake ID: 820106-00

● Sampling site

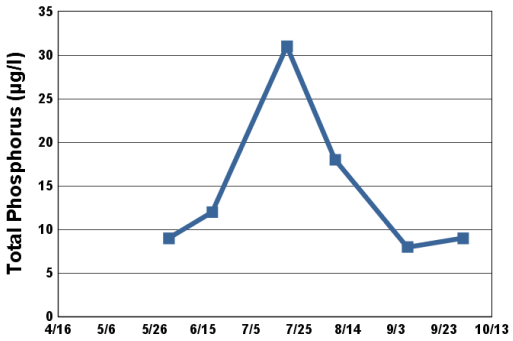
Contours in meters

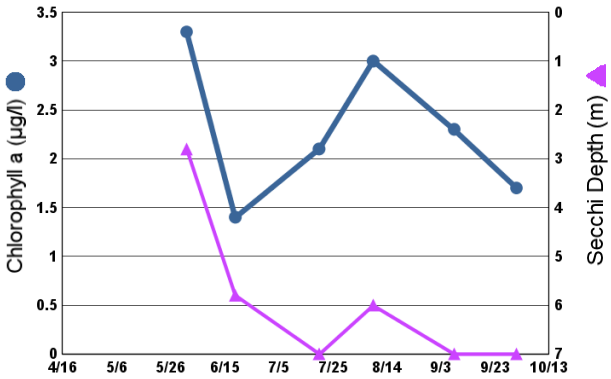


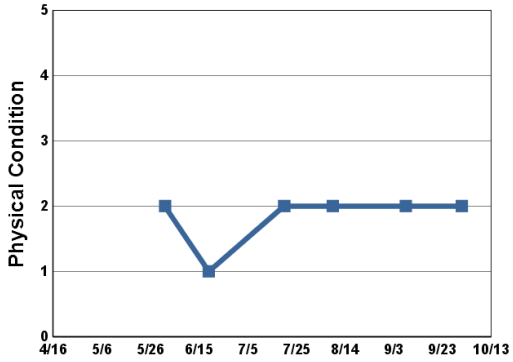


2013 Data

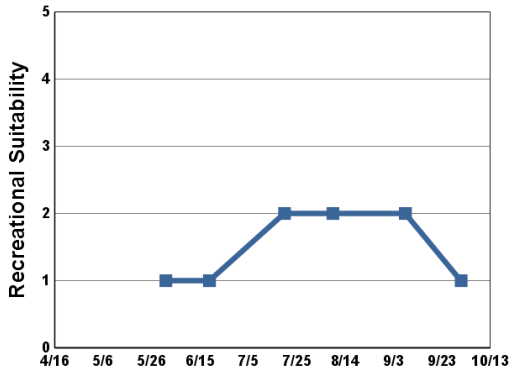
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/1	18.4		3.3	9	2.8	2	1
6/19	22.3		1.4	12	5.8	1	1
7/20	25.5		2.1	31	7.0	2	2
8/9	23.0		3.0	18	6.0	2	2
9/8	24.7		2.3	8	7.0	2	2
10/1	18.2		1.7	9	7.0	2	1







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Farquar Lake (19–0023) *City of Apple Valley*

Volunteer: Jeff Christianson

Farquar Lake is located in the City of Apple Valley (Dakota County). The lake covers an area of 67 acres and has a maximum depth of 3.0 m (10 feet). The lake's mean depth of 1.4 m (4.6 feet) and surface area translates to an approximate lake volume of 290 ac-ft. Because the maximum depth is only 3.0 m, the entire lake area is considered littoral (the area of aquatic plant dominance), and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

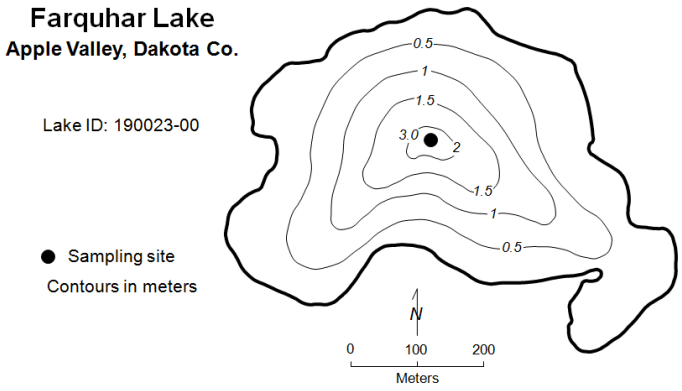
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	95	46	155	D
CLA (µg/l)	26	9.8	61	C
Secchi (m)	0.8	0.5	1.1	D
TKN (mg/l)	1.75	1.20	2.50	
			Lake Grade	D

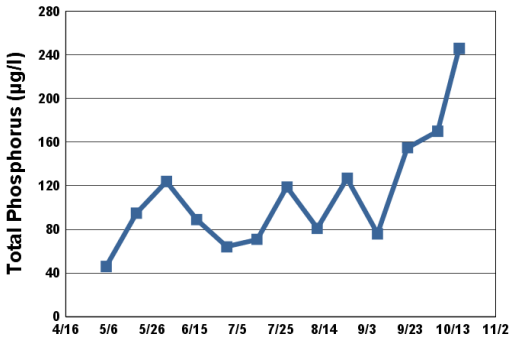
The lake received a lake grade of D for 2013. The overall water quality in 2013 appears somewhat improved compared to the previous 14 years, and similar to water quality that the lake experienced in the mid 1990s. Continued monitoring is recommended to determine if this apparent change may be a developing trend.

Throughout the monitoring period, the volunteer's opinions of 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/.

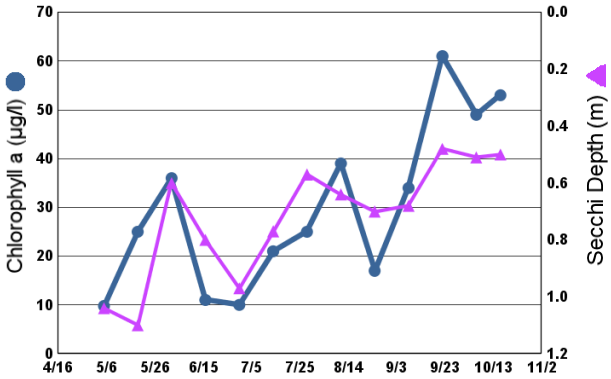
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

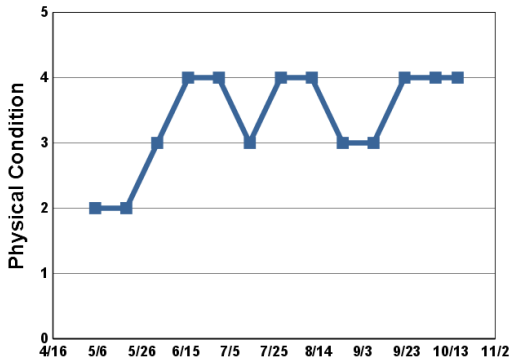




2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	13.2		9.8	46	1.0	2	1
5/19	17.1		25	95	1.1	2	2
6/2	20.1		36	124	0.6	3	3
6/16	22.3		11	89	0.8	4	3
6/30	27.4		10	64	1.0	4	3
7/14	27.1		21	71	0.8	3	3
7/28	23.3		25	119	0.6	4	3
8/11	26.0		39	81	0.6	4	3
8/25	27.2		17	127	0.7	3	2
9/8	24.5		34	76	0.7	3	3
9/22	19.3		61	155	0.5	4	3
10/6	15.8		49	170	0.5	4	3
10/16	12.3		53	246	0.5	4	3





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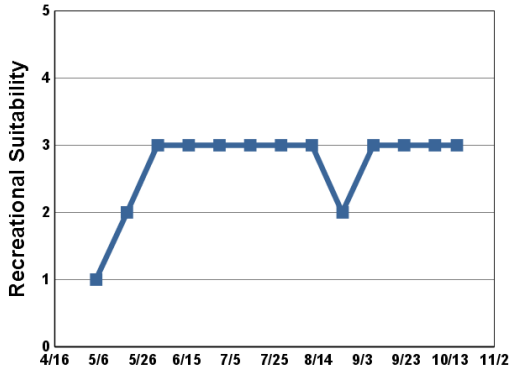
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

Fireman's Clayhole Lake (10–0226) *Carver County Environmental Services*

Volunteer: Carver County staff

Fireman's Lake is located within the City of Chaska (Carver County). This lake has an area of 8 acres and a maximum depth of 7.0 m (23 feet). Roughly 88 percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance). The DNR has designated the lake as being infested with Eurasian Water Milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

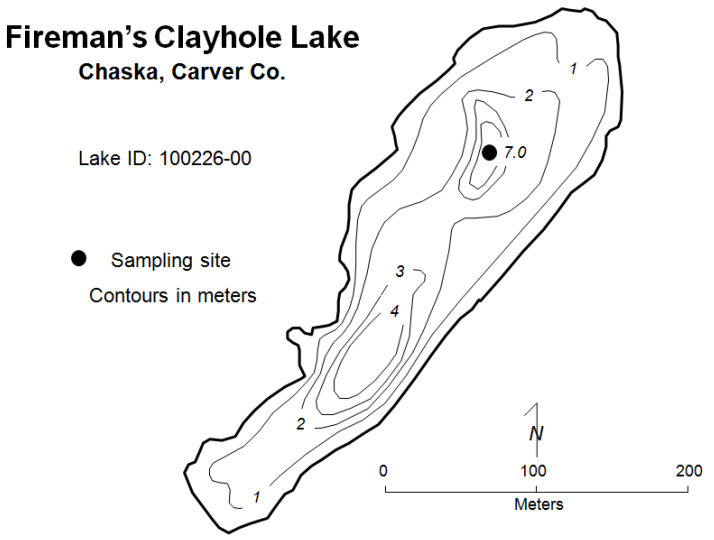
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	16	46	B
CLA (µg/l)	8.1	2.1	29	A
Secchi (m)	2.2	1.6	3.1	B
TKN (mg/l)	0.52	0.35	0.69	
			Lake Grade	B

The lake received a lake grade of B for 2013, which is consistent with its historical database. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

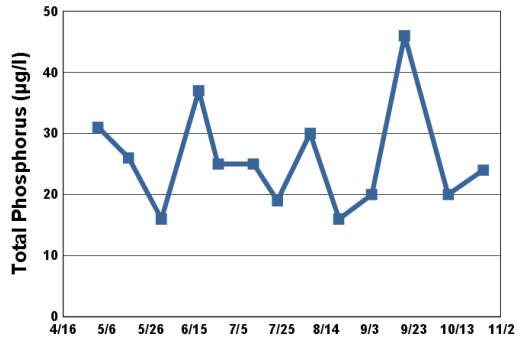
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

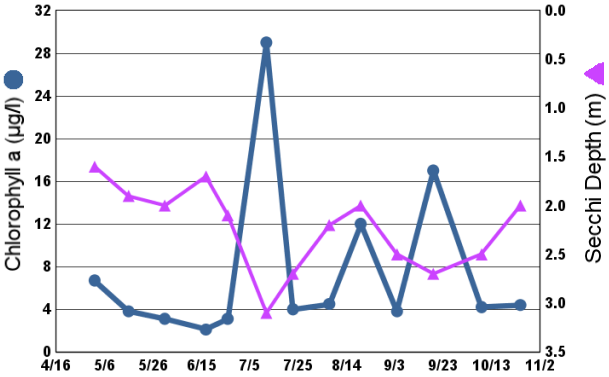
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

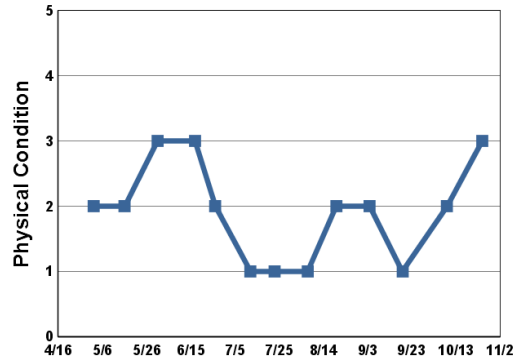


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	12.6	14.6	6.7	31	1.6	2	2
5/16	18.1	13.0	3.8	26	1.9	2	2
5/31	19.9	13.2	3.1	16	2.0	3	3
6/17	24.1	8.1	2.1	37	1.7	3	3
6/26	28.9	11.2	3.1	25	2.1	2	2
7/12	28.2	9.1	29	25	3.1	1	1
7/23	26.7	6.5	4.0	19	2.7	1	1
8/7	24.0	11.4	4.5	30	2.2	1	1
8/20	26.7	10.3	12	16	2.0	2	1
9/4	25.9	7.2	3.8	20	2.5	2	2
9/19	21.1	12.8	17	46	2.7	1	1
10/9	16.2	9.0	4.2	20	2.5	2	2
10/25	9.3		4.4	24	2.0	3	2







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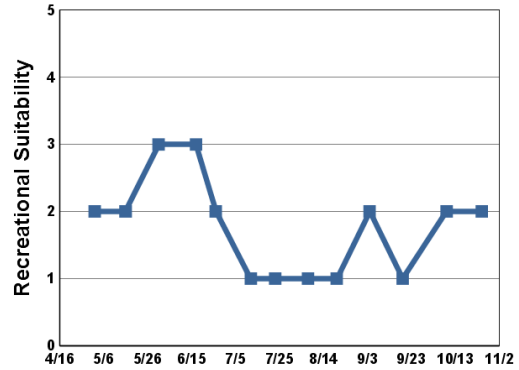

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Fish Lake [Spring Lake] (70–0069) *Prior Lake — Spring Lake Watershed District*

Volunteer: Jon Haferman, Abby Haferman

Fish Lake is located in Spring Lake Township (Scott County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 171 acres. The lake has a mean and a maximum depth of 4.4 m (14 feet) and 8.5 m (28 feet). The MPCA has listed the lake as impaired for mercury content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	45	23	70	C
CLA (µg/l)	25	13	39	C
Secchi (m)	1.1	0.9	1.3	D
TKN (mg/l)	1.12	0.84	1.40	
			Lake Grade	C

The lake received a lake grade of C for 2013. The lake appears to be represented overall by a lake grade of C given its historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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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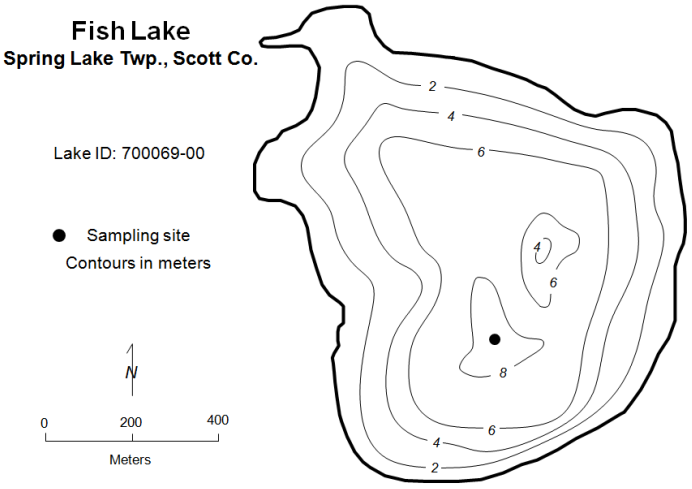
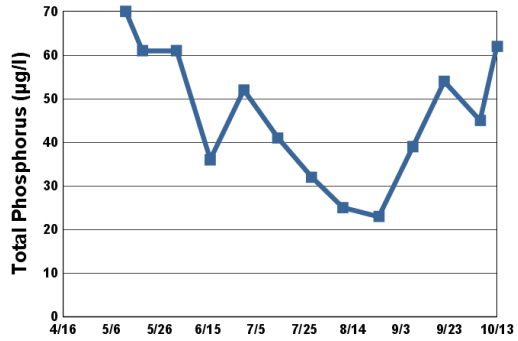
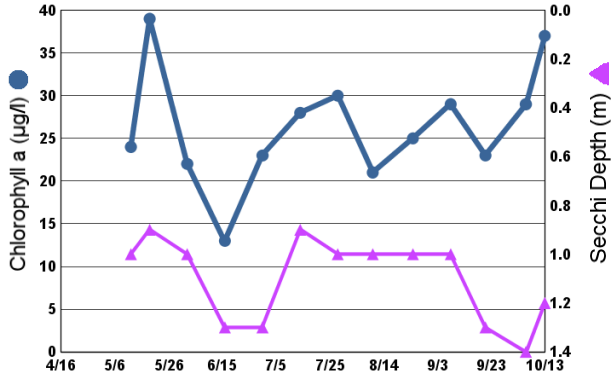
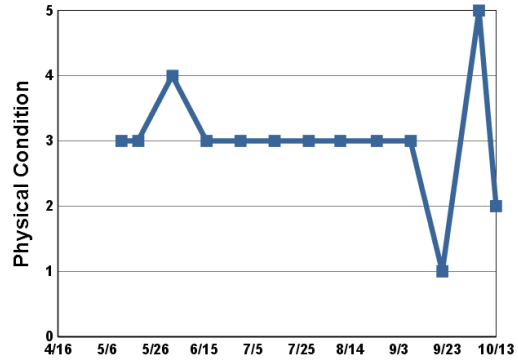


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/12	10.5		24	70	1.0	3	3
5/19	16.6		39	61	0.9	3	3
6/2	17.8		22	61	1.0	4	4
6/16	22.7		13	36	1.3	3	2
6/30	24.8		23	52	1.3	3	2
7/14	26.3		28	41	0.9	3	2
7/28	23.2		30	32	1.0	3	2
8/10	24.6		21	25	1.0	3	2
8/25	26.3		25	23	1.0	3	2
9/8	25.3		29	39	1.0	3	2
9/21	19.7		23	54	1.3	1	1
10/6	16.5		29	45	1.4	5	3
10/13	16.1		37	62	1.2	2	2







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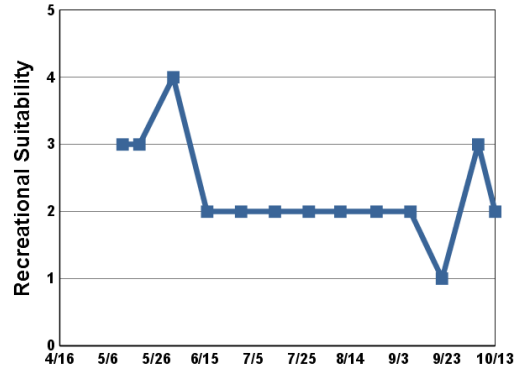

1 = Beautiful
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3 = Swimming Impaired
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Fish Lake [Woodbury] (82–0093) *Washington Conservation District*

Volunteer: Washington Conservation District staff

Fish Lake is located in the City of Woodbury (Washington County). It has a surface area of approximately 5 acres. Little morphological information is available for the lake. No historical water quality data for the lake was available in the STORET nationwide water quality database.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	79	30	224	D
CLA (µg/l)	14	4.2	36	B
Secchi (m)	0.9	0.3	1.4	D
TKN (mg/l)	1.14	0.91	1.60	
			Lake Grade	C

The lake received a lake grade of C in 2013. The water quality in 2013 appears improved compared to the previous 3 years, given that reductions in TP and CLA concentrations. Additional monitoring is suggested to build the water quality database of this lake.

Throughout the monitoring period, the volunteer's opinions of 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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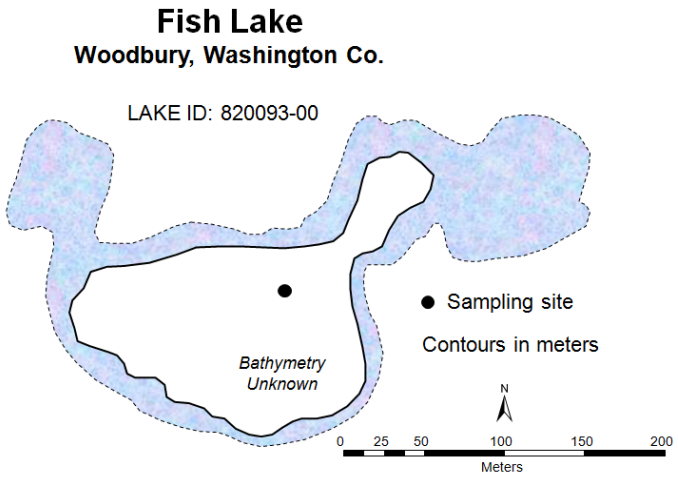
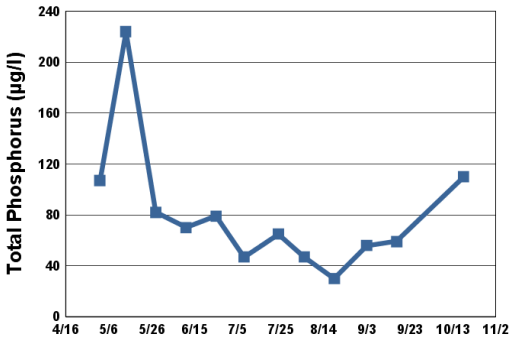
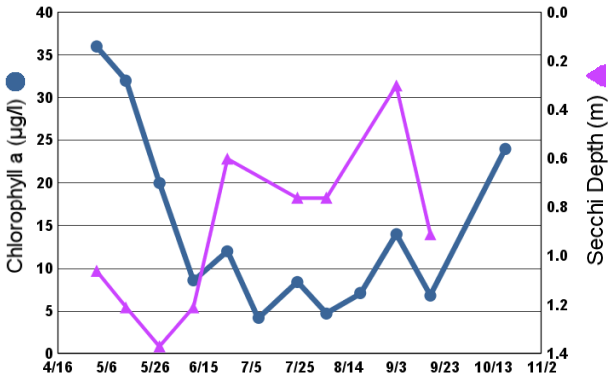
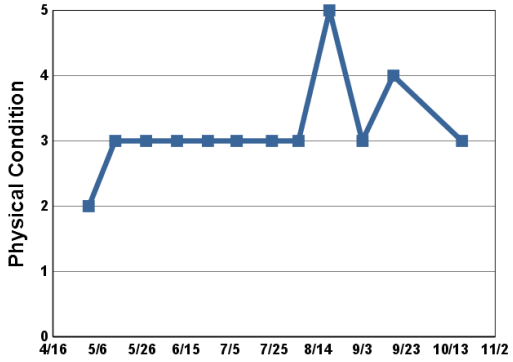


2013 Data

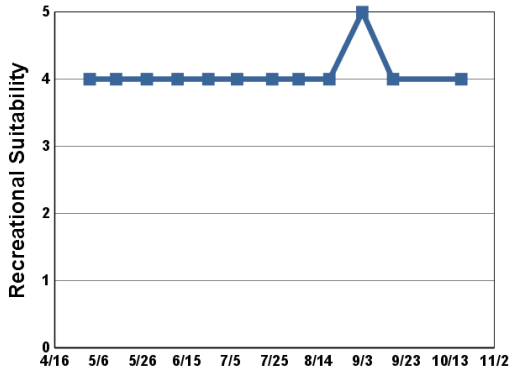
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	10.5	7.4	36	107	1.1	2	4
5/14	14.8	9.0	32	224	1.2	3	4
5/28	15.3	6.0	20	82	1.4	3	4
6/11	19.0	10.0	8.6	70	1.2	3	4
6/25	24.6	6.6	12	79	0.6	3	4
7/8	26.2	8.2	4.2	47		3	4
7/24	23.2	3.6	8.4	65	0.8	3	4
8/5	20.2	4.4	4.7	47	0.8	3	4
8/19	26.4	7.5	7.1	30		5	4
9/3	19.9	2.2	14	56	0.3	3	5
9/17	15.9	4.4	6.8	59	0.9	4	4
10/18	10.4	9.1	24	110		3	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Fish Lake [Grant Township] (82–0137) *Rice Creek Watershed District*

Volunteer: Washington Conservation District staff

Fish Lake is located in the Township of Grant (Washington County). It has a surface area of 21 acres and a maximum depth of 10.4 meters.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	34	91	
CLA (µg/l)	13	3.1	33	
Secchi (m)	1.7	1.1	2.7	
TKN (mg/l)	1.33	1.20	1.50	
			Lake Grade	

There were insufficient data to calculate grades for 2013. The means values of TP, CLA, Secchi depth, and TKN compared reasonably well with those received in 2012. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

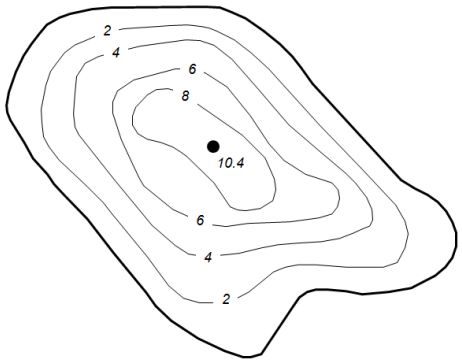
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

Fish Lake
Grant, Washington Co.

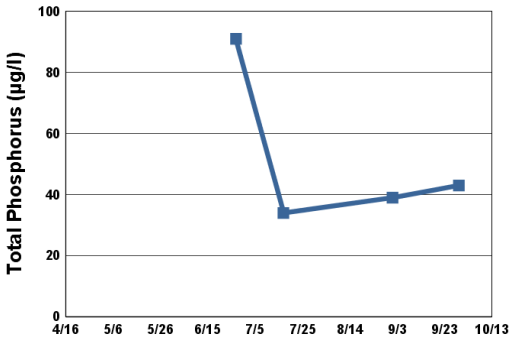
Lake ID: 820137-00

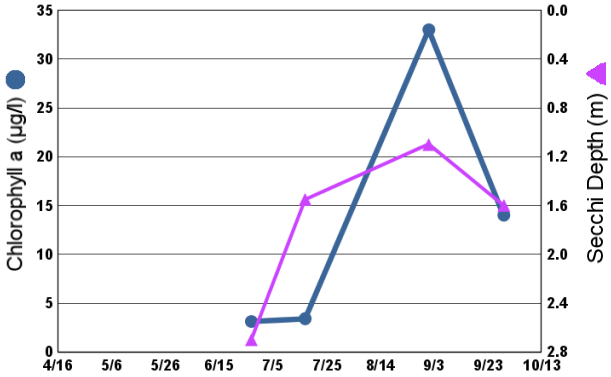
● Sampling site
Contours in meters

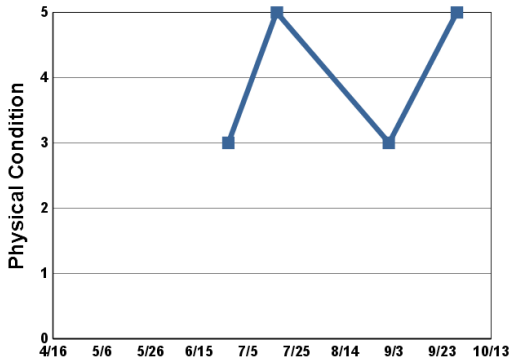


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/27	28.3		3.1	91	2.7	3	3
7/17	31.9		3.4	34	1.6	5	5
9/1	25.6		33	39	1.1	3	4
9/29	19.0		14	43	1.6	5	4







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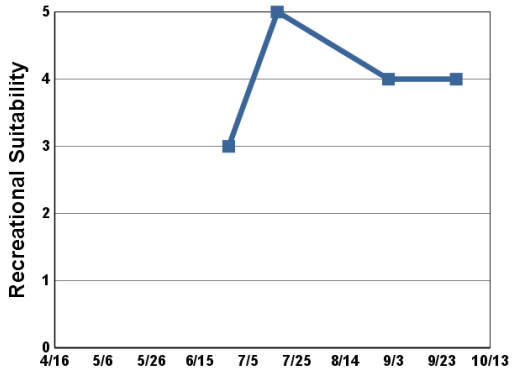

1 = Beautiful
2 = Minor Aesthetic Problem
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Forest Lake [East Basin] (82–0159) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Judy Weninger, Washington Conservation District staff

Forest Lake is located in the City of Forest Lake (Washington County). It is divided into three distinct basins. The entire lake is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The MN DNR has designated the lake as being infested with Flowering rush (*Butomus umbellatus*). The MPCA has listed the lake as impaired for polychlorinated biphenyl (PCB) content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	10	45	B
CLA (µg/l)	10	2.0	44	B
Secchi (m)	2.0	1.0	3.3	C
TKN (mg/l)	0.86	0.43	1.40	
			Lake Grade	B

The east basin received a lake grade of B for 2013. The east typically basin has received a C grade since 1980.

Throughout the monitoring period, the volunteer's opinions of 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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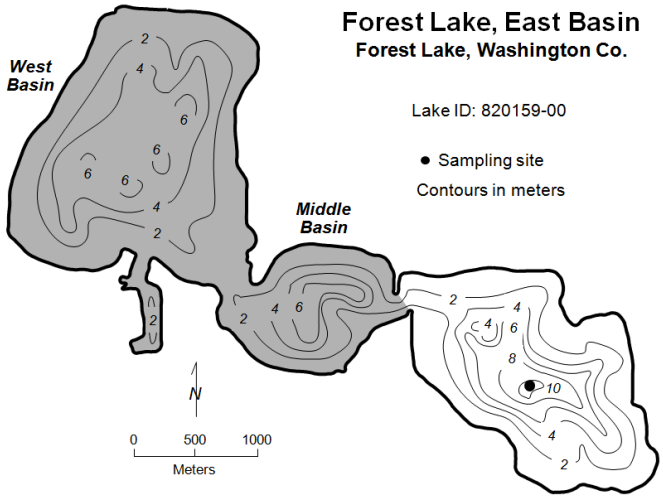
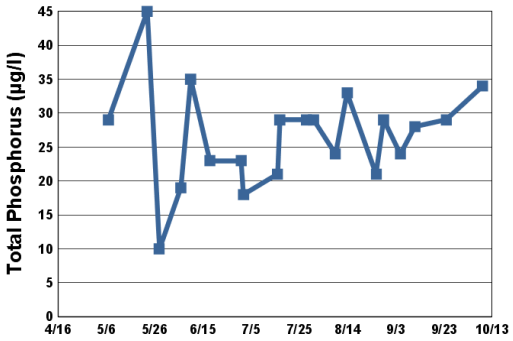
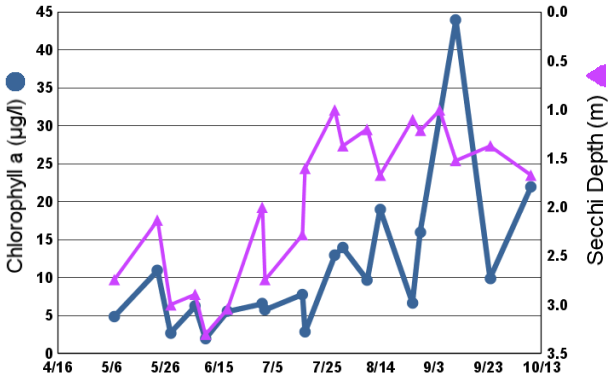
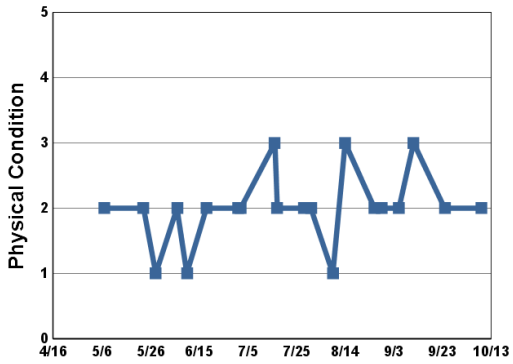


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	11.3	10.7	4.9	29	2.7	2	2
5/23	14.4	9.3	11	45	2.1	2	2
5/28	14.4		2.7	10	3.0	1	1
6/6	16.4	7.7	6.3	19	2.9	2	2
6/10	18.5		2.0	35	3.3	1	1
6/18	21.5	9.5	5.6	23	3.0	2	2
7/1	24.7		6.6	23	2.0	2	1
7/2	24.5	8.8	5.8	18	2.7	2	2
7/16	26.3	8.0	7.8	21	2.3	3	3
7/17	28.5		2.9	29	1.6	2	1
7/28	21.6		13	29	1.0	2	1
7/31	21.7	7.6	14	29	1.4	2	2
8/9	23.5		9.7	24	1.2	1	1
8/14	23.2	8.9	19	33	1.7	3	2
8/26	27.4		6.7	21	1.1	2	1
8/29	27.1	8.7	16	29	1.2	2	2
9/5	23.3			24	1.0	2	1
9/11	23.2	7.5	44	28	1.5	3	2
9/24	17.8	8.1	9.9	29	1.4	2	3
10/9	15.5	9.1	22	34	1.7	2	2







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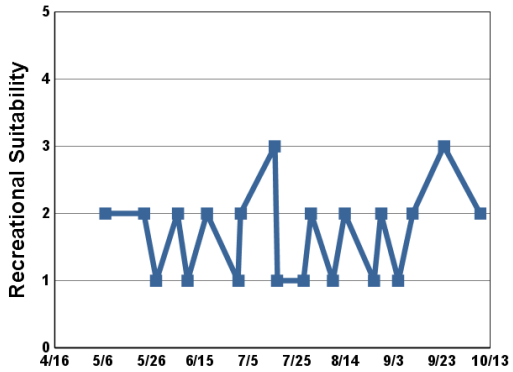


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Forest Lake [Middle Basin] (82–0159) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Jim Hannon, Washington Conservation District staff

Forest Lake is located in the City of Forest Lake (Washington County). It is divided into three distinct basins. The entire lake is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The MN DNR has designated the lake as being infested with Flowering rush (*Butomus umbellatus*). The MPCA has listed the lake as impaired for polychlorinated biphenyl (PCB) content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

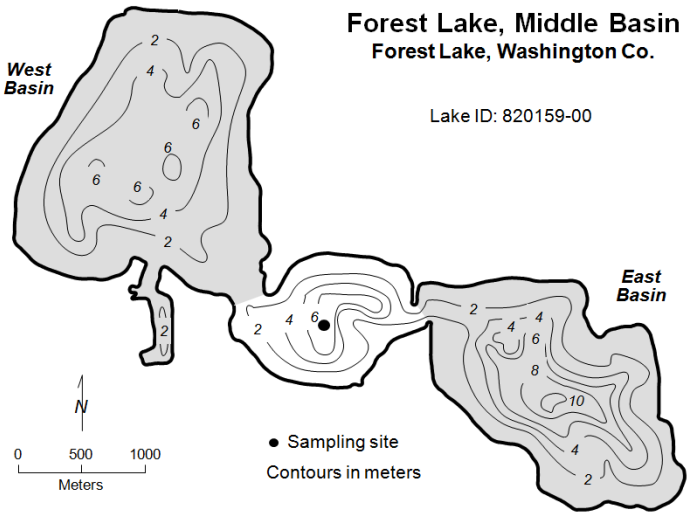
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	12	82	B
CLA (µg/l)	13	4.3	65	B
Secchi (m)	1.8	1.1	3.0	C
TKN (mg/l)	0.99	0.70	1.90	
			Lake Grade	B

The middle basin received a lake grade of B for 2013. The middle basin typically has received a C grade since 1984, with the occasional B.

Throughout the monitoring period, the volunteer's opinions of 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.

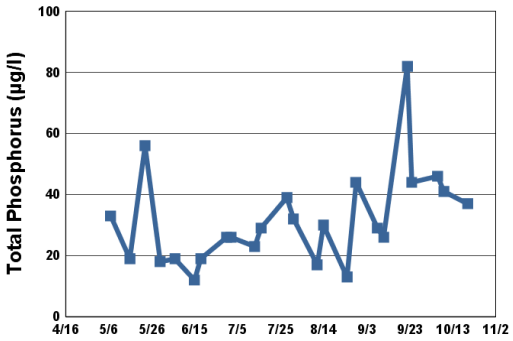
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

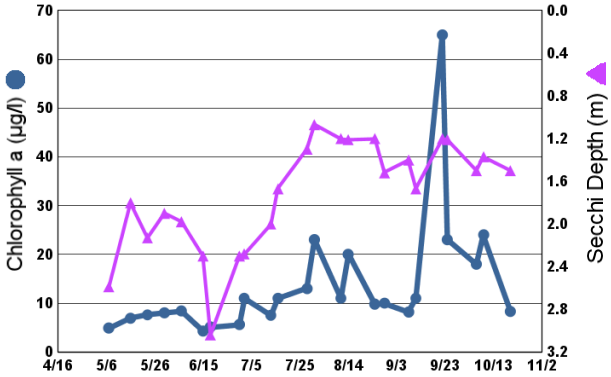
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

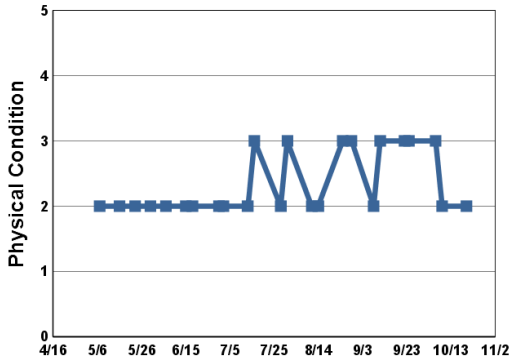


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	12.3	10.6	4.9	33	2.6	2	2
5/16	16.2		6.9	19	1.8	2	1
5/23	14.6	8.7	7.6	56	2.1	2	2
5/30	16.9		8.0	18	1.9	2	1
6/6	16.5	7.8	8.4	19	2.0	2	2
6/15	22.1		4.3	12	2.3	2	1
6/18	21.6	8.9	5.1	19	3.0	2	2
6/30	24.4		5.6	26	2.3	2	1
7/2	24.7	9.0	11	26	2.3	2	2
7/13	26.2		7.5	23	2.0	2	1
7/16	26.6	8.2	11	29	1.7	3	3
7/28	22.8		13	39	1.3	2	1
7/31	21.6	8.2	23	32	1.1	3	3
8/11	25.0		11	17	1.2	2	1
8/14	23.5	8.8	20	30	1.2	2	2
8/25	26.0		9.8	13	1.2	3	2
8/29	27.3	8.5	10	44	1.5	3	2
9/8	26.2		8.2	29	1.4	2	2
9/11	23.1	7.5	11	26	1.7	3	2
9/22	16.6		65	82	1.2	3	2
9/24	17.9	8.4	23	44	1.2	3	3
10/6	18.9		18	46	1.5	3	2
10/9	15.4	9.3	24	41	1.4	2	2
10/20	8.6		8.3	37	1.5	2	2







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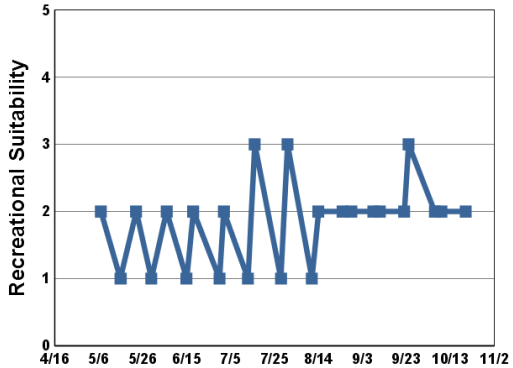

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Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Forest Lake [West Basin] (82–0159) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Steve Schmaltz, Washington Conservation District staff

Forest Lake is located in the City of Forest Lake (Washington County). It is divided into three distinct basins. The entire lake is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The MN DNR has designated the lake as being infested with Flowering rush (*Butomus umbellatus*). The MPCA has listed the lake as impaired for polychlorinated biphenyl (PCB) content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	32	10	48	C
CLA (µg/l)	15	2.8	33	B
Secchi (m)	1.3	0.5	2.3	C
TKN (mg/l)	1.03	0.67	1.70	
			Lake Grade	C

The lake received a lake grade of C for 2013. The water quality of the west basin has fluctuated between lake grades of B and C according to its historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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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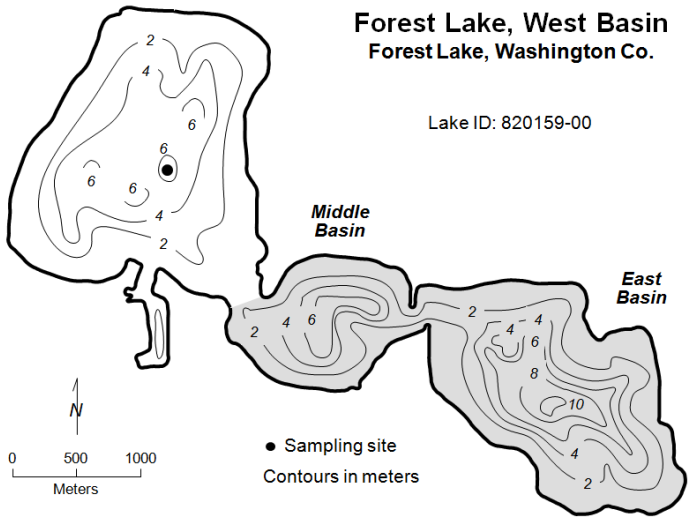
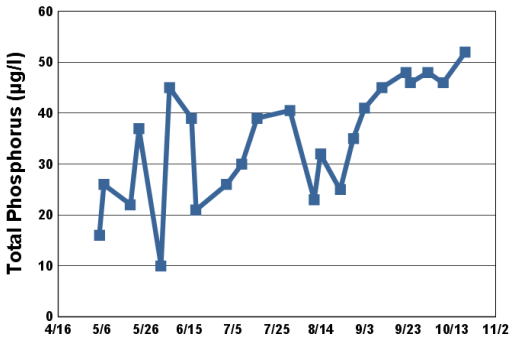
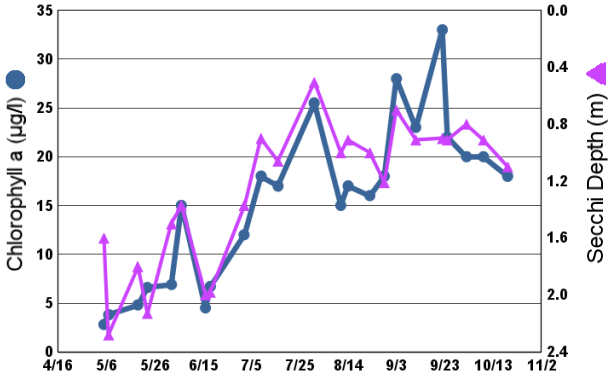
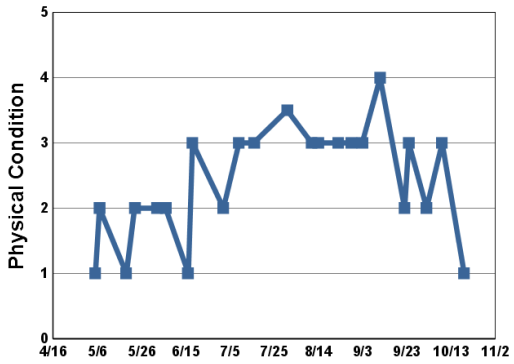


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	12.8		2.8	16	1.6	1	1
5/7	14.9	10.3	3.8	26	2.3	2	2
5/19	16.2		4.8	22	1.8	1	1
5/23	14.7	8.9	6.6	37	2.1	2	2
6/2	18.2		6.9	10	1.5	2	1
6/6	16.5	8.2	15	45	1.4	2	2
6/16	21.5		4.5	39	2.0	1	1
6/18	21.0	9.3	6.7	21	2.0	3	2
7/2	24.4	8.3	12	26	1.4	2	2
7/9	24.1		18	30	0.9	3	2
7/16	26.2	8.3	17	39	1.1	3	3
7/31	23.0	8.3	26	41	0.5	4	4
8/11	25.0		15	23	1.0	3	3
8/14	23.0	8.0	17	32	0.9	3	2
8/23	25.0		16	25	1.0	3	3
8/29	26.7	8.8	18	35	1.2	3	3
9/3	24.5		28	41	0.7	3	3
9/11	23.2	7.6	23	45	0.9	4	3
9/22	17.7		33	48	0.9	2	3
9/24	17.7	9.2	22	46	0.9	3	3
10/2	17.2		20	48	0.8	2	2
10/9	15.0	9.4	20	46	0.9	3	3
10/19	10.9		18	52	1.1	1	1







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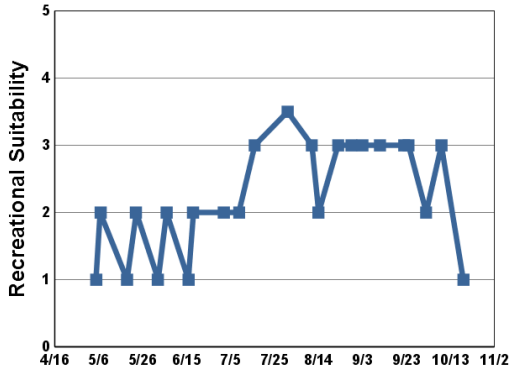


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

George Watch Lake (2–0005) *Rice Creek Watershed District*

Volunteer: Wargo Nature Center

George Watch Lake is located in the City of Lino Lakes (Anoka County). The 528-acre lake has a mean and maximum depth of 1.5 m (5 feet) and 2.0 m (6.5 feet). The 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 major land uses within the lake's immediate watershed are undeveloped and park land.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

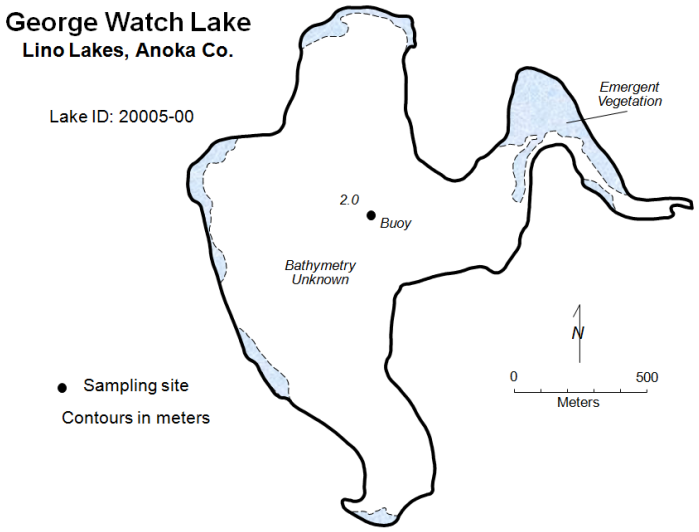
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	277	67	650	F
CLA (µg/l)	150	13	400	F
Secchi (m)	0.4	0.1	1.1	F
TKN (mg/l)	3.89	1.40	8.00	
			Lake Grade	F

The lake received a lake grade of F for 2013, which is consistent with previous lake grades received in the past. The historical lake grades seem to indicate that the lake water quality has fluctuated between an F and D lake grade throughout the 20+ years of data. The TP and Secchi grades have remained fairly consistent throughout the monitoring years with respect to the more variable CLA grades.

Throughout the monitoring period, the volunteer's opinions of 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.

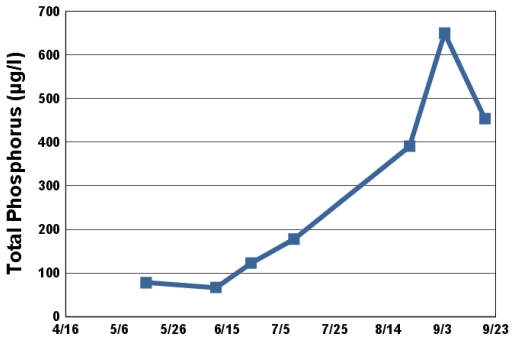
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

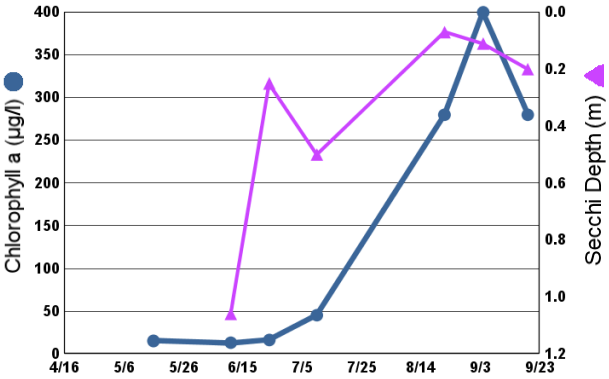
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

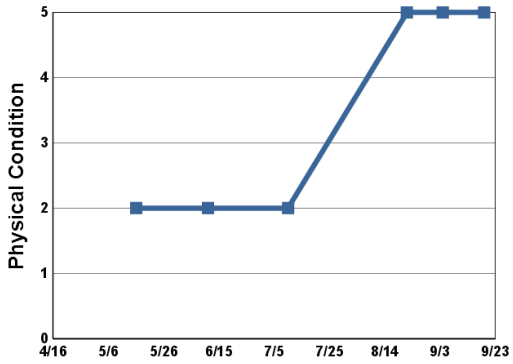


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	19.6		15	78		2	4
6/11	22.8		13	67	1.1	2	3
6/24	24.8		16	123	0.3		4
7/10	24.1		45	178	0.5	2	4
8/22	24.0		280	391	0.1	5	4
9/4	20.3		400	650	0.1	5	4
9/19	19.7		280	454	0.2	5	5







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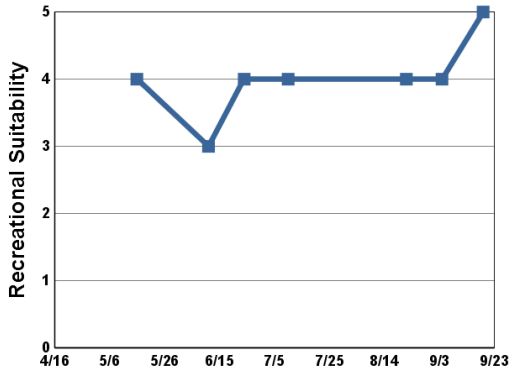
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Goggins Lake (82–0077) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Goggins Lake is located within May Township (Washington County). It has a surface area of a 11 acres. Little bathymetric information is available for the lake but the maximum depth is approximately 4.0 m (13 feet). 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	65	44	115	C
CLA (µg/l)	29	4.1	63	C
Secchi (m)	1.2	0.9	1.7	D
TKN (mg/l)	1.54	1.40	2.10	
			Lake Grade	C

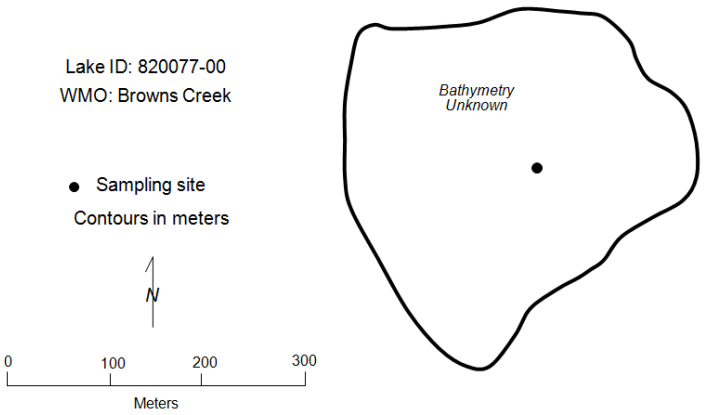
The lake received a lake grade of C for 2013 which is consistent with those received in some previous years. The lake's water quality seems to be represented by a lake grade of C or D, depending on the year. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

Throughout the monitoring period, the volunteer's opinions of 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.

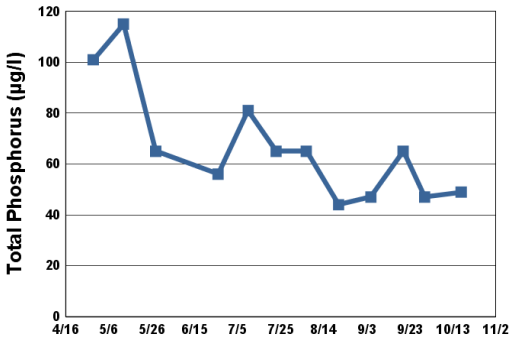
Goggins Lake
May Twp., Washington Co.

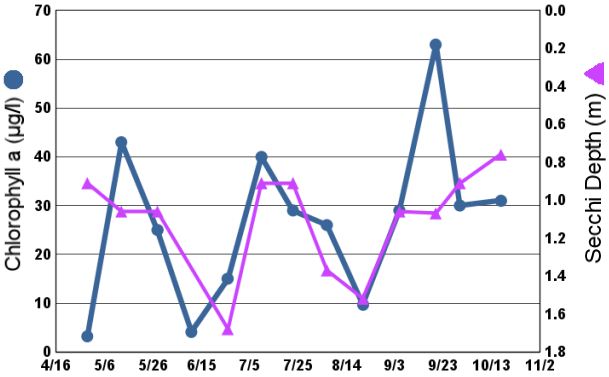
Lake ID: 820077-00
WMO: Browns Creek

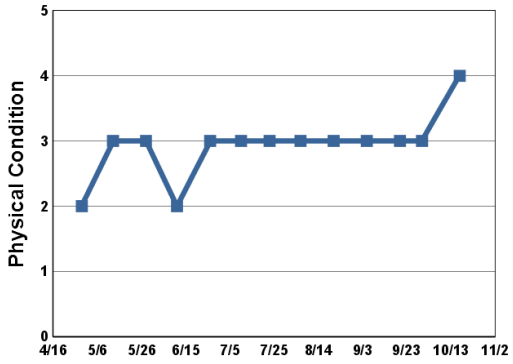


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	11.6	12.6	3.2	101	0.9	2	2
5/13	12.0	11.3	43	115	1.1	3	3
5/28	15.2	8.7	25	65	1.1	3	4
6/11	20.1	8.2	4.1			2	2
6/26	26.8	8.7	15	56	1.7	3	3
7/10	25.9	7.5	40	81	0.9	3	4
7/23	26.1	8.0	29	65	0.9	3	4
8/6	22.8	9.4	26	65	1.4	3	3
8/21	26.0	8.8	9.7	44	1.5	3	3
9/5	23.5	8.2	29	47	1.1	3	4
9/20	18.8	9.0	63	65	1.1	3	4
9/30	17.1	8.7	30	47	0.9	3	4
10/17	12.5	9.5	31	49	0.8	4	4







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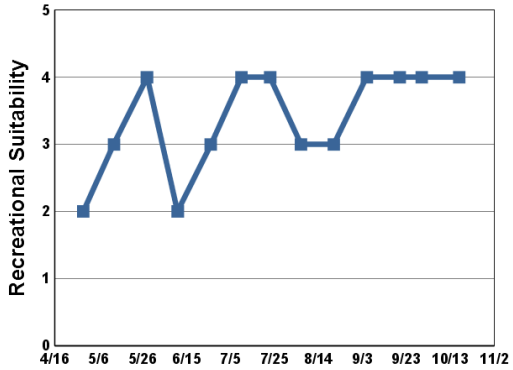

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Goose Lake [Waconia] (10–0089) *Carver County Environmental Services*

Volunteer: Carver County staff

Goose Lake is located in Waconia Township (Carver County). It has a surface area of 407-acres. The maximum depth of the lake is 3.0 m; therefore the entire lake area is considered littoral zone which is the 0-15 feet depth area of the lake dominated by aquatic vegetation. 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

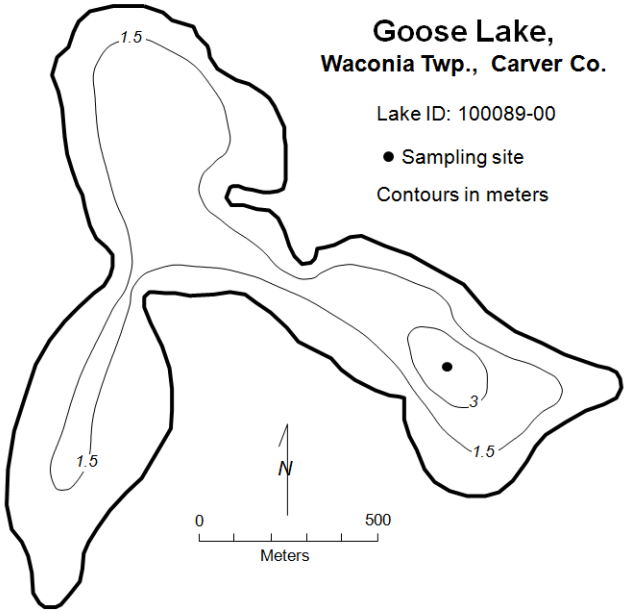
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	104	73	140	D
CLA (µg/l)	93	14	230	F
Secchi (m)	0.4	0.3	0.6	F
TKN (mg/l)	3.65	3.00	4.70	
			Lake Grade	F

The lake received a lake grade of F for 2013 which is consistent with its historical database. The lake has experienced variability in water quality over the long term (i.e. grades ranging from C to F), with F grades being predominant for the past 10 years. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

Throughout the monitoring period, the volunteer's opinions of 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.

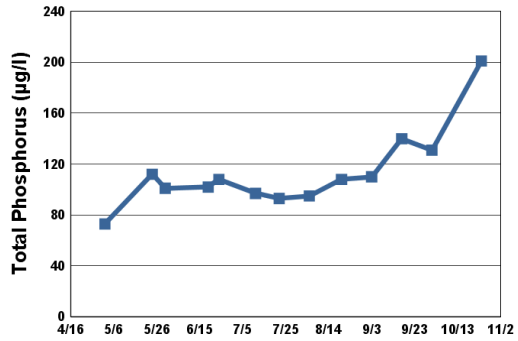
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

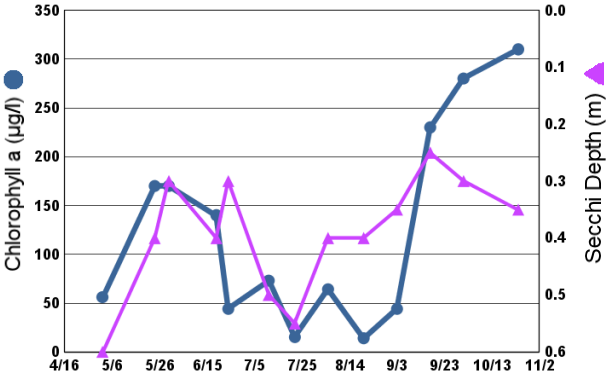
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

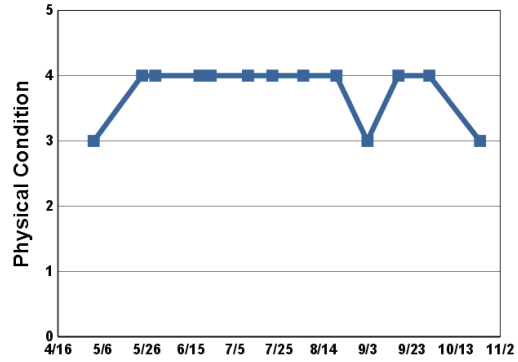


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	9.4	15.5	56	73	0.6	3	3
5/24	16.4	16.9	170	112	0.4	4	4
5/30	17.5	13.6	170	101	0.3	4	4
6/19	22.7	14.8	140	102	0.4	4	4
6/24	25.8	18.7	44	108	0.3	4	5
7/11	26.3	8.7	73	97	0.5	4	4
7/22	27.1	4.8	15	93	0.6	4	4
8/5	23.0	10.5	64	95	0.4	4	4
8/20	24.6	8.6	14	108	0.4	4	3
9/3	22.8	8.5	44	110	0.4	3	3
9/17	17.5	9.6	230	140	0.3	4	4
10/1	17.2	9.5	280	131	0.3	4	4
10/24	5.2		310	201	0.4	3	3







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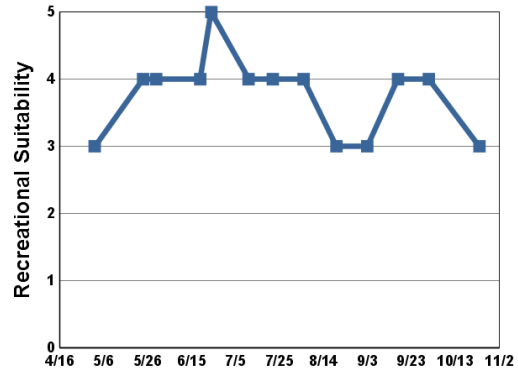

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Goose Lake [Scandia] (82–0059) *Carnelian — Marine — St. Croix Watershed District*

Washington Conservation District staff

Goose Lake is located in the City of Scandia (Washington County). The lake has a surface area of 83 acres. The lake has a maximum and mean depth of 7.6 m (25 feet) and 2.4 m (8 feet), respectively.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

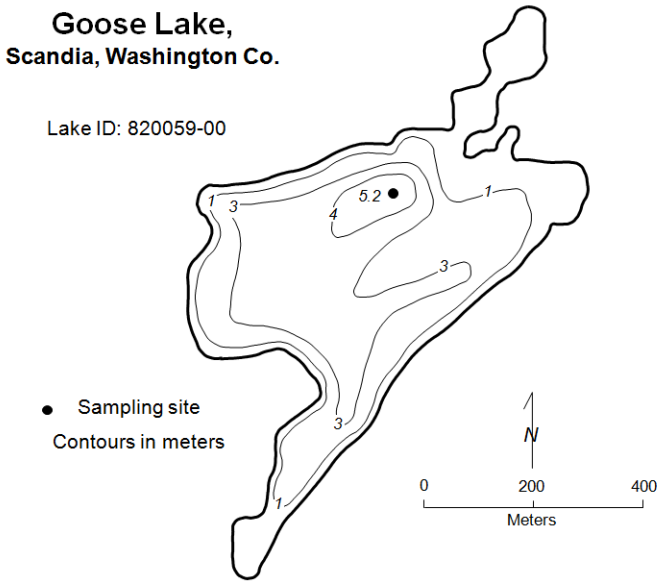
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	33	63	C
CLA (µg/l)	29	6.0	61	C
Secchi (m)	1.4	0.6	2.9	C
TKN (mg/l)	1.49	0.85	2.20	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is similar to the lake grades received in the past. The lake's overall water quality seems to be represented by a lake grade of C given the historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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.

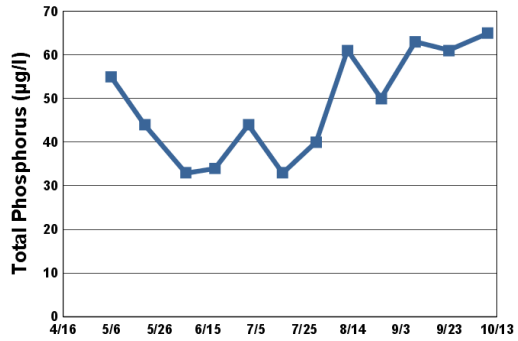
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

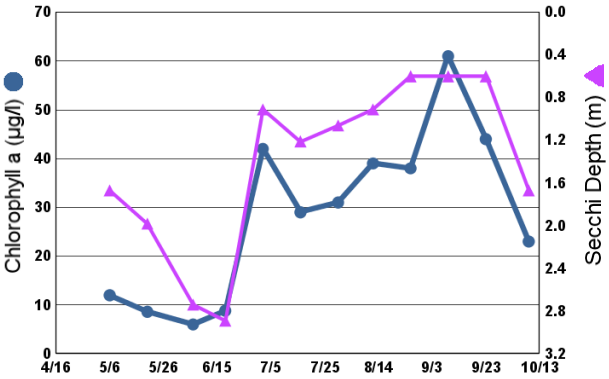
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

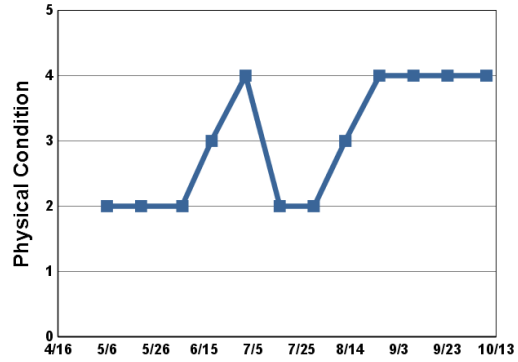


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	12.2		12	55	1.7	2	2
5/20	18.7		8.6	44	2.0	2	3
6/6	16.9	8.8	6.0	33	2.7	2	4
6/18	21.8	8.4	8.8	34	2.9	3	2
7/2	26.3	12.8	42	44	0.9	4	3
7/16	28.7	10.0	29	33	1.2	2	2
7/30	22.5	8.3	31	40	1.1	2	2
8/12	24.4	9.8	39	61	0.9	3	3
8/26	26.9	8.6	38	50	0.6	4	4
9/9	22.9	7.5	61	63	0.6	4	4
9/23	18.3	7.6	44	61	0.6	4	4
10/9	15.7	5.4	23	65	1.7	4	3







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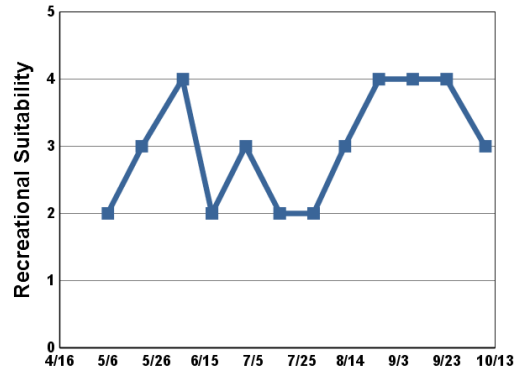
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

Goose Lake [North Basin] (82–0113–01) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Goose Lake is located in the City of Lake Elmo (Washington County). The lake is split into two basins by county highway 10. The north basin is Site #1 of Goose Lake. The depth of the north basin at the sampling location is 1.8 m (6 ft). There is no other bathymetric information available for the lake. A search via STORET revealed no historical monitoring data prior to 2008.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

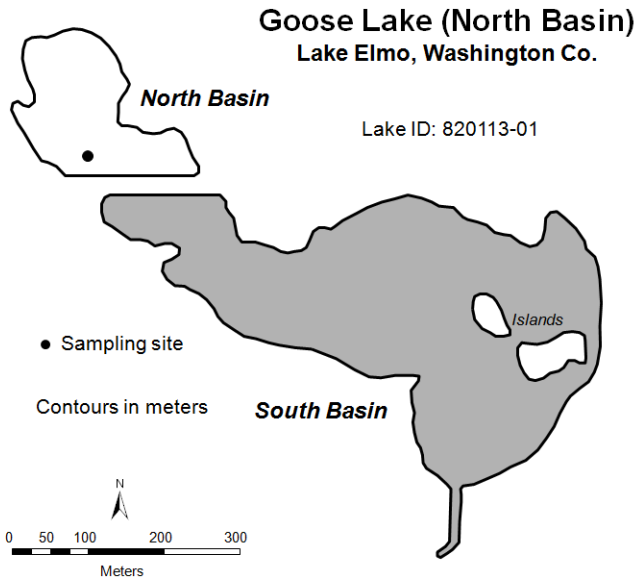
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	175	76	278	F
CLA (µg/l)	64	4.0	160	D
Secchi (m)	0.3	0.1	0.8	F
TKN (mg/l)	2.55	1.40	3.90	
			Lake Grade	F

The north basin received a lake grade of F for 2013. Continued monitoring is suggested to build an historical water quality database for this lake site.

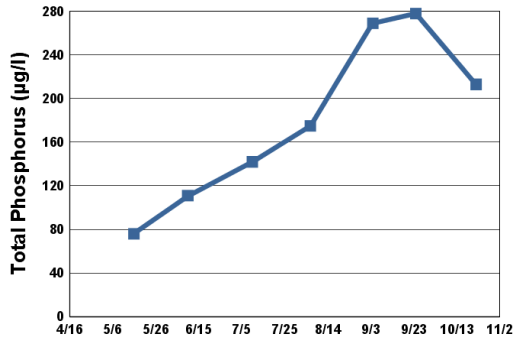
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

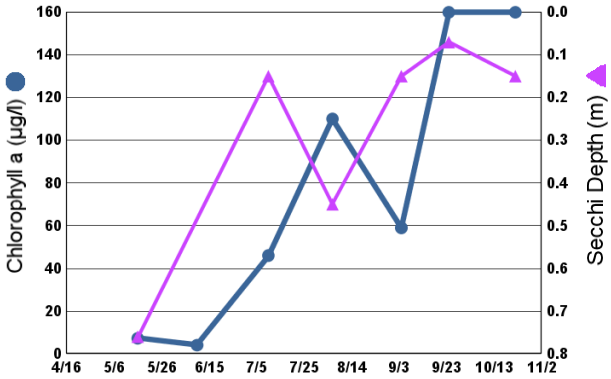
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

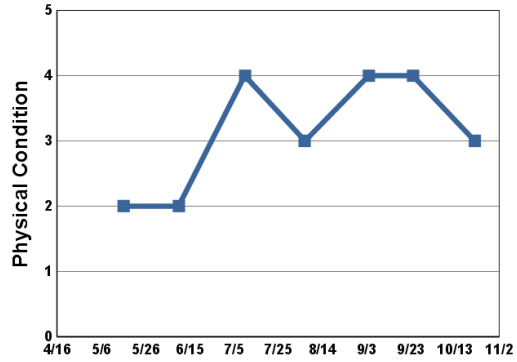


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	18.5	9.4	7.2	76	0.8	2	4
6/10	20.1	2.3	4.0	111		2	3
7/10	28.6	9.1	46	142	0.2	4	4
8/6	21.6	6.1	110	175	0.5	3	4
9/4	22.6	8.2	59	269	0.2	4	5
9/24	18.7	12.6	160	278	0.1	4	4
10/22	6.4	10.4	160	213	0.2	3	4







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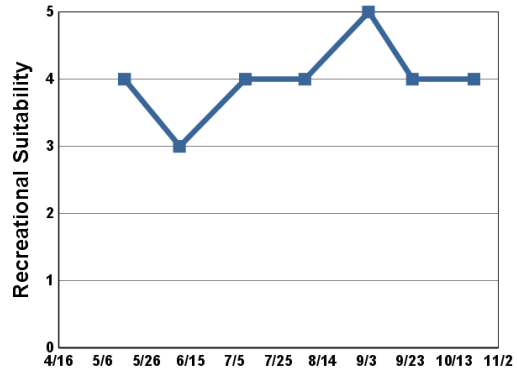
5 = Severe Algal Bloom



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
TP					F	F	F		F	F
CLA					F	F	F		F	D
Secchi					F	F	F		F	F
Lake Grade					**F**	**F**	**F**		**F**	**F**

Source: Metropolitan Council and STORET data

Goose Lake [South Basin] (82–0113–02) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Goose Lake is located in the City of Lake Elmo (Washington County). The lake is split into two basins by county highway 10. The south basin is Site #2 of Goose Lake. The depth of the south basin at the sampling location is 2.1 m (7 ft). There is no other bathymetric information available for the lake. A search via STORET revealed no historical monitoring data prior to 2008.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	117	75	212	D
CLA (µg/l)	75	22	130	D
Secchi (m)	0.4	0.2	0.6	F
TKN (mg/l)	2.92	1.90	5.00	
			Lake Grade	D

The south basin received a lake grade of D for 2013, which is a step above the F grades it has received since 2008. Continued monitoring is suggested to build an historical water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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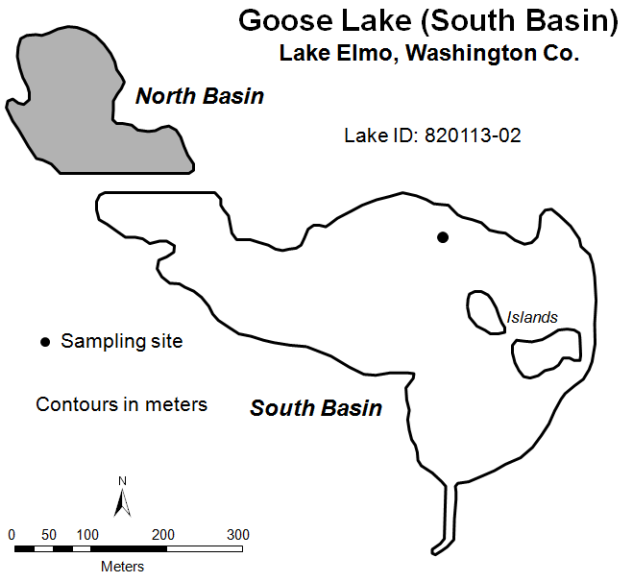
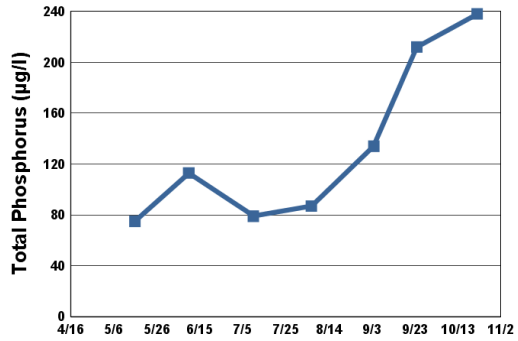
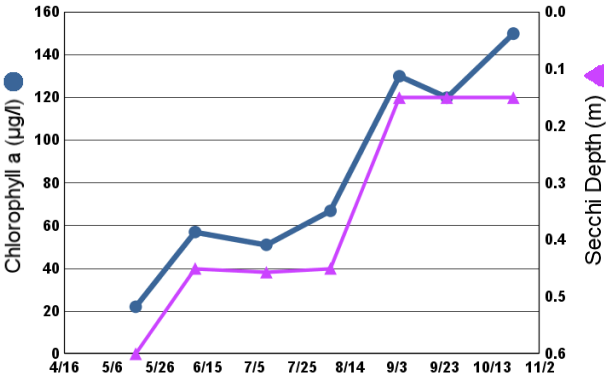
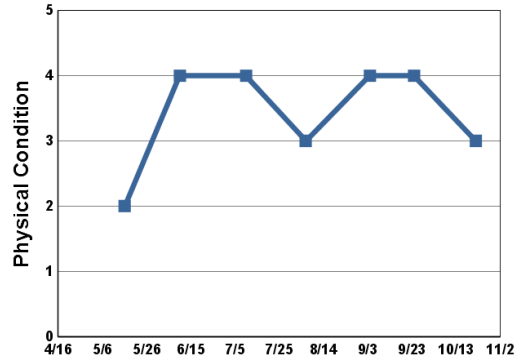


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	18.1	10.7	22	75	0.6	2	4
6/10	17.6	10.1	57	113	0.5	4	4
7/10	26.1	7.9	51	79	0.5	4	4
8/6	22.2	10.8	67	87	0.5	3	4
9/4	24.2	9.5	130	134	0.2	4	4
9/24	19.2	13.2	120	212	0.2	4	4
10/22	6.9	11.5	150	238	0.2	3	4







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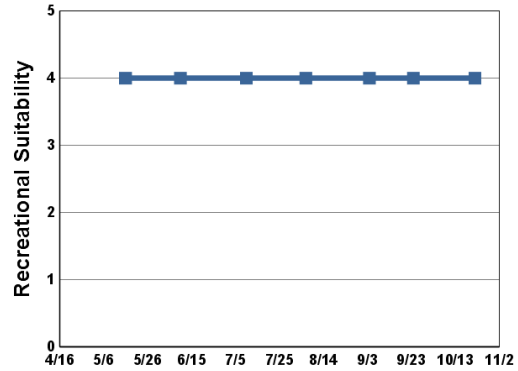


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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
TP					F	F	F		F	D
CLA					F	F	F		F	D
Secchi					F	F	F		F	F
Lake Grade					**F**	**F**	**F**		**F**	**D**

Source: Metropolitan Council and STORET data

Grace Lake (10–0218) *Carver County Environmental Services*

Volunteer: Carver County staff

Grace Lake is a 22-acre lake located near the City of Chaska (Carver County). The lake has a maximum depth of 6.7 m (22 feet). A search through the STORET nationwide water quality database for historical data provided no data other than CAMP data.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	114	55	187	D
CLA (µg/l)	48	2.3	230	C
Secchi (m)	0.9	0.4	2.6	D
TKN (mg/l)	2.07	1.20	3.30	
			Lake Grade	D

The lake received a lake grade of D for 2013 which is consistent with its historical database. Further monitoring is suggested for this lake to develop an historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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/.

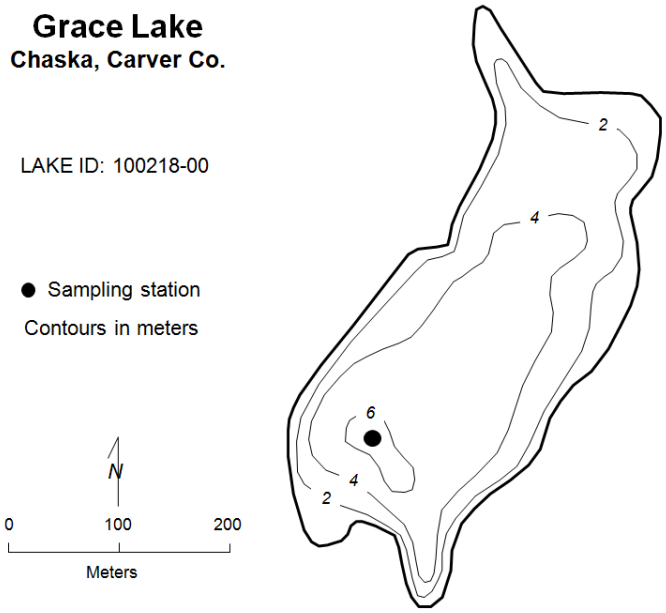
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Grace Lake
Chaska, Carver Co.

LAKE ID: 100218-00

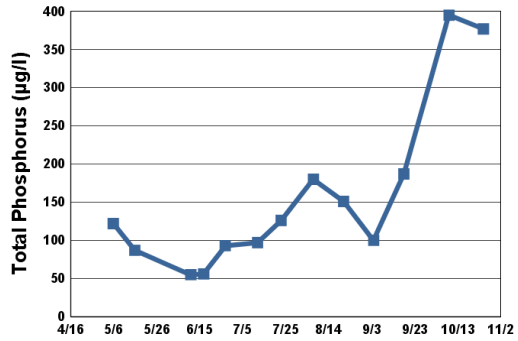
● Sampling station

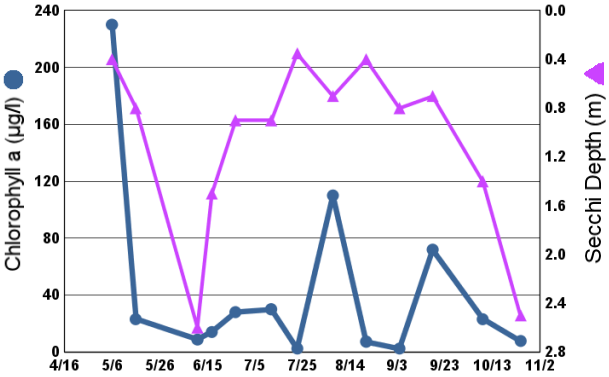
Contours in meters

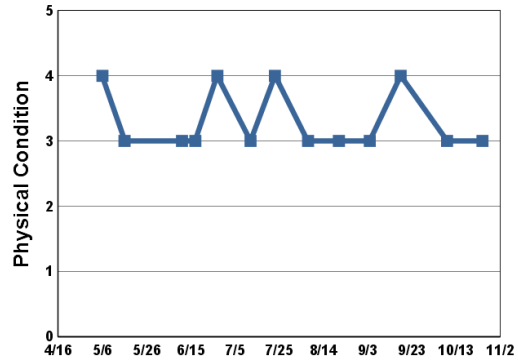


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	13.0	38.0	230	122	0.4	4	4
5/16	18.4	19.4	23	87	0.8	3	4
6/11			8.6	55	2.6	3	3
6/17	24.2	12.3	14	56	1.5	3	4
6/27	28.4	21.5	28	93	0.9	4	4
7/12	27.2	13.3	30	97	0.9	3	3
7/23	25.0	8.1	2.3	126	0.4	4	4
8/7	23.2	13.8	110	180	0.7	3	3
8/21	26.0	10.8	7.2	151	0.4	3	4
9/4	23.2	7.4	2.3	100	0.8	3	3
9/18	19.7	4.8	72	187	0.7	4	4
10/9	15.6	2.5	23	395	1.4	3	3
10/25	8.5		7.7	377	2.5	3	3







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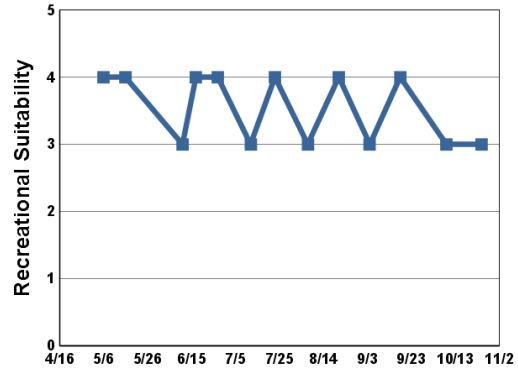

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Haas Lake (70–0078) *Prior Lake — Spring Lake Watershed District*

Volunteer: Thomas Chaklos

Hass Lake is located in the city of Prior Lake (Scott County). It has a surface area of 32 acres. Few other morphological data are available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

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

This was the first year that the lake was monitored by the CAMP. There were insufficient data from the summertime period to populate the data summary table. There were insufficient data to calculate grades.

Throughout the monitoring period, the volunteer's opinions of 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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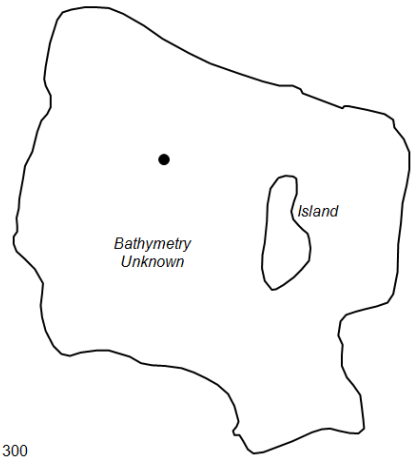
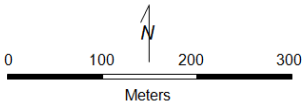
Haas Lake,
Prior Lake, Scott Co.

LAKE ID: 700078-00
WD: Prior Lake-Spring Lake

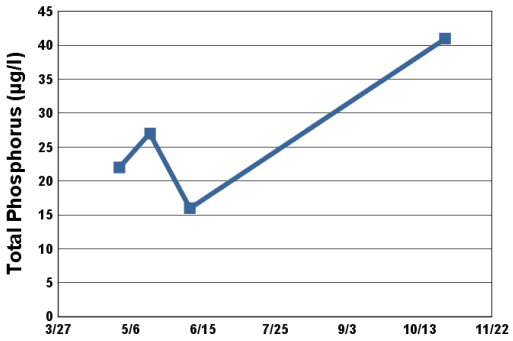
● Sampling site
Contours in meters

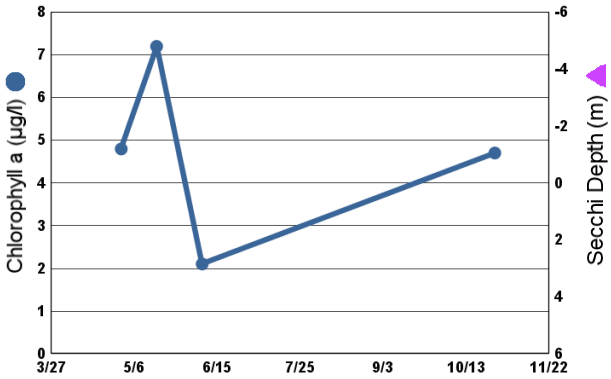


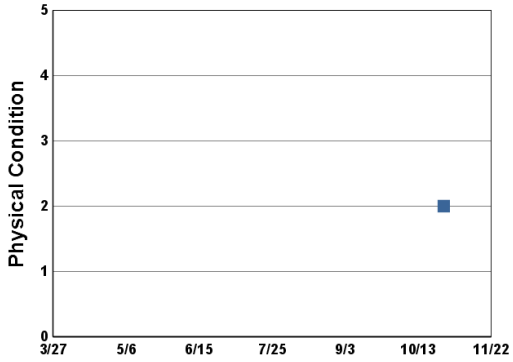


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	17.4		4.8	22			
5/17	18.2		7.2	27			
6/8	18.1		2.1	16			
10/27	14.0		4.7	41		2	2







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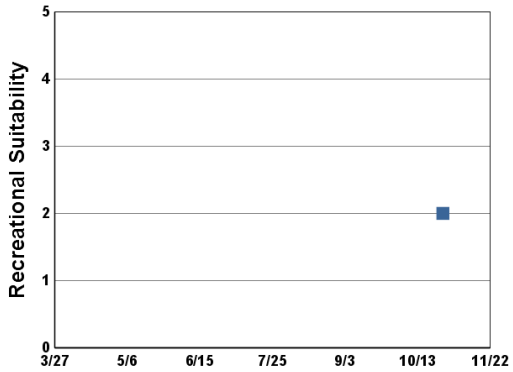
4 = High Algal Color
5 = Severe Algal Bloom



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	2013
TP	
CLA	
Secchi	
Lake Grade	

Source: Metropolitan Council and STORET data

Hafften Lake (27–0199) *Pioneer — Sarah Watershed Management Commission*

Volunteer: Jim Van Someren

Hafften Lake, located in Greenfield (Hennepin County), has public access on the eastern side of the lake. The 43-acre lake has a maximum depth of 13.4 m (roughly 44 feet). Roughly 60 percent of the lake's surface area is considered littoral zone which is the 0–15 feet depth zone of the lake typically dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

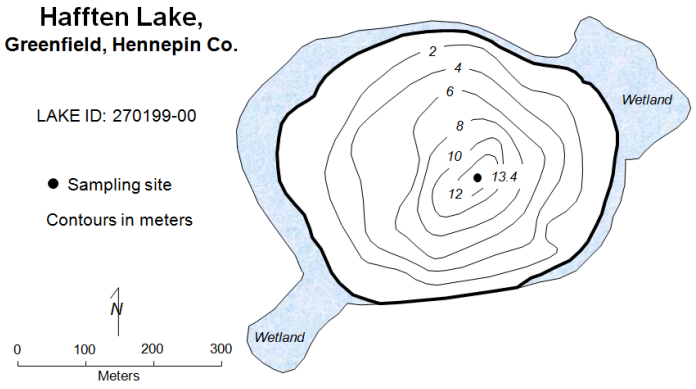
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	50	26	74	C
CLA (µg/l)	21	4.9	53	C
Secchi (m)	1.2	0.7	2.1	C
TKN (mg/l)	1.50	1.10	1.80	
			Lake Grade	C

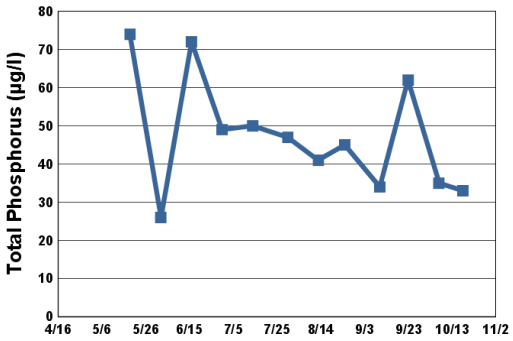
The lake received a lake grade of C in 2013, which is consistent with its historical database. Futher monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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/.

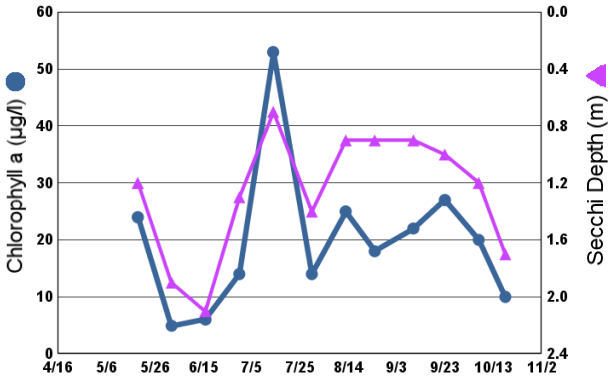
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

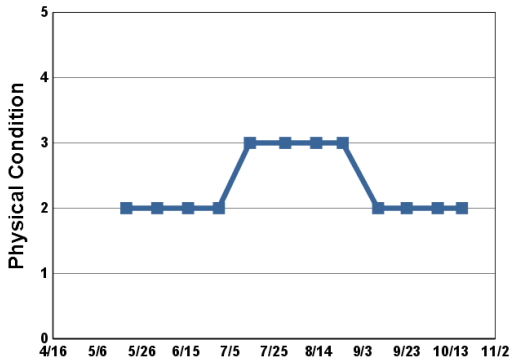




2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/19	19.8		24	74	1.2	2	2
6/2	20.4		4.9	26	1.9	2	2
6/16	23.1		6.0	72	2.1	2	2
6/30	28.3		14	49	1.3	2	2
7/14	27.0		53	50	0.7	3	3
7/30	25.0		14	47	1.4	3	3
8/13	26.6		25	41	0.9	3	3
8/25	27.1		18	45	0.9	3	3
9/10	24.6		22	34	0.9	2	3
9/23	19.1		27	62	1.0	2	2
10/7	16.6		20	35	1.2	2	2
10/18	12.9		10	33	1.7	2	2





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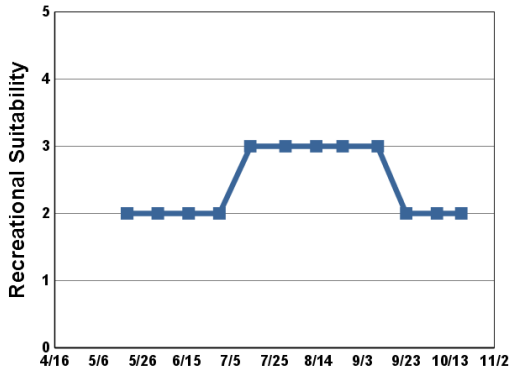

1 = Beautiful
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Hay Lake (82–0065) *Carnelian — Marine — St. Croix Watershed District*

Hay lake is located in the City of Scandia (Washington County). The lake has a surface area of 33 acres. It has a maximum depth of 6.1 m (20 feet).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

hay

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	37	22	57	C
CLA (µg/l)	9.5	2.1	20	A
Secchi (m)				
TKN (mg/l)	0.94	0.77	1.20	
			Lake Grade	

There were insufficient quantity of Secchi depth measurements available to calculate a Secchi grade in 2013. Most of the Secchi depth measurements were obscured by aquatic macrophytes. The primary production of this lake is dominated by aquatic macrophytes as given by the observations of moderate to substantial aquatic macrophyte population and low pelagic algal populations (as given by low CLA concentrations). There has been a consistent downward trend of summertime mean CLA concentrations since 1998. Continued monitoring is suggested to determine if this trend continues.

Throughout the monitoring period, the volunteer's opinions of 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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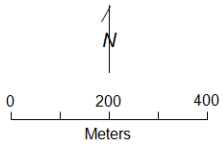
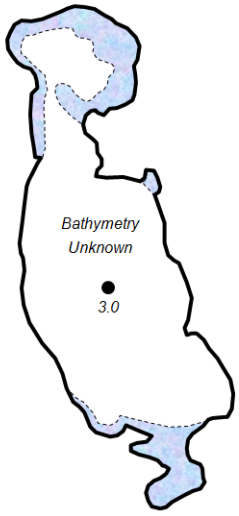
Hay Lake

Scandia, Washington Co.

LAKE ID: 820065-00
WMO: Marine-on-St. Croix

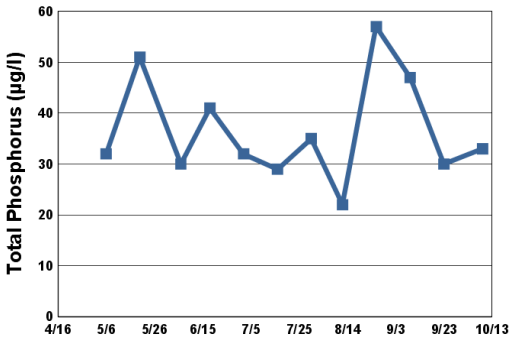
● Sampling site
Contours in meters

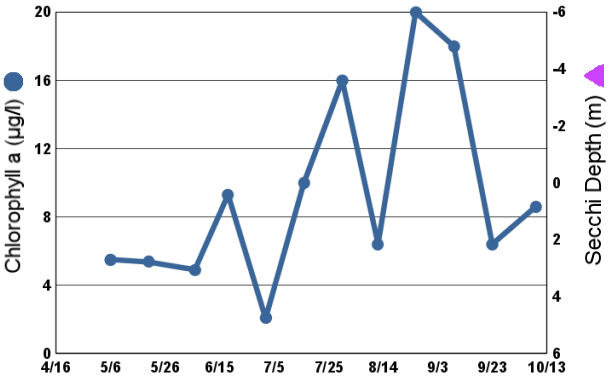


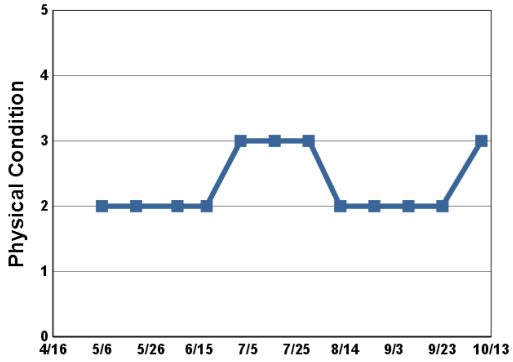


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	16.5		5.5	32		2	2
5/20	20.3		5.4	51		2	2
6/6	16.7	7.4	4.9	30		2	2
6/18	23.0	8.2	9.3	41		2	3
7/2	25.1	6.4	2.1	32		3	3
7/16	28.7	7.3	10	29		3	3
7/30	21.0	7.0	16	35		3	4
8/12	23.9	6.1	6.4	22		2	3
8/26	28.4	6.2	20	57		2	3
9/9	22.1	4.8	18	47		2	4
9/23	17.7	6.1	6.4	30		2	4
10/9	15.4	7.5	8.6	33		3	4







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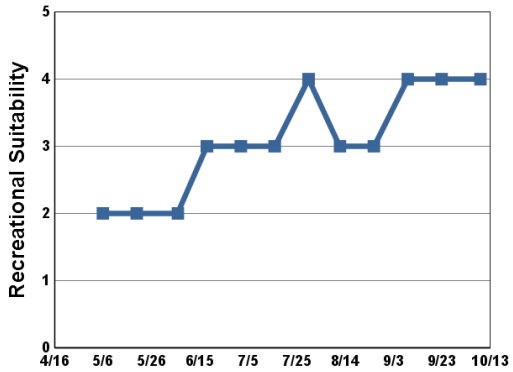

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Hazeltine Lake (10–0014) *Carver County Environmental Services*

Volunteer: Carver County staff

Hazeltine Lake is located in the City of Chaska (Carver County). The lake has a surface area of 236 acres, and a maximum depth of 2.0 m (6.6 ft). The entire lake is considered littoral zone, which is the shallow 0 to 15 feet depth zone that is typically dominated by aquatic plants.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

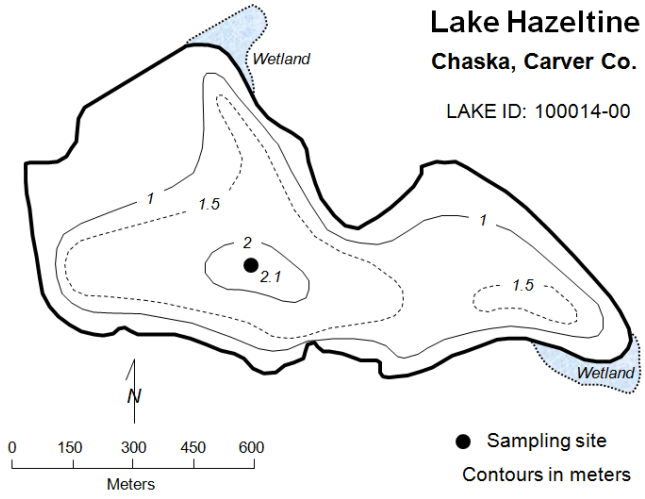
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	220	93	344	F
CLA (µg/l)	124	3.3	510	F
Secchi (m)	0.3	0.1	0.6	F
TKN (mg/l)	4.53	2.20	9.00	
			Lake Grade	F

The lake received a lake grade of F for 2013, which is consistent with its limited historical database. Continued monitoring is suggested to continue to build the water quality database for this lake.

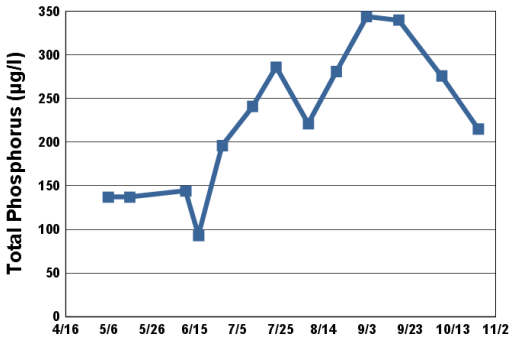
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

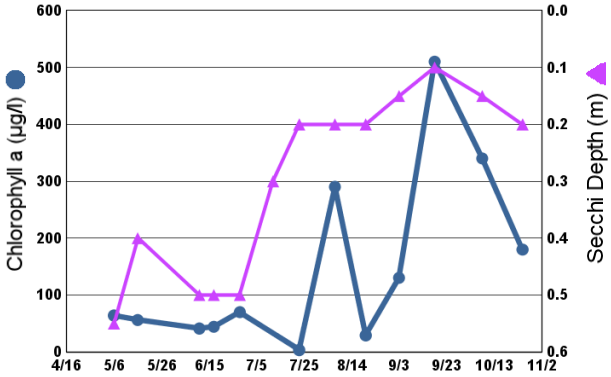
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

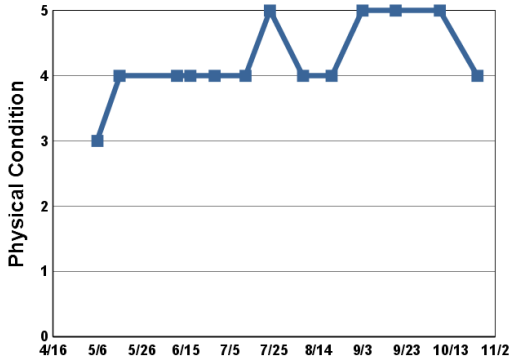


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	11.8	24.4	64	137	0.6	3	4
5/16	18.6	17.1	56	137	0.4	4	4
6/11			41	144	0.5	4	4
6/17	24.6	10.8	44	93	0.5	4	4
6/28	26.1	14.1	70	196	0.5	4	4
7/12	25.9	11.5		241	0.3	4	5
7/23	25.5	6.9	3.3	286	0.2	5	5
8/7	24.6	10.9	290	221	0.2	4	4
8/20	27.4	14.9	29	281	0.2	4	4
9/3	22.3	14.3	130	344	0.2	5	5
9/18	17.4	6.5	510	340	0.1	5	5
10/8	14.1	11.7	340	276	0.2	5	5
10/25	3.8		180	215	0.2	4	4







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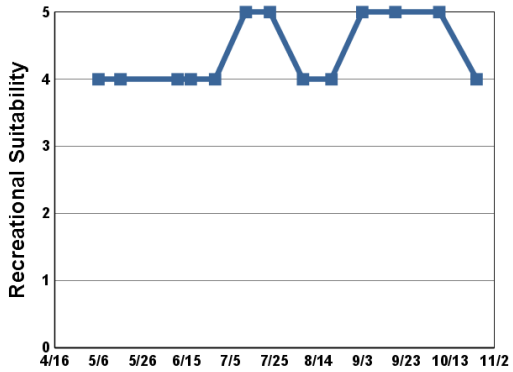

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Lake Water Quality Grades Based on Summertime Averages

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									F	F		
CLA									F	F		
Secchi									F	F		
Lake Grade									**F**	**F**		

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

Source: Metropolitan Council and STORET data

Horseshoe Lake [Sunfish Lake] (19–0051) *City of Sunfish Lake*

Volunteer: Jim Nayes

Horseshoe Lake is a 16-acre lake located within the City of Sunfish Lake (Dakota County). There is little morphological information available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	12	49	B
CLA (µg/l)	8.7	1.6	35	A
Secchi (m)	+ 2.7	1.4	+ 3.1	A
TKN (mg/l)	0.62	0.40	0.75	
			Lake Grade	A

+ indicates that the secchi disk is visible on the bottom of the lake
(+ *means that the true Secchi transparency was greater that indicated in the table because the Secchi disk was visible on the bottom of the lake.*)

(> *means that the true Secchi transparency was greater than indicated in the table because the visibility of the disk was blocked by aquatic vegetation rather than by light attenuation in the water column.*)

For most of the monitoring events during the 2013 monitoring season, the Secchi disk was visible either on the lake bottom or the visibility of the disk was blocked by aquatic vegetation rather than by light attenuation in the water column. Although few true Secchi transparencies were attained, the mean Secchi depth for the summer time period was greater than 2.7 m, and therefore likely to be about 3.0 m or possibly even greater. It is reasonable therefore then to give a Secchi depth grade of A for 2013. The good water clarity is further correlated with the good CLA grade of A. The annual TP mean has varied noticeably since 2006, resulting in variations of TP grades in the range of A to C. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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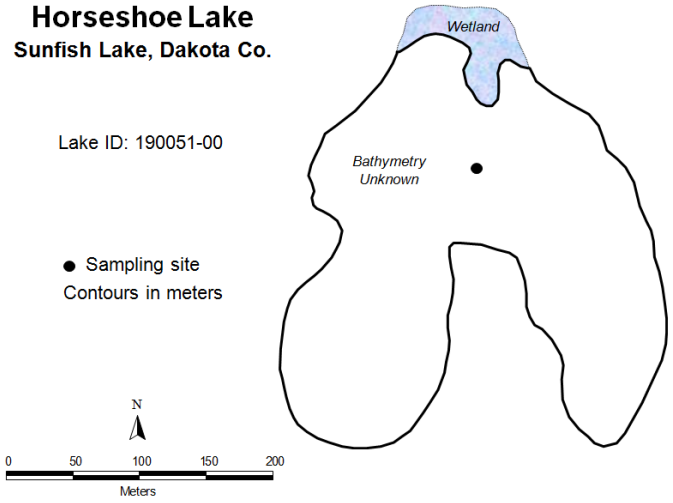
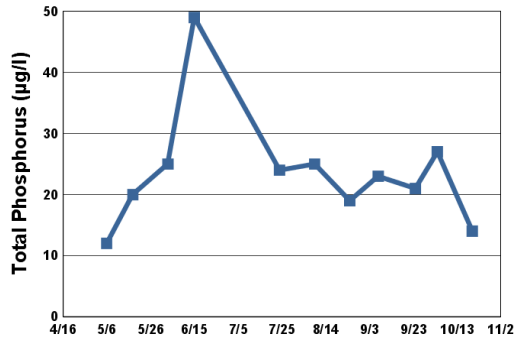


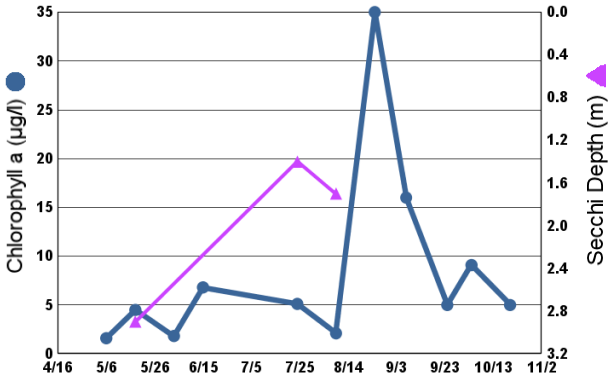
2013 Data

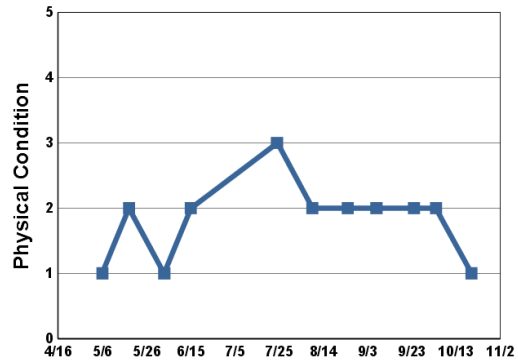
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	15.3		1.6	12	+ 3.1	1	1
5/18	19.5		4.5	20	2.9	2	1
6/3	20.7		1.8	25	+ 3.1	1	1
6/15	23.1		6.8	49	> 2.8	2	1
7/24	26.3		5.1	24	1.4	3	2
8/9	24.7		2.1	25	1.7	2	1
8/25	28.8		35	19	+ 3.1	2	1
9/7	26.8		16	23	+ 3.1	2	1
9/24	20.0		5.0	21	> 2.8	2	1
10/4	16.9		9.1	27	> 2.3	2	1
10/20	10.6		5.0	14	+ 3.1	1	1

+ indicates that the secchi disk is visible on the bottom of the lake
> indicates that vegatation blocked the volunteers view of the secchi disk

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







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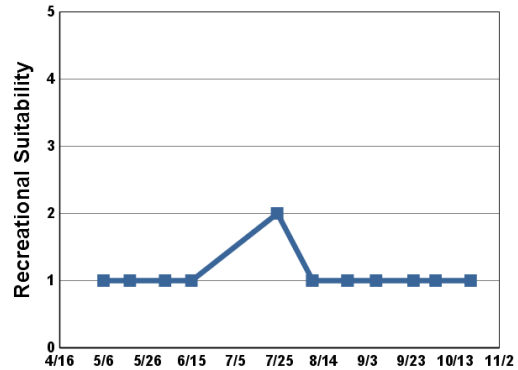


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

Horseshoe Lake [Site 3] (82–0074) *Washington Conservation District*

Volunteer: Washington Conservation District staff

Horseshoe Lake is located in the City of Lake Elmo and West Lakeland Township (Washington County). The lake has a surface area of 53 acres. The lake has a surface area of 53 acres and a maximum depth 3.4m (11 ft).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

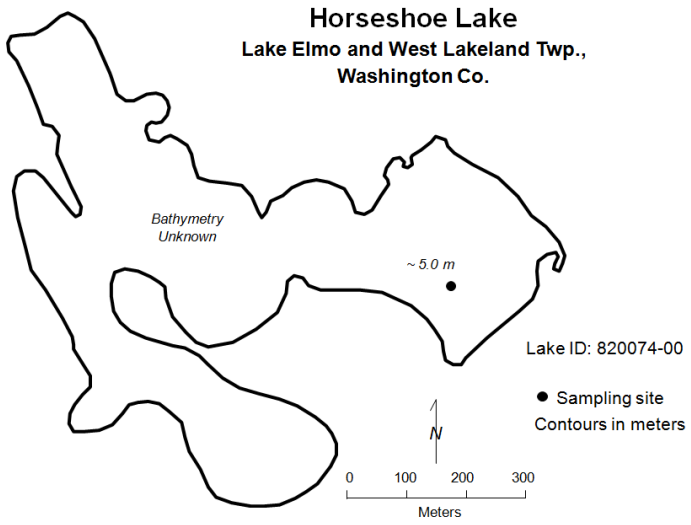
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	45	32	67	C
CLA (µg/l)	25	15	37	C
Secchi (m)	0.9	0.5	1.4	D
TKN (mg/l)	1.32	1.10	1.60	
			Lake Grade	C

The lake site received a lake grade of C for 2013. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

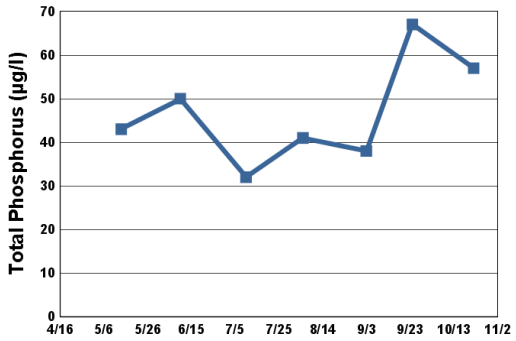
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

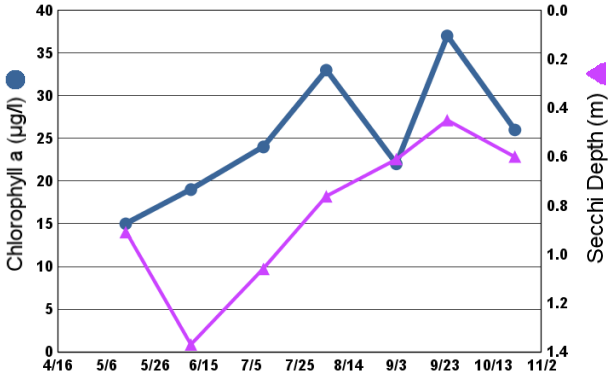
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

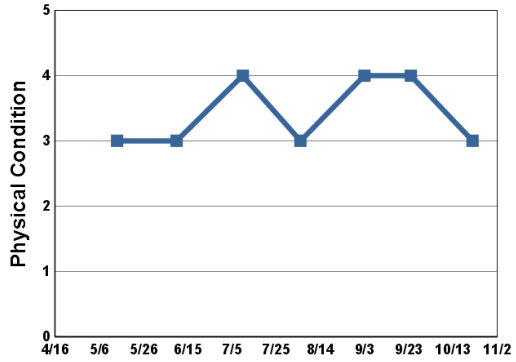


2013 Data

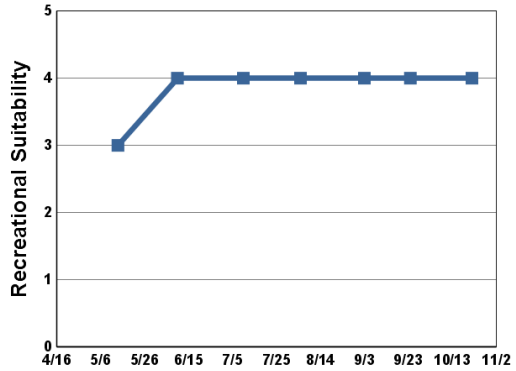
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	14.2	13.7	15	43	0.9	3	3
6/10	17.8	7.2	19	50	1.4	3	4
7/10	26.6	8.6	24	32	1.1	4	4
8/5	23.1	8.9	33	41	0.8	3	4
9/3	24.6	8.0	22	38	0.6	4	4
9/24	19.5	11.3	37	67	0.5	4	4
10/22	8.8	9.2	26	57	0.6	3	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Hydes Lake (10–0088) *Carver County Environmental Services*

Volunteer: Carver County staff

Hydes Lake is located within Waconia Township (Carver County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 215 acres. The mean and maximum depth of the lake is 3.0 (10 feet) and 5.5 m (18 feet). Most of the lake is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

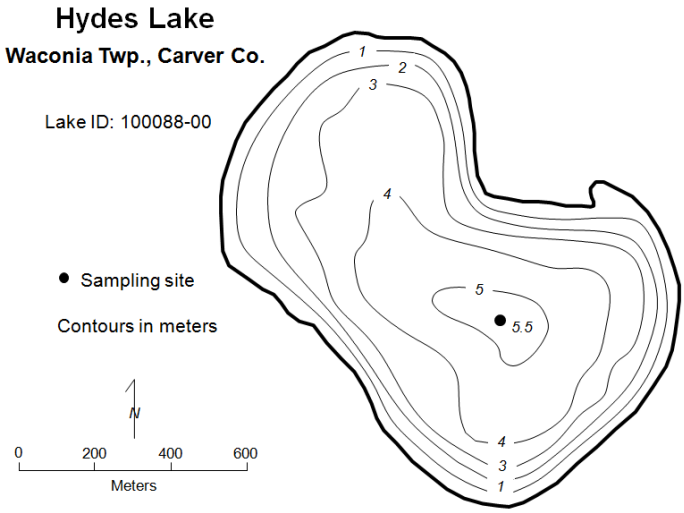
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	64	26	107	C
CLA (µg/l)	33	7.0	69	C
Secchi (m)	1.3	0.7	2.4	C
TKN (mg/l)	1.63	1.00	2.20	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical database. The lake seems to fluctuate between C and F grades.

Throughout the monitoring period, the volunteer's opinions of 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.

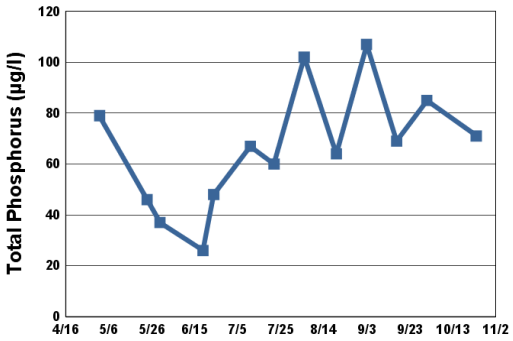
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

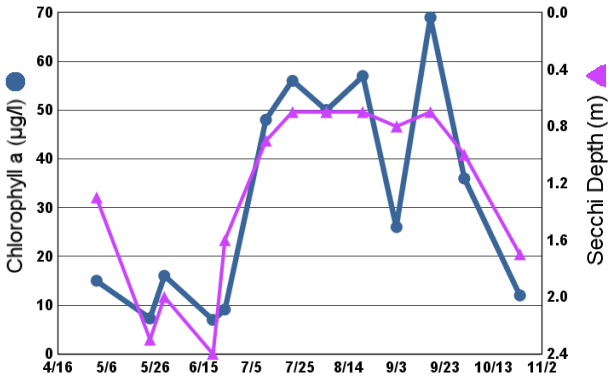
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

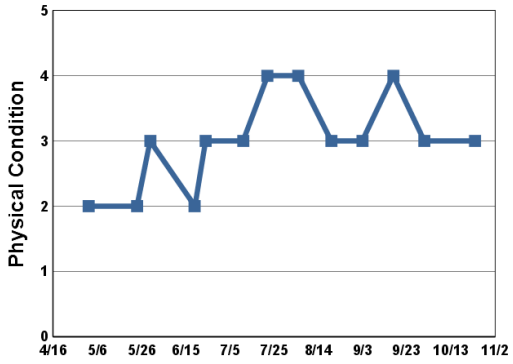


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	6.5	13.0	15	79	1.3	2	2
5/24	15.8	12.3	7.3	46	2.3	2	2
5/30	16.4	12.3	16	37	2.0	3	2
6/19	22.1	15.4	7.0	26	2.4	2	2
6/24	24.5	15.4	9.1	48	1.6	3	3
7/11	25.6	9.9	48	67	0.9	3	4
7/22	26.6	7.8	56	60	0.7	4	3
8/5	23.0	7.8	50	102	0.7	4	4
8/20	24.5	8.4	57	64	0.7	3	3
9/3	23.7	3.3	26	107	0.8	3	3
9/17	19.9	6.8	69	69	0.7	4	4
10/1	17.7	6.5	36	85	1.0	3	3
10/24	7.6		12	71	1.7	3	3







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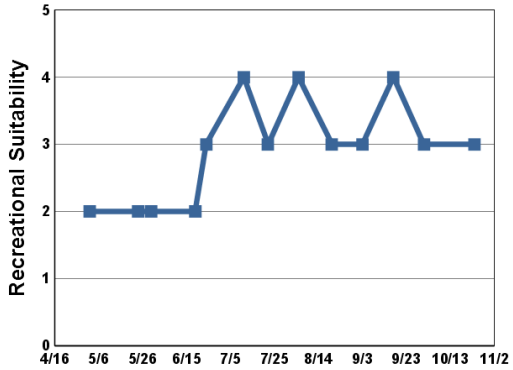
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

Jackson Wildlife Management Area Wetland (82–0305) *Washington Conservation District*

Volunteer: Washington Conservation District staff

The Jackson Wildlife Management Area (WMA) wetland is located in the City of Stillwater (Washington County). The wetland has a surface area of 14.3 acres. The entire surface area is considered littoral zone, which is the zone of aquatic plant dominance. A search through the MPCA's EDA system provided no historical monitoring information for the wetland.

This was the first year the wetland was monitored as part of the CAMP.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

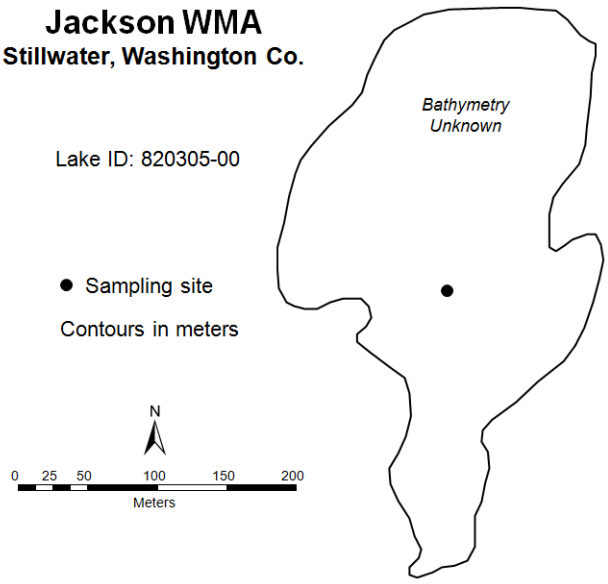
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	43	29	76	C
CLA (µg/l)	9.6	2.0	18	A
Secchi (m)	1.7	1.4	2.3	C
TKN (mg/l)	1.07	0.76	1.60	
			Lake Grade	B

The lake received a lake grade of C for 2013. Continued monitoring is suggested to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

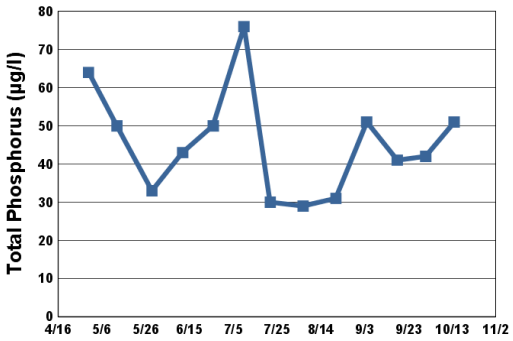
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

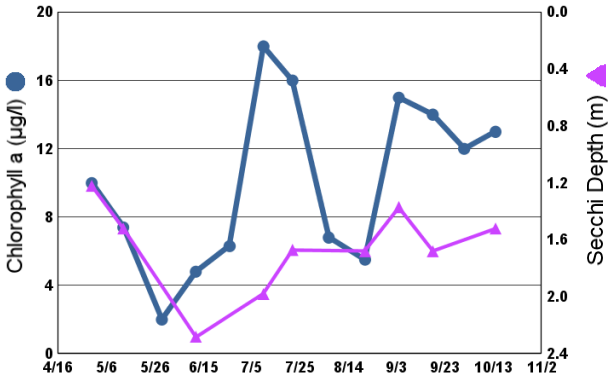
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

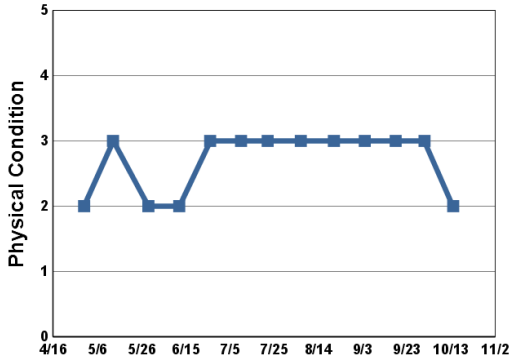


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	15.6	12.0	10	64	1.2	2	2
5/13	13.6	9.5	7.4	50	1.5	3	3
5/29	17.3	6.2	2.0	33		2	2
6/12	19.7	7.9	4.8	43	2.3	2	3
6/26	26.8	7.3	6.3	50		3	3
7/10	25.5	5.9	18	76	2.0	3	4
7/22	25.7	3.6	16	30	1.7	3	4
8/6	24.5	8.4	6.8	29		3	3
8/21	26.5	8.0	5.5	31	1.7	3	3
9/4	25.1	6.3	15	51	1.4	3	4
9/18	18.7	8.4	14	41	1.7	3	4
10/1	17.7	7.5	12	42		3	4
10/14	13.8	7.9	13	51	1.5	2	3







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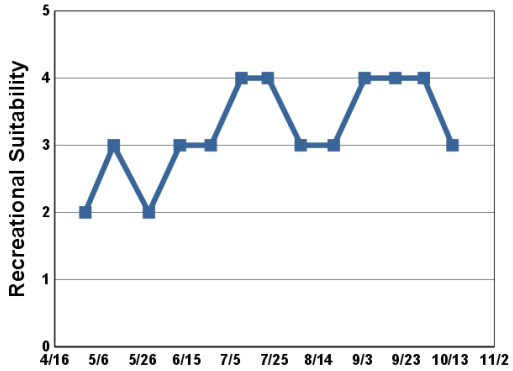

1 = Beautiful
2 = Minor Aesthetic Problem
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5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

Jane Lake (82–0104) *Valley Branch Watershed District*

Volunteer: Anne McGee

Lake Jane is located in the northwest corner of the City of Lake Elmo (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity (METC 2007). The MPCA has listed the lake as impaired for mercury content in fish.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	9	3	13	
CLA (µg/l)	2.2	1.0	3.2	
Secchi (m)	4.5	3.7	5.0	
TKN (mg/l)	0.47	0.42	0.53	
			Lake Grade	

There were insufficient quantity of data to calculate grades in 2013. At least 5 data points are needed over the summer time period.

Throughout the monitoring period, the volunteer's opinions of 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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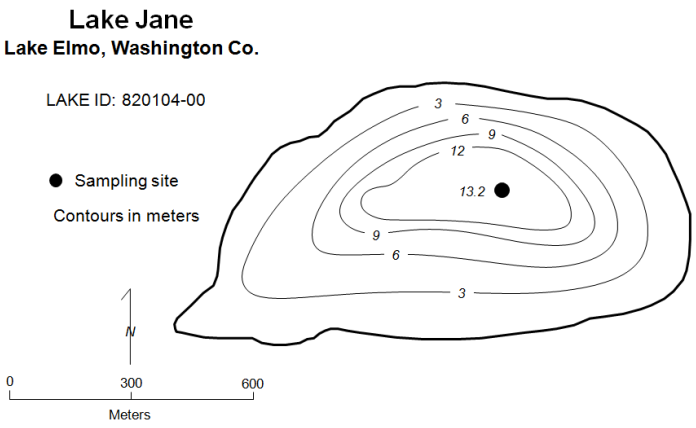
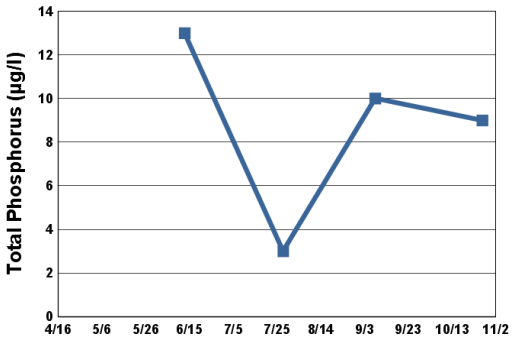
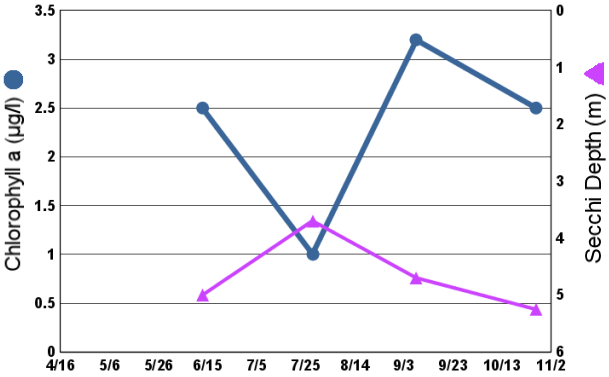
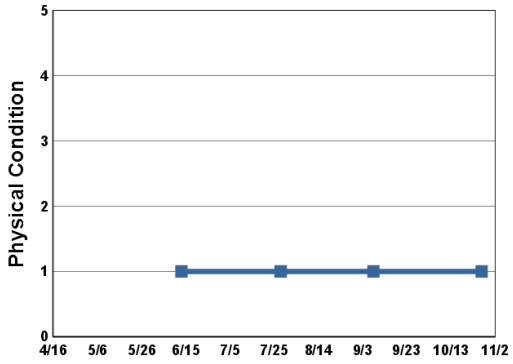


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/13	23.4		2.5	13	5.0	1	
7/28	26.6		1.0	3	3.7	1	1
9/8	24.7		3.2	10	4.7	1	1
10/27	8.3		2.5	9	5.3	1	1







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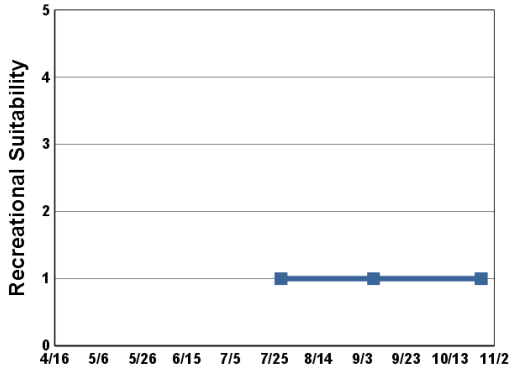

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
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 and STORET data

Jonathan Lake (10–0217) *Carver County Environmental Services*

Volunteer: Carver County staff

Jonathan Lake is a small lake located in Carver County. There are few known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	169	67	392	F
CLA (µg/l)	34	9.8	96	C
Secchi (m)	0.7	0.3	1.3	F
TKN (mg/l)	2.59	1.50	4.70	
			Lake Grade	D

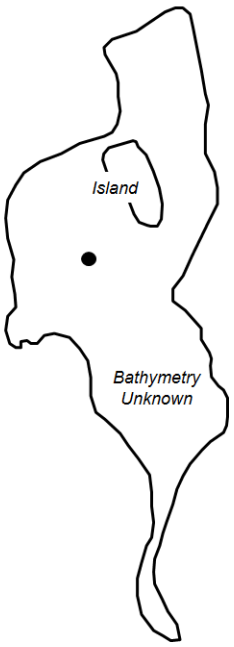
The lake received a lake grade of D for 2013, which is better than the F grades received over the past decade. Additional monitoring is suggested to develop a historical water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

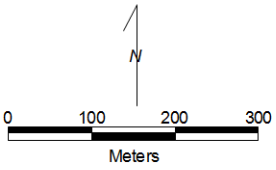
Jonathan Lake
Chaska, Carver Co.

LAKE ID: 100217-00



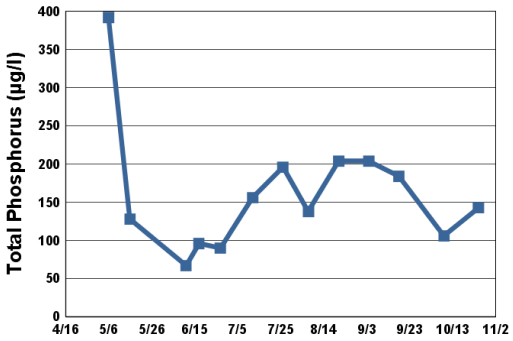
● Sampling site

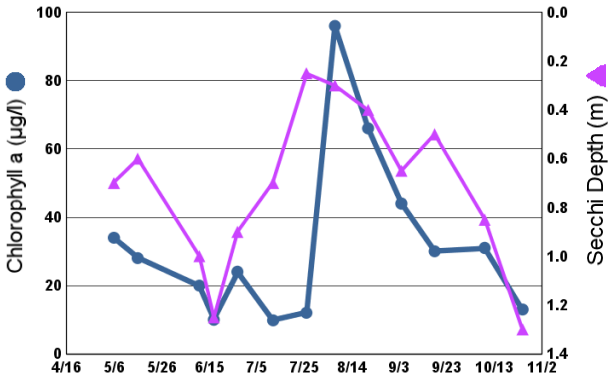
Contours in meters

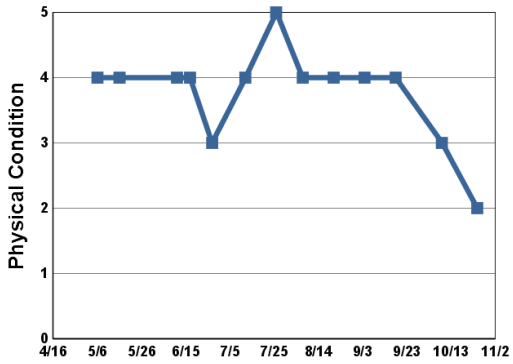


2013 Data

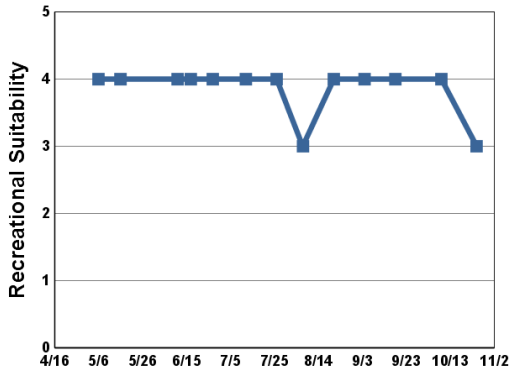
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	14.9	19.3	34	392	0.7	4	4
5/16	19.1	14.6	28	128	0.6	4	4
6/11	20.8	11.7	20	67	1.0	4	4
6/17	24.4	10.6	10	96	1.3	4	4
6/27	28.2	15.9	24	90	0.9	3	4
7/12	26.9	11.9	9.8	156	0.7	4	4
7/26	24.3	7.3	12	196	0.3	5	4
8/7	23.3	12.0	96	138	0.3	4	3
8/21	26.0	9.1	66	204	0.4	4	4
9/4	22.3	7.8	44	204	0.7	4	4
9/18	18.1	6.5	30	184	0.5	4	4
10/9			31	106	0.9	3	4
10/25	5.7		13	143	1.3	2	3







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

July Lake (10–0217) *Carver County Environmental Services*

Volunteer: Washington Conservation District staff

July Lake is a small lake located in Washington County. There are few known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

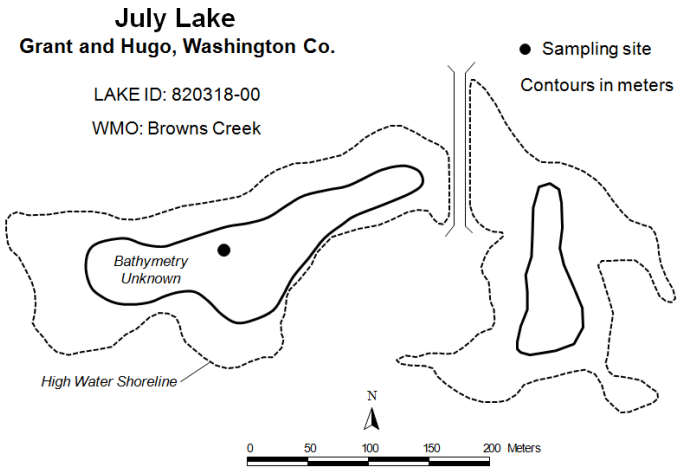
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	81	60	120	D
CLA (µg/l)	25	3.7	63	C
Secchi (m)	1.1	0.6	1.7	D
TKN (mg/l)	1.68	1.20	2.40	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is consistent with its limited database. The lake has received lake grades ranging from C to F since 2006. Additional monitoring is suggested to develop the historical water quality database for this lake.

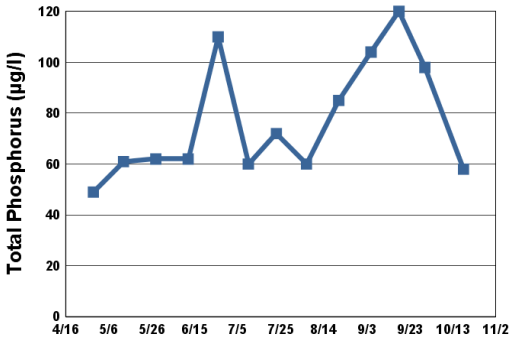
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

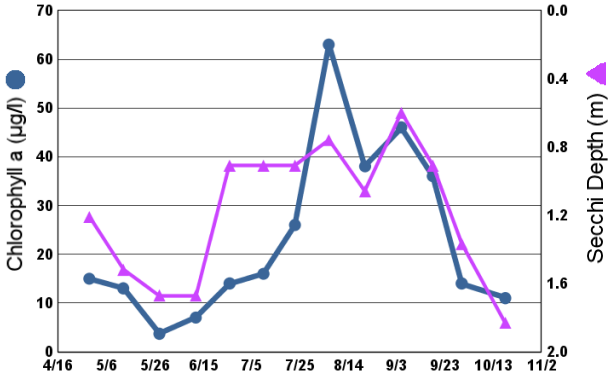
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

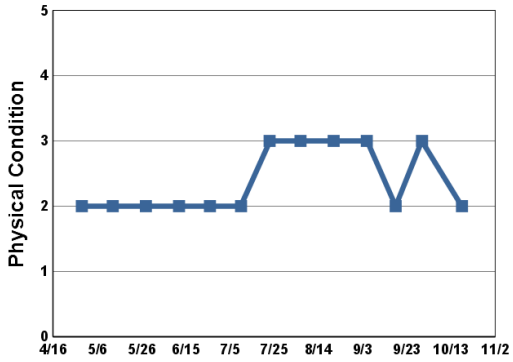


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	15.8	12.4	15	49	1.2	2	4
5/13	14.3	10.4	13	61	1.5	2	2
5/28	15.5	6.8	3.7	62	1.7	2	3
6/12	18.8	6.9	7.0	62	1.7	2	2
6/26	26.7	7.2	14	110	0.9	2	2
7/10	26.8	4.2	16	60	0.9	2	4
7/23	26.7	6.2	26	72	0.9	3	3
8/6	22.8	9.1	63	60	0.8	3	3
8/21	26.6	6.6	38	85	1.1	3	3
9/5	23.7	4.6	46	104	0.6	3	4
9/18	18.0	5.9	36	120	0.9	2	3
9/30	16.9	3.6	14	98	1.4	3	3
10/18	11.0	6.2	11	58	1.8	2	2







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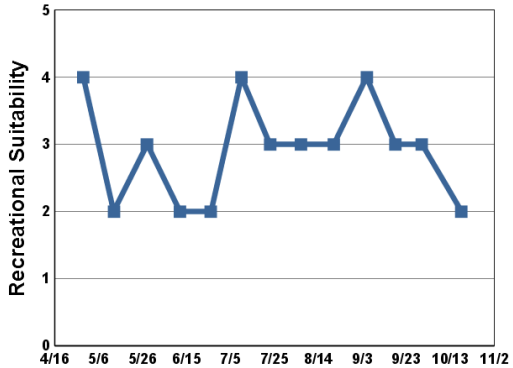
4 = High Algal Color
5 = Severe Algal Bloom



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												
CLA												
Secchi												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Karth Lake (62–0072) *Rice Creek Watershed District*

Volunteer: Andrew Elmquist

Karth Lake is located in the City of Arden Hills. There is very little physical information available for this lake. A search in STORET showed that the lake was monitored for a variety of parameters on three different dates. Monitoring occurred on one day in July in each of the following years: 1988, 1990, and 1991.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

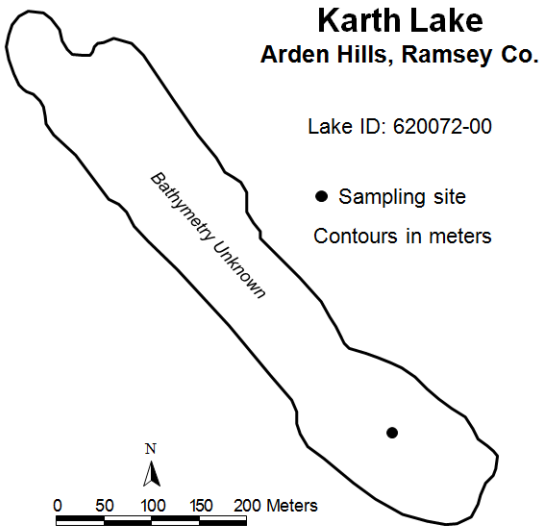
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	12	48	B
CLA (µg/l)	7.2	2.1	13	A
Secchi (m)	2.7	1.4	3.7	B
TKN (mg/l)	0.65	0.51	0.81	
			Lake Grade	B

The lake received a lake grade of B for 2013. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

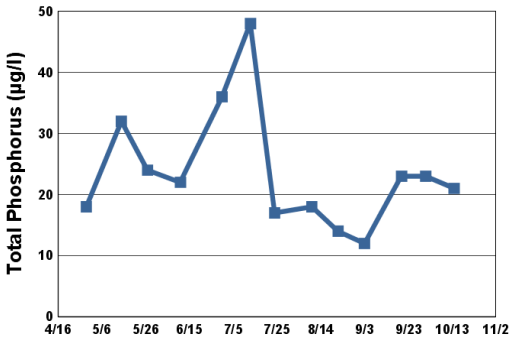
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

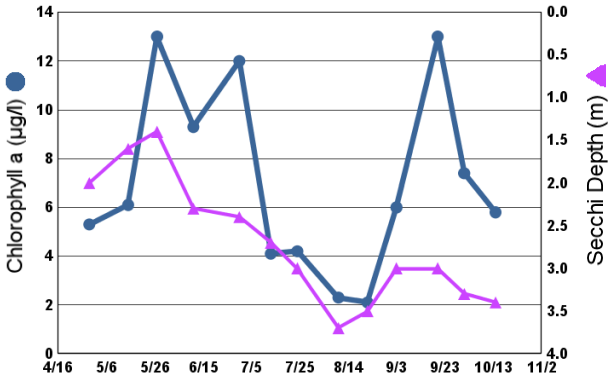
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

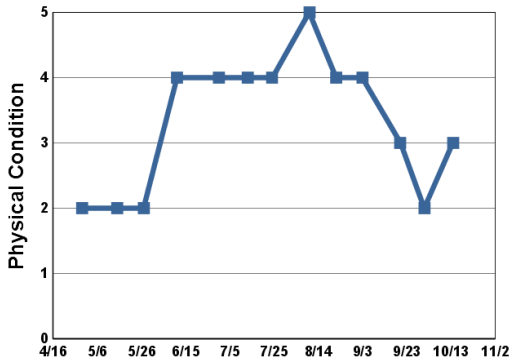


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	9.0		5.3	18	2.0	2	3
5/15	13.8		6.1	32	1.6	2	3
5/27	16.3		13	24	1.4	2	3
6/11	19.9		9.3	22	2.3	4	4
6/30	26.5		12	36	2.4	4	4
7/13	26.1		4.1	48	2.7	4	4
7/24	25.9		4.2	17	3.0	4	4
8/10	24.1		2.3	18	3.7	5	4
8/22	26.5		2.1	14	3.5	4	4
9/3	24.7		6.0	12	3.0	4	4
9/20	19.7		13	23	3.0	3	4
10/1	18.4		7.4	23	3.3	2	4
10/14	16.1		5.8	21	3.4	3	4







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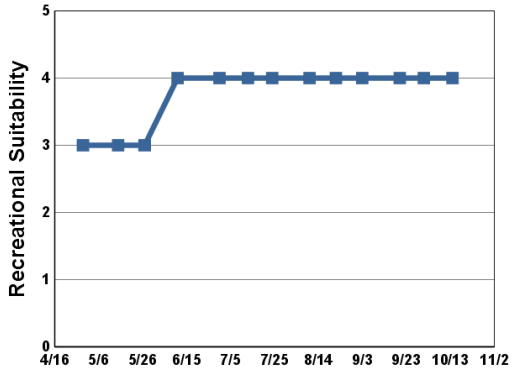

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Keller Lake [Burnsville] (19–0025) *Black Dog Watershed Management Commission*

Volunteer: Glen Gramse

Keller Lake is located in the cities of Apple Valley and Burnsville (Dakota County). The surface area of the lake is 55 acres. It has a maximum depth of 3.0 m (10 feet) and a mean depth of 1.1 m (3.7 feet). The entire 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 MNDNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	110	41	189	D
CLA (µg/l)	68	6.1	140	D
Secchi (m)	0.5	0.3	1.4	F
TKN (mg/l)	1.76	0.85	2.70	
			Lake Grade	D

The lake received a lake grade of D for 2013. The water quality of 2013 continues the trend of poorer water quality that started in 2009. Continued monitoring is suggested to determine if the shifting water quality may be a continuing trend.

Throughout the monitoring period, the volunteer's opinions of 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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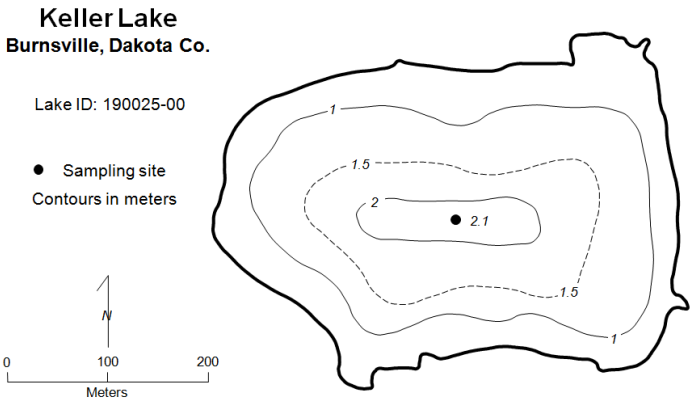
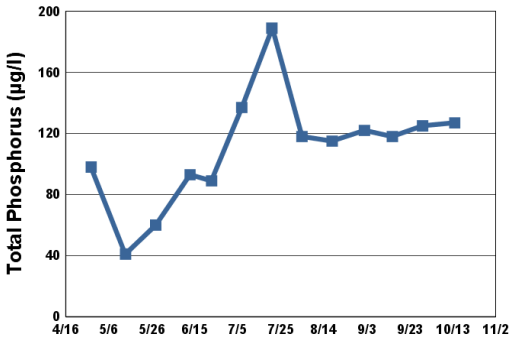
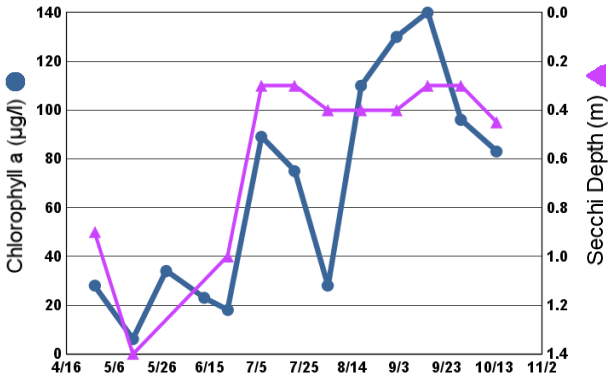
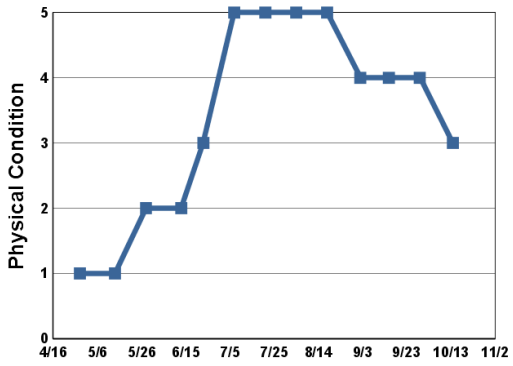


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/28	10.5		28	98	0.9	1	1
5/14	15.7		6.1	41	1.4	1	1
5/28	15.4		34	60		2	3
6/13	20.5		23	93		2	4
6/23	25.2		18	89	1.0	3	4
7/7	27.2		89	137	0.3	5	4
7/21	26.5		75	189	0.3	5	4
8/4	22.7		28	118	0.4	5	4
8/18	23.8		110	115	0.4	5	4
9/2	23.5		130	122	0.4	4	4
9/15	19.9		140	118	0.3	4	4
9/29	17.8		96	125	0.3	4	4
10/14	12.7		83	127	0.5	3	4







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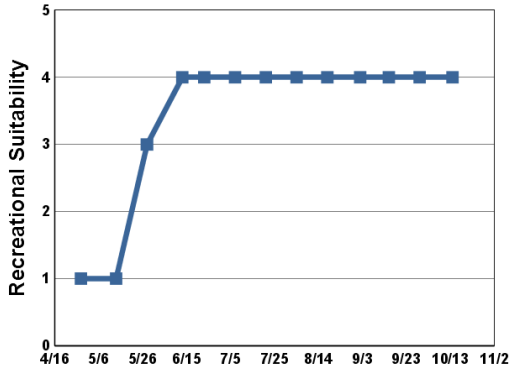

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Kingsley Lake (19–0030) *Black Dog Watershed Management Commission*

Volunteer: City of Lakeville staff

Kingsley Lake is located in the northwestern corner of the City of Lakeville in Dakota County. The lake has a surface area of 44 acres, and a maximum depth of 4.0 m (13 feet). The entire 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	11	3	17	A
CLA (µg/l)	2.8	1.2	3.7	A
Secchi (m)	+ 2.7	+ 2.5	+ 2.9	A
TKN (mg/l)	0.47	0.42	0.56	
			Lake Grade	A

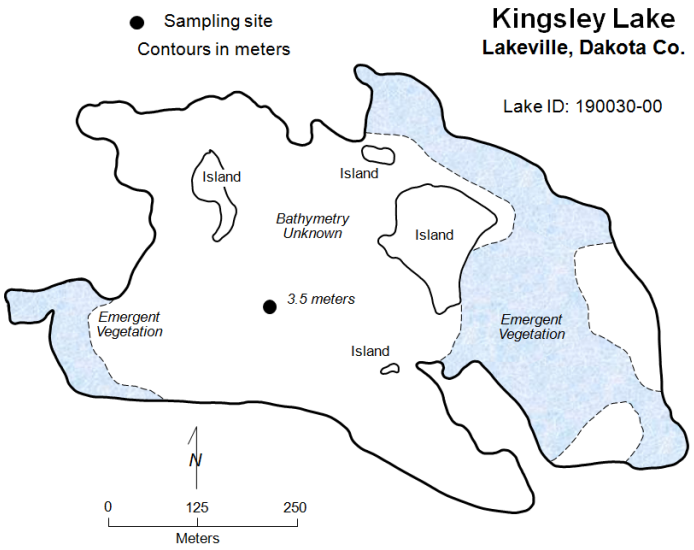
+ indicates that the secchi disk is visible on the bottom of the lake
(+ *means that the true Secchi transparency was greater that indicated in the table because the Secchi disk was visible on the bottom of the lake.*)

(> *means that the true Secchi transparency was greater than indicated in the table because the visibility of the disk was blocked by aquatic vegetation rather than by light attenuation in the water column.*)

Similar to past years, either the lake's excessive submergent macrophyte growth obscured the Secchi disk, or the disk was visible while resting on the lake bottom. According to the monitoring personnel's judgement, the Secchi depths in these instances would have likely been in excess of 3 meters. Also, the other two water quality parameter received A grades. Therefore, it is reasonable to assume that Kingsley Lake falls within the A grade category.

Throughout the monitoring period, the volunteer's opinions of 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.



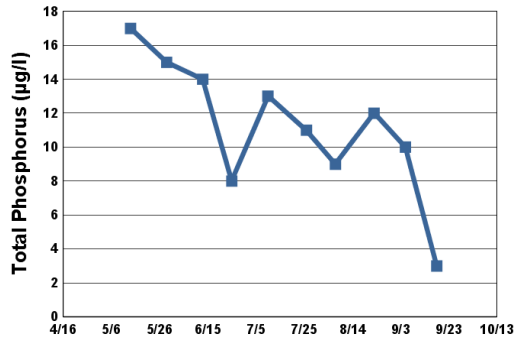
2013 Data

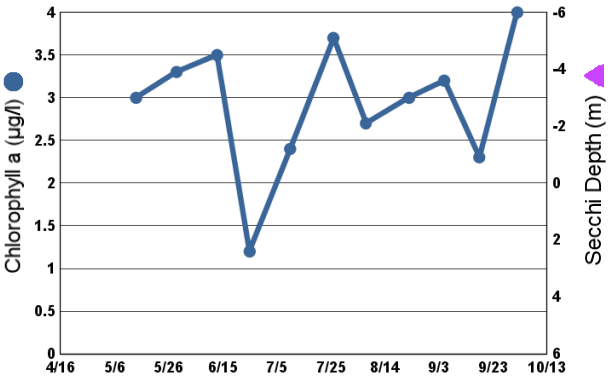
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	15.0		3.0	17	+ 2.6	1	1
5/29	16.0		3.3	15	+ 2.7	1	1
6/13	22.0		3.5	14	+ 2.7	2	1
6/25	26.1		1.2	8	+ 2.9	1	1
7/10	27.0		2.4	13	+ 2.8	1	2
7/26	24.4		3.7	11	+ 2.7	1	1
8/7	24.6		2.7	9	+ 2.7	2	1
8/23	22.0		3.0	12	+ 2.5	1	2
9/5	23.6		3.2	10	+ 2.7	2	1
9/18	19.4		2.3	3	+ 2.7	1	1
10/2	15.0		4.0		+ 2.6	1	1

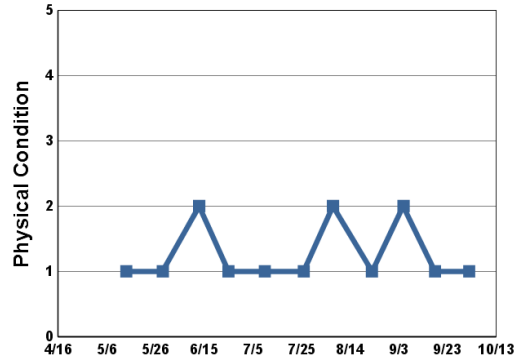
+ indicates that the secchi disk is visible on the bottom of the lake

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

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







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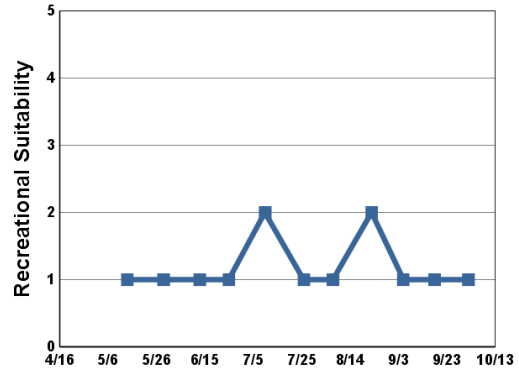

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Kismet Lake (82–0333) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Kismet Lake is located in Washington County. This relatively small lake has a maximum depth of approximately 3.7 m (12 feet). Because of the shallowness of the lake the whole lake is considered littoral zone, which is the 0 – 15 feet depth zone dominated by aquatic vegetation. 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	15	30	A
CLA (µg/l)	5.1	1.4	12	A
Secchi (m)				
TKN (mg/l)	0.70	0.55	0.80	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because either the disk was visible on the lake bottom or the visibility of the disk was blocked by aquatic vegetation rather than by water clarity. There were insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The water quality with respect to TP and CLA was noticeably improved in 2013 in comparison to most previous years.

Throughout the monitoring period, the volunteer's opinions of 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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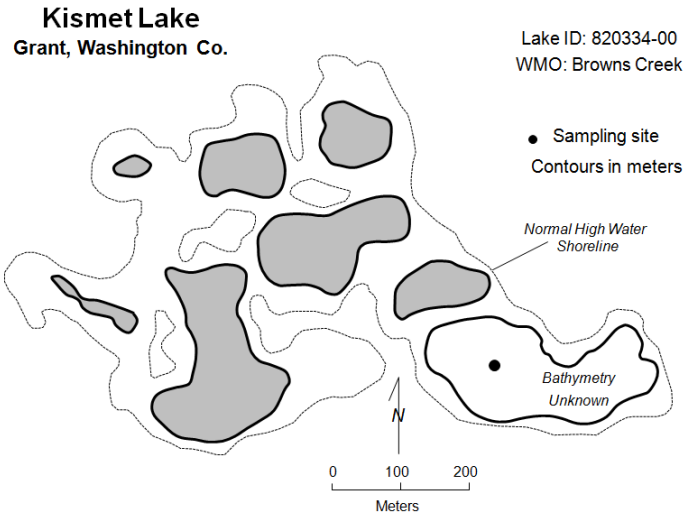
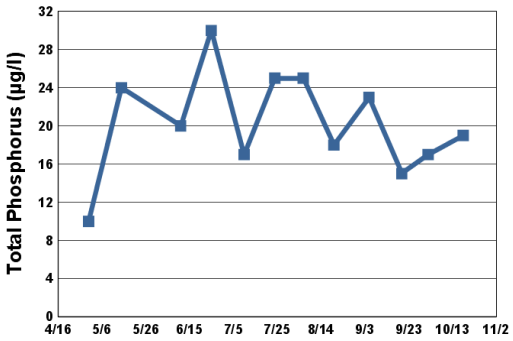
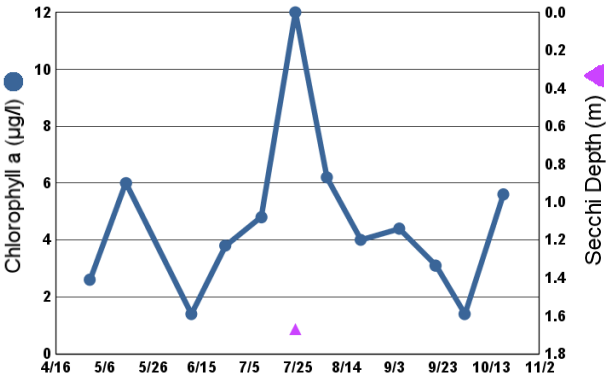
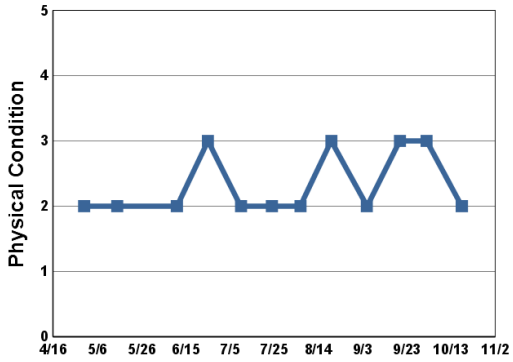


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	10.9	13.1	2.6	10		2	2
5/15	15.8	9.8	6.0	24		2	2
6/11	21.4	14.1	1.4	20		2	4
6/25	28.5	7.5	3.8	30		3	3
7/10	26.2	6.3	4.8	17		2	4
7/24	24.8	4.8	12	25	1.7	2	2
8/6	23.7	5.9	6.2	25		2	2
8/20	25.0	7.7	4.0	18		3	3
9/5	24.7	6.9	4.4	23		2	4
9/20	18.3	8.8	3.1	15		3	3
10/2	17.2	8.7	1.4	17		3	4
10/18	10.8	10.0	5.6	19		2	1







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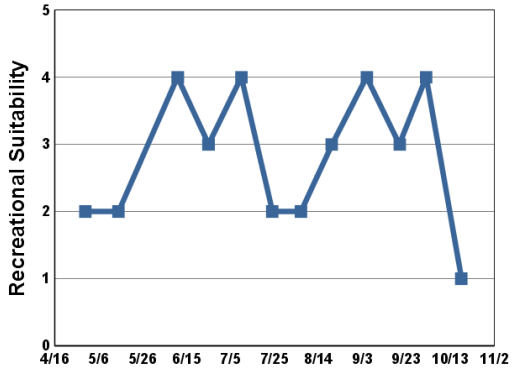

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Klawitter Pond (82–0368) *Valley Branch Watershed District*

Volunteer: Bonnie Juran, Pat Barrett, Steve Chlebeck

Klawitter Pond is a 4.5-acre lake located within the City of Lake Elmo (Washington County). Because of the shallowness of the lake, it is considered entirely littoral, which is the 0-15 feet depth zone dominated by aquatic vegetation. The lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column. The lake's surface area and watershed area of 168 acres translate to a 37:1 watershed-to-lake area ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	64	47	95	C
CLA (µg/l)	23	4.5	48	C
Secchi (m)	0.8	0.6	1.2	D
TKN (mg/l)	1.25	0.88	1.70	
			Lake Grade	C

The lake received a lake grade of D for 2013, which is similar to previous years' lake grades. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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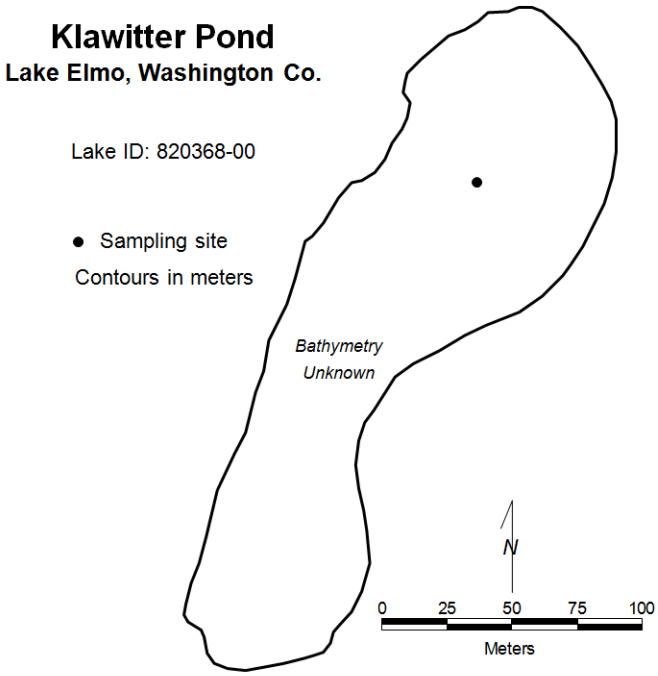
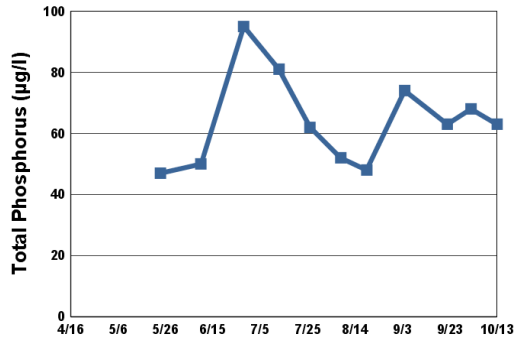
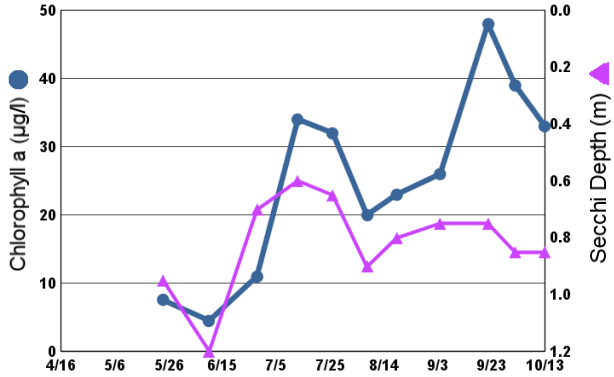
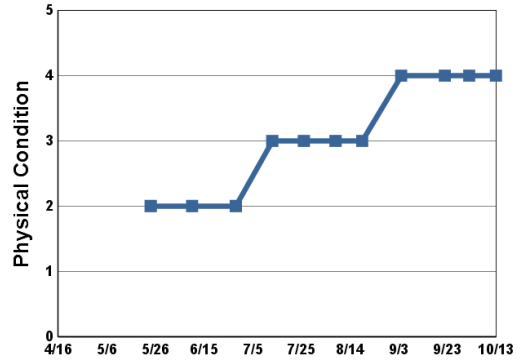


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	19.2		7.6	47	1.0	2	2
6/10	19.5		4.5	50	1.2	2	2
6/28	25.5		11	95	0.7	2	4
7/13	26.3		34	81	0.6	3	4
7/26	25.1		32	62	0.7	3	4
8/8	24.6		20	52	0.9	3	3
8/19	24.5		23	48	0.8	3	3
9/4	25.5		26	74	0.8	4	
9/22	19.1		48	63	0.8	4	4
10/2	19.2		39	68	0.9	4	4
10/13	15.8		33	63	0.9	4	4







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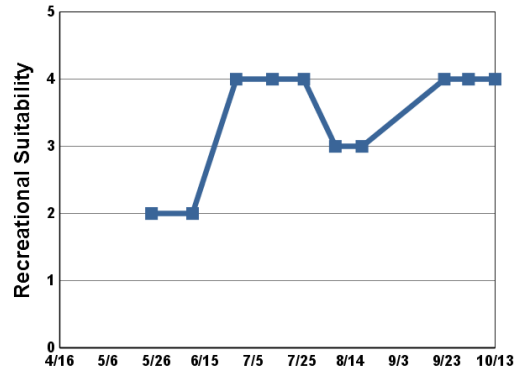

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Kramer Pond (82–0117) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

Kramer Pond is located within the City of Lake Elmo (Washington County). Little morphological information is available for the lake. The maximum depth at the sampling point is 1.8 m (6.0 feet). Because of the shallowness of the lake, the entire surface area is considered littoral zone, which is the 0-15 feet depth zone dominated by aquatic vegetation. The lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column.

No water quality data for the lake was available in the STORET nationwide water quality database.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	890	445	1,280	F
CLA (µg/l)	16	2.4	71	B
Secchi (m)	0.6	0.3	0.9	F
TKN (mg/l)	5.57	3.70	8.60	
			Lake Grade	D

The lake received a lake grade of D for 2013. The mean chlorophyll concentration was much lower in 2013 than in previous years. The CLA grade jumped from an F to B in 2013, which is striking. The water color was observed to be brown on most monitoring visits in 2013, indicating significant suspended non-algal material in the water column.. Also, the aquatic macrophyte abundance was noted to be minimal to none. It is possible that algal and macrophyte production was light-limited to the turbid conditions in 2013. Additional years of monitoring are suggested to build a water quality database so to better understand the lake's water quality and determine potential water quality trends, including this years drastic change in algal abundance.

Throughout the monitoring period, the volunteer's opinions of 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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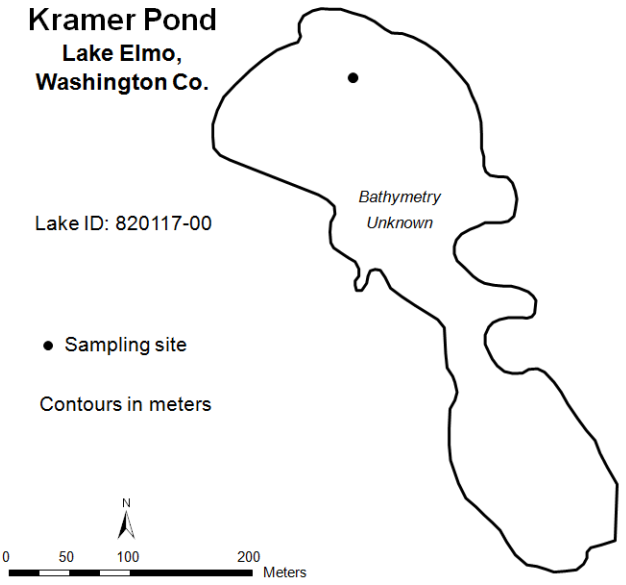
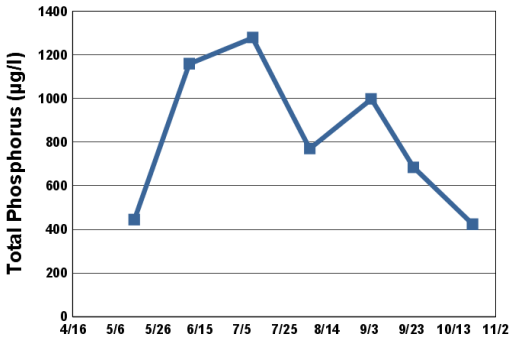
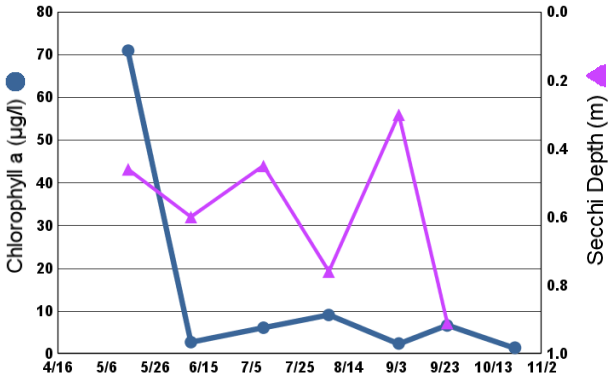
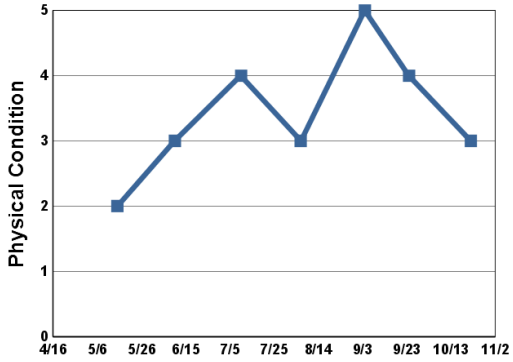


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/15	16.6	9.9	71	445	0.5	2	5
6/10	17.6	3.6	2.7	1,160	0.6	3	4
7/10	26.1	3.8	6.1	1,280	0.5	4	4
8/6	21.6	3.7	9.1	771	0.8	3	4
9/4	22.8	9.4	2.4	999	0.3	5	5
9/24	19.2	8.6	6.6	685	0.9	4	4
10/22	4.6	10.3	1.4	424		3	4







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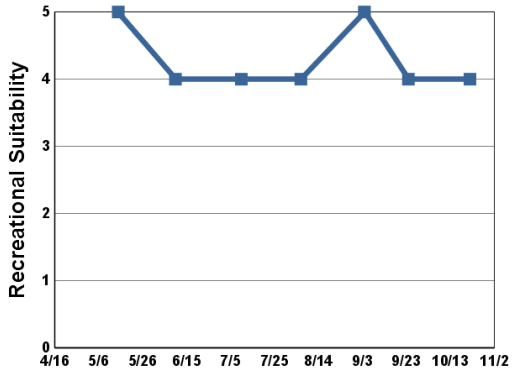

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Lake Water Quality Grades Based on Summertime Averages

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
TP					F	F	F		F	F
CLA					F	F	F		F	B
Secchi					F	F	F		F	F
Lake Grade					**F**	**F**	**F**		**F**	**D**

Source: Metropolitan Council and STORET data

La Lake (82–0097) *City of Woodbury*

Volunteer: Tim Weber

La Lake is located in the City of Woodbury (Washington County). The lake has a surface area of approximately 35 acres and a maximum depth of 3.5 m (11 feet). Because of the shallowness of the lake, it is considered littoral zone, which is the 0-15 feet depth zone of the lake dominated by aquatic vegetation. Furthermore, the lake 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	60	29	82	C
CLA (µg/l)	15	2.0	58	B
Secchi (m)	1.5	1.2	2.0	C
TKN (mg/l)	1.03	0.66	1.50	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical database. Water quality for the lake has experienced intra-annual variability in which the lake grades have varied from Bs and Cs.

Throughout the monitoring period, the volunteer's opinions of 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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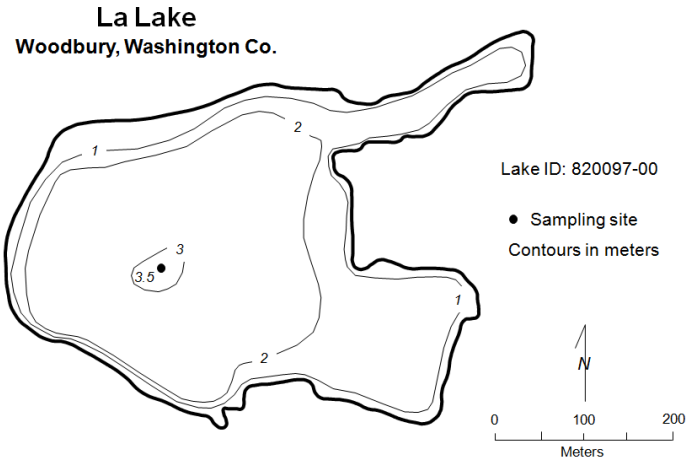
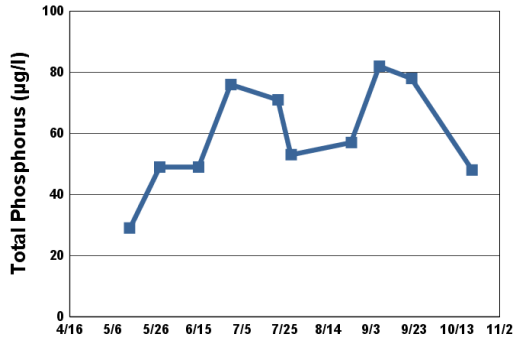
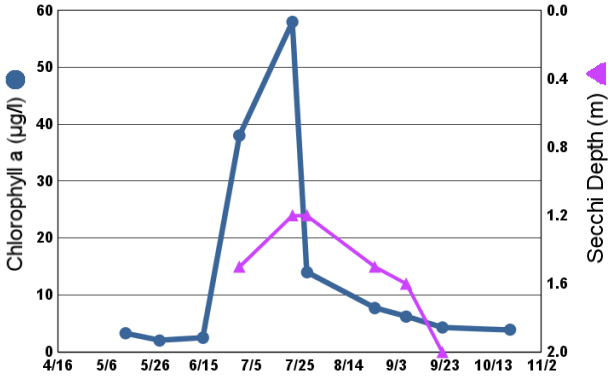
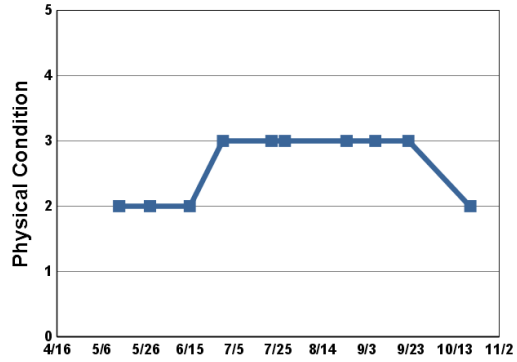


2013 Data

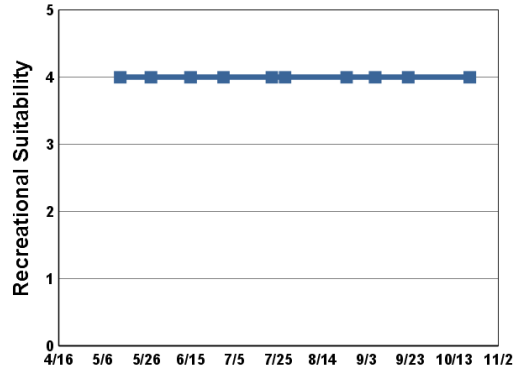
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	17.7		3.3	29		2	4
5/28	15.9		2.0	49		2	4
6/15	21.3		2.5	49		2	4
6/30	26.0		38	76	1.5	3	4
7/22	27.6		58	71	1.2	3	4
7/28	23.7		14	53	1.2	3	4
8/25	26.7		7.7	57	1.5	3	4
9/7	26.9		6.2	82	1.6	3	4
9/22	18.5		4.3	78	2.0	3	4
10/20	8.5		3.9	48		2	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Lac Lavon Lake (19–0446) *Black Dog Watershed Management Commission*

Volunteer: Wally Shaver

Lac Lavon is located within the City of Apple Valley (Dakota County). It is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity (METC 2007). The lake is an abandoned gravel pit maintained by groundwater (MDNR 1996). The lake has been designated by the Minnesota DNR as being infested with the aquatic plants Eurasian Water Milfoil (*Myriophyllum spicatum*) and Brittle Naiad(*Najas minor*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	8	3	24	A
CLA (µg/l)	3.8	1.3	11	A
Secchi (m)	3.8	2.2	4.7	A
TKN (mg/l)	0.54	0.35	0.74	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with its overall historical water quality database.

Throughout the monitoring period, the volunteer's opinions of 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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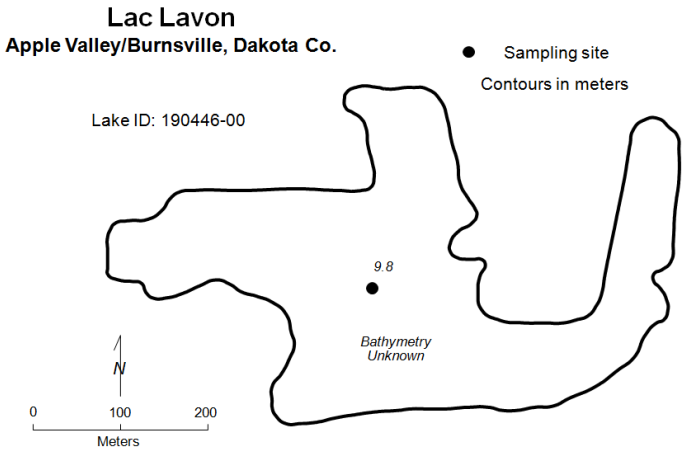
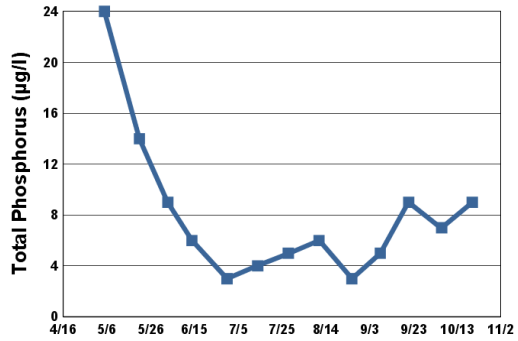
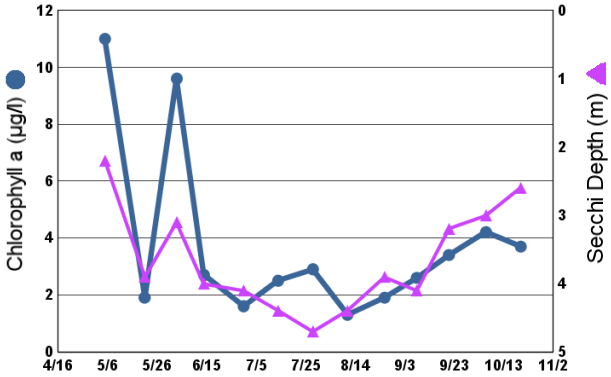
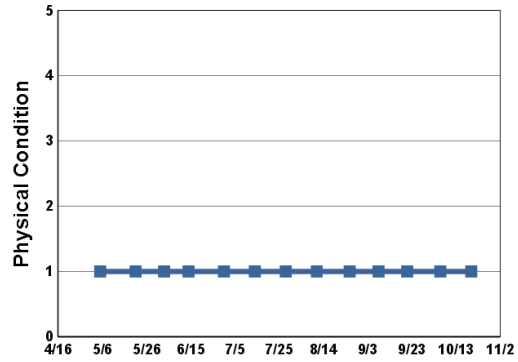


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	9.1		11	24	2.2	1	1
5/21	17.1		1.9	14	3.9	1	1
6/3	17.5		9.6	9	3.1	1	1
6/14	21.0		2.7	6	4.0	1	1
6/30	25.8		1.6	3	4.1	1	1
7/14	27.9		2.5	4	4.4	1	1
7/28	23.6		2.9	5	4.7	1	1
8/11	24.3		1.3	6	4.4	1	1
8/26	26.7		1.9	3	3.9	1	1
9/8	25.2		2.6	5	4.1	1	1
9/21	20.3		3.4	9	3.2	1	1
10/6	16.7		4.2	7	3.0	1	1
10/20	12.2		3.7	9	2.6	1	1







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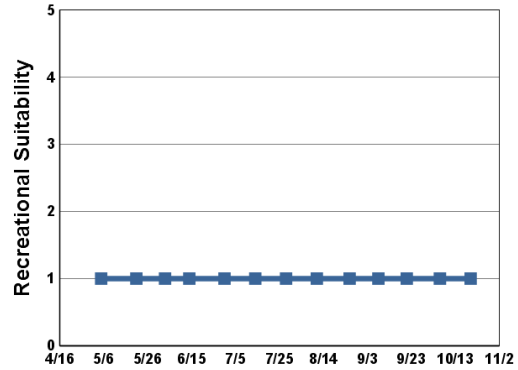

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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Langton Lake [North Basin Site-1] (62–0049–01) *Rice Creek Watershed District*

Volunteer: Tam McGehee, Dick McGehee

Langton Lake is divided into two basins. This report discusses the monitoring results for Site 1. The entire 30-acre lake is located within the City of Roseville (Ramsey County). The maximum depth of the lake is 1.5 m (4.9 ft). 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 MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	62	21	132	C
CLA (µg/l)	8.4	2.1	23	A
Secchi (m)	1.0	0.8	1.1	
TKN (mg/l)	1.04	0.67	1.40	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because either the disk was visible on the lake bottom or the visibility of the disk was blocked by aquatic vegetation rather than by water clarity. There were insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The TP and CLA grades received in 2013 were consistent with grades received in some previous years. TP grades typically are Cs, whereas CLA grades have varied from As to Cs. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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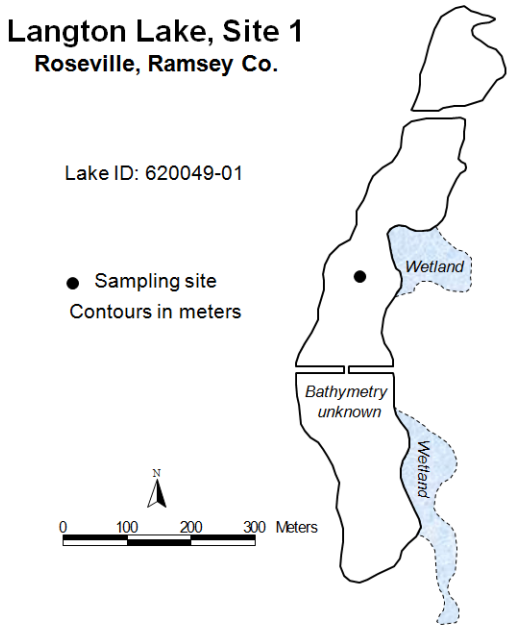

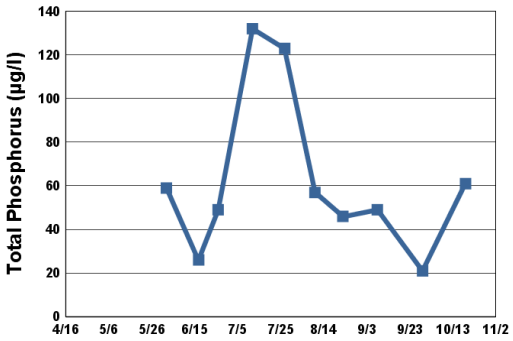

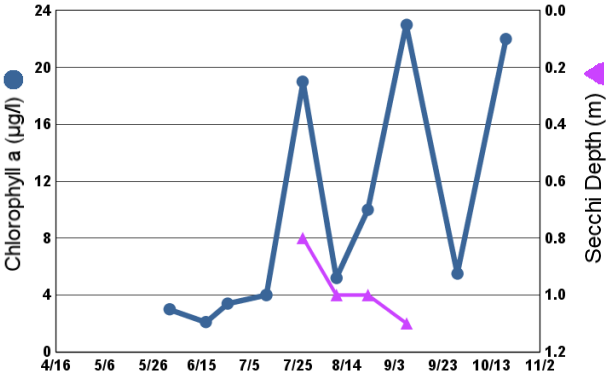

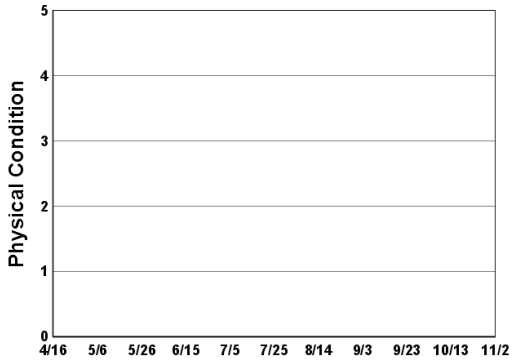

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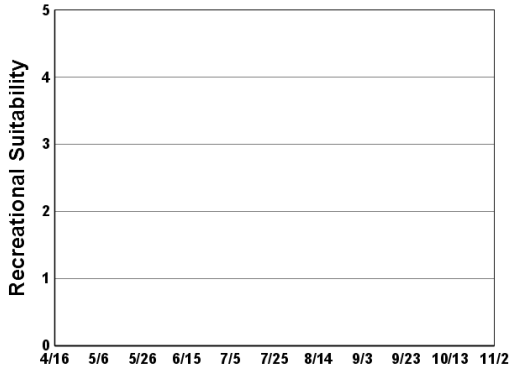
4 = High Algal Color
5 = Severe Algal Bloom



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

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/2	20.7		3.0	59			
6/17	23.7		2.1	26			
6/26	26.6		3.4	49			
7/12	25.7		4.0	132			
7/27	21.0		19	123	0.8		
8/10	22.3		5.2	57	1.0		
8/23	23.6		10	46	1.0		
9/8	22.9		23	49	1.1		
9/29	18.4		5.5	21			
10/19	10.9		22	61			

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

Source: Metropolitan Council and STORET data

Laura Lake (27–0123) *Elm Creek Watershed Management Commission*

Volunteer: Chris Foley

Laura Lake is located in the city of Dayton (Hennepin County). It has a surface area of 33 acres, and a maximum depth of 2.9 m. The lake is dominated by littoral area, which is the area of the lake that is less than 15 feet deep and dominated by aquatic vegetation. The lake does not maintain a thermocline, which is a density gradient cause by varying temperatures in the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	98	23	145	D
CLA (µg/l)	18	1.0	59	B
Secchi (m)	1.2	0.4	2.3	C
TKN (mg/l)	1.26	0.58	2.00	
			Lake Grade	C

This was the first year the lake was part of the CAMP. Continued monitoring is recommended to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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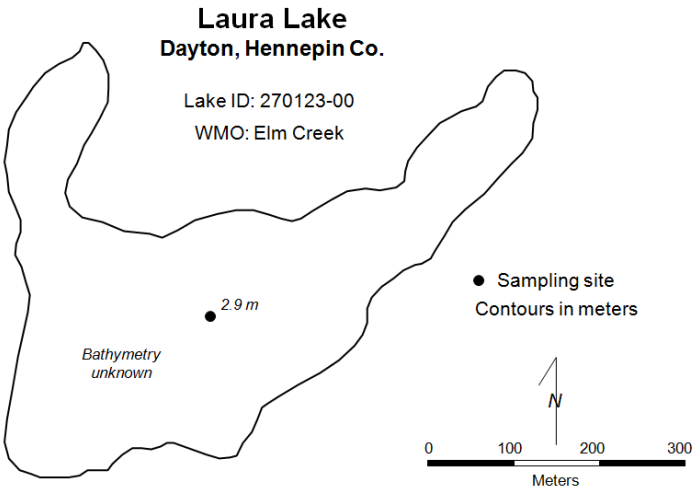
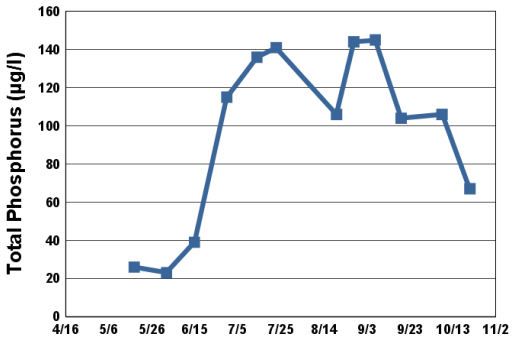
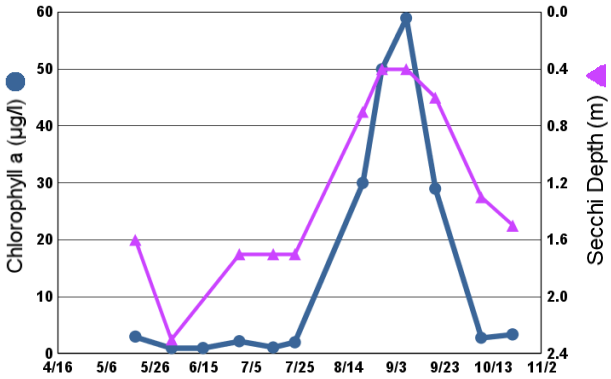
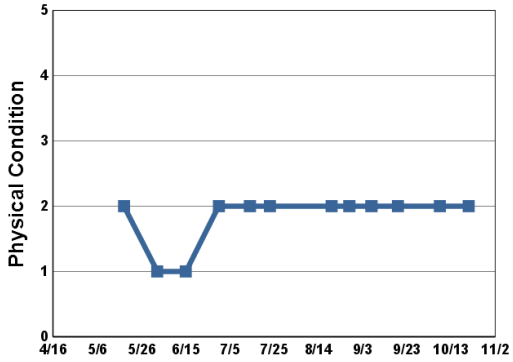


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/18	16.9		3.0	26	1.6	2	3
6/2	20.2		1.0	23	2.3	1	4
6/15	24.9		1.0	39		1	4
6/30	25.3		2.2	115	1.7	2	4
7/14	26.5		1.1	136	1.7	2	4
7/23	27.1		2.0	141	1.7	2	4
8/20	26.4		30	106	0.7	2	2
8/28	27.9		50	144	0.4	2	4
9/7	26.7		59	145	0.4	2	4
9/19	19.8		29	104	0.6	2	4
10/8	14.9		2.8	106	1.3	2	4
10/21	8.0		3.4	67	1.5	2	4







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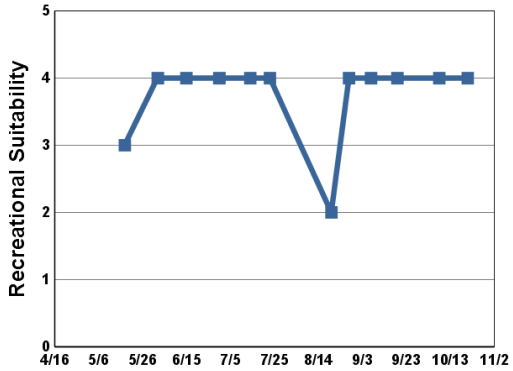

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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

Year	2013
TP	D
CLA	B
Secchi	C
Lake Grade	**C**

Source: Metropolitan Council and STORET data

Lee Lake (19–0029) *City of Lakeville*

Volunteer: City of Lakeville staff

Lee Lake is located in Lakeville (Dakota County). The lake has a surface area of 25 acres with a maximum depth of 5.2 m (17 ft). The lake is landlocked with no natural outlet. Curlyleaf pond weed has been a continuing problem in the lake (McComas and Stuckert 2008). Not only is it an aesthetic and recreational problem, but the decaying of these plants in late-summer contributes to algal blooms.

Barley straw has been added to this lake in the past to study the potential inhibition of algal populations within the lake (McComas and Stuckert 2009a).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	14	39	B
CLA (µg/l)	7.2	4.7	11	A
Secchi (m)	2.2	1.6	3.2	C
TKN (mg/l)	0.72	0.55	0.95	
			Lake Grade	B

The lake received a lake grade of B for 2013. The lake grades have varied from A to C over the past 6 years. Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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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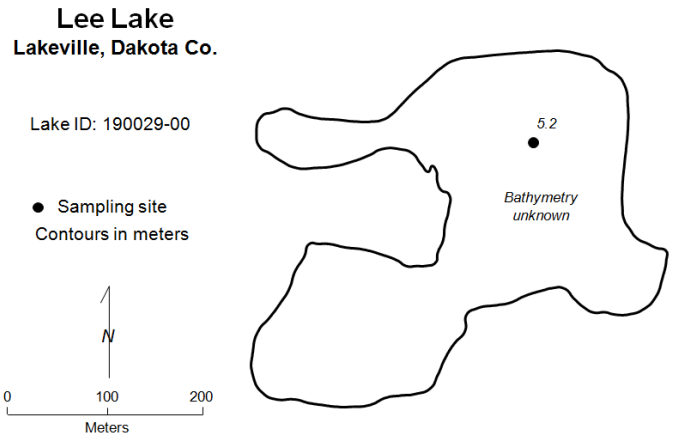
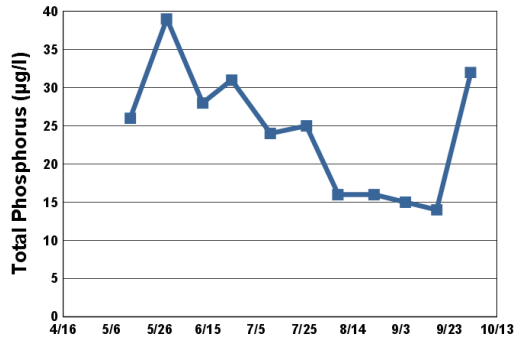
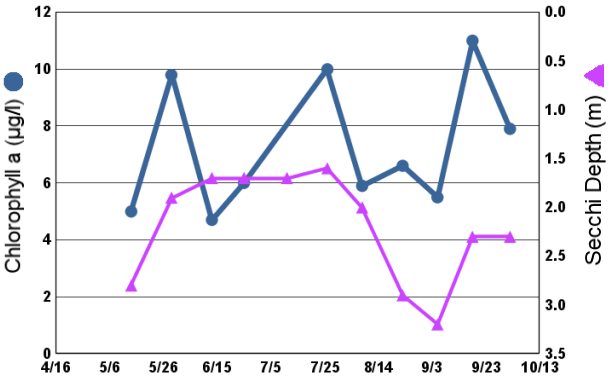
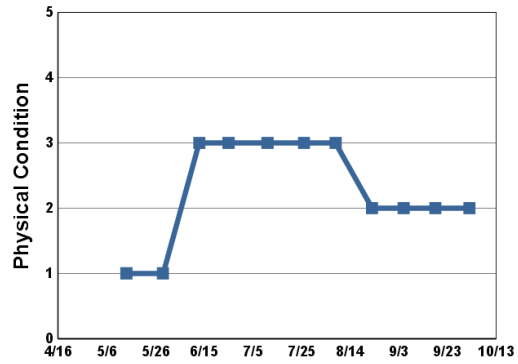


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	15.0		5.0	26	2.8	1	1
5/29	16.0		9.8	39	1.9	1	1
6/13	22.0		4.7	28	1.7	3	2
6/25	26.0		6.0	31	1.7	3	4
7/11	26.0			24	1.7	3	3
7/26	24.9		10	25	1.6	3	3
8/8	24.7		5.9	16	2.0	3	3
8/23	23.0		6.6	16	2.9	2	2
9/5	24.1		5.5	15	3.2	2	2
9/18	20.3		11	14	2.3	2	2
10/2	17.0		7.9	32	2.3	2	2







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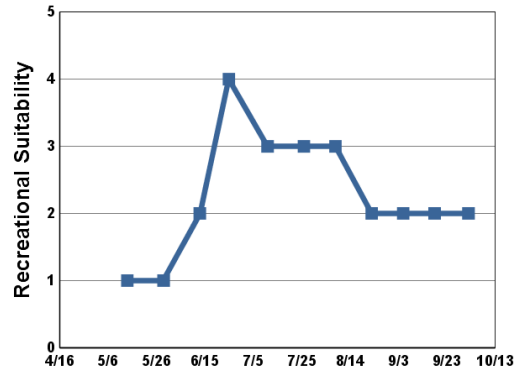

1 = Beautiful
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3 = Swimming Impaired
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

LeMay Lake (19–0082) *City of Mendota Heights*

Volunteer: City of Mendota Heights staff

LeMay Lake is located in the City of Mendota Heights. It has a surface area of 34 acres and an average depth of 1.6 m (5.1 ft). The maximum depth is 4.0 m (13 ft). The entire 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

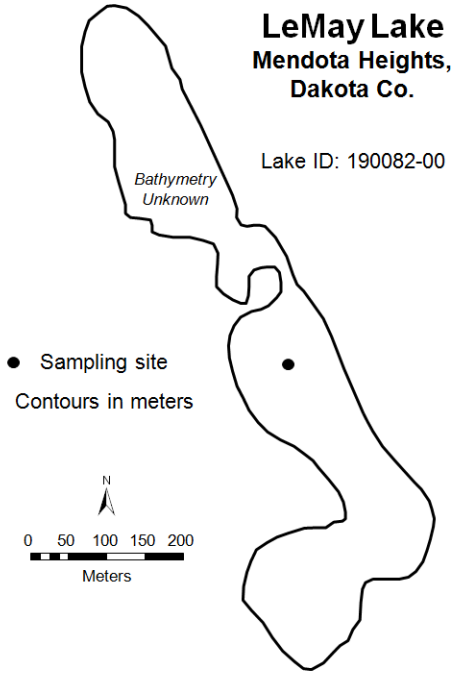
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	40	16	88	C
CLA (µg/l)	6.7	2.2	16	A
Secchi (m)	1.6	0.9	2.2	C
TKN (mg/l)	0.99	0.71	1.60	
			Lake Grade	B

The lake received a lake grad of B for 2013, which is consistent with its limited historical database. Additional years of monitoring are suggested for continuing to build the water quality database.

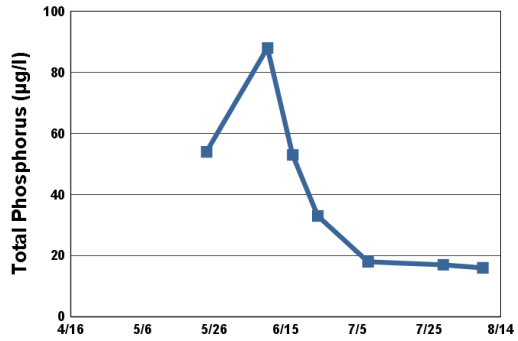
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

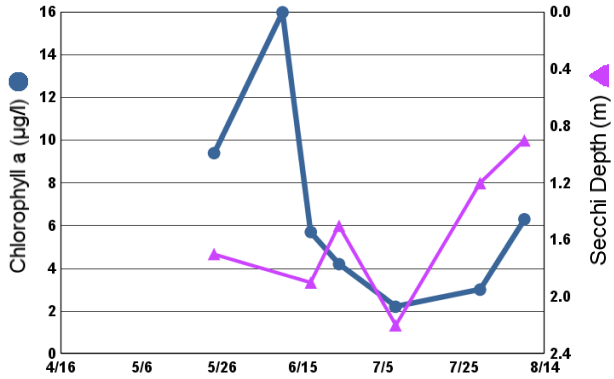
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

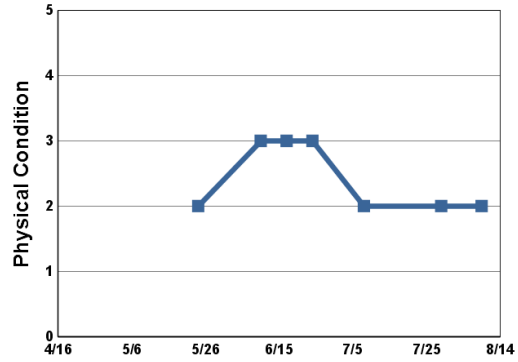


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	21.6		9.4	54	1.7	2	4
6/10			16	88		3	4
6/17	24.0		5.7	53	1.9	3	4
6/24	26.4		4.2	33	1.5	3	4
7/8	28.4		2.2	18	2.2	2	4
7/29	20.9		3.0	17	1.2	2	4
8/9	24.1		6.3	16	0.9	2	4







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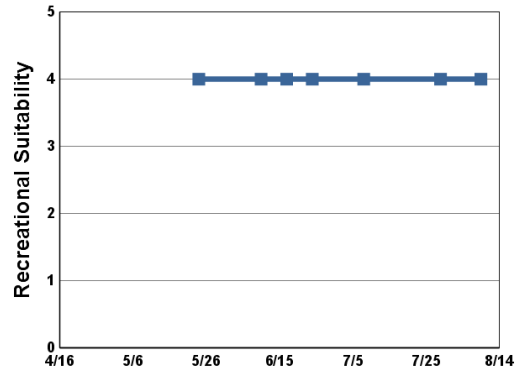
5 = Severe Algal Bloom



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Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Lily Lake (82–0023) *City of Stillwater*

Volunteer: Washington Conservation District staff

Lily Lake is located in the City of Stillwater in Washington County. The lake has a surface area of 52 acres, and a maximum depth of 17.4 m (57 feet). It has public access located on the lake's northern shore, and a fishing pier on its southern shore.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	32	16	58	B
CLA (µg/l)	11	2.4	24	B
Secchi (m)	2.2	1.4	4.3	C
TKN (mg/l)	0.97	0.81	1.20	
			Lake Grade	B

The lake received a lake grade of B for 2013. On the basis of the historical water quality database, the lake water quality has varied from B to C. However, there appears to be more variation in the historical CLA and water clarity grades.

Throughout the monitoring period, the volunteer's opinions of 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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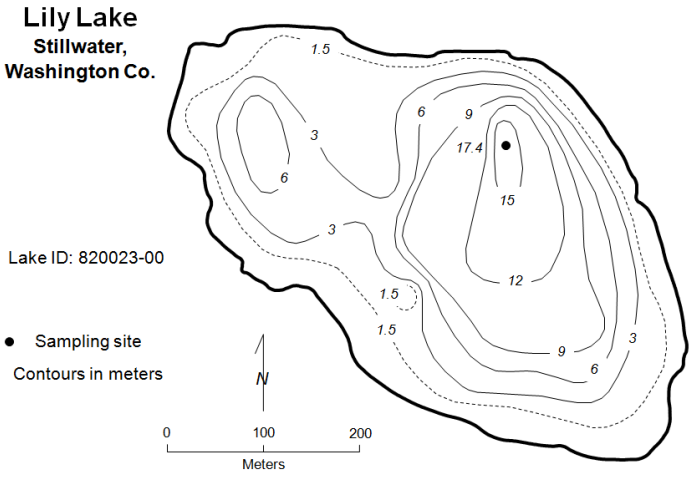
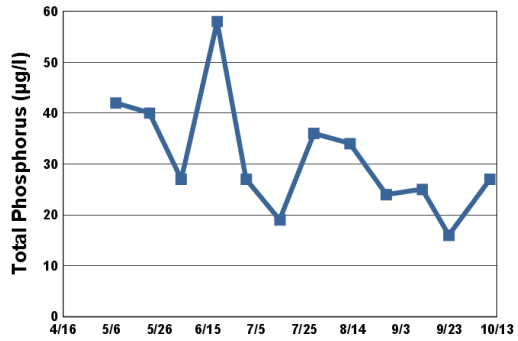
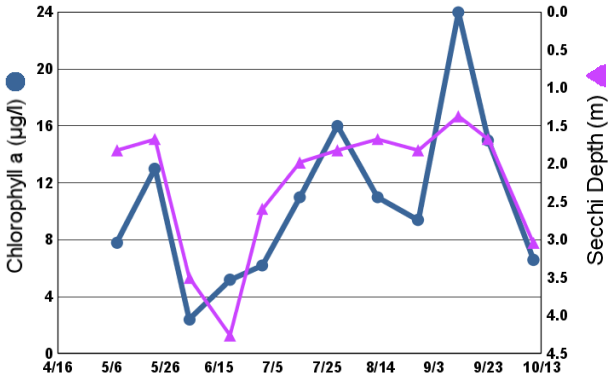
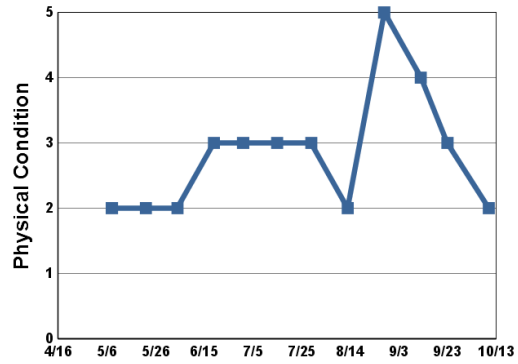


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	16.7	10.9	7.8	42	1.8	2	2
5/22	17.6	9.5	13	40	1.7	2	2
6/4	19.1	7.8	2.4	27	3.5	2	3
6/19	22.9	9.1	5.2	58	4.3	3	3
7/1	27.1	7.9	6.2	27	2.6	3	3
7/15	26.8	7.4	11	19	2.0	3	3
7/29	23.0	9.0	16	36	1.8	3	4
8/13	24.5	8.5	11	34	1.7	2	4
8/28	29.3	8.0	9.4	24	1.8	5	4
9/12	23.2	7.5	24	25	1.4	4	4
9/23	18.4	8.0	15	16	1.7	3	4
10/10	16.3	8.3	6.6	27	3.0	2	4







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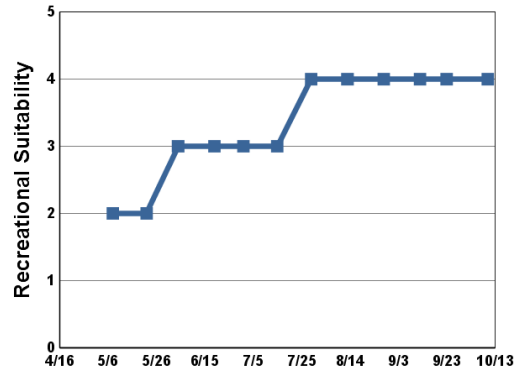

1 = Beautiful
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Little Carnelian Lake (82–0014) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

Little Carnelian Lake is located in Stillwater Township (Washington County). It is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity. The lake has a surface area of 162 acres, and has a shoreline length of 1.7 miles. It has a mean and maximum depth of 10.7 m (35 feet) and 21.3 m (70 feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 5,686 ac-ft. The lake's watershed has an area of 565 acres which translates to a watershed-to-lake area ratio of 3.5:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	8	3	13	A
CLA (µg/l)	2.0	1.0	3.2	A
Secchi (m)	6.7	5.0	7.6	A
TKN (mg/l)	0.52	0.44	0.65	
			Lake Grade	A

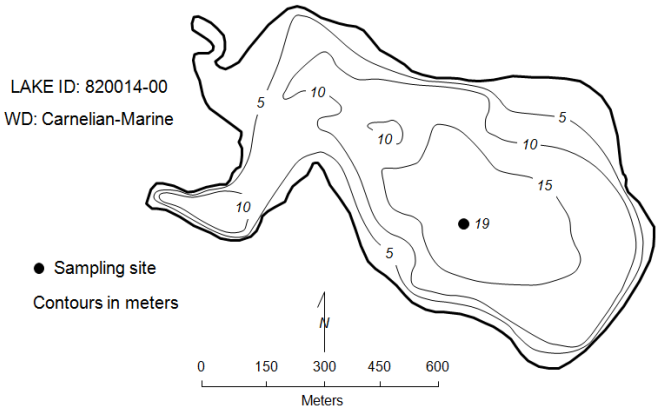
The lake received a lake grade of A in 2013, which is consistent with its historical database. Water clarity continues to be very good for a lake in the Twin Cities Metropolitan Area.

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

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

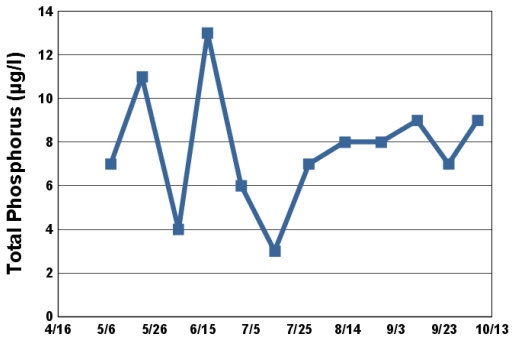
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

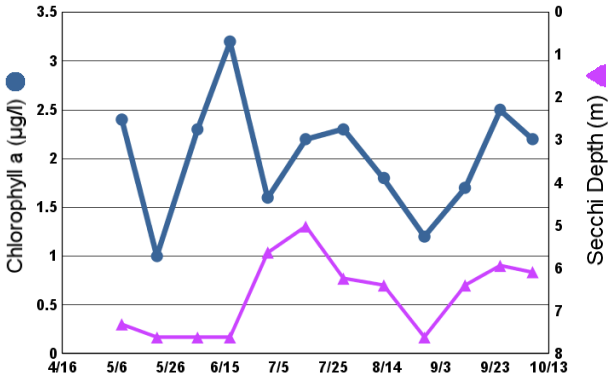
Little Carnelian Lake
Stillwater Twp., Washington Co.

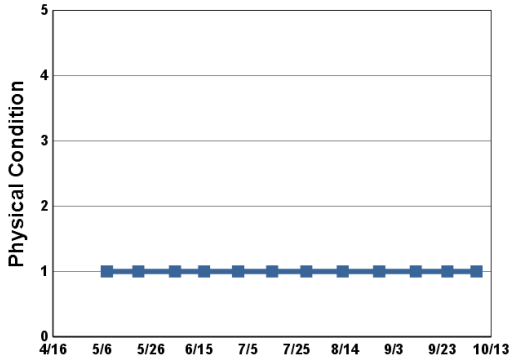


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	13.6	10.0	2.4	7	7.3	1	2
5/21	16.4	9.3	1.0	11	7.6	1	1
6/5	17.1	9.0	2.3	4	7.6	1	1
6/17	21.4	8.9	3.2	13	7.6	1	1
7/1	26.0	7.9	1.6	6	5.6	1	1
7/15	25.8	7.3	2.2	3	5.0	1	1
7/29	23.4	7.9	2.3	7	6.2	1	1
8/13	24.0	8.6	1.8	8	6.4	1	2
8/28	27.5	7.6	1.2	8	7.6	1	2
9/12	23.8	7.4	1.7	9	6.4	1	1
9/25	19.4	8.0	2.5	7	5.9	1	1
10/7	17.4	8.4	2.2	9	6.1	1	1







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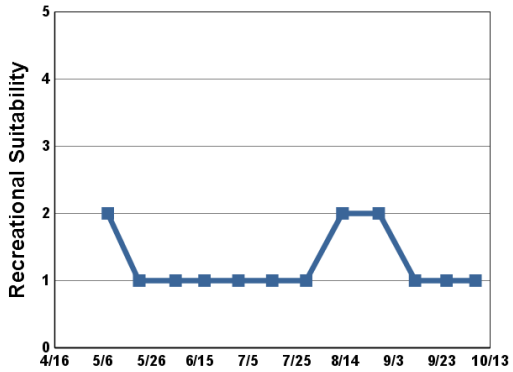

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Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Little Comfort Lake (13–0054) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Steve Schreiber and Washington Conservation District staff

Little Comfort Lake is located near the City of Wyoming (Chisago County). The lake has a maximum depth of 17.0 m (56 feet).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	11	106	C
CLA (µg/l)	20	6.7	61	B
Secchi (m)	1.5	0.9	2.3	C
TKN (mg/l)	1.24	0.68	1.80	
			Lake Grade	C

The lake received a lake grade of C for 2013 which is consistent with its varying historical water quality database. Additional annual monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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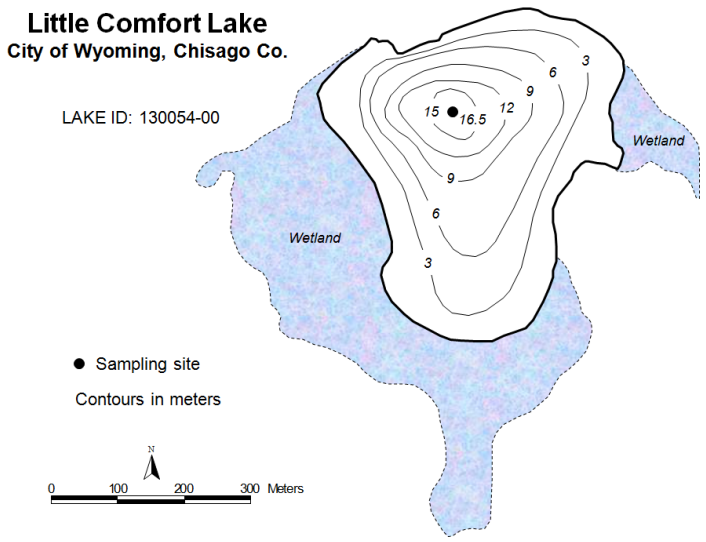
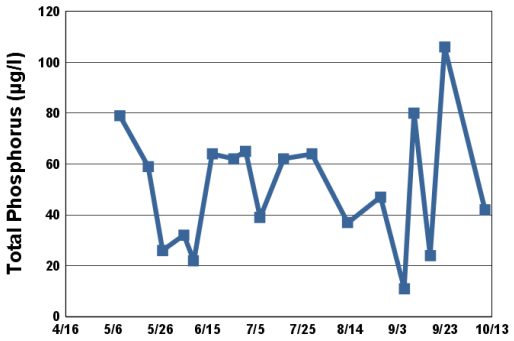
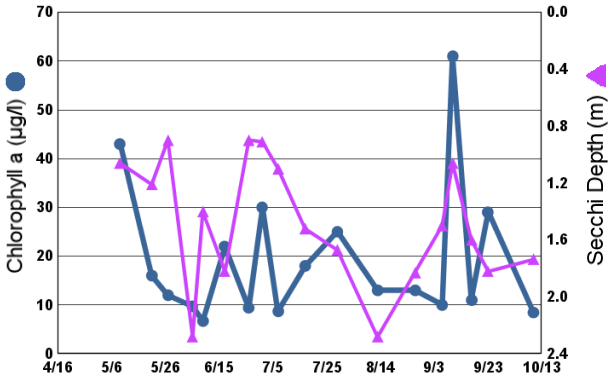
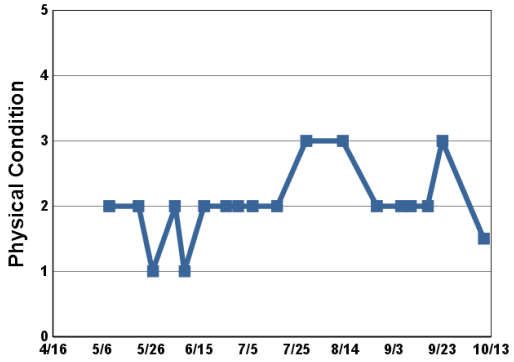


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/9	14.3	12.5	43	79	1.1	2	2
5/21	18.0	9.0	16	59	1.2	2	2
5/27	15.7		12	26	0.9	1	1
6/5	17.4	7.4	9.7	32	2.3	2	2
6/9	17.3		6.7	22	1.4	1	1
6/17	22.0	6.3	22	64	1.8	2	2
6/26	26.4		9.4	62	0.9	2	2
7/1	24.3	7.7	30	65	0.9	2	3
7/7	28.8		8.7	39	1.1	2	3
7/17	27.9	6.6	18	62	1.5	2	2
7/29	20.7	6.7	25	64	1.7	3	3
8/13	22.5	5.7	13	37	2.3	3	3
8/27	27.6	7.3	13	47	1.8	2	3
9/6	20.1		10	11	1.5	2	2
9/10	23.1	6.9	61	80	1.1	2	3
9/17	19.6		11	24	1.6	2	2
9/23	17.3	7.1	29	106	1.8	3	3
10/10	14.6	6.9	8.5	42	1.7	2	2







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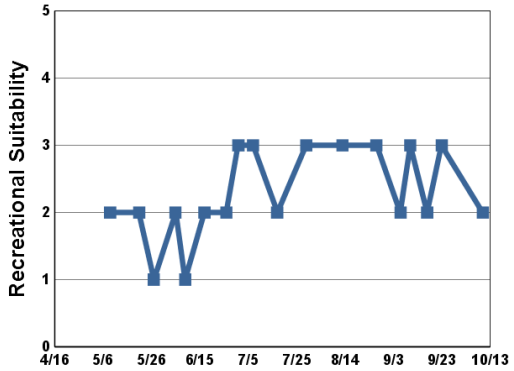

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Lake Water Quality Grades Based on Summertime Averages

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									
CLA			C									
Secchi			C									
Lake Grade			**C**									

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

Source: Metropolitan Council and STORET data

Little Johanna Lake (62–0058) *Rice Creek Watershed District*

Volunteer: Fred Fox

Little Johanna Lake is located on the boundary between the cities of Arden Hills and Roseville (Ramsey County). The lake has a surface area of 18 acres and a maximum depth of 12.0 m (39 feet).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	31	81	C
CLA (µg/l)	10	1.6	21	B
Secchi (m)	1.7	0.9	2.9	C
TKN (mg/l)	0.77	0.43	1.00	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical water quality database. The lake appears well represented by a lake grade of C. Continued monitoring is recommended to increase the power for determining trends, and to continue to build the water quality database for this

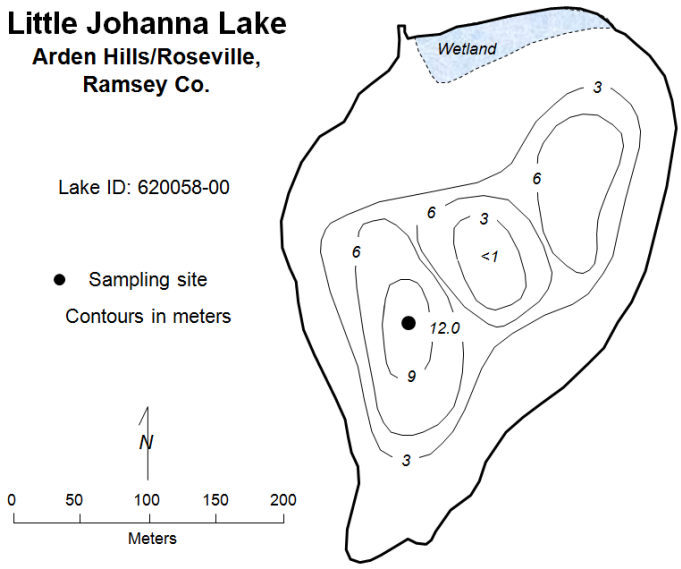
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

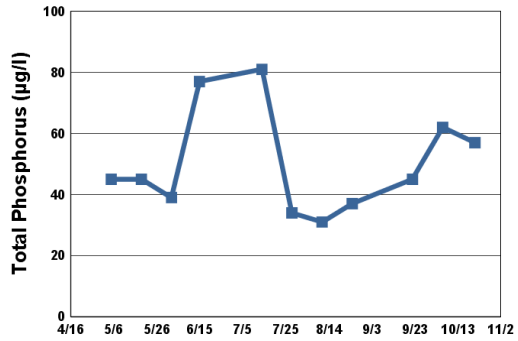
Little Johanna Lake
Arden Hills/Roseville, Ramsey Co.

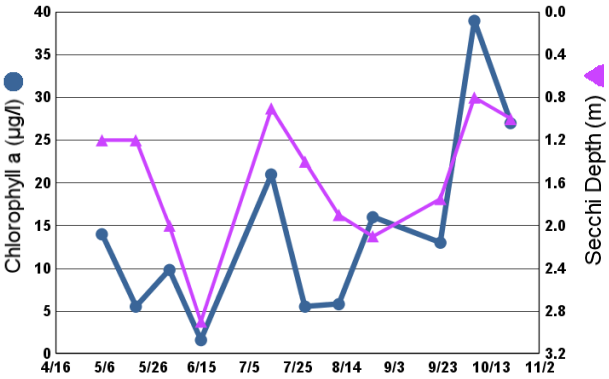
Lake ID: 620058-00

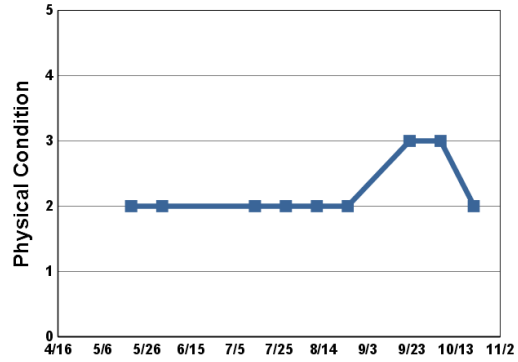


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	9.9		14	45	1.2		4
5/19	19.0		5.5	45	1.2	2	2
6/2			9.8	39	2.0	2	2
6/15	22.4		1.6	77	2.9		2
7/14	26.2		21	81	0.9	2	3
7/28	21.8		5.5	34	1.4	2	2
8/11	23.5		5.8	31	1.9	2	4
8/25	27.1		16	37	2.1	2	3
9/22	18.1		13	45	1.8	3	3
10/6	14.4		39	62	0.8	3	3
10/21	8.9		27	57	1.0	2	4







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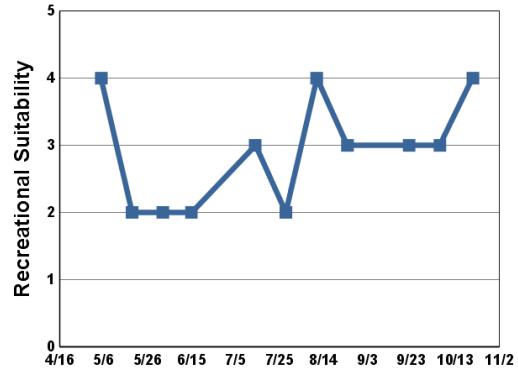


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Lochness Lake (2–0585) *Rice Creek Watershed District*

Volunteer: Jim and Tricia Hafner

Lochness Lake is located in the City of Blaine (Anoka County). It has a surface area of 5.3 acres. There are few known morphological data available for the lake other than it has a maximum depth of 4.9 m (16ft). Because of the shallowness of the lake, the entire area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. Also the lake 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

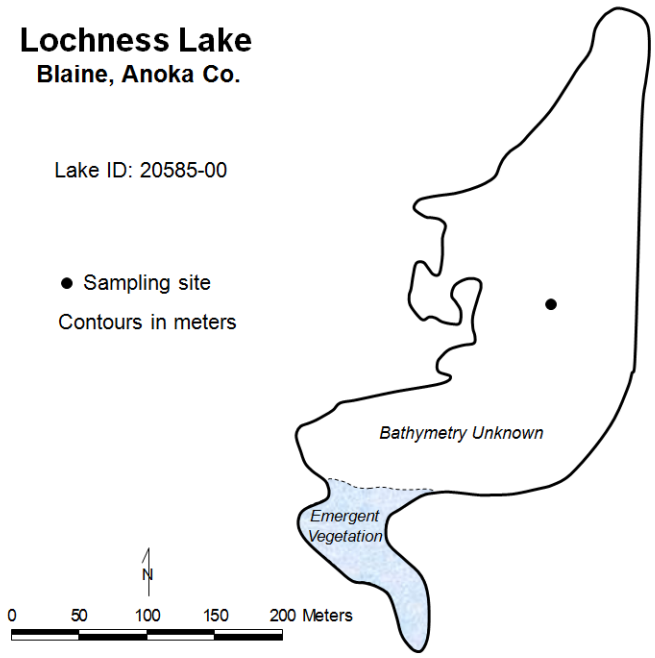
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	33	10	51	C
CLA (µg/l)	25	5.3	60	C
Secchi (m)	2.0	1.2	2.7	C
TKN (mg/l)	1.14	0.91	1.50	
			Lake Grade	C

The lake received a lake grade of C for 2013. Water quality with respect to TP and CLA seems to indicate a worsening of water quality since CAMP monitoring began in 2007. However, TP concentrations appears improved overall compared to last year (2012). Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

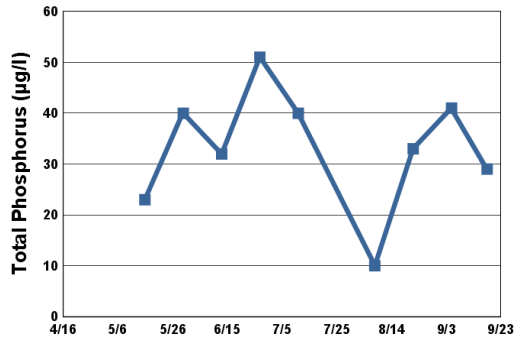
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

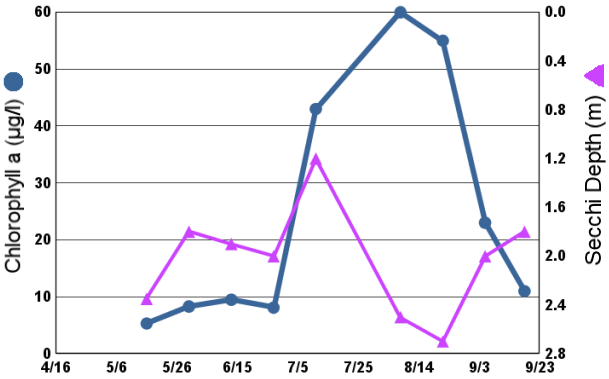
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

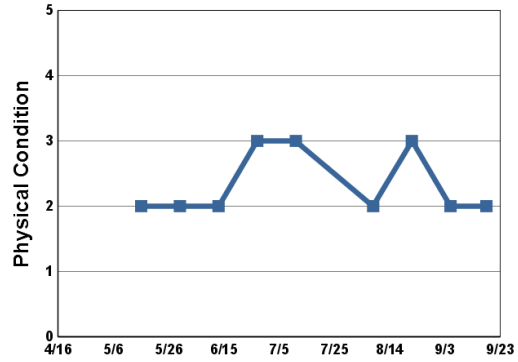


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	17.4		5.3	23	2.4	2	4
5/30	19.1		8.3	40	1.8	2	4
6/13	19.1		9.5	32	1.9	2	4
6/27	26.6		8.1	51	2.0	3	4
7/11			43	40	1.2	3	4
8/8	24.8		60	10	2.5	2	4
8/22	26.6		55	33	2.7	3	4
9/5	23.0		23	41	2.0	2	4
9/18	18.5		11	29	1.8	2	4







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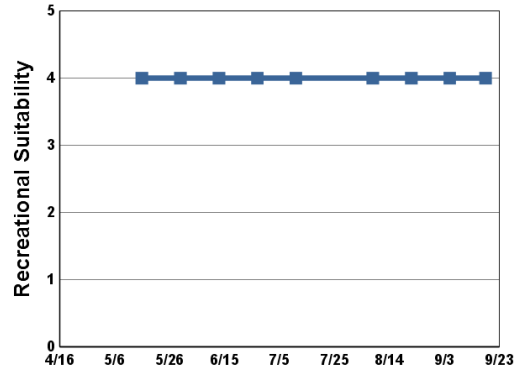

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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5 = No Aesthetics Possible

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												
CLA												
Secchi												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Long Lake [Apple Valley] (19–0022) *City of Apple Valley*

Volunteer: Christy McGlocklin

Long Lake, which has a surface area of roughly 36 acres, is located within the City of Apple Valley (Dakota County). The maximum depth of the lake is approximately 1.5 m (5 feet). 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

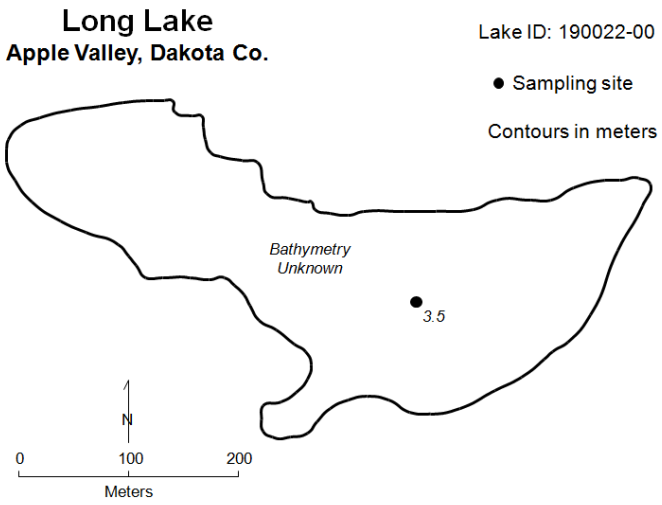
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	161	32	396	F
CLA (µg/l)	102	1.0	380	F
Secchi (m)	0.5	0.1	1.1	F
TKN (mg/l)	2.73	0.90	6.40	
			Lake Grade	F

The lake received a lake grade of F for 2013, which is similar to those recorded in the past decade.

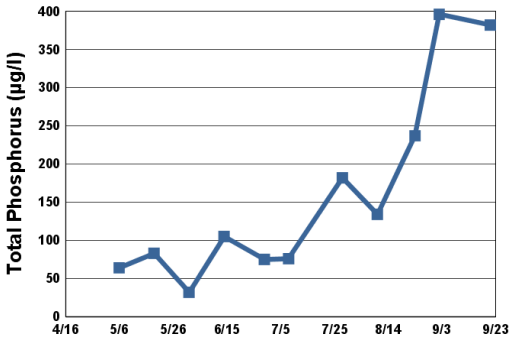
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

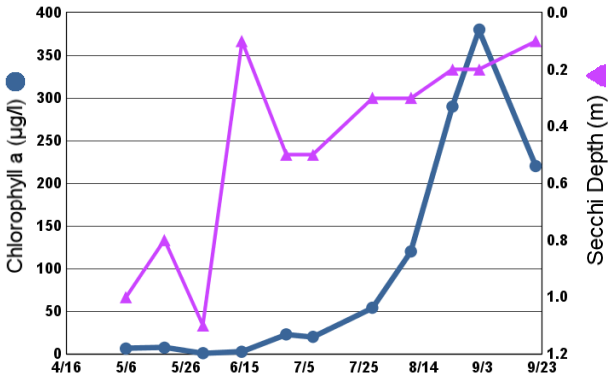
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

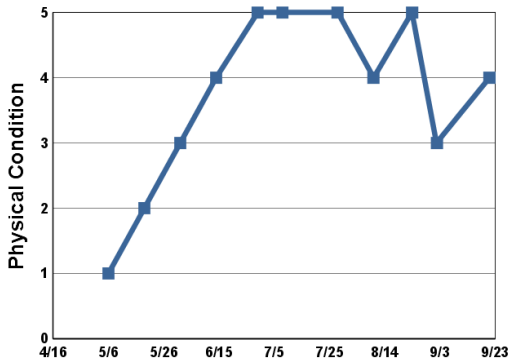


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	19.2		6.4	64	1.0	1	1
5/19	21.5		7.3	83	0.8	2	4
6/1	22.1		1.0	32	1.1	3	4
6/14	24.9		2.6	105	0.1	4	5
6/29	26.7		23	75	0.5	5	5
7/8	31.8		20	76	0.5	5	5
7/28	18.0		54	182	0.3	5	5
8/10			120	134	0.3	4	5
8/24			290	237	0.2	5	5
9/2	23.8		380	396	0.2	3	5
9/21	19.5		220	382	0.1	4	5







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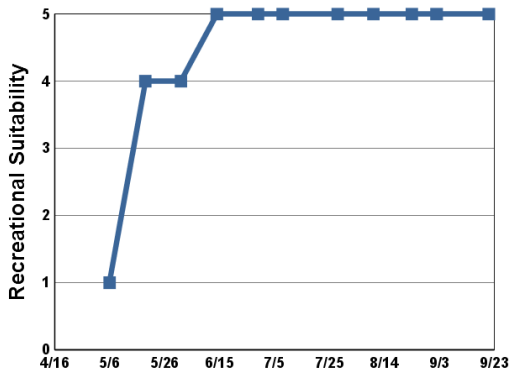

1 = Beautiful
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Long Lake [Site 1, North Basin] [Stillwater] (82–0021) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Long Lake is located on the western boundary of the City of Stillwater (Washington County). It has a surface area of 96 acres, and its maximum depth is 6.7 m (22 feet). Approximately 95 percent of the surface area is considered littoral zone, which is the 0-15 feet depth zone dominated by aquatic vegetation. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	45	30	63	C
CLA (µg/l)	14	2.7	29	B
Secchi (m)	1.7	1.1	3.5	C
TKN (mg/l)	1.22	0.98	1.70	
			Lake Grade	C

The lake received a lake grade of C for 2013. The lake has experienced varying lake grades from D to B since 2004. Prior to 2004 the lake grades were constant Ds and Fs. Continued monitoring is suggested to determine if the improved water quality that started around 2004 is sustained into the future.

Throughout the monitoring period, the volunteer's opinions of 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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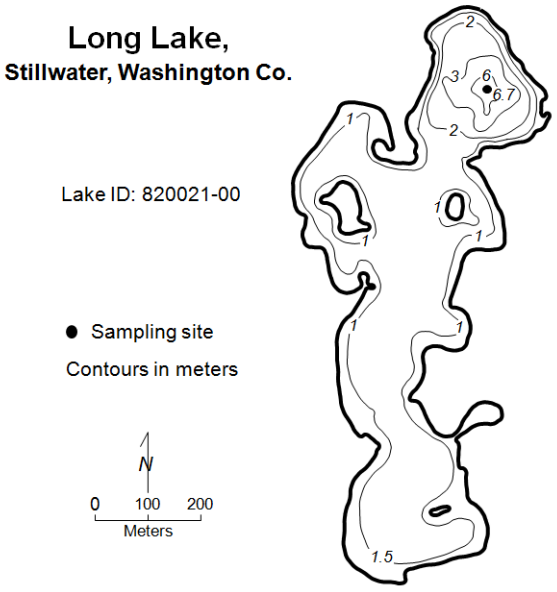
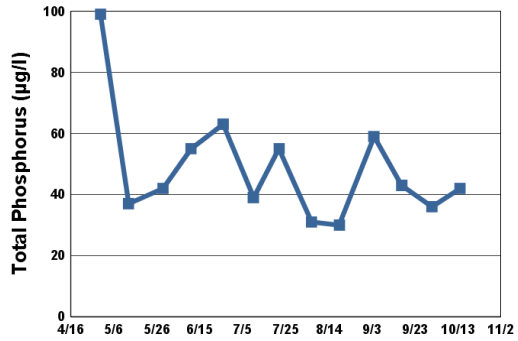
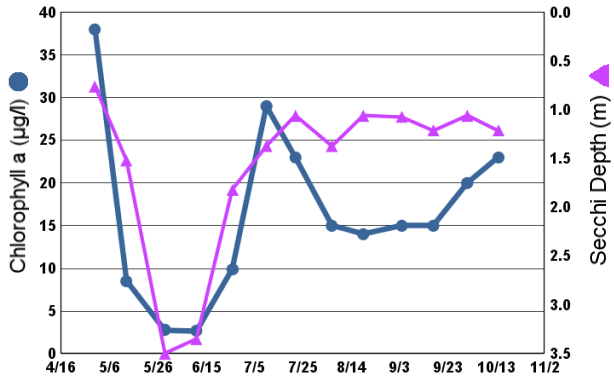
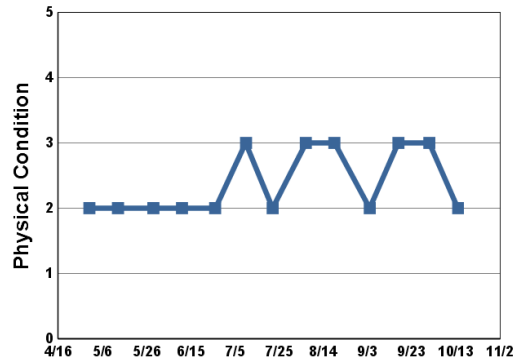


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	14.6	12.6	38	99	0.8	2	2
5/13	13.4	11.2	8.5	37	1.5	2	2
5/29	17.0	6.4	2.8	42	3.5	2	2
6/11	20.0	7.5	2.7	55	3.4	2	2
6/26	27.1	8.4	9.9	63	1.8	2	2
7/10	26.0	9.0	29	39	1.4	3	3
7/22	26.2	8.3	23	55	1.1	2	3
8/6	24.2	10.0	15	31	1.4	3	3
8/19	23.6	8.2	14	30	1.1	3	3
9/4	25.1	7.1	15	59	1.1	2	4
9/17	19.0	8.2	15	43	1.2	3	2
10/1	17.6	7.6	20	36	1.1	3	4
10/14	14.4	7.6	23	42	1.2	2	2







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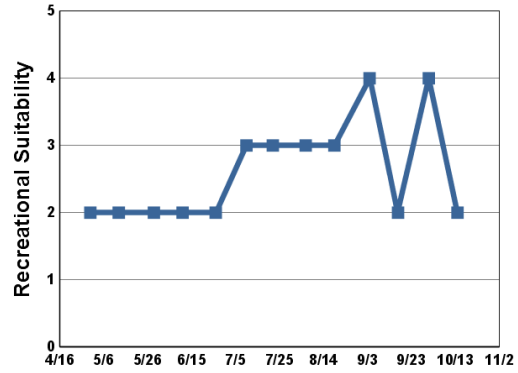

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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Long Lake [Site 2, Middle Basin] [Stillwater] (82–0021) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Long Lake is located on the western boundary of the City of Stillwater (Washington County). It has a surface area of 96 acres, and its maximum depth is 6.7 m (22 feet). Approximately 95 percent of the surface area is considered littoral zone, which is the 0-15 feet depth zone dominated by aquatic vegetation. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	41	38	44	
CLA (µg/l)	6.7	5.3	7.8	
Secchi (m)				
TKN (mg/l)	0.91	0.64	1.10	
			Lake Grade	

There was an insufficient quantity of data to calculate grades for this monitoring site in 2013. There were 4 monitoring events in 2013; at least 5 monitoring events during the summer-time period (May –September) are needed to calculate grades. For all of the site visits, the Secchi disk was either visible on the lake bottom or obscured by aquatic macrophytes, so no valid Secchi depths were measurable.

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

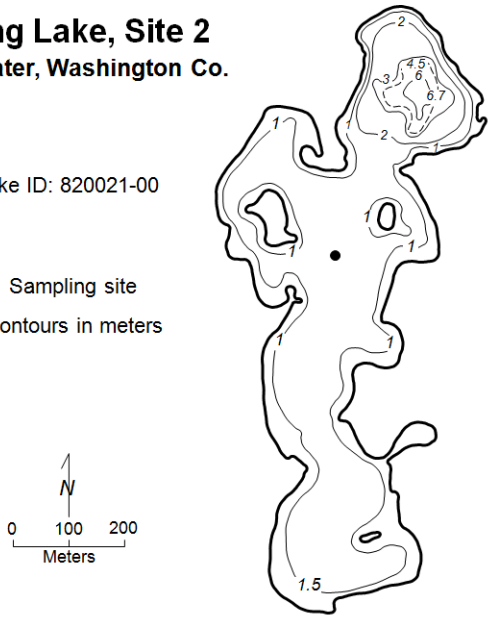
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Long Lake, Site 2

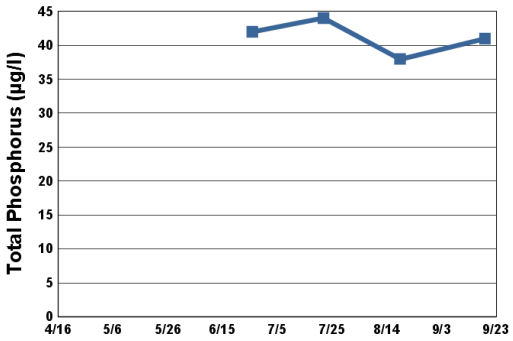
Stillwater, Washington Co.

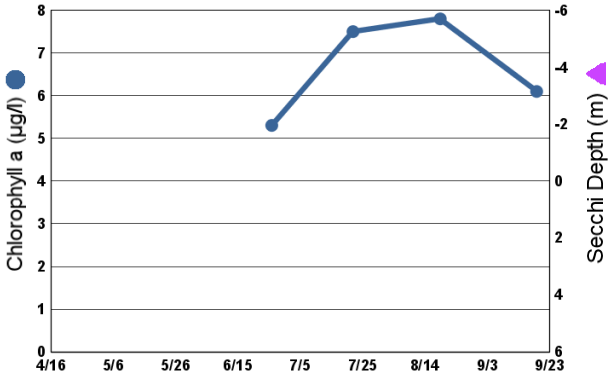
Lake ID: 820021-00

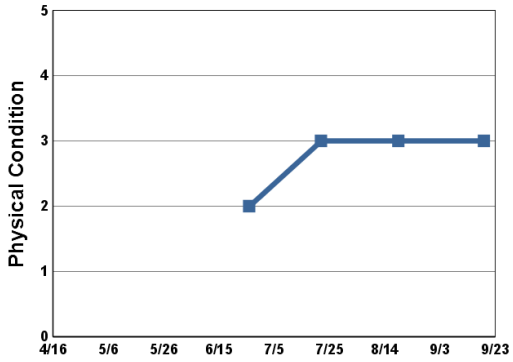


2013 Data

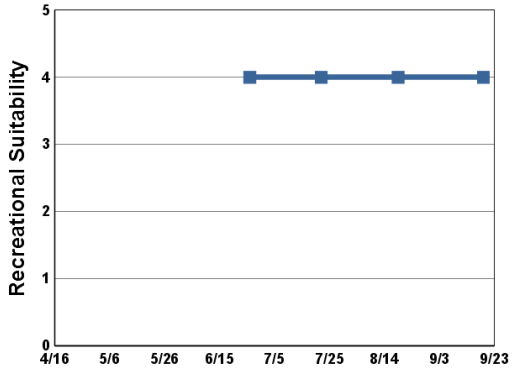
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/26	27.1	9.0	5.3	42		2	4
7/22	24.8	5.0	7.5	44		3	4
8/19	21.3	4.8	7.8	38		3	4
9/19	18.6	7.7	6.1	41		3	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Long Lake [Site 3, South Basin] [Stillwater] (82–0021) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Long Lake is located on the western boundary of the City of Stillwater (Washington County). It has a surface area of 96 acres, and its maximum depth is 6.7 m (22 feet). Approximately 95 percent of the surface area is considered littoral zone, which is the 0-15 feet depth zone dominated by aquatic vegetation. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	122	67	192	
CLA (µg/l)	47	4.2	91	
Secchi (m)				
TKN (mg/l)	1.23	0.83	1.60	
			Lake Grade	

There was an insufficient quantity of data to calculate grades for this monitoring site in 2013. There were 4 monitoring events in 2012; at least 5 monitoring events during the summer-time period (May –September) are needed to calculate grades. For a majority of the site visits, the Secchi disk was either visible on the lake bottom or obscured by aquatic macrophytes.

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

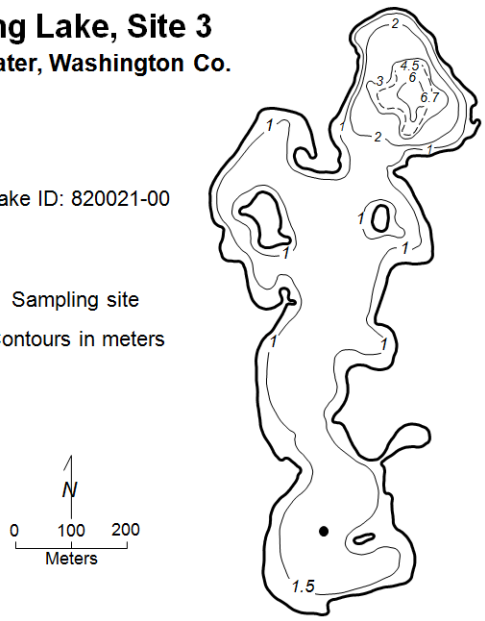
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Long Lake, Site 3

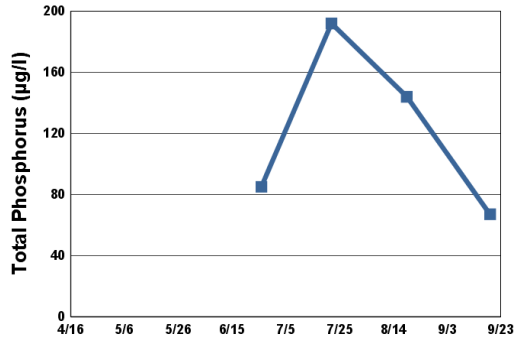
Stillwater, Washington Co.

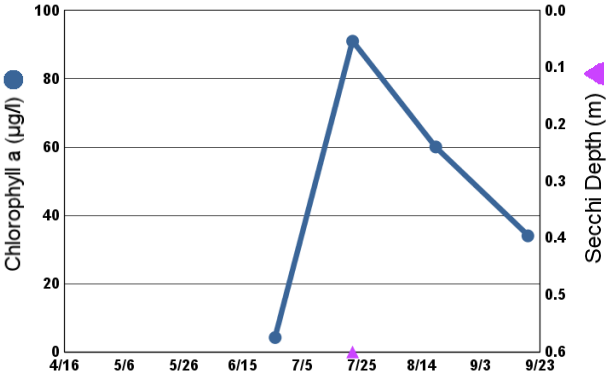
Lake ID: 820021-00

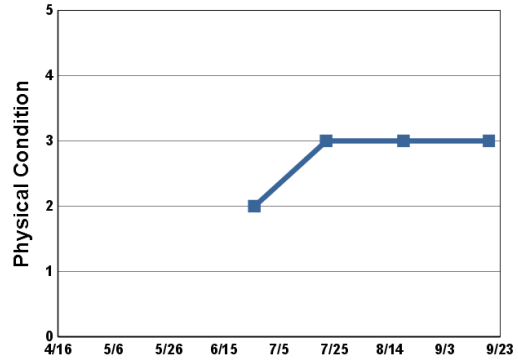


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/26	26.2	5.5	4.2	85		2	4
7/22	22.8	1.2	91	192	0.6	3	4
8/19	20.7	1.0	60	144		3	4
9/19	18.2	4.9	34	67		3	4







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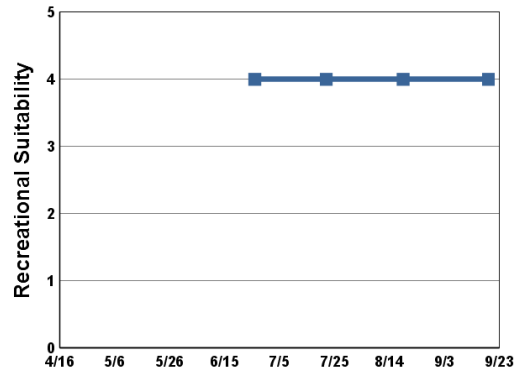
4 = High Algal Color
5 = Severe Algal Bloom



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
TP										
CLA										
Secchi										
Lake Grade										

Source: Metropolitan Council and STORET data

Long Lake [May Township] (82–0030) *Carnelian — Marine — St. Croix Watershed District*

Long Lake is located in May Township (Washington County). It has a surface area of 88 acres. The maximum depth is 3.7 m (12 feet). The entire lake area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The lake 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 the lake was monitored for secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

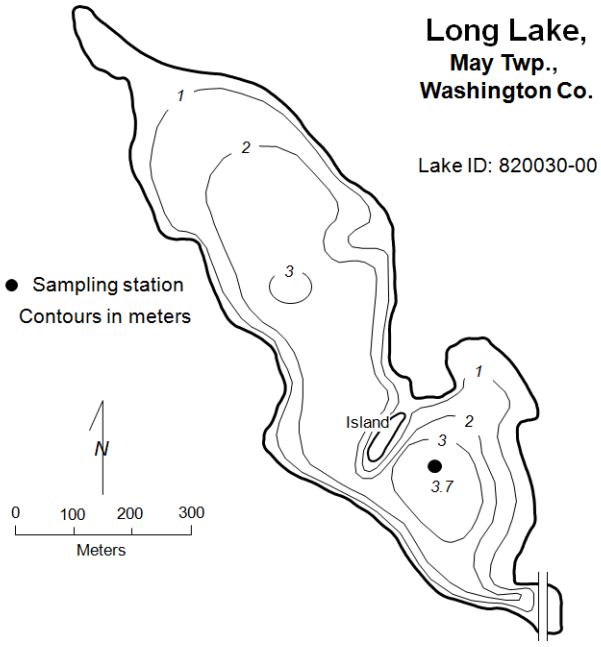
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	2.7	2.0	3.8	B
TKN (mg/l)				
			Lake Grade	

The lake received a Secchi grade of B for 2013. This grade is consistent with Secchi grades received over the past decade, and an apparent improvement over the C grades typically received in the 1990s. Notable is the change in typical CLA grades received in the mid 1990s (C's) compared to the CLA grades received since 2003 (A's). Approximately half of the Secchi depth measurements were limited by aquatic macrophytes or the lake bottom, so water clarity was likely clearer than indicated by the valid Secchi depths reported in the tables.

Throughout the monitoring period, the volunteer's opinions of 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.

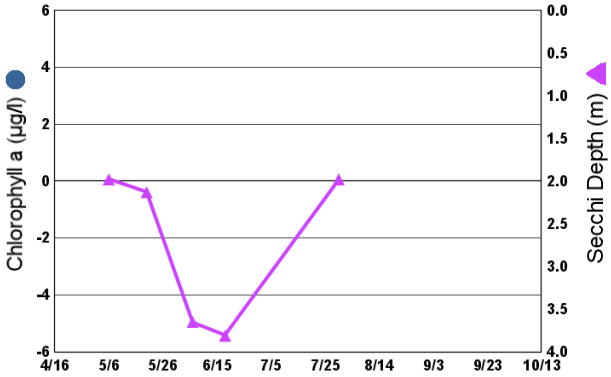
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

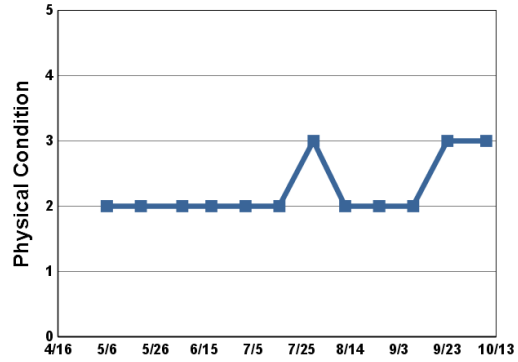
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	12.0				2.0	2	3
5/20	19.7				2.1	2	3
6/6	17.1	8.2			3.7	2	4
6/18	22.3	8.4			3.8	2	1
7/2	25.5					2	2
7/16						2	2
7/30	21.6	6.0			2.0	3	3
8/12	23.7					2	3
8/26	27.2					2	2
9/9	23.2					2	4
9/23	17.7					3	3
10/9	16.7					3	4





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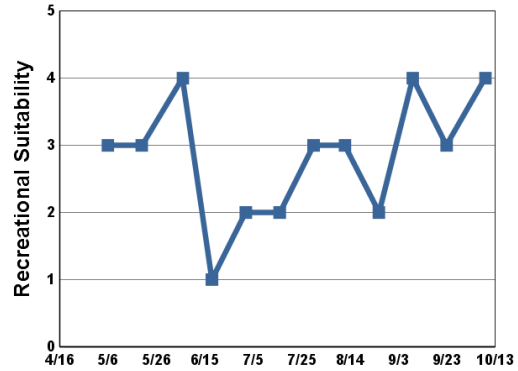
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Long Lake [Pine Springs] (82–0118) *Valley Branch Watershed District*

Volunteer: Bill Feely

Long Lake is located in Pine Springs Township (Washington County). It has a surface area of 62 acres. The mean and maximum depths of the lake are 3.6 m (12 feet) and 10.4 m (34 feet), respectively. The lake's surface area and watershed area of 2,060 acres translates to a 33:1 watershed-to-lake area ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	19	7	41	A
CLA (µg/l)	4.8	1.7	8.6	A
Secchi (m)	2.6	1.8	3.9	B
TKN (mg/l)	0.72	0.50	1.00	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is similar to water quality received in 2009 but with a lesser mean water clarity in 2013. The good water quality year of 2009 follows an alum treatment that occurred in 2008 and a second dosing in 2009. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

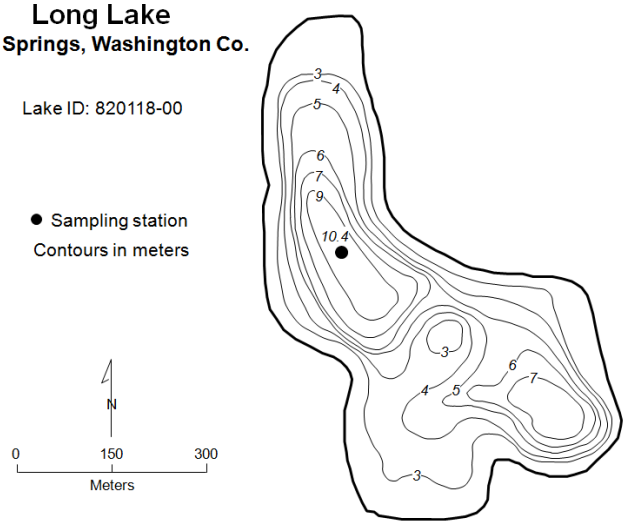
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

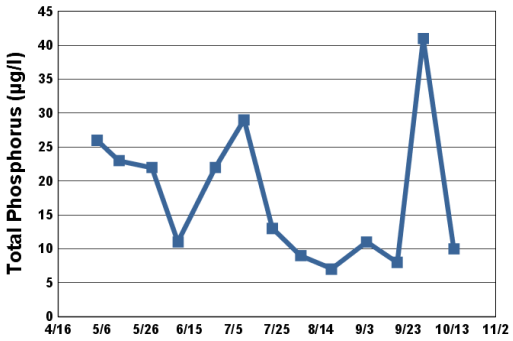
Long Lake
Pine Springs, Washington Co.

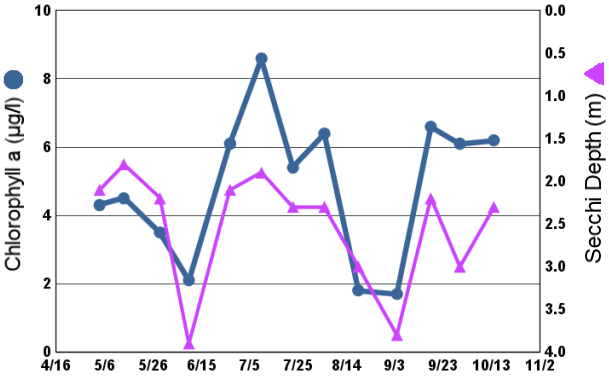
Lake ID: 820118-00

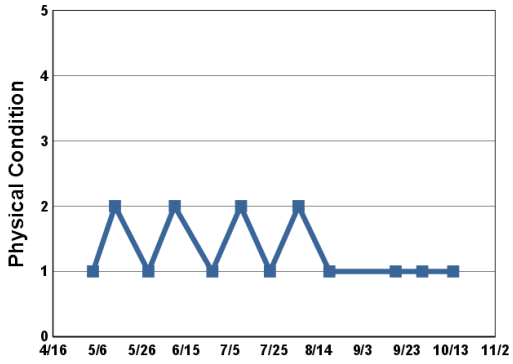


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/4	7.2		4.3	26	2.1	1	1
5/14	12.7		4.5	23	1.8	2	2
5/29	17.2		3.5	22	2.2	1	1
6/10	18.5		2.1	11	3.9	2	1
6/27	26.6		6.1	22	2.1	1	1
7/10	26.6		8.6	29	1.9	2	1
7/23	26.5		5.4	13	2.3	1	1
8/5	23.1		6.4	9	2.3	2	1
8/19	24.4		1.8	7	3.0	1	1
9/4	24.2		1.7	11	3.8		
9/18	20.2		6.6	8	2.2	1	1
9/30	18.7		6.1	41	3.0	1	1
10/14	14.8		6.2	10	2.3	1	1







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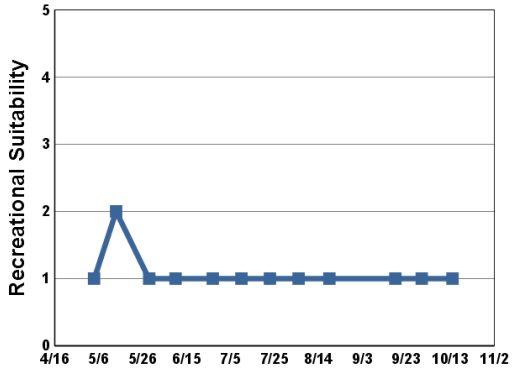

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Long Lake [Mahtomedi] (82–0130) *Rice Creek Watershed District*

Volunteer: Kitty Francy-Payton

Long Lake is located within the City of Mahtomedi (Washington County). It has a surface area of 48 acres and a maximum depth of 7.7 m (25 feet). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	11	49	B
CLA (µg/l)	7.8	2.7	23	A
Secchi (m)	2.0	1.1	2.9	C
TKN (mg/l)	0.76	0.56	0.91	
			Lake Grade	B

The lake received a lake grade of B for 2013, which is a return to the overall water quality experienced by the lake in the mid 2000's, and an improvement over last year's C lake grade. The lake grades for the past 10 years have varied between B's and A's with one C. Additional years of monitoring are suggested to continue to build the water quality database to help determine potential trends in water quality.

Throughout the monitoring period, the volunteer's opinions of 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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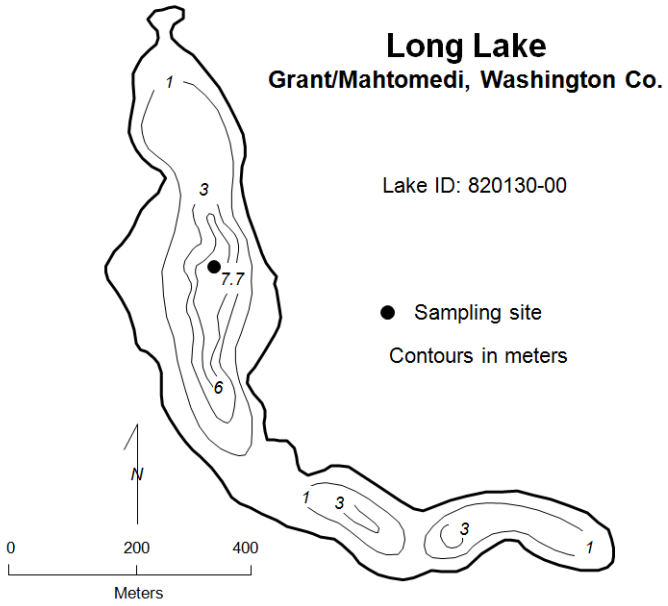
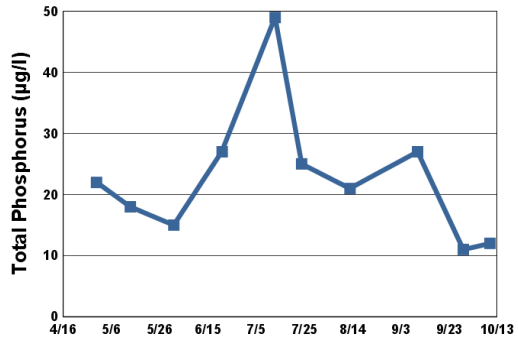
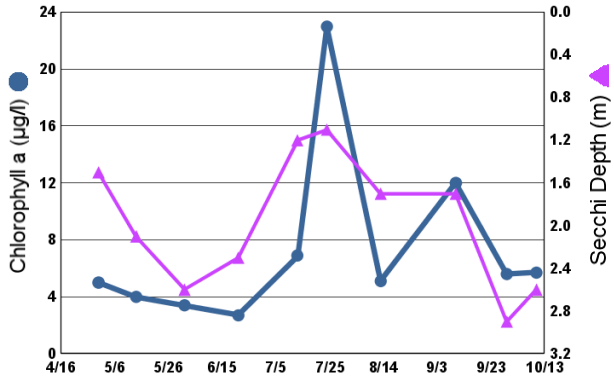
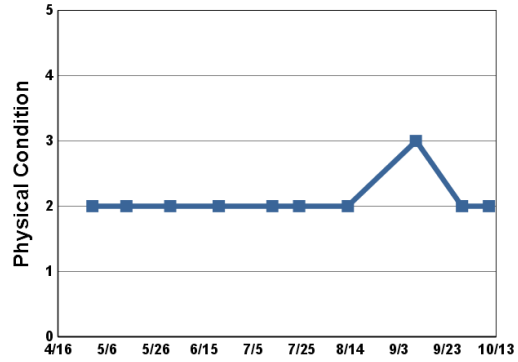


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	11.3		5.0	22	1.5	2	1
5/14	13.6		4.0	18	2.1	2	2
6/1	27.1		3.4	15	2.6	2	2
6/21	24.0		2.7	27	2.3	2	2
7/13	25.0		6.9	49	1.2	2	3
7/24	24.6		23	25	1.1	2	3
8/13	23.0		5.1	21	1.7	2	2
9/10	24.3		12	27	1.7	3	3
9/29	18.2		5.6	11	2.9	2	2
10/10	15.0		5.7	12	2.6	2	2







1 = Crystal Clear
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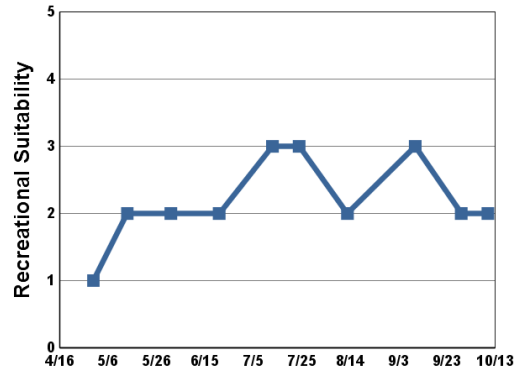


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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
CLA												A
Secchi												B
Lake Grade												**B**

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

Source: Metropolitan Council and STORET data

Lost Lake (27–0103) *Bassett Creek Watershed Management Commission*

Volunteer: Barrie Froseth

Lost Lake is located in the city of Plymouth (Hennepin County). The lake has a surface area of 22 acres and maximum depth of 1.8 m. The lake does not stratify during the summer months, which is a density gradient caused by varying water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

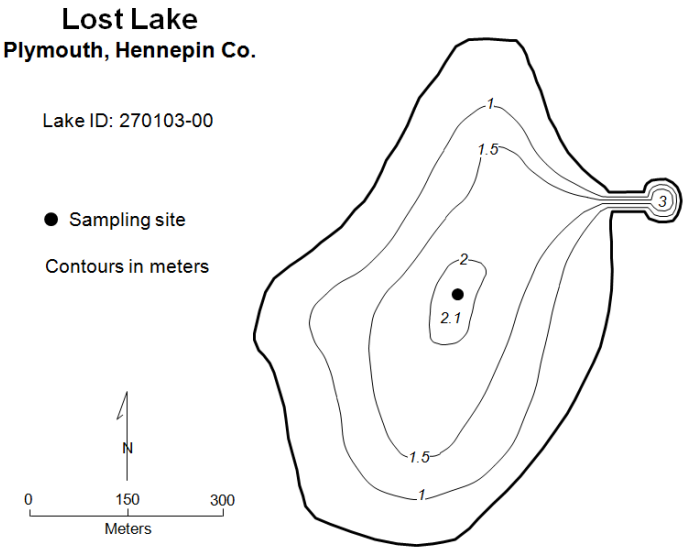
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	77	39	100	
CLA (µg/l)	32	10	46	
Secchi (m)	0.9	0.5	1.6	
TKN (mg/l)	1.93	1.80	2.00	
			Lake Grade	

There were insufficient data to calculate grades in 2013. At least 5 data points are required during the summer-time period to calculate a grade. Continued monitoring is recommended to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

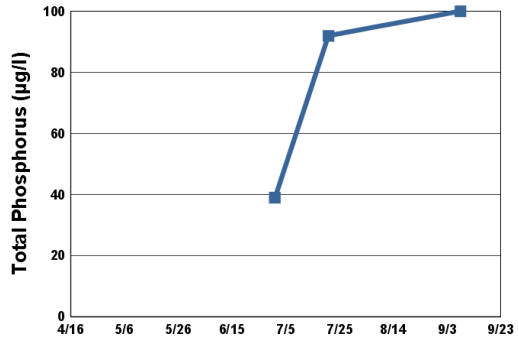
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

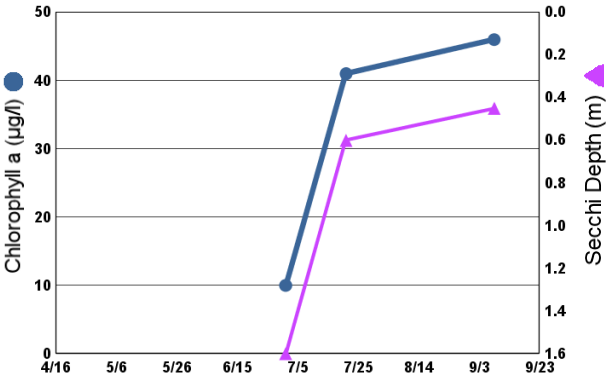
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

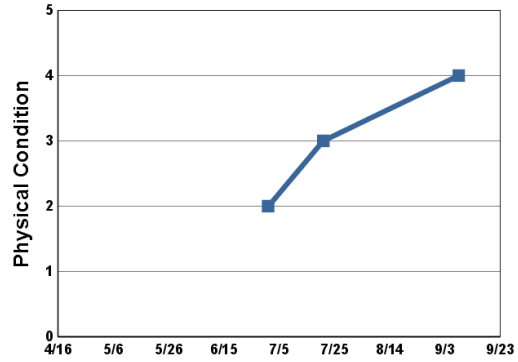


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
7/1	25.5		10	39	1.6	2	3
7/21	29.2		41	92	0.6	3	3
9/8	23.6		46	100	0.5	4	2







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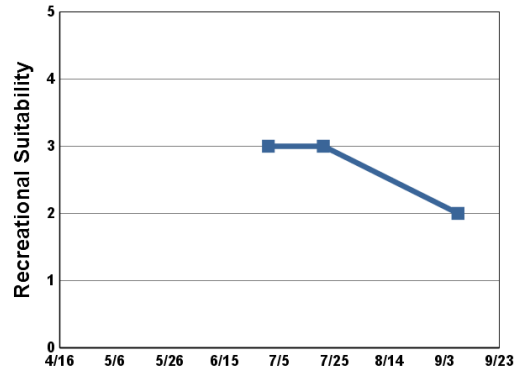

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Lucy Lake (10–0006) *City of Chanhassen*

Volunteer: Tim and Sharon McCotter

Lucy Lake is located within the City of Chanhassen (Carver County). It has a surface area of 87 acres and a maximum depth of 6.4 m (21 ft). Ninety nine percent of the lake's surface area is considered a littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the lake's water column. The MN DNR has designated the lake as being infested with Eurasion water milfoil(*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	56	39	81	C
CLA (µg/l)	22	1.8	39	C
Secchi (m)	1.4	0.7	3.9	C
TKN (mg/l)	1.61	1.20	2.70	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical water quality database. Further monitoring is suggested to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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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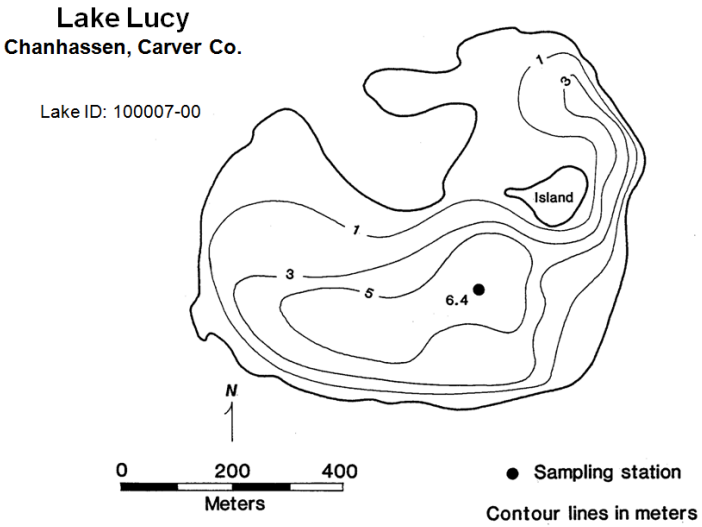
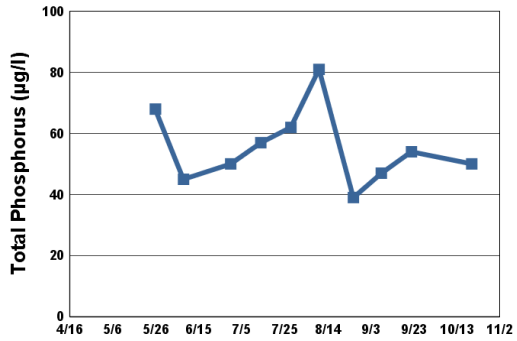
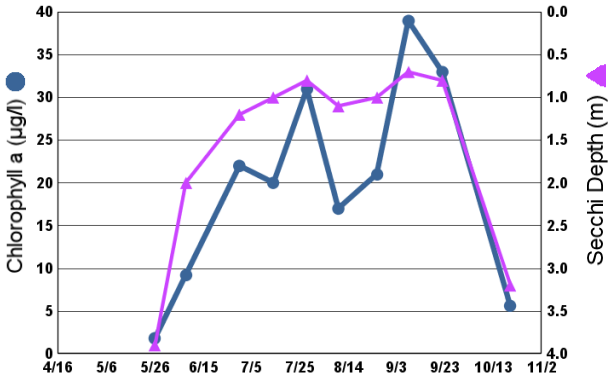
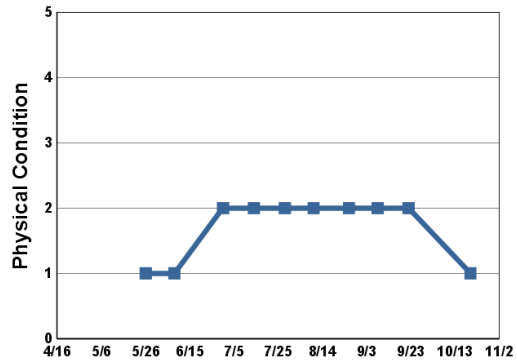


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/26	15.5		1.8	68	3.9	1	1
6/8	18.6		9.2	45	2.0	1	2
6/30	25.3		22	50	1.2	2	2
7/14	25.9		20	57	1.0	2	2
7/28	23.3		31	62	0.8	2	2
8/10	24.1		17	81	1.1	2	2
8/26	29.4		21	39	1.0	2	2
9/8	24.4		39	47	0.7	2	2
9/22	18.7		33	54	0.8	2	2
10/20	11.1		5.6	50	3.2	1	1







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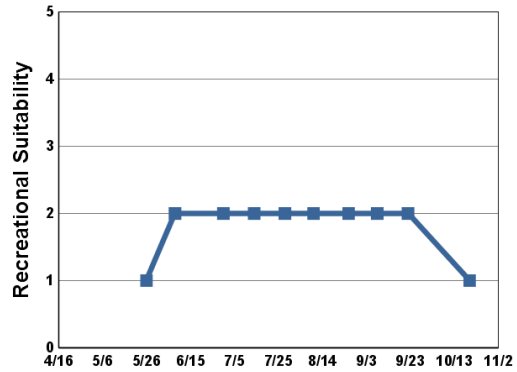

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Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Lynch Lake [Site 1, North Basin] (82–0042) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Lynch Lake is located in Washington County. It has a surface area of 43 acres. The depth of the lake at the north basin site was approximately 0 – 2 m. There are few known morphological data available for the lake. Note that some previous Annual lake reports (2006 – 2009) erroneously placed site #1 in the south basin. The monitoring actually took place in the north basin during the 2006 – 2009 monitoring seasons.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	143	52	262	D
CLA (µg/l)	141	5.6	340	F
Secchi (m)	0.5	0.1	1.4	F
TKN (mg/l)	3.36	1.30	6.80	
			Lake Grade	F

The north basin received a lake grade of F for 2013, which is return to similar water quality observed prior to 2012. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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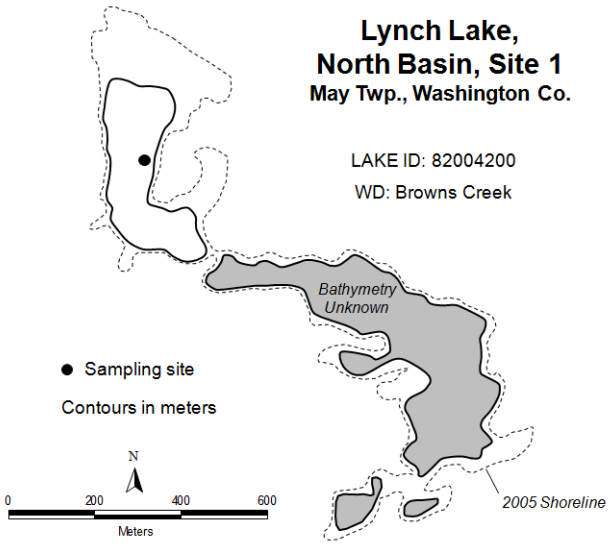
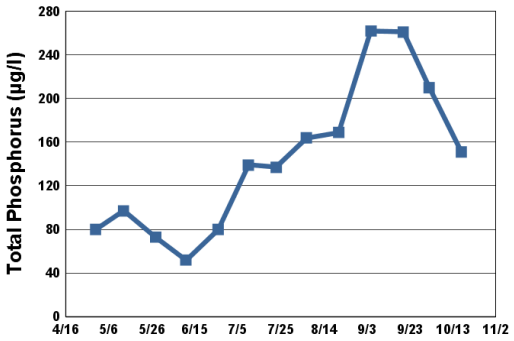
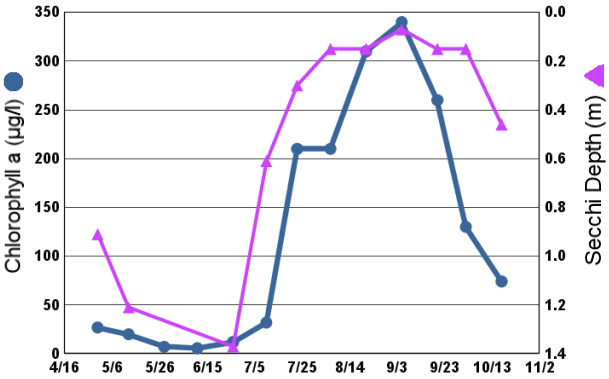
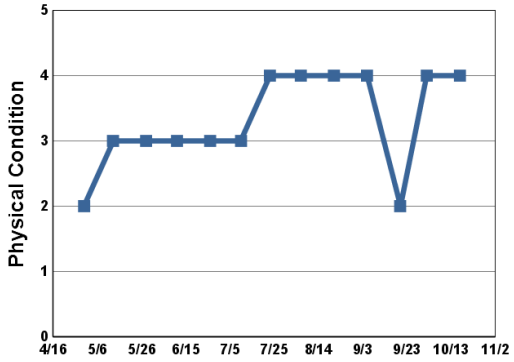


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	14.6	13.2	27	80	0.9	2	4
5/13	12.6	10.0	20	97	1.2	3	3
5/28	15.5	7.9	7.2	73		3	3
6/11	21.8	8.7	5.6	52		3	2
6/26	27.8	7.4	12	80	1.4	3	4
7/10	25.0	6.8	32	139	0.6	3	4
7/23	24.5	11.5	210	137	0.3	4	4
8/6	21.5	9.3	210	164	0.2	4	4
8/21	25.1	7.1	310	169	0.2	4	3
9/5	22.2	10.5	340	262	0.1	4	5
9/20	18.2	5.8	260	261	0.2	2	4
10/2	16.2	5.9	130	210	0.2	4	4
10/17	11.6	10.4	74	151	0.5	4	4







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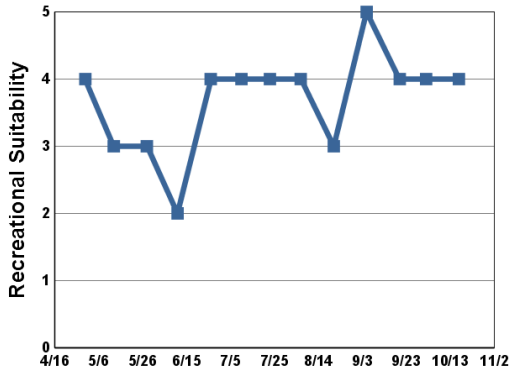

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Lynch Lake [Site 2, South Basin] (82–0042) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Lynch Lake is located in Washington County. It has a surface area of 43 acres. The depth of the lake at the south site was approximately 5 to 6 m. There are little known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	43	71	C
CLA (µg/l)	22	9.6	34	C
Secchi (m)	1.1	0.6	1.4	D
TKN (mg/l)	1.34	1.20	1.50	
			Lake Grade	C

The south site received a lake grade of C for 2013, which is the best lake grade received thus far in the 4 years of monitoring in the CAMP. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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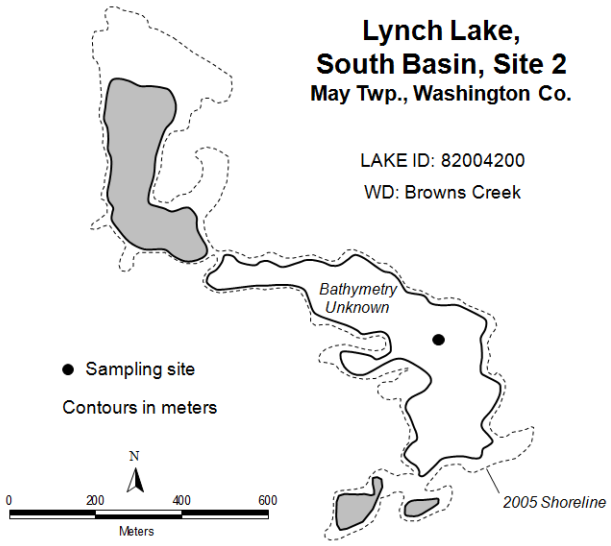
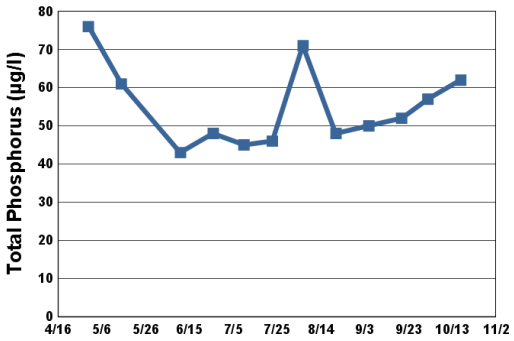
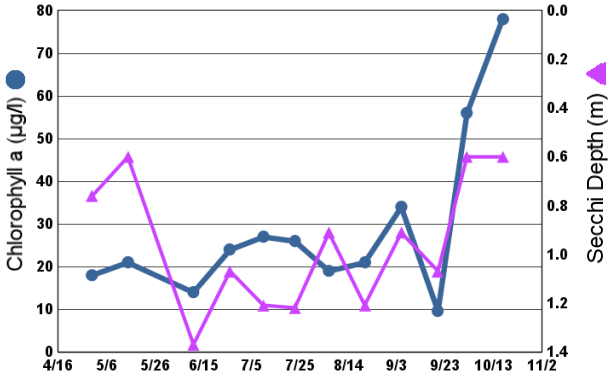
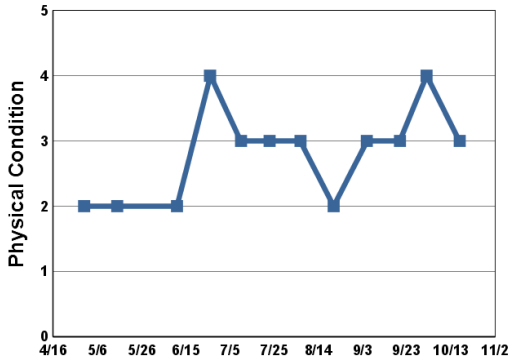


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	10.7	13.3	18	76	0.8	2	4
5/15	15.0	9.4	21	61	0.6	2	4
6/11	20.9	8.4	14	43	1.4	2	2
6/26	28.0	8.2	24	48	1.1	4	3
7/10	25.3	6.2	27	45	1.2	3	4
7/23	25.2	5.8	26	46	1.2	3	3
8/6	22.2	7.7	19	71	0.9	3	3
8/21	25.3	7.4	21	48	1.2	2	2
9/5	22.8	7.1	34	50	0.9	3	4
9/20	19.0	6.6	9.6	52	1.1	3	4
10/2	17.3	8.0	56	57	0.6	4	4
10/17	12.9	10.5	78	62	0.6	3	3







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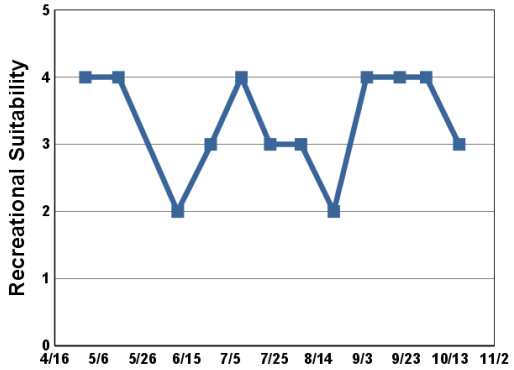

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Lake Water Quality Grades Based on Summertime Averages

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												
CLA												
Secchi												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Marcott (Ohmans) Lake [east basin] (19–0042) *City of Inver Grove Heights*

Volunteer: Dakota Soil & Water Conservation District staff

Marcott Lake, also known as Ohmans Lake, is a part of several nearby lakes called Marcott Lakes. The lake has a surface area of about 34 acres, and a maximum depth of about 10 meters in the east basin. The west basin is shallower and dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

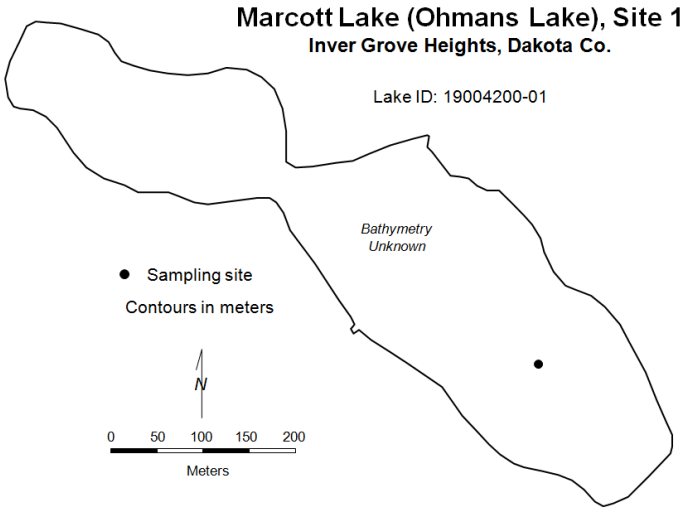
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	12	8	17	A
CLA (µg/l)	3.1	1.5	6.0	A
Secchi (m)	3.9	1.8	4.6	A
TKN (mg/l)	0.59	0.45	0.66	
			Lake Grade	A

The lake water quality is very good in the east basin, as indicated by the A lake grade. No historical water quality data were located in the MPCA's EQuIS database. Continued monitoring is suggested to build the water quality database for this lake.

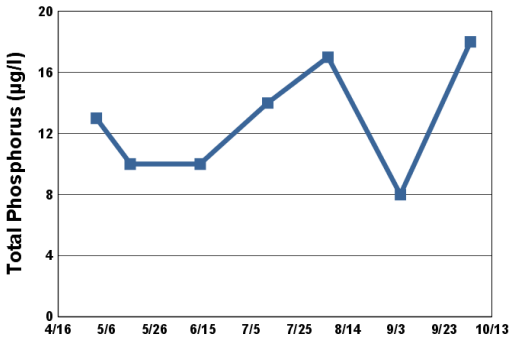
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

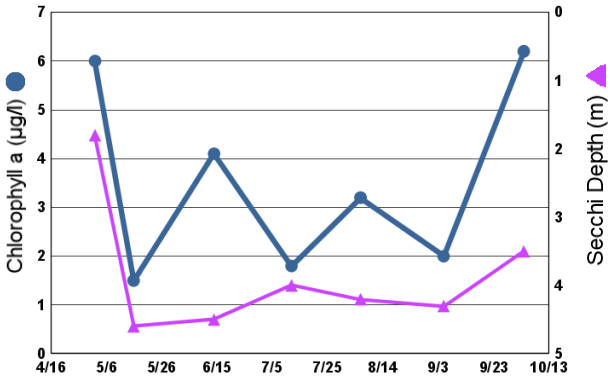
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

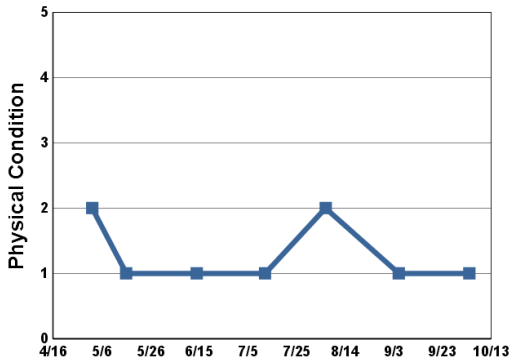


2013 Data

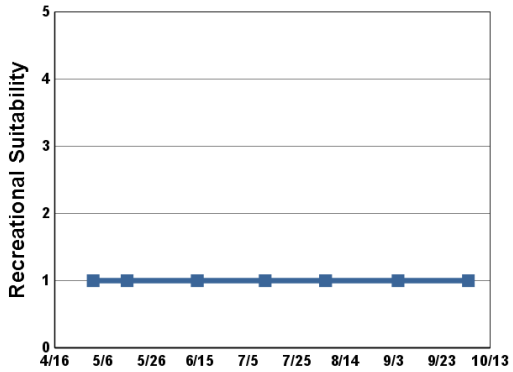
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	8.5		6.0	13	1.8	2	1
5/16	17.9		1.5	10	4.6	1	1
6/14	21.2		4.1	10	4.5	1	1
7/12	26.3		1.8	14	4.0	1	1
8/6	22.6		3.2	17	4.2	2	1
9/5	24.9		2.0	8	4.3	1	1
10/4	17.5		6.2	18	3.5	1	1







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												
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
TP									A	A
CLA									A	A
Secchi									A	A
Lake Grade									**A**	**A**

Source: Metropolitan Council and STORET data

Marcott (Ohmans) Lake [west basin] (19–0042) *City of Inver Grove Heights*

Volunteer: Dakota Soil & Water Conservation District staff

Marcott Lake, also known as Ohmans Lake, is a part of several nearby lakes called Marcott Lakes. The lake has a surface area of about 34 acres, and a maximum depth of about 10 meters in the east basin. The west basin is shallower and dominated by aquatic vegetation. The year 2012 was the first year the lake has been part of the Metropolitan Council's lake monitoring program.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

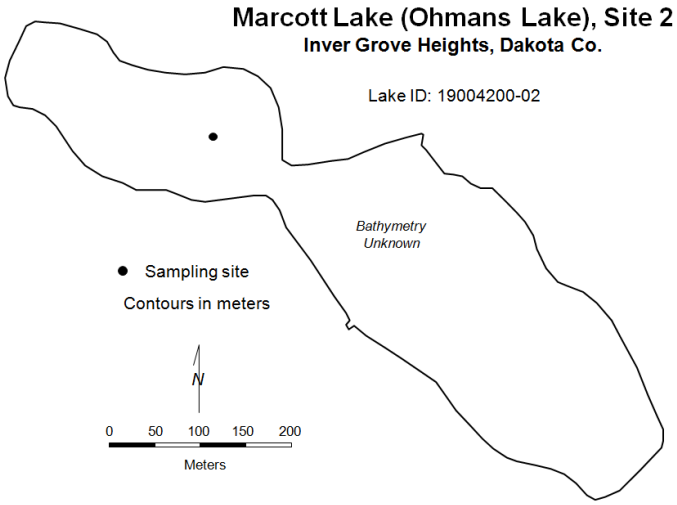
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	41	23	79	C
CLA (µg/l)	7.7	2.6	20	A
Secchi (m)	1.8	1.2	2.5	C
TKN (mg/l)	1.14	0.85	1.40	
			Lake Grade	B

The west basin tends to have higher mean concentrations of TP and lower Secchi depths than the deeper east basin. The west basin experienced notably higher TP concentrations during the spring and early summer.

No historical water quality data were located in the MPCA's EQuIS database. Continued monitoring is suggested to build the water quality database for this lake.

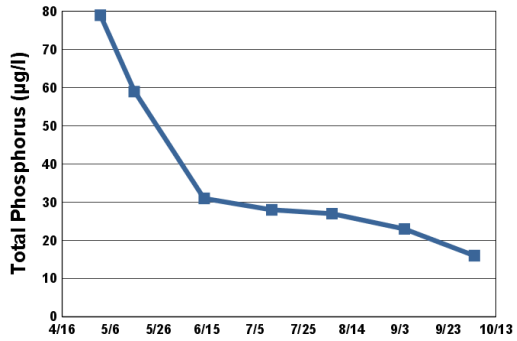
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

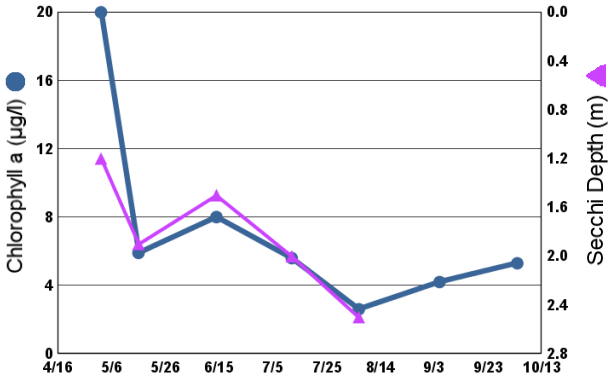
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

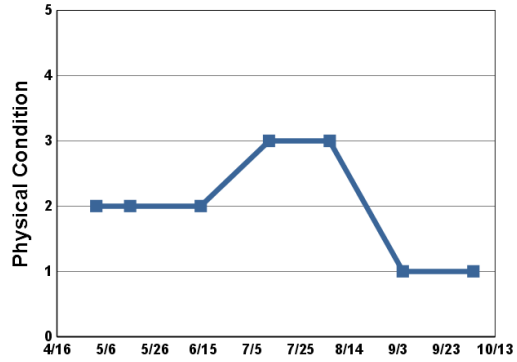


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	10.3		20	79	1.2	2	1
5/16	21.5		5.9	59	1.9	2	2
6/14	22.5		8.0	31	1.5	2	2
7/12	25.9		5.6	28	2.0	3	4
8/6	21.1		2.6	27	2.5	3	5
9/5	23.3		4.2	23		1	1
10/4	16.3		5.3	16		1	1







1 = Crystal Clear
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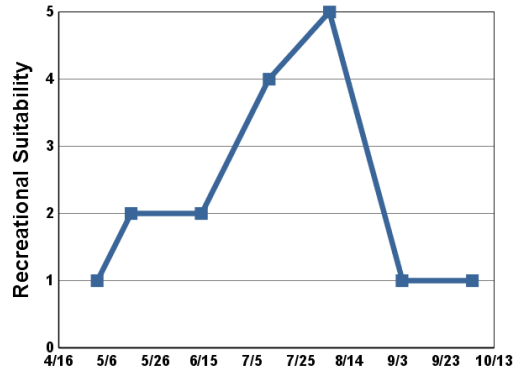


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

Marcott (Rosenberg) Lake (19–0041) *City of Inver Grove Heights*

Volunteer: Dakota Soil & Water Conservation District staff

Marcott Lake, also known as Rosenberg Lake, is a part of several nearby lakes called Marcott Lakes. The lake has a surface area of about 19 acres. About 95 percent of the lake's surface area is considered littoral zone, which is the shallow 0 — 15 feet depth zone dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	23	18	29	B
CLA (µg/l)	4.1	2.1	5.8	A
Secchi (m)	2.4	2.2	2.6	B
TKN (mg/l)	0.83	0.69	0.95	
			Lake Grade	B

The lake received a B for 2013, which is lower than the A grades received in the 1990s. Continued monitoring is suggested to build the water quality database after a decade of no monitoring.

Throughout the monitoring period, the volunteer's opinions of 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.

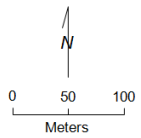
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

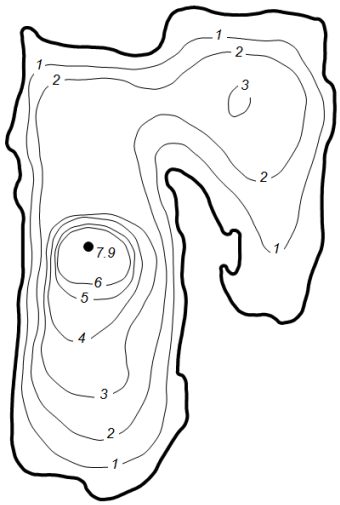
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Marcott Lake, Basin 2
Inver Grove Heights, Dakota Co.

Lake ID: 190041-00

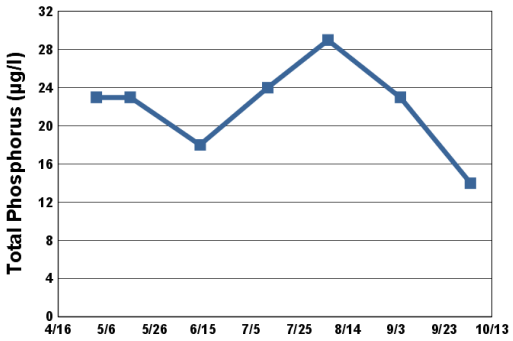
● Sampling site
Contours in meters

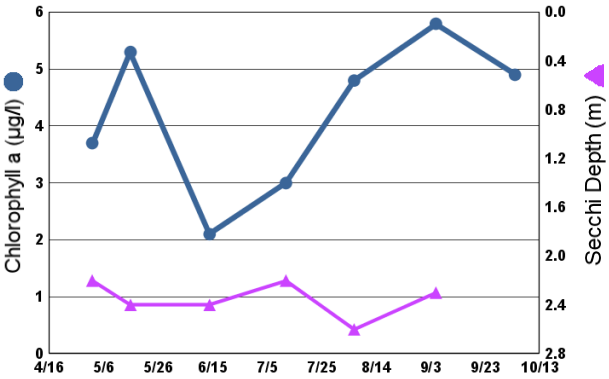


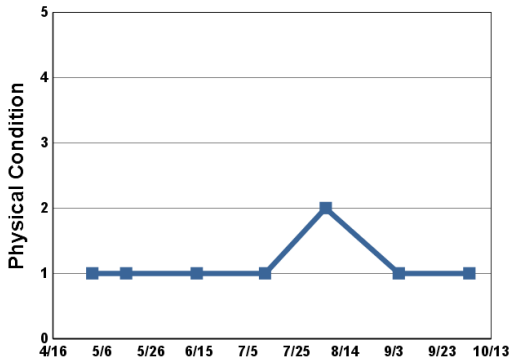


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	10.8		3.7	23	2.2	1	1
5/16	19.6		5.3	23	2.4	1	1
6/14	22.0		2.1	18	2.4	1	2
7/12	25.8		3.0	24	2.2	1	1
8/6	21.3		4.8	29	2.6	2	2
9/5	23.5		5.8	23	2.3	1	1
10/4	16.1		4.9	14		1	1







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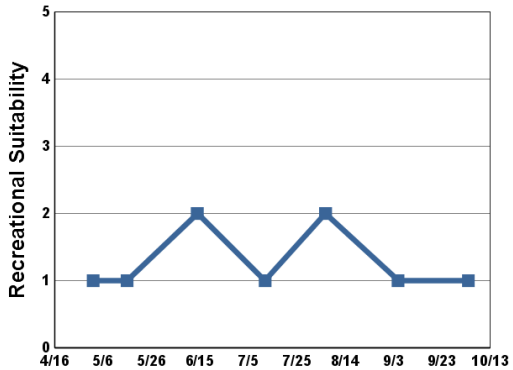

1 = Beautiful
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Marion Lake (19–0026) *City of Lakeville*

Volunteer: Curt Savstrom

Marion Lake is located in the City of Lakeville (Dakota County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). It has a surface area of approximately 560 acres, and has a maximum depth of 6.4 m (21 feet). The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*). The lake gets heavy use by area fishermen and other lake users during the winter and summer months.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	19	8	33	A
CLA (µg/l)	14	3.2	57	B
Secchi (m)	2.1	1.4	2.9	C
TKN (mg/l)	0.76	0.37	1.10	
			Lake Grade	B

The lake received a lake grade of B for 2013. On the basis of the historical water quality database, the surface water quality of the lake has varied from Bs to a D, with Cs being most common. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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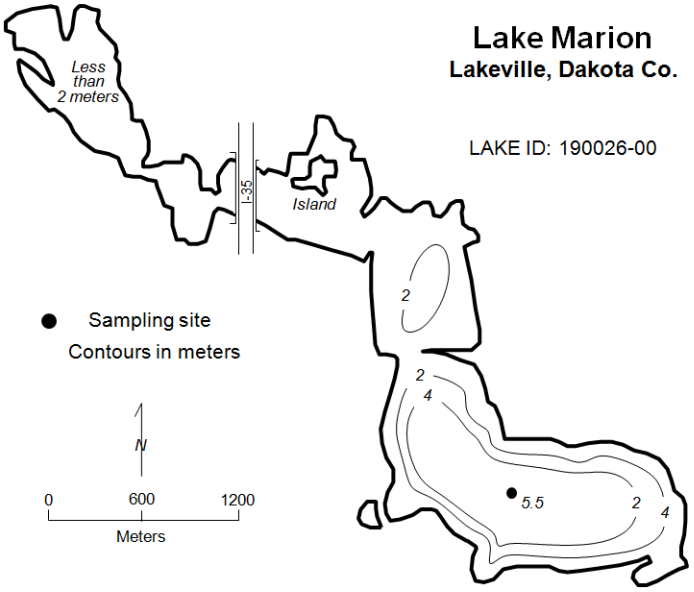

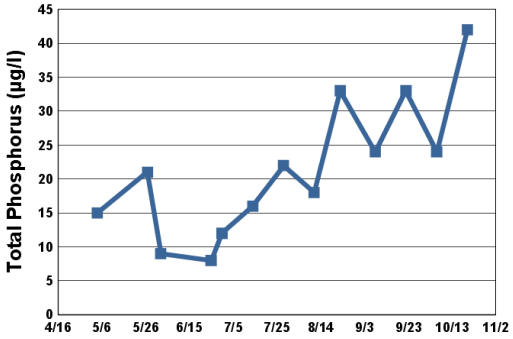

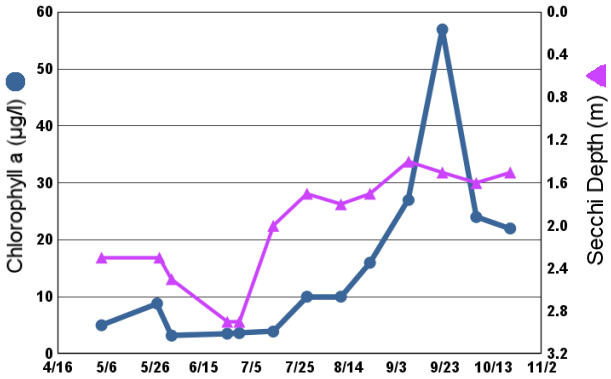

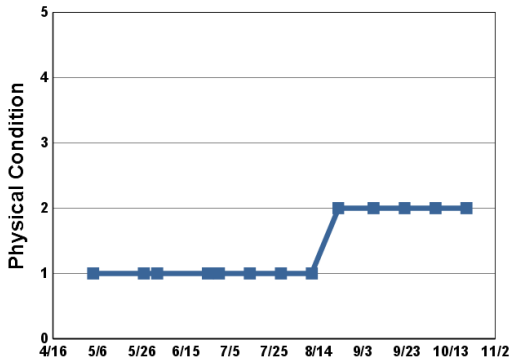

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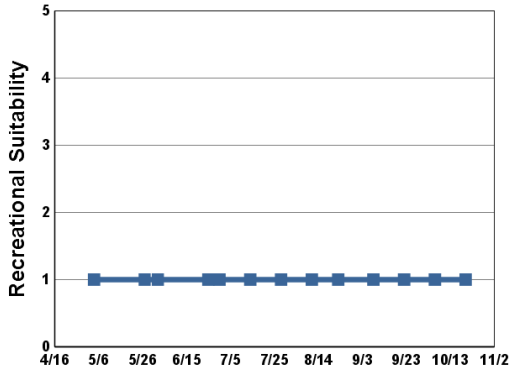


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/4	6.5		5.0	15	2.3	1	1
5/27	14.7		8.8	21		1	1
5/28					2.3		
6/2	17.7		3.2	9	2.5	1	1
6/25	24.1		3.5	8	2.9	1	1
6/30	23.9		3.6	12	2.9	1	1
7/14	24.5		3.9	16	2.0	1	1
7/28	22.6		10	22	1.7	1	1
8/11	23.3		10	18	1.8	1	1
8/23	24.1		16	33	1.7	2	1
9/8	24.5		27	24	1.4	2	1
9/22	19.0		57	33	1.5	2	1
10/6	15.9		24	24	1.6	2	1
10/20	11.2		22	42	1.5	2	1

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Markgrafs Lake (82–0089) *City of Woodbury*

Volunteer: Washington Conservation District staff

Markgrafs Lake is located within the City of Woodbury (Washington County). It has a surface area of approximately 46 acres, and a maximum depth of 2.4 m (8 feet). The entire 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 lake has a piped outlet on the southern end. Downstream from the outlet is a valve that can direct the overflow to either Powers or Wilmes lakes. The lake is used by the MDNR Fisheries as a rearing pond for walleyes.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

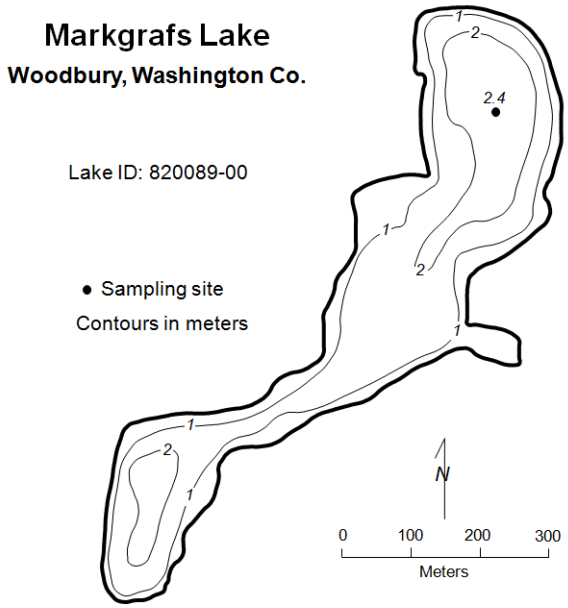
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	98	49	179	D
CLA (µg/l)	60	33	94	D
Secchi (m)	0.5	0.2	0.9	F
TKN (mg/l)	2.42	0.77	3.60	
			Lake Grade	D

The lake received a lake grade of F for 2013. Over the past decade, the lake grades have varied back and forth in the D to F range.

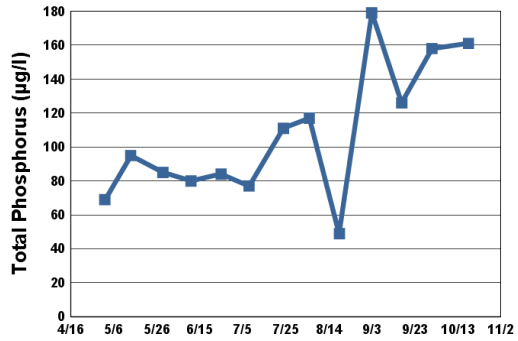
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

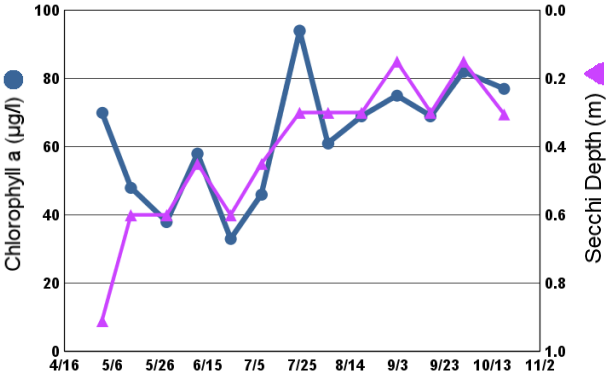
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

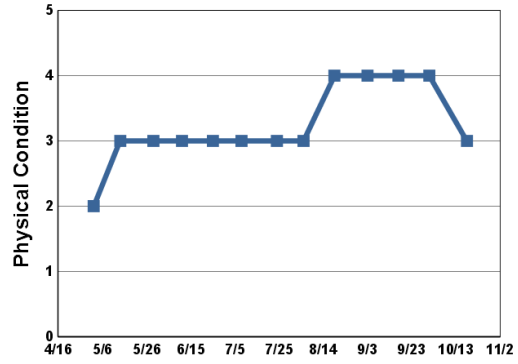


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	11.4	10.9	70	69	0.9	2	2
5/14	14.0	11.5	48	95	0.6	3	4
5/29	16.7	8.9	38	85	0.6	3	4
6/11	19.9	12.4	58	80	0.5	3	4
6/25	25.5	8.9	33	84	0.6	3	4
7/8	27.3	9.5	46	77	0.5	3	4
7/24	24.3	7.9	94	111	0.3	3	4
8/5	21.6	9.1	61	117	0.3	3	4
8/19	24.3	11.7	69	49	0.3	4	4
9/3	22.5	8.3	75	179	0.2	4	4
9/17	18.0	11.2	69	126	0.3	4	4
10/1	18.2	10.0	82	158	0.2	4	4
10/18	11.5	11.3	77	161	0.3	3	4







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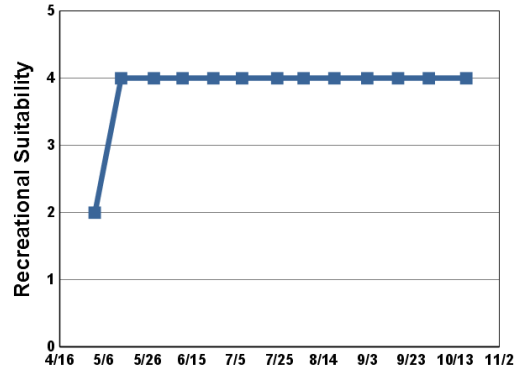
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

Masterman Lake (82–0126) *Browns Creek Watershed District*

Volunteer: Washington Conservation District staff

Masterman Lake is located in Grant Township (Washington County). It has a surface area of 45 acres. There is very little known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

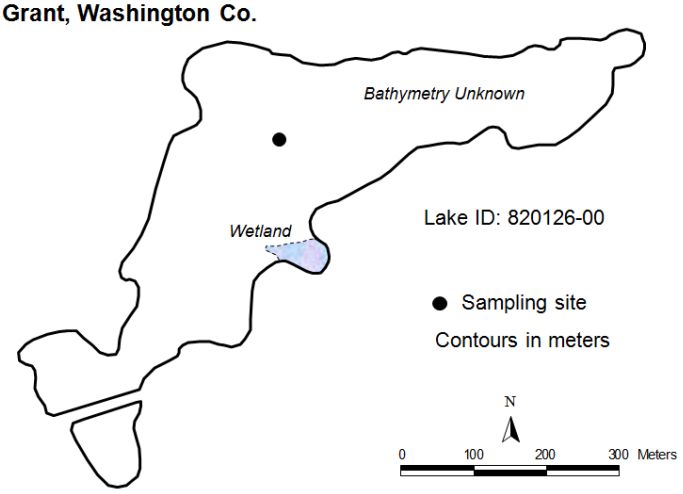
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	10	38	B
CLA (µg/l)	6.9	1.8	11	A
Secchi (m)				
TKN (mg/l)	0.87	0.67	1.10	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation rather than by water clarity or the disc was visible on the bottom of lake. There was an insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The 2013 TP and CLA grades of B and A, respectively, were the highest grades achieved yet since 2006. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

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

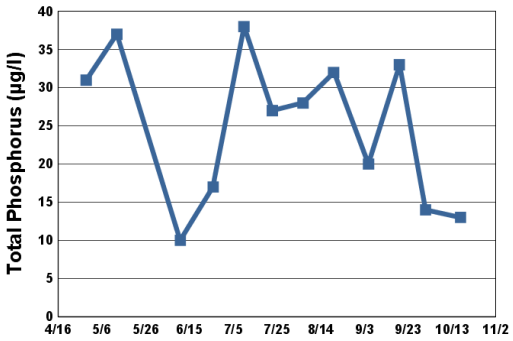
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

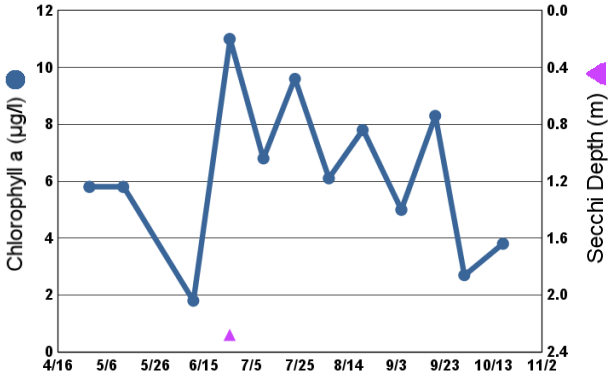
Masterman Lake
Grant, Washington Co.

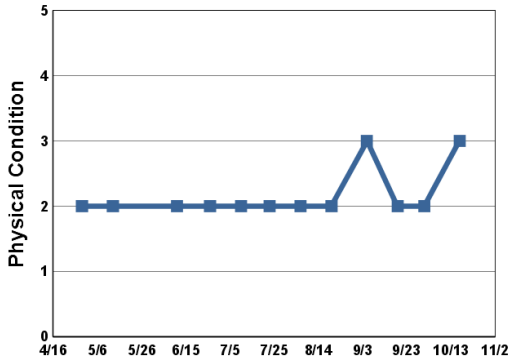


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	8.8	11.0	5.8	31		2	2
5/13	14.5	10.9	5.8	37		2	1
6/11	19.2	8.8	1.8	10		2	2
6/26	27.0	7.8	11	17	2.3	2	2
7/10	27.6	6.5	6.8	38		2	2
7/23	26.3	6.0	9.6	27		2	2
8/6	24.1	6.8	6.1	28		2	2
8/20	24.7	8.7	7.8	32		2	3
9/5	23.0	5.5	5.0	20		3	4
9/19	19.5	7.3	8.3	33		2	2
10/1	17.8	7.1	2.7	14		2	1
10/17	11.8	8.0	3.8	13		3	2







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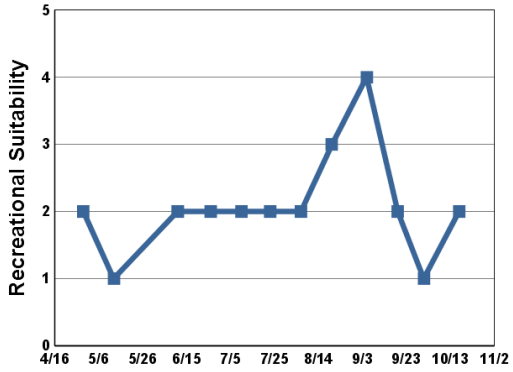
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Mays Lake (82–0033) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Dan Carlson, Warner Nature Center

Mays Lake is located in Mays Township (Washington County). The lake has a surface area of 25 acres, and a maximum depth of 7.6 m (25 ft). Approximately 92 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance.

On each sampling day the lake was monitored for Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

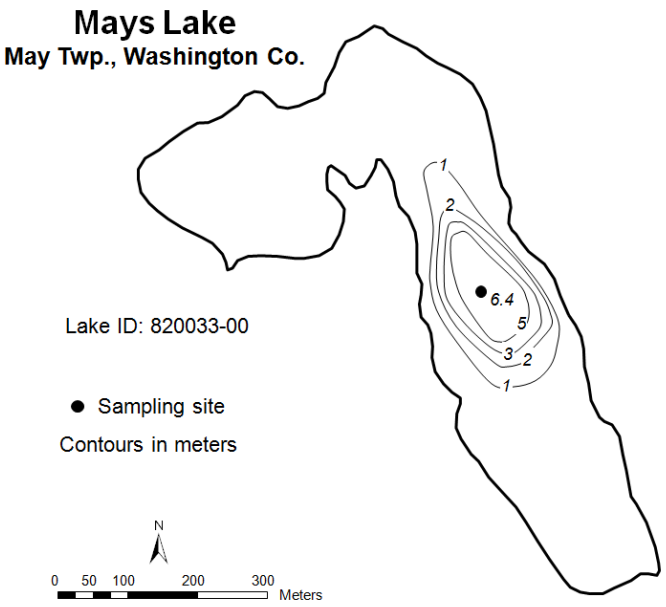
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	5.6	5.4	5.8	A
TKN (mg/l)				
			Lake Grade	

The lake received a Secchi grade of A for 2013. TP, TKN, and CLA were not monitored in 2013. The lake continues to have very good water clarity.

Throughout the monitoring period, the volunteer's opinions of 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.

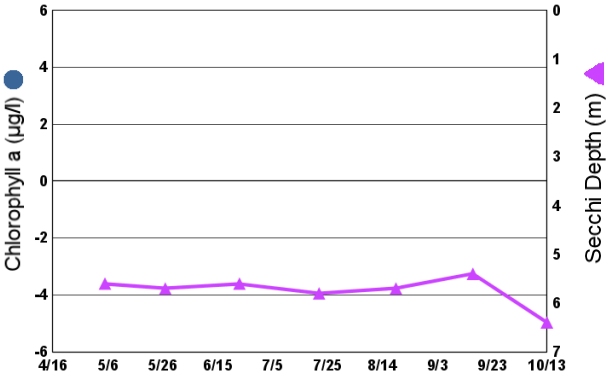
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

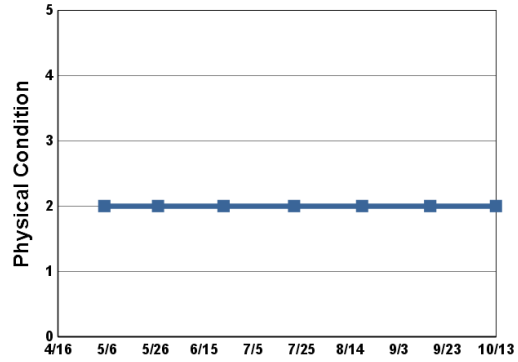
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.



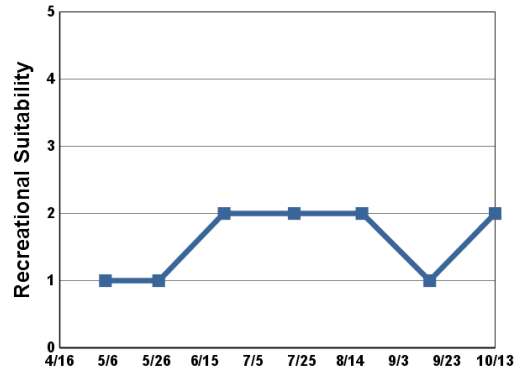
2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	6.0				5.6	2	1
5/27	15.9				5.7	2	1
6/23	23.9				5.6	2	2
7/22	27.3				5.8	2	2
8/19	24.4				5.7	2	2
9/16	20.7				5.4	2	1
10/13	14.8				6.4	2	2





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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

McDonald Lake (82–0010) *Valley Branch Watershed District*

Volunteer: Washington Conservation District staff

McDonald Lake is a 54-acre land-locked (no outlet) lake located within Baytown Township (Washington County). The mean and maximum depth of the lake is 1.8 m (nearly 6 feet) and 3.7 m (roughly 12 feet).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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	67	39	94	C
CLA (µg/l)	27	3.3	49	C
Secchi (m)	1.6	1.2	2.1	C
TKN (mg/l)	1.12	0.90	1.30	
			Lake Grade	C

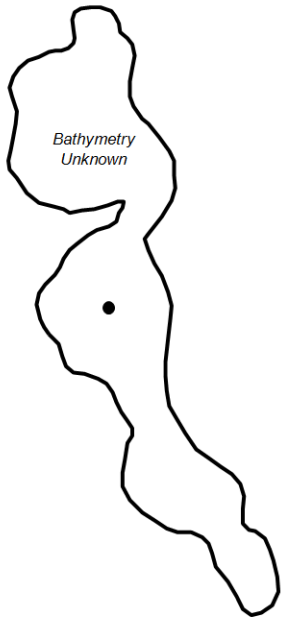
The lake received a lake grade of C for 2013. The lake's water quality has been typically represented by a lake grade of C, with some variation from year to year.

Throughout the monitoring period, the volunteer's opinions of 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.

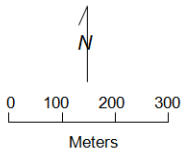
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

McDonald Lake
Baytown Twp., Washington Co.

Lake ID: 820010-00

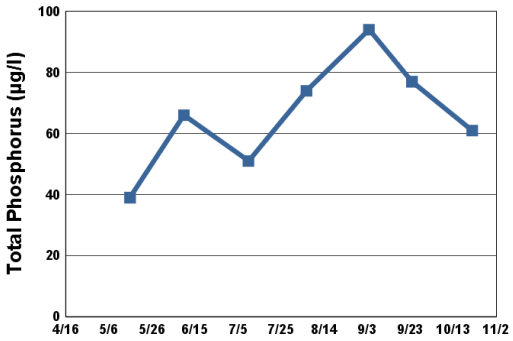


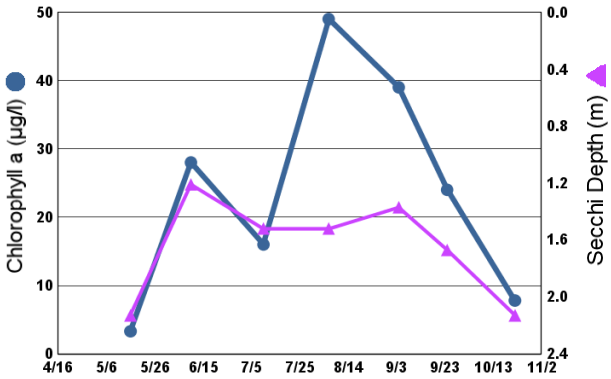
● Sampling site
Contours in meters

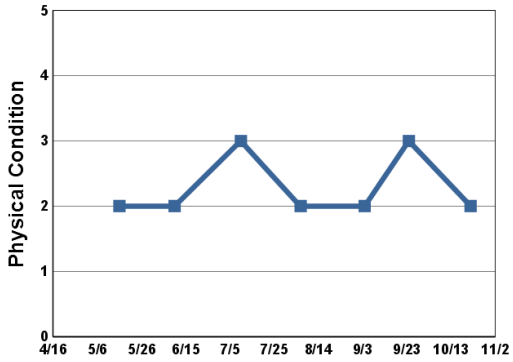


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	19.6	10.4	3.3	39	2.1	2	2
6/10	20.2	9.3	28	66	1.2	2	3
7/10	25.5	5.0	16	51	1.5	3	3
8/6	22.3	4.3	49	74	1.5	2	2
9/4	22.7	1.5	39	94	1.4	2	4
9/24	18.2	5.4	24	77	1.7	3	3
10/22	8.7	3.4	7.8	61	2.1	2	2







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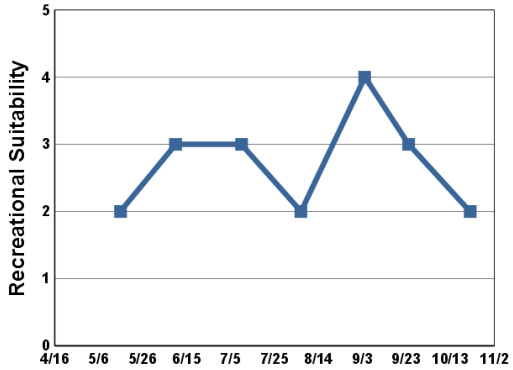


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

McKnight Lake (10–0216) *Carver County Environmental Services*

Volunteer: Carver County staff

McKnight Lake is a small lake located in Carver County. There is very little known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	129	65	186	D
CLA (µg/l)	69	16	160	D
Secchi (m)	0.7	0.3	1.4	F
TKN (mg/l)	2.21	1.20	3.60	
			Lake Grade	D

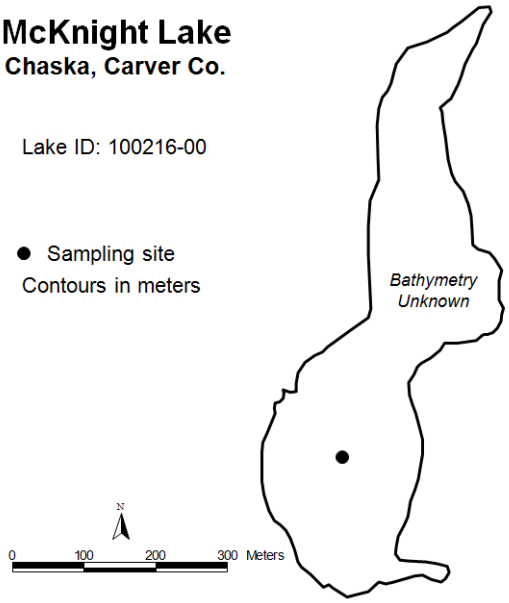
The lake received a lake grade of D for 2013, which is the first D grade received in its limited historical database. Mean, minimum, and maximum TP concentrations were lower overall in 2013 compared to 2012, allowing the improvement in water quality with respect to TP. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

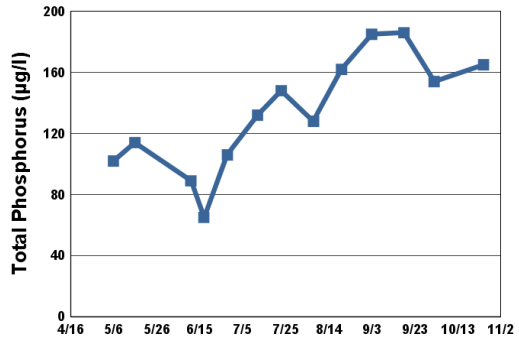
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

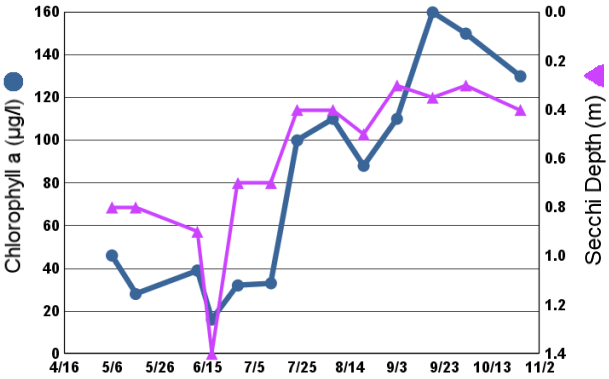
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

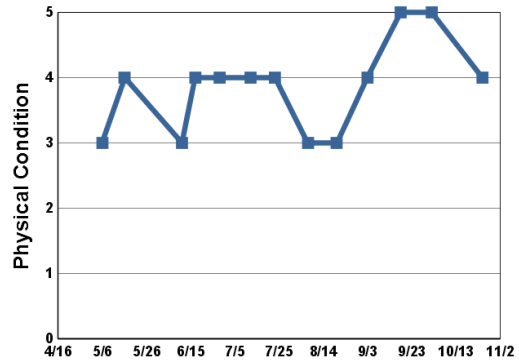
McKnight Lake
Chaska, Carver Co.

Lake ID: 100216-00









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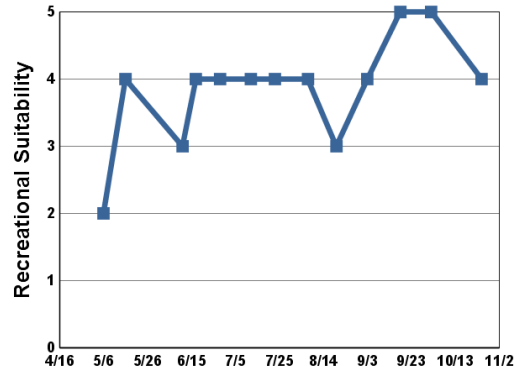


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	12.2	34.6	46	102	0.8	3	2
5/16	18.4	20.2	28	114	0.8	4	4
6/11			39	89	0.9	3	3
6/17	25.8	12.5	16	65	1.4	4	4
6/28	25.7	14.0	32	106	0.7	4	4
7/12	26.7	10.9	33	132	0.7	4	4
7/23	25.8	6.8	100	148	0.4	4	4
8/7	23.9	8.6	110	128	0.4	3	4
8/20	26.9	12.8	88	162	0.5	3	3
9/3	23.0	9.1	110	185	0.3	4	4
9/18	18.5	6.5	160	186	0.4	5	5
10/2	18.1	9.6	150	154	0.3	5	5
10/25	6.3		130	165	0.4	4	4

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

McKusick Lake (82–0020) *Middle St. Croix Watershed Management Organization*

Volunteer: Washington Conservation District staff

McKusick Lake is located in the City of Stillwater (Washington County). The lake has surface area of 46 acres, and a maximum depth of 4.7 m (15 ft). The entire 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

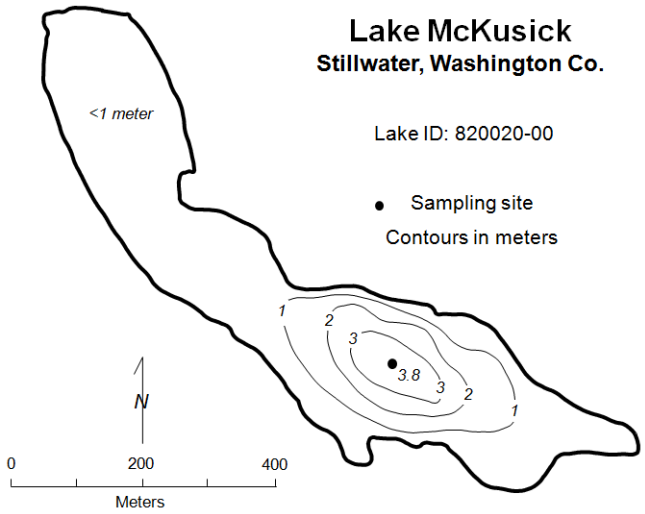
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	62	44	107	C
CLA (µg/l)	13	3.6	41	B
Secchi (m)	1.7	1.4	2.4	C
TKN (mg/l)	1.05	0.79	1.40	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical database. The lake grades over the past 18 years have varied in the B to D range. The historical water quality database suggests that the lake has been represented by a lake grade of C or B for the past 10 years. The lake has not received a D lake grade since 1999.

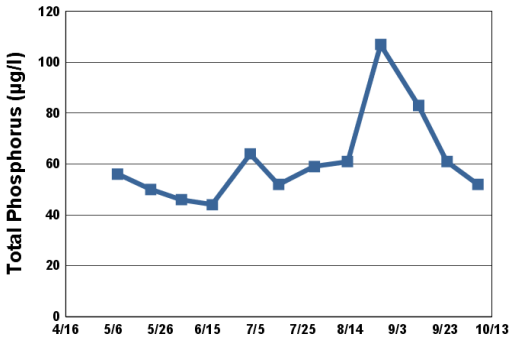
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

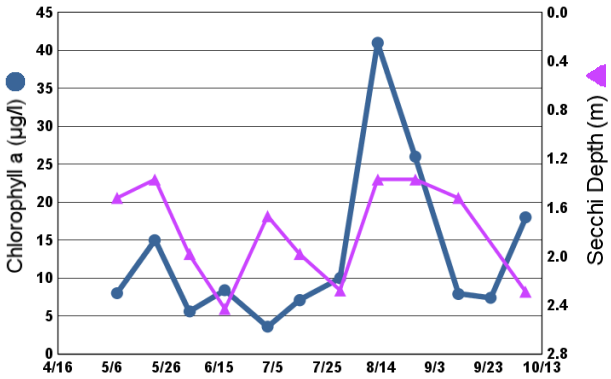
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

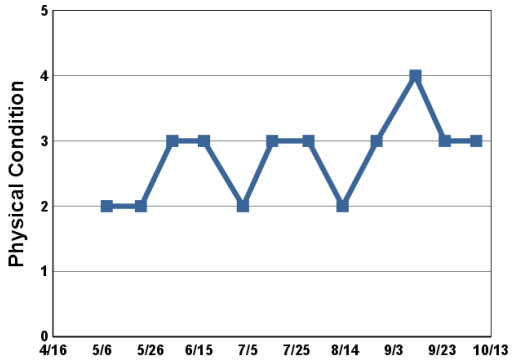


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	17.3	9.9	8.0	56	1.5	2	4
5/22	17.9	6.8	15	50	1.4	2	2
6/4	19.0	6.9	5.6	46	2.0	3	3
6/17	24.1	8.4	8.4	44	2.4	3	3
7/3	23.6	6.6	3.6	64	1.7	2	3
7/15	25.8	5.3	7.1	52	2.0	3	4
7/30	21.0	6.8	10	59	2.3	3	3
8/13	23.2	6.2	41	61	1.4	2	4
8/27	29.9	4.4	26	107	1.4	3	4
9/12	21.9	2.7	7.9	83	1.5	4	4
9/24	17.0	7.0	7.4	61		3	4
10/7	15.7	5.3	18	52	2.3	3	4







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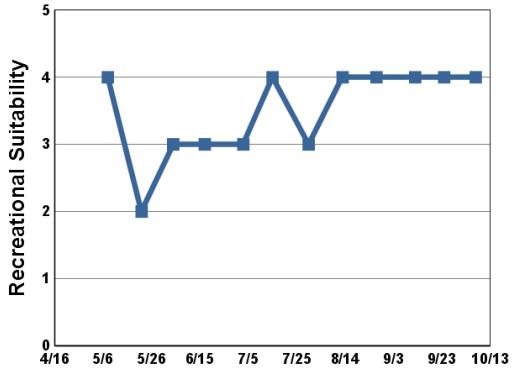
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

McMahon Lake (70–0050) *Scott County Watershed Management Organization*

Volunteer: Joe and Diane Williamson

McMahon Lake, also known as Carl's Lake, is located in Spring Lake Township (Scott County). The lake has a surface area of 110 acres and a maximum depth of 4.5 m (14 feet). 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 MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	28	16	64	B
CLA (µg/l)	23	2.0	68	C
Secchi (m)	1.8	0.5	3.0	C
TKN (mg/l)	0.82	0.51	1.50	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is the fifth year in a row that the lake received a C grade. The lake historically has been characterized as a D lake. But recent monitoring has shown improvements to the C grade on occasion. Notable in 2013 is the reduction in overall TP concentrations as shown in the lower mean, minimum, and maximum concentrations ascompared to previous years. Continued monitoring is suggested to determine if there is an improving trend in the lake's water quality.

Throughout the monitoring period, the volunteer's opinions of 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/.

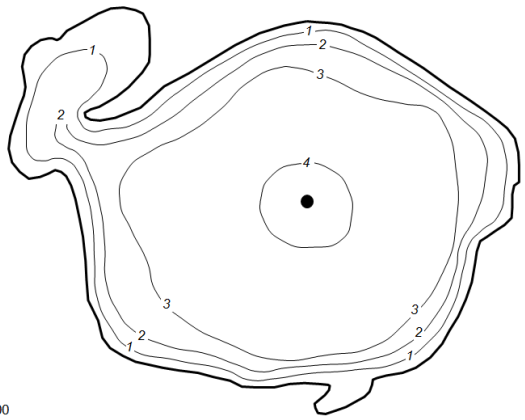
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

McMahon Lake
Spring Lake Twp., Scott Co.

Lake ID: 700050-00

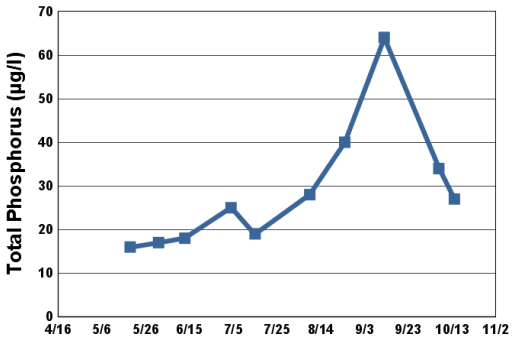
● Sampling site

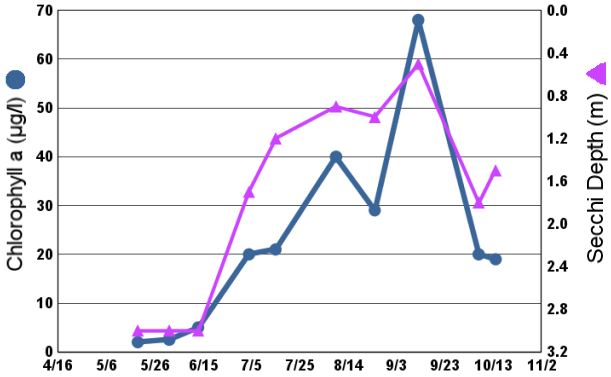
Contours in meters

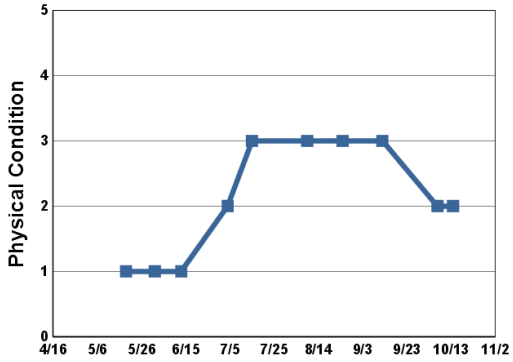


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/19	17.1		2.0	16	3.0	1	1
6/1	18.7		2.5	17	3.0	1	1
6/13	20.7		5.0	18	3.0	1	1
7/4	26.1		20	25	1.7	2	1
7/15	29.6		21	19	1.2	3	1
8/9	25.0		40	28	0.9	3	1
8/25	26.8		29	40	1.0	3	1
9/12	22.5		68	64	0.5	3	1
10/7	16.2		20	34	1.8	2	1
10/14	16.0		19	27	1.5	2	1







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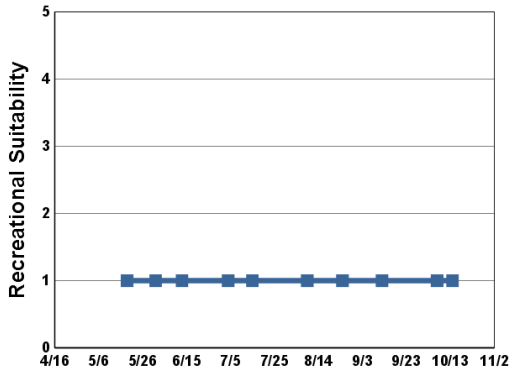

1 = Beautiful
2 = Minor Aesthetic Problem
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Medicine Lake [Site 1, Southwest Bay] (27–0104) *Bassett Creek Watershed Management Commission*

Volunteer: David, Josie, and Karl Nelson

Medicine Lake is located mainly in the City of Plymouth (Hennepin County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 886 acres. The maximum depth of the lake is 14.9 m (49 ft). Approximately 45 percent of the surface area of the lake is littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. The MN DNR has designated the lake as being infested with Eurasion watermilfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	42	17	71	C
CLA (µg/l)	24	4.6	43	C
Secchi (m)	1.6	1.0	3.7	C
TKN (mg/l)	1.02	0.79	1.20	
			Lake Grade	C

This lake site received a lake grade of C for 2013. This lake site has received C grades for the individual parameter grades since the early 1980s. Additional monitoring is recommended to continue to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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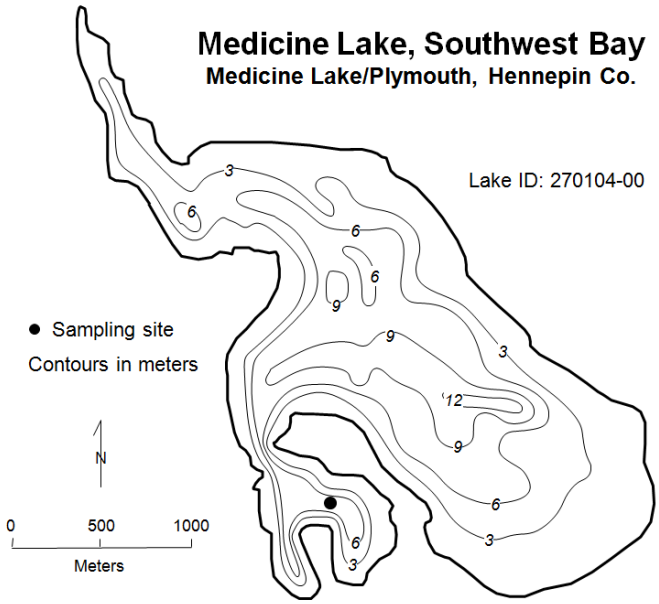
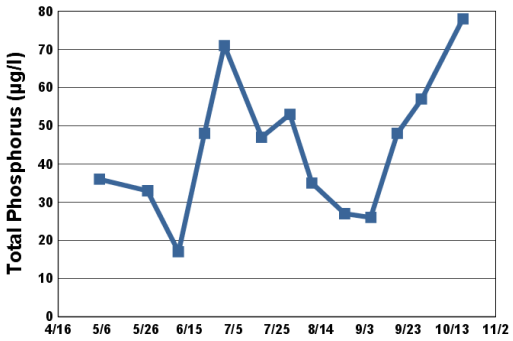
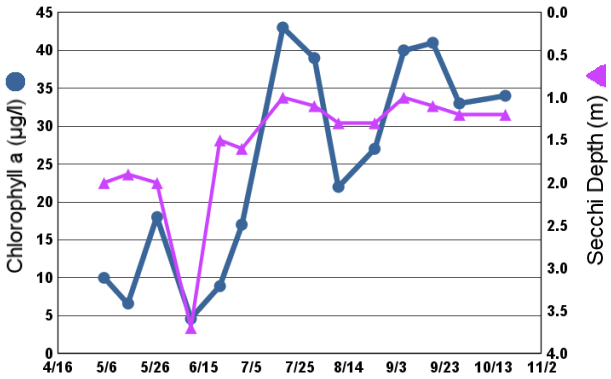
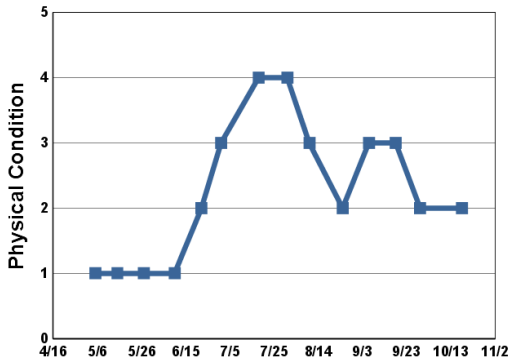


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	7.0		10	36	2.0	1	1
5/15	12.2		6.6		1.9	1	
5/27	14.8		18	33	2.0	1	1
6/10	17.0		4.6	17	3.7	1	1
6/22	22.5		8.9	48	1.5	2	2
7/1	26.0		17	71	1.6	3	1
7/18	28.0		43	47	1.0	4	3
7/31	22.5		39	53	1.1	4	1
8/10	24.0		22	35	1.3	3	
8/25	23.0		27	27	1.3	2	2
9/6	24.2		40	26	1.0	3	1
9/18	20.0		41	48	1.1	3	1
9/29	18.2		33	57	1.2	2	1
10/18	12.9		34	78	1.2	2	1







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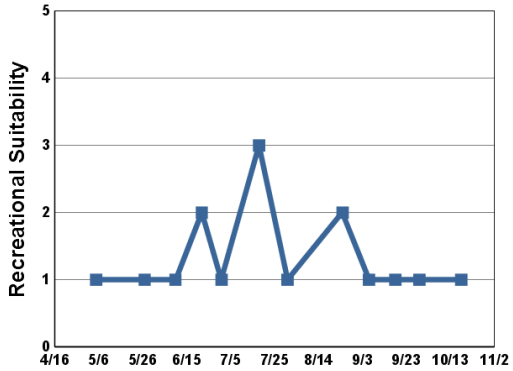

1 = Beautiful
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Medicine Lake [Site 2, Main Lake] (27–0104) *Bassett Creek Watershed Management Commission*

Volunteer: Ryan Atwell, Ted Hoshal

Medicine Lake is located mainly in the City of Plymouth (Hennepin County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 886 acres. The maximum depth of the lake is 14.9 m (49 ft). Approximately 45 percent of the surface area of the lake is littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	39	21	83	C
CLA (µg/l)	24	5.3	45	C
Secchi (m)	1.8	1.0	3.2	C
TKN (mg/l)	1.06	0.58	1.70	
			Lake Grade	C

This lake site received a lake grade of C for 2013. This lake site has received C grades for the individual parameter grades since the early 1980s. Additional monitoring is recommended to continue to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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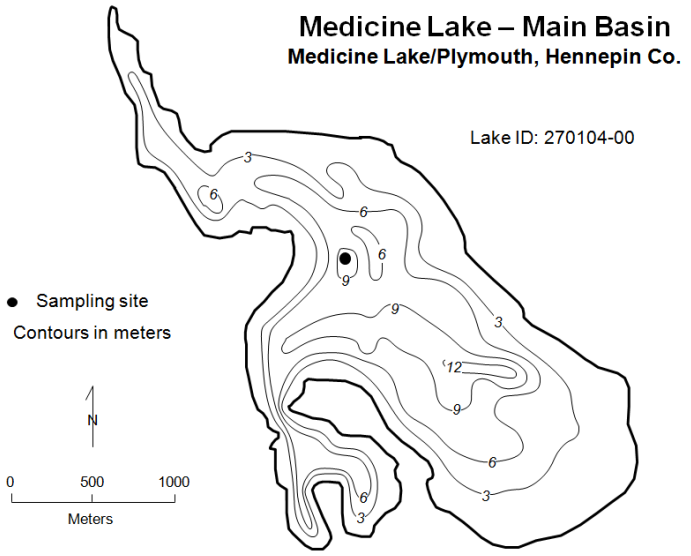
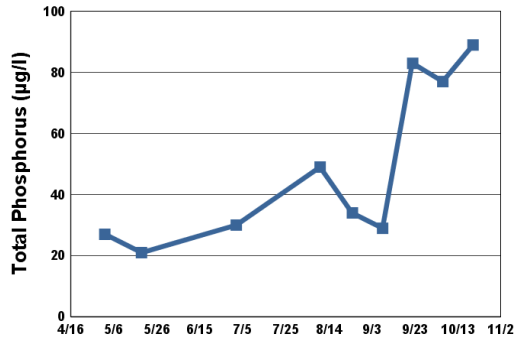
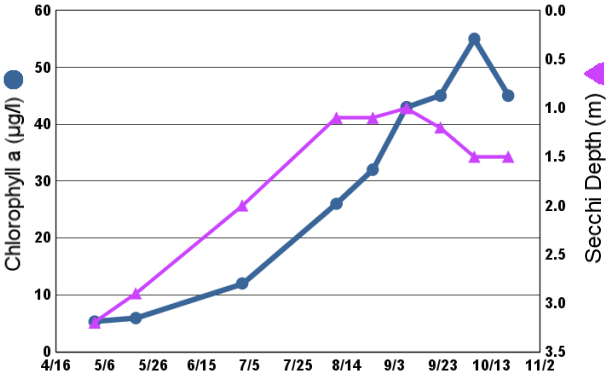
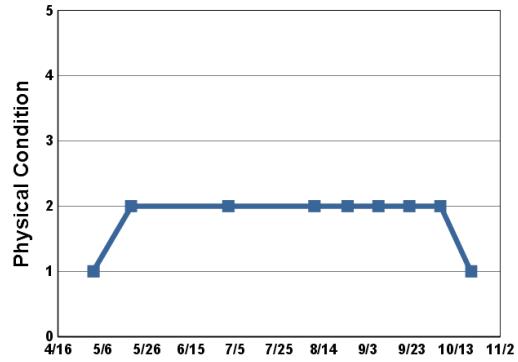


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	6.5		5.3	27	3.2	1	1
5/19	14.8		5.9	21	2.9	2	1
7/2	23.6		12	30	2.0	2	2
8/10	23.1		26	49	1.1	2	1
8/25	23.1		32	34	1.1	2	2
9/8	24.0		43	29	1.0	2	2
9/22	18.8		45	83	1.2	2	2
10/6	16.3		55	77	1.5	2	2
10/20	12.2		45	89	1.5	1	2







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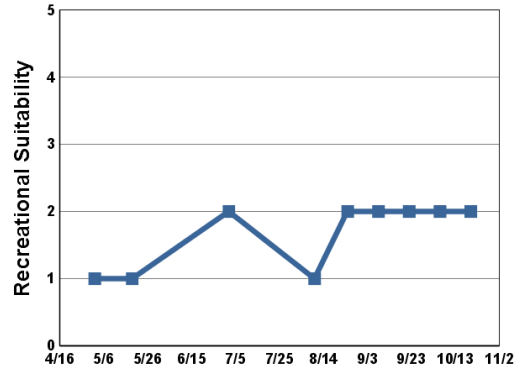

1 = Beautiful
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3 = Swimming Impaired
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Miller Lake (10–0029) *Carver County Environmental Services*

Volunteer: Carver County staff

Miller Lake is located within Dahlgren Township (Carver County). It has a surface area of 145 acres. The mean and maximum depths of the lake are 3.1 m (10 feet) and 4.3 m (roughly 14 feet), respectively. The entire lake is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants. Since the lake is relatively shallow, it does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

The lake has a 16,701-acre immediate watershed, which translates to a large watershed-to-lake area ratio of 115:1 (Carver County Planning 1999). The larger the ratio the greater the potential stress put on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

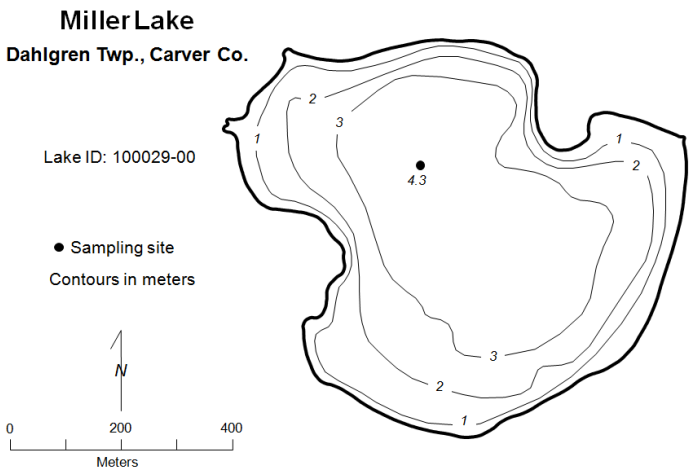
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	207	123	317	F
CLA (µg/l)	29	2.5	77	C
Secchi (m)	0.6	0.3	1.0	F
TKN (mg/l)	2.32	1.60	3.20	
			Lake Grade	D

The lake received a lake grade of D for 2013 which is consistent with its historical database. The historical lake grades typically fall in the range of D to F.

Throughout the monitoring period, the volunteer's opinions of 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.

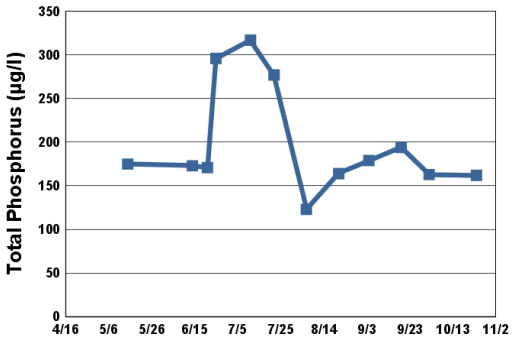
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

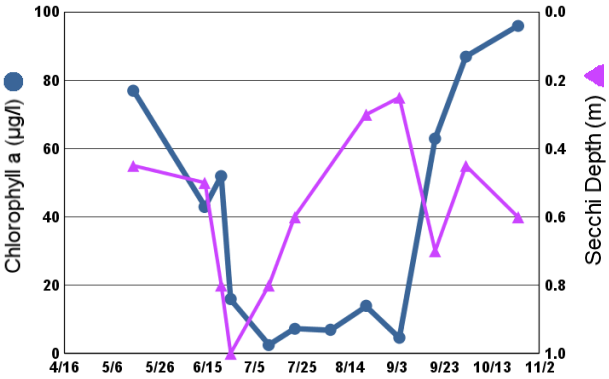
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

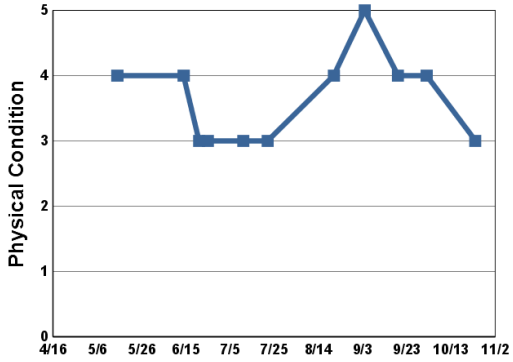


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/15	14.8	16.2	77	175	0.5	4	4
6/14	20.4	15.9	43	173	0.5	4	4
6/21	23.1	17.2	52	171	0.8	3	3
6/25	25.4	8.6	16	296	1.0	3	4
7/11	26.7	9.5	2.5	317	0.8	3	3
7/22	26.7	7.8	7.3	277	0.6	3	4
8/6			7.0	123			
8/21	25.6	16.6	14	164	0.3	4	4
9/4	24.5	17.1	4.7	179	0.3	5	5
9/19	19.8	9.0	63	194	0.7	4	4
10/2	17.6	9.1	87	163	0.5	4	4
10/24	7.0		96	162	0.6	3	3







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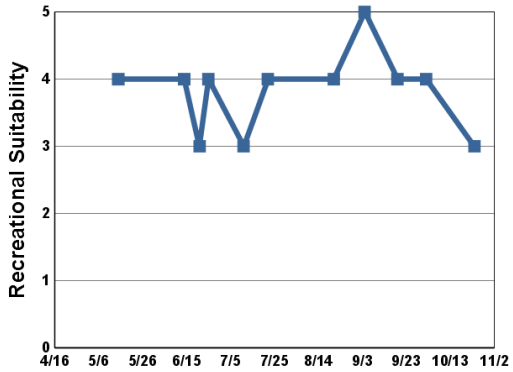
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

Minnetoga Lake (10–0009) *Nine Mile Creek Watershed District*

Volunteer: John Twele, Joe Stratmann

Lake Minnetoga is located in Minnetonka, Hennepin County. The lake has a surface area of 14.4 acres, and an average depth of 3.9 m. The entire 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	14	113	C
CLA (µg/l)	24	3.5	45	C
Secchi (m)	2.3	1.0	3.1	B
TKN (mg/l)	1.32	0.73	2.00	
			Lake Grade	C

The lake received a lake grade of C for 2013. The lake grades have varied in the B to C range since 2007. Further monitoring is suggested to continue to build the water quality database for this lake.

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

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

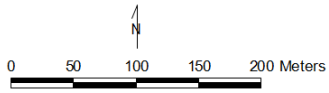
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

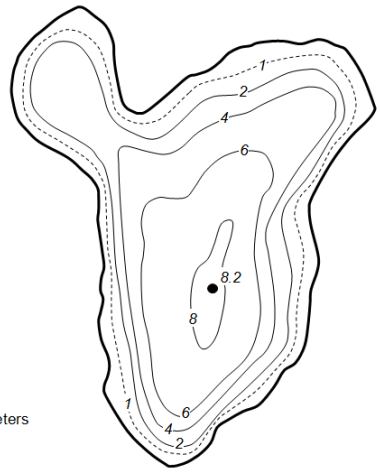
Lake Minnetoga
Minnetonka, Hennepin Co.

Lake ID: 270088-00

● Sampling site

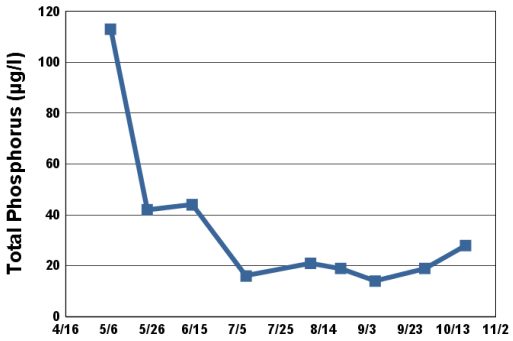
Contours in meters

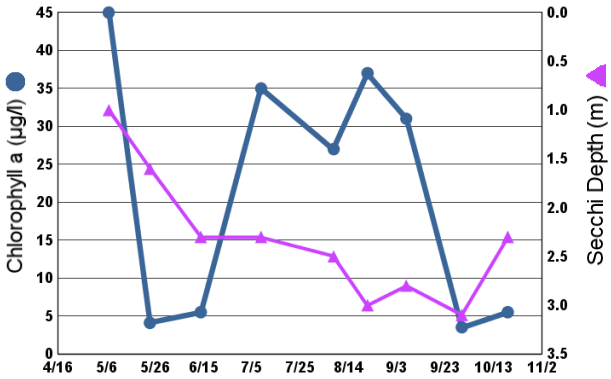


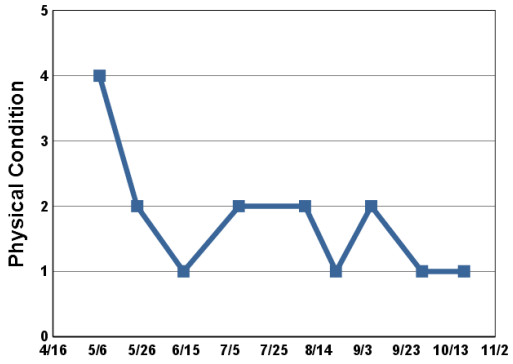


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	18.5		45	113	1.0	4	4
5/24	16.9		4.1	42	1.6	2	1
6/14	21.5		5.5	44	2.3	1	1
7/9	28.2		35	16	2.3	2	2
8/8	26.1		27	21	2.5	2	1
8/22	25.6		37	19	3.0	1	1
9/7	26.1		31	14	2.8	2	2
9/30	18.2		3.5	19	3.1	1	1
10/19	12.4		5.5	28	2.3	1	1







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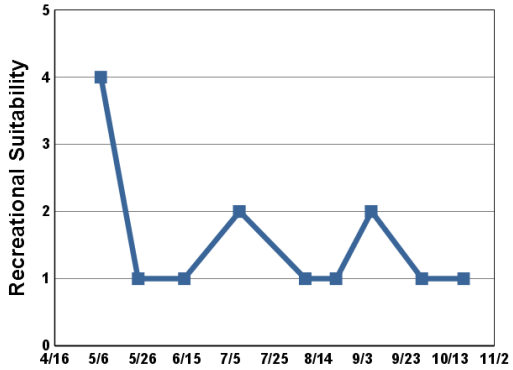

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Minnewashta Lake [Site-2, South Bay] (10–0009) *City of Chanhassen*

Volunteer: Steve Aldritt

Minnewashta Lake is located in the City of Chanhassen (Carver County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value. 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 Minnesota DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	10	24	A
CLA (µg/l)	24	3.3	62	C
Secchi (m)	2.5	1.2	4.5	B
TKN (mg/l)	0.85	0.79	0.96	
			Lake Grade	B

The south bay received a lake grade of B for 2013. The mean, minimum, and maximum CLA concentrations were higher in 2013 compared to 2012, causing the CLA grade to shift from an A to a C. Additional monitoring is recommended to continue to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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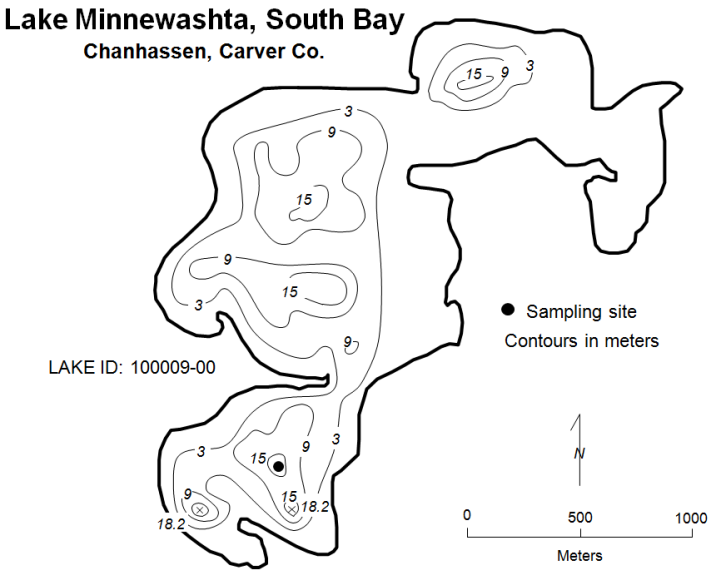
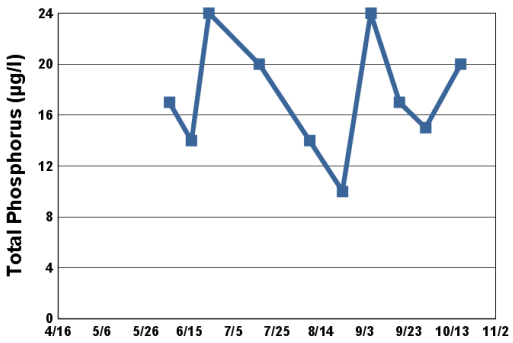
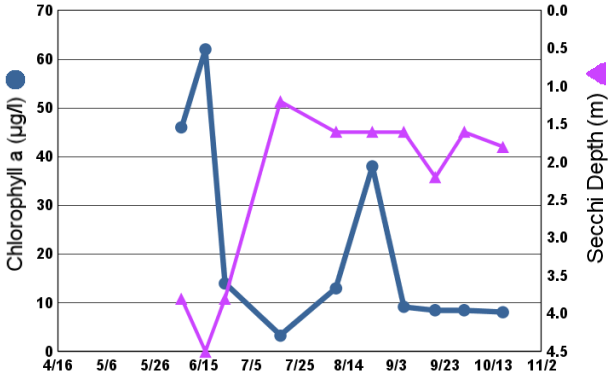
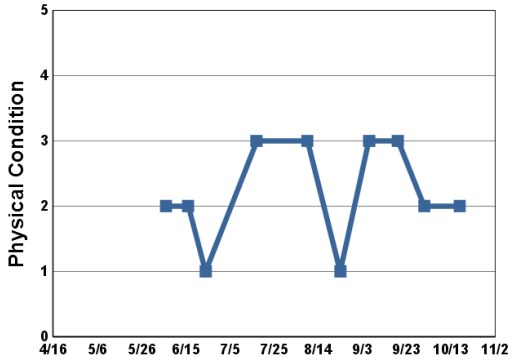


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/6	24.8		46	17	3.8	2	1
6/16	21.5		62	14	4.5	2	1
6/24	23.1		14	24	3.8	1	1
7/17	26.8		3.3	20	1.2	3	1
8/9	23.8		13	14	1.6	3	2
8/24	23.8		38	10	1.6	1	1
9/6	23.9		9.2	24	1.6	3	2
9/19	15.7		8.5	17	2.2	3	1
10/1	14.6		8.5	15	1.6	2	1
10/17	13.5		8.1	20	1.8	2	1







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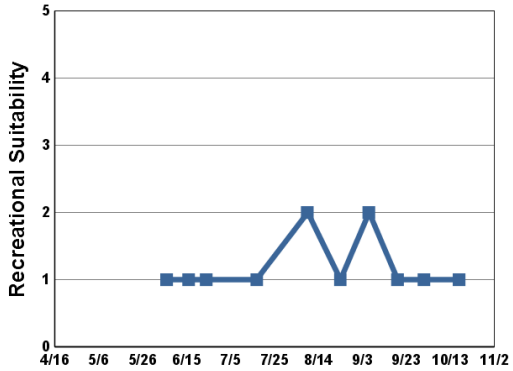

1 = Beautiful
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Mitchell Lake (27–0070) *City of Eden Prairie*

Volunteer: Gordon and Fran Warner

Mitchell Lake is located in the City of Eden Prairie (Hennepin County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). It has a surface area of 112 acres. The maximum depth of the lake is 5.8 m (19 feet). Approximately 97 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a substantial thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The Minnesota DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	19	83	C
CLA (µg/l)	18	2.4	83	B
Secchi (m)	1.6	1.0	3.0	C
TKN (mg/l)	1.02	0.70	1.40	
			Lake Grade	C

The lake received a lake grade of C which is consistent with its historical database. The lake's water quality seems represented by lake grades between C and D. Further monitoring is suggested to continue to build the water quality database for increasing statistical power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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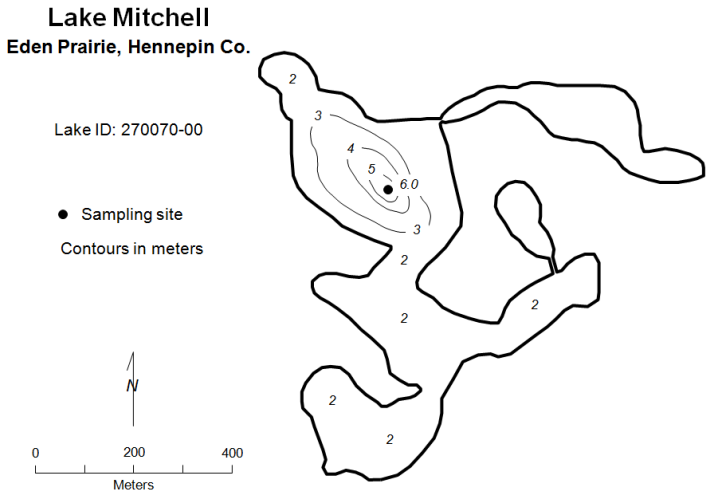
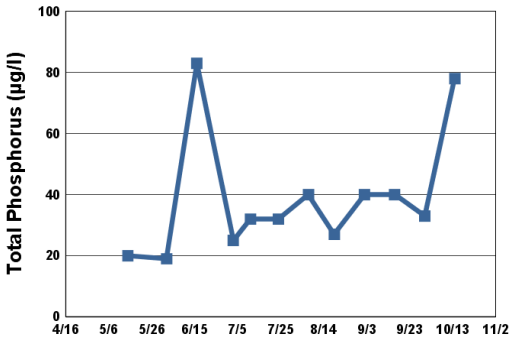
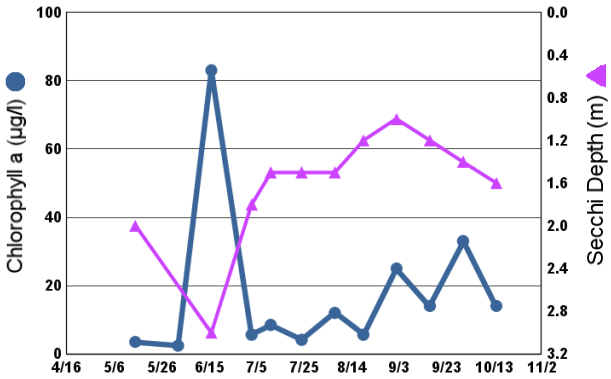
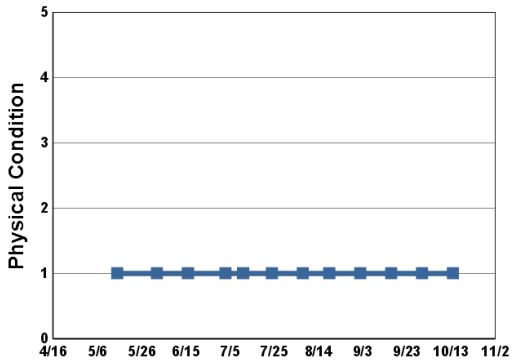


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/15	16.8		3.5	20	2.0	1	1
6/2	19.1		2.4	19		1	1
6/16	25.5		83	83	3.0	1	1
7/3	27.3		5.6	25	1.8	1	1
7/11	27.2		8.5	32	1.5	1	1
7/24	26.7		4.1	32	1.5	1	1
8/7	23.0		12	40	1.5	1	1
8/19	24.9		5.6	27	1.2	1	1
9/2	23.7		25	40	1.0	1	1
9/16	20.6		14	40	1.2	1	1
9/30	18.3		33	33	1.4	1	1
10/14	15.2		14	78	1.6	1	1







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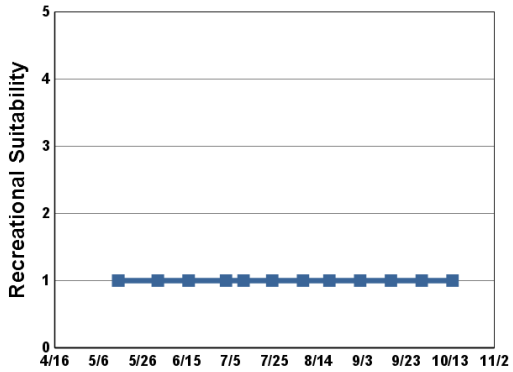


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Moody Lake (13–0023) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Douglas Toavs, Washington Conservation District staff

Moody Lake is a 35-acre lake located near Chisago City (Chisago County). The lake has a maximum depth of approximately 14.6 m (48 feet). Roughly 63 percent of the lake's surface area is considered littoral zone, which is the shallow 0 – 15 feet depth zone that is typically dominated by aquatic plants.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

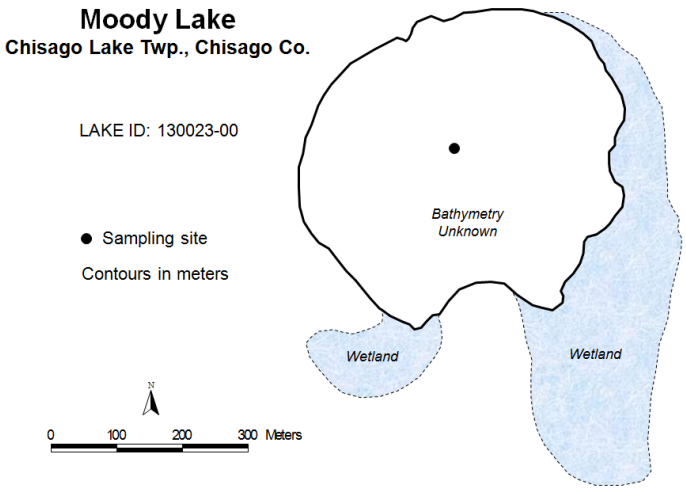
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	80	27	178	D
CLA (µg/l)	38	12	120	C
Secchi (m)	1.1	0.6	2.3	D
TKN (mg/l)	1.67	0.78	2.60	
			Lake Grade	D

The lake received a D grade for 2013, which is consistent with its limited historical water quality database. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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.

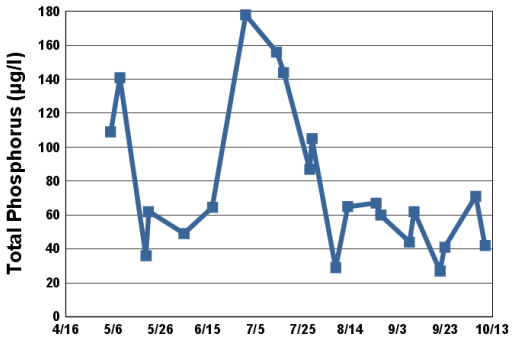
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

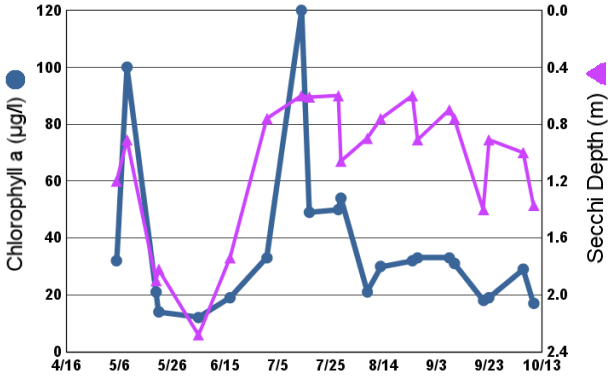
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

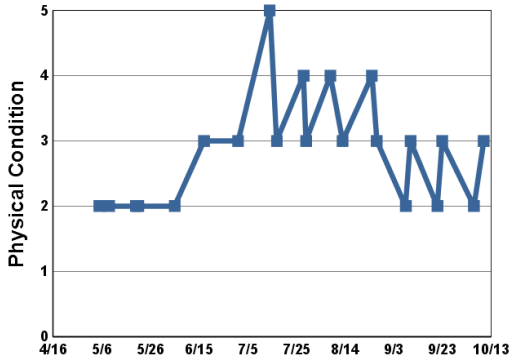


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	8.5		32	109	1.2	2	2
5/9	14.9	13.8	100	141	0.9	2	2
5/20	18.7		21	36	1.9	2	1
5/21	18.0	9.1	14	62	1.8	2	2
6/5	17.3	7.7	12	49	2.3	2	3
6/17	22.8	8.9	19	65	1.7	3	4
7/1	24.6	7.9	33	178	0.8	3	4
7/14	26.4		120	156	0.6	5	5
7/17	29.0	8.6	49	144	0.6	3	4
7/28	23.9		50	87	0.6	4	4
7/29	21.4	7.6	54	105	1.1	3	4
8/8	27.0		21	29	0.9	4	4
8/13	23.8	7.5	30	65	0.8	3	3
8/25	28.9		32	67	0.6	4	4
8/27	28.7	7.9	33	60	0.9	3	4
9/8	23.7		33	44	0.7	2	3
9/10	23.5	6.8	31	62	0.8	3	4
9/21	18.9		18	27	1.4	2	1
9/23	17.4	7.9	19	41	0.9	3	3
10/6	14.6		29	71	1.0	2	1
10/10	15.2	8.4	17	42	1.4	3	3







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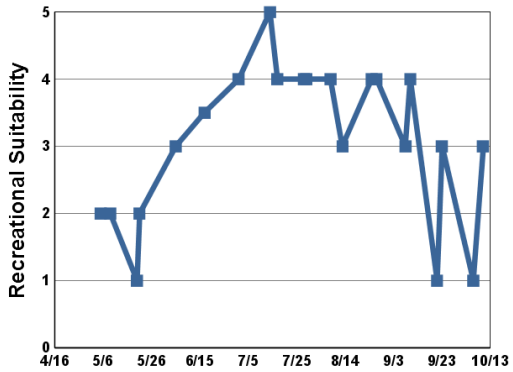
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

North Twin Lake (82–0018) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

North Twin Lake is located in Stillwater Township (Washington County). It has a surface area of 69 acres. The maximum and mean depths of the lake are 1.8 m (5.9 ft) and 0.9 m (2.9 ft), respectively. The volume of the lake is approximately 207 ac-ft. The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The lake's 187-acre immediate watershed translates to a watershed-to-lake size ratio of 3:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

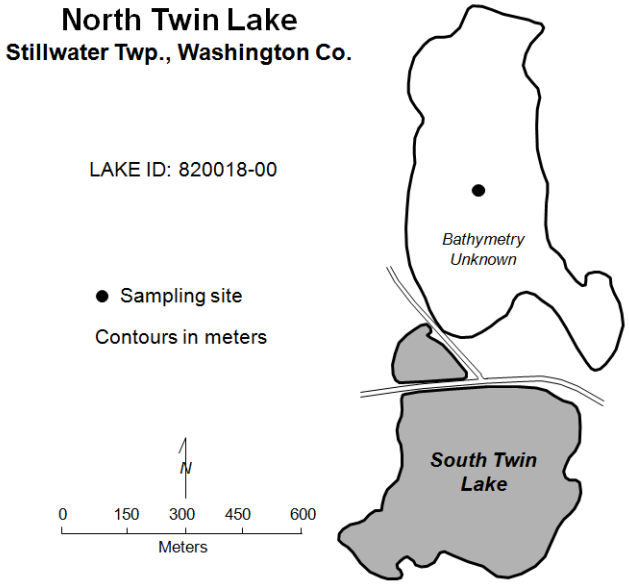
2013 summer (May - September) data summary

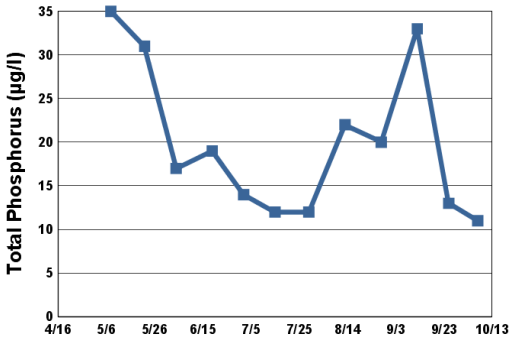
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	21	12	35	A
CLA (µg/l)	3.7	1.3	11	A
Secchi (m)				
TKN (mg/l)	0.77	0.64	0.96	
			Lake Grade	

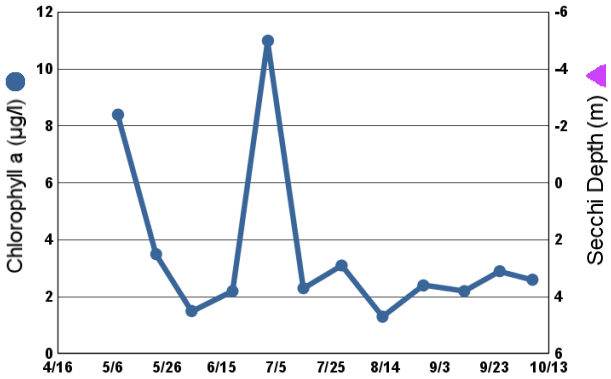
Most of the Secchi depth measurements were not attainable because either the visibility of the disk was blocked by aquatic vegetation (rather than by water clarity) or the disk was visible on the bottom of the lake. There were insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The TP and CLA grades for 2013, both A's, were similar to those received in 2004. The relatively low TP and CLA concentrations in combination with the observations of substantial macrophyte growth, indicate that the primary production of the lake is focused on production of aquatic macrophytes rather than algae.

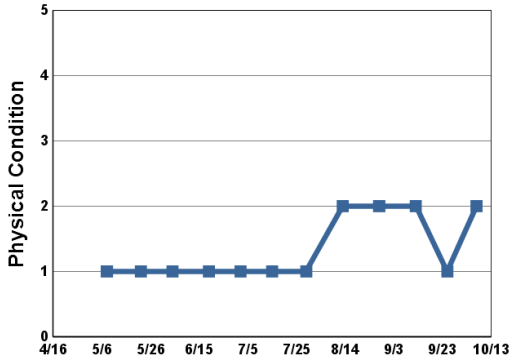
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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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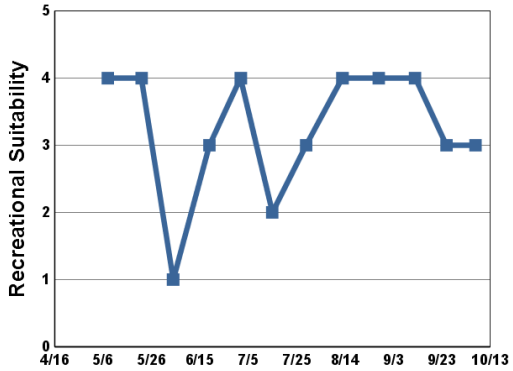
5 = Severe Algal Bloom



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

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	20.6	10.1	8.4	35		1	4
5/22	16.6	7.2	3.5	31		1	4
6/4	19.2	8.0	1.5	17		1	1
6/19	23.4	8.6	2.2	19		1	3
7/2	28.0	11.2	11	14		1	4
7/15	27.3	7.8	2.3	12		1	2
7/29	22.1	9.2	3.1	12		1	3
8/13	24.9	8.7	1.3	22		2	4
8/28	27.8	4.2	2.4	20		2	4
9/12	21.2	3.1	2.2	33		2	4
9/25	16.4	9.5	2.9	13		1	3
10/7	15.0	8.4	2.6	11		2	3

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Northwood Lake (27–0627) *Bassett Creek Watershed Management Organization*

Volunteer: Robert White

Northwood Lake is a 15-acre lake located within the City of New Hope (Hennepin County). The mean and maximum depths of the lake are 0.8 m (2.5 ft) and 1.5 m (4.9 ft), respectively. The entire 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 lake's 1,341-acre immediate watershed translates to a large watershed-to-lake area ratio of 89:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	177	71	324	F
CLA (µg/l)	43	12	110	C
Secchi (m)	0.8	0.6	1.0	D
TKN (mg/l)	1.28	0.57	1.90	
			Lake Grade	D

The lake received a lake grade of D in 2013 which is consistent with its historical database. Over the past 10 years, the lake grades have varied in the D and C range. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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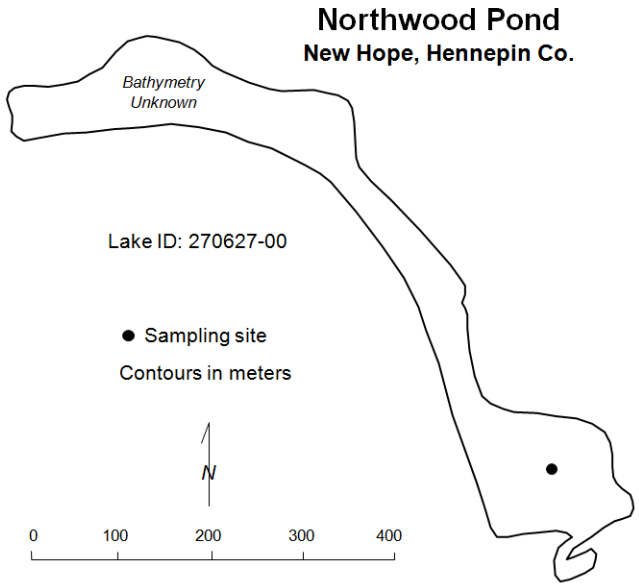
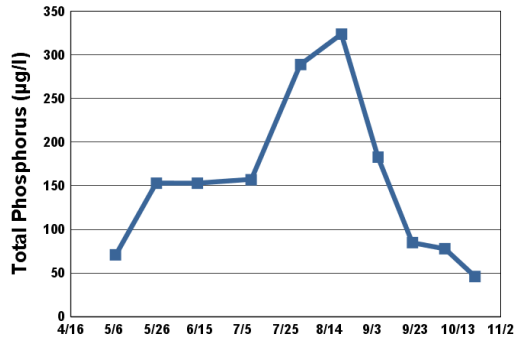
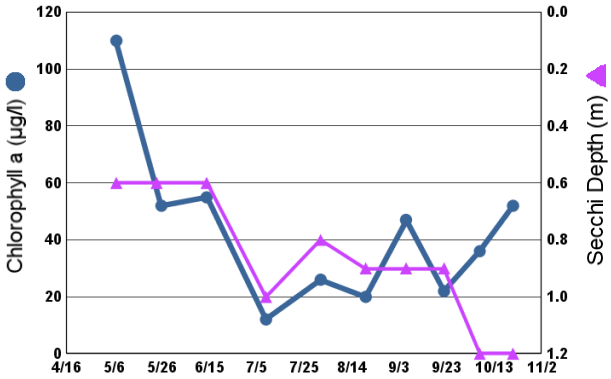
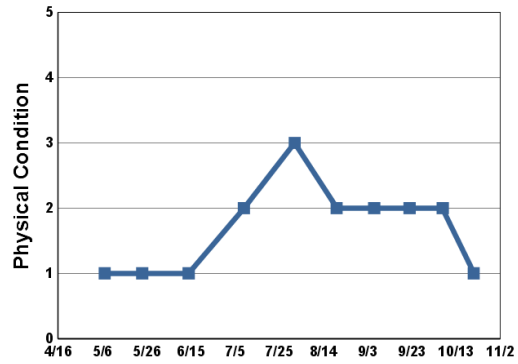


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	19.3		110	71	0.6	1	4
5/24	18.2				0.6	1	4
5/26			52	153			
6/14	22.2		55	153	0.6	1	4
7/9	29.7		12	157	1.0	2	4
8/1	26.0		26	289	0.8	3	4
8/20	28.8		20	324	0.9	2	
9/6	24.9		47	183	0.9	2	4
9/22	18.0		22	85	0.9	2	4
10/7	16.2		36	78	1.2	2	4
10/21	5.2		52	46	1.2	1	4







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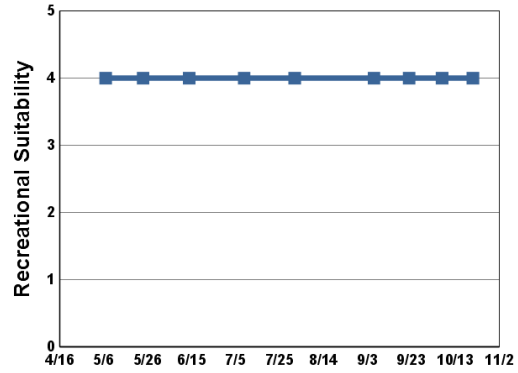

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

O'Connor Lake (82–0002) *Washington Conservation District*

Volunteer: Jeff Keene

O'Connor Lake is a 38-acre lake located within Denmark Township (Washington County). There are few known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	29	35	B
CLA (µg/l)	19	7.2	36	B
Secchi (m)	1.5	1.1	1.8	C
TKN (mg/l)	0.74	0.46	0.98	
			Lake Grade	B

The lake received a lake grade of B in 2013, which is consistent with its historical water quality database. The lake grades have varied between B and D. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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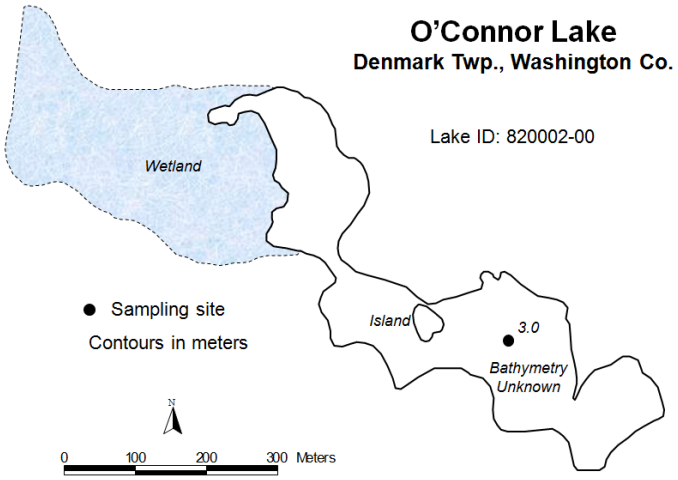
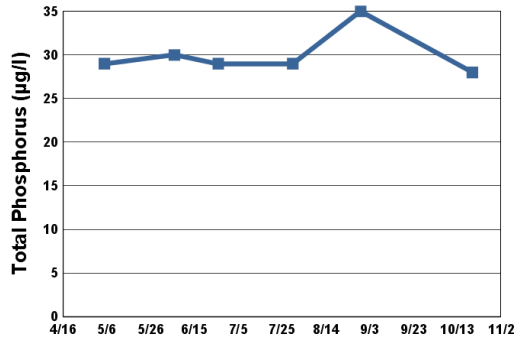
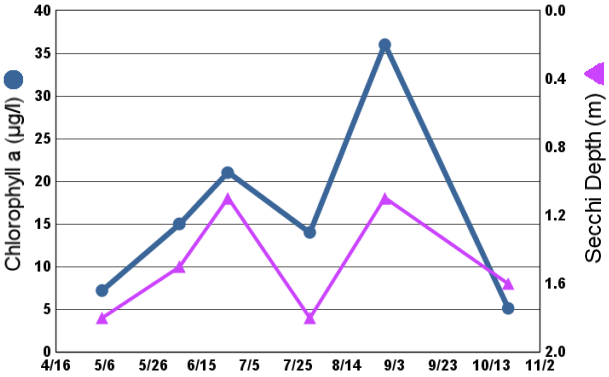
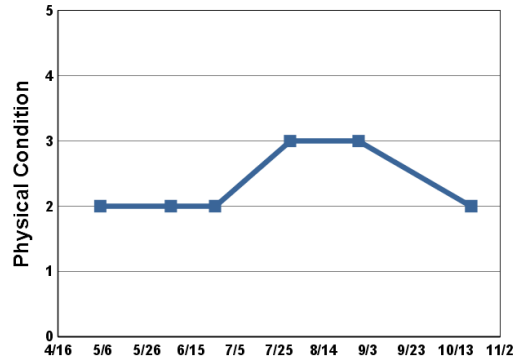


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	10.8		7.2	29	1.8	2	4
6/6	17.4		15	30	1.5	2	4
6/26	28.1		21	29	1.1	2	4
7/30	24.6		14	29	1.8	3	4
8/30	29.2		36	35	1.1	3	4
10/20	9.4		5.1	28	1.6	2	4







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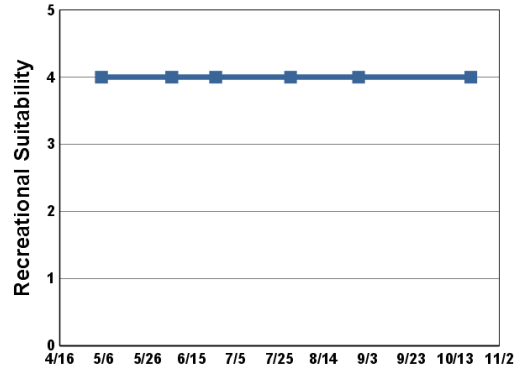

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

O'Dowd Lake (70–0095) *City of Shakopee*

Volunteer: Sandy and Mike Boyce

O'Dowd Lake is located in both Louisville Township and the City of Shakopee (Scott County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC2007). The lake's surface area is 258 acres and has a maximum depth of 6.7 m (roughly 22 feet).Approximately 63 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	10	45	B
CLA (µg/l)	20	2.7	56	C
Secchi (m)	1.5	0.7	2.6	C
TKN (mg/l)	1.09	0.74	1.60	
			Lake Grade	C

The lake received a lake grade of C for 2013. The lake's water quality seems to be represented by a lake grade of C with the occasional D, according to its historical CAMP database. Of note in 2013 was the overall lower TP concentrations (mean, minimum, and maximum) in 2013 compared to previous years.

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

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

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

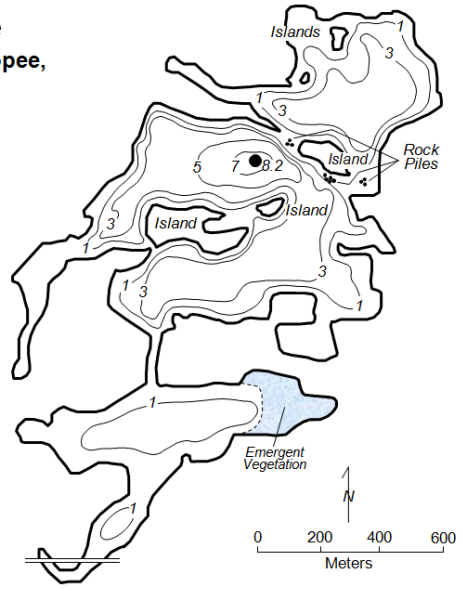
O'Dowd Lake

Louisville Twp./Shakopee, Scott Co.

LAKE ID: 700095-00

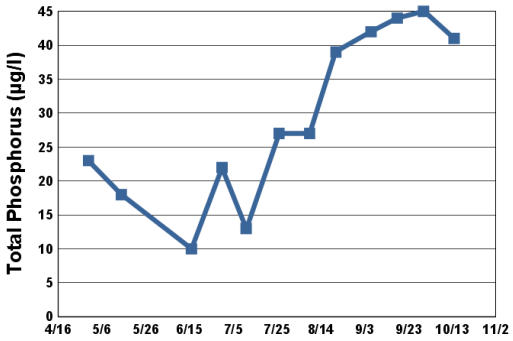
● Sampling site

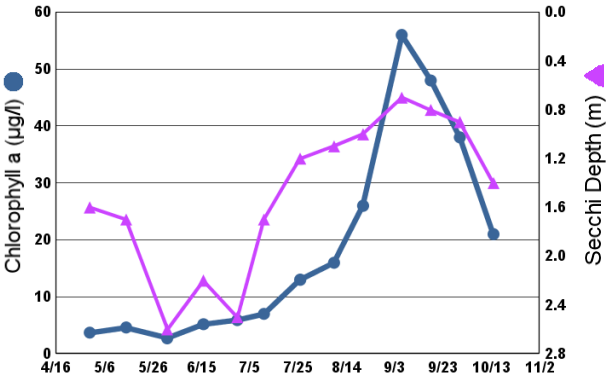
Contours in meters

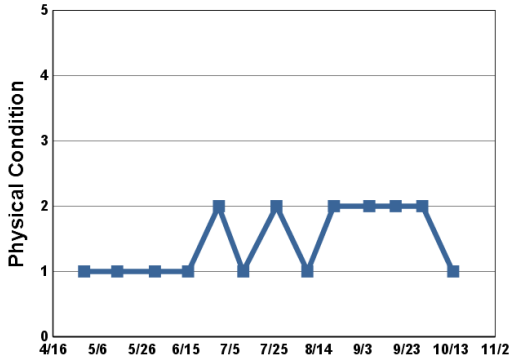


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	10.7		3.7	23	1.6	1	1
5/15	16.4		4.6	18	1.7	1	1
6/1	19.3		2.7		2.6	1	1
6/16	22.0		5.2	10	2.2	1	1
6/30	24.7		5.9	22	2.5	2	2
7/11	27.2		7.0	13	1.7	1	1
7/26	23.8		13	27	1.2	2	1
8/9	23.7		16	27	1.1	1	1
8/21	25.7		26	39	1.0	2	1
9/6	25.7		56	42	0.7	2	2
9/18	20.1		48	44	0.8	2	1
9/30	18.4		38	45	0.9	2	1
10/14	16.2		21	41	1.4	1	







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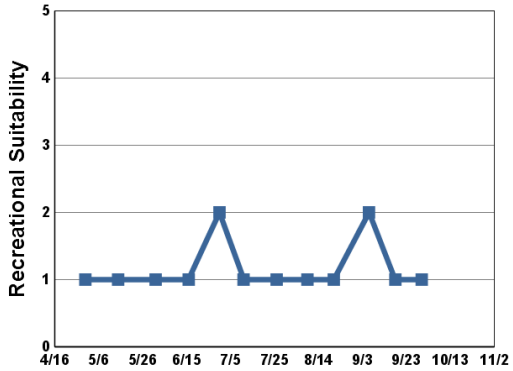
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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					C							
CLA					C							
Secchi					C							
Lake Grade					**C**							

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

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

Source: Metropolitan Council and STORET data

Olson Lake (82–0103) *Valley Branch Watershed District*

Volunteer: Bob Meier

Olson Lake is located in the City of Lake Elmo (Washingon County). It is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity (METC 2007). The lake has a surface area of 89 acres and a mean and maximum depth of 2.1 (6.9 feet) and 4.5 m (14.8 feet). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	15	7	25	A
CLA (µg/l)	3.8	1.5	7.3	A
Secchi (m)	3.6	2.6	4.6	A
TKN (mg/l)	0.85	0.75	0.98	
			Lake Grade	A

The lake received a lake grade of A for 2013. This grade is consistent with much of its recent historical water quality database. Also, the historical water quality database indicates that the lake grades have improved since the 1980's. The lake received a lake grade of C in 1984, as well as receiving Secchi grades of C in 1984-1986, and 1988-1990. Lake Grades of B were received in 1991, 1993, and 1995. For the past decade, the lake has recorded lake grades varying between A and B.

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

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

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

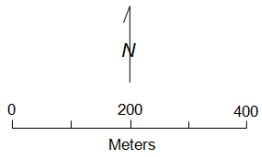
Lake Olson

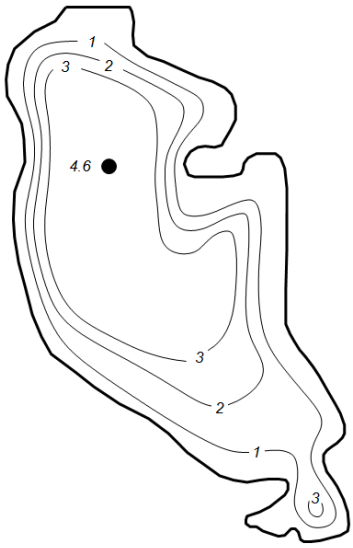
Lake Elmo, Washington Co.

Lake ID: 820103-00

● Sampling site

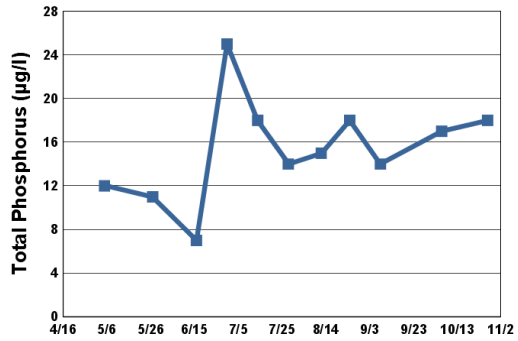
Contours in meters

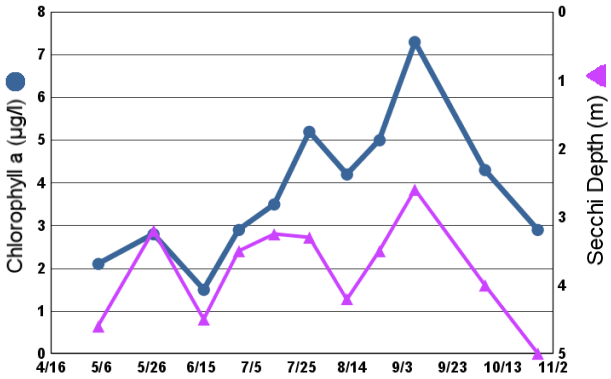


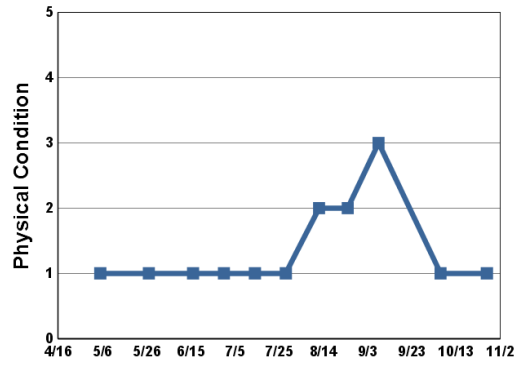


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	9.1		2.1	12	4.6	1	1
5/27	15.8		2.8	11	3.2	1	1
6/16	21.5		1.5	7	4.5	1	1
6/30	26.2		2.9	25	3.5	1	1
7/14	26.9		3.5	18	3.3	1	1
7/28	25.4		5.2	14	3.3	1	1
8/12	26.5		4.2	15	4.2	2	1
8/25	28.6		5.0	18	3.5	2	2
9/8	25.0		7.3	14	2.6	3	2
10/6	16.0		4.3	17	4.0	1	1
10/27	8.5		2.9	18	5.0	1	1







1 = Crystal Clear
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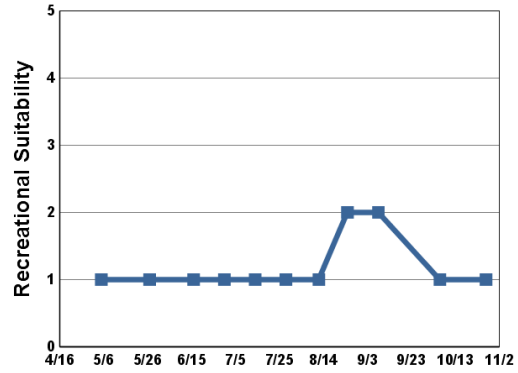


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Orchard Lake (19–0031) *Black Dog Lake Watershed Management Organization*

Volunteer: Tom Goodwin

Orchard Lake is located in the City of Lakeville (Dakota County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). It has a surface area of 250 acres.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

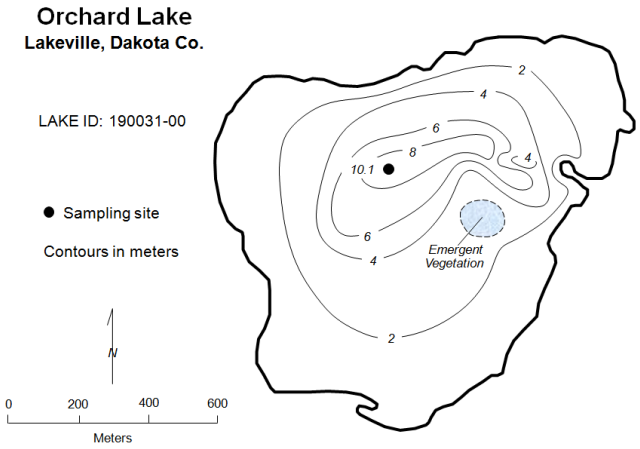
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	16	7	30	A
CLA (µg/l)	4.0	1.6	8.0	A
Secchi (m)	3.1	2.0	4.9	A
TKN (mg/l)	0.84	0.69	0.98	
			Lake Grade	A

The lake received a lake grade of A for 2013. The lake continues to have lower summer-time chlorophyll in comparison to 10 years ago and earlier, as demonstrated by the recent streak of CLA grades of A. The overall water quality has improved overall in the past 6 years in comparison to years prior going back to 1980, as given by the shift in lake grades from the C to B range to the B to A range.

Throughout the monitoring period, the volunteer's opinions of 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.

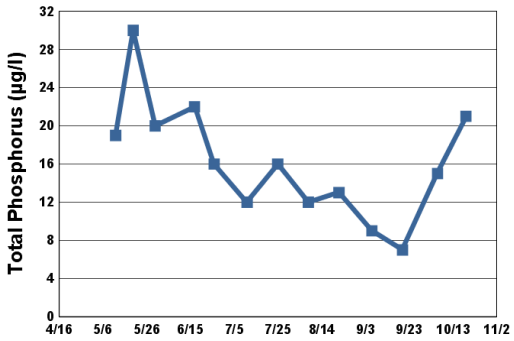
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

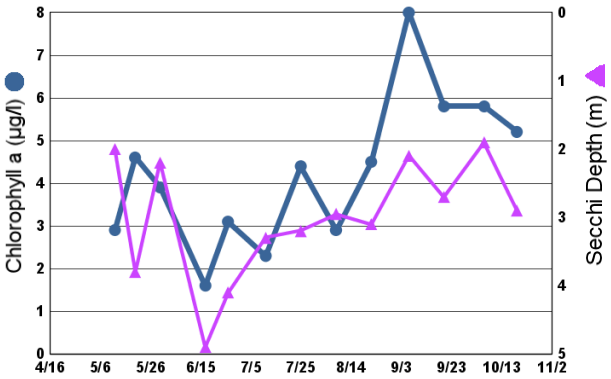
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

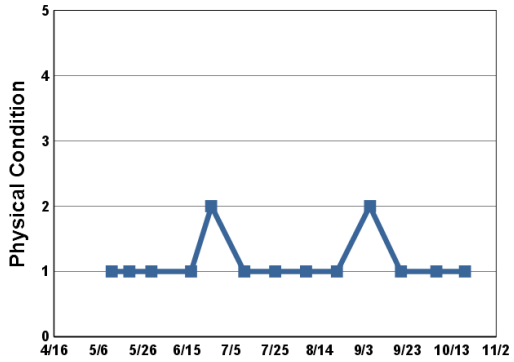


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Sec-chi (m)	PC (1-5)	RS (1-5)
5/12	12.5		2.9	19	2.0	1	1
5/20	17.7		4.6	30	3.8	1	1
5/30	16.7		3.9	20	2.2	1	1
6/17	21.4		1.6	22	4.9	1	1
6/26	26.4		3.1	16	4.1	2	2
7/11	26.8		2.3	12	3.3	1	2
7/25	25.2		4.4	16	3.2	1	1
8/8	23.7		2.9	12	3.0	1	2
8/22	24.9		4.5	13	3.1	1	1
9/6	24.7		8.0	9	2.1	2	1
9/20	18.9		5.8	7	2.7	1	1
10/6	15.7		5.8	15	1.9	1	1
10/19	12.2		5.2	21	2.9	1	1







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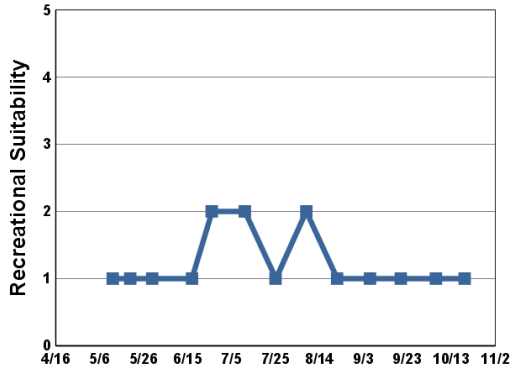

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Pat Lake (82–0125) *Browns Creek Watershed District*

Volunteer: 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

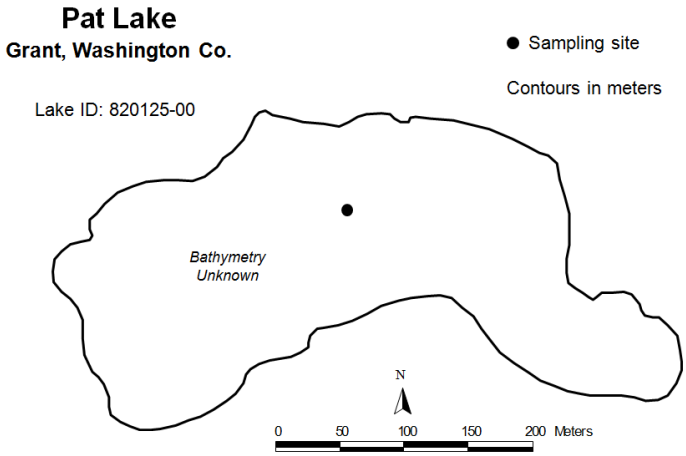
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	54	27	78	C
CLA (µg/l)	17	3.0	49	B
Secchi (m)	1.9	0.6	2.9	C
TKN (mg/l)	1.18	0.82	2.10	
			Lake Grade	C

The lake received a lake grade of C, which is consistent with its historical water quality database. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

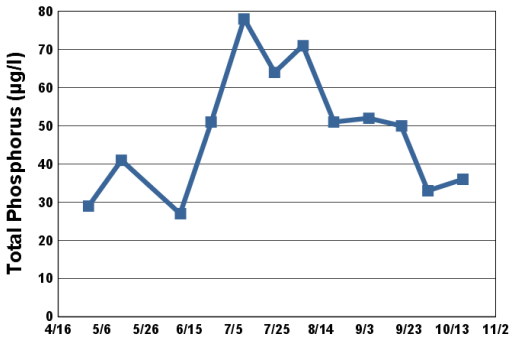
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

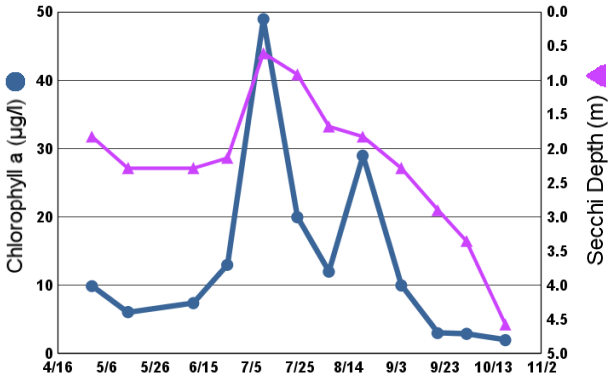
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

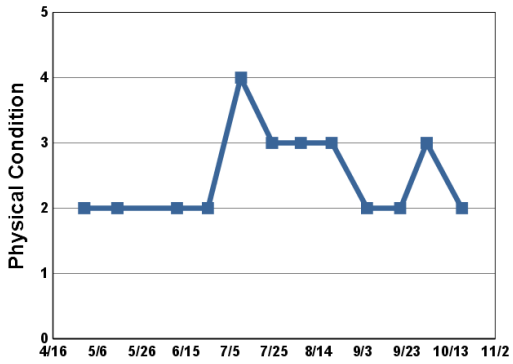


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	13.6	12.7	9.9	29	1.8	2	4
5/15	16.2	9.6	6.1	41	2.3	2	4
6/11	19.8	10.2	7.4	27	2.3	2	3
6/25	28.3	8.8	13	51	2.1	2	2
7/10	27.1	12.2	49	78	0.6	4	4
7/24	24.4	4.3	20	64	0.9	3	4
8/6	23.6	7.8	12	71	1.7	3	3
8/20	25.4	8.4	29	51	1.8	3	3
9/5	24.6	7.9	10	52	2.3	2	4
9/20	18.3	6.3	3.0	50	2.9	2	2
10/2	16.9	5.5	2.9	33	3.4	3	3
10/18	11.1	9.2	2.0	36	4.6	2	2







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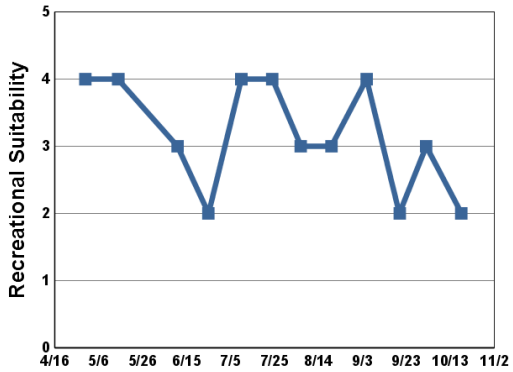

1 = Beautiful
2 = Minor Aesthetic Problem
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

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 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

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	129	41	313	D
CLA (µg/l)	48	5.6	120	D
Secchi (m)	0.8	0.2	1.5	D
TKN (mg/l)	1.90	0.78	4.00	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is an improvement compared to the previous 4 years; the improvement was observed for all three parameters: TP, CLA, and Secchi depth. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site to help determine if this is a sign of an improving trend.

Throughout the monitoring period, the volunteer's opinions of 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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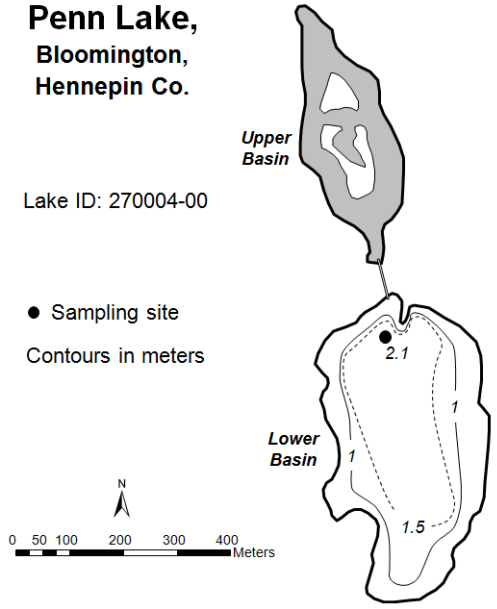
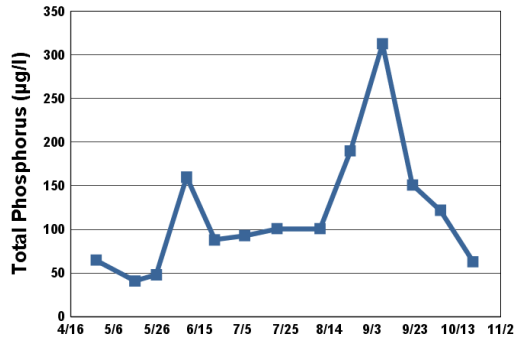
Penn Lake,
Bloomington,
Hennepin Co.

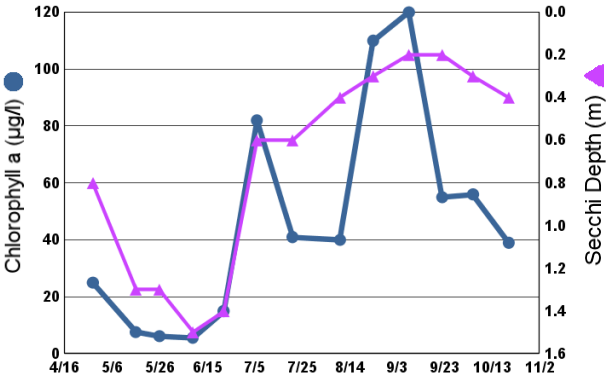
Lake ID: 270004-00

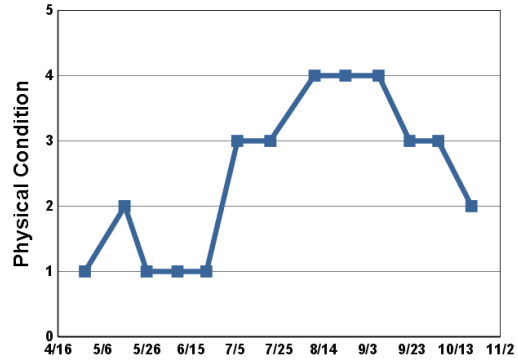


2013 Data

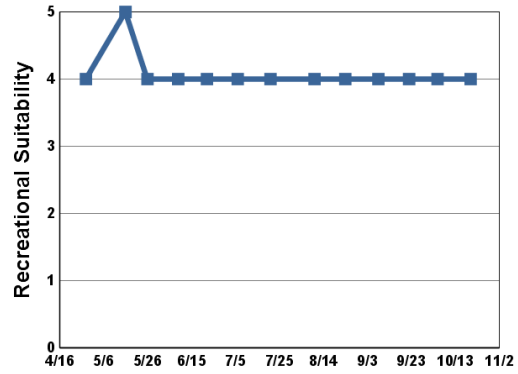
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/28	17.7		25	65	0.8	1	4
5/16	20.3		7.6	41	1.3	2	5
5/26	15.4		6.2	48	1.3	1	4
6/9	17.8		5.6	160	1.5	1	4
6/22	25.9		15	88	1.4	1	4
7/6	26.9		82	93	0.6	3	4
7/21	28.1		41	101	0.6	3	4
8/10	24.9		40	101	0.4	4	4
8/24	30.8		110	190	0.3	4	4
9/8	24.5		120	313	0.2	4	4
9/22	19.0		55	151	0.2	3	4
10/5	16.2		56	122	0.3	3	4
10/20	8.9		39	63	0.4	2	4







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Pine Tree Lake (87–0122) *Rice Creek Watershed District*

Volunteer: Gene Berwald

Pine Tree Lake, located on the eastern edge of the City of Dellwood (Washington County), covers an area of 174 acres. It has a maximum depth of 7.9 m (26 feet), and a mean depth of 3.0 m (10 feet).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	19	12	38	A
CLA (µg/l)	4.5	2.2	14	A
Secchi (m)	2.7	2.0	3.2	B
TKN (mg/l)	0.75	0.57	0.98	
			Lake Grade	A

The lake received a lake grade of A, which is consistent with grades received in more recent years. Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

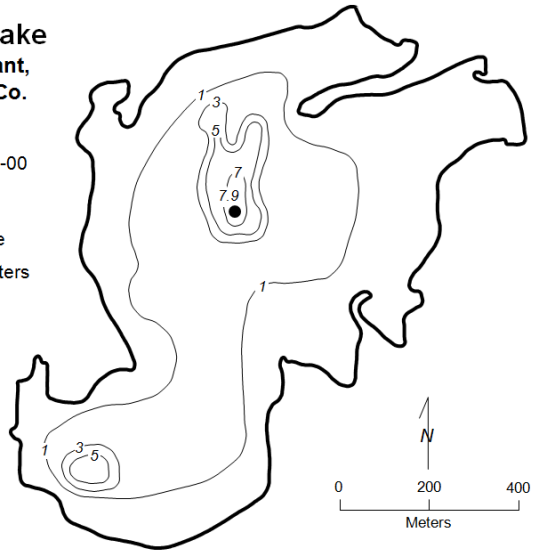
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

Pine Tree Lake
Dellwood/Grant, Washington Co.

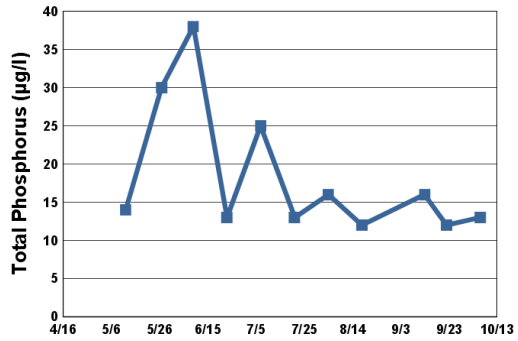
Lake ID: 820122-00

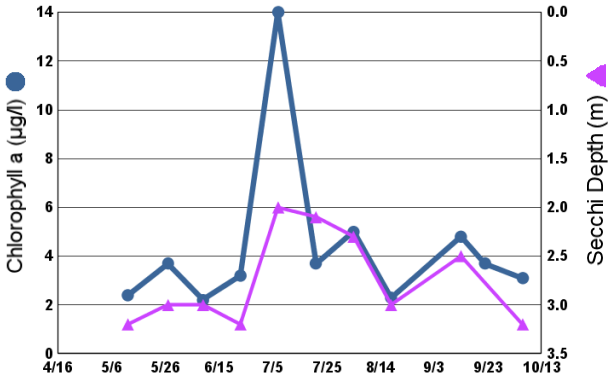
● Sampling site
Contours in meters

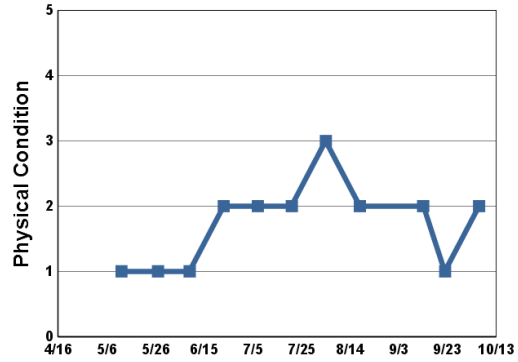


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/12	12.6		2.4	14	3.2	1	4
5/27	15.7		3.7	30	3.0	1	2
6/9	18.0		2.2	38	3.0	1	2
6/23	25.4		3.2	13	3.2	2	3
7/7	28.5		14	25	2.0	2	3
7/21	27.2		3.7	13	2.1	2	2
8/4	23.3		5.0	16	2.3	3	2
8/18	24.5		2.3	12	3.0	2	3
9/13	19.8		4.8	16	2.5	2	3
9/22	19.3		3.7	12		1	2
10/6	14.5		3.1	13	3.2	2	2







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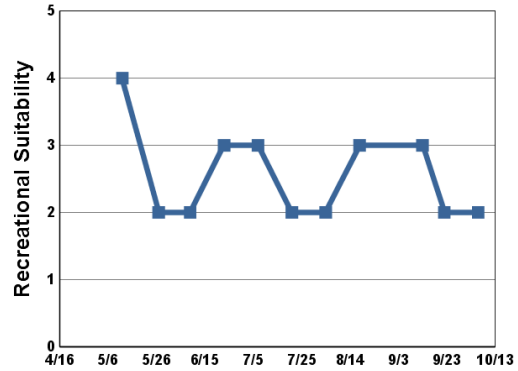


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Plaisted Lake (82–0148) *Washington Conservation District*

Volunteer: Washington Conservation District staff

Plaisted Lake is located in the City of Hugo (Washington County). Little morphological data is available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

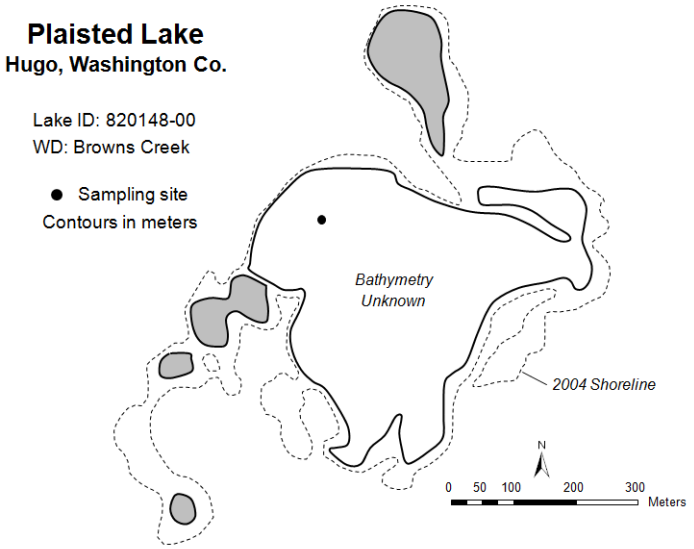
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	53	27	151	C
CLA (µg/l)	11	3.9	17	B
Secchi (m)	2.1	1.5	2.3	C
TKN (mg/l)	1.09	0.85	1.50	
			Lake Grade	C

The lake received a lake grade of C, which is consistent with its limited water quality database. However, there seems to be an improvement in water quality in 2013 compared to previous years. The 2013 means, minimums, and maximums tor TP and CLA generally decreased and Secchi depth generally increased in 2013 compared to previous years. Approximately half of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation (rather than by water clarity), so water clarity was greater than the measured Secchi depths indicate. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

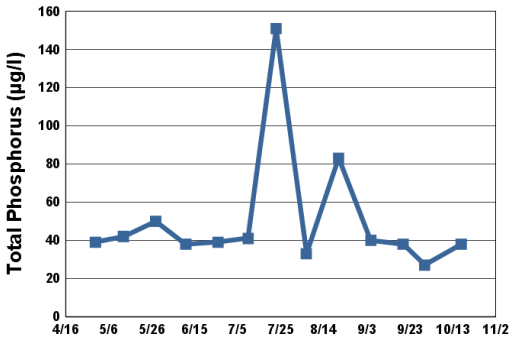
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

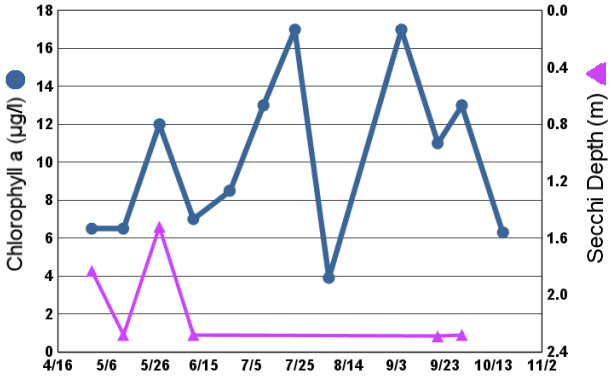
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

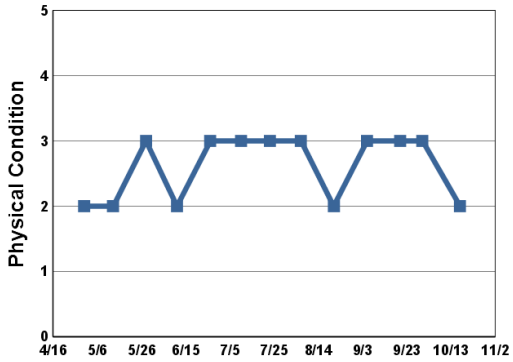


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	7.9	11.5	6.5	39	1.8	2	2
5/13	12.4	11.1	6.5	42	2.3	2	2
5/28	15.8	9.0	12	50	1.5	3	4
6/11	21.1	10.5	7.0	38	2.3	2	3
6/26	27.0	8.9	8.5	39		3	3
7/10	25.6	7.9	13	41		3	3
7/23	25.9	8.2	17	151		3	4
8/6	22.1	10.9	3.9	33		3	3
8/21	25.4	8.5		83		2	3
9/5	22.9	6.6	17	40		3	3
9/20	18.8	7.9	11	38	2.3	3	4
9/30	17.4	6.9	13	27	2.3	3	3
10/17	12.1	8.4	6.3	38		2	2







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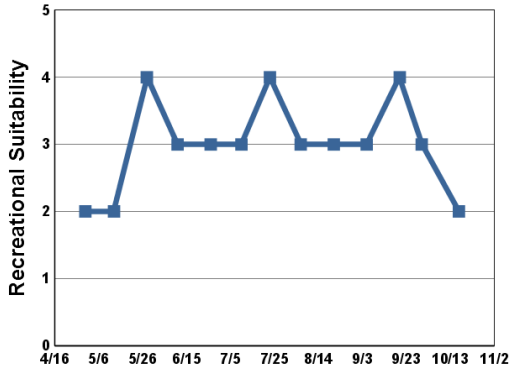

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Powers Lake (82–0092) *City of Woodbury*

Volunteer: 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 has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	16	40	B
CLA (µg/l)	3.6	1.5	9.9	A
Secchi (m)	4.9	2.6	7.3	A
TKN (mg/l)	0.78	0.59	1.00	
			Lake Grade	A

The lake received a lake grade of A. This was the second A lake grade received since 1999. The previous lake grade of A was received last year (2012). The lake seems to vary in range of A to C grades. Continued monitoring is suggested to determine if this year's improved water quality is a developing trend.

Throughout the monitoring period, the volunteer's opinions of 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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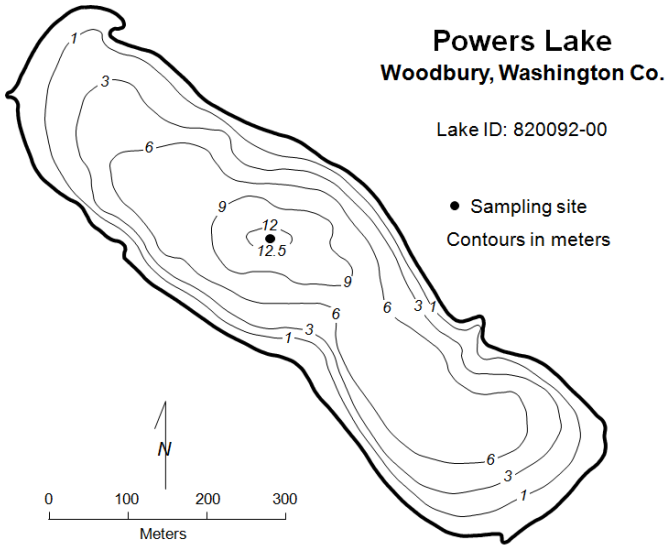
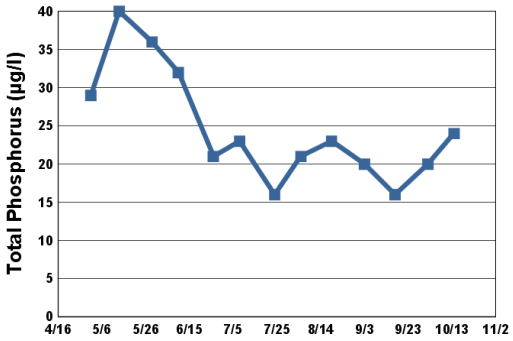
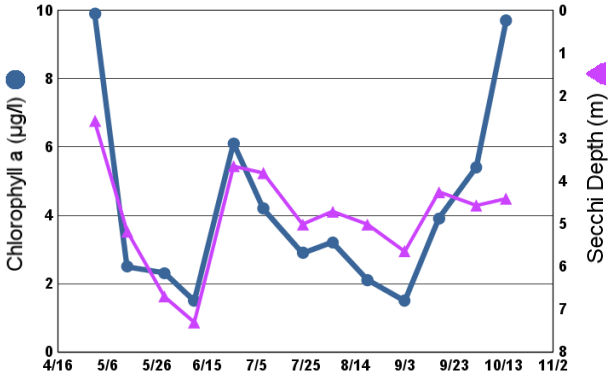
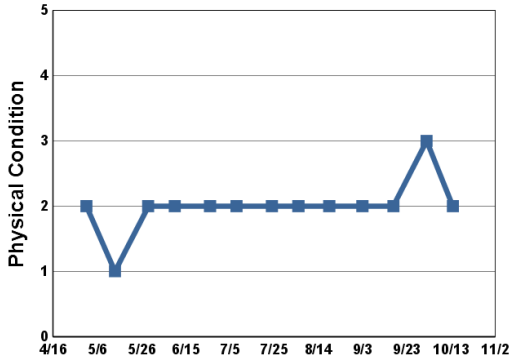


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/1	8.6	12.1	9.9	29	2.6	2	2
5/14	12.3	11.3	2.5	40	5.2	1	1
5/29	16.1	8.5	2.3	36	6.7	2	2
6/10	17.9	9.5	1.5	32	7.3	2	2
6/26	26.3	9.0	6.1	21	3.7	2	2
7/8	27.3	8.8	4.2	23	3.8	2	3
7/24	25.9	7.2	2.9	16	5.0	2	2
8/5	22.9	7.8	3.2	21	4.7	2	2
8/19	24.0	7.8	2.1	23	5.0	2	3
9/3	24.3	6.4	1.5	20	5.6	2	3
9/17	20.9	8.0	3.9	16	4.3	2	2
10/2	18.3	7.4	5.4	20	4.6	3	2
10/14	15.5	7.5	9.7	24	4.4	2	2







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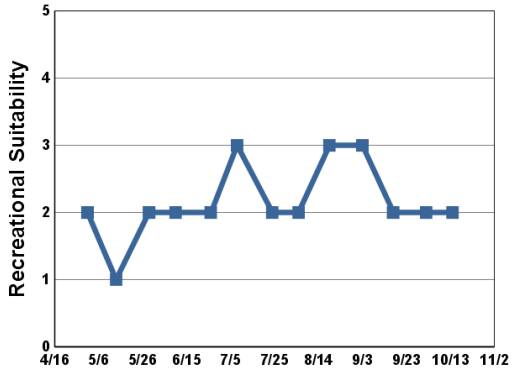

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Prior Lake [Lower Basin, Site 1] (70–0026) *Prior Lake — Spring Lake Watershed District*

Volunteer: Marianne Breitbach, Carter Christie

Prior Lake (lower basin) is located in the City of Prior Lake (Scott County). The lower basin is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lower basin has a surface area of 957 acres. The maximum and mean depths of the basin are 18.3 and 4.1m (60 and 13 feet), respectively. The lower basin has one inlet, which is the outlet from the upper basin of Prior Lake. The lower basin has one outlet. The outlet structure, located at the southwestern portion of the basin, was installed to regulate surface water elevations.

The MN DNR has designated the lower basin as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) and Zebra mussels (*Dreissena spp.*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	14	6	21	A
CLA (µg/l)	5.3	1.2	17	A
Secchi (m)	4.1	2.5	7.0	A
TKN (mg/l)	0.74	0.35	1.00	
			Lake Grade	A

This lake site received a lake grade of A. The historical lake grades appear to vary from A's to C's, although there has not been a C lake grade observed since 2002. Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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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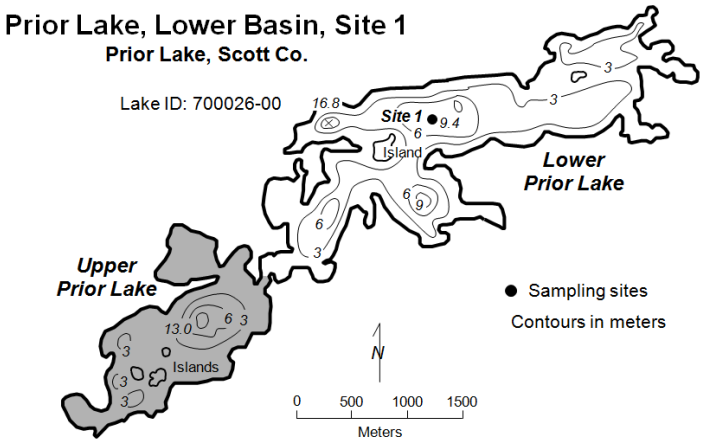
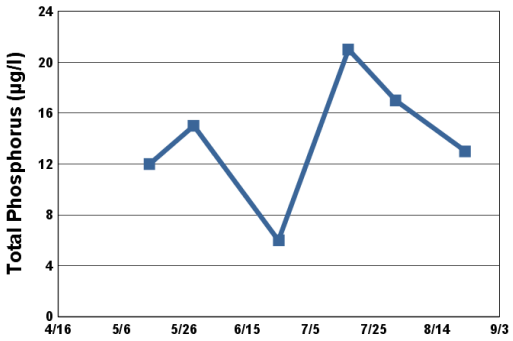
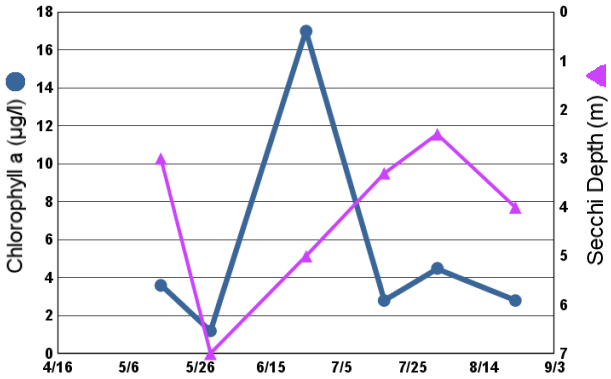
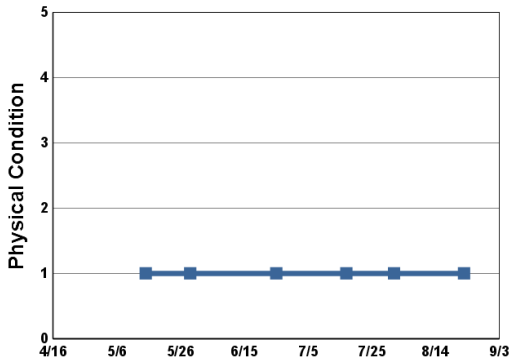


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/15	11.8		3.6	12	3.0	1	1
5/29	14.9		1.2	15	7.0	1	1
6/25	23.5		17	6	5.0	1	1
7/17	26.9		2.8	21	3.3	1	1
8/1	22.8		4.5	17	2.5	1	1
8/23	24.8		2.8	13	4.0	1	1







1 = Crystal Clear
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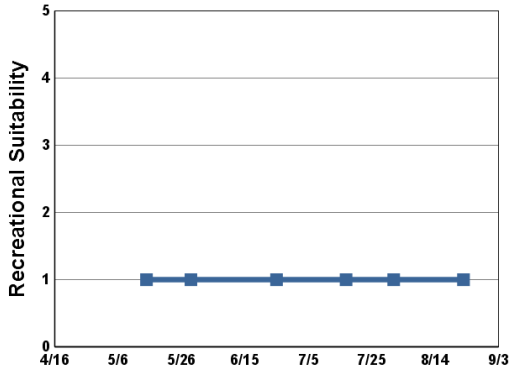


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Prior Lake [Lower Basin, Site 2] (70–0026) *Prior Lake — Spring Lake Watershed District*

Volunteer: Dave Rech

Prior Lake (lower basin) is located in the City of Prior Lake (Scott County). The lower basin is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lower basin has a surface area of 957 acres. The maximum and mean depths of the basin are 18.3 and 4.1m (60 and 13 feet), respectively. The lower basin has one inlet, which is the outlet from the upper basin of Prior Lake. The lower basin has one outlet. The outlet structure, located at the southwestern portion of the basin, was installed to regulate surface water elevations.

The MN DNR has designated the lower basin as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) and Zebra mussels (*Dreissena spp.*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

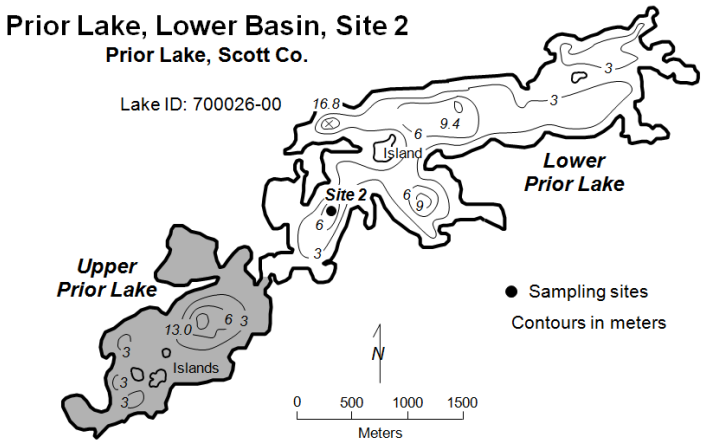
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	24	14	33	
CLA (µg/l)	8.0	1.4	13	
Secchi (m)	2.8	1.4	6.0	
TKN (mg/l)	1.03	0.88	1.40	
			Lake Grade	

There were insufficient data to determine parameter and lake grades in 2013 for this lake site. At least 5 data points are needed throughout the summer-time period for each parameter to calculate a grade.

Throughout the monitoring period, the volunteer's opinions of 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.

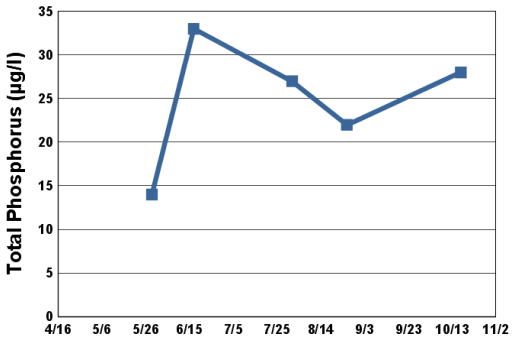
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

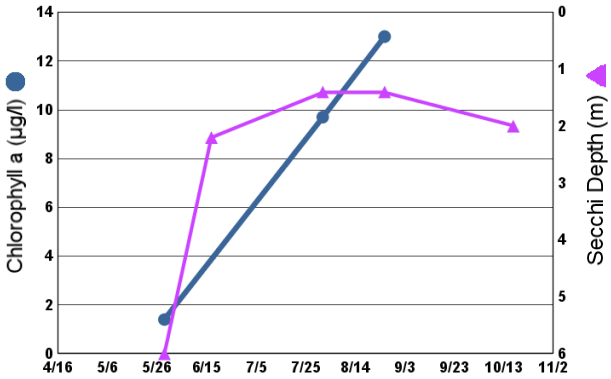
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

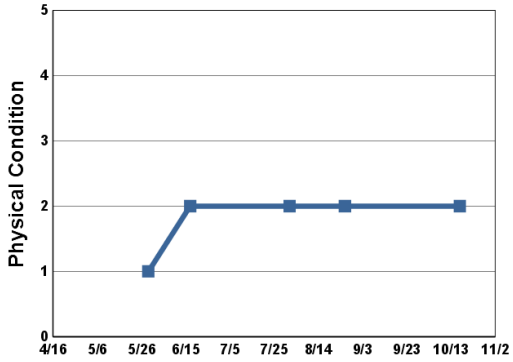


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/29	15.1		1.4	14	6.0	1	1
6/17	21.1			33	2.2	2	2
8/1	24.1		9.7	27	1.4	2	2
8/26	26.4		13	22	1.4	2	2
10/17	13.5			28	2.0	2	2







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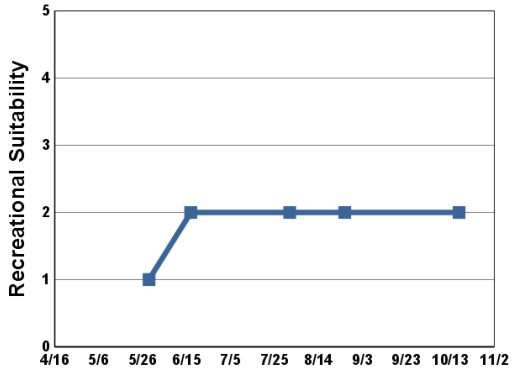

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Prior Lake [Upper Basin, Site 1] (70–0072) *Prior Lake — Spring Lake Watershed District*

Volunteer: Kim Silvernagel

Prior Lake (upper basin) is located in the City of Prior Lake (Scott County). The upper basin is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The upper basin has a surface area of 386 acres. The maximum and mean depths of the upper basin of Prior Lake are 15.2 and 3.1 m (50 and 10 feet), respectively. The upper basin of Prior Lake has two natural inlets, inflow from Spring Lake and the inlet from Rice and Crystal Lake drainage.

The MN DNR has designated the upper basin as being infested with Eurasian water milfoil (*Myriophyllum spicatum*) and Zebra mussels (*Dreissena spp.*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	18	92	C
CLA (µg/l)	33	1.0	91	C
Secchi (m)	2.0	0.5	5.1	C
TKN (mg/l)	1.26	0.77	1.90	
			Lake Grade	C

The lake received a lake grade of C. Historical data for the upper basin indicate that the water quality of the basin has varied between lake grades of C and D. Continued monitoring is suggested to determine the trend direction, if any, of the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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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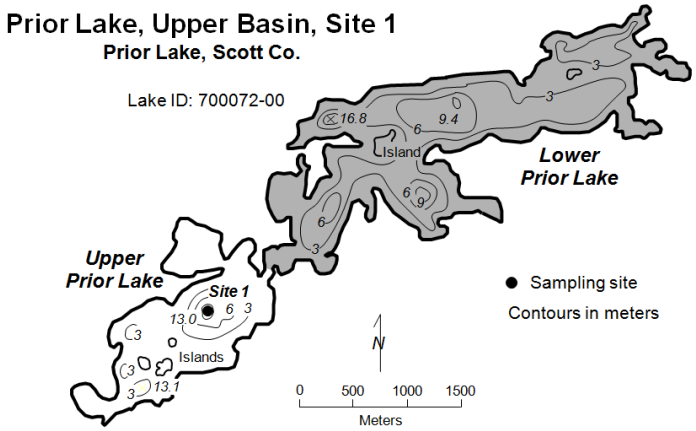
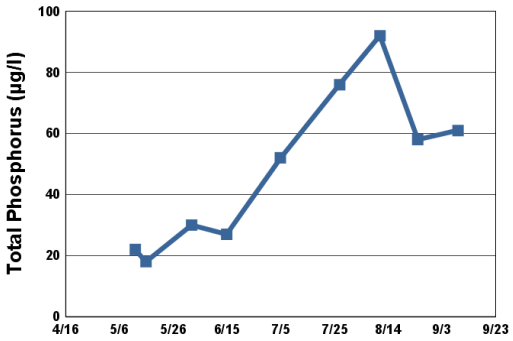
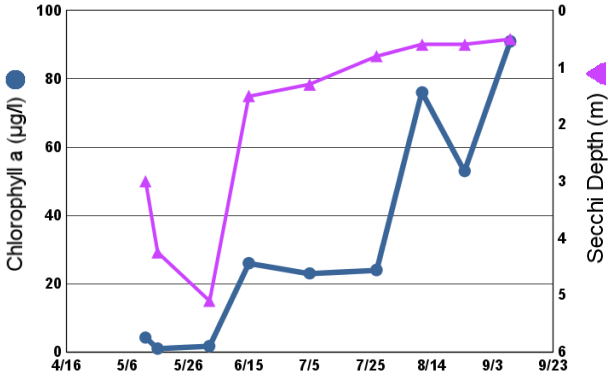
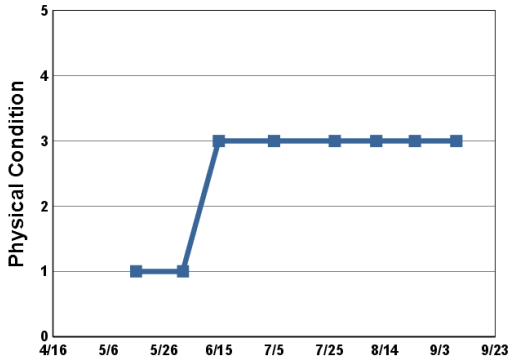


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/12	11.8		4.2	22	3.0		1
5/16	15.4		1.0	18	4.3	1	1
6/2	18.2		1.7	30	5.1	1	1
6/15	21.5		26	27	1.5	3	2
7/5	25.5		23	52	1.3	3	2
7/27	23.0		24	76	0.8	3	2
8/11	25.7		76	92	0.6	3	3
8/25	24.7		53	58	0.6	3	2
9/9	25.3		91	61	0.5	3	3







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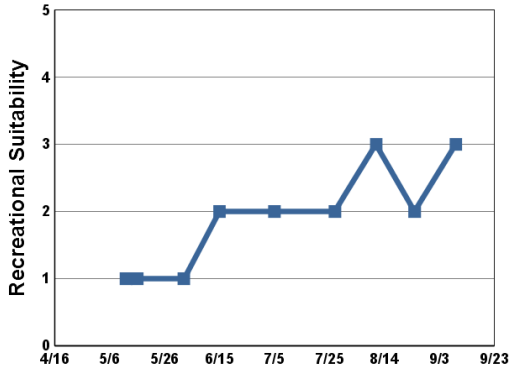
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

Regional Park Lake (82–0087) *South Washington Watershed District*

Volunteer: 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. Most of the area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	53	25	86	C
CLA (µg/l)	28	3.3	56	C
Secchi (m)	2.0	0.8	4.0	C
TKN (mg/l)	1.09	0.68	1.70	
			Lake Grade	C

The lake received a lake grade of C for 2013 which is a return to the B and C grades received from 2004 through 2011. Continued monitoring is recommended to monitor the varying water quality of this lake.

Throughout the monitoring period, the volunteer's opinions of 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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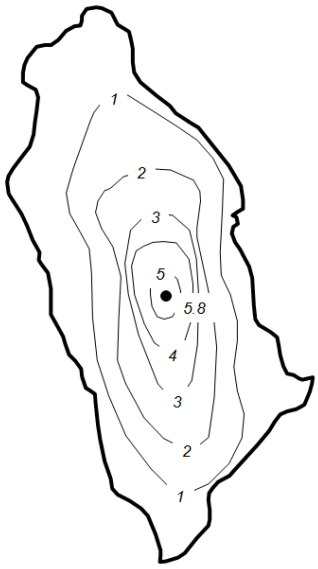
Regional Park Lake

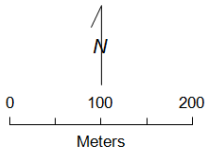
Cottage Grove, Washington Co.

Lake ID: 820086-00



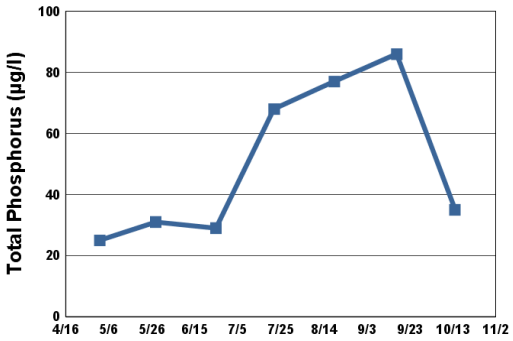
● Sampling site

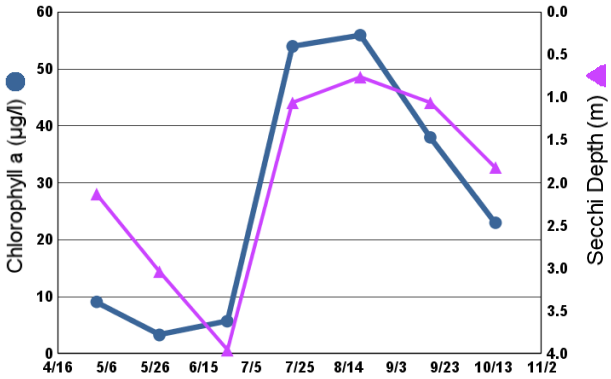
Contours in meters

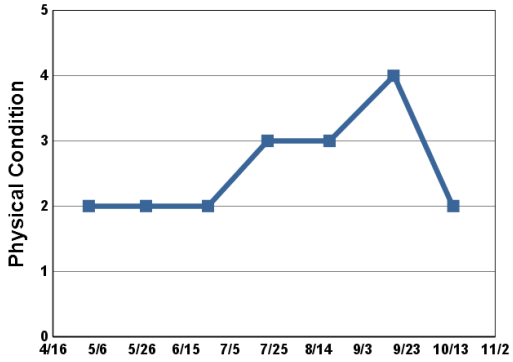


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	11.4	13.5	9.1	25	2.1	2	2
5/28	16.1	10.4	3.3	31	3.0	2	3
6/25	24.4	8.9	5.7	29	4.0	2	2
7/22	27.5	10.2	54	68	1.1	3	4
8/19	23.2	12.2	56	77	0.8	3	4
9/17	18.9	9.2	38	86	1.1	4	4
10/14	14.2	7.6	23	35	1.8	2	3







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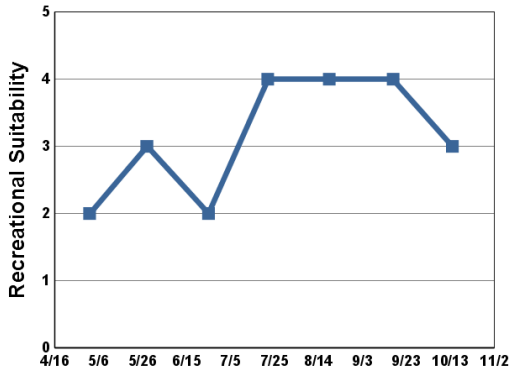

1 = Beautiful
2 = Minor Aesthetic Problem
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Reitz Lake (10–0052) *Carver County Environmental Services*

Volunteer: Lynne and Mark McMullen

Reitz Lake is located in Laketown Township (Carver County). The lake has a surface area of 79 acres and a watershed area of 3,711 acres, which gives a large watershed-to-lake area ratio of 47:1. The larger the ratio the greater the potential stress put on the lake from surface runoff. The DNR has designated the lake as being infested with Eurasion Water Milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	80	41	176	D
CLA (µg/l)	37	3.1	86	C
Secchi (m)	1.4	0.9	2.8	C
TKN (mg/l)	1.85	1.50	2.30	
			Lake Grade	C

The lake received a lake grade of C, which is consistent with its historical water quality database, except for 2012 which was a poorer water quality year. Continued monitoring is suggested to monitor the recent variation in water quality.

Throughout the monitoring period, the volunteer's opinions of 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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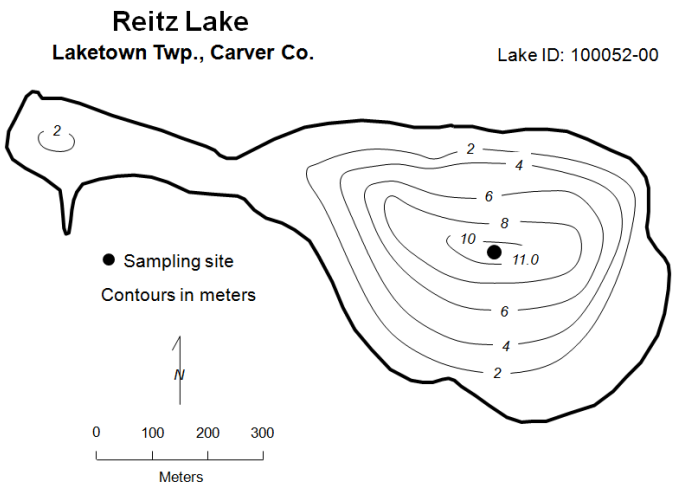
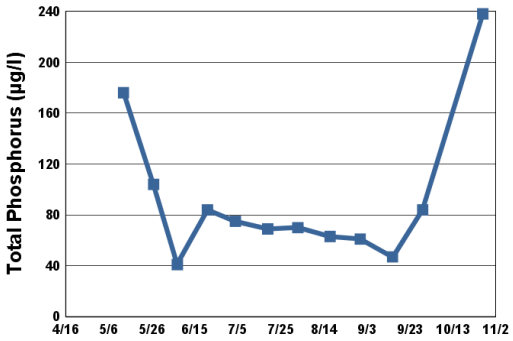
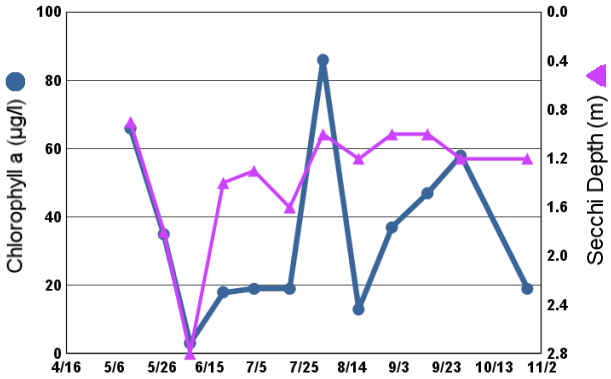
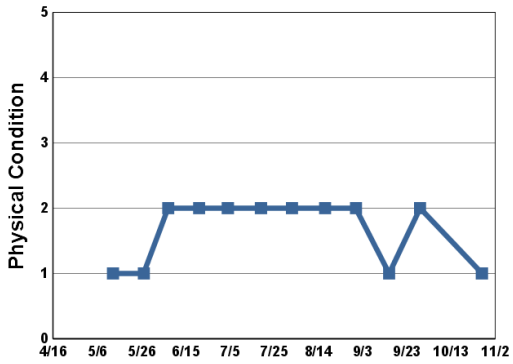


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	11.0		66	176	0.9	1	1
5/27	14.0		35	104	1.8	1	1
6/7	18.0		3.1	41	2.8	2	1
6/21	20.0		18	84	1.4	2	2
7/4	23.0		19	75	1.3	2	1
7/19	27.0		19	69	1.6	2	2
8/2	22.0		86	70	1.0	2	1
8/17	23.0		13	63	1.2	2	1
8/31	24.0		37	61	1.0	2	1
9/15	21.0		47	47	1.0	1	1
9/29	20.0		58	84	1.2	2	1
10/27	10.0		19	238	1.2	1	1







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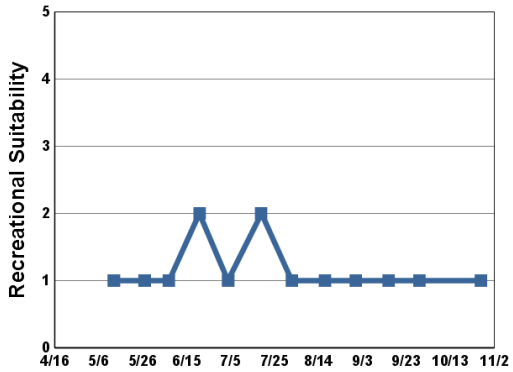
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Reshanau Lake (02–0009) *Rice Creek Watershed District*

Volunteer: Lori Fredlund

Reshanau Lake is located in the City of Lino Lakes (Anoka County). The 336-acre lake has a mean and maximum depth of 3.2 m (10.5 feet) and 4.9 m (16 feet). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

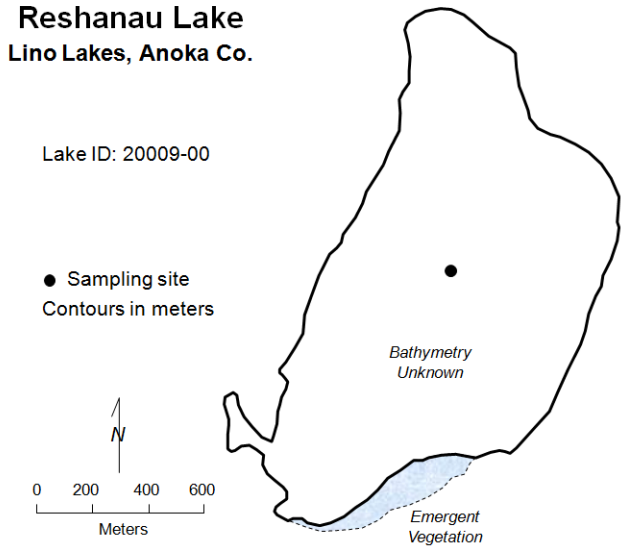
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	118	28	229	D
CLA (µg/l)	40	6.3	110	C
Secchi (m)	0.8	0.1	2.0	D
TKN (mg/l)	2.40	1.30	3.70	
			Lake Grade	D

The lake received a lake grade of D, which is consistent with its historical water quality database. Continued monitoring is recommended to continue to build the water quality database for this lake.

Throughout the monitoring period, the volunteer's opinions of 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.

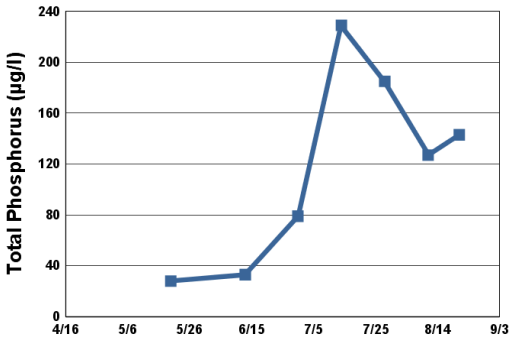
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

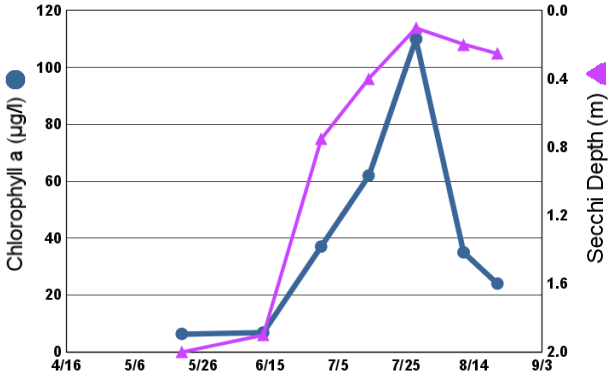
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

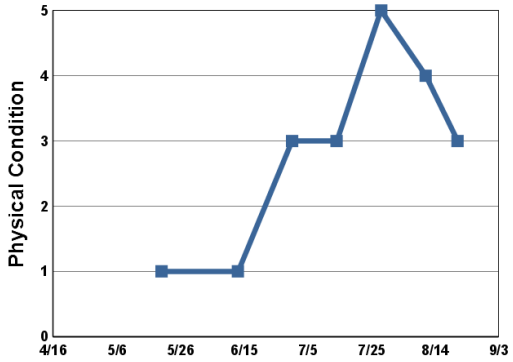


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/20	18.0		6.3	28	2.0	1	1
6/13	19.9		6.8	33	1.9	1	1
6/30	24.8		37	79	0.8	3	2
7/14	27.2		62	229	0.4	3	3
7/28	23.4		110	185	0.1	5	4
8/11	24.4		35	127	0.2	4	4
8/21	27.8		24	143	0.3	3	3







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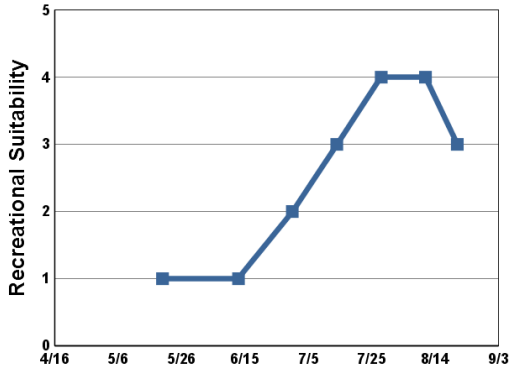

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Lake Water Quality Grades Based on Summertime Averages

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												
CLA												
Secchi												
Lake Grade												

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

Source: Metropolitan Council and STORET data

Rest Area Pond (82–0514) *Valley Branch Watershed District*

Volunteer: 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. Generally the larger the ratio, the greater the potential stress on the pond from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	93	34	206	D
CLA (µg/l)	36	2.6	110	C
Secchi (m)	1.0	0.3	2.5	D
TKN (mg/l)	1.53	0.97	2.70	
			Lake Grade	D

The pond received a lake grade of D, which is consistent with its historical water quality database. The pond has received lake grades ranging from C to F since 2006. Additional years of monitoring are suggested for continuing to build the water quality database for this pond.

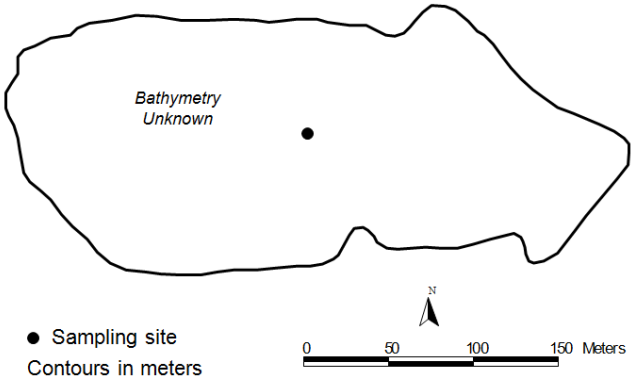
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

Rest Area Pond

West Lakeland Twp., Washington Co.

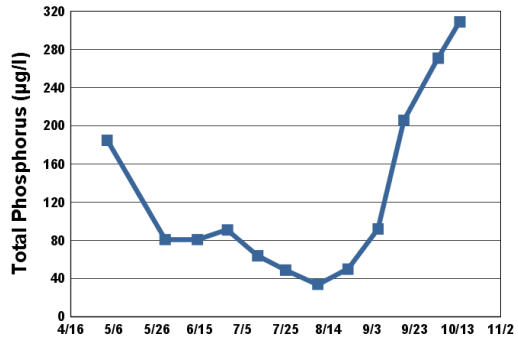
Lake ID: 820514-00

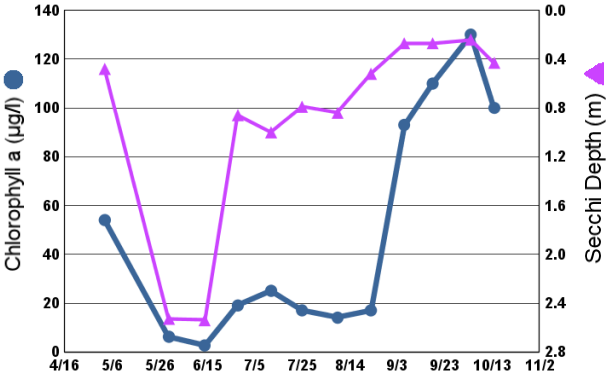


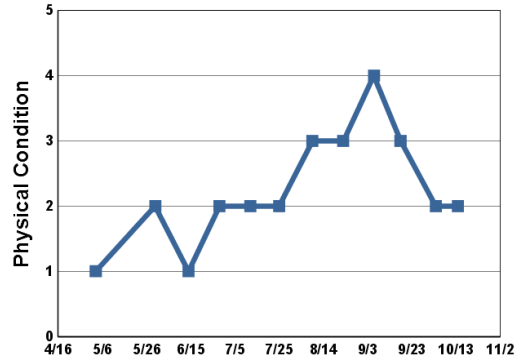
● Sampling site
Contours in meters

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/3	9.4		54	185	0.5	1	4
5/30	18.3		6.2	81	2.5	2	3
6/14	21.7		2.6	81	2.5	1	1
6/28	25.2		19	91	0.9	2	3
7/12	26.4		25	64	1.0	2	3
7/25	25.4		17	49	0.8	2	4
8/9	23.0		14	34	0.8	3	3
8/23	25.1		17	50	0.5	3	4
9/6	23.4		93	92	0.3	4	4
9/18	18.0		110	206	0.3	3	4
10/4	15.9		130	271	0.2	2	4
10/14	13.1		100	309	0.4	2	4







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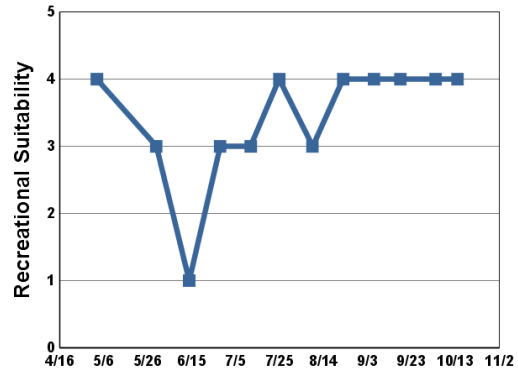

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

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). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC2007). The maximum and mean depths are 15.0 m and 6.6 m, respectively. The MN DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*). The lake is listed on the MPCA's 2012 Impaired Waters List for impairments to aquatic consumption (mercury in fish tissue) and aquatic recreation (excessive nutrients/eutrophication).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	34	14	52	C
CLA (µg/l)	13	1.9	33	B
Secchi (m)	1.3	0.8	2.3	C
TKN (mg/l)	1.29	0.82	1.70	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with most years of monitoring dating back to 1980. The lake appears to be characterized as a C lake grade.

Throughout the monitoring period, the volunteer's opinions of 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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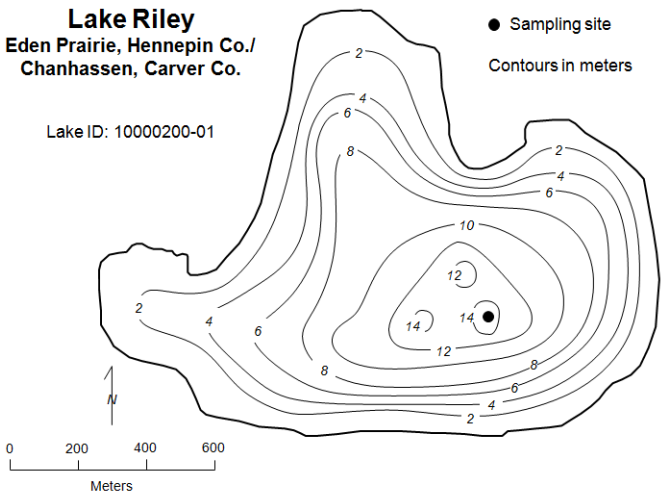
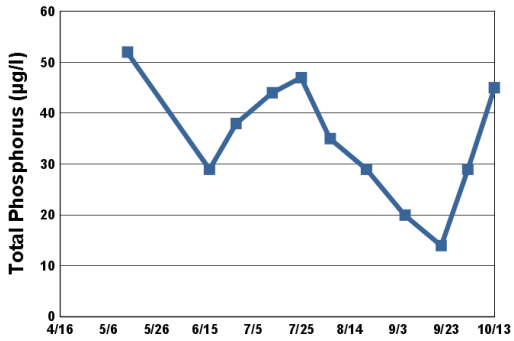
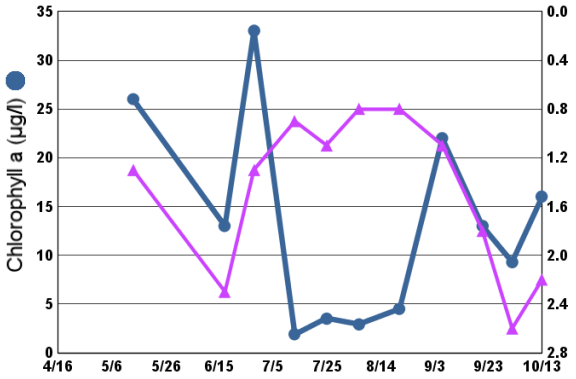
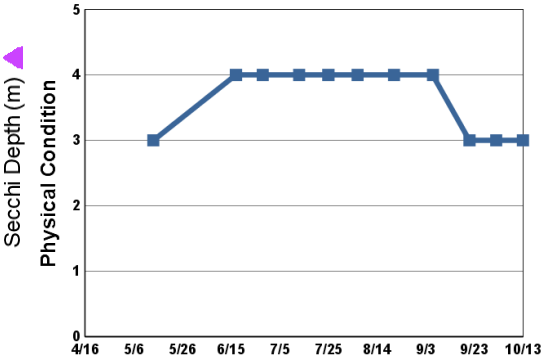


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	11.3		26	52	1.3	3	3
6/17	22.7		13	29	2.3	4	3
6/28	25.1		33	38	1.3	4	3
7/13	25.6		1.9	44	0.9	4	3
7/25	25.6		3.5	47	1.1	4	3
8/6	23.0		2.9	35	0.8	4	3
8/21	25.5		4.5	29	0.8	4	3
9/6	24.8		22	20	1.1	4	3
9/21	19.1		13	14	1.8	3	3
10/2	18.3		9.3	29	2.6	3	3
10/13	16.1		16	45	2.2	3	2







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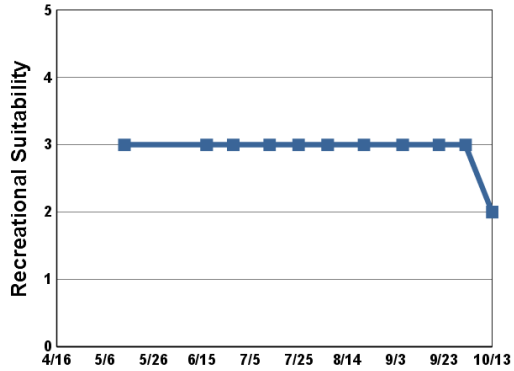

1 = Beautiful
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2 = Minor Aesthetic Problem
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Rogers Lake (19–0080) *City of Mendota Heights*

Volunteer: Doug Hennes

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 area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	18	9	28	A
CLA (µg/l)	5.5	1.5	13	A
Secchi (m)				
TKN (mg/l)	1.00	0.78	1.20	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation rather than by water clarity. There was an insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The CLA grade (A) is consistent with the grades received since 2007. The overall TP concentrations during the year were notably lower in 2013 in comparison to previous years. With aquatic macrophytes significant enough to block views of the Secchi disk and low pelagic algal populations (as given by low CLA concentrations), the primary production of the lake appears to be focused on production of aquatic macrophytes rather than algae. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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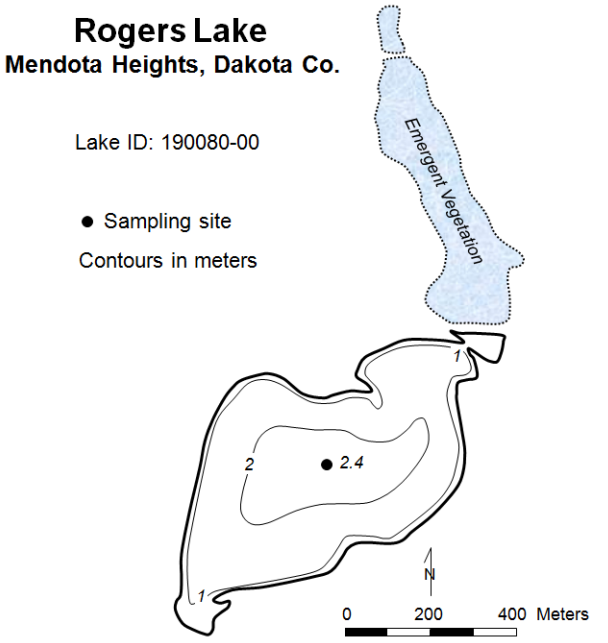
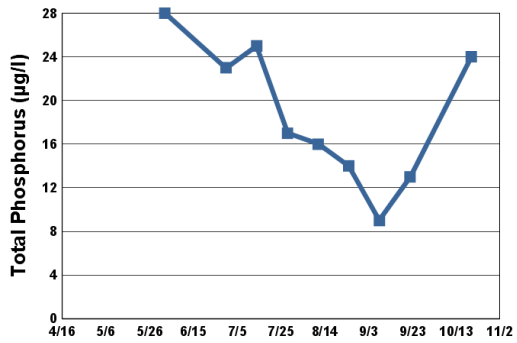
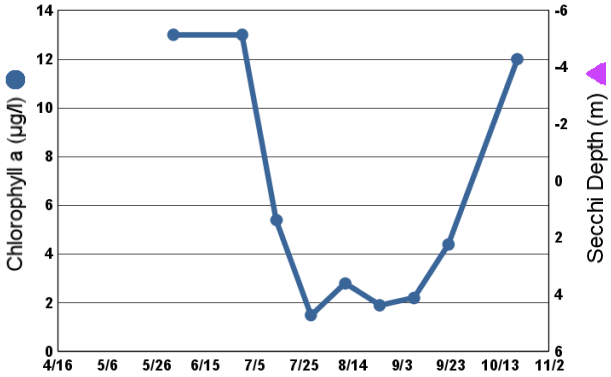
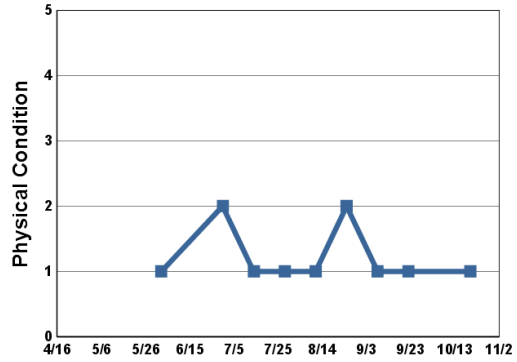


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/2	18.4		13	28		1	1
6/30	26.3		13	23		2	2
7/14	26.8		5.4	25		1	1
7/28	23.4		1.5	17		1	1
8/11	23.6		2.8	16		1	2
8/25	27.7		1.9	14		2	2
9/8	19.8		2.2	9		1	2
9/22	19.4		4.4	13		1	1
10/20	9.4		12	24		1	1







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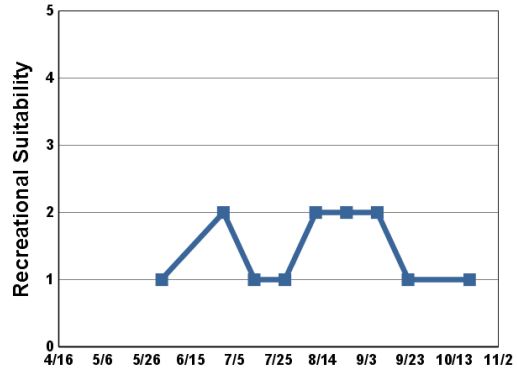


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

Sand Lake (82–0067) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

Sand Lake is located within the City of Scandia (Washington County). The lake has a surface area of 46 acres.

On each sampling day the lake was monitored for Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	1.8	1.2	2.6	C
TKN (mg/l)				
			Lake Grade	

Only Secchi depth transparency, dissolved oxygen, and temperature were measured in 2013. Therefore no lake grade was determined. Water clarity has varied between grades A and C over the past decade.

Throughout the monitoring period, the volunteer's opinions of 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.

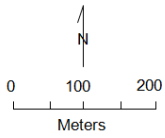
Sand Lake

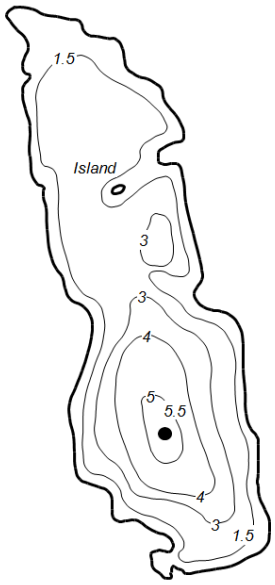
New Scandia Twp., Washington Co.

Lake ID: 820067-00

● Sampling site

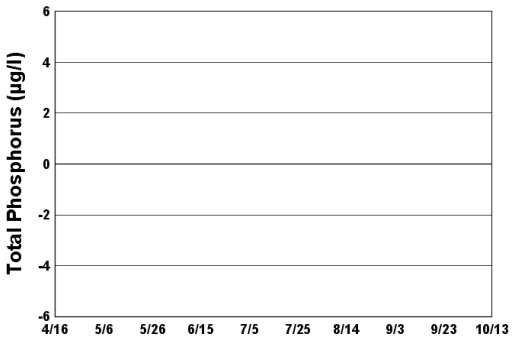
Contours in meters

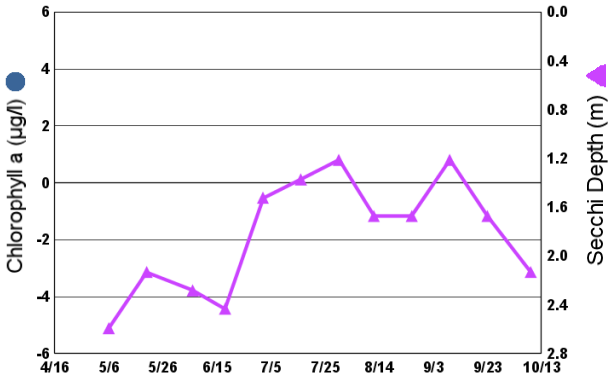


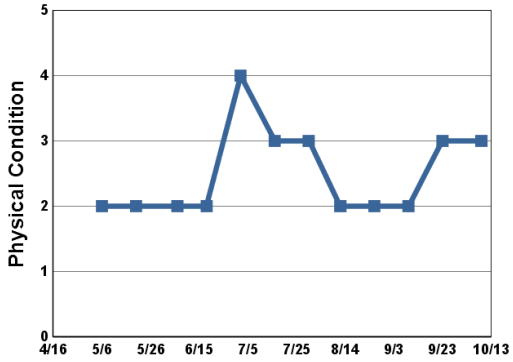


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	12.1				2.6	2	2
5/20	19.3				2.1	2	2
6/6	17.2	7.9			2.3	2	2
6/18	22.4	8.6			2.4	2	2
7/2	26.9				1.5	4	3
7/16					1.4	3	2
7/30	22.4	7.6			1.2	3	3
8/12	24.2				1.7	2	3
8/26	28.0				1.7	2	3
9/9	23.3				1.2	2	3
9/23	18.4				1.7	3	3
10/9	16.0				2.1	3	3







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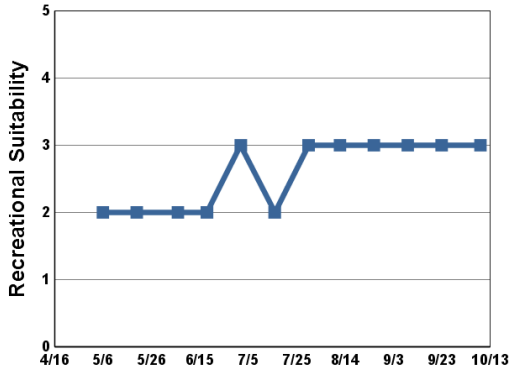

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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 area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

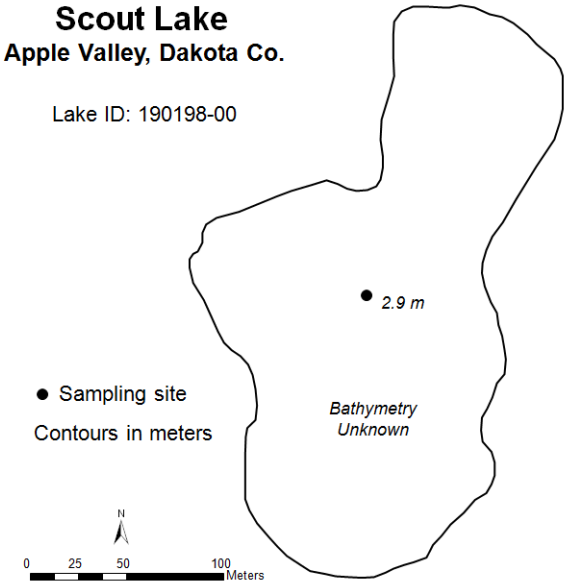
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	62	34	130	C
CLA (µg/l)	45	5.1	140	C
Secchi (m)	1.0	0.4	1.8	D
TKN (mg/l)	2.08	1.30	4.10	
			Lake Grade	C

The lake received a lake grade of C. The lake grades have varied between C and F since CAMP monitoring began in 2007. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

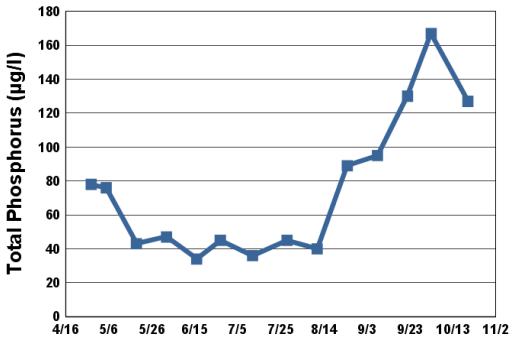
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

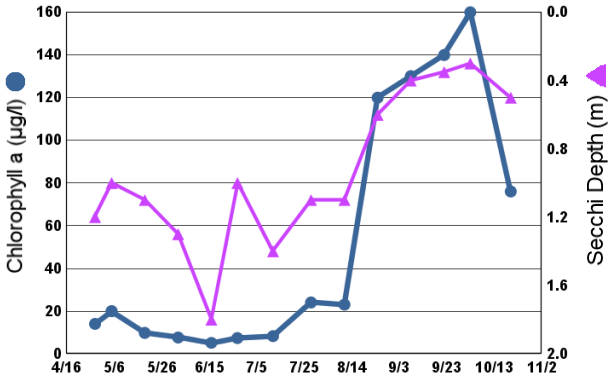
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

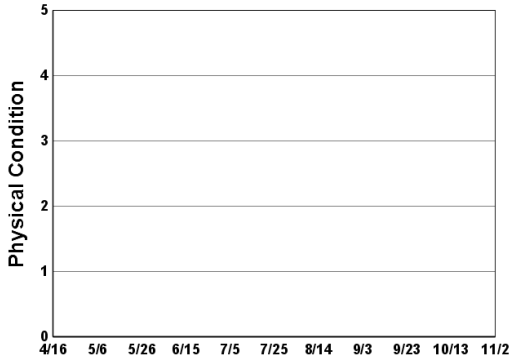


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/28	11.7		14	78	1.2		
5/5	14.1		20	76	1.0		
5/19	20.5		9.7	43	1.1		
6/2	21.0		7.6	47	1.3		
6/16	24.9		5.1	34	1.8		
6/27	28.4		7.3	45	1.0		
7/12	28.1		8.2	36	1.4		
7/28	23.8		24	45	1.1		
8/11	24.4		23	40	1.1		
8/25	30.1		120	89	0.6		
9/8	26.0		130	95	0.4		
9/22	19.3		140	130	0.4		
10/3	18.8		160	167	0.3		
10/20	10.5		76	127	0.5		







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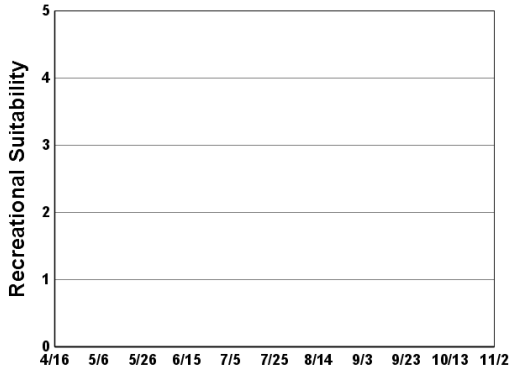

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Shields Lake (82–0162) *Comfort Lake — Forest Lake Watershed District*

Volunteer: Bob Roethke and Washington Conservation District staff

Shields Lake is located in the city of Forest Lake (Washington County). It has a surface area of 27 acres, with 85 percent of the area considered littoral zone, which is the shallow 0 — 15 feet depth zone dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	169	81	358	F
CLA (µg/l)	50	8.9	180	D
Secchi (m)	1.2	0.6	2.4	D
TKN (mg/l)	2.45	1.50	3.20	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is consistent with its historical water quality database. However, CLA concentrations were higher, and Secchi depths were lower in 2013 compared to 2012 as given by the mean, minimum, and maximum values during the summer-time period. The lake received similar water quality in 2005 as it did in 2013.

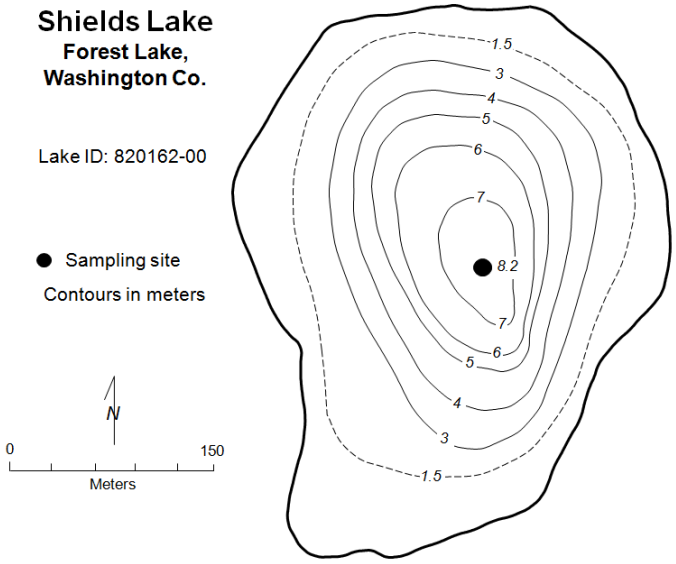
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

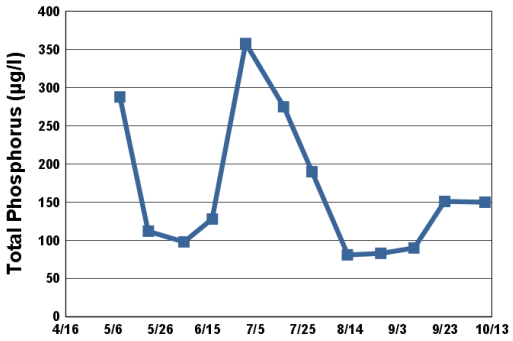
Shields Lake
Forest Lake, Washington Co.

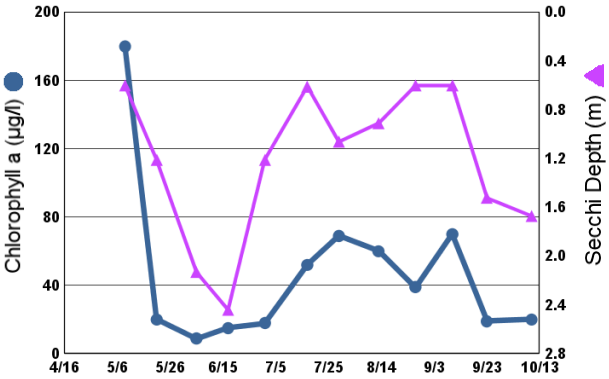
Lake ID: 820162-00

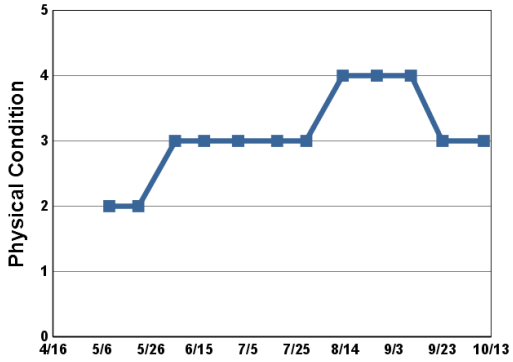


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/9	15.5	20.4	180	288	0.6	2	2
5/21	18.6	9.6	20	112	1.2	2	3
6/5	17.1	7.8	8.9	98	2.1	3	3
6/17	22.3	7.3	15	128	2.4	3	3
7/1	25.3	5.1	18	358	1.2	3	4
7/17	29.3	12.6	52	275	0.6	3	4
7/29	21.2	8.6	69	190	1.1	3	4
8/13	23.8	7.3	60	81	0.9	4	4
8/27	29.5	12.2	39	83	0.6	4	4
9/10	23.9	8.3	70	90	0.6	4	4
9/23	17.3	4.7	19	151	1.5	3	4
10/10	15.2	5.9	20	150	1.7	3	4







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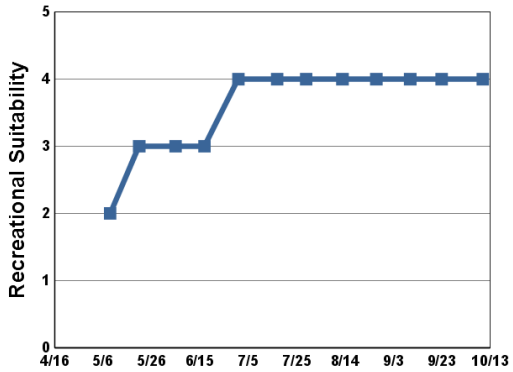

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: Dakota Soil & Water Conservation District staff

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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	25	98	C
CLA (µg/l)	15	4.1	26	B
Secchi (m)	1.5	0.8	2.3	C
TKN (mg/l)	1.08	0.60	1.70	
			Lake Grade	C

The water quality was characterized by a lake grade of C for 2013, which is similar to water quality observed in the early 2000s and 1993. Continued monitoring is suggested to continue to the build the water quality database after a 10 year break.

Throughout the monitoring period, the volunteer's opinions of 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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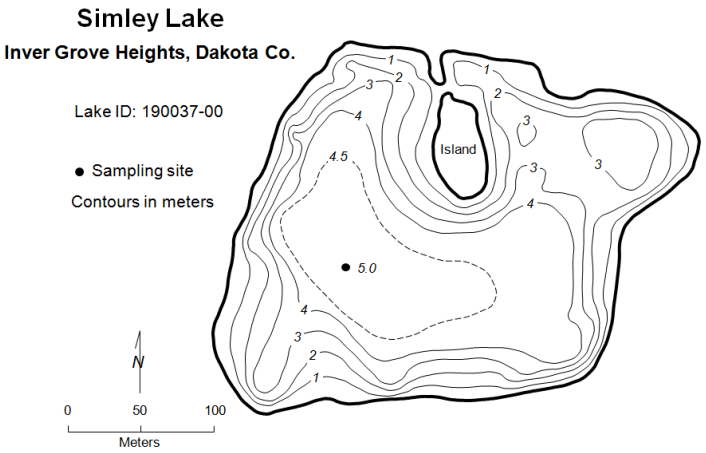
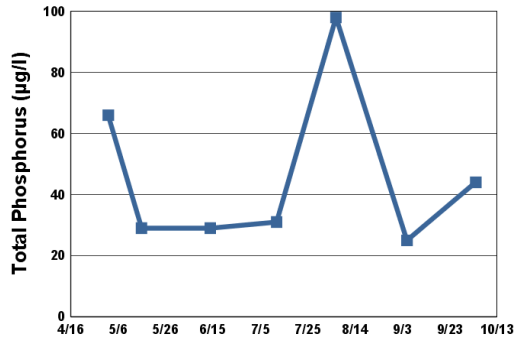
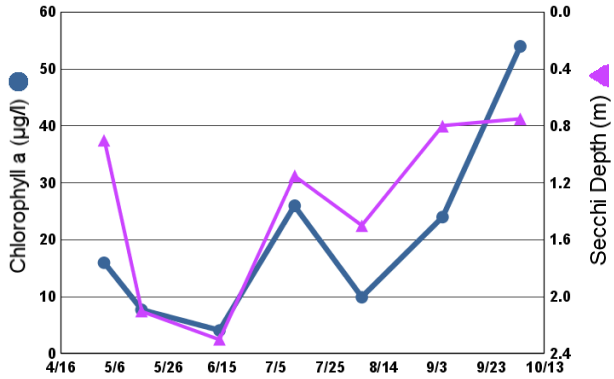
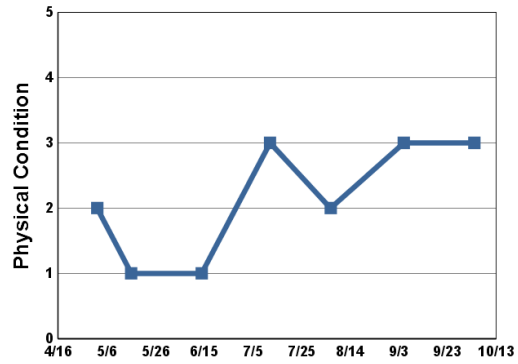


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	9.9		16	66	0.9	2	1
5/16	18.0		7.7	29	2.1	1	1
6/14	21.4		4.1	29	2.3	1	1
7/12	25.7		26	31	1.2	3	1
8/6	21.8		9.9	98	1.5	2	2
9/5	24.1		24	25	0.8	3	2
10/4	16.6		54	44	0.8	3	3







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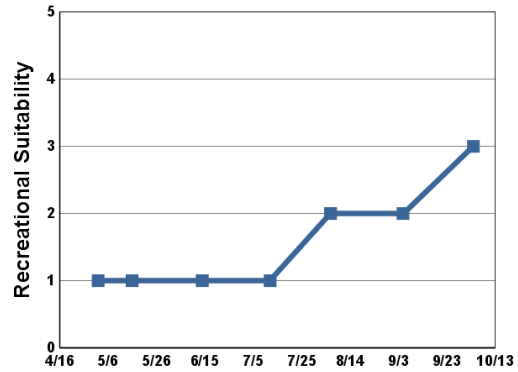

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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

Volunteer: Sean Peine, Adrian Sola, Richard Bonk

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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

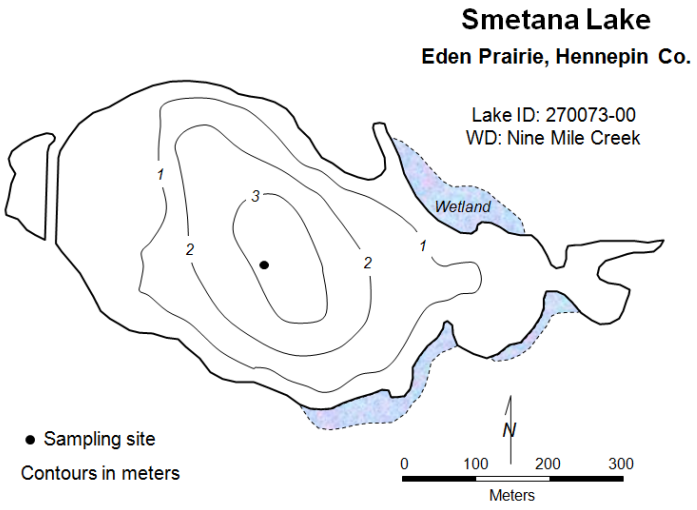
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	21	99	C
CLA (µg/l)	7.0	2.2	17	A
Secchi (m)	2.2	1.3	2.8	C
TKN (mg/l)	0.87	0.55	1.10	
			Lake Grade	B

The lake received a lake grade of B in 2013, which was the first year the lake was part of the CAMP.

Throughout the monitoring period, the volunteer's opinions of 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.

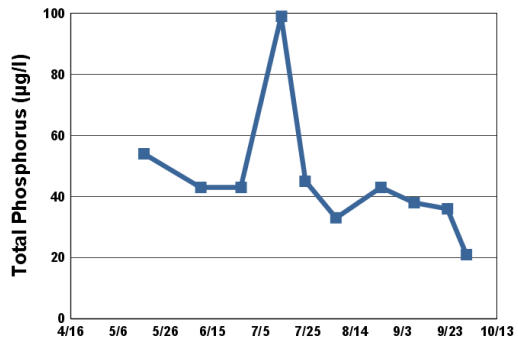
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

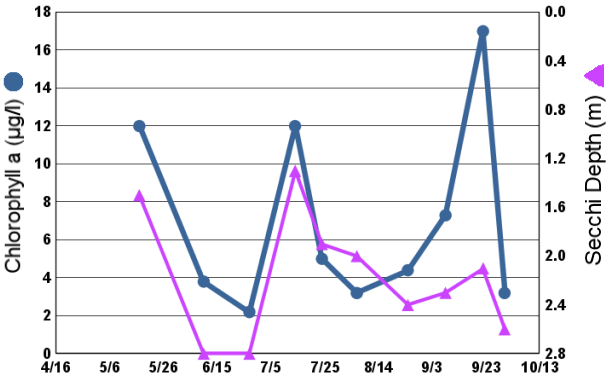
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

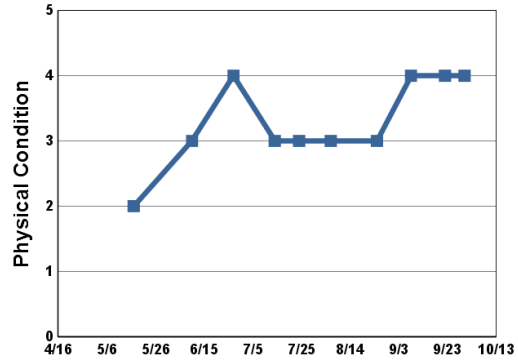


2013 Data

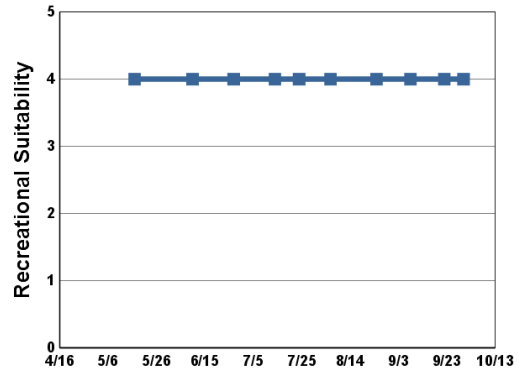
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/17	16.9		12	54	1.5	2	4
6/10	17.7		3.8	43	2.8	3	4
6/27	26.9		2.2	43	2.8	4	4
7/14	25.7		12	99	1.3	3	4
7/24	26.3		5.0	45	1.9	3	4
8/6	23.6		3.2	33	2.0	3	4
8/25	25.4		4.4	43	2.4	3	4
9/8	23.5		7.3	38	2.3	4	4
9/22	21.3		17	36	2.1	4	4
9/30	17.6		3.2	21	2.6	4	4







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



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

Lake Water Quality Grades Based on Summertime Averages

Year	2013
TP	C
CLA	A
Secchi	C
Lake Grade	**B**

Source: Metropolitan Council and STORET data

South Oak Lake (27-0661) *City of St. Louis Park*

Volunteer: Nancy Ebner

South Oak is a small shallow lake located within City of St. Louis Park (Hennepin County). There are few known morphological data available for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	87	20	164	D
CLA (µg/l)	42	6.6	81	C
Secchi (m)	0.7	0.4	0.9	F
TKN (mg/l)	1.36	0.68	2.00	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is consistent with its historical water quality database. The lake grades have varied in the C to F range over time.

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

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

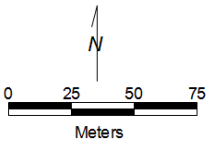
South Oak Lake

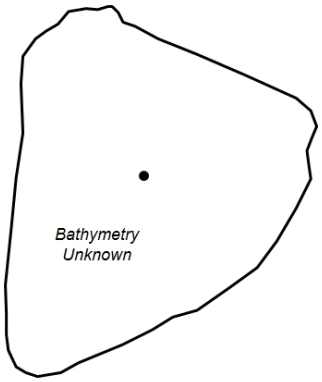
St. Louis Park, Hennepin Co.

Lake ID: 270661-00

● Sampling site

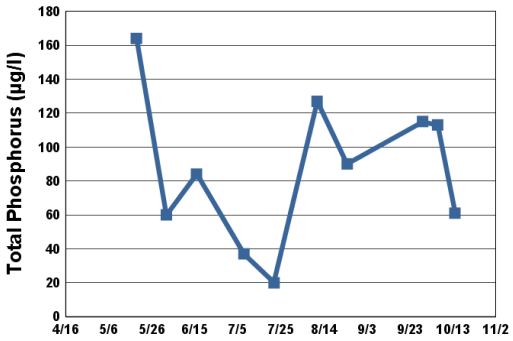
Contours in meters

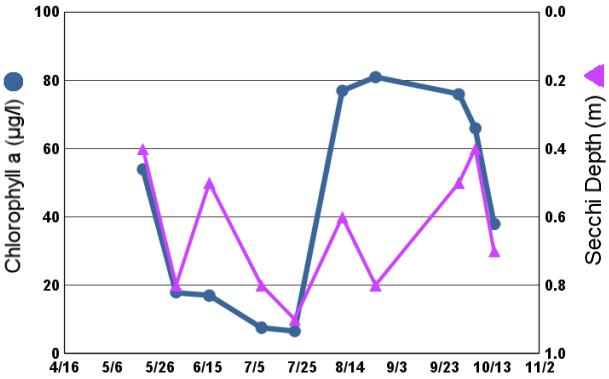


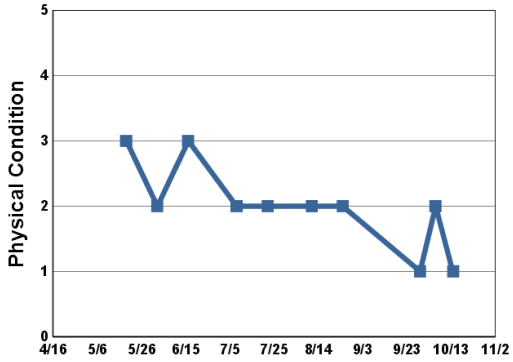


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/19	19.9		54	164	0.4	3	4
6/2	20.6		18	60	0.8	2	4
6/16	23.8		17	84	0.5	3	4
7/8	30.3		7.6	37	0.8	2	5
7/22	26.8		6.6	20	0.9	2	5
8/11	24.6		77	127	0.6	2	5
8/25	26.6		81	90	0.8	2	5
9/29	18.4		76	115	0.5	1	5
10/6	13.8		66	113	0.4	2	5
10/14	12.3		38	61	0.7	1	5







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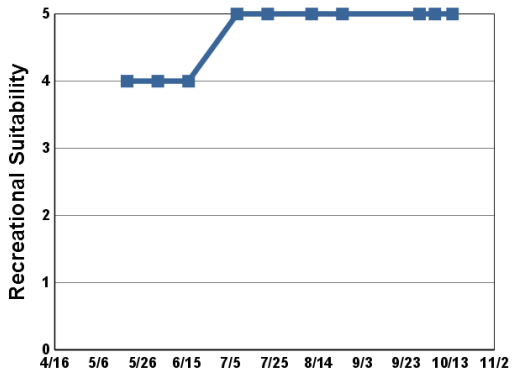


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

South School Section Lake (82–0151) *Browns Creek Watershed District*

Volunteer: 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).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	15	94	C
CLA (µg/l)	39	2.2	130	C
Secchi (m)	1.6	0.5	4.0	C
TKN (mg/l)	1.21	0.72	1.90	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical water quality database. The lake has typically received C lake grades with the occasional B grade.

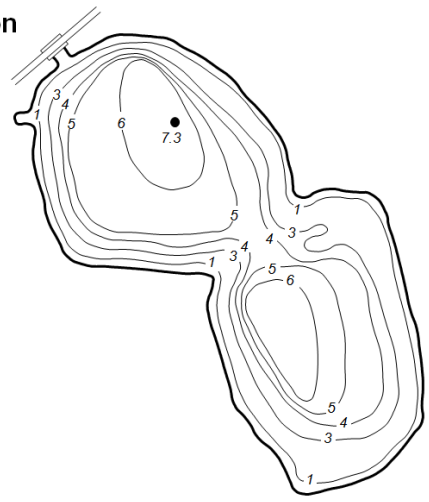
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

South School Section Lake,
Hugo, Washington Co.

Lake ID: 820151-00

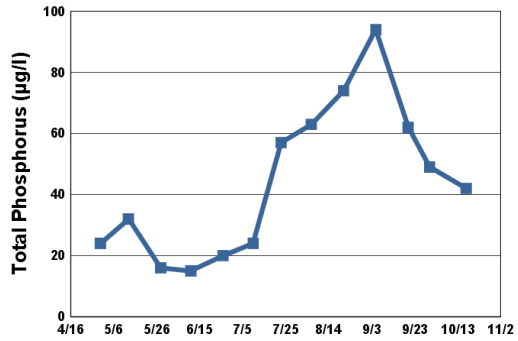


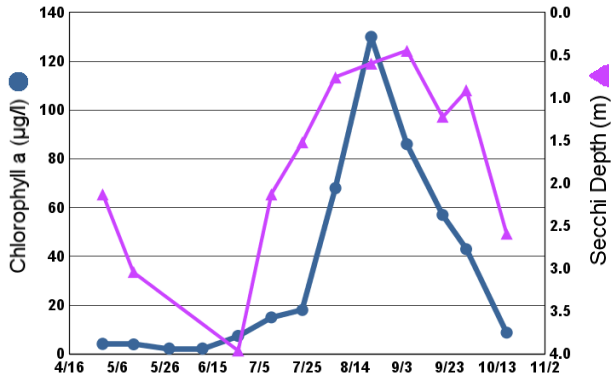
● Sampling site

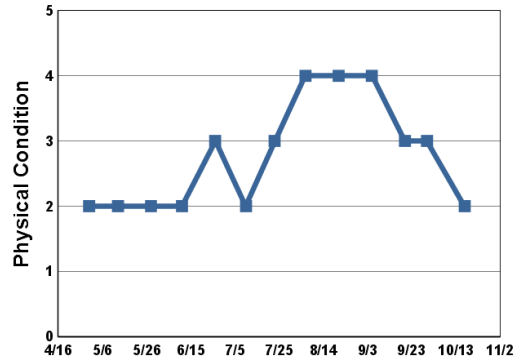
Contours in meters

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	6.1	9.5	4.1	24	2.1	2	2
5/13	10.9	10.3	3.9	32	3.0	2	2
5/28	15.5	8.4	2.2	16		2	2
6/11	20.2	8.9	2.2	15		2	2
6/26	26.2	8.3	7.4	20	4.0	3	3
7/10	25.5	7.5	15	24	2.1	2	3
7/23	26.0	6.9	18	57	1.5	3	3
8/6	22.8	11.8	68	63	0.8	4	4
8/21	25.7	9.3	130	74	0.6	4	4
9/5	23.9	9.1	86	94	0.5	4	4
9/20	18.9	7.5	57	62	1.2	3	4
9/30	17.4	7.0	43	49	0.9	3	4
10/17	12.7	5.9	8.7	42	2.6	2	2







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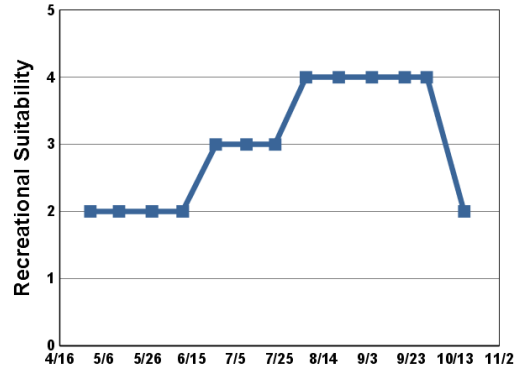

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Lake Water Quality Grades Based on Summertime Averages

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				C	C		C					
Secchi				C	C		C					
Lake Grade				**C**	**C**		**C**					

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

Source: Metropolitan Council and STORET data

Spring Lake (70–0054) *Prior Lake — Spring Lake Watershed District*

Volunteer: Jim Weninger

Spring Lake is located in Spring Lake Township (Scott County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake has a surface area of 630 acres. The maximum and mean depths of the lake are 11.3 and 5.6 m (37 and 18 feet), respectively.

In an attempt to improve the lake's water quality, a ferric chloride ($FeCl_3$) addition system was constructed at the outlet of the Highway 13 wetland in 1998. Continuous operation started in 1999. The system was designed to enhance phosphorus (P) removal from the discharge of the wetland prior to entering the lake. The system consists of a dosing station at the outlet of the wetland, followed by a settling basin. The dosing station meters $FeCl_3$ into the wetland outlet. The $FeCl_3$ dissassociates into free iron (Fe) where it combines with P to form an insoluble Fe-P complex called floc. The desiltation basin then provides an area where the floc can settle out and be removed. The watershed district continues to monitor the effectiveness of the system.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	151	78	296	D
CLA (µg/l)	61	9.3	130	D
Secchi (m)	0.9	0.4	1.9	D
TKN (mg/l)	2.17	1.40	4.30	
			Lake Grade	D

The lake received a lake grade of D in 2013. The lake grades have varied from Cs to Ds since 1980. Continued monitoring is suggested to provide water quality data for supporting the PLSLWD's efforts in managing Spring Lake.

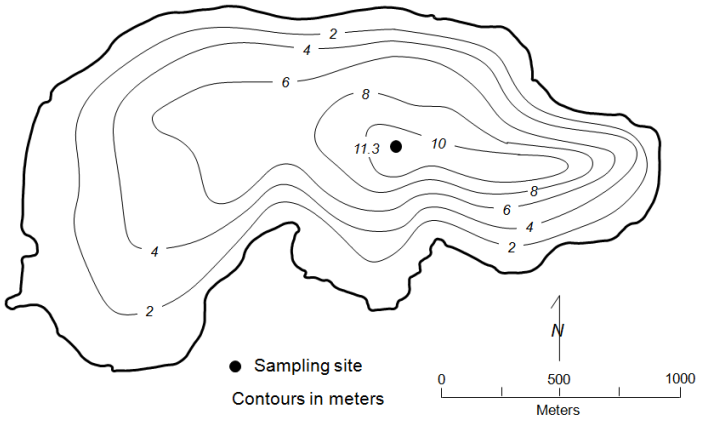
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

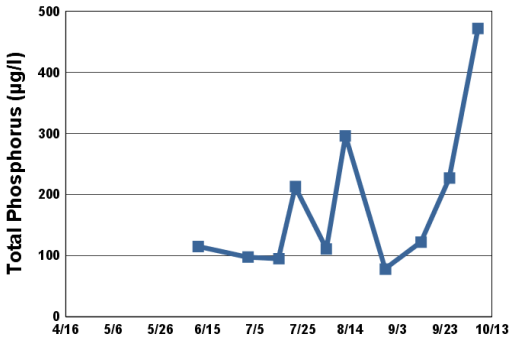
Spring Lake

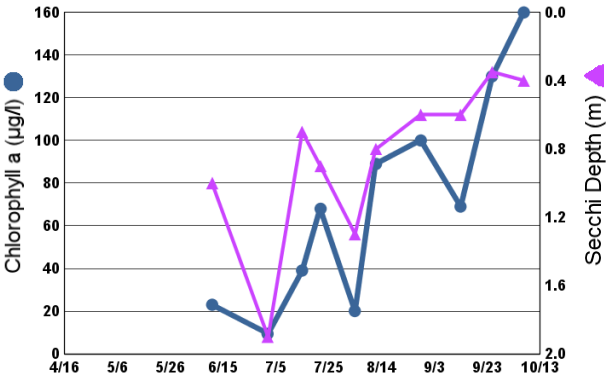
Prior Lake/Spring Lake Twp., Scott Co. Lake ID: 700054-00

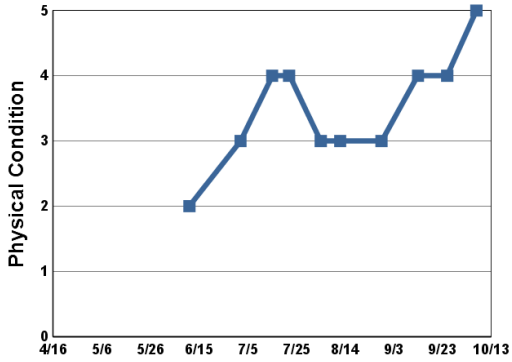


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/11	24.2		23	115	1.0	2	2
7/2	25.8		9.3	98	1.9	3	2
7/15	29.0		39	95	0.7	4	4
7/22	28.0		68	213	0.9	4	3
8/4	22.9		20	111	1.3	3	2
8/12	24.8		89	296	0.8	3	3
8/29	28.0		100	78	0.6	3	3
9/13	24.5		69	122	0.6	4	3
9/25	18.7		130	227	0.4	4	3
10/7	14.0		160	472	0.4	5	3







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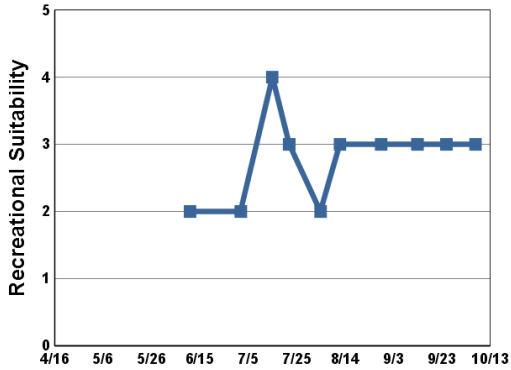

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Square Lake (82-0046) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Dr. Leif Hembre

Square Lake is located in May Township (Washington County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value and exceptional water clarity (METC 2007).The lake has a surface area of 193 acres, and a maximum and mean depth of 20.7 and 9.0 m, respectively. The lake has a trout fishery (MDNR 1996).

The lake is managed as a trout fishery, and it has been stocked regularly with rainbow trout by the Mn DNR. 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 lake was last stocked with rainbow trout in the spring of 2012. The study will continue through 2015 along with the stocking moratorium. The study is being led by the Carnelian — Marine — St. Croix Watershed District in collaboration with the Mn DNR and Hamline University.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	6	4	10	A
CLA (µg/l)	2.6	1.0	9.8	A
Secchi (m)	5.5	4.8	8.1	A
TKN (mg/l)	0.43	0.33	0.78	
			Lake Grade	A

The lake continues to receive A lake grades. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends for this outstanding water resource.

Throughout the monitoring period, the volunteer's opinions of 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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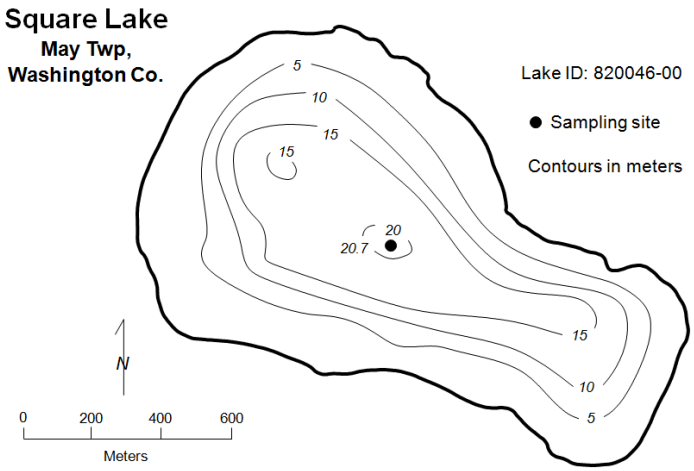
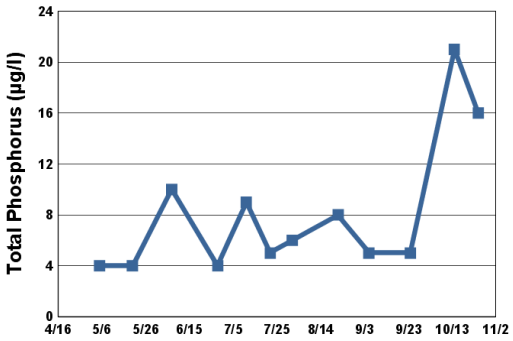
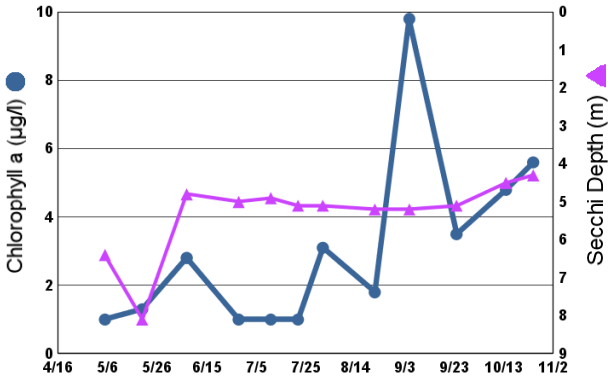
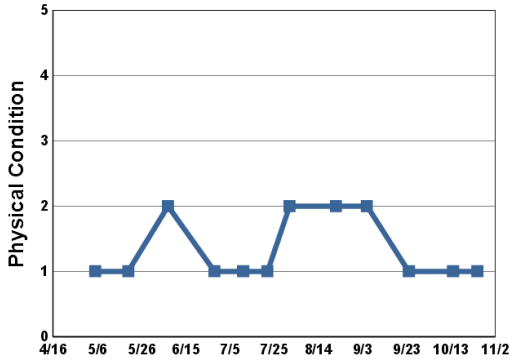


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	6.9		1.0	4	6.4	1	1
5/20	16.3		1.3	4	8.1	1	1
6/7	17.0		2.8	10	4.8	2	1
6/28	24.7		1.0	4	5.0	1	1
7/11			1.0	9	4.9	1	1
7/22	26.5		1.0	5	5.1	1	1
8/1	22.6		3.1	6	5.1	2	1
8/22	25.0		1.8	8	5.2	2	2
9/5	24.3		9.8	5	5.2	2	2
9/24			3.5	5	5.1	1	1
10/14	15.5		4.8	21	4.5	1	1
10/25	10.2		5.6	16	4.3	1	1







1 = Crystal Clear
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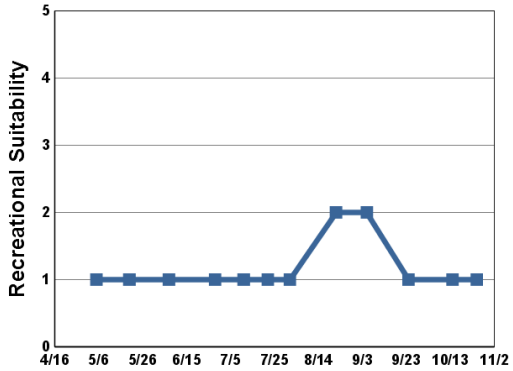

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

St. Croix Lake [whole lake] (82–0001) *St. Croix Basin Planning Team*

Lake St. Croix is divided into four distinct pools: Bayport Pool, Troy Beach Pool, Black Bass Pool, and Kinnickinnic Pool. There were 7 monitoring sites amongst the four pools in 2013. The results will be discussed for the entire lake, as well as individually for each of the sites.

Lake St. Croix (approximately 8,600 acres) is considered by the MDNR to extend from Stillwater, Minnesota to Prescott, Wisconsin, a distance of approximately 23 miles. Morphometry information for each of the pools is given in the following table.

Morphometry Information

Pool Name	Length (miles)	Area (ac)	Volume (ac-ft)	Mean Depth range (dry vs. wet years) (meters)
Bayport Pool	6.0	2,800	62,500	6.2 — 7.3
Troy Beach Pool	6.0	3,100	107,800	9.9 — 11.0
Black Bass Pool	7.0	1,300	59,600	12.9 — 14.0
Kinnickinnic Pool	5.0	1,400	46,274	9.2 — 10.3

The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*) and zebra mussels (*Dreissena spp.*)

The year 2013 was the ninth year in which any of the sites on Lake St. Croix were part of the CAMP. Prior to 2005, a citizen-monitoring program conducted by the St. Croix Basin Planning team produced water quality data for the following sites during the 1999–2002 period: Bayport Pool-site 2; Troy Beach Pool-site 3; Troy Beach Pool-site 5; and Black Bass Pool-site 6. Kinnickkinnic Pool-site 7 was monitored in 2000–2001.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The monitoring data are summarized in tables and figures on the following pages for each lake site. The following table shows the summer data summarized with respect to the whole lake.

2013 summer (May — September) Data Summary (whole lake)

Parameter	Mean	Mininum	Maximum	Grade
TP (µg/L)	45	20	79	C
CLA (µg/L)	18	4.7	68	B
Secchi (m)	1.4	0.8	2.2	C
TKN (mg/L)	0.86	0.50	1.40	
			Lake Grade	C

The whole lake received a lake grade of C for 2013, which is consistent with the lake's historical water quality database.

Lake Water Quality Grades Based on Summer-time Means

Year	1998	1999	2000	2001	2002	2003	2004	2005
TP		D	D	C	C			C
CLA		B	C	C	C			B
Secchi		C	C	C	C			C
Lake Grade		**C**	**C**	**C**	**C**			**C**

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

Source: Metropolitan Council and STORET

Throughout the monitoring period, the volunteers' opinions of the lake sites' physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following pages.

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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St. Croix Lake [Bayport Pool - Site 1N] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Jim and Roberta Harper

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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	25	78	C
CLA (µg/l)	19	10	31	B
Secchi (m)	1.3	1.0	1.8	C
TKN (mg/l)	0.86	0.59	1.10	
			Lake Grade	C

This lake site received a lake grade of C for 2011. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

Throughout the monitoring period, the volunteer's opinions of 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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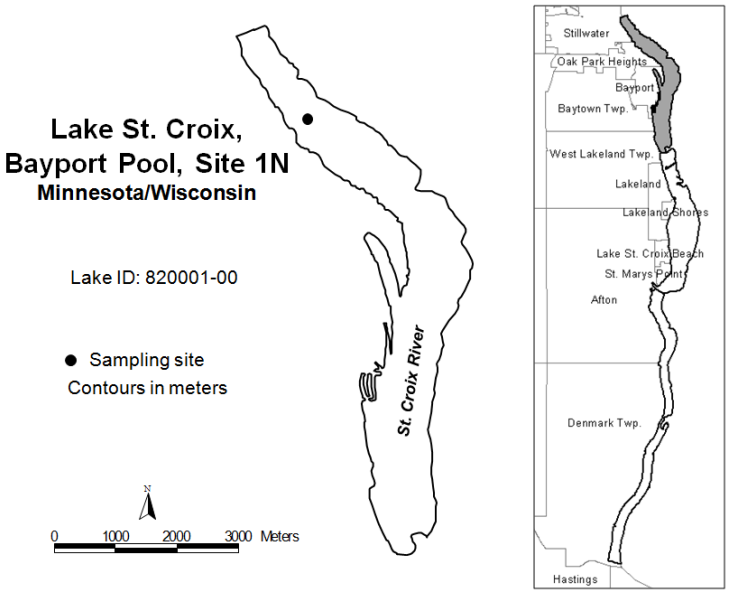
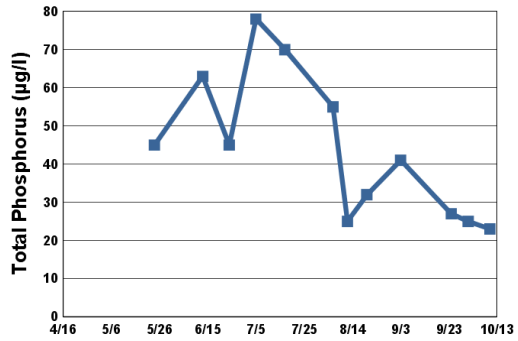
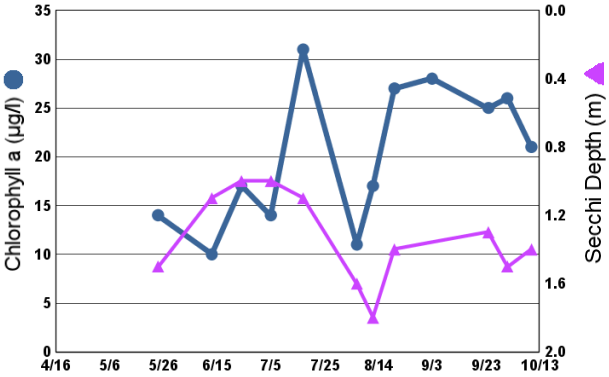
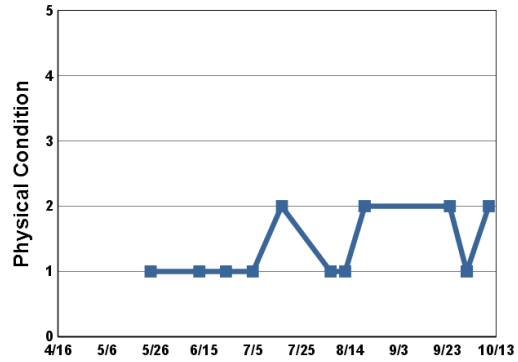


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	15.2		14	45	1.5	1	
6/13	18.6		10	63	1.1	1	1
6/24	24.2		17	45	1.0	1	1
7/5	24.9		14	78	1.0	1	1
7/17	28.6		31	70	1.1	2	1
8/6	23.7		11	55	1.6	1	1
8/12	23.8		17	25	1.8	1	1
8/20	25.9		27	32	1.4	2	1
9/3			28	41			
9/24	19.8		25	27	1.3	2	1
10/1	19.8		26	25	1.5	1	1
10/10	17.5		21	23	1.4	2	2







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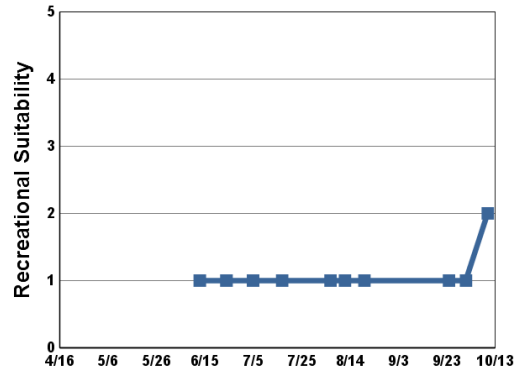

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Bayport Pool-Site 2] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Jim and Roberta Harper

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	30	71	C
CLA (µg/l)	16	8.6	24	B
Secchi (m)	1.2	0.8	1.4	D
TKN (mg/l)	0.80	0.59	1.20	
			Lake Grade	C

The pool received a lake grade of C for 2013, which is similar to lake grades received in the past. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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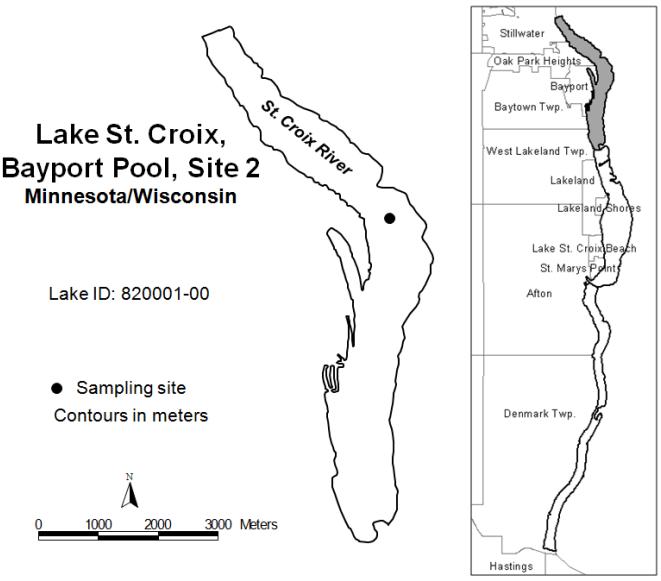
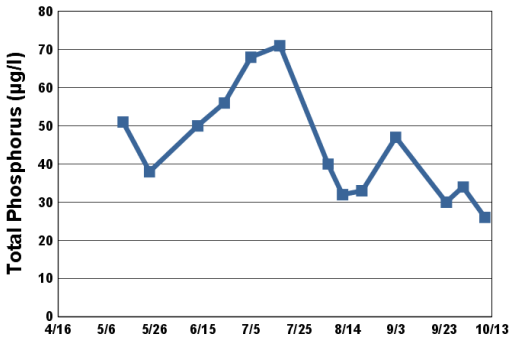
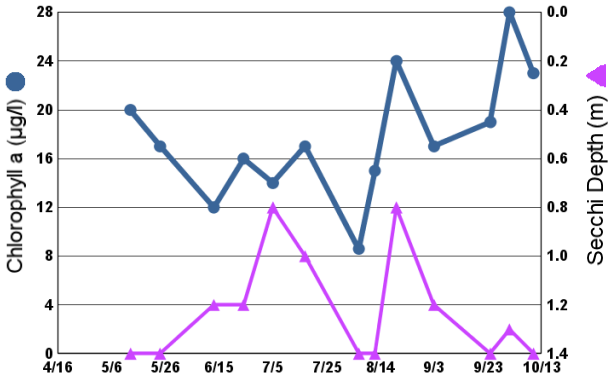
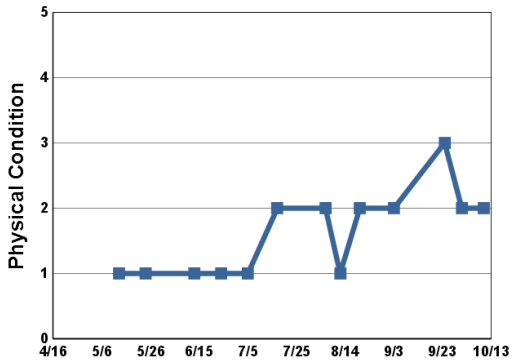


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	12.7		20	51	1.4	1	1
5/24	16.5		17	38	1.4	1	1
6/13	19.5		12	50	1.2	1	1
6/24	25.3		16	56	1.2	1	1
7/5	25.3		14	68	0.8	1	1
7/17	29.6		17	71	1.0	2	1
8/6	26.4		8.6	40	1.4	2	1
8/12	26.7		15	32	1.4	1	1
8/20	28.0		24	33	0.8	2	2
9/3	27.5		17	47	1.2	2	1
9/24	24.2		19	30	1.4	3	2
10/1	22.1		28	34	1.3	2	1
10/10	20.4		23	26	1.4	2	2







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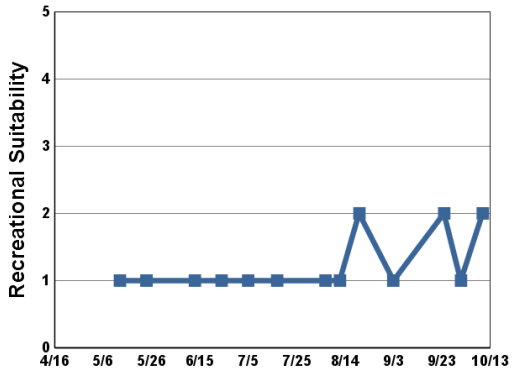

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Troy Beach Pool-Site 3] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Cecilia and Harry Martin

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	40	26	61	C
CLA (µg/l)	14	8.0	32	B
Secchi (m)	1.4	1.0	2.2	C
TKN (mg/l)	0.74	0.50	0.99	
			Lake Grade	C

The site received a lake grade of C for 2011, which is consistent with its historical database. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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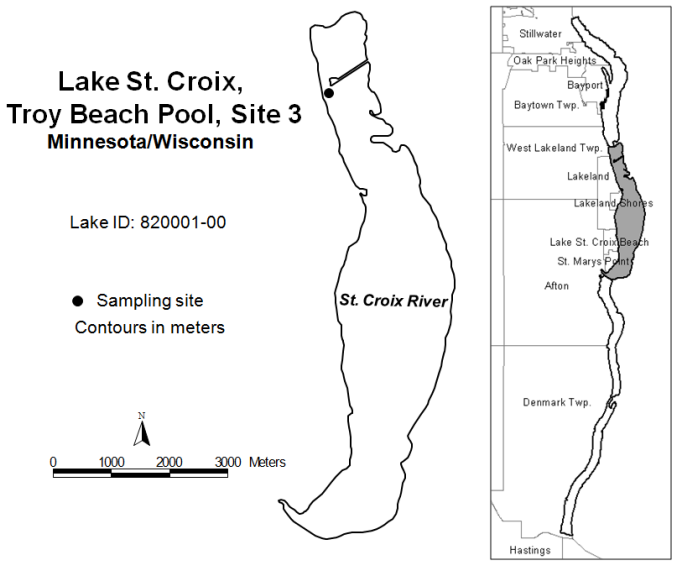
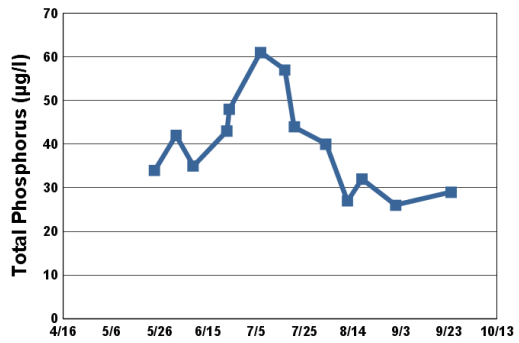
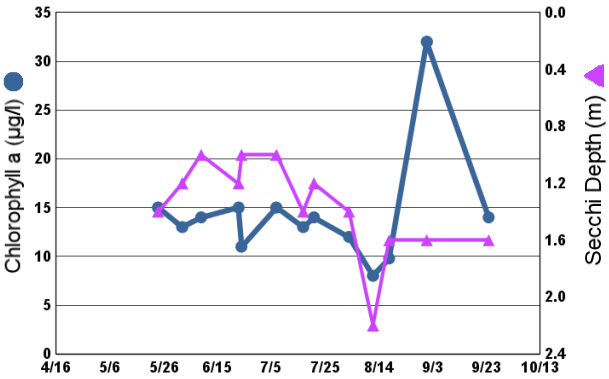
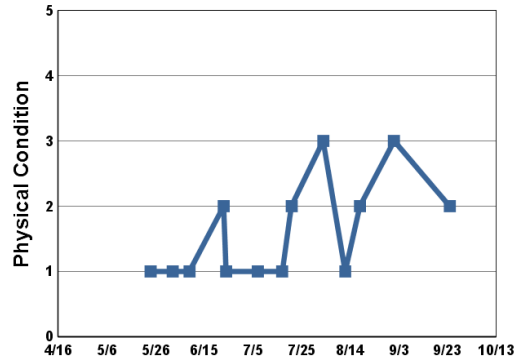


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	16.6		15	34	1.4	1	1
6/2	18.7		13	42	1.2	1	1
6/9	16.7		14	35	1.0	1	1
6/23	22.6		15	43	1.2	2	2
6/24	23.7		11	48	1.0	1	1
7/7	24.9		15	61	1.0	1	2
7/17	27.4		13	57	1.4	1	1
7/21	28.1		14	44	1.2	2	1
8/3	23.4		12	40	1.4	3	2
8/12	23.6		8.0	27	2.2	1	1
8/18	23.7		9.8	32	1.6	2	3
9/1	26.6		32	26	1.6	3	3
9/24	19.4		14	29	1.6	2	1







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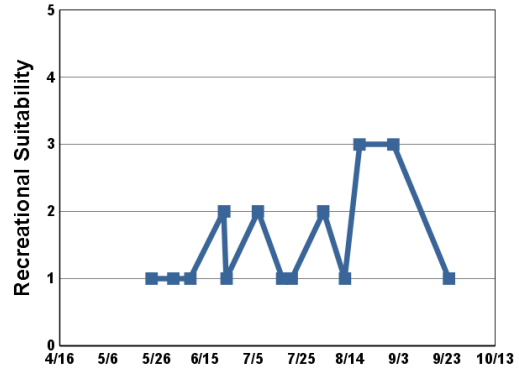

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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Troy Beach Pool-Site 4] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Jim and Roberta Harper

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

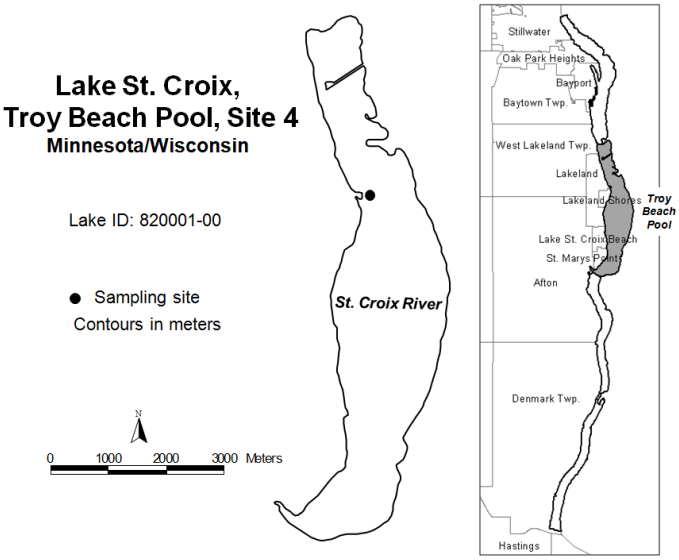
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	48	23	65	C
CLA (µg/l)	25	10	68	C
Secchi (m)	1.5	1.0	2.0	C
TKN (mg/l)	0.87	0.73	1.20	
			Lake Grade	C

The site received a lake grade of C, which is consistent with its historical water quality database. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

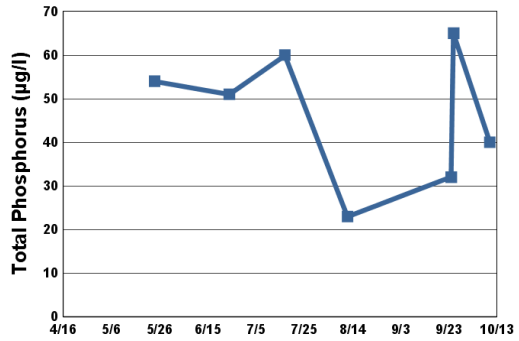
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

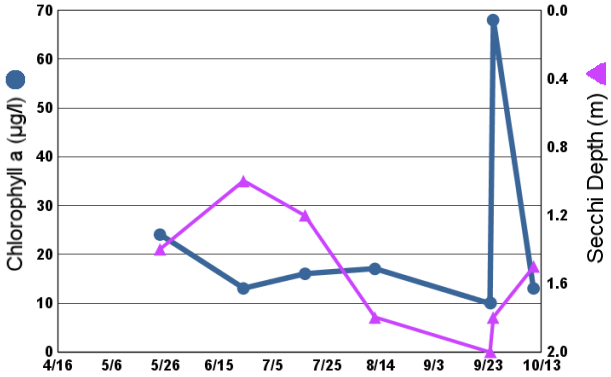
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

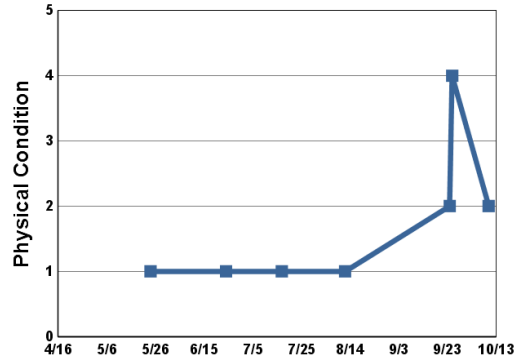


2013 Data

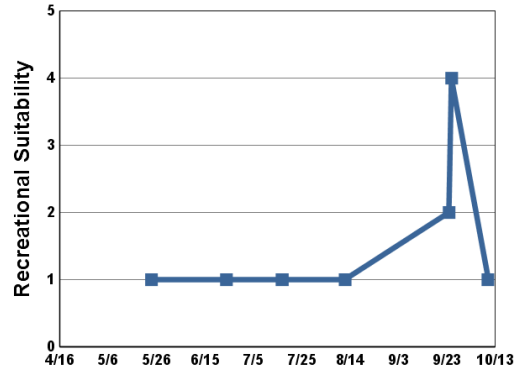
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	17.5		24	54	1.4	1	1
6/24	24.0		13	51	1.0	1	1
7/17	28.3		16	60	1.2	1	1
8/12	24.0		17	23	1.8	1	1
9/24	21.0		10	32	2.0	2	2
9/25	20.1		68	65	1.8	4	4
10/10	17.7		13	40	1.5	2	1







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

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Troy Beach Pool-Site 5] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Jim and Roberta Harper

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

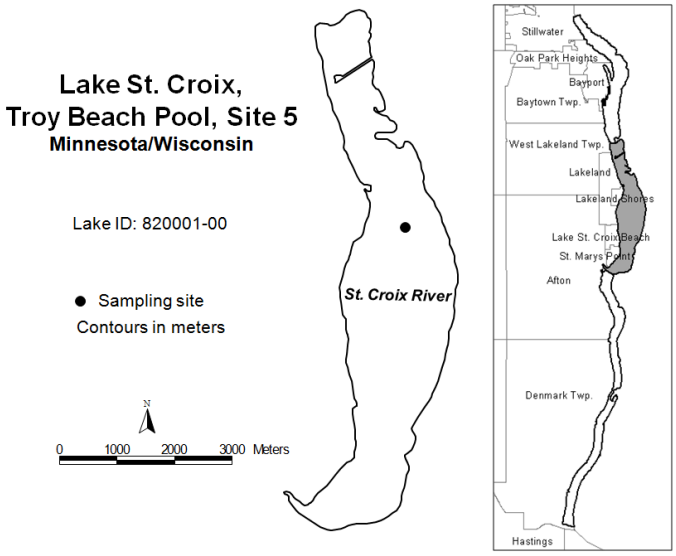
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	38	20	51	C
CLA (µg/l)	12	4.7	24	B
Secchi (m)	1.6	1.4	1.9	C
TKN (mg/l)	0.83	0.74	1.00	
			Lake Grade	C

The site received a lake grade of C, which is consistent with its historical water quality database. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

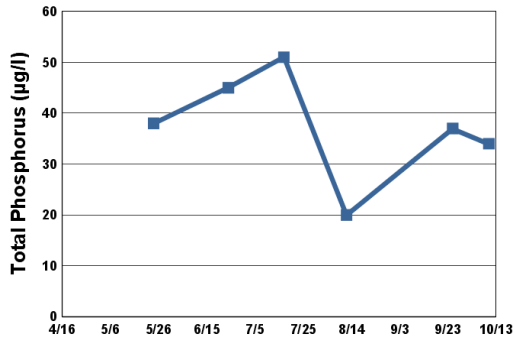
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

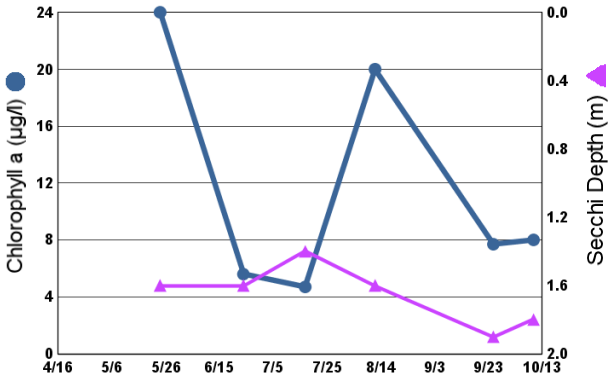
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

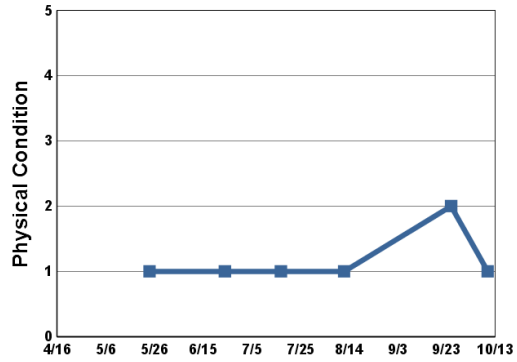


2013 Data

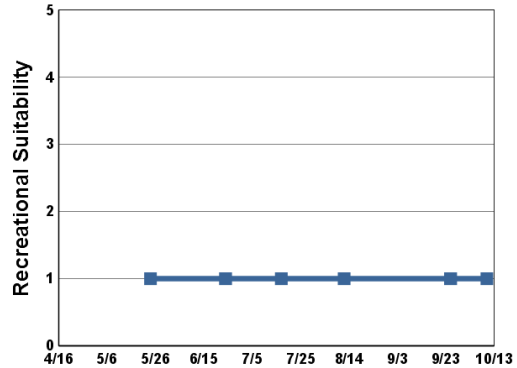
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	17.6		24	38	1.6	1	1
6/24	24.3		5.6	45	1.6	1	1
7/17	28.1		4.7	51	1.4	1	1
8/12	23.8		20	20	1.6	1	1
9/25	20.1		7.7	37	1.9	2	1
10/10	17.8		8.0	34	1.8	1	1







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Black Bass Pool-Site 6] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Rick Meierotto

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	44	24	79	C
CLA (µg/l)	19	5.0	52	B
Secchi (m)	1.5	1.1	1.9	C
TKN (mg/l)	0.95	0.69	1.40	
			Lake Grade	C

The site received a lake grade of C, which is consistent with its historical water quality database. Further monitoring is suggested to continue to build the water quality database for increasing power to detect potential water quality trends.

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

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

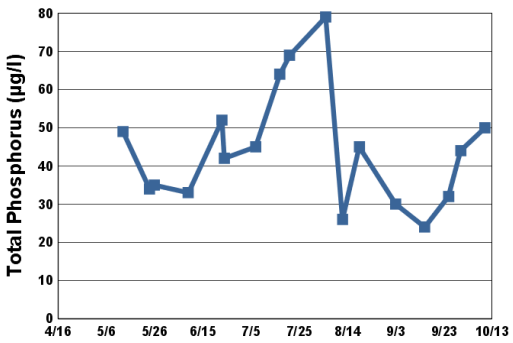
Lake St. Croix,
Black Bass Pool, Site 6
Minnesota/Wisconsin

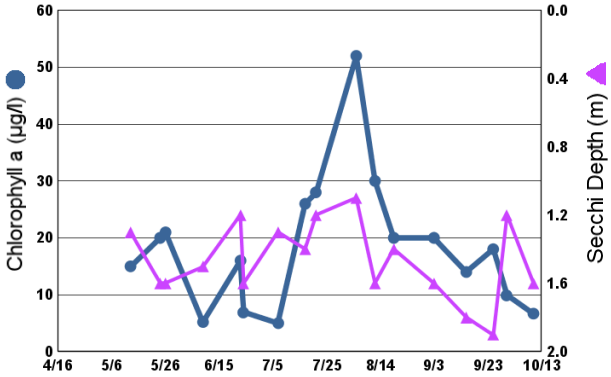
Lake ID: 820001-00

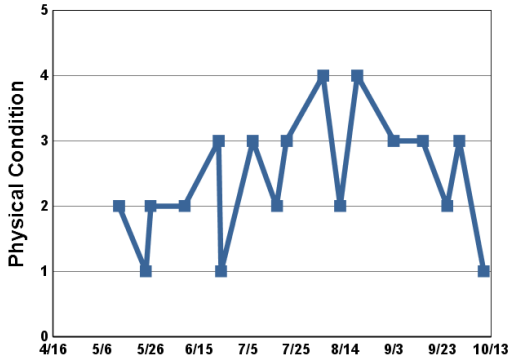
● Sampling site
Contours in meters

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	11.2		15	49	1.3	2	2
5/24	17.3		20	34	1.6	1	1
5/26	16.2		21	35	1.6	2	2
6/9	17.7		5.2	33	1.5	2	2
6/23	23.3		16	52	1.2	3	3
6/24	23.0		6.9	42	1.6	1	1
7/7	25.9		5.0	45	1.3	3	3
7/17	28.2		26	64	1.4	2	1
7/21	27.7		28	69	1.2	3	3
8/5	23.4		52	79	1.1	4	4
8/12	24.2		30	26	1.6	2	1
8/19	23.1		20	45	1.4	4	3
9/3	25.6		20	30	1.6	3	4
9/15	22.1		14	24	1.8	3	3
9/25	20.6		18	32	1.9	2	2
9/30	20.5		9.9	44	1.2	3	3
10/10	18.1		6.7	50	1.6	1	1







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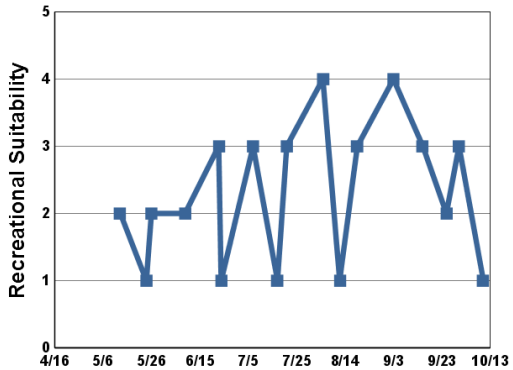
4 = High Algal Color
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

St. Croix Lake [Kinnickinnic Pool-Site–7] (82–0001) *St. Croix Basin Planning Team*

Volunteer: Carpenter Nature Center (volunteer coordinator: Mayme Johnson)

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

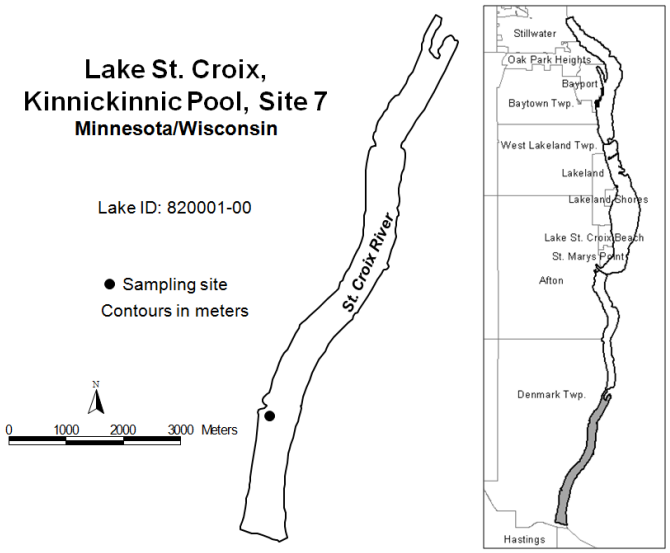
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	49	20	73	C
CLA (µg/l)	21	6.8	48	C
Secchi (m)	1.5	0.8	2.0	C
TKN (mg/l)	0.96	0.64	1.40	
			Lake Grade	C

The lake site received a lake grade of C in 2013, which is consistent with its historical database. The lake grades for this site have varied between B and C. This was the first year the lake received a C grade for CLA since 2000. The CLA grades typically are B, with one A in 2011. Additional years of monitoring are suggested for continuing to build the water quality database for this lake site.

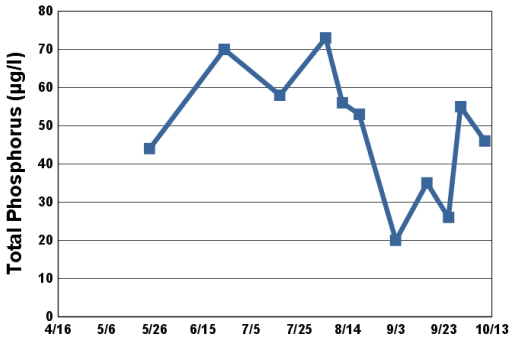
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

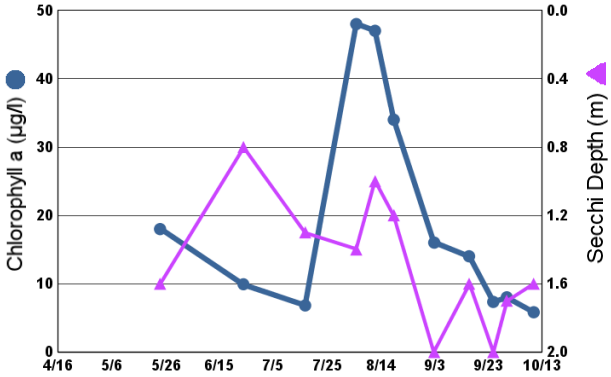
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

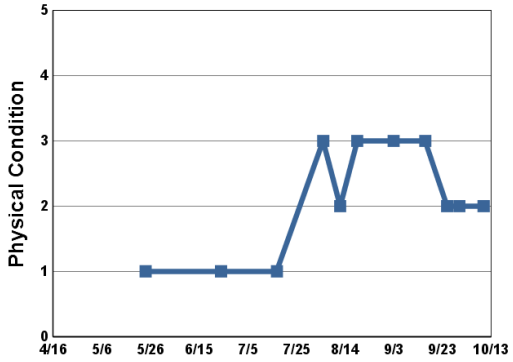


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	17.8		18	44	1.6	1	1
6/24	22.6		9.9	70	0.8	1	1
7/17	28.4		6.8	58	1.3	1	1
8/5	23.1		48	73	1.4	3	2
8/12	25.0		47	56	1.0	2	1
8/19	24.6		34	53	1.2	3	3
9/3	25.6		16	20	2.0	3	3
9/16	22.3		14	35	1.6	3	3
9/25	20.8		7.3	26	2.0	2	2
9/30	19.7		8.0	55	1.7	2	2
10/10	18.5		5.8	46	1.6	2	2







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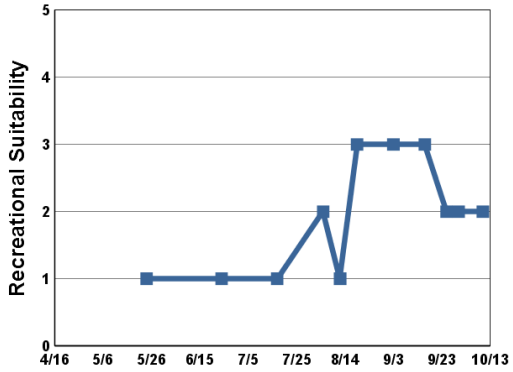

1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

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

Volunteer: Sue Morgan, Linda Scott

St. Joe Lake is a 14-acre lake located within the City of Chanhassen (Carver County). It has a maximum depth of 15.9 m (52 ft).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	13	9	16	
CLA (µg/l)	2.5	1.7	2.9	
Secchi (m)	2.5	2.1	2.9	
TKN (mg/l)	0.73	0.69	0.79	
			Lake Grade	

There were insufficient data in 2013 to calculate grades. The lake has varied in the A to B lake grade range over the past decade. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

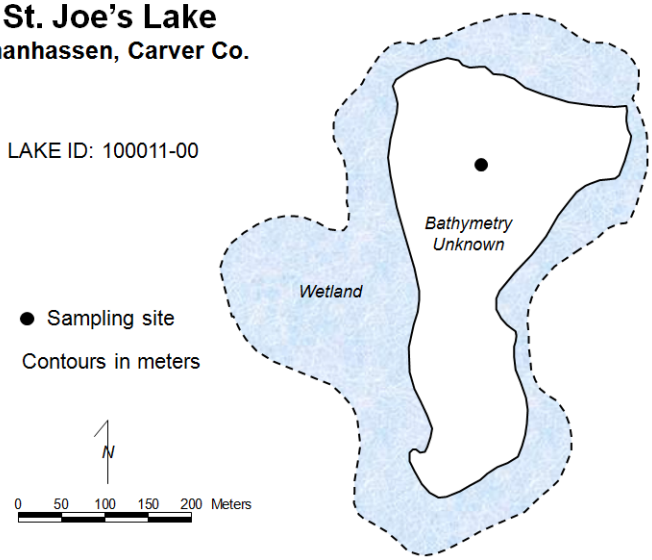
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

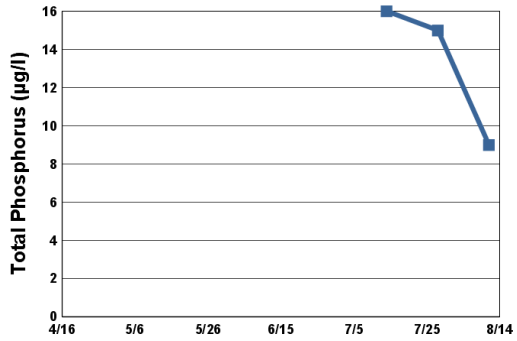
St. Joe's Lake
Chanhassen, Carver Co.

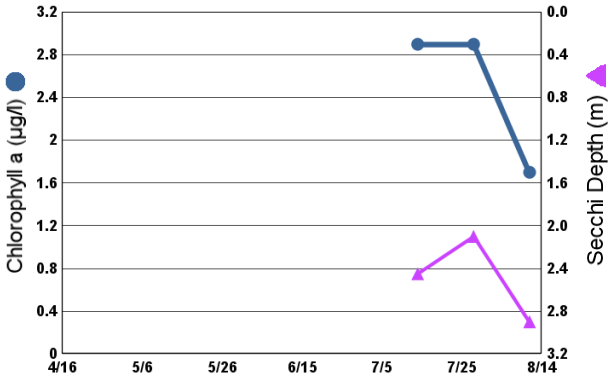
LAKE ID: 100011-00

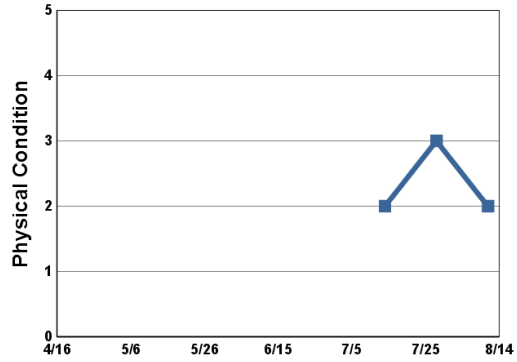


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
7/14	25.6		2.9	16	2.5	2	1
7/28	22.8		2.9	15	2.1	3	1
8/11	24.4		1.7	9	2.9	2	1







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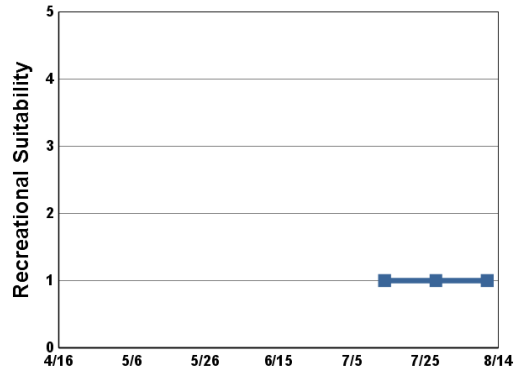


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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			C		B							
Lake Grade												

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

Source: Metropolitan Council and STORET data

Staples Lake (82–0028) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

Staples Lake is located in May Township (Washington County). It has a surface area of 24 acres. It has a maximum depth of 4.3 m and a mean depth of 2.1 m. It is a shallow lake, and does not maintain a thermocline, which is a density gradient caused by varying water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

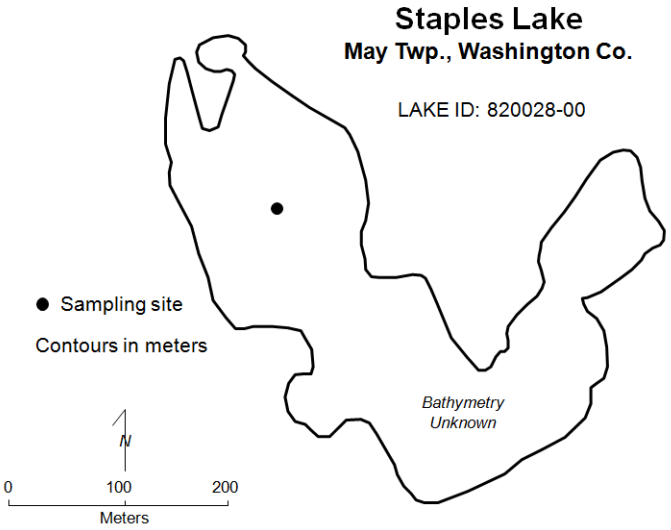
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	27	18	38	B
CLA (µg/l)	14	4.7	32	B
Secchi (m)	2.3	2.1	2.6	
TKN (mg/l)	0.72	0.63	0.91	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation (rather than by water clarity). There were insufficient quantity of Secchi depth data to calculate a Secchi grade, and therefore no lake grade was calculated. The TP and CLA grades for 2013, both B's, were similar to those received in the past according to its historical water quality database. The relatively low TP and 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.

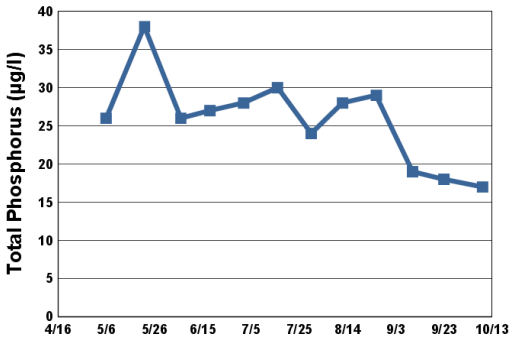
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

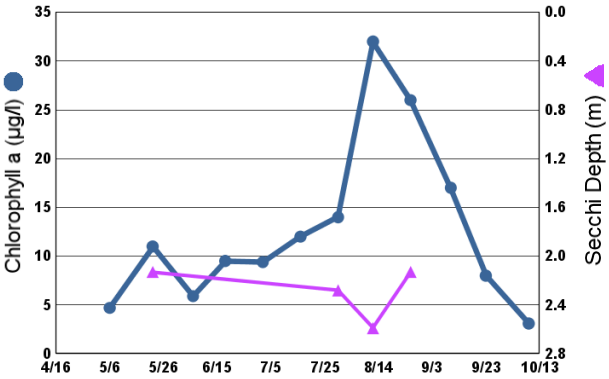
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

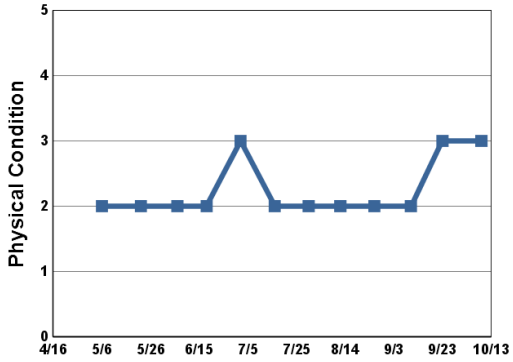


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	11.5		4.7	26		2	4
5/22	17.3		11	38	2.1	2	2
6/6	16.9	6.8	5.9	26		2	4
6/18	23.2	7.9	9.5	27		2	2
7/2	27.0	7.8	9.4	28		3	3
7/16	31.0	6.8	12	30		2	3
7/30	22.2	5.9	14	24	2.3	2	3
8/12	23.9	7.5	32	28	2.6	2	3
8/26	27.8	6.0	26	29	2.1	2	4
9/10	24.2	6.0	17	19		2	4
9/23	18.3	7.6	8.0	18		3	3
10/9	15.2	7.7	3.1	17		3	3







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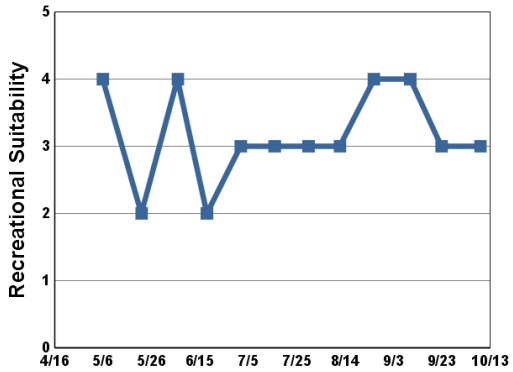
5 = Severe Algal Bloom



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

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

Source: Metropolitan Council and STORET data

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).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	26	12	39	B
CLA (µg/l)	22	2.7	58	C
Secchi (m)	1.8	0.6	3.5	C
TKN (mg/l)	0.99	0.62	1.70	
			Lake Grade	C

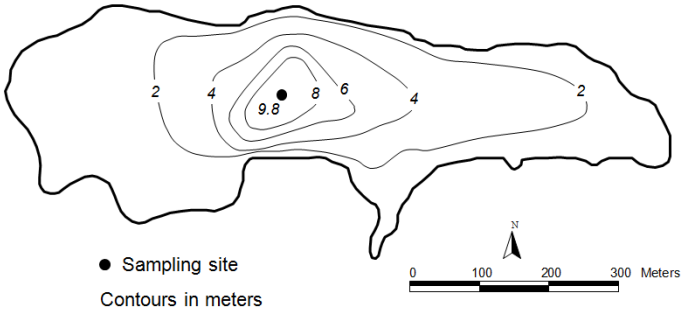
The lake received a lake grade of C for 2013 which is consistent with its limited historical database. The lake grades have varied from B to C since 2006, and the Secchi grades received in the mid-1980s to early 1990's were C grades as well. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

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

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

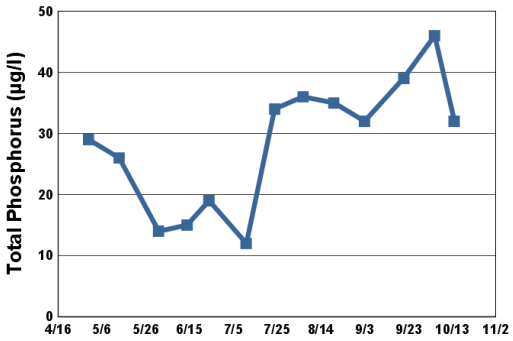
Sunfish Lake

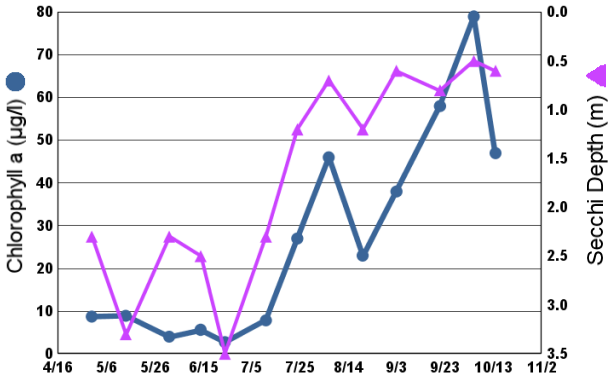
Sunfish Lake, Dakota Co. Lake ID: 190050-00

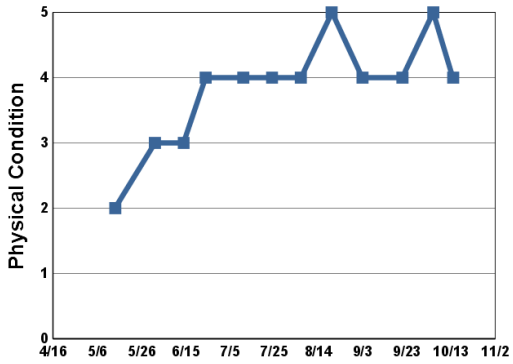


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/30	11.5		8.7	29	2.3		2
5/14	13.4		8.9	26	3.3	2	2
6/1	18.5		4.0	14	2.3	3	2
6/14	19.2		5.6	15	2.5	3	2
6/24	23.9		2.7	19	3.5	4	2
7/11	25.8		7.8	12	2.3	4	2
7/24	24.0		27	34	1.2	4	3
8/6	21.6		46	36	0.7	4	4
8/20	23.9		23	35	1.2	5	4
9/3	22.0		38	32	0.6	4	4
9/21	16.5		58	39	0.8	4	4
10/5	15.9		79	46	0.5	5	4
10/14	13.5		47	32	0.6	4	4







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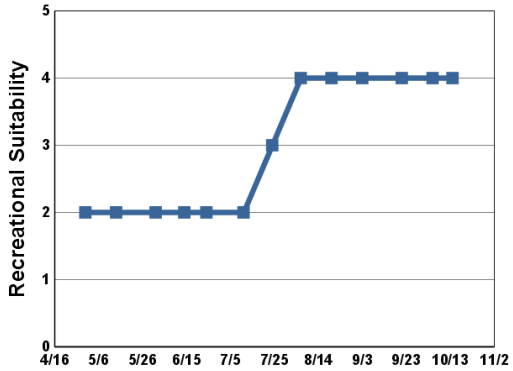

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Sunfish Lake [Lake Elmo] (82–0107) *Valley Branch Watershed District*

Volunteer: 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 lake has a 526-acre immediate drainage area, which results in a watershed-to-lake area ratio of approximately 11:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

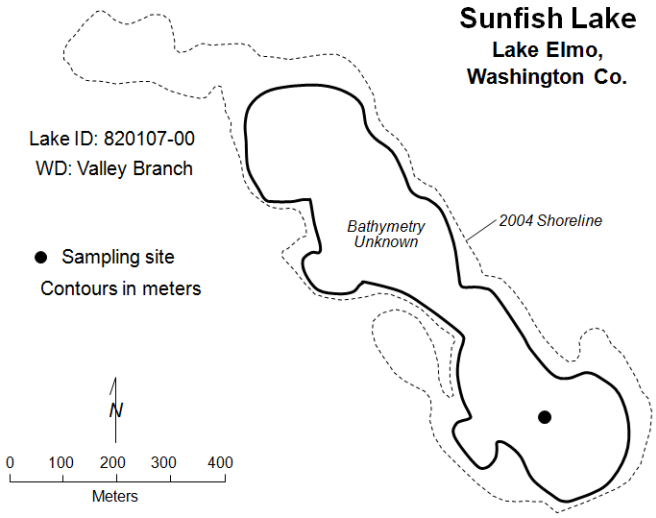
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	52	37	61	C
CLA (µg/l)	50	27	100	D
Secchi (m)	0.6	0.3	1.1	F
TKN (mg/l)	1.77	1.20	2.10	
			Lake Grade	D

The lake received a lake grade of C for 2013. The lake has received lake grades varying from C's to D's since 2000. Continued monitoring is suggested to continue to build the water quality database for this lake.

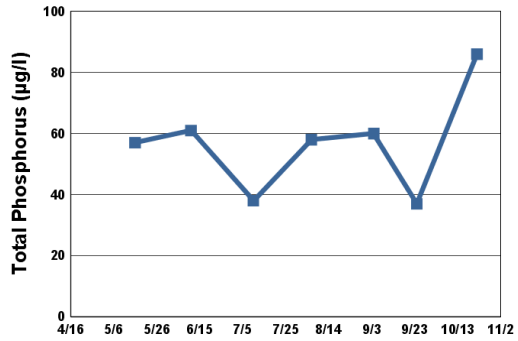
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

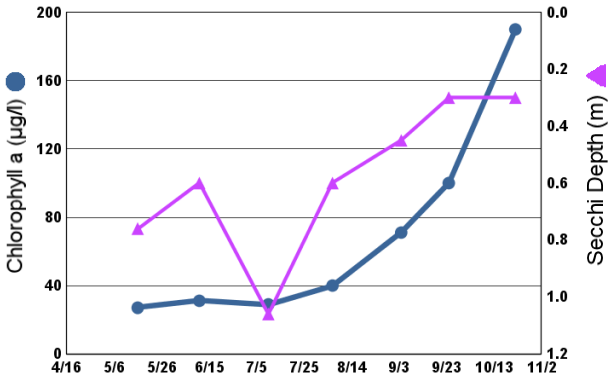
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

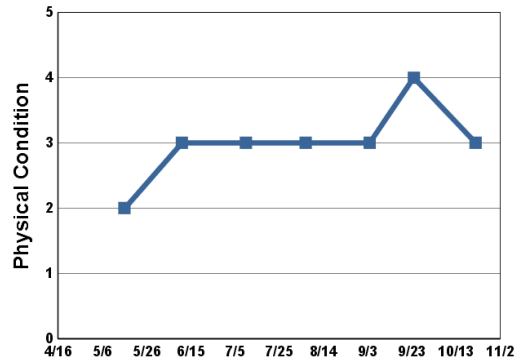


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/16	17.1	12.4	27	57	0.8	2	4
6/11	20.1	12.7	31	61	0.6	3	4
7/10	26.7	6.7	29	38	1.1	3	3
8/6	23.1	9.5	40	58	0.6	3	4
9/4	23.4	6.9	71	60	0.5	3	4
9/24	17.6	10.2	100	37	0.3	4	4
10/22	8.1	10.9	190	86	0.3	3	4







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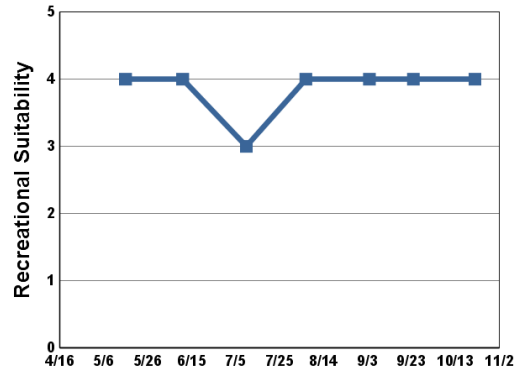

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Lake Water Quality Grades Based on Summertime Averages

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			
CLA									C			
Secchi									D			
Lake Grade									**C**			

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

Source: Metropolitan Council and STORET data

Sunset Lake (82-0153) *Rice Creek Watershed District*

Volunteer: Dianne 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). Nearly 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 MN DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	12	9	15	A
CLA (µg/l)	2.9	2.4	4.1	A
Secchi (m)	2.7	2.3	3.0	B
TKN (mg/l)	0.52	0.41	0.64	
			Lake Grade	A

The lake received a lake grade of A for 2013. According to the historical water quality database, the water quality of the lake has improved over the past 25 years, as demonstrated by the shift from mostly C lake grades received in the period 1993-1999 to A lake grades in the period 2001-2010. Water clarity has improved over this same time period as well. Secchi grades in the 1980s were in the C to D range but in recent years they were in the A to B range.

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

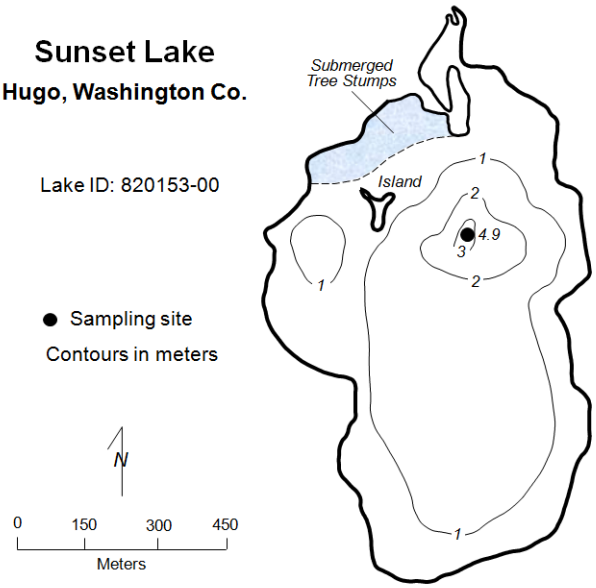
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Sunset Lake

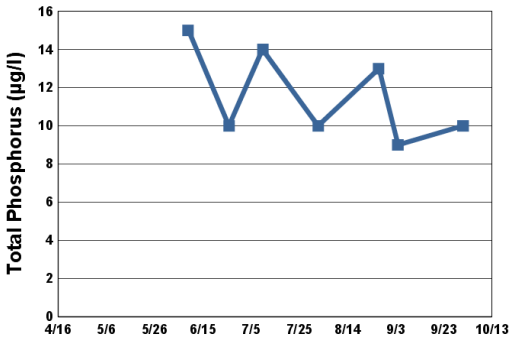
Hugo, Washington Co.

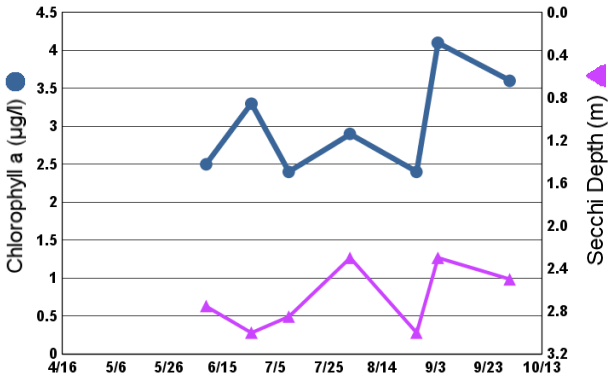
Lake ID: 820153-00

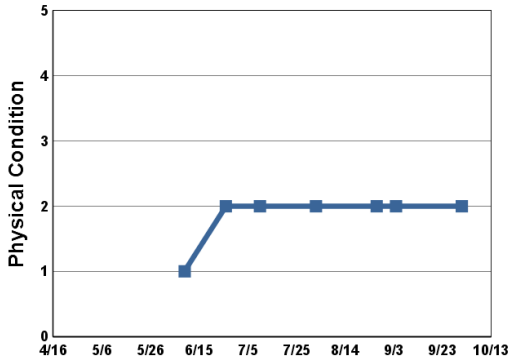


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
6/9	18.0		2.5	15	2.8	1	
6/26	26.9		3.3	10	3.0	2	1
7/10	27.0		2.4	14	2.9	2	
8/2	24.0		2.9	10	2.3	2	
8/27	29.1		2.4	13	3.0	2	
9/4	25.2		4.1	9	2.3	2	
10/1	18.1		3.6	10	2.5	2	







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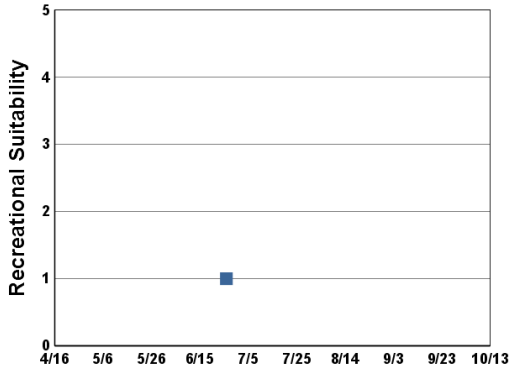

1 = Beautiful
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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Sunset Pond (19–0451) *Black Dog Watershed Management Commission*

Volunteer: Dan Wallace

Sunset Pond, a 60-acre man-made lake, is located in the City of Burnsville (Dakota County). It has been involved in CAMP since 1994 (with an omission in 1999). The pond has a normal maximum depth of 3.7m (12 ft). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout 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 pond has been designated by the MN DNR as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	46	33	77	C
CLA (µg/l)	7.4	2.8	19	A
Secchi (m)	2.2	1.5	2.5	C
TKN (mg/l)	0.97	0.69	1.20	
			Lake Grade	B

The pond received a lake grade of B for 2013, which is consistent with lake grades received since 2007. The pond experiences variability in its water quality as demonstrated by the variation in the historical lake grades. The lake typically receives a B or C lake grade. The Secchi grade of C does not correlate well with the CLA grade of A. One possible explanation for this incongruency may be that the water clarity may be affected by higher levels of total suspended solids from surface runoff via the surrounding urbanized watershed. In this scenario, higher loadings of suspended solids could cause a decrease in water clarity which would decrease light penetration, thereby inhibiting algal growth. In other words, the algal population may be light-limited rather than nutrient-limited.

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

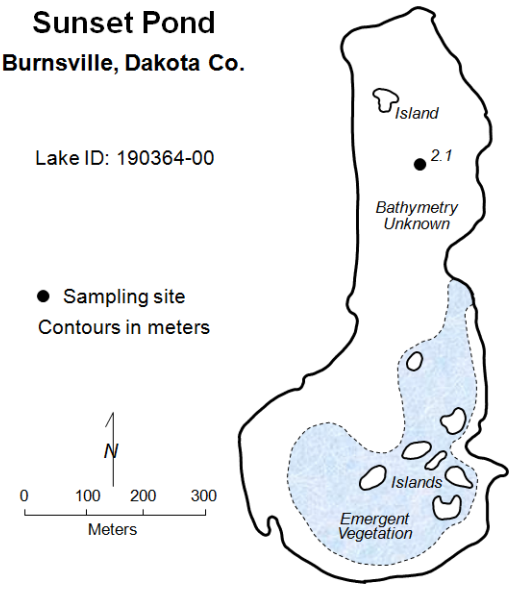
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Sunset Pond

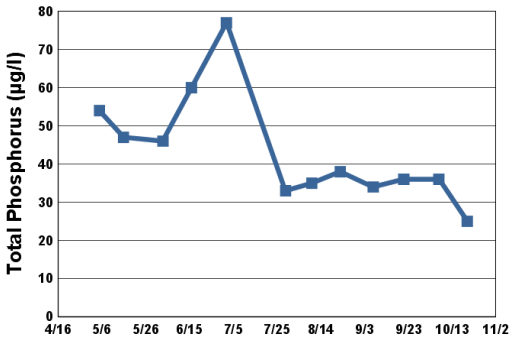
Burnsville, Dakota Co.

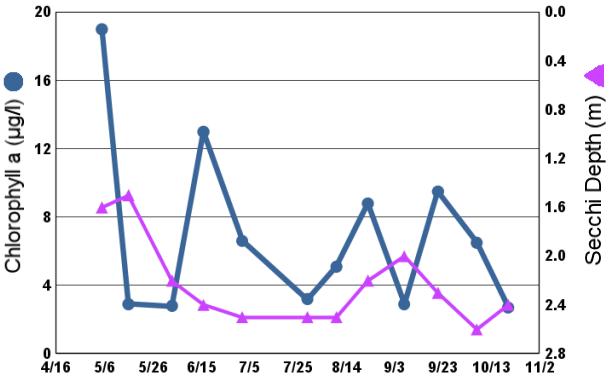
Lake ID: 190364-00

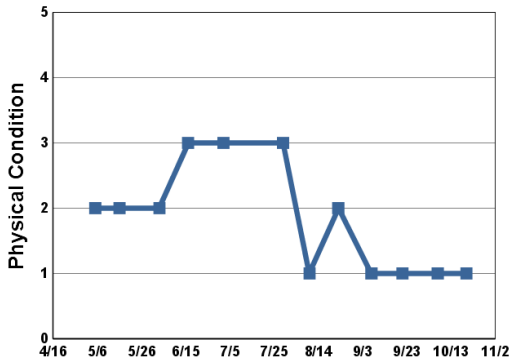


2013 Data

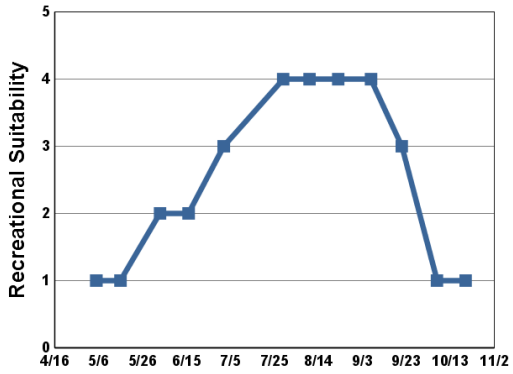
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	12.5		19	54	1.6	2	1
5/16	19.8		2.9	47	1.5	2	1
6/3	19.7		2.8	46	2.2	2	2
6/16	22.5		13	60	2.4	3	2
7/2	24.9		6.6	77	2.5	3	3
7/29	20.8		3.2	33	2.5	3	4
8/10	25.5		5.1	35	2.5	1	4
8/23	25.5		8.8	38	2.2	2	4
9/7	25.3		2.9	34	2.0	1	4
9/21	18.5		9.5	36	2.3	1	3
10/7	16.1		6.5	36	2.6	1	1
10/20	9.8		2.7	25	2.4	1	1







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



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

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Susan Lake (10–0013) *City of Chanhassen*

Volunteer: Gary and Noah Schultz

Susan Lake, located in the City of Chanhassen (Carver County), covers an area of 93 acres and has a maximum depth of 5.2 m (17 feet). Approximately 81 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The MN DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

Susan Lake is involved in a study on the common carp (*Cyprinus carpio*), which is an invasive, nonnative fish species, originally from central Asia. The study is being lead by Dr. Peter Sorensen of the the University of Minnesota. The purpose of the study is to develop an integrated management plan for the Riley chain-of-lakes (including Susan Lake) so as to improve the water quality of the lake chain. The activity and feeding behavior of the common carp can wreak havoc on the water quality and ecology of lakes by causing a litany of problems including reduced water clarity, decreased abundance of rooted aquatic vegetation, increase in algal populations, resuspension of sediment, increased internal loading of phosphorus, and negative changes in native fish populations. The long-term goal of the study is to develop a carp management strategy that can be applied to other lakes beyond the study lakes. For more information on this project, please refer to Dr. Sorensen's website at: http://sorensenlab.cfans.umn.edu/home/research/

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	49	28	79	C
CLA (µg/l)	26	1.3	66	C
Secchi (m)	1.4	0.7	2.8	C
TKN (mg/l)	1.48	0.89	3.10	
			Lake Grade	C

The lake received a lake grade of C for 2013. The lake grades have varied between C and D since 2006. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

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

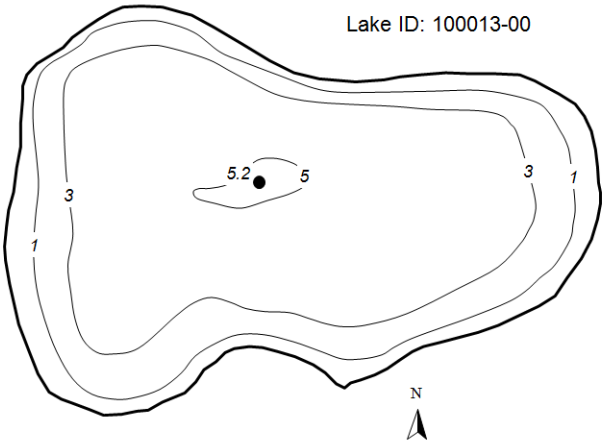
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Lake Susan

Chanhassen, Carver Co.

Lake ID: 100013-00

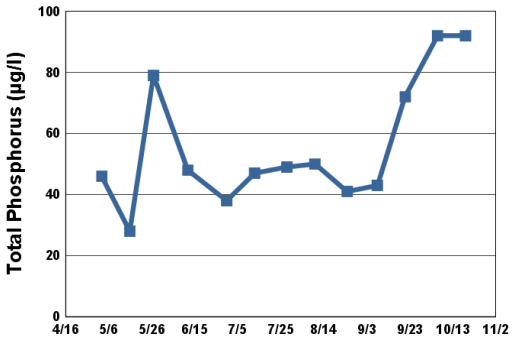


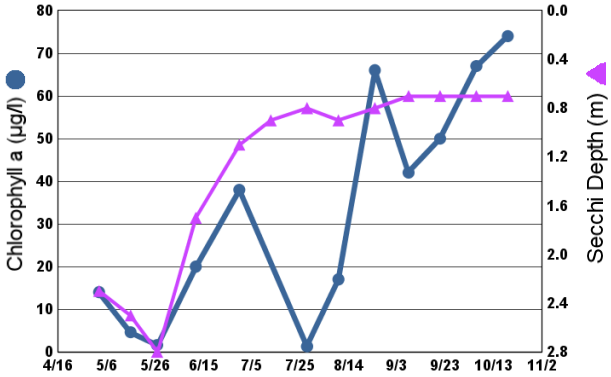
● Sampling site

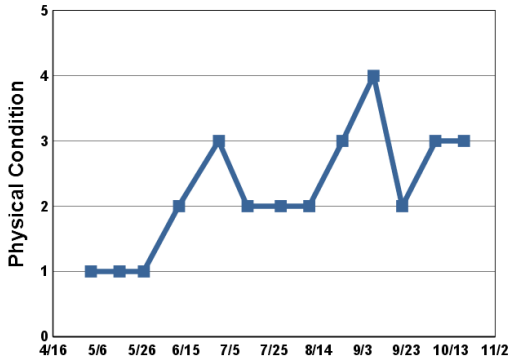
Contours in meters

2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/3	9.1		14	46	2.3	1	1
5/16	16.6		4.6	28	2.5	1	1
5/27	14.7		1.6	79	2.8	1	1
6/12	19.5		20	48	1.7	2	1
6/30	25.7		38	38	1.1	3	1
7/13	25.3			47	0.9	2	2
7/28	21.2		1.3	49	0.8	2	1
8/10	24.9		17	50	0.9	2	1
8/25	27.1		66	41	0.8	3	2
9/8	24.5		42	43	0.7	4	2
9/21	19.0		50	72	0.7	2	2
10/6	16.1		67	92	0.7	3	2
10/19	11.8		74	92	0.7	3	1







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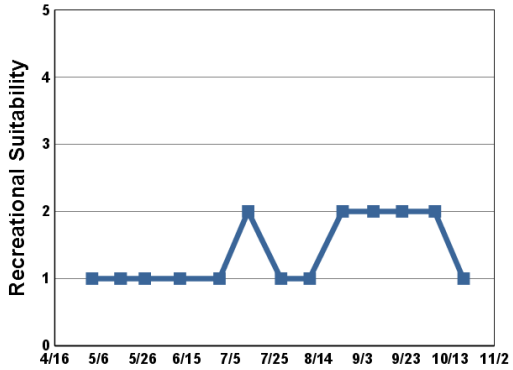
4 = High Algal Color
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Swede Lake (10–0095) *Carver County Environmental Services*

Volunteer: Wayne Hubin

Swede Lake is a 376-acre lake located in Watertown Township (Carver County) with a maximum depth of approximately 4.0 m (13.1 feet). Because of the shallowness of the lake, its entire surface area is considered littoral (the shallow [0-15 foot depth] area dominated by aquatic vegetation). The MN DNR has designated the lake as being infested with Eurasion Water Milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	311	196	534	F
CLA (µg/l)	53	11	240	D
Secchi (m)	0.5	0.3	0.8	F
TKN (mg/l)	3.45	2.80	4.00	
			Lake Grade	F

The lake received a lake grade of F. The lake receives typically F lake grades with the occasional D grade. The lake's water quality seems well represented by a lake grade of F with occasional variation.

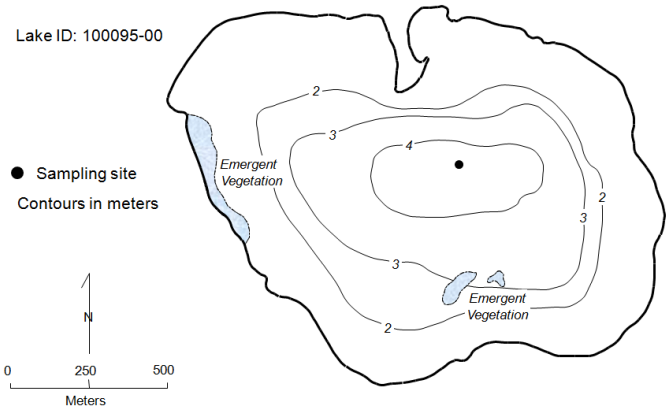
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

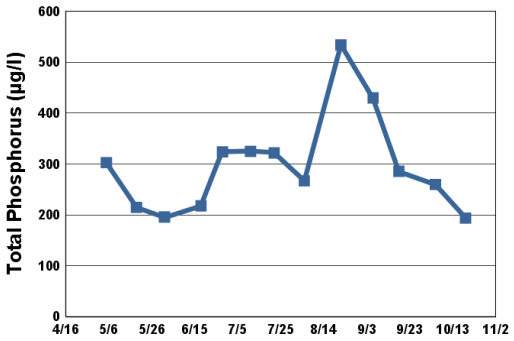
Swede Lake

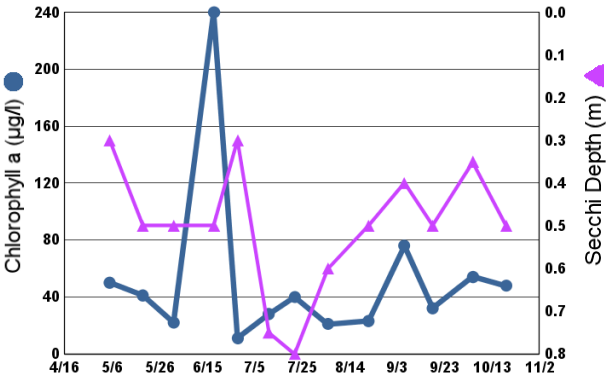
Watertown Twp., Carver Co.

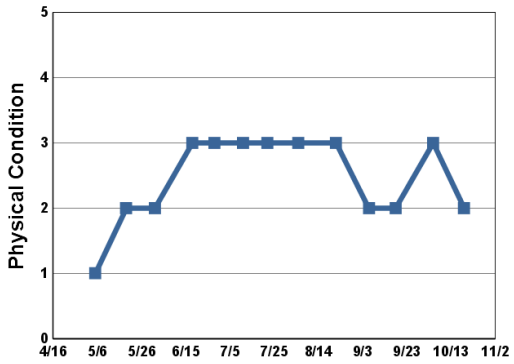


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	21.0		50	303	0.3	1	
5/19	21.0		41	215	0.5	2	4
6/1	20.0		22	196	0.5	2	
6/18	23.0		240	218	0.5	3	4
6/28	28.0		11	324	0.3	3	4
7/11	29.0		28	325	0.8	3	4
7/22	26.0		40	322	0.8	3	4
8/5	27.0		21	267	0.6	3	4
8/22	27.0		23	534	0.5	3	4
9/6	26.0		76	430	0.4	2	4
9/18	21.0		32	286	0.5	2	4
10/5	18.0		54	260	0.4	3	4
10/19	11.0		48	194	0.5	2	4







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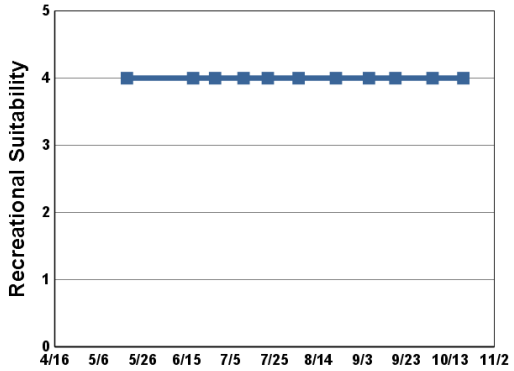


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Sweeney Lake [Site-1, South Site] (27-0035–01) *Bassett Creek Watershed Management Commission*

Volunteer: Dave Hanson

Sweeney Lake is located in the City of Golden Valley (Hennepin County). The lake has a surface area of 66 acres and mean and maximum depths of 3.6 m (12 ft) and 8.0 m (26 ft), respectively. The lake's surface area and a watershed area of 2,400 acres give a large watershed-to-lake area ratio of 36:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The Sweeney Lake branch of Bassett Creek flows into the lake on the south end and discharges at the north end over a dam. 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 lake has a hypolimnetic aeration system which generally operates year round. The aeration system keeps the lake well mixed, so it does not develop a thermocline when the system is operational. A thermocline is a density gradient caused by changing water temperatures throughout the water column.

The aeration system was turned off during the monitoring seasons of 2007 and 2008 as part of a total maximum daily load (TMDL) study. The TMDL study was initiated in response to the lake being listed asimpaired in 2004 by the Minnesota Pollution Control Agency. The impaired listing is due to excessive nutrients.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	25	61	C
CLA (µg/l)	14	5.2	28	B
Secchi (m)	1.1	1.0	1.3	D
TKN (mg/l)	1.14	0.94	1.40	
			Lake Grade	C

The south site received a lake grade of C, which is consistent with its historical database. Over the period of the monitoring database, the water quality of the lake seems represented by a lake grade of C. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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.

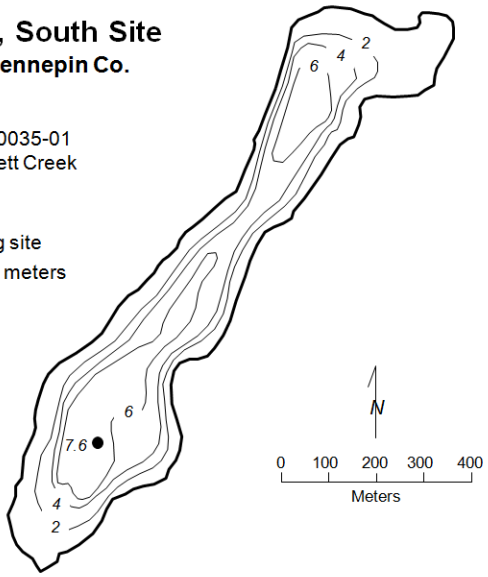
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

Sweeney Lake, South Site
Golden Valley, Hennepin Co.

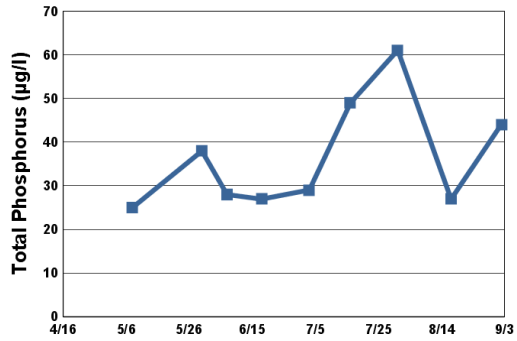
Lake ID: 270035-01
WMO: Bassett Creek

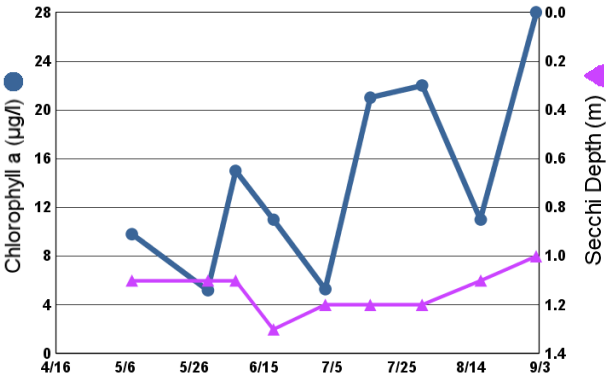
● Sampling site
Contours in meters

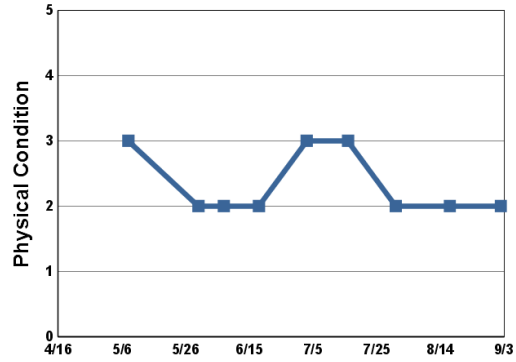


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	12.7		9.8	25	1.1	3	2
5/30	17.4		5.2	38	1.1	2	1
6/7	18.1		15	28	1.1	2	1
6/18	21.6		11	27	1.3	2	2
7/3	27.0		5.3	29	1.2	3	3
7/16	28.0		21	49	1.2	3	3
7/31	23.4		22	61	1.2	2	2
8/17	24.4		11	27	1.1	2	2
9/2	25.2		28	44	1.0	2	1







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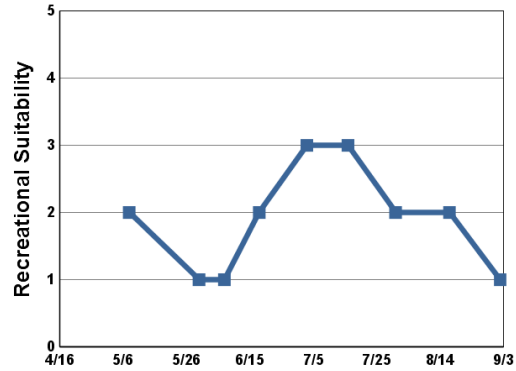

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Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Sylvan Lake (27–0171) *Elm Creek Watershed Management Commission*

Volunteer: Gene Wipf

Sylvan Lake is located in the city of Rogers (Hennepin County). The lake has a maximum depth of approximately 4 m and a surface area of about 134 acres. The entire area of the lake is considered littoral zone, which is the shallow 0 — 15 feet depth zone that is typically dominated by aquatic vegetation.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

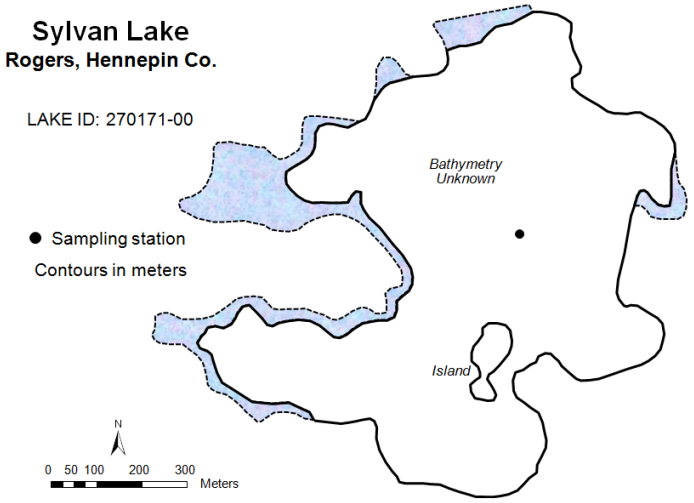
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	274	144	463	F
CLA (µg/l)	46	34	70	C
Secchi (m)	0.6	0.3	1.5	F
TKN (mg/l)	2.96	1.80	3.40	
			Lake Grade	D

The lake received a lake grade of F for 2013. The mean Secchi depths for 2012 and 2013 were notably worse than measured in 2008. Continued monitoring is suggested to build the water quality database for this lake.

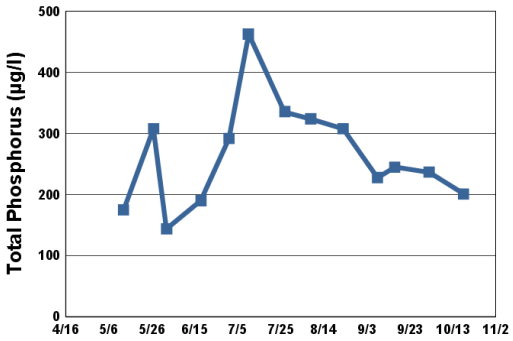
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

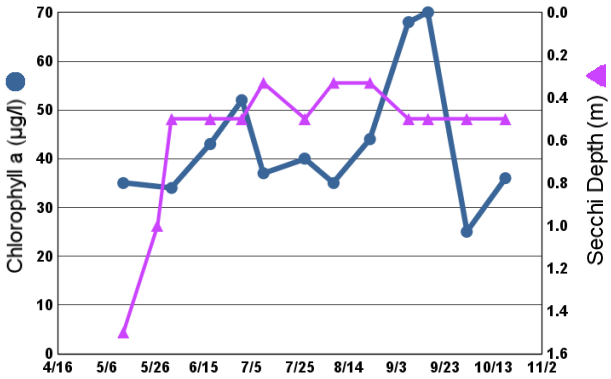
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

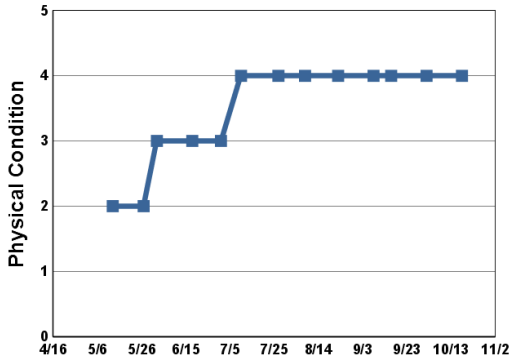


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/13	18.5		35	175	1.5	2	4
5/27	19.0			308	1.0	2	4
6/2	20.5		34	144	0.5	3	4
6/18	22.0		43	190	0.5	3	4
7/1	24.3		52	292	0.5	3	4
7/10	24.0		37	463	0.3	4	4
7/27	24.3		40	336	0.5	4	4
8/8	23.4		35	324	0.3	4	4
8/23	26.4		44	308	0.3	4	4
9/8	19.7		68	228	0.5	4	4
9/16	18.2		70	245	0.5	4	4
10/2	17.5		25	237	0.5	4	4
10/18	13.8		36	201	0.5	4	4







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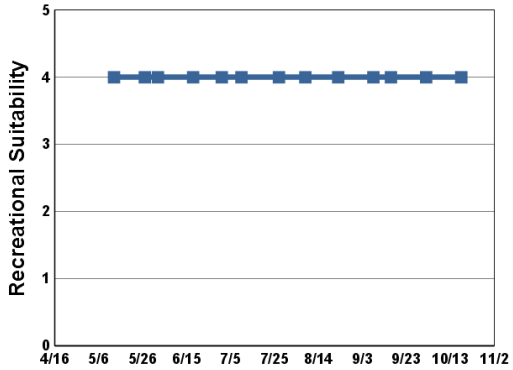
4 = High Algal Color
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Sylvan Lake [Half Breed Lake] (82—0080) *Comfort Lake – Forest Lake Watershed District*

Volunteer: Curt Sparks and Washington Conservation District staff

Sylvan Lake (also known as Half Breed Lake) is a 75-acre lake located in the city of Forest Lake (Washington County). It is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity (METC 2007).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	13	3	25	A
CLA (µg/l)	4.3	1.0	21	A
Secchi (m)	4.2	2.3	5.6	A
TKN (mg/l)	0.71	0.38	2.00	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with its historical water quality database. The historic water quality database indicates that the lake has maintained its high quality over the past 20+ years.

Throughout the monitoring period, the volunteer's opinions of 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/.

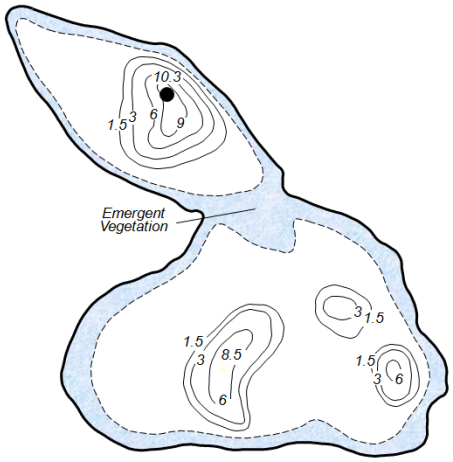
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sylvan Lake
(Halfbreed Lake)
Forest Lake/Scandia, Washington Co.

LAKE ID: 820080-00

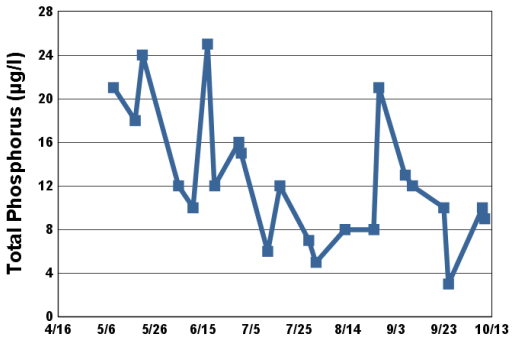
● Sampling station

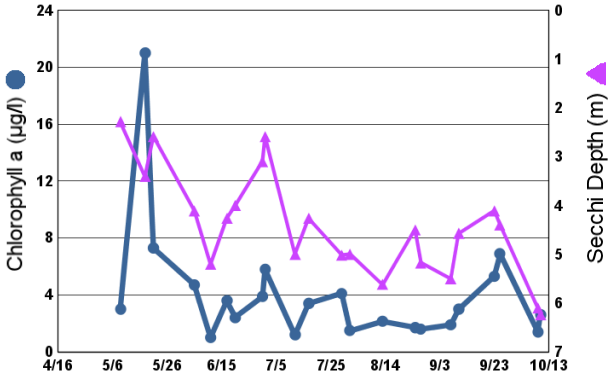
Contours in meters

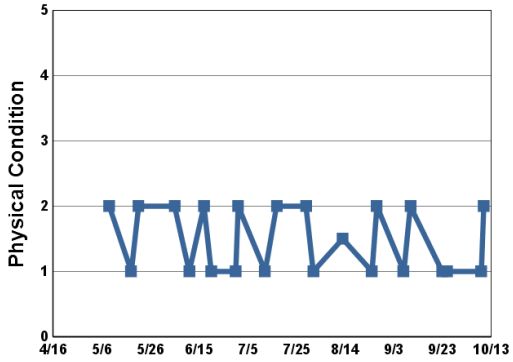


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/9	14.3	9.5	3.0	21	2.3	2	2
5/18	18.4		21	18	3.4	1	1
5/21	18.4	8.1	7.3	24	2.6	2	2
6/5	17.4	7.1	4.7	12	4.1	2	2
6/11	18.8		1.0	10	5.2	1	1
6/17	22.3	8.3	3.6	25	4.3	2	2
6/20	23.9		2.4	12	4.0	1	1
6/30	24.4		3.9	16	3.1	1	1
7/1	25.3	7.7	5.8	15	2.6	2	2
7/12	25.4		1.2	6	5.0	1	1
7/17	28.4	8.3	3.4	12	4.3	2	1
7/29	21.5	7.5	4.1	7	5.0	2	1
8/1	22.9		1.5	5	5.0	1	1
8/13	23.4	7.9	2.2	8	5.6	2	2
8/25	25.4		1.7	8	4.5	1	1
8/27	28.4	7.5	1.6	21	5.2	2	3
9/7	24.1		1.9	13	5.5	1	1
9/10	23.5	6.8	3.0	12	4.6	2	3
9/23	17.4	8.3	5.3	10	4.1	1	1
9/25	17.6		6.9	3	4.4	1	1
10/9	14.9		1.4	10	6.1	1	1
10/10	15.2	8.1	2.6	9	6.2	2	1







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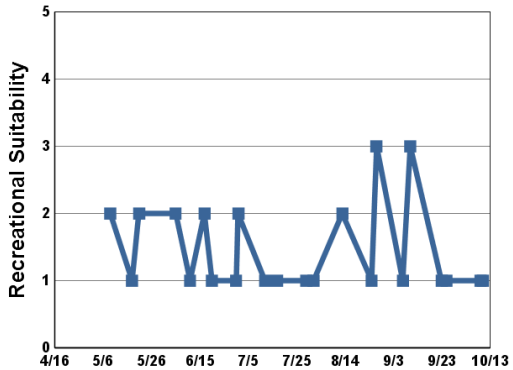

1 = Beautiful
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3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Terrapin Lake (82—0031) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Dan Carlson, Warner Nature Center

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 entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	+ 3.7	3.5	+ 4.0	A
TKN (mg/l)				
			Lake Grade	

+ indicates that the secchi disk is visible on the bottom of the lake
(+ *means that the true Secchi transparency was greater that indicated in the table because the Secchi disk was visible on the bottom of the lake.*)

(> *means that the true Secchi transparency was greater than indicated in the table because the visibility of the disk was blocked by aquatic vegetation rather than by light attenuation in the water column.*)

No TP, TKN, and CLA samples were collected in 2013. The Secchi disk was visible while resting on the lake bottom or the visibility of the disk was blocked by aquatic vegetation during the monitoring events. However, the Secchi depths were greater than 3.0 m in these cases, which translates into an A Secchi grade. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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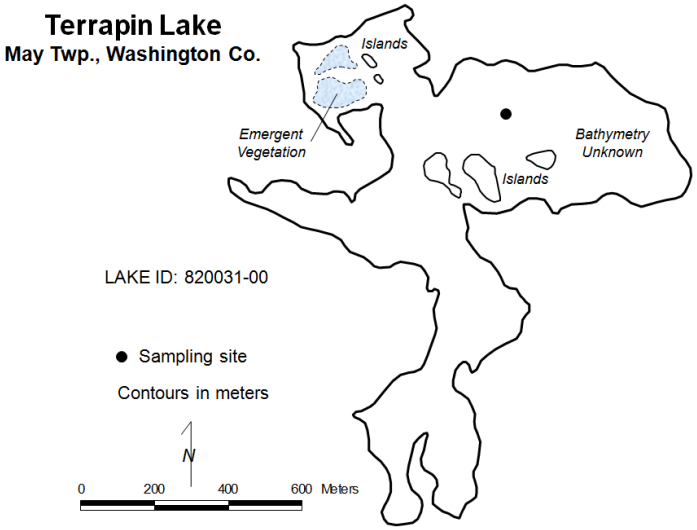


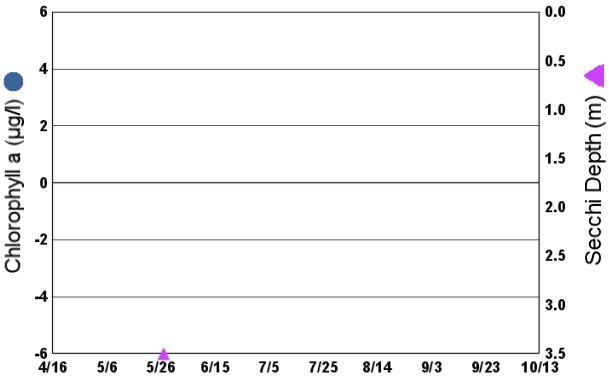
2013 Data

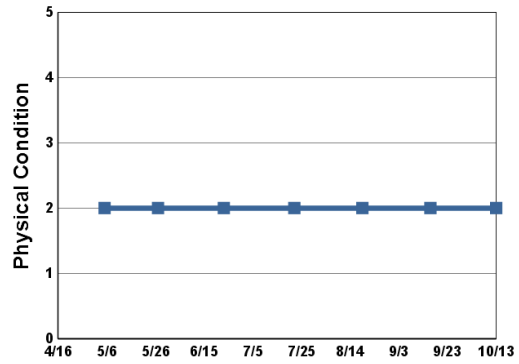
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	6.3				+ 4.0	2	2
5/27	16.1				3.5	2	2
6/23	23.7				> 3.8	2	2
7/22	27.0				> 3.8	2	2
8/19	25.1				> 3.6	2	3
9/16	20.9				> 3.5	2	2
10/13	15.2				> 3.5	2	2

+ indicates that the secchi disk is visible on the bottom of the lake
> indicates that vegatation blocked the volunteers view of the secchi disk

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

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





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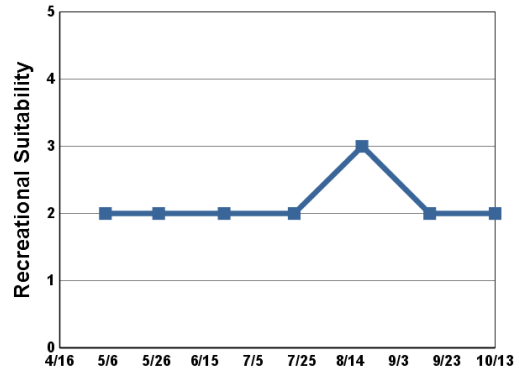

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Turtle Lake (82—0036) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

Turtle Lake is located in May Township (Washington County). The lake has a surface area of 44 acres, and has a maximum and mean depth of 2.4 m (7.9 ft) and 1.2 m (3.9 ft), respectively. It has an approximate volume of 172 ac-ft. The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The lake's watershed area is approximately 699 acres. The lake has 16:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	115	30	471	D
CLA (µg/l)	8.2	3.3	25	A
Secchi (m)				
TKN (mg/l)	1.10	0.81	2.00	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because either the disk was visible on the bottom of the lake or the visibility of the disk was blocked by aquatic vegetation (rather than by water clarity). There were insufficient quantity of Secchi depth measurements to calculate a Secchi grade, and therefore no lake grade was calculated. The TP and CLA grades for 2013 were within the same range as those received in the past according to its historical water quality database. 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.

A review of the historical water quality database shows that lake grades and individual parameter grades (particulary chlorophyll-a and secchi depth grades) seem to have improved during the period from 1991-2008. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested, particularly to continue monitoring TP and CLA, so as to gain a more complete understanding of this lake's water quality.

Throughout the monitoring period, the volunteer's opinions of 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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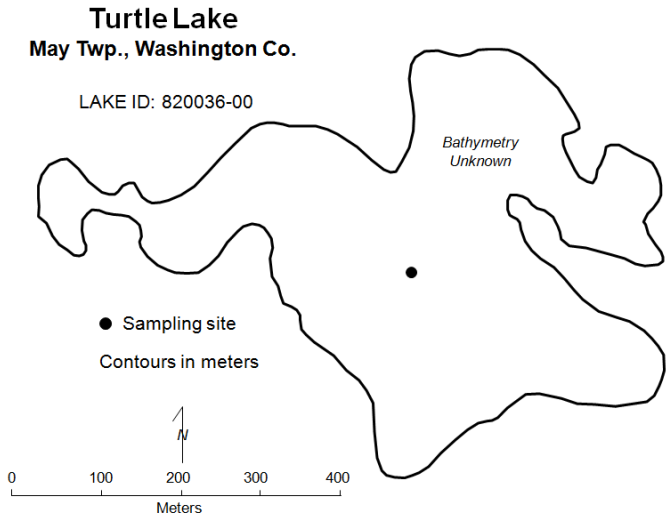
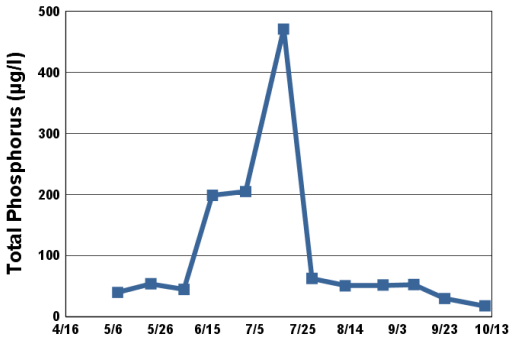
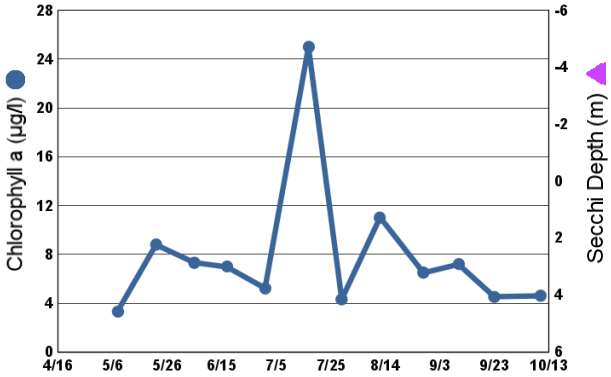
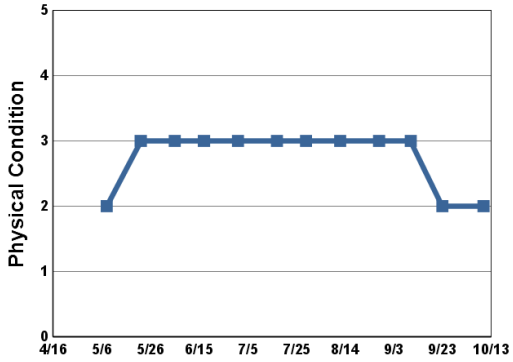


2013 Data

Date	SU-RF-TE-MP (° C)	SU-RF DO (mg/L)	CLA (µg/L)	SU-RF TP (µg/L)	Sec-chi (m)	PC (1-5)	RS (1-5)
5/8	16.4	9.7	3.3	40		2	4
5/22	16.8	4.9	8.8	54		3	4
6/5	16.7	6.9	7.3	45		3	4
6/17	23.7	9.0	7.0	199		3	4
7/1	28.0	9.1	5.2	205		3	4
7/17	29.1	7.5	25	471		3	4
7/29	20.1	11.2	4.3	63		3	4
8/12	25.0	9.9	11	51		3	4
8/28	30.7	8.6	6.5	52		3	5
9/10	22.8	6.9	7.2	53		3	4
9/23	18.5	15.5	4.5	30		2	4
10/10	14.9	10.7	4.6	18		2	4







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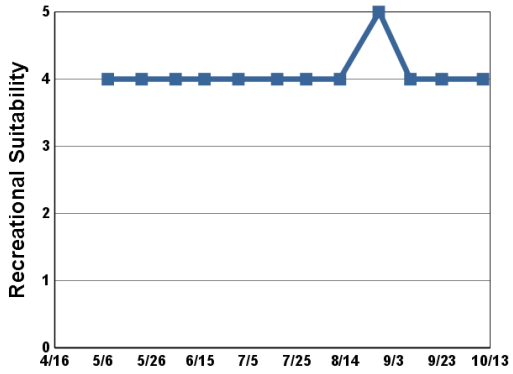

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5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

Twin Lake [Burnsville] (19–0028) *Black Dog Watershed Management Commission*

Volunteer: Dan Freeman

Twin Lake is an 11-acre lake located in the City of Burnsville (Dakota County). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. Furthermore, the lake does not maintain a thermocline, which is a density gradient caused by changing water temperatures throughout the water column. The lake has been designated by the MN DNR has being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

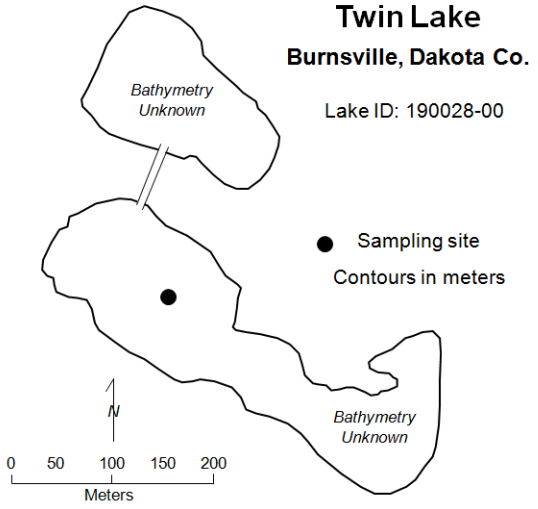
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	25	14	36	B
CLA (µg/l)	8.7	2.8	24	A
Secchi (m)	1.7	1.0	2.2	C
TKN (mg/l)	0.86	0.68	1.10	
			Lake Grade	B

The lake received a lake grade of B in 2013. Many of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation rather than by water clarity. But there were sufficient quantity of measurements to calculate a Secchi grade this year. The water quality of this lake has varied in the B to C range since 1999. However, the TP grades (B's) over the past 3 years seem to show an improving trend compared to the C and D grades received during the late 1990s to mid-2000s.

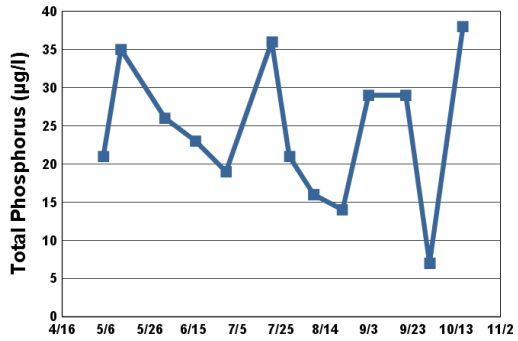
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

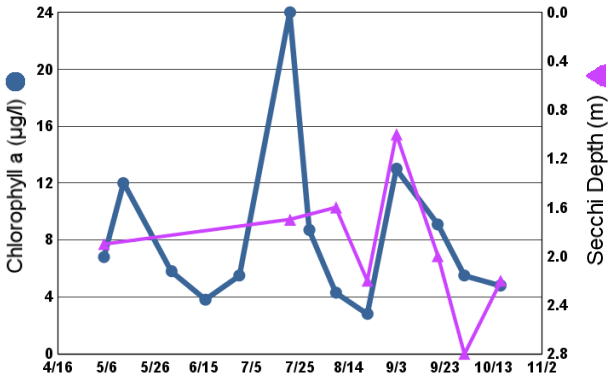
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

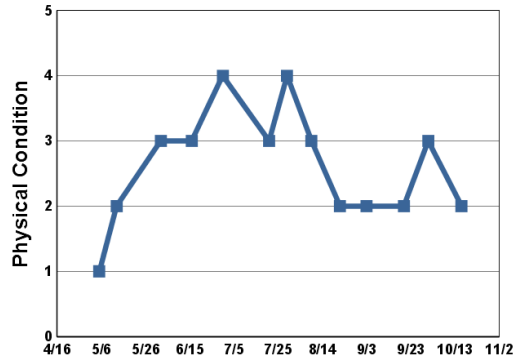


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	12.3		6.8	21	1.9	1	4
5/13	14.5		12	35		2	4
6/2	21.4		5.8	26		3	
6/16	23.0		3.8	23		3	4
6/30	25.7		5.5	19		4	4
7/21	28.0		24	36	1.7	3	
7/29	21.5		8.7	21		4	4
8/9	23.9		4.3	16	1.6	3	4
8/22	24.0		2.8	14	2.2	2	4
9/3	22.5		13	29	1.0	2	4
9/20	18.6		9.1	29	2.0	2	4
10/1	18.5		5.5	7	2.8	3	4
10/16	11.8		4.8	38	2.2	2	4







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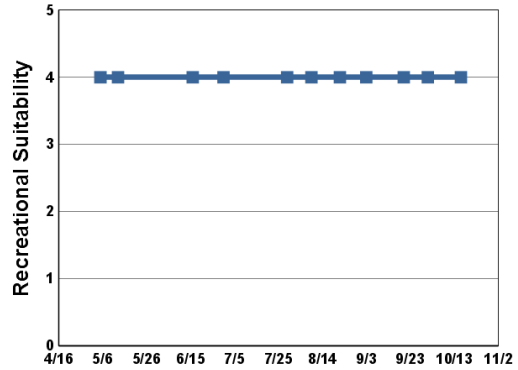
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

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

Source: Metropolitan Council and STORET data

Twin Lake [Golden Valley] (27–0035–02) *Bassett Creek Watershed Management Commission*

Volunteer: Jonathon Burris

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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	22	7	76	A
CLA (µg/l)	14	1.3	51	B
Secchi (m)	3.1	1.4	4.0	A
TKN (mg/l)	0.92	0.33	1.60	
			Lake Grade	A

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

There were limited historical data available for this lake according the MPCA's Environmental Data Access System: 3 days in 1977, 1 day in 1996, 2 days in 1997. Further monitoring is suggested to build a water quality database for this lake.

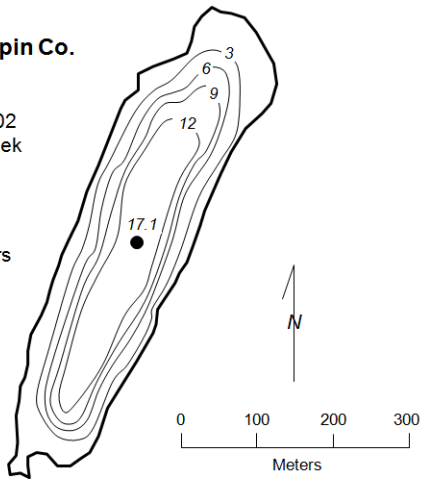
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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.

Twin Lake
Golden Valley, Hennepin Co.

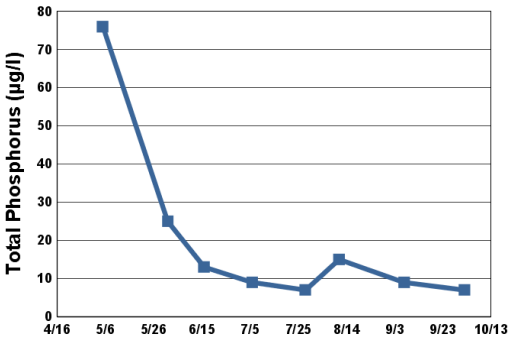
Lake ID: 270035-02
WMO: Bassett Creek

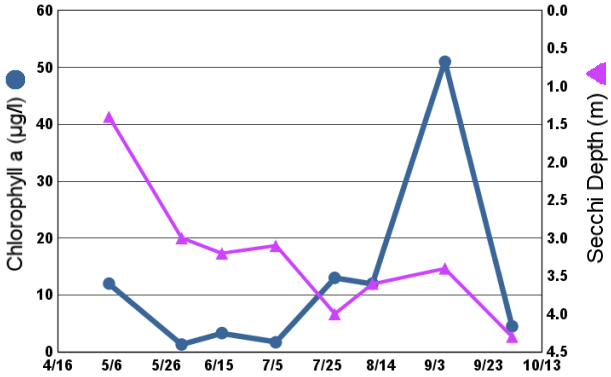
● Sampling site
Contours in meters

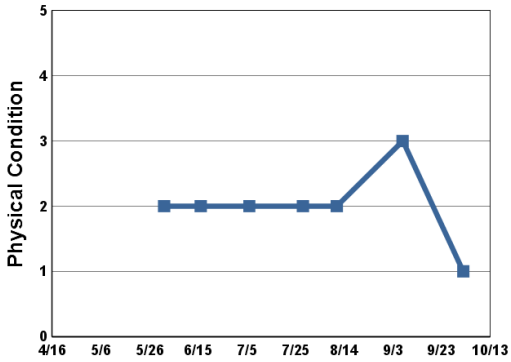


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	11.1		12	76	1.4		
6/1	19.2		1.3	25	3.0	2	2
6/16	21.0		3.3	13	3.2	2	1
7/6	24.7		1.7	9	3.1	2	1
7/28	22.8		13	7	4.0	2	1
8/11	25.0		12	15	3.6	2	1
9/7	25.5		51	9	3.4	3	1
10/2	18.0		4.5	7	4.3	1	1







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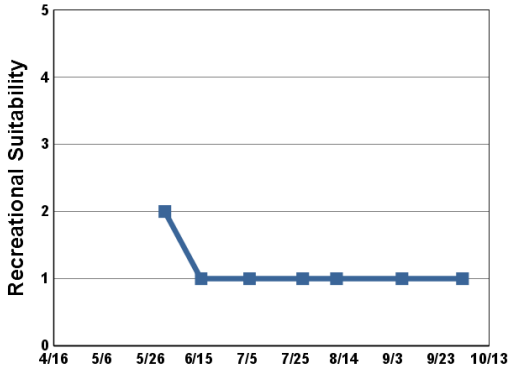
4 = High Algal Color
5 = Severe Algal Bloom



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

Source: Metropolitan Council and STORET data

Twin Lake [St. Louis Park] (27–0656) *City of St. Louis Park*

Volunteer: Paul O'Brien

Twin Lake is a small shallow lake located within the city of St. Louis Park (Hennepin County). Bathymetric information is unknown for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

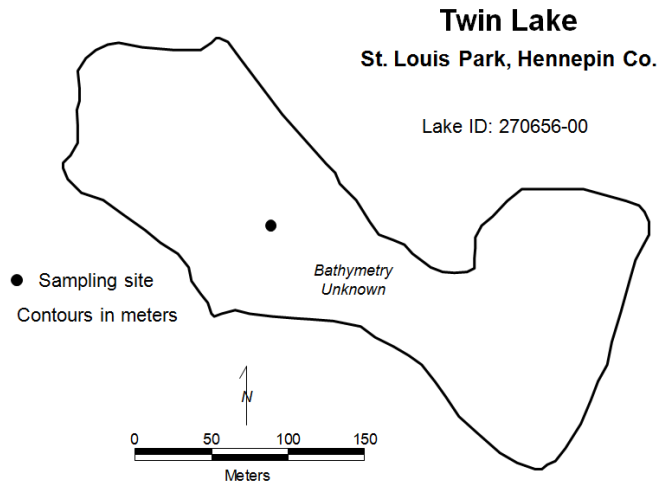
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	138	59	223	D
CLA (µg/l)	68	4.0	200	D
Secchi (m)	0.7	0.5	0.9	F
TKN (mg/l)	1.64	0.66	2.50	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is consistent with its water quality database over the past 7years. The Secchi grade remains poor with a grade of a low F. Secchi grades in 2002-2004 were Ds, but since then water clarity grades degressed to Fs. Also, the CLA grades have reduced from a B grade in 2002; to C grades in 2003, 2005, and 2006; to D grades in 2007, 2008, and 2010; and to F grades in 2009 and 2011. These observations seem to indicate that the water quality for Twin Lake has degraded since 2002. Further monitoring is suggested to continue to observe if this trend continues or not.

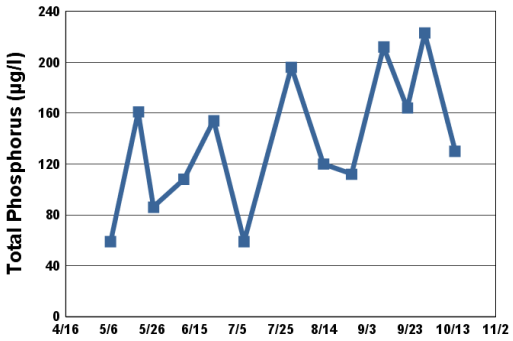
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

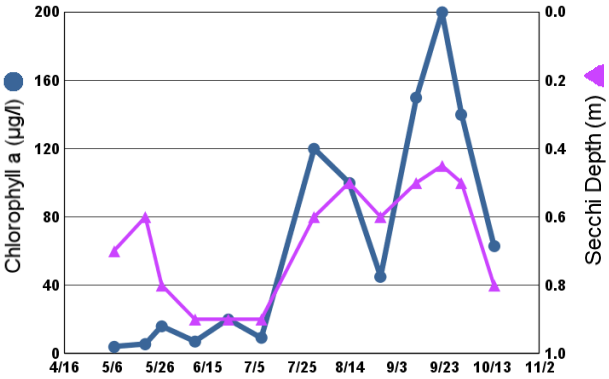
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

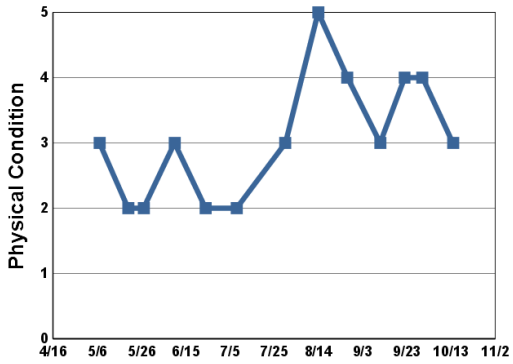


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/7	20.8		4.0	59	0.7	3	4
5/20	22.0		5.6	161	0.6	2	3
5/27	15.4		16	86	0.8	2	4
6/10	25.0		7.1	108	0.9	3	4
6/24	25.5		20	154	0.9	2	4
7/8	30.5		9.3	59	0.9	2	4
7/30	23.4		120	196	0.6	3	4
8/14	25.0		100	120	0.5	5	4
8/27	32.0		45	112	0.6	4	4
9/11	26.0		150	212	0.5	3	4
9/22	18.6		200	164	0.5	4	4
9/30	20.5		140	223	0.5	4	4
10/14	14.0		63	130	0.8	3	4







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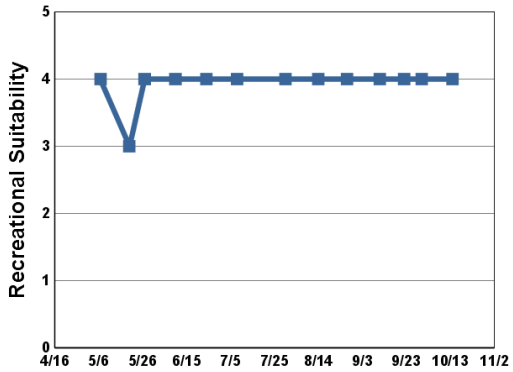

1 = Beautiful
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5 = No Aesthetics Possible

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

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

Source: Metropolitan Council and STORET data

Twin Lake [May Township] (82–0048) *Carnelian — Marine — St. Croix Watershed District*

Volunteer: Washington Conservation District staff

Twin Lake is located in May Township (Washington County). The lake is considered an METC Priority Lake for its exceptional water clarity (METC 2007). The south basin has a maximum depth of 10 m (33ft). Other bathymetric information is unknown for this lake. The lake's inflow receives water from Square Lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	13	4	26	A
CLA (µg/l)	3.0	1.4	4.9	A
Secchi (m)	4.8	2.7	6.4	A
TKN (mg/l)	0.62	0.43	0.87	
			Lake Grade	A

The lake received a lake grade of A for 2013, which is consistent with its limited historical database. Further monitoring is suggested to continue to build the water quality database for increasing power to detect water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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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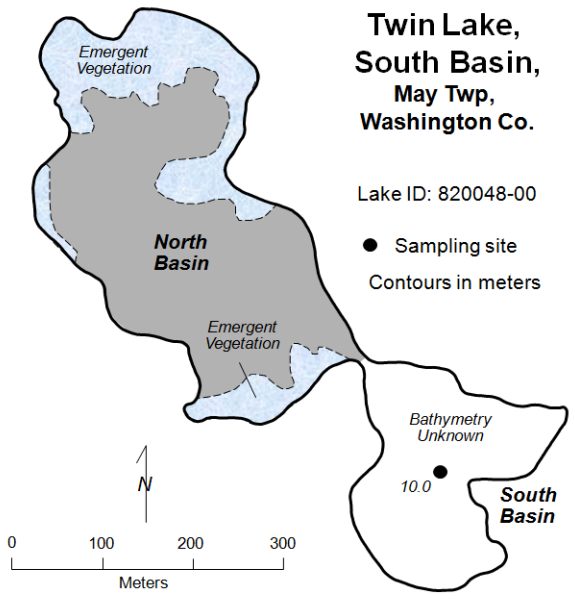
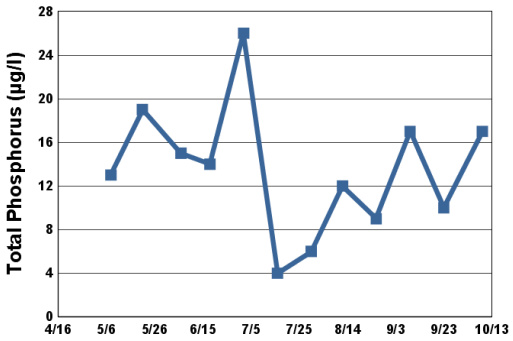
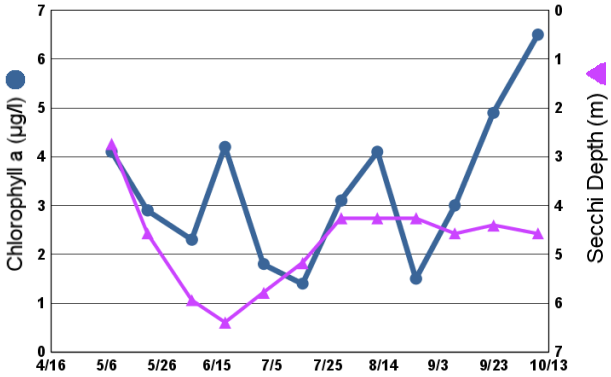
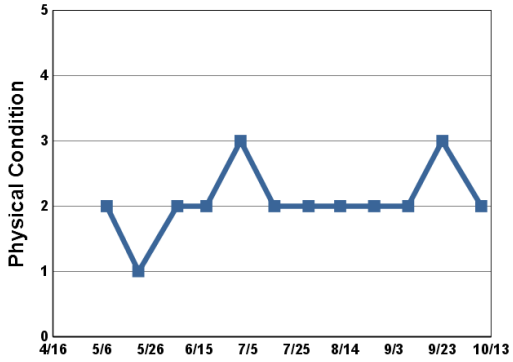


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/8	16.0		4.1	13	2.7	2	2
5/21	19.7		2.9	19	4.6	1	1
6/6	17.4	8.8	2.3	15	5.9	2	2
6/18	22.2	8.8	4.2	14	6.4	2	1
7/2	24.7	8.8	1.8	26	5.8	3	2
7/16	27.4	7.5	1.4	4	5.2	2	3
7/30	23.2	6.6	3.1	6	4.3	2	3
8/12	23.9	7.4	4.1	12	4.3	2	2
8/26	26.9	7.2	1.5	9	4.3	2	4
9/9	24.2	6.6	3.0	17	4.6	2	3
9/23	19.1	7.0	4.9	10	4.4	3	3
10/9	16.4	7.9	6.5	17	4.6	2	2







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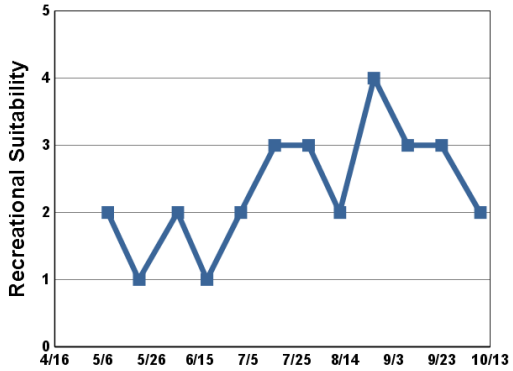

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Lake Water Quality Grades Based on Summertime Averages

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						A	A					
CLA						A	A					
Secchi						A	A					
Lake Grade						**A**	**A**					

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

Source: Metropolitan Council and STORET data

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

Volunteer: City of Lakeville staff

Valley Lake is located in the City of Lakeville (Dakota County). The surface area of the lake is 8 acres, and it has a maximum depth of 3.2 m (10 ft). 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 MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

The lake has been involved in a project in which barley straw or crushed corn was added to the lake in an attempt to inhibit algal populations. CAMP data were used to evaluate the effectiveness of these additions. Refer to McComas and Stuckert (2009b) for details on the project.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	175	37	370	F
CLA (µg/l)	84	5.4	270	F
Secchi (m)	1.2	0.5	2.3	D
TKN (mg/l)	1.67	0.90	3.00	
			Lake Grade	F

The lake received a lake grade of F for 2013. The water quality for 2013 was the worst observed yet according to its historical water quality database (1995 — 2013). The lake grades have varied in the range of B to D for the years prior to 2013.

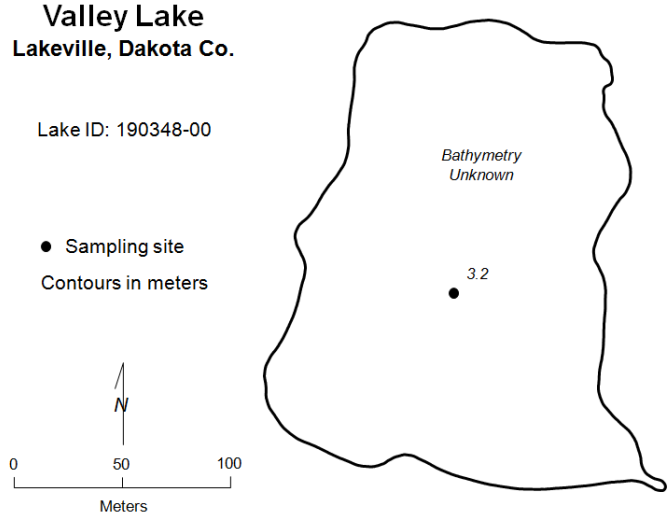
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

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

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

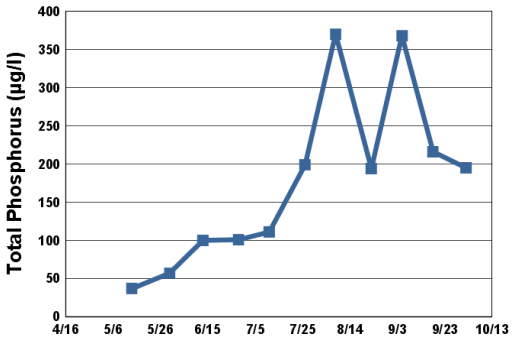
Valley Lake
Lakeville, Dakota Co.

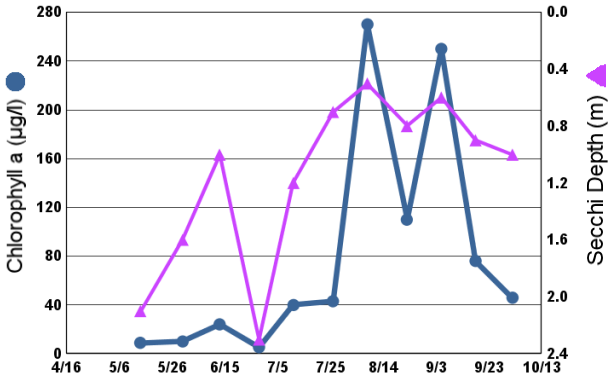
Lake ID: 190348-00

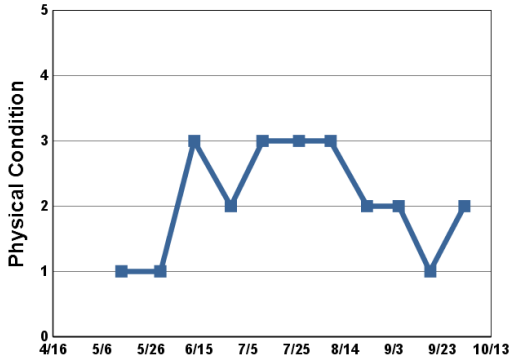


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/14	16.0		8.9	37	2.1	1	1
5/30	15.0		10	57	1.6	1	1
6/13	22.0		24	100	1.0	3	3
6/28	25.1		5.4	101	2.3	2	2
7/11	27.0		40	111	1.2	3	3
7/26	24.5		43	199	0.7	3	
8/8	25.2		270	370	0.5	3	4
8/23	25.0		110	194	0.8	2	2
9/5	26.2		250	368	0.6	2	1
9/18	19.9		76	216	0.9	1	1
10/2	17.0		46	195	1.0	2	2







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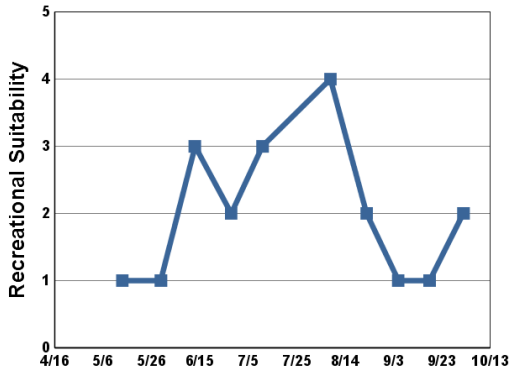
3 = Definite Algal Presence
4 = High Algal Color
5 = Severe Algal Bloom



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

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Waconia Lake (10–0059) *Carver County Environmental Services*

Volunteer: Carver County staff

Lake Waconia is located near the City of Waconia (Carver County). It is considered a Priority Lake by the Metropolitan Council for its high regional recreation value (METC 2007). The lake is one of the largest bodies of water in the region with a surface area of approximately 3,000 acres. It has mean and maximum depths of 4.0 m and 11.3 m (13 ft and 47 ft), respectively. The MN DNR has designated the lake as being infested with Eurasian water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

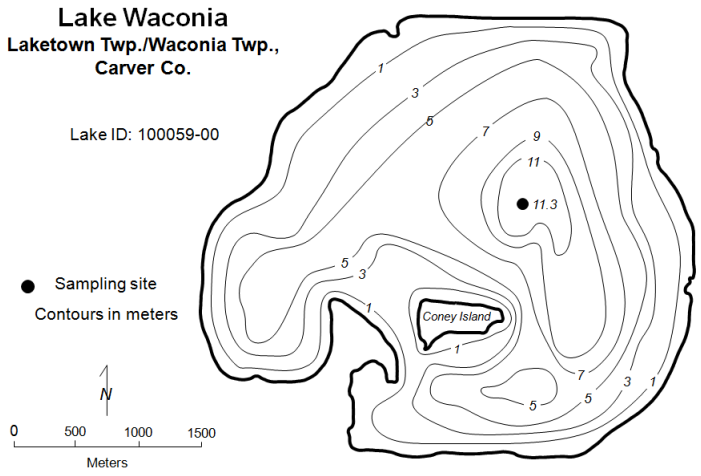
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	31	12	62	B
CLA (µg/l)	13	2.0	36	B
Secchi (m)	2.8	1.2	5.6	B
TKN (mg/l)	0.84	0.54	1.20	
			Lake Grade	B

The lake received a lake grade of B for 2013, which is consistent with its historical database. The lake grades fluctuate from year to year, but generally the lake receives either a B or C lake grade.

Throughout the monitoring period, the volunteer's opinions of 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.

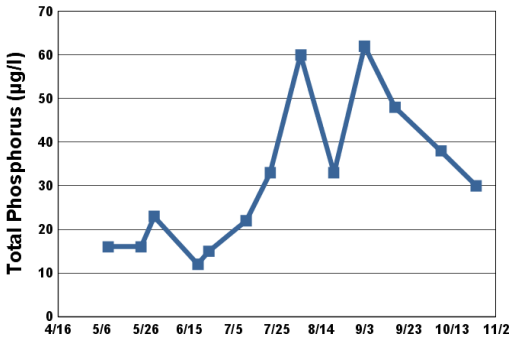
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

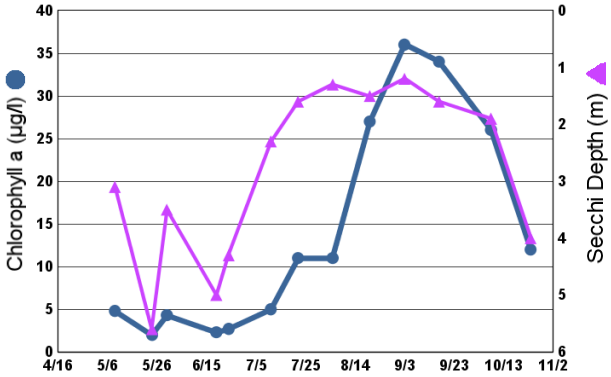
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

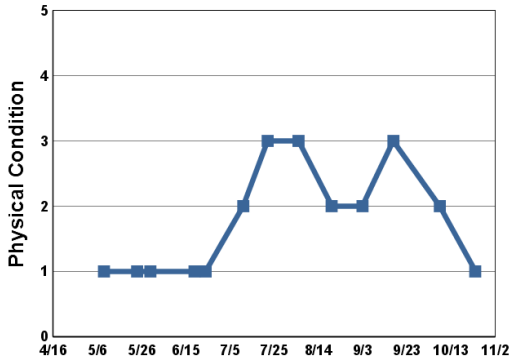


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/9	7.3	13.9	4.8	16	3.1	1	1
5/24	14.7	14.5	2.0	16	5.6	1	1
5/30	15.4	12.5	4.3	23	3.5	1	1
6/19	20.9	15.6	2.3	12	5.0	1	1
6/24	23.1	14.7	2.7	15	4.3	1	1
7/11	25.5	9.6	5.0	22	2.3	2	2
7/22	26.5	7.0	11	33	1.6	3	2
8/5	23.3	10.0	11	60	1.3	3	3
8/20	24.0	10.2	27	33	1.5	2	2
9/3	24.0	6.6	36	62	1.2	2	2
9/17	20.2	8.8	34	48	1.6	3	3
10/8	15.7	8.7	26	38	1.9	2	2
10/24	8.8		12	30	4.0	1	2







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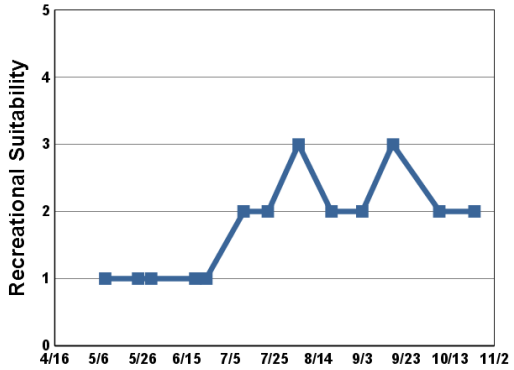
4 = High Algal Color
5 = Severe Algal Bloom



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

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

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

Source: Metropolitan Council and STORET data

West Boot Lake (82–0044) *Carnelian — Marine Watershed District*

Volunteer: Washington Conservation District staff

West Boot Lake is located in May Township (Washington County). It is considered a Priority Lake by the Metropolitan Council for its exceptional water clarity. The 110-acre lake has a mean and maximum depth of 5.9 m (19 feet) and 11.9 m (39 feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 2,090 ac-ft. Approximately 56 percent of the lake's surface area is considered littoral zone, which is the 0-15 feet depth zone of aquatic plant dominance. The lake's 209-acre immediate watershed translates to a 2:1 watershed-to-lake area ratio. The greater the ratio, the greater the potential stress on the lake from surface runoff.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

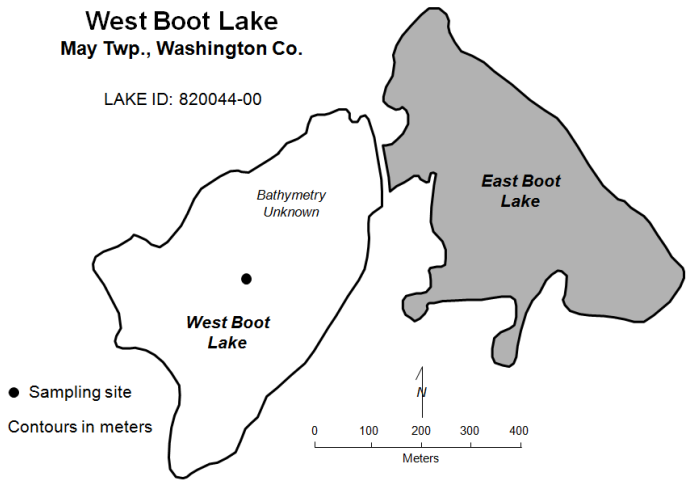
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	30	13	68	B
CLA (µg/l)	3.8	1.3	9.6	A
Secchi (m)	3.9	2.7	4.6	A
TKN (mg/l)	0.74	0.63	0.89	
			Lake Grade	A

The lake received a lake grade of A in 2013 which is consistent with its historical database.

Throughout the monitoring period, the volunteer's opinions of 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.

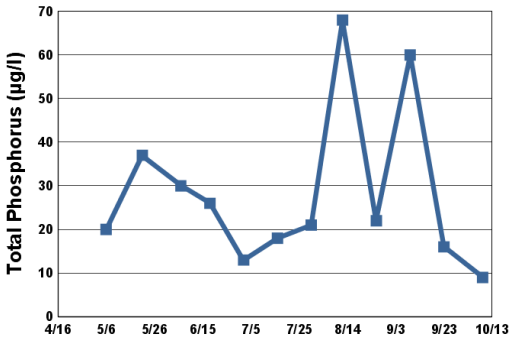
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

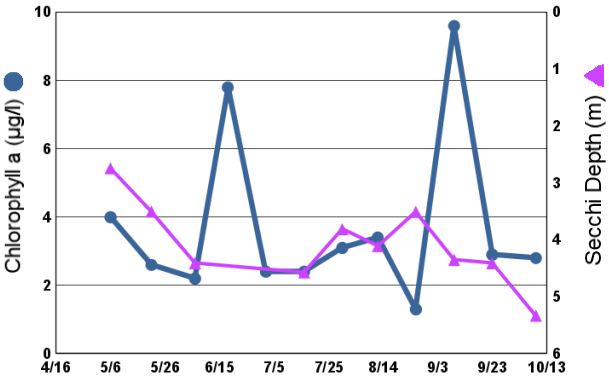
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

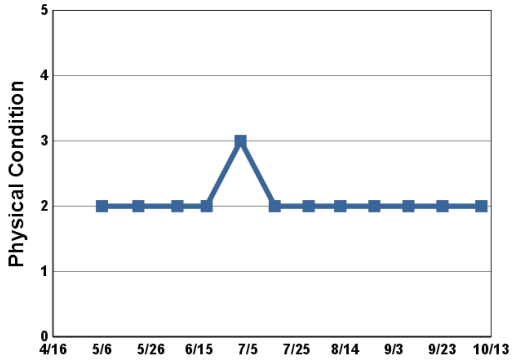


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/6	10.3		4.0	20	2.7	2	2
5/21	19.1		2.6	37	3.5	2	2
6/6	17.4	7.0	2.2	30	4.4	2	2
6/18	22.5	9.0	7.8	26		2	1
7/2	24.8	7.9	2.4	13		3	3
7/16	26.9	8.1	2.4	18	4.6	2	3
7/30	21.7	5.6	3.1	21	3.8	2	2
8/12	22.9	6.8	3.4	68	4.1	2	2
8/26	26.0	5.4	1.3	22	3.5	2	3
9/9	22.7	4.4	9.6	60	4.4	2	3
9/23	17.7	4.5	2.9	16	4.4	2	3
10/9	15.2	6.6	2.8	9	5.3	2	2







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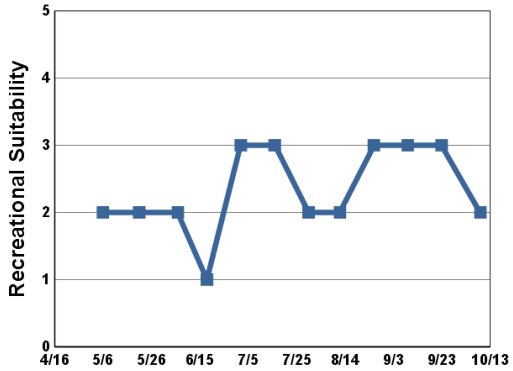

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4 = No Swimming; Boating OK
5 = No Aesthetics Possible

Lake Water Quality Grades Based on Summertime Averages

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

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

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

Source: Metropolitan Council and STORET data

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

Volunteer: Mayra Guzman

Westwood Lake is located in the City of St. Louis Park (Hennepin County). The lake has a surface are of 41 acres and a maximum depth of 2.0 m (6.6 ft). The entire area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

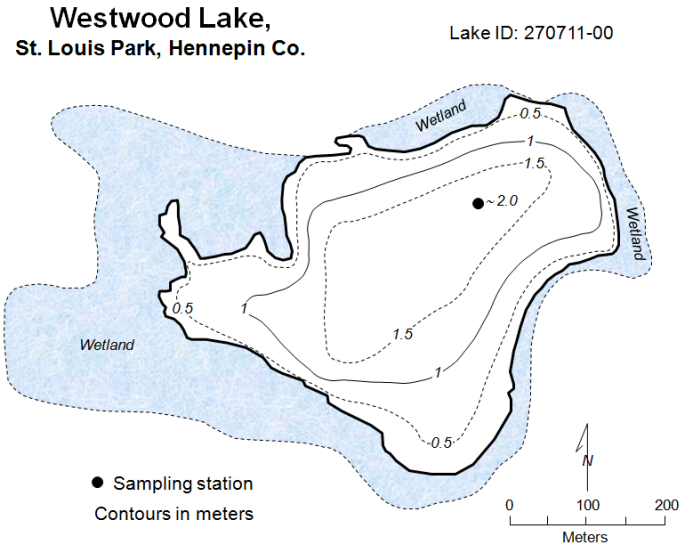
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	47	8	182	C
CLA (µg/l)	5.0	1.0	17	A
Secchi (m)	1.4	1.3	1.5	
TKN (mg/l)	1.05	0.75	1.40	
			Lake Grade	

Most of the Secchi depth measurements were not attainable because the visibility of the disk was blocked by aquatic vegetation (rather than by water clarity). There were insufficient quantity of Secchi depth measurements to calculate a Secchi grade, and therefore no lake grade was calculated. The TP and CLA grades for 2013 were within the same range as those received in the past according to its historical water quality database. 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.

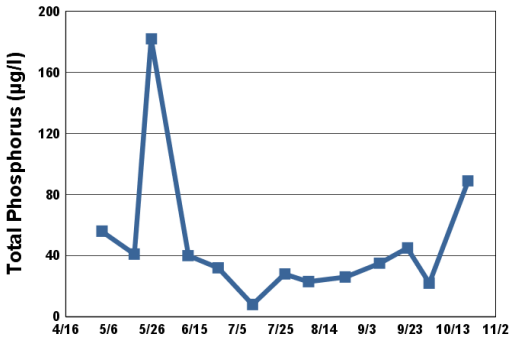
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

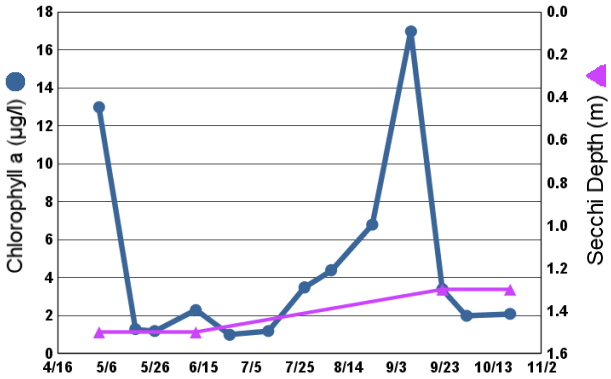
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

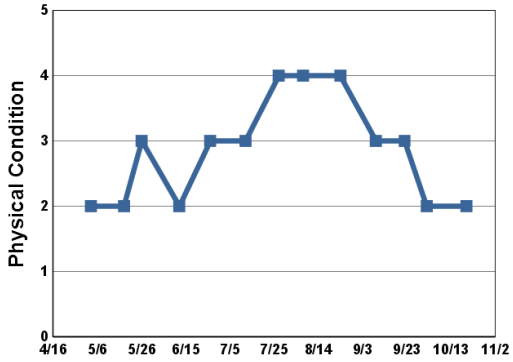


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/3	7.3		13	56	1.5	2	1
5/18	16.0		1.3	41		2	1
5/26	19.0		1.2	182		3	2
6/12	23.0		2.3	40	1.5	2	2
6/26	28.0		1.0	32		3	3
7/12	28.0		1.2	8		3	3
7/27	25.0		3.5	28		4	4
8/7	26.0		4.4	23		4	4
8/24	25.0		6.8	26		4	4
9/9	19.0		17	35		3	4
9/22			3.4	45	1.3	3	4
10/2	9.0		2.0	22		2	4
10/20	9.0		2.1	89	1.3	2	4







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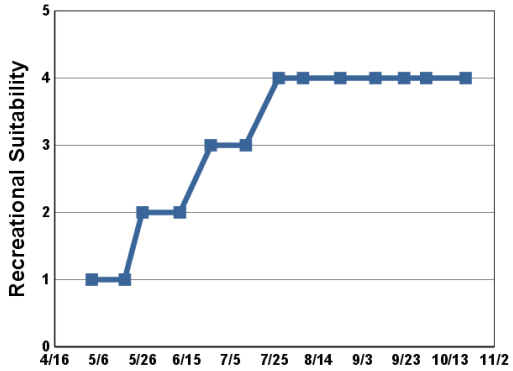

1 = Beautiful
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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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 is no other known morphological data for the lake.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	36	23	53	C
CLA (µg/l)	12	2.6	21	B
Secchi (m)	1.7	0.9	2.5	C
TKN (mg/l)	1.02	0.47	1.60	
			Lake Grade	C

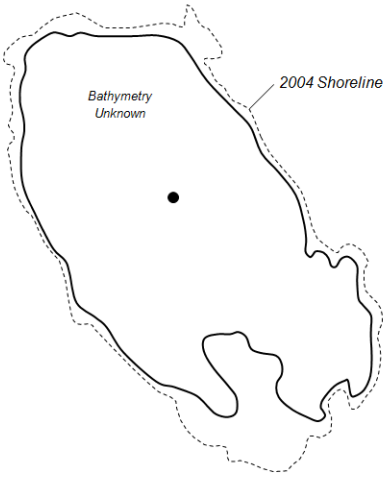
The lake received a lake grade of C in 2013, which is the fourth year in a row where a C lake grade was received. Recent years' water quality appears to be an improvement compared to water quality observed in the mid to late 2000's. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

Throughout the monitoring period, the volunteer's opinions of 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.

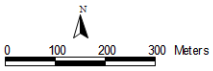
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

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

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

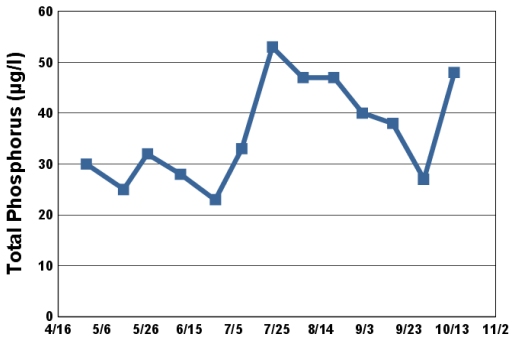


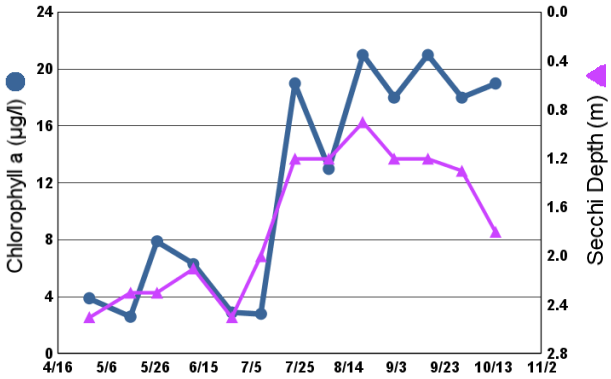
● Sampling station
Contours in meters

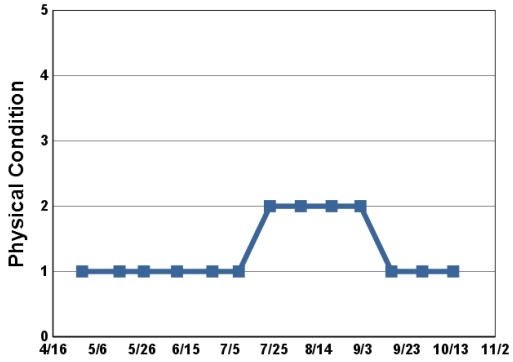


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	10.4		3.9	30	2.5	1	1
5/16	19.6		2.6	25	2.3	1	1
5/27	15.9		7.9	32	2.3	1	1
6/11	21.0		6.3	28	2.1	1	2
6/27			2.9	23	2.5	1	1
7/9	26.2		2.8	33	2.0	1	1
7/23	26.1		19	53	1.2	2	2
8/6	22.8		13	47	1.2	2	2
8/20	25.9		21	47	0.9	2	2
9/2	22.7		18	40	1.2	2	2
9/16	19.5		21	38	1.2	1	1
9/30	18.1		18	27	1.3	1	1
10/14	13.4		19	48	1.8	1	1







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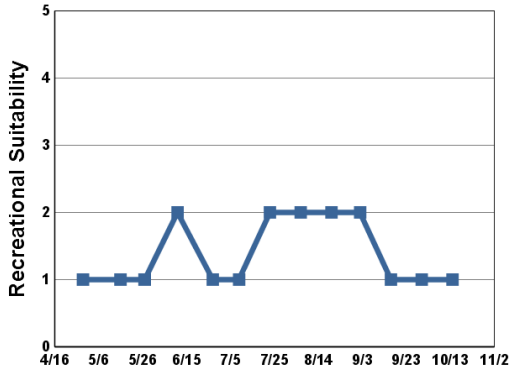


1 = Beautiful
2 = Minor Aesthetic Problem
3 = Swimming Impaired
4 = No Swimming; Boating OK
5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

Wilmes Lake (82–0090) *City of Woodbury*

Volunteer: 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 larger the ratio, the greater the potential stress on the lake quality from surface runoff. The MN DNR has designated the lake as being infested with Eurasion water milfoil (*Myriophyllum spicatum*).

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

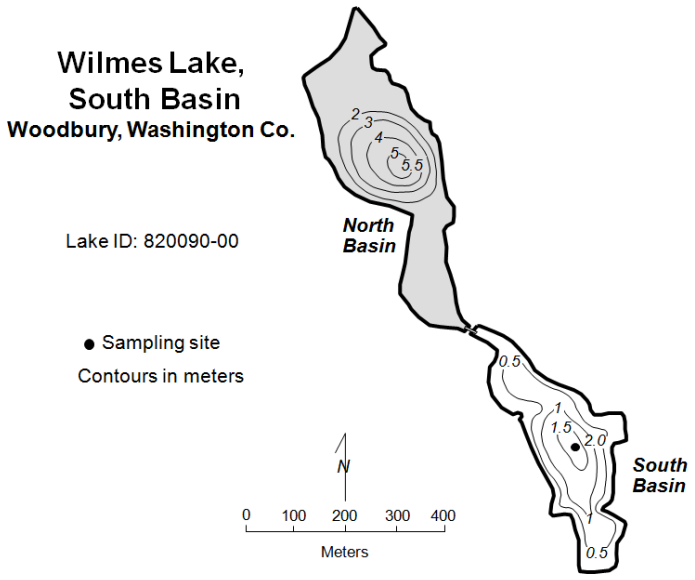
Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	68	50	111	C
CLA (µg/l)	26	1.9	52	C
Secchi (m)	0.9	0.5	1.2	D
TKN (mg/l)	1.46	1.10	1.90	
			Lake Grade	C

The lake received a lake grade of C for 2013, which is consistent with its historical water quality database. 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, while the 1996-2013 monitoring was performed in the lake's south basin.

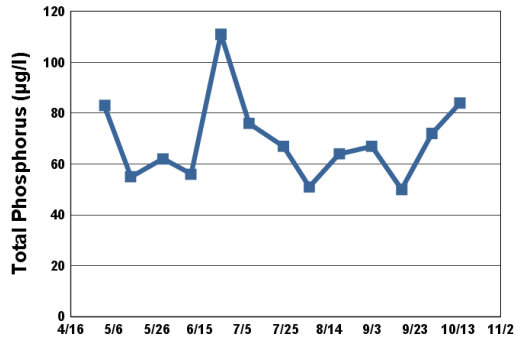
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

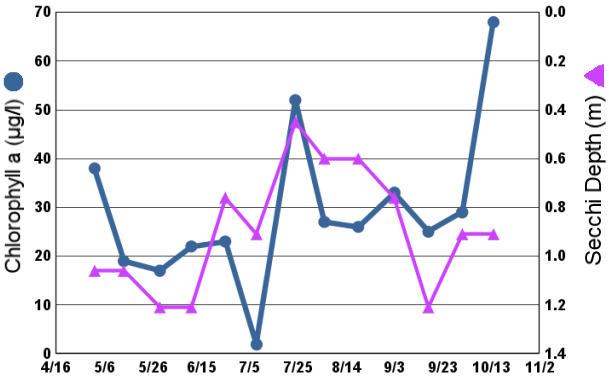
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

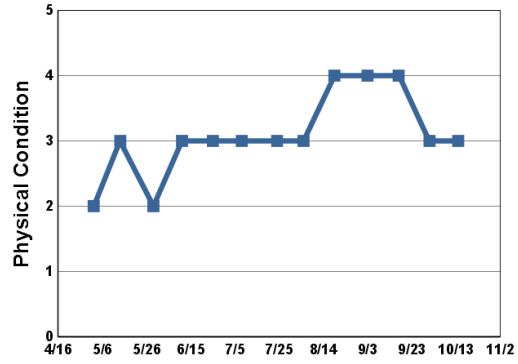


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/2	10.8	13.1	38	83	1.1	2	2
5/14	13.2	13.6	19	55	1.1	3	3
5/29	16.2	8.6	17	62	1.2	2	3
6/11	18.7	9.9	22	56	1.2	3	3
6/25	23.9	6.8	23	111	0.8	3	3
7/8	27.1	9.4	1.9	76	0.9	3	4
7/24	25.0	8.4	52	67	0.5	3	4
8/5	21.7	8.1	27	51	0.6	3	4
8/19	23.4	8.4	26	64	0.6	4	4
9/3	22.3	7.3	33	67	0.8	4	4
9/17	18.2	7.2	25	50	1.2	4	4
10/1	18.3	7.2	29	72	0.9	3	4
10/14	14.2	10.1	68	84	0.9	3	4







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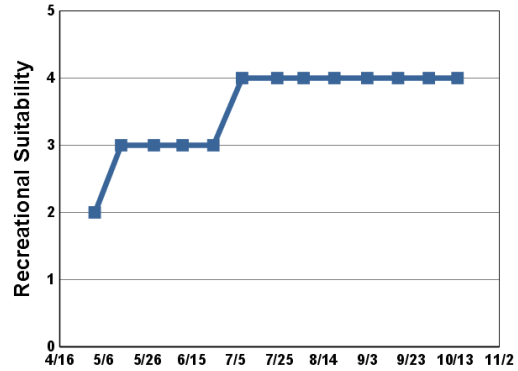

1 = Beautiful
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3 = Swimming Impaired
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5 = No Aesthetics Possible

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

Source: Metropolitan Council and STORET data

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

Volunteer: John Burton, Mary Quinn

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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

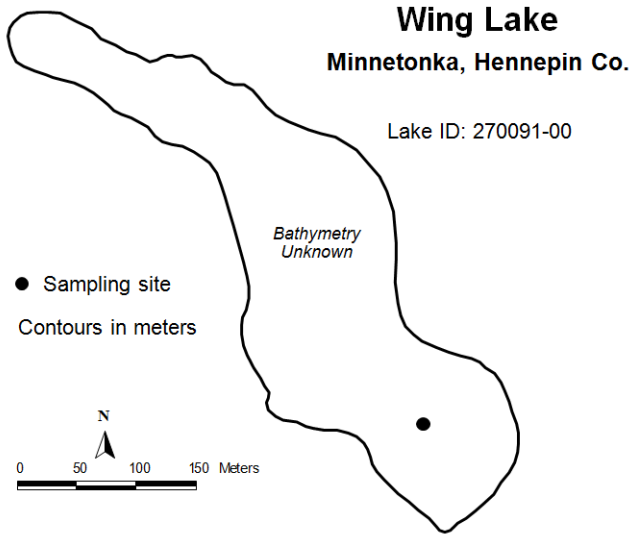
2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	77	48	133	D
CLA (µg/l)	32	8.9	67	C
Secchi (m)	0.9	0.6	1.7	D
TKN (mg/l)	1.16	0.82	1.60	
			Lake Grade	D

The lake received a lake grade of D for 2013, which is consistent with its limited historical database. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

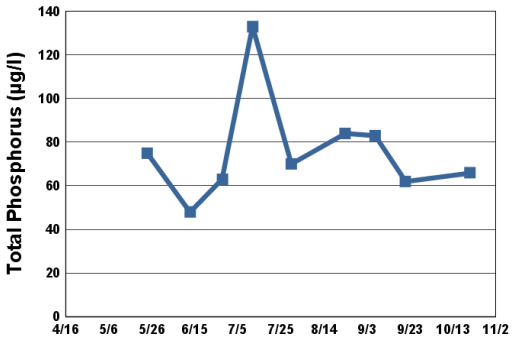
Throughout the monitoring period, the volunteer's opinions of the lake's physical condition and recreational suitability were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page.

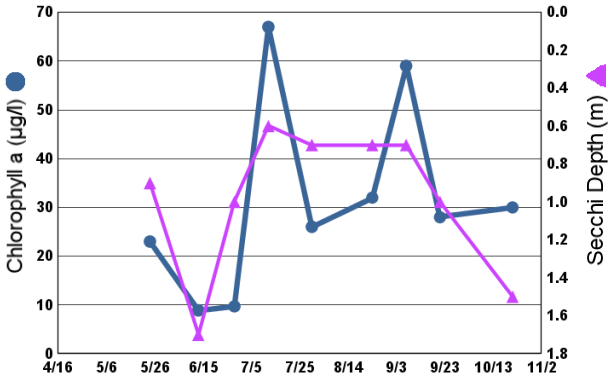
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

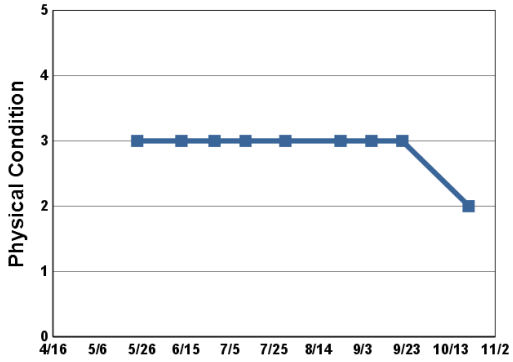


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/24	19.2		23	75	0.9	3	4
6/13	20.0		8.9	48	1.7	3	5
6/28	23.0		9.7	63	1.0	3	5
7/12	25.0		67	133	0.6	3	5
7/30	22.0		26	70	0.7	3	5
8/24	22.0		32	84	0.7	3	5
9/7	23.0		59	83	0.7	3	5
9/21	13.0		28	62	1.0	3	5
10/21	4.0		30	66	1.5	2	4







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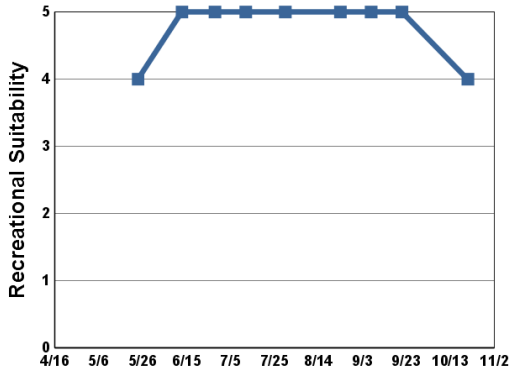
4 = High Algal Color
5 = Severe Algal Bloom



1 = Beautiful
2 = Minor Aesthetic Problem
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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												
Sec-chi												
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
TP			D	D	D	D	D	D	F	D
CLA			C	C	C	C	D	C	C	C
Secchi			D	D	D	D	D	D	D	D
Lake Grade			**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data

Wood Lake (19–0024) *Black Dog Watershed Management Commission*

Volunteer: The Mock Family

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 area of the lake is considered littoral zone which is the 0-15 feet depth zone of aquatic plant dominance. 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.

On each sampling day the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	33	19	48	C
CLA (µg/l)	7.6	2.3	15	A
Secchi (m)	1.3	0.3	2.9	C
TKN (mg/l)	1.01	0.74	1.20	
			Lake Grade	B

The lake received a lake grade of B for 2013, which is a return to water quality observed in 2011. The lake typically has received a lake grade of C with the occasional B.

Throughout the monitoring period, the volunteer's opinions of 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.

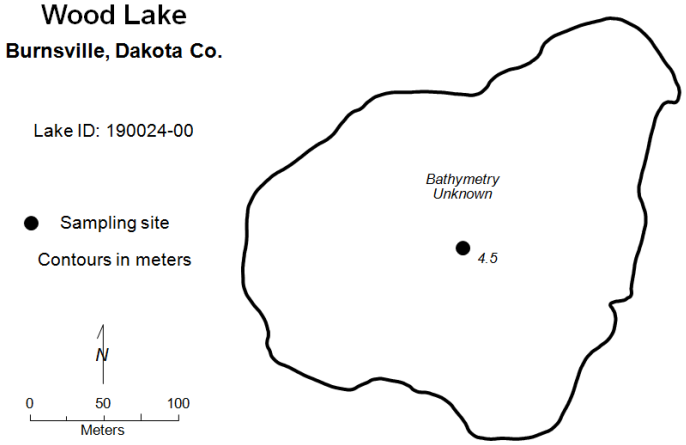
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 259-5831 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

Wood Lake

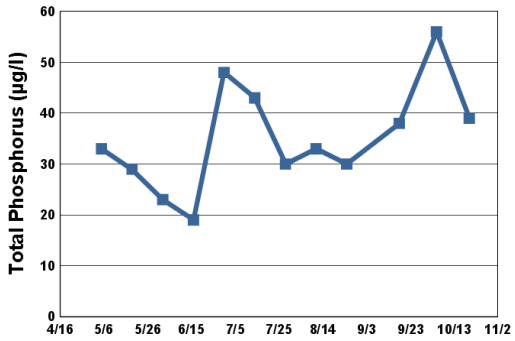
Burnsville, Dakota Co.

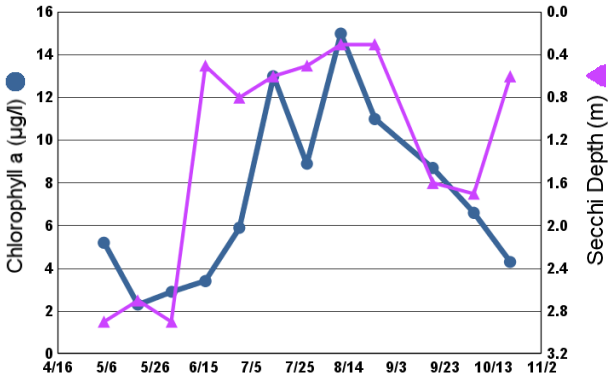
Lake ID: 190024-00

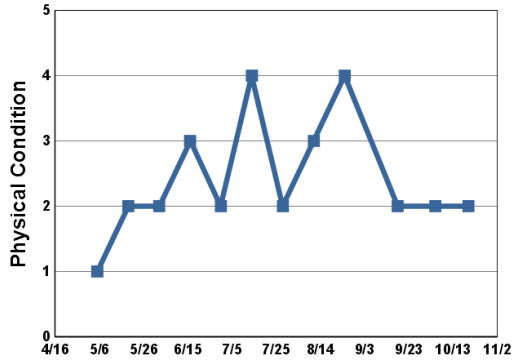


2013 Data

Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
5/5	19.1		5.2	33	2.9	1	3
5/19	20.0		2.3	29	2.7	2	2
6/2	20.2		2.9	23	2.9	2	2
6/16	23.7		3.4	19	0.5	3	2
6/30	23.7		5.9	48	0.8	2	2
7/14	27.0		13	43	0.6	4	3
7/28	26.0		8.9	30	0.5	2	
8/11	26.2		15	33	0.3	3	
8/25	28.6		11	30	0.3	4	
9/18	18.6		8.7	38	1.6	2	2
10/5	16.2		6.6	56	1.7	2	2
10/20	15.0		4.3	39	0.6	2	2







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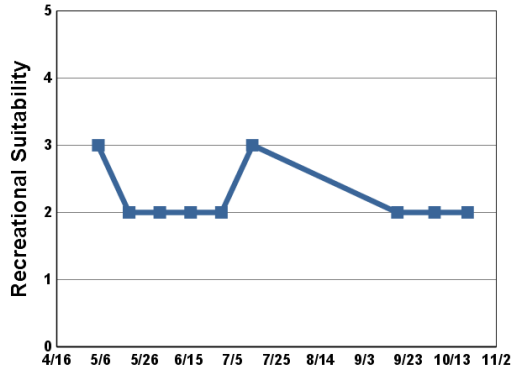

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Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

Woodpile Lake (82–0123) *Browns Creek Watershed District*

Volunteer: 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 the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data are summarized in tables and figures on the following pages.

2013 summer (May - September) data summary

Parameter	Mean	Minimum	Maximum	Grade
TP (µg/l)	29	22	35	B
CLA (µg/l)	6.8	4.2	11	A
Secchi (m)	3.4	2.0	4.3	A
TKN (mg/l)	0.98	0.88	1.30	
			Lake Grade	A

The lake received a lake grade of A for 2013. This year was the third year in a row that the lake received an A grade for Secchi depth. All three parameter grades have improved since 2006. TP grades have changed from D to B; 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. Additional years of monitoring are suggested for continuing to build the water quality database so as to better understand the lake's water quality and determine potential water quality trends.

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

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

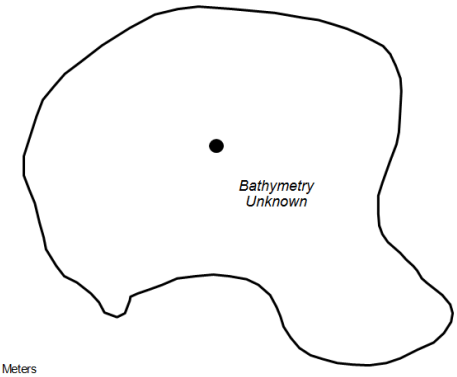
Woodpile Lake

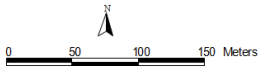
Grant, Washington Co.

Lake ID: 820132-00

● Sampling site

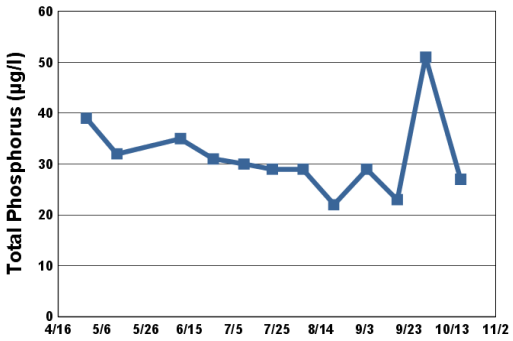
Contours in meters

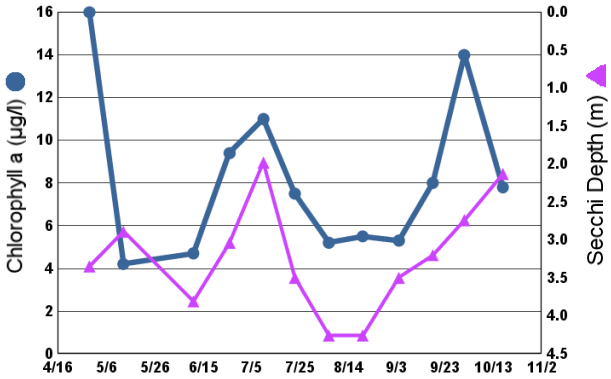


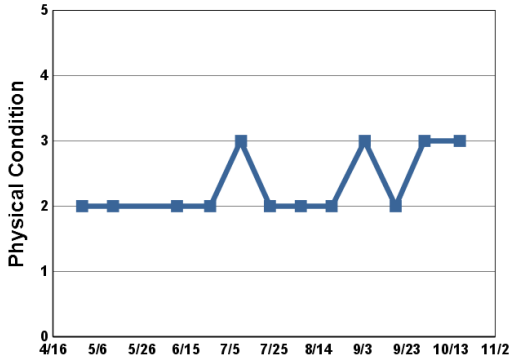


2013 Data

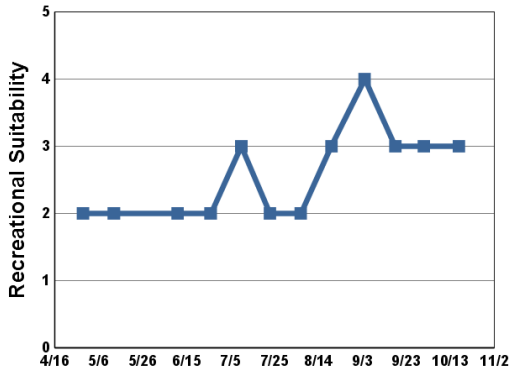
Date	SURF-TEMP (° C)	SURF DO (mg/L)	CLA (µg/L)	SURF TP (µg/L)	Secchi (m)	PC (1-5)	RS (1-5)
4/29	6.2	10.6	16	39	3.4	2	2
5/13	13.3	12.5	4.2	32	2.9	2	2
6/11	18.7	9.9	4.7	35	3.8	2	2
6/26	26.7	8.9	9.4	31	3.0	2	2
7/10	27.1	8.0	11	30	2.0	3	3
7/23	26.1	6.2	7.5	29	3.5	2	2
8/6	23.7	7.5	5.2	29	4.3	2	2
8/20	24.5	8.6	5.5	22	4.3	2	3
9/4	25.7	6.5	5.3	29	3.5	3	4
9/18	19.2	8.6	8.0	23	3.2	2	3
10/1	17.9	8.4	14	51	2.7	3	3
10/17	12.6	6.6	7.8	27	2.1	3	3







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



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

Lake Water Quality Grades Based on Summertime Averages

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

Source: Metropolitan Council and STORET data

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Appendices

Topics Covered in this Chapter

♦ Appendix A
♦ Appendix B
♦ Appendix C
♦ Appendix D
♦ Appendix E

Appendix A

APPENDIX A

Lakes Sampled by Metropolitan Council Staff and the CAMP, 1980 - 2013

(Numbers indicate monitoring events per year. A "v" indicates monitoring performed by volunteers.)

Lake	DNR ID	Location	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
Acorn Lake	82010200																												v14		v 6	v 6	v 7			
Alimagnet Lake	19002100																	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
Anderson Pond	19009400																																v 12	v 9	v 3	
Ann Lake	10001200							5				13													13										6	
Ardmore Lake	27015300																													v4	v 11	v 14	v 12			
Armstrong Lake	82011602	south basin																			v15	v10	v13	v14	v15	v14	v14	v14	v7	v7	v 7	v 14	v 7	v 7	v 7	v 7
Assumption Lake	10006300																					v1														
Auburn Lake	10004401	west				10			17	18				12			13																			
Auburn Lake	10004402	east				10																														
Aue Lake	10002800																					v1														
Bald Eagle Lake	62000200	site 1	4	5		5																					13	13								
Bald Eagle Lake	62000200	site 2																									13	13								
Baldwin Lake	2001300																																	v 2		
Barker Lake	82007600																						v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7				v 12
Barnes Lake	10010900																					v1														
Bass Lake	27001500	St. Louis Park																							v12			v12	v2							
Bass Lake	27009800	Plymouth	4														v16			v15		v15		v13		v9		v15		v14		v 12		v 14		
Bass Lake	82003500	May Township																					v14	v5	v7	v7	v7	v7	v7	v7	v 7	v 7			v 7	v 12
Bass Lake	82012300	west [Grant Twnshp]																											v7	v8	v 7	v 7	v 14	v 14	v 14	v 12
Bass Lake	82012400	east [Grant Twnshp]																											v7	v7	v 7	v 7	v 14	v 14	v 14	v 12
Battle Creek Lake	82009100															v14	v13	v11	v13																
Bavaria Lake	10001900					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
Bay Pond	82001100																												v14	v14	v 11	v 7	v 7		v 6	v 7
Benton Lake	10006900																					v13	v14	v14		v15		v14		v13	v 14	v 14	v 14	v 14	v 14	v 13
Benz Lake	82012000																				v8							v14	v14	v14	v 14	v 14	v 14	v 15	v 14	v 12
Berliner Lake	10010300																					v1														
Beutel Pond	82039900																														v 7	v 5	v 3			
Big Carnelian Lake	82004900						5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7	v 6	v 7	v 7		v 6	v 12
Big Comfort Lake	13005300																			v3			v14	v14	v14	v14	v14	v13	v14	v14	v 14	v 13	v 14	v 13	v 14	v 22

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Lake	DNR ID	Location	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
Big Marine Lake	82005200		4	5			5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7	v 7	v 7	4 & v 7	12		v 12
Big Marine Lake	82005200																																4	11		
Birch Lake	13004200																											v10	v7	v7						
Birch Lake	62002400		2																									v14								
Bluebill Bay Lake	19044900																			v8																
Bone Lake	82005400						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
Brand Lake	10011000																					v1														
Braunworth Lake	10010700																					v1														
Brick Pond	82030800																														v 7	v 6	v 7	v 7	v 6	v 6
Brickyard Clayhole Lake	10022500																								v14	v13	v14	v14	v14	v13	v 14	v 15	v 14	v 14	v 14	v 13
Bryant Lake	27006700		2	5	16		5					13	13	12																				v 2	
Burandt Lake	10008400																					v7	v13	v9			v18	v22				v 4	v 14	v 14	v 14	v 13
Bush Lake	27004700						5									13	13					13		13			13		v13	v15	v 13	v 13	v 13	v 12	v 13	v 12
Byllesby Lake	19000600	deepest point														v14	v14	v13																		
Byllesby Lake	19000600	east end of lake																																		12
Byllesby Lake	19000600	center of lake																																		12
Calhoun Lake	27003100			5			5																													
Campbell Lake	10012700																					v2	v14		v10			v14	v14							
Capaul Pond	82036500	east basin																													v 7	v 3	v 7			
Capaul Pond	82036500	west basin																													v 7	v 1				
Carol Lake	82001700																						v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 6			v 5	v 10
Carver Lake	82016600										20					v15	v15	v16	v9																	
Cates Lake	70001800																								v14	v13	v15	v13	v14	v13	v 12	v 13	v 13	v 12	v 9	v 11
Cedar Island Lake	27011900																	v13						v13		v11			v9			v 11				
Cedar Lake	27003900	Minneapolis					5																													
Cedar Lake	70009100	Scott Co.	4	5			5						13			14					13			13				13	v14	v14	v 14	v 14	v 14	v 14	v 14	v 12
Cedar Lake	70009100	Scott Co.																																v 11	v 13	
Cenaiko Lake	2065400																			v12	v11	v13	v11	v13	v12	v12	v14	v14	v14	v12	v 13	v 13	v 13	v 13	v 14	
Centerville Lake	2000600		4	5		5																	13	13/v4	v1	13	13					2				

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Lake	DNR ID	Location	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
Charley Lake	62006200							5																												
Christmas Lake	27013700		4	5				5												13	13	13			13	13							1	4	4	2
Chub Lake	19002000		2													v14	v14	v11														10	10		
Clear Lake	82004500	May Township																													v 14	v 14	v 7	v 8	v 7	v 7
Clear Lake	82009900	north lobe [Lake Elmo]																														v 4				
Clear Lake	82009900	south lobe [Lake Elmo]																														v 6				
Clear Lake	82016300	Forest Lake	4				5						13			v11	v12	v12	v11	v10	v11	v10	v9	v12	v12	v12	v6		13			3				
Cleary Lake	70002200						5																													
Cloverdale Lake	82000900																							v10	v10	v11	v13	v12	v11	v10	v 9	v 11	v 10	v 9	v 9	v 8
Cobblecrest Lake	27005300																								v4		v14	v16	v13	v13	v 13	v 10	v 9	v 6	v 4	v 7
Cobblestone Lake	19045600																											v14	v14	v12	v 14	v 13	v 14	v 14	v 13	v 12
Cody Lake	66006100																													v3						
Colby Lake	82009400																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
Coon Lake	2004200		4				5										13			13												2				
Cornelia Lake	27002800																									v7		v11	v14	v14	v 13	v 14				v 5
Courthouse Lake	10000500	Chaska																	v2	v14	v13	v13	v14	v14	v14	v14	v14	v14	v13	v13	v 14	v 14	v 14	v 14	v 14	v 13
Cowley Lake	27016900																		v12										v10	v1		v 4	v 6			
Crane Lake	27073400															v9																				
Crooked Lake	2008400					5						13				v15	v15	v14	v14	v12	v14	v14														
Crystal Lake	19002700	Burnsville	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
Crystal Lake	27003400	Robbinsdale							17	19	19						v15			v11				v8				v7			v 7		v 8			
Crystal Lake	70006100	Spring Lake																		v12		v11														
Cynthia Lake	70005200		2																																	
Dan Patch Lake	70001600																			v15																
Dean Lake	70007400																								v7	v7	v6	v7	v8	v9	v 10	v 12	v 8	v 3		
Deeg Lake	19011700																							v12												
Deep Lake	62001800							5																												
Demontreville Lake	82010100		4				5							12		v15		14					13			13	v14	v7	v7	v11	v 20	v 12	v 14	v 20	v 14	v 12
Diamond Lake	27012500	Dayton	2														v13										13									

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Lake	DNR ID	Location	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
Downs Lake	82011000																					v14		v9	v9	v6	v7	v9	v7	v5	v 2	v 9	v 1		v 7	v 7
Dubay Lake	27012900																																		v 14	v 8
Dutch Lake	27018100						5																													
Eagle Lake	10012100	Young America	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
Eagle Lake	27011101	Maple Grove	4			5			17	18				11		v15			v14	v14	v14		v6		v4			v6				v 6			11	
Eagle Point Lake	82010900				2											v14													v5	v2	v 2	v 2		v 7	v 6	v 7
Earley Lake	19003300																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
East Boot Lake	82003400																						v14	v14	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7	v 7	v 7	v 12
East Lake	19034900																											v13	v6	v14	v 13		v 14	v 11	v 13	v 11
East Twin Lake	2013300		2	5		5						13						13			13											3	6			
Echo Lake	82013500																												v10	v8	v 4		v 7		v 7	v 7
Edina Lake	27002900																										v10	v10								
Edith Lake	82000400																											v6	v12	v12	v 15	v 17		v 15	v 15	v 16
Egg Lake	82014700																							v3												
Elmo Lake	82010600		4	5	16		5				19			12			v11											v9	v8	v8	v 18	v 9	v 19	v 9	v 9	v 6
Fahlstrom Pond	82000500	east basin																													v 3	v 8	v 4			
Fahlstrom Pond	82000500	west basin																													v 5	v 5	v 5			
Farquhar Lake	19002300		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
Fireman's Clayhole Lake	10022600																							v12	v14	v14	v14	v14	v13	v13	v 14	v 14	v 14	v 14	v 14	v 13
Fish Lake	19005700	Eagan										13																								
Fish Lake	27011800	Maple Grove	4	5	16			5					13																							
Fish Lake	70006900	Scott Co.	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
Fish Lake	82006400	Washington Co.																					v5	v14	v7	v7	v7	v7	v7	v7	v 7	v 8	v 7	v 7		
Fish Lake	82009300	Woodbury																															v 14	v 14	v 14	v 12
Fish Lake	82013700	Grant Township																							v5	v5	v4							v 13	v 14	v 4
Forest Lake	82015900	west basin					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
Forest Lake	82015900	middle basin					5						13			v7			v12						13			13	13			v 11		v 12	v 14	v 24
Forest Lake	82015900	east basin	4				5						13			v7			v12						13			13	13			v 8	v 8	v 7	v 16	v 20
French Lake	27012700																							v11	v10	v7	v7									

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Lake	DNR ID	Location	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
Friedrich's Pond	82010800																												v13	v14	v 11	v 1				
Gables Lake	82008200																				v8	v5														
Gaystock Lake	10003100																					v2	v14	v14				v14	v14							
George Lake	2009100		4	5	16		5					13					13				13											v 14				
George Watch Lake	2000500																		v14	v12	v11	v11	v6	v7	v8	v9	v10	v12	v7	v8	v 12	v 14	v 14	v 14	v 12	v 8
German Lake	82005600																								v7	v7	v7	v7	v7	v7	v 7	v 7			v 7	
Gervais Lake	62000700							5																												
Glen Lake	27009300																												v13	v7	v 4					
Goetschel Lake	82031300																								v11	v9	v4	v15	v9	v5	v 7	v 7	v 7			
Goggins Lake	82007700																					v13	v14	v14	v14	v14	v14	v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13
Golden Lake	2004500		2											12		14			v13	v11	v15	v13	v13	v12	v11	v11	v10	v11	v11	v10	v 9	v 13	v 12			
Goose Lake	10008900	Waconia																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
Goose Lake	19036000	Lakeville																v13	v13																	
Goose Lake	82005900	New Scandia															v15	v15	v13	v13	v15						v7	v7	v7	v7	v 14	v 7	v 7	v 7	v 7	v 12
Goose Lake	82011300	north basin [Lake Elmo]																													v 7	v 7	v 7		v 7	v 7
Goose Lake	82011300	south basin [Lake Elmo]																													v 7	v 7	v 7		v 7	v 7
Grace Lake	10021800																								v11	v14	v14		v14		v 14	v 14	v 14	v 14	v 14	v 14
Grass Lake	27068100																			v12																
Haas Lake	70007800																																			v 4
Hafften Lake	27019900																						13	13			13	v15	v13				v 13			v 12
Ham Lake	2005300						5									v15	v13		v13	v9	v14															
Harriet Lake	27001600						5																													
Hart Lake	2008100																										v6	v4	v8							
Harvey Lake	27067000																										v10									
Haughey Lake	27018700																								v4											
Hay Lake	82006500																				v14	v13	v14	v14	v4	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7		v 12
Hazeltine Lake	10001400																					v1	v14	v14				v14	v14			v 14	v 14	v 14	v 14	v 13
Heims Lake	13005600																															v 10				
Henry Lake	27017500																	v10										v11	v11	v6	v 7	v 7	v 5	v 10		

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Herber Pond	82001501																										v14	v14	v7	v7						
Hidden Lake	27069300																																v 9			
Highland Lake	2007900																					v13	v11	v13	v12	v12	v14	v14	v14	v12						
Holland Lake	19006500					10	16	15			20					13						13											1	4	4	2
Hornbeam Lake	19004700																												v11	v8	v 7	v 5	v 2			
Horseshoe Lake	19003200	Dakota Co.																v11	v10												v 1					
Horseshoe Lake	19005100	Sunfish Lake																											v11	v11	v 8	v 14	v 13	v 10	v 11	v 11
Horseshoe Lake	82007400	center																				v1														
Horseshoe Lake	82007400	west basin																														v 8				
Horseshoe Lake	82007400	east basin																														v 7	v 7	v 7	v 7	v 7
Hydes Lake	10008800							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
Independence Lake	27017600		4	5		5							13			v14	v15																			
Isabelle Lake	19000400																v14																			
Island Lake	2002200	Linwood				7																				v12	v14	v14	v14	v13	v 13	v 14	v 14	v 14	v 14	
Jackson WMA	82030500																																v 14	v 14	v 14	v 13
Jane Lake	82010400						5		17	18				12			v12						13				v15	v13	v10	v12	v 16	v 11	v 9	v 9	v 5	v 4
Jellums Lake	82005202	Site 1																					v14	v14	v12	v14	v14	v14	v7	v7	v 7	v 7	v 7	v 7		
Jellums Lake	82005202	Site 2																							v11	v11										
Johanna Lake	62007800			5				5				13																								
Jonathan Lake	10021700																								v13				v14		v 14	v 14	v 14	v 14	v 14	v 13
Josephine Lake	62005700							5				13																								
Jubert Lake	27016500																						v11													
July Lake	82031800																												v7	v7	v 7	v 5		v 14	v 14	v 13
Karth Lake	62007200																													v11	v 13	v 14	v 14	v 13	v 14	v 13
Keller Lake	19002500	Burnsville																	13	13	v13	v15	v14	v12	v13	v15	v15	v14	\14	v12	v 8	v 12	v 14	v 13	v 14	v 13
Keller Lake	62001000	Maplewood						5																												
Kingsley Lake	19003000															5		v11	v10	v9			v14	v14	v15	v14	v15	v16	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11
Kismet Lake	82033400																				v14	v13	v14	v14	v14	v14	v14	v13	v14	v14	v 14	v 14	v 14	v 14	v 14	v 12
Klawitter Pond	82036800																								v13	v13	v14	v13	v12	v12	v 13	v 14	v 11	v 12	v 13	v 11

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Lake	DNR ID	Location	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
Kohlman Lake	62000600							5																												
Kramer Pond	82011700																														v 7	v 7	v 7		v 7	v 7
La Lake	82009700																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
Lac Lavon Lake	19044600																			v11	v10	v10	v9	v2	v7	v12	v12	v12	v12	v13	v 12	v 14	v 13	v 13	v 14	v 13
Laddie Lake	2007200		4													v13	v14	v12					v13	v13	v14	v10									
Lake Forest	82018700																														v 12	v 11				
Lake of the Isles	27004000						5																													
Lake Minnetonka	27013302	lower	4	5																																
Lake Minnetonka	27013305	upper	2	5																																
Langdon Lake	27018200						5																													
Langton Lake	62004901	north site																										v14	v7	v13	v 13	v 13	v 13	v 13	v 12	v 10
Langton Lake	62004902	south site																										v14	v13	v13	v 13					
Langton Lake	62020400	north basin																										v14								
Laura Lake	27012300																																			v 12
Lee Lake	19002900																v14	v15	v14	v13			v12	v13	v11	v9	v15	v9	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11
Legion Pond	82046200																											v14	v10		v 7	v 2				
Lemay Lake	19008200																													v11	v 11	v 9	v 11	v 10	v 5	v 7
LeVander Pond	19008800																																v 11	v 9	v 3	
Libbs Lake	27008500																										v10									
Lily Lake	82002300																	v15	v14	v14	v15	v13	v14	v14	v14	v7	v7	v7	v7	v7	v 14	v 12	v 9		v 11	v 12
Linwood Lake	2002600		4	5		7						13					13			13											v 13					
Lippert Lake	10010400																					v1														
Little Carnelian Lake	82001400																						v14	v7	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7		v 1	v 12
Little Comfort Lake	13005400																												v14	v13	v 12	v 12	v 12	v 13	v 11	v 19
Little Johanna Lake	62005800																							v12	v16	v15	v8	v6	v3		v 14	v 13	v 12	v 10	v 14	v 11
Little Long Lake	27017901		4				5						13								13			13		13			v11	v2		v 13	v 14		10	
Lochness Lake	2058500																													v12	v 11	v 13	v 10	v 7	v 11	v 9
Lone Lake	27009400																															v 15	v 13	v 11		
Long Lake	10001600	Carver Co.																				v2		v13		v5										

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Long Lake	19002200	Apple Valley																		v16					v11	v13	v12	v15	v14	v13	v 14	v 13	v 14	v 14	v 13	v 11
Long Lake	27016000	Orono				5																														
Long Lake	62006700	north site [New Brighton]						5																												
Long Lake	62006700	south site [New Brighton]						5																												
Long Lake	82002100	north basin [Stillwater]																v14	v7		v14	v13	v14	v14	v14	v14	v14	v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13
Long Lake	82002100	middle basin [Stillwater]																														v 4	v 4	v 4	v 4	v 4
Long Lake	82002100	south basin [Stillwater]																														v 4	v 4	v 4	v 4	v 4
Long Lake	82003000	May Township														v14	v14	v14	v13	v14		v14	v14	v14	v14	v14	v7	v7	v7	v7	v 7	v 7	v 7	v 7		v 12
Long Lake	82006800	Scandia																					v5	v14	v7	v7	v7	v7	v7	v7	v 8	v 6	v 7	v 7		
Long Lake	82011800	Pine Springs														v14										13	v15	v14	v14	v14	v 14	v 14		v 21	v 14	v 13
Long Lake	82013000	Mahtomedi																								v11	v9	v12	v10	v10	v 10	v 10	v 9	v 9	v 8	v 10
Loon Lake	82001502									2	18												v14	v14	v7	v7	v7	v7	v7	v7	v 14	v 7	v 12	v 1	v 5	
Lost Lake	27010300															v13																			v 3
Lost Lake	82013401	north basin																										v13	v13	v 11					
Lotus Lake	10000600							5					13									13	13			v5	v10	v8	v11	v9	v 11	v 10	v 11	v 8	v 2	
Louise Lake	82002500																						v5	v5	v7	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7		
Lucy Lake	10000700							5																								v 13	v 12	v 13	v 12	v 10
Lynch Lake	82004200	north																											v7	v 14	v 13	v 14	v 14	v 14	v 13
Lynch Lake	82004200	south																															v 14	v 14	v 14	v 12
MacDonald Lake	82006200																										v14	v14	v7	v7					
Magda Lake	27006500																					v14	v13			v11			v12			v 9			v 13	
Maple Marsh Lake	82003800																						v5	v5	v7	v7	v7	v7	v7	v7						
Marcott (Rosenberg) Lake	19004100																	v15	v13	v10	v10	v12	v10	v6	v5									v 7	v 7
Marcott (Ohmans) Lake	19004200	east basin																																	v 7	v 7
Marcott (Ohmans) Lake	19004200	west basin																																	v 6	v 7
Marcott Lake	19026300																	v15																		
Maria Lake	10005800																					v2	v14	v14				v13						5	
Marion Lake	19002601		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
Markgraf Lake	82008900																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

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Markley Lake	70002100																			v11	v13	v12	v14	v13	v9	v6	v4		v10	v7						
Marsh Lake	10005400																					v1														
Marshan Lake	2000700																		v10	v13	v10	v9	v8	v7												
Martin Lake	2003400					7															13										v 13					
Masterman Lake	82012600																												v14	v14	v 14	v 14	v 14	v 14	v 14	v 12
Mays Lake	82003300																														v 14	v 14	v 7	v 8	v 7	v 7
McCarrons Lake	62005400						12	20	17	18	19	13	13	12		14	13	16	13			18	13	13	13		13	13								
McDonald Lake	82001000																					v11		v14	v9	v12	v12	v14	v10	v9	v 15	v 7		v 8	v 7	v 7
McDonough Lake	19007600							5														13														
McKnight Lake	10021600																												v14		v 14	v 14	v 14	v 14	v 13	v 13
McKusick Lake	82002000																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
McMahon Lake	70005000		2				5											13			13			13				13	v14	v10	v 11	v 10	v 11	v 9	v 9	v 10
Meadow Lake	27005700																		v12			v12			v9			v10			v 14			v 13		
Medicine Lake	27010400	main lake		5		10							13	12																				v 10	v 12	v 9
Medicine Lake	27010400	southwest bay	4			9																											v 13	v 15	v 14	v 14
Medina Lake	27014600																																		v 7	
Mergens Pond	82048200																						v10			v3	v2	v6			v 6	v 1				
Meuwissen Lake	10007000																					v1									v 11					
Miller Lake	10002900																		v6	v13		v12	v14	v13	v13	v14	v14	v14	v12	v13	v 14	v 14	v 13	v 14	v 14	v 11
Minnetoga Lake	27008800																													v14	v 12		v 14	v 13	v 13	v 9
Minnewashta Lake	10000900	main lake					5						13			13				13	13	13			13	13										
Minnewashta Lake	10000900	south bay																															v 13	v 11	v 12	v 10
Mitchell Lake	27007000																	13				13	13			13	v14	v14	v14	v13	v 13	v 14	v 13	v 13	v 11	v 12
Moody Lake	13002300																											v14	v14	v14			v 12	v 10	v 10	v 22
Mooney Lake	27013400															v14	v10																			
Moore Lake	2007502																					v14														
Mud Lake	82002602																						v5	v5	v7	v7	v7	v7	v7	v7			v 14	v 7		
Myers Lake	10006800																					v1														
Nokomis Lake	27001900		4				5																													

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Normandale Lake	27104500																												v5	v3		v 11	v 13	v 9	v 14	
North Twin Lake	82001800																						v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7		v 7	v 12
Northwood Lake	27062700																						v12	v10	v13	v12	v12	v10	v10	v10	v 9	v 11	v 11	v 12	v 11	v 11
Oak Lake	10009300	site 1																				v2		v14	v13	v12	v14	v14	v14		v 15					
Oak Lake	10009300	site 2																											v10							
Oak Lake	10009300	site 3																											v10							
O'Connor Lake	82000200																											v8	v15	v12	v 15	v 10	v 9	v 7	v 6	v 6
O'dowd Lake	70009500						5										13			13			13		13			13	v12	v13	v 14	v 14	v 14	v 14	v 14	v 13
Olson Lake	82010300													12		v15		14					13			13	v14	v7	v7	v11	v 19	v 13	v 12	v 18	v 13	v 11
Oneka Lake	82014000																					v13	v11	v11	v9	v6	v5						v 13	v 10	v 10	
Orchard Lake	19003100		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
Otter Lake	2000300		2			5																														
Owasso Lake	62005600		4			5																														
Ox Yoke Lake	27017800																														v 1					
Pamela Lake	27067500																											v10								
Parkers Lake	27010700		4										13					13				13	v12		v14	v15	v15	v15	v14	v14	v 13	v 14	v 13		v 10	
Parley Lake	10004200						5		17	18				12					12			13		13		13			13							
Pat Lake	82012500																												v7	v7	v 8	v 7	v 14	v 14	v 14	v 12
Patterson Lake	10008600																					v2														
Peltier Lake	2000400					5										v14	v16	v15	v14	v14	v13	v13	v14	v13	v17	v15	v15	v16	v17	v16						
Penn Lake	27000400																															v 14	v 14	v 12	v 14	v 13
Pepin Lake	40002800																													v13						
Peter Lake	27014702	north bay																														v 13	v 6	v 2		
Phalen Lake	62001300		4	5				5																												
Pickerel Lake	2013000		2															13															6	7		
Pierson Lake	10005300		2	5		5						13						13						13	13	13			13							
Pike Lake	27011102	Maple Grove																	v14	v15	v13		v13							v4		v 8		v 10		
Pike Lake	62006900	Ramsey Co.																				v14	v10	v14	v14	v14	v15	v15	v11	v14	v 13					
Pike Lake	70007600	site 1 [Scott Co.]																		v9		v10	v9	v9	v11	v15	v15	v13								

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Pike Lake	70007600	site 2 [Scott Co.]																							v11											
Pine Tree Lake	82012200							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
Plaisted Lake	82014800																														v 7	v 8	v 14	v 14	v 14	v 13
Pleasant Lake	62004600	North Oaks						5																												
Pleasant Lake	70009800	New Prague														13																	5			
Pomerleau Lake	27010000																		v9			v10		v6		v3									
Powers Lake	82009200																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
Priebe Lake	62003600																														v 13	v 10	v 9	v 7	v 8	
Prior Lake - Lower	70002600	Site 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	Site 2																			v14	v13	v9	v14	v15											v 5
Prior Lake - Upper	70007200	Site 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	Site 2																							v12											
Raven Lake	19036900																	v13	v6	v8																
Rebecca Lake	27019200					10	12	12																												
Red Rock Lake	27007600																					12	13			13	13		13					v 2		
Regional Park Lake	82008700																				v12	v14	v12	v13	v14	v15	v15	v14	v7	v7	v 7	v 7	v 7	v 7	v 7	v 7
Reitz Lake	10005200							5						12		13						v15	v13	v7	v13	v14	v14	15	v14	v14	v 11	v 11	v 12	v 11	v 14	v 12
Reshanau Lake	2000900		2																			v7	v1	v6					v13	v9	v 7	v 9	v 11	v 10	v 10	v 7
Rest Area Pond	82051400																												v13	v10	v 13	v 12	v 10	v 9	v 14	v 12
Rice Lake	10007800	Carver Co.	2																			v1														
Rice Lake	27011600	Maple Grove																												v10	v 10	v 12	v 14	v 12		
Riley Lake	10000200		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
Rogers Lake	19008000																													v12	v 9	v 11	v 11	v 9	v 11	v 9
Rose Lake	27009200	Minnetonka																											v14	v13	v 13					
Rose Lake	82011200	north basin [Lake Elmo]																													v 7	v 7	v 7			
Rose Lake	82011200	south basin [Lake Elmo]																													v 7	v 7	v 7			
Rutz Lake	10008000																					v1	v14	v14	v14				v14	v7	v 5	v 8	v 5	v 7		
Ryan Lake	27005800																		v14		v5		v9		v4	v6					v 13		v 10		v 4	
Sanborn Lake	40002700																													v2						

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Sand Lake	82006700															v7	v14	v14	v13						v14	v7	v7	v7	v7	v7	v 14	v 7	v 7	v 7		v 12
Sarah Lake	27019100		4			5																														
Scheuble Lake	10008500																					v1													
Schmidt Lake	27010200																	v14			v12		v12	v9			v14	v9		v9				v 9		
School Lake	13005700																											v14	v7	v7		v 6				
Schroeder Pond	82030100																										v14	v14	v7	v7						
Schultz Lake	19007500						5	5														13														
Schutz Lake	10001800						5																v6	v10	v6	v8	v9	v11								
Scout Lake	19019800																													v14	v 14	v 14	v 14	v 14	v 14	v 14
Sea Lake	82005300																														v 12	v 7				
Seidl Lake	19009500																	v15	v14	v14	v15	v16	v14	v14	v15	v8	v14	v14	v14	v8	v 4	v 2	v 12	v 9	v 3	
Shady Oak Lake	27008902	middle bay																														v 12	v 11			
Shavers Lake	27008600	east basin																										v14	v13							
Shavers Lake	27008600	west basin																											v6							
Shields Lake	82016200															v6	v14	v14	v13	v13	v14	v14	v14	v14	v14	v14	v14	v14	v14	v7				v 7	v 12
Silver Lake	62000100	North St. Paul																											v12							
Silver Lake	82001600	Washington Co.																					v14	v5	v7	v7	v7	v7	v7	v7	v	v	v			
Simley Lake	19003700																	v10	v16	v14	v15	v16	v14	v12	v14									v 7	v 7
Smetana Lake	27007300																																			v 10
Snail Lake	62007300		4					5																												
South Oak Lake	27066100																								v12	v15			v9	v8	v 5	v 7	v 13	v 14	v 12	v 10
South Rice Lake	27064500																						v9	v14	v15	v14	v14	v15	v14	v12	v 6					
South School Section Lake	82015100																	v14	v7		v14							v14	v14	v14	v 14	v 14	v 14	v 14	v 14	v 13
South Twin Lake	82001900																						v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7	v 7		
Spring Lake	2007100	Anoka Co.																						v11												
Spring Lake	70005400	Prior Lake	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		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
St. Croix Lake	82000100	site 1, Bayport Pool																											v2				v 12	v 11	v 3	
St. Croix Lake	82000100	site 1N, Bayport Pool																																	v 11	v 12

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Lake	DNR ID	Location	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
St. Croix Lake	82000100	site 2, Bayport Pool																										v10	v10	v9	v 9		v 12	v 11	v 12	v 13
St. Croix Lake	82000100	site 3, Troy Beach Pool																										v11	v9	v9	v 10		v 12	v 15	v 16	v 13
St. Croix Lake	82000100	site 4, Troy Beach Pool																															v 6	v 6	v 6	v 7
St. Croix Lake	82000100	site 5, Troy Beach Pool																										v8	v10	v7	v 8		v 15	v 10	v 6	v 6
St. Croix Lake	82000100	site 6, Black Bass Pool																										v11	v10	v10	v 9		v 16	v 16	v 16	v 17
St. Croix Lake	82000100	site 7, Kinnickinnic Pool																										v8	v8	v10	v 5		v 13	v 6	v 12	v 11
St. Joe Lake	10001100																										v17	v8	v9	v9	v 9	v 5	v 7	v 9	v 7	v 3
Staples Lake	82002800																						v14	v5	v7	v7	v7	v7	v7	v7	v 7	v 7				v 12
Staring Lake	27007800		4					5										13				13		13			13		13						
Stieger Lake	10004500						12					13						13																		
Success Lake	27063400																		v10							v11			v11		v 10			v 14		
Sucker Lake	62002800							5																												
Sullivan Lake	2008000															v14	v14	v15		v15	v14	v13	v11	v11	v12	v12									
Sunfish Lake	19005000	Sunfish Lake																											v13	v13	v 13	v 14	1 &v 15	4 &v 14	4 &v 13	2 &v 13
Sunfish Lake	82010700	Lake Elmo																					v10					v13	v11		v 7			v 7	v 7	v 7
Sunnybrook Lake	82013300																					v14		v13	v10	v12	v10	v16	v14	v14	v 14	v 14	v 13	v 14	v 14	
Sunset Lake	82015300						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
Sunset Pond	19045100																v14	v14	v14	v12	v10		v13	v11	v10	v12	v11		v14	v14	v 14	v 14	v 14	v 14	v 14	v 12
Susan Lake	10001300																												v7	v11	v 12	v 13	v 14	v 13	v 14	v 13
Swan Lake	10008200																					v1														
Swede Lake	10009500		2																13					13	v14	v16	v13	v14	v14	v13	v 14	v 14	v 14	v 14	v 14	v 13
Sweeney Lake	27003501	south basin																					v11	v9	v14	v13	v14	v11	v10	v15	v 12	v 13	v 14	v 12	v 9	v 9
Sweeney Lake	27003501	north basin																					v11	v9									v 10	v 9		
Sylvan Lake	27017100	Hennepin Co.																													v 10				v 14	v 13
Sylvan Lake	82008000	Washington Co.														v7			v14		v15	v14	v14	v14	v14	v14	v14	v14		v11	v 9	v 9	v 9	v 11	v 12	v 23
Tamarack Lake	10001000																							v10	v11	v12	v11	v11	v13	v14	v 11	v 13				
Tanners Lake	82011500		2								20					v14	v13	v12	v14																	
Terrapin Lake	82003100																										v7	v7	v7	v7	v 7	v 7	v 7	v 8	v 7	v 7
Thole Lake	70012001						5										13			13			13		13			13	v14			2	7	9		

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Thomas Lake	19006700		2																																	
Tiger Lake	10010800																					v1														
Turtle Lake	62006100	Ramsey Co.	4	5		5																														
Turtle Lake	82003600	Washington Co.																					v5	v5	v7	v7	v7	v7	v7	v7	v 7	v 7	v 7		v 7	v 12
Twin Lake	19002800	Burnsville																				v6		v13	v11	v6	v2	v11	v8	v8	v 14	v 14	v 13	v 14	v 13	v 13
Twin Lake	27003502	Golden Valley																															v 9	v 9		v 8
Twin Lake	27004201	upper [Br. Center]												12		v14			11		v15		v11		v13		v14		v13		v 12		v 12			
Twin Lake	27004202	middle [Crystal]						5						12					13	v11		v13	13			v13		v8			v 13		v 13			
Twin Lake	27004203	lower [Robbinsdale]												12		v14			13		v5		13			v13		v8					v 9			
Twin Lake	27065600	St. Louis Park																							v12	v14	v14	v11	v14	v10	v 10	v 11	v 13	v 11	v 14	v 13
Twin Lake	82004800	south [May Twnshp]																		v13	v13										v 14	v 7	v 7	v 7	v 6	v 12
Vadnais Lake	62003801							5																												
Valentine Lake	62007100																							v14	v13	v12	v12	v9	v10	v12	v 13					
Valley Lake	19034800																	v15	v14	v11		v8	v14	v14	v14	v14	v14	v13	v14	v14	v 13	v 14	v 14	v 12	v 13	v 11
Virginia Lake	10001500																						v11	v12	v14	v12	v15	v13								
Wabasso Lake	62008200		4	5		5						12																								
Waconia Lake	10005900		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
Wasserman Lake	10004800					5			17	18							13			13	13	13			13	13			13							
Weaver Lake	27011700					5			17	18																										
Weber Lake	82011900																												v12		v 7	v 7	v 7			
West Boot Lake	82004400																						v14	v14	v14	v14	v14	v14	v7	v7	v 7	v 7	v 7		v 7	v 12
West Lakeland Basin	100	south basin																													v 3					
West Lakeland Basin	82048800	north basin																					v2								v 7	v 7	v 7			
Westwood Lake	27071100															v13							v15	v14	v10	v9	v7	v7	v8	v8	v 7	v 7	v 10	v 9	v 6	v 13
Whaletail Lake	27018400	north basin																									13	13				3				
Whaletail Lake	27018400	south basin	4				5														13			13			13	13				3				
White Bear Lake	82016700		4	5			5																													
White Rock Lake	82007200																												v11	v14	v 13	v 15	v 14	v 15	v 14	v 13
Wilmes Lake	82009000																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

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Windsor Lake	27008200																										v12	v14								
Wing Lake	27009100																												v14	v14	v 12	v 9	v 14	v 11	v 9	v 9
Winkler Lake	10006600																					v8	v6	v6		v13		v14		v13	v 13		v 13	v 13		
Wolsfeld Lake	27015700		4																																	
Wood Lake	19002400																		v10	v14	v15	v15	v14	v13	v14	v14	v14	v14	v13	v13	v 12	v 9	v 13	v 12	v 13	v 12
Woodpile Lake	82013200																												v7	v7	v 15	v 14	v 14	v 14	v 14	v 12
Young America Lake	10010500																					v1														
Zumbra Lake	10004100						5						13												13											

Appendix B

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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	100	Y	N	
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			6.1	2.4	78	89		N	
Armstrong Lake	82011602		39			1.5	1	128	100	Y	N	
Auburn Lake	10004400		287	8,027	28.0	25.6			56		Y	
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		N	
Bass Lake	82003500	May Township	81			4.3			100	Y	N	
Bass Lake	82012300	Grant Township							100		N	
Bass Lake	82012400	Grant Township							100		N	
Bavaria Lake	10001900		200	711	3.6	18.3	5.6	3,674	40		Y	Centrarchid
Bay Pond	82001100		10	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					1.1				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	
Birch Lake	13004200		65									
Bone Lake	82005400		212	5,177	24.4	9.8	3.7	2,820	59		Y	

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Brick Pond	82030800					1.5				Y		
Brickyard Clayhole Lake	10022500		17			13.1			35		N	
Bryant Lake	27006700		176			13.7			36		Y	
Burandt Lake	10008400		96			7.3			70		N	
Bush Lake	27004700		172			8.5			64		Y	
Byllesby Lake	19000600		1,369	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	
Cedar Lake	70009100		742	11,104	15.0	4.7	2.1	5,194	100		Y	
Cedar Island Lake	27011900		80	800	10.0	2.1	1.4	368	100	Y	N	
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		N	
Clear Lake	82009900											
Clear Lake	82016300		400			8.5	3.7	4,800	67		Y	Walleye
Cloverdale Lake	82000900		45	819	18.2	8.5	3	450	86		N	
Cobblecrest Lake	27005300		10								N	
Cobblestone Lake	19045600		37			6.0						
Cody Lake	66006100		256			3.7	2.4	78		Y		
Colby Lake	82009400		71	8,088	113.9	3.4			100	Y	N	
Cornelia Lake	27002800		52			2.0				Y	N	
Courthouse Lake	10000500		10			17.4			30		N	Stocked w/Trout

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Cowley Lake	27016900											
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
Dean Lake	70007400		128						100		N	
DeMontreville Lake	82010100		160	1,108	6.9	7.3	2.4	1,280	90		Y	
Downs Lake	82011000		35	2,400	68.6	2.1	1.5	175	100	Y	N	
Dubay Lake	27012900		17								N	
Eagle Lake	10012100	Carver	186	1,050	5.6	4.3	2.5	1,500	100	Y	Y	
Eagle Lake	27011101	Maple Grove	291	3,220	11.1	10.4	3.8	3,667	68		Y	Centrarchid
Eagle Point Lake	82010900		120	11,502	95.9	1.8	1	360	100	Y	N	
Earley Lake	19003300		29	1,629	56.2						N	
East Lake	19034900		40									
East Boot Lake	82003400		47	93	2.0	8.2	0.9	282	84		Y	
Echo Lake	82013500		41	194	4.7	1.8	0.8	107	100	Y	N	
Edina Lake	27002900					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			
Farquar Lake	19002300		63	353	5.6	3.0	1.4	290	100	Y	N	
Fireman's Clayhole Lake	10022600		8			7.0			88			
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									
Fish Lake	82013700	Grant Township	21			10.4			67			
Forest Lake	82015900		2,249	4,285	1.9	11.5	3.4	24,986	68		Y	

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French Lake	27012700		352	870	2.5	1.0				Y	Y	
Friedrich's Pond	82010800		15	360	24.8							
Gaystock Lake	10003100		105			5.0			100		N	
George Lake	2009100		488			9.8			80			
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		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	
Goose Lake	82005900	Scandia	83			7.6	2.4	664	55		Y	
Goose Lake	10008900	Waconia	407	1,100	2.7	3.0	1.5	2,035	100	Y		Natural Environment
Grace Lake	10021800		22			6.7			79			
Haas Lake	70007800		32								N	
Hafften Lake	27019900		43						60		Y	
Half Breed Lake (Sylvan Lake)	82008000		75	303	4.0	10.3	1.7	420	67		N	
Hart Lake	2008100		8						100		N	
Harvey Lake	27006700					0.7			100	Y	N	
Hay Lake	82006500		33								N	
Hazeltine Lake	10001400		236			2.0			100	Y	N	
Heims Lake	13005600											
Henry Lake	10017500		77			1.5			100	Y	N	
Herber's Pond	82001501					2.0			100	Y	N	
Hidden Lake	27069300		9			8.5			56		N	

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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	2,150	88		Y	
Island Lake	2002200		67			6.7			87		N	
Jackson WMA	82030500		14									
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		N	
Jonathon Lake	10021700											
July Lake	82031800											
Karth Lake	62007200											
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										N	
Klawitter Lake	82036800		5	168	37.3				100			
Kramer Lake	82011700											
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	
Langton Lake	62004900		30	257	8.6	1.5	1.2	120	100	Y		
Laura Lake	27012300		33	312	9.3	2.9			100	Y	N	
Lee Lake	19002900		25	324	13.0	5.2			100		N	

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Legion Pond	82046200		16	224	14.0							
LeMay Lake	27008500		34			4.0	1.6	173		Y		
Levander Pond	19008800		3									
Libbs Lake	27008500		23			2.1			100	Y	N	
Lily Lake	82002300		52			17.4			73		Y	Centrarchid - Fishing Pier
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	
Lochness Lake	2058400		5			4.9						
Lone Lake	27009400		22			8.2			18		Y	
Long Lake	19002200	Appley Valley	36			1.5			100	Y	N	
Long Lake	82002100	Stillwater	71			6.7			96		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		N	
Loon Lake	82001502		64	407	6.4	4.9	2.4	206	100		N	
Lost Lake	82013400		9			7.9			82			
Lotus Lake	10000600		246	1,033	4.2	8.8	4.3	3,500	74			
Louise Lake	82002500		48	616	12.8	3.7	1.8	283	100	Y	Y N	
Lucy Lake	10000700		87			6.4			99		N	
Lynch Lake	82004200		43									
MacDonald Pond	82006200		12			2.7			100	Y	N	

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Magda Lake	27006500		15									
Maple Marsh Lake	82003800		38	148	3.9	3.4	1.7	212	100	Y	N	
Marcott Lake (Rosenberg Lake)	19004100		20			8.2			90		N	
Marcott Lake (Ohmans Lake)	19004200		34			10.1					N	
Maria Lake	10005800		169			1.0			100	Y	Y	
Marion Lake	19002600		560			6.4			81		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											
McKusick Lake	82002000		46			4.7			100		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	
Minnewashta Lake	10000900		677			21.3			55		Y	
Minnetoga Lake	27008800		14			8.2	3.9	183				
Mitchell Lake	27007000		112			5.8			97		Y	
Moody Lake	13002300		35			14.6			63		N	
Mud Lake	82002602		62	899	14.5	2.1	1.1	224	100	Y	N	
Normandale Lake	21104500		103			3.7			100	Y		

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
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	
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	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	Gamefish
Penn Lake	27000400		31			2.1			100	Y	Y	
Pepin Lake	40002800		326			3.4	1.1	1,150		Y	Y	
Peter Lake	27014700		46			20.7			35		N	
Pike Lake	27011102	Maple Grove	59	919	15.6	6.7	2	395	95		Y	Centrarchid
Pike Lake	62006900	New Brighton	35			4.9	2.1	252	100		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	1,740	91		N	Centrarchid
Pleasant Lake	70009800		300			1.5			100	Y	Y	
Powers Lake	82009200		57	1,238	21.7	12.5			57		N	Centrarchid
Priebe Lake	62003600					1.5			100	Y	N	
Lower Prior Lake	70002600		827	19,560	23.7	18.3	4.1	11,120	46		Y	Centrarchid
Upper Prior Lake	70007200		340	16,460	48.4	15.2	3.1	3,460	93		Y	Centrarchid

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
Red Rock Lake	27007600		97			4.9			94		Y	
Regional Park Lake	82008700		16	600	37.5	5.8			100		N	
Reitz Lake	10005200		79	3,711	47.0	11.0	4	1,027	58		Y	
Reshnanau Lake	2000900											
Rest Area Pond	82051400		13	17,781	1,411.2							
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	
South School Section Lake	82015100		125			8.0			41			
Sanborn Lake	40002700					1.2	0.9			Y	Y	
Sand Lake	82006700		46			5.5	2.4	368	46		N	
Schmidt Lake	27010200		37	190	5.1	9.1	1.5	207	92		N	
School Lake	13005700		48									
Schroeder Pond	82030100					3.0			100	Y	N	
Schutz Lake	10001800		105	943	9.0	15.0	6	2,100	27		N	
Scout Lake	19019800					2.9				Y		
Seidl's Lake	19009500		14	415	29.6	5.0			100		N	Rearing
Shady Oak Lake	27008900		85			10.7			66		Y	
Shaver Lake	27008600		11								N	
Shields Lake	82016200		27			8.2			85		N	
Silver Lake	82001600		98	455	4.6	3.4	1.7	549	100	Y	N	
Silver Lake	62000100		72			5.5			99		Y	

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
Simley Lake	19003700		14			5.2					Y	
Smetana Lake	27007300		48			3.7			90	Y	N	
South Oak Lake	27066100										N	
South Rice Lake	27064500		3	63	19.7	2.5	0.5	5	100	Y	N	
South Twin Lake	82001900		54	63	1.2	4.0	2	356	100	Y	N	
Spring Lake	19000501	Nininger Township	1,839	23,780,000	12,931	5.2			100		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	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	
Success Lake	27063400											
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	104			N	
Sunset Lake	82015300		124			5.2			100		N	Gamefish
Sunset Pond	19045100		60			3.7			100	Y	N	
Susan Lake	10001300		93			5.2			81		Y	
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	
Terrapin Lake	82003100		86			4.6			100		N	
Thole Lake	70012000		105			3.7			100	Y	Y	

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
Turtle Lake	82003600		44	699	15.9	2.4	1.2	172	100	Y	N	
Twin Lake	19002800	Burnsville	11						100			
Twin Lake	27003502	Golden Valley	19			17.0			42		N	
Twin Lake, lower	27004200	Robbinsdale	46	5,322	115.7	6.7	2.3	340	83		Y	Centrarchid
Twin Lake, middle	27004200	Crystal	69	4,053	58.7	14.0	4.9	918	57		Y	Centrarchid
Twin Lake, upper	27004200	Brooklyn Park	137	3,657	26.7	2.4	0.9	397	100	Y	N	Centrarchid
Twin Lake	27065600	St. Louis Park									N	
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	
Waconia Lake	10005900		3,000	7,880	2.6	11.3	4	38,632	53		Y	Centrarchid
Weber Lake	82011900		8	1	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						N	
Westwood Lake	27071100		41			2.0			100	Y	N	
White Rock Lake	82007200		65									
Wilmes Lake	82009000		41	2,247	54.8	5.5					Y	
Windsor Lake	27008200		14								N	
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									

Appendix C

Appendix C
2013 CAMP Volunteers

Sponsor	LAKE	DNR ID	Volunteer Name(s)
Apple Valley, City of	Cobblestone	19045600	Apple Valley staff
Apple Valley, City of	Farquar	19002300	Jeff Christianson
Apple Valley, City of	Long	19002200	Christy McGlocklin
Apple Valley, City of	Scout	19019800	Dan Stanek
Basset Creek WMO	Lost	27010300	Barrie Froseth
Basset Creek WMO	Medicine, site 1	27010400	David Nelson, Josie Nelson, Karl Nelson
Basset Creek WMO	Medicine, site 2	27010400	Ryan Atwell, Ted Hoshal
Basset Creek WMO	Northwood	27062700	Robert White
Basset Creek WMO	Parkers	27010700	Steve Johnson
Basset Creek WMO	Sweeney	27003501	Dave Hanson
Basset Creek WMO	Twin	27003502	Jonathon Burris
Basset Creek WMO	Westwood	27071100	Mayra Guzman
Black Dog WMO	Crystal	19002700	Joe Tranchilla
Black Dog WMO	Keller	19002500	Glenn Gramse
Black Dog WMO	Kingsley	19003000	Lakeville staff
Black Dog WMO	Lac Lavon	19044600	Wally Shaver
Black Dog WMO	Orchard	19003100	Tom Goodwin
Burnsville, City of	Aligmagnet	19002100	John Ritter
Burnsville, City of	Earley	19003300	Mike Zytkovicz
Burnsville, City of	Sunset Pond	19045100	Dan Wallace
Burnsville, City of	Twin Lake south	19002800	Dan Freeman
Burnsville, City of	Wood Pond	19002400	Mock Family
Carver County	Bavaria	10001900	John Ryski
Carver County	Benton	10006900	Jacob Steinbauer
Carver County	Brickyard	10022500	Carver County staff
Carver County	Burandt	10008400	Carver County staff
Carver County	Courthouse	10000500	Carver County staff
Carver County	Eagle	10012100	Carver County staff
Carver County	Firemans	10022600	Carver County staff
Carver County	Goose	10008900	Carver County staff
Carver County	Grace	10021800	Carver County staff
Carver County	Hazeltine	10001400	Carver County staff
Carver County	Hydes	10008800	Carver County staff
Carver County	Jonathan	10021700	Carver County staff
Carver County	McKnight	10021600	Carver County staff
Carver County	Miller	10002900	Carver County staff
Carver County	Reitz	10005200	Mark McMullen, Lynne McMullen
Carver County	Swede	10009500	Wayne Hubin
Carver County	Waconia	10005900	Carver County staff
Chanhassen, City of	Lucy	10000700	Tim McCotter, Sharon McCotter
Chanhassen, City of	Minnewashta, site 2	10000900	Steve Aldritt
Chanhassen, City of	Riley	10000200	David Florenzano
Chanhassen, City of	St. Joe	10001100	Sue Morgan, Linda Scott
Chanhassen, City of	Susan	10001300	Gary Schultz

Appendix C
2013 CAMP Volunteers

Sponsor	LAKE	DNR ID	Volunteer Name(s)
CLFLWD	Bone	82005400	Jon Hafner, Teresa Hafner
CLFLWD	Comfort	13005300	Wally Ostlie
CLFLWD	Forest Lake, west basin	82015900	Steve Schmaltz
CLFLWD	Forest Lake, middle basin	82015900	James Hannon
CLFLWD	Forest Lake, east basin	82015900	Judy Weninger
CLFLWD	Little Comfort	13005400	Steve Schreiber
CLFLWD	Moody	13002300	Douglas Toavs
CLFLWD	Shields	82016200	Bob Roethke
CLFLWD	Sylvan	82008000	Curt Sparks
Eden Prairie, City of	Mitchell	27007000	Gordon Warner, Fran Warner
Eden Prairie, City of	Smetana	27007300	Sean Peine, Adrian Sola, Richard Bonk
Elm Creek WMC	Dubay	27012900	Doug Baines
Elm Creek WMC	Laura	27012300	Chris Foley
Elm Creek WMC	Sylvan	27017100	Gene Wipf
Inver Grove Heights, City of	Marcott (Ohmans), site 1	19004200	Dakota SWCD staff
Inver Grove Heights, City of	Marcott (Ohmans), site 2	19004200	Dakota SWCD staff
Inver Grove Heights, City of	Marcott (Rosenberg)	19004100	Dakota SWCD staff
Inver Grove Heights, City of	Simley	19003700	Dakota SWCD staff
Lakeville, City of	East	19034900	Lakeville staff
Lakeville, City of	Lee	19002900	Lakeville staff
Lakeville, City of	Marion	19002601	Curt Savstrom
Lakeville, City of	Valley	19034800	Lakeville staff
Mendota Heights, City of	Lemay	19008200	Mendota Heights staff
Mendota Heights, City of	Rogers	19008000	Doug Hennes
Nine Mile Creek WD	Bush	27004700	Paul Erdmann, Elizabeth Erdmann
Nine Mile Creek WD	Cornelia	27002802	Stephen Sando
Nine Mile Creek WD	Minnetoga	27008800	John Twele, Joe Stratmann
Nine Mile Creek WD	Penn (lower)	27000400	Lisa McIntire
Nine Mile Creek WD	Wing	27009100	John Burton, Mary Quinn
Pioneer-Sarah WMC	Hafften	27019900	Jim Van Someren
Prior Lake Spring Lake WD	Cates	70001800	Tom Sletta, Peggy Sletta
Prior Lake Spring Lake WD	Fish	70006900	Jon Haferman, Abby Hafermn
Prior Lake Spring Lake WD	Haas	70007800	Thomas Chaklos
Prior Lake Spring Lake WD	Prior, lower, site 1	70002600	Marianne Breitbach, Carter Christie
Prior Lake Spring Lake WD	Prior, lower, site 2	70002600	Dave Rech
Prior Lake Spring Lake WD	Prior, upper	70007200	Kim Silvernagel
Prior Lake Spring Lake WD	Spring	70005400	Jim Weninger
Rice Cr WD	Fish	82013700	Paul Bolstad
Rice Cr WD	George Watch	2000500	Wargo Nature Ctr.
Rice Cr WD	Karth	62007200	Andrew Elmquist

Appendix C
2013 CAMP Volunteers

Sponsor	LAKE	DNR ID	Volunteer Name(s)
Rice Cr WD	Langton	62004901	Tam McGehee, Dick McGehee
Rice Cr WD	Little Johanna	62005800	Fred Fox
Rice Cr WD	Lochness	2058500	Jim Hafner, Tricia Hafner
Rice Cr WD	Long	82013000	Kitty Francy-Payton
Rice Cr WD	Pine Tree	82012200	Gene Berwald
Rice Cr WD	Reshanau	2000900	Lori Fredlund
Rice Cr WD	Sunset	82015300	Dianne Coderre
Rice Cr WD	White Rock	82007200	David Bluhm
Saint Louis Park, City of	Cobblecrest	27005300	Jim Kellogg
Saint Louis Park, City of	South Oak	27066100	Nancy Ebner
Saint Louis Park, City of	Twin	27065600	Paul O'Brien
Scott County	Cedar, site 1	70009100	Lowell Mohn
Scott County	Cedar, site 2	70009100	Lowell Mohn
Scott County	McMahon	70000500	Joe Williamson, Diane Williamson
Shakopee, City of	O'Dowd	70009500	Sandy Boyce, Mike Boyce
St. Croix Basin Planning Team	Lake St. Croix – site 1N	82000100	Jim Harper, Roberta Harper
St. Croix Basin Planning Team	Lake St. Croix – site 2	82000100	Jim Harper, Roberta Harper
St. Croix Basin Planning Team	Lake St. Croix – site 3	82000100	Cecilia Martin, Harry Martin
St. Croix Basin Planning Team	Lake St. Croix – site 4	82000100	Jim Harper, Roberta Harper
St. Croix Basin Planning Team	Lake St. Croix – site 5	82000100	Jim Harper, Roberta Harper
St. Croix Basin Planning Team	Lake St. Croix – site 6	82000100	Rick Meierotto
St. Croix Basin Planning Team	Lake St. Croix – site 7	82000100	Carpenter Nature Center (volunteer coordinator: Mayme Johnson)
Sunfish Lake, City of	Horseshoe	19005100	Jim Nayes
Sunfish Lake, City of	Sunfish	19005000	James Stowell
VBWD	Cloverdale	82000900	Dr. Kevin Bjork
VBWD	DeMontreville	82010100	Steve Iverson
VBWD	Edith	82000400	Joseph Reithmeyer
VBWD	Elmo	82010600	Wendy Griffin, Jeff Berg
VBWD	Jane	82010400	Anne McGee
VBWD	Klawitter	82036800	Bonnie Juran, Pat Barrett, Steve Chlebeck
VBWD	Long	82011800	Bill Feely
VBWD	Olson	82010300	Bob Meier
VBWD	Rest Area Pond	82051400	MnDOT
Washington CD	Armstrong Lake	82011600	Todd Heruth
Washington CD	Barker	82007600	WCD Staff
Washington CD	Bass	82003500	WCD Staff
Washington CD	Bass East	82012400	WCD Staff
Washington CD	Bass West	82012300	WCD Staff
Washington CD	Bay	82001100	WCD Staff
Washington CD	Benz	82012000	WCD Staff
Washington CD	Big Carnelian	82004900	WCD Staff

Appendix C
2013 CAMP Volunteers

Sponsor	LAKE	DNR ID	Volunteer Name(s)
Washington CD	Big Marine	82005200	WCD Staff
Washington CD	Bone	82005400	WCD Staff
Washington CD	Brick Pond	82030800	WCD Staff
Washington CD	Carol	82001700	WCD Staff
Washington CD	Clear	82004500	Warner Nature Center, Dan Carlson
Washington CD	Comfort	13005300	WCD Staff
Washington CD	Cottage Grove Park	82008700	WCD Staff
Washington CD	Downs	82011000	WCD Staff
Washington CD	Eagle Point	82010900	WCD Staff
Washington CD	East Boot	82003400	WCD Staff
Washington CD	Echo	82013500	WCD Staff
Washington CD	Edith	82000400	WCD Staff
Washington CD	Fish Lake	82009300	WCD Staff
Washington CD	Forest Lake, west basin	82015900	WCD Staff
Washington CD	Forest Lake, middle basin	82015900	WCD Staff
Washington CD	Forest Lake, east basin	82015900	WCD Staff
Washington CD	Goggins	82007700	WCD Staff
Washington CD	Goose	82005900	WCD Staff
Washington CD	Goose	82011300	WCD Staff
Washington CD	Hay	82006500	WCD Staff
Washington CD	Horseshoe, east basin	82007400	WCD Staff
Washington CD	Jackson WMA	82030500	WCD Staff
Washington CD	July Avenue	82031800	WCD Staff
Washington CD	Kismet Basin	82033400	WCD Staff
Washington CD	Kramer Pond	82011700	WCD Staff
Washington CD	Lily	82002300	WCD Staff
Washington CD	Little Carnelian	82001400	WCD Staff
Washington CD	Little Comfort	13005400	WCD Staff
Washington CD	Long	82002100	WCD Staff
Washington CD	Long	82003000	WCD Staff
Washington CD	Lynch	82004200	WCD Staff
Washington CD	Masterman	82012600	WCD Staff
Washington CD	Mays	82003300	Warner Nature Center, Dan Carlson
Washington CD	McDonald	82001000	WCD Staff
Washington CD	McKusick	82002000	WCD Staff
Washington CD	Moody	13002300	WCD Staff
Washington CD	North Twin	82001800	WCD Staff
Washington CD	O'Conners Lake	82000200	Jeff Keene
Washington CD	Pat Lake	82012500	WCD Staff
Washington CD	Plaisted	82014800	WCD Staff
Washington CD	Sand	82006700	WCD Staff
Washington CD	Shields	82016200	WCD Staff
Washington CD	South School Section	82015100	WCD Staff
Washington CD	Square	82004600	Leif Hembre
Washington CD	Staples	82002800	WCD Staff
Washington CD	Sunfish	82010700	WCD Staff
Washington CD	Sylvan/Halfbreed	82008000	WCD Staff
Washington CD	Terrapin	82003100	Warner Nature Center, Dan Carlson
Washington CD	Turtle	82003600	WCD Staff
Washington CD	Twin	82004800	WCD Staff

Appendix C
2013 CAMP Volunteers

Sponsor	LAKE	DNR ID	Volunteer Name(s)
Washington CD	West Boot	82004400	WCD Staff
Washington CD	Woodpile	82013200	WCD Staff
Woodbury, City of	Colby	82009400	WCD Staff
Woodbury, City of	La	82009700	Tim Weber
Woodbury, City of	Markgrafs	82008900	WCD Staff
Woodbury, City of	Powers	82009200	WCD Staff
Woodbury, City of	Wilmes	82009000	WCD Staff

Appendix D

Appendix D
CAMP Quality Control Data 2013

Lake Name	DNR ID#	Date METC	Date CAMP	TP, ug/L METC	TP, ug/L CAMP	CLA, ug/L METC	CLA, ug/L CAMP	Secchi, m METC	Secchi, m CAMP
DeMontreville Lake	82010100	7/12/13	7/14/13	18	14	2.8	3.5	4.9	4.0
Marion Lake	19002601	8/12/13	8/11/13	55	18	21	10	2.1	1.8
Medicine Lake	27010400	8/10/13	8/10/13	34	35	20	22	1.3	1.3
Mitchell Lake	27007000	8/23/13	8/19/13	40	27	40	5.6	1.1	1.2
Olson Lake	82010300	7/12/13	7/14/13	18	18	2.0	3.5	4.2	3.3
Orchard Lake	19003100	8/12/13	8/8/13	19	12	4.1	2.9	4.3	3.0
Riley Lake	10000200	5/13/13	5/14/13		52		26	1.5	1.3
Riley Lake	10000200	8/23/13	8/21/13	29	29	41	4.5	0.7	0.8

Appendix E

APPENDIX E
Metro Area Chloride Monitoring Project Data: 2013

LAKE	DNR ID	SITE	DATE	DEPTH m	Secchi Depth m	TEMP C	DO mg/L	pH	SP COND µmho/cm	Alkalinity mg/L as $CaCO_3$	Ca mg/L	Cl mg/L	Hardness mg/L as $CaCO_3$	Fe mg/L	Mg mg/L	Sulfate, Dissolved mg/L	Sulfate, Total mg/L
Christmas Lake	27013700	401	2/6/2013	0.0		1.06	14.9			143	29.8	35	154	< 0.02	15.9		2.35
Christmas Lake	27013700	401	2/6/2013	0.6		1.06	14.9	8.39	386								
Christmas Lake	27013700	401	2/6/2013	1.0		3.04	13.3	8.04	378								
Christmas Lake	27013700	401	2/6/2013	2.0		3.13	13.2	7.94	378								
Christmas Lake	27013700	401	2/6/2013	3.0		3.1	13.2	7.89	379								
Christmas Lake	27013700	401	2/6/2013	4.0		3.1	13.2	7.85	378								
Christmas Lake	27013700	401	2/6/2013	5.0		3.1	13.1	7.84	378								
Christmas Lake	27013700	401	2/6/2013	6.0		3.1	13.1	7.83	378								
Christmas Lake	27013700	401	2/6/2013	7.0		3.1	13.1	7.82	379								
Christmas Lake	27013700	401	2/6/2013	8.0		3.1	13.1	7.79	379								
Christmas Lake	27013700	401	2/6/2013	9.0		3.09	13.1	7.8	380								
Christmas Lake	27013700	401	2/6/2013	10.0		3.1	13.1	7.78	380								
Christmas Lake	27013700	401	2/6/2013	12.0		3.14	13.1	7.79	381								
Christmas Lake	27013700	401	2/6/2013	14.0		3.21	12.8	7.74	381								
Christmas Lake	27013700	401	2/6/2013	16.0		3.23	12	7.69	383								
Christmas Lake	27013700	401	2/6/2013	18.0		3.24	10.9	7.61	385								
Christmas Lake	27013700	401	2/6/2013	20.0		3.25	9.2	7.55	389								
Christmas Lake	27013700	401	2/6/2013	21.0		3.3	7.2	7.46	388								
Christmas Lake	27013700	401	2/6/2013	22.0		3.34	6.2	7.42	390								
Christmas Lake	27013700	401	2/6/2013	23.0						148	33.3	36	158	~ 0.13	17.2		2.33
Christmas Lake	27013700	401	2/6/2013	23.0		3.4	0.9	7.26	391								
Christmas Lake	27013700	401	5/13/2013	0.0	7.25	9.44	12			131	31.1	33.9	148	< 0.02	15.8	2.76	
Christmas Lake	27013700	401	5/13/2013	0.5		9.44	12	7.99	352								
Christmas Lake	27013700	401	5/13/2013	1.0		9.44	12.2	7.77	353								
Christmas Lake	27013700	401	5/13/2013	2.0		9.43	12.5	7.68	353								
Christmas Lake	27013700	401	5/13/2013	3.0		9.21	12.9	7.64	354								
Christmas Lake	27013700	401	5/13/2013	4.0		8.75	12.2	7.61	355								
Christmas Lake	27013700	401	5/13/2013	5.0		8.25	12.3	7.6	356								
Christmas Lake	27013700	401	5/13/2013	6.0		7.91	12.4	7.6	357								
Christmas Lake	27013700	401	5/13/2013	7.0		7.3	12.4	7.59	357								
Christmas Lake	27013700	401	5/13/2013	8.0		6.64	11.9	7.56	361								
Christmas Lake	27013700	401	5/13/2013	9.0		5.93	11.9	7.53	362								
Christmas Lake	27013700	401	5/13/2013	10.0		5.34	10.6	7.47	367								
Christmas Lake	27013700	401	5/13/2013	12.0		4.75	8.3	7.38	377								
Christmas Lake	27013700	401	5/13/2013	14.0		4.21	5.4	7.27	388								
Christmas Lake	27013700	401	5/13/2013	16.0		4.17	5.1	7.22	390								
Christmas Lake	27013700	401	5/13/2013	18.0		4.1	4.6	7.19	393								
Christmas Lake	27013700	401	5/13/2013	20.0		4.05	4.4	7.17	394								
Christmas Lake	27013700	401	5/13/2013	22.0		4.03	4.2	7.14	395								
Christmas Lake	27013700	401	5/13/2013	24.0		3.98	3.7	7.12	397								
Christmas Lake	27013700	401	5/13/2013	24.5						148	33.9	37.1	164	~ 0.03	17	2.55	

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Metro Area Chloride Monitoring Project Data: 2013

LAKE	DNR ID	SITE	DATE	DEPTH m	Secchi Depth m	TEMP C	DO mg/L	pH	SP COND µmho/cm	Alkalinity mg/L as $CaCO_3$	Ca mg/L	Cl mg/L	Hardness mg/L as $CaCO_3$	Fe mg/L	Mg mg/L	Sulfate, Dissolved mg/L	Sulfate, Total mg/L
Christmas Lake	27013700	401	5/13/2013	25.0		3.96	3.6	7.1	397								
Crystal Lake	19002700	401	2/4/2013	0.0		0.94	13.2			141	38.5	99	224	~ 0.03	16		4
Crystal Lake	19002700	401	2/4/2013	0.5		0.94	13.2	7.45	652								
Crystal Lake	19002700	401	2/4/2013	1.0		3.23	12.4	7.42	640								
Crystal Lake	19002700	401	2/4/2013	2.0		3.54	12.4	7.37	638								
Crystal Lake	19002700	401	2/4/2013	3.0		3.8	12	7.35	638								
Crystal Lake	19002700	401	2/4/2013	4.0		3.93	10.1	7.31	642								
Crystal Lake	19002700	401	2/4/2013	5.0		4.01	10	7.26	653								
Crystal Lake	19002700	401	2/4/2013	6.0		4.24	2.4	7.14	665								
Crystal Lake	19002700	401	2/4/2013	7.0		4.38	2.5	7.1	691								
Crystal Lake	19002700	401	2/4/2013	7.5						162	44.3	97	224	~ 0.11	16.9		4.2
Crystal Lake	19002700	401	2/4/2013	8.0		4.71	2.5	7.07	721								
Crystal Lake	19002700	401	5/8/2013	0.0	2.4	15.72	12.46			118	36.7	97.4	150	~ 0.04	13.4	3.35	
Crystal Lake	19002700	401	5/8/2013	0.5		15.72	12.46	7.9	586								
Crystal Lake	19002700	401	5/8/2013	1.0		15.13	12.71	7.88	586								
Crystal Lake	19002700	401	5/8/2013	2.0		9.84	14.14	7.91	583								
Crystal Lake	19002700	401	5/8/2013	3.0		8.95	14.09	7.91	581								
Crystal Lake	19002700	401	5/8/2013	4.0		8.06	13.3	7.85	584								
Crystal Lake	19002700	401	5/8/2013	5.0		7.52	10.11	7.66	604								
Crystal Lake	19002700	401	5/8/2013	6.0		6.33	1.46	7.38	719								
Crystal Lake	19002700	401	5/8/2013	7.0		5.64	0.44	7.27	784								
Crystal Lake	19002700	401	5/8/2013	8.0						190	53.7	134.8	216	~ 0.75	19.8	4.94	
Crystal Lake	19002700	401	5/8/2013	8.0		5.65	0.27	7.22	815								
Holland Lake	19006500	401	2/25/2013	0.0		0.42	7.6			88	29.8	40	112	~ 0.06	10.8		0.5
Holland Lake	19006500	401	2/25/2013	0.5		0.42	7.6	7.64	329								
Holland Lake	19006500	401	2/25/2013	1.0		0.92	7.2	7.5	323								
Holland Lake	19006500	401	2/25/2013	2.0		2.57	1.9	7.03	324								
Holland Lake	19006500	401	2/25/2013	3.0		3.82	1.8	6.98	324								
Holland Lake	19006500	401	2/25/2013	4.0		4.04	1.8	6.94	328								
Holland Lake	19006500	401	2/25/2013	5.0		4	1.6	6.92	330								
Holland Lake	19006500	401	2/25/2013	6.0		3.94	1.3	6.88	336								
Holland Lake	19006500	401	2/25/2013	7.0		3.84	0.9	6.88	336								
Holland Lake	19006500	401	2/25/2013	8.0		3.91	0.5	6.84	339								
Holland Lake	19006500	401	2/25/2013	9.0		3.79	0.4	6.83	340								
Holland Lake	19006500	401	2/25/2013	10.0		3.75	0.2	6.83	345								
Holland Lake	19006500	401	2/25/2013	12.0		3.77	0.1	6.8	351								
Holland Lake	19006500	401	2/25/2013	14.0		4.59	0.1	6.59	517								
Holland Lake	19006500	401	2/25/2013	15.0		4.96	0.1	6.62	581								
Holland Lake	19006500	401	2/25/2013	16.0						137	34.3	39	136	49.6	10.9		< 0.4

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LAKE	DNR ID	SITE	DATE	DEPTH m	Secchi Depth m	TEMP C	DO mg/L	pH	SP COND µmho/cm	Alkalinity mg/L as $CaCO_3$	Ca mg/L	Cl mg/L	Hardness mg/L as $CaCO_3$	Fe mg/L	Mg mg/L	Sulfate, Dissolved mg/L	Sulfate, Total mg/L
Holland Lake	19006500	401	2/25/2013	16.0		5.14	0.1	6.68	595								
Holland Lake	19006500	401	5/20/2013	0.0	2.3	19.45	9.3			70	22.7	31.6	88	~ 0.09	8	0.78	
Holland Lake	19006500	401	5/20/2013	0.5		19.45	9.3	7.64	249								
Holland Lake	19006500	401	5/20/2013	1.0		19.01	9.2	7.52	251								
Holland Lake	19006500	401	5/20/2013	2.0		16.86	9.5	7.49	257								
Holland Lake	19006500	401	5/20/2013	3.0		13.84	12.4	7.62	258								
Holland Lake	19006500	401	5/20/2013	4.0		9.11	14	7.63	272								
Holland Lake	19006500	401	5/20/2013	4.9		6.81	12.4	7.52	322								
Holland Lake	19006500	401	5/20/2013	6.1		5.51	7.1	7.28	332								
Holland Lake	19006500	401	5/20/2013	7.0		4.91	2	7.17	336								
Holland Lake	19006500	401	5/20/2013	8.0		4.46	0.4	7.1	340								
Holland Lake	19006500	401	5/20/2013	9.1		4.15	0.2	6.99	348								
Holland Lake	19006500	401	5/20/2013	10.1		4.15	0.1	6.96	357								
Holland Lake	19006500	401	5/20/2013	12.1		4.24	0.1	6.93	384								
Holland Lake	19006500	401	5/20/2013	13.9		4.52	0.1	6.81	479								
Holland Lake	19006500	401	5/20/2013	15.0		4.68	0.1	6.8	541								
Holland Lake	19006500	401	5/20/2013	16.0		4.89	0.1	6.78	612								
Holland Lake	19006500	401	5/20/2013	17.0						127	31.6	40.8	148	59.4	9.8	< 0.4	
Holland Lake	19006500	401	5/20/2013	17.0		4.99	0.1	6.81	631								
Riley Lake	10000200	401	2/13/2013	0.0		0.64	13.6			128	39.9	108	188	< 0.02	16.4		2.45
Riley Lake	10000200	401	2/13/2013	0.6		0.64	13.6	7.25	670								
Riley Lake	10000200	401	2/13/2013	1.0		2.83	12.2	7.35	662								
Riley Lake	10000200	401	2/13/2013	2.0		3.07	12.1	7.3	663								
Riley Lake	10000200	401	2/13/2013	3.0		3.09	12.1	7.31	661								
Riley Lake	10000200	401	2/13/2013	4.0		3.05	12.1	7.33	665								
Riley Lake	10000200	401	2/13/2013	5.0		3.08	12.1	7.36	662								
Riley Lake	10000200	401	2/13/2013	6.0		3.07	12.1	7.37	666								
Riley Lake	10000200	401	2/13/2013	7.0		3.24	11.3	7.4	663								
Riley Lake	10000200	401	2/13/2013	9.0		3.4	6.9	7.31	669								
Riley Lake	10000200	401	2/13/2013	10.0		3.51	3.2	7.16	670								
Riley Lake	10000200	401	2/13/2013	11.0		3.59	1.2	7.11	672								
Riley Lake	10000200	401	2/13/2013	12.0		3.71	0.2	7.06	673								
Riley Lake	10000200	401	2/13/2013	12.5						125	35	109	204	~ 0.07	14.2		2.03
Riley Lake	10000200	401	2/13/2013	13.0		3.78	0.1	7.04	673								
Riley Lake	10000200	401	5/13/2013	0.0	1.5	10.24	13.5			120	36.1	111.3		~ 0.02	14.2	2.52	
Riley Lake	10000200	401	5/13/2013	0.5		10.24	13.5	7.86	580								
Riley Lake	10000200	401	5/13/2013	1.0		10.18	13.5	7.9	607								
Riley Lake	10000200	401	5/13/2013	2.0		10.13	13.4	7.95	607								
Riley Lake	10000200	401	5/13/2013	3.0		10.01	13.4	7.98	610								
Riley Lake	10000200	401	5/13/2013	4.0		9.99	12.7	7.98	611								

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Riley Lake	10000200	401	5/13/2013	5.0		9.11	11.3	7.88	615								
Riley Lake	10000200	401	5/13/2013	6.0		8.52	9.8	7.71	619								
Riley Lake	10000200	401	5/13/2013	7.0		8.02	9	7.61	624								
Riley Lake	10000200	401	5/13/2013	8.0		7.63	8.3	7.49	626								
Riley Lake	10000200	401	5/13/2013	9.0		6.8	6.3	7.41	633								
Riley Lake	10000200	401	5/13/2013	10.0		5.67	1.5	7.29	665								
Riley Lake	10000200	401	5/13/2013	12.0		5.37	0.3	7.23	675								
Riley Lake	10000200	401	5/13/2013	13.0		5.13	0.2	7.2	686								
Riley Lake	10000200	401	5/13/2013	13.5						140	39.5	123.7	160	~ 0.05	15.4	2.41	
Riley Lake	10000200	401	5/13/2013	14.0		5.02	0.1	7.17	690								
Sunfish Lake	19005000	401	2/27/2013	0.0		0.42	7.9			94	29.8	26	112	~ 0.19	10.6		3.65
Sunfish Lake	19005000	401	2/27/2013	0.5		0.42	7.9	7.6	304								
Sunfish Lake	19005000	401	2/27/2013	1.0		2.21	7.4	7.38	296								
Sunfish Lake	19005000	401	2/27/2013	2.0		3.9	6.2	7.24	293								
Sunfish Lake	19005000	401	2/27/2013	3.0		4.01	5.9	7.12	293								
Sunfish Lake	19005000	401	2/27/2013	4.0		4.07	5.5	7.07	295								
Sunfish Lake	19005000	401	2/27/2013	5.0		4.11	4.8	7.01	295								
Sunfish Lake	19005000	401	2/27/2013	6.0		4.17	4.1	6.91	295								
Sunfish Lake	19005000	401	2/27/2013	7.0		4.23	3.4	6.9	297								
Sunfish Lake	19005000	401	2/27/2013	8.0		4.26	3	6.88	295								
Sunfish Lake	19005000	401	2/27/2013	8.5						84	30.7	26	116	~ 0.27	10.9		3.56
Sunfish Lake	19005000	401	2/27/2013	8.5		4.31	0.6	6.77	299								
Sunfish Lake	19005000	401	2/27/2013	9.0		4.31	0.2	6.76	298								
Sunfish Lake	19005000	401	5/20/2013	0.0	1.6	19.14	13.3			58	17.9	18.6	82	~ 0.03	6.6	2.59	
Sunfish Lake	19005000	401	5/20/2013	0.5		19.14	13.3	7.93	209								
Sunfish Lake	19005000	401	5/20/2013	1.0		19.12	13.3	8.08	209								
Sunfish Lake	19005000	401	5/20/2013	2.0		16.98	14	8.16	214								
Sunfish Lake	19005000	401	5/20/2013	3.0		15.92	13.1	8.13	216								
Sunfish Lake	19005000	401	5/20/2013	4.0		13.1	11.9	7.87	231								
Sunfish Lake	19005000	401	5/20/2013	5.3		6.42	10.3	7.28	290								
Sunfish Lake	19005000	401	5/20/2013	6.0		5.25	0.7	7.19	295								
Sunfish Lake	19005000	401	5/20/2013	7.0		4.76	0.3	7.14	297								
Sunfish Lake	19005000	401	5/20/2013	8.0		4.73	0.3	7.1	310								
Sunfish Lake	19005000	401	5/20/2013	9.0						114	28.2	27	120	2.5	9.3	1.57	
Sunfish Lake	19005000	401	5/20/2013	9.0		4.79	0.2	7	334								