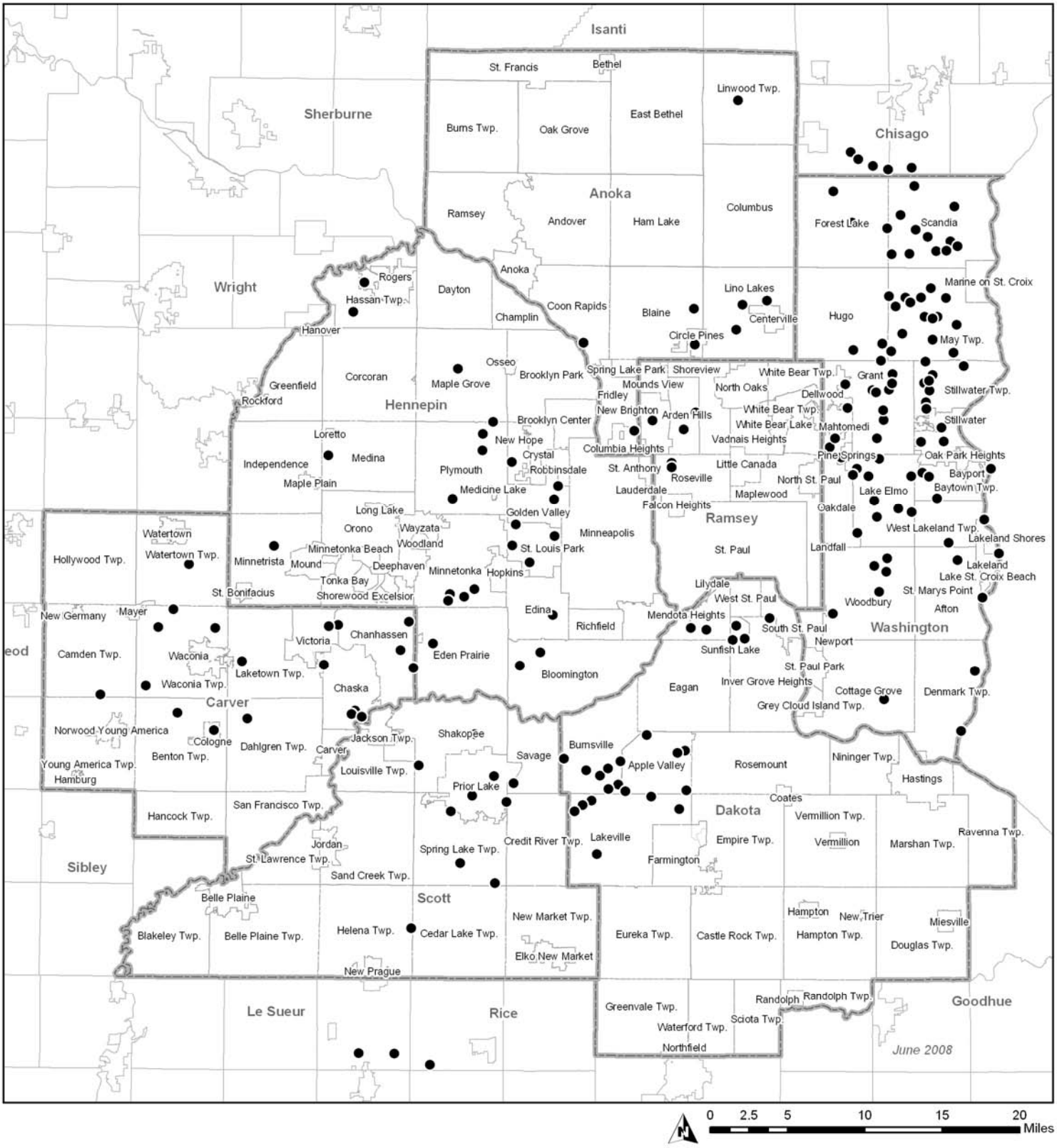
2007 Study of the Water Quality of 176 Metropolitan Area Lakes



By
Brian Johnson
Metropolitan Council
July 2008

EXECUTIVE SUMMARY

To date, the Metropolitan Council's lake monitoring programs (including the staff- and volunteer-monitoring programs) have provided an important tool for making informed lake management decisions. Data from our regional lake monitoring programs are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of unmonitored lakes, examine intra-and inter-regional differences, determine potential impairments due to water quality, and investigate the relationships between land use and water quality.

This report is the latest in a continuing series of reports summarizing results of the Metropolitan Council's (Council's) annual lake monitoring program. The Council has collected water quality data on area lakes since 1980. This report contains data from a total of 181 lake sites on 176 lakes sampled in 2007. All of the lakes monitored in 2007 were monitored by volunteers through the Council's Citizen-Assisted Lake Monitoring Program (CAMP). Council staff did not monitor any Metropolitan Area lakes in 2007.

Seventy-one of the 176 lakes monitored in 2007 were listed by the MPCA as impaired waters due to excessive phosphorus, which affects the lakes' ability to support their designated recreational uses. To learn more about the impaired lakes listings and potential next steps, see http://www.pca.state.mn.us/water/tmdl/index.html.

The objectives of this study were to:

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.

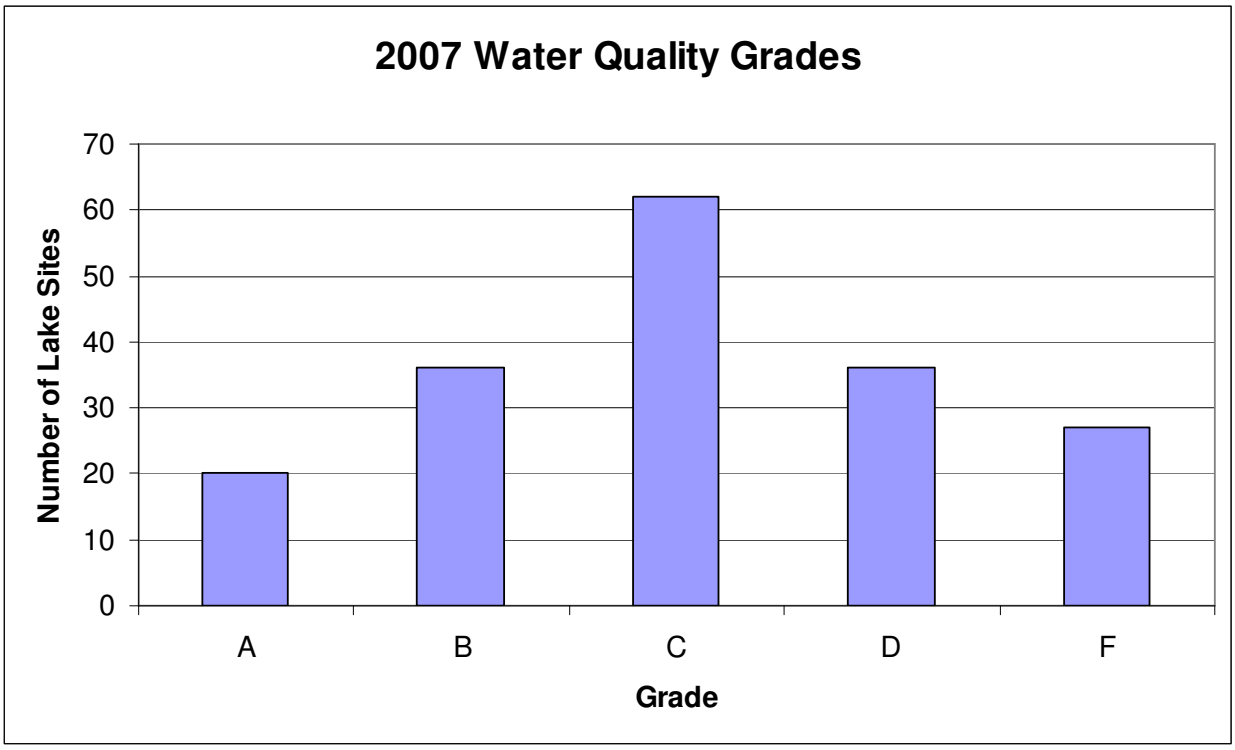
The year 2007 marked the fifteenth year that CAMP was used to increase our knowledge of the water quality of area lakes. Once again, volunteers measured surface water temperature and transparency, and collected surface water samples that were analyzed for total phosphorus, total Kjeldahl nitrogen, and chlorophyll-a on a biweekly basis from mid-April to mid-October (approximately 14 sampling events).

This year's monitoring program included 11 lakes never before monitored by the Council and volunteers. The 2007 lakes monitoring program included lakes from 36 municipalities, watershed management organizations/districts, and counties. Additionally, the 2007 CAMP program enrolled one new group (City of Mendota Heights), continuing to expand the list of monitoring partners.

Each lake was given an annual water quality grade. The spread of water quality grades for all of the lakes monitored in 2007 is as follows:

- A – 11% (20 lake sites).
- B – 20% (36 lake sites).
- C – 34% (62 lake sites).
- D – 20% (36 lake sites).
- F – 15% (27 lake sites).

The greatest percentage of the lake sites monitored through CAMP in 2007 received a water quality grade of "C" (34%). The water quality of these lakes is considered average as compared to others in the seven-county Metropolitan Area. When comparing the percentage of above-average lakes, those receiving grades of "A" or "B" (31%), to below-average lakes, those receiving "D" or "F" (35%), more lakes were below average.



Of the 159 lake sites previously monitored in 2006 with a sufficient database needed to generate annual grades:

- 19 lakes had a worse water quality grade in 2007 [Armstrong, Barker, Bass (west), Benz, Bush, Demontreville, Earley, Henry, Herber's, La, Long (May Township), MacDonald's, McDonald's, North Twin, O'Connor, Orchard, Rutz, South Oak, and Twin (St. Louis Park)];
- 34 lakes had a better water quality grade in 2007 [Alimagnet, Bass (May Township), Bass (east), Big Comfort, Big Marine, Carol, Colby, Cowley, Edith, Farquar, Fireman's, Fish (Scandia), Island, Jellum's, Keller, Kingsley, Little Comfort, Long (Pine Springs), Long (Stillwater), McMahon, Mitchell, Markgraffs, O'Dowd, Pat, Peltier, Reitz, Sand, St. Joes, Sunset Pond, Sweeney (site 1), Tamarack, Twin (Burnsville), Valley, and Woodpile]; and
- 106 lakes had the same water quality grade in both 2006 and 2007.

Water quality data from the 159 lake sites monitored in both 2006 and 2007 seem to indicate that the Metro Area lakes experienced slightly better water quality conditions in 2007 as compared to 2006. This observation indicates a reversal of a previous trend in which more lakes saw degradation in their water quality grades from 2004 to 2006.

The MPCA recently conducted a statewide statistical trend analysis on lakes with extensive Secchi transparency databases. The analysis revealed that the majority of assessed lakes showed no statistically significant trends in water clarity (either negative or improving). However, more lakes showed an improving trend than a degrading trend (MPCA 2008). There were 81 CAMP lakes monitored in 2007 which were included in the MPCA's trend analysis. The following is a summary of which lakes saw a statistically significant trend in water clarity:

- 24 lakes showed an improving trend in water clarity [Armstrong (south bay), Bass (Plymouth), Big Carnelian, Big Marine, Colby, Courthouse, DeMontreville, Earley, Elmo, Halfbreed (Sylvan), Hay, Kismet, Langton (site 2), Little Carnelian, Long (May Township), Marion, McKusick, Olson, Pine Tree, Silver (Stillwater), Sunset, Valentine, Waconia, and West Boot].
- 9 lakes showed a negative trend [Goggins, La, Little Long, Markgrafs, Pike (Maple Grove), Powers, Seidl, Shields, and Square].

Since 1980, 333 Metropolitan Area lakes have been monitored through the Council's lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 354 lake sites have been monitored. The list of lakes in the Council's monitoring database is shown in Appendix A. The resulting data from the Council's lake monitoring program are permanently stored in the U.S. EPA's national water quality data bank, STORET (STOrage and RETrieval). The Council's lake monitoring data are readily available via the Metropolitan Council Environmental Information Management System (EIMS), at: http://es.metc.state.mn.us/eims/lakes/index.asp. The majority of the 354 lake sites have been revisited on a rotating schedule throughout the past 28 years, to develop a working baseline to help determine possible water quality trends, and to aid lake and watershed managers in their decision making. While the Council has done its best to enhance and expand the region's lake water quality database, it is apparent that one of the most economical and efficient methods to expand knowledge of our lakes has been with the assistance of volunteers and the cooperation and financial support of local partners, including watershed management organizations, watershed districts, counties, and cities. So while the first 15 years of CAMP have been very successful, our future goal is to continue to expand the coverage of our lake monitoring program, in order to better understand and manage the region's water resources.

The Council's lake monitoring program, especially the use of volunteer monitors through CAMP, has played a key role in the Council's recent efforts to use satellite images to assess annual lake water clarity for the entire region. The monitoring program provides "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 region's lake water quality from just the lakes involved in our ground-based programs to all of the lakes in the region. 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.

If you have questions pertaining to the lake data or descriptions contained in this report, inquiries about CAMP, or suggestions of lakes the Council 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:

A. The various watershed management organizations (WMOs), participating agencies, and volunteers involved in the citizen-assisted monitoring program (CAMP). Without their enthusiastic participation, CAMP would not be successful. A list of involved WMOs, agencies, and volunteer lake monitors is shown in Appendix B. The following volunteers should be given added thanks for their multiple years of service:

15 years of service
Diane and Bob Coderre - Sunset Lake

14 years of service
Washington Co. SWCD- Multiple

13 years of service
Bill Aamadt- Wilmes Lake
Carver Co. Env. Services- Multiple
Wayne LeBlanc- Lake Peltier

12 years of service
City of Circle Pines- Golden Lake
John Ritter - Lake Alimagnet
Wargo Nature Center- George Watch

11 years of service
Anoka Co. Parks- Multiple

10 years of service
Glen Gramse- Keller Lake
Wally Shaver- Lac Lavon Lake
City of Prior Lake- Markley Lake

9 years of service
Philip Goodrich- Pike Lake
Lakeville- Valley and Lee lakes
John Ryski- Bavaria Lake
Westwood Nature Center- Westwood Lake

8 years of service
Dave Hanson-Sweeney Lake

7 years of service
Arnett Family- Crystal Lake
Gene Berwald- Pine Tree Lake
Kevin Bjork- Cloverdale Lake
Tom/Dorothy Goodwin- Orchard Lake
Dale Wahlstrom – Schmidt Lake
Wally Potter- Marion Lake
Rice Creek WD- Multiple
Terry Riley- Markgrafs Lake
Mike Shouldice- Tamarack Lake
Sly Family- Downs Lake
Streff Family- South Rice Lake
Bob Videen- Parkers Lake

6 years of service
Bonnie Jurand- Klawitter Lake
Al Kettlekamp- Long Lake (A.V.)
Tom Sletta- Cates Lake

5 years of service
Walt Burris- Lower Prior Lake
Conservation League of Edina-Cornelia Lake
Bill Feely- Long Lake
Kellogg Family- Cobblecrest Lake
Kitty Francy-Payton- Long Lake

4 years service
David Bess- Wood Lake
David Florenzano- Riley Lake
Wayne Hubin- Swede Lake
Shelly Strohmaier- Lotus Lake
Chuck Taylor- Jane Lake
Gordan Warner- Mitchell Lake
Jim Kellog – Cobblecrest Lake
Sue Morgan & Linda Scott – St. Joe Lake
Bob Kistler – Valentine Lake

3 years service
Marvin Groth – Bass Lake
Steve Pierson – Fish Lake
Jeff Keene & Ken Nieman – O'Connor Lake
Arnie Johnson – Sunnybrook Lake

B. The Metropolitan Council Environmental Services – Laboratory Services Section, for laboratory analysis of the lake samples.

C. Members of the Metropolitan Council and its environmental staff:
    a. Craig Skone for support with data management, report preparation, and for developing all of the graphics for this report.
    b. Karen Jensen deserves special recognition as the interim CAMP manager, for keeping the CAMP program running during the search for a new lake monitoring program manager.

CONTENTS

Physical/chemical lake data and copies of the volunteer monitoring methods pilot study can be obtained upon request by contacting Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us**.**

2007 LAKE MONITORING PROGRAM

INTRODUCTION

This report continues a series of annual lake studies from 1980 to present (the list of past annual reports is included in the References section of this report). Since 1980, 333 Metropolitan Area lakes have been monitored through the Council's lake monitoring program. Since some of these lakes have multiple monitoring sites, a total of 354 lake sites have been monitored. The list of lakes in the Council's monitoring database is shown in Appendix A. The resulting data from the Council's lake monitoring program are permanently stored in the U.S. EPA's national water quality data bank, STORET (STOrage and RETrieval). The Council's lake monitoring data are readily available via the Metropolitan Council Environmental Information Management System (EIMS), at: http://es.metc.state.mn.us/eims/lakes/index.asp.

Council staff did not monitor any lakes in 2007, because the lake monitoring program was without a program manager for most of the 2007 monitoring season. However, the CAMP program was in full operation during 2007. CAMP was managed by an interim CAMP manager until the new lake monitoring program manager started in September 2007. Figure 1 shows the lakes that were monitored in 2007.

The long-term goal of the Council's lake studies has been to provide a comprehensive database to enable cities, counties and watershed management organizations (WMOs) to better manage area lakes. The Council believes that, without such comprehensive lake data, the foundation of lake and watershed management plans is weakened.

To date, the Council's lake monitoring program has been an important tool for making informed lake management decisions. The lake monitoring data are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of unmonitored lakes, examine intra-and inter-regional 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.

The Council addressed this lack of adequate lake water quality data by initiating a citizen-assisted lake monitoring program (CAMP) in 1993. CAMP is funded in part by watershed districts (WDs), WMOs, counties, and cities that are participating in the program. Through this program, citizens collect comprehensive data. To assure that the data collection methods used by citizen volunteers were credible, the Council conducted a pilot study along with its routine monitoring in 1991 (Hartsoe and Osgood 1991). The pilot study and its results are included in the 1993 lake report, and can be obtained by contacting Brian Johnson at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Volunteer monitoring is a growing endeavor around the country. Citizens are finding that good information on the status of local water quality and the causes of water quality degradation are often not available from scientific research projects or government surveys. Therefore, the citizens themselves are collecting this information.

Figure 1

2007 CAMP Study Lakes

Key to Washington County Lake Numbering

1. DeMontreville
2. Goetschel Pond
3. Klawitter
4. Sunnybrook
5. Woodpile
6. Masterman
7. Bass (East)
8. Bass (West)
9. Kismet
10. Twin (South)
11. Twin (North)
12. Silver
13. Herber's Pond
14. Loon
15. Louise
16. South School Section
17. Goggins
18. Schroeder's Pond
19. East Boot
20. West Boot
21. Bass
22. Turtle
23. Staples
24. Big Marine
25. Jellum's Bay
26. MacDonald's Pond

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

CAMP was initiated by the Metropolitan Council in 1993 to help bridge the data gaps for area lakes, provide a more complete and improved Metropolitan Area database, give local decision makers a better idea of the water quality of their lakes, and assist them in decision making on water quality issues. The Council's goal for CAMP is to provide a means to gather as much information on area lakes as is economically possible.

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).

Not only does volunteer involvement in the lake monitoring process substantially reduce the cost of obtaining data, but it enhances the grass-roots understanding of how lakes work and how certain lake conditions relate to the surrounding watershed.

The Council's lake monitoring program, especially the use of volunteer monitors through CAMP, has played a key role in the Council's recent efforts to use satellite images to assess annual lake water clarity for the entire region. The monitoring program provides "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 region'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.

PURPOSE OF THE VOLUNTEER MONITORING PROGRAM

The main purpose of CAMP is to provide lake and watershed managers with water quality data that will not only support them in properly managing the resources, but also provide much needed historical baseline data to help document water quality impacts and trends. As noted earlier, 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.

Volunteers collect surface water samples that are analyzed for total phosphorus (TP), total Kjeldahl nitrogen (TKN), and chlorophyll-a (CLA) [a select few of the lakes are analyzed for chloride as well]. In addition, they measure surface water temperature and water transparency, and record user perceptions (some monitors also measure dissolved oxygen). Most lakes are visited biweekly from April through October (fourteen sampling dates) and are sampled at the lake's deepest open-water location. In 2007, quite a few 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. Samples are submitted to Council staff and then analyzed at the MCES-EQA laboratory.

ACKNOWLEDGMENTS

The success of the 2007 volunteer lake monitoring program would not have been possible without the greatly appreciated work conducted by volunteer monitors, and the support of the organizations that enrolled lakes in the program.

The enrolling organizations, which included 18 watershed management organizations/watershed districts (WMOs/WDs), 15 cities, two counties, and one basin planning group, 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.

However, those deserving the greatest appreciation are the volunteers themselves. Their help has made this program successful. The list of the volunteers involved in the 2007 Citizen-Assisted Monitoring Program (CAMP) is shown in Appendix B. The Metropolitan Council and their sponsoring local partners thank them for their sustained efforts over six months, as well as the quality of their work.

CAMP METHODS

Recruiting Volunteers

Active recruitment of lakes and interested volunteers for the 2007 volunteer monitoring program began in the winter months of 2006. Letters and registration forms were sent to various WMOs, WDs, counties, and cities to determine their interest in enrolling lakes within their jurisdiction. The organizations were then encouraged to recruit volunteers for each lake they enrolled in the program. If there were problems finding willing volunteers, the Council assisted in 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.

The year 2007 marked the fifteenth year of the Council's volunteer program. Eighteen watershed management organizations/watershed districts (WMOs/WDs), 15 cities, two counties, and one basin planning group participated in CAMP in 2007. This year's volunteer monitoring program included 11 lake sites never before monitored by the Council and 159 lake sites which were also monitored in 2006. Figure 1 shows the location of the 2007 CAMP lakes. A list of the volunteer monitors for each lake is provided in Appendix B.

Training Volunteers

Volunteer training was conducted by Council staff at various locations throughout the seven-county Metropolitan Area. Volunteer training was scheduled between late-February and early-April 2007. At each training session, volunteers were given a handbook describing the program, outlining basics in the biology and ecology of lake systems, and containing detailed written instructions for the lake monitoring and data form completion procedures.

At each training session, volunteers received the necessary equipment for lake monitoring. This equipment was purchased by the local partner through the Council and loaned to the volunteers. At the end of the monitoring season, equipment was returned to the local partner to be used in future years. Each lake's volunteer received:

- Chlorophyll hand pump, flask, and filters
- LCD thermometer
- Map of lake with sampling site(s)
- Sampling observation forms
- Sample jug
- Sample vials 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 Council or the local partner enrolling the lake in the program, and that they would use proper safety equipment and observe boat operating methods specified by the State of Minnesota.

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 methods they used were determined through a pilot study in 1991 that tested simplified methods for using volunteers to obtain credible water quality data (Anhorn 1994). 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 (the deep open-water area of the lake). Once at the monitoring location, an observation form for lake and meteorological conditions was completed. The form, shown in Figure 2, provided space to mention natural and cultural observations which may have influenced what was happening in the lake (i.e., heavy rains two days before monitoring), and an area to relate general perceptions of the lake's condition and suitability for recreation.
Next, the volunteers took a water transparency reading by lowering a Secchi disk on the shaded side of the boat to the point at which it disappeared. The point where the disk reappears is the Secchi transparency depth that was recorded on the observation form.

Collecting a surface water sample. The next lake monitoring step involved the collection of the surface water sample. A surface water sample was collected in a clean one-gallon plastic milk jug. To begin, the volunteer pre-rinsed the jug three times with lake water. After rinsing, the jug was filled by submersing it upside down to forearm depth and turning it upright while still submersed. After filling the sample jug, volunteers tested and prepared it for the following parameters:

- **Temperature**. Surface water temperature was measured from the volunteer's sampling jug using a LCD thermometer that is readable 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)**. Two samples, one each for TP and TKN, were decanted from the volunteer's jug in the field into their respective triple pre-rinsed, pre-labeled (including lake name, date, time, and parameter) 50-milliliter (ml) vials. These samples were then placed in the cooler, taken home, and stored in the freezer until they were picked up and delivered to the laboratory for analysis.

- **Chlorophyll-a (CLA)**. CLA samples from the volunteer's jug were filtered in the field *(out of direct sunlight)* onto a 1 micrometer (µm) glass-fiber filter using a field filtration apparatus and a hand pump. Water from the sampling jug was measured and poured into the pump reservoir using a graduated cylinder. The pump reservoir holds approximately 250 ml. By squeezing the handle of the pump, the sample water was forced through the filter and the suspended planktonic algae became attached to the filter. The filtered water was then dumped back into the lake. If possible, this was repeated until a total of 1000 ml of sample water was allowed to pass through the filter. However, if the water sample was too green and the filter became clogged without allowing more water to pass through, the amount of water that did pass through the filter was calculated and recorded on the observation form. The filter was then removed from the filter holder with a tweezers, and placed in a petri dish. The sample container was then labeled using the same methods as those for the TP and TKN sample vials (except the amount of water pumped through the filter was also included on the label), wrapped in aluminum foil, and frozen until pick-up and delivery to the laboratory for analysis.

The frozen samples were picked up within approximately 30-90 days by Council staff and delivered to the MCES EQA laboratory for chemical analysis. Results from the 1991 pilot study reveal that the volunteer monitoring and handling methods chosen for use in the CAMP program yield results comparable to routine methods used by the Council (Hartsoe and Osgood 1991).

In addition, a few local partners had their volunteer(s) record dissolved oxygen (DO) and temperature profiles, as well as collect surface chloride and subsurface TP and CLA samples. Chloride samples were prepared in the field in a manner identical to that used for the TP/TKN samples. The local partners provided their volunteers with supplementary equipment and training to use this equipment, and also paid for the additional cost of laboratory analysis of the chloride, TP, and CLA samples. The additional profile data and subsurface samples were picked up by Council staff, along with the routine samples. Profile data obtained by the volunteers were then mailed to the local partner, and the samples were delivered to the lab for analysis.

Figure 2. Example of CAMP Monitoring Form

Lake Name and ID #:_____ Site #:

Sampling Date:_____ Time:____

Name(s) of Volunteer(s):

_____

_____

SECCHI DISK DEPTH:___meters

SURFACE TEMPERATURE:____°C

VOLUME OF FILTERED LAKE WATER (CLA) ___ml

GENERAL OBSERVATIONS

(Circle)

* Water Color

Clear Yellow
Green Gray
Brown Blue-Green
Comment:

* Odor of Water

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

* Wind Conditions

Calm Strong
Breezy
Direction:

* Water Surface

Calm Moderate Waves
Ripple Whitecaps 25%
Small Waves
Comment:

* Cloud Cover

0% 75%
100% Normal
50%

* Lake Level

Above 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 Swim..Boating OK(4)
No Aesthetics Possible(5)

LABORATORY ANALYTICAL METHODS

The routine chemical analyses were performed at the Metropolitan Council Environmental Services - Environmental Quality Assurance Department (MCES-EQA) laboratory, following U.S. EPA approved methods. Surface and subsurface water samples that were analyzed for TDP were filtered through a 0.45 µm membrane filter and analyzed for TP. Water samples analyzed for TP and TKN were digested with the sulfates of hydrogen, potassium and mercury (H_2SO4, K_2SO_4 and $HgSO_4$). Following digestion, phosphorus was analyzed using a modified ascorbic acid reduction method (APHA 1992). Samples analyzed for TKN were chemically reduced the same way as the TP samples, then were color-intensified with sodium nitroprusside and assayed for ammonia colorimetrically. TKN and TP in surface samples were periodically analyzed in duplicate to determine accuracy, at which time their average values were reported.

Chlorophyll was extracted from the filters by homogenization in 90 percent aqueous acetone. The optical density of the extract was measured spectrophotometrically at 630, 647, 664 and 750 nm. CLA was calculated from a trichromatic equation that corrects for turbidity (APHA 1992).

DATA HANDLING AND ANALYSIS

Once each lake's sampling forms and lab analyses were delivered to the Council, the data were entered into the Council's Environmental Information Management System (EIMS). EIMS is a system for providing timely and reliable information for environmental planning and decision-making. The Council's EIMS can be accessed via the internet at http://es.metc.state.mn.us/eims/. This data handling system served three purposes:

1. Check-in of forms and tracking of volunteer participation;

2. Entry of nutrient, Secchi, and user perception data into a database for statistical, graphical, and tabular outputs; and

3. Storage of the CAMP data in the Metropolitan Council's EIMS, as well as in the U.S. Environmental Protection Agency's (U.S. EPA) national water quality data bank, STORET.

If there were questions concerning the data and/or lake observations, Council staff contacted the volunteer. The Council maintained contact with most volunteers throughout the season by telephone or in person during sample pick-up.

PROGRAM QUALITY ASSURANCE/QUALITY CONTROL

The quality assurance/quality control (QA/QC) objective for CAMP is to prevent erroneous data from being produced and used. If by chance errors did occur, they were identified and corrected. Additionally, all suspect data were excluded in lake databases and/or data assessment.

The MCES EQA laboratory follows its own internal QA/QC program, which employs an extensive internal and external check and balance system to ensure credible data. Documentation of these QA/QC procedures can be obtained from the laboratory.

To ensure that CAMP volunteers were using proper sampling techniques and producing credible data, two QA/QC methods have been used. Either Council staff accompanied a volunteer on a sampling event to oversee his/her collection and preparation procedures, or staff monitored a CAMP lake site during the same week (although not necessarily the same day) that the volunteer was to sample the lake site. The

first method was used to simply observe the volunteer's methods to determine if there were any problems that needed to be addressed. This procedure was usually undertaken when the Council staff member was in a volunteer's area on a known sampling day, or when it seemed necessary.

The most common quality assurance check, however, has been the monitoring of the lake by the Council during a scheduled monitoring week. For these sampling events, Council staff used the same type of equipment and same methods as the volunteers. The Council-collected QA/QC samples were then treated just as the volunteer samples were, so that the nutrient concentrations and Secchi transparencies of both sampling events could be compared to determine if any procedural problems existed. If there seemed to be discrepancies, Council staff would accompany the volunteer on their next sampling event to observe their methods and, if necessary, re-train them. Data determined to be erroneous were eliminated from the database.

Council staff collected QA/QC samples with insufficient frequency in 2007 because the program was without a full-time lake monitoring person for a majority of the sampling season. Six lakes were sampled by Council staff for QA/QC, at one sampling event each, towards the very end of the monitoring season (i.e. October). Four of these lakes were monitored within 7 days of the volunteer's monitoring visit. Therefore, only 4 lakes were available for data comparison. Without sufficient quantity of data points, the analysis to compare the volunteer's data with professionally collected data would not have the statistical confidence to determine meaningful comparisons on the program's overall methods and results.

Instead, the regression analysis from the 2006 lake monitoring report is repeated here to document historical QA/QC performance of the CAMP program. [As a reminder, the samples for CLA and TP/TKN collected in 2006 for QA/QC purposes were mistakenly removed from the freezer and discarded. Therefore, the only 2006 monitoring data available for comparison between the volunteer and professionally collected data is Secchi transparency.] The regression analysis was performed on the historical QA/QC dataset to determine if there was an agreeable linear correlation between volunteer- and professionally-collected data.

The 2005 and 1993-2005 QA/QC volunteer- and professionally-collected TP and CLA and 2006 and 1993-2006 Secchi transparency data were plotted on scatter plot graphs (Figures 3-8). If the professionally- (y) and volunteer-collected (x) data were identical, the data points would fall along the dashed line (x = y) as shown in figures 3-8. .

Because of variation in the data, the data points do not match exactly between the professionally- and volunteer collected data. Therefore, a linear regression analysis was performed to estimate the degree of variation between the two data sets. The regression lines are shown on the graphs as solid lines. The graphs show that the data agree well with the x = y line as demonstrated by the close agreement between the regression line and the x = y line. Furthermore, the R^2 values are 0.95 and greater (0.91 for 2005 TP data) which indicates strong linear correlations between the data sets.

Figure 3. 2005 Professionally-collected TP vs. CAMP-collected TP

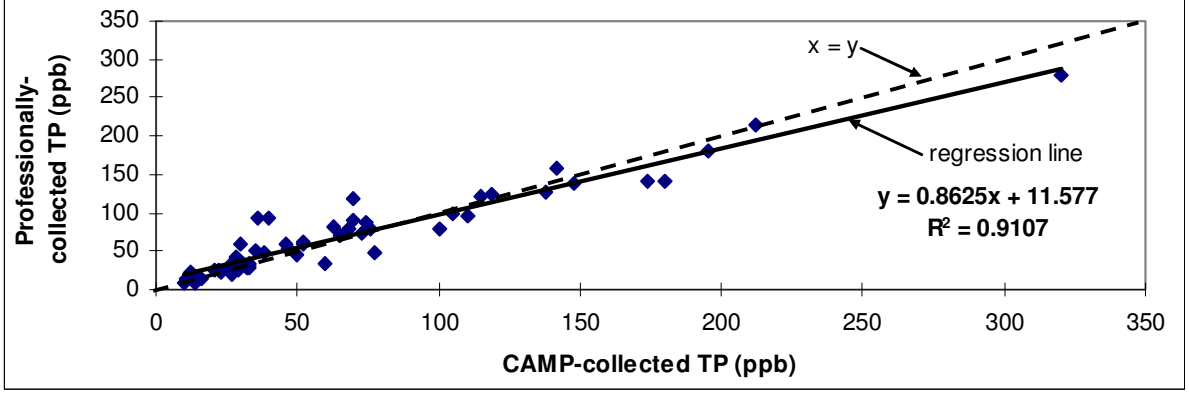


Figure 4. 2005 Professionally-collected CLA vs. CAMP-collected CLA

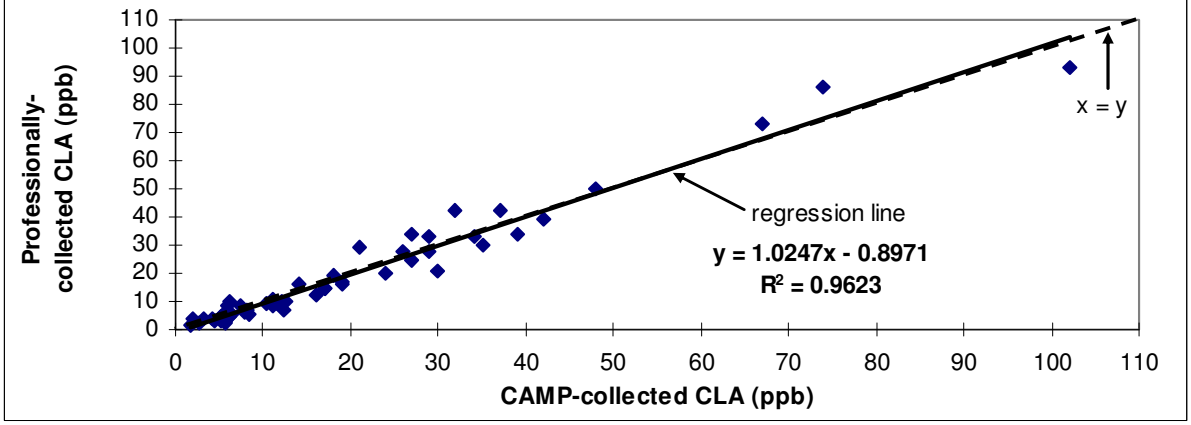
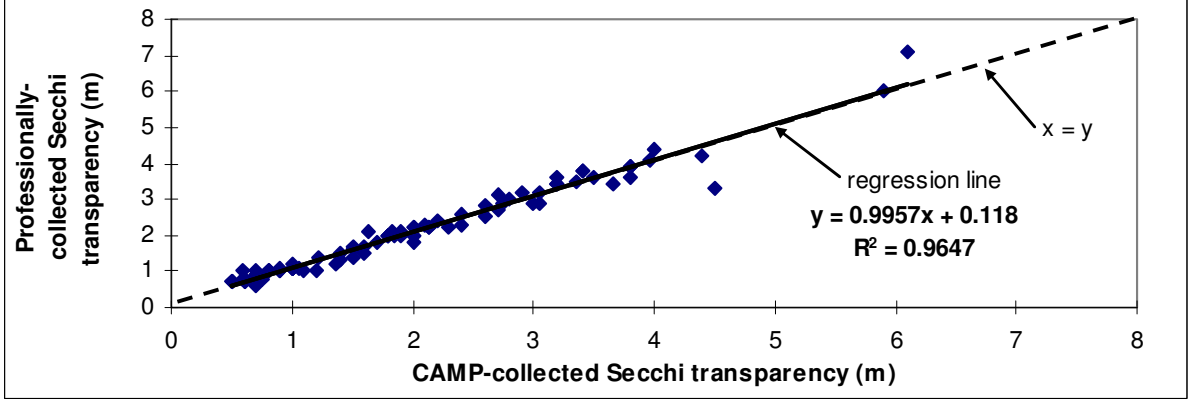


Figure 5. 2006 Professionally-collected Secchi transparency vs. CAMP-collected Secchi transparency



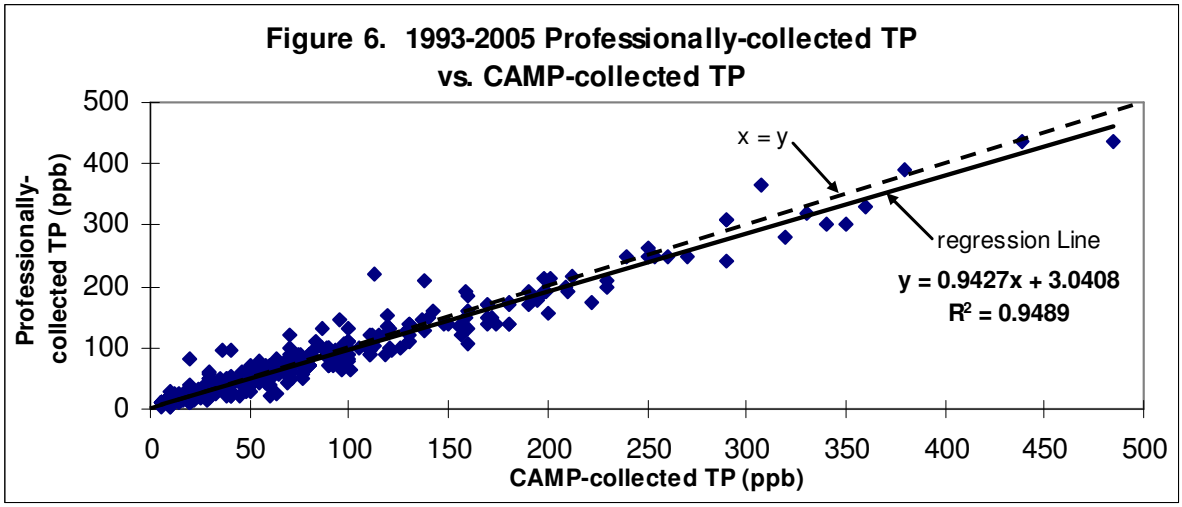


Figure 6. 1993-2005 Professionally-collected TP vs. CAMP-collected TP
Professionally-collected TP (ppb)
CAMP-collected TP (ppb)
x = y
regression Line
y = 0.9427x + 3.0408
R² = 0.9489
0
100
200
300
400
500
0
50
100
150
200
250
300
350
400
450
500

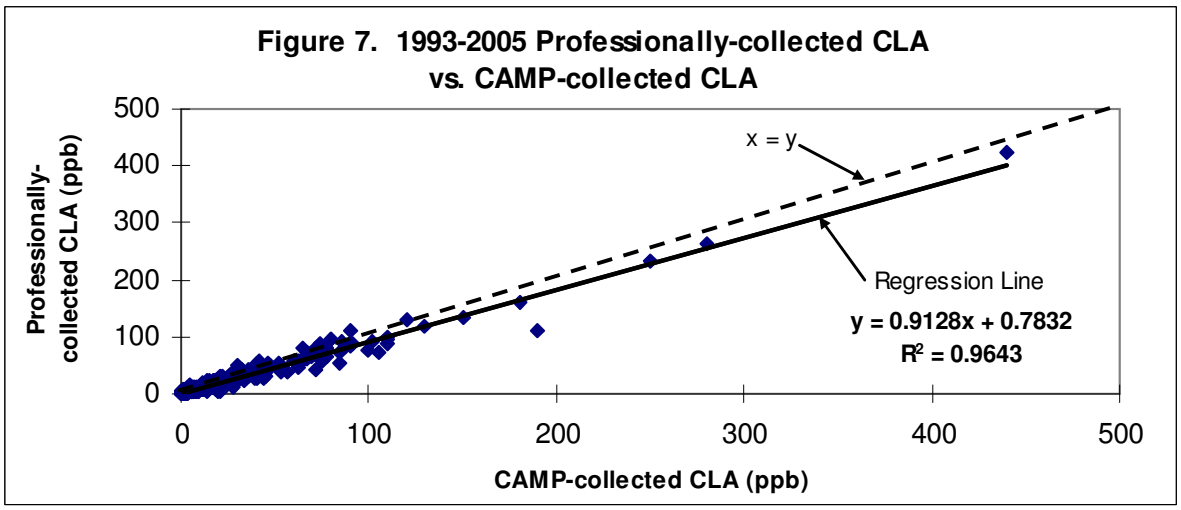


Figure 7. 1993-2005 Professionally-collected CLA vs. CAMP-collected CLA
Professionally-collected CLA (ppb)
CAMP-collected CLA (ppb)
x = y
Regression Line
y = 0.9128x + 0.7832
R² = 0.9643
0
100
200
300
400
500

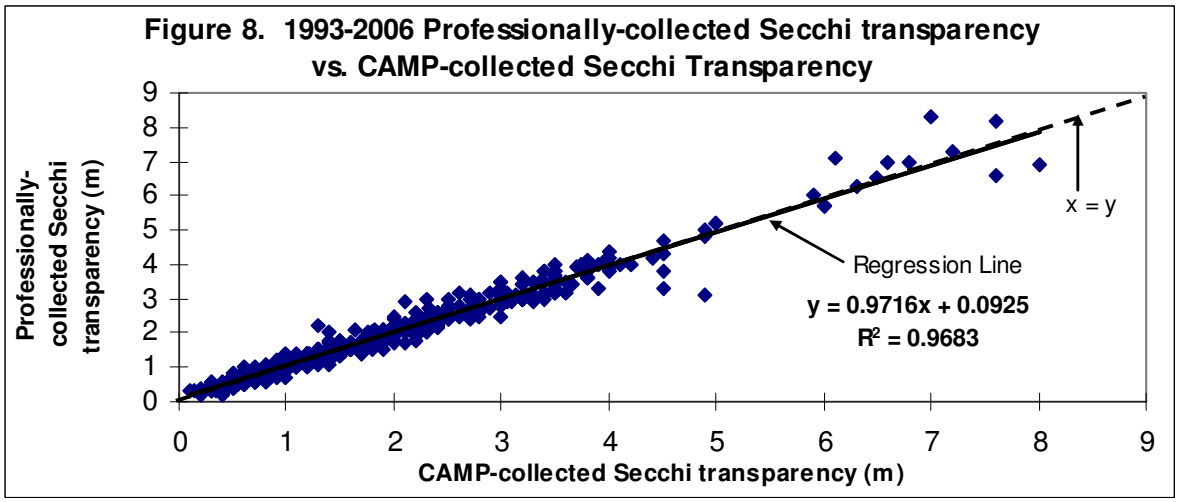


Figure 8. 1993-2006 Professionally-collected Secchi transparency vs. CAMP-collected Secchi Transparency
Professionally-collected Secchi transparency (m)
CAMP-collected Secchi transparency (m)
x = y
Regression Line
y = 0.9716x + 0.0925
R² = 0.9683
0
1
2
3
4
5
6
7
8
9

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 area lakes. The grading curve represents percentile ranges for three water quality indicators - the summertime (May - September) average values for total phosphorus, chlorophyll-a, and Secchi transparency. These percentiles use ranked data from 120 lakes sampled from 1980 - 1988:

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

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 continue to be used for lake quality grading purposes.

The three parameters used in the grading system strongly relate to open-water nuisance-aspects of a lake (i.e. algal blooms), 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 1988b). 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. And finally, Secchi transparency 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 1988b).

However, these three parameters 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 TP, CLA and Secchi grades to the monitored lakes. Therefore, a lake having a mean summertime Secchi transparency of 1.7 m would receive a “C” grade for that parameter. The water quality grade for each lake was determined by taking the average of the individual parameter grades. Water quality grades generally correspond to descriptive rankings and recreational-use impairments of lakes. Lakes receiving an “A” grade (<10-percentile) can be deemed exceptional as compared to other area lakes and as having no recreational use impairments. A “B” grade lake is considered to have very good water quality and some recreational use impairment, while lakes receiving a “C” are considered to have average water quality and are recreationally impaired. A “D” grade lake translates to a very poor ranking (severely impaired), and a lake receiving a grade of “F” would mean extremely poor water quality compared to other area lakes, with no possible recreational use.

RESULTS AND ANALYSIS

The water quality of the CAMP lakes is discussed on a lake-by-lake basis in the following pages. A summary of known lake and watershed characteristics for each lake is provided in Appendix C.

The results and subsequent analysis of the water quality of each lake includes a written section describing the lake's current condition as determined through 2007 CAMP monitoring, and a separate lake information sheet. Each information sheet includes current 2007 water quality data, shown in both tabular and graphic form, and all 1980-to-present lake water quality grades. Each lake's 1980-to-present database was used to determine water quality trends (i.e., whether lake quality is improving, degrading, staying the same, or has no trend).

The Handbook for the Citizen-Assisted Lake Monitoring Program (Anhorn 2003) distributed at the volunteer training sessions provides an overview of limnology and lake ecology.

If you notice any errors in the lake's data or physical information, or are aware of 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*

Approximately half of Lake Alimagnet'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's shoreline is 3.2 miles. The lake has maximum and mean depths of 3.0 and 1.5 m (10 and five feet), respectively. Because the lake is relatively shallow, it does not develop and maintain a thermocline (a density gradient due to changing water temperatures throughout the water column), and the entire lake is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants). The approximate lake volume is 545 acre-feet (ac-ft). 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.

There are 12 inlets into the lake. A 1990 Clean Water Partnership Diagnostic-Feasibility Study on the lake estimated land use for the watershed at: 29 percent single-family residential, eight percent multi-family residential, three percent commercial/industrial, 19 percent wooded, 10 percent open waters/wetlands, and 31 percent open/undeveloped (Montgomery Watson 1990). Land use percentages have no doubt continued to shift from open/undeveloped to urban uses (single-family residential, multi-family residential and commercial/industrial) since that study.

The lake, which has been monitored through CAMP since 1995, was sampled 10 times between late-April and late-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	120.7	65.0	253.0	D
CLA (µg/l)	58.6	17.0	170.0	D
Secchi (m)	0.5	0.3	0.8	F
TKN (mg/l)	3.09	1.90	3.90	
			Water Quality	D

The 2007 water quality grade was a D. The lake's historic water quality grades indicate that the lake fluctuates between a C and D. Most recently, the lake's grade has consistently been a D (1999-2005). The lake's 2007 summertime TP mean was lower than last year, which allowed the TP letter grade to improve from an F in 2006 to a D in 2007; it also helped to lift the grade to a D. The mean Secchi depth in 2007 was similar to that in 2006.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The summertime mean physical condition was 3.7 on a 1-to-5 scale, as shown on the lake information sheet (between 3- "definite algae present" and 4-"high algal color"). The mean suitability for recreation ranking, also on a 1-to-5 scale, was 3.0 (3- "swimming slightly impaired").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

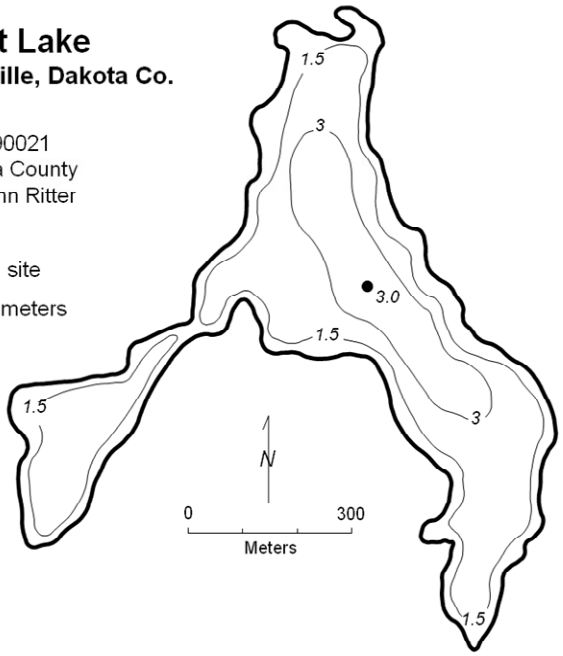
Alimagnet Lake

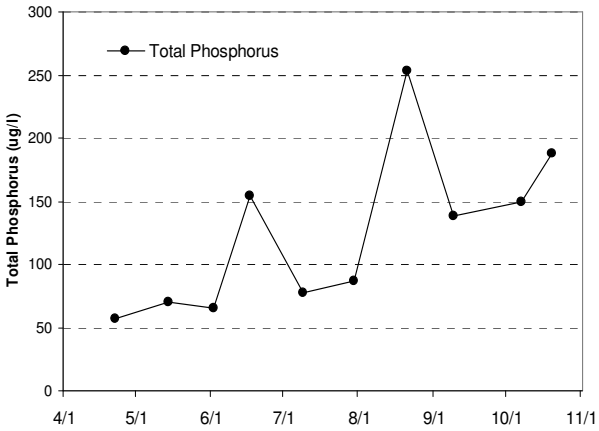
Apple Valley/Burnsville, Dakota Co.

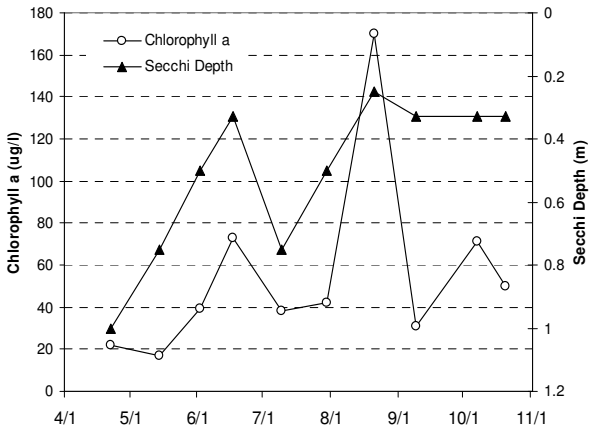
Lake ID: 190021
WMO: Dakota County
Volunteer: John Ritter

● Sampling site

Contours in meters

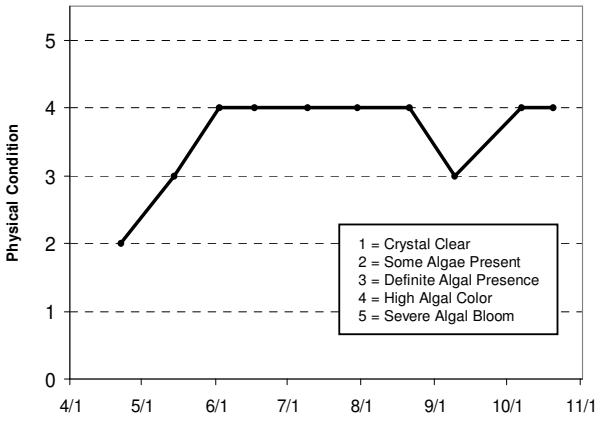






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/22/07	15				22	57		1	2	
05/14/07	16.7				17	70		0.75	3	2
06/02/07	20				39	65		0.5	4	4
06/17/07	23.3				73	154		0.33	4	3
07/09/07	25.6				38	78		0.75	4	3
07/30/07	28.3				42	87		0.5	4	3
08/21/07	23.3				170	253		0.25	4	3
09/09/07	21.7				31	138		0.33	3	3
10/07/07	18.9				71	150		0.33	4	3
10/20/07	11.7				50	188		0.33	4	3

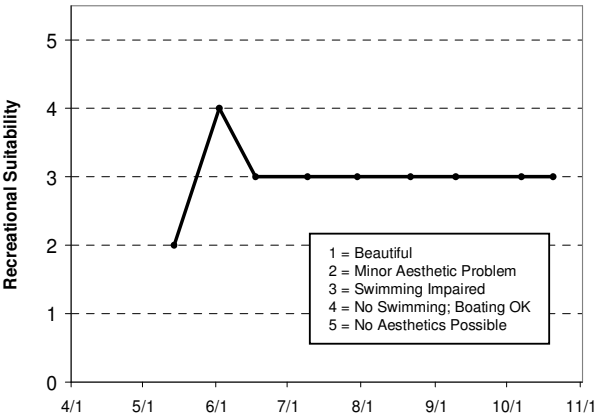


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	F	D									F			
Chlorophyll a											D			
Secchi Depth	F	F	D	D	C	D	F	F	F	F	D	C	D	C
Overall											**D**			

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D	D	C	D	F	D	D	D	D	D	D	F	D
Chlorophyll a		B	C	C	C	D	D	C	C	C	D	D	D	D
Secchi Depth	C	C	D	C	C	D	F	D	F	F	F	F	F	F
Overall		**C**	**D**	**C**	**C**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**F**	**D**

Source: Metropolitan Council and STORET data



Ardmore Lake (27-0153) *Pioneer-Sarah Watershed Management Commission*

This was the first year that Ardmore Lake was monitored in the CAMP program. The lake is located in the City of Medina. The lake has surface area of 10.1 acres and a maximum depth of 6.1 m (20 feet). Most of the lake is considered littoral (approximately 9 acres with a depth of 0-15 feet). The lake has an average depth of 2.4 m (7.7 feet) and a volume of 78.0 acre-feet. There is no public access to the lake.

Ardmore Lake was monitored 4 times between mid-June and mid-August 2007. Secchi depth measurements were not recorded by the volunteer. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	444.5	351.0	662.0	F
CLA (µg/l)	373.3	240.0	450.0	F
Secchi (m)				
TKN (mg/l)	5.50	2.10	6.90	
			Water Quality	F

The TP and chlorophyll means indicate that the water quality translates to a grade of F. The user perception rankings of physical condition and recreational suitability were not documented by the volunteer, and therefore are not reported here.

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) 297-4916 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.

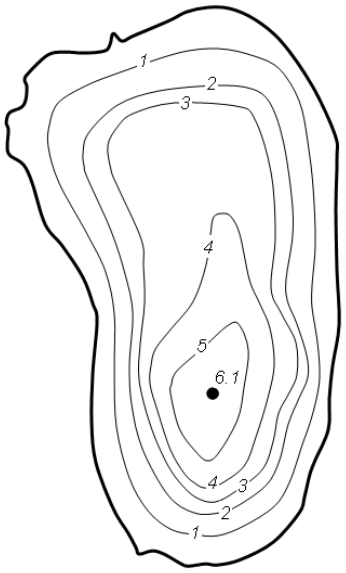
Ardmore Lake

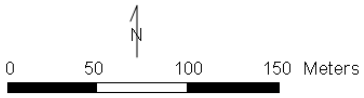
Medina, Hennepin Co.

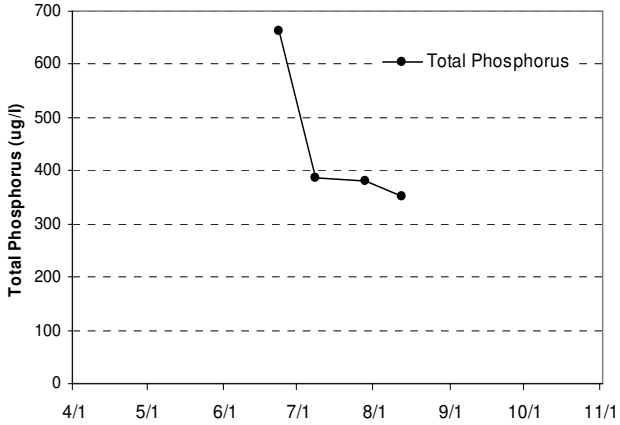
Lake ID: 270153
WMO: Pioneer-Sarah Creek
Volunteer: Pioneer Sarah WMC

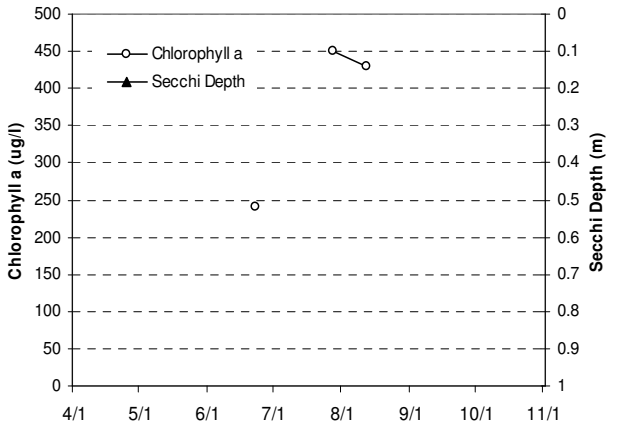
● Sampling site

Contours in meters



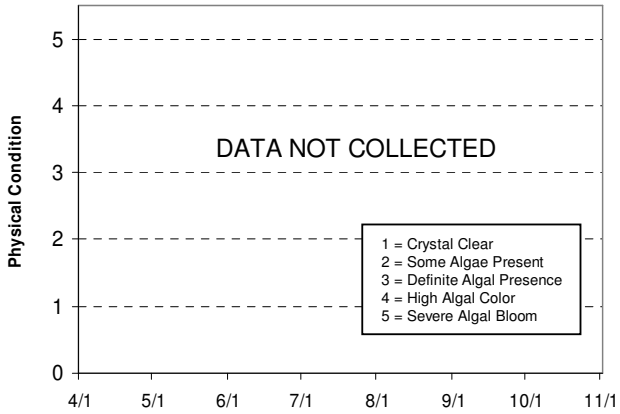






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/23/07					240	662				
07/08/07						385				
07/28/07					450	380				
08/12/07					430	351				

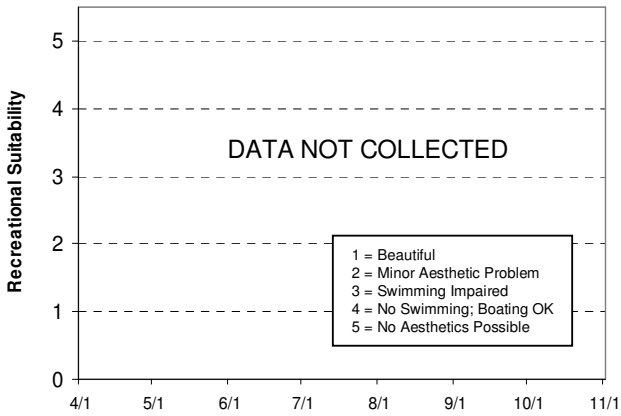


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														F
Chlorophyll a														F
Secchi Depth														
Overall														**F**

Source: Metropolitan Council and STORET data



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

Armstrong Lake has been annually monitored through CAMP since 1998. There is very little physical information available on the lake or the lake's watershed. Located partially within the cities of Lake Elmo and Oakdale (Washington County), the 39-acre lake has a mean and maximum depth of 1.0 m (3.2 feet) and 1.5 m (roughly 5 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 128 ac-ft. There is no public access to the lake.

Armstrong Lake was monitored 7 times between mid-April and early-October, 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	95.6	62.0	156.0	D
CLA (µg/l)	26.9	7.6	69.0	C
Secchi (m)	0.8	0.6	1.1	D
TKN (mg/l)	2.68	2.00	4.60	
			Water Quality	D

The lake's 2007 water quality grade was worse than the years 2000, 2002-2006, but better than the D's recorded in 1998-1999. The main reason for the lake's decline in the water quality grade from 2006 was the increase in mean chlorophyll concentration.

By comparing the lake's historic database TP (nutrient), CLA (algal biomass estimator), and Secchi (water clarity) grades, it is apparent that the TP and Secchi grades are quite a bit worse than the CLA grade. In most cases, the three should be fairly comparable. One possible explanation for the lake's recent findings may be that the majority of the lake's TP comes from either in-lake suspended sediments (re-suspension), or the intrusion of sediment-laden runoff to the lake, which in turn lessens the clarity of the water and inhibits algal growth.

To better understand the lake's current water quality condition, and which direction it may be heading, continued monitoring is suggested. In the short-tern, however, the lake's quality seems best described by a high D/low C grade.

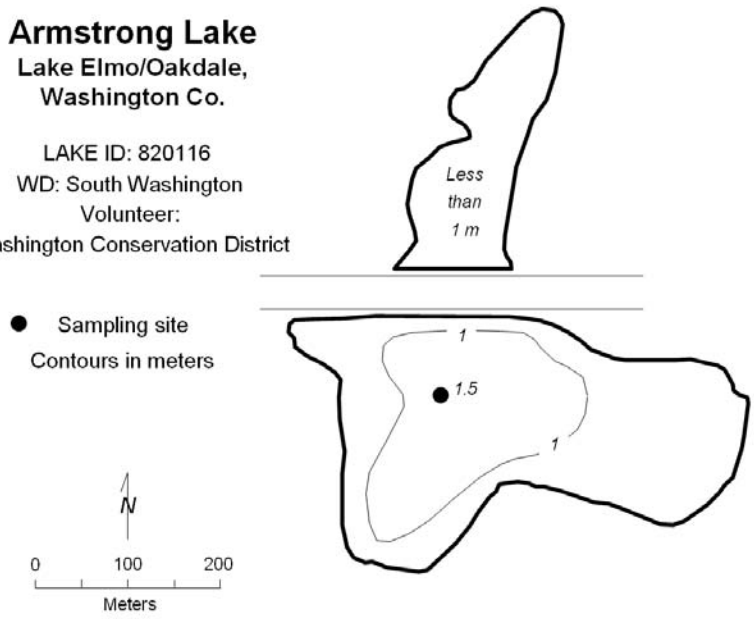
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 2.8 (ranking between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 3.8 (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

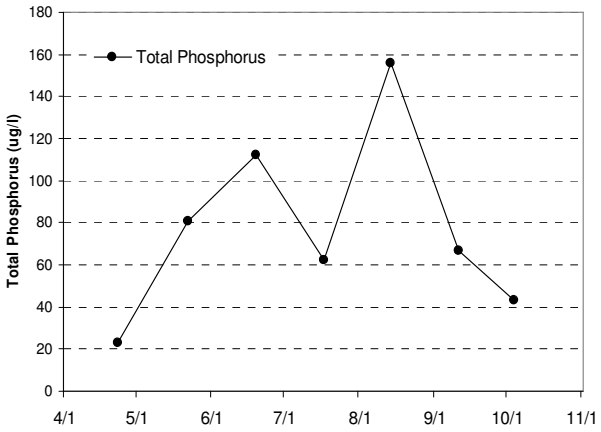
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

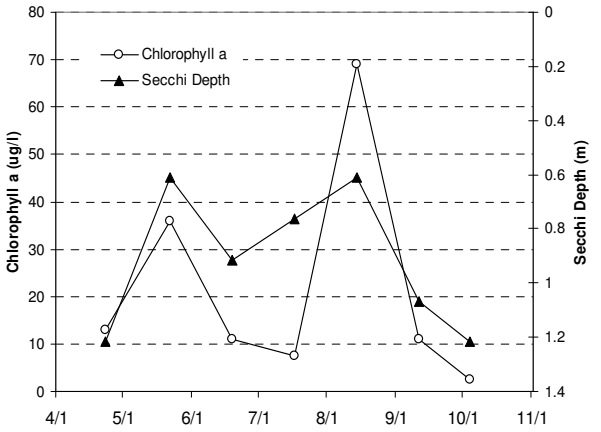
Armstrong Lake

Lake Elmo/Oakdale, Washington Co.

LAKE ID: 820116
WD: South Washington
Volunteer:
Washington Conservation District

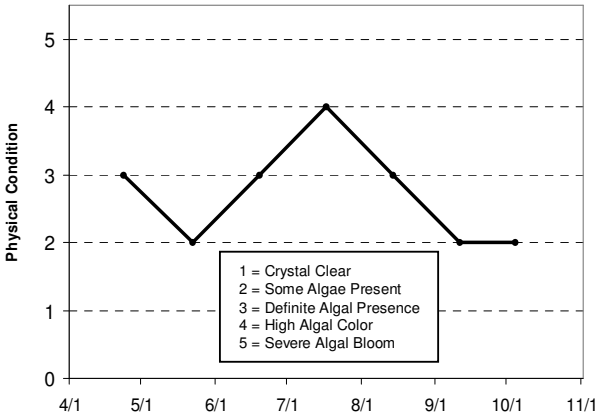






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/23/07	15.3	15.3		7.25	13	23		1.219	3	5
05/22/07	21.1	20.4		8.5	36	81		0.61	2	4
06/19/07	23.6	23.6		5.11	11	112		0.914	3	4
07/17/07	30.8	29.4	6.53	2.13	7.6	62		0.762	4	4
08/14/07	28.4	27.8	6.27	1.31	69	156		0.61	3	4
09/11/07	19.5	19.7	8.39	0.28	11	67		1.067	2	3
10/04/07	18	17.6	7.32	0.48	2.4	43		1.219	2	4

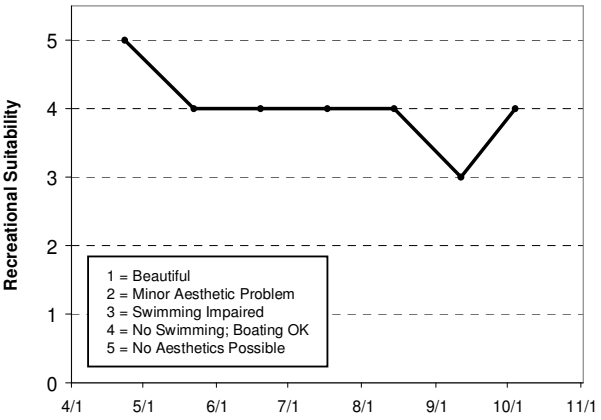


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					D	F	C	D	D	D	C	C	D	D
Chlorophyll a					D	C	C	C	B	B	A	A	B	C
Secchi Depth					D	F	D	D	D	D	D	D	D	D
Overall					**D**	**D**	**C**	**D**	**C**	**C**	**C**	**C**	**C**	**D**

Source: Metropolitan Council and STORET data



Barker Lake (82-0076) *Carnelian - Marine Watershed District*

Barker Lake is a 45-acre lake located within May Township (Washington County). The mean and maximum depth of the lake is 4.4 m (14 feet) and 9.0 m (roughly 29 feet), respectively. 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). Additionally, the surface area and mean depth of the lake result in a calculated volume of 648 ac-ft.). The lake has an 823-acre watershed and a rather large watershed-to-lake area ratio of 19:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This marks the eighth year in which Barker Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake revealed a limited amount of data (1997-2005) collected over the past twenty years.

The lake's Secchi transparency was monitored seven times from April to mid-October, 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)				
CLA (µg/l)				
Secchi (m)	1.1	0.3	2.6	D
TKN (mg/l)				
			Water Quality	D

No water samples were collected for analysis of TP, TKN and chlorophyll for the lake in 2007. Because Secchi transparency was the only data collected there are no nutrient or chlorophyll concentration means to compare to previous years. The lake's water quality translates to a grade of D for water clarity, worse than water clarity grades recorded in 1998-2004 and 2006, and similar to the grade received in 2005.

Statistical analysis on the lake's water quality database did not detect any long-term trends. To better understand the lake's current water quality and in which direction it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.2 for physical condition (between 3- "definite algae present" and 4-"high algal color"), and 3.6 for recreational suitability (between 3- "swimming slightly impaired" and 4-"no swimming, boating ok"). Both of these observations are worse than perceived observations in 2006, which is consistent with the decrease in water clarity from year 2006.

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

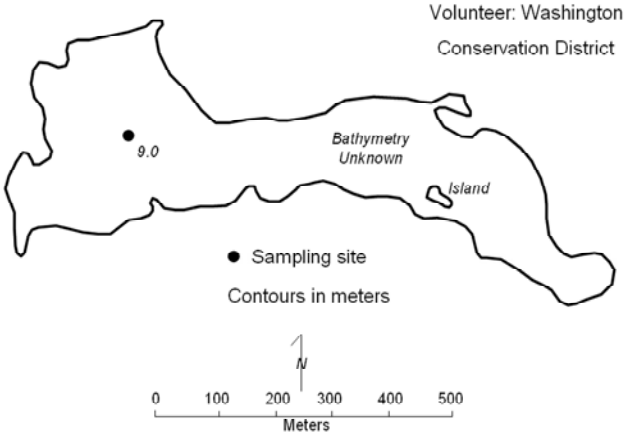
Barker Lake

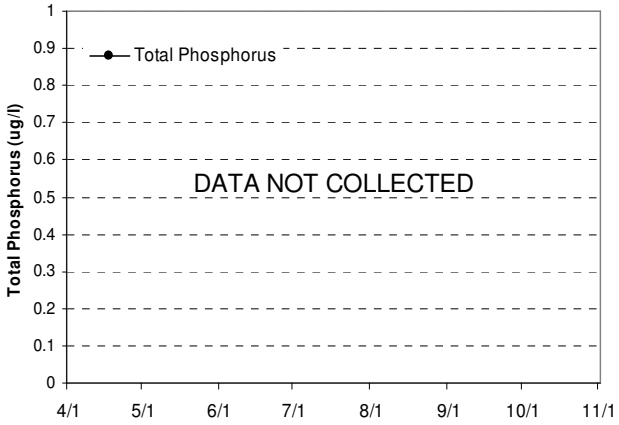
Hugo, May Twp., Washington Co.

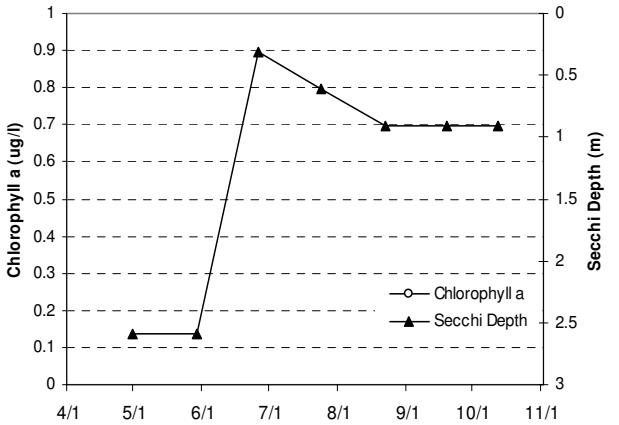
LAKE ID: 820076

WD: Carnelian-Marine-St. Croix

Volunteer: Washington Conservation District

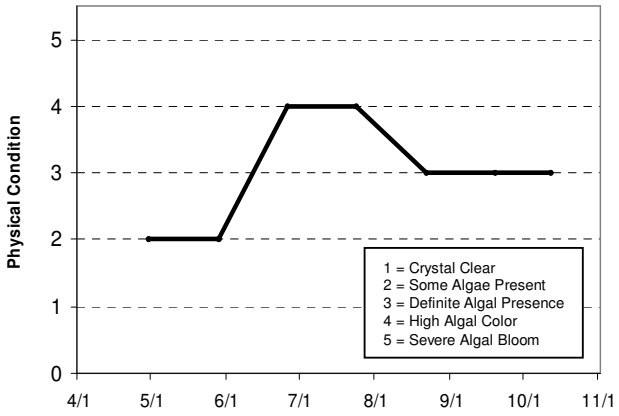






2007 Data

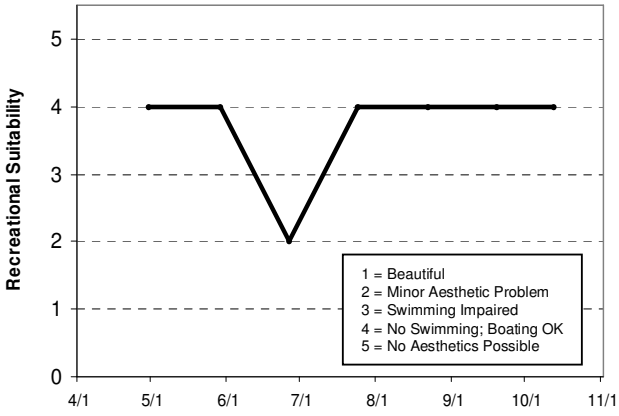
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/30/07	16.3	5.3	9.85	1.06				2.591	2	4
05/29/07	22.1	11.9	8.46	0.14				2.591	2	4
06/26/07	28.8	12.2	9.14	0.1				0.305	4	2
07/24/07	29.8	12.9	9.68	0.07				0.61	4	4
08/22/07	23.1	13.2	8.8	0.19				0.914	3	4
09/19/07	18.3	11.4	6.86	0.02				0.914	3	4
10/12/07	16	15.4	3.18	0.42				0.914	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				C	D	D	C	D						
Chlorophyll a				C	C	D	B	C						
Secchi Depth				D	C	C	C	C	C	C	C	D	C	D
Overall				**C**	**C**	**D**	**C**	**C**						**D**



Source: Metropolitan Council and STORET data

Bass Lake (27-0098) *Shingle Creek Watershed Management Commission*

Bass Lake is located within the City of Plymouth (Hennepin County). The lake covers an area of 194 acres and has a maximum and mean depth of 9.4 m (roughly 31 feet) and 2.9 m (9.5 feet). About 82 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 1,640 acre-feet (ac-ft) and its approximate residence time (the amount of time required to completely replace the lake's current volume of water with an equal volume of "new" water) is 0.7 years. The lake's watershed of 3,100 acres translates to a rather large watershed-to-lake size ratio of 16:1. The larger the ratio the greater the potential stress put on the lake from surface runoff. 1990 land use estimates indicate that approximately 23.1 % of the watershed is single family residential, 1.2 % is commercial/retail, 0.4 % is industrial/manufacturing, 13.0 % is public waters/wetlands, and 62.3 % is available for potential growth (Montgomery Watson 1994).

Additionally, the lake is considered a "Priority Lake" by the Metropolitan Council, due to its multi-recreational uses. Primary management concerns in the past have revolved around the lake's sizable aquatic macrophyte population and periods of low oxygen levels.

Bass Lake, which was also monitored through CAMP in 1994, 1997, 1999, 2001, 2003, and 2005, was monitored 14 times from mid-April to late-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	62.2	21.0	127.0	C
CLA (µg/l)	49.4	6.0	120.0	D
Secchi (m)	1.0	0.6	2.3	D
TKN (mg/l)	2.23	1.70	3.20	
			Water Quality	D

The water quality database for Bass Lake contains seven years of CAMP data collection (1994, 1997, 1999, 2001, 2003, 2005, and 2007). This year's water quality grade of D is the worst grade received by Bass Lake in years monitored by the CAMP. The main factor affecting the lowered grade is that the water clarity was much reduced, on average, than in previous years. The average total phosphorous and chlorophyll-a concentrations for 2007 were similar to those in 2006.

While the limited nature of the lake's water quality database makes detecting trends difficult, the last four years of data (2001, 2003, 2005, and 2007) have shown an apparent decrease in water quality over that recorded in the 1990's. This is especially shown in the increase in summer mean total phosphorus and chlorophyll-a concentrations in addition to decreases in water clarity.

The summertime mean physical condition was ranked 3.0 on a 1-to-5 scale shown on the lake information sheet (between 3- "definite algae present" and 4- "high algal color"). The mean suitability for recreation ranking, also on a 1-to-5 scale, was 3.1 (3- "swimming slightly impaired").

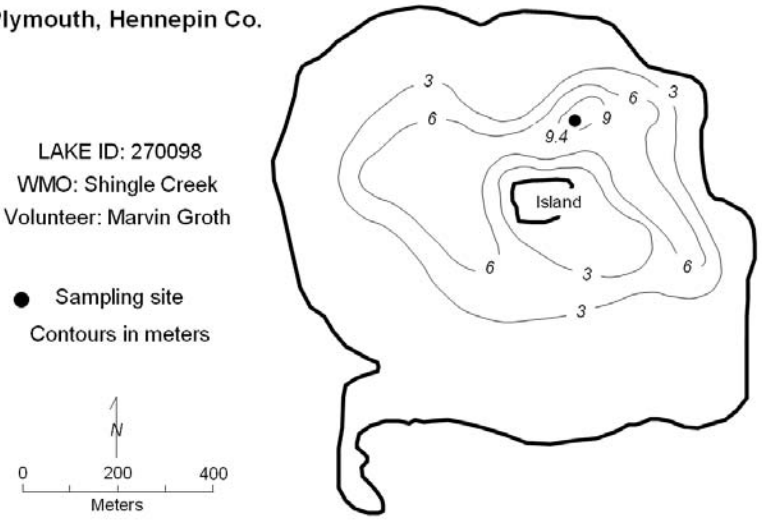
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

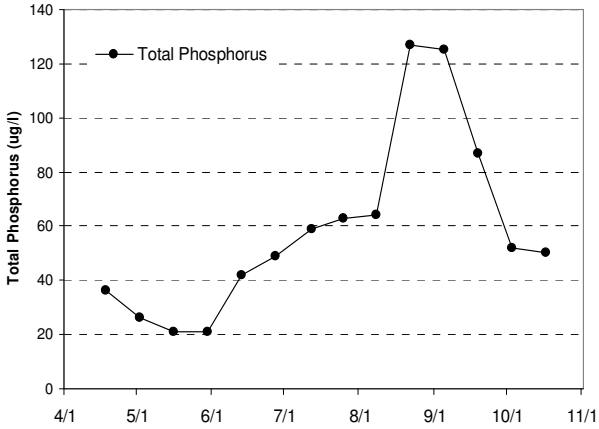
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

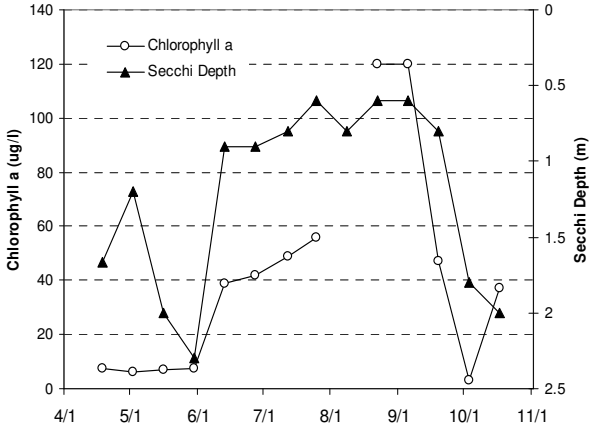
Bass Lake

Plymouth, Hennepin Co.

LAKE ID: 270098
WMO: Shingle Creek
Volunteer: Marvin Groth

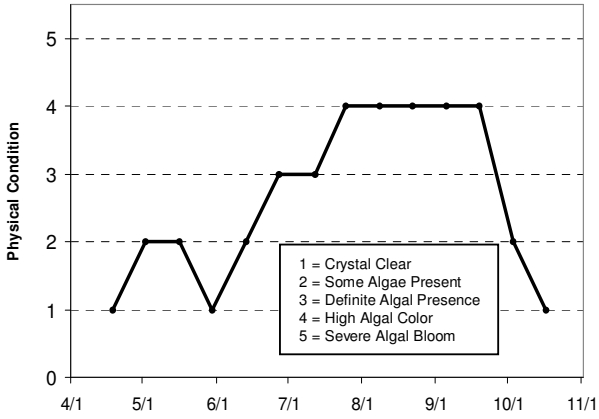






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/18/07	10.1				7.2	36		1.67	1	1
05/02/07	16.8				6	26		1.2	2	2
05/16/07	18.1				7	21		2	2	2
05/30/07	21				7.5	21		2.3	1	1
06/13/07	25.2				39	42		0.9	2	3
06/27/07	26.3				42	49		0.9	3	3
07/12/07	23.8				49	59		0.8	3	3
07/25/07	28.8				56	63		0.6	4	4
08/08/07	26.5					64		0.8	4	4
08/22/07	22.6				120	127		0.6	4	4
09/05/07	26.1				120	125		0.6	4	4
09/19/07	19.4				47	87		0.8	4	4
10/03/07	16.8				3.2	52		1.8	2	1
10/17/07	13.2				37	50		2	1	1

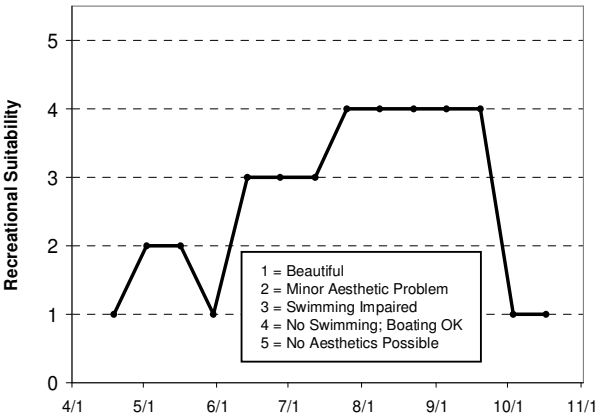


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C			C		C		C		C		C		C
Chlorophyll a	C			C		C		C		C		D		D
Secchi Depth	C			C	D	C	C	C		C		C		D
Overall	**C**			**C**		**C**		**C**		**C**		**C**		**D**

Source: Metropolitan Council and STORET data



Bass Lake (82-0035) *Carnelian - Marine Watershed District*

Bass Lake is an 81-acre lake located within May Township (Washington County). The maximum depth of the lake is 4.3 m (roughly 14 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).

This was the eighth year that Bass Lake was monitored through CAMP. A search through the STORET nationwide water quality database provided a moderate amount of historic data including Secchi data from 1991-2003 and nutrient and CLA data in 1991-1992, 1996-2001, and 2003-2004.

The lake was monitored eight times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	29.3	16.0	42.0	B
CLA (µg/l)	11.4	3.8	24.0	B
Secchi (m)	2.3	1.4	3.7	B
TKN (mg/l)	0.82	0.55	1.10	
			Water Quality	B

The 2007 grade of B is similar to that recorded in 1992, 2004, and 2005 and better than the C's recorded in 1991, 1997-2001, and 2003. The 2007 summer means were slightly worse than those recorded in 2004 (which are the lake's best recorded water quality to date). The 2007 summer means were slightly better than those recorded in 2005.

The lake's water quality seems to be well represented by a grade of C+ to B. To better understand the lake's water quality and where it may be heading, more data are needed.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-5-scale. The user perception rankings are shown on the lake's associated information sheet on the following page. The mean summertime physical condition was ranked 2.5 on a (between 2- "some algae present" and 3- "definite algae present"). The mean suitability for recreation ranking, also on a 1-to-5 scale, was 2.3 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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

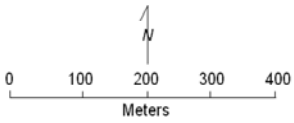
Bass Lake

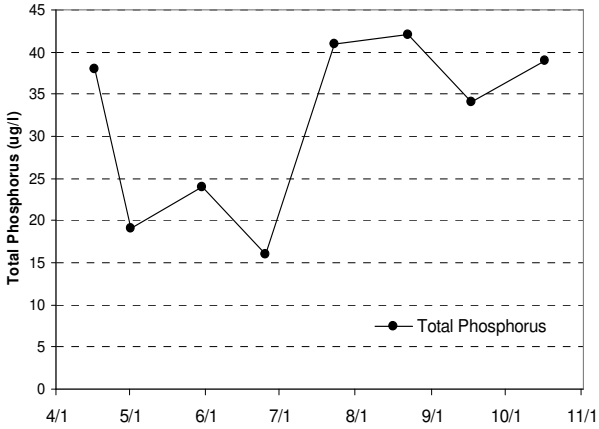
May Twp., Washington Co.

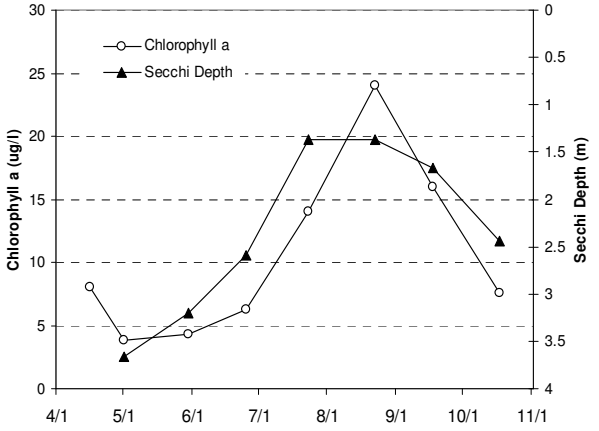
LAKE ID: 820035
WD: Carnelian-Marine-St. Croix
Volunteer:
Washington
Conservation District

● Sampling site

Contours in meters

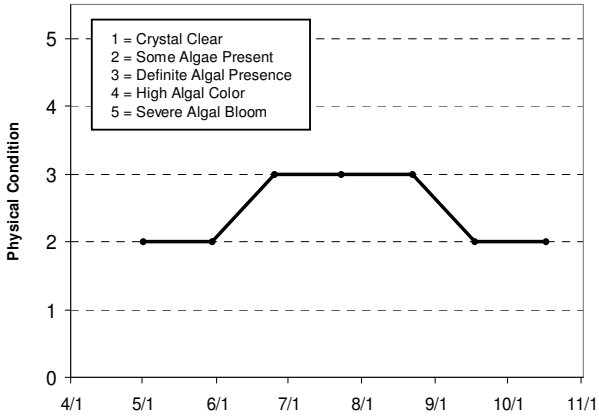






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/16/07					8	38				
05/01/07	16.9	10.6		12.38	3.8	19		3.658	2	1
05/30/07	22.3	18.6		4.31	4.3	24		3.2	2	1
06/25/07	28.2	25.1		0.45	6.3	16		2.591	3	2
07/23/07	27	24.3	7.33	0.05	14	41		1.372	3	3
08/22/07	23.5	22	6.13	0.16	24	42		1.372	3	4
09/17/07	19.8	18.8	7.93	0.24	16	34		1.676	2	3
10/17/07	14.4	14.3	5.14	0.31	7.6	39		2.438	2	2



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus												C	B	
Chlorophyll a												B	B	
Secchi Depth												C	C	C
Overall												**C**	**B**	

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	C	C	C	C	C		C	B	C	C	B
Chlorophyll a			C	C	B	B	B	B		B	A	B	B	B
Secchi Depth	C	C	C	C	C	C	C	C	B	C	B	B	C	B
Overall				**C**	**C**	**C**	**C**	**C**		**C**	**B**	**B**	**C**	**B**

Source: Metropolitan Council and STORET data

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

Bass Lake (west) is located west of Joliet Lane in Grant Township. There is little known morphological data available for the lake. This is the second year that Bass Lake (west) has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Therefore, 2006 is the first known year of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

Bass Lake (west) was monitored seven times between early-May and mid-October 2007. The resulting data and graphs appear on the next page.

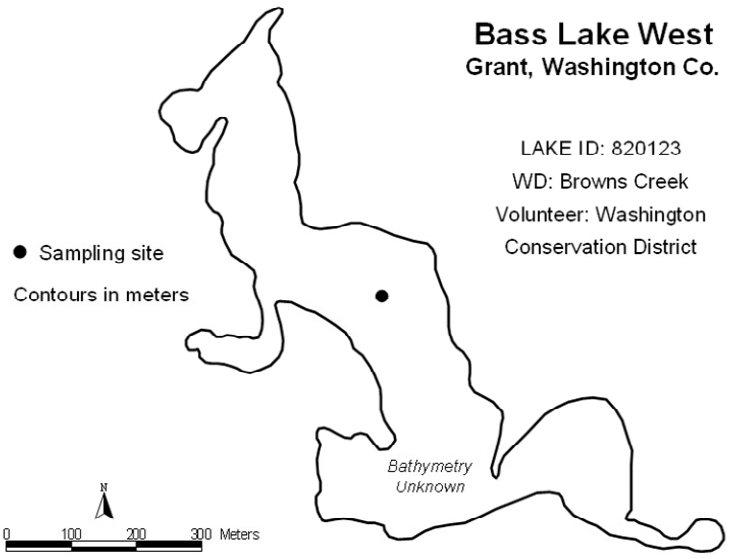
2007 summer (May-September) data summary

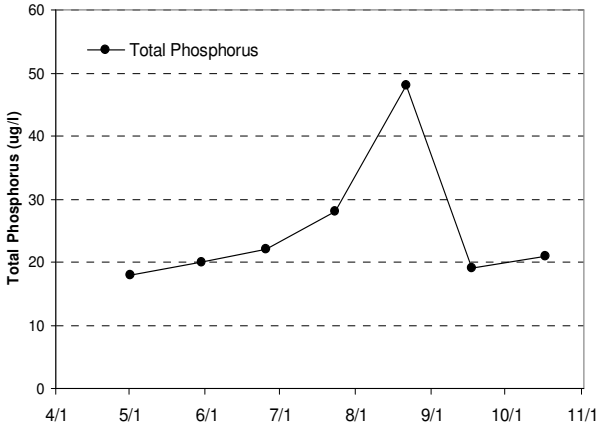
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	25.8	18.0	48.0	B
CLA (µg/l)	9.7	3.1	24.0	A
Secchi (m)	2.5	1.8	3.0	B
TKN (mg/l)	0.80	0.52	1.00	
			Water Quality	B

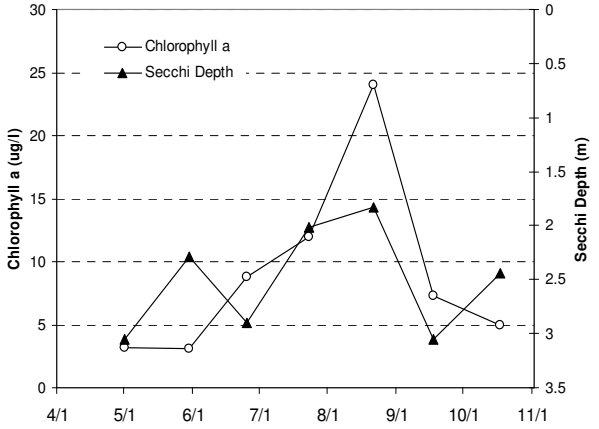
As mentioned earlier, there are no water quality data available for Bass Lake (west) other than the CAMP data. Therefore it is not possible to determine any long-term or short-term trends. However, the 2007 summer-time means were slightly worse in 2007 for chlorophyll-a and water clarity compared to 2006. The average secchi depth result was about 0.5 meter less in 2007 than in 2006. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.5 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.3 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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

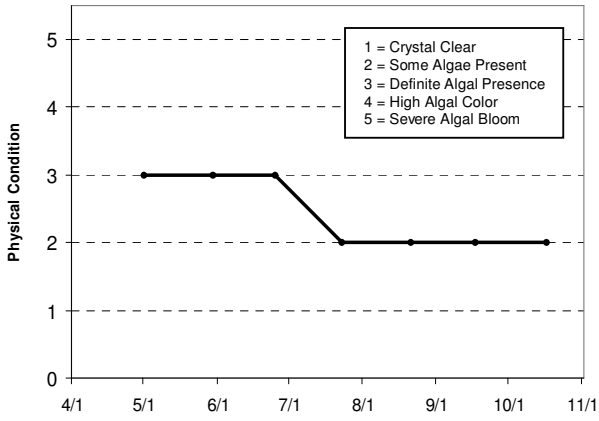






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/01/07	16.8	16.3	9.31	8.68	3.2	18		3.048	3	4
05/30/07	23	19.9	9.39	7.29	3.1	20		2.286	3	2
06/25/07	28.8	22.5	8.09	0.05	8.8	22		2.896	3	2
07/23/07	27	26.2	4.93	0.62	12	28		2.012	2	2
08/21/07	22.2	21.9	4.91	4.25	24	48		1.829	2	2
09/17/07	19.9	18.7	8.32	0.77	7.3	19		3.048	2	2
10/17/07	14.7	14.5	6.34	5.99	5	21		2.438	2	3

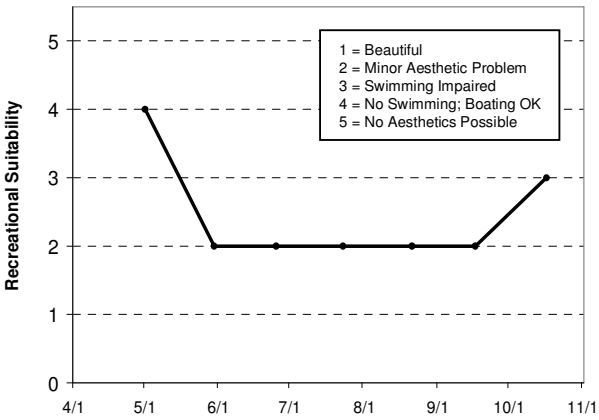


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													B	B
Chlorophyll a													A	A
Secchi Depth													A	B
Overall													**A**	**B**

Source: Metropolitan Council and STORET data



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

Bass Lake (east) is located east of Joliet Lane in Grant Township. There is little known morphological data available for the lake. This is the second year that Bass Lake (east) has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Therefore, 2006 is the first known year of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

This is the second year in which Bass Lake (east) has been involved in CAMP. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

Bass Lake (east) was monitored seven times between early-May and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	41.2	30.0	59.0	C
CLA (µg/l)	13.3	3.3	34.0	B
Secchi (m)	2.5	1.2	4.0	B
TKN (mg/l)	1.10	0.91	1.40	
			Water Quality	B

As mentioned earlier, there are no water quality data available for Bass Lake (east) other than the 2006 CAMP data. Therefore it is not possible to determine any long-term or short-term trends. However, the water quality for 2007, as determined from summer-time means and letter grades, shows an improvement overall compared to 2006. The water quality grade for 2007 was a B compared to last year's grade of C. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.0 for physical condition (3- "definite algae present"), and 3.3 for recreational suitability (between 3- "swimming slightly impaired" and 4-no swimming; boating ok").

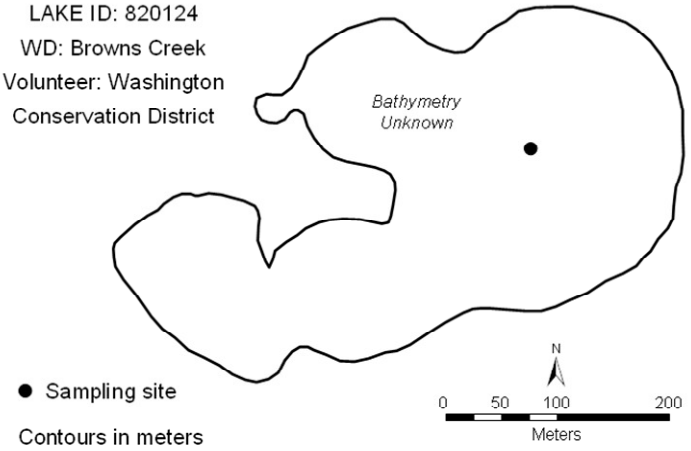
The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

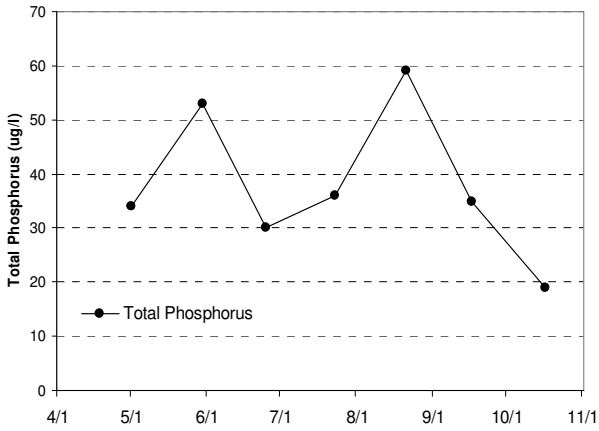
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

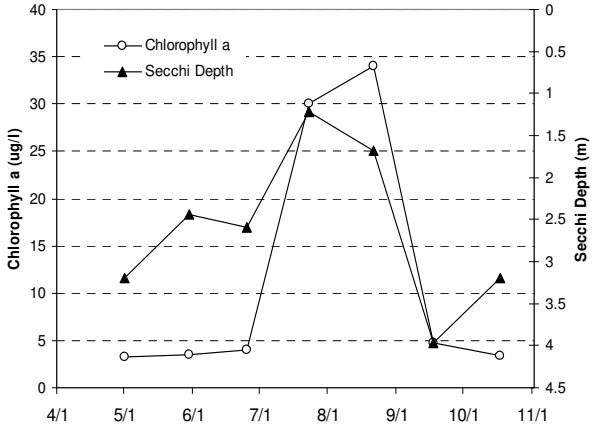
Bass Lake East

Grant, Washington Co.

LAKE ID: 820124
WD: Browns Creek
Volunteer: Washington Conservation District

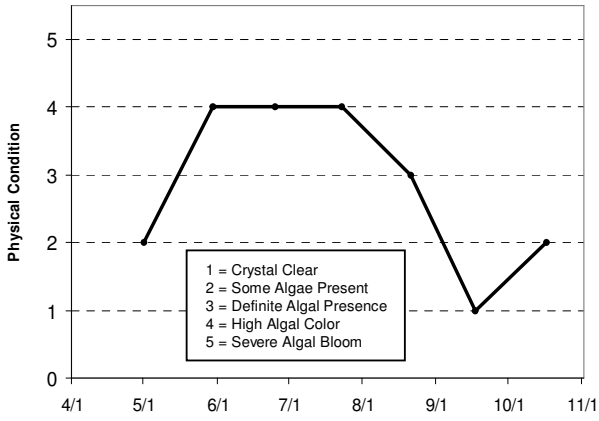






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/01/07	18	11		3.56	3.3	34		3.2	2	4
05/30/07	23.8	18.4		0.72	3.5	53		2.438	4	4
06/25/07	30.7	16.7		0.1	4	30		2.591	4	2
07/23/07	27.8	26.3	6.7	0.13	30	36		1.219	4	4
08/21/07	22.1	21.6	4.23	2.2	34	59		1.676	3	4
09/17/07	20.4	18.9	10.5	0.22	4.7	35		3.962	1	2
10/17/07	14.7	14.4	7.11	0.28	3.4	19		3.2	2	2

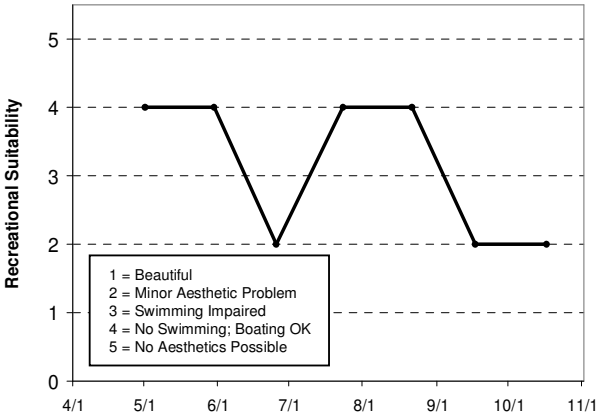


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													B	B
Secchi Depth													C	B
Overall													**C**	**B**

Source: Metropolitan Council and STORET data



Bavaria Lake (10-0019) *City of Chaska*

Lake Bavaria, located in the City of Chaska (Carver County), the 200-acre lake has a mean and maximum depth of 5.6 m (18.4 feet) and 18.3 m (60 feet), respectively. Roughly 65 percent of the lake is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

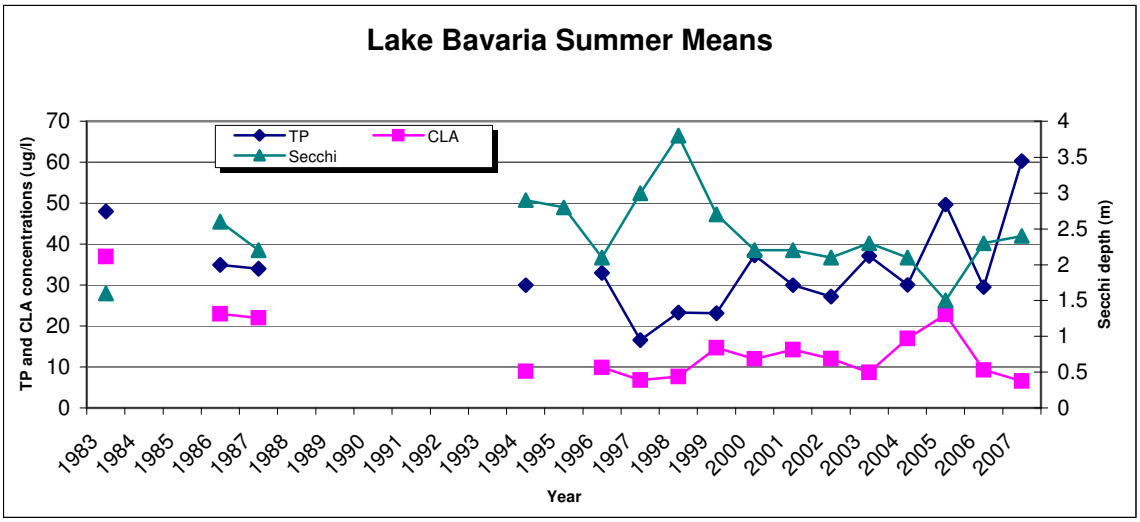
The lake's surface area and mean depth translates to an approximate lake volume of 3,674 ac-ft. The lake has a 711-acre immediate watershed, which translates to a watershed-to-lake area ratio of 3.5:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: 17.5 percent residential, 52.7 percent agricultural, 29.7 percent commercial/industrial, and 0.2 percent open/undeveloped (Carver County Planning 1999). A public access is located on the lake's western edge. Because of its multi-recreational uses it is considered a "Priority Lake" in the Metropolitan Area.

While 2007 was the twelfth year that Bavaria has been involved in CAMP, the lake has been monitored by Council staff in the past and has recently been involved in the MPCA's volunteer Secchi transparency program (included in the lake's report card grading system on the following page). Additionally, Lake Bavaria was included within the MPCA's Lake Assessment Program (LAP) in 2001. Through this program additional data, besides in-lake data through CAMP, was collected to help complete a more comprehensive study on the lake.

Lake Bavaria was monitored 14 times between mid-May and mid-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	60.3	21.0	311.0	C
CLA (µg/l)	6.6	1.1	14.0	A
Secchi (m)	2.4	1.5	3.5	B
TKN (mg/l)	1.13	0.91	1.80	
			Water Quality	B



Available data for Bavaria Lake reveal that the lake water quality remained constant through the 1980's (C's) and improved through the mid-1990s (grades of B in 1994 and 1996, and A in 1997-1998), before falling back to grades of B in 1999-2004. In 2005, the grade once again was a C but the water quality in

2006 has increased and the grade is back to a B. The grade of B continued for the year 2007, however the highest total phosphorus concentration (summer-mean) ever observed in Bavaria Lake occurred in 2007. However, this mean concentration was highly influenced by a single spike of total phosphorus which was observed on June 1, 2007.

The lake's summer mean graph and report card grades clearly depict that the lake's water quality has recently (mid-1990s to present) started to degrade. However, an MPCA conducted trend analysis on the lake's Secchi transparency data (January 2008), revealed no statistically significant trend in recent water clarity.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake's associated information sheet on the following page. The mean physical condition ranking was 2.3 (between 2- "some algae present and 3- "definite algae present"), while the mean recreational suitability ranking for the lake was 2.5 (between 2- "minor aesthetic problem" and 3-"Swimming Impaired").

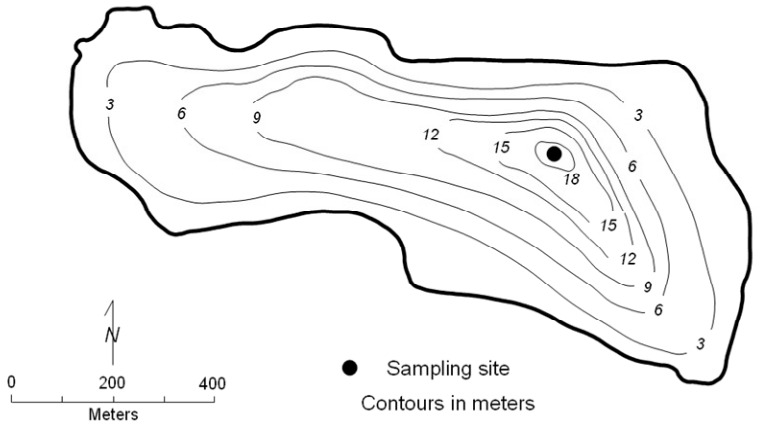
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

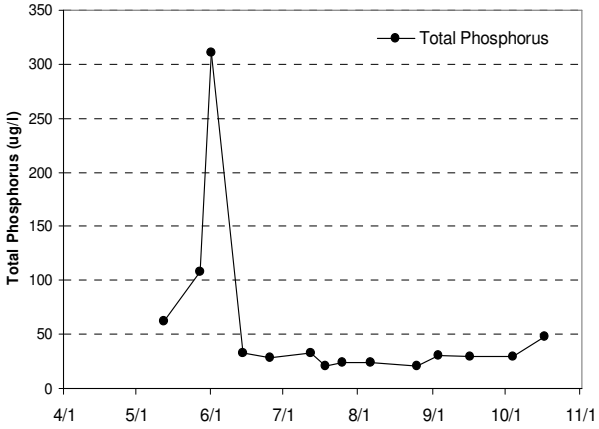
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

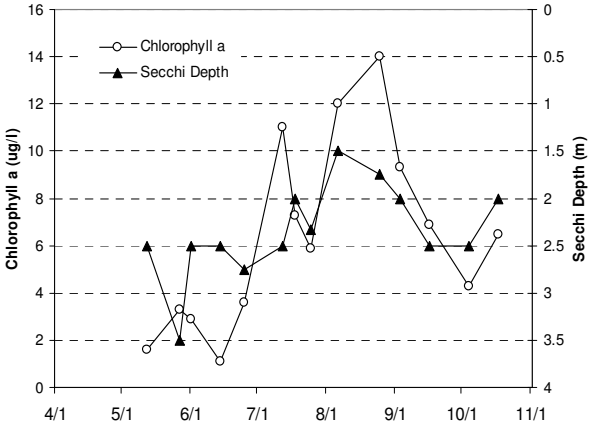
Lake Bavaria

Chaska/Laketown Twp., Carver Co.

LAKE ID: 100019
WMO: Carver County
Volunteer: John Ryski

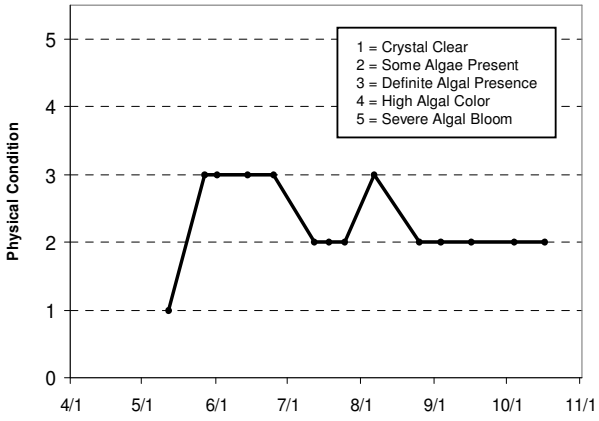






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/12/07	15				1.6	62		2.5	1	1
05/27/07	15				3.3	108		3.5	3	3
06/01/07	18				2.9	311		2.5	3	3
06/14/07	23				1.1	33		2.5	3	3
06/25/07	23				3.6	28		2.75	3	3
07/12/07	22				11	33		2.5	2	3
07/18/07	25				7.3	21		2	2	3
07/25/07	25				5.9	24		2.33	2	2
08/06/07	23				12	24		1.5	3	3
08/25/07	21				14	21		1.75	2	2
09/03/07	23				9.3	30		2	2	2
09/16/07	15				6.9	29		2.5	2	2
10/04/07	16				4.3	29		2.5	2	2
10/17/07	12				6.5	48		2	2	2

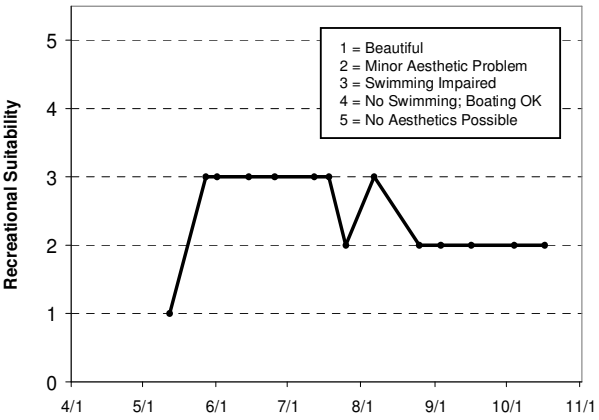


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus				C			C	C						
Chlorophyll a				C			C	C						
Secchi Depth				C			C	C						
Overall				**C**			**C**	**C**						

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	B		C	A	B	B	C	B	B	C	B	C	B	C
Chlorophyll a	A		A	A	A	B	B	B	B	A	B	C	A	A
Secchi Depth	B	B	C	A	A	B	B	B	C	B	C	C	B	B
Overall	**B**		**B**	**A**	**A**	**B**	**B**	**B**	**B**	**B**	**B**	**C**	**B**	**B**

Source: Metropolitan Council and STORET data



Bay Pond (Bay Lake) (82-0011) *Valley Branch Watershed District*

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 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. There is no public access to the lake. The lake's surface area and watershed size (849 acres) translates to a 9:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the second year that Bay Pond Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, the 2006 CAMP data represent the first year nutrient data availability. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 14 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	479.0	127.0	1230.0	F
CLA (µg/l)	242.4	4.5	650.0	F
Secchi (m)	0.7	0.2	2.5	D
TKN (mg/l)	5.99	1.30	14.00	
			Water Quality	F

As mentioned earlier, there are no nutrient data available for Bay Pond other than the 2006 CAMP data. Therefore it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.0 for physical condition (3- "definite algae present"), and 3.4 for recreational suitability (between 3- "swimming slightly impaired" and 4-"no swimming; boating OK").

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

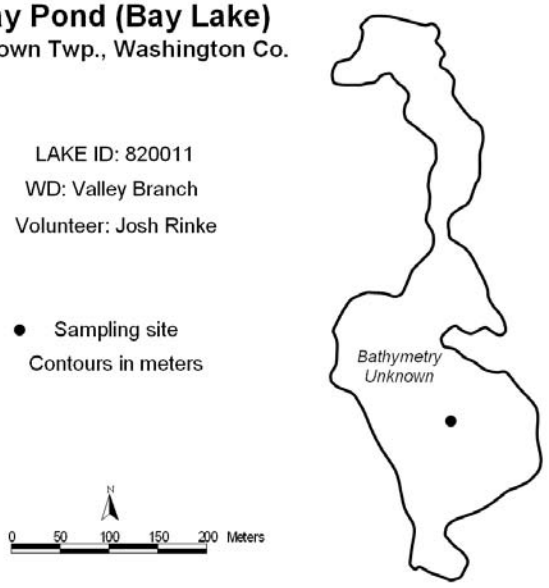
Bay Pond (Bay Lake)

Baytown Twp., Washington Co.

LAKE ID: 820011

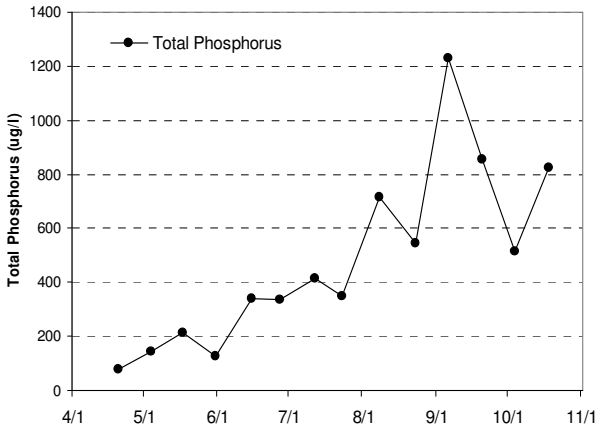
WD: Valley Branch

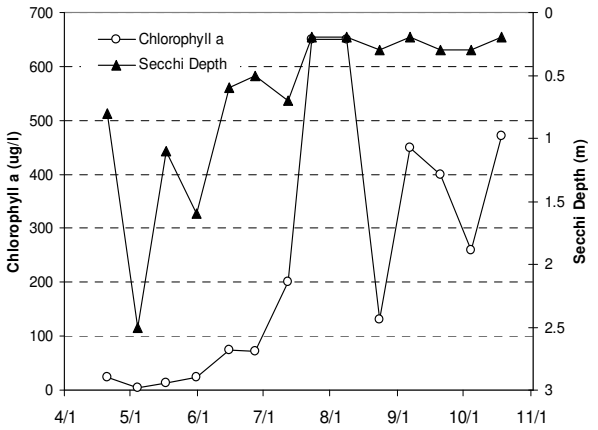
Volunteer: Josh Rinke

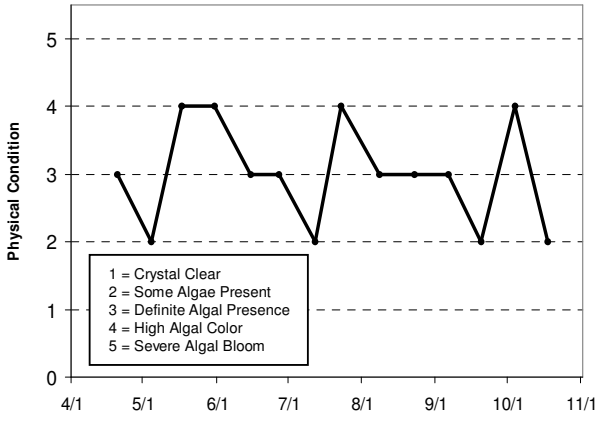


2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/20/07					24	78		0.8	3	3
05/04/07	22.9				4.5	145		2.5	2	2
05/17/07	21.4				14	212		1.1	4	3
05/31/07	28.5				23	127		1.6	4	3
06/15/07	29.5				74	342		0.6	3	3
06/27/07	30.7				71	336		0.5	3	3
07/12/07	25.7				200	416		0.7	2	4
07/23/07	27.2				650	348		0.2	4	4
08/08/07	25.2				650	715		0.2	3	3
08/23/07	20.7				130	545		0.3	3	4
09/06/07	30.4				450	1230		0.2	3	4
09/20/07	19.4				400	853		0.3	2	4
10/04/07	20.4				260	516		0.3	4	4
10/18/07	13.7				470	825		0.2	2	4





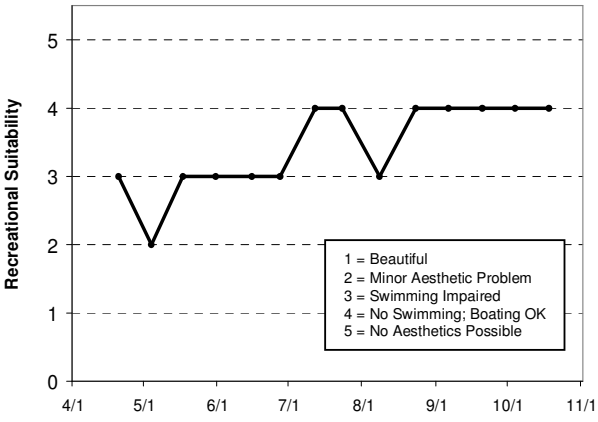


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													F	F
Chlorophyll a													F	F
Secchi Depth													F	D
Overall													**F**	**F**

Source: Metropolitan Council and STORET data



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

Benton Lake is a 115-acre lake 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 322-acre immediate watershed, which translates to 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). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: 19 percent residential, 55 percent agricultural, 16 percent commercial/industrial, and 10 percent open/undeveloped (Carver County Planning 1999).

This was the sixth year that Benton Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided only three years of prior data (collected through CAMP in 1999-2001 and 2003). The lake was monitored 13 times between mid-April and mid-October 2007. During each monitoring event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as its perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	375.2	182.0	754.0	F
CLA (µg/l)	248.0	120.0	430.0	F
Secchi (m)	0.2	0.1	0.3	F
TKN (mg/l)	11.79	5.30	24.00	
			Water Quality	F

Similar to that recorded from 1999-2001 and 2003, the resulting grade for the lake's 2007 water quality was F.

As mentioned earlier, there are no water quality data available for Benton Lake other than the 1999-2001, 2003, 2005, and 2007 CAMP data. Therefore it is not possible to determine any long-term trends. In the short-term, however, the lakes water quality is well represented by an grade of F. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

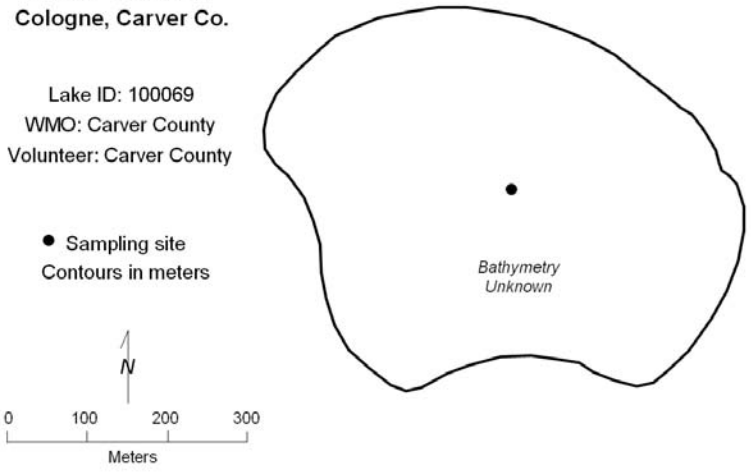
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake's associated information sheet on the following page. The average user perception rankings, on a 1-to-5 scale, were 4.3 for physical condition (between 4- "high algal color" and 5-"severe algal bloom"), and 4.4 for recreational suitability (4- "no swimming - boating ok" and 5-"no aesthetics possible").

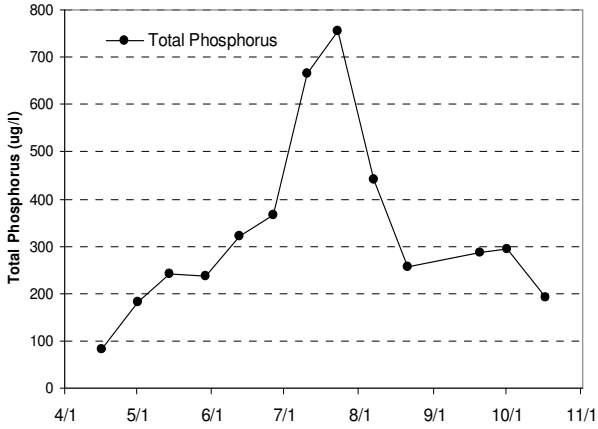
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

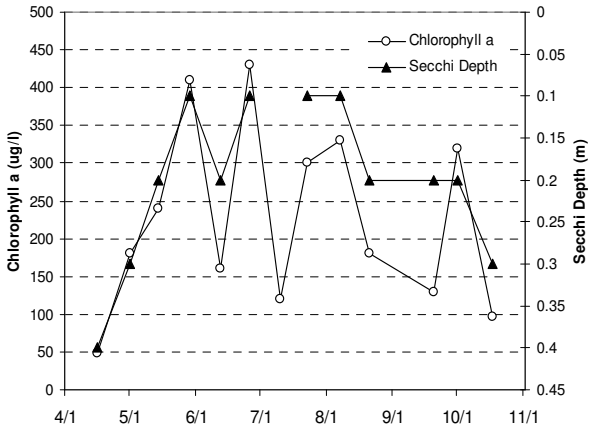
Lake Benton

Cologne, Carver Co.

Lake ID: 100069
WMO: Carver County
Volunteer: Carver County

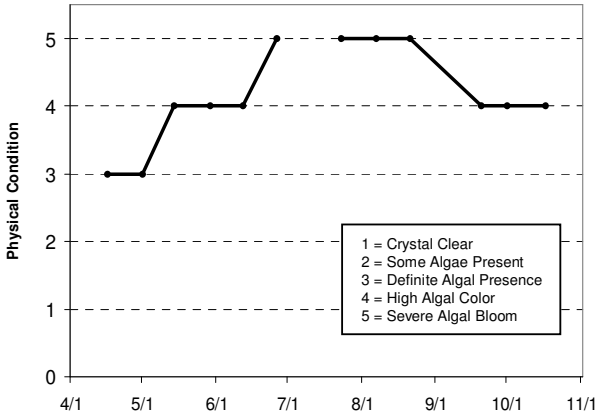






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/16/07	10.6		21.1		49	82		0.4	3	3
05/01/07	17.23		12.33		180	182		0.3	3	3
05/14/07	20.65		9.81		240	242		0.2	4	4
05/29/07	20.37		9.55		410	237		0.1	4	4
06/12/07					160	321		0.2	4	5
06/26/07	26.4		17.46		430	367		0.1	5	5
07/10/07					120	666				
07/23/07	25.02		9.93		300	754		0.1	5	5
08/07/07	23.65		6.67		330	440		0.1	5	5
08/21/07	19.98		9.38		180	256		0.2	5	5
09/20/07			4.25		130	287		0.2	4	4
10/01/07	26.36		11.84		320	293		0.2	4	4
10/17/07	10.97		11.4		96	192		0.3	4	4

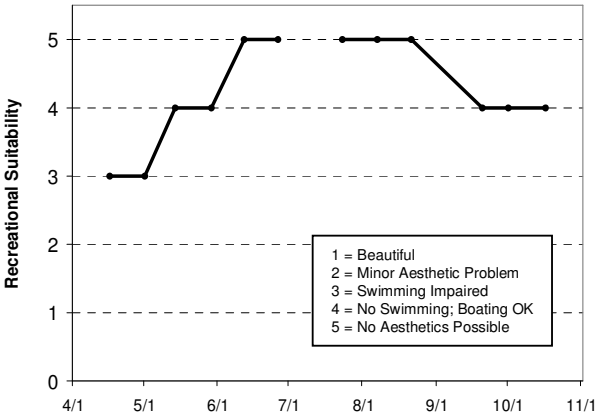


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						F	F	F		F		F		F
Chlorophyll a						F	F	F		F		F		F
Secchi Depth	C					F	F	F		F		F		F
Overall						**F**	**F**	**F**		**F**		**F**		**F**

Source: Metropolitan Council and STORET data



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

Benz Lake is a 36-acre lake located in Grant Township (Washington County) with a maximum depth of approximately 2.7 m (9 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 year 2007 marks the fourth year that Benz Lake has been involved in CAMP (1998 being the first). A search through the STORET nationwide water quality database provided no additional data other than the 1998, 2005, and 2006 CAMP data.

On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 14 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	179.0	114.0	240.0	F
CLA (µg/l)	124.0	31.0	360.0	F
Secchi (m)	0.7	0.3	1.2	F
TKN (mg/l)	3.11	2.30	3.90	
			Water Quality	F

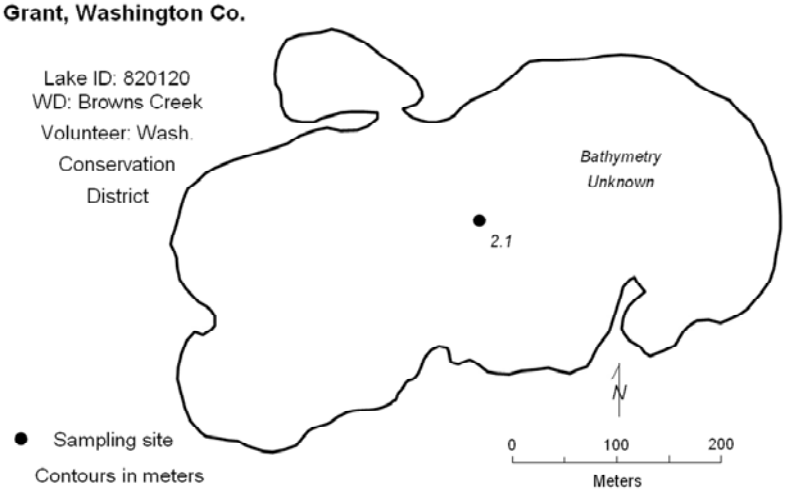
The lake received a grade of F in 2007 which was a return to the F grade conditions observed in 2005. As mentioned earlier, there is a very limited amount of water quality data available for Benz Lake. Therefore it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

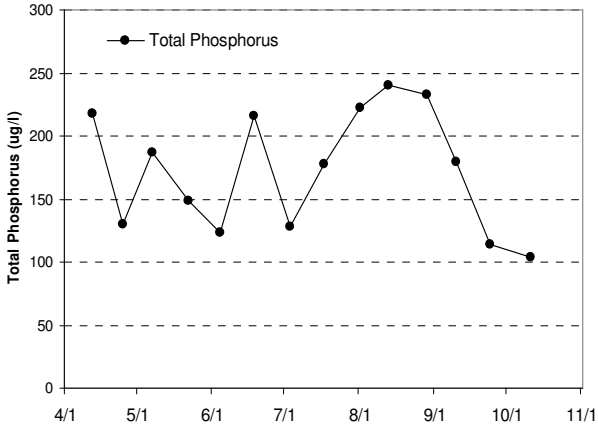
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.1 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 2.9 for recreational suitability (between 2-"minor aesthetic problem" and 3- "swimming slightly impaired").

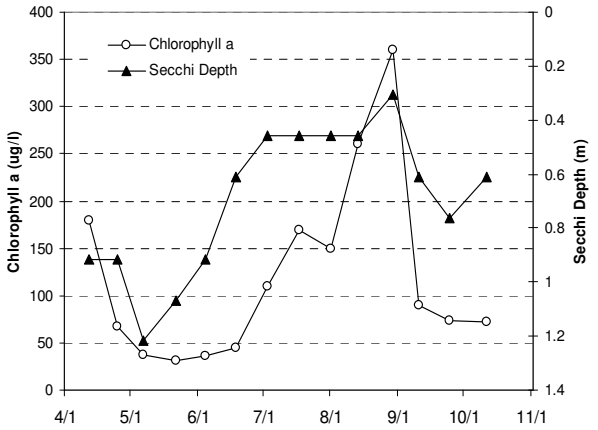
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Benz Lake

Grant, Washington Co.

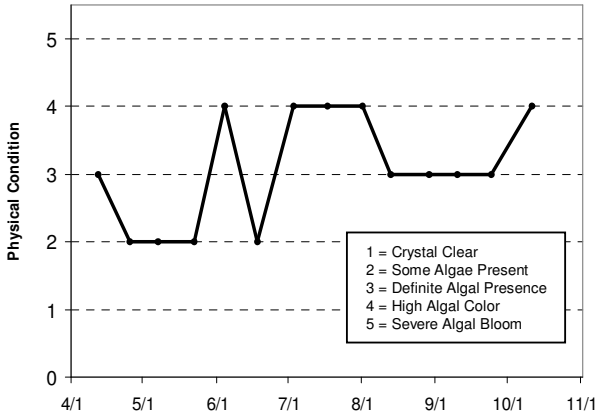






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/12/07	6.4	5.4		13.73	180	218		0.914	3	2
04/25/07	15.3	15.2		9.34	67	130		0.914	2	4
05/07/07	16.3	16.2		9.72	38	187		1.219	2	2
05/22/07	20.5	18.3		6.16	31	149		1.067	2	2
06/04/07	24.9	22.1		2.87	36	123		0.914	4	2
06/18/07	29.5	29.4		3.38	45	216		0.61	2	2
07/03/07	26.9	26.3		0.11	110	128		0.457	4	2
07/17/07	27.9	26.2	9.91	0.14	170	178		0.457	4	2
08/01/07	30.8	29.1	6.67	0.08	150	222		0.457	4	4
08/13/07	26.3	25.9	7.52	0.07	260	240		0.457	3	4
08/29/07	26	24.1	7.06	0.12	360	233		0.305	3	4
09/10/07	24.7	23.9	6.25	0.15	90	179		0.61	3	4
09/24/07	23.4	21.3	10.31	0.15	74	114		0.762	3	4
10/11/07	16.4	16.1	7.97	7.16	72	104		0.61	4	4

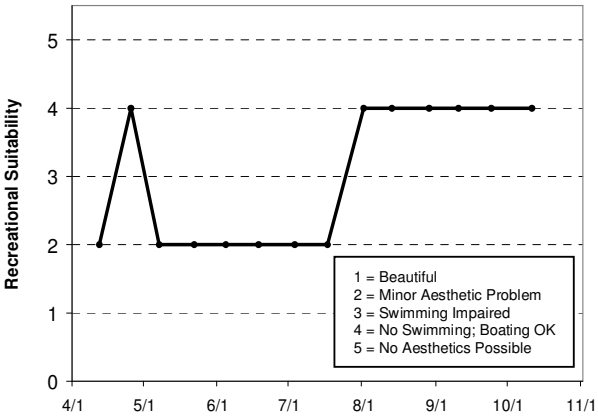


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												F	F	F
Chlorophyll a												F	D	F
Secchi Depth					F							F	D	F
Overall												**F**	**D**	**F**

Source: Metropolitan Council and STORET data



Big Carnelian Lake (82-0049) *Carnelian - Marine Watershed District*

Big Carnelian Lake, located within May Township (Washington County), has a public access on its southwestern side, and is considered a "Priority Lake" due to its multi-recreational uses. The lake covers an area of 455 acres and has a maximum and mean depth of 20 m (roughly 66 feet) and 9.8 m (32 feet). Roughly 28 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 14,560 acre-feet (ac-ft). The lake's watershed of 1,900 acres translates to a rather small watershed-to-lake size ratio of 4:1. The larger the ratio the greater the potential stress put on the lake from surface.

Big Carnelian Lake was monitored seven times between early-May and early-October 2007. The data and related graphs are presented on the information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	18.0	8.0	28.0	A
CLA (µg/l)	5.2	2.8	8.3	A
Secchi (m)	4.5	3.2	5.3	A
TKN (mg/l)	0.59	0.49	0.63	
			Water Quality	A

The lake received grades of A in 1980, 1989, 1991, 1994, 1996-1998, 2000-2002, and 2004-2007, and a grade of B in 1984, 1999, and 2003.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 2.0 (2- "some algae present"), while the mean recreational suitability ranking was 1.3 (between 1- "beautiful" and 2- "minor aesthetic problem").

No long-term trend is evident from the lake's water quality database, in the short-term however, the lake's quality seems well represented by an grade of A.

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Big Carnelian Lake

May Twp., Washington Co.

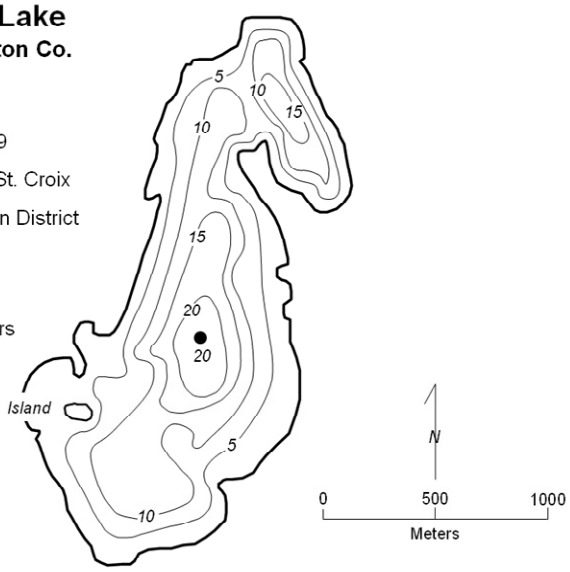
LAKE ID: 820049

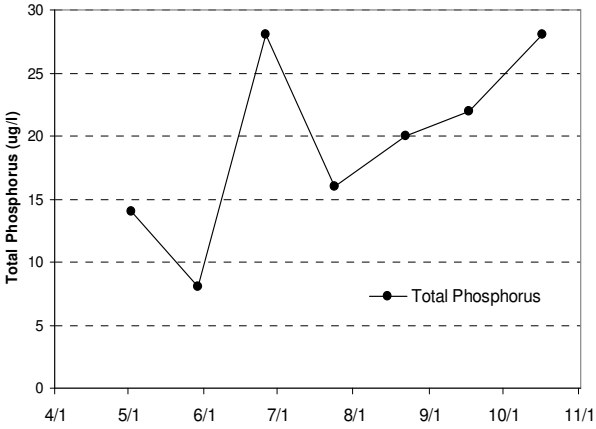
WD: Carnelian-Marine-St. Croix

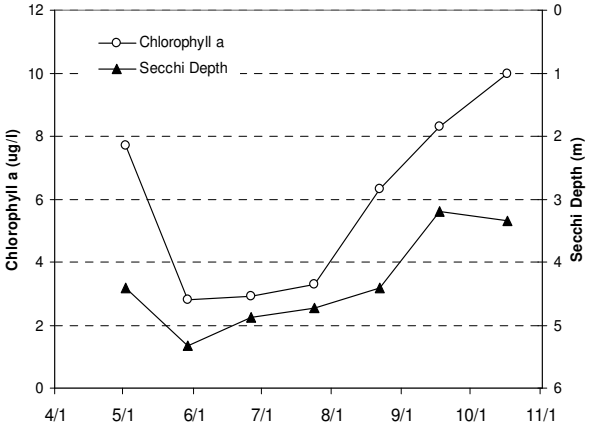
Washington Conservation District

● Sampling site

Contours in meters

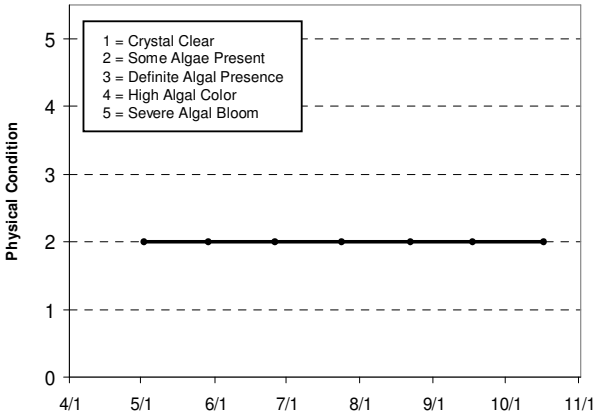






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/02/07	13.9	6.1		8.27	7.7	14		4.42	2	1
05/29/07	19.8	7.5		0.13	2.8	8		5.334	2	1
06/26/07	27.2	9.3		0.16	2.9	28		4.877	2	1
07/24/07	27.7	9.5	7.76	0.07	3.3	16		4.724	2	2
08/22/07	24.8	9.4	7.21	0.29	6.3	20		4.42	2	2
09/17/07	21.4	9.8	7.71	0.32	8.3	22		3.2	2	1
10/17/07	16.9	9.8	6.46	0.44	10	28		3.353	2	1

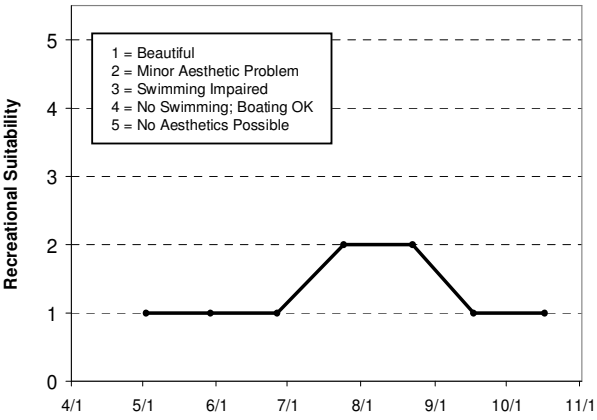


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	A				B					A		A		
Chlorophyll a	A				B					A		A		
Secchi Depth	A				B					A		B	B	B
Overall	**A**				**B**					**A**		**A**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A		A	A	A	A	A	A	B	A	A	A	B	A
Chlorophyll a	A		A	A	A	B	A	A	A	A	A	A	A	A
Secchi Depth	B	B	B	A	A	B	A	A	A	B	A	A	A	A
Overall	**A**		**A**	**A**	**A**	**B**	**A**	**A**	**A**	**B**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Big Comfort Lake (13-0053) *Comfort Lake-Forest Lake Watershed District*

Big Comfort Lake is located just north east of the City of Forest Lake, in Isanti County. This year marked the ninth year that the 219-acre lake has been enrolled in CAMP (1998 [it was, however, only monitored a two times in October] and 2000-2007). The lake has a maximum depth of 14.3 m (47 feet). Roughly 41 percent of the lake's area is considered littoral, the shallow (0-15 foot) depth area dominated by aquatic vegetation.

An in-depth lake assessment was undertaken 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.

Big Comfort Lake was monitored 7 times between early-May and mid-October 2007. The data and related graphs are presented on the information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	21.3	15.0	34.0	A
CLA (µg/l)	9.8	5.3	18.0	A
Secchi (m)	1.8	1.2	2.7	C
TKN (mg/l)	0.93	0.44	1.70	
			Water Quality	B

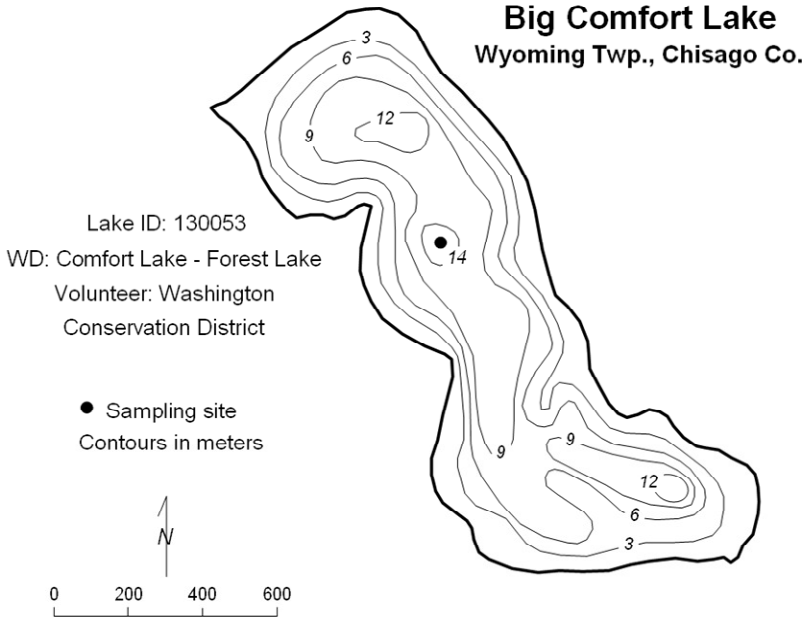
The lakes 2007 grade was the best grade that lake has yet received in the CAMP. Even though the lake has received an grade of B in the past, year 2007 marks the first year where the lake received A grades for total phosphorus and chlorophyll-a. The lake typically receives a grade of C for secchi depth.

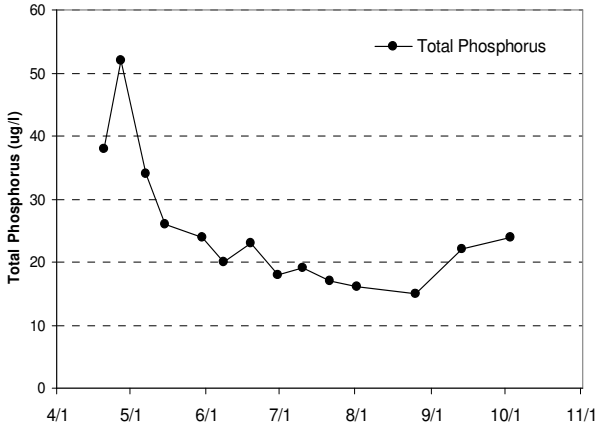
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 1.0 (1- "crystal clear"), while the mean recreational suitability ranking was 1.0 (1- "beautiful"). Only 2 to 3 observations for user perceptions were recorded in the field notes by the volunteer.

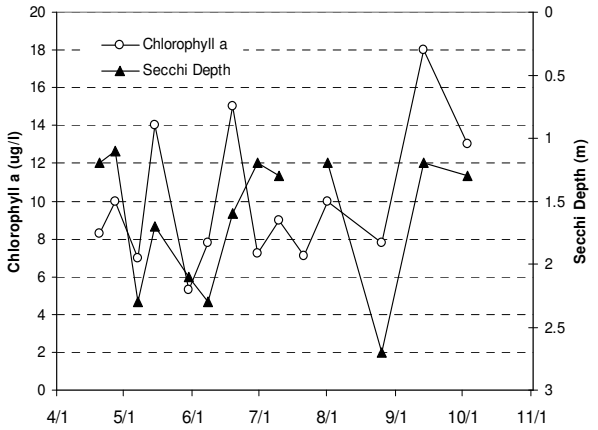
Statistical analysis on the lake's water quality database did not detect any long-term trends. In the short-term however, the lake seems well represented by an grade of C+. To better understand the lake's current water quality and in which direction it may be heading, continued monitoring is suggested.

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) 297-4916 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.

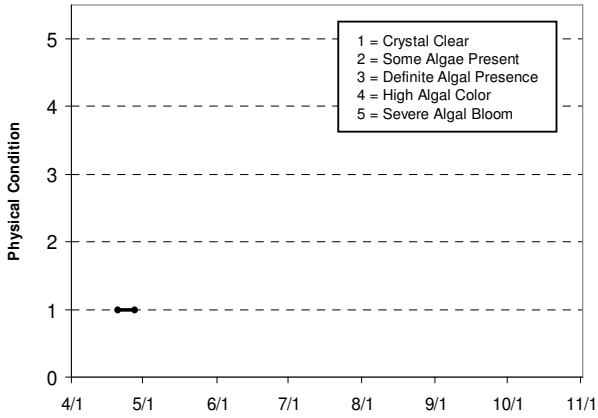






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/20/07	10.4				8.3	38		1.2	1	1
04/27/07	15.5				10	52		1.1	1	1
05/07/07	14.2				7	34		2.3		
05/15/07	17.3				14	26		1.7		
05/30/07	20.3				5.3	24		2.1		
06/08/07	20.2				7.8	20		2.3		
06/19/07	24.1				15	23		1.6		
06/30/07	27.2				7.2	18		1.2		
07/10/07	26.2				9	19		1.3		
07/21/07	24.3				7.1	17				
08/01/07	26.8				10	16		1.2		1
08/25/07	21.7				7.8	15		2.7		
09/13/07	19.6				18	22		1.2		
10/03/07	17.3				13	24		1.3		

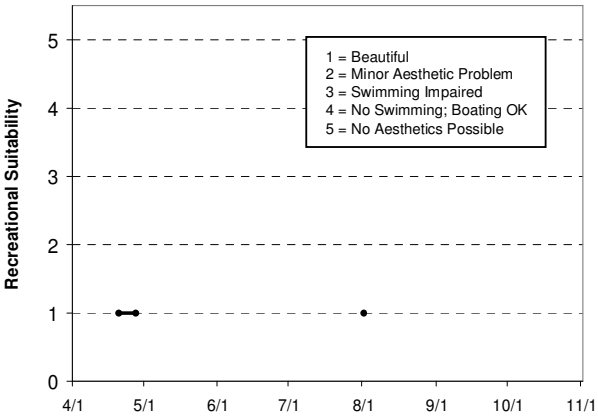


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth								B	B	B				
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	D						C	B	C	C	C	B	C	A
Chlorophyll a	B						C	B	C	C	B	B	B	A
Secchi Depth	C	C		C	C		C	C	C	C	C	C	C	C
Overall	**C**						**C**	**B**	**C**	**C**	**C**	**B**	**C**	**B**

Source: Metropolitan Council and STORET data



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

Big Marine Lake, located within City of Scandia (Washington County), has two public accesses, and is considered a "Priority Lake" due to its multi-recreational uses. 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.

Big Marine Lake was monitored seven times between mid-April and early-October 2007. The data and related graphs are presented on the information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	22.8	20.0	24.0	A
CLA (µg/l)	8.5	4.7	14.0	A
Secchi (m)	3.2	1.8	5.3	A
TKN (mg/l)	0.79	0.66	0.91	
			Water Quality	A

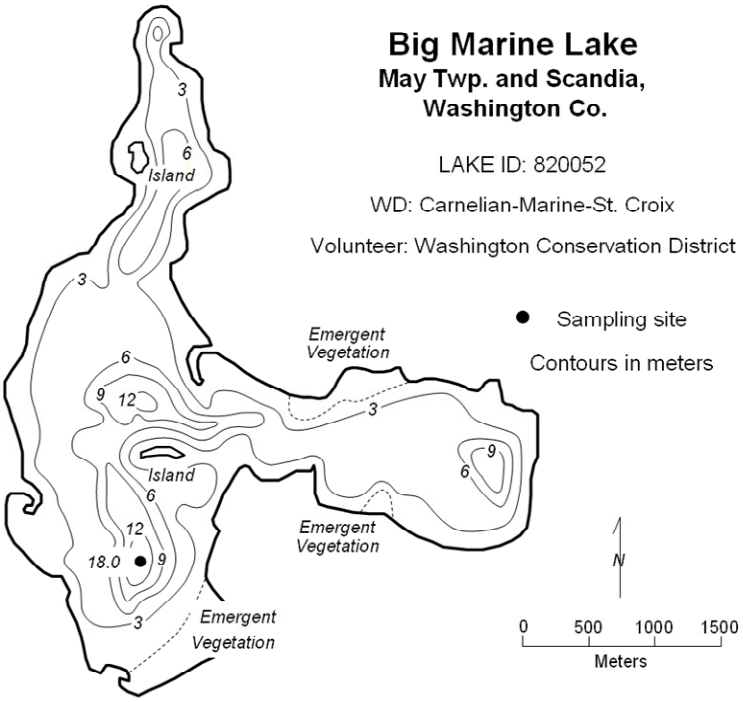
The lake grade in 2007 was an A which is consistent with grades received in past years. The history of lake grades fluctuate between A and B for this lake. Given that information, there does not appear to be an apparent trend in improving or degrading water quality grades.

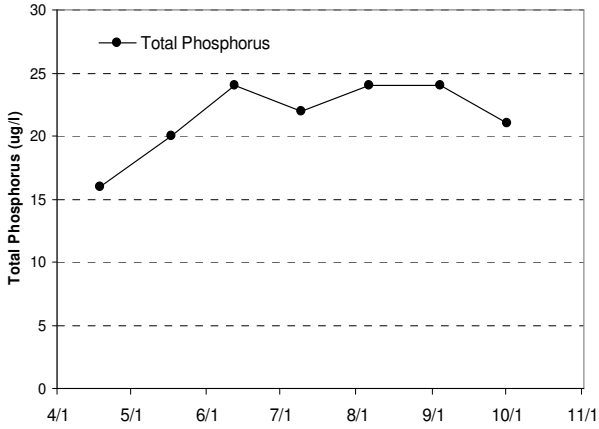
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 2.2 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 1.8 (between 1-"beautiful" and 2- "minor aesthetic problem").

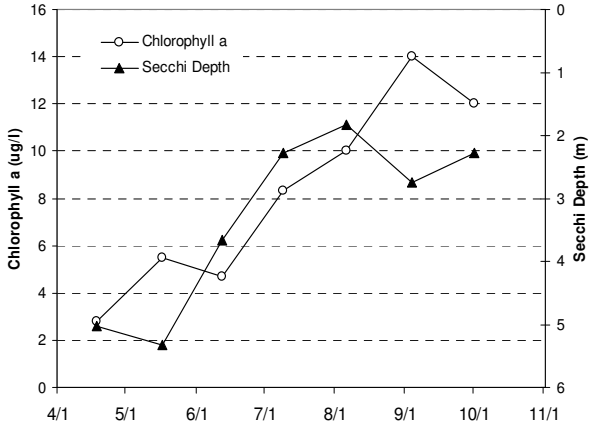
While no long-term trend is evident from the lake's whole water quality database (including TP, CLA and Secchi data), a recent MPCA conducted trend analysis using just the lake's Secchi transparency data, revealed a statistically significant improvement in recent water clarity. In the short-term, the lake's quality seems well represented by an grade of B/A.

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) 297-4916 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.

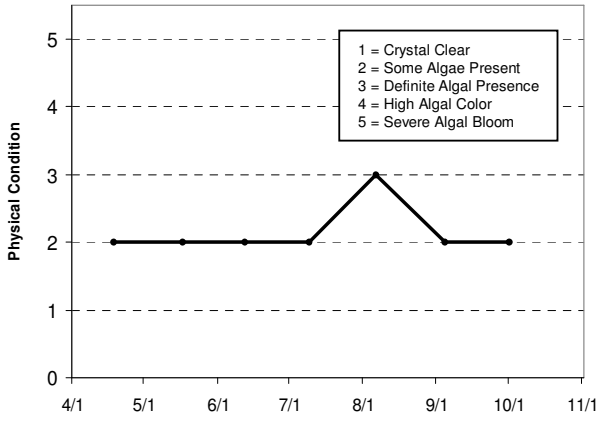






2007 Data

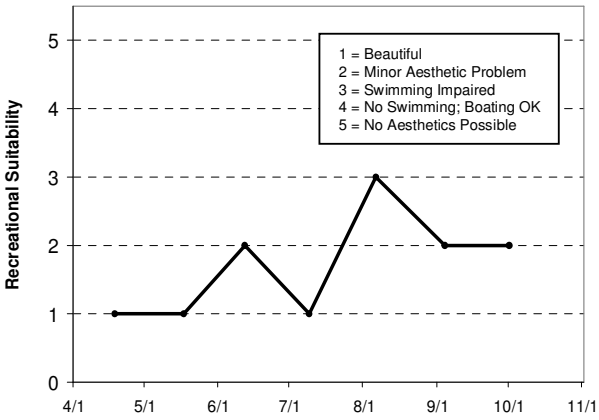
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/18/07	7.6	6.3		0.08	2.8	16		5.029	2	1
05/17/07	17.5	13.2		3.75	5.5	20		5.334	2	1
06/12/07	25	18	7.66	0.09	4.7	24		3.658	2	2
07/09/07	28.4	18	7.24	0.05	8.3	22		2.286	2	1
08/06/07	28.1	18.7	7.09	0.12	10	24		1.829	3	3
09/04/07	25.3	20	8.47	0.14	14	24		2.743	2	2
10/01/07	19.9	19.5	7.56	0.15	12	21		2.286	2	2



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	B	B			B					A		B		
Chlorophyll a	B	B			B					A		A		
Secchi Depth	B	B			B	B	B	B	C	A	C	B	A	A
Overall	**B**	**B**			**B**					**A**		**B**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A		B	A	A	A	A	A	B	A	A	A	C	A
Chlorophyll a	A		A	A	A	B	A	A	B	A	A	A	A	A
Secchi Depth	B		A	B	A	B	A	A	B	B	A	A	A	A
Overall	**A**		**A**	**A**	**A**	**B**	**A**	**A**	**B**	**A**	**A**	**A**	**B**	**A**



Source: Metropolitan Council and STORET data

Birch Lake (13-0042) *Comfort Lake-Forest Lake Watershed District*

Birch Lake is a 65-acre lake located in southern Chisago County. There is very little other known morphological data available for the lake.

This marks the third year in which Birch Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, 2005 - 2007 are the only known years of water quality data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored seven times between mid-April and late-September 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	55.5	35.0	83.0	C
CLA (µg/l)	18.7	5.9	41.0	B
Secchi (m)	2.0	0.9	3.2	C
TKN (mg/l)	1.28	0.67	1.80	
			Water Quality	C

The grade for the lake in 2007 was a C which is better than the water quality of a D reported in 2005. The C grade in 2007 was also better than the grade of C in 2006 because the total phosphorus and chlorophyll-a water quality grades each improved a letter grade from 2006 to 2007. This appears to be the result of a lower mean CLA and lower total phosphorus results for the 2007 sampling season as compared to 2005 and 2006. Because of the limitedness of the lake's water quality database, it is not possible to determine any long-term or short-term trends. 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 volunteers ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 2.8 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 3.8 (between 3- "swimming slightly impaired" and 4- "no swimming - boating ok").

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

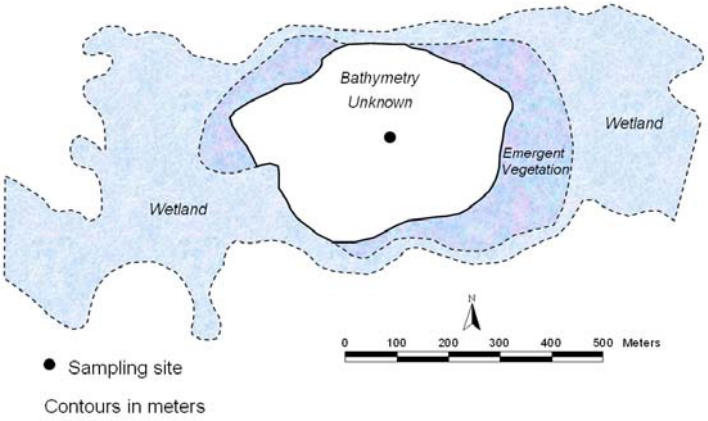
Birch Lake

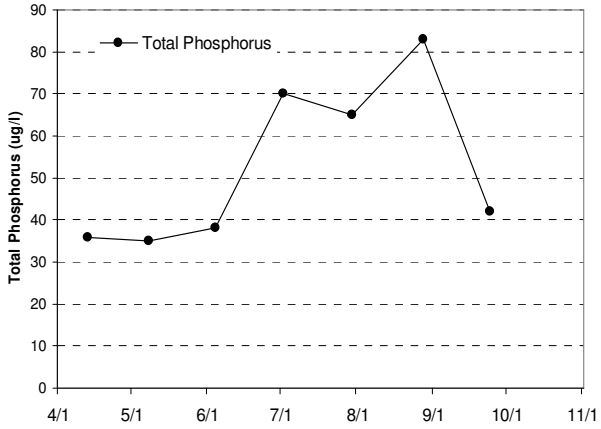
Chisago Lake Twp. and Wyoming Twp., Chisago Co.

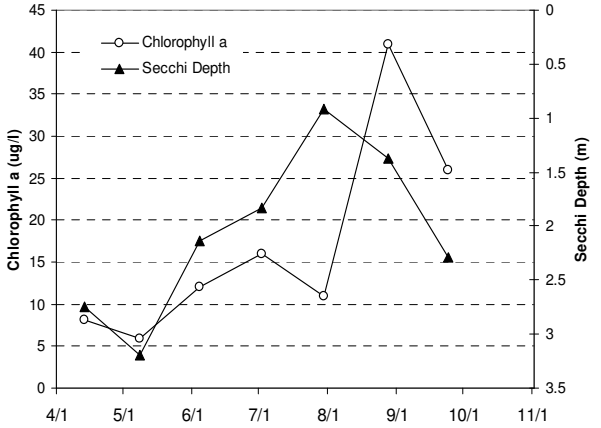
LAKE ID: 130042

WMO: Comfort Lake-Forest Lake

Volunteer: Washington Conservation District

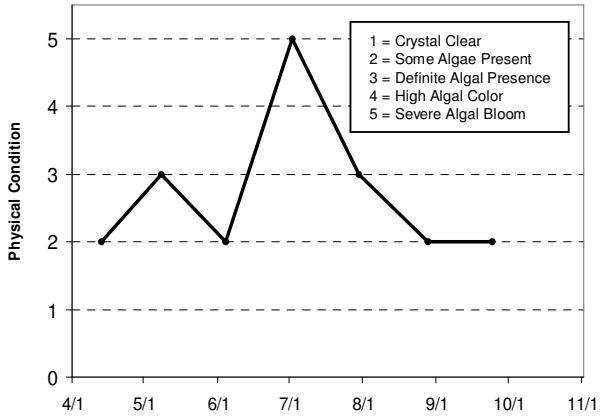






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/13/07	4	3.9	11.58	11.69	8.2	36		2.743	2	4
05/08/07	17.1	14.7		8.33	5.9	35		3.2	3	4
06/04/07	21.9	21		6.23	12	38		2.134	2	4
07/02/07	25	23	7.59	1.18	16	70		1.829	5	4
07/30/07	29	23.3	3.67	0.33	11	65		0.914	3	4
08/28/07	24.3	21.5	6.47	0.1	41	83		1.372	2	4
09/24/07	22.3	19.4	7.63	0.18	26	42		2.286	2	3

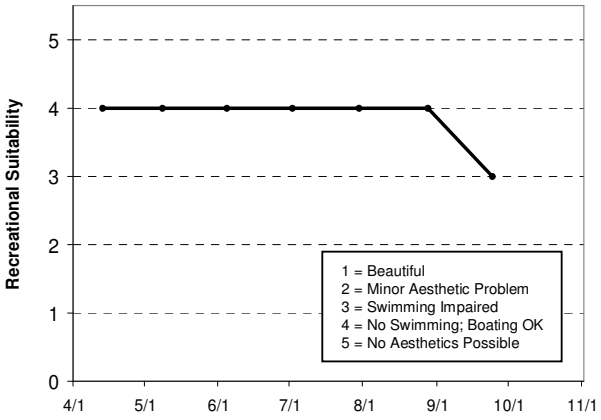


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												D	D	C
Chlorophyll a												D	C	B
Secchi Depth												C	C	C
Overall												**D**	**C**	**C**

Source: Metropolitan Council and STORET data



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

Bone Lake was previously monitored as a part of CAMP in 1993, 1995, 1997-1999, and 2001-2005. In 2007, the lake was monitored 10 times between late-April and late-August. Results are presented on the information sheet on the following page.

The 212-acre lake is located within New Scandia Township (Washington County). It receives flow through three inlets. The lake has a public access on its northwestern side and has a maximum and mean depth of 9.8 m and 3.7 m (32 and 12 feet), respectively. The approximate lake volume of Bone Lake, which has been stocked with walleye by the MDNR in the 1990's, is 2,820 ac-ft. The lake's 5,177-acre watershed translates to a rather large watershed-to-lake size ratio of 24:1. The greater the ratio, the greater the potential stress on the lake from surface runoff. Roughly 59 percent of the lake is considered littoral zone, that is, the area of aquatic plant dominance. The lake is considered a Metropolitan Council "Priority Lake" due to its multi-recreational uses.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	37.4	26.0	76.0	C
CLA (µg/l)	19.9	7.1	34.0	B
Secchi (m)	1.2	0.8	1.7	C
TKN (mg/l)	1.13	0.90	1.50	
			Water Quality	C

Based on the lake water quality grade, the lake's quality throughout the mid-1980's, 1990's, and early-to-mid 2000's seems to be consistently represented by an grade of C.

Throughout the summer, the volunteer(s) ranked the lake's perceived physical and recreational conditions on a 1-to-5 scale (see lake information sheet). The mean rankings were 2.2 for physical condition (between 2-"some algae present" and 3- "definite algae present"), and 2.0 for recreational suitability (2-"minor aesthetic problem").

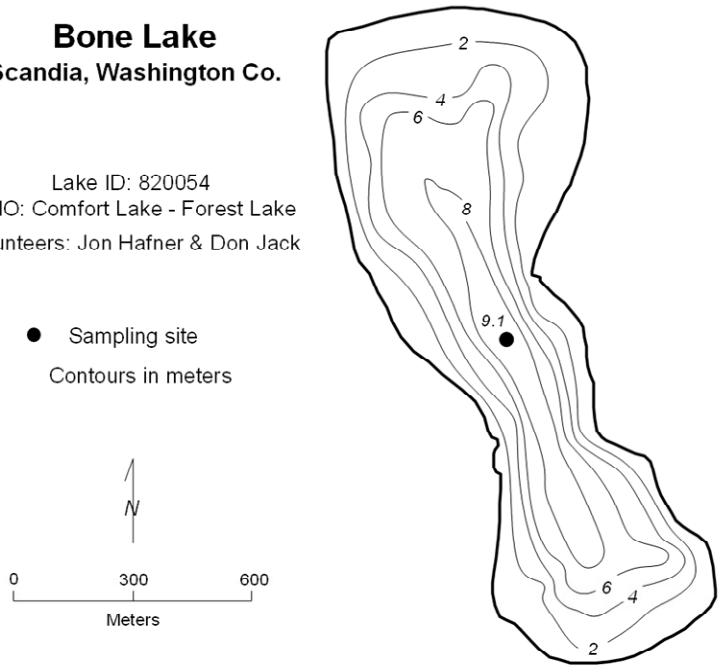
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

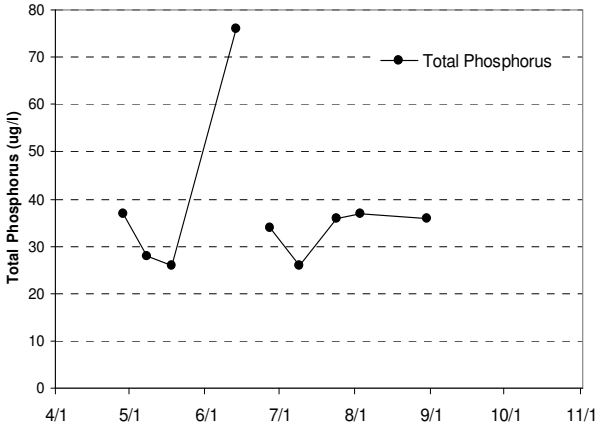
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

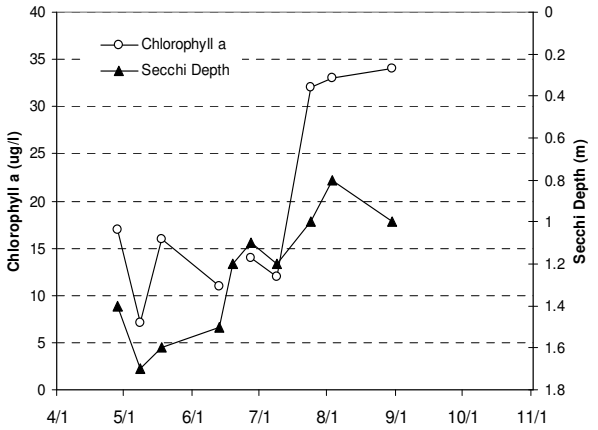
Bone Lake

Scandia, Washington Co.

Lake ID: 820054
WMO: Comfort Lake - Forest Lake
Volunteers: Jon Hafner & Don Jack

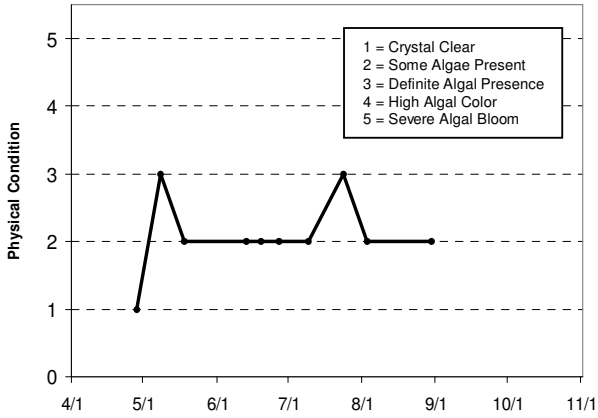






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/28/07	18.8				17	37		1.4	1	2
05/08/07	19.6				7.1	28		1.7	3	2
05/18/07	18.8				16	26		1.6	2	2
06/13/07	25.7				11	76		1.5	2	2
06/19/07	23.6							1.2	2	2
06/27/07	25.9				14	34		1.1	2	2
07/09/07	28.9				12	26		1.2	2	2
07/24/07	27.8				32	36		1	3	3
08/03/07	28.7				33	37		0.8	2	2
08/30/07	25.4				34	36		1	2	1

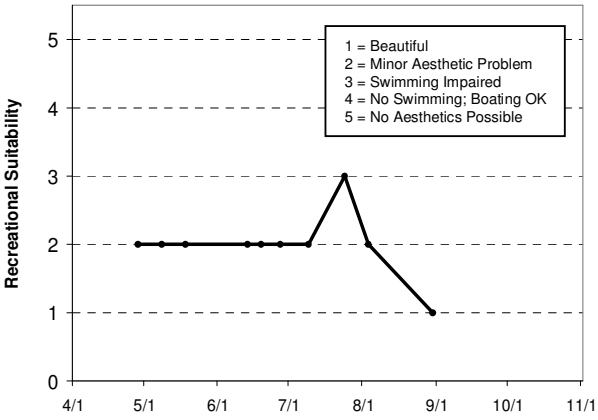


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					D			C	C	C		D		C
Chlorophyll a					C			B	C	C		C		C
Secchi Depth					C		D	C	D	C	C	C		C
Overall					**C**			**C**	**C**	**C**		**C**		**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				C	C	C		C	C	D	C	C	C	C
Chlorophyll a				B	B	C		C	C	C	C	B	B	B
Secchi Depth	D	C		C	C	D		C	D	C	C	C	C	C
Overall				**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Brickyard Lake (10-0225) *Carver County Environmental Services*

Brickyard Lake is a 17-acre lake located near the City of Chaska (Carver County). The maximum depth of the lake is 13.1 m (roughly 43 feet). Thirty-five percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance).

This was the sixth year that Brickyard Lake has been involved in CAMP (2002 being the first). The lake was monitored 13 times between mid-April and mid-October 2007. During each monitoring event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as its perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	17.3	11.0	36.0	A
CLA (µg/l)	3.3	1.3	13.0	A
Secchi (m)	3.9	2.3	5.5	A
TKN (mg/l)	0.82	0.33	1.50	
			Water Quality	A

To the best of our knowledge, there are no water quality data available for Brickyard Lake other than the 2002-2007 CAMP data. Because of the limited available data, it is not possible to determine long-term trends. In the short-term, the lake's water quality is well represented by an grade of A. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 1.2 for physical condition (between 1- "crystal clear" and 2-"some algae present"), and 1.2 for recreational suitability (between 1- "beautiful" and 2-"minor aesthetic problem").

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) 297-4916 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.

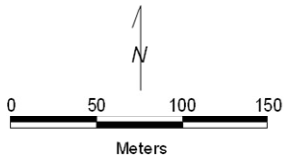
Brickyard Lake

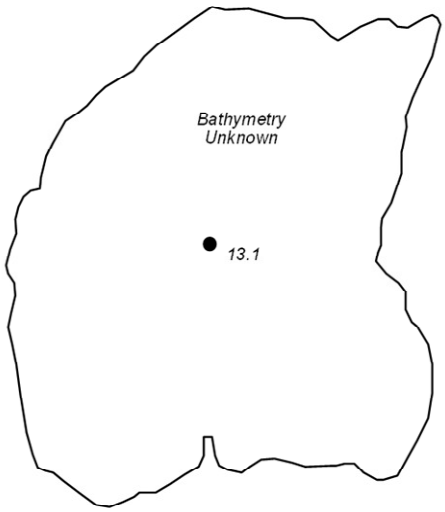
Chaska, Carver Co.

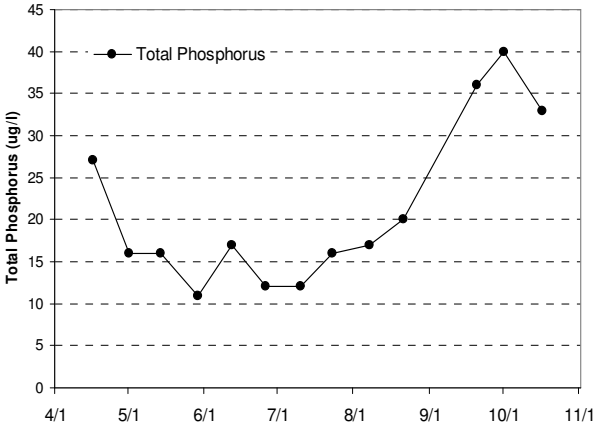
Lake ID: 100225
WMO: Carver County
Volunteer: Carver County

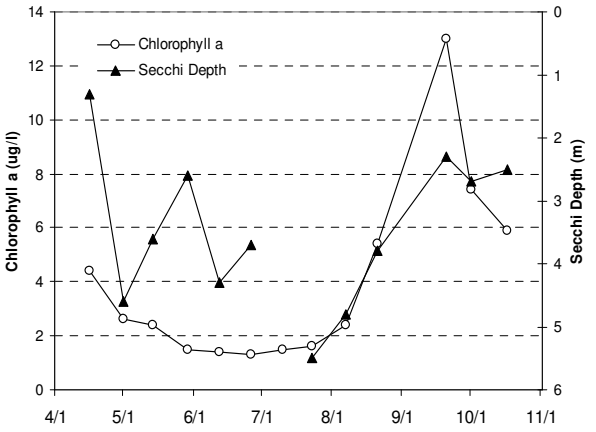
● Sampling site

Contours in meters



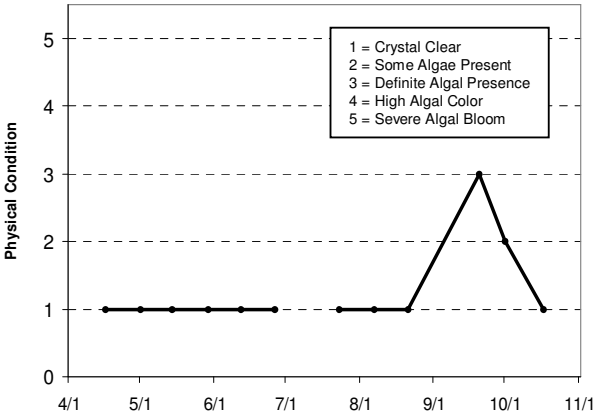






2007 Data

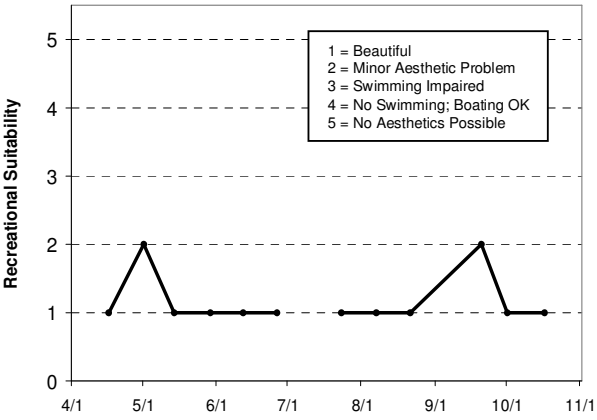
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/16/07	9.51		11.44		4.4	27		1.3	1	1
05/01/07	16.52		9.11		2.6	16		4.6	1	2
05/14/07	19.7		9.78		2.4	16		3.6	1	1
05/29/07	2.21		9.6		1.5	11		2.6	1	1
06/12/07					1.4	17		4.3	1	1
06/26/07	26.1		11.8		1.3	12		3.7	1	1
07/10/07					1.5	12				
07/23/07	26.09		9.69		1.6	16		5.5	1	1
08/07/07	26.08		3.97		2.4	17		4.8	1	1
08/21/07	22.72		6.88		5.4	20		3.8	1	1
09/20/07	19.46		8.59		13	36		2.3	3	2
10/01/07			4.77		7.4	40		2.7	2	1
10/17/07	14.12		9.51		5.9	33		2.5	1	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									A	A	A	A	B	A
Chlorophyll a									A	A	A	A	A	A
Secchi Depth									A	A	A	A	A	A
Overall									**A**	**A**	**A**	**A**	**A**	**A**



Source: Metropolitan Council and STORET data

Bush Lake (27-0047) *Nine Mile Creek Watershed District*

Bush Lake, located in the City of Bloomington (Hennepin County), covers an area of 172 acres and has a maximum depth of 8.5 m (29 feet). Sixty-four percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance). Because of its multi-recreational uses, the lake is considered a "Priority Lake" in the Metropolitan Area. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

This is the second year that Bush Lake has been enrolled in CAMP; the lake had been monitored by Council staff in the past. The lake was monitored 15 times between mid-April and mid-October. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	16.0	9.0	28.0	A
CLA (µg/l)	10.4	1.6	24.0	B
Secchi (m)	3.0	1.1	6.1	B
TKN (mg/l)	0.98	0.55	1.50	
			Water Quality	B

The lake's grade in 2007 (B) is similar to that recorded in 1983, 1999, and 2004, and is below than those recorded in other years. No long-term trend is readily apparent from the lake's water quality database. The lake's water quality seems to be best represented by an grade of A/B.

Throughout the monitoring season, the volunteer monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 2.2 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 1.6 (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 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.

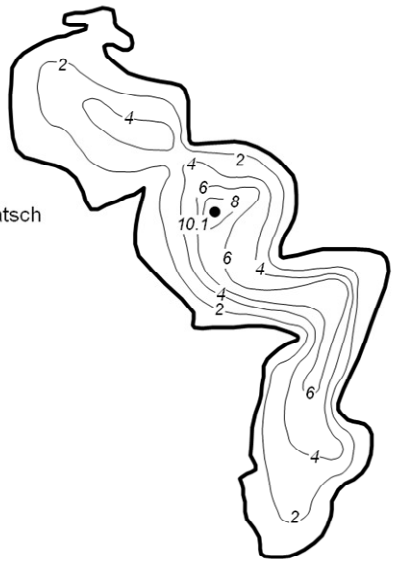
Lake ID: 270047

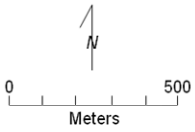
WD: Nine Mile Creek

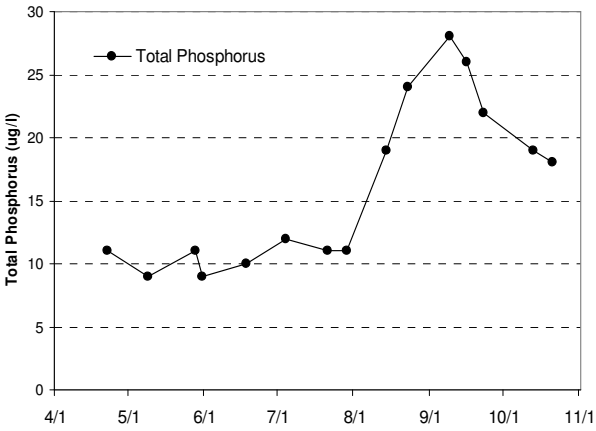
Volunteers: Gregg Thompson & Gordy Bratsch

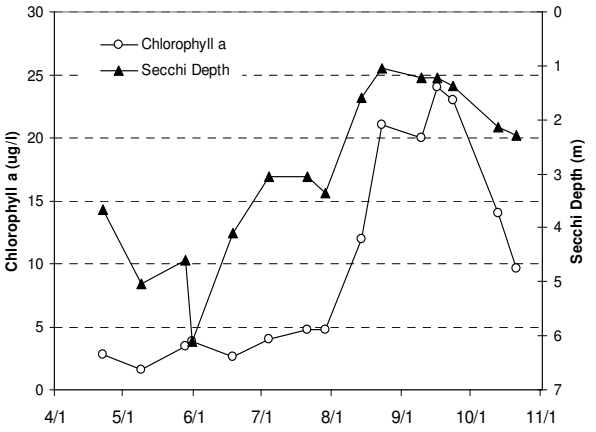
● Sampling site

Contours in meters



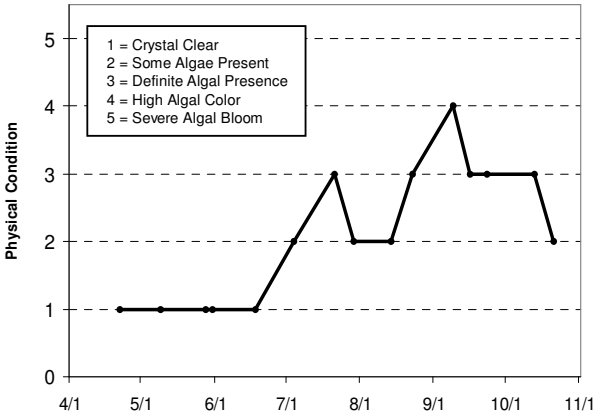






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/22/07	15.5				2.8	11		3.66	1	1
05/09/07	22.4				1.6	9		5.03	1	1
05/28/07	20				3.5	11		4.6	1	1
05/31/07	22.2				3.8	9		6.1	1	1
06/18/07	27				2.6	10		4.11	1	1
07/04/07	26.3				4	12		3.05	2	1
07/21/07	26.6				4.8	11		3.05	3	2
07/29/07	29.4				4.8	11		3.35	2	2
08/14/07	27.3				12	19		1.6	2	2
08/23/07	23				21	24		1.05	3	2
09/09/07	24				20	28		1.22	4	2
09/16/07	18.8				24	26		1.22	3	2
09/23/07	20				23	22		1.37	3	2
10/13/07	15.6				14	19		2.13	3	2
10/21/07	14				9.6	18		2.29	2	2

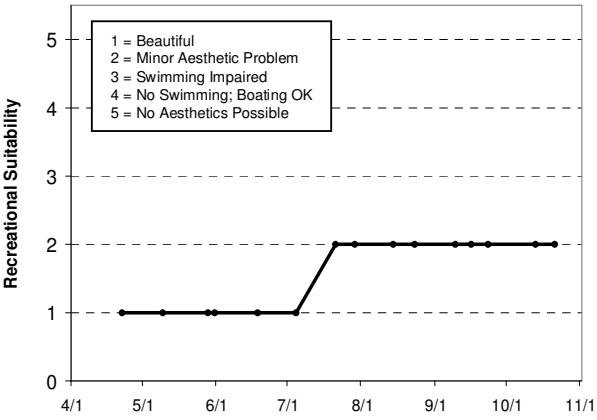


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus				B	A									A
Chlorophyll a				B	A									A
Secchi Depth				B	A	B	A	B	C					A
Overall				**B**	**A**									**A**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A					B		A			A		A	A
Chlorophyll a	A					B		B			B		A	B
Secchi Depth	B					B		A			B		B	B
Overall	**A**					**B**		**A**			**B**		**A**	**B**

Source: Metropolitan Council and STORET data



Carol Lake (82-0017) *Carnelian - Marine Watershed District*

Carol Lake is located within Stillwater Township (Washington County). The lake covers an area of 63 acres and has a maximum and mean depth of 1.8 m (roughly 6 feet) and 0.9 m (3 feet). Because of the shallowness of the lake, the entire lake is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation, and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The approximate volume of the lake is 186 acre-feet (ac-ft). The lake's watershed of 375 acres translates to a watershed-to-lake size ratio of 6:1. The larger the ratio the greater the potential stress put on the lake from surface runoff.

This was the eighth year that Carol Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake revealed a fair amount of historic data (1996-2006). The lake was monitored seven times from late-April to mid-October 2007. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	23.8	15.0	35.0	B
CLA (µg/l)	4.6	2.9	7.8	A
Secchi (m)	1.2	0.9	1.5	D
TKN (mg/l)	0.56	0.47	0.66	
			Water Quality	B

The grade for 2007 (B) was an improvement to the grades received in 2003-2006 (C's). The lake had received grades of B in the earlier years of monitoring (1996-2001). The Secchi transparency grade remains at a D for 2007, which is similar to the previous 4 years. In fact, the lake's Secchi transparency grade has steadily fallen from B's in 1996-1999, to C's in 2000-2001, to D's in 2002-2007. This decrease in the lake's short-term water quality should cause some concern and a watchful eye should be kept on the lake's future quality. To better understand the lake's water quality and where it may truly be heading, more data are needed.

The difference between the TP, CLA and Secchi grades in recent years may indicate that suspended sediments may play a large role in the inner workings of the lake. This scenario can be fairly typical for shallow lakes where wind action and storm sewer inflow either increase the influx of sediments to the system or cause the re-suspension of existing bottom sediments. That is, the suspended sediments influence the lake's phosphorus make-up (a larger portion of the in-lake phosphorus in particulate form rather than a soluble form more readily available for algal uptake), reduce water clarity, and could actually be limiting the amount of light available for algal growth, thus keeping the CLA concentrations down (resulting in a better than expected grade).

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.2 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 3.4 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

If you notice any errors in the lake's data or physical information, or are aware of 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.

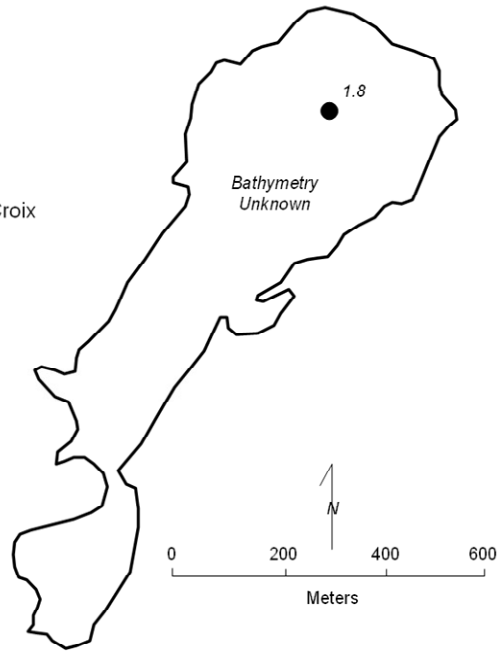
LAKE ID: 820017

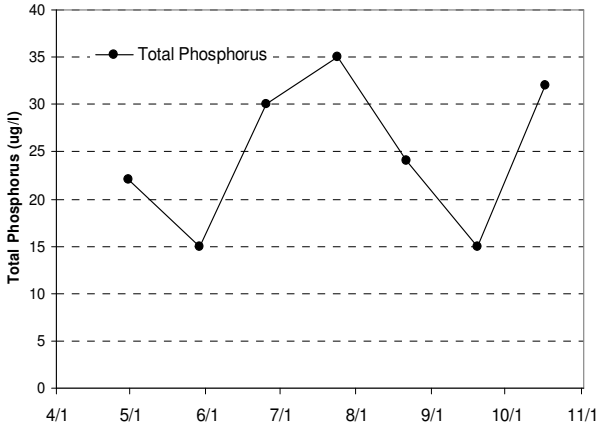
WD: Carnelian-Marine-St. Croix

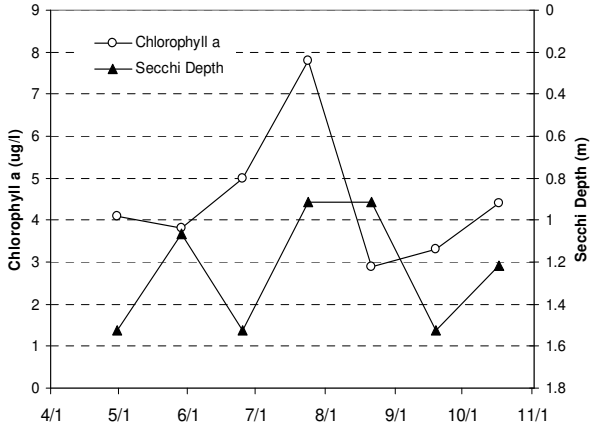
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

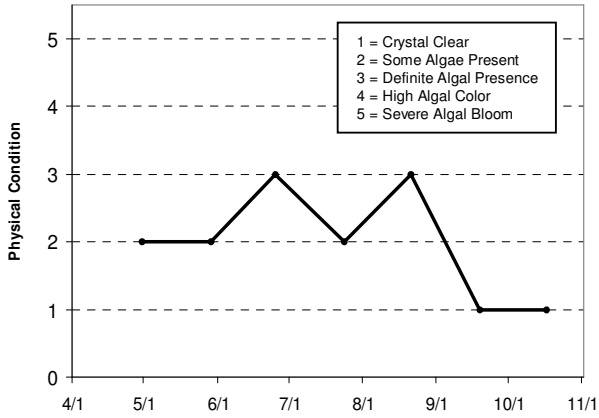






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/30/07	18.5	18.5	9.44	9.37	4.1	22		1.524	2	4
05/29/07	21.9	19.4	9.54	2.68	3.8	15		1.067	2	4
06/25/07	29.5	27.9	8.77	4.28	5	30		1.524	3	4
07/24/07	26.1	24.7	4.67	0.15	7.8	35		0.914	2	3
08/21/07	20.6	20.5	1.51	0.08	2.9	24		0.914	3	4
09/19/07	19	15.9	6.01	0.28	3.3	15		1.524	1	2
10/17/07	15.1	13.6	7.32	0.87	4.4	32		1.219	1	2

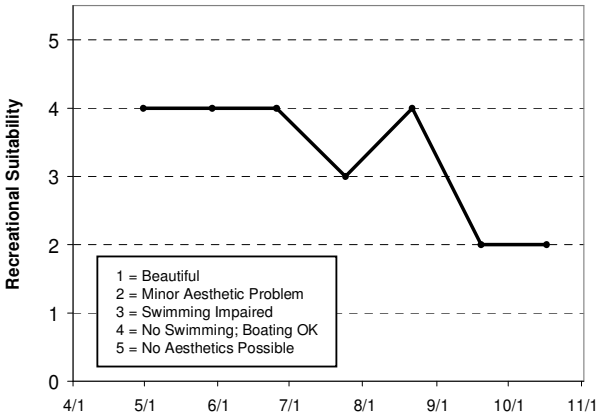


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			B	A	A	A	A	B		C	C	C	C	B
Chlorophyll a			B	C	C	C	A	A		B	B	B	A	A
Secchi Depth			B	B	B	B	C	C	D	D	D	D	D	D
Overall			**B**	**B**	**B**	**B**	**B**	**B**		**C**	**C**	**C**	**C**	**B**

Source: Metropolitan Council and STORET data



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

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 (roughly 13 feet). Because of the shallowness of the lake, its entire area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and the lake does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake has no public access.

This was the sixth year that Cates Lake has been involved in CAMP (2002 being the first). The lake was monitored 13 times between mid-May and mid-October 2007. During each monitoring event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as its perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	18.9	9.0	23.0	A
CLA (µg/l)	3.3	2.3	5.1	A
Secchi (m)	1.9	1.8	2.0	C
TKN (mg/l)	1.45	0.94	1.80	
			Water Quality	B

To the best of our knowledge, there are no water quality data available for Cates Lake other than the 2002-2007 CAMP data. Therefore there is not enough data at this time to determine any long-term trends. In the short-term however, the lake's water quality is well represented by an grade of B. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

During each monitoring event, the volunteers' opinion of the lake condition was ranked on a 1-to-5 scale as shown on the lake information sheet. The average score for physical condition was 2.8 (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4 - "no swimming – boating ok").

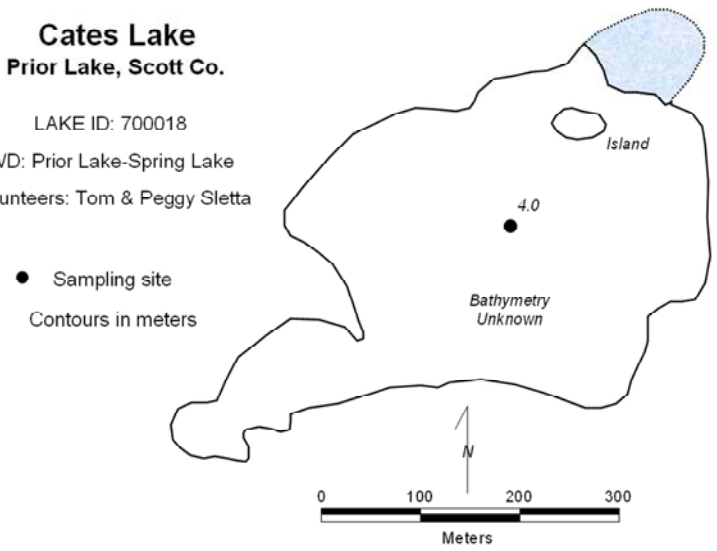
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

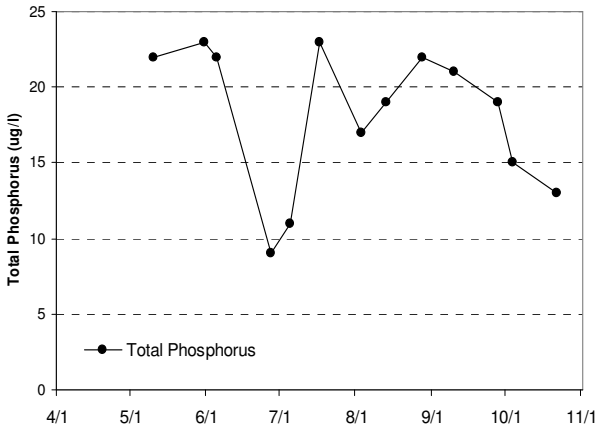
Cates Lake
Prior Lake, Scott Co.

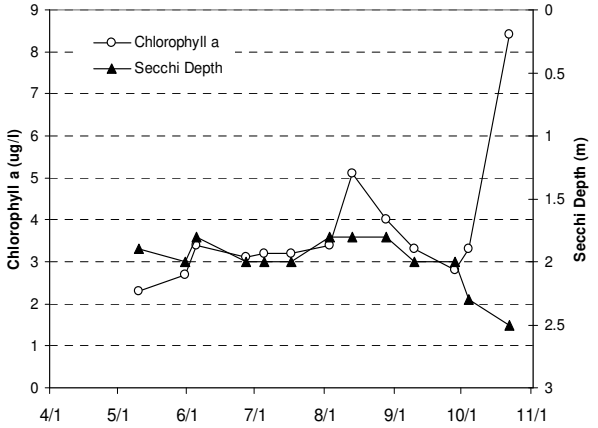
LAKE ID: 700018

WD: Prior Lake-Spring Lake

Volunteers: Tom & Peggy Sletta

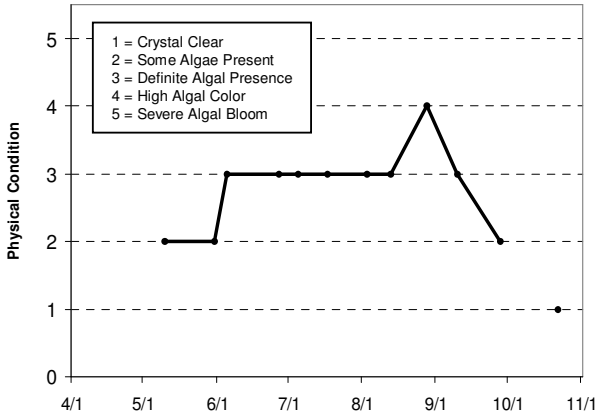






2007 Data

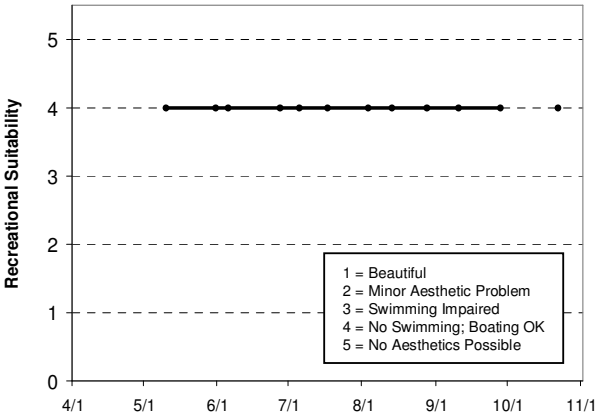
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/10/07	22				2.3	22		1.9	2	4
05/31/07	24.5				2.7	23		2	2	4
06/05/07	22.7				3.4	22		1.8	3	4
06/27/07	25.7				3.1	9		2	3	4
07/05/07	25.7				3.2	11		2	3	4
07/17/07	25.5				3.2	23		2	3	4
08/03/07	25.9				3.4	17		1.8	3	4
08/13/07	25.4				5.1	19		1.8	3	4
08/28/07	23.9				4	22		1.8	4	4
09/10/07	22.8				3.3	21		2	3	4
09/28/07	19				2.8	19		2	2	4
10/04/07	19.4				3.3	15		2.3		
10/22/07	12.5				8.4	13		2.5	1	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									A	B	B	A	B	A
Chlorophyll a									A	A	A	A	A	A
Secchi Depth									C	C	C	C	C	C
Overall									**B**	**B**	**B**	**B**	**B**	**B**



Source: Metropolitan Council and STORET data

Cedar Lake (70-0091) *Scott County Watershed Management Organization*

Cedar Lake, located in Cedar Lake Township (Scott County), covers an area of 742 acres and has a maximum depth of 4.7 m (roughly 15 feet). The lake's mean depth of 2.1 m (6.9 feet) and surface area translates to an approximate lake volume of 5,194 ac-ft. Because the maximum depth is only 4.7 m (15 feet), 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). Because of its multi-recreational uses, the lake is considered a "Priority Lake" in the Metropolitan Area

The majority land use within the 11,104-acre contributing watershed is agricultural. The watershed-to-lake size ratio is 14:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This is the second year that Cedar Lake has been enrolled in CAMP, the lake had been monitored by Council staff in the past. In 2007, the lake was monitored 14 times between mid-April and mid-October. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	181.6	33.0	348.0	F
CLA (µg/l)	51.8	4.7	130.0	D
Secchi (m)	0.9	0.4	1.6	D
TKN (mg/l)	2.08	0.95	2.80	
			Water Quality	D

The lake's grade in 2007 (D) is similar to that recorded in 1981, 1984, 1993, 1998, and 2006, better than those recorded in 1980 and 2001 (F), and worse than the C recorded in 2005. Because of the variability of the lake's grades, no long-term trend is apparent from the lake's water quality database. The lake's water quality seems to be best represented by an grade of D.

Throughout the 2006 season, the volunteer monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 2.5 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 2.2 (2- "minor aesthetic problem" and 3-"swimming impaired").

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) 297-4916 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.

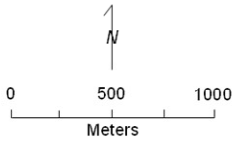
● Sampling site

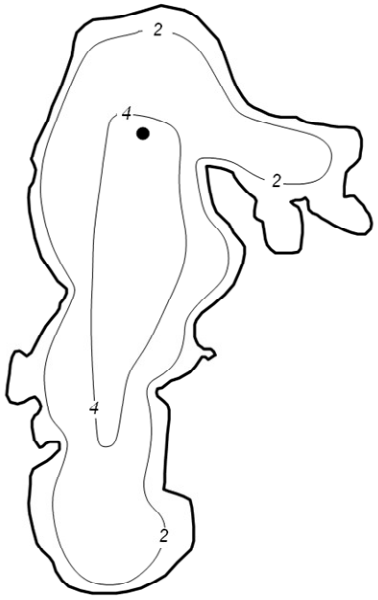
Contours in meters

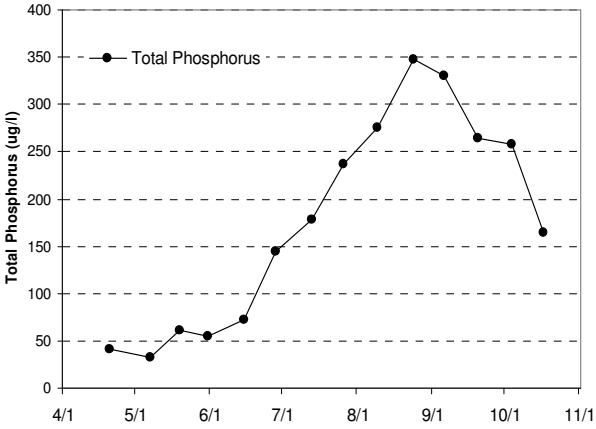
Volunteer: Jerry Edberg

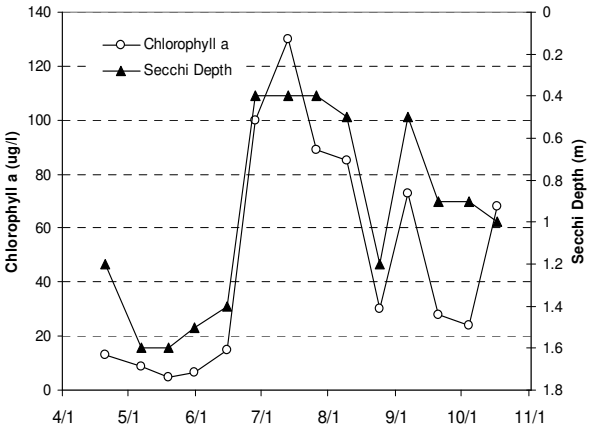
LAKE ID: 700091

WMO: Scott County



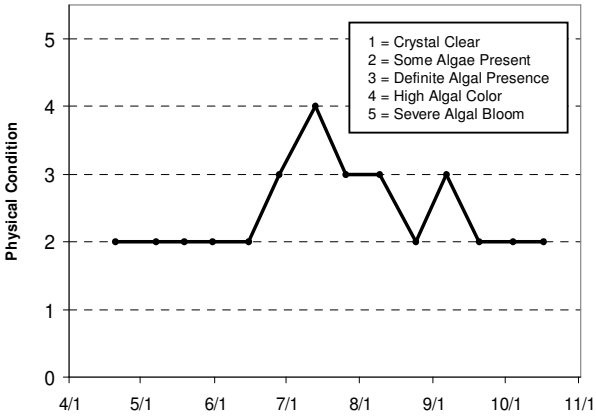






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/20/07	11.9				13	41		1.2	2	1
05/07/07	14.9				8.8	33	30	1.6	2	1
05/19/07	17.4				4.7	61	66.5	1.6	2	2
05/31/07	22				6.6	55	88	1.5	2	3
06/15/07	24.8				15	72.5	175.5	1.4	2	3
06/28/07	25				100	144	180	0.4	3	3
07/13/07	24.1				130	178.5	773	0.4	4	3
07/26/07	26.4				89	236.5	262	0.4	3	2
08/09/07	25.8				85	275.5	293	0.5	3	3
08/24/07	21.3				30	348	367	1.2	2	1
09/06/07	25.5				73	330	306	0.5	3	2
09/20/07	17.7				28	264	266	0.9	2	1
10/04/07	15.7				24	258	248	0.9	2	2
10/17/07	12.4				68	164	171	1	2	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	F	F			F									F
Chlorophyll a	F	D			D						D			C
Secchi Depth	C	C	C	C	C	C				F	D	D	D	C
Overall	**F**	**D**			**D**									**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					F			F				D	F	F
Chlorophyll a					D			F				C	D	D
Secchi Depth					D			D				C	D	D
Overall					**D**			**F**				**C**	**D**	**D**

Source: Metropolitan Council and STORET data

Cenaiko Lake (2-0654) *Anoka County Parks*

This was the eleventh year in which Cenaiko Lake, located within Coon Rapids Dam Regional Park in the City of Coon Rapids in Anoka County, has been monitored through CAMP. Except for the eleven years of CAMP data, a search through the STORET nationwide water quality database for historic data on the lake came up empty.

The lake is maintained by groundwater and has a very small watershed that is completely publicly owned (MDNR 1996). No boats, canoes, or floatables are allowed on the 29-acre man-made lake that is one of only six lakes in the seven-county metropolitan area that are stocked with trout (brook and rainbows). The only fishing access to the lake is two fishing docks and the lake's shoreline. The lake, which is 0.6 miles in circumference, has a maximum depth of 9.1 m (30 ft). Only 12 percent of the lake is considered littoral zone (the 0-15 foot depth zone of the lake dominated by aquatic vegetation). Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

Cenaiko Lake was monitored 12 times between mid-April and mid-October 2007. The data and resulting graphs showing seasonal variability in TP and CLA concentrations, Secchi transparency, and user perceptions are presented on the information sheet following these written comments.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	12.1	8.0	17.0	A
CLA (µg/l)	2.8	1.3	5.5	A
Secchi (m)	2.5	1.5	3.4	B
TKN (mg/l)	0.95	0.46	1.50	
			Water Quality	A

The lake's 2007 lake quality grade of A is consistent with grades reported in 1998-2000, 2002-2006 and is better than grades reported (B) in 1997 and 2001. No trends are apparent from the lake's water quality database. The lake seems well represented by an grade of B+/A. To better understand the quality of the lake and what direction it may be heading, continued monitoring is recommended.

At each monitoring event, the volunteers' opinion of the lake condition was ranked on a 1-to-5 scale as shown on the lake information sheet. The average score for physical condition was 1.7 (between 1- "crystal clear and 2- "some algae present"), and 1.0 for recreational suitability (1- "beautiful").

Cenaiko Lake was one of eight lakes in Minnesota and one in Wisconsin that where a part of a research project supported by the MDNR and conducted by researchers at the University of Minnesota. The research project examined the possibilities of an aquatic weevil *Euryhchiopsis lecontei* as a biological control agent for EWM (U.S.EPA 1997). The following is an excerpt from a U.S.EPA document detailing research in weevils as a biological control:

> Of the nine sites, the most pronounced weevil infestation was found in Cenaiko Lake in Anoka County, Minnesota. Weevils caused severe damage to the EWM plants in Cenaiko Lake, most likely resulting in the plants' decreased abundance. EWM biomass (wet weight) at Cenaiko decline from 974 g/m^2 in July 1996, to 239 g/m^2 in September 1996 (Newman et al. 1996). Researchers estimate that the biomass in June 1996 (before sampling) was close to 2,000 g/m^2 (Newman we al. 1996). In July 1996, EWM was approximately 50 percent of the total plant biomass in the lake; by September 1996, this value had decreased to 14 percent.

> Monitoring of Cenaiko Lake did not begin until June 1996 when a dense population of weevils was discovered during reconnaissance studies for introduction sites (Newman et al. 1996). Cenaiko Lake was then added to the list of regular sampling sites. Plant samples collected at Cenaiko Lake, as well as at other sites, were processed for invertebrates, plant biomass, and stem damage.
>
> Because monitoring is still ongoing, sampling and data are limited for this study. However, the preliminary results indicate the weevils in Cenaiko Lake may be responsible for the natural decline of EWM.

Since that report however, the lake's biological make-up has changed. The lake's Sunfish population has increased, which has resulted in a reduced aquatic weevil population (the Sunfish feed on the weevils). The reduction in the aquatic weevil population has resulted in an increase in abundance of EWM within the lake. The last fish survey the DNR performed on Lake Cenaiko was in 2003.

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

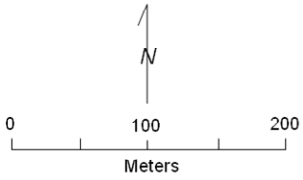
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

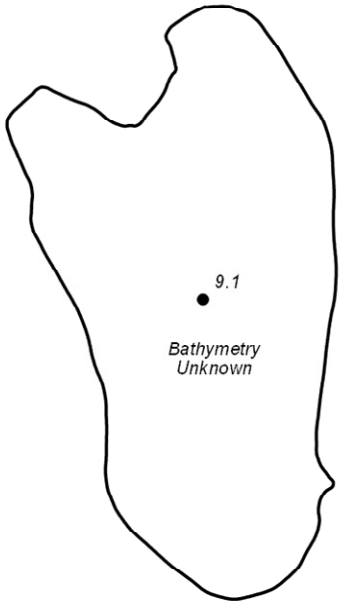
Lake Cenaiko

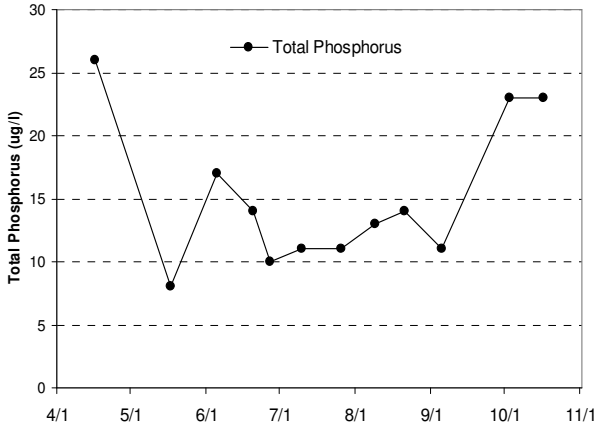
Coon Rapids, Anoka Co.

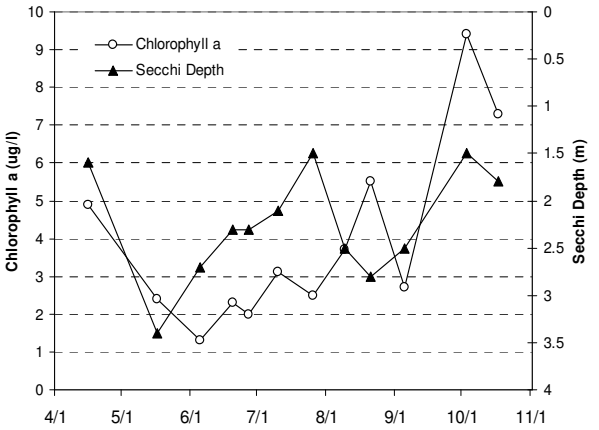
Lake ID: 20654
WD: Coon Creek
Volunteer: Anoka Co. Parks

● Sampling site
Contours in meters



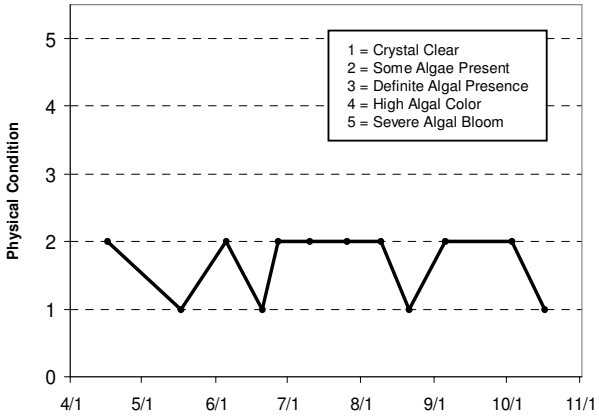






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	9.2				4.9	26		1.6	2	1
05/17/07	18.8				2.4	8		3.4	1	1
06/05/07	22.7				1.3	17		2.7	2	1
06/20/07	24				2.3	14		2.3	1	1
06/27/07	27.5				2	10		2.3	2	1
07/10/07	27.1				3.1	11		2.1	2	1
07/26/07	29.7				2.5	11		1.5	2	1
08/09/07	26.2				3.7	13		2.5	2	1
08/21/07	22.9				5.5	14		2.8	1	1
09/05/07	26.4				2.7	11		2.5	2	1
10/03/07	17.7				9.4	23		1.5	2	1
10/17/07	13.1				7.3	23		1.8	1	1

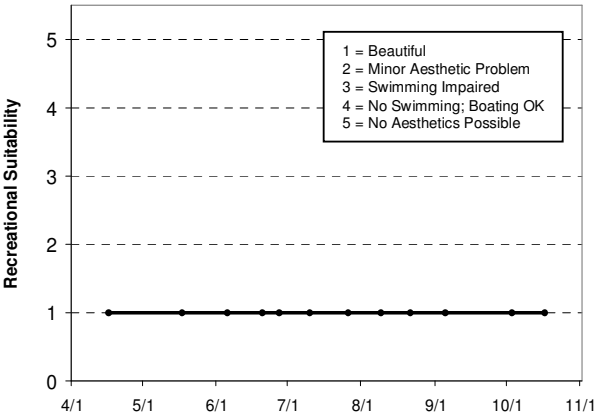


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				A	A	A	A	A	A	A	A	A	A	A
Chlorophyll a				A	A	A	A	A	A	A	A	A	A	A
Secchi Depth				C	A	A	B	C	A	A	B	B	A	B
Overall				**B**	**A**	**A**	**A**	**B**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



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

Cloverdale Lake is a 45-acre landlocked lake located within Baytown Township (Washington County). The mean and maximum depth of the lake is 3.0 m (roughly 10 feet) and 8.5 m (almost 30 feet), respectively. Roughly 86 percent of the lake's area is considered littoral (the 0-15 foot depth area of aquatic vegetation dominance). The lake's size and mean depth results in an approximate lake volume of 450 ac-ft.

The lake's surface area and watershed size (819 acres) translates to an 18:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the seventh year that Cloverdale Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, 2001-2007 CAMP data are the only years of available nutrient data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 10 times between late-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.4	18.0	40.0	B
CLA (µg/l)	7.8	2.2	18.0	A
Secchi (m)	2.9	2.2	4.6	B
TKN (mg/l)	1.57	1.40	1.80	
			Water Quality	B

The lake's 2007 lake quality grade of B is better than the C recorded in 2001, worse than the A recorded in 2005 and similar to the B's recorded in 2002-2004. The lake's 2006 Secchi mean, however, is the best recorded to date.

As mentioned earlier, there are no nutrient data available for Cloverdale Lake other than the 2001-2007 CAMP data. Therefore there is not enough data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

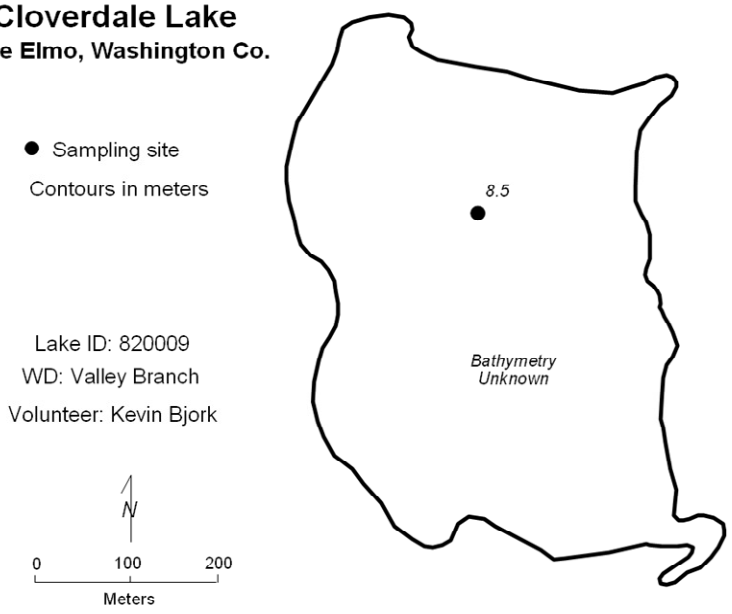
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.1 for physical condition (between 2- "some algae present" and 3-"definite algae present), and 1.9 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

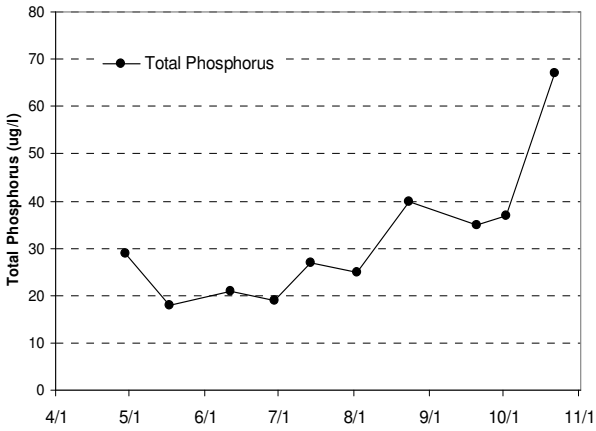
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

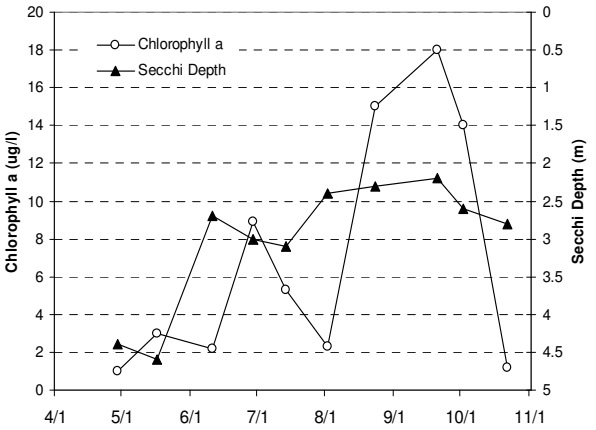
Cloverdale Lake

Lake Elmo, Washington Co.



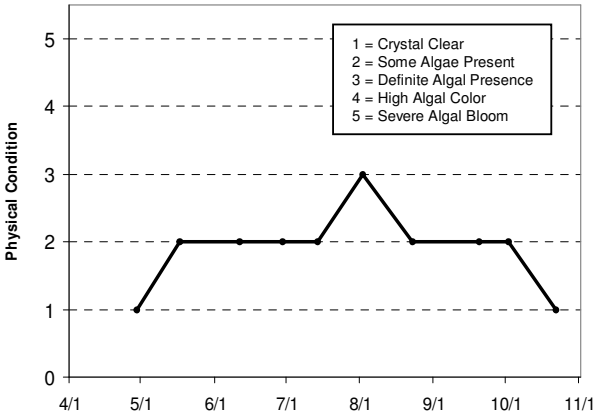
Lake ID: 820009
WD: Valley Branch
Volunteer: Kevin Bjork





2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/29/07	17.7				1	29		4.4	1	1
05/17/07	18.6				3	18		4.6	2	1
06/11/07	26.7				2.2	21		2.7	2	2
06/29/07	25				8.9	19		3	2	2
07/14/07	24.8				5.3	27		3.1	2	2
08/02/07	25.8				2.3	25		2.4	3	2
08/23/07	22.3				15	40		2.3	2	2
09/20/07	18.9				18	35		2.2	2	2
10/02/07	17.8				14	37		2.6	2	2
10/22/07	13.1				1.2	67		2.8	1	1

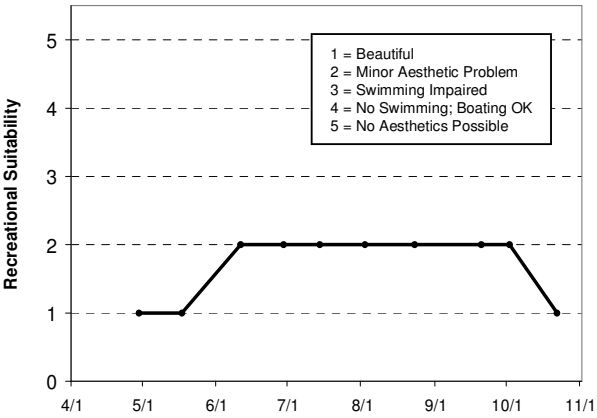


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus								C	C	C	C	B	B	B
Chlorophyll a								B	B	B	B	A	B	A
Secchi Depth								C	B	B	A	A	A	B
Overall								**C**	**B**	**B**	**B**	**A**	**B**	**B**

Source: Metropolitan Council and STORET data



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

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.

This marks the fifth year in which Cobblecrest Lake has been involved in CAMP (2002 and 2004-2006 being the others). Other than for the mentioned CAMP data, a search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Thus, 2002 and 2004-2007 are the only complete years of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 13 times between late-April and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	168.5	114.0	266.0	F
CLA (µg/l)	126.4	44.0	230.0	F
Secchi (m)	0.3	0.2	0.4	F
TKN (mg/l)	3.48	2.50	4.40	
			Water Quality	F

The lake's 2007 lake quality grade of F is consistent with the lake grades in 2004-2006 and worse than the C recorded in 2002.

As mentioned earlier, there are no water quality data available for Cobblecrest Lake other than the 2002 and 2004-2006 CAMP data. Therefore it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

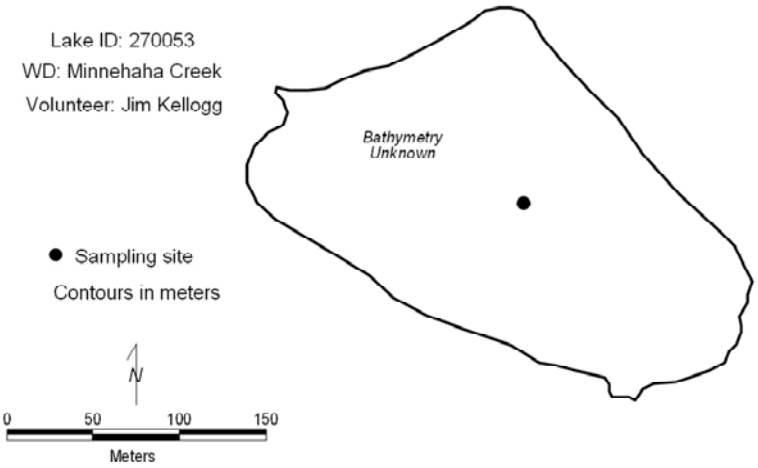
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.4 for physical condition (between 3- "definite algae present" and 4-"high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

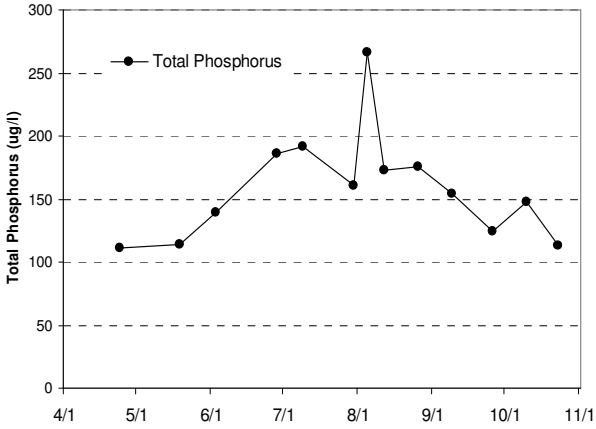
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

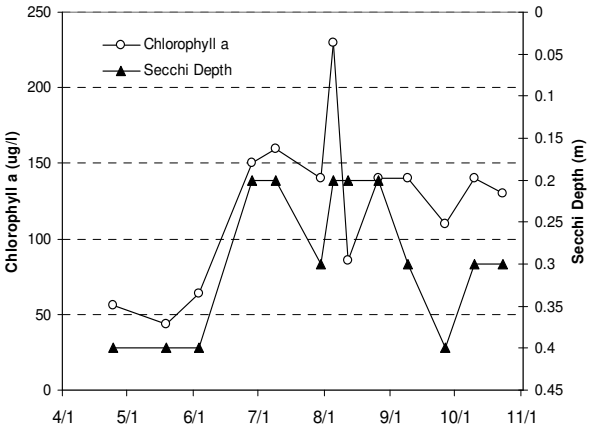
Cobble Crest Lake

St. Louis Park, Hennepin Co.

Lake ID: 270053
WD: Minnehaha Creek
Volunteer: Jim Kellogg

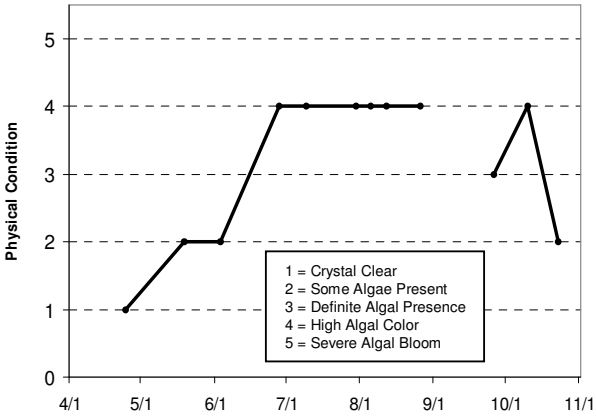






2007 Data

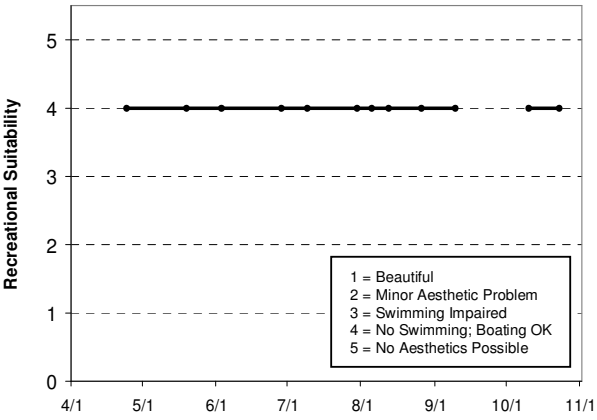
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/24/07	17.8				56	111		0.4	1	4
05/19/07	21.2				44	114		0.4	2	4
06/03/07	21.5				64	139		0.4	2	4
06/28/07	25.4				150	186		0.2	4	4
07/09/07	27.4				160	192		0.2	4	4
07/30/07	28.6				140	161		0.3	4	4
08/05/07	24.3				230	266		0.2	4	4
08/12/07	26.6				86	173		0.2	4	4
08/26/07	24.8				140	176		0.2	4	4
09/09/07	20.2				140	154		0.3		4
09/26/07	19.8				110	124		0.4	3	
10/10/07	15.1				140	148		0.3	4	4
10/23/07	15.6				130	113		0.3	2	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									C		D	F	D	F
Chlorophyll a									C		F	F	F	F
Secchi Depth									C		F	F	F	F
Overall									**C**		**F**	**F**	**F**	**F**



Source: Metropolitan Council and STORET data

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

Cobblestone Lake is a small lake located in Apple Valley (Dakota County). There is very little morphological data available for the lake.

This marks the third year in which Cobblestone Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, 2005-2007 are the only complete years of water quality data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 12 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	53.3	36.0	110.0	C
CLA (µg/l)	21.4	7.4	36.0	C
Secchi (m)	0.8	0.6	1.2	D
TKN (mg/l)	1.42	0.97	2.00	
			Water Quality	C

The lake's 2007 lake quality grade of C is slightly better than the recorded lake grade in 2005 (D), and is similar to the water quality in 2006.

Throughout the monitoring period, the volunteers ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 1.9 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 2.4 (2- "minor aesthetic problem" and 3-"swimming impaired").

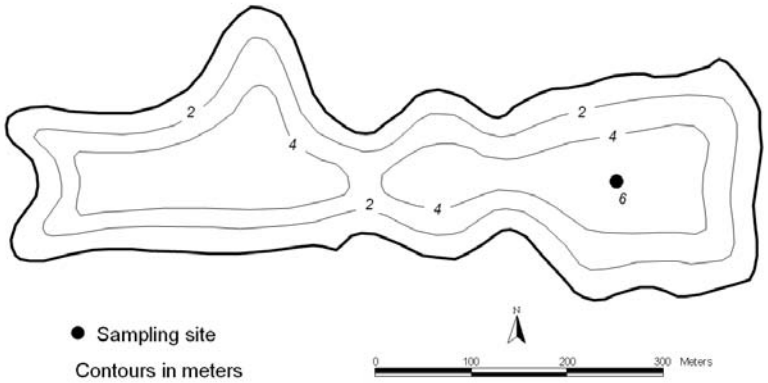
Because of the limitedness of the lake's water quality database, there is not enough data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

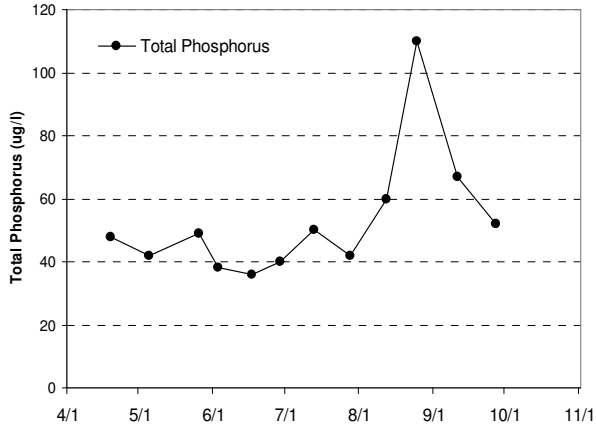
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

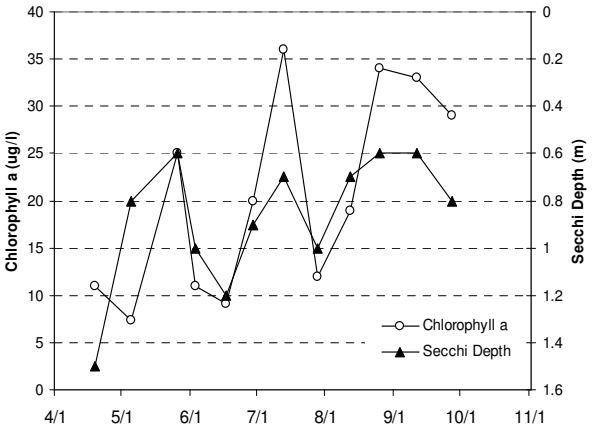
Cobblestone Lake

Apple Valley, Dakota Co.

Lake ID: 190456
WMO: Vermillion River
Volunteer: Wyatt Yohnk

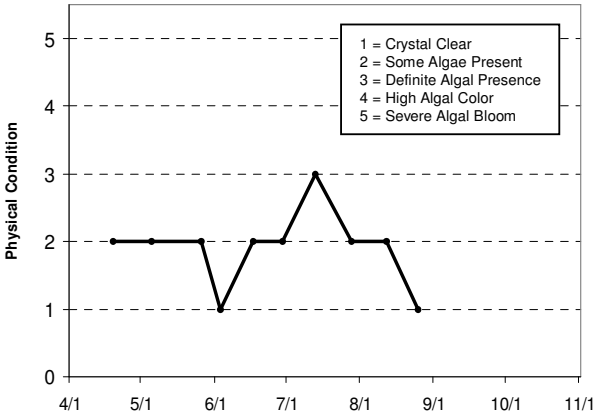






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/19/07	11.6				11	48		1.5	2	1
05/05/07	15.1				7.4	42		0.8	2	5
05/26/07	18.7				25	49		0.6	2	2
06/03/07	20.9				11	38		1	1	4
06/17/07					9.1	36		1.2	2	2
06/29/07	25.3				20	40		0.9	2	2
07/13/07	24.3				36	50		0.7	3	2
07/28/07					12	42		1	2	2
08/12/07	25.8				19	60		0.7	2	2
08/25/07	23.1				34	110		0.6	1	1
09/11/07	19.5				33	67		0.6		
09/27/07	19				29	52		0.8		2

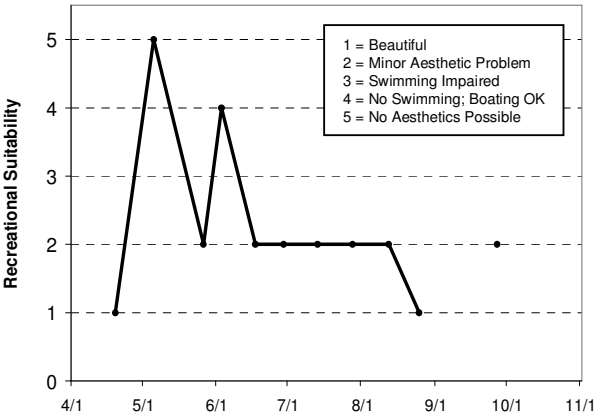


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												D	C	C
Chlorophyll a												D	C	C
Secchi Depth												F	D	D
Overall												**D**	**C**	**C**

Source: Metropolitan Council and STORET data



Cody Lake (66-0061) *Wheatland Township, Rice County*

Cody Lake is located in Wheatland Township in Rice County, and is within the Sand Creek Watershed Management Organization. The lake has a surface area of approximately 256 acres. The maximum depth is 3.7 m (12 feet), and has an average depth of 2.4 m (7.7 feet). The volume of the lake is approximately 78 acre-feet. The entire lake's surface area is considered littoral (the 0-15 foot depth area of aquatic vegetation dominance). Year 2007 was the first year the lake was part of the CAMP. A search of the STORET database showed that the lake was monitored on three dates in 2002 for total phosphorous, chlorophyll-a, and Secchi transparency.

The lake was monitored three times between early-June and early-July 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	300.3	167.0	383.0	F
CLA (µg/l)	98.3	81.0	130.0	F
Secchi (m)	0.3	0.3	0.3	F
TKN (mg/l)	3.70	3.00	4.80	
			Water Quality	F

The water quality for the lake was an F for 2007. The data in the STORET database indicates that the lake received a grade of F for water quality in year 2002 as well.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 2.7 (between 2-"some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 3.3 (between 3- "no swimming - boating ok" and 4-"no swimming; boating ok").

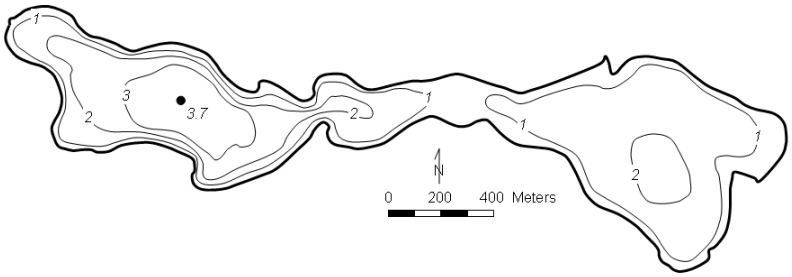
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

Cody Lake

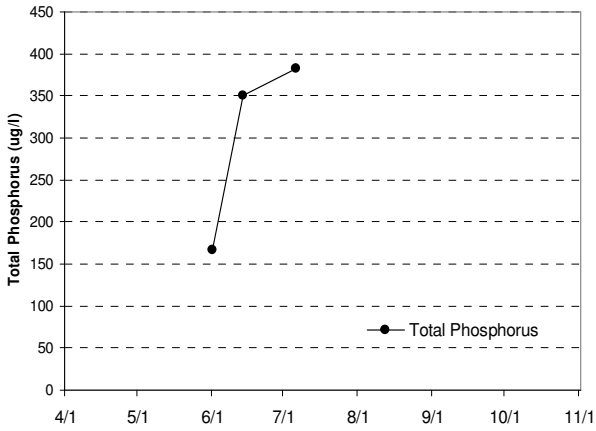
Wheatland Twp., Rice Co.

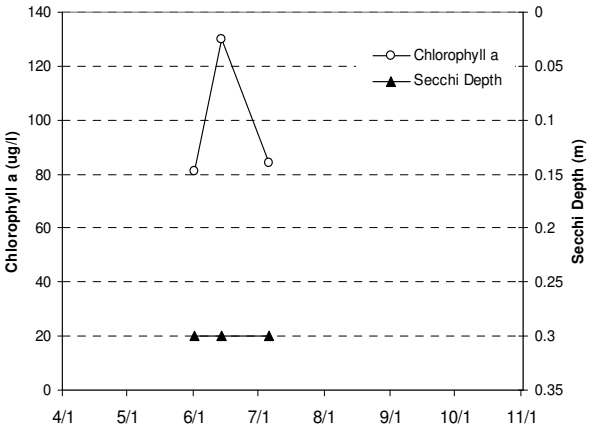
Lake ID: 660061
WD: Sand Creek
Volunteer: Scott County



● Sampling site

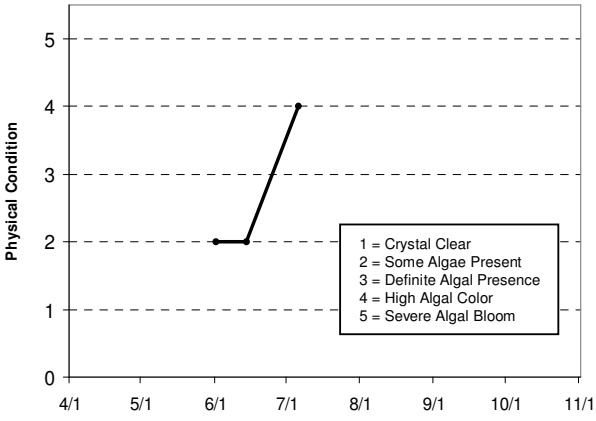
Contours in meters





2007 Data

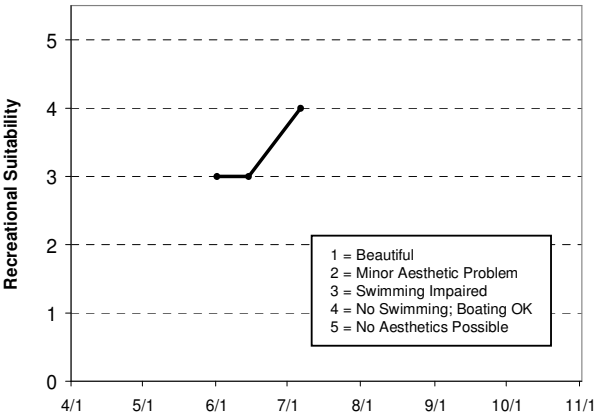
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
06/01/07	22.3				81	167		0.3	2	3
06/14/07	26.6				130	351		0.3	2	3
07/06/07	27.5				84	383		0.3	4	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														F
Chlorophyll a														F
Secchi Depth														F
Overall														**F**



Source: Metropolitan Council and STORET data

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

Colby Lake is located in the City of Woodbury in Washington County. Information from the City of Woodbury revealed that the lake has a surface area of 71 acres and a maximum depth of just 3.4 m (11 feet). The lake's large 8,088-acre contributing watershed results in a large 114:1 watershed-to-lake size ratio. A larger ratio indicates a greater potential for stress on the lake from surface runoff. Because of the shallowness of the lake, its entire area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and the lake does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake has no public access.

Colby Lake's database now includes 14 years of CAMP collected data (1994-2007). As part of the city's involvement in CAMP in 2007, the lake was monitored seven times between late-April and early-October. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	142.6	89.0	215.0	D
CLA (µg/l)	52.6	31.0	100.0	D
Secchi (m)	0.6	0.3	0.9	F
TKN (mg/l)	2.62	1.60	3.10	
			Water Quality	D

No long-term trend is apparent from the lake's water quality database. The lake's water quality seems well represented by an water quality grade of D/F.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 3.6 (3- "definite algae present" and 4-"high algal color"), while the mean recreational suitability ranking was 3.2 (between 3- "no swimming - boating ok" and 4- "no swimming; boating ok").

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) 297-4916 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.

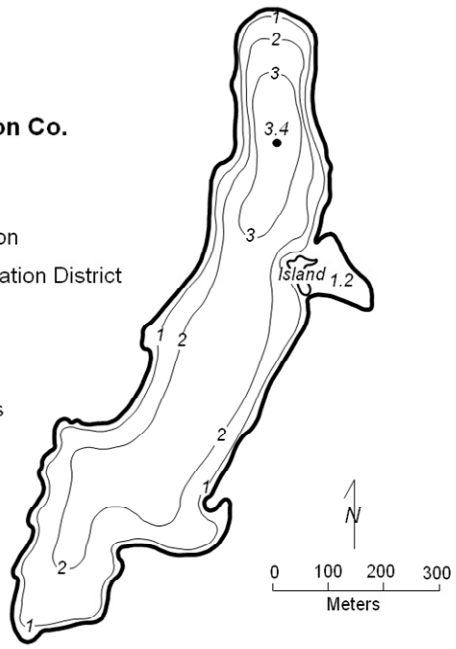
Lake ID: 820094

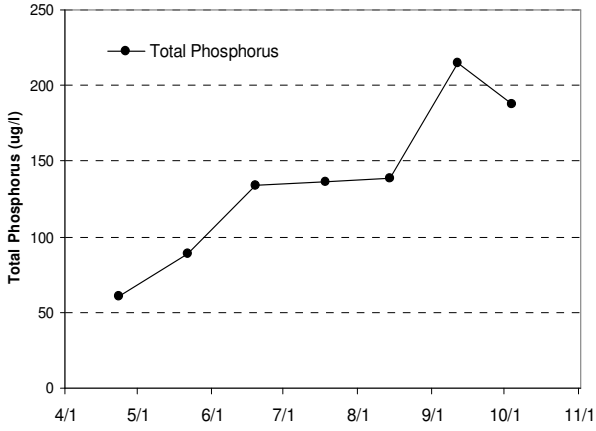
WD: South Washington

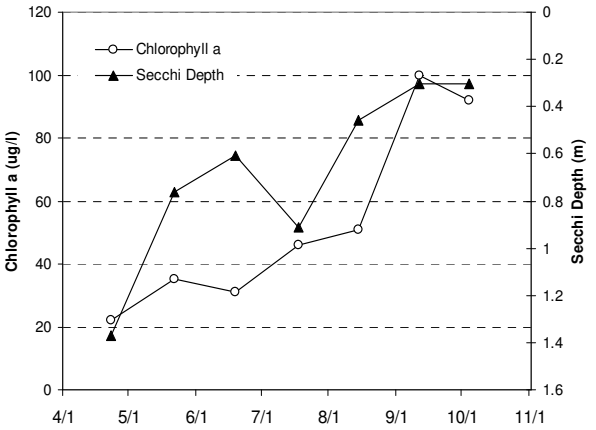
Volunteer: Washington Conservation District

• Sampling site

Contours in meters

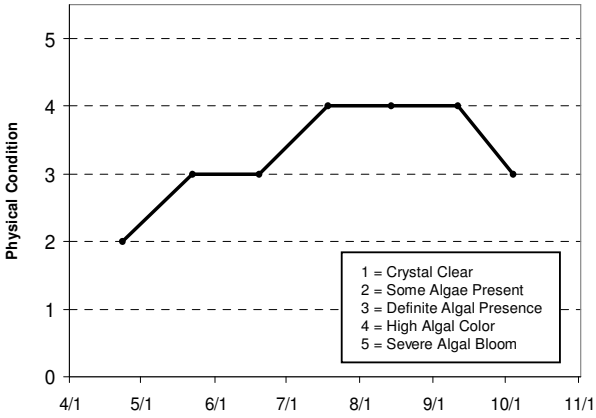






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/23/07	15.5	15.1	9.62	9.18	22	61		1.372	2	4
05/22/07	20.5	20.4	8.92	8.74	35	89		0.762	3	2
06/19/07	27.3	27.2	5.99	5.97	31	134		0.61	3	2
07/18/07	30.6	25.6	12.55	0.89	46	136		0.914	4	4
08/14/07	29.1	27.7	9.44	0.14	51	139		0.457	4	4
09/11/07	23	23.2	8.03	0.22	100	215		0.305	4	4
10/04/07	19	18.9	8.3	0.32	92	188		0.305	3	4

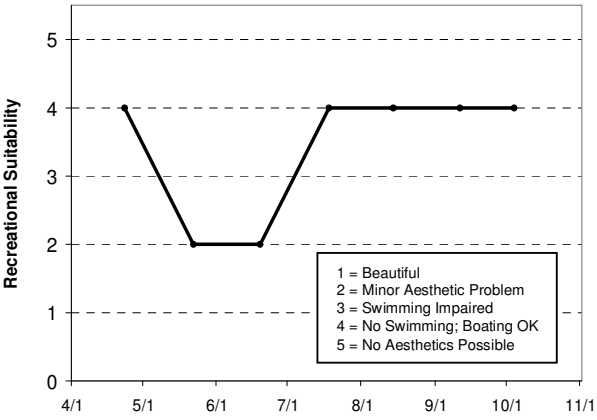


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	D	D	F	F	F	D	D	F	F	F	D	D	F	D
Chlorophyll a	D	F	F	C	F	F	D	F	C	D	C	F	F	D
Secchi Depth	F	F	F	F	F	D	D	D	F	F	F	D	F	F
Overall	**D**	**F**	**F**	**D**	**F**	**D**	**D**	**F**	**D**	**F**	**D**	**D**	**F**	**D**

Source: Metropolitan Council and STORET data



Cornelia Lake (27-0028-01) *Nine Mile Creek Watershed District*

Lake Cornelia is a small shallow lake located within Edina (Hennepin County). There is very little known morphological data available for the lake.

This marks the fourth year in which Lake Cornelia has been involved in CAMP (2003 being the first). In fact, a search through the STORET nationwide water quality database for historic data on the lake produced only the mentioned CAMP collected data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 14 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

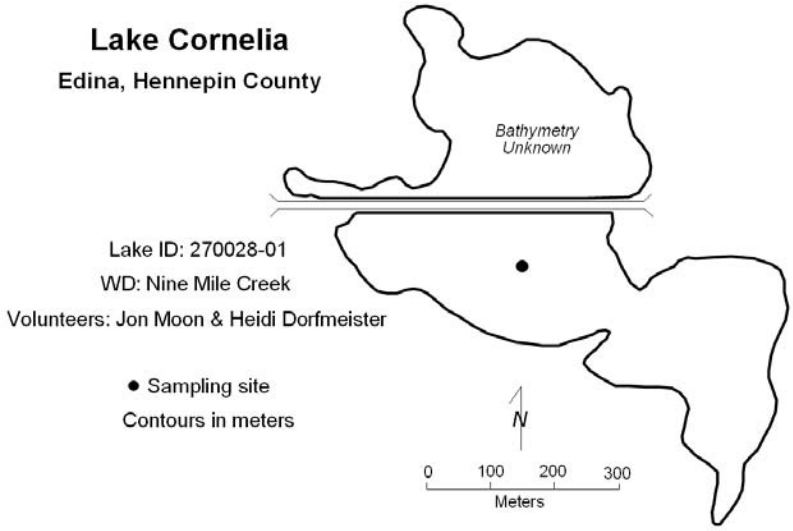
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	216.3	127.0	324.0	F
CLA (µg/l)	89.5	50.0	150.0	F
Secchi (m)	0.3	0.2	0.6	F
TKN (mg/l)	3.10	1.20	5.20	
			Water Quality	F

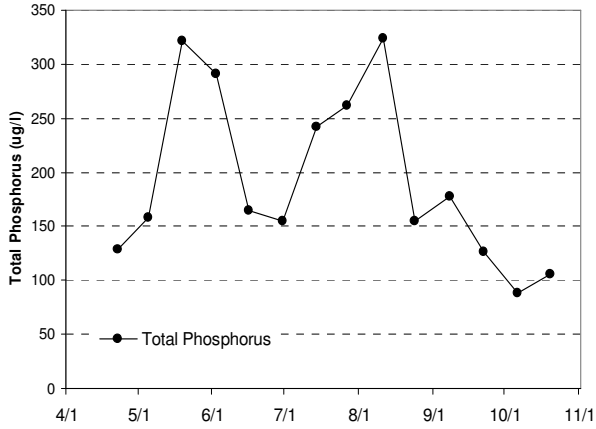
The lakes' 2006 grade of F is similar to those recorded in 2003, 2005, and 2006.

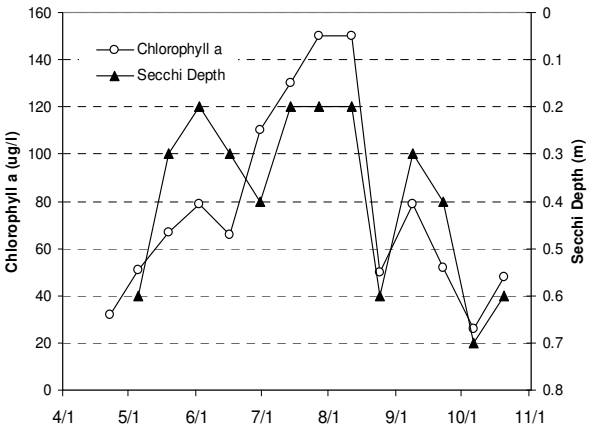
Because of the limitedness of the Lake Cornelia water quality database, it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (between 4- "no swimming – boating ok").

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

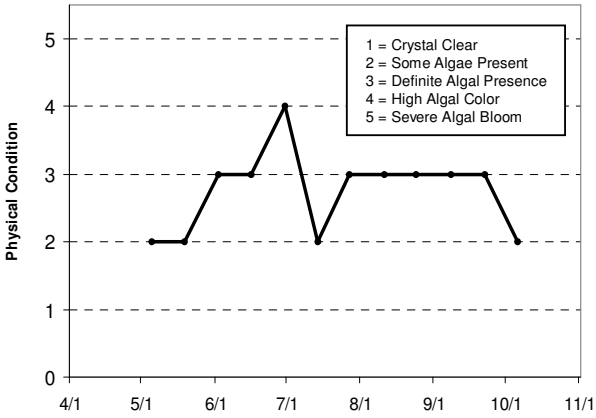






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/22/07	17				32	129				
05/05/07	16				51	158		0.6	2	4
05/19/07	20				67	322		0.3	2	4
06/02/07	22				79	291		0.2	3	4
06/16/07	27				66	165		0.3	3	4
06/30/07	25				110	155		0.4	4	4
07/14/07	24				130	242		0.2	2	4
07/27/07	30				150	262		0.2	3	4
08/11/07	26				150	324		0.2	3	4
08/24/07	23				50	155		0.6	3	4
09/08/07	23				79	178		0.3	3	4
09/22/07	19				52	127		0.4	3	4
10/06/07	20				26	88		0.7	2	4
10/20/07	12				48	106		0.6		4

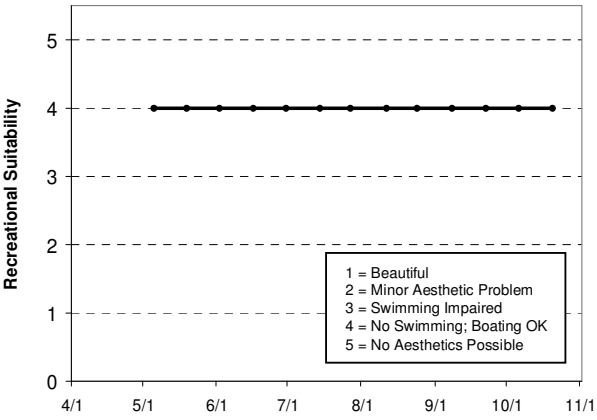


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus										F		F	F	F
Chlorophyll a										F		D	D	F
Secchi Depth										F		F	F	F
Overall										**F**		**F**	**F**	**F**

Source: Metropolitan Council and STORET data



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

Courthouse Lake, located in the City of Chaska (Carver County) is a unique resource in the Twin Cities Metropolitan Area. The lake is only one of six lakes in the seven-county metropolitan area stocked with trout (rainbows). The 10-acre lake (0.6 miles in circumference) has a maximum depth of 17.4 m (57 feet) and only three percent of the lake is considered littoral zone (the 0-15 foot depth zone of the lake dominated by aquatic vegetation). The lake's level is maintained by groundwater. It has a very small watershed that is completely publicly owned (MDNR 1996).

The only data available for Courthouse Lake are a result of CAMP monitoring from 1996-2007. Courthouse Lake was monitored biweekly from mid-April to mid-October 2007 for a total of 13 monitoring events. The data collected by volunteers showed seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability). Results are presented on the lake's information sheet.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	17.5	12.0	30.0	A
CLA (µg/l)	2.2	1.0	3.6	A
Secchi (m)	4.2	3.0	5.0	A
TKN (mg/l)	0.70	0.38	1.20	
			Water Quality	A

The lake's 2006 grade was similar to that of 1996, 1998-2001, and 2003-2006, and better than 1997 and 2002 (grades of B).

No long-term trend is apparent from the lake's water quality database. The lake's water quality seems well represented by a water quality grade of A/B+.

The average user perception rankings, on a 1-to-5 scale, were 1.2 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.2 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

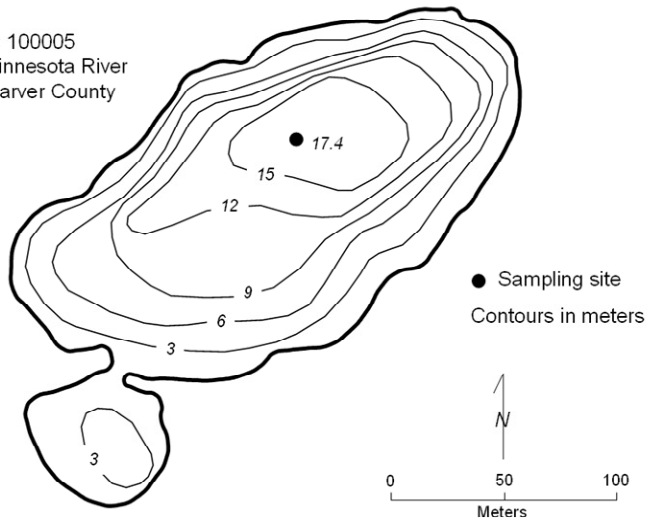
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

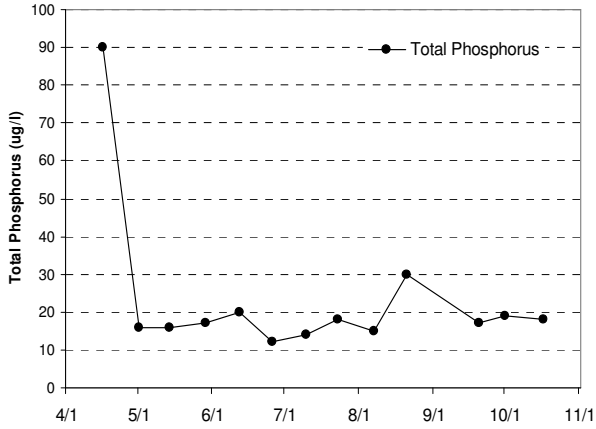
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

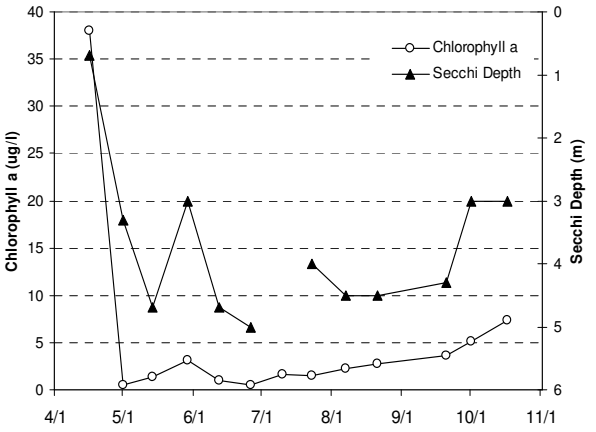
Courthouse Lake

Chaska, Carver Co.

Lake ID: 100005
WD: Lower Minnesota River
Volunteer: Carver County

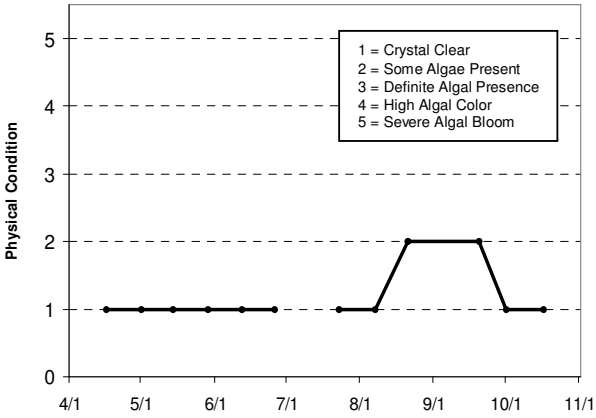






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/16/07	10.74		11.66		38	90		0.7	1	2
05/01/07	17.1		8.8		0.5	16		3.3	1	1
05/14/07	19.62		9.74		1.4	16		4.7	1	1
05/29/07	21.11		10		3.1	17		3	1	1
06/12/07					1	20		4.7	1	1
06/26/07	26.8		11.2		0.5	12		5	1	1
07/10/07					1.6	14				
07/23/07	26.95		8.8		1.5	18		4	1	1
08/07/07	26.58		8.08		2.2	15		4.5	1	1
08/21/07	23.2		8.05		2.8	30		4.5	2	2
09/20/07	20.19		9.43		3.6	17		4.3	2	2
10/01/07			5.82		5.1	19		3	1	1
10/17/07	14.6		10.33		7.4	18		3	1	2

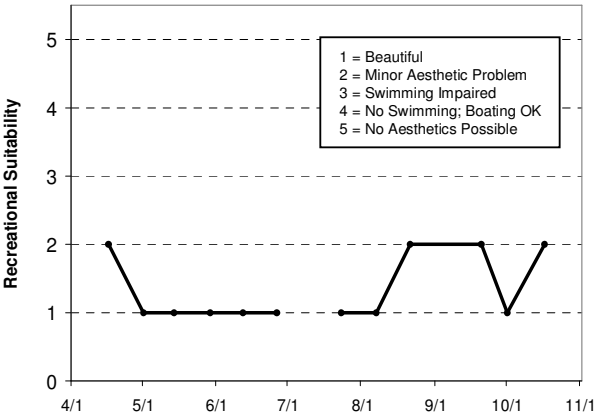


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			A	A	A	A	A	A	B	A	A	A	A	A
Chlorophyll a			A	A	A	A	A	A	A	A	A	A	A	A
Secchi Depth			A	C	A	B	A	A	B	A	B	A	A	A
Overall			**A**	**B**	**A**	**A**	**A**	**A**	**B**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Cowley Lake (27-0169) *Elm Creek Watershed management Commission*

Cowley Lake is a small lake located within Hassan Township (Hennepin County). There is little morphological information available for the water body. 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).

This was the third year that Cowley's Pond has been involved in CAMP. On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored on one day only during the 2007 monitoring season.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	3830.0	3830.0	3830.0	F
CLA (µg/l)	150.0	150.0	150.0	F
Secchi (m)	2.0	2.0	2.0	C
TKN (mg/l)	18.00	18.00	18.00	
			Water Quality	D

The lake's 2007 grade was an F. Cowley Lake had the distinction of having the highest surface water total phosphorus concentration of all the lakes monitored in the 2007 CAMP.

There are no known water quality data available for Cowley Lake other than for the limited data in 1996, 2006, and 2007 CAMP data. Therefore it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.0 for physical condition (2- "some algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

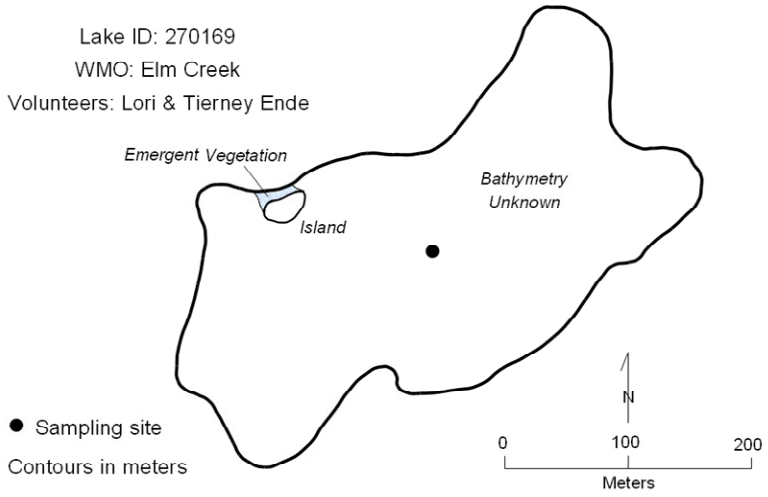
Cowley Lake

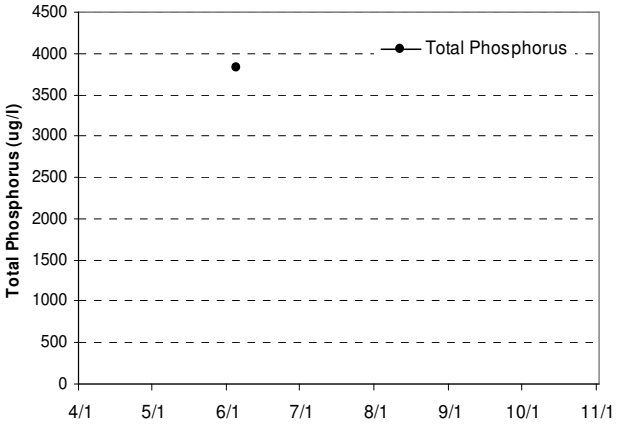
Hassan Twp., Hennepin Co.

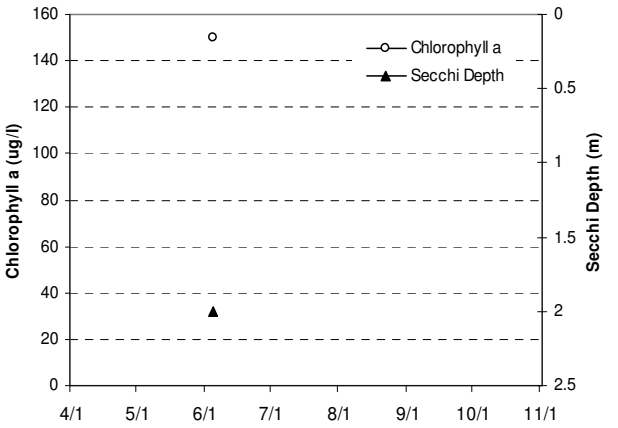
Lake ID: 270169

WMO: Elm Creek

Volunteers: Lori & Tierney Ende

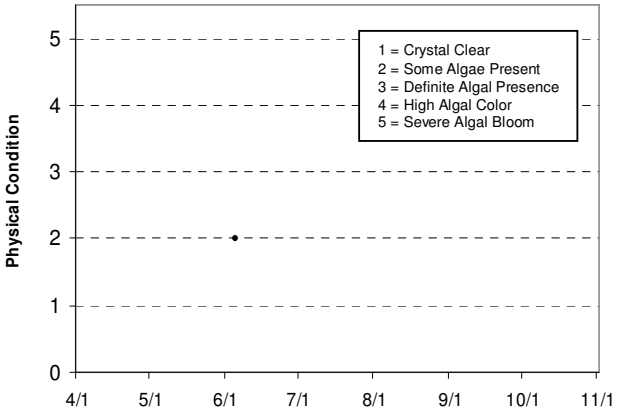






2007 Data

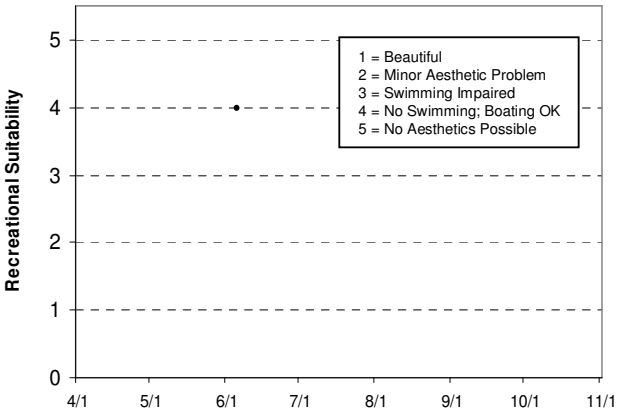
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/05/07	21.9				150	3830		2	2	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F										F	F
Chlorophyll a													F	F
Secchi Depth			D										D	C
Overall													**F**	**D**



Source: Metropolitan Council and STORET data

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

Crystal Lake located mainly in the City of Burnsville (Dakota County) covers an area of 292 acres, with 5.3 miles of shoreline. The maximum and mean depths of the lake are 11.3 m (37 feet) and 3.1 m (10 feet), respectively. The lake's surface area and mean depth translate to an approximate lake volume of 2,920 acre-feet. The lake's watershed covers approximately 2,001 acres of which roughly two-thirds is urban/developed. The watershed and lake surface areas translate to a moderate watershed-to-lake size ratio of 7:1 (the smaller the ratio the less stress on the lake from surface runoff).

Roughly 72 percent of the lake's area is considered littoral (the 0-15 foot depth area of aquatic vegetation dominance). Because of its multi-recreational uses, the lake is considered a "Priority Lake" in the Metropolitan Area. The lake, managed by the MDNR as a panfish lake and stocked with tiger muskellunge, has a public access and fishing pier on its north side and a public swimming beach on its eastern shore. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake.

This was the ninth year that Crystal Lake has been involved in CAMP (1999-2007). A search of the STORET nationwide water quality database for data on the lake revealed an extensive database since the 1980's, with nutrient data available in 1980, 1983, 1989, and 1994-2006. Additionally, Secchi transparency data are available for all years between 1980 and 1999 except 1993.

The lake was monitored 14 times between mid-April and mid-October 2007. Results are presented on graphs and data tables on the following page. During each monitoring event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as its perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

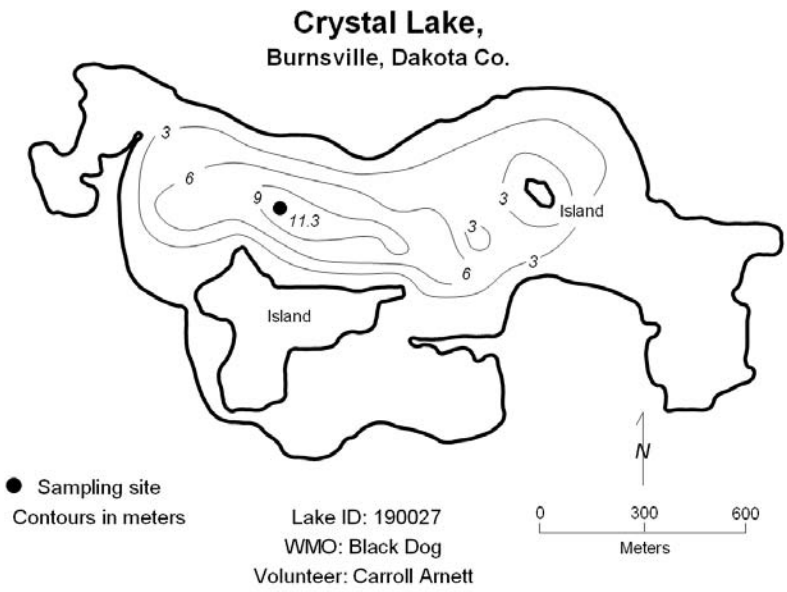
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	38.4	18.0	70.0	C
CLA (µg/l)	20.6	2.1	41.0	C
Secchi (m)	2.0	1.0	3.6	C
TKN (mg/l)	1.62	0.90	2.10	
			Water Quality	C

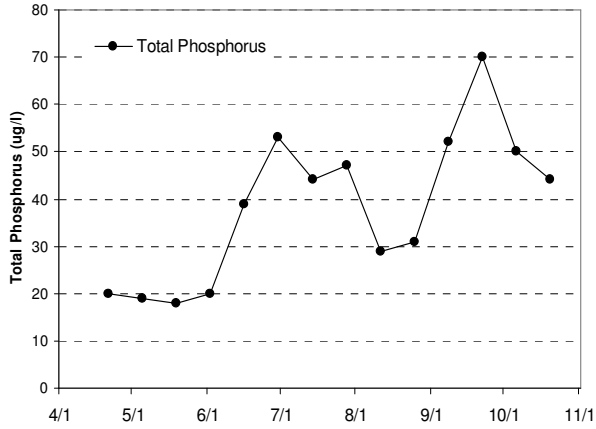
The 2007 grade of a C is similar to those recorded from 1994-2000, and 2002-2006, and worse than the B's recorded in 1983, 1989, and 2001. No long-term trend is apparent from the lake's water quality database. The lake's water quality seems well represented by a water quality grade of C/B-.

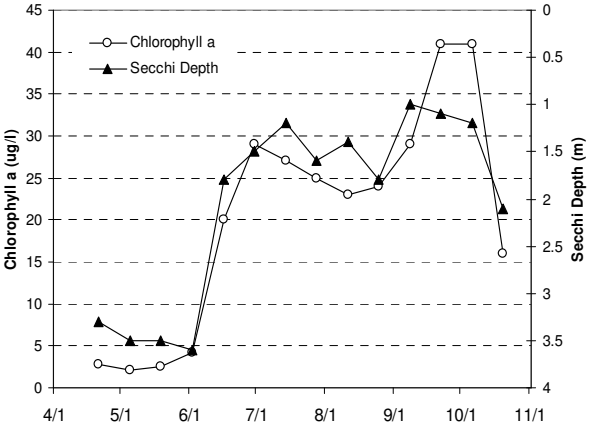
Throughout the monitoring period, the volunteer's opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The average user perception rankings, were 2.4 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

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) 297-4916 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.

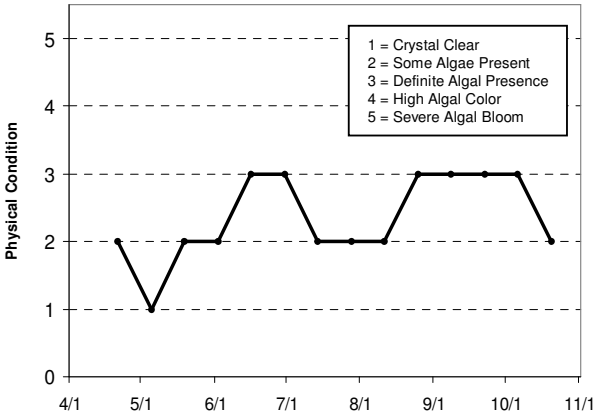






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/21/07	12.5				2.8	20		3.3	2	1
05/05/07	15.3				2.1	19		3.5	1	1
05/19/07	19.3				2.5	18		3.5	2	3
06/02/07	21.6				4.2	20		3.6	2	2
06/16/07	26.2				20	39		1.8	3	2
06/30/07	26.1				29	53		1.5	3	2
07/14/07	24.1				27	44		1.2	2	2
07/28/07	27.6				25	47		1.6	2	2
08/11/07	26.3				23	29		1.4	2	2
08/25/07	22.4				24	31		1.8	3	2
09/08/07	24.4				29	52		1	3	2
09/22/07	19.2				41	70		1.1	3	2
10/06/07	20.5				41	50		1.2	3	2
10/20/07	13.8				16	44		2.1	2	1

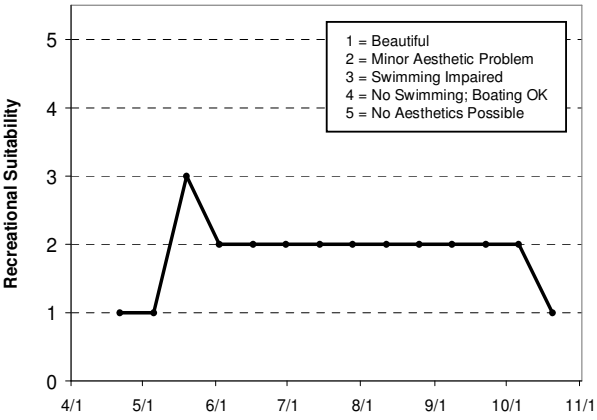


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	C		C						B				
Chlorophyll a	C			B				C		B				
Secchi Depth	C	C	C	B	C	B	B	C	C	B	C	B	B	
Overall	**C**			**B**						**B**				

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C	C	C	C	C	B	C	C	C	C	C	C
Chlorophyll a	B	C	C	C	C	B	C	B	B	C	B	C	C	C
Secchi Depth	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Overall	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**B**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Dean Lake (70-0074) *City of Shakopee*

Dean Lake is a small shallow lake located within City of Shakopee (Scott County). There is very little known morphological data available for the lake. Because of the shallowness of the lake, its entire area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and the lake does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

This was the sixth year in which Dean Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Thus, 2002-2007 are the only years of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored nine times between mid-May and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

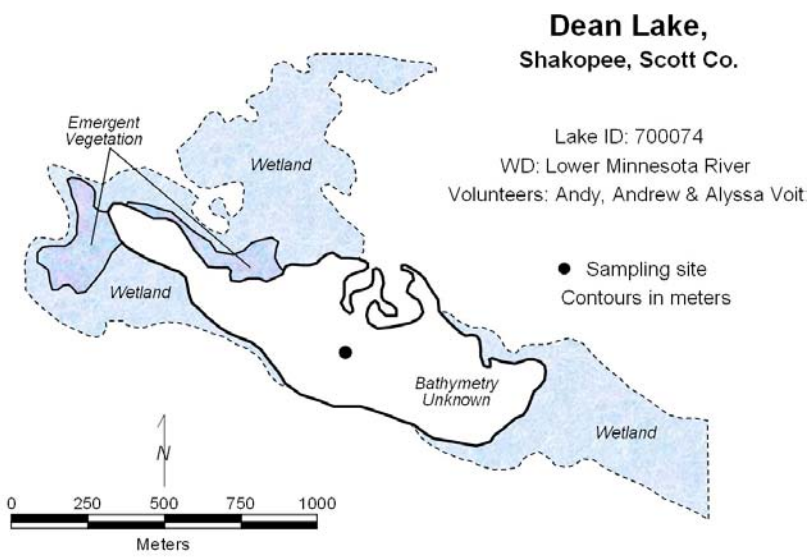
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	250.9	45.0	409.0	F
CLA (µg/l)	53.6	1.1	170.0	D
Secchi (m)	0.5	0.3	0.7	F
TKN (mg/l)	2.40	1.20	4.30	
			Water Quality	F

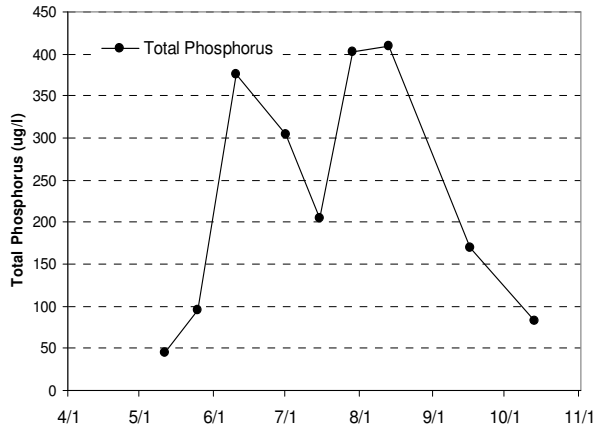
The difference between the TP, CLA and Secchi grades in current and past years (see report grade on the lake's information page), may indicate that suspended sediments may play a large role in the inner workings of the lake. This scenario can be fairly typical for shallow lakes where wind action and storm sewer inflow either increase the influx of sediments to the system or cause the re-suspension of existing bottom sediments. That is, the suspended sediments influence the lake's phosphorus make-up (a larger portion of the in-lake phosphorus in particulate form rather than a soluble form more readily available for algal uptake), reduce water clarity, and could actually be limiting the amount of light available for algal growth, thus keeping the CLA concentrations down (resulting in a better than expected grade).

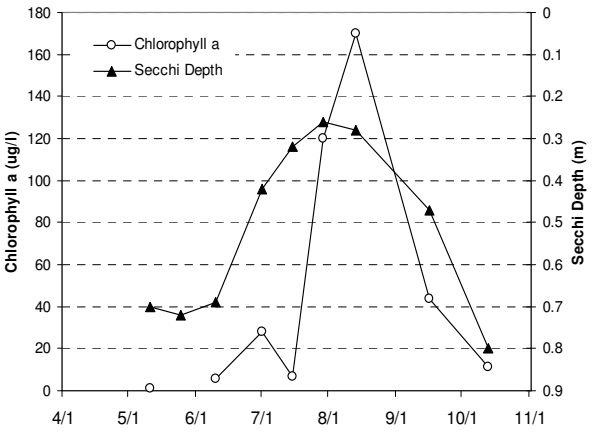
As mentioned earlier, there are no water quality data available for Dean Lake other than the 2002-2007 CAMP data. Therefore there is not enough data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 3.4 for recreational suitability (between 3- "swimming slightly impaired"4- "no swimming – boating ok").

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

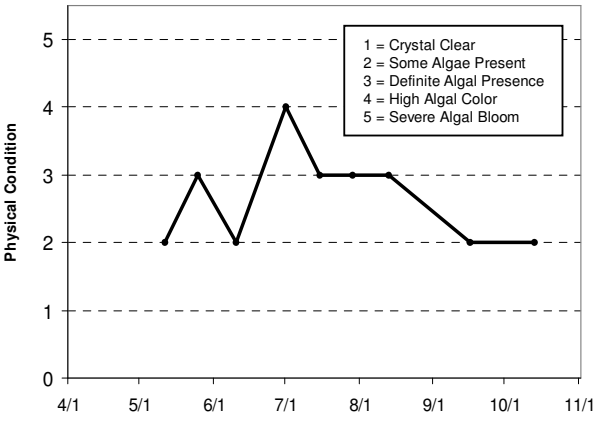






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/11/07	22.5				1.1	45		0.7	2	2
05/25/07	20					96		0.72	3	4
06/10/07	24.2				5.6	376		0.69	2	4
07/01/07					28	304		0.42	4	4
07/15/07					6.5	204		0.32	3	4
07/29/07	32.3				120	403		0.26	3	4
08/13/07	28.5				170	409		0.28	3	4
09/16/07	20.4				44	170		0.47	2	1
10/13/07	12.7				11	83		0.8	2	1

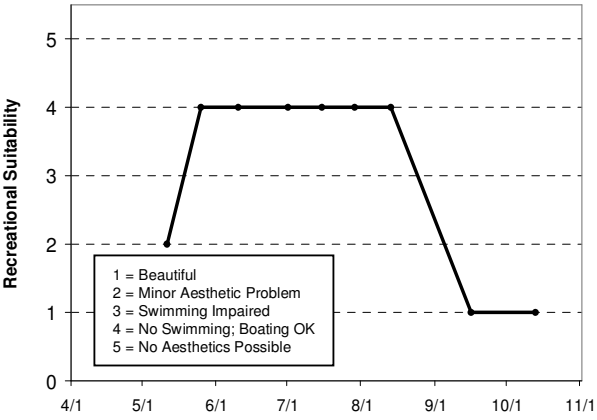


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									F	F	D	F	F	F
Chlorophyll a									D	C	B	C	D	D
Secchi Depth									F	F	F	F	F	F
Overall									**F**	**D**	**D**	**D**	**F**	**F**

Source: Metropolitan Council and STORET data



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

Lake DeMontreville, located in Lake Elmo (Washington County), has public access on its northwestern side, and is considered a "Priority Lake" due to its multi-recreational uses. The 160-acre lake has a mean and maximum depth of 2.4 m (~8 feet) and 7.3 m (24 feet). Roughly 90 percent of the lake's area is considered littoral zone (the 0-15 foot depth area of aquatic vegetation dominance). The lake's size and mean depth results in an approximate lake volume of 1,280 ac-ft.

The lake's surface area and watershed size (1,108 acres) translates to a 7:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the fifth year that Lake DeMontreville has been involved in CAMP. The lake has been monitored in the past by Council staff (most recently in 2003). A search of the STORET nationwide water quality database for data on the lake revealed a moderate database since the 1980's with nutrient and Secchi transparency data available in 1980, 1984, 1991, 1993, 1995, 2000 and 2003-2006. Additionally, Secchi transparency data are available for 1985-1986, and 1988-1989.

The lake was monitored 11 times between late-April and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

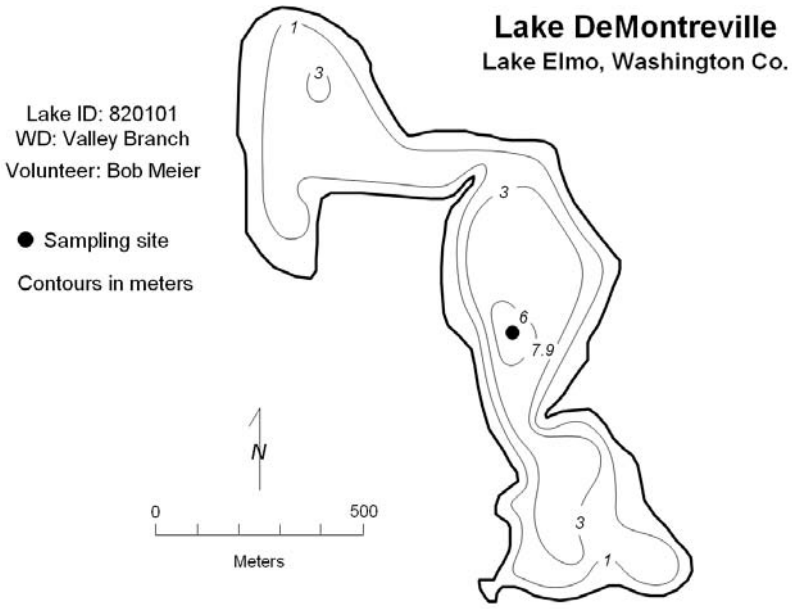
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	30.5	9.0	50.0	B
CLA (µg/l)	21.9	1.7	55.0	C
Secchi (m)	2.1	0.7	4.0	C
TKN (mg/l)	1.95	0.67	2.50	
			Water Quality	C

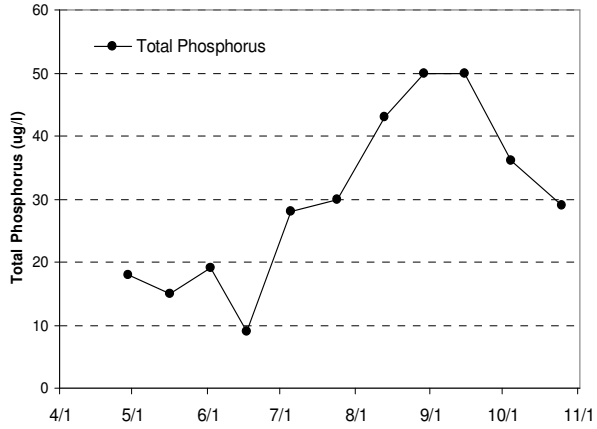
The grade for the lake in 2007 was a C. Historically, 1980-2005 lake quality grades for Lake DeMontreville (see lake information sheet on the following page) show that the quality of the lake has improved over the past 25 years. The grades in 1980, 1984, and 1991 were all C. However year 2007 showed a downward departure in water quality as reflected in this year's grade of C. The grades in 1993, 1995, and 2005 were B, and the grades for 2000, and 2003-2004 were A. A recent MPCA conducted trend analysis on the lake's Secchi transparency data, revealed a statistically significant improvement in recent water clarity.

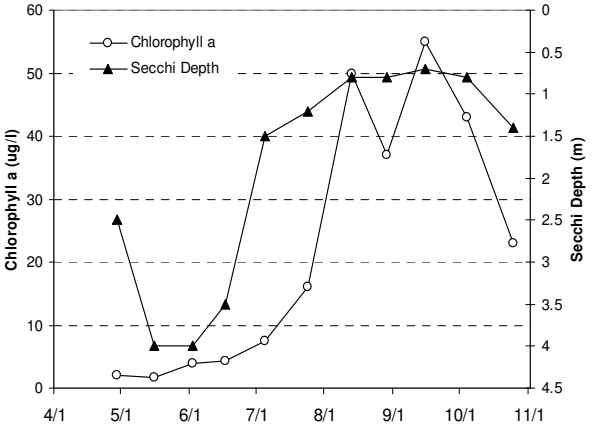
The graphs showing the volunteer's perceptions of the lake's physical condition and recreational suitability seem somewhat correlated to the other graphs for this lake. The better the lake's clarity (also relating to lower TP and CLA concentrations), the better the lake's perceived physical condition and recreational suitability. The summertime mean recorded physical condition was 2.0 on a 1 to 5 ranking scale shown on the lake information sheet (2- "some algae present"). The mean suitability for recreation ranking, also on a 1-to-5 scale, was 1.2 (between 1- "beautiful" and 2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

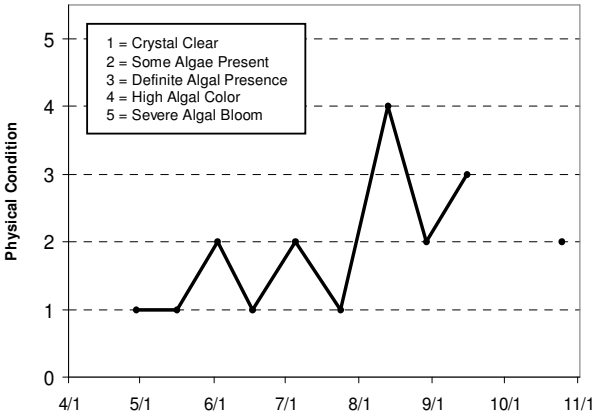






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/29/07	16.9				2	18		2.5	1	1
05/16/07	19				1.7	15		4	1	1
06/02/07	21.7				3.9	19		4	2	
06/17/07	27.1				4.3	9		3.5	1	1
07/05/07	26.3				7.4	28		1.5	2	1
07/24/07	28				16	30		1.2	1	1
08/13/07	27				50	43		0.8	4	
08/29/07	24.3				37	50		0.8	2	1
09/15/07	18.5				55	50		0.7	3	2
10/04/07	18.5				43	36		0.8		
10/25/07	11.8				23	29		1.4	2	1

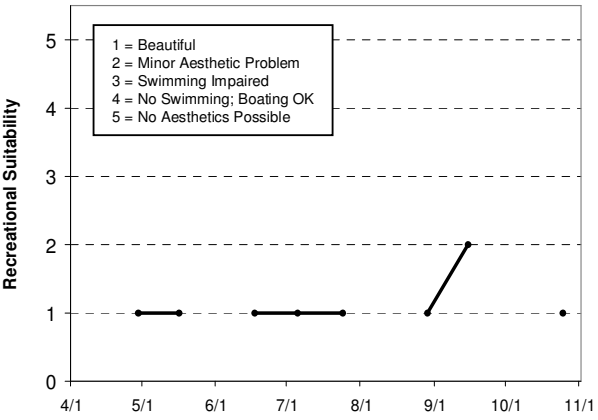


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C				C							B		B
Chlorophyll a	C				C							C		A
Secchi Depth	C				C	C	C		C	D		C		B
Overall	**C**				**C**							**C**		**B**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C					A			A	A	B	C	B
Chlorophyll a		B					A			B	A	B	B	C
Secchi Depth		B					A			A	B	A	B	C
Overall		**B**					**A**			**A**	**A**	**B**	**B**	**C**

Source: Metropolitan Council and STORET data



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

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.

This was the seventh year in which Downs Lake has been involved in CAMP. The lake was monitored 5 times between late-May and early-September 2007.A search through the STORET nationwide water quality database for data on the lake resulted in no data other than that collected through CAMP. Thus, 1999 and 2001-2007 are the only years where data are available. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	172.8	75.0	287.0	F
CLA (µg/l)	98.8	20.0	170.0	F
Secchi (m)	0.3	0.2	0.6	F
TKN (mg/l)	3.20	2.00	4.90	
			Water Quality	F

The water quality grade was F. The lake's 2007 water quality grade is similar to that recorded in 2001-2002 and 2004, and worse than those of 1999, 2003 and 2005 (grade of D).

As mentioned earlier, there are no water quality data available for Downs Lake other than the 1999 and 2001-2007 CAMP data. Therefore there are not enough data to determine long-term trends. In the short-term, the lake seems to fluctuate between grades of D/F. 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 and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The average user perception rankings, were 2.6 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming - boating ok").

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

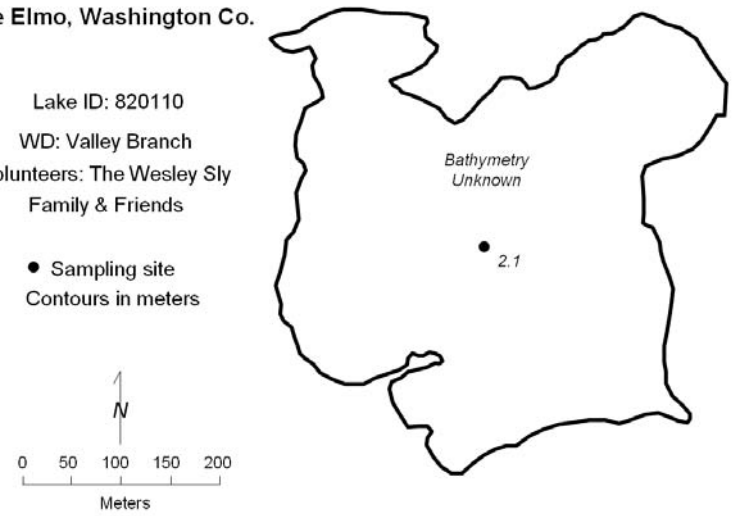
Downs Lake

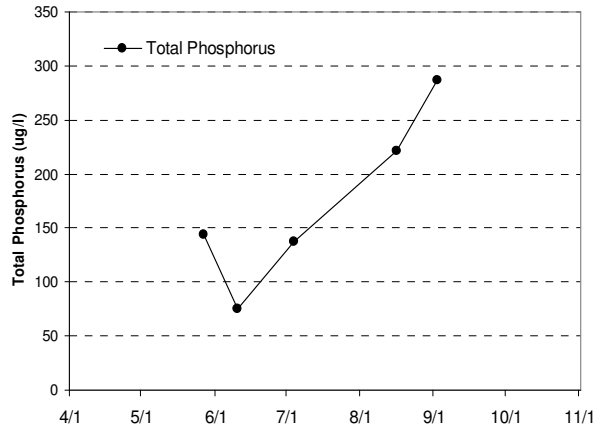
Lake Elmo, Washington Co.

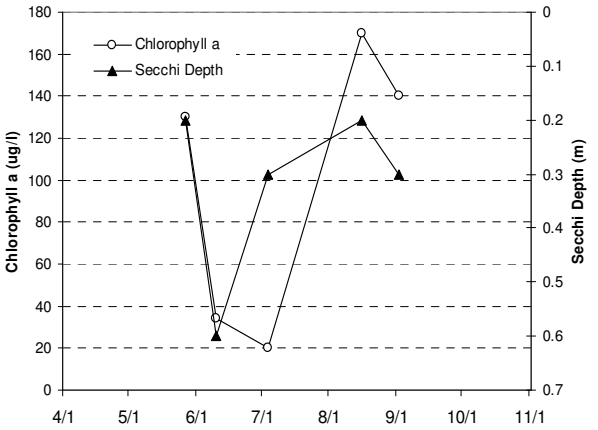
Lake ID: 820110

WD: Valley Branch

Volunteers: The Wesley Sly Family & Friends

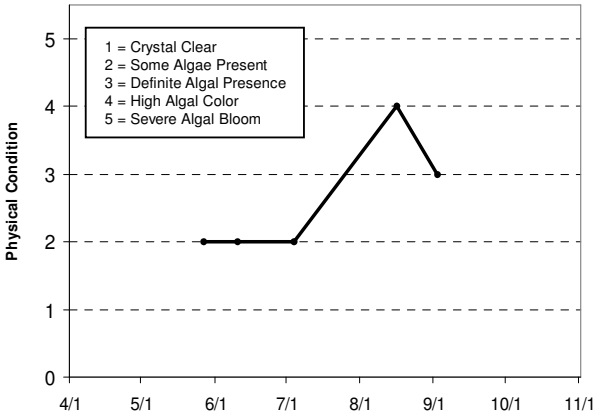






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/27/07	21				130	144		0.2	2	4
06/10/07	25.6				34	75		0.6	2	4
07/04/07	28.2				20	137		0.3	2	4
08/16/07	27				170	221		0.2	4	4
09/02/07	28.3				140	287		0.3	3	4

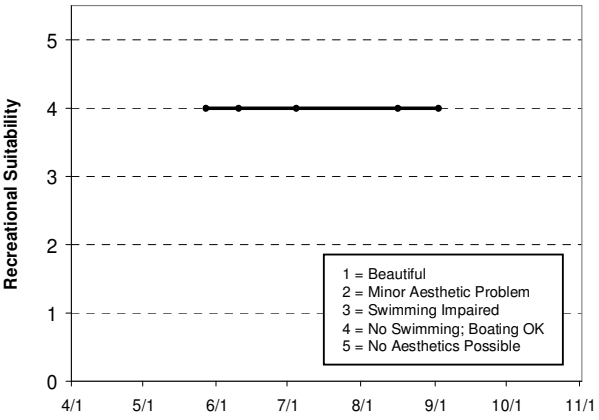


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D		D	F	D	F	D	F	F
Chlorophyll a						D		F	F	C	D	D	F	F
Secchi Depth						D		F	F	F	F	F	F	F
Overall						**D**		**F**	**F**	**D**	**F**	**D**	**F**	**F**

Source: Metropolitan Council and STORET data



Eagle Lake [Carver County] (10-0121) *Carver County Environmental Services*

Eagle Lake is located in Young America Township in Carver County. The lake has a surface area of 233-acres, and a maximum and mean depth of 7.9 m (26 feet) and 1.2 m (4 feet), respectively. Because of the shallowness of the lake, the entire area is considered littoral, (the shallow [0-15 foot depth] area dominated by aquatic vegetation) and does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

The lake has a 1,050-acre immediate watershed, which translates to a watershed-to-lake area ratio of 4.5:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: two percent residential, 63 percent agricultural, and 35 percent open/undeveloped (Carver County Planning 1999).

This was the ninth year that Eagle Lake has been involved in CAMP, although it has been previously monitored by Council staff (as recently as 2004). The lake was monitored 13 times between mid-April and mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	199.0	93.0	341.0	F
CLA (µg/l)	87.2	20.0	260.0	F
Secchi (m)	0.6	0.2	1.2	F
TKN (mg/l)	2.30	1.60	3.60	
			Water Quality	F

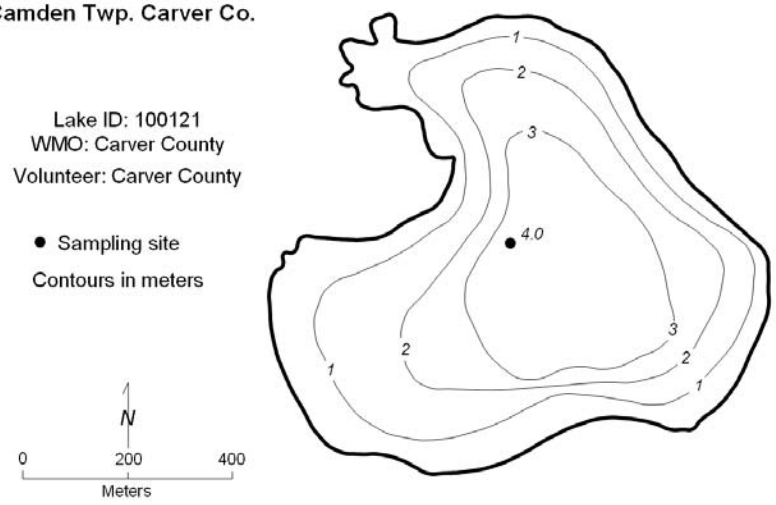
The lake's 2007 water quality grade (F) is similar to that recorded in 1985, 2002, and 2006, and worse than that recorded (D) in 1980-1981, 1996, 1998-2001, 2003-2004, and in 2005 (grade of C).

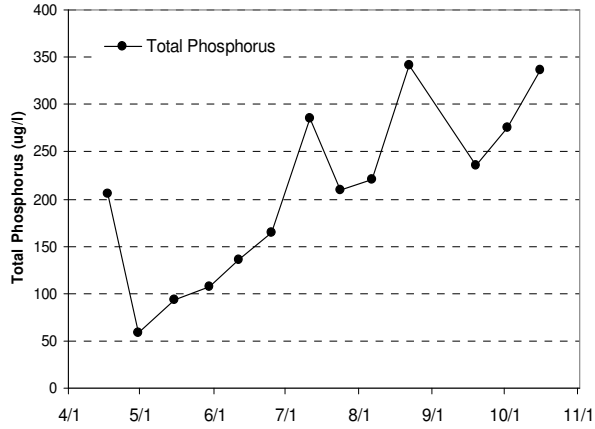
The perceived physical and recreational conditions of the lake, recorded by the volunteers, were ranked on a 1-to-5 scale. The rankings are shown in both tabular and graphical form on the lake's associated information sheet. The mean physical condition ranking was 3.4 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.2 (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

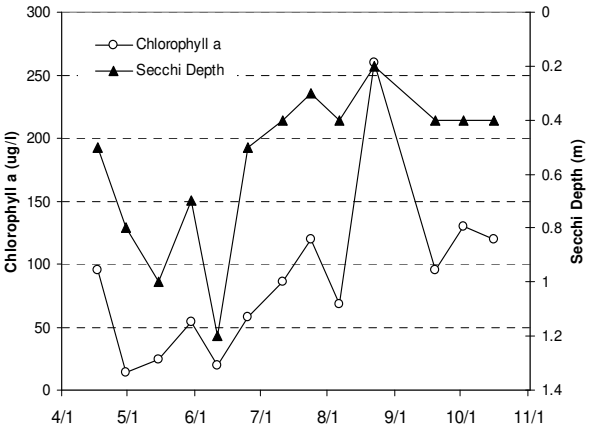
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

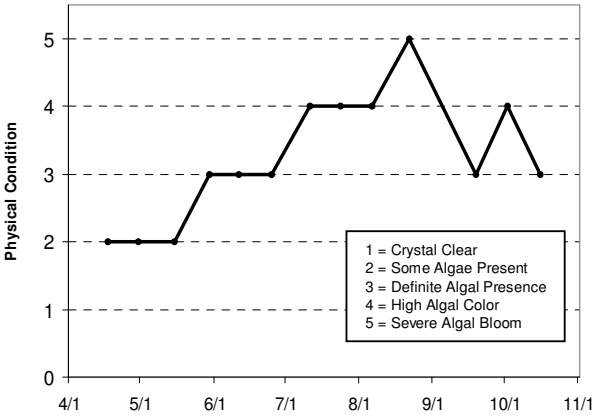






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/17/07	8.64		16.66		95	205		0.5	2	2
04/30/07	16.08		10.04		14	58		0.8	2	2
05/15/07	18.43		7.02		24	93		1	2	2
05/30/07	20.25		10.82		54	107		0.7	3	2
06/11/07					20	136		1.2	3	3
06/25/07	24.1		6		58	164		0.5	3	3
07/11/07					86	285		0.4	4	4
07/24/07	25.9		13.69		120	209		0.3	4	4
08/06/07	24.2		6		68	220		0.4	4	4
08/22/07	22.06		10.88		260	341		0.2	5	4
09/19/07	18.24		8.44		95	236		0.4	3	3
10/02/07	18.97		11.31		130	275		0.4	4	3
10/16/07	11.71		5.32		120	336		0.4	3	3

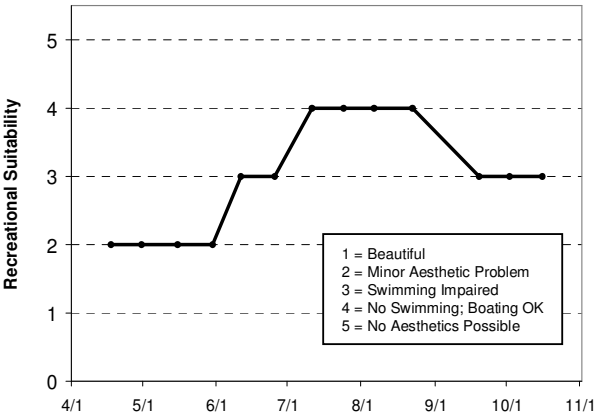


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	F	F				F								
Chlorophyll a	D	C				F								
Secchi Depth	C	C				F								
Overall	**D**	**D**				**F**								

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F		F	F	F	F	F	F	F	D	F	F
Chlorophyll a			C		C	C	C	D	D	C	C	C	F	F
Secchi Depth			B		C	B	C	D	F	D	D	C	D	F
Overall			**D**		**D**	**D**	**D**	**D**	**F**	**D**	**D**	**C**	**F**	**F**

Source: Metropolitan Council and STORET data



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

Eagle Point Lake is an approximate 120-acre lake located within the City of Lake Elmo (Washington County). The mean and maximum depths of the lake are 0.9 m (3 feet) and 1.8 m (roughly 6 feet), respectively. The lake's size and mean depth results in an approximate lake volume of 360 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 11,502-acre watershed translates to a large watershed-to-lake size ratio of 96:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the third year that Eagle Point has been involved in CAMP (1993 being the other). On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 2 times in 2007, once in late-June and once in early-October 2007. Low lake water levels prevented access to open water for most of the year because of drought conditions.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	859.8	602.0	1,320.0	F
CLA (µg/l)	115.5	4.8	260.0	F
Secchi (m)	0.1	0.1	0.2	F
TKN (mg/l)	8.35	6.80	11.00	
			Water Quality	F

Eagle Point Lake received an water quality grade of F in 2007 which is similar to last year's grade of F.

Other than for the 1993, 2006, and 2007 CAMP data, there are no known water quality data available for Eagle Point Lake. Therefore there is not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 5.0 for physical condition (5- "severe algal bloom"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

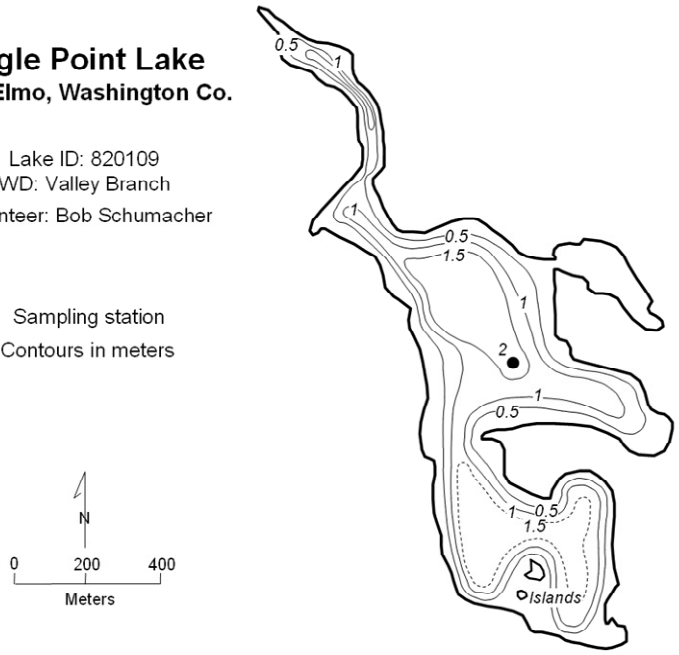
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

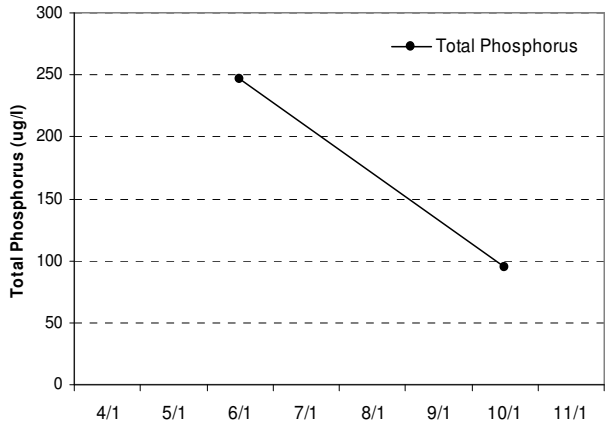
Eagle Point Lake

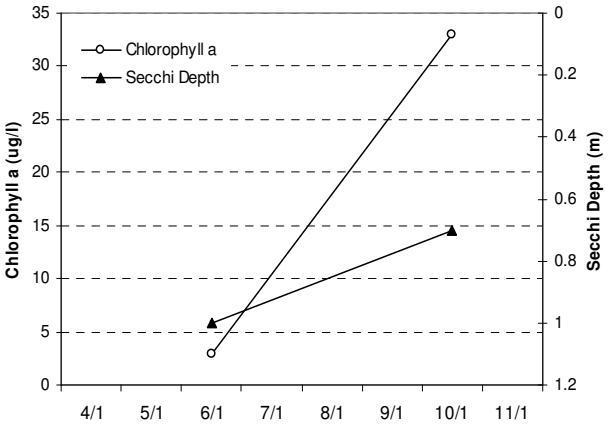
Lake Elmo, Washington Co.

Lake ID: 820109
WD: Valley Branch
Volunteer: Bob Schumacher

● Sampling station
Contours in meters

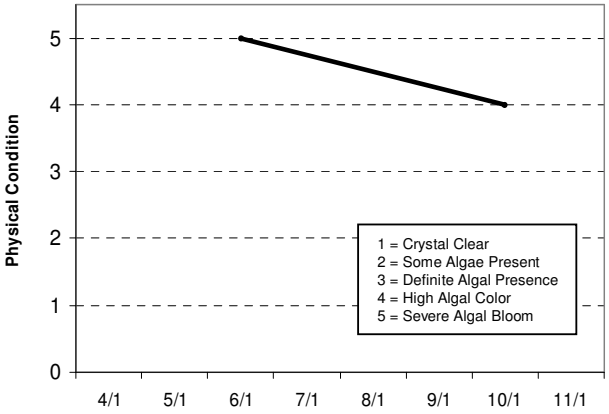






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/26/07	25.8				2.9	246		1	5	4
10/11/07	11.6				33	95		0.7	4	4

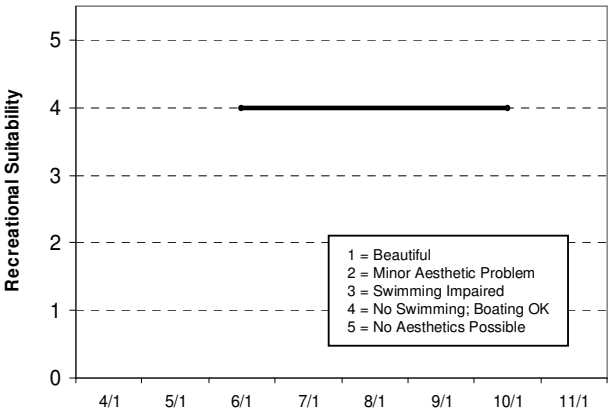


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														F
Chlorophyll a														
Secchi Depth														F
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													F	F
Chlorophyll a													F	A
Secchi Depth													F	D
Overall													**F**	**C**

Source: Metropolitan Council and STORET data



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

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.

Earley Lake has been enrolled in CAMP since 1994. The lake was monitored 12 times between mid-April and mid-October 2007. On each sampling date the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	39.3	22.0	75.0	C
CLA (µg/l)	15.0	3.1	50.0	B
Secchi (m)	1.5	0.8	2.1	C
TKN (mg/l)	1.31	0.43	3.70	
			Water Quality	C

The lake's water quality grade for 2006 was its best recorded grade to date. For year 2007, the lake water quality grade returned to the grades it has typically received in the past, that is, grades of C from 1994-2005.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean physical condition ranking was 2.1 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 4.0 (4- "no swimming – boating ok").

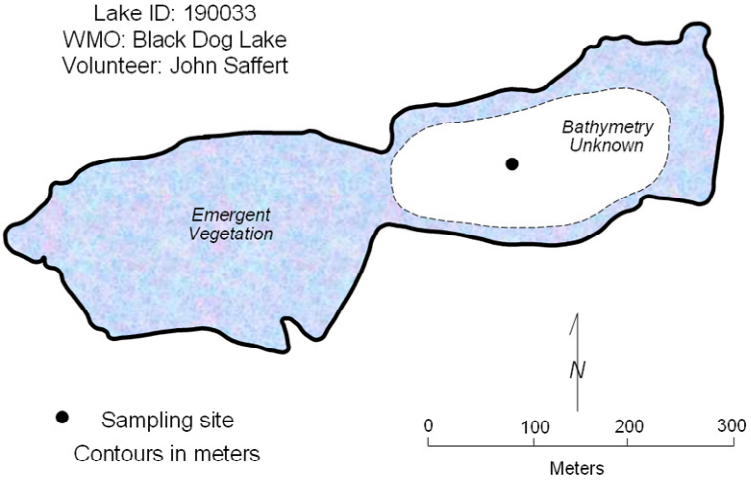
Statistical analysis on the lake's water quality database did not detect any long-term trends, in the short-term however, the lake seems to be very well represented by an water quality grade of C/C+. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

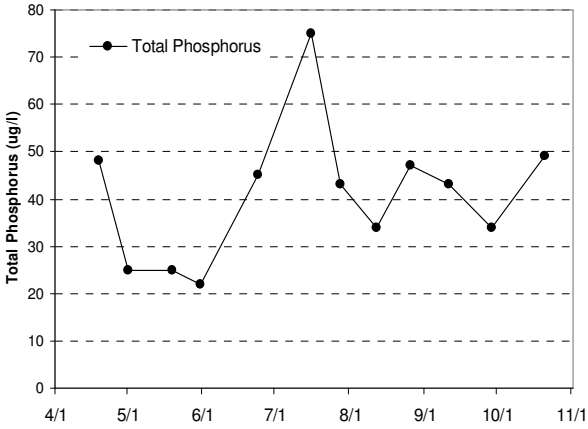
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

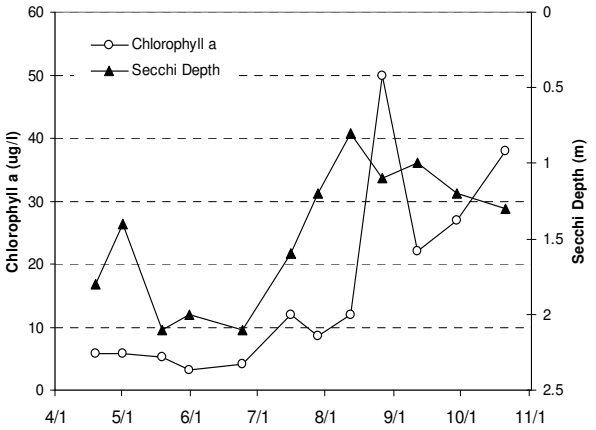
Earley Lake

Burnsville, Dakota Co.

Lake ID: 190033
WMO: Black Dog Lake
Volunteer: John Saffert

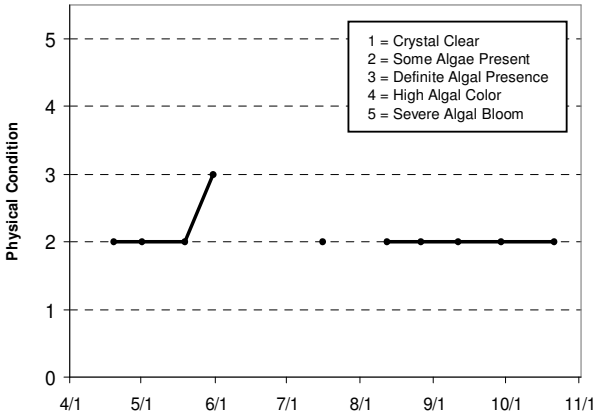






2007 Data

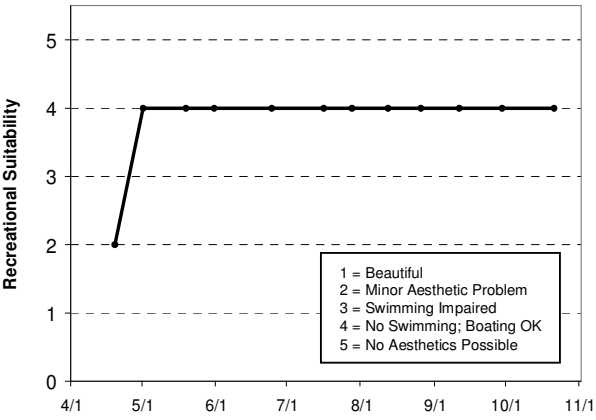
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/19/07	15.5				5.8	48		1.8	2	2
05/01/07	19.7				5.8	25		1.4	2	4
05/19/07					5.2	25		2.1	2	4
05/31/07					3.1	22		2	3	4
06/24/07	28.1				4.1	45		2.1		4
07/16/07	27.3				12	75		1.6	2	4
07/28/07	30.5				8.6	43		1.2		4
08/12/07	26.8				12	34		0.8	2	4
08/26/07	24.3				50	47		1.1	2	4
09/11/07	20.6				22	43		1	2	4
09/29/07	17.8				27	34		1.2	2	4
10/21/07	13.1				38	49		1.3	2	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Chlorophyll a	B	B	B	B	B	B	B	B	B	B	B	B	A	B
Secchi Depth	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Overall	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**B**	**C**



Source: Metropolitan Council and STORET data

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

East Lake is a small lake located in Lakeville (Dakota County). There is very little morphological data available for the lake.

This marks the third year in which East Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, 2005-2007 are the only years where water quality data are available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 14 times between mid-April and late October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

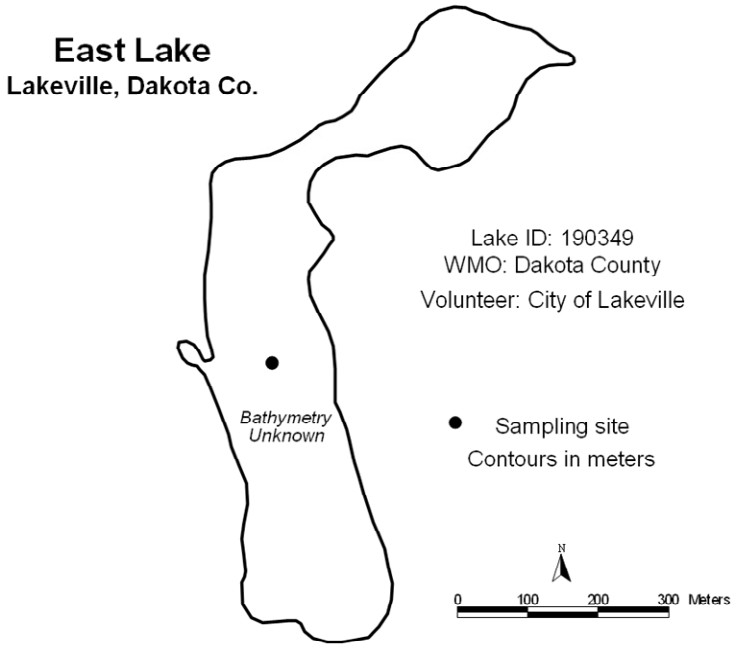
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	233.6	89.0	452.0	F
CLA (µg/l)	153.8	61.0	520.0	F
Secchi (m)	0.3	0.2	0.5	F
TKN (mg/l)	2.75	0.71	5.00	
			Water Quality	F

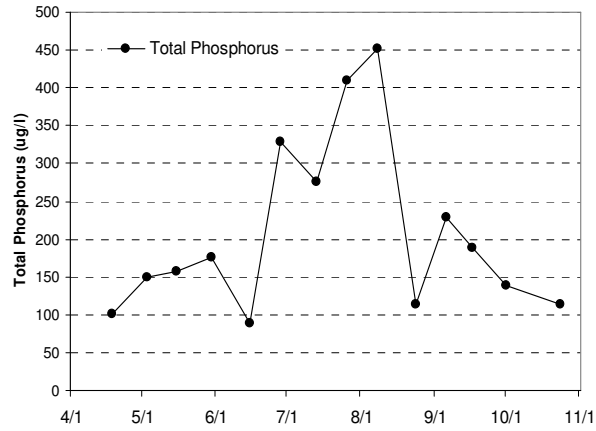
The water quality grade of F for 2007 is similar to the F grade received in 2005.

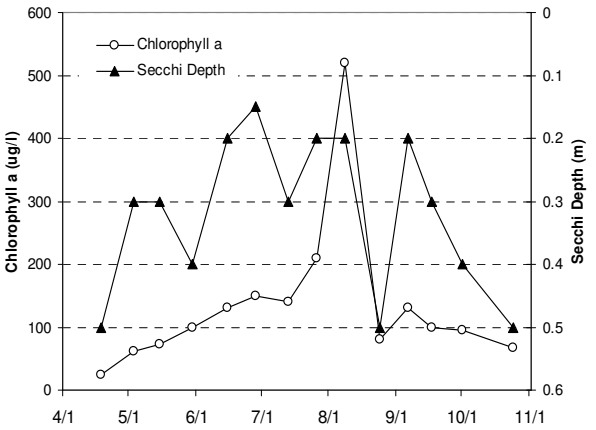
Throughout the monitoring period, the volunteers ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 3.8 (between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming - boating ok").

Because of the limitedness of the lake's water quality database, it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

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

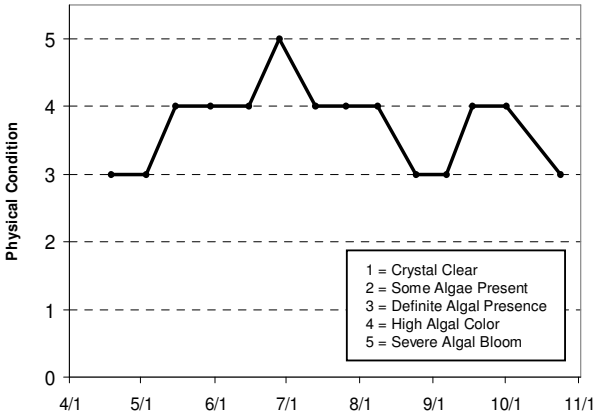






2007 Data

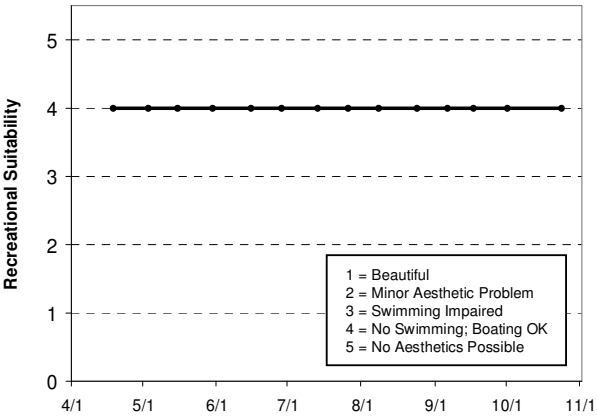
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/18/07	15.6				24	102		0.5	3	4
05/03/07	17.8				61	150		0.3	3	4
05/15/07	20				72	157		0.3	4	4
05/30/07	21.1				100	176		0.4	4	4
06/15/07	27.8				130	89		0.2	4	4
06/28/07	26.1				150	329		0.15	5	4
07/13/07	26.1				140	275		0.3	4	4
07/26/07	26.7				210	410		0.2	4	4
08/08/07	28.9				520	452		0.2	4	4
08/24/07	20				80	114		0.5	3	4
09/06/07	26.7				130	229		0.2	3	4
09/17/07	15.6				99	189		0.3	4	4
10/01/07	16.7				95	139		0.4	4	4
10/24/07	12.2				68	113		0.5	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												F	NA	F
Chlorophyll a												F	NA	F
Secchi Depth												F	NA	F
Overall												**F**		**F**



Source: Metropolitan Council and STORET data

East Boot Lake (82-0034) *Carnelian - Marine Watershed District*

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. The lake's size and mean depth results in an approximate lake volume of 282 ac-ft. Because of the overall shallowness of the lake, roughly 82 percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance), the majority of the lake does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake's small 93-acre immediate watershed translates to a small watershed-to-lake size ratio of 2:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the seventh year that East Boot Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake revealed historical data for 1996-2005 and now 2006.

The lake was monitored 7 times between mid-April and early-October 2007.On each sampling date, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.6	21.0	78.0	C
CLA (µg/l)	16.4	1.7	36.0	B
Secchi (m)	3.5	1.4	7.6	A
TKN (mg/l)	1.22	0.78	1.60	
			Water Quality	B

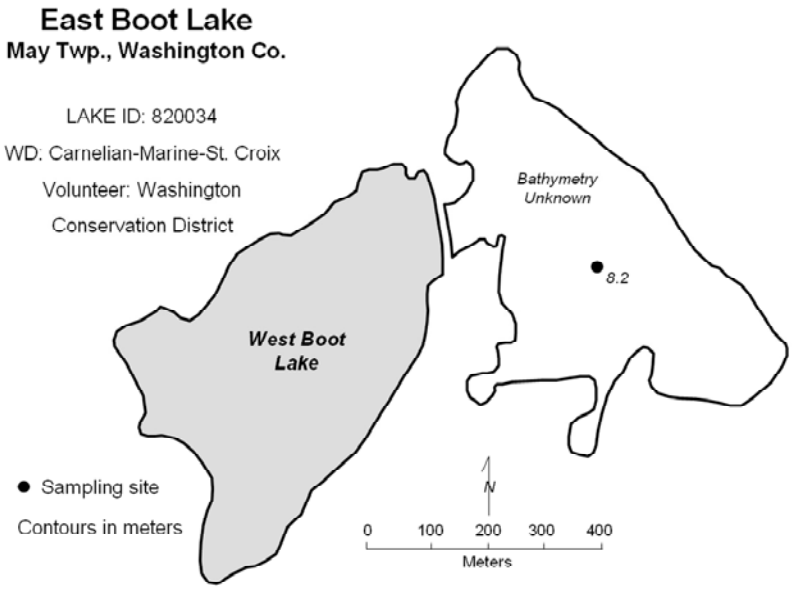
The lake's 2007 grade is similar to those recorded through CAMP in 1996-1998 and 2004-2006, and better than the recent grades posted in 1999-2003 (C).

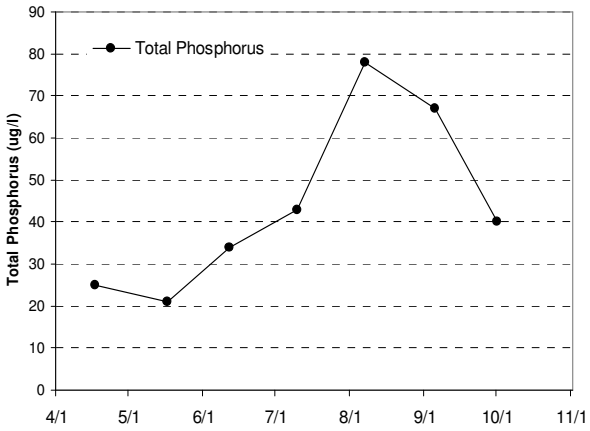
There does not appear to be a trend in improving or degrading water quality for the lake. The lake's recent water quality seems to be well represented by an grade of C+/B-. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

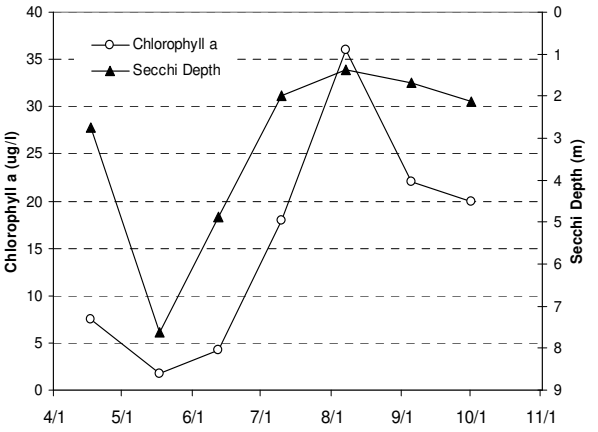
The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.0 for physical condition (3- "definite algae present"), and 3.6 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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) 297-4916 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.

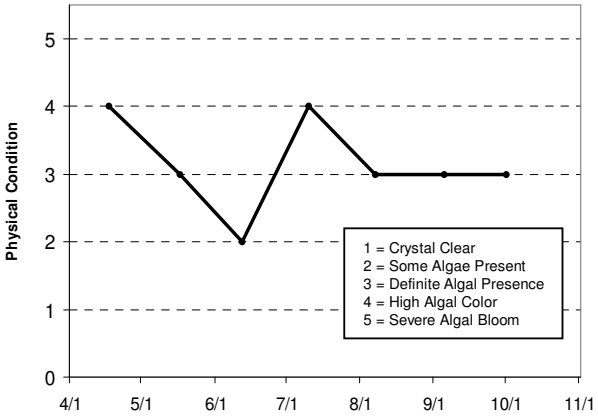






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/17/07	10.3	5.3	14.38	12.08	7.5	25		2.743	4	4
05/17/07	19.5	7	10.11	0.1	1.7	21		7.62	3	4
06/12/07	27.1	9.5	7.47	0.08	4.2	34		4.877	2	3
07/10/07	29.3	9.5	7.12	0.08	18	43		1.981	4	4
08/07/07	27.9	9.9	7.5	0.56	36	78		1.372	3	4
09/05/07	27.5	10.2	9.46	0.34	22	67		1.676	3	3
10/01/07	20	11.1	6.47	0.34	20	40		2.134	3	3

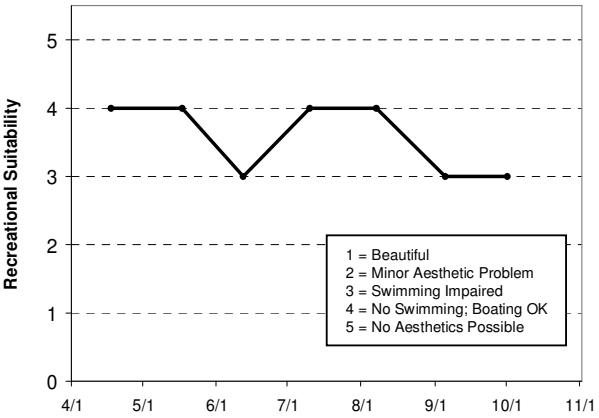


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			B	B	B	C	C	C	C	C	C	C	C	C
Chlorophyll a			B	C	C	C	C	C	C	C	B	B	C	B
Secchi Depth			B	A	B	C	C	C	B	B	A	A	A	A
Overall			**B**	**B**	**B**	**C**	**C**	**C**	**C**	**C**	**B**	**B**	**B**	**B**

Source: Metropolitan Council and STORET data



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

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.

This was the second year that Echo Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up with secchi information for 2005. Thus, the 2006 and 2007 CAMP data are the only known nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 8 times between early-May and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	71.4	54.0	108.0	D
CLA (µg/l)	132.3	17.0	720.0	F
Secchi (m)	0.7	0.5	1.0	D
TKN (mg/l)	1.93	1.20	2.30	
			Water Quality	D

As mentioned earlier, there are no nutrient data available for Echo Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.1 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

Echo Lake
Mahtomedi, Washington Co.

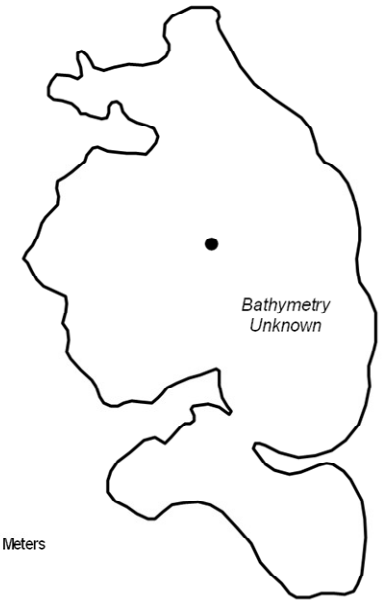
LAKE ID: 820135

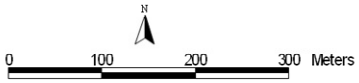
WD: Valley Branch

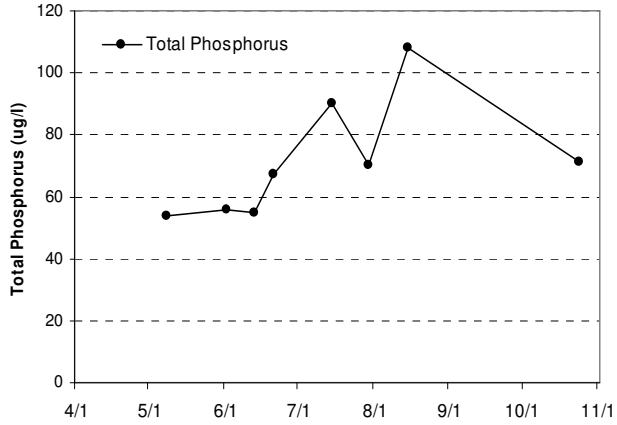
Volunteer: Jim Serley

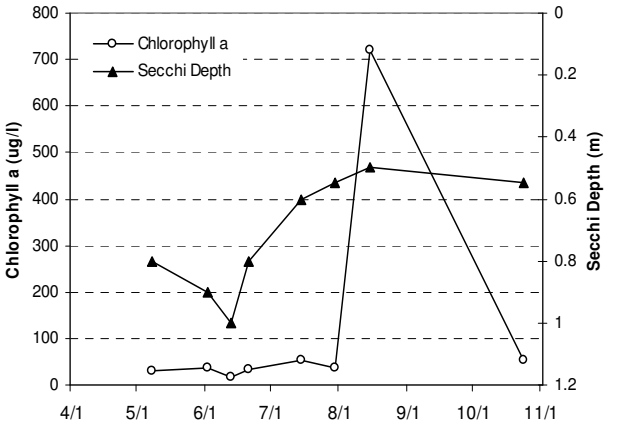
● Sampling site

Contours in meters



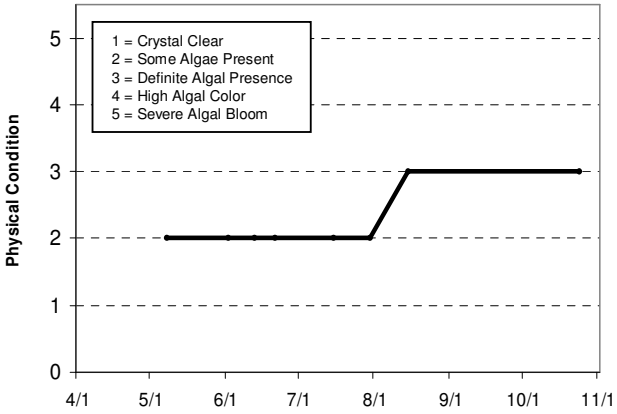






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/08/07	19.4				29	54		0.8	2	4
06/02/07	22.3				36	56		0.9	2	4
06/13/07	24.6				17	55		1	2	4
06/21/07	24.2				34	67		0.8	2	4
07/15/07	23.5				54	90		0.6	2	4
07/30/07	26.8				36	70		0.55	2	4
08/15/07	24.7				720	108		0.5	3	4
10/24/07	11.3				54	71		0.55	3	4

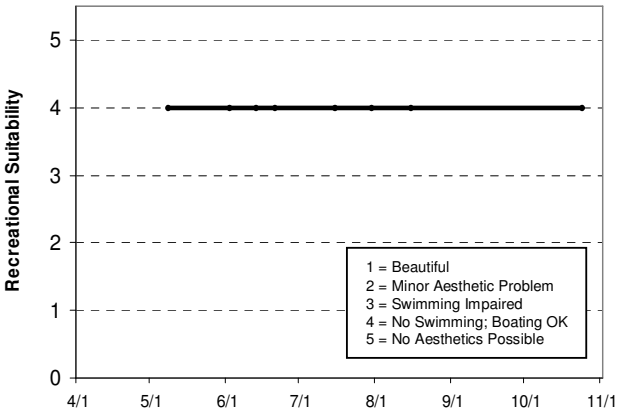


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	D
Chlorophyll a													C	F
Secchi Depth												F	F	D
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



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

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). Additionally, the lake has a 1,576-acre immediate drainage area, which results in a watershed-to-lake area ratio of 19:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This marks the third year in which Edith Lake has been involved in CAMP (2005 being the first). A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Therefore, 2005-2007 are the only known years where data are available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 12 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	15.9	10.0	25.5	A
CLA (µg/l)	4.6	2.5	6.8	A
Secchi (m)	2.5	1.8	3.0	B
TKN (mg/l)	0.64	0.48	0.86	
			Water Quality	A

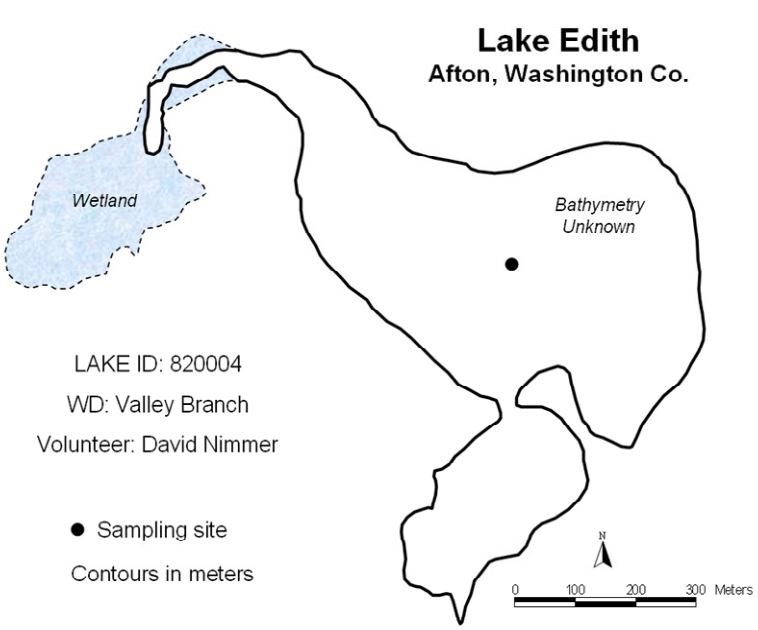
The lake's 2007 grade of A is similar to the grade of A it received in 2005.

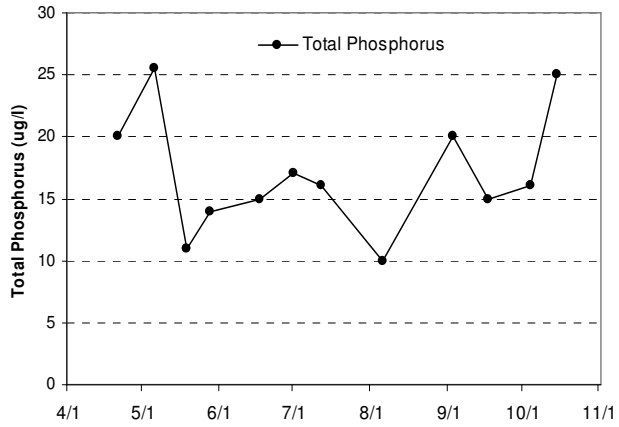
As mentioned earlier, there are no water quality data available for Edith Lake other than the 2005-2007 CAMP data. Therefore there is not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

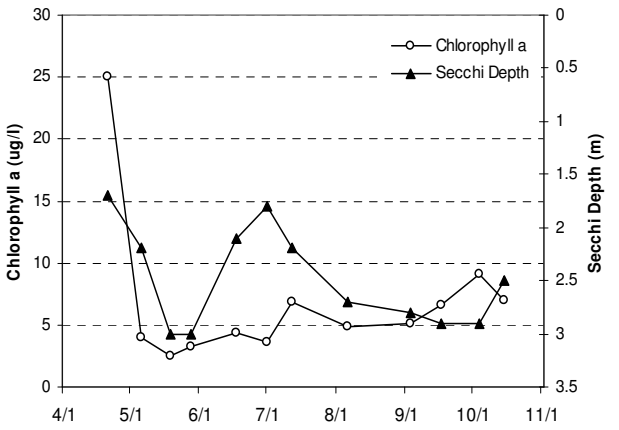
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 1.6 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 2.1 for recreational suitability (roughly 2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

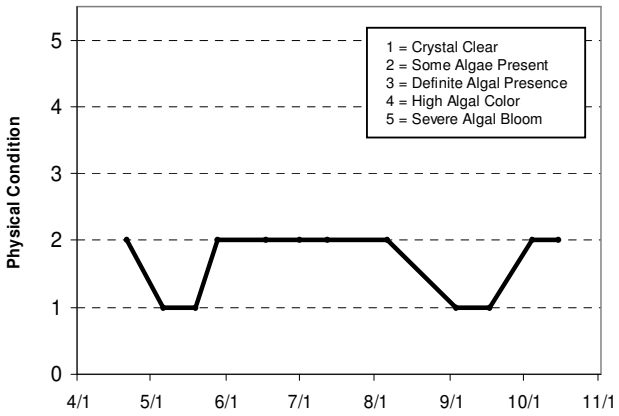






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	14.3				25	20		1.7	2	2
05/06/07	14.3				4	25.5		2.2	1	2
05/19/07	18.6				2.5	11		3	1	2
05/28/07	19.7				3.2	14		3	2	2
06/17/07	27.5				4.4	15		2.1	2	2
07/01/07	26.3				3.6	17		1.8	2	2
07/12/07	25.1				6.8	16		2.2	2	3
08/06/07	26.7				4.8	10		2.7	2	2
09/03/07	24.8				5.1	20		2.8	1	2
09/17/07	20.8				6.6	15		2.9	1	2
10/04/07	18.1				9.1	16		2.9	2	2
10/15/07	15.3				7	25		2.5	2	2

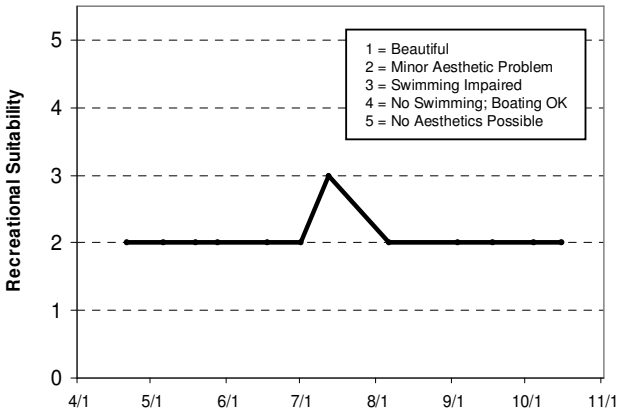


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												A	B	A
Chlorophyll a												A	A	A
Secchi Depth												B	C	B
Overall												**A**	**B**	**A**

Source: Metropolitan Council and STORET data



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

Lake Elmo, located in Lake Elmo (Washington County), has public access associated with the Lake Elmo Regional Park located on the west side of the lake. The lake is considered a "Priority Lake" due to its multi-recreational uses. The 284-acre lake has a maximum depth of 41.7 m (roughly 140 feet [deepest in the TCMA]). Roughly 22 percent of the lake's surface area is considered littoral zone (the 0-15 foot depth area of aquatic plant dominance).

This was the fourth year that Lake Elmo has been involved in CAMP. The lake was monitored 8 times from early-May to early-September 2007. The lake has been monitored in the past by Council staff (most recently in 1991). The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	14.5	6.0	31.0	A
CLA (µg/l)	2.3	1.9	3.0	A
Secchi (m)	3.6	2.4	4.8	A
TKN (mg/l)	0.36	0.28	0.51	
			Water Quality	A

The lake's 2006 water quality grade (A) is identical to those recorded in 1981, 1988, 1991, 1994, 2005, and 2006 and better than those recorded in 1980, 1982, and 1984 (B).

A search of the STORET nationwide water quality database for data on the lake revealed a moderate database since the 1980's with nutrient and Secchi transparency data available in 1980-1982, 1984, 1988, 1991, 1994 and 2005-2006. Additionally, Secchi transparency data are available for 1985-1987, 1989-1990 and 1992-1993. The lake's database indicates that the lake's recent water quality is well represented by an grade of A. Additionally, a recent MPCA conducted trend analysis on the lake's Secchi transparency data, revealed a statistically significant improvement in recent water clarity.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The summertime mean recorded physical condition was 1.0 (1-"crystal clear"). The mean suitability for recreation ranking, also on a 1-to-5 scale, was 1.0 (1-"beautiful").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

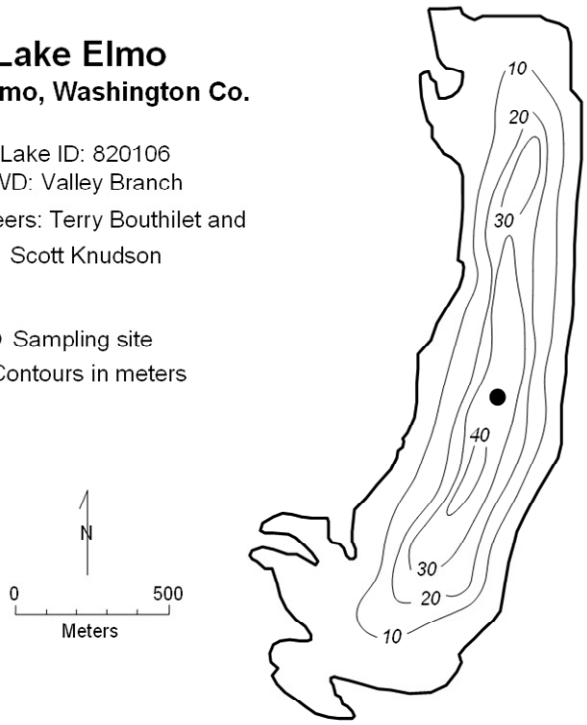
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

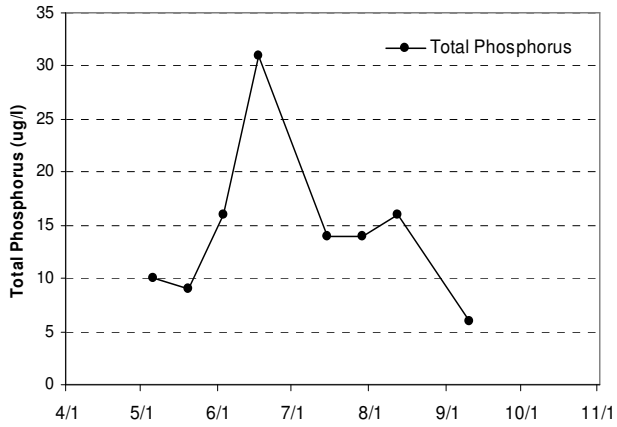
Lake Elmo

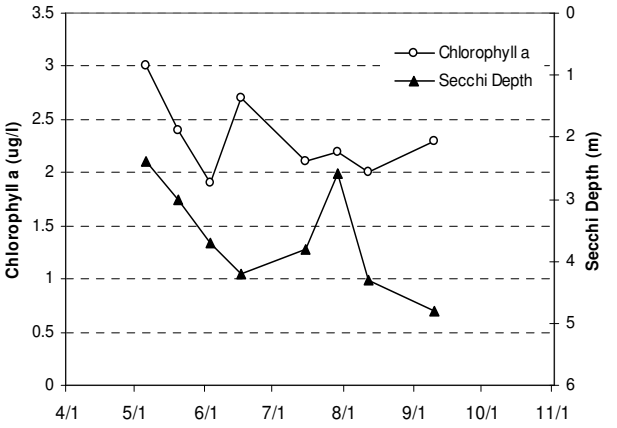
Lake Elmo, Washington Co.

Lake ID: 820106
WD: Valley Branch
Volunteers: Terry Bouthilet and Scott Knudson

● Sampling site
Contours in meters

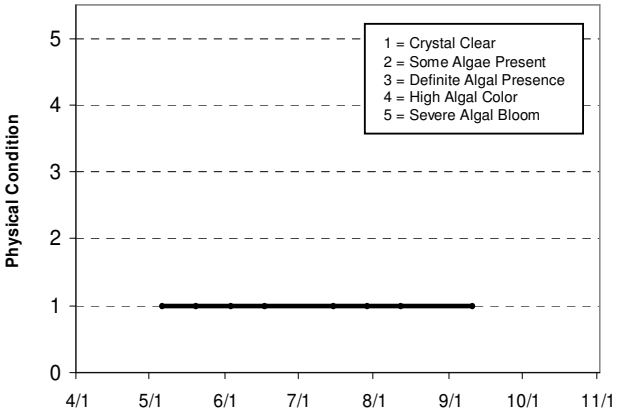






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07	13.6				3	10		2.4	1	1
05/20/07	16.9				2.4	9		3	1	1
06/03/07	20.9				1.9	16		3.7	1	1
06/17/07	25.6				2.7	31		4.2	1	1
07/15/07	25.4				2.1	14		3.8	1	1
07/29/07	27.2				2.2	14		2.6	1	1
08/12/07	26.9				2	16		4.3	1	1
09/10/07	23.1				2.3	6		4.8	1	1

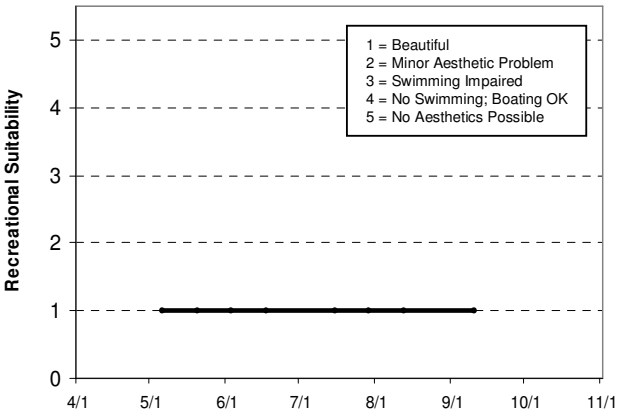


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	B	A	B		B				B			A		
Chlorophyll a	B	A	B		A				A			A		
Secchi Depth	C	B	C		B	A	B	B	A	A	A	A	A	A
Overall	**B**	**A**	**B**		**B**				**A**			**A**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A											A	A	A
Chlorophyll a	A											A	A	A
Secchi Depth	A											A	A	A
Overall	**A**											**A**	**A**	**A**

Source: Metropolitan Council and STORET data



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

Farquar Lake, located in the City of Apple Valley (Dakota County), covers an area of 63 acres and has a maximum depth of 3.0 m (10 feet). The lake's mean depth of 1.4 m (4.6 feet) and surface area translates to an approximate lake volume of 290 ac-ft (the lake volume may have changed over the past couple years due to the lake level rising 1.5 to 2.0 feet above normal). 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).

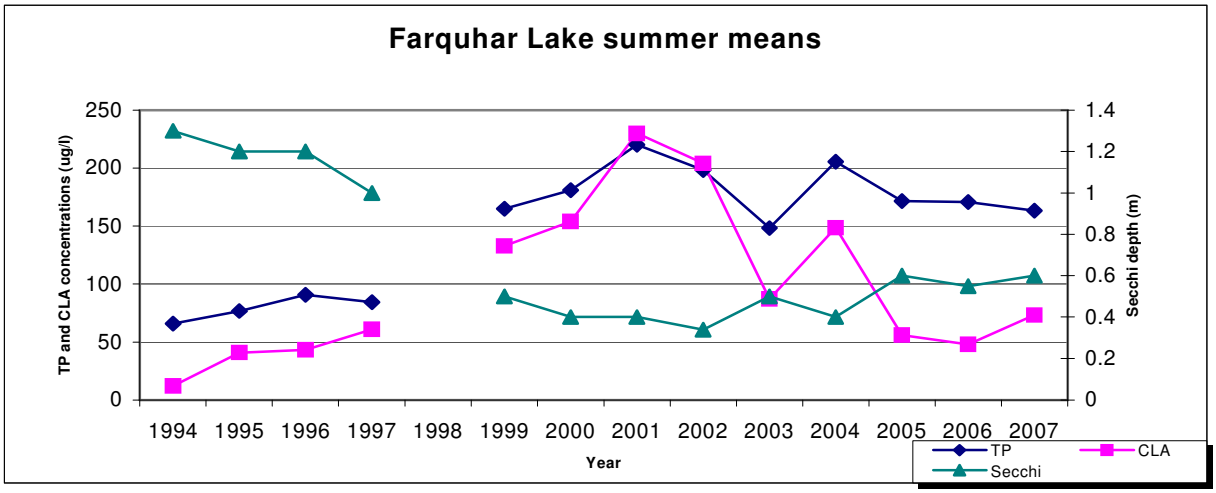
The land uses within the 353-acre contributing watershed to the lake are approximately split between agricultural uses and urban/residential. The watershed-to-lake size ratio is 6:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the thirteenth year that Farquar Lake has been enrolled in CAMP. The lake was monitored 13 times between early-May and mid-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	163.3	64.0	241.0	F
CLA (µg/l)	73.2	21.0	130.0	D
Secchi (m)	0.6	0.4	1.0	F
TKN (mg/l)	2.73	1.40	3.60	
			Water Quality	F

The lake's 2007 grade of F is similar to those recorded in 1999-2005, and worse than the C's and D's recorded in 1994-1997 and 2006.



The above graph shows that recent (2005 – 2007) summer-time means for chlorophyll-a have returned to similar values as observed in the mid-1990's. On the other hand, summer-time means for total-phosphorus have not returned to those concentrations observed in the mid-1990's, but it appears that total phosphorus mean concentrations have not increased over the past several years. The most recent trend analysis performed by the MPCA (January 2008) on the Secchi transparency reported no statistically significant trend. However, the individual and water quality grades are currently worse than they were

about a decade ago. A more in-depth study combining watershed as well as in-lake monitoring may help determine the areas contributing the most to the lake's changing water quality.

Throughout the monitoring season, the volunteers monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 3.5 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability was 3.5 (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

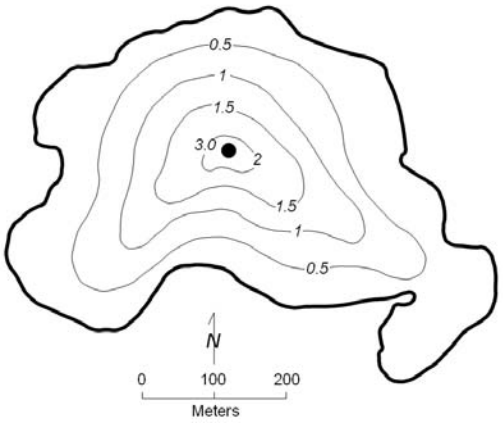
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

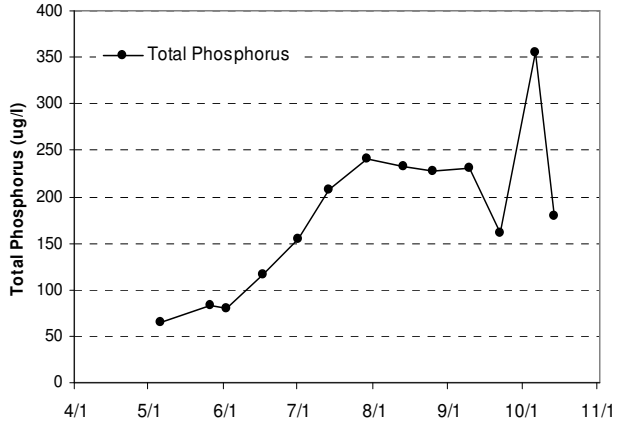
Farquhar Lake

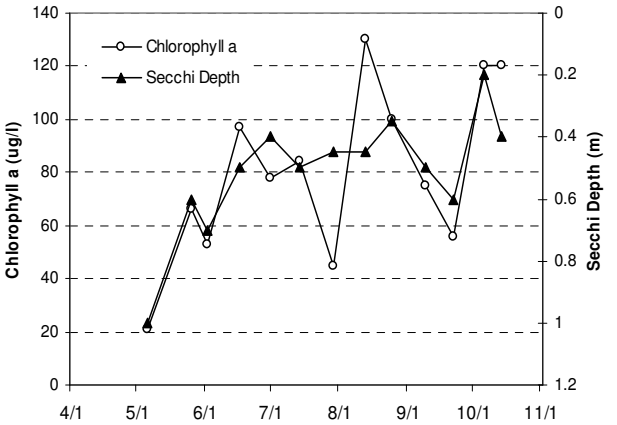
Apple Valley, Dakota Co.

Lake ID: 190023
WMO: Dakota County
Volunteer: Bill Sherry

● Sampling site
Contours in meters

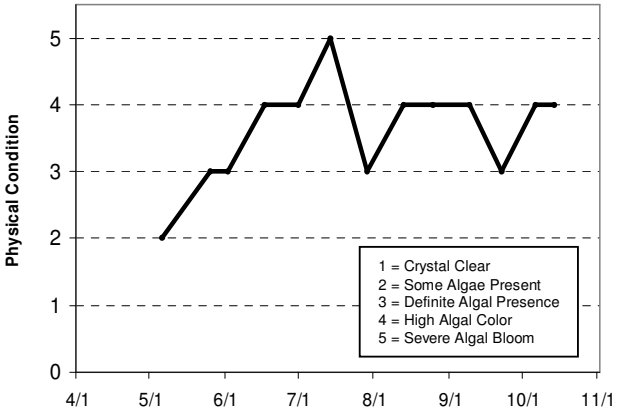






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07					21	64		1	2	2
05/26/07	19.2				66	83		0.6	3	3
06/02/07	21.9				53	79		0.7	3	3
06/17/07	27.8				97	117		0.5	4	4
07/01/07	26.5				78	155		0.4	4	4
07/14/07	24.9				84	207		0.5	5	4
07/29/07	30.3				45	241		0.45	3	3
08/13/07	27.9				130	232		0.45	4	4
08/25/07	21.5				100	227		0.35	4	4
09/09/07	23.2				75	230		0.5	4	4
09/22/07	18.5				56	161		0.6	3	3
10/06/07	20.8				120	356		0.2	4	4
10/14/07	13.1				120	180		0.4	4	4

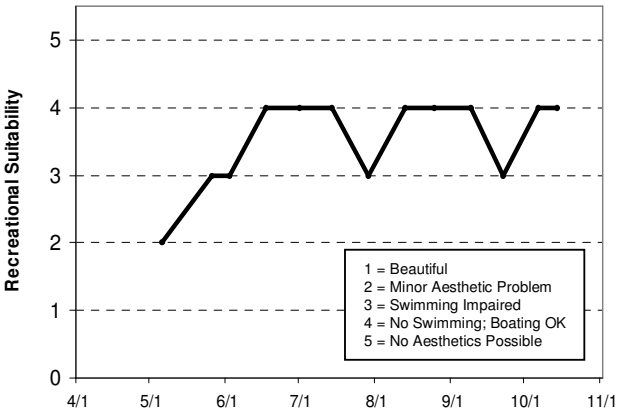


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	D	D	D		F	F	F	F	D	F	F	F	F
Chlorophyll a	B	C	C	D		F	F	F	F	F	F	D	C	D
Secchi Depth	C	D	C	D		F	F	F	F	F	F	F	F	F
Overall	**C**	**D**	**C**	**D**		**F**	**F**	**F**	**F**	**F**	**F**	**F**	**D**	**F**

Source: Metropolitan Council and STORET data



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

Fireman's Lake is located within the City of Chaska. 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) and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

A search through the STORET nationwide water quality database determined that the 2001-2007 CAMP data are the only years of available water quality data for the lake.

This was the seventh year that Fireman's Lake, has been involved in CAMP (the lake was first enrolled in 2001). The lake was monitored 13 times from mid-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	21.5	14.0	32.0	A
CLA (µg/l)	2.8	1.3	5.6	A
Secchi (m)	3.0	2.0	4.5	B
TKN (mg/l)	0.39	0.22	0.56	
			Water Quality	A

The lake's 2007 grade (A) is similar to the A grades it received in years past.

As mentioned earlier, there are no water quality data available for Fireman's Lake other than the limited 2001-2006 CAMP data. Therefore there are not sufficient data to determine any long-term trends. In the short-term however, the lake's water quality is well represented by an grade of A. To better understand the lake's water quality and where it may be heading, more data are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 1.3 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.3 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

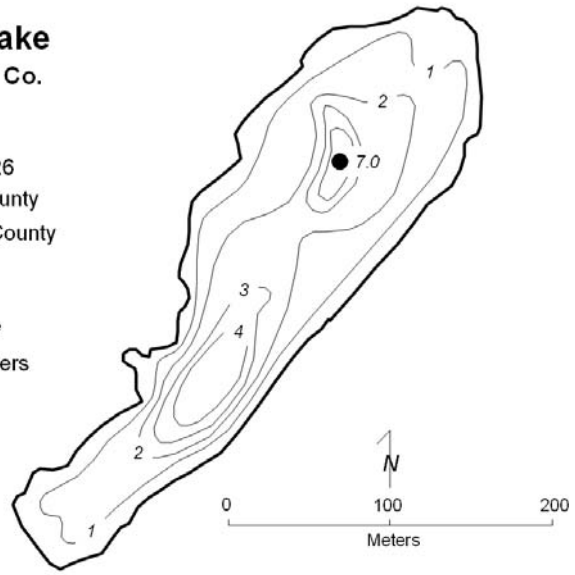
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

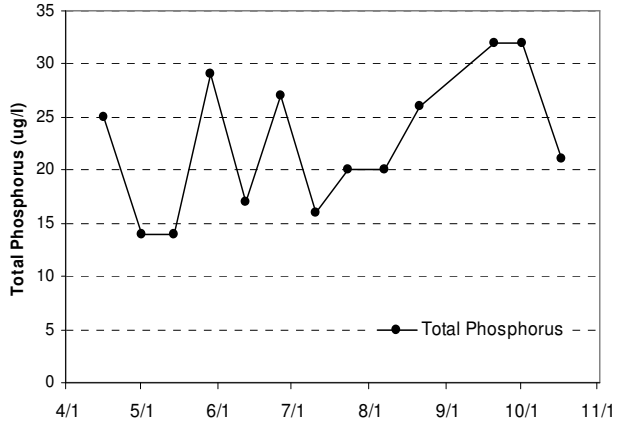
Fireman's Lake

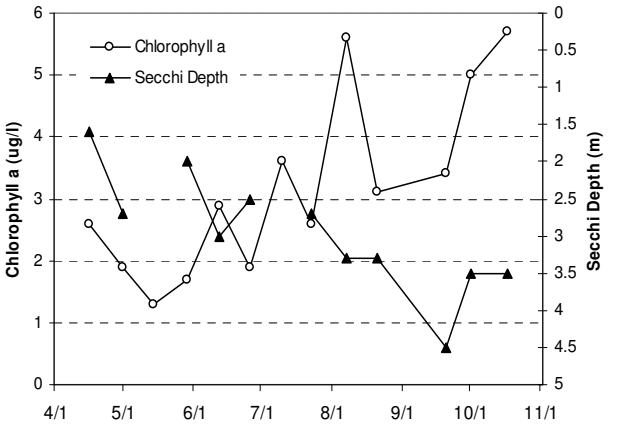
Chaska, Carver Co.

Lake ID: 100226
WMO: Carver County
Volunteer: Carver County

● Sampling site
Contours in meters

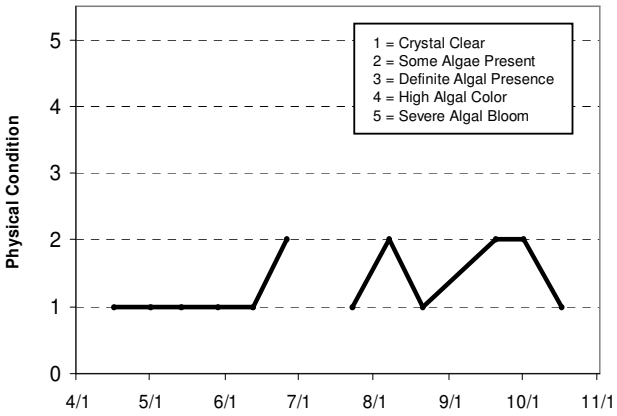






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	10.82		10.12		2.6	25		1.6	1	1
05/01/07	17.01		8.66		1.9	14		2.7	1	1
05/14/07	20.33		9.56		1.3	14			1	1
05/29/07	21.2		7.17		1.7	29		2	1	1
06/12/07					2.9	17		3	1	1
06/26/07	27.2		13.66		1.9	27		2.5	2	2
07/10/07					3.6	16				
07/23/07	27.17		12.23		2.6	20		2.7	1	1
08/07/07	26.17		5.52		5.6	20		3.3	2	2
08/21/07	22.12		4.61		3.1	26		3.3	1	1
09/20/07	34.67		6.28		3.4	32		4.5	2	2
10/01/07	51		3.18		5	32		3.5	2	2
10/17/07	13.32		8.46		5.7	21		3.5	1	1

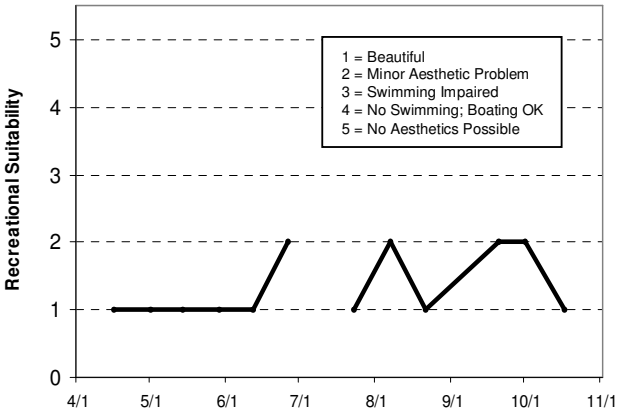


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus								A	A	B	A	B	B	A
Chlorophyll a								A	A	A	A	A	A	A
Secchi Depth								B	A	A	A	A	B	B
Overall								**A**	**A**	**A**	**A**	**A**	**B**	**A**

Source: Metropolitan Council and STORET data



Fish Lake [Scott County] (70-0069) *Prior Lake - Spring Lake Watershed District*

Fish Lake is located in Spring Lake Township (Scott County). This was the ninth year that the 171-acre lake has been a part of CAMP. The lake's mean and maximum depth of 4.4 m (14 feet) and 8.5 m (28 feet) translates to an approximate volume of 2,468 ac-ft. Roughly 43 percent of the lake's surface area is considered littoral, that is, the 0-15 foot depth area of the lake dominated by aquatic vegetation. The lake has a 434-acre watershed that, when divided by the surface area of the lake results in a rather small watershed-to-lake size ratio of 2.5:1 (the larger the ratio the greater the potential stress on the lake from surface runoff). The lake is considered a Metropolitan Council "Priority Lake" due to its multi-recreational uses. The lake can be accessed on the northwestern end.

The lake was monitored 13 times between mid-May and mid-October 2007. A search for historic water quality data through Council, MPCA, and STORET files resulted in a few years of data (1980, 1984, 1990, 1995, 1997 [only two monitoring events], and 1998-2006).

The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

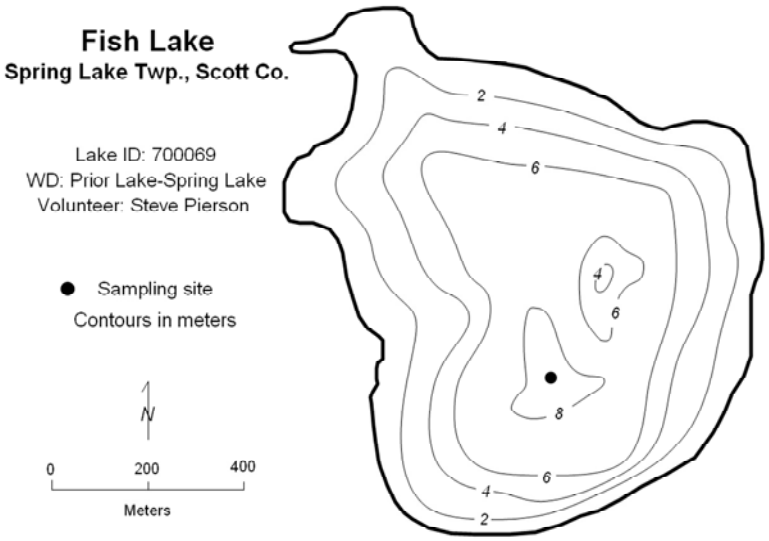
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	42.5	23.0	114.0	C
CLA (µg/l)	24.6	14.0	43.0	C
Secchi (m)	1.3	1.0	2.0	C
TKN (mg/l)	1.43	1.10	1.80	
			Water Quality	C

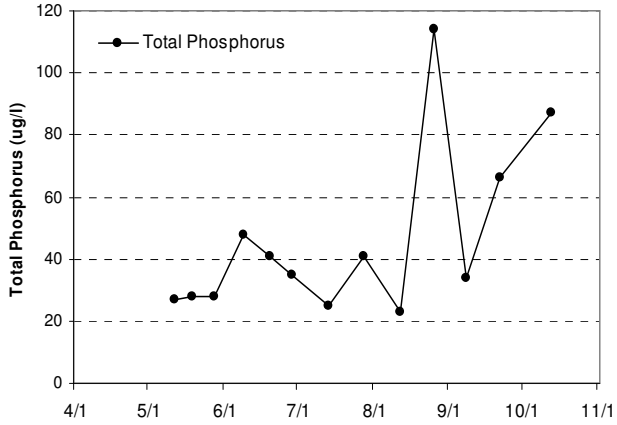
This year's water quality grade of C is similar to the grades it has received in the past. This lake seems to be very well represented by an lake water quality grade of C/C+. More data are needed to determine long term trends in water quality.

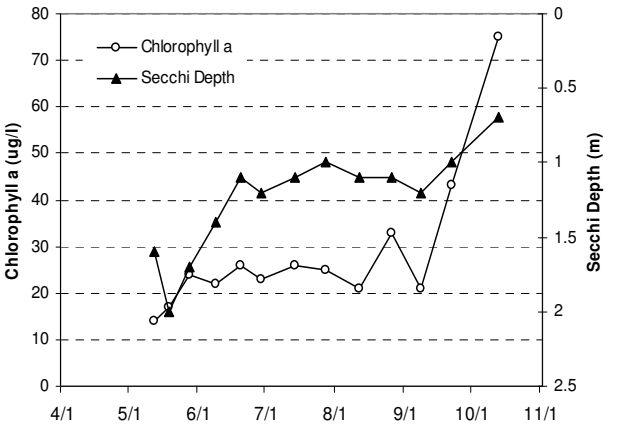
During each visit, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean physical condition ranking was 2.8 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 2.0 (2- "minor aesthetic problem").

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) 297-4916 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.

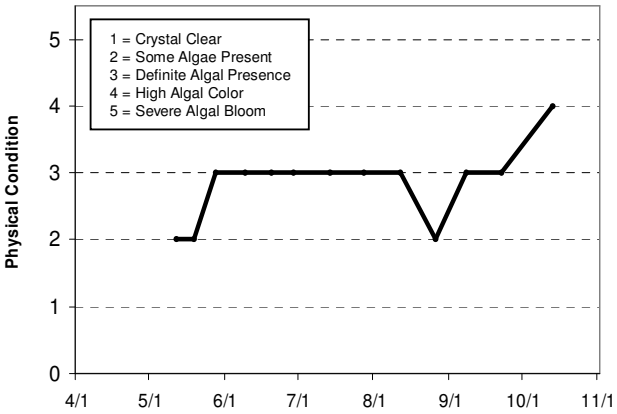






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/12/07	19.1				14	27		1.6	2	2
05/19/07	19.9				17	28		2	2	2
05/28/07	19.6				24	28		1.7	3	2
06/09/07	21.2				22	48		1.4	3	2
06/20/07	24.1				26	41		1.1	3	2
06/29/07	27.1				23	35		1.2	3	2
07/14/07	24.8				26	25		1.1	3	2
07/28/07	28.1				25	41		1	3	2
08/12/07	26.8				21	23		1.1	3	2
08/26/07	23.6				33	114		1.1	2	2
09/08/07	24.4				21	34		1.2	3	2
09/22/07	19.6				43	66		1	3	2
10/13/07	15.8				75	87		0.7	4	3

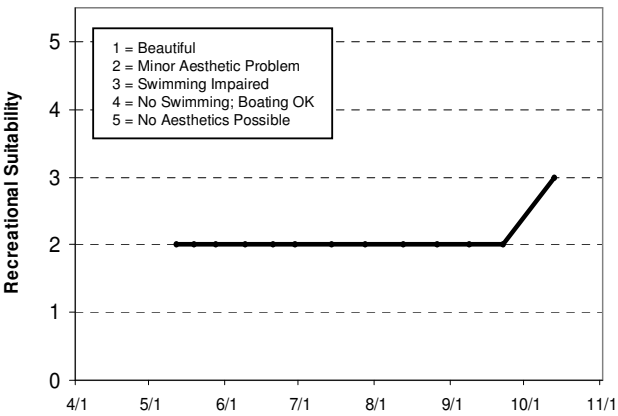


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C				D									
Chlorophyll a	C				D						C			
Secchi Depth	D				D						C			
Overall	**C**				**D**									

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C		C	C	C	C	C	D	C	C	C	C	C
Chlorophyll a		C		C	C	C	C	B	C	C	C	C	B	C
Secchi Depth		D		C	C	C	B	B	D	B	C	C	C	C
Overall		**C**		**C**	**C**	**C**	**C**	**B**	**D**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Fish Lake [Washington County] (82-0064) *Carnelian - Marine Watershed District*

Fish Lake is located in City of Scandia in Washington County. The lake has a surface area of 72 acres, and a maximum and mean depth of 3.0 m (10 feet) and 1.5 m (5 feet), respectively. 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, and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The mean depth and surface area of the lake translates to an approximate volume of 360 ac-ft. The lake's watershed area of 683 acres translates to a watershed-to-lake size ratio of 9.5:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the seventh year that Fish Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake revealed a limited amount of data collected. Water quality data were found for 1998-2006.

The lake was monitored 7 times between mid-April and early-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	105.8	30.0	184.0	D
CLA (µg/l)	42.5	3.1	79.0	C
Secchi (m)	1.4	0.6	2.4	C
TKN (mg/l)	1.84	1.10	2.40	
			Water Quality	C

The grade of C for 2007 is an improvement over the D's and F's received in years past. This was the first year that this lake received a letter grade of C. To better understand the lake's water quality and what direction it may be heading, more years of data collection are needed.

The perceived physical and recreational conditions of the lake, recorded by the volunteers, were ranked on a 1-to-5 scale. The rankings are shown in both tabular and graphical form on the lake's associated information sheet. The mean physical condition ranking was 3.2 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.0 (3- "swimming slightly impaired").

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) 297-4916 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
Scandia, Washington Co.

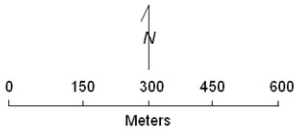
LAKE ID: 820064

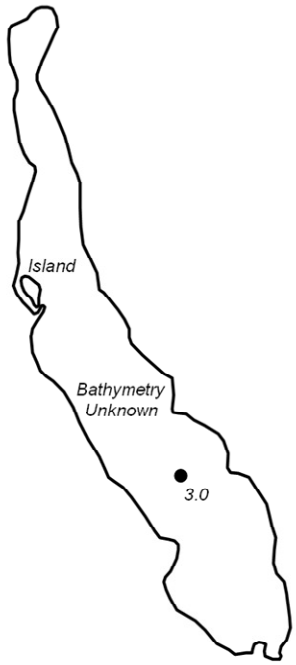
WD: Carnelian-Marine-St. Croix

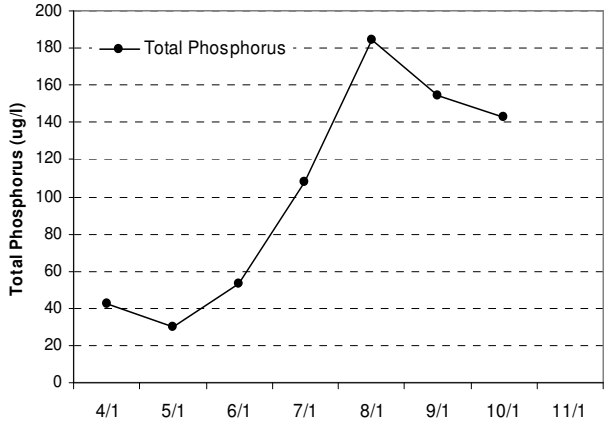
Volunteer: Washington Conservation District

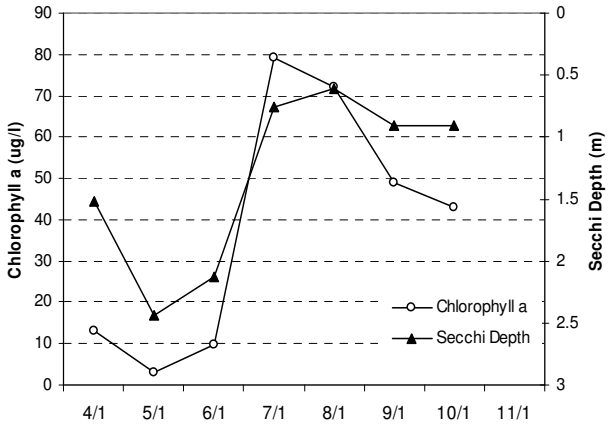
● Sampling site

Contours in meters



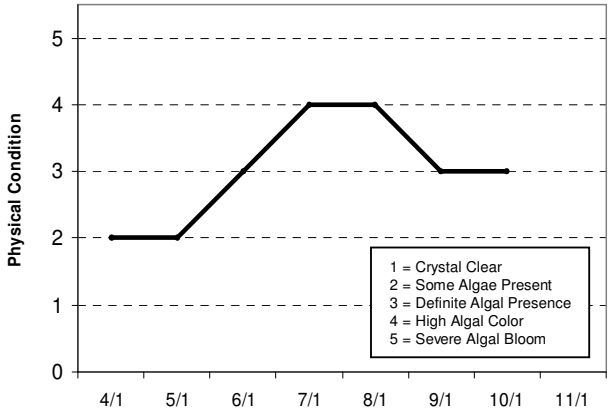






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	10.1	9.1	12.61	12.21	13	42		1.524	2	1
05/14/07	20.4	20.1	7.5	7.2	3.1	30		2.438	2	1
06/11/07	25.2	24.8	6.35	5.6	9.6	53		2.134	3	4
07/10/07	28.6	27.7	7.61	4.24	79	108		0.762	4	2
08/07/07	28.4	25.8	5.1	0.06	72	184		0.61	4	4
09/05/07	26.9	24	8.43	0.13	49	154		0.914	3	4
10/03/07	19.7	18.5	9.2	0.27	43	143		0.914	3	4

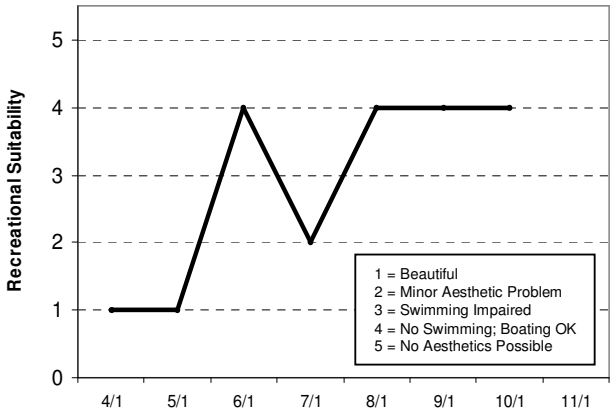


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					F	F	D	D	D	D	D	D	D	D
Chlorophyll a					D	D	F	F	D	F	F	C	D	C
Secchi Depth					F	F	F	F	D	F	D	D	D	C
Overall					**F**	**F**	**F**	**F**	**D**	**F**	**D**	**D**	**D**	**C**

Source: Metropolitan Council and STORET data



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

Forest Lake is divided into three distinct basins; however, only the west basin was monitored through CAMP in 2007. Because of the lake's multi-recreational uses it is considered a "Priority Lake" in the Metropolitan Area. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake.

The entire 2,249-acre lake is located within the City of Forest Lake (Washington County). The acreage of each basin is as follows: west basin= 1,109 acres, middle basin= 360 acres, and the east basin= 780 acres. While the lake as a whole has a maximum and mean depths of 11.5 and 3.4 m (38 and 11 feet), the western basin itself has a mean and maximum depth of 3.0 m and 6.7 m (10 and 22 feet). The total volume of the whole lake is 24,986 ac-ft, and depending on hydrologic conditions has an 8-12 year residence time. Roughly 68 percent of the lake's surface area is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants). The 4,285-acre watershed translates to a rather small watershed-to-lake area ratio of 2:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). The lake has nine public accesses, 14 inlets and one outlet.

This was the twelfth year that the west basin of Forest Lake has been involved in CAMP (the previous being 1993, and 1996-2005). In 2007, the west basin of Forest Lake was monitored 14 times between mid-April and mid-October. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

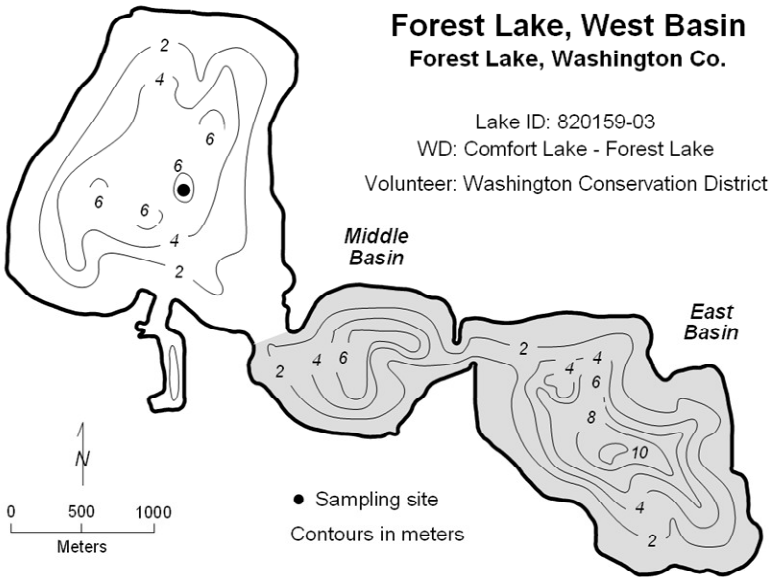
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	33.9	14.0	51.0	C
CLA (µg/l)	21.0	3.9	49.0	C
Secchi (m)	1.3	0.7	2.5	C
TKN (mg/l)	0.87	0.34	1.30	
			Water Quality	C

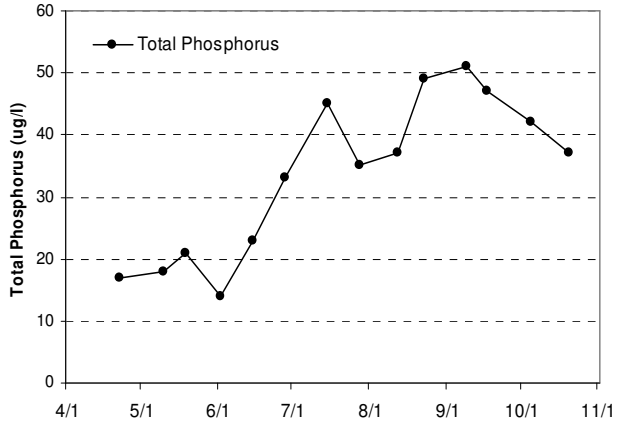
Given the volatility of the lake's annual water quality (the lake received water quality grades of C in 1984, 1986, 1988, 1991, 1992, 1999-2000, 2002-2003, 2005, and 2007, and B in 1989, 1997-1998, 2001 and 2004), no definitive long-trends can be determined at this time. The lake's water quality fluctuates between and B and C.

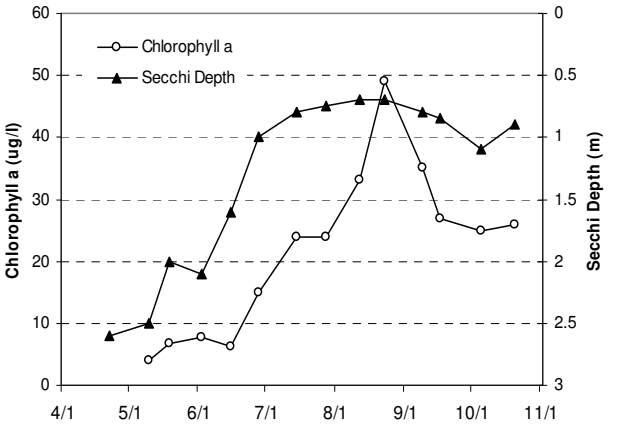
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean perceived physical condition of the west basin of Forest Lake was 2.5 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 1.0 (1- "beautiful").

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) 297-4916 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.

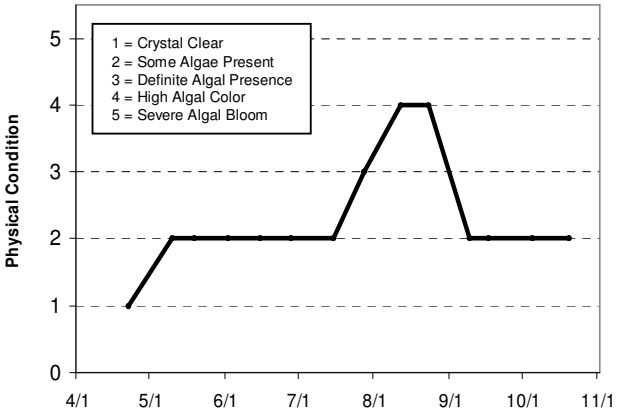






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/22/07	12.3					17		2.6	1	
05/10/07	17.4				3.9	18		2.5	2	1
05/19/07	17.4				6.8	21		2	2	1
06/02/07	20.3				7.6	14		2.1	2	1
06/15/07	25.5				6.2	23		1.6	2	1
06/28/07	23.6				15	33		1	2	1
07/15/07	23				24	45		0.8	2	1
07/28/07	26.1				24	35		0.75	3	1
08/12/07	25.7				33	37		0.7	4	1
08/23/07	21.6				49	49		0.7	4	1
09/09/07	21.8				35	51		0.8	2	1
09/17/07	17				27	47		0.85	2	1
10/05/07	18.2				25	42		1.1	2	1
10/20/07	12				26	37		0.9	2	1

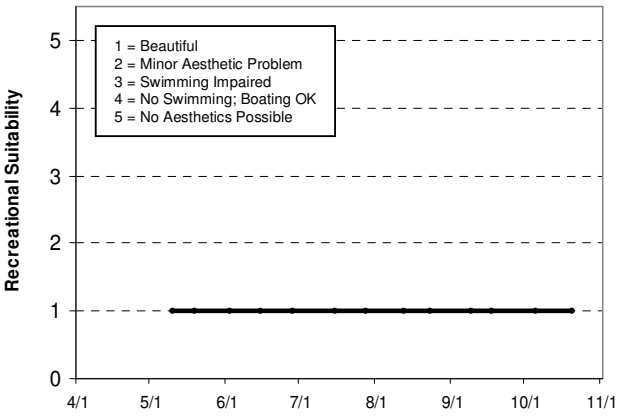


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					C		C	C	C	B		C		C
Chlorophyll a					C		C		C	B	C	B		B
Secchi Depth					C		C	C	C	C	C	C		C
Overall					**C**		**C**		**C**	**B**		**C**		**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	B	B	C	C	B	C	C	B	C	C	C
Chlorophyll a			B	B	B	B	B	B	B	B	A	C	B	C
Secchi Depth			C	C	C	C	C	C	C	C	B	C	C	C
Overall			**C**	**B**	**B**	**C**	**C**	**B**	**C**	**C**	**B**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Friedrich's Pond Lake (82-0108) *Valley Branch Watershed District*

Friedrich's Pond is a 14.5-acre lake located within the City of Lake Elmo (Washington County). There is little morphological information available for the lake. The lake's surface area and watershed size (360 acres) translates to a 25:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the second year that Friedrich's Pond has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, the 2006 and 2007 CAMP data are the only known nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 14 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	446.4	96.0	763.0	F
CLA (µg/l)	80.4	6.3	220.0	F
Secchi (m)	0.5	0.2	0.8	F
TKN (mg/l)	5.52	3.10	8.90	
			Water Quality	F

The lake's 2006 lake quality grade was an F. As mentioned earlier, there are no nutrient data available for Friedrich's Pond other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.5 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.8 for recreational suitability (roughly 3- "swimming slightly impaired").

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

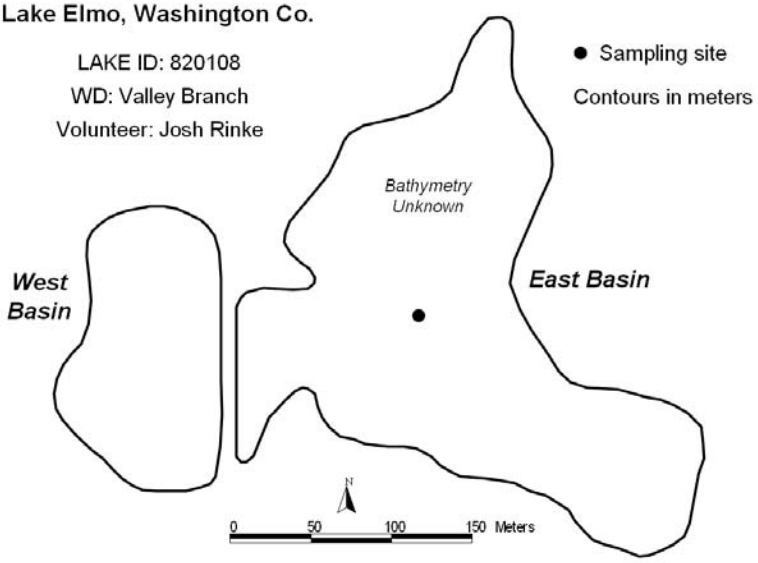
Friedrich's Pond

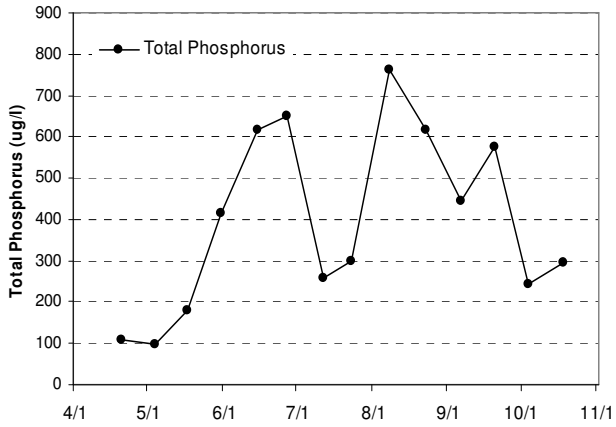
Lake Elmo, Washington Co.

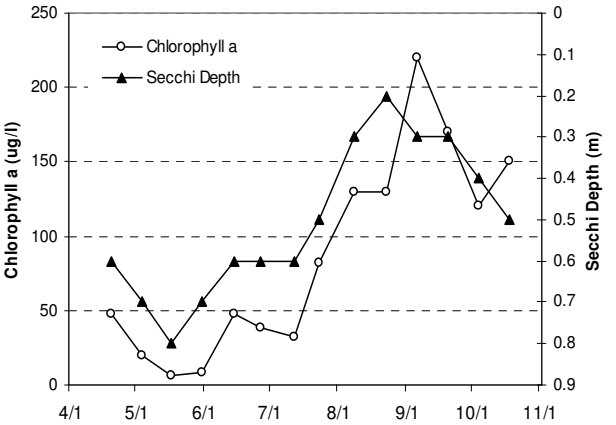
LAKE ID: 820108

WD: Valley Branch

Volunteer: Josh Rinke

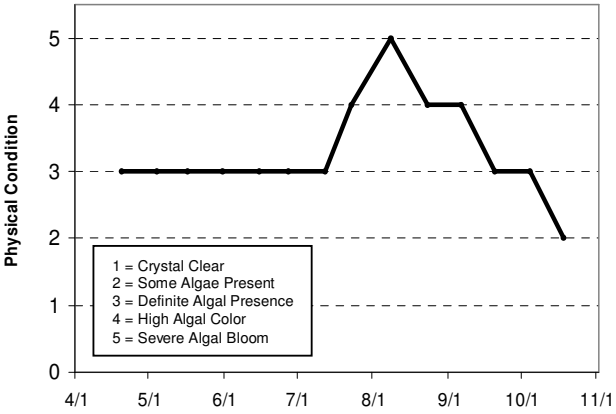






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/20/07	15.8				48	110		0.6	3	3
05/04/07	25.5				20	96		0.7	3	3
05/17/07	23.4				6.3	178		0.8	3	3
05/31/07	29.1				8.5	415		0.7	3	3
06/15/07	27.3				48	618		0.6	3	4
06/27/07	30.9				38	649		0.6	3	4
07/12/07	24.5				32	258		0.6	3	4
07/23/07	26.2				82	299		0.5	4	4
08/08/07	24				130	763		0.3	5	5
08/23/07	20.4				130	616		0.2	4	4
09/06/07	29.6				220	444		0.3	4	4
09/20/07	18.7				170	574		0.3	3	4
10/04/07	20				120	242		0.4	3	4
10/18/07	13.6				150	294		0.5	2	4

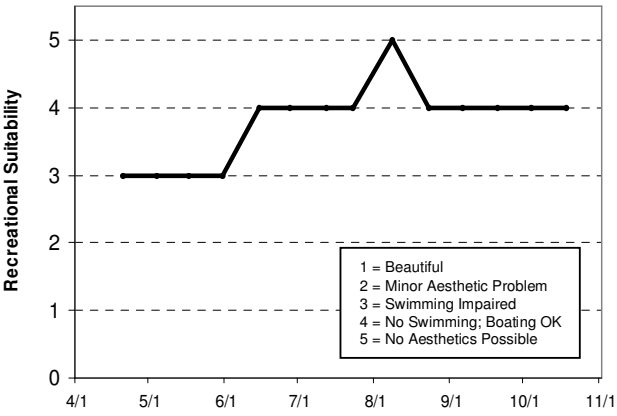


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													F	F
Chlorophyll a													F	F
Secchi Depth													F	F
Overall													**F**	**F**

Source: Metropolitan Council and STORET data



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

This was the twelfth year that George Watch Lake, located in the City of Lino Lakes (Anoka County), has been enrolled in CAMP. The lake was monitored 8 times from early-May to early-October 2007. The 528-acre lake, which has a canoe access on its eastern side, has a mean and maximum depth of 1.5 m (5 feet) and 2.0 m (6.5 feet). The lake's approximate volume is 2,587 ac-ft and because of the shallowness of the lake, it is entirely littoral zone (the area of aquatic plant dominance) and never develops and maintains a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column) through the summer months. The major land use within the lake's immediate watershed is undeveloped/park.

2007 summer (May-September) data summary

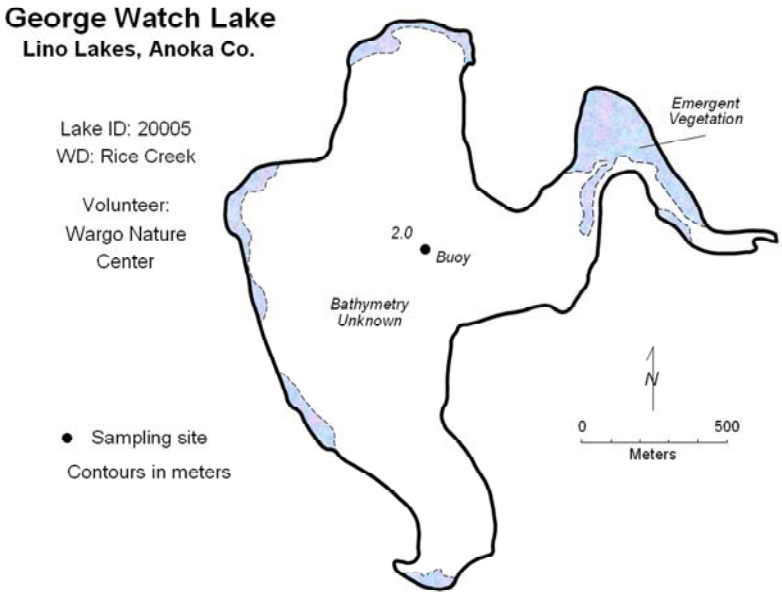
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	211.1	82.0	524.0	F
CLA (µg/l)	58.2	17.0	230.0	D
Secchi (m)	0.5	0.1	1.0	F
TKN (mg/l)	3.73	1.90	9.60	
			Water Quality	F

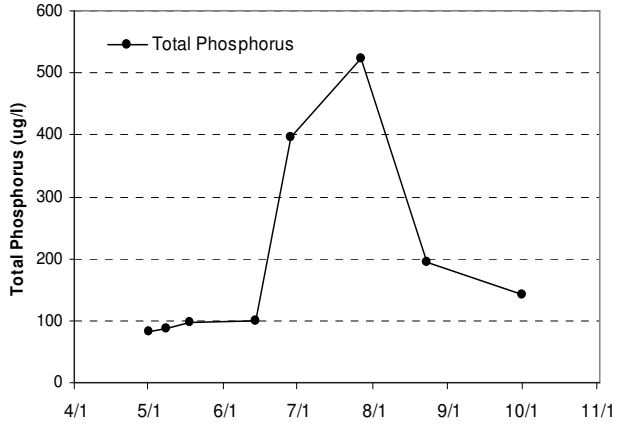
The lake's 2007 lake quality grade was an F which is consistent with past year's letter grades. A search through the STORET database for historic data on George Watch showed that the lake has been monitored several times in the past. There are nutrient data available for 1981-1983, 1985-1991, and 1996-2005-2006. The lake's lake water quality grades seem to indicate that the lake water quality has remained fairly constant fluctuating between an F and D grade throughout the 20+ years of data. The TP and Secchi data has remained fairly consistent throughout the monitoring years, but the CLA seems to fluctuate greatly. A reason for the fluctuating CLA means while the Secchi and TP numbers remain fairly constant could be the amount of sedimentation that could at times be limiting the amount of light available for algal growth thus keeping CLA low and vice versa

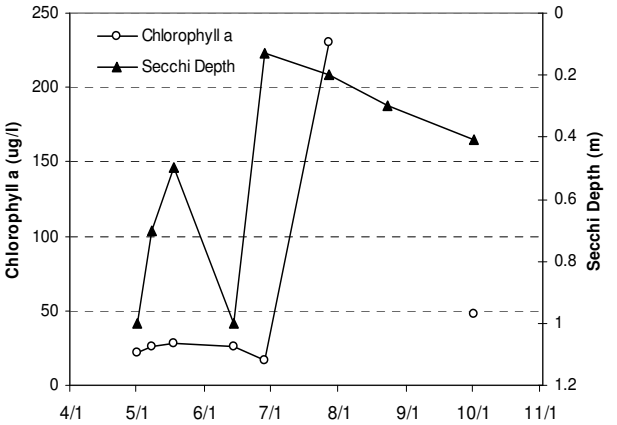
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The summertime mean physical condition was 3.4 (between 3- "definite algae present" and 4- "high algal color"). The mean suitability for recreation ranking was 4.0 (4- "no swimming - boating ok").

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) 297-4916 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.

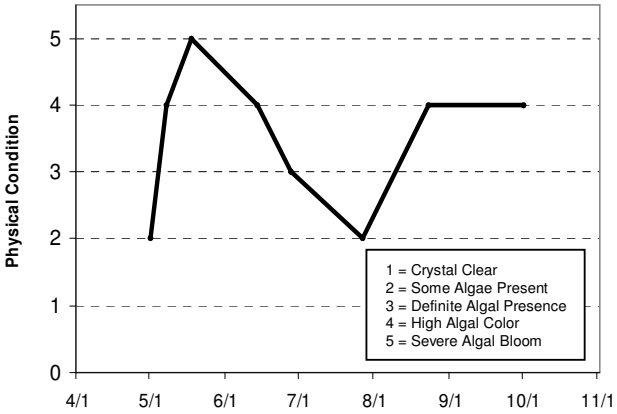






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/01/07	17.6				22	82		1	2	4
05/08/07	23				26	88		0.7	4	4
05/18/07	23.6				28	96		0.5	5	4
06/14/07	26.4				26	99		1	4	4
06/28/07	22.6				17	396		0.13	3	4
07/27/07	30.1				230	524		0.2	2	4
08/23/07	21.7					193		0.3	4	4
10/01/07	17.3				48	141		0.41	4	4

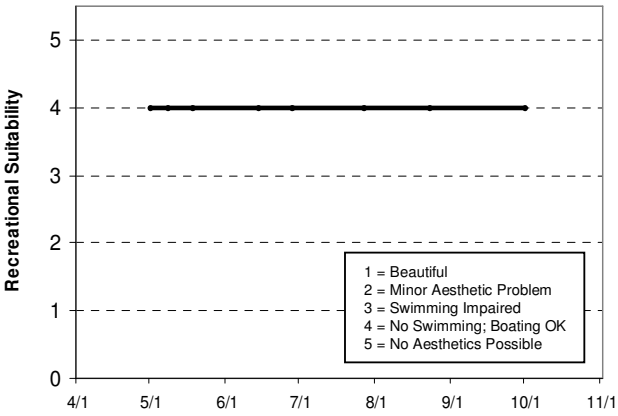


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus		F	F	F		F		F	F	F	F	F		
Chlorophyll a		F	C	B		B		C	B	D	C	F		
Secchi Depth		F	D	F		F		F	F	F	D	F		
Overall		**F**	**D**	**D**		**D**		**D**	**D**	**F**	**D**	**F**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F	D	F	D	D	F	D	F	F	F	F	F
Chlorophyll a			D	C	D	C	C	F	D	C	D	C	F	D
Secchi Depth			F	F	F	D	F	D	F	D	F	F	F	F
Overall			**F**	**D**	**F**	**D**	**D**	**F**	**D**	**D**	**F**	**D**	**F**	**F**

Source: Metropolitan Council and STORET data



German Lake (82-0056) *Carnelian – Marine Watershed District*

German Lake is a 109-acre lake located in City of Scandia (Washington County). There is very little known morphological data available for the lake.

This was the sixth year that German Lake has been involved in CAMP. A search through the STORET nationwide water quality database determined that the 2002-2007 CAMP data are the only years of available water quality data for the lake.

The lake was monitored 7 times between mid-April and early-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	20.4	13.0	26.0	A
CLA (µg/l)	5.4	2.9	9.1	A
Secchi (m)	1.8	1.4	2.1	C
TKN (mg/l)	0.78	0.55	1.10	
			Water Quality	B

The lake 2006 water quality grade (B) is similar to those recorded in 2002-2006. For 2007, the total phosphorus summer-time mean concentration yielded a letter grade of A, which is the best grade for this parameter to date.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 2.0 (2- "some algae present"), while the mean recreational suitability ranking was 2.8 (between 2- "minor aesthetics" and 3- "swimming slightly impaired").

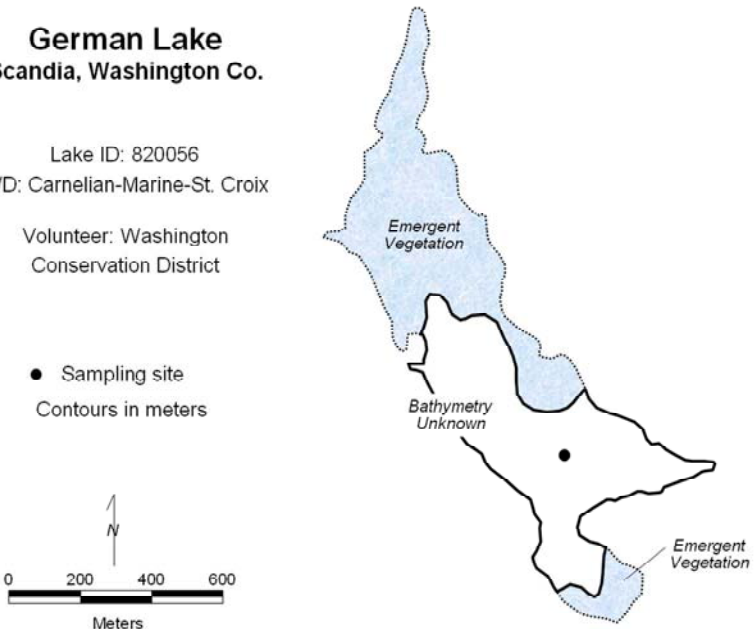
As mentioned earlier, there are no water quality data available for German Lake other than the 2002-2007 CAMP data. Therefore there are not sufficient data to determine any long-term trends. In the short-term however, the lake's water quality is well represented by an grade of B. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

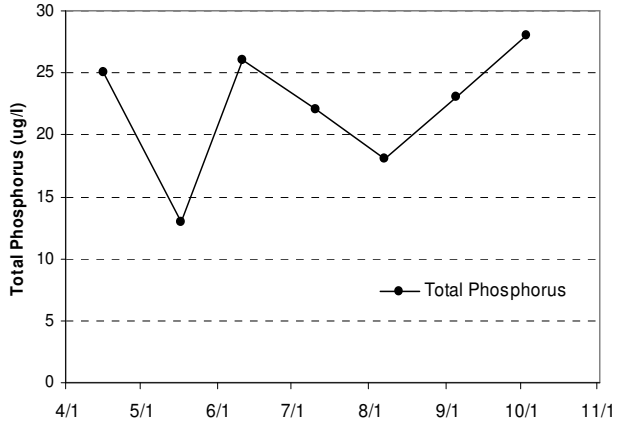
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

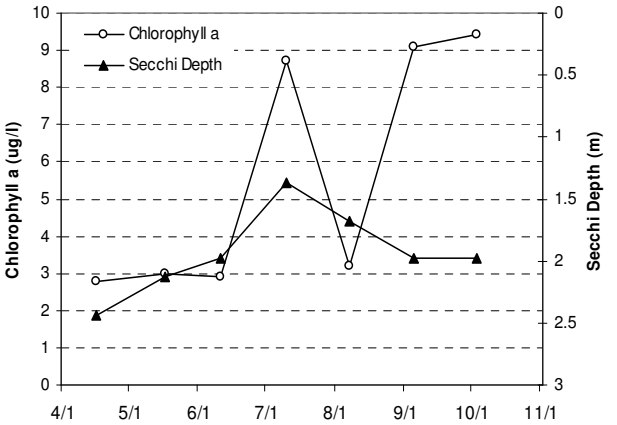
German Lake
Scandia, Washington Co.

Lake ID: 820056
WD: Carnelian-Marine-St. Croix

Volunteer: Washington Conservation District

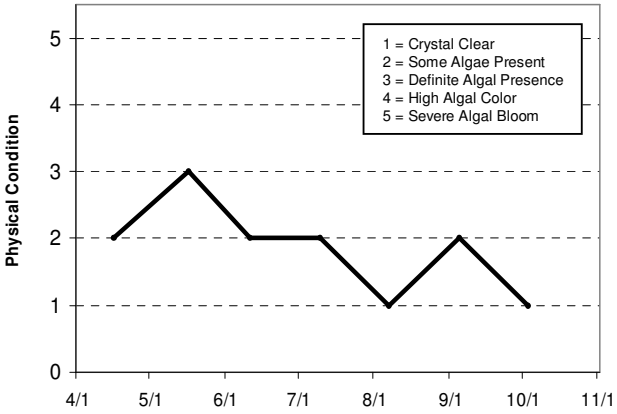






2007 Data

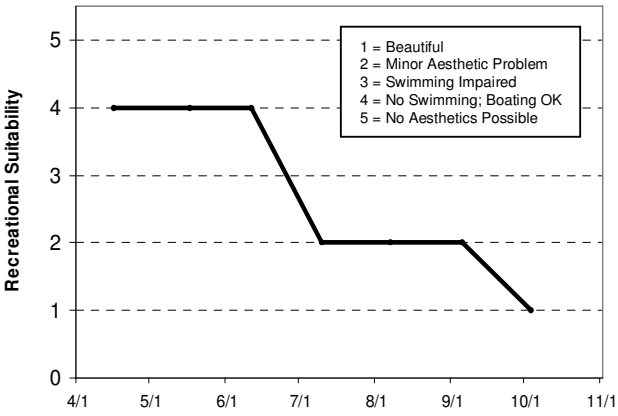
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/16/07	10.1	9.6	12.53	13.01	2.8	25		2.438	2	4
05/17/07	18.6	17	8.54	9.16	3	13		2.134	3	4
06/11/07	24.4	22.9	8.37	2.87	2.9	26		1.981	2	4
07/10/07	28.6	28.4	7.54	4.55	8.7	22		1.372	2	2
08/07/07	28.8	26.3	8.3	0.57	3.2	18		1.676	1	2
09/05/07	26.5	24.8	8.3	0.33	9.1	23		1.981	2	2
10/03/07	18.4	18.3	7.29	7.34	9.4	28		1.981	1	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									B	B	B	B	C	A
Chlorophyll a									A	A	A	A	A	A
Secchi Depth									C	B	B	B	B	C
Overall									**B**	**B**	**B**	**B**	**B**	**B**



Source: Metropolitan Council and STORET data

Glen Lake (27-0093) *Nine Mile Creek Watershed District*

Glen Lake is a 98-acre lake located within the City of Minnetonka (Hennepin County). The maximum depth of the lake is 7.6 m (roughly 10 feet) and 8.5 m (almost 30 feet), respectively. Roughly 91 percent of the lake's area is considered littoral (the 0-15 foot depth area of aquatic vegetation dominance).

This was the second year that Glen Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, the 2006 and 2007 CAMP data are the only known nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 7 times between early-June and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	21.0	18.0	24.0	A
CLA (µg/l)	2.7	2.0	3.3	A
Secchi (m)	3.9	2.9	5.0	A
TKN (mg/l)	0.72	0.66	0.77	
			Water Quality	A

The lake's 2007 lake quality grade was an A. As mentioned earlier, there are no nutrient data available for Glen Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 1.5 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

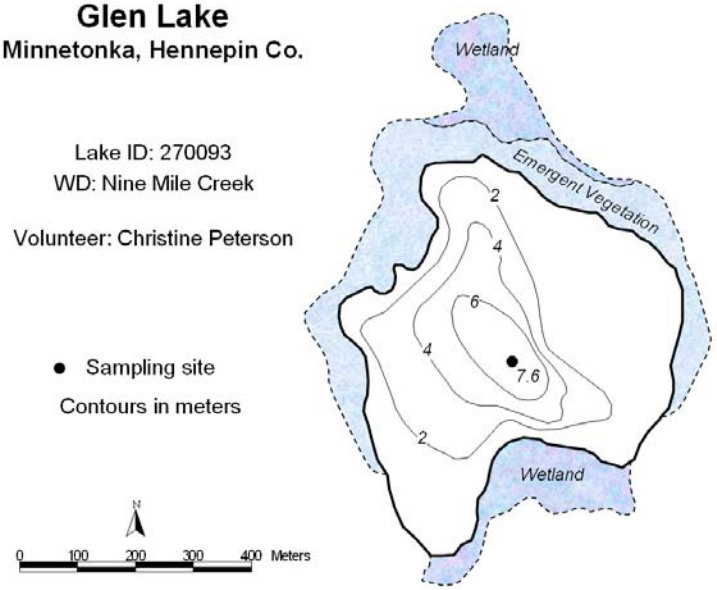
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

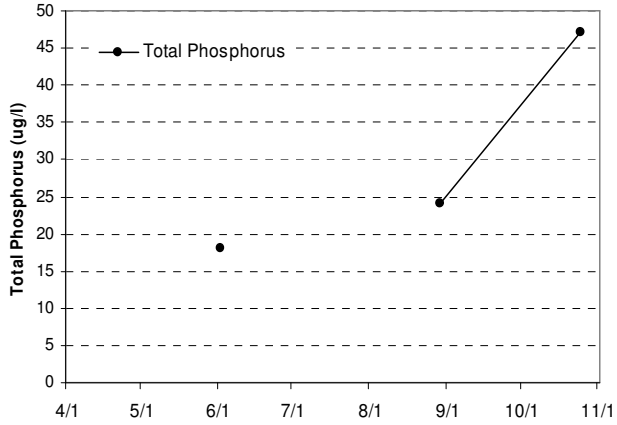
Glen Lake

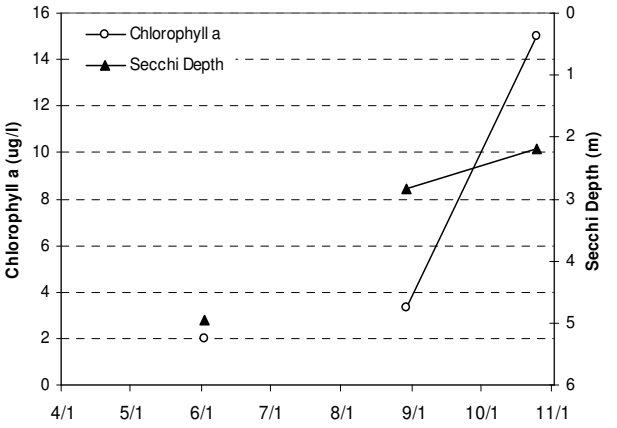
Minnetonka, Hennepin Co.

Lake ID: 270093
WD: Nine Mile Creek

Volunteer: Christine Peterson

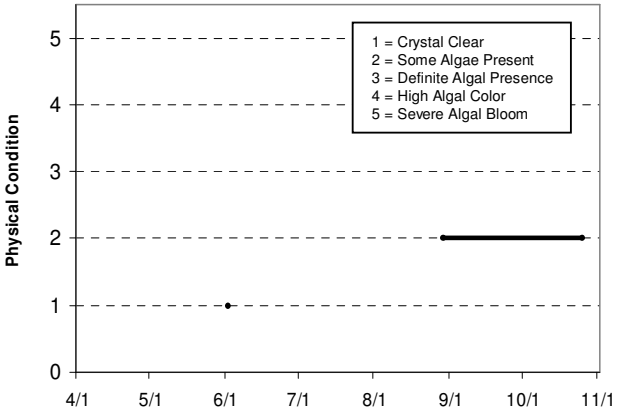






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/02/07	22.7				2	18		4.95	1	1
06/11/07										
06/25/07										
07/09/07										
07/23/07										
08/29/07	23.9				3.3	24		2.85	2	3
10/25/07	11.4				15	47		2.2	2	1

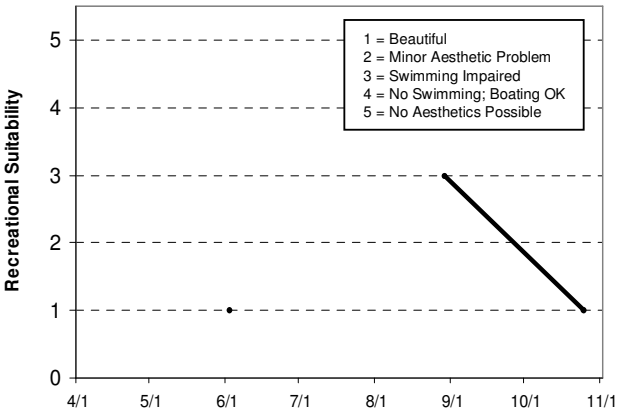


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	A
Chlorophyll a													A	A
Secchi Depth													A	A
Overall													**B**	**A**

Source: Metropolitan Council and STORET data



Goetschel Lake (82-0313) *Valley Branch Watershed District*

Goetschel Lake is located in Grant Township (Washington County). This was the sixth year that the 22-acre lake has been a part of CAMP. The lake's mean and maximum depth of 1.2 m (4 feet) and 4.2 m (14 feet) translates to an approximate volume of 88 ac-ft. Because of the shallowness of the lake, its entire surface area is considered littoral, that is, the 0-15 foot depth area of the lake dominated by aquatic vegetation. The lake has a 2,812-acre watershed that, when divided by the surface area of the lake results in a large watershed-to-lake size ratio of 122:1 (the larger the ratio the greater the potential stress on the lake from surface runoff).

A search through the STORET nationwide water quality database determined that the 2002-2006 CAMP data are the only years of available water quality data for the lake.

The lake was monitored 5 times between mid-May and late-August 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	31.6	17.0	44.0	B
CLA (µg/l)	3.0	1.8	3.6	A
Secchi (m)	1.6	1.0	2.2	C
TKN (mg/l)	0.58	0.36	0.69	
			Water Quality	B

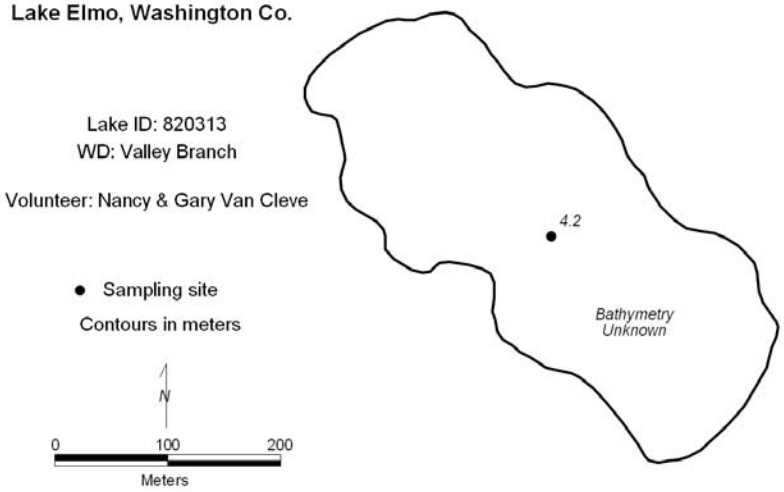
The lakes 2006 water quality grade is similar to those recorded in 2002-2006. As mentioned earlier, there are no water quality data available for Goetschel Lake other than the 2002-2007 CAMP data. Therefore there are not sufficient data to determine any long-term trends. In the short-term however, the lake's water quality is well represented by an grade of B. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

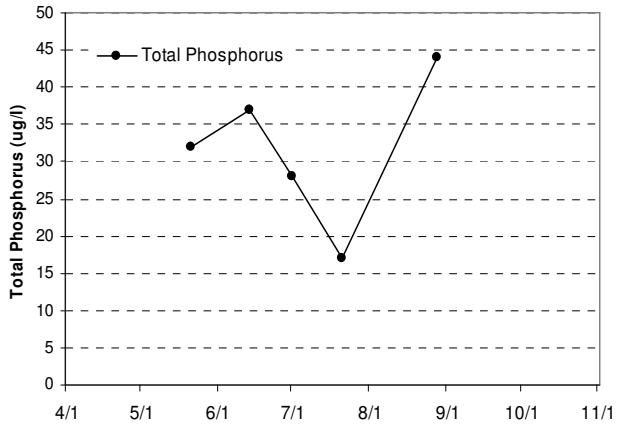
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 3.4 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.6 (between 3- "swimming impaired" and 4- "no swimming – boating ok").

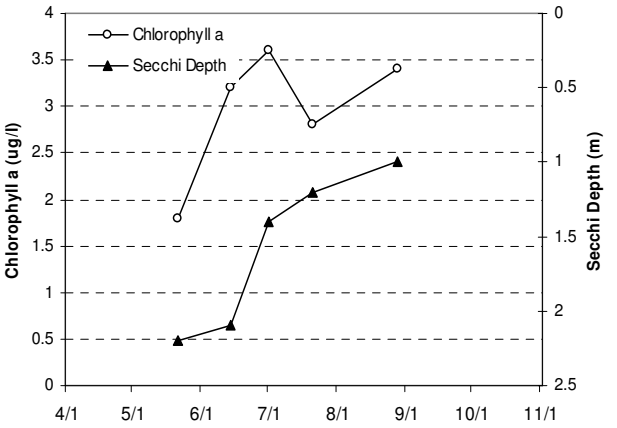
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Goetschel Pond

Lake Elmo, Washington Co.

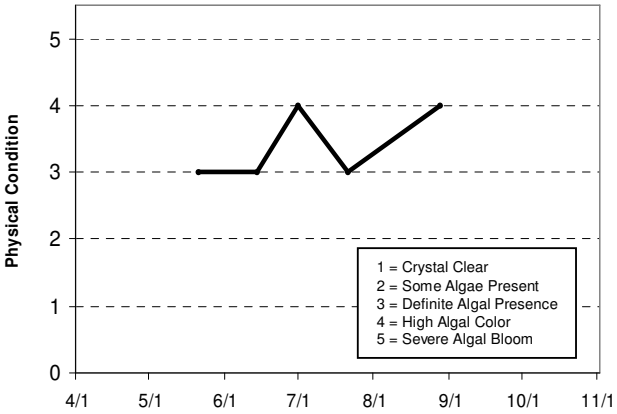






2007 Data

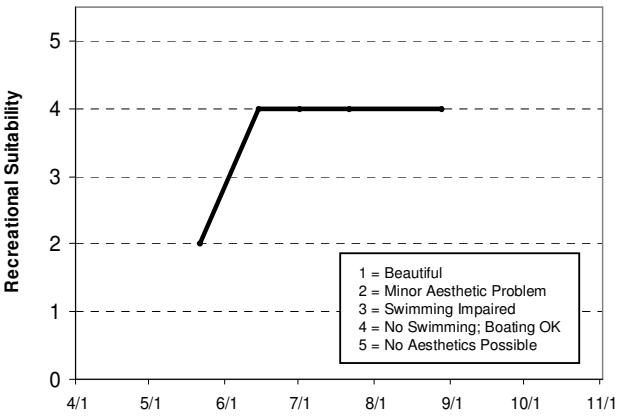
Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/21/07	19.3				1.8	32		2.2	3	2
06/14/07	24				3.2	37		2.1	3	4
07/01/07	26.6				3.6	28		1.4	4	4
07/21/07	23.8				2.8	17		1.2	3	4
08/28/07	22.3				3.4	44		1	4	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									C	C	B	C	C	B
Chlorophyll a									A	A	B	A	A	A
Secchi Depth									C	B	C	C	B	C
Overall									**B**	**B**	**B**	**B**	**B**	**B**



Source: Metropolitan Council and STORET data

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

Goggins Lake is an 11-acre lake located within May Township (Washington County). 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).

This was the ninth year that Goggins Lake has been involved in CAMP (1999 being the first). Other than the CAMP data, a search through the STORET nationwide water quality database for historical water quality data for the lake came up empty. The lake was monitored 14 times between mid-April and mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

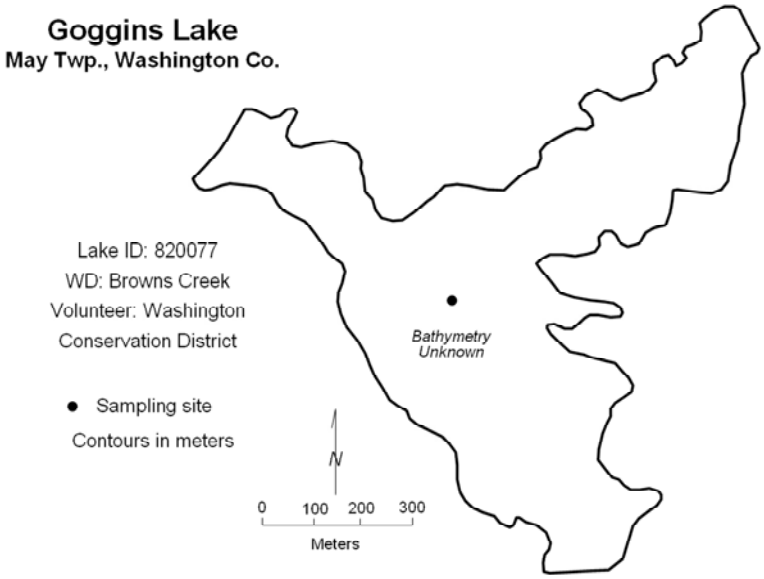
2007 summer (May-September) data summary

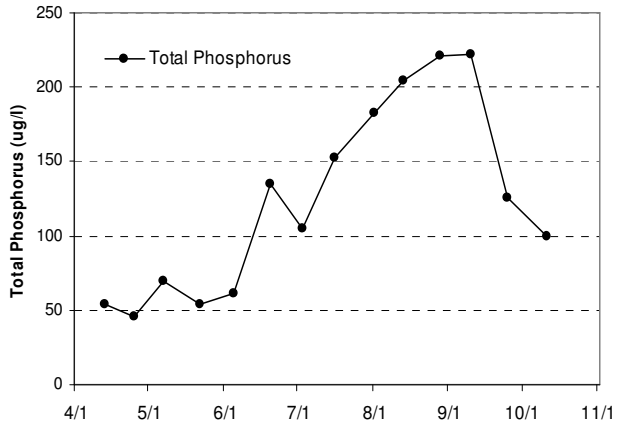
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	139.5	54.0	222.0	D
CLA (µg/l)	76.1	5.5	140.0	D
Secchi (m)	0.8	0.3	2.6	D
TKN (mg/l)	3.05	1.40	4.70	
			Water Quality	D

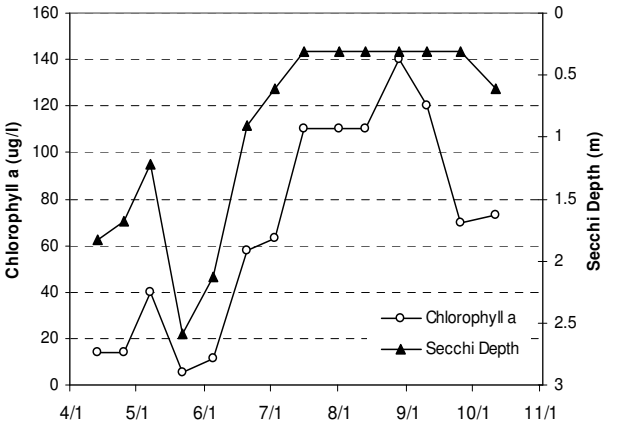
The 2007 grade is similar to other past year's data where letter grades of D were received. The lake seems to fluctuate between an grade of C and D. However, 2007 marks the first year where all three parameters received a letter grade of D. In previous years, a C was received in at least one of the parameters. In fact, this was the first year a D was received for chlorophyll-a; all previous years have seen C's for this parameter. The lake's water quality is represented by an grade of D/C. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.5 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.6 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming – boating ok").

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

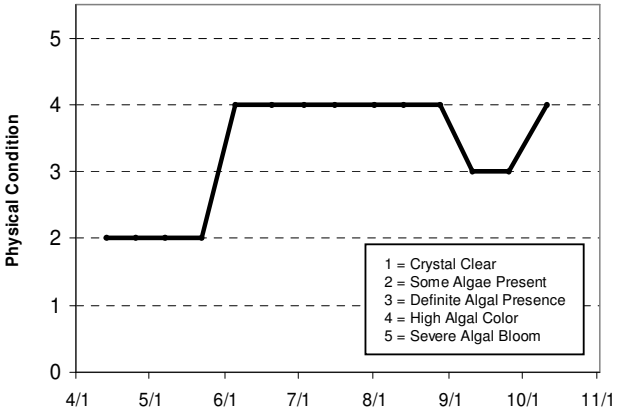






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
04/13/07	4.6	4.4	12.99	12.92	14	54		1.829	2	4
04/25/07	14.1	14	10.46	9.81	14	46		1.676	2	4
05/07/07	15.5	15.2	11.93	10.29	40	70		1.219	2	4
05/22/07	18.7	18.6	8.19	4.02	5.5	54		2.591	2	4
06/05/07	21.9	21.4	6.07	1.9	11	61		2.134	4	4
06/20/07	26.2	23.1	6.08	0.1	58	135		0.914	4	4
07/03/07	26.4	23.4	7.06	0.16	63	105		0.61	4	2
07/16/07	26.2	23.9	8.81	0.09	110	153		0.305	4	2
08/01/07	29.7	24.7	8.45	0.09	110	183		0.305	4	4
08/13/07	25.1	22.2	6.79	0.08	110	204		0.305	4	4
08/28/07	23.9	22	6.99	0.14	140	221		0.305	4	4
09/10/07	23.4	23	6.25	0.2	120	222		0.305	3	4
09/25/07	22	21.2	8.19	0.33	70	126		0.305	3	4
10/11/07	16.2	16.2	8.86	8.88	73	100		0.61	4	4

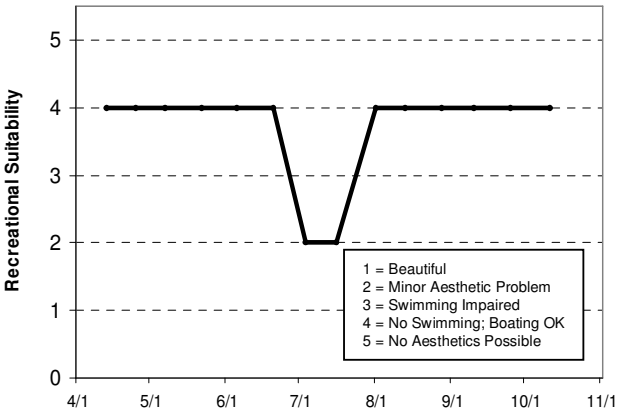


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D	D	D	D	C	C	D	D	D
Chlorophyll a						C	C	C	C	C	C	C	C	D
Secchi Depth						C	D	D	D	C	D	C	D	D
Overall						**C**	**D**	**D**	**D**	**C**	**C**	**C**	**D**	**D**

Source: Metropolitan Council and STORET data



Golden Lake (2-0045) *Rice Creek Watershed District*

Golden Lake is located in the City of Circle Pines (Anoka County). Public access to the 57-acre lake (1.5 miles in circumference) is possible for non-motorized boats through Golden Lake County Park. The mean and maximum depths of the lake are 2.5 m (8 feet) and 7.3 m (24 feet), respectively. The lake's size and mean depth results in an approximate lake volume of 460 ac-ft. Roughly 42 percent of the lake is considered littoral zone, that is, an area of aquatic plant dominance. The lake's 7,680-acre watershed translates to a large watershed-to-lake size ratio of 135:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The lake was monitored 10 times between mid-May and early-October 2007. On each sampling date, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	50.9	27.0	94.0	C
CLA (µg/l)	32.8	15.0	70.0	C
Secchi (m)	1.3	0.8	1.8	C
TKN (mg/l)	2.79	2.20	3.50	
			Water Quality	C

Golden Lake has a fairly extensive water quality database with Secchi and nutrient data for 1980-1981, 1984-1991, and 1993-2005. Because the lake's water quality grade has fluctuated between C, D, and F throughout 20+ years of monitoring data, no long-term trends are apparent. It seems that the lake has a very wide fluctuation range in its water quality. In order to detect any possible long-term trends, more years of data collection are needed.

The physical and recreational conditions of Golden Lake as perceived by the volunteer(s) were ranked on a 1-to-5 scale. These rankings are shown on the lake's information sheet on the next page. The summertime mean physical condition was 1.8 (between 1- " crystal clear" and 2- "some algae present"). The mean suitability for recreation ranking, was 1.7 (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

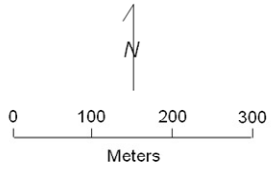
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

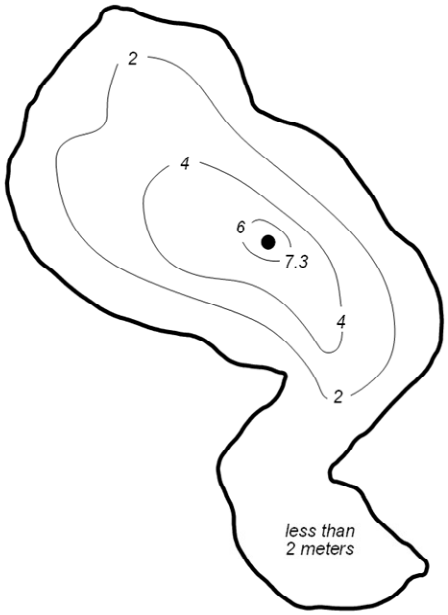
Golden Lake

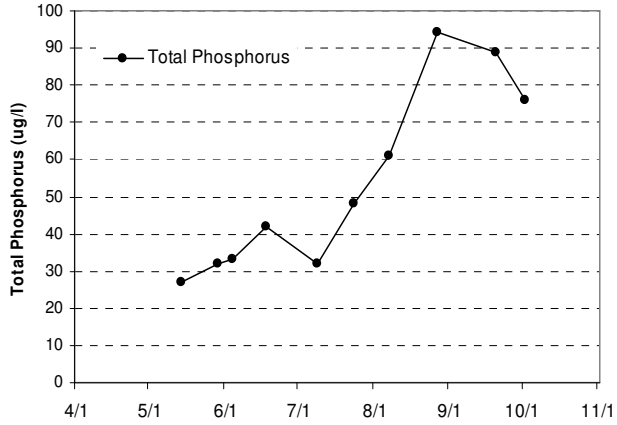
Circle Pines, Anoka Co.

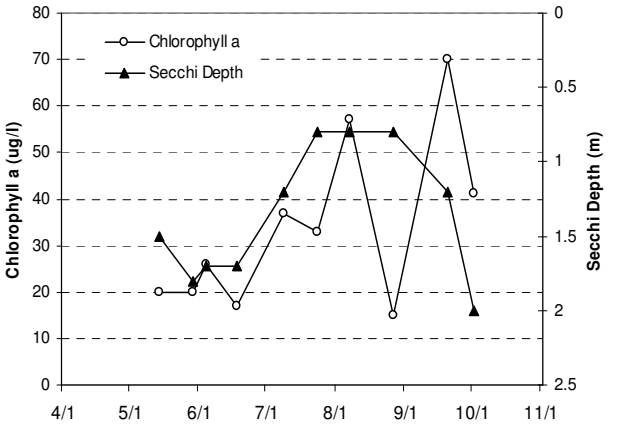
Lake ID: 20045
WD: Rice Creek
Volunteer: Dave Phipps

● Sampling site
Contours in meters



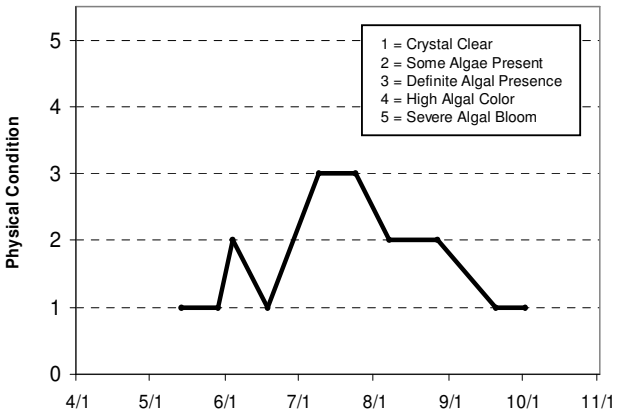






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
05/14/07	18.4				20	27		1.5	1	1
05/29/07	19.6				20	32		1.8	1	2
06/04/07	21.5				26	33		1.7	2	2
06/18/07	26.7				17	42		1.7	1	1
07/09/07	27.6				37	32		1.2	3	2
07/24/07	27.7				33	48		0.8	3	2
08/07/07	25.6				57	61		0.8	2	2
08/27/07	22.2				15	94		0.8	2	2
09/20/07	18.2				70	89		1.2	1	1
10/02/07	17.3				41	76		2	1	1

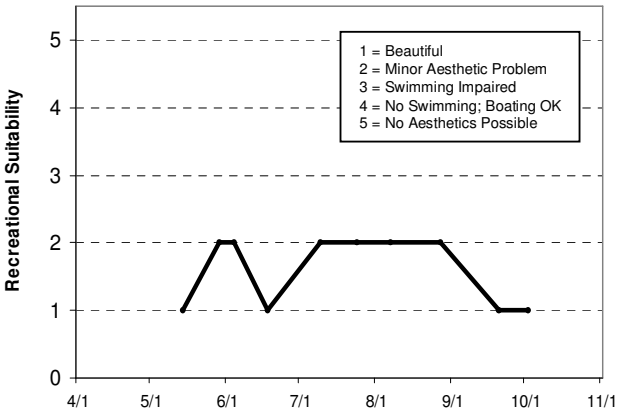


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	D			D	F	C	F	D	D	D	D		D
Chlorophyll a	D					C	C	D	F	F	F	F		D
Secchi Depth	D	D				C	C	C	F	F	F	F		D
Overall	**D**					**D**	**C**	**D**	**F**	**F**	**F**	**F**		**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	D	C	C	C	D	D	D	D	C	D	C
Chlorophyll a			C	C	C	C	C	D	D	C	D	C	C	C
Secchi Depth			D	D	D	D	C	D	D	D	F	C	C	C
Overall			**C**	**D**	**C**	**C**	**C**	**D**	**D**	**D**	**D**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Goose Lake [Scandia] (82-0059) *Marine on St. Croix Watershed Management Organization*

Goose Lake, an 83-acre lake (1.9 miles in circumference) is located in the City of Scandia (Washington County). The lake has an area of 83 acres, and has a circumference of 1.9 miles. Goose Lake was enrolled in CAMP in 1994-1998 and 2004-2006. The lake has a maximum and mean depth of 7.6 m (25 feet) and 2.4 m (8 feet), respectively. The lake's mean depth and size translate to a lake volume of approximately, 664 ac-ft. Because of the shallowness of the lake, roughly 98 percent of the lake is considered littoral (the area of aquatic vegetation dominance). A Public access is located on the western side of the lake.

The lake was monitored seven times from mid-April to early-October 2007. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	45.6	25.0	75.0	C
CLA (µg/l)	47.0	9.9	98.0	C
Secchi (m)	1.5	0.6	2.9	C
TKN (mg/l)	1.69	0.84	3.10	
			Water Quality	C

The lake's 2007 grade was the same as those recorded in 1994-1998 and 2004-2006. No trends are apparent in the water quality for this lake. There is some fluctuation in each parameters annual means, however. On the short-term, however, the lake's water quality seems to be represented quite well by an grade of C. To better understand the quality of the lake and what direction it may be heading, more years of data collection are needed.

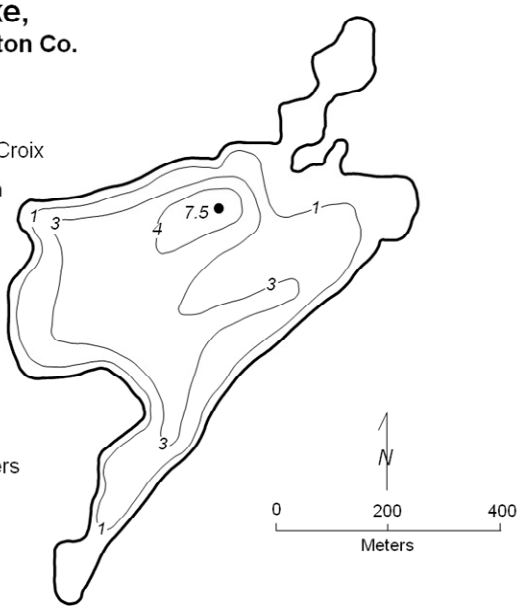
Throughout the monitoring period, the volunteers' opinion of the lake's physical and recreational conditions was ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 3.4 (roughly 3- "definite algae present"), while the mean recreational suitability ranking was 2.8 (between 2- "minor aesthetic problem and 3- "swimming slightly impaired").

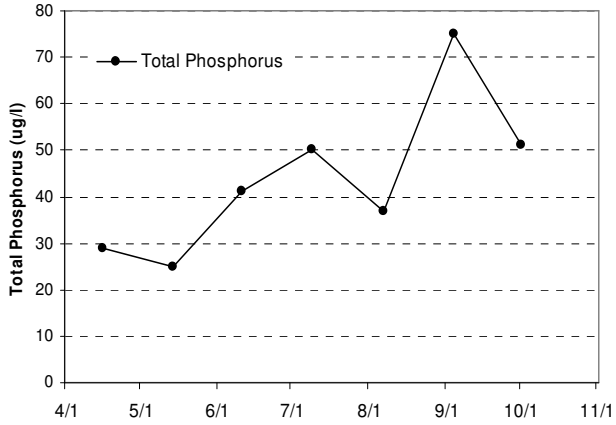
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

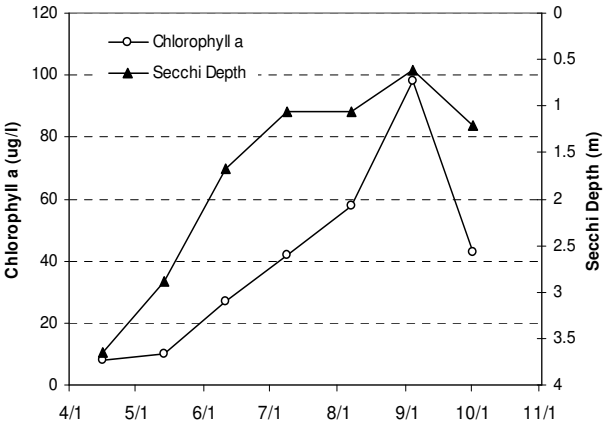
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Goose Lake,
Scandia, Washington Co.

Lake ID: 820059
WD: Carnelian-Marine-St. Croix
Volunteer: Washington
Conservation District

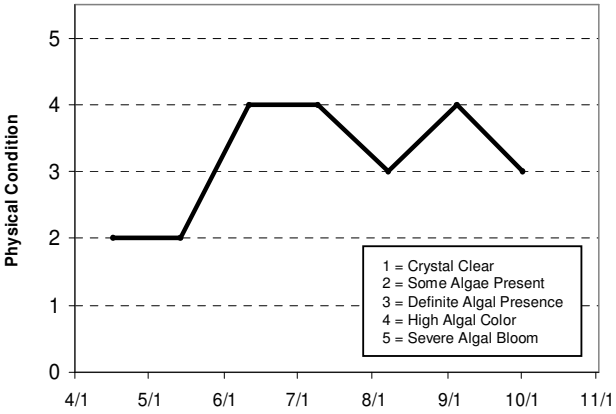






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.1	6.2	12.82	11.21	7.8	29		3.658	2	2
05/14/07	19.6	15.7	10.1	4.74	9.9	25		2.896	2	2
06/11/07	25.1	20.3	8.52	0.13	27	41		1.676	4	2
07/09/07	30	20.5	7.54	0.11	42	50		1.067	4	2
08/07/07	27.9	21.6	8.7	0.1	58	37		1.067	3	4
09/04/07	26.6	22.4	10.93	0.13	98	75		0.61	4	4
10/01/07	19.9	19.6	5.52	4.76	43	51		1.219	3	4

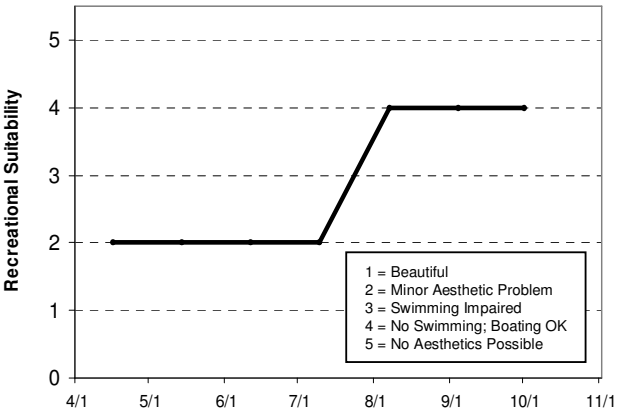


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	D	C	C	C						C	C	D	C
Chlorophyll a	C	B	C	C	C						C	C	C	C
Secchi Depth	D	C	C	C	C						B	C	C	C
Overall	**C**	**C**	**C**	**C**	**C**						**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



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

Goose Lake is located in Waconia Township in Carver County. The lake has been involved in CAMP since 1995. Because the maximum depth of the 407-acre lake is only 3.0 m (10 feet), the entire lake area is considered littoral zone (the 0-15 foot depth area of the lake dominated by aquatic vegetation). Additionally, because of the lake's shallowness it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake's mean depth of 1.5 m (roughly 5 feet) and its surface area translate to an approximate lake volume of 2,035 ac-ft.

The lake has a 1,100-acre immediate watershed, which translates to a watershed-to-lake area ratio of 27:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: four percent residential, 61.0 percent agricultural, and 35.0 percent open/undeveloped (Carver County Planning 1999).

The lake was monitored 13 times between mid-April and mid-October 2007. On each sampling date, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

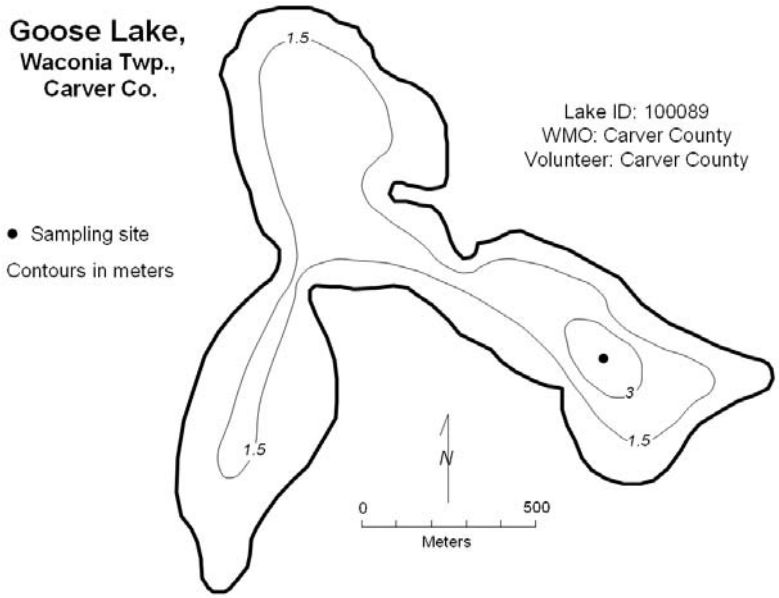
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	103.1	77.0	162.0	D
CLA (µg/l)	137.7	73.0	270.0	F
Secchi (m)	0.4	0.3	0.6	F
TKN (mg/l)	4.49	2.70	5.80	
			Water Quality	F

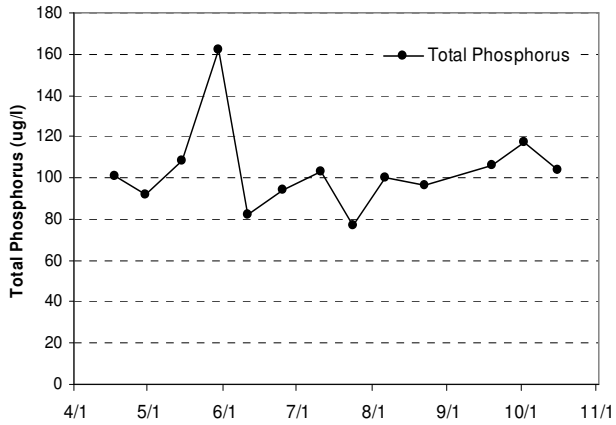
Because of the large variability in the lake's water quality data (grades ranging from C to F), no long-term trends are apparent. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

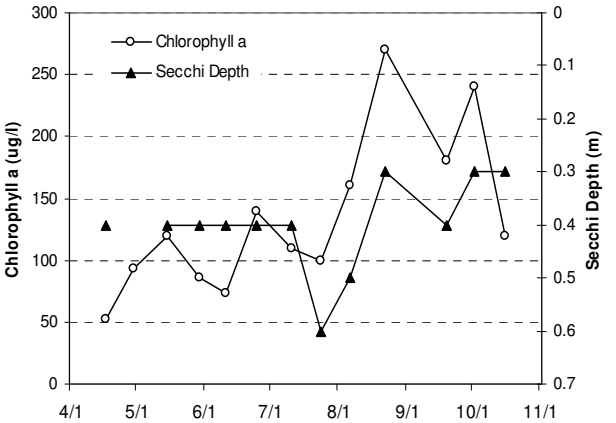
The physical and recreational conditions of Goose Lake as perceived by the volunteer were ranked on a 1-to-5 scale. These rankings are shown on the lake's information sheet on the next page. The mean physical condition ranking was 3.2 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.3, (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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) 297-4916 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.

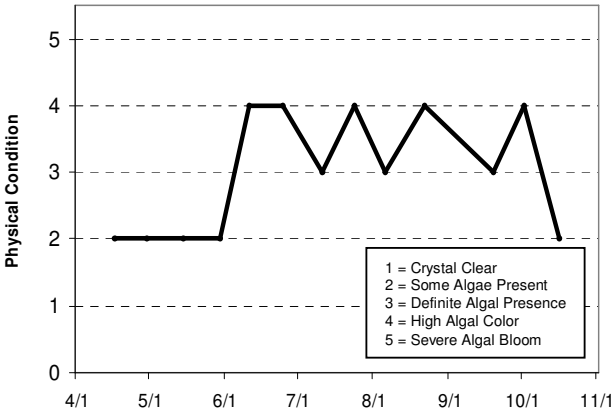






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	9.83		11.11		52	101		0.4	2	2
04/30/07	16.85		11.85		93	92			2	2
05/15/07	18.35		9.72		120	108		0.4	2	2
05/30/07	20.69		9.73		86	162		0.4	2	3
06/11/07					73	82		0.4	4	4
06/25/07	24.7		6.2		140	94		0.4	4	4
07/11/07					110	103		0.4	3	3
07/24/07	26.06		11.53		100	77		0.6	4	4
08/06/07	24.01		8.68		160	100		0.5	3	3
08/22/07	20.84		10.98		270	96		0.3	4	4
09/19/07	17.92		8.09		180	106		0.4	3	3
10/02/07			4.07		240	117		0.3	4	4
10/16/07	24.5		7.39		120	104		0.3	2	2

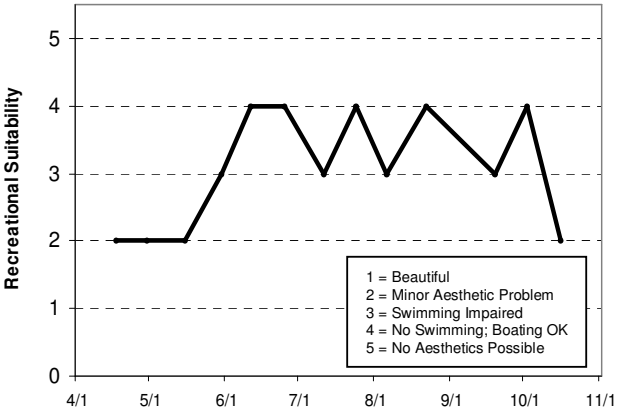


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D	C	F	D	D	F	D	D	F		D	D	D
Chlorophyll a		C	C	D	C	D	F	C	C	F		F	F	F
Secchi Depth		F	C	F	C	F	F	D	F	F		F	F	F
Overall		**D**	**C**	**F**	**C**	**D**	**F**	**D**	**D**	**F**		**F**	**F**	**F**

Source: Metropolitan Council and STORET data



Half Breed Lake [Sylvan] (82-0080) *Comfort Lake-Forest Lake Watershed District*

Half Breed Lake (also known as Sylvan Lake) is a 75-acre lake located in Forest Lake Township (Washington County). The lake's mean and maximum depth of 1.7 m (5.6 feet) and 10.3 m (34 feet) translates to an approximate volume of 420 ac-ft. Roughly 67 percent of the lake's surface area is considered littoral, that is, the area dominated by aquatic vegetation. The lake has a 303-acre watershed which, when divided by the surface area of the lake results in a rather small watershed-to-lake size ratio of 4:1 (the larger the ratio the greater the potential stress on the lake from surface runoff). The lake has no inlets and no public access to the lake.

Half Breed Lake was monitored 11 times from late-April to early-September 2007. The collected data and resulting graphs showing the seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	13.8	12.0	17.0	A
CLA (µg/l)	5.4	1.7	28.0	A
Secchi (m)	4.5	4.0	5.0	A
TKN (mg/l)	0.51	0.24	0.83	
			Water Quality	A

The lake's 2007 grade is similar to previous years of data. Historic water quality data and resulting lake quality grades indicate that the lake has maintained its high quality over the past 20+ years. Additionally, the MPCA recently conducted a trend analysis on the lake's Secchi transparency data, which revealed a statistically significant improvement in recent water clarity.

Throughout the monitoring period, the volunteer's opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 1.0 (1- "crystal clear"), while the mean recreational suitability ranking was 1.0 (between 1- "beautiful").

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) 297-4916 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.

Halfbreed Lake

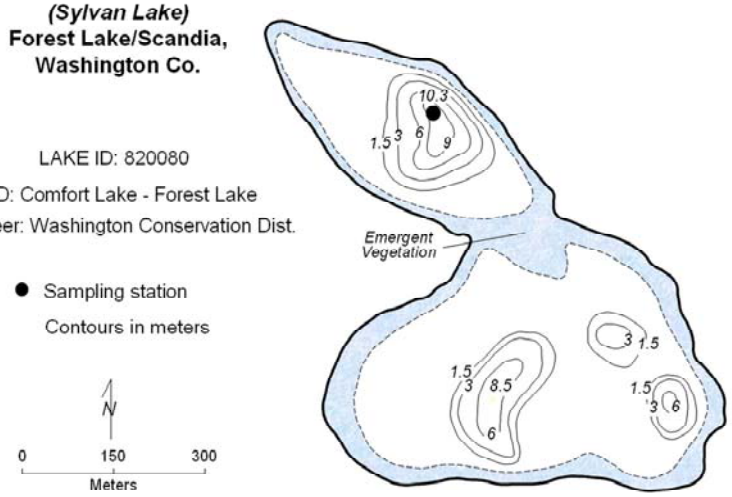
(Sylvan Lake)

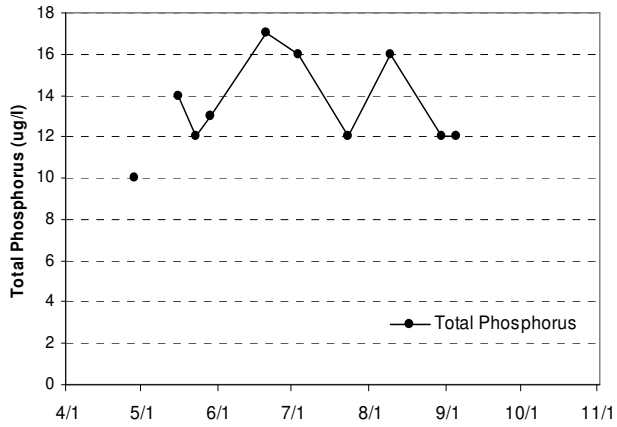
Forest Lake/Scandia, Washington Co.

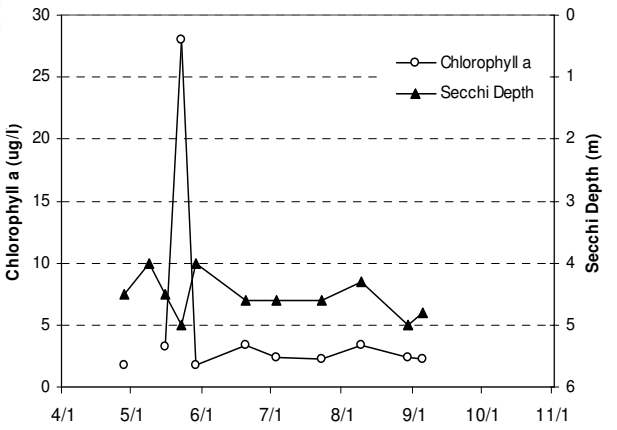
LAKE ID: 820080

WD: Comfort Lake - Forest Lake

Volunteer: Washington Conservation Dist.

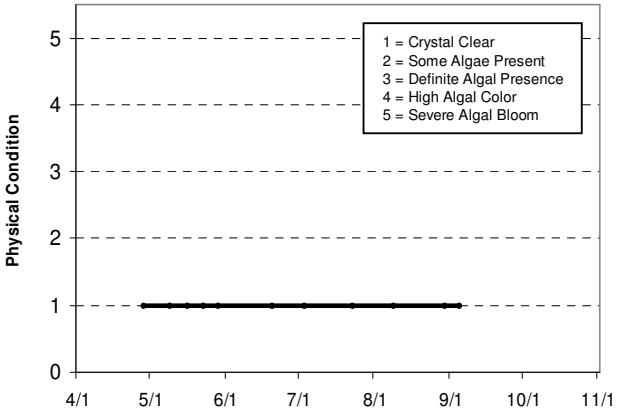






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/28/07	16.3				1.8	10		4.5	1	1
05/09/07	17.7							4	1	1
05/16/07	17.6				3.2	14		4.5	1	1
05/23/07	19.9				28	12		5	1	1
05/29/07	19.7				1.7	13		4	1	1
06/20/07	24				3.3	17		4.6	1	1
07/03/07	24				2.4	16		4.6	1	1
07/23/07	24.1				2.2	12		4.6	1	1
08/09/07	25.3				3.3	16		4.3	1	1
08/30/07	21.8				2.4	12		5	1	1
09/05/07	23.8				2.3	12		4.8	1	1

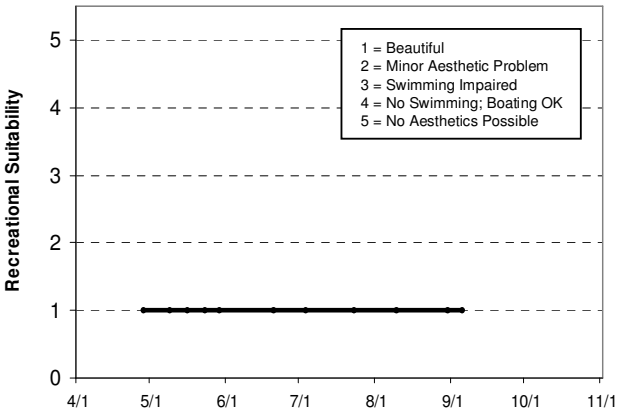


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	B	A					C	B	A	A		A		A
Chlorophyll a							B	A	A	A		A		A
Secchi Depth	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Overall							**B**	**A**	**A**	**A**		**A**		**A**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			A		A	A	A	A	A	A	A	A		A
Chlorophyll a			A		A	A	A	A	A	A	A	A		A
Secchi Depth			A		A	A	A	A	A	A	A	A		A
Overall			**A**		**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**		**A**

Source: Metropolitan Council and STORET data



Hay Lake (82-0065) *Marine on St. Croix Watershed Management Organization*

Hay lake is located in City of Scandia (Washington County). The only known morphological data available for the 33-acre lake is its maximum depth (6.1 m [20 feet]). Other than the 1998-2001, and 2003-2007 CAMP data for the lake, a search for historical water quality data and any physical information came up empty.

The lake was monitored 7 times between mid-April and early-October 2007. During each monitoring event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	79.2	28.0	139.0	D
CLA (µg/l)	32.9	4.7	55.0	C
Secchi (m)	1.5	0.9	2.1	C
TKN (mg/l)	1.24	0.78	1.80	
			Water Quality	C

The lake's 2007 lake water quality grade (C) was similar to that recorded in 2003 and 2006, and better than those recorded in 1998-2001, and 2004-2005 (D). The lake seems well represented with an water quality grade of D/C. 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) ranked the perceived physical condition of the lake on a 1-to-5 scale. The mean perceived physical condition of Hay Lake was 2.0 (2- "some algae present"), while the mean recreational suitability was 1.4 (between 1- "beautiful" and 2- "minor aesthetic possible").

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

Hay Lake

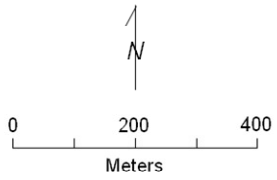
Scandia,

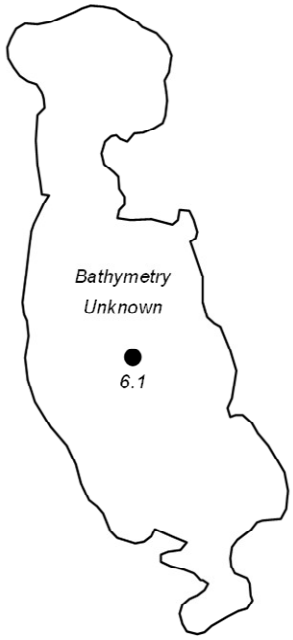
Washington Co.

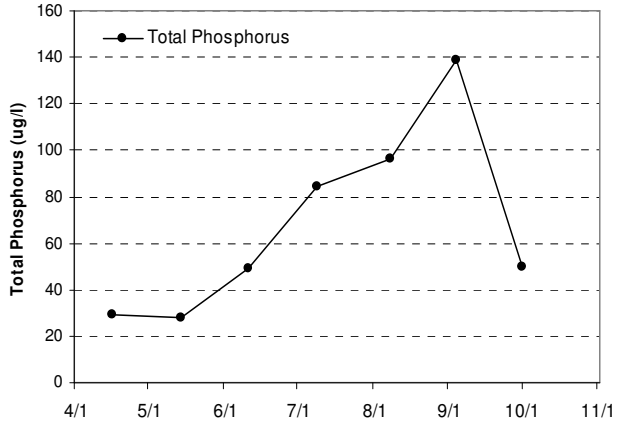
LAKE ID: 820065
WD: Carnelian-Marine-St. Croix
Volunteer: Washington Conservation District

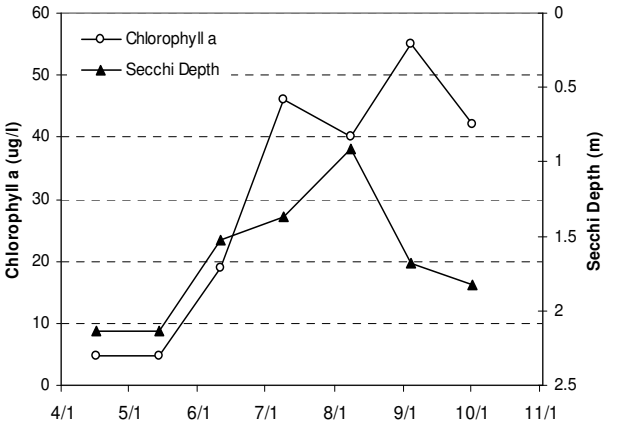
● Sampling site

Contours in meters



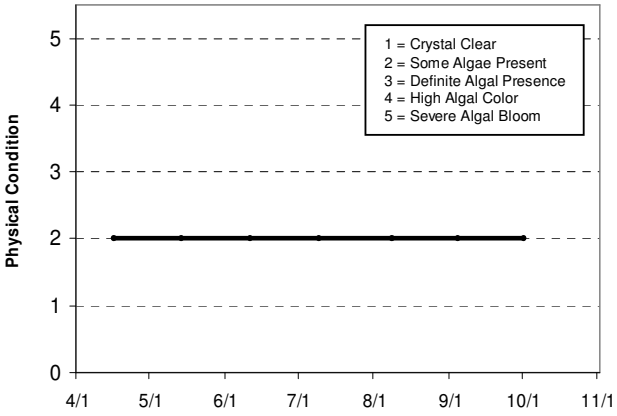






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	9.6	9.4	11.65	11.52	4.7	29		2.134	2	1
05/14/07	21.5	21.2	8.1	8.01	4.7	28		2.134	2	1
06/11/07	25.3	22.6	7.39	2.69	19	49		1.524	2	1
07/09/07	30.2	26.2	6.14	0.1	46	84		1.372	2	1
08/08/07	26.6	24.9	4.03	0.14	40	96		0.914	2	2
09/04/07	27.2	24.2	7.25	0.13	55	139		1.676	2	2
10/01/07	19.1	18.8	6.82	0.21	42	50		1.829	2	2

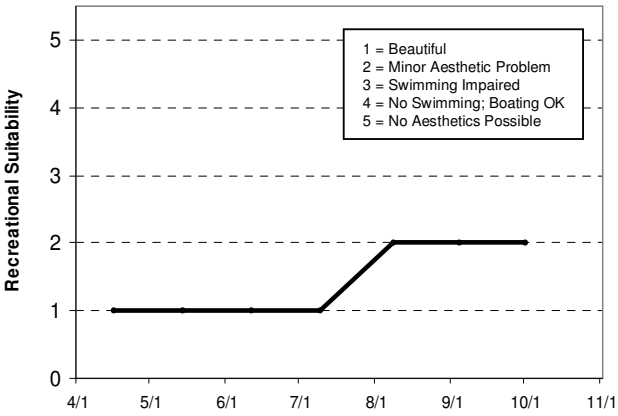


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					D	D	D	D		D	D	D	D	D
Chlorophyll a					F	F	F	F		C	D	F	B	C
Secchi Depth					D	D	D	D		C	D	D	C	C
Overall					**D**	**D**	**D**	**D**		**C**	**D**	**D**	**C**	**C**

Source: Metropolitan Council and STORET data



Henry Lake (27-0175) *Elm Creek Watershed Management Commission*

Henry Lake is a 77-acre lake located within Hassan Township (Hennepin County). Because the maximum depth of the lake is only 1.5 m (5 feet), the entire lake area is considered littoral zone (the 0-15 foot depth area of the lake dominated by aquatic vegetation). Additionally, because of the lake's shallowness it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

This marks the fourth year that Henry Lake has been involved in CAMP. Other than for the 1995 and 2005-2007 CAMP data, a search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, 1995, 2005-2007 are the only known years of data available.

The lake was monitored 6 times between late-June and early-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	168.8	75.0	244.0	F
CLA (µg/l)	32.9	6.7	61.0	C
Secchi (m)	0.9	0.5	1.1	D
TKN (mg/l)	1.82	1.40	2.30	
			Water Quality	D

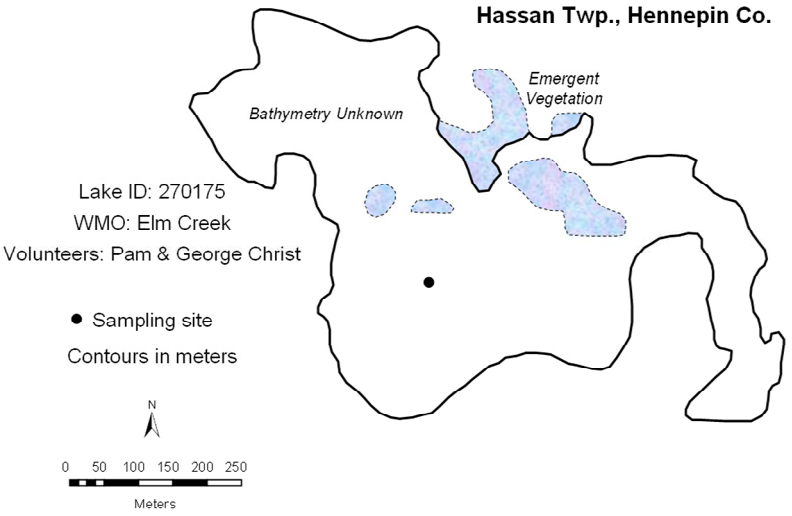
The lake's 2007 grade was a D, and is similar to previous year's grades. As mentioned earlier, there are no water quality data available for Henry Lake other than the 1995, 2005 - 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

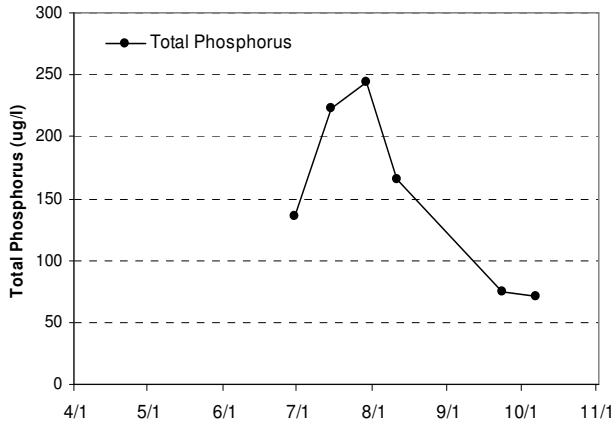
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.4 for physical condition (between 3- "definite algal color" and 4- "high algal color"), and 4.8 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

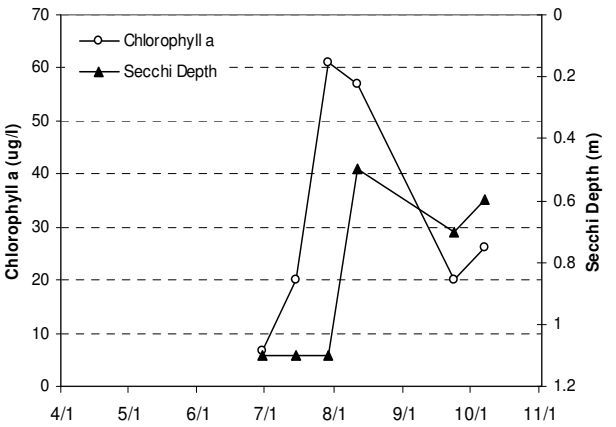
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Henry

Hassan Twp., Hennepin Co.

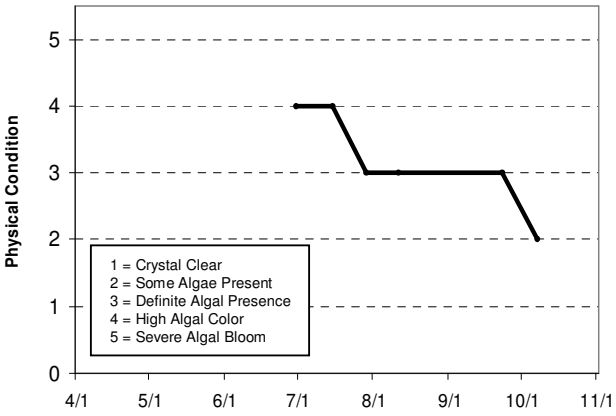






2007 Data

Date	Surf. Tmp C	Bot. Tmp C	Surf. DO (mg/L)	Bot. DO (mg/L)	CLA (ug/L)	Surf. TP (ug/L)	Bot. TP (ug/L)	Secchi (m)	PC 1 thru 5	RS 1 thru 5
06/30/07	26.7				6.7	136		1.1	4	5
07/15/07	28.2				20	223		1.1	4	5
07/29/07	29.9				61	244		1.1	3	4
08/11/07	28				57	166		0.5	3	5
09/23/07	19.3				20	75		0.7	3	5
10/07/07	23				26	71		0.6	2	4

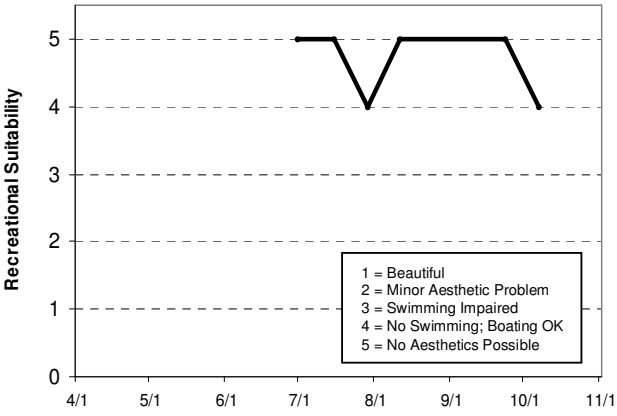


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D										D	F	C
Chlorophyll a		C										C	B	D
Secchi Depth		D										D	C	D
Overall		**D**										**D**	**C**	**D**

Source: Metropolitan Council and STORET data



Herber's Pond (82-0015-01) *Carnelian – Marine Watershed District*

Herber's Pond is a small (13-acre) shallow lake (a maximum depth of approximately 2.0 m (6.6 feet), located in Hugo (Washington County). 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). There is very little other known morphological data available for the water body.

This was the fourth year that Herber's Pond has been involved in CAMP. The lake was monitored 7 times between mid-April and early-October 2007. On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	125.8	76.0	194.0	D
CLA (µg/l)	40.6	18.0	62.0	C
Secchi (m)	1.1	0.6	1.5	D
TKN (mg/l)	1.32	1.20	1.50	
			Water Quality	D

The lake's 2007 water quality grade was a D. The lake's water quality grade seems to fluctuate between C and D from year to year. There are no known nutrient data available for Herber's Pond other than the 2004-2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.4 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 3.6 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

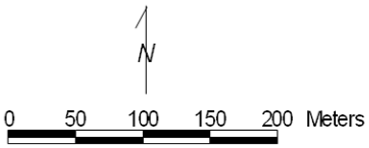
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

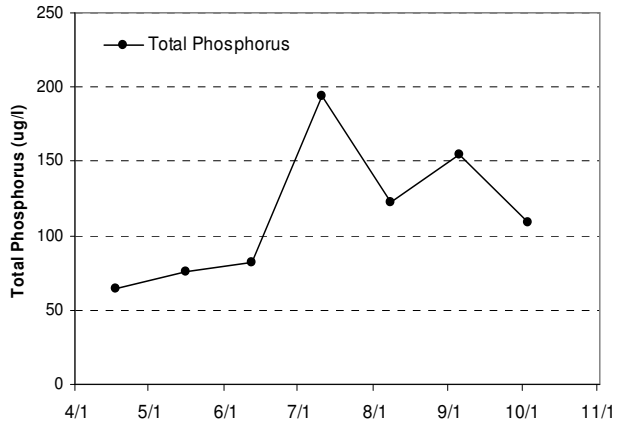
Herber's Pond

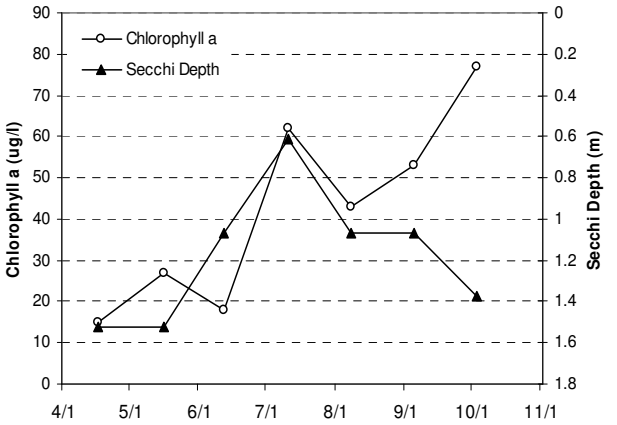
Stillwater Twp.,
Washington Co.

LAKE ID: 820015-01
WD: Carnelian-Marine-St. Croix
Volunteer: Washington Conservation District

● Sampling site
Contours in meters

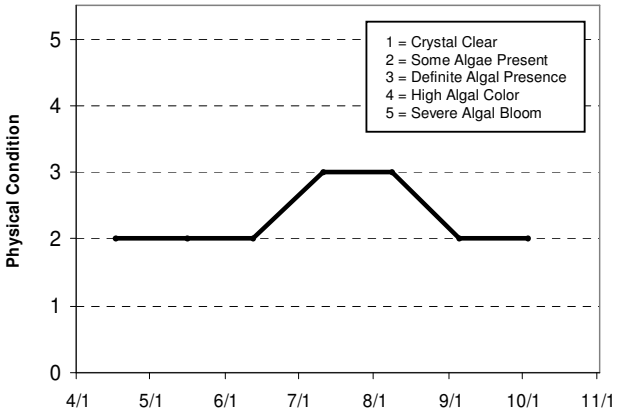






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	11.7	11.7	10.49	10.33	15	64		1.524	2	4
05/16/07	19.6	19.3	8.77	8.02	27	76		1.524	2	4
06/12/07	29.4	23.1	8.6	1.69	18	82		1.067	2	3
07/11/07	25.7	23.8	2.98	0.12	62	194		0.61	3	4
08/08/07	26.4	24	5.05	0.13	43	122		1.067	3	4
09/05/07	25.4	22.9	4.76	0.2	53	155		1.067	2	3
10/03/07	19	17.7	7.1	0.23	77	109		1.372	2	2

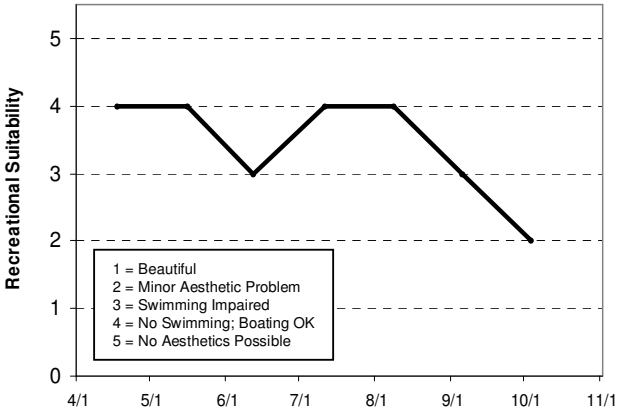


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus											D	D	D	D
Chlorophyll a											C	D	C	C
Secchi Depth											C	D	C	D
Overall											**C**	**D**	**C**	**D**

Source: Metropolitan Council and STORET data



Highland Lake (2-0079) *Anoka County Parks*

Highland Lake is a 22-acre lake located within the City of Columbia Heights (Anoka County). The maximum depth of the lake is approximately only 1.0 m (roughly 3 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).

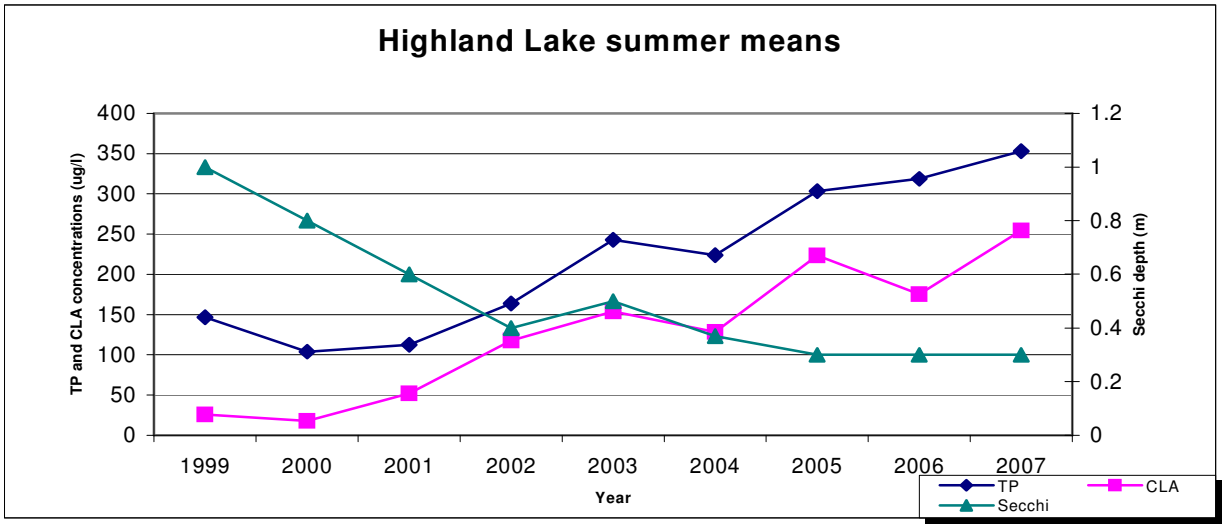
This was the ninth year that Highland Lake has been involved in CAMP. Other than the past CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty.

The lake was monitored 12 times between mid-April and mid-October 2007. During each monitoring event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	353.4	178.0	459.0	F
CLA (µg/l)	254.4	120.0	400.0	F
Secchi (m)	0.3	0.2	0.4	F
TKN (mg/l)	4.81	2.20	6.30	
			Water Quality	F

The lake's water quality seems to be degrading. The lake's recent water quality (2002-2007) apparently is worse than that recorded in 1999-2001 for the summer time means of all three parameters. Furthermore the lake was receiving water quality grades of C and D in 1999 – 2001, whereas recent water quality grades (since 2002) have dropped to a consistent F. To better understand the lake's water quality in the long term and where it may be heading, additional years of data collection are suggested.



The above graph shows the lakes recent degradation. The reason for the degradation in the lake's water quality is not entirely known. A more in-depth study combining watershed as well as in-lake monitoring may help determine the areas contributing the most to the lake's degradation.

The last two graphs on the information sheet show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception ranking, on a 1-to-5 scale, was 3.9 for physical condition (between 3- "definite algae present" and 4- "high algal color") and 4.8 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

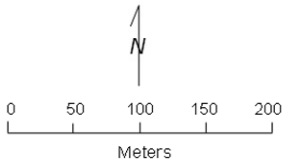
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

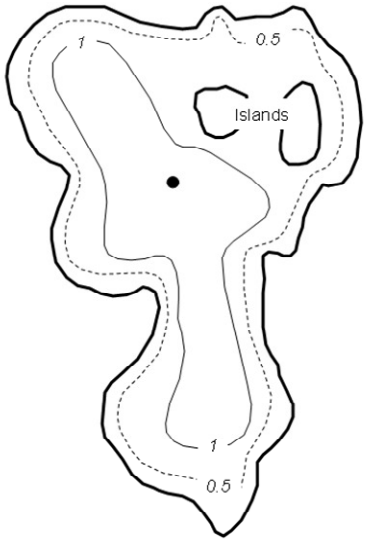
Highland Lake

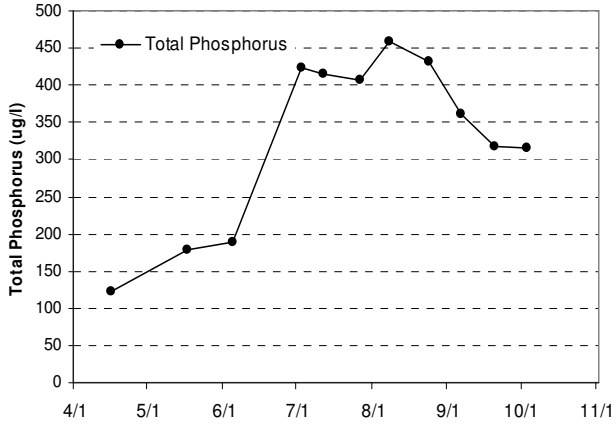
Columbia Heights, Anoka Co.

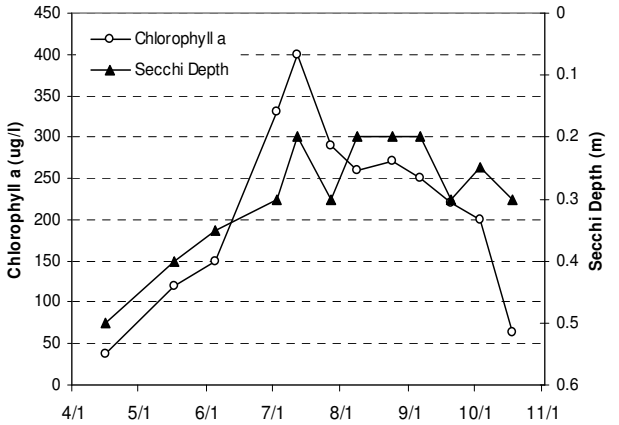
Lake ID: 20079
WMO: Six Cities
Volunteer: Anoka Co. Parks

● Sampling site
Contours in meters



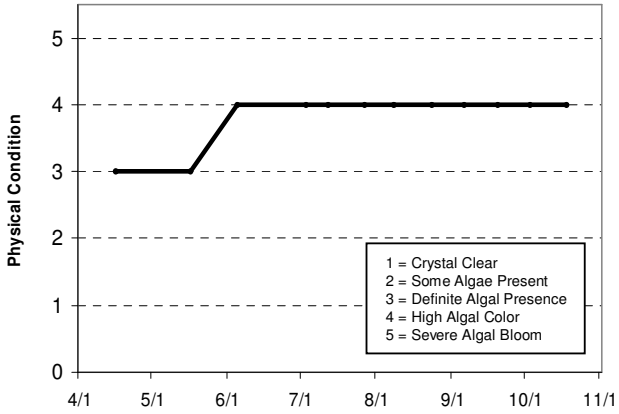






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	12.1				37	123		0.5	3	2
05/17/07	17.3				120	178		0.4	3	4
06/05/07	20.8				150	188		0.35	4	4
07/03/07	23.8				330	424		0.3	4	5
07/12/07	20.8				400	415		0.2	4	5
07/27/07	27.2				290	407		0.3	4	5
08/08/07	24.6				260	459		0.2	4	5
08/24/07	19.7				270	432		0.2	4	5
09/06/07	25.1				250	361		0.2	4	5
09/20/07	17.3				220	317		0.3	4	5
10/03/07	14.8				200	316		0.25	4	5
10/18/07	13.7				64			0.3	4	5

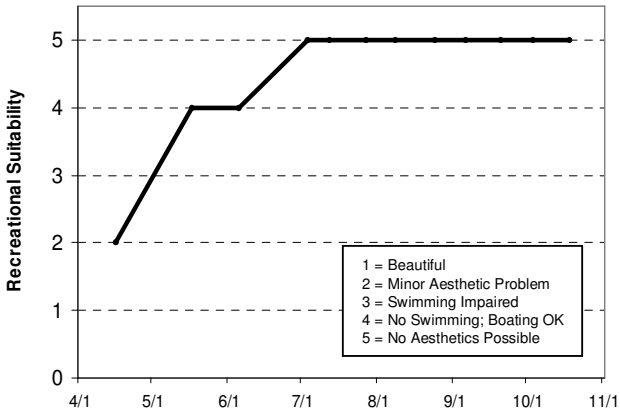


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D	D	D	F	F	F	F	F	F
Chlorophyll a						C	B	D	F	F	F	F	F	F
Secchi Depth						D	D	F	F	F	F	F	F	F
Overall						**D**	**C**	**D**	**F**	**F**	**F**	**F**	**F**	**F**

Source: Metropolitan Council and STORET data



Hornbean Lake (19-0047) *City of Sunfish Lake*

Hornbean Lake is an approximate 22-acre lake located within the City of Sunfish Lake (Dakota County). There is very little morphological information available for the lake.

This was the second year that Hornbean Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, the 2006 and 2007 CAMP data are the only nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 8 times between early-May and mid-October 2007. The resulting data and graphs appear on the next page.

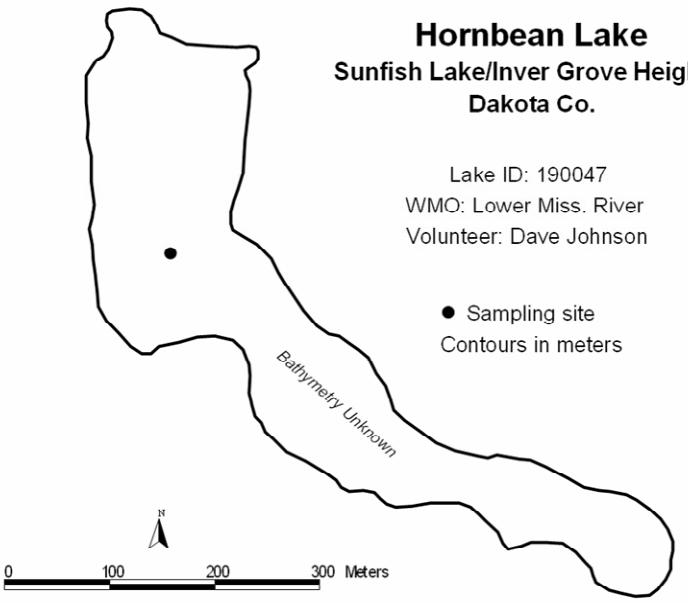
2007 summer (May-September) data summary

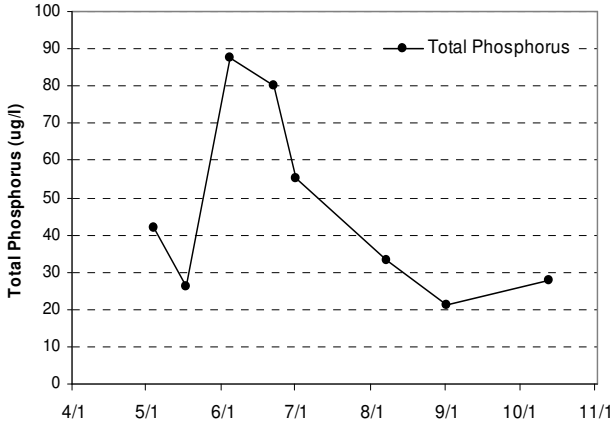
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	49.2	21.0	87.5	C
CLA (µg/l)	30.5	2.6	87.0	C
Secchi (m)	1.4	0.3	2.5	C
TKN (mg/l)	2.45	1.60	3.45	
			Water Quality	C

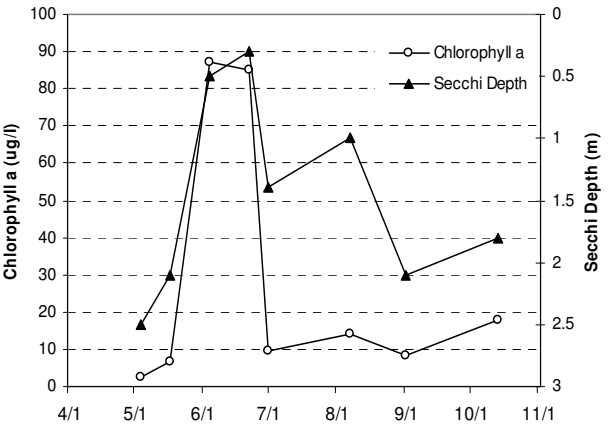
The lake's 2007 lake quality grade was a C, which was the same as last year's grade. As mentioned earlier, there are no nutrient data available for Hornbean Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.1 for physical condition (between 3- "definite algae present" and 4- "high algal color), and 3.4 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming; boating ok").

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

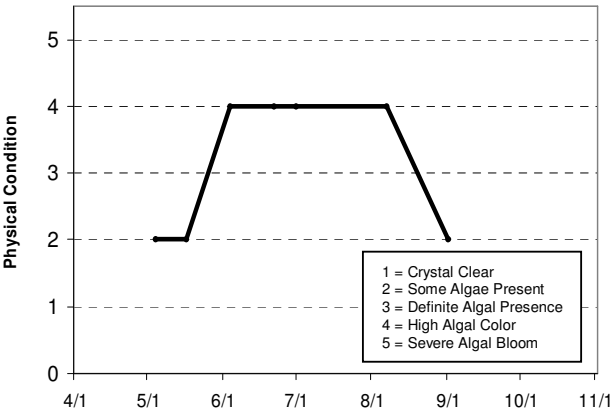






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/04/07	19.3				2.6	42		2.5	2	2
05/17/07	19.6				6.8	26		2.1	2	3
06/04/07	22.2				87	87.5		0.5	4	4
06/22/07	27.5				85	80		0.3	4	4
07/01/07	27.9				9.6	55		1.4	4	4
08/07/07	28.2				14	33		1	4	4
09/01/07	26.7				8.3	21		2.1	2	3
10/13/07	14.6				18	28		1.8		

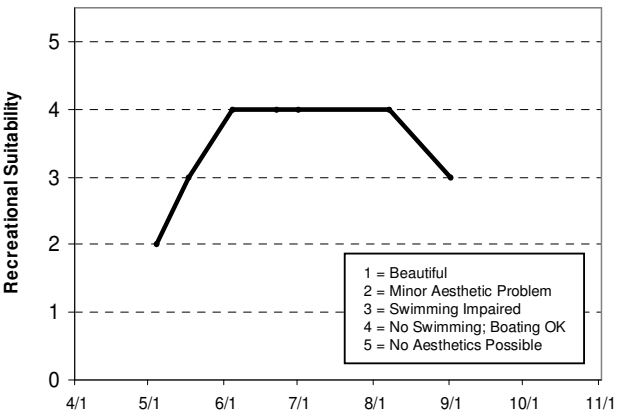


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													B	C
Secchi Depth													C	C
Overall													**C**	**C**

Source: Metropolitan Council and STORET data



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

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

This was the second year that Horseshoe Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Thus, the 2006 and 2007 CAMP data are the only nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 11 times between early-May and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	35.8	24.0	56.0	C
CLA (µg/l)	7.9	1.3	29.0	A
Secchi (m)	1.7	1.3	2.2	C
TKN (mg/l)	0.71	0.54	1.10	
			Water Quality	B

The lake's 2007 lake quality grade was a B, which was similar to last year's grade. The individual grades for each parameter were similar as last year's individual grades as well. As mentioned earlier, there are no nutrient data available for Horseshoe Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 1.6 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

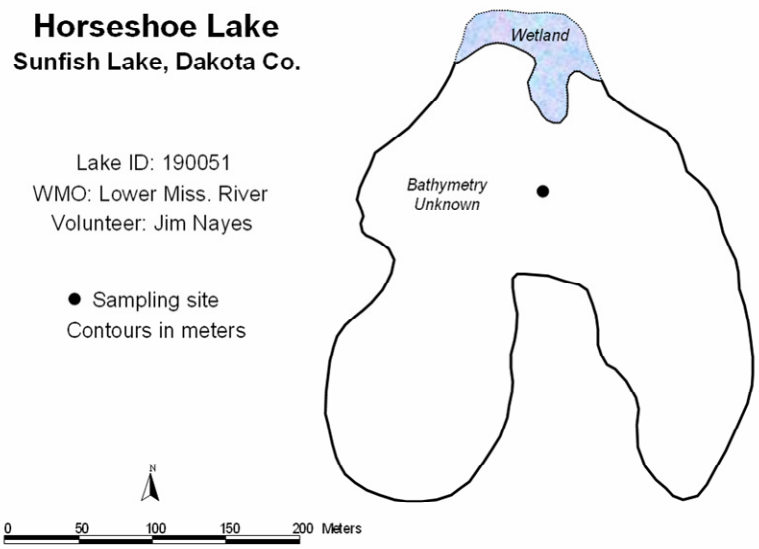
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

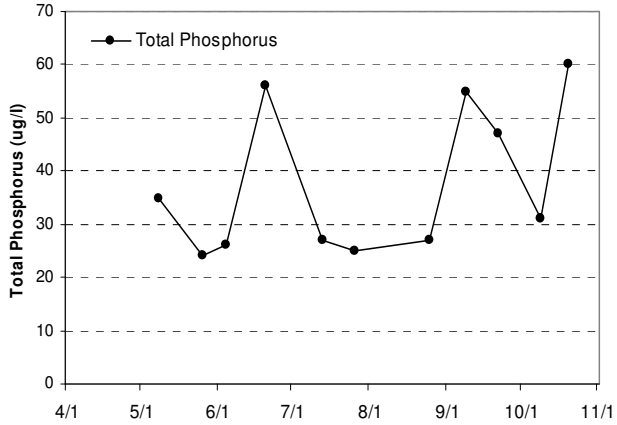
Horseshoe Lake

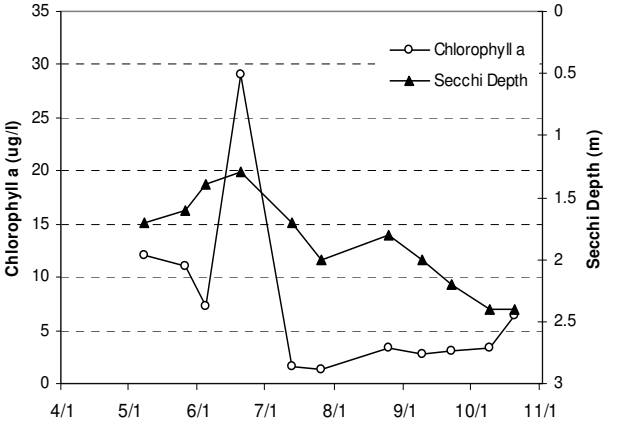
Sunfish Lake, Dakota Co.

Lake ID: 190051
WMO: Lower Miss. River
Volunteer: Jim Nayes

● Sampling site
Contours in meters

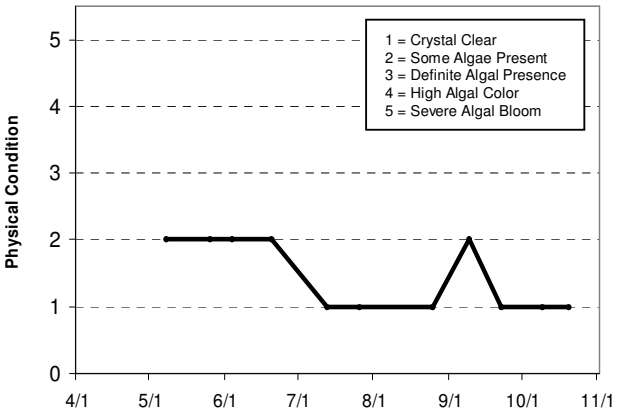






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/08/07	20				12	35		1.7	2	1
05/26/07	19.8				11	24		1.6	2	2
06/04/07	22.7				7.3	26		1.4	2	2
06/20/07	26.6				29	56		1.3	2	2
07/13/07	23.3				1.6	27		1.7	1	4
07/26/07	28.3				1.3	25		2	1	3
08/25/07	22.4				3.3	27		1.8	1	2
09/09/07	21.5				2.7	55		2	2	1
09/22/07	19.2				3.1	47		2.2	1	1
10/09/07	18				3.4	31		2.4	1	1
10/20/07	19.9				6.4	60		2.4	1	1

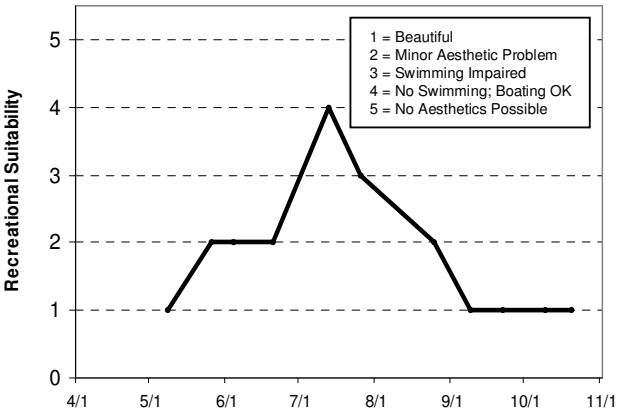


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													A	A
Secchi Depth													C	C
Overall													**B**	**B**

Source: Metropolitan Council and STORET data



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

Hydes Lake, a 215-acre lake located within Waconia Township (Carver County) is considered a Metropolitan Area "Priority Lake" because of its multi-recreational uses. A public access is located on the lake's northeastern shore. The mean and maximum depth of the lake is 3.0 (roughly 10 feet) and 5.5 m (18 feet). Because of the shallowness of the lake, 88 percent of the total lake 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's surface area and mean depth result in an approximate lake volume of 2,150 ac-ft.

The lake has a 430-acre immediate watershed, which translates to a watershed-to-lake area ratio of 2:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: seven percent residential, 76 percent agricultural, and 17 percent open/undeveloped (Carver County Planning 1999).

This was the ninth year that Hydes Lake has been involved in CAMP (the lake was initially enrolled in 1999). The lake has been monitored by Council staff in the past (the last year being 1996). A search of the STORET nationwide water quality database for data on the lake revealed a moderate database throughout the 1990's with nutrient data available in 1985, 1991, 1993, 1996 and now 1999-2006.

The lake was monitored 13 times between mid-April and mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

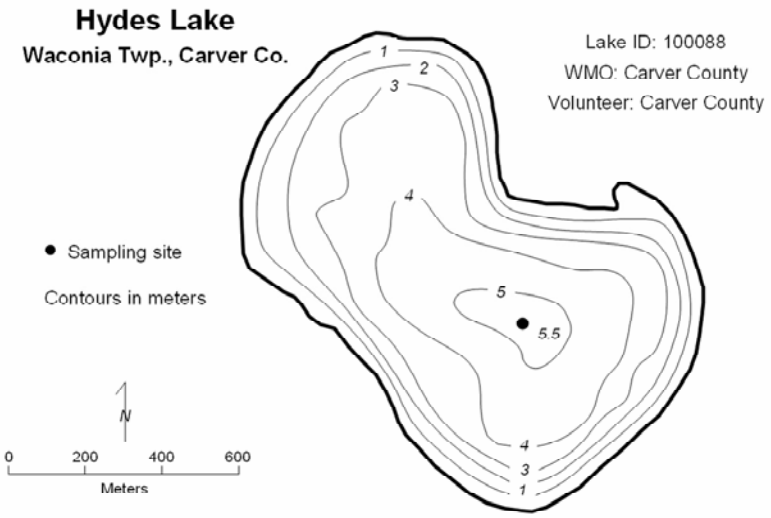
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	150.7	95.0	208.0	D
CLA (µg/l)	60.8	6.4	230.0	D
Secchi (m)	1.6	0.4	3.2	C
TKN (mg/l)	2.51	1.80	3.50	
			Water Quality	D

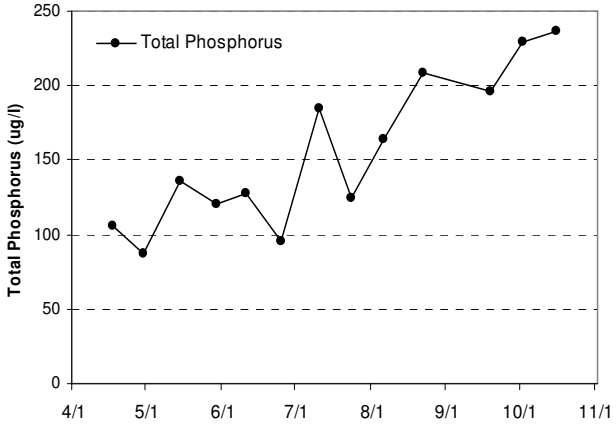
The lake's 2007 grade is similar to most of the lake's past lake grades. The lake has received grades of C for two past years (2001 and 2003), but for the most part the lake water quality may be characterized as a D. No long term trends are apparent in the available lake data. In order to detect any possible long-term trends, additional years of data collection are needed.

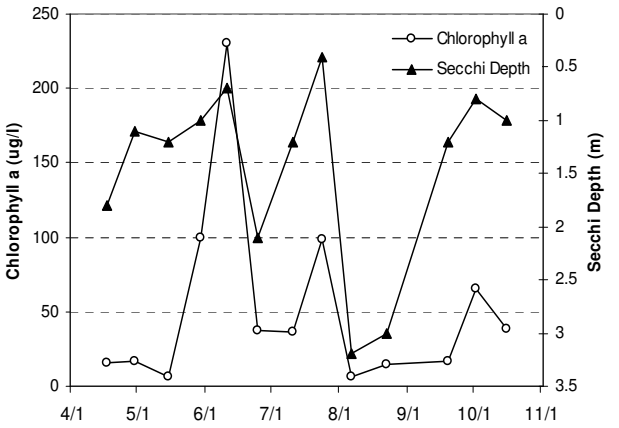
The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.2 for physical condition (between 3- "definite algae present" and 4- "high algal color") and 3.0 for recreational suitability (3- "swimming slightly impaired").

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) 297-4916 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.

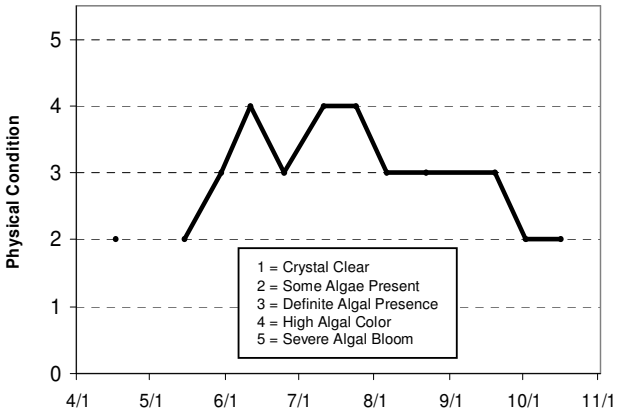






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	7.6		12.05		16	106		1.8	2	2
04/30/07	15.27		11.81		17	87		1.1		2
05/15/07	18.02		8.44		6.4	136		1.2	2	2
05/30/07	19.91		12.12		100	120		1	3	2
06/11/07					230	128		0.7	4	4
06/25/07	24.4		4.6		37	95		2.1	3	3
07/11/07					36	185		1.2	4	4
07/24/07	26.2		14		99	124		0.4	4	4
08/06/07	24.75		2.02		6.6	164		3.2	3	3
08/22/07	22.64		7.35		15	208		3	3	3
09/19/07	18.08		17.59		17	196		1.2	3	2
10/02/07			5.05		65	229		0.8	2	2
10/16/07	12.2		10.34		38	236		1	2	3

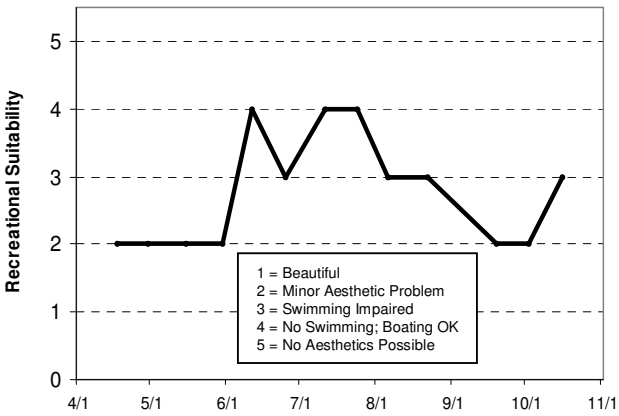


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus						F						F		F
Chlorophyll a						D						D		C
Secchi Depth						D						D		C
Overall						**D**						**D**		**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F			F	F	D	D	D	D	F	F	D
Chlorophyll a			C			C	C	C	C	C	D	D	C	D
Secchi Depth			C			C	C	C	F	C	D	C	C	C
Overall			**D**			**D**	**D**	**C**	**D**	**C**	**D**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data



Island Lake (2-0022) *Anoka County Parks*

This was the fifth year of CAMP monitoring on Island Lake, which is located in Linwood Township (Anoka County). The lake has a surface area of 67 acres and a maximum depth of 6.7 m (22 feet). Roughly 87 percent of the lake's surface area is considered littoral zone (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).

A search through the STORET nationwide water quality database for data on the lake provided only one prior year of water quality data for the lake (1983) prior to the 2003-2006 CAMP data. The lake was monitored 13 times between mid-April and mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.4	16.0	33.0	B
CLA (µg/l)	10.1	4.2	22.0	B
Secchi (m)	1.5	1.0	2.0	C
TKN (mg/l)	0.91	0.77	1.10	
			Water Quality	B

The lake's 2007 lake quality grade of B is similar to that observed in 2003. The grades of B received in 2003 and this year (2007) are the best water quality grades for this lake to date. No long term trends are apparent in the available data. To better understand the quality of the lake and what direction it may be heading, more years of data collection are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.4 for physical condition (between 2- "some algae present" and 3- "definite algal presence") and 1.7 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

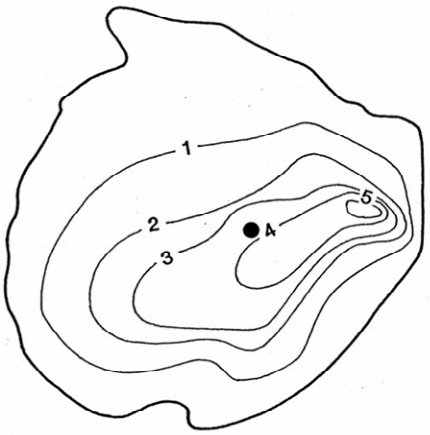
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

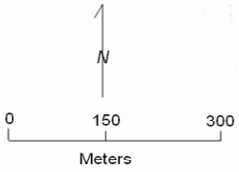
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

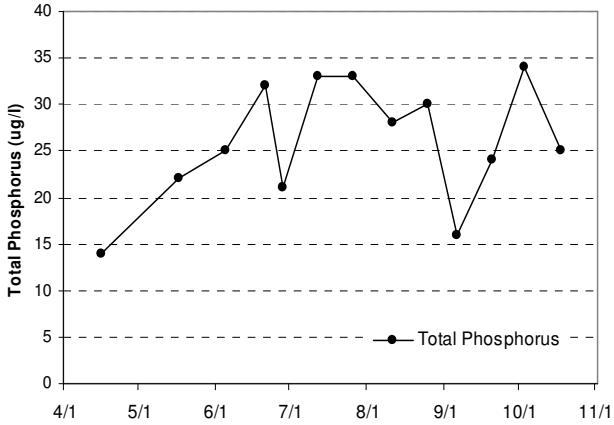
Island Lake
Linwood Twp., Anoka Co.

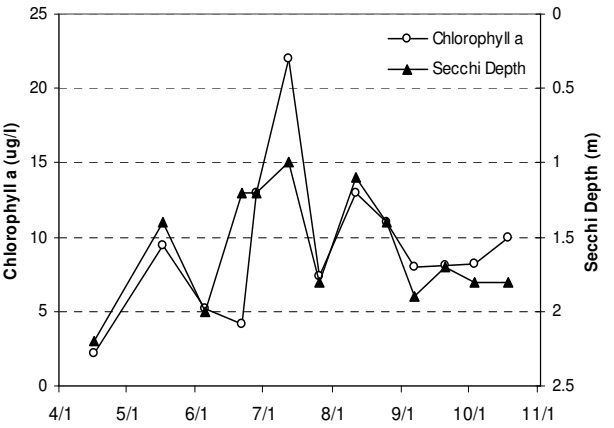
Lake ID: 20022
WMO: Sunrise River
Volunteer: Anoka Co. Parks

● Sampling site
Contours in meters



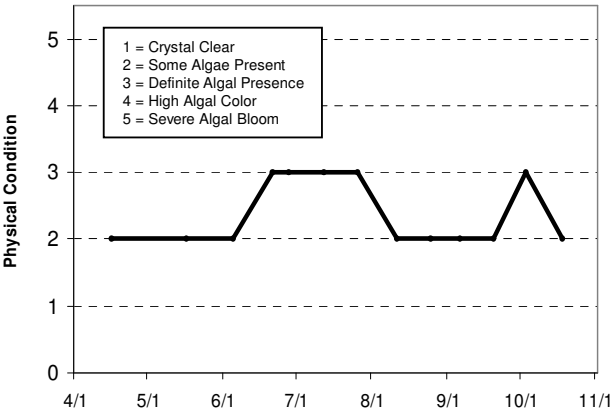






2007 Data

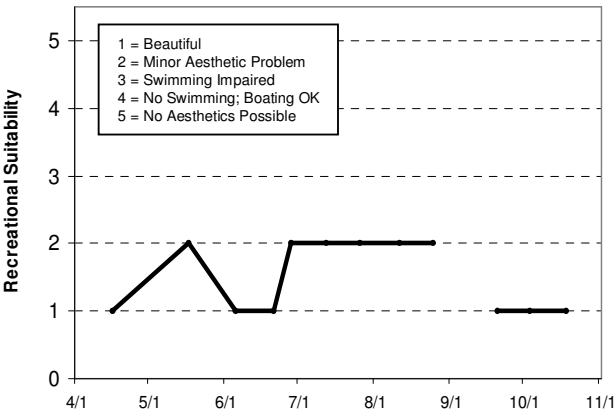
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.9				2.2	14		2.2	2	1
05/17/07	17.4				9.4	22		1.4	2	2
06/05/07	21.1				5.2	25		2	2	1
06/21/07	25				4.2	32		1.2	3	1
06/28/07	25.1				13	21		1.2	3	2
07/12/07	24				22	33		1	3	2
07/26/07	30				7.4	33		1.8	3	2
08/11/07	27.8				13	28		1.1	2	2
08/25/07	22.8				11	30		1.4	2	2
09/06/07	25.5				8	16		1.9	2	
09/20/07	17.4				8.1	24		1.7	2	1
10/03/07	14.8				8.2	34		1.8	3	1
10/18/07	12.3				10	25		1.8	2	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus				C										
Chlorophyll a				C										
Secchi Depth				D										
Overall				**C**										

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus										B	C	C	C	B
Chlorophyll a										B	A	B	B	B
Secchi Depth										C	C	C	C	C
Overall										**B**	**B**	**C**	**C**	**B**



Source: Metropolitan Council and STORET data

Jane Lake (82-0104) *Valley Branch Watershed District*

Lake Jane, which has a surface area of roughly 155 acres, is located in the northwest corner of the City of Lake Elmo (Washington County). The maximum and mean depths of the lake are 12.0 and 3.7 m (39 and 12 feet), respectively (roughly 72 % of the lake is considered littoral; the area of aquatic plant dominance). The approximate volume of the lake is 1,860 acre-feet (ac-ft) and its residence time (the estimated time it would take the lake to replenish itself if it were drained), is roughly 1.4 years. The size of the lake's immediate watershed is approximately 1,402 acres.

The lake has a public access located on its south end, which gets heavy use by area fishermen (the MNDNR manages the lake for largemouth bass, bluegill and crappie, and reports good reproduction) and boaters during the summer months. Furthermore, Lake Jane is considered a "Priority Lake" in the Metropolitan Area because of its multi-recreational uses.

This is the fifth year the lake has been a part of CAMP (1994 being the first). In addition to the CAMP monitoring, the lake has been monitored in past years by Council staff. As part of the 2007 volunteer monitoring program, Lake Jane was monitored 12 times from mid-April to early-October. Graphs as well as the data collected by volunteers show the seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition only). The graphs and data tables are presented on the information sheet on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	14.1	8.0	24.0	A
CLA (µg/l)	2.8	1.2	4.8	A
Secchi (m)	4.7	4.2	6.0	A
TKN (mg/l)	0.71	0.58	0.98	
			Water Quality	A

Data retrieved from the MPCA's STORET water quality database revealed an extensive historical database for Lake Jane. Varying amounts of water quality data were available representing each year since 1980. The lake's best water quality has been recorded in 2000 and 2004-2005. The year 2007 data also had outstanding water quality, which was similar, if not slightly better, than last year's data (2006). A trend analysis conducted by the MPCA indicated no statistically significant trend for Secchi transparency (MPCA 2008).

The average user perception rankings of Lake Jane correspond to the good quality of the lake. On a 1 to 5 ranking scale, the mean physical condition ranking was 1.0 (1- "crystal clear"). The volunteer did not record recreational suitability perceptions.

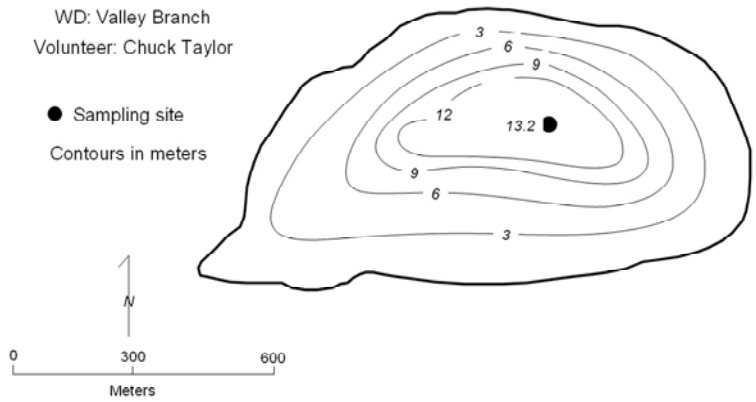
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

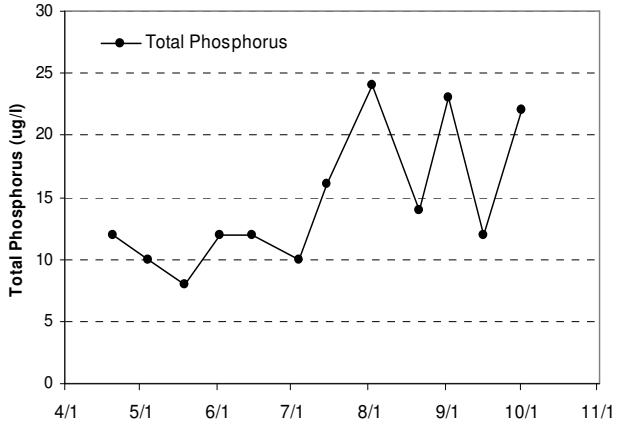
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

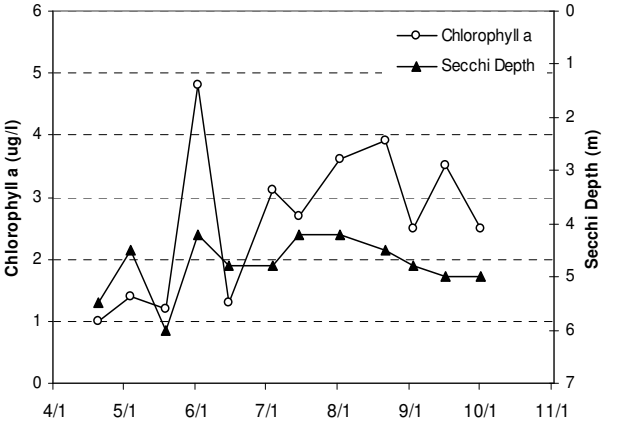
Lake Jane

Lake Elmo, Washington Co.

LAKE ID: 820104
WD: Valley Branch
Volunteer: Chuck Taylor

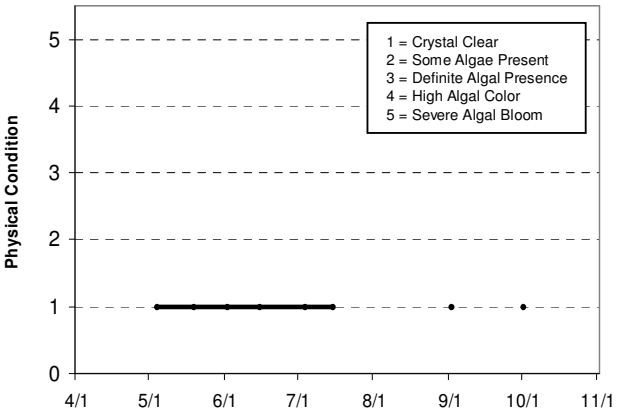






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	11.4				1	12		5.5		
05/04/07	15				1.4	10		4.5	1	
05/19/07	20.8				1.2	8		6	1	
06/02/07	21.5				4.8	12		4.2	1	
06/15/07	26.5				1.3	12		4.8	1	
07/04/07	25.2				3.1	10		4.8	1	
07/15/07	24.9				2.7	16		4.2	1	
08/02/07	27.7				3.6	24		4.2		
08/21/07	21.3				3.9	14		4.5		
09/02/07	24.4				2.5	23		4.8	1	
09/16/07	17.8				3.5	12		5		
10/01/07	17.9				2.5	22		5	1	

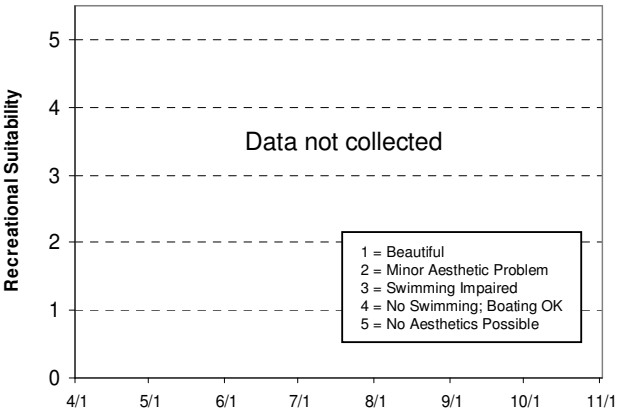


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	B	B			C		B	B				B		
Chlorophyll a					C		B	B				B		
Secchi Depth	A	A	A	A	B	B	B	B	B	B	B	B	C	B
Overall					**C**		**B**	**B**				**B**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A						A				A	A	A	A
Chlorophyll a	A						A				A	A	A	A
Secchi Depth	B						A				A	A	A	A
Overall	**A**						**A**				**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Jellum's Bay [Site-1] (82-0052-02) *Carnelian - Marine Watershed District*

Jellum's Bay is located in City of Scandia in Washington County. This was the seventh year the lake has been involved in CAMP. Because the maximum depth of the 72-acre lake is only 4.9 m (16 feet), the majority of the lake's area is considered littoral zone (the 0-15 foot depth area of the lake dominated by aquatic vegetation). Additionally, because of the lake's shallowness it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake's mean depth of 2.4 m (roughly 8 feet) and its surface area translate to an approximate lake volume of 569 ac-ft. The lake has a 333-acre immediate watershed, which translates to a watershed-to-lake area ratio of 4.6:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff).

A search through the STORET nationwide water quality database for data on the lake provided historical water quality data on the lake for years 1996-2006. The resulting data and graphs appear on the next page.

The lake was monitored 7 times between mid-April and early-October 2007. Results are presented on graphs and data tables on the following page. During each monitoring event the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.4	37.0	79.0	C
CLA (µg/l)	24.7	4.4	42.0	C
Secchi (m)	1.9	1.1	2.7	C
TKN (mg/l)	1.54	1.10	2.50	
			Water Quality	C

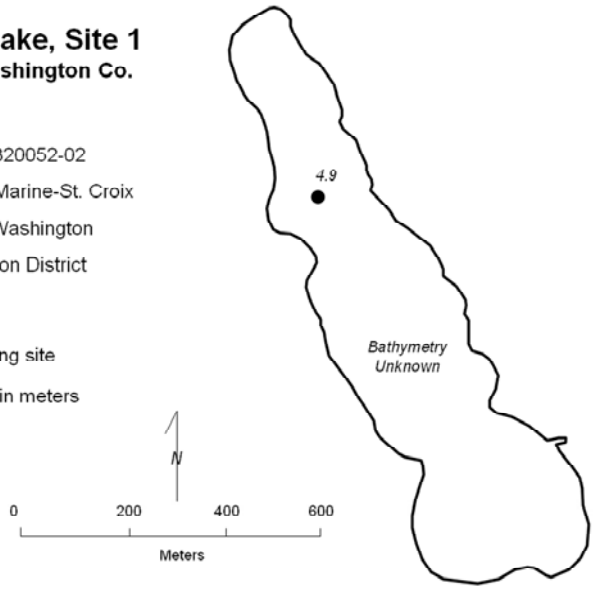
The lake's 2007 grade of C is the best water quality for the lake yet observed. However, the water quality for this lake has been typically a D since 1996, so there does not appear to be a long term trend in water quality. The lake's water quality seems to be well represented by an grade of D. With this year's notable improvement, further monitoring is suggested to determine if the lake water quality is changing.

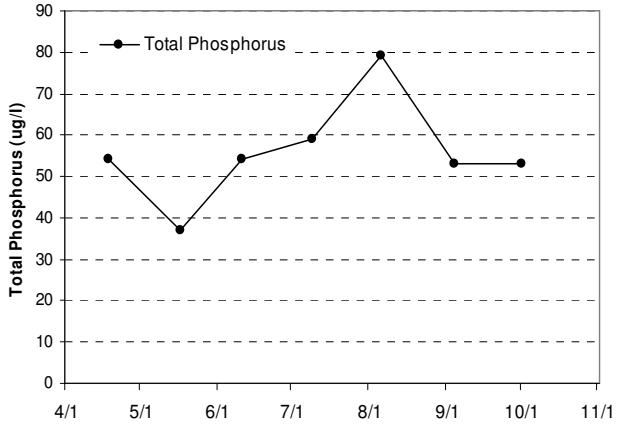
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean perceived physical condition of Jellum's Bay was 2.6 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 3.0 (3- "swimming slightly impaired").

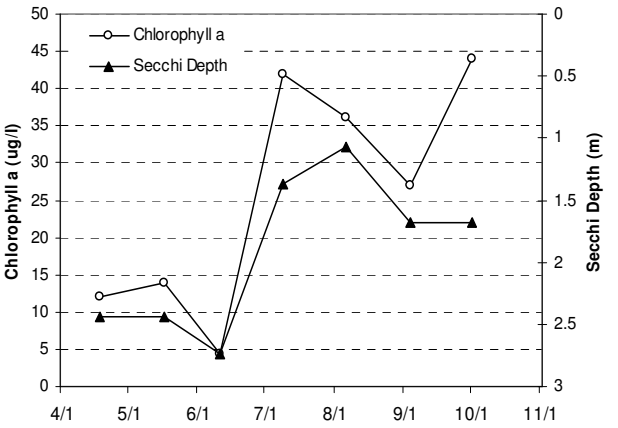
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Jellum's Lake, Site 1
Scandia, Washington Co.

LAKE ID: 820052-02
WD: Carnelian-Marine-St. Croix
Volunteer: Washington
Conservation District

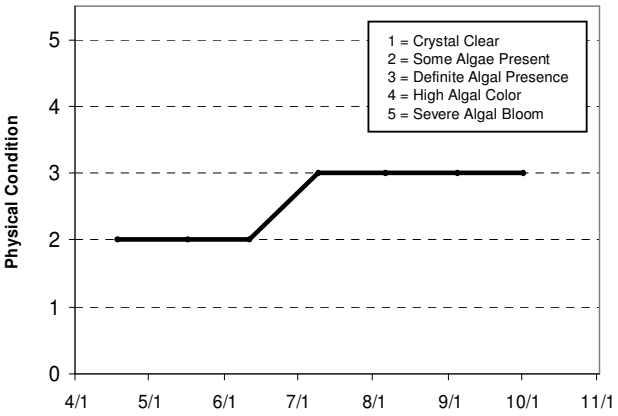






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/18/07	10.5	8.1	11.77	10.3	12	54		2.438	2	4
05/17/07	18.6	17.8	7.9	6.11	14	37		2.438	2	4
06/11/07	26	22.6	6.84	0.49	4.4	54		2.743	2	2
07/09/07	29.1	24.1	7.36	0.07	42	59		1.372	3	2
08/06/07	28.3	23.6	7.13	0.08	36	79		1.067	3	4
09/04/07	26.3	23.8	9.5	0.16	27	53		1.676	3	3
10/01/07	19.6	19.2	7.58	0.37	44	53		1.676	3	4

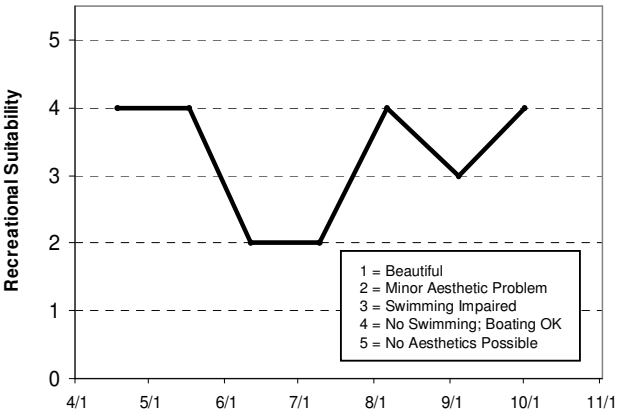


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F	D	D	D	D	D	C	D	D	D	D	C
Chlorophyll a			D	D	D	D	F	D	D	F	C	D	C	C
Secchi Depth			D	D	F	F	F	D	D	D	D	D	D	C
Overall			**D**	**D**	**D**	**D**	**F**	**D**	**D**	**D**	**D**	**D**	**D**	**C**

Source: Metropolitan Council and STORET data



July Lake (82-0318) *Browns Creek Watershed District*

July Lake is a small lake located in Washington County. There is very little known morphological data available for the lake.

This was the second year that July Lake has been involved in CAMP. 2006 and 2007 are the only years of available water quality data for the lake.

The lake was monitored 7 times between mid-April and late-September 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

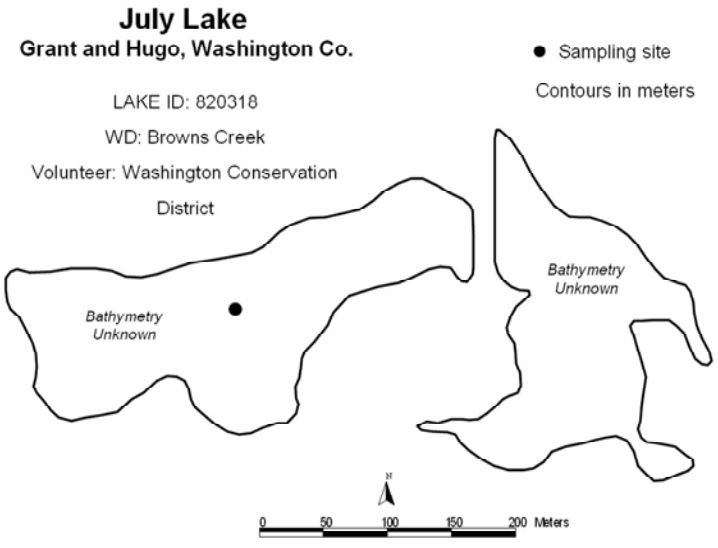
2007 summer (May-September) data summary

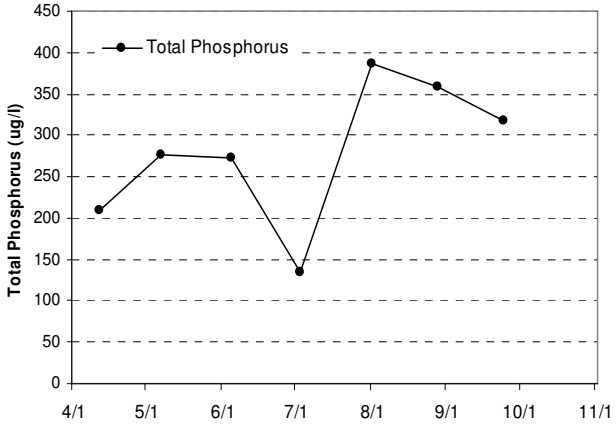
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	291.2	135.0	387.0	F
CLA (µg/l)	389.3	56.0	770.0	F
Secchi (m)	0.2	0.1	0.3	F
TKN (mg/l)	8.48	3.90	22.00	
			Water Quality	F

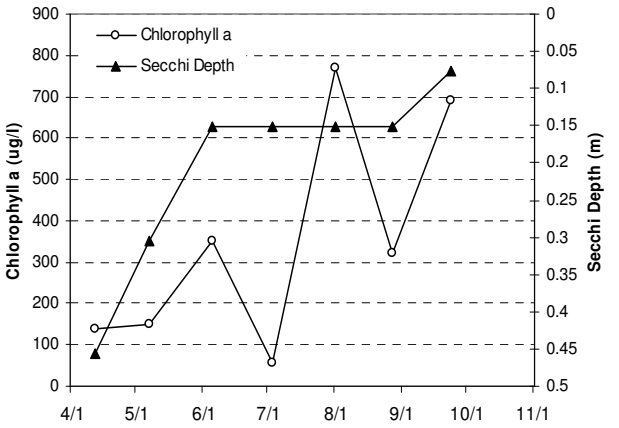
The lake's 2007 lake quality grade was an F. As mentioned earlier, there are no nutrient data available for July Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.5 for physical condition (roughly 4- "high algal color"), and 4.3 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

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

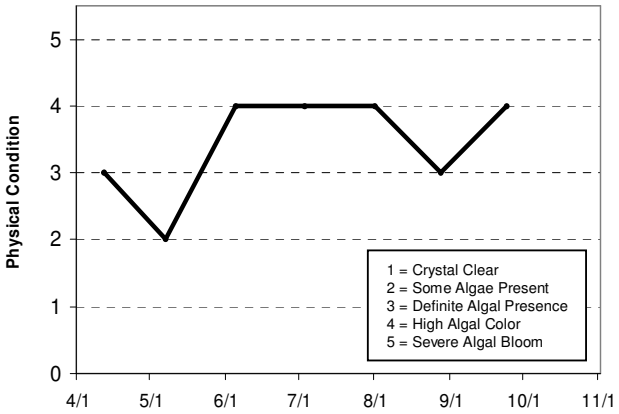






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/12/07	6	5.8	14.59	14.59	140	210		0.457	3	3
05/07/07	15.9	15.7	11.35	10.06	150	276		0.305	2	5
06/05/07	21.7	21	7.13	4.65	350	273		0.152	4	4
07/03/07	25.6	25.4	7.68	0.45	56	135		0.152	4	4
08/01/07	30.4	29.4	11.72	0.09	770	387		0.152	4	5
08/28/07	24.5	24.5	3.77	0.14	320	359		0.152	3	4
09/24/07	23.7	23.3	9.16	0.21	690	317		0.076	4	4

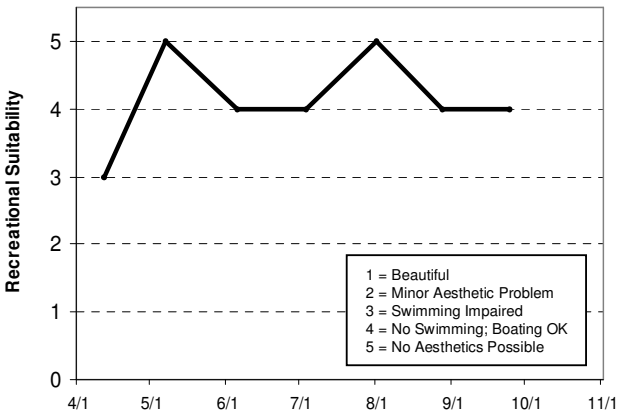


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													F	F
Chlorophyll a													F	F
Secchi Depth													F	F
Overall													**F**	**F**

Source: Metropolitan Council and STORET data



Karth Lake (62-0072) *Rice Creek Watershed District*

Karth Lake is located in the City of Arden Hills. There is 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.

This was the first year that Karth Lake was monitored in the CAMP. The lake was monitored 11 times between mid-April and mid-October 2007. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

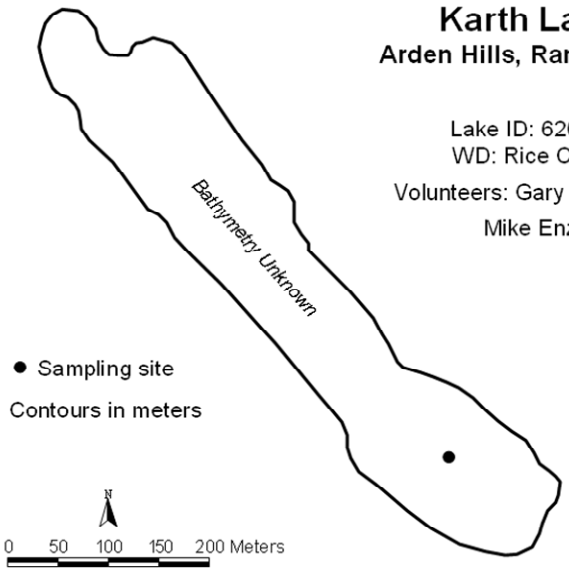
2007 summer (May-September) data summary

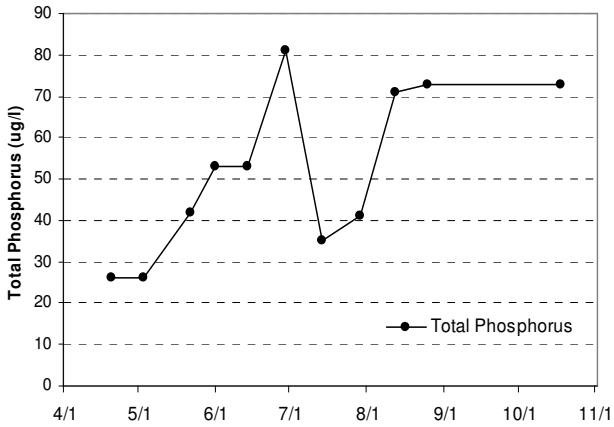
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	52.8	26.0	81.0	C
CLA (µg/l)	23.5	2.2	35.0	C
Secchi (m)	1.2	0.6	2.5	D
TKN (mg/l)	1.79	1.20	2.40	
			Water Quality	C

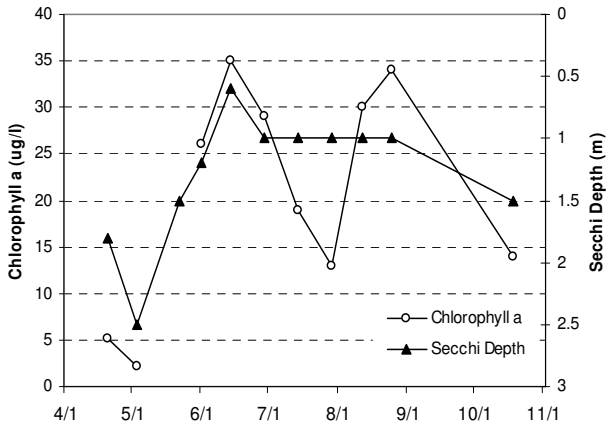
The lake received an water quality grade of C. Further monitoring is suggested to develop a database for determining future water quality trends for this lake.

The volunteer(s) monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 3.7 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability was 3.7 (between 3- "swimming impaired" and 4- "no swimming - boating ok").

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

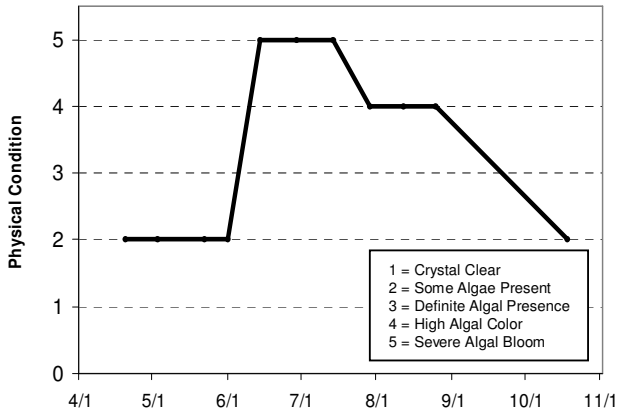






2007 Data

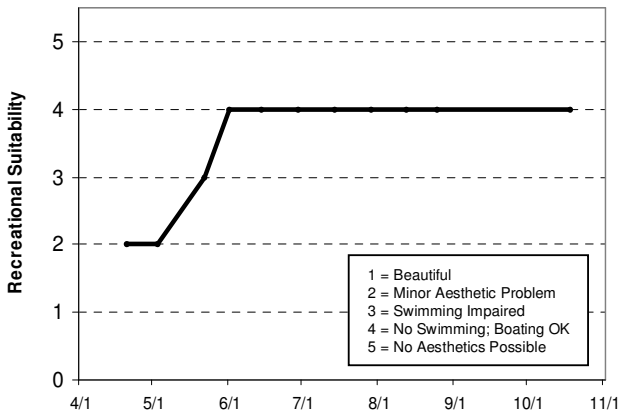
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	13.1				5.2	26		1.8	2	2
05/03/07	17.6				2.2	26		2.5	2	2
05/22/07	18.9					42		1.5	2	3
06/01/07	22.6				26	53		1.2	2	4
06/14/07	26.5				35	53		0.6	5	4
06/29/07	27.6				29	81		1	5	4
07/14/07	24.5				19	35		1	5	4
07/29/07	32				13	41		1	4	4
08/12/07	28				30	71		1	4	4
08/25/07	28.2				34	73		1	4	4
10/18/07					14	73		1.5	2	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														C
Chlorophyll a														C
Secchi Depth														D
Overall														**C**



Source: Metropolitan Council and STORET data

Keller Lake [Burnsville] (19-0025) *Black Dog Watershed Management Commission*

Keller Lake, located in the cities of Apple Valley and Burnsville (Dakota County), covers an area of 55 acres with a maximum depth of 3.0 m (10 feet). The lake's mean depth of 1.1 m (3.7 feet) and surface area translates to an approximate lake volume of 203 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).

The area of the contributing watershed to the lake is 1,387 acres which excludes the surface area of the lake (BDWMO 2003). The contributing watershed is nearly entirely developed. The land uses within the contributing watershed are predominantly low-density residential (53 percent) and roadway right-of-way (21 percent), and park/open space (9 percent). The remaining land uses consist of institutional (7 percent), commercial (4 percent), and higher-density residential (2 percent). The watershed-to-lake size ratio is approximately 25:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the tenth year that Keller Lake has been enrolled in CAMP. The lake had been monitored by Council staff in the past as part of a study on Crystal Lake (Keller lake is tributary to Crystal), and was again monitored by Council staff in 2006. The lake was monitored 12 times between mid-April and early-October 2007. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	74.7	28.0	99.0	D
CLA (µg/l)	16.8	3.2	41.0	B
Secchi (m)	1.7	0.6	2.3	C
TKN (mg/l)	1.70	1.30	2.00	
			Water Quality	C

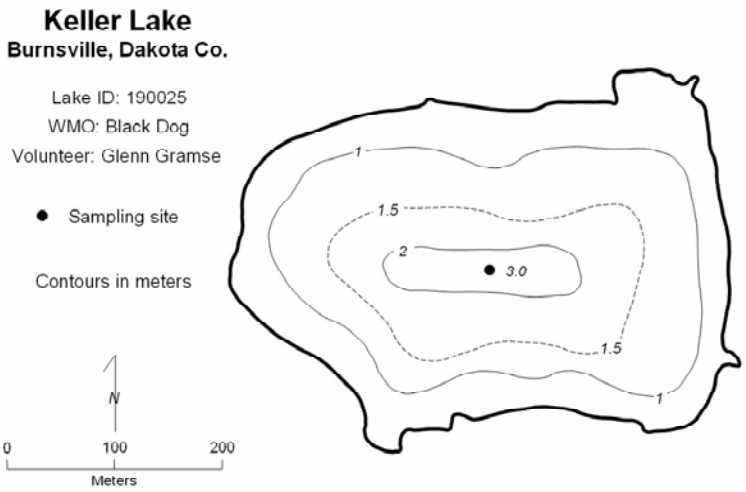
The lake's grade in 2007 was a C, which is similar to that recorded in 2002 and 2004. Otherwise, the lake typically has received an grade of D in past years, with the exception of a B in 1998. Because of the variability of the lake's grades, no long-term trend is evident from the lake's water quality database. The lake's water quality seems to be best represented by an grade of D+/C.

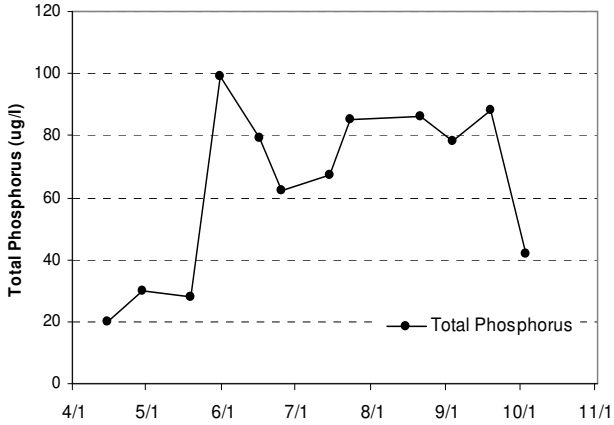
Similar to past years, the 2007 Secchi transparency would have been greater except on many monitoring events the lake's excessive submergent macrophyte growth got in the way. Therefore, the lake's 2007 water clarity was actually better than that represented by the summer mean and resulting grade.

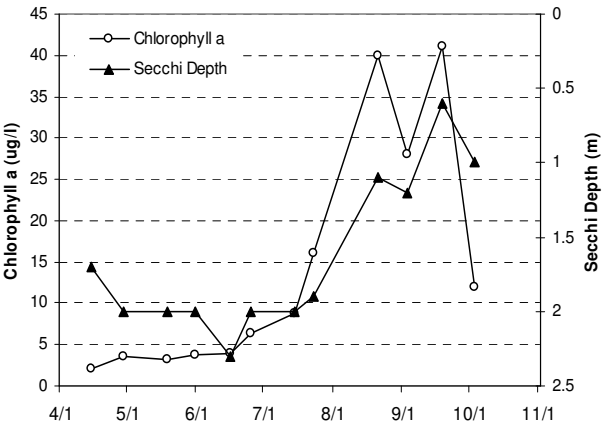
The volunteer monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 3.6 (between 3- "definite algae present and 4- "high algal color"), while the mean recreational suitability was 4.2 (between 4- "no swimming - boating ok" and 5- "no aesthetics possible).

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) 297-4916 or by downloading Internet information 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.

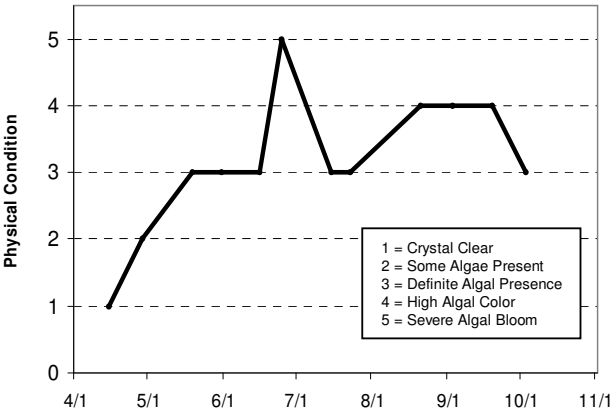






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/15/07	10.4				2	20		1.7	1	1
04/29/07	19.2				3.5	30		2	2	4
05/19/07	22.1				3.2	28		2	3	5
05/31/07	22.2				3.8	99		2	3	5
06/16/07	30.2				3.9	79		2.3	3	4
06/25/07	26				6.3	62		2	5	4
07/15/07	25.4				8.7	67		2	3	4
07/23/07	25.6				16	85		1.9	3	4
08/21/07	22.9				40	86		1.1	4	4
09/03/07	26.8				28	78		1.2	4	4
09/19/07	20.9				41	88		0.6	4	4
10/03/07	18.9				12	42		1	3	4

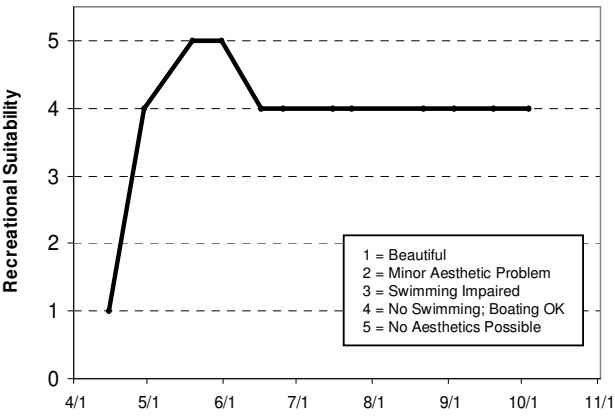


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			D	D	C	D	D	D	C	D	C	C	D	D
Chlorophyll a			F	C	A	C	C	C	B	C	B	B	D	B
Secchi Depth			D	D	C	D	D	D	D	D	C	C	D	C
Overall			**D**	**D**	**B**	**D**	**D**	**D**	**C**	**D**	**C**	**C**	**D**	**C**

Source: Metropolitan Council and STORET data



Kingsley Lake (19-0030) *Black Dog Watershed Management Commission*

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 (shoreline length of 1.7 miles), a maximum depth of 4.0 m (13 feet), and a contributing watershed of 193 acres. The resulting watershed-to-lake size ratio is a rather small 4:1 that no doubt contributes to the good water quality of the lake. Because of the shallowness of the lake, the entire lake is considered littoral (area of aquatic vegetation dominance), and never develops and maintains a thermocline.

This was the eleventh year that Kingsley Lake has been monitored as part of CAMP. Additionally, the lake was monitored by Council staff in 1993. Kingsley Lake was monitored 14 times between mid-April and late-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

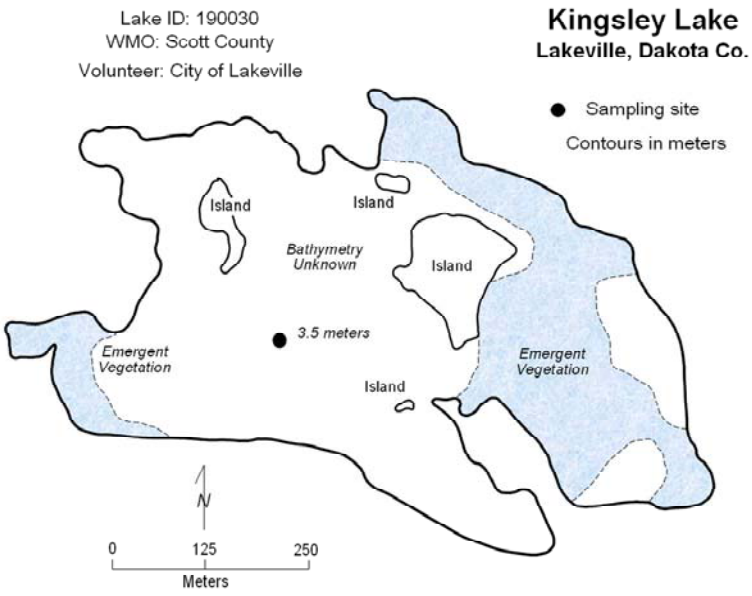
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	13.8	8.0	20.0	A
CLA (µg/l)	5.4	1.3	36.0	A
Secchi (m)	2.5	1.5	3.1	B
TKN (mg/l)	0.56	0.32	0.71	
			Water Quality	A

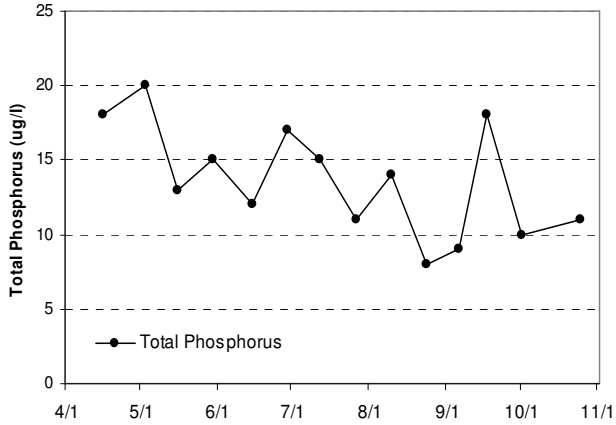
Similar to past years, the Secchi transparency in 2007 would have been greater except that on many monitoring events, the lake's excessive submergent macrophyte growth got in the way. For this reason, if it weren't for the macrophyte interference, the water clarity conditions may have actually been that of an A grade.

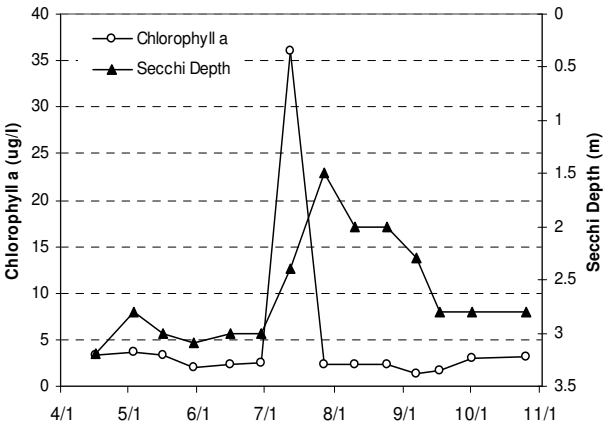
The physical and recreational conditions of Kingsley Lake as perceived by the volunteer(s) were ranked on a 1-to-5 scale. The mean physical condition ranking was 1.4 (roughly 2- "some algae present"), while the mean recreational suitability ranking was 1.1 (roughly 1-"beautiful").

No long-term trend is evident from the lake's water quality database, in the short-term however, the lake's water quality seems to be represented by a water quality grade of A/B+.

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

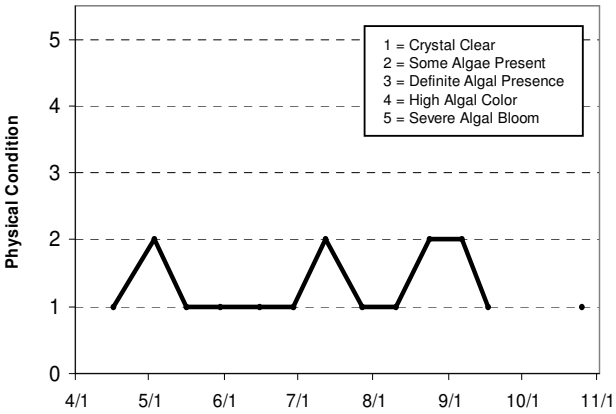






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	10				3.3	18		3.2	1	1
05/03/07	16.1				3.7	20		2.8	2	1
05/16/07	18.9				3.3	13		3	1	1
05/30/07	20				2	15		3.1	1	1
06/15/07	26.1				2.3	12		3	1	1
06/29/07	25.6				2.5	17		3	1	1
07/12/07	25.6				36	15		2.4	2	1
07/27/07	26				2.4	11		1.5	1	2
08/10/07	26				2.3	14		2	1	1
08/24/07	22				2.4	8		2	2	1
09/06/07	27				1.3	9		2.3	2	1
09/17/07	21				1.7	18		2.8	1	1
10/01/07	16				3	10		2.8		2
10/25/07	9.4				3.2	11		2.8	1	1

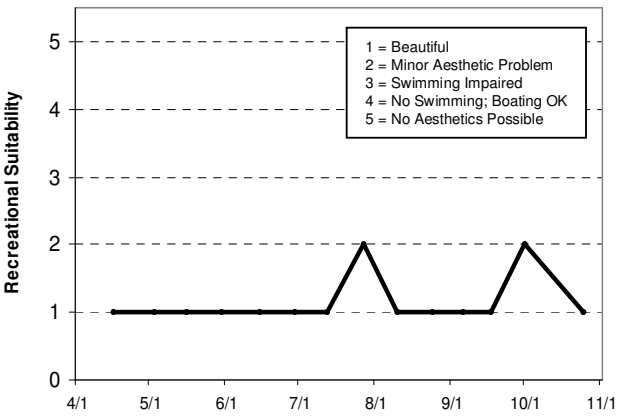


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														B
Chlorophyll a														A
Secchi Depth														A
Overall														**A**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		B	A	A			A	A	A	B	A	A	B	A
Chlorophyll a		A	A	A			A	A	A	A	A	A	A	A
Secchi Depth		B	B	B			B	C	B	B	B	B	B	B
Overall		**B**	**A**	**A**			**A**	**B**	**A**	**B**	**A**	**A**	**B**	**A**

Source: Metropolitan Council and STORET data



Kismet Lake (82-0333) *Browns Creek Watershed District*

Kismet Lake is located in Washington County. The 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, the shallow (0-15 foot depth) area dominated by aquatic vegetation.

This was the tenth year that Kismet Lake has been involved in CAMP. The only available lake data found through a search for historical water quality was the 1998-2006 CAMP data. The lake was monitored 14 times between mid-April and mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	41.2	14.0	92.0	C
CLA (µg/l)	20.0	3.8	110.0	C
Secchi (m)	1.5	0.9	2.0	C
TKN (mg/l)	1.08	0.67	1.80	
			Water Quality	C

The lake's 2007 grade is identical to those recorded in 1998-2002 and 2005-2006, and worse than those recorded in 2003-2004 (B).

No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's quality seems well represented by an grade of B+/C. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

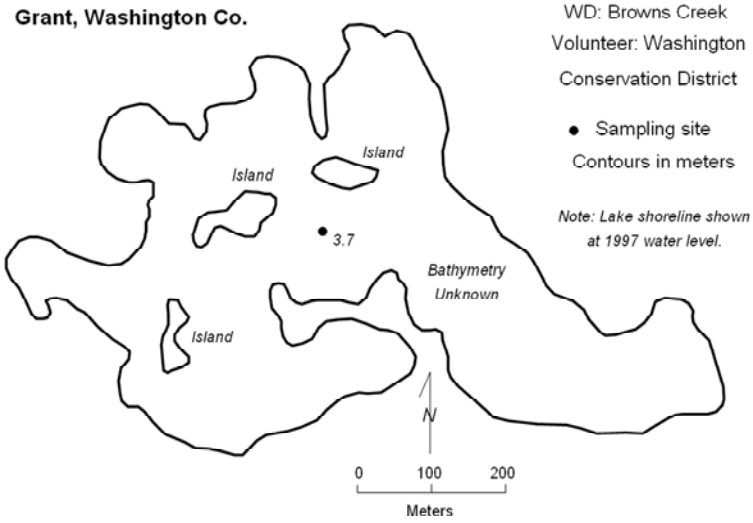
The perceived physical and recreational conditions of the lake, recorded by the volunteers, were ranked on a 1-to-5 scale. The rankings are shown in both tabular and graphical form on the lake's associated information sheet. The mean physical condition ranking was 2.7 (2- "some algae present" and 3- "definite algal presence"), while the mean recreational suitability ranking was 2.4 (between 2- "minor aesthetic problem and 3- "swimming slightly impaired").

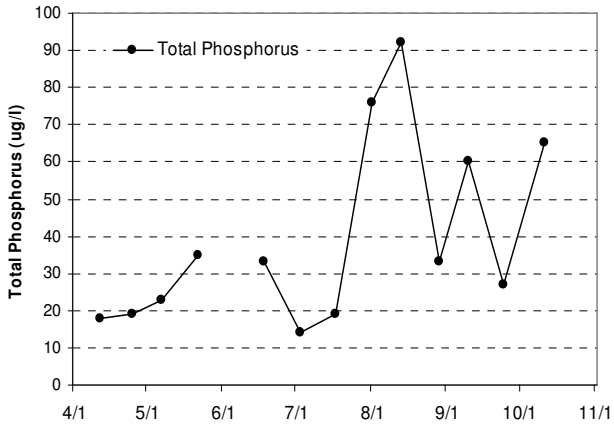
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

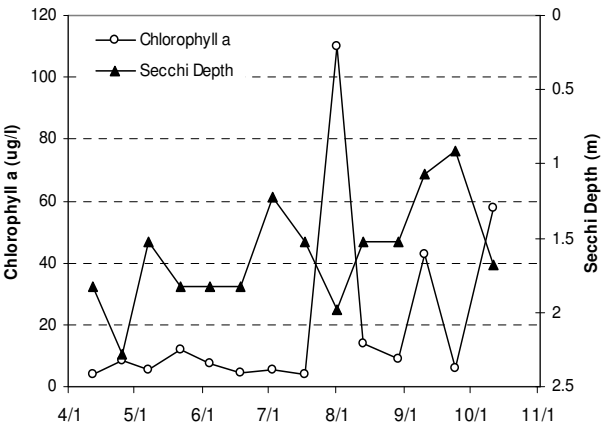
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Kismet Lake

Grant, Washington Co.

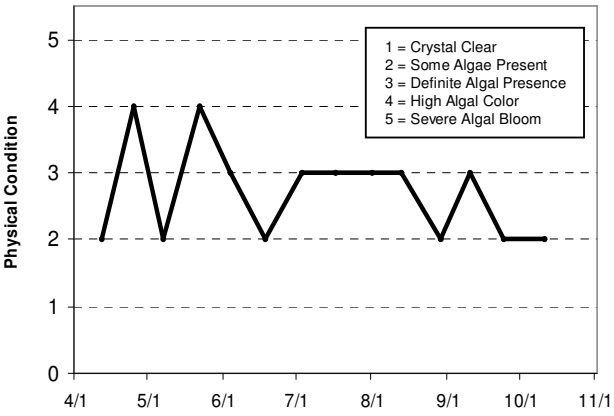






2007 Data

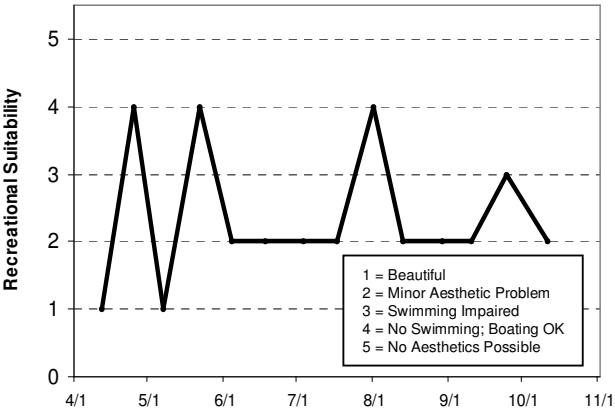
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/12/07	6	6.1	13.28	13.1	4.1	18		1.829	2	1
04/25/07	15.2	10.6	9.95	7.58	8.4	19		2.286	4	4
05/07/07	16.2	15.7	11.05	9.45	5.4	23		1.524	2	1
05/22/07	20	18.3	9.63	6.16	12	35		1.829	4	4
06/04/07	24.1	18.3	9.34	0.44	7.3			1.829	3	2
06/18/07	29.6	22.6	6.55	0.14	4.3	33		1.829	2	2
07/03/07	27.4	22.2	7.99	0.19	5.3	14		1.219	3	2
07/17/07	27.3	25.7	7.1	1.49	3.8	19		1.524	3	2
08/01/07	31.9	21.6	7.6	0.1	110	76		1.981	3	4
08/13/07	26.6	20.3	8.47	0.04	14	92		1.524	3	2
08/29/07	24.9	21.5	7.7	0.2	8.9	33		1.524	2	2
09/10/07	23.7	22.3	6.46	0.11	43	60		1.067	3	2
09/24/07	23	19.1	9.75	0.44	6.2	27		0.914	2	3
10/11/07	15.5	15.4	7.6	7.5	58	65		1.676	2	2



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					C	C	D	C	C	B	B	C	C	C
Chlorophyll a					C	C	C	B	B	B	A	B	C	C
Secchi Depth					C	C	C	C	C	B	B	C	C	C
Overall					**C**	**C**	**C**	**C**	**C**	**B**	**B**	**C**	**C**	**C**



Source: Metropolitan Council and STORET data

Klawitter Lake (82-0368) *Valley Branch Watershed District*

Klawitter Lake is a small 4.5-acre lake located within the boundaries of Lake Elmo (Washington County). Because of the shallowness of the lake, it is considered entirely littoral (the 0-15 foot depth zone of a lake dominated by aquatic vegetation), and does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake's surface area and watershed size (168 acres) translates to a 37:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the sixth year that Klawitter Lake has been involved in CAMP. Other than for the 2002-2006 CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty.

The lake was monitored 12 times between late-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	86.9	62.0	115.0	D
CLA (µg/l)	37.9	13.0	85.0	C
Secchi (m)	0.5	0.4	0.8	F
TKN (mg/l)	3.03	2.40	3.50	
			Water Quality	D

The 2007 grade of D is similar to that recorded in 2003-2006, and worse than the grade of C in 2002. There are no water quality data available other than the 2002-2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. 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 volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 2.9 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 2.8 (between 2- "minor aesthetic problem and 3- "swimming slightly impaired").

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

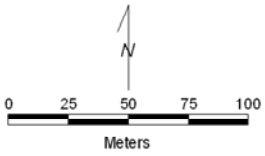
Klawitter Pond
Lake Elmo, Washington Co.

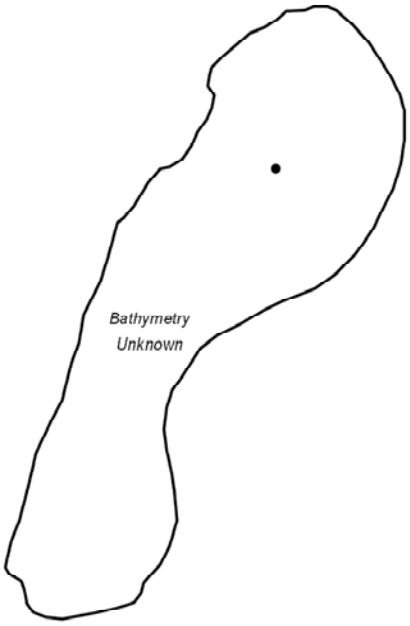
Lake ID: 820368
WD: Valley Branch

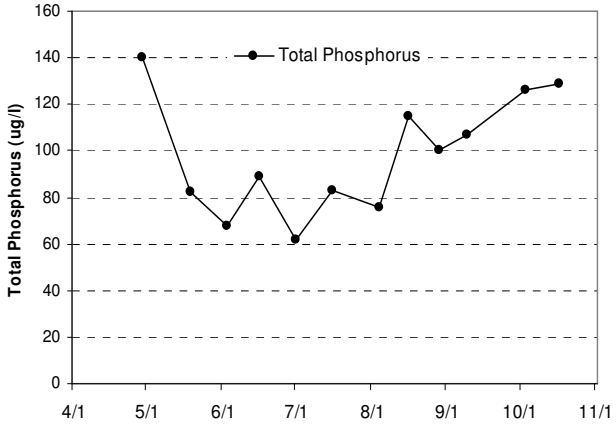
Volunteer: Bonnie Juran

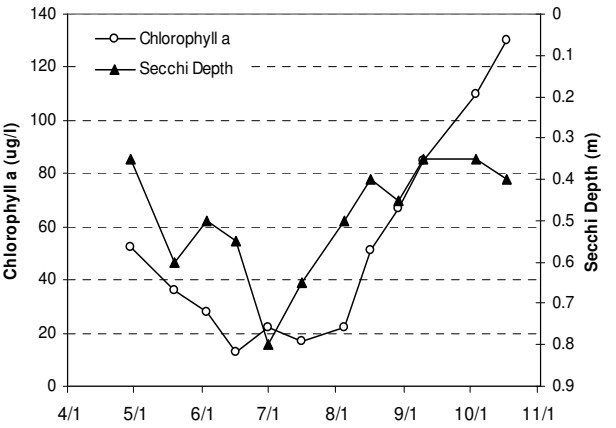
- Sampling site

Contours in meters



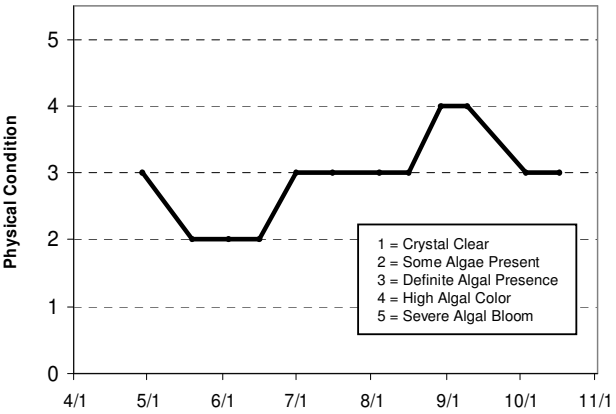






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/29/07	20.5				52	140		0.35	3	2
05/19/07	23				36	82		0.6	2	2
06/03/07	23				28	68		0.5	2	2
06/16/07	30.3				13	89		0.55	2	3
07/01/07	27.2				22	62		0.8	3	3
07/16/07	27.6				17	83		0.65	3	3
08/04/07	25.7				22	76		0.5	3	3
08/16/07	26				51	115		0.4	3	3
08/29/07	23.5				67	100		0.45	4	3
09/09/07	22.5				85	107		0.35	4	3
10/03/07	18.7				110	126		0.35	3	3
10/17/07	15				130	129		0.4	3	

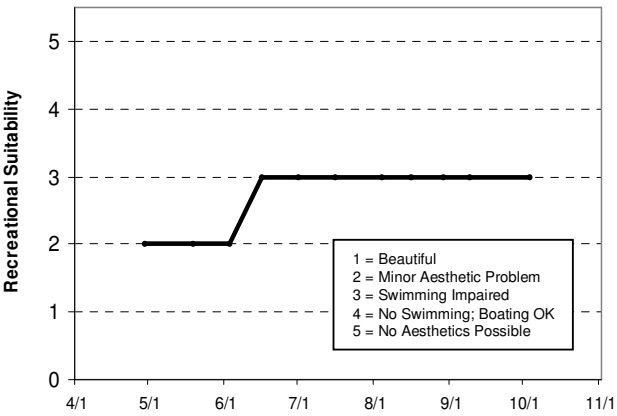


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									D	D	D	D	D	D
Chlorophyll a									B	C	C	C	C	C
Secchi Depth									D	F	D	D	F	F
Overall									**C**	**D**	**D**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data



La Lake (82-0097) *City of Woodbury*

La Lake, located in the City of Woodbury (Washington County), has been monitored through CAMP since 1994. The lake has a surface area of approximately 35 acres (1.3 miles around) and a maximum depth of 3.5 m (11 feet). Because of the shallowness of the lake, it is considered entirely littoral (the 0-15 foot depth zone of a lake dominated by aquatic vegetation), and does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

The lake was monitored 14 times between mid-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	119.7	50.0	284.0	D
CLA (µg/l)	56.9	5.2	230.0	D
Secchi (m)	1.1	0.4	2.0	D
TKN (mg/l)	1.90	0.68	4.40	
			Water Quality	D

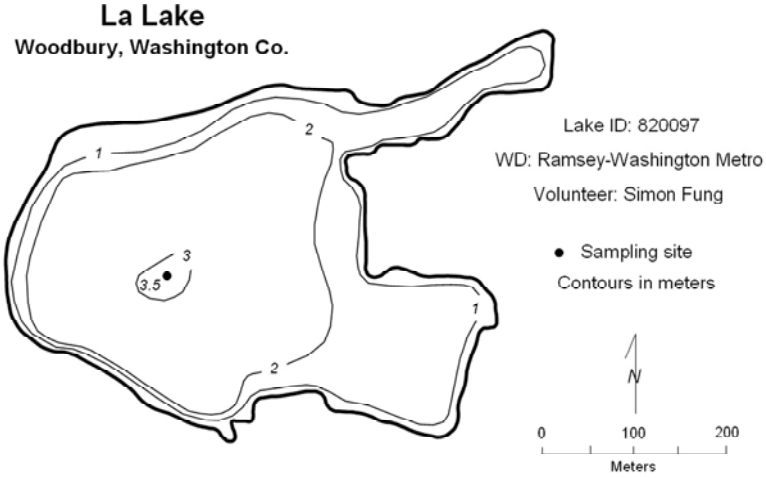
The lake's 2007 grade was D, which was the worst grade this lake has received since CAMP monitoring began in 1994. Furthermore, 2007 was the first year that the grades for chlorophyll-a and Secchi depth each received a D. Typically, this lake receives an grade of C or an occasional B. No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems to be well represented by a water quality grade of high-C/low-B. With this in mind, however, some concern should be given to the recent (late-1990's and early-2000's) poor water quality years. Further monitoring is suggested to determine if the poor water quality of 2007 is an anomaly or indication of decreasing water quality.

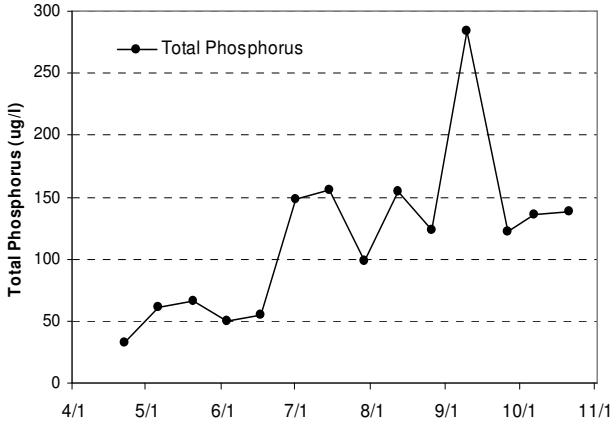
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 3.3 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.3 (between 3- "swimming slightly impaired" and 4- "no swimming; boating ok").

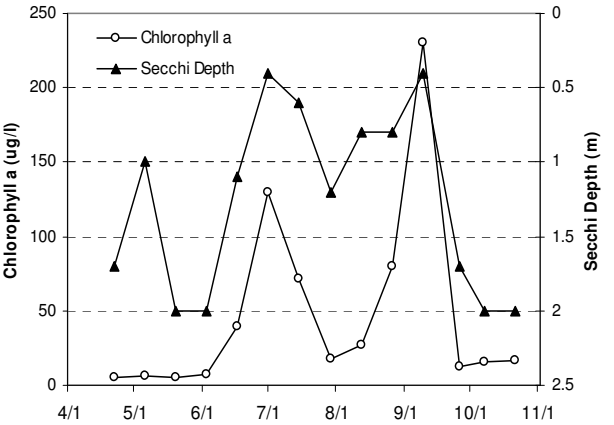
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

La Lake

Woodbury, Washington Co.

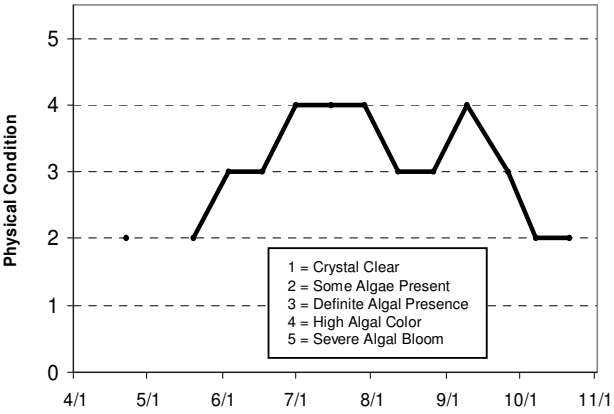






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/22/07	16				5.1	32		1.7	2	2
05/06/07	15.3				6	61		1		2
05/20/07	18.4				5.2	66		2	2	2
06/03/07	22.2				6.8	50		2	3	2
06/17/07	29.6				39	55		1.1	3	3
07/01/07	26.3				130	148		0.4	4	4
07/15/07	27.5				72	156		0.6	4	4
07/29/07	31.6				18	98		1.2	4	4
08/12/07	26.7				27	154		0.8	3	4
08/26/07	24.1				80	123		0.8	3	4
09/09/07	23.7				230	284		0.4	4	4
09/26/07	19.2				12	122		1.7	3	
10/07/07	22.5				16	136		2	2	2
10/21/07	12.5				17	138		2	2	2

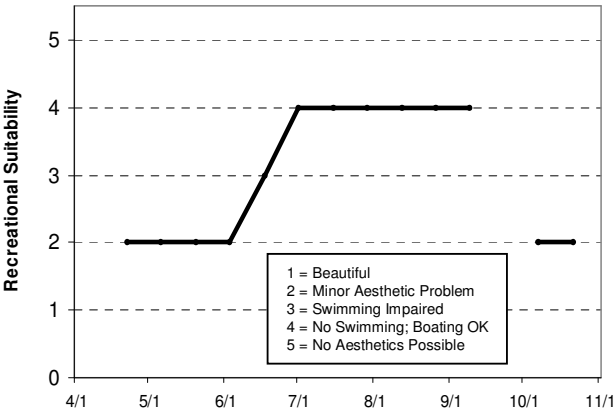


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	D	D	C	D	D	D	D	C		C	D	D
Chlorophyll a	B	A	B	C	B	C	C	C	B	C		B	C	D
Secchi Depth	C	B	C	C	B	C	C	C	C	B		C	C	D
Overall	**C**	**B**	**C**	**C**	**B**	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**D**

Source: Metropolitan Council and STORET data



Lac Lavon Lake (19-0446) *Black Dog Watershed Management Commission*

This was the eleventh year that Lac Lavon has been involved in CAMP. The only other known water quality data available for the lake were Secchi transparency data in 1989-1991 and CAMP data for 1997-2006.

The lake, located within the City of Apple Valley in Dakota County, is actually an abandoned gravel pit maintained by groundwater (MDNR 1996). The 55-acre lake (2.3 miles in circumference) has a maximum depth of 9.8 m (32 feet) and 65 percent of the lake is considered littoral zone (the 0-15 foot depth zone of the lake dominated by aquatic vegetation). The lake's fishing pier is located on the eastern end of the lake. An area of concern and need for future management is the recent detection of Eurasian Water Milfoil (*Myriophyllum spicatum*) in the lake.

Lac Lavon was monitored 13 times between mid-April and mid-October 2007. The data and resulting graphs showing seasonal variability in TP and CLA concentrations, Secchi transparency, and user perceptions are presented on the information sheet following these written comments.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	20.7	17.0	29.0	A
CLA (µg/l)	5.3	1.6	13.0	A
Secchi (m)	3.7	2.0	4.6	A
TKN (mg/l)	1.49	1.00	2.10	
			Water Quality	A

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 1.0 (1-"crystal clear"), while the mean recreational suitability ranking was 1.0 (1- "beautiful").

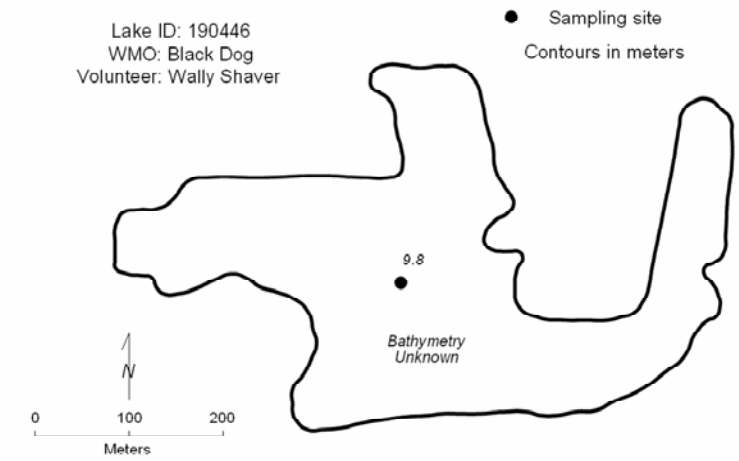
No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems well represented by an grade of A.

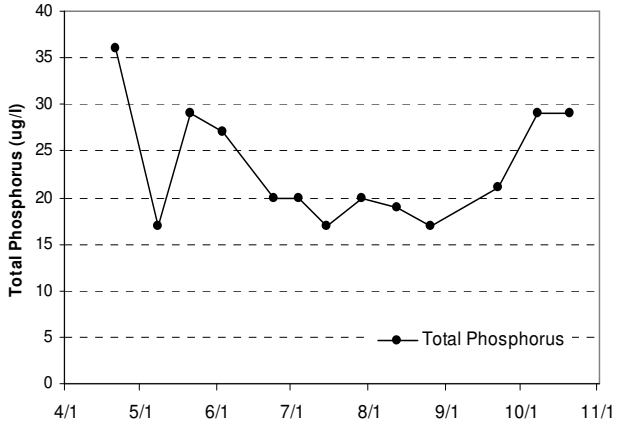
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

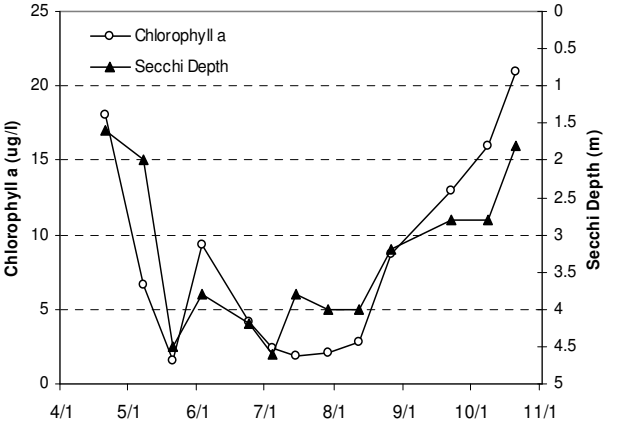
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lac Lavon

Apple Valley/Burnsville, Dakota Co.

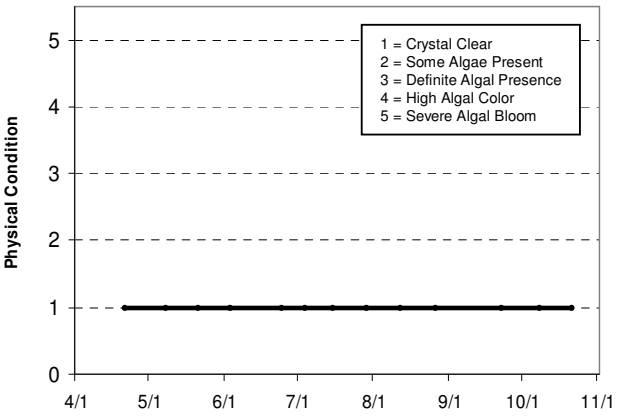






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	12.7				18	36		1.6	1	1
05/08/07	17.6				6.6	17		2	1	1
05/21/07	19.6				1.6	29		4.5	1	1
06/03/07	20.8				9.3	27		3.8	1	1
06/24/07	22.8				4.2	20		4.2	1	1
07/04/07	26				2.4	20		4.6	1	1
07/15/07	24.9				1.9	17		3.8	1	1
07/29/07	27				2.1	20		4	1	1
08/12/07	26.6				2.8	19		4	1	1
08/26/07	22.5				8.7	17		3.2	1	1
09/22/07	18.9				13	21		2.8	1	1
10/08/07	19.4				16	29		2.8	1	1
10/21/07	13.3				21	29		1.8	1	1

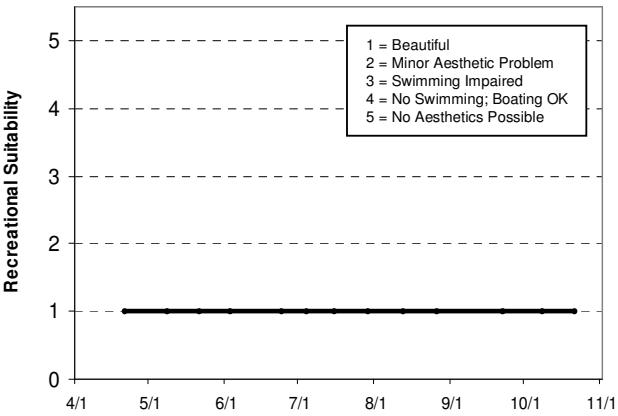


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth										A	A	A		
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				A	A	A	A	B	A	A	A	A	A	A
Chlorophyll a				A	A	A	A	A	A	A	A	A	A	A
Secchi Depth				A	A	A	A	A	A	A	A	A	A	A
Overall				**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Langton Lake [Site-1] (62-0049-01) *Rice Creek Watershed District*

Langton Lake is divided into three distinct basins. Two of the three basins were monitoring in 2007. The results will be discussed individually for each of the sites.

The entire 30-acre lake is located within the City of Roseville (Ramsey County). The maximum and mean depths of the lake are 1.5 m and 1.2 m (5 feet and 4 feet), which along with the surface area, translate to an approximate volume of approximately 120 ac-ft. Because of the shallowness of the lake, its entire surface area is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants). The lake's contributing watershed is 257 acres, which translates to a watershed-to-lake area ratio of 9:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

Langton Lake (Site-1) was monitored 13 times between early-May and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.7	22.0	78.0	C
CLA (µg/l)	7.4	4.0	20.0	A
Secchi (m)	1.1	0.7	1.5	D
TKN (mg/l)	1.66	1.10	2.00	
			Water Quality	C

The lake's 2007 grade of C is similar the C grades received in 2005 and 2006. There are no other nutrient and chlorophyll-a data available for Langton Lake (Site-1) other than the 2005-2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. A search through the STORET nationwide water quality database for data on the lake did provide historical Secchi transparency information for 1984, 1985, 1987, 1988, and 1990. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.3 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 1.5 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

Langton Lake, Site 1
Roseville, Ramsey Co.

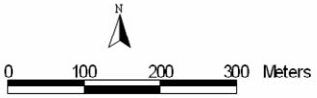
Lake ID: 620049-01

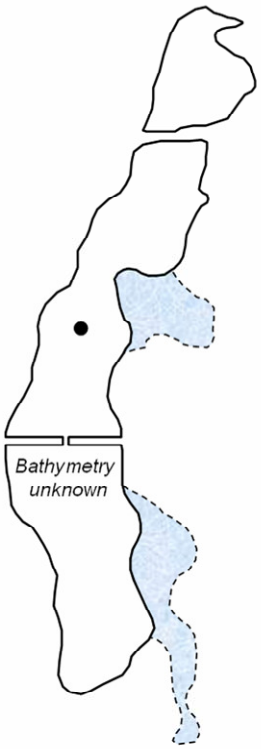
WD: Rice Creek

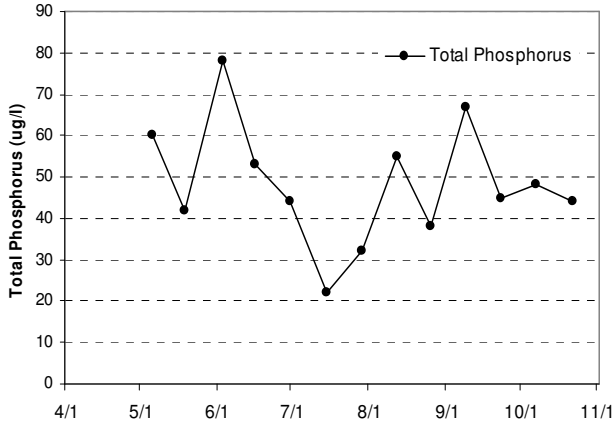
Volunteers: Tam & Dick McGehee

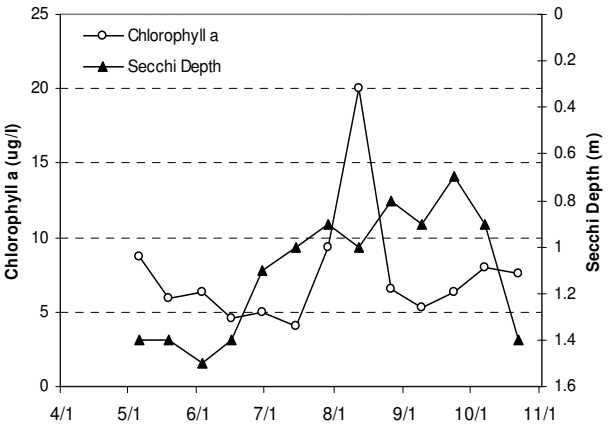
● Sampling site

Contours in meters



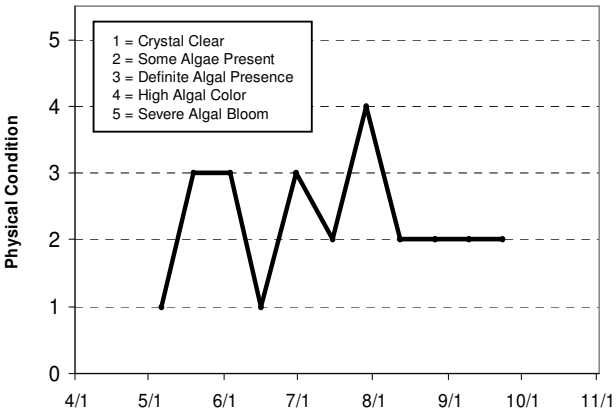






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07	15				8.7	60		1.4	1	
05/19/07	19.7				5.9	42		1.4	3	1
06/03/07	21.8				6.3	78		1.5	3	
06/16/07	26.9				4.6	53		1.4	1	1
06/30/07	27.2				5	44		1.1	3	2
07/15/07	23.6				4	22		1	2	2
07/29/07	30.8				9.3	32		0.9	4	
08/12/07	28				20	55		1	2	
08/26/07	23.4	28.4			6.5	38	40	0.8	2	
09/09/07	21				5.3	67		0.9	2	
09/23/07	20.5				6.3	45		0.7	2	
10/07/07	20.8				8	48		0.9		
10/22/07	12.4				7.6	44		1.4		

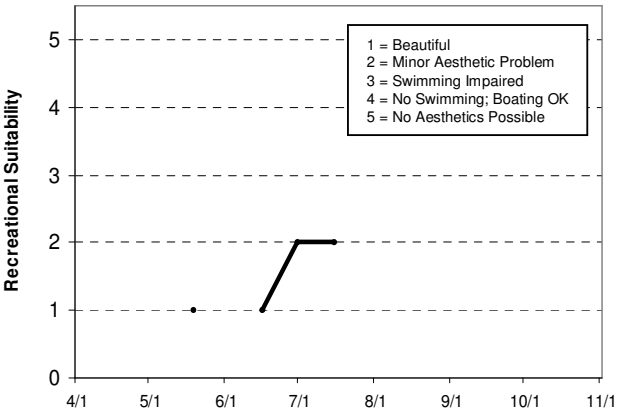


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth					F									
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												C	C	C
Chlorophyll a												C	B	A
Secchi Depth		D	D	D	C	C	D	C	C	C	C	D	D	D
Overall												**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Langton Lake [Site-2] (62-004-02) *Rice Creek Watershed District*

Langton Lake is divided into three distinct basins. Two of the three basins were monitoring in 2007. The results will be discussed individually for each of the sites monitored in 2007.

Langton Lake (Site-2) was monitored 13 times between early-May and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	66.3	36.0	160.0	C
CLA (µg/l)	10.2	3.9	19.0	B
Secchi (m)	1.1	0.9	1.4	D
TKN (mg/l)	1.72	1.00	2.20	
			Water Quality	C

The grade for the lake was a C which is similar to the two previous years. The lake site has also received identical letter grades for each of the three parameters for the years 2005-2007. There are no other nutrient and chlorophyll data available for Langton Lake (Site-2) other than the 2005-2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends with respect to water quality. A search through STORET revealed many years of Secchi transparency data from 1984 and 1995-2006. A recent MPCA-conducted trend analysis on the lake's Secchi transparency data revealed a statistically significant improvement in recent water clarity (MPCA 2008). 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.2 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 2.7 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

Langton Lake, Site 2
Roseville, Ramsey Co.

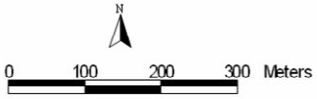
Lake ID: 620049-02

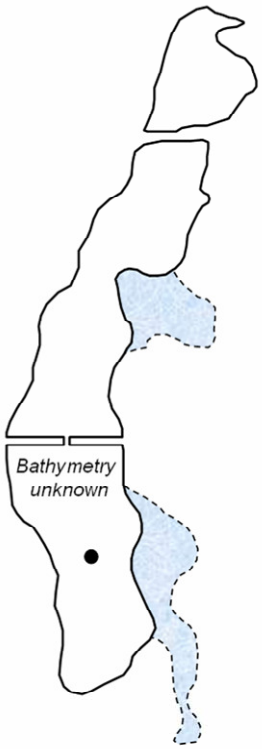
WD: Rice Creek

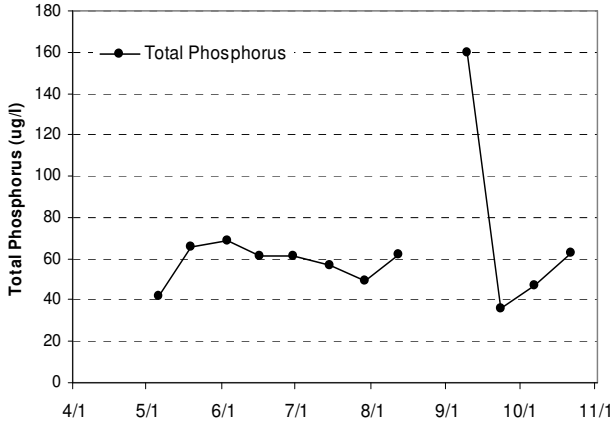
Volunteers: Tam & Dick McGehee

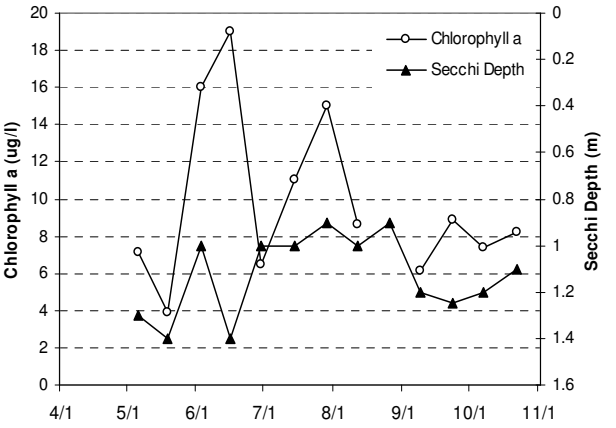
● Sampling site

Contours in meters



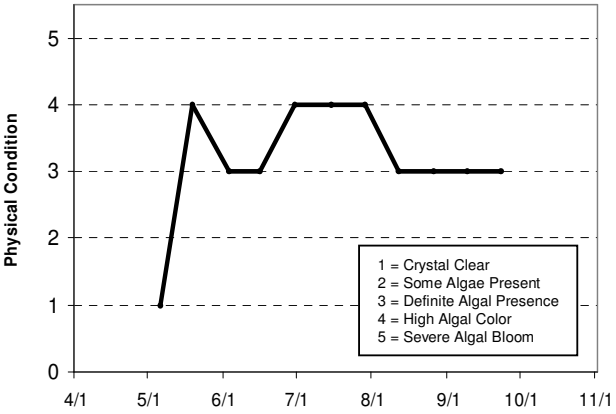






2007 Data

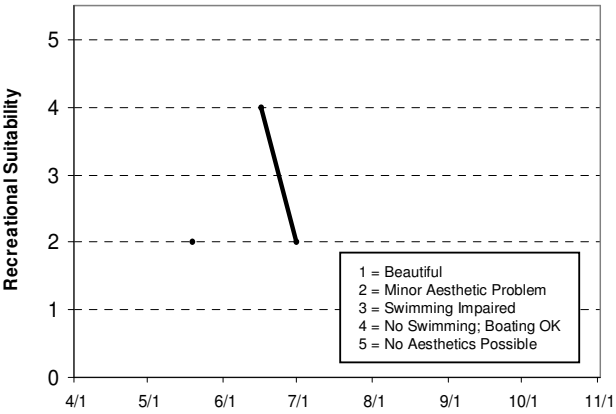
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07	14				7.1	42		1.3	1	
05/19/07	21.2				3.9	66		1.4	4	2
06/03/07	21.9				16	69		1	3	
06/16/07	27.4				19	61		1.4	3	4
06/30/07	27.8				6.5	61		1	4	2
07/15/07	24.2				11	57		1	4	
07/29/07	30.9				15	49		0.9	4	
08/12/07	28.4				8.6	62		1	3	
08/26/07	23.8							0.9	3	
09/09/07	21.6				6.1	160		1.2	3	
09/23/07	20.8				8.9	36		1.25	3	
10/07/07	21.3				7.4	47		1.2		
10/22/07	11.9				8.2	63		1.1		



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												C	C	C
Chlorophyll a												B	B	B
Secchi Depth												D	D	D
Overall												**C**	**C**	**C**



Source: Metropolitan Council and STORET data

Lee Lake (19-0029) *City of Lakeville*

Lee Lake, a 25-acre land-locked lake with a maximum depth of 5.2 m (17 feet), is located in Lakeville (Dakota County). The shoreline length of the lake is 1.0 miles. The majority of its 324-acre watershed (which translates to a watershed-to-lake size ratio of 13:1) is now developed with urban uses; however, past cattle farming is the primary phosphorus source to the lake and may have left behind an internal loading problem. To determine if this is the case, a more in-depth monitoring program is needed. An abundance of submerged aquatic vegetation (Curlyleaf pondweed) has been a continuing problem in the lake. Not only is it an aesthetic and recreational problem, but the decaying of plants in late-summer adds to concentrations of phosphorus in the water column.

The lake has been involved in an organic carbon amendment project where barley straw was added to the lake in an attempt to inhibit algal populations. Barley straw has been used to control algae in the United Kingdom for many years. CAMP data was used to evaluate the effectiveness of the barley straw additions. The 2006 Metropolitan Council lake study report (METC 2007) included a synopsis of the carbon amendment study. More detailed discussion of the study can be found in McComas and Stuckert (2008).

The lake was monitored 14 times between mid-April and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	43.6	31.0	73.0	C
CLA (µg/l)	23.5	5.4	81.0	C
Secchi (m)	1.7	1.0	2.9	C
TKN (mg/l)	1.80	1.20	2.60	
			Water Quality	C

The lake's water quality grade is similar to those recorded in 1994-1997, 1999, and 2001-2006, and better than that recorded in 2000 (D). The 2007 Secchi transparency grade of C was similar to the grade received in 2006. In fact, the average summer-time mean of 1.7 m for 2007 was identical to the 1.7 m average Secchi transparency observed in 2006. The chlorophyll-a grade of C was a decrease from the B observed in 2006. No long-term trend is evident from the lake's water quality database, in the short-term however, the lake seems well represented by an grade of C. In order to determine any long-term trends or to better define the lake's normal water quality range, more data are needed.

The volunteer(s) ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. These rankings are shown on the lake's information sheet on the following page. The mean physical condition ranking was 2.4 (between 2- "some algae present and 3- "definite algae present"), while the mean recreational suitability ranking was 2.5 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

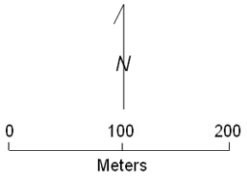
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

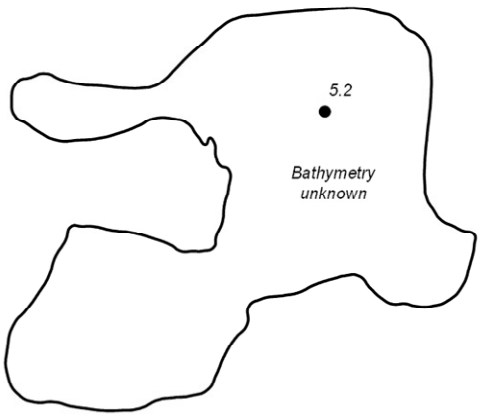
Lee Lake

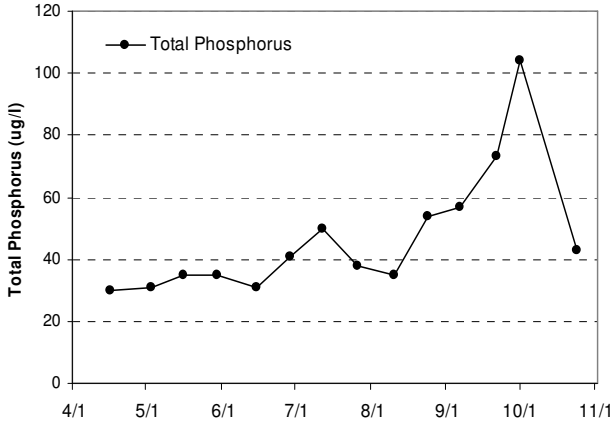
Lakeville, Dakota Co.

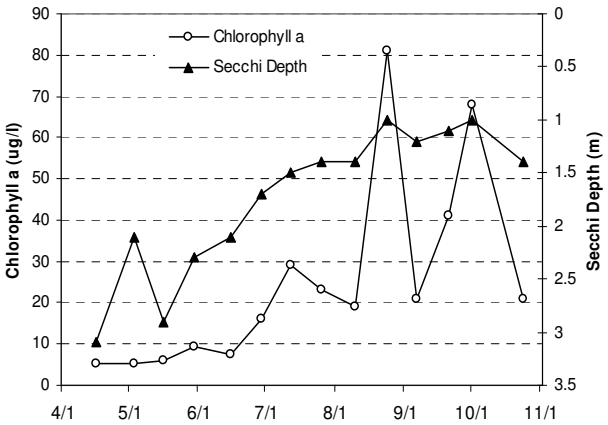
Lake ID: 190029
WMO: Black Dog Lake
Volunteer: City of Lakeville

● Sampling site
Contours in meters



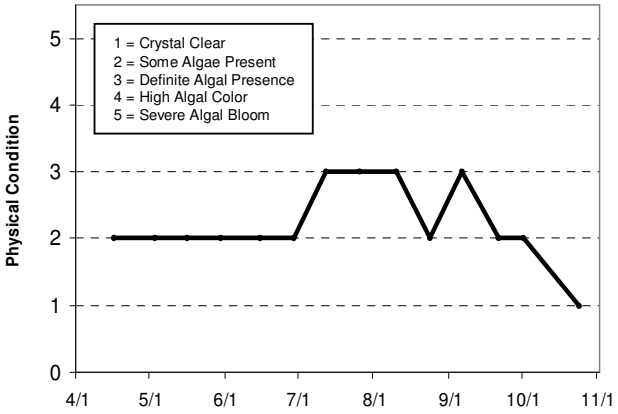






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.9				5.2	30		3.1	2	2
05/03/07	16				5.4	31		2.1	2	1
05/16/07	18				5.9	35		2.9	2	1
05/30/07	20				9.3	35		2.3	2	2
06/15/07	26				7.4	31		2.1	2	2
06/29/07	26				16	41		1.7	2	3
07/12/07	26				29	50		1.5	3	2
07/26/07	27				23	38		1.4	3	4
08/10/07	27				19	35		1.4	3	4
08/24/07	22				81	54		1	2	2
09/06/07	26				21	57		1.2	3	3
09/21/07	20				41	73		1.1	2	4
10/01/07	16				68	104		1	2	4
10/24/07	12				21	43		1.4	1	

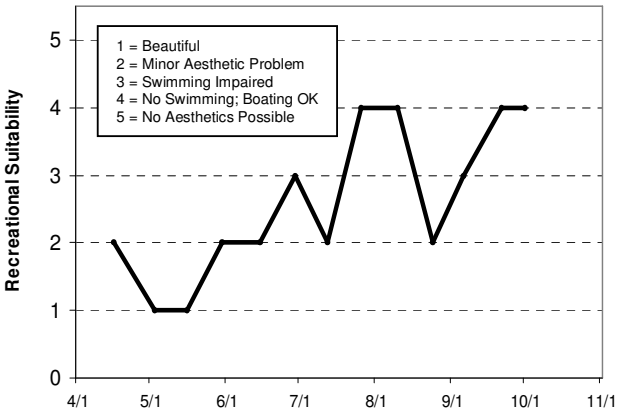


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C	C			D	C	C	C	C	D	D	C
Chlorophyll a	C	B	B	B			C	B	B	C	C	B	B	C
Secchi Depth	C	C	C	C			D	C	C	C	D	C	C	C
Overall	**C**	**C**	**C**	**C**			**D**	**C**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



LeMay Lake (19-0082) *Gun Club Lake Watershed Management Organization*

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), which gives it a volume of 173 acre-feet. The maximum depth is 4.0 m (13 ft).

This marks the first year in which LeMay Lake has been involved in CAMP. A search through the STORET nationwide water quality database provided Secchi transparency data for sporadic dates in 1998, 2000-2003, and 2005-2007. Therefore, this year marks the first year that nutrient and chlorophyll-a data are available for the lake.

The lake was monitored 11 times between late-April and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	50.5	31.0	74.0	C
CLA (µg/l)	12.0	5.9	20.0	B
Secchi (m)	1.0	0.6	1.7	D
TKN (mg/l)	2.43	1.80	3.90	
			Water Quality	C

The lake received an water quality grade of C for 2007. As mentioned earlier, there are no water quality data available than this year's CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

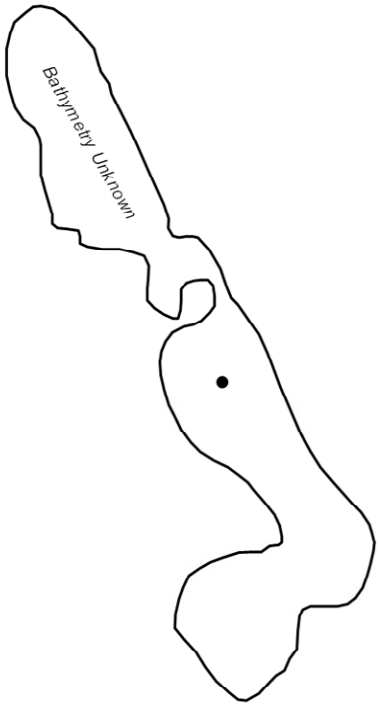
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 2.1 for recreational suitability (roughly 2- "minor aesthetic problem").

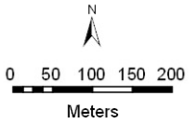
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

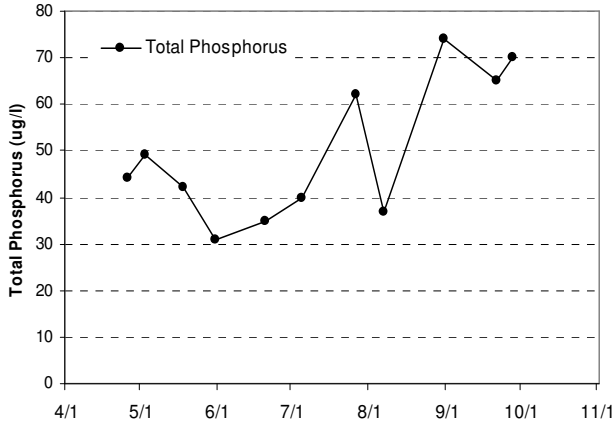
LeMay Lake
Mendota Heights, Dakota Co.

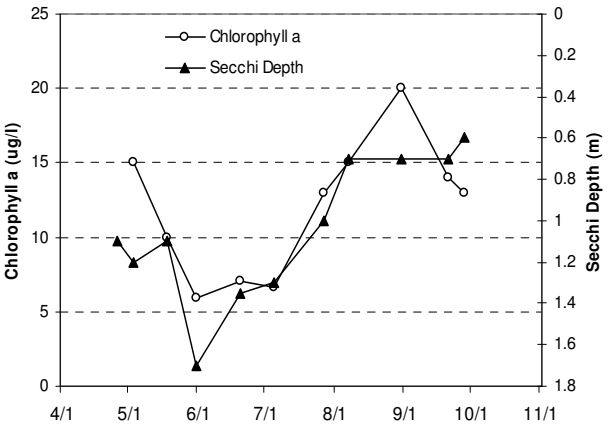
Lake ID: 190082
WMO: Gun Club Lake
Volunteer: City of Mendota Heights

● Sampling site
Contours in meters



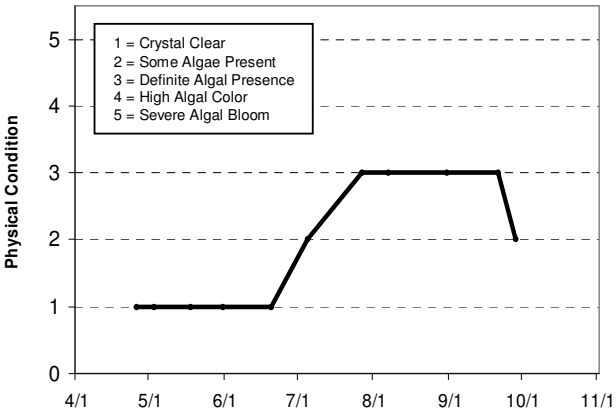






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/26/07	15					44		1.1	1	1
05/03/07	18.4				15	49		1.2	1	1
05/18/07	20.3				10	42		1.1	1	1
05/31/07	24.4				5.9	31		1.7	1	2
06/20/07	24.8				7.1	35		1.35	1	2
07/05/07	27.7				6.6	40		1.3	2	2
07/27/07	29.9				13	62		1	3	2
08/07/07	27.9				15	37		0.7	3	3
08/31/07	23.7				20	74		0.7	3	4
09/21/07	20.1				14	65		0.7	3	2
09/28/07	19.9				13	70		0.6	2	2

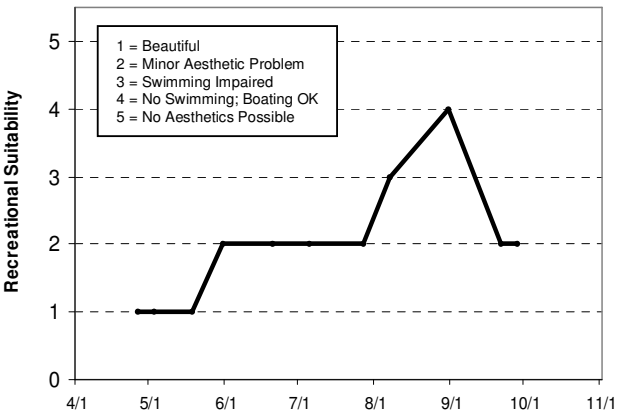


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														C
Chlorophyll a														B
Secchi Depth														D
Overall														**C**

Source: Metropolitan Council and STORET data



Lily Lake (82-0023) *City of Stillwater*

Lily Lake is located in the City of Stillwater in Washington County. The 52-acre lake has a maximum depth of 17.4 m (57 feet), and has public access located on the lake's northern shore and a fishing pier on its southern shore.

Lily Lake was monitored 7 times between late-April and mid-October 2007. The lake has been monitored through CAMP since 1995On each sampling date Lily Lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.0	33.0	69.0	C
CLA (µg/l)	20.2	6.1	37.0	C
Secchi (m)	1.4	1.1	2.3	C
TKN (mg/l)	2.08	1.60	3.20	
			Water Quality	C

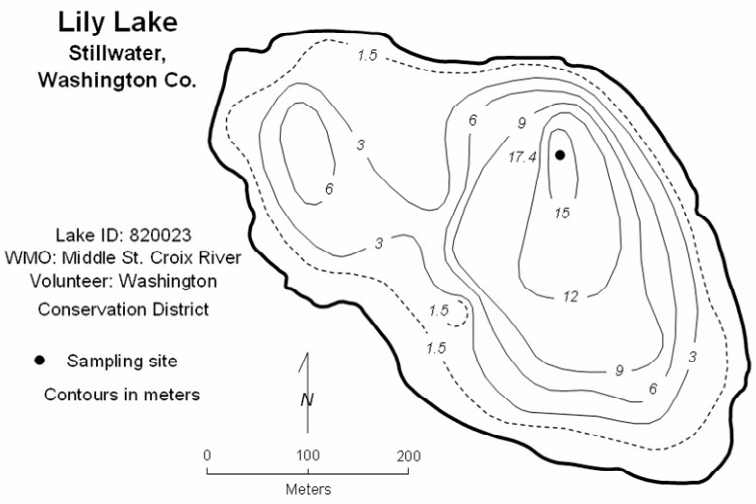
The lake's 2007 water quality grade is similar to those recorded in 1996-2000 and 2002-2006, and worse than those of 1995 and 2001 (B).

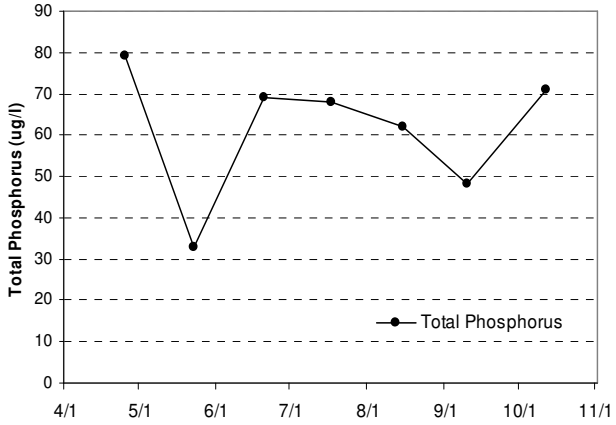
The physical and recreational conditions of Lily Lake as perceived by the volunteer(s) were ranked on a 1-to-5 scale. These rankings are also graphed on the lake's information sheet. The mean physical condition ranking was 2.6 (2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 2.2 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

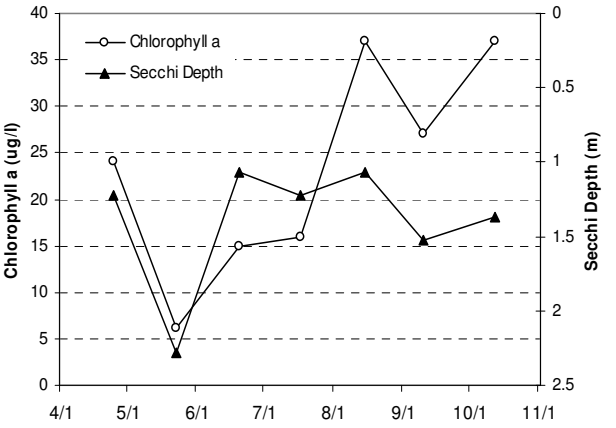
A search for water quality data through STORET files resulted in a moderate amount of data. While 1995-2007 are the only years for which nutrient data are available, Secchi transparencies were collected through the MPCA's Citizen Lake Monitoring Program in 1985, and 1987-1992. The data seem to show a wide fluctuation in the lake's mean CLA concentration and water clarity. The best conditions were recorded in 1995 and 2001 (A's and B's), while 1996-2000 and 2002-2007 conditions were mainly represented by C's.

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) 297-4916 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.

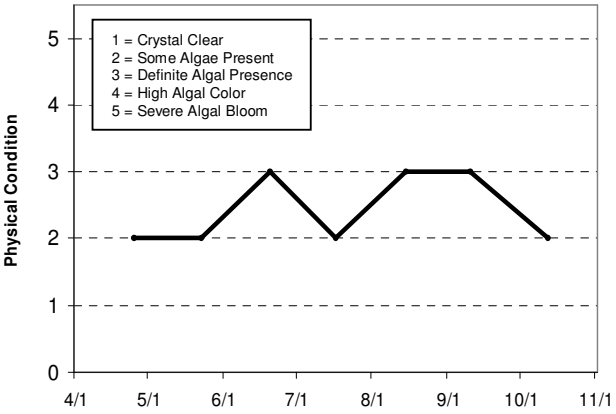






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/25/07	15.1	4.8	12.14	4.43	24	79		1.219	2	2
05/23/07	20.4	6	7.55	0.18	6.1	33		2.286	2	1
06/20/07	27.9	8	6.8	0.09	15	69		1.067	3	2
07/17/07	28.3	7.7	7.76	0.05	16	68		1.219	2	1
08/15/07	27.6	7.2	6.5	0.36	37	62		1.067	3	4
09/10/07	25.1	7.6	5.32	0.27	27	48		1.524	3	3
10/12/07	17.1	7.8	5.34	0.33	37	71		1.372	2	3

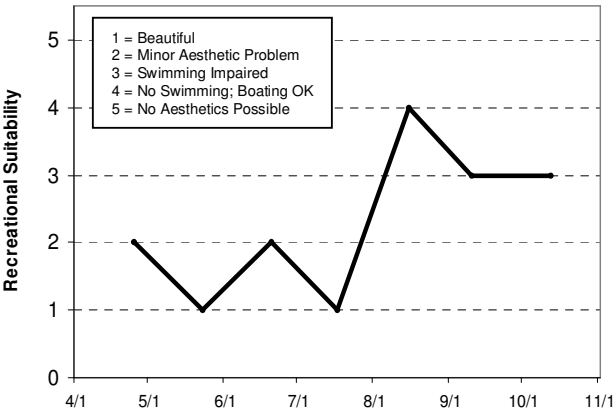


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth						D		C	C	C	C	C	B	
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C	C	C	C	C	C	C	C	C	C	C	C	C
Chlorophyll a		B	C	B	C	C	C	A	B	B	B	B	C	C
Secchi Depth		A	B	C	C	C	C	B	C	C	C	C	C	C
Overall		**B**	**C**	**C**	**C**	**C**	**C**	**B**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Little Carnelian Lake (82-0014) *Carnelian - Marine Watershed District*

Little Carnelian Lake is located in Stillwater Township (Washington County). It 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 does not have a public access and its 565-acre watershed translates to a meager 3.5:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the eighth year of CAMP monitoring in Little Carnelian Lake. The lake was monitored 7 times between early-May and mid-October 2007. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	16.4	9.0	29.0	A
CLA (µg/l)	2.7	1.7	3.4	A
Secchi (m)	7.2	5.8	7.6	A
TKN (mg/l)	0.52	0.47	0.57	
			Water Quality	A

Similar to all past years of CAMP monitoring, the individual grades result in an lake grade of A. This places the lake's water quality within the top 10 percent of Metro Area lakes for the years 2000-2007. In fact, similar to that reported in 2005 and 2006, the lake's mean Secchi transparency was the best mean water clarity in CAMP for 2007.

Throughout the summer, the volunteer ranked the lake's perceived physical condition on a 1-to-5 scale (see lake information sheet). The mean physical condition ranking was 1.7 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 1.2 (between 1- "beautiful" and 2- "minor aesthetic problem").

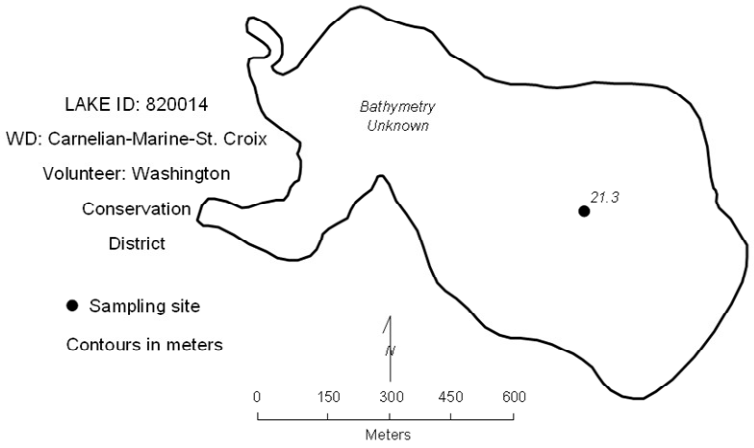
A search of the STORET nationwide water quality database for data on the lake revealed a moderate database throughout the 1990's with nutrient data available in 1991-1996 and 1998-2006. The lake's database indicates that the lake's water quality is well represented by an grade of A. Furthermore, a recent MPCA conducted trend analysis on the lake's Secchi transparency data, revealed a statistically significant improvement in recent water clarity (MPCA 2008).

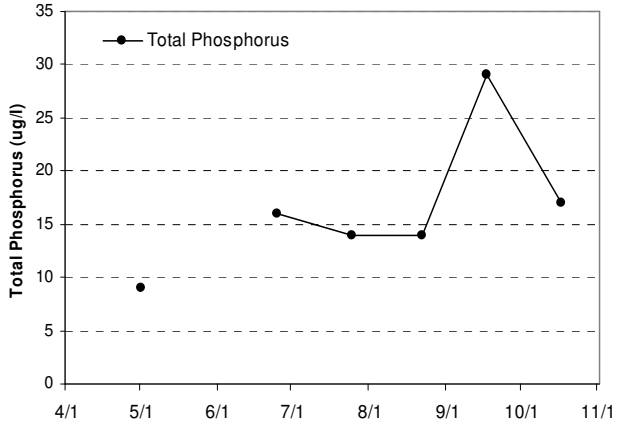
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

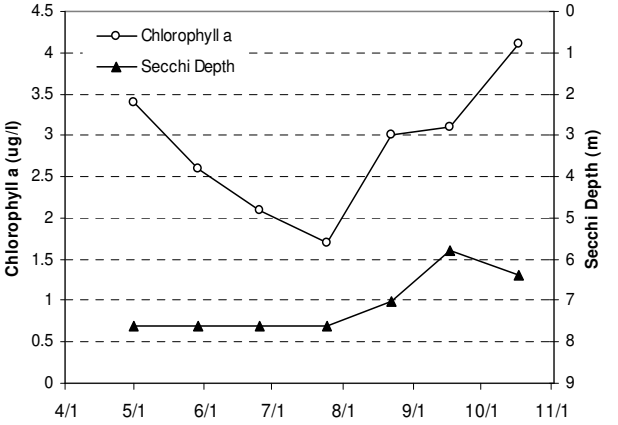
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Little Carnelian Lake

Stillwater Twp., Washington Co.

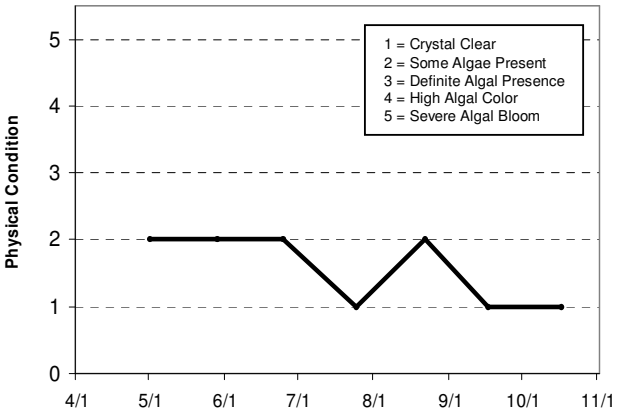






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/01/07	14.4	5	10.88	0.13	3.4	9		7.62	2	1
05/29/07	19.9	6.6	9.52	4.46	2.6			7.62	2	1
06/25/07	27.2	8.8	7.35	0.18	2.1	16		7.62	2	1
07/25/07	28.1	8.8	7.44	0.23	1.7	14		7.62	1	1
08/22/07	24.8	8.8	7.44	0.28	3	14		7.01	2	2
09/17/07	21.7	9.5	8	0.39	3.1	29		5.791	1	1
10/17/07	17.5	9.4	6.76	0.65	4.1	17		6.401	1	1

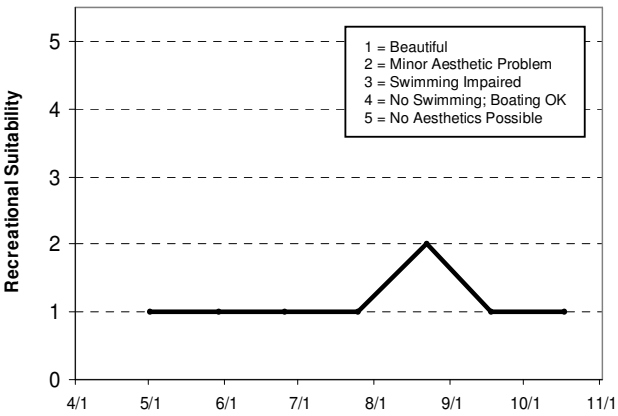


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus												A	A	
Chlorophyll a												A	A	
Secchi Depth												A	A	A
Overall												**A**	**A**	

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			A	A			A	B	A	A	A	A	A	A
Chlorophyll a			A	A			A	A	A	A	A	A	A	A
Secchi Depth	A	A	A	A	A		A	A	A	A	A	A	A	A
Overall			**A**	**A**			**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Little Comfort Lake (13-0054) *Comfort Lake - Forest Lake Watershed District*

Little Comfort Lake is a 36-acre lake located near the City of Wyoming in Chisago County. The lake has a maximum depth of 17.0 m (56 feet). Roughly 44 percent of the lake's surface 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).

This was the second year that Little Comfort Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided data for 1994 as well as the CAMP data for 2006.

The lake was monitored 13 times between mid-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	43.3	18.0	101.0	C
CLA (µg/l)	8.9	3.7	19.0	A
Secchi (m)	1.5	0.4	2.3	C
TKN (mg/l)	0.89	0.58	1.10	
			Water Quality	B

The lake received an water quality grade of C for 2007. It also received C grades in 1994 and 2006. However, this year's grade is considered the best yet received because it received a grade of A for chlorophyll-a. Because there are limited nutrient data available for the lake, there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 1.9 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

Little Comfort Lake

Wyoming Twp., Chisago Co.

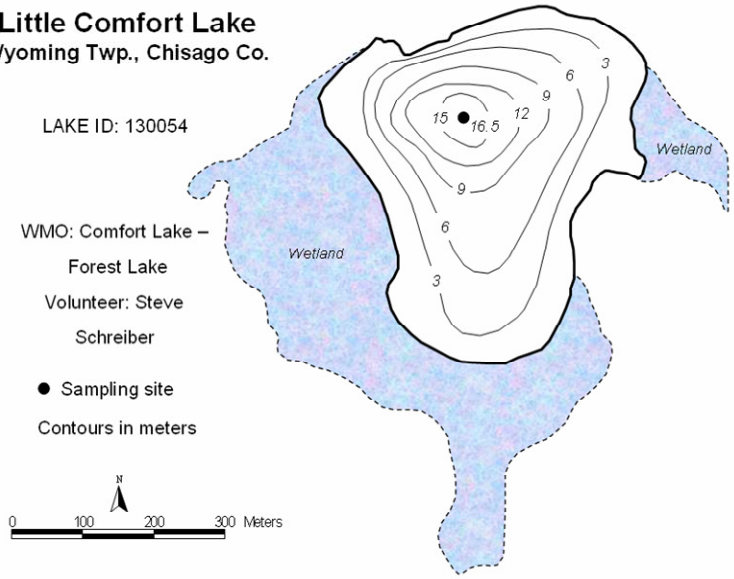
LAKE ID: 130054

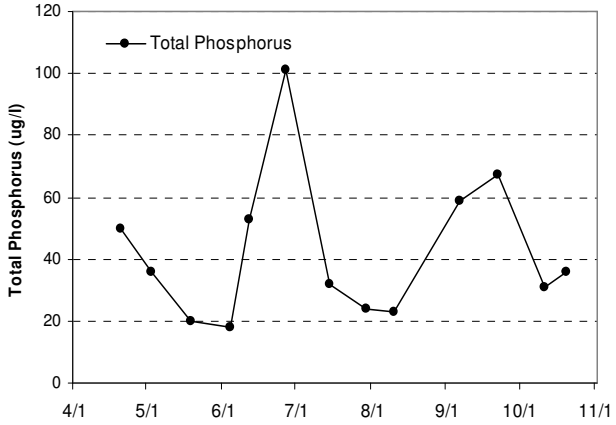
WMO: Comfort Lake – Forest Lake

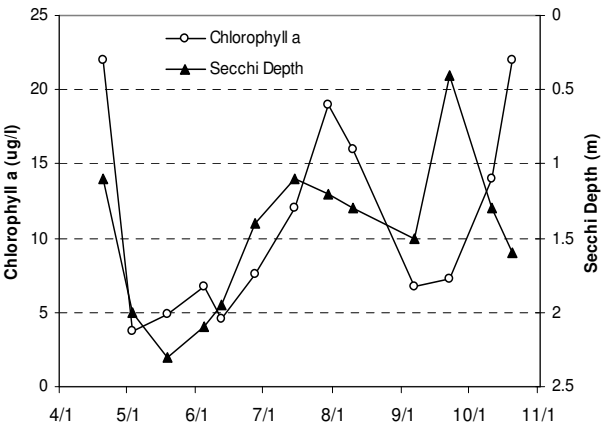
Volunteer: Steve Schreiber

● Sampling site

Contours in meters

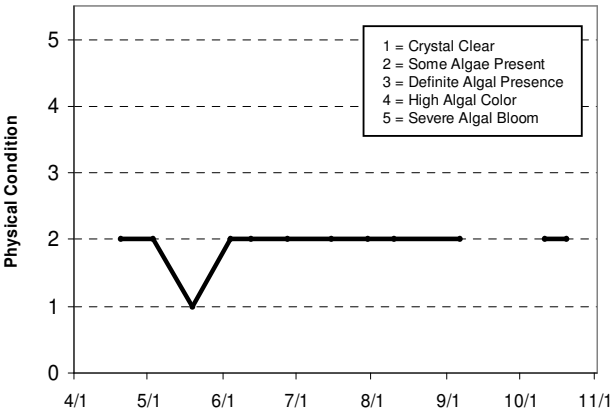






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	12.3				22	50		1.1	2	1
05/03/07	14.7				3.7	36		2	2	1
05/19/07	16.3				4.9	20		2.3	1	1
06/04/07	23.1				6.7	18		2.1	2	2
06/12/07	27.2				4.6	53		1.95	2	3
06/27/07	27.6				7.6	101		1.4	2	3
07/15/07	27.8				12	32		1.1	2	2
07/30/07	27				19	24		1.2	2	2
08/10/07	26.9				16	23		1.3	2	2
09/06/07	21.8				6.7	59		1.5	2	2
09/22/07	18.6				7.3	67		0.4		
10/11/07	15.2				14	31		1.3	2	1
10/20/07	13.5				22	36		1.6	2	2

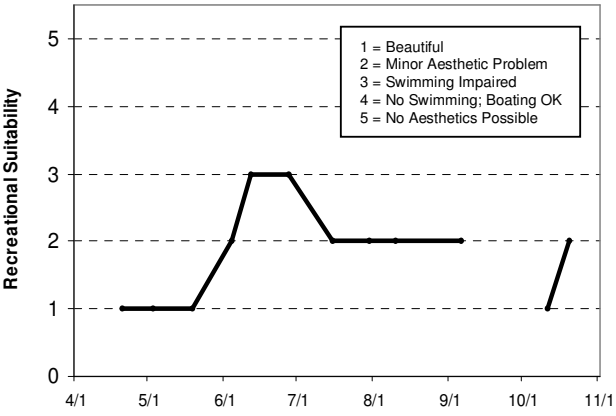


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C												D	C
Chlorophyll a	C												C	A
Secchi Depth	C												C	C
Overall	**C**												**C**	**B**

Source: Metropolitan Council and STORET data



Little Long Lake (27-0179-01) *Pioneer-Sarah Watershed Management Commission*

Little Long Lake, located near Minnetrista (Hennepin County), covers an area of 108 acres and has a maximum depth of 23.2 m (76 feet). Roughly 49 percent of the 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). Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

This is the second year that Little Long Lake was enrolled in CAMP; the lake had been monitored by Council staff in the past. The lake was monitored 2 times in 2007. The collected data and resulting graphs showing TP and CLA concentrations are presented on the lake's information sheet on the following page. Secchi transparency and user perception rankings were not provided by the volunteer.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	13.0	10.0	16.0	A
CLA (µg/l)	2.0	1.9	2.0	A
Secchi (m)				
TKN (mg/l)	0.39	0.30	0.47	
			Water Quality	A

The lake's grade of A in 2007 is typical of grades received in past years, but better than last year's B grade. However, the 2007 grade is based on only 2 sampling dates and no Secchi transparency data. Therefore, the 2007 data does not provide a complete view of the year's water quality.

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) 297-4916 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.

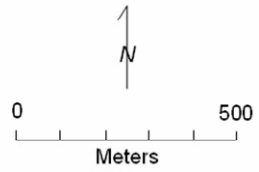
Little Long Lake

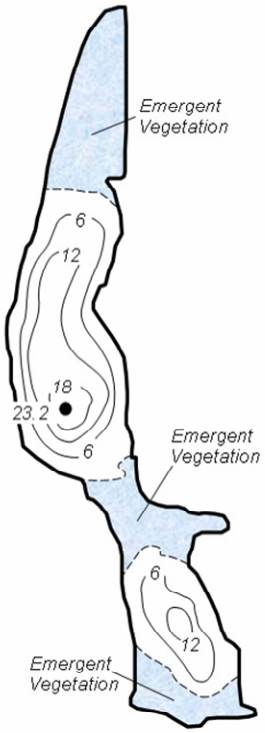
Minnetrista, Hennepin Co.

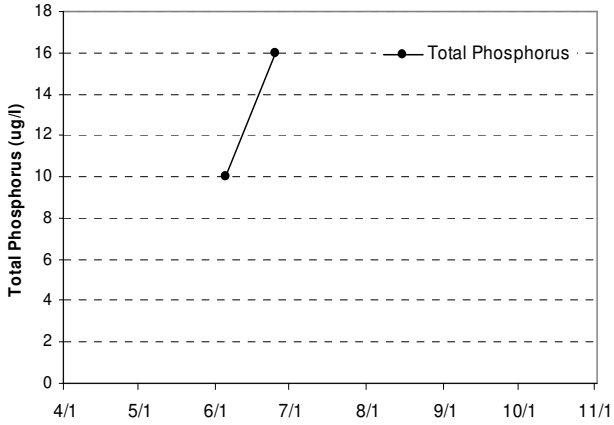
Lake ID: 270179-01
WMO: Pioneer-Sarah Creek
Volunteers: Boys and Girls Club

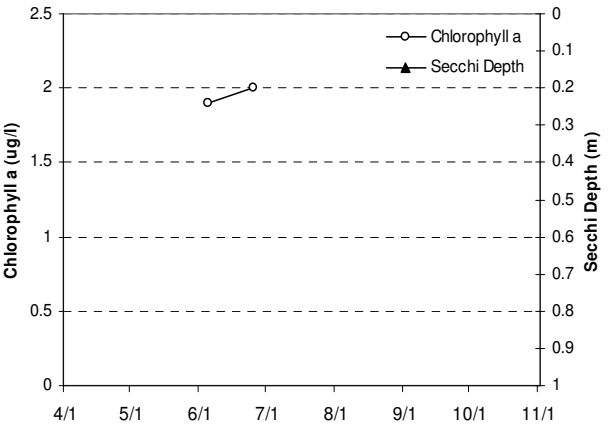
● Sampling site

Contours in meters



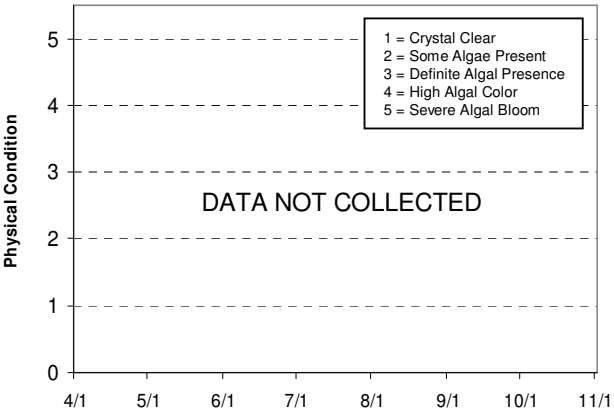






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/05/07					1.9	10				
06/25/07					2	16				

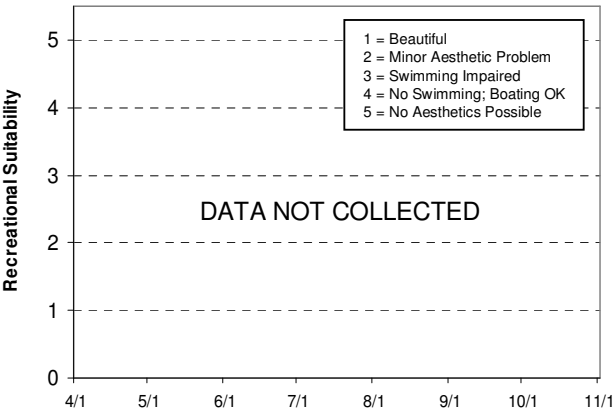


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	A				A									
Chlorophyll a	A				A						A			
Secchi Depth	A				A						A			
Overall	**A**				**A**									

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					A			A		A			C	A
Chlorophyll a					A			A		A			A	A
Secchi Depth					A			A		A			A	
Overall					**A**			**A**		**A**			**B**	**A**

Source: Metropolitan Council and STORET data



Long Lake [Apple Valley] (19-0022) *Vermillion River Watershed Management Commission*

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 3.5 m (10 feet). There is no other known morphological data available for the lake. Because the lake is relatively shallow, it does not develop and maintain a thermocline (a density gradient owed to changing water temperatures throughout the water column), and the entire lake is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants).

This is the seventh year in which Long Lake was involved in CAMP. A search for other historical water quality data for the lake came up empty.

The lake was monitored 13 times from mid-April to mid-October 2007. Graphs as well as the actual data collected by the volunteer(s) show the seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability). The graphs and data tables are presented on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	346.7	102.0	737.0	F
CLA (µg/l)	197.7	33.0	460.0	F
Secchi (m)	0.3	0.1	0.5	F
TKN (mg/l)	7.47	1.90	22.00	
			Water Quality	F

The lake's 2007 grade of F is similar to those recorded in 2002-2006, and worse than that recorded in 1997 (D). No long-term trends are apparent from the lake's entire dataset. In the short-term however, the lake's water quality is well represented by an grade of F. To better understand the quality of the lake and what direction it may be heading, more years of data collection are needed.

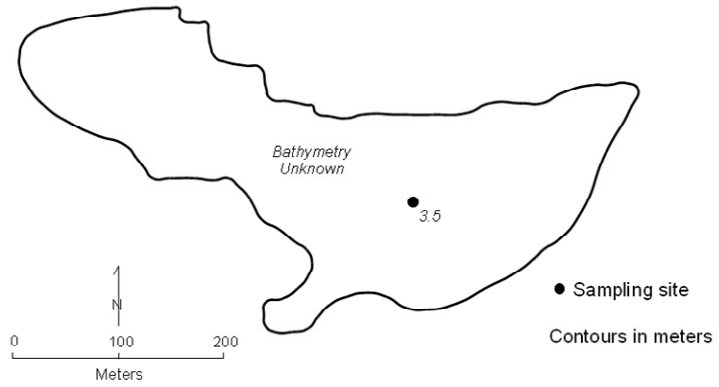
Throughout the course of the study, the volunteers ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. These user perception rankings are shown on the lake's information sheet on the following page. The mean physical condition ranking was 3.3 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability was 4.2 (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

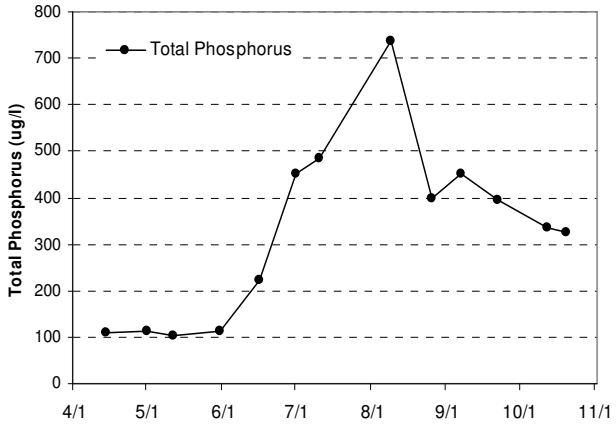
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Long Lake

Apple Valley, Dakota Co.

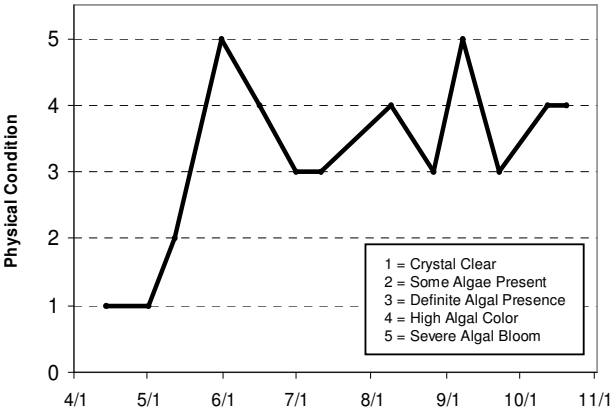
Lake ID: 190022
WMO: Dakota County
Volunteer: Al Kettlekamp





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/14/07	11.8				24	109		0.6	1	4
05/01/07	20.7				44	113		0.5	1	4
05/12/07	21.3				40	102		0.53	2	4
05/31/07	26.4				33	114		0.2	5	5
06/16/07	27.7				100	222		0.31	4	4
07/01/07	26.7				270	452		0.15	3	4
07/11/07	25.6				450	485		0.2	3	4
08/09/07	29.1				460	737		0.1	4	4
08/26/07	23.6				200	397		0.2	3	4
09/07/07	27				250	450		0.2	5	4
09/22/07	21.4				130	395		0.19	3	5
10/12/07	13.6				210	334		0.2	4	5
10/20/07	14.8				190	324		0.3	4	4

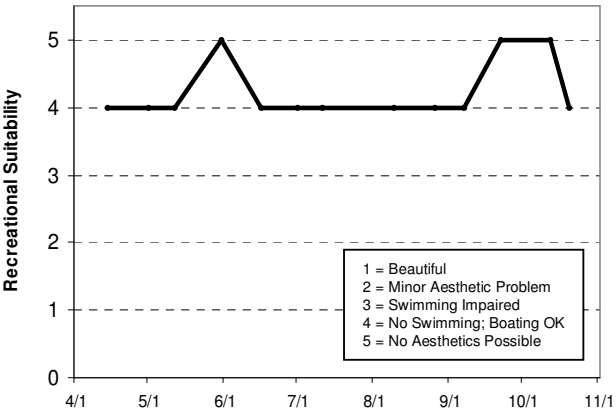


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				D					F	F	F	F	F	F
Chlorophyll a				D					F	F	F	F	F	F
Secchi Depth				F					F	F	F	F	F	F
Overall				**D**					**F**	**F**	**F**	**F**	**F**	**F**

Source: Metropolitan Council and STORET data



Long Lake [Mahtomedi] (82-0130) *Rice Creek Watershed District*

Long Lake, a 48-acre lake with a maximum depth of 7.7 m (25 feet), is located within City of Mahtomedi (Washington County). Roughly 92 percent of the lake's surface 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).

This marks the fifth year in which Long Lake has been involved in CAMP. Other than for the 2003-2007 CAMP data, a search through the STORET nationwide water quality database for historic data on the lake was unsuccessful.

On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 10 times between late-June and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

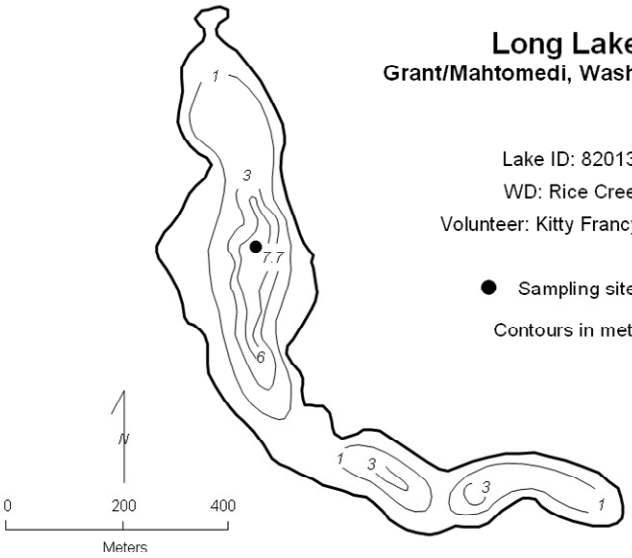
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	61.0	16.0	340.0	C
CLA (µg/l)	2.8	1.7	3.8	A
Secchi (m)	2.9	2.1	4.3	B
TKN (mg/l)	0.76	0.50	1.80	
			Water Quality	B

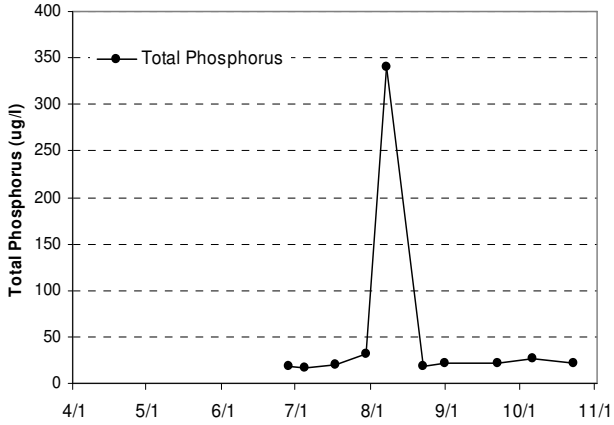
The lake's 2007 water quality grade (B) is similar to that recorded in 2003, 2005, and 2006 and slightly worse than that recorded in 2004 (grade of an A).

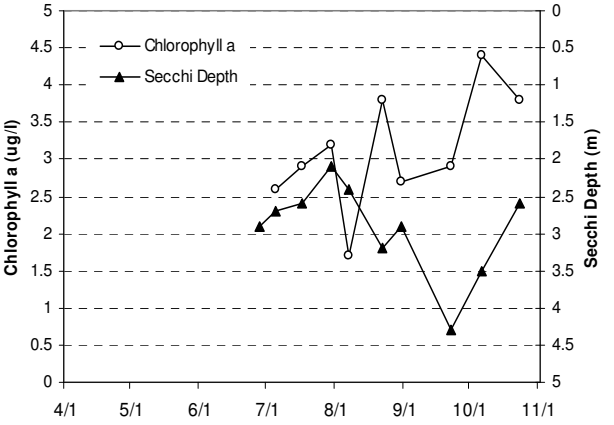
As mentioned earlier, there are no water quality data available for Long Lake other than the 2003-2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.4 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.9 for recreational suitability (roughly 3- "swimming slightly impaired").

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

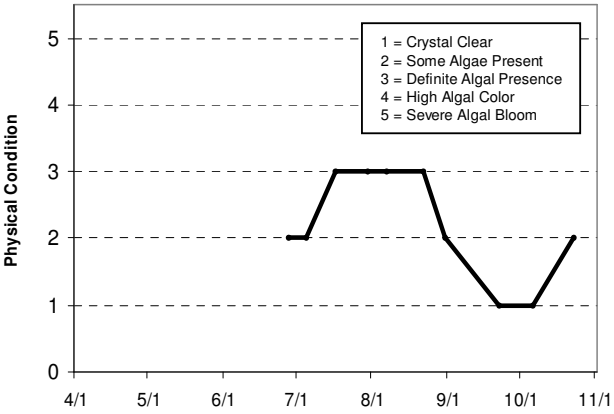






2007 Data

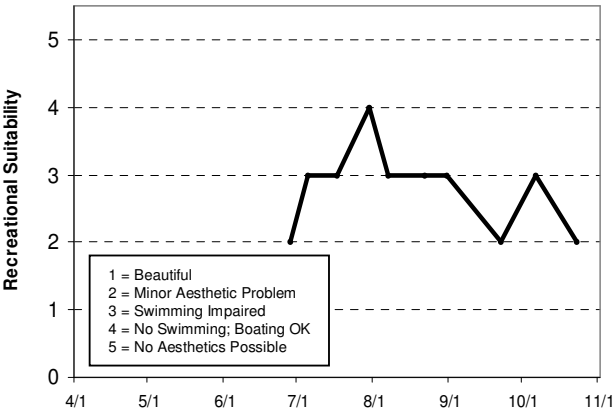
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/28/07	26					19		2.9	2	2
07/05/07	26.2				2.6	16		2.7	2	3
07/17/07	25.5				2.9	20		2.6	3	3
07/30/07	28.9				3.2	31		2.1	3	4
08/07/07	25.9				1.7	340		2.4	3	3
08/22/07	22.2				3.8	19		3.2	3	3
08/31/07	24.2				2.7	22		2.9	2	3
09/22/07	18.6				2.9	21		4.3	1	2
10/06/07	19				4.4	26		3.5	1	3
10/23/07	12.2				3.8	21		2.59	2	2



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus										B	A	C	B	C
Chlorophyll a										A	A	A	A	A
Secchi Depth										B	B	B	B	B
Overall										**B**	**A**	**B**	**B**	**B**



Source: Metropolitan Council and STORET data

Long Lake [May Township] (82-0030) *Marine on St. Croix WMO*

Long Lake is an 88-acre lake located in May Township (Washington County). There is little morphological data available for the lake. Because the maximum depth is only 3.7 m (12 feet), 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). The lake was sampled 7 times between mid-April and early-October 2007.

2007 summer (May-September) data summary

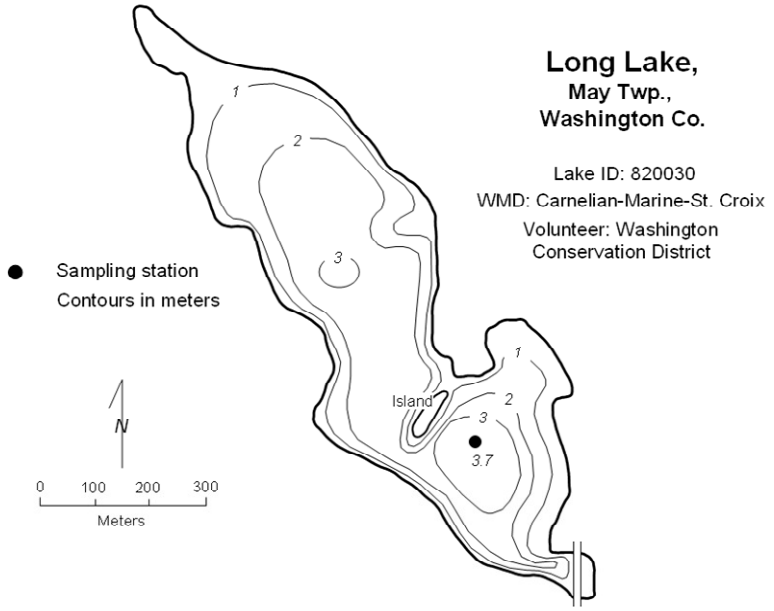
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	34.8	28.0	44.0	C
CLA (µg/l)	10.0	4.2	16.0	B
Secchi (m)	2.1	1.5	2.6	C
TKN (mg/l)	0.87	0.81	0.95	
			Water Quality	C

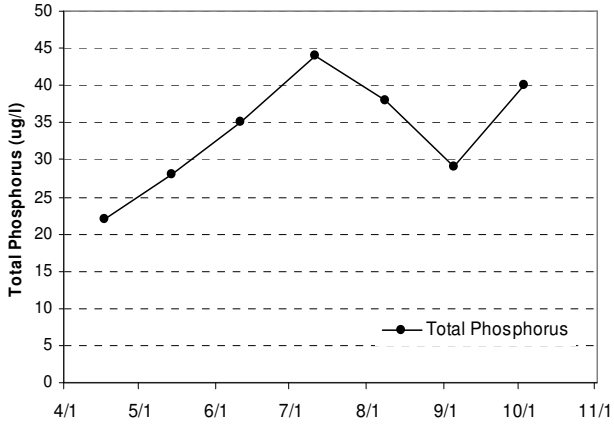
The lake's 2007 grade was similar to those recorded in 2000-2001 and 2003-2006, and better than those of 1993-1997, 1999, and 2002 (C). Overall, the lake's water quality is representative of a C+/B grade. A recent MPCA conducted trend analysis on the lake's Secchi transparency data showed a statistically significant improvement in recent water clarity (MPCA 2008).

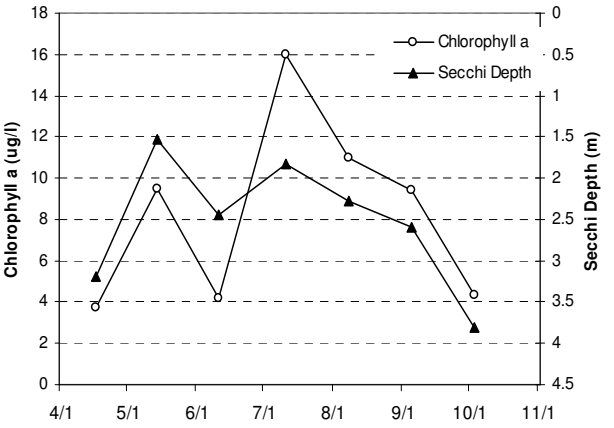
Throughout the course of the study, the volunteer monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. These rankings as well as the data and graphs discussed above are shown on the lake's information sheet on the following page. The mean physical condition ranking was 2.4 (between 2- "some algae present" and 3- "definite algal presence"), while the mean recreational suitability ranking was 2.6 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

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) 297-4916 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.

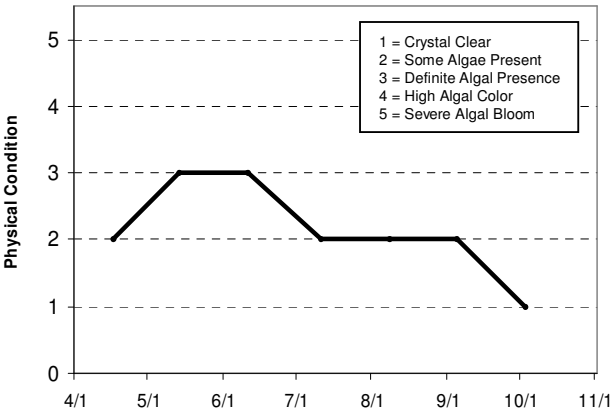






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	9.8	7.3	11.96	12.88	3.7	22		3.2	2	1
05/14/07	22	18.2	9.64	9.25	9.5	28		1.524	3	4
06/11/07	25.8	20.7	9.13	1.35	4.2	35		2.438	3	2
07/11/07	27	26.1	6.31	0.62	16	44		1.829	2	2
08/08/07	27.6	23.7	5.25	0.12	11	38		2.286	2	2
09/05/07	25.9	22.1	6.82	0.12	9.4	29		2.591	2	3
10/03/07	19.1	18.7	5.33	0.32	4.3	40		3.81	1	1

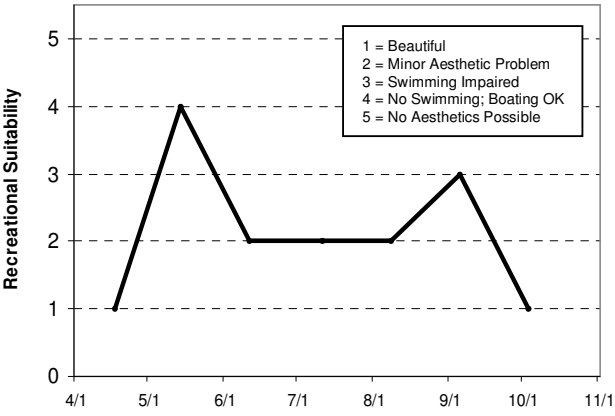


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														C
Chlorophyll a														C
Secchi Depth														B
Overall														**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C	C		C	C	C	C	C	B	C	C	C
Chlorophyll a	C	C	B	C		B	B	B	B	A	A	B	A	B
Secchi Depth	C	C	C	C		C	B	B	C	B	B	B	B	C
Overall	**C**	**C**	**C**	**C**		**C**	**B**	**B**	**C**	**B**	**B**	**B**	**B**	**C**

Source: Metropolitan Council and STORET data



Long Lake [Pine Springs] (82-0118) *Valley Branch Watershed District*

Long Lake is a 62-acre lake located in Pine Springs Township (Washington County). The mean and maximum depth of the lake is 3.6 m (roughly 12 feet) and 10.4 m (34 feet), respectively. Roughly 55 percent of the lake's area is considered littoral (the 0-15 foot depth area of aquatic vegetation dominance). The lake's size and mean depth results in an approximate lake volume of 744 ac-ft. The lake's surface area and watershed size (2,060 acres) translates to a 33:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has recently been found in the lake.

This was the fifth year that Long Lake has been involved in CAMP (the other being 1993 and 2004-2006). The lake has been monitored in the past by Council staff (most recently in 2003). The lake was monitored 14 times between mid-April and mid-October 2007. The volunteer data and resulting graphs showing the seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.4	18.0	41.0	B
CLA (µg/l)	9.0	3.4	14.0	A
Secchi (m)	2.7	1.7	4.6	B
TKN (mg/l)	1.75	1.50	1.90	
			Water Quality	B

A search for water quality data on Long Lake uncovered a very small database. The only years other than 2007 where water quality data was available was 1984, 1993, and 2003-2006. While the limited database restricts the ability to determine long-term trends, the lake seems to fluctuate between an grade of B and C. The lake's best recorded water quality was observed in 2003. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

The average user perception rankings, on a 1-to-5 scale, was 2.2 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.3 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

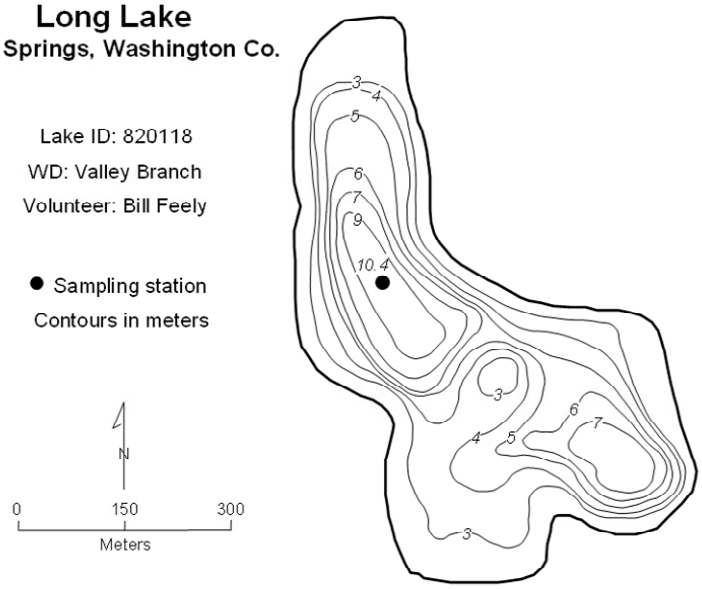
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

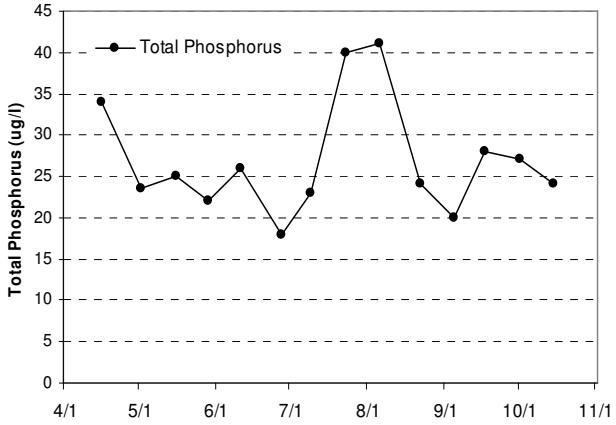
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

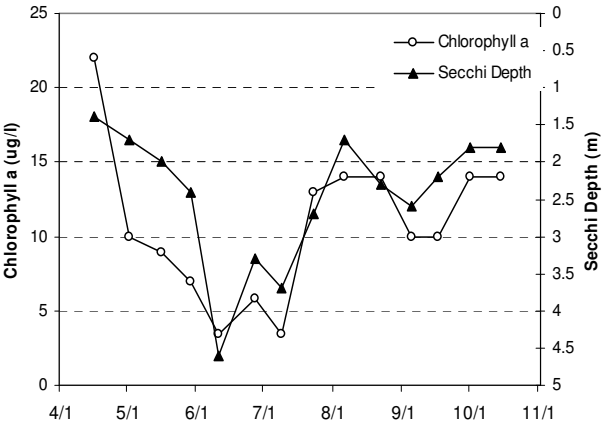
Long Lake
Pine Springs, Washington Co.

Lake ID: 820118
WD: Valley Branch
Volunteer: Bill Feely

● Sampling station
Contours in meters

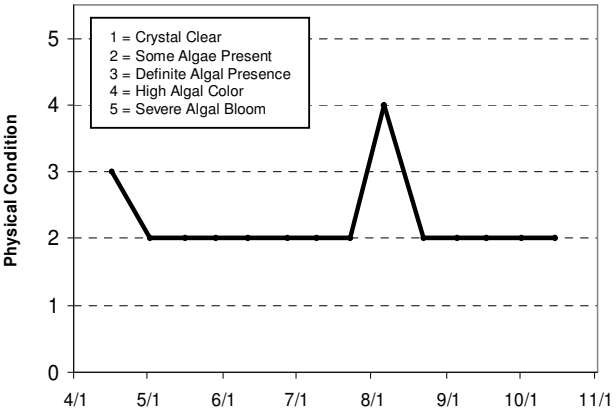






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.4				22	34		1.4	3	3
05/02/07	15.9				10	23.5		1.7	2	3
05/16/07	17.4				8.9	25		2	2	2
05/29/07	19.6				6.9	22		2.4	2	2
06/11/07	24.6				3.4	26		4.6	2	1
06/27/07	25.5				5.8	18		3.3	2	2
07/09/07	27.7				3.4	23		3.7	2	1
07/23/07	25.9				13	40		2.7	2	3
08/06/07	26.9				14	41		1.7	4	4
08/22/07	22.6				14	24		2.3	2	3
09/05/07	24.9				10	20		2.6	2	2
09/17/07	18.9				10	28		2.2	2	2
10/01/07	18.3				14	27		1.8	2	2
10/15/07	14.6				14	24		1.8	2	3

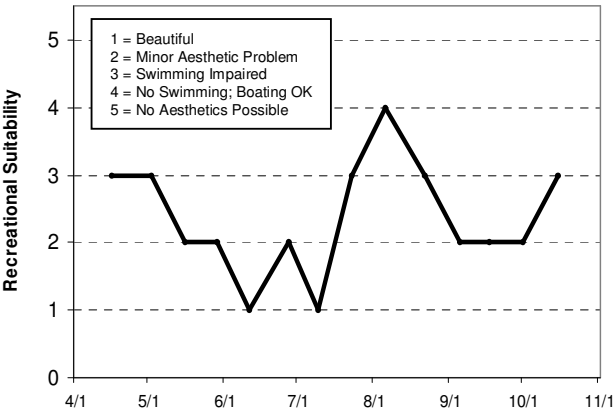


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					C									B
Chlorophyll a					B									B
Secchi Depth					C									C
Overall					**C**									**B**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus										B	C	C	C	B
Chlorophyll a										A	B	B	C	A
Secchi Depth										B	C	C	C	B
Overall										**B**	**C**	**C**	**C**	**B**

Source: Metropolitan Council and STORET data



Long Lake [Stillwater] (82-0021) *Browns Creek Watershed District*

Long Lake, which has a surface area of roughly 96 acres, is located on the western boundary of the City of Stillwater (Washington County). Its maximum depth is 6.7 m (22 feet).

The lake was monitored 14 times from mid-April to mid-October 2007. This was the tenth year that Long Lake has been involved in CAMP. The lake was also involved in the program in 1995-1996, and 1998-2006. Graphs as well as the actual data collected by volunteers show the seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability). The graphs and data tables are presented on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	63.7	41.0	136.0	C
CLA (µg/l)	23.8	9.8	44.0	C
Secchi (m)	1.1	0.9	1.7	D
TKN (mg/l)	2.47	1.70	3.40	
			Water Quality	C

A search for water quality data through STORET files resulted in a moderate amount of data. Nutrient data are available for the lake in 1995-1996, and 1998-2006. Additionally, Secchi transparencies collected through the MPCA's Citizen Lake Monitoring Program are available for 1987, 1989, and 1991-1994. When these data are analyzed, it reveals that the lake's water clarity, prior to the C recorded in 2004, had been fairly constant with grades of F in 1987, 1991-1995, 1998-2003, and D in 1989, 1996 (although the 1996 database is limited), 2005 and 2006. The water quality grade of C for 2007 was an improvement over last year, and 2007 was the second best year for the water quality for this lake.

A recent MPCA conducted trend analysis on the lake's Secchi transparency data, revealed no statistically significant trends in recent water clarity (MPCA 2008).

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The mean physical condition ranking was 3.3 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability was 2.9 (roughly 3- "swimming slightly impaired").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

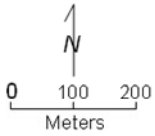
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

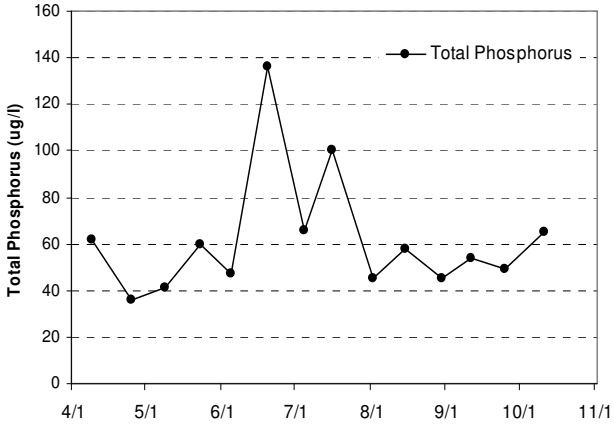
Long Lake,
Stillwater, Washington Co.

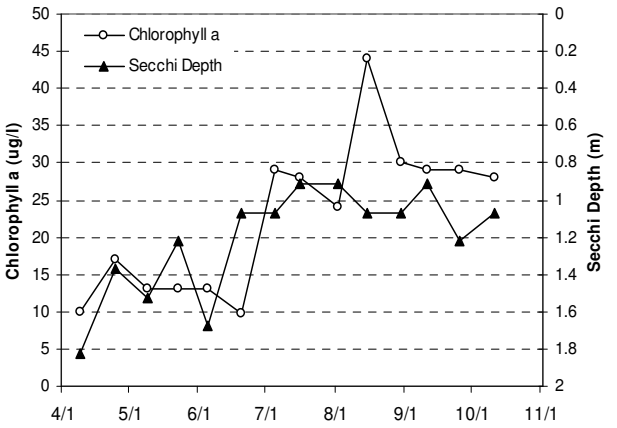
Lake ID: 820021
WD: Browns Creek
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

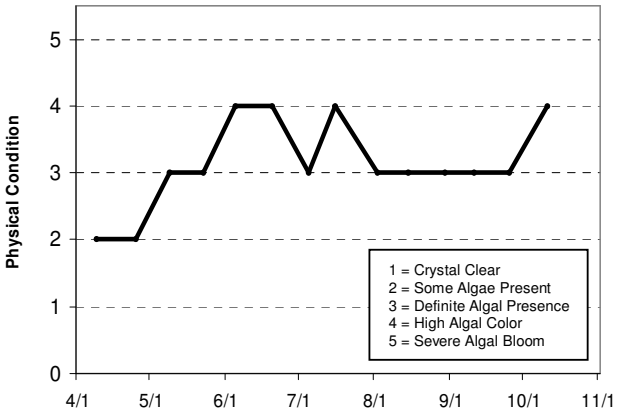






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/09/07	6.8	4.7	12.2	0.08	10	62		1.829	2	1
04/25/07	15.5	5.9	10.27	7.42	17	36		1.372	2	2
05/09/07	19.8	8.2	10.92	1.36	13	41		1.524	3	2
05/23/07	21.2	8.7	8.68	0.24	13	60		1.219	3	2
06/05/07	24.1	9.9	8.64	0.15	13	47		1.676	4	2
06/20/07	28.2	10.9	7.77	0.1	9.8	136		1.067	4	2
07/05/07	27.8	11.4	7.82	0.2	29	66		1.067	3	2
07/16/07	29.7	13.8	8.61	0.19	28	100		0.914	4	2
08/02/07	30.3	14	7.15	0.65	24	45		0.914	3	4
08/15/07	27.7	15.2	7.25	0.26	44	58		1.067	3	4
08/30/07	23.2	19.2	7.15	0.13	30	45		1.067	3	4
09/11/07	23.2	16.6	8.59	0.13	29	54		0.914	3	4
09/25/07	22.4	16.2	5.73	0.16	29	49		1.219	3	4
10/11/07	17.6	16.9	5.73	4.55	28	65		1.067	4	4

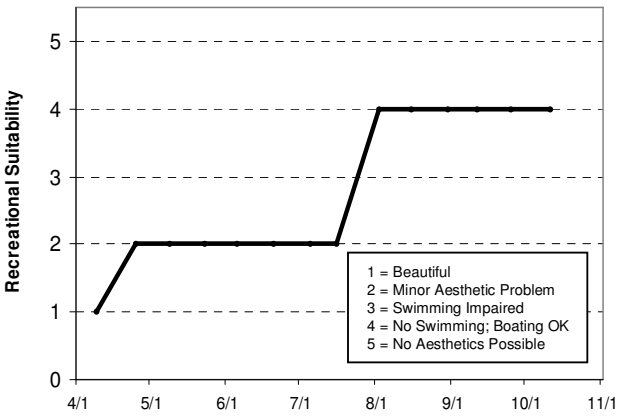


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth								F		D		F	F	F
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D	D		D	D	F	D	D	D	C	D	D	C
Chlorophyll a		D	D		F	F	F	F	D	D	C	D	C	C
Secchi Depth	F	F	D		F	F	F	F	F	F	C	D	D	D
Overall		**D**	**D**		**F**	**F**	**F**	**F**	**D**	**D**	**C**	**D**	**D**	**C**

Source: Metropolitan Council and STORET data



Long Lake [Washington Co.] (82-0068) *Carnelian - Marine Watershed District*

Long Lake is a 35-acre lake located within City of Scandia (Washington County). The maximum and mean depths of the lake are 2.1 m (roughly seven feet) and 1.1 m (three-and-a-half feet), respectively. 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's surface area and mean depth translates to an approximate volume of 126 ac-ft.

The majority of the land within the 381-acre watershed is undeveloped. The watershed-to-lake size ratio is 11:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the eighth year that Long Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake was very limited. The only years in which data are available other than the 2000-2006 CAMP data, were 1998-1999. The lake was monitored 7 times between mid-April and early-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.6	26.0	87.0	C
CLA (µg/l)	24.9	2.6	44.0	C
Secchi (m)	1.6	1.2	2.0	C
TKN (mg/l)	1.18	0.81	1.60	
			Water Quality	C

The lake's 2006 grade (C), which is similar to that recorded in 2002, is better than those recorded in 1998-2000, and 2003(F), and 2001, 2004-2005 (grade of a D).

As mentioned earlier, there is a limited amount of water quality data available for Long Lake. Therefore there are not sufficient data to determine any long-term or short-term trends. The lake's quality has fluctuated between an grade of C and F. To better understand the lake's water quality and where it may be heading, more data are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.6 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok"").

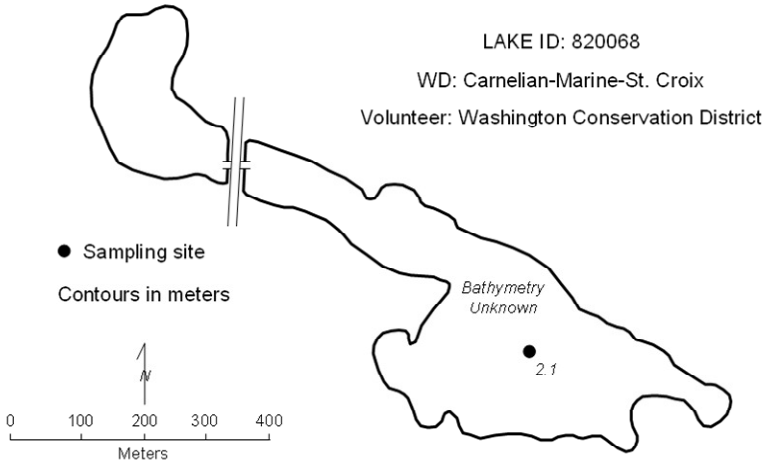
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

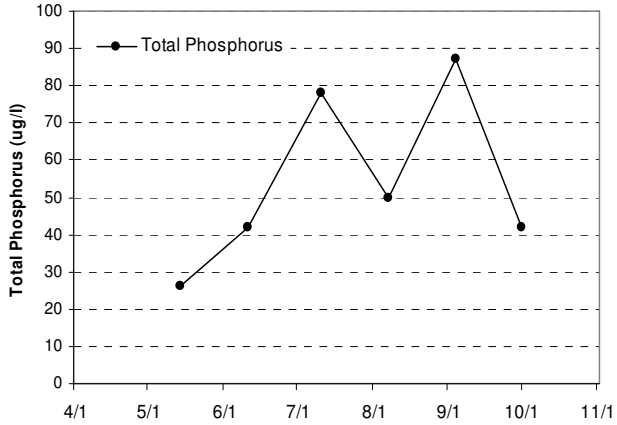
Long Lake
Scandia, Washington Co.

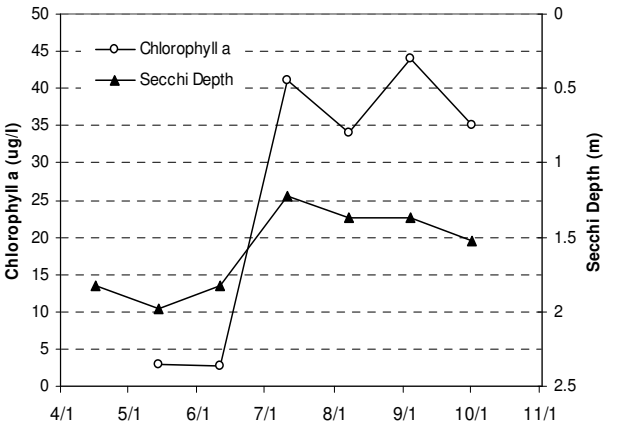
LAKE ID: 820068

WD: Carnelian-Marine-St. Croix

Volunteer: Washington Conservation District

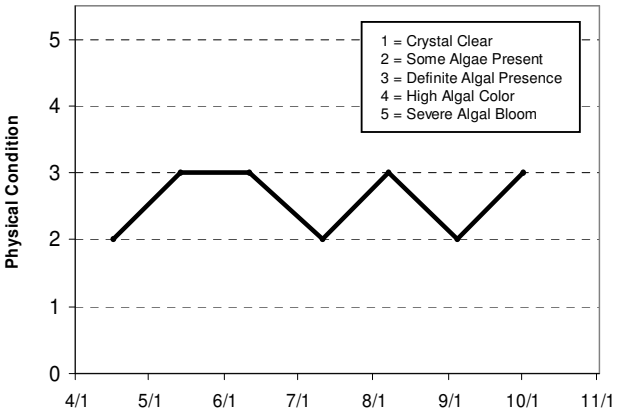






2007 Data

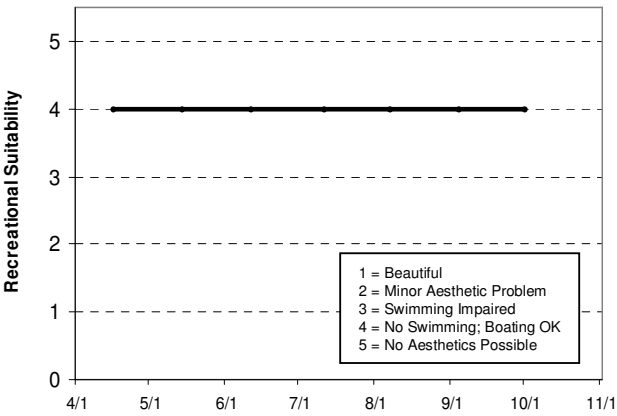
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	10.2	9.4	12.08	11.67				1.829	2	4
05/14/07	21.1	20.8	8.29	8.13	3	26		1.981	3	4
06/11/07	27.3	25.3	7.78	4.57	2.6	42		1.829	3	4
07/11/07	26.7	26.5	5.8	5.08	41	78		1.219	2	4
08/07/07	27.9	26.4	7.98	1.31	34	50		1.372	3	4
09/04/07	28.3	26.1	8.43	0.15	44	87		1.372	2	4
10/01/07	19.7	19.2	7.41	2.34	35	42		1.524	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					D	D	D	C	C	D	D	D	D	C
Chlorophyll a					F	F	F	D	C	F	D	C	B	C
Secchi Depth					F	F	F	D	D	F	D	D	C	C
Overall					**F**	**F**	**F**	**D**	**C**	**F**	**D**	**D**	**C**	**C**



Source: Metropolitan Council and STORET data

Loon Lake (82-0015-02) *Carnelian - Marine Watershed District*

Loon Lake is located in the Stillwater Township (Washington County). The 64-acre lake has a mean and maximum depth of 2.4 m (eight feet) and 4.9 m (16 feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 206 ac-ft. Because of the shallowness of the lake, the majority of its area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake does not have a public access and its 407-acre watershed translates to a 6.4:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

The lake was monitored 7 times between mid-April and early-October 2007. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	150.2	66.0	209.0	D
CLA (µg/l)	115.4	44.0	210.0	F
Secchi (m)	0.5	0.3	0.6	F
TKN (mg/l)	4.08	2.30	6.20	
			Water Quality	F

The lake's 2007 grade of F was identical to those recorded in 1996-1998 and 2003-2006, and worse than those in 2000-2002 (D).

The volunteer ranked the lake's physical and recreational conditions on a 1-to-5 scale (see lake information sheet). The mean physical condition ranking was 3.6 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.2 (between 3- "swimming impaired" and 4- "no swimming – boating ok").

There is no apparent trend in water quality for this because it fluctuates between a D and F grade. The lake's water quality seems to be well represented by D/F+. To better understand the quality of the lake and what direction it may be heading, more years of data collection are needed.

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) 297-4916 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.

Loon Lake

Stillwater Twp., Washington Co.

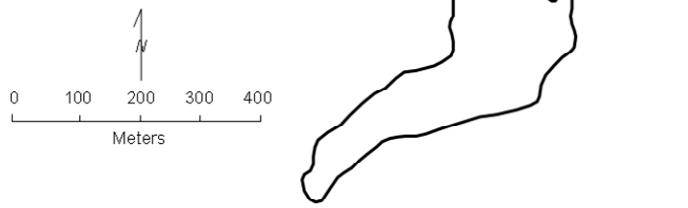
LAKE ID: 820015-02

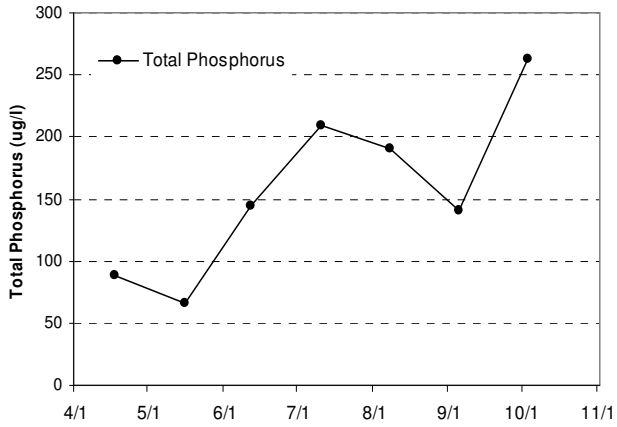
WD: Carnelian-Marine-St. Croix

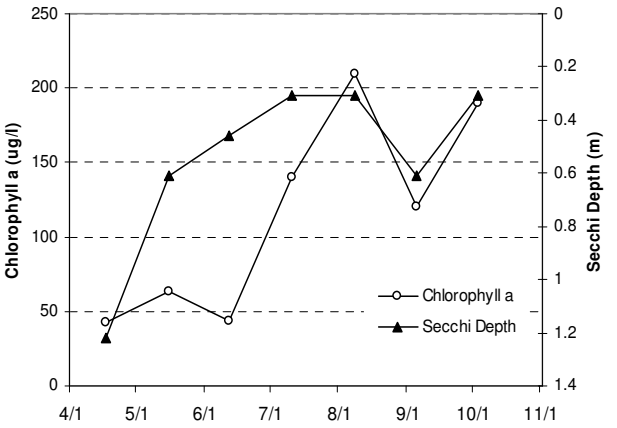
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

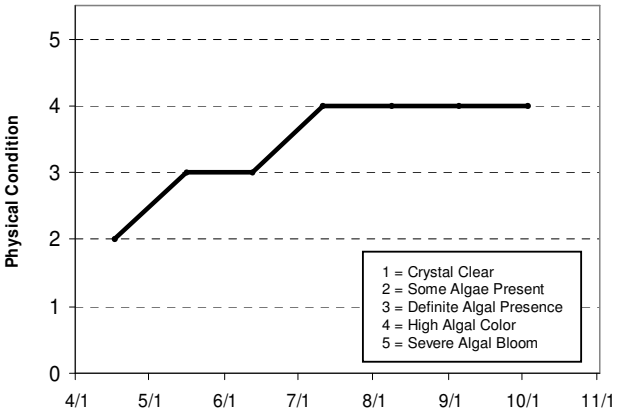






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	10.8	6	12.52	7.87	43	89		1.219	2	2
05/16/07	19.5	14.6	9.78	0.82	63	66		0.61	3	2
06/12/07	28.8	22.7	9.76	0.08	44	144		0.457	3	4
07/11/07	27.1	21.6	5.13	0.07	140	209		0.305	4	2
08/08/07	28	24.7	7.58	0.12	210	191		0.305	4	4
09/05/07	27.3	23.8	11.3	0.2	120	141		0.61	4	4
10/03/07	19.6	18.7	10.11	0.28	190	263		0.305	4	4

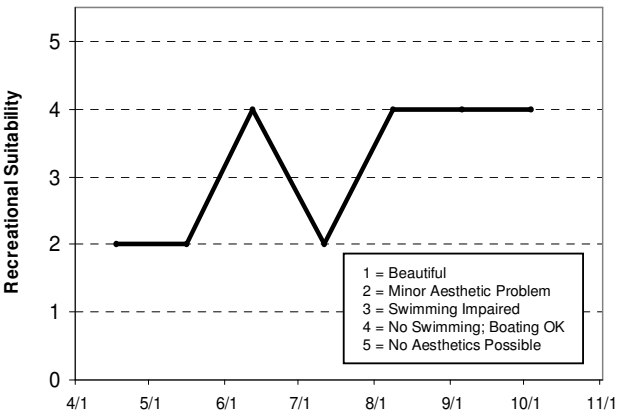


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			F	F	F	F	D	D	D	D	D	D	F	D
Chlorophyll a			D	D	D	D	D	D	D	F	F	F	F	F
Secchi Depth			F	F	F	F	D	D	F	F	F	F	F	F
Overall			**F**	**F**	**F**	**F**	**D**	**D**	**D**	**F**	**F**	**F**	**F**	**F**

Source: Metropolitan Council and STORET data



Lost Lake (82-0134) *City of Mahtomedi*

Lost Lake is a small lake located in the City of Mahtomedi (Washington County). There is very little known morphological data available for the lake.

This was the second year that Lost Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no other data, therefore 2006 and 2007 are the only years of available water quality data for the lake.

The lake was monitored 13 times between late-April and late-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	60.7	26.0	112.0	C
CLA (µg/l)	20.2	5.0	55.0	C
Secchi (m)	2.1	0.4	6.3	C
TKN (mg/l)	1.76	1.30	2.50	
			Water Quality	C

The lake's 2007 lake quality grade was a C which is similar to last year's grade, although total phosphorus and Secchi transparency seemed a bit better in 2007 than in 2006. For total phosphorus, the mean, minimum, and maximum concentrations were all less than the concentrations observed in 2006. The mean Secchi transparency depth was greater in 2007 than in 2006. The mean Secchi depth in 2007 was highly influenced by the 6.2 m measurement observed on June 29. This Secchi depth coincided on the same date with the lowest total phosphorus and lowest chlorophyll-a concentrations observed in 2007, which means that the 6.2 m Secchi depth should not be necessarily viewed as an outlier data point.

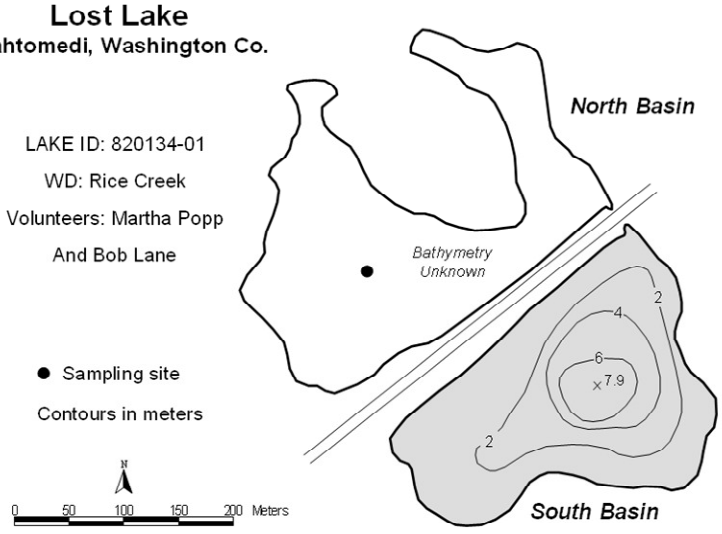
As mentioned earlier, there are no nutrient data available for Lost Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

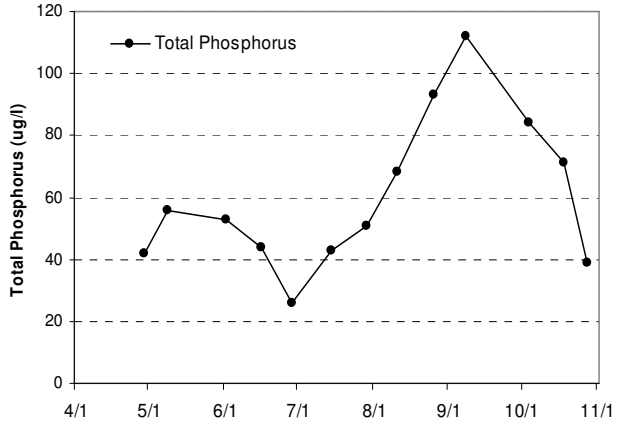
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.3 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

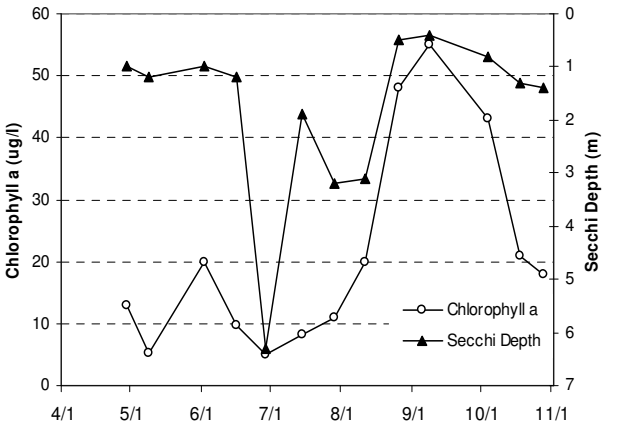
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lost Lake
Mahtomedi, Washington Co.

LAKE ID: 820134-01
WD: Rice Creek
Volunteers: Martha Popp
And Bob Lane

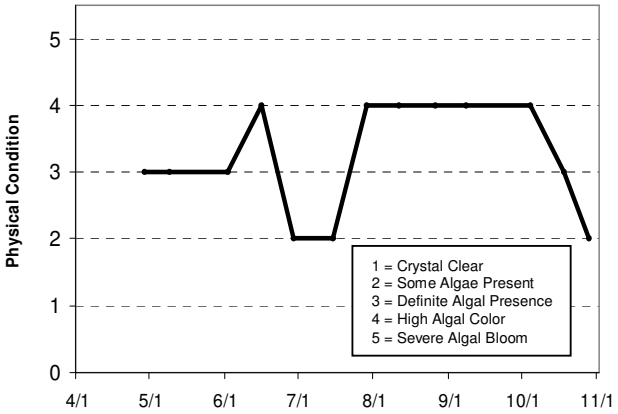






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/29/07	19.5				13	42		1	3	4
05/09/07	24				5.3	56		1.2	3	4
06/02/07	24				20	53		1	3	4
06/16/07	29.3				9.6	44		1.2	4	4
06/29/07	27.3				5	26		6.3	2	4
07/15/07	27.8				8.2	43		1.9	2	4
07/29/07	30.2				11	51		3.2	4	4
08/11/07	26.4				20	68		3.1	4	4
08/26/07	24.9				48	93		0.5	4	4
09/08/07	25				55	112		0.4	4	4
10/04/07	17.2				43	84		0.8	4	4
10/18/07	13.2				21	71		1.3	3	4
10/28/07	10.7				18	39		1.4	2	2

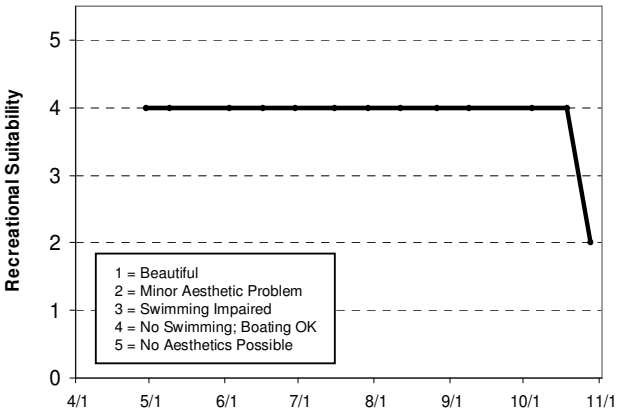


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	C
Chlorophyll a													C	C
Secchi Depth													C	C
Overall													**C**	**C**

Source: Metropolitan Council and STORET data



Lotus Lake (10-0006) *City of Chanhassen*

Lotus Lake, with a surface area of 246 acres, is located within the City of Chanhassen (Carver County). There is public access to the lake on the southern end of the lake. The lake's surface area and its 1,033-acre watershed translates to a 4:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

The lake's maximum and mean depths of 8.9 and 4.3 (29.2 and 14.2 feet), along with its surface area, translates to a lake volume of approximately 3,500 ac-ft. Roughly 74 percent of the lake's surface 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 is considered a "Priority Lake" due to its multi-recreational uses. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

While Lotus Lake has previously been monitored by Council staff (1985, 1990 and 1999-2000) and the MPCA's volunteer Secchi program (1980, 1988-1991), 2007 marks the fifth year the lake has been monitored through CAMP. In 2007, Lotus Lake was monitored 9 times between late-April and early-October. Results are presented on graphs and data tables on the following page. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	45.7	19.0	76.0	C
CLA (µg/l)	33.5	3.2	66.0	C
Secchi (m)	1.5	0.7	2.6	C
TKN (mg/l)	1.79	0.87	2.80	
			Water Quality	C

The lake's 2006 grade of C is similar to those recorded in 1985, 1999-2000, and 2004-2006, and better than the D recorded in 2003. Overall, the water quality of this lake can be considered a C. A trend analysis conducted by the MPCA on the secchi transparency of the lake showed no statistically significant trend (MPCA 2008).

Throughout the summer, the volunteer ranked their opinion of the lake's physical and recreational conditions on a 1-to-5 scale (see lake information sheet). The mean physical condition was 2.7 (between 2- "some algae present" and 3- "definite algae present"), while the recreational suitability ranking was 2.6 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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) 297-4916 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.

Lotus Lake

Chanhassen, Carver Co.

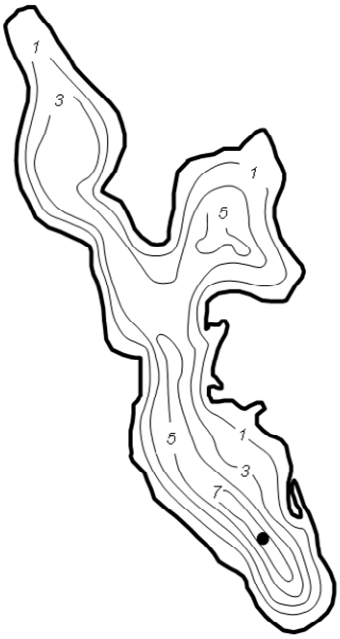
Lake ID: 100006

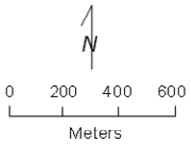
WD: Riley-Purgatory-Bluff Creek

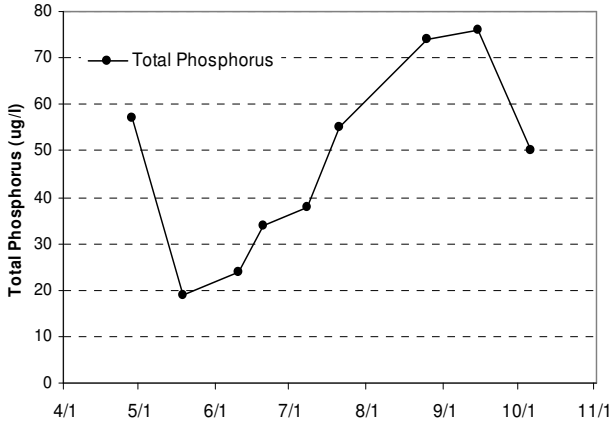
Volunteers: Shelly Strohmaier & Family

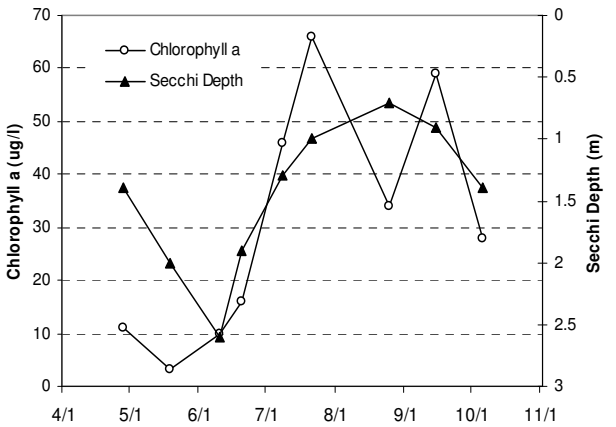
● Sampling site

Contours in meters



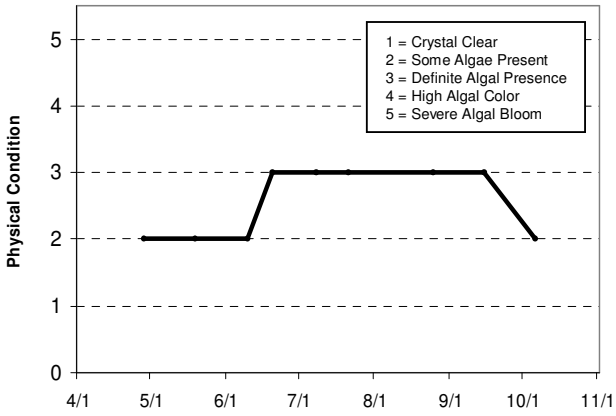






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/28/07	17				11	57		1.4	2	1
05/19/07	21.2				3.2	19		2	2	2
06/10/07	21.6				10	24		2.6	2	2
06/20/07	24				16	34		1.9	3	2
07/08/07	27.5				46	38		1.3	3	3
07/21/07	25.9				66	55		1	3	3
08/25/07	23.4				34	74		0.71	3	3
09/15/07	18.4				59	76		0.91	3	3
10/06/07	18.6				28	50		1.4	2	2

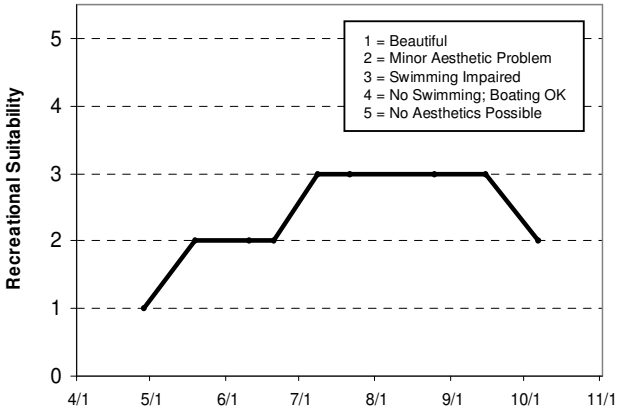


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus						C								
Chlorophyll a						C					C			
Secchi Depth	D					C			D	C	C	C		
Overall						**C**								

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C	C			D	C	C	C	C
Chlorophyll a						C	C			C	C	C	C	C
Secchi Depth						C	C			D	C	C	C	C
Overall						**C**	**C**			**D**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Louise Lake (82-0025) *Carnelian - Marine Watershed District*

Louise Lake is a 48-acre lake located within Stillwater Township (Washington County). The maximum and mean depths of the lake are 3.7 m (roughly 12 feet) and 1.8 m (six feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 283 ac-ft. 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's 616-acre watershed and surface area translates to a watershed-to-lake size ratio of 13:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the eighth year that Louise Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided limited information (1996-2006).

The lake's Secchi transparency was monitored 7 times from late-April to mid-October 2007. Surface water samples were collected for analysis of TP, TKN and chlorophyll on only April 30, 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

The lake's 2007 summertime (May through September) mean Secchi transparency was 0.7 m (minimum of 0.3 m and a maximum of 2.0 m). This translates to a grade of D for water clarity. The lake's 2007 water clarity was the same as in 2005 (0.7 m), and dramatically worse than those recorded in 2003-2004 (2.0 m and 2.5 m).

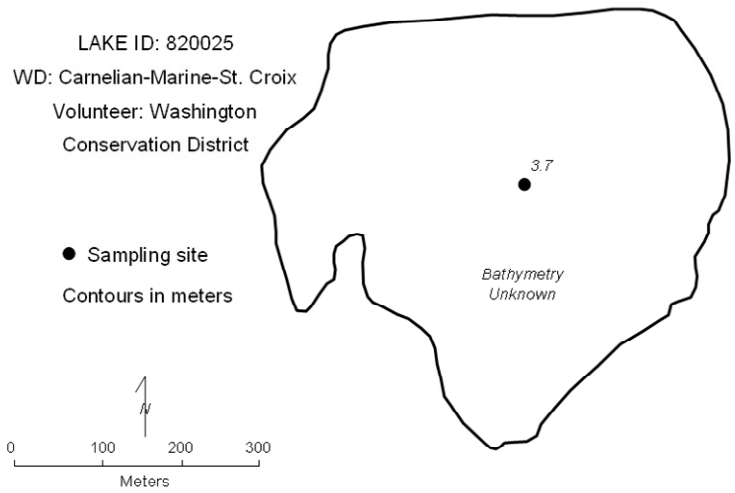
Because of the limitedness of the lake's water quality database, no long-term trends can be determined. In the short-term however, the data seems to show that the lake, fluctuates between an C and D grade. To better understand the lake's water quality and where it may be heading, more data are needed.

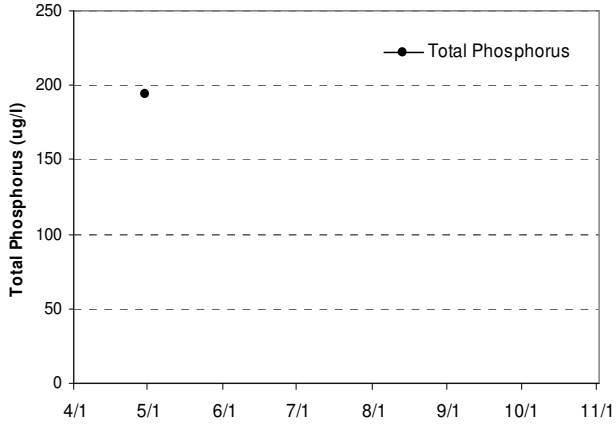
The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.8 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.8 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

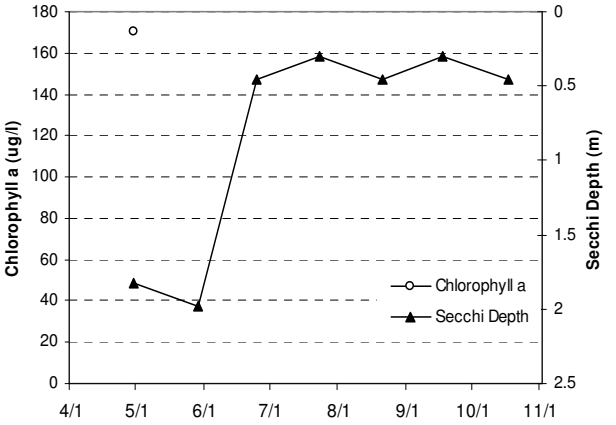
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Louise

Stillwater Twp., Washington Co.

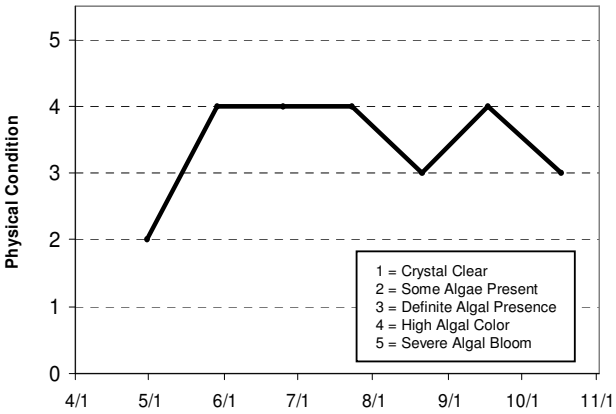






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/30/07	17.8	17.4	10.49	11.37	170	194		1.829	2	2
05/29/07	20.8	19	8.55	7.56				1.981	4	4
06/25/07	28.6	25.6	13.35	0.53				0.457	4	3
07/23/07	27.2	25.7	7.62	0.05				0.305	4	4
08/21/07	21.6	21.6	2.47	0.1				0.457	3	4
09/17/07	19	18.7	9.6	0.21				0.305	4	4
10/17/07	13.9	14	6.75	0.33				0.457	3	4

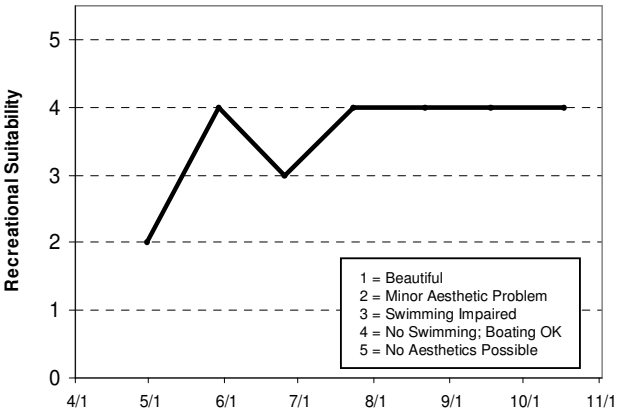


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			D	D	B	C	D	D	D					
Chlorophyll a			D	D	D	F	B	D	C					
Secchi Depth			B	C	C	C	C	D	D	B	C	D	D	D
Overall			**C**	**D**	**C**	**D**	**C**	**D**	**D**					**D**

Source: Metropolitan Council and STORET data



Lynch Lake (82-0042) *Browns Creek Watershed District*

Lynch Lake is a small 43-acre lake located in Washington County. There is very little known morphological data available for the lake.

This was the second year that Lynch Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no other data, therefore 2006 and 2007 are the only years of available water quality data for the lake.

The lake was monitored 7 times between late-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

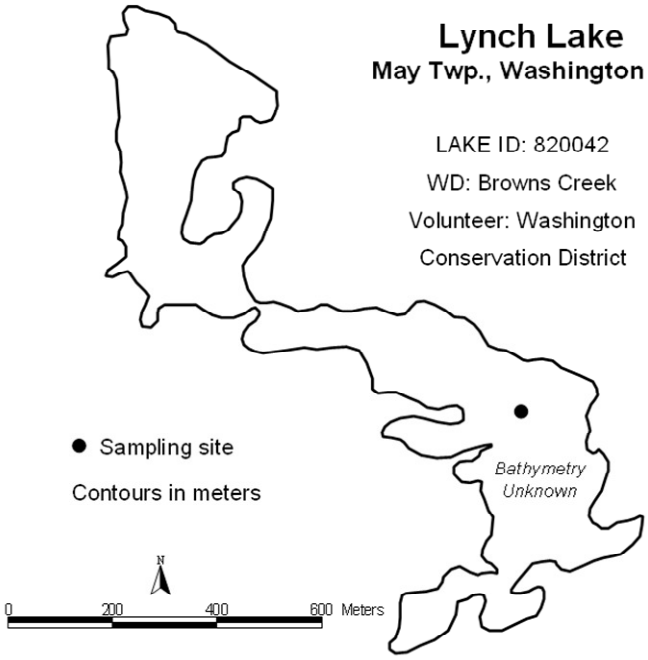
2007 summer (May-September) data summary

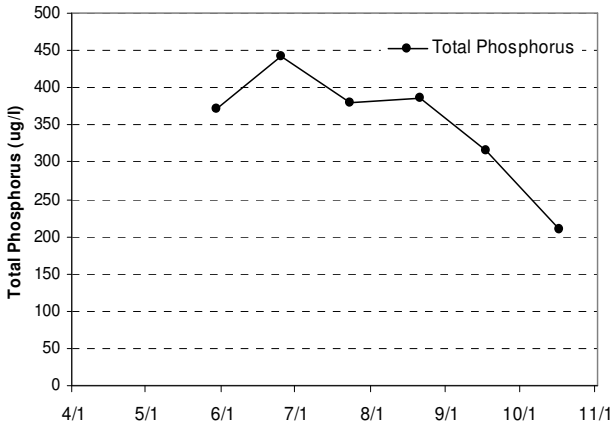
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	378.8	315.0	441.0	F
CLA (µg/l)	363.8	39.0	630.0	F
Secchi (m)	0.2	0.2	0.3	F
TKN (mg/l)	11.82	6.40	20.00	
			Water Quality	F

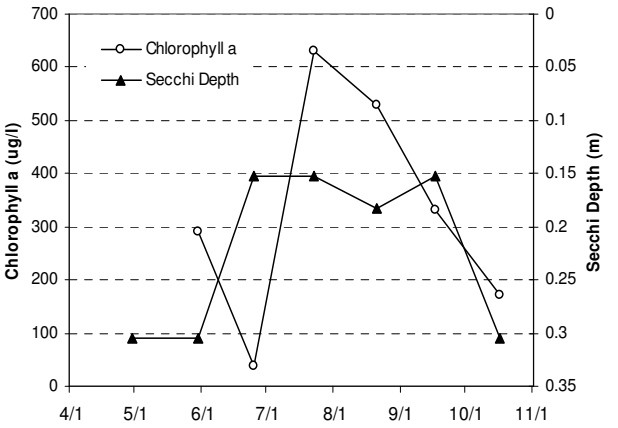
The 2007 water quality grade was an F. This lake also received an F grade in 2006. However, the means for all four water quality parameters were worse in 2007 than in 2006. As mentioned earlier, there are no nutrient data available for the lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.8 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

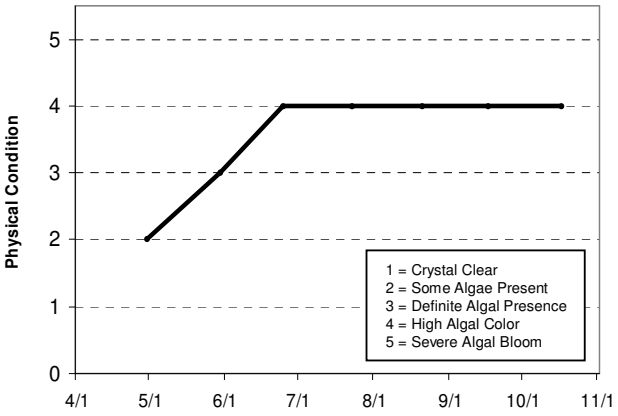






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/30/07	17.7	17.6	11.93	11.43				0.305	2	4
05/30/07	23.4	22.3	10.35	6.89	290	372		0.305	3	4
06/25/07	28	27.9	7.03	6.67	39	441		0.152	4	4
07/23/07	21	24.9	9.06	3.49	630	380		0.152	4	4
08/21/07	25.7	20.3	8.99	0.17	530	386		0.183	4	4
09/17/07	18.9	18.9	8.01	0.28	330	315		0.152	4	4
10/17/07	14.1	13.9	8.7	0.33	170	209		0.305	4	4

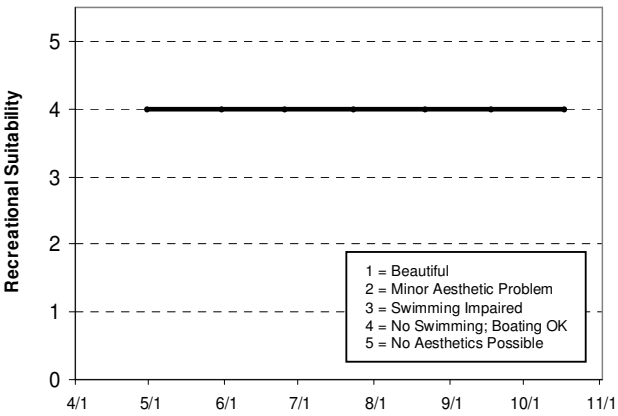


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													F	F
Chlorophyll a													F	F
Secchi Depth													F	F
Overall													**F**	**F**

Source: Metropolitan Council and STORET data



Lochness Lake (2-0584) *Rice Creek Watershed District*

Lochness Lake is located in Blaine, Anoka County. It has a surface area of only 5.3 acres. There is very little known morphological data available for the lake other than it has a maximum depth of 4.9 m (16 ft). 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).

This was the first year that Lynch Lake has been involved in CAMP. A search for other data on the lake via STORET, the nationwide water quality database, provided no other data. Therefore, 2007 is the only year of available water quality data for the lake.

The lake was monitored 12 times between mid-April and late-September 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

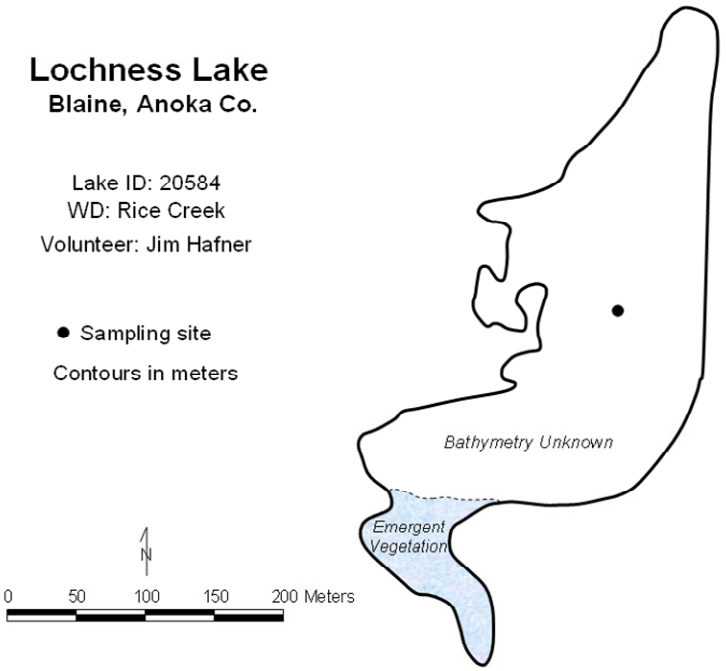
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	22.1	14.0	39.0	A
CLA (µg/l)	4.8	2.8	9.4	A
Secchi (m)	2.6	1.8	3.0	B
TKN (mg/l)	1.78	1.20	2.00	
			Water Quality	A

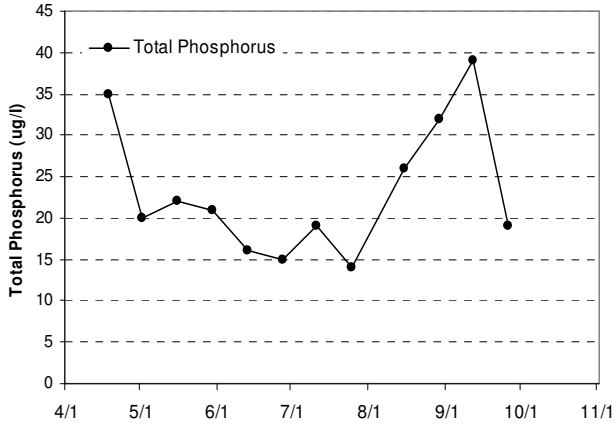
The water quality grade for this lake in 2007 was an A. Since year 2007 is the only year of water quality data for this lake, continued monitoring is suggested to determine future water quality trends for this lake. One note of concern is the fish kill that occurred in 2004. The fish survey in 2005 indicated that the fish population had not recovered from that event. Please see the paragraph below for obtaining more information on the lake's fishery.

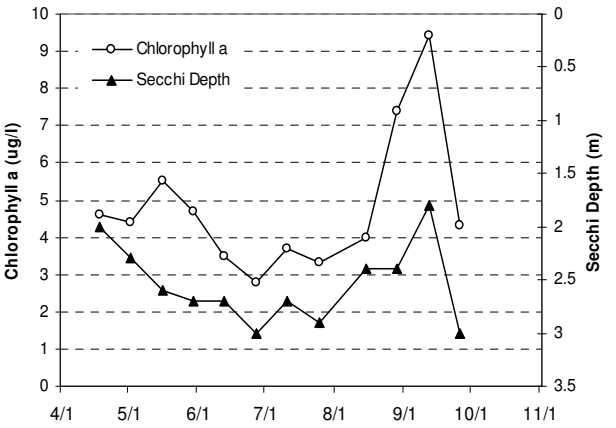
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.2 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake in 2005. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 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.

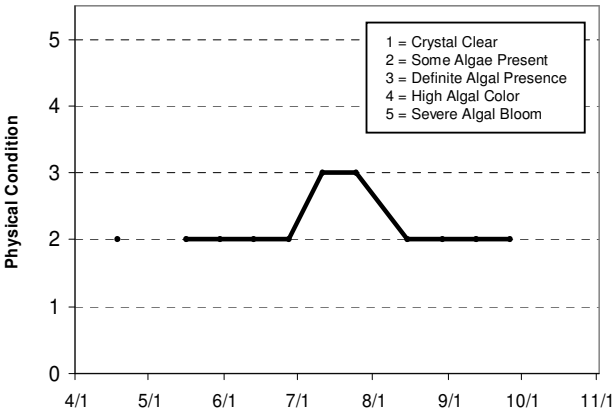






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/18/07	10				4.6	35		2	2	
05/02/07	16				4.4	20		2.3		
05/16/07	18				5.5	22		2.6	2	4
05/30/07	21.3				4.7	21		2.7	2	4
06/13/07	25.3				3.5	16		2.7	2	4
06/27/07	26.4				2.8	15		3	2	4
07/11/07	24.9				3.7	19		2.7	3	4
07/25/07	26.2				3.3	14		2.9	3	4
08/15/07	24.9				4	26		2.4	2	4
08/29/07	21.9				7.4	32		2.4	2	4
09/12/07	19.1				9.4	39		1.8	2	4
09/26/07	18.6				4.3	19		3	2	4

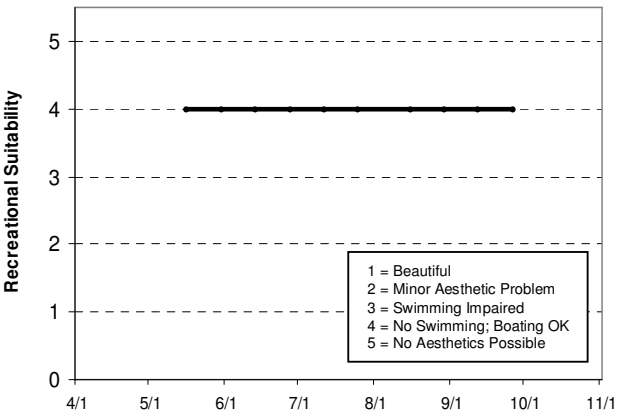


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														A
Chlorophyll a														A
Secchi Depth														B
Overall														**A**

Source: Metropolitan Council and STORET data



MacDonald's Pond (82-0062) *Carnelian – Marine Watershed District*

MacDonald's Pond is an approximate 12-acre land-locked lake located within City of Scandia (Washington County). The maximum depth of the lake is 2.7 m (roughly 9 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). There is very little other known morphological data available for the water body.

This was the fourth year that MacDonald's Pond has been involved in CAMP (2004 being the first). On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 7 times between mid-April and early-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	38.8	14.0	92.0	C
CLA (µg/l)	10.1	3.0	35.0	B
Secchi (m)	2.3	2.0	2.7	B
TKN (mg/l)	1.15	0.68	2.60	
			Water Quality	B

The lake's 2007 grade is similar to that reported in 2005 (grade of B). Year 2007 was the first year for this lake to receive a grade of C for an individual parameter (total phosphorus) and not to receive an individual grade of A for at least one of the parameters. Other than for the 2004-2007 CAMP data, there are no known water quality data available for MacDonald's Pond. Therefore there is no sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

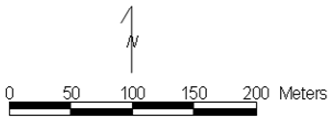
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.0 for physical condition (2- "some algae present"), and 2.4 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

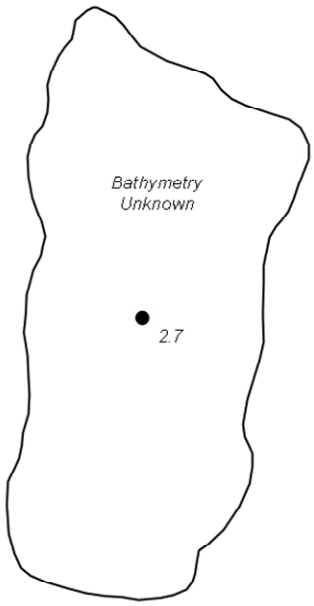
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

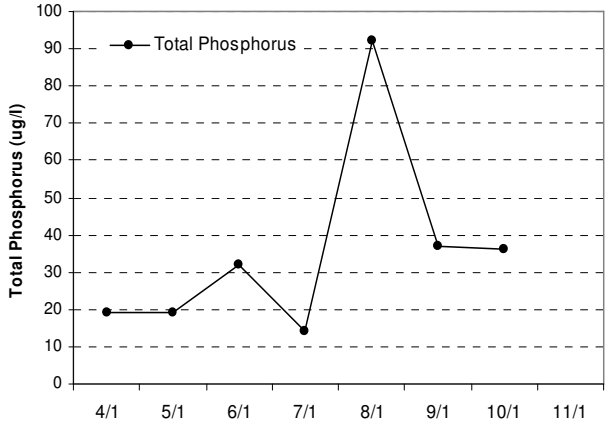
MacDonald's Pond
Scandia, Washington Co.

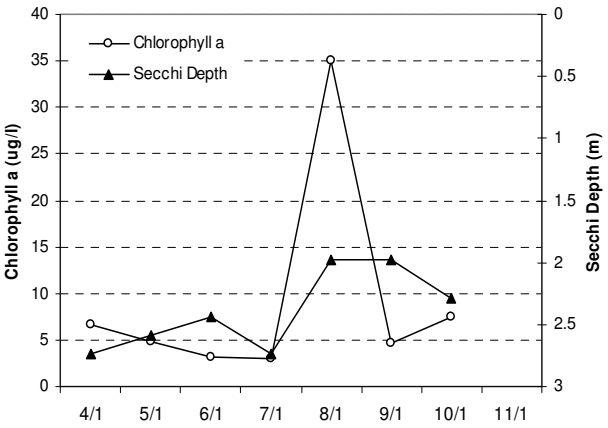
LAKE ID: 820062
WD: Carnelian-Marine-St. Croix
Volunteer: Washington
Conservation District

● Sampling site
Contours in meters



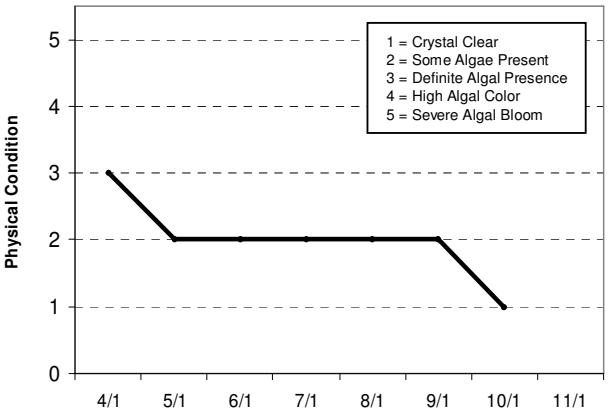






2007 Data

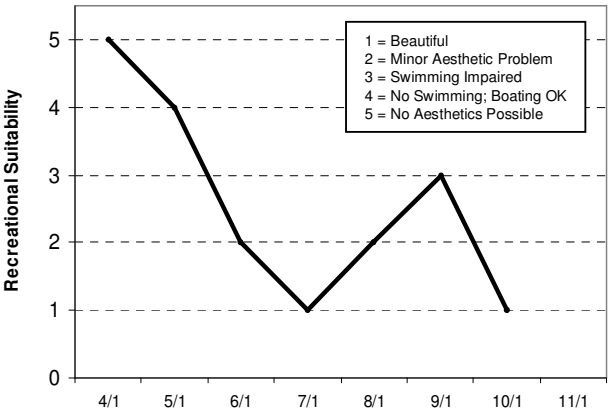
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	11.1	8.9	12.75	14.2	6.6	19		2.743	3	5
05/14/07	21.4	18.9	10.26	6.9	4.8	19		2.591	2	4
06/11/07	27.1	24.7	8.26	9.03	3.2	32		2.438	2	2
07/09/07	30	24.9	7.41	0.13	3	14		2.743	2	1
08/07/07	30.7	23.2	6.15	0.1	35	92		1.981	2	2
09/05/07	26.5	23.3	9.2	0.21	4.7	37		1.981	2	3
10/03/07	20.2	18.7	5.21	2.02	7.5	36		2.286	1	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus											A	B	A	C
Chlorophyll a											A	A	A	B
Secchi Depth											A	B	B	B
Overall											**A**	**B**	**A**	**B**



Source: Metropolitan Council and STORET data

Maple Marsh (82-0038) *Carnelian - Marine Watershed District*

Maple Marsh Lake is a 38-acre lake located within May Township (Washington County). The maximum and mean depths of the lake are 3.4 m (roughly 11 feet) and 1.7 m (five-and-a-half feet), respectively. 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's surface area and mean depth translates to an approximate volume of 126 ac-ft.

The majority of the land within the 148-acre watershed is undeveloped. The watershed-to-lake size ratio is 4:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the seventh year that Maple Marsh Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided limited information (1997-2006).

The lake's Secchi transparency was monitored seven times from late-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

Water samples to be analyzed for TP, TKN and chlorophyll were not collected for the lake in 2007. Because Secchi transparency was the only data collected there are no nutrient of chlorophyll concentration means to compare to previous years. The lake's 2007 summertime (May through September) mean Secchi transparency was 1.2 m (minimum of 0.3 m and a maximum of 2.4 m). This translates to a grade of D for water clarity. The lake's 2007 Secchi grade is identical to those recorded in 1997, 1999-2001, 2003, 2005, and 2006 better than the F in 1998, but worse than the C's of 2002 and 2004.

The lake's water quality data seems fluctuates between an grade of C and D. To better understand the lake's water quality and where it may be heading, more monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.4 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

Maple Marsh
May Twp., Washington Co.

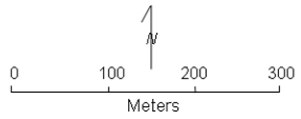
LAKE ID: 820038

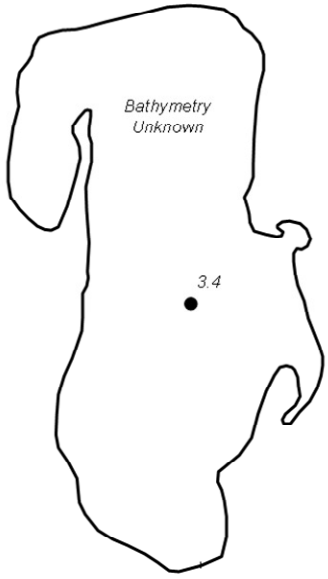
WD: Carnelian-Marine-St. Croix

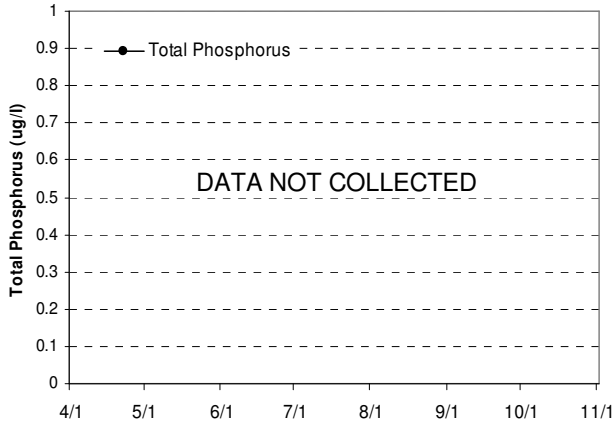
Volunteer: Washington Conservation District

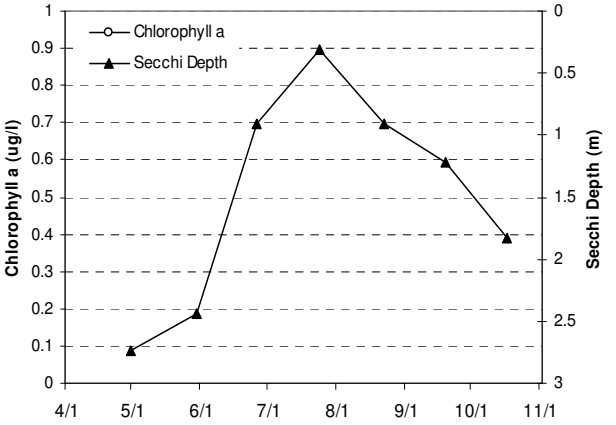
● Sampling site

Contours in meters



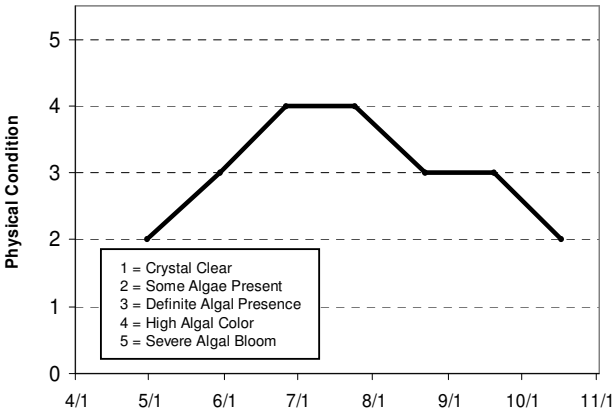






2007 Data

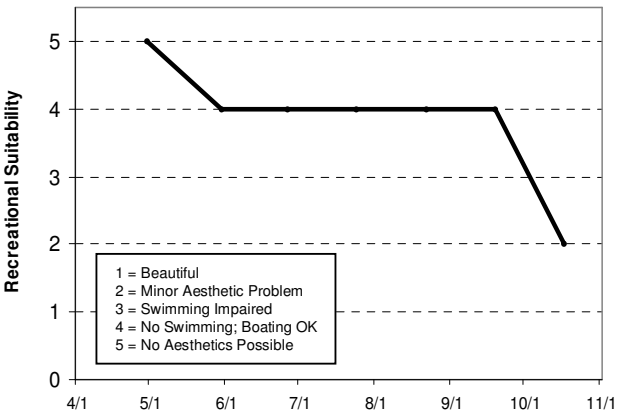
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/30/07	16.8	16.8	8.57	8.11				2.743	2	5
05/30/07	21.4	21.3	8	7.69				2.438	3	4
06/26/07	28.5	27.7	7.65	0.12				0.914	4	4
07/24/07	26.6	25.6	10.24	0.09				0.305	4	4
08/22/07	23	21	8.05	0.16				0.914	3	4
09/19/07	18.1	18.1	6.88	0.08				1.219	3	4
10/17/07	13.5	13.6	7.13	0.35				1.829	2	2



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				F	F	C	D	F						
Chlorophyll a				D	F	F	C	D						
Secchi Depth				D	F	D	D	D	C	D	C	D	D	D
Overall				**D**	**F**	**D**	**D**	**D**						**D**



Source: Metropolitan Council and STORET data

Marion Lake (19-0026) *City of Lakeville*

This was the tenth year that Marion Lake has been a part of CAMP (the others were 1994 and 1999-2006). The area around Lake Marion, located in the City of Lakeville (Dakota County), is rapidly developing. The lake covers an area of roughly 560 acres and has a maximum depth of 6.4 m (21 feet). There is one public access to the lake located in Casperspon Park on the western side of the lake off of 195th Street West. Lake Marion is considered a "Priority Lake" by the Metropolitan Council because of its multi-recreational uses. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake.

The lake gets heavy use by area fishermen and other lake users during the winter and summer months. The MDNR manages the lake for northern pike-panfish, and has stocked the lake with walleye over the past decade. Because of past winterkills, the lake's oxygen levels are monitored throughout the winter, and the lake is aerated when needed.

The lake was monitored 14 times from mid-April to mid-October 2007. During each monitoring event the lake was monitored for TP, CLA, TKN, and Secchi transparency, and the lake's perceived physical condition and recreational suitability. Graphs as well as the actual data collected by volunteers, show the seasonal variability of the collected data (see lake information sheet on the next page).

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.2	18.0	177.0	C
CLA (µg/l)	35.0	3.5	80.0	C
Secchi (m)	1.8	0.8	3.5	C
TKN (mg/l)	1.65	0.87	2.40	
			Water Quality	C

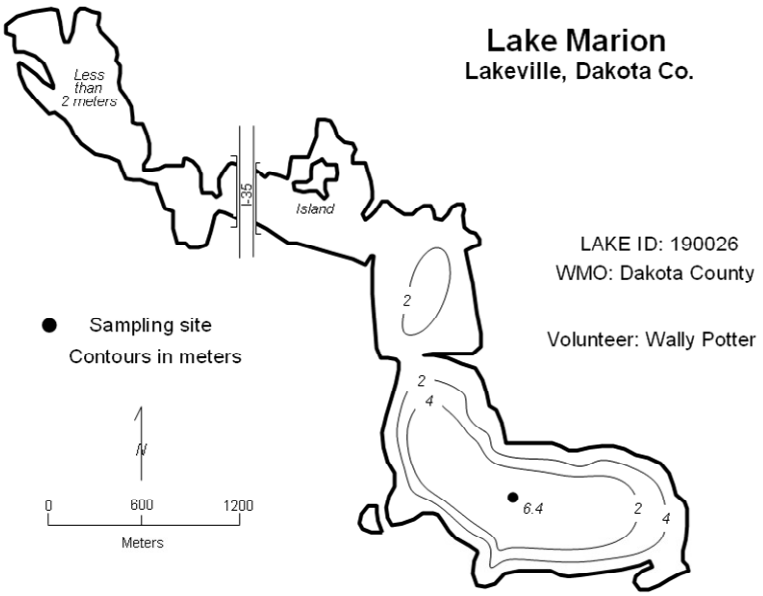
The resulting grade in 2007 is a C (similar to those recorded in 2002-2006), represents a decrease in water quality as compared to the grade of B the lake received in 1994, and 1999-2001.

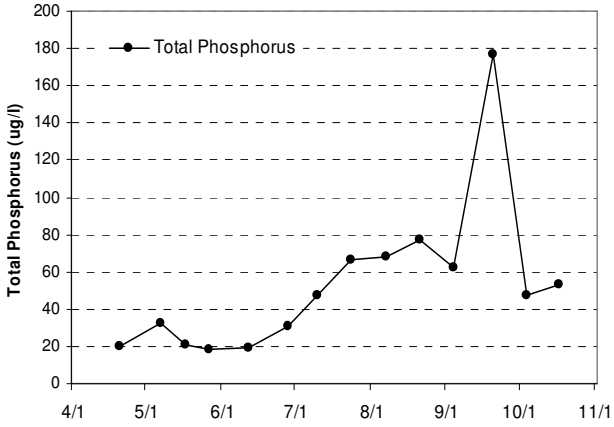
The physical and recreational conditions of the lake, as observed by the volunteer monitors, were ranked on a 1 to 5 ranking scale. The volunteer's user perception rankings are shown on the lake's information sheet. The mean physical condition ranking was 2.0 (2- "some algae present"), while the lake's mean recreational suitability ranking was 1.2 (between 1- "beautiful" and 2- "minor aesthetic problem").

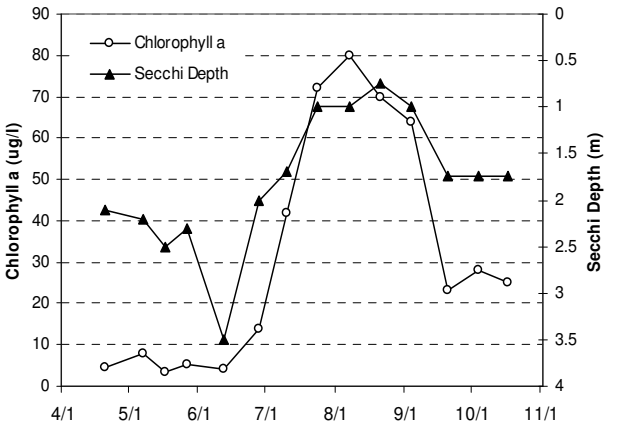
While Lake Marion does have 16 years of data (14 of which contain some nutrient measurements) over the past 25 years, it is difficult to determine what is happening with the lake's water quality. The available data shows a wide range in the lake's quality with the water quality showing an improvement in the 1990's as compared to the 1980's. The lake received an water quality grade of D in 1981; C in 1980, 1983, 1987, and 2002-2007; and finally received a B in 1994, and 1999-2001.

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) 297-4916 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.

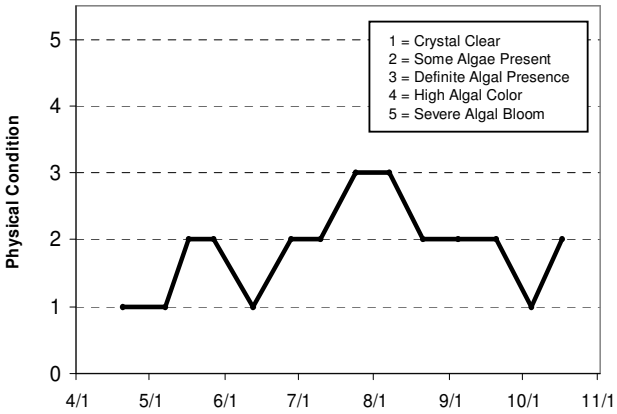






2007 Data

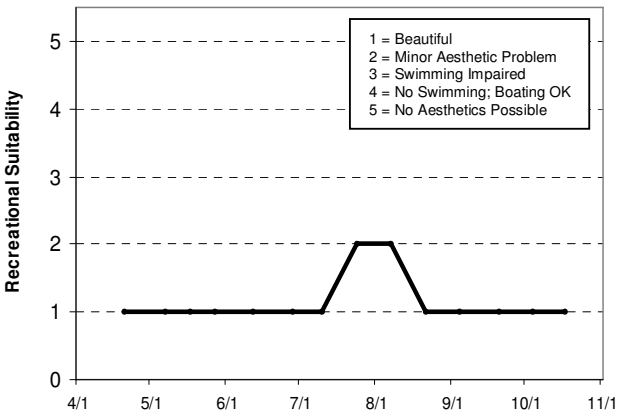
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	10.1				4.3	20		2.1	1	1
05/07/07	15.1				7.9	32		2.2	1	1
05/17/07	17.8				3.5	21		2.5	2	1
05/27/07	18.6				5.1	18		2.3	2	1
06/12/07	22.9				4	19		3.5	1	1
06/28/07	25.3				14	31		2	2	1
07/10/07	26.9				42	47		1.7	2	1
07/24/07	26.4				72	66		1	3	2
08/07/07	25.5				80	68		1	3	2
08/21/07	22.2				70	77		0.75	2	1
09/04/07	24.7				64	62		1	2	1
09/20/07	18.8				23	177		1.75	2	1
10/04/07	17.2				28	47		1.75	1	1
10/17/07	13.9				25	53		1.75	2	1



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	C		C				C		C				
Chlorophyll a	C	D		C				C		C				
Secchi Depth	C	D		B				C		C	C	C		
Overall	**C**	**D**		**C**				**C**		**C**				

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	B					B	B	B	C	B	C	C	C	C
Chlorophyll a	A					B	A	B	B	C	C	C	C	C
Secchi Depth	B					C	B	B	C	C	C	C	C	C
Overall	**B**					**B**	**B**	**B**	**C**	**C**	**C**	**C**	**C**	**C**



Source: Metropolitan Council and STORET data

Markgrafs Lake (82-0089) *City of Woodbury*

Markgrafs Lake, located within the City of Woodbury (Washington County), has a surface area of approximately 46 acres (2.6 miles around), and a maximum depth of 2.4 m (8 feet). The lake, which is used by the MDNR Fisheries as a rearing pond for walleyes, 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 413-acre drainage area to the lake is presently made up of open/undeveloped areas. Future land uses are projected to be 11.5 percent single-family residential, 14.8 percent multi-family residential, 51.8 percent commercial/retail, 15.1 percent parks/open space, and 6.8 percent ponds/wetlands. The lake's watershed-to-lake size ratio is 10:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). Because of the lake's shallowness, much of the lake is considered littoral zone (the 0-15 foot depth area of the lake dominated by aquatic vegetation). It does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

The lake has been involved in CAMP since 1994. Between mid-April and mid-October 2007, the lake was monitored 14 times. During each monitoring event; TP, CLA, TKN, and Secchi transparency were measured, as was the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	150.5	79.0	176.0	D
CLA (µg/l)	64.2	21.0	120.0	D
Secchi (m)	0.4	0.3	0.5	F
TKN (mg/l)	5.54	2.90	9.00	
			Water Quality	D

The lake's 2007 lake quality report card grade of D is similar to those recorded in the early 2000's, worse than the C's observed in 1995-1996, and better than last year's (2006) grade of F.

A moderate amount historical water quality data is available for Markgrafs Lake. Data found were collected through CAMP in 1994-2006. The lake experienced its worst recorded overall water quality (F) in 1998 and 2006 and its best water quality in 1995. A recent MPCA conducted trend analysis, using just the lake's Secchi transparency data, revealed a statistically significant trend towards strong declining water clarity (MPCA 2008).

Throughout the course of the monitoring season the volunteer monitor ranked the lake's perceived physical and recreational conditions on a 1-to-5 scale. The mean physical condition was 4.0 (4- "high algal color") while the mean recreational suitability was 4.0 (4- "no swimming – boating ok").

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

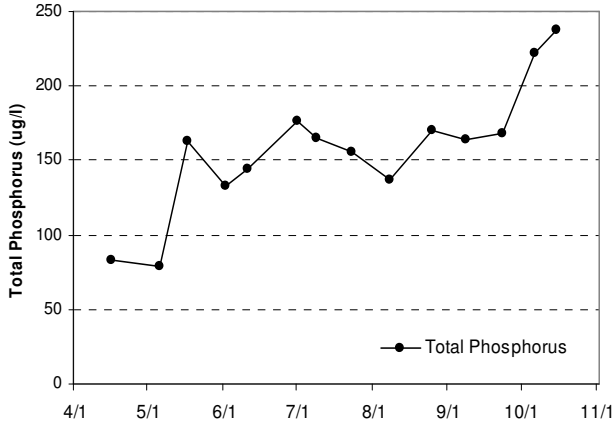
Markgrafs Lake

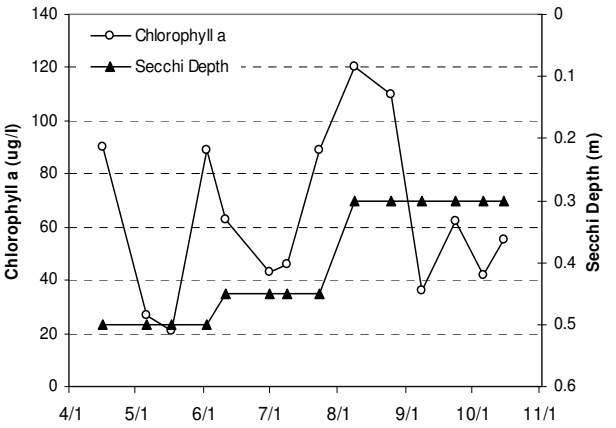
Woodbury, Washington Co.

Lake ID: 820089
WD: South Washington
Volunteer: Terry Riley

- Sampling site

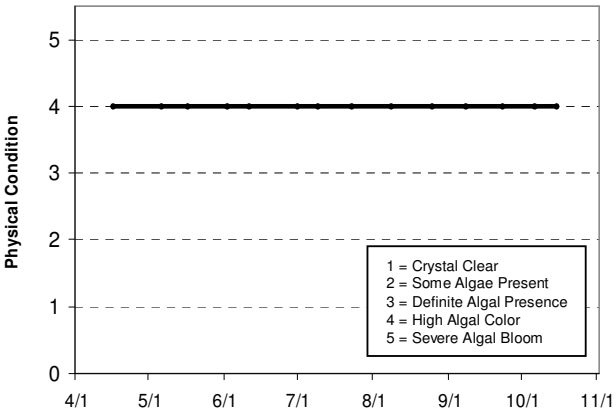
Contours in meters





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	11				90	83		0.5	4	4
05/06/07	26.3				27	79		0.5	4	4
05/17/07	26.8				21	163		0.5	4	4
06/02/07	27.4				89	133		0.5	4	4
06/11/07	23.8				63	144		0.45	4	4
07/01/07	24.1				43	176		0.45	4	4
07/09/07	25.3				46	165		0.45	4	4
07/23/07	24.5				89	156		0.45	4	4
08/08/07	25.7				120	137		0.3	4	4
08/25/07	23.3				110	170		0.3	4	4
09/08/07	23.6				36	164		0.3	4	4
09/23/07	21				62	168		0.3	4	4
10/06/07	21				42	222		0.3	4	4
10/15/07	12.3				55	238		0.3	4	4

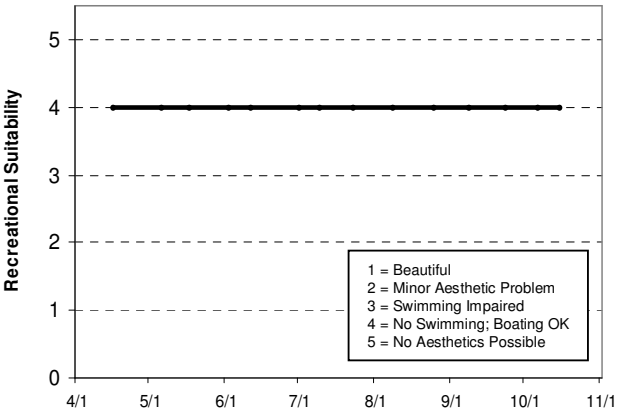


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	D	C	D	D	F	D	D	F	F	D	D	D	F	D
Chlorophyll a	C	B	B	C	F	C	C	C	C	C	D	C	D	D
Secchi Depth	D	C	C	D	F	D	C	D	F	D	F	F	F	F
Overall	**D**	**C**	**C**	**D**	**F**	**D**	**C**	**D**	**D**	**D**	**D**	**D**	**F**	**D**

Source: Metropolitan Council and STORET data



Markley Lake (70-0021) *City of Prior Lake*

This was the tenth year that Markley Lake has been monitored for lake water quality through CAMP. The lake, which has a surface area of roughly 27 acres (because of high water, the actual surface area of the lake may be slightly larger) is located within the City of Prior Lake (Scott County). Its maximum depth is 3.7 m (22 feet). Because of the lake's shallowness 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).

Markley Lake was monitored 7 times from mid-May to late-August 2007. During each monitoring event; TP, CLA, TKN, and Secchi transparency were measured, as was the lake's perceived physical condition and recreational suitability. Graphs as well as the actual data collected by volunteers, show the seasonal variability of the collected data (see lake information sheet on the next page).

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.4	29.0	92.0	C
CLA (µg/l)	24.3	5.0	51.0	C
Secchi (m)	1.4	0.7	2.2	C
TKN (mg/l)	1.93	1.30	2.40	
			Water Quality	C

The lake's 2007 lake quality report card grade of C is similar to those recorded in 1997-2004 and 2006. Data found were collected through CAMP in 1997-2004 and 2006. No long-term trend is apparent from the lake's water quality database. The lake's water seems to be well represented by an grade of C. In order to detect any possible long-term water quality trends, continued monitoring is suggested. A recent trend analysis conducted by the MPCA on secchi transparency showed no statistically significant trend in water clarity (MPCA 2008).

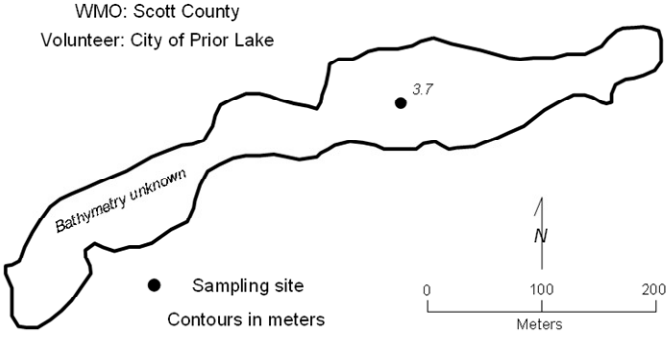
Throughout the course of the monitoring season the volunteer monitor ranked the lake's perceived physical and recreational conditions on a 1-to-5 scale. The mean physical condition was 1.9 (roughly 2- "some algae present") while the mean recreational suitability was 3.6 (between 3- "swimming impaired" and 4- "no swimming – boating ok").

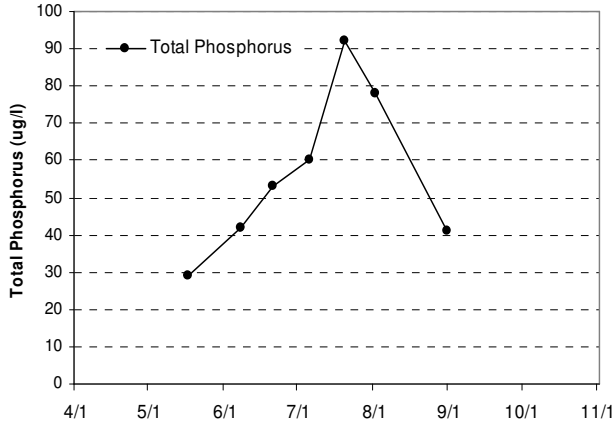
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

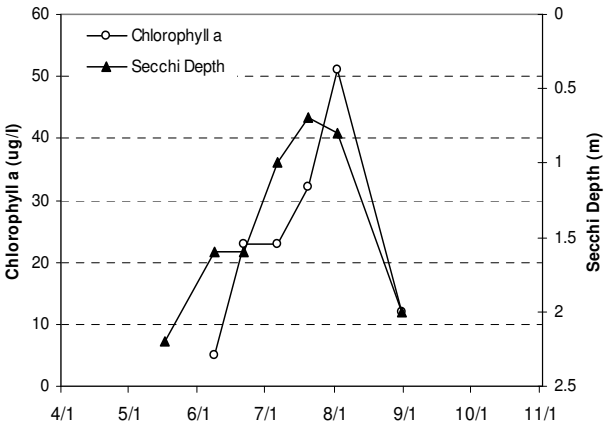
Markley Lake

Credit River Twp./Prior Lake, Scott Co.

Lake ID: 700021
WMO: Scott County
Volunteer: City of Prior Lake

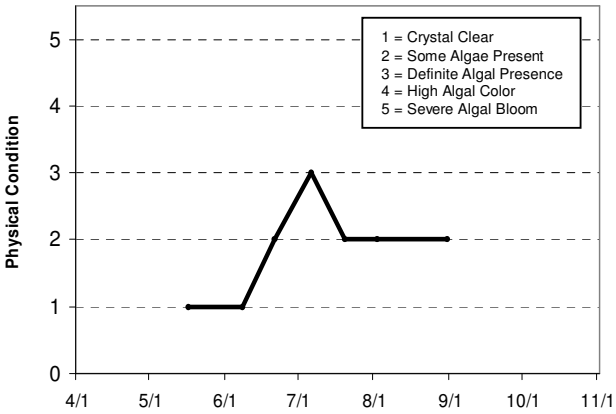






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/17/07	17.6					29		2.2	1	3
06/08/07	21				5	42		1.6	1	3
06/21/07	26				23	53		1.6	2	4
07/06/07	26				23	60		1	3	4
07/20/07	25				32	92		0.7	2	4
08/02/07	25				51	78		0.8	2	3
08/31/07	22				12	41		2	2	4

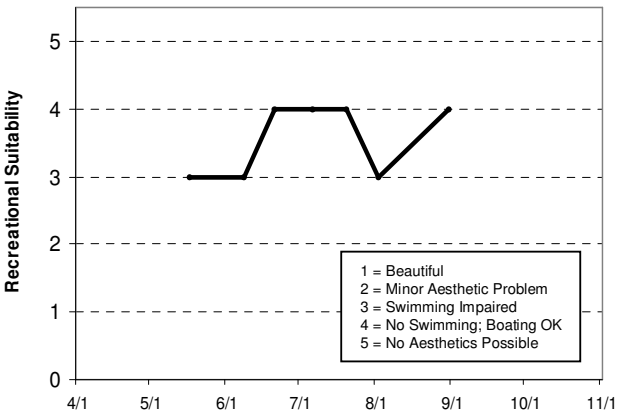


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				C	C	C	C	C	C	C	C		C	C
Chlorophyll a				B	B	B	C	B	B	B	B		B	C
Secchi Depth				C	C	C	C	C	C	C	C		C	C
Overall				**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**		**C**	**C**

Source: Metropolitan Council and STORET data



Masterman Lake (82-0126) *Browns Creek Watershed District*

Masterman Lake is a small 45-acre lake located in Washington County. There is very little known morphological data available for the lake.

This was the second year that Masterman Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data, therefore 2006 and 2007 are the only years of available water quality data for the lake.

The lake was monitored 14 times between mid-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Graphs as well as the actual data collected by volunteers, show the seasonal variability of the collected data (see lake information sheet on the next page).

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	37.7	14.0	74.0	C
CLA (µg/l)	14.0	2.6	50.0	B
Secchi (m)	2.0	1.7	2.6	C
TKN (mg/l)	0.95	0.65	1.50	
			Water Quality	C

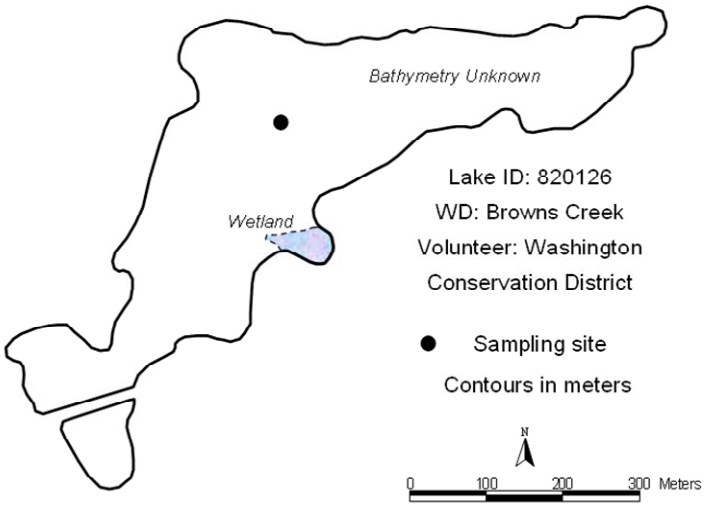
As mentioned earlier, there are no nutrient data available for Masterman Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

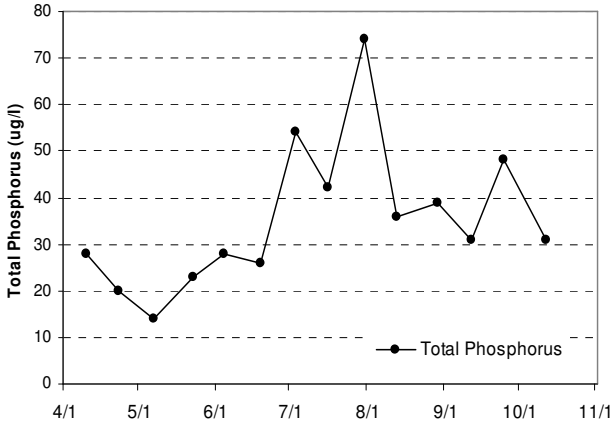
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.3 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.6 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

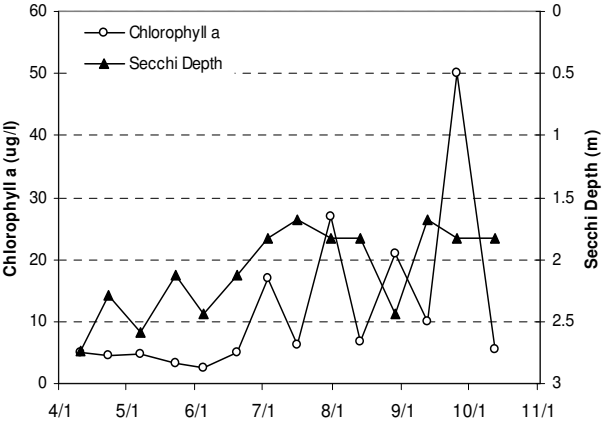
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Masterman Lake

Grant, Washington Co.

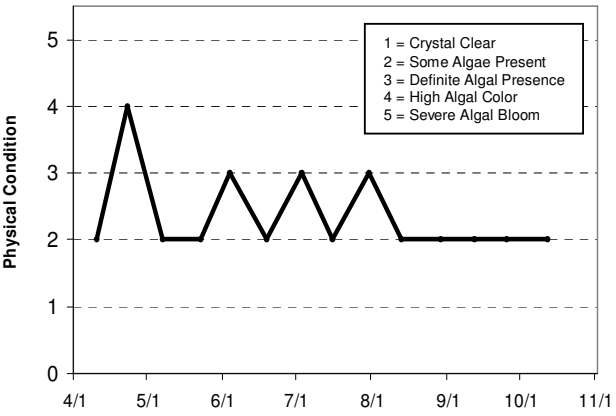






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/10/07	5.6	5.5	14.13	14.24	5.1	28		2.743	2	1
04/23/07	17.7	16.1	9.69	12.66	4.5	20		2.286	4	4
05/07/07	16.4	16.3	10.91	10.27	4.7	14		2.591	2	2
05/23/07	22	19.2	8.78	4.85	3.3	23		2.134	2	4
06/04/07	24.3	17.7	9.43	3.94	2.6	28		2.438	3	4
06/19/07	26.7	25.5	6.63	3.17	5.1	26		2.134	2	2
07/03/07	28.1	26.7	7.28	7.06	17	54		1.829	3	2
07/16/07	29	24.1	7.59	0.11	6.1	42		1.676	2	2
07/31/07	32.2	24.5	7.17	0.1	27	74		1.829	3	3
08/13/07	27.1	21.6	8.01	0.03	6.7	36		1.829	2	3
08/29/07	26	21.6	6.95	0.22	21	39		2.438	2	2
09/12/07	21.2	21	4.43	4.28	10	31		1.676	2	3
09/25/07	22.8	20.7	7.72	0.3	50	48		1.829	2	2
10/12/07	15.7	15.6	5.09	4.19	5.4	31		1.829	2	2

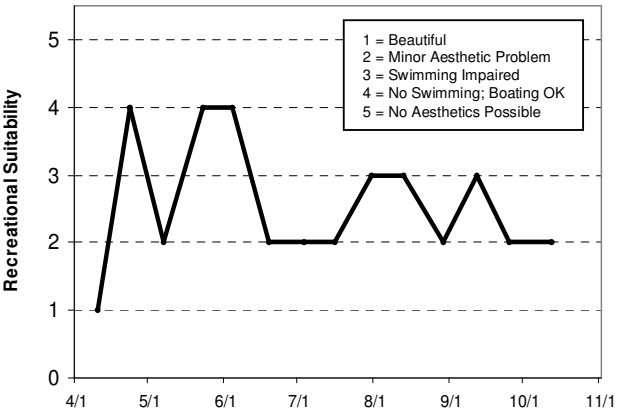


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													B	B
Secchi Depth													C	C
Overall													**C**	**C**

Source: Metropolitan Council and STORET data



McDonald Lake (82-0010) *Valley Branch Watershed District*

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). 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's size and mean depth results in an approximate lake volume of 324 ac-ft.

The lake's surface area and watershed size (1,051 acres) translates to a 12:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the eighth year in which McDonald Lake has been involved in CAMP (the lake was enrolled in the program in 1999 and 2001-2006 as well). The only historical water quality data found for McDonald Lake were Secchi transparency data for 1998 and 2000, and CAMP data from 1999 and 2001-2006. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 9 times between mid-April and early October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	52.7	35.0	73.0	C
CLA (µg/l)	123.3	3.7	660.0	F
Secchi (m)	1.2	0.6	2.3	C
TKN (mg/l)	1.68	0.88	2.50	
			Water Quality	D

The lake's 2007 grade of D is the worst water quality grade that this lake has yet received while being enrolled in CAMP. Of particular note are the two high chlorophyll-a concentrations observed at the end of the monitoring season, one of which greatly skewed the mean chlorophyll concentration because it was considered as being part of the summer time period. The 2006 season also saw a spike in chlorophyll-a concentration, although not as high in magnitude as in 2007. The spike in 2006 occurred at the end of August, a bit earlier than it did in 2007, but still towards the end of the monitoring season. Further monitoring is suggested to determine if this end of season chlorophyll spike is an annual event for this lake.

No long-term trend is apparent from the lake's water quality database. The lake's quality seems well represented by an grade of C. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

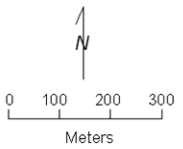
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 4.0 for physical condition (4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming; boating ok").

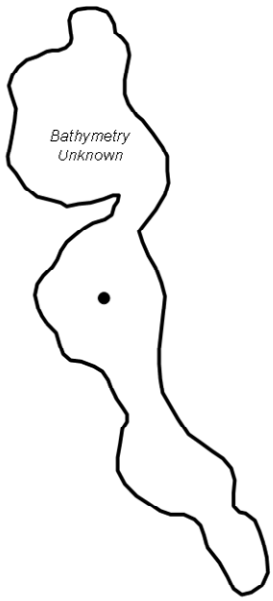
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

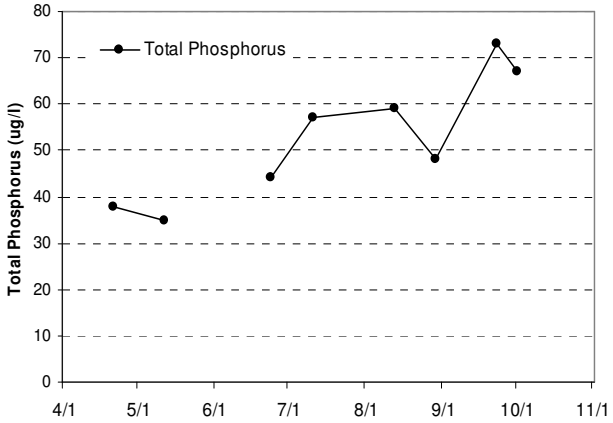
McDonald Lake
Baytown Twp., Washington Co.

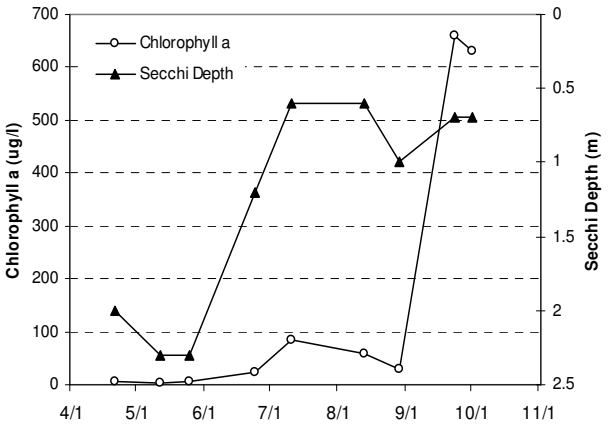
Lake ID: 820010
WD: Valley Branch
Volunteer: Randy Hunt

● Sampling site
Contours in meters



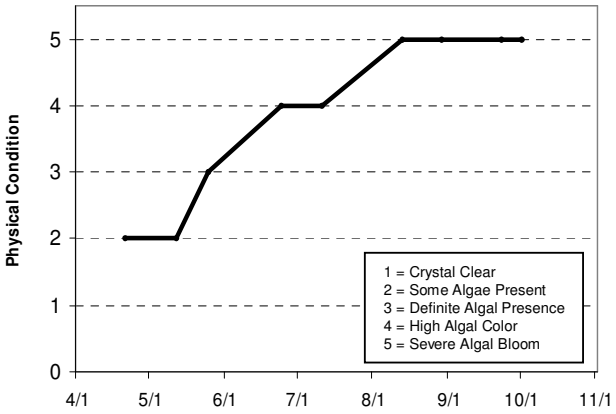






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	14.6				7.1	38		2	2	2
05/12/07	21.9				3.7	35		2.3	2	2
05/25/07	19.1				6.4			2.3	3	3
06/24/07	26.4				23	44		1.2	4	4
07/11/07	25.3				85	57		0.6	4	4
08/13/07	26.9				57	59		0.6	5	5
08/29/07	23.6				28	48		1	5	5
09/23/07	20.6				660	73		0.7	5	5
10/01/07	17.1				630	67		0.7	5	5

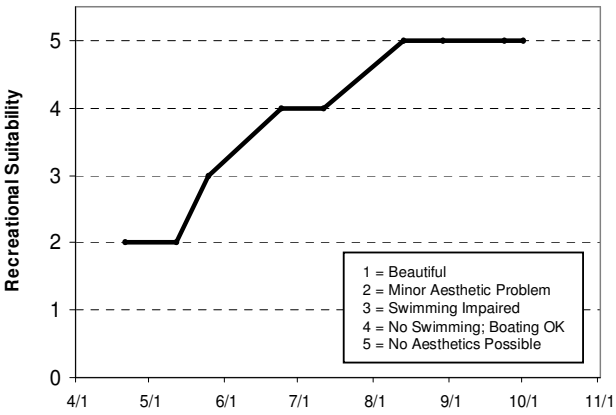


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C		C	C	C	C	C	C	C
Chlorophyll a						B		C	C	C	B	B	C	F
Secchi Depth					C	C	C	C	C	C	B	C	C	C
Overall						**C**		**C**	**C**	**C**	**B**	**C**	**C**	**D**

Source: Metropolitan Council and STORET data



McKusick Lake (82-0020) *Middle St. Croix Watershed Management Organization*

Lake McKusick, a 46-acre lake located within the City of Stillwater (Washington County) has a maximum depth of 4.7 m (roughly 15.5 feet). The lake has been involved in CAMP since 1994. In 2007, the lake was monitored 14 times between mid-April and early-October.

On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

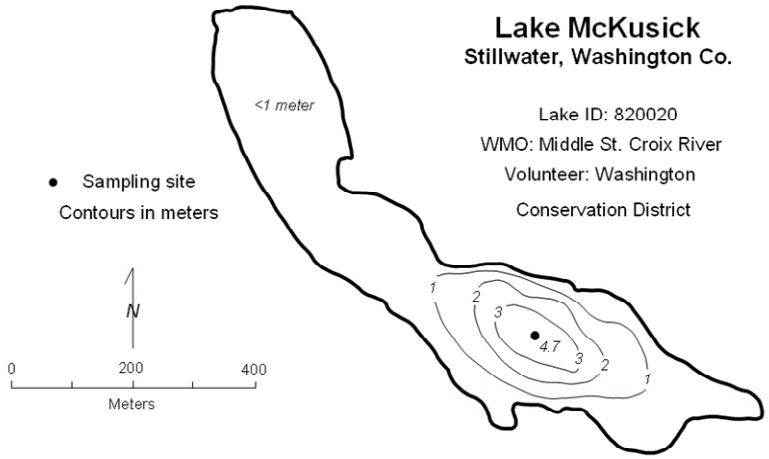
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	59.5	29.0	84.0	C
CLA (µg/l)	16.2	4.3	48.0	B
Secchi (m)	2.1	1.4	2.4	C
TKN (mg/l)	1.75	1.20	2.50	
			Water Quality	C

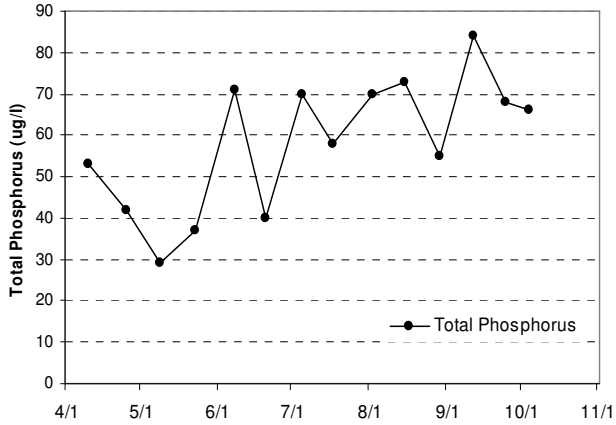
The lake's 2007 grade of C is identical to those recorded in 1997, 2002-2003, 2005, and 2006, better than the D's of 1994-1996 and 1998-1999, but worse than the B's of 2000-2001 and 2004. The grade of B recorded in 2000 and 2001 is the lake's best-recorded grade to date. A closer look at the three years that the lake received an grade of B, reveals that the best means for the parameters were recorded in 2004.

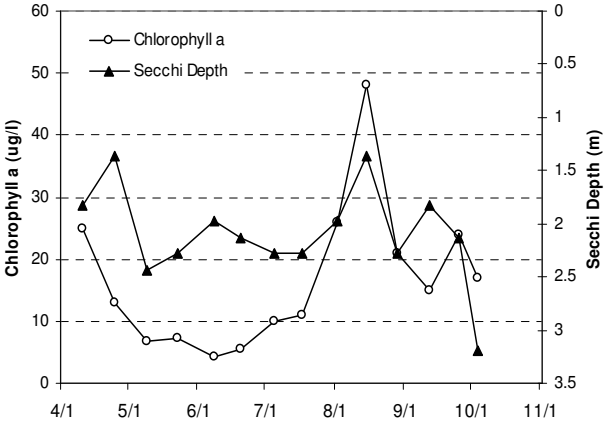
Throughout the monitoring period, the volunteer(s) ranked their opinions of physical and recreational conditions of the lake on a 1-to-5 scale. The resulting user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 3.4 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 2.8 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

Because of the wide variation in the lake's 1994-2006 water quality database, no long-term trends can be determined. In the short-term however, it seems that the lake was well represented by an grade of D/C until recently (2000-2005) when the lake's grade has improved to C+/B. In order to detect any possible long-term water quality trends, additional years of data collection are needed. A recent MPCA conducted trend analysis on the lake's Secchi transparency data, however, revealed a statistically significant improvement in recent water clarity (MPCA 2008).

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

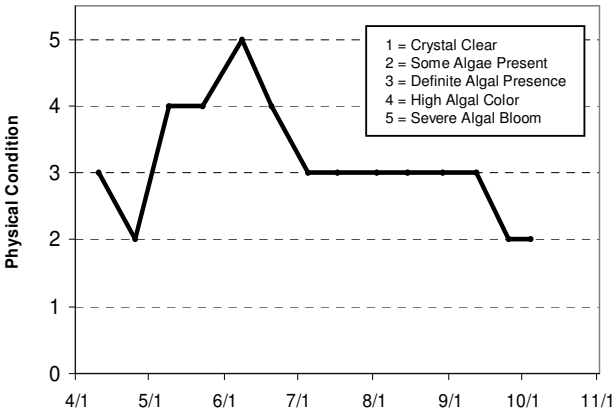






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/10/07	4.3	4.2	14.45	14.11	25	53		1.829	3	1
04/25/07	15.7	7.5	7.54	6.55	13	42		1.372	2	1
05/09/07	19.6	17.1	10.07	7.41	6.7	29		2.438	4	2
05/23/07	20.3	17.1	7.89	0.33	7.2	37		2.286	4	4
06/08/07	19.8	16.8	5.37	0.26	4.3	71		1.981	5	2
06/20/07	26.2	24.4	5.54	1.71	5.4	40		2.134	4	4
07/05/07	26.8	24.2	4.26	0.12	10	70		2.286	3	2
07/17/07	27.3	24	6.15	0.07	11	58		2.286	3	2
08/02/07	29.4	26.2	3.79	0.08	26	70		1.981	3	4
08/15/07	26.8	20.3	3.9	0.19	48	73		1.372	3	3
08/29/07	25.6	20.4	7.79	0.16	21	55		2.286	3	3
09/12/07	21.2	20.2	5.68	0.84	15	84		1.829	3	3
09/25/07	21.7	20.2	6.79	0.19	24	68		2.134	2	2
10/04/07	18.4	17.7	6.3	0.36	17	66		3.2	2	3

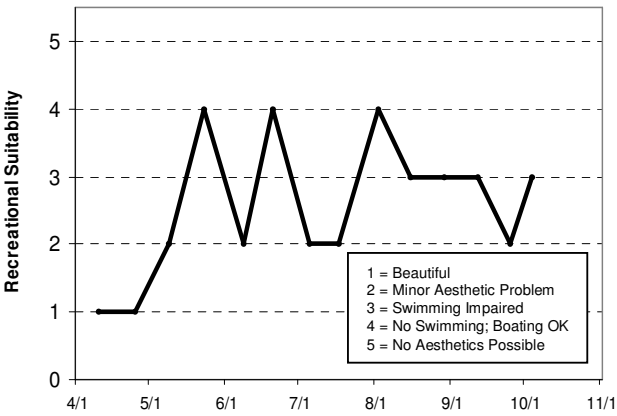


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	D	D	D	C	D	D	C	C	C	C	C	C	C	C
Chlorophyll a	D	C	C	C	D	D	B	B	C	B	A	B	B	B
Secchi Depth	D	D	D	C	D	D	B	B	D	C	B	C	C	C
Overall	**D**	**D**	**D**	**C**	**D**	**D**	**B**	**B**	**C**	**C**	**B**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



McMahon Lake (70-0050) *Scott County Watershed Management Organization*

McMahon Lake (also known as Carl's Lake), is located in Spring Lake Township (Scott County). The lake's surface area is 110 acres and has a maximum depth of 4.5 m (roughly 14 feet). Because the maximum depth is less than 15 feet, 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).

This is the second year that McMahon Lake has been enrolled in CAMP, the lake had been monitored by Council staff in the past. In 2007, the lake was monitored 10 times between early-May and mid-September. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	46.4	20.0	91.0	C
CLA (µg/l)	40.8	8.1	97.0	C
Secchi (m)	1.0	0.4	2.1	D
TKN (mg/l)	1.33	0.77	1.90	
			Water Quality	C

The lake's grade of C in 2007 is the best water quality grade the lake has yet received. No apparent long-term trend is evident from the lake's water quality database. However, the lake's water quality seems to be best represented by an grade of D. Further monitoring is suggested to determine further water quality trends, such as if the improvements in water quality observed in 2007 may continue or not.

The volunteer(s) monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 2.4 (between 2-"some algae present" and 3-"definite algae present"), while the mean recreational suitability was 1.7 (between 1- "beautiful" and 2-"minor aesthetic problem").

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) 297-4916 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.

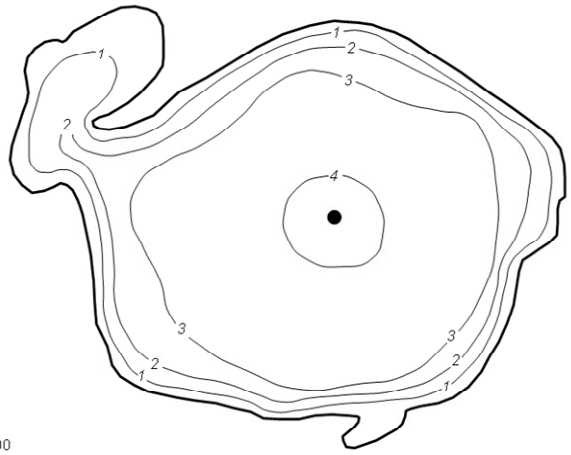
McMahon Lake

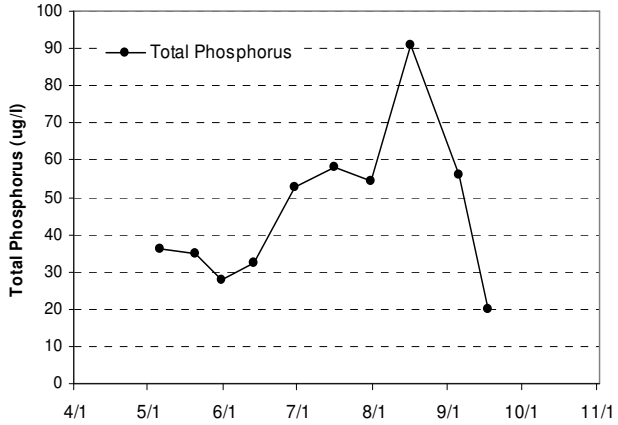
Spring Lake Twp., Scott Co.

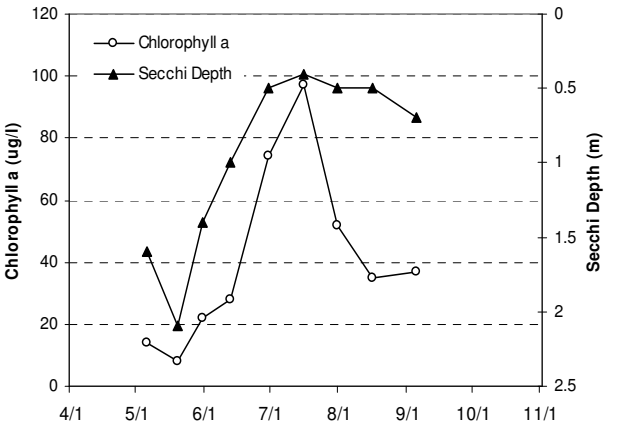
Lake ID: 700050
WMO: Scott County
Volunteer:
Joe Williamson

● Sampling site

Contours in meters

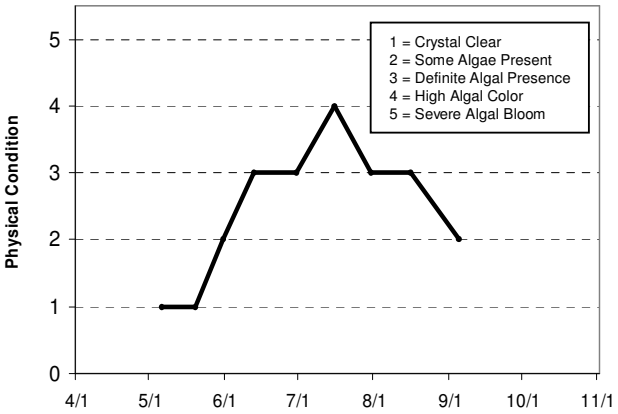






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07	18				14	36		1.6	1	1
05/20/07	20				8.1	35		2.1	1	1
05/31/07	21.3				22	28	45	1.4	2	1
06/13/07	24.6				28	32.5	236	1	3	2
06/30/07	21.1				74	52.5	71.5	0.5	3	2
07/16/07	25.4				97	58	44.5	0.4	4	2
07/31/07	29.1				52	54.5	351	0.5	3	2
08/16/07	26.9				35	91	125	0.5	3	2
09/05/07	25.1				37	56	68	0.7	2	2
09/17/07						20				

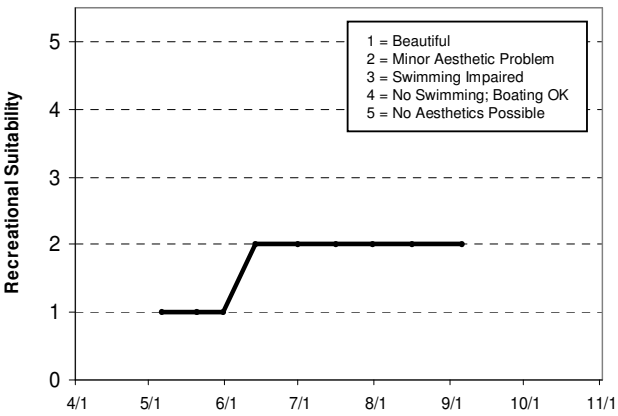


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	F				D									
Chlorophyll a	F				D									
Secchi Depth	C				D									
Overall	**D**				**D**									

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D			D			D				D	C	C
Chlorophyll a		D			D			D				F	D	C
Secchi Depth		C			D			D				D	D	D
Overall		**D**			**D**			**D**				**D**	**D**	**C**

Source: Metropolitan Council and STORET data



Miller Lake (10-0029) *Carver County Environmental Services*

Miller Lake, a 145-acre lake located within Dahlgren Township (Carver County) is considered a Metropolitan Area "Priority Lake" because of its multi-recreational uses. The mean and maximum depths of the lake are 3.1 m (10 feet) and 4.3 m (roughly 14 feet), respectively. The lake's mean depth and surface area translate to an approximate lake volume of 1,479 ac-ft. 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 16,701-acre immediate watershed, which translates to a watershed-to-lake area ratio of 115:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: four percent residential, 71 percent agricultural, two percent commercial/industrial, and 23 percent open/undeveloped (Carver County Planning 1999).

This was the twelfth year that Miller Lake has been involved in CAMP. A search through the STORET nationwide water quality database revealed a limited water quality database with water quality data available for 1995-1997, and 1999-2006.

The lake was monitored 13 times between mid-April and mid-October 2007. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	216.6	110.0	352.0	F
CLA (µg/l)	82.1	38.0	150.0	F
Secchi (m)	0.5	0.2	0.8	F
TKN (mg/l)	2.90	1.90	3.40	
			Water Quality	F

The lake's 2007 grade is similar to those recorded in 1995-1996, 2003-2004, and 2006, and worse than the D's recorded in 1997, and 1999-2002, and 2005.

No long-term trend is apparent from the lake's water quality database. The lake is represented by an D/F grade. Also, the lake's CLA grade had steadily improved from F's in 1995-1996, D's in 1997 and 1999, to C's in 2000-2002 before falling back to a D in 2003-2006 and an F in 2007.

Throughout the monitoring period, the volunteer(s) ranked the perceived physical condition of the lake on a 1-to-5 scale. The mean perceived physical condition of Miller Lake was 3.4 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability was 3.0 (3- "swimming slightly impaired").

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) 297-4916 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.

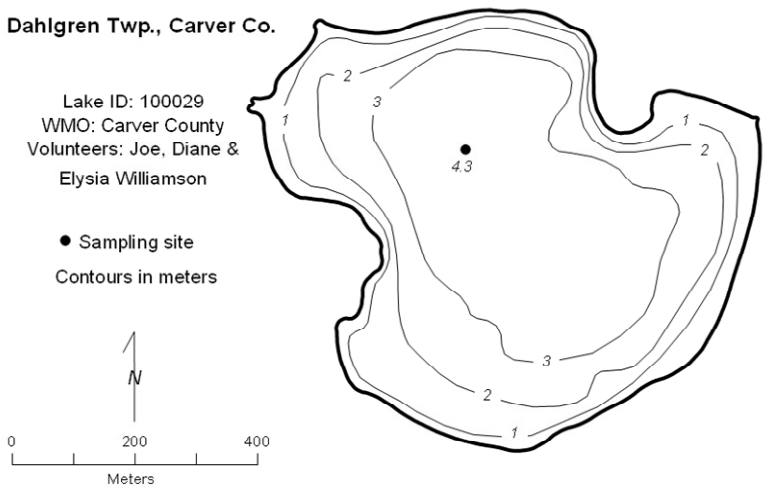
Miller Lake

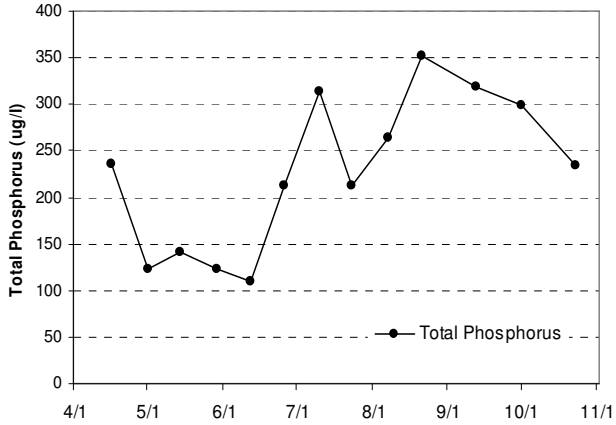
Dahlgren Twp., Carver Co.

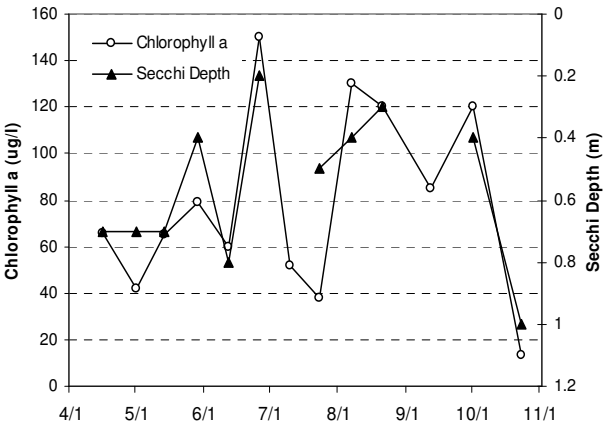
Lake ID: 100029
WMO: Carver County
Volunteers: Joe, Diane & Elysia Williamson

● Sampling site

Contours in meters

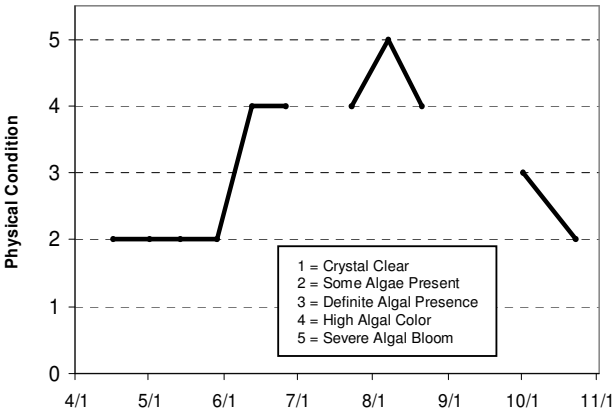






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.01		15.64		66	235		0.7	2	2
05/01/07	15.51		9.47		42	122		0.7	2	2
05/14/07	18.61		11.58		65	141		0.7	2	2
05/29/07	20.35		12.58		79	122		0.4	2	2
06/12/07					60	110		0.8	4	3
06/26/07	25.7		17		150	212		0.2	4	4
07/10/07					52	313				
07/23/07	25.63		9.47		38	212		0.5	4	3
08/07/07	25.15		6.66		130	264		0.4	5	5
08/21/07	21.03		9.01		120	352		0.3	4	3
09/12/07					85	318				
10/01/07	28.08		11.79		120	298		0.4	3	3
10/23/07	10.81		9.86		13	234		1	2	2

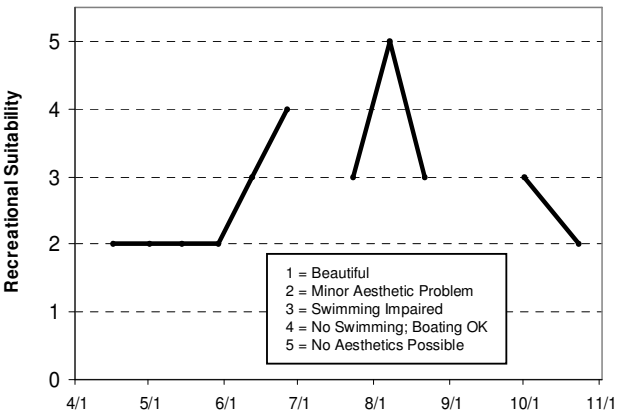


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		F	F	F		F	F	F	F	F	F	D	F	F
Chlorophyll a		F	F	D		D	C	C	C	D	D	D	D	F
Secchi Depth		F	F	D		D	D	C	C	F	F	D	F	F
Overall		**F**	**F**	**D**		**D**	**D**	**D**	**D**	**F**	**F**	**D**	**F**	**F**

Source: Metropolitan Council and STORET data



Minnetoga Lake (27-0088) *Nine Mile Creek Watershed District*

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 (12.7 ft). The maximum depth is 8.2 m (26.9 ft). The volume of the lake is 183 acre-feet.

This was the first year that Lake Minnetoga has been involved in CAMP. A search through the STORET nationwide water quality database revealed a limited water quality database with water quality data available: only two dates in 2001 with Secchi depth measurements.

The lake was monitored 14 times between mid-April and mid-October 2007. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	53.5	26.0	153.0	C
CLA (µg/l)	20.7	3.0	70.0	C
Secchi (m)	2.0	0.5	2.9	C
TKN (mg/l)	2.15	1.40	2.80	
			Water Quality	C

The lake received an water quality grade of C for 2007. More monitoring is suggested to build up the long term database for this lake.

Throughout the monitoring period, the volunteer(s) ranked the perceived physical condition of the lake on a 1-to-5 scale. The mean perceived physical condition of the lake was 2.3 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 2.7 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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) 297-4916 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.

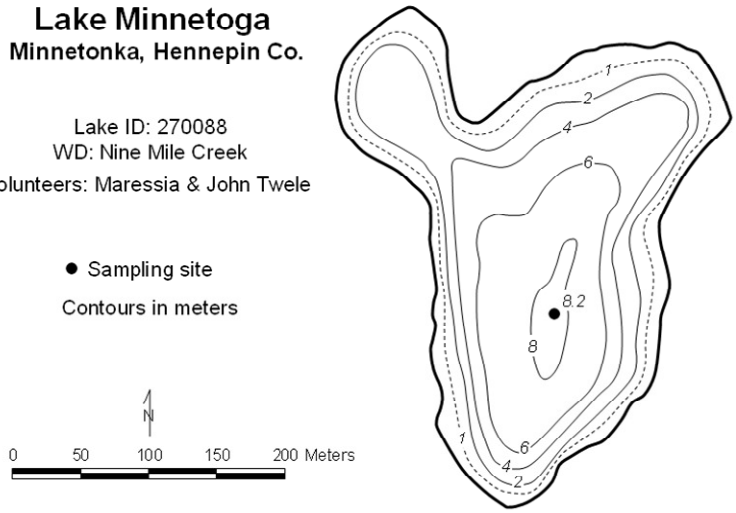
Lake Minnetoga

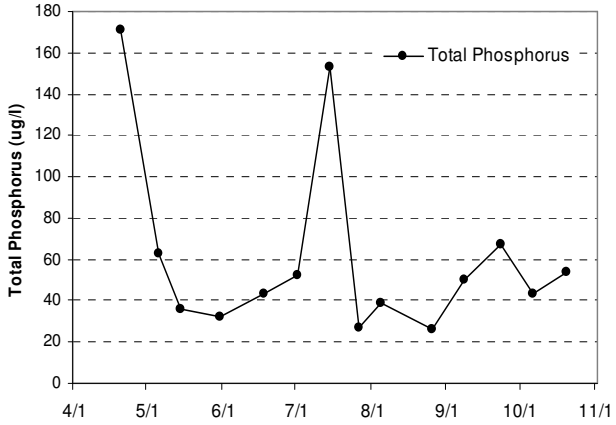
Minnetonka, Hennepin Co.

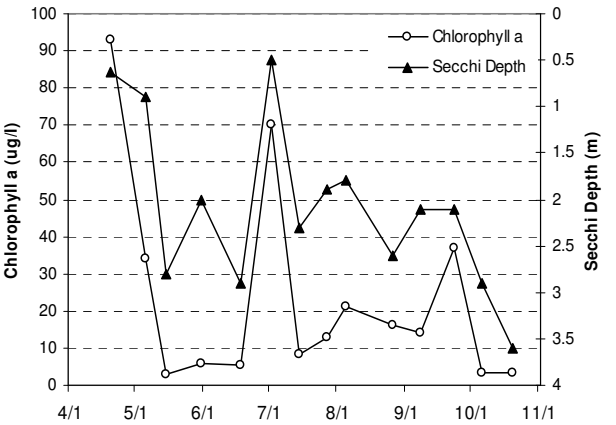
Lake ID: 270088
WD: Nine Mile Creek
Volunteers: Maressia & John Twele

● Sampling site

Contours in meters

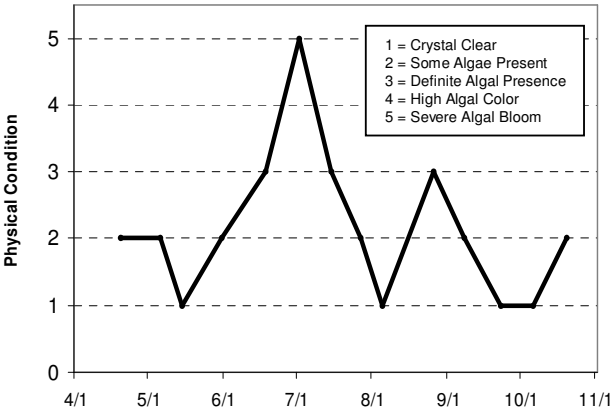






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	14				93	171		0.63	2	5
05/06/07	14.8				34	63		0.9	2	4
05/15/07	18.6				3	36		2.8	1	3
05/31/07	23				5.7	32		2	2	3
06/18/07	25.8				5.4	43		2.9	3	2
07/02/07	24.8				70	52		0.5	5	4
07/15/07	24.7				8.1	153		2.3	3	2
07/27/07	27				13	27		1.9	2	2
08/05/07	25.4				21	39		1.8	1	
08/26/07	23.3				16	26		2.6	3	2
09/08/07	23.7				14	50		2.1	2	2
09/23/07	20.9				37	67		2.1	1	
10/06/07	20.2				3.2	43		2.9	1	
10/20/07	13.3				3.5	54		3.6	2	1

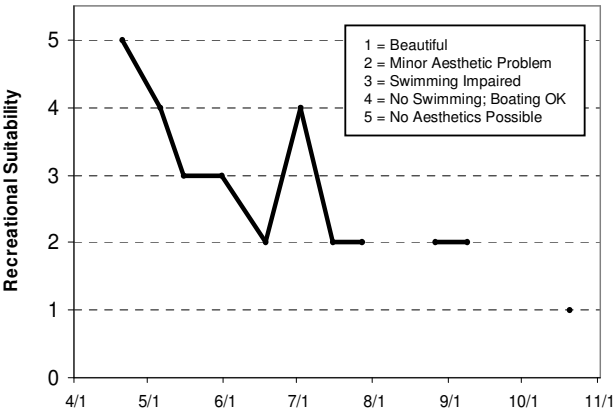


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														C
Chlorophyll a														C
Secchi Depth														C
Overall														**C**

Source: Metropolitan Council and STORET data



Mitchell Lake (27-0070) *City of Eden Prairie*

While Mitchell Lake has previously been monitored by Council staff, 2007 marks the fourth year the lake has been monitored through CAMP (2004 being the first). Mitchell Lake, with a surface area of 112 acres, is located with the City of Eden Prairie (Hennepin County). The maximum and depths of the lake are 5.8 (19 feet), respectively. Because of the shallowness of the lake, roughly 97 percent of the lake's surface 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).

Because of its multi-recreational uses, the lake is considered a "Priority Lake". The lake has a public access and fishing pier on its southern end. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake.

In 2007, Mitchell Lake was monitored 13 times between late-April and early-October. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	58.5	35.0	101.0	C
CLA (µg/l)	20.9	2.8	49.0	C
Secchi (m)	1.4	0.5	4.1	C
TKN (mg/l)	2.49	2.00	3.60	
			Water Quality	C

The lake's 2007 grade of C is similar to those recorded in 1991, 1995, and 2004-2005 but better than the D's recorded in 1999-2000 and 2003. No long-term trend is apparent from the lake's water quality database. The lake's water quality seems well represented by an grade of C/D+. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

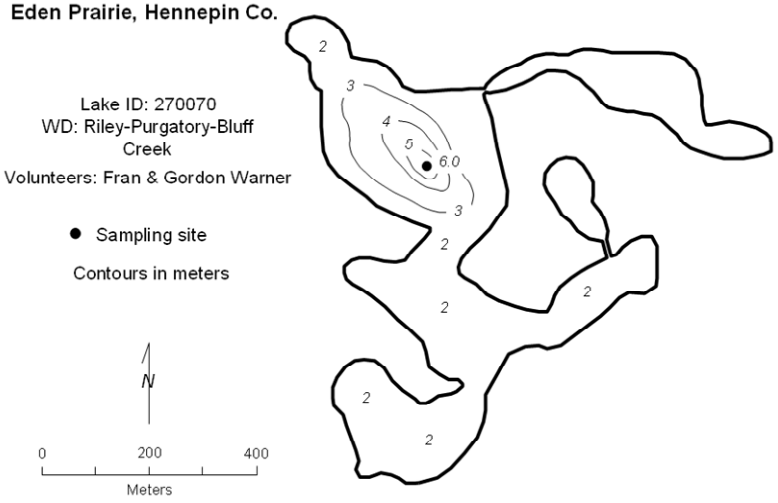
The average user perception rankings, on a 1-to-5 scale, were 1.6 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.0 for recreational suitability (1- "beautiful").

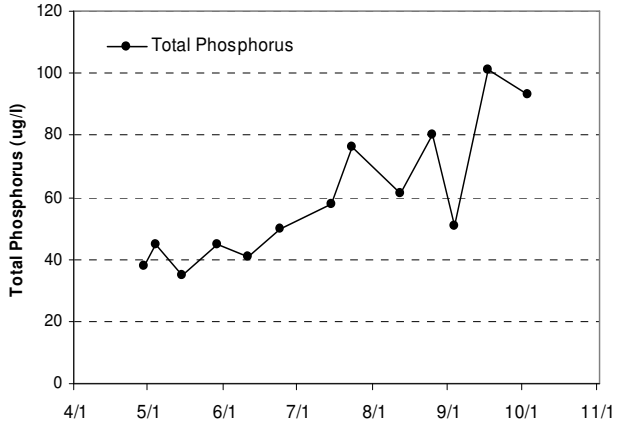
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

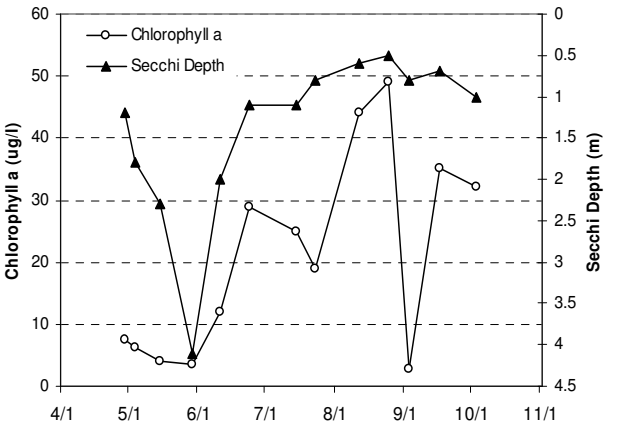
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake Mitchell

Eden Prairie, Hennepin Co.

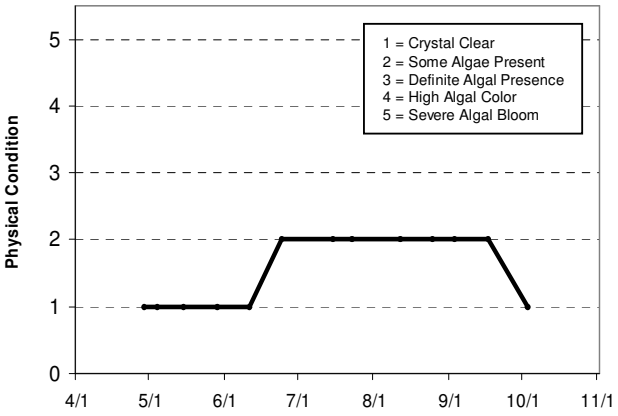






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/29/07	17.6				7.4	38		1.2	1	1
05/04/07	16.5				6.2	45		1.8	1	1
05/15/07	18.6				4.1	35		2.3	1	1
05/29/07	21.1				3.5	45		4.1	1	1
06/11/07	21.6				12	41		2	1	1
06/24/07	26				29	50		1.1	2	1
07/15/07	25.6				25	58		1.1	2	1
07/23/07	26				19	76		0.8	2	1
08/12/07	27.1				44	61		0.6	2	1
08/25/07	23.9				49	80		0.5	2	1
09/03/07	26.1				2.8	51		0.8	2	1
09/17/07	17.8				35	101		0.7	2	1
10/03/07	16.9				32	93		1	1	1

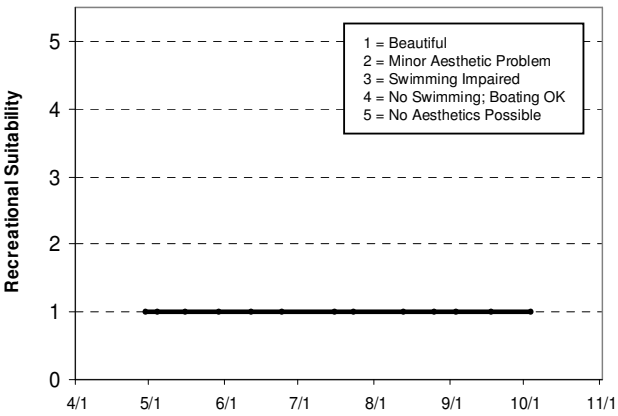


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus												D		
Chlorophyll a												C		
Secchi Depth												C		
Overall												**C**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C				D	D			D	C	D	D	C
Chlorophyll a		C				D	D			D	C	C	C	C
Secchi Depth		C				D	C			C	C	C	D	C
Overall		**C**				**D**	**D**			**D**	**C**	**C**	**D**	**C**

Source: Metropolitan Council and STORET data



Moody Lake (13-0023) *Comfort Lake-Forest Lake Watershed District*

Moody Lake is a 35-acre lake located near Chisago City (Chisago County). The lake has a maximum and mean depth of depth of approximately 14.6 m (48 feet). Roughly 63 percent of the lake's surface area is considered littoral zone (the 0-15 foot depth area of aquatic plant dominance).

This marks the third year in which Moody Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Therefore, 2005-2007 are the only known years of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 14 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	153.8	72.0	223.0	F
CLA (µg/l)	70.2	18.0	130.0	D
Secchi (m)	0.8	0.3	1.5	D
TKN (mg/l)	2.78	1.40	4.50	
			Water Quality	D

As mentioned earlier, there are no water quality data available for Moody other than the 2005-2007 CAMP data. Therefore there are no sufficient data to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.2 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.2 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming – boating ok").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

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

Moody Lake

Chisago Lake Twp., Chisago Co.

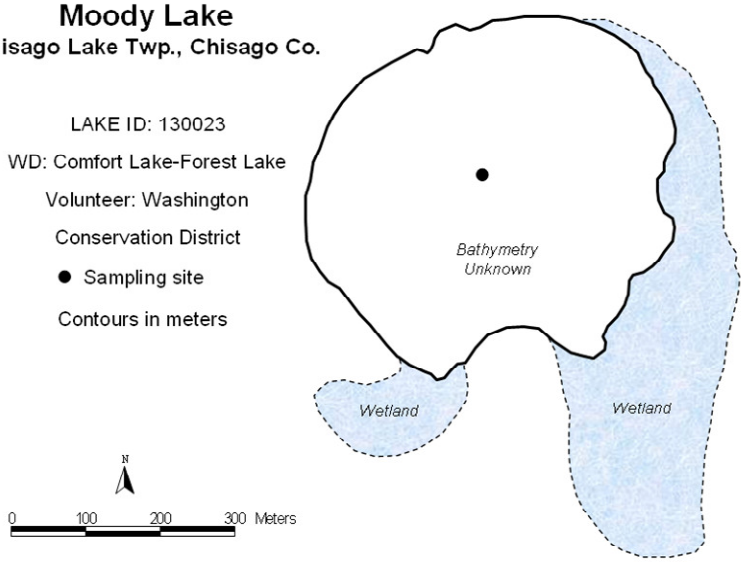
LAKE ID: 130023

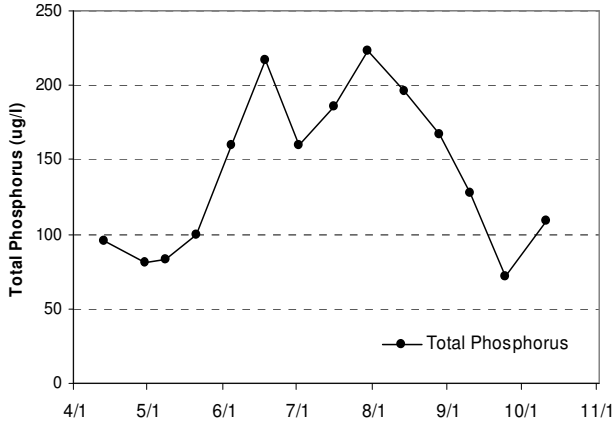
WD: Comfort Lake-Forest Lake

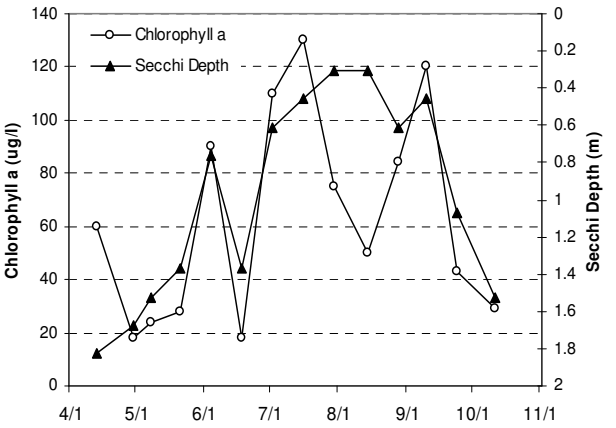
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

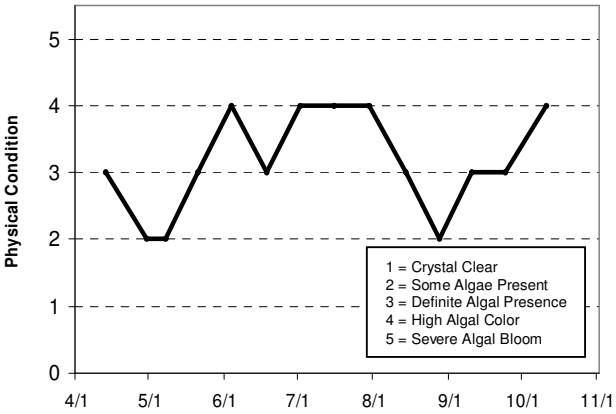






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/13/07	4.7	4.4	14.31	0.05	60	95		1.829	3	4
04/30/07	16.8	4.5	10.09	0.09	18	81		1.676	2	4
05/08/07	15.6	6.6	12.27	0.05	24	83		1.524	2	1
05/21/07	17.9	6.1	9.19	0.06	28	100		1.372	3	4
06/04/07	21.7	6.2	9.23	0.16	90	160		0.762	4	2
06/18/07	29.4	8.5	3.84	0.09	18	217		1.372	3	2
07/02/07	26.5	8.1	8.03	0.06	110	160		0.61	4	4
07/16/07	26.8	8.2	9.5	0.06	130	186		0.457	4	2
07/30/07	30.3	8.7	9.2	0.24	75	223		0.305	4	4
08/14/07	27.3	9.2	3.12	0.36	50	196		0.305	3	4
08/28/07	24.6	9.2	8.21	0.31	84	167		0.61	2	4
09/10/07	23.4	9.3	8.29	0.3	120	128		0.457	3	4
09/24/07	21.4	9.2	8.36	0.36	43	72		1.067	3	4
10/11/07	16.4	9.8	4.84	0.33	29	109		1.524	4	4

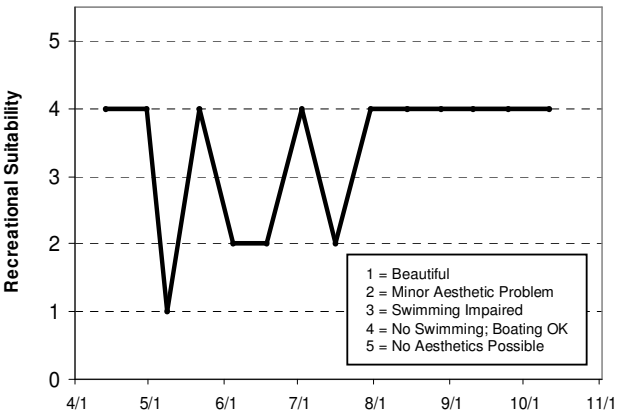


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												D	D	F
Chlorophyll a												D	C	D
Secchi Depth												D	D	D
Overall												**D**	**D**	**D**

Source: Metropolitan Council and STORET data



Mud Lake (82-0026) *Carnelian - Marine Watershed District*

Mud Lake is a 62-acre lake located within May Township (Washington County). The maximum and mean depths of the lake are 2.1 m (roughly seven feet) and 1.1 m (three-and-a-half feet), respectively. The lake's size and mean depth results in an approximate lake volume of 224 ac-ft. 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's small 93-acre immediate watershed translates to a small watershed-to-lake size ratio of 2:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the eighth year that Mud Lake has been involved in CAMP (2000-2006 being the others). A search through the STORET nationwide water quality database for historical data on Mud Lake provided data for 12 years (1995-2006).

The lake's Secchi transparency was monitored seven times from late-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

Water samples to be analyzed for TP, TKN and chlorophyll were not collected for the lake in 2007. Because Secchi transparency was the only data collected there are no nutrient or chlorophyll concentration means to compare to previous years. The lake's 2007 summertime (May through September) mean Secchi transparency was 0.9 m (minimum of 0.3 m and a maximum of 1.4 m). This translates to a grade of D for water clarity.

No long-term trend is apparent from the lake's water quality database. However, the lake's water clarity seems to be slightly better recently than about 10 years ago. The lake's water clarity since 2002 has been mostly D's and one C. From 1995 to 2001, the water clarity grades were mainly F's. To better understand the lake's water quality and where it may be heading, more data are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.2 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.6 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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

Mud Lake
May Twp., Washington Co.

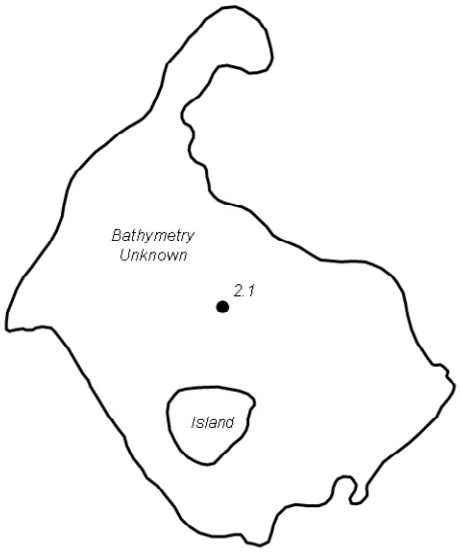
LAKE ID: 820026

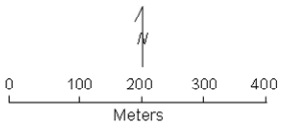
WD: Carnelian-Marine-St. Croix

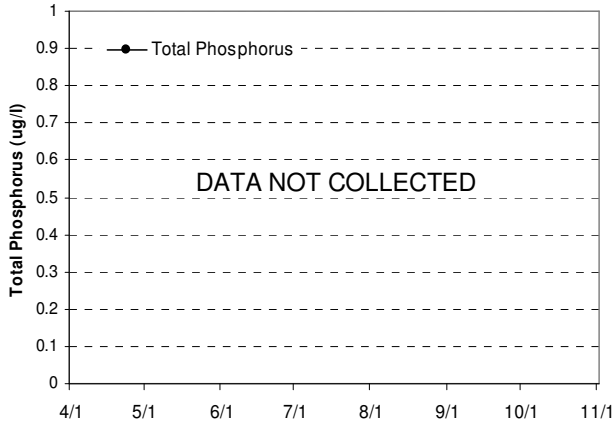
Volunteer: Washington Conservation District

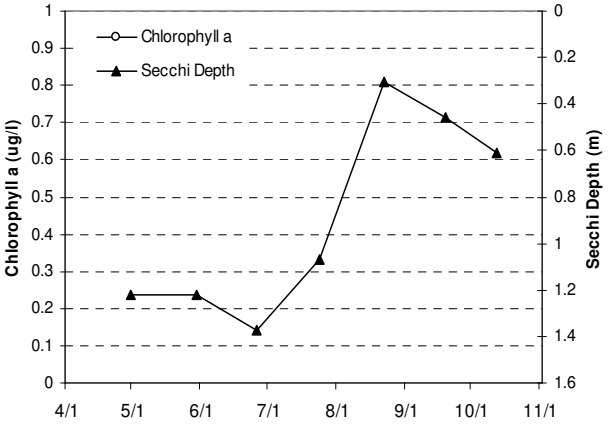
● Sampling site

Contours in meters



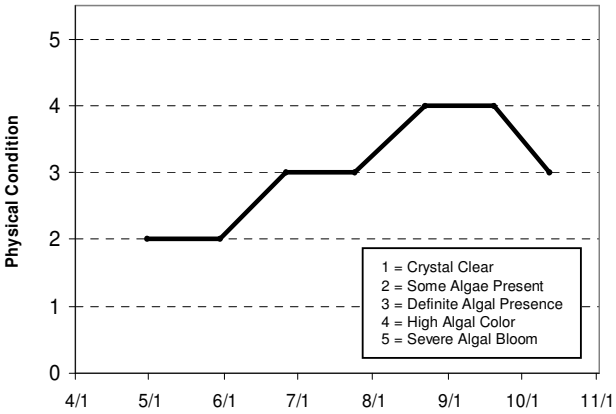






2007 Data

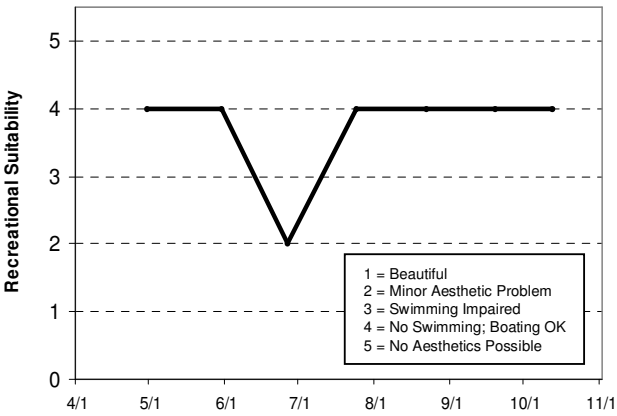
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/30/07	17.7	17.7	6.61	6.44				1.219	2	4
05/30/07	22	21.9	8.11	7.29				1.219	2	4
06/26/07	28.5	27.4	9.96	7.45				1.372	3	2
07/24/07	27.4	26.5	5.39	6.05				1.067	3	4
08/22/07	22.4	21.7	4.63	0.25				0.305	4	4
09/19/07	17.6	17.1	6.84	0.18				0.457	4	4
10/12/07	13.7	14.1	7.01	1.02				0.61	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			D	F	F	F	F	D						
Chlorophyll a			D	D	F	D	F	F						
Secchi Depth		F	F	F	F	F	F	F	D	D	C	D	D	D
Overall			**D**	**F**	**F**	**F**	**F**	**F**						**D**



Source: Metropolitan Council and STORET data

Normandale Lake (27-1045) *Nine Mile Creek Watershed District*

Normandale Lake is a 103-acre lake located near in the City of Bloomington (Hennepin County). The lake has a maximum depth of 3.7 m (12 feet). Because of the shallowness of the lake, its entire surface 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).

This was the second year that Normandale Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, the 2006 and 2007 CAMP data are the only known nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored only three times between late-April and late-May 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	37.0	32.0	42.0	C
CLA (µg/l)	5.3	1.4	9.1	A
Secchi (m)	1.6	1.1	2.1	C
TKN (mg/l)	1.70	1.60	1.80	
			Water Quality	B

The water quality grade of B for 2007 was an improvement over last years grade of C. However, it should be kept in mind that this year's data set consists of only 3 sampling dates which is not representative of the entire summer time period (May through September). As mentioned earlier, there are no nutrient data available for Normandale Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 4.0 for physical condition (4- "high algal color"), and 4.5 for recreational suitability (between 4- " no swimming; boating ok" and 5- "no aesthetics possible").

The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 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.

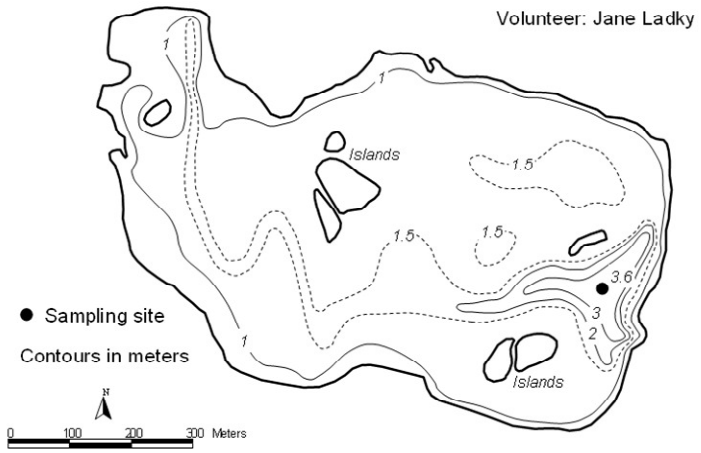
Normandale Lake (Nordmyr Lake)

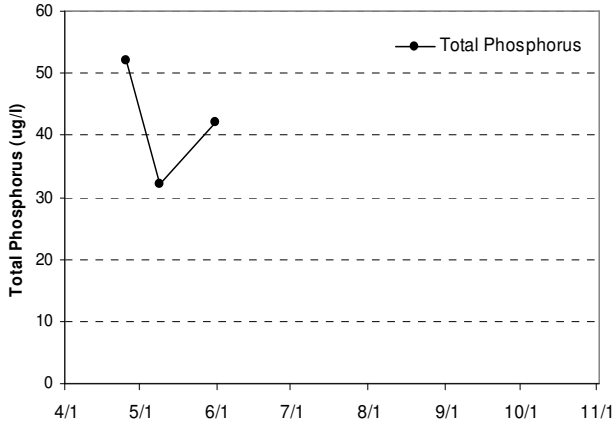
Bloomington, Hennepin Co.

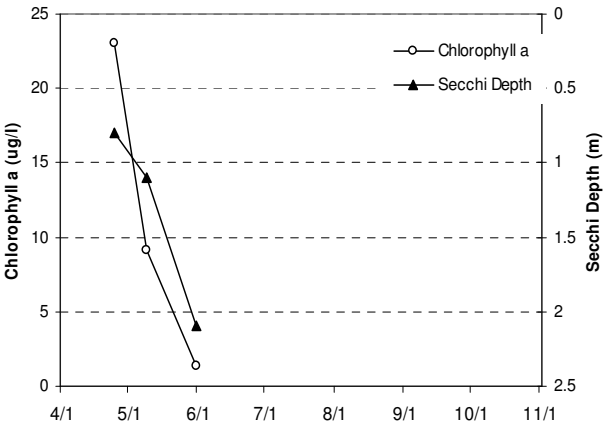
LAKE ID: 271045

WD: Nine Mile Creek

Volunteer: Jane Ladky

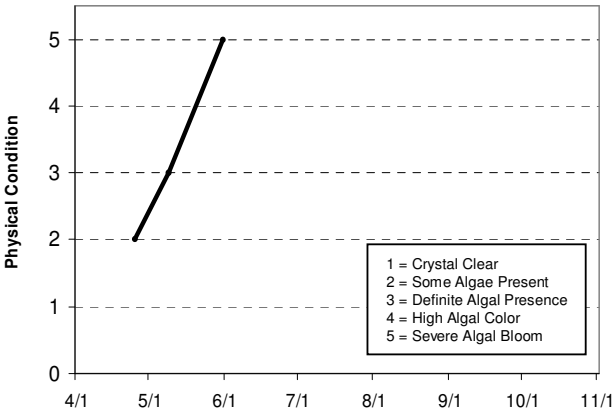






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/25/07	15.8				23	52		0.8	2	2
05/09/07	23				9.1	32		1.1	3	4
05/31/07	23.1				1.4	42		2.1	5	5

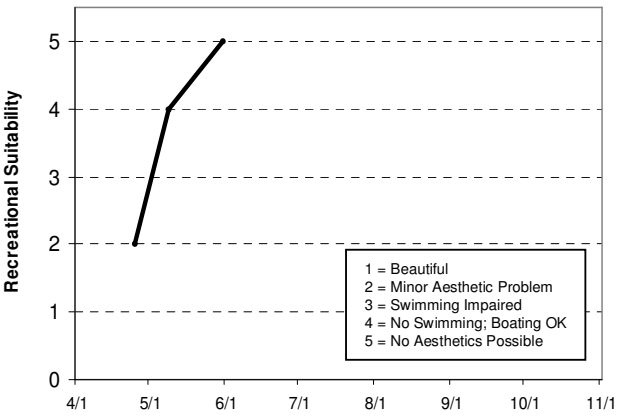


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													B	A
Secchi Depth													D	C
Overall													**C**	**B**

Source: Metropolitan Council and STORET data



North Twin Lake (82-0018) *Carnelian - Marine Watershed District*

North Twin Lake is a 69-acre lake located in Stillwater Township (Washington County). The maximum and mean depths of the lake are 1.8 m (roughly six feet) and 0.9 m (three feet), respectively. The lake's size and mean depth results in an approximate lake volume of 207 ac-ft. 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's 187-acre immediate watershed translates to a small watershed-to-lake size ratio of 3:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the eighth year that North Twin Lake has been involved in CAMP (2000-2006 being the others). A search through the STORET nationwide water quality database for data on the lake provided limited information (1996-2006).

The lake's water quality was monitored seven times from late-April to early-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	40.2	17.0	95.0	C
CLA (µg/l)	3.4	2.5	4.0	A
Secchi (m)	1.1	0.9	1.2	D
TKN (mg/l)	0.97	0.80	1.20	
			Water Quality	C

The 2006 grade of C was worse than last year's grade of B. The last year that this lake received a C grade was in 1998.

This grade is skewed however, due to the shallowness of the lake. When examining the lake's mean TP and CLA concentrations, it seems that the lake's Secchi readings were limited by the shallowness rather than algal abundance. So, while the lake only received an grade of C, the actual water quality may have been better.

No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's quality seems well represented by an grade of B. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 1.8 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.6 for recreational suitability (between 1- "crystal clear" and 2- "minor aesthetic problem").

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

North Twin Lake
Stillwater Twp., Washington Co.

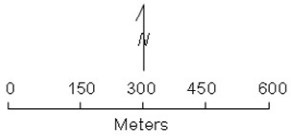
LAKE ID: 820018

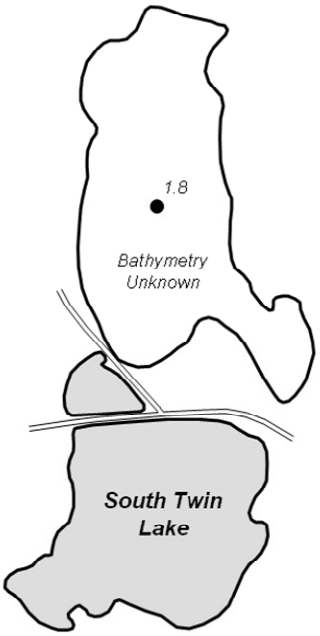
WD: Carnelian-Marine-St. Croix

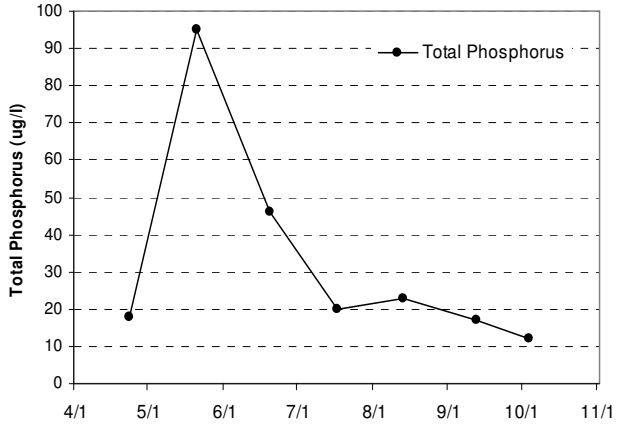
Volunteer: Washington Conservation District

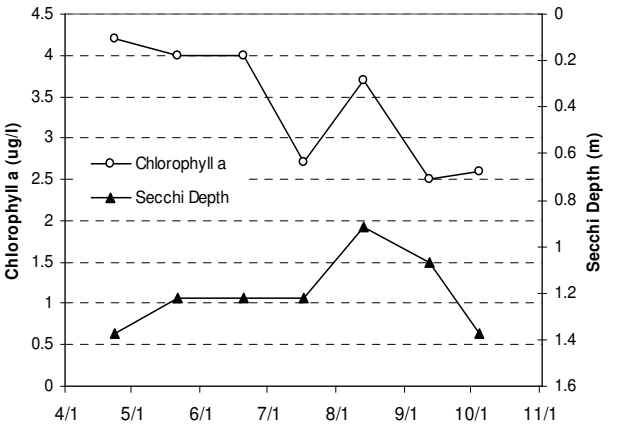
● Sampling site

Contours in meters



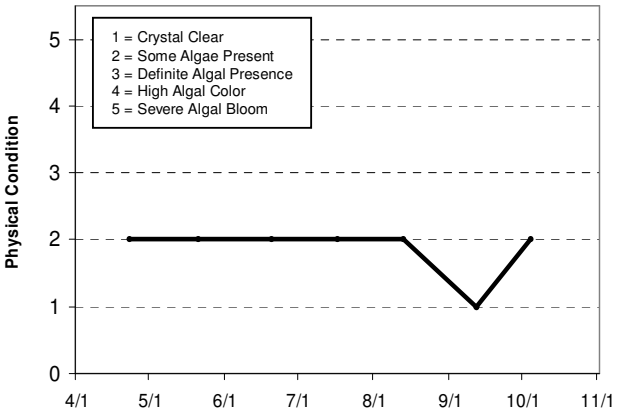






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/23/07	17.7	17.7	9.83	10.14	4.2	18		1.372	2	1
05/21/07	20.4	20	8.91	9.64	4	95		1.219	2	1
06/20/07	26.9	26.3	7.42	7.9	4	46		1.219	2	1
07/17/07	27.9	25.6	8.42	0.26	2.7	20		1.219	2	2
08/13/07	26.6	25.8	7.77	1.08	3.7	23		0.914	2	3
09/12/07	18.6	18.2	7.24	0.69	2.5	17		1.067	1	1
10/04/07	19	18.3	9.44	3.12	2.6	12		1.372	2	2

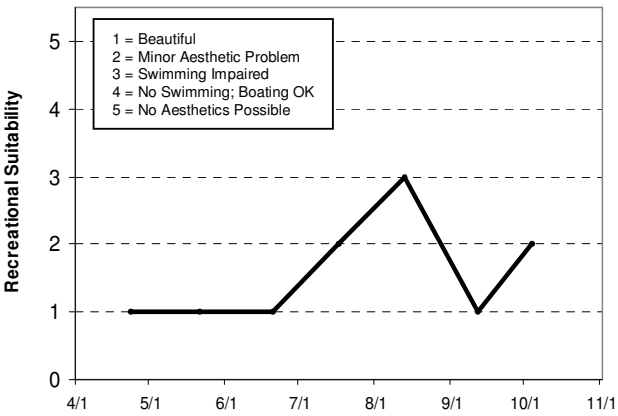


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	B	B	A	B	B		B	A	B	C	C
Chlorophyll a			D	C	D	B	A	B		A	A	A	A	A
Secchi Depth			B	B	B	B	C	C	C	C	C	D	C	D
Overall			**C**	**B**	**C**	**B**	**B**	**B**		**B**	**B**	**B**	**B**	**C**

Source: Metropolitan Council and STORET data



Northwood Lake (27-0627) *Bassett Creek Watershed Management Organization*

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 (roughly 2.5 feet) and 1.5 m (roughly five feet), respectively. The lake's size and mean depth results in an approximate lake volume of 41 ac-ft. 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's 1,341-acre immediate watershed translates to a small watershed-to-lake size ratio of 89:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the eighth year that Northwood Lake has been involved in CAMP. The lake was also enrolled in the program in 2000-2006. Other than the 2000-2006 CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty. Thus, 2000-2007 are the only years of available data.

The lake was monitored 10 times from mid-April to mid-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

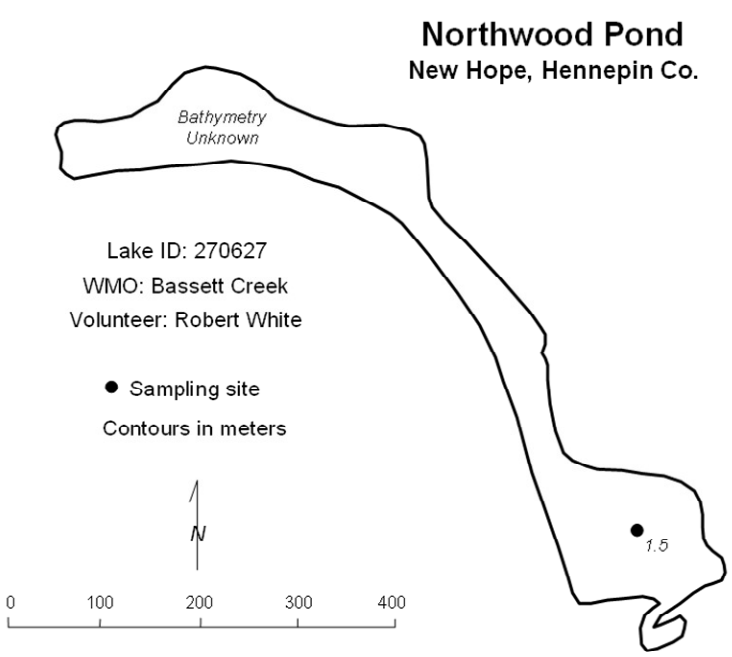
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	268.9	145.0	477.0	F
CLA (µg/l)	29.9	13.0	59.0	C
Secchi (m)	1.0	0.9	1.3	D
TKN (mg/l)	2.03	0.87	2.70	
			Water Quality	D

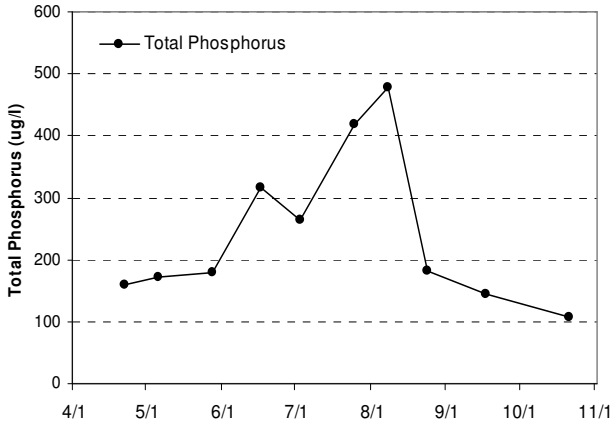
The lake's 2007 grade of D is similar to those recorded in 2000-2001, 2003, and 2006 (D) and worse than the C's recorded in 2002, and 2004-2005.

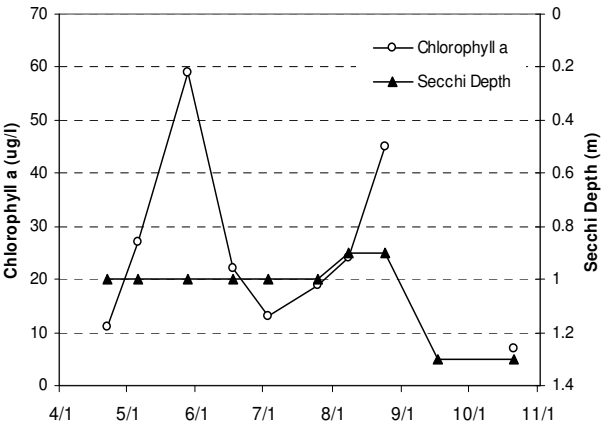
No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's quality seems well represented by an grade of D/C. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.5 for physical condition (between 2- "some algae present" and 3- "definite algal presence"), and 4.1 for recreational suitability (roughly 4- "no swimming - boating ok").

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

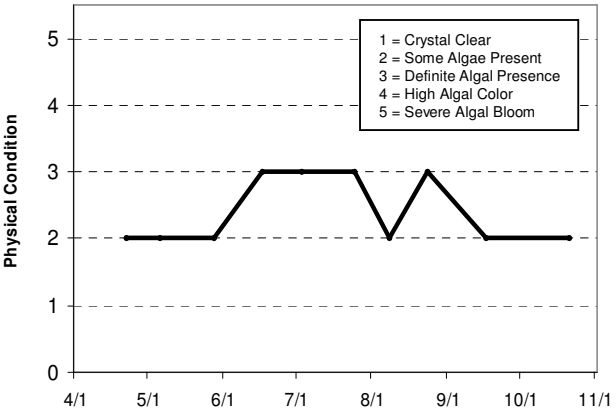






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/22/07	19.8				11	160		1	2	4
05/06/07	20.7				27	171		1	2	4
05/28/07	22.1				59	179		1	2	4
06/17/07	24.5				22	315		1	3	4
07/03/07	25.7				13	264		1	3	5
07/25/07	29.7				19	418		1	3	4
08/08/07	27.5				24	477		0.9	2	4
08/24/07	26.4				45	182		0.9	3	4
09/17/07	22.1					145		1.3	2	
10/21/07	12.3				6.9	108		1.3	2	4

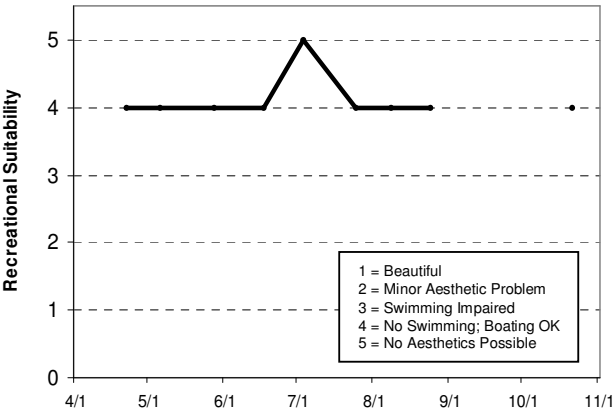


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							F	F	D	F	D	D	F	F
Chlorophyll a							B	C	B	C	B	B	B	C
Secchi Depth							D	D	D	D	D	D	D	D
Overall							**D**	**D**	**C**	**D**	**C**	**C**	**D**	**D**

Source: Metropolitan Council and STORET data



O'Connor Lake (82-0002) *Lower St. Croix Valley Watershed Management Organization*

O'Connor Lake is a 38-acre lake located within Denmark Township (Washington County). There is very little known morphological data available for the lake.

This marks the third year in which O'Connor Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Therefore, 2005-2007 are the only known years of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 12 times between late-April and late-September 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

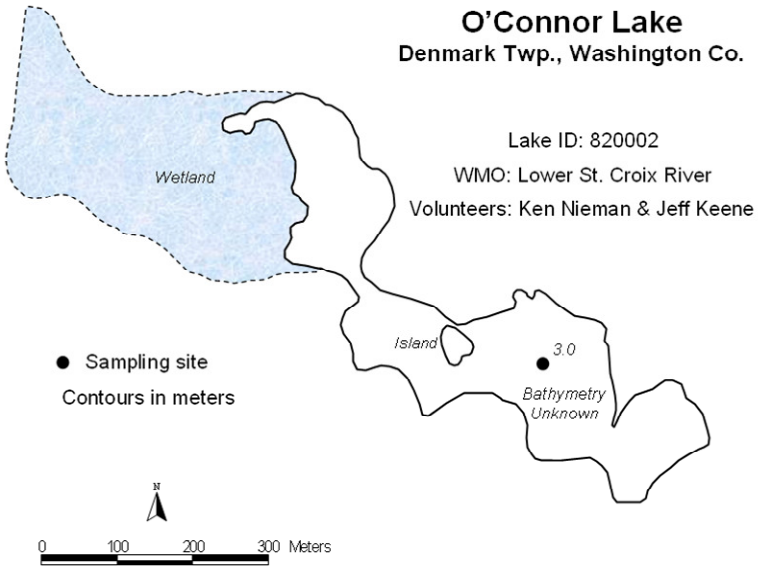
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	46.0	23.0	106.0	C
CLA (µg/l)	4.2	1.4	9.9	A
Secchi (m)	0.5	0.4	0.9	F
TKN (mg/l)	0.78	0.44	1.60	
			Water Quality	C

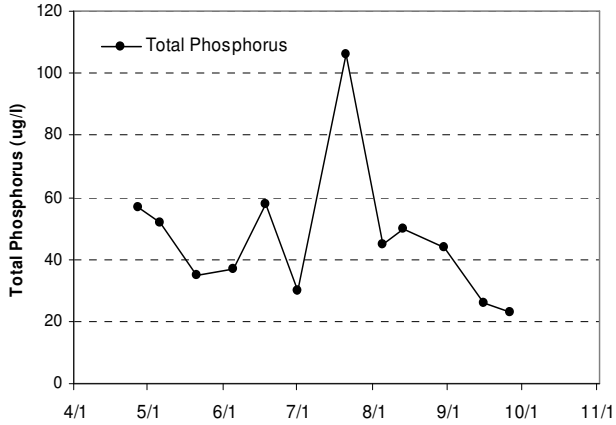
The lake's 2007 grade of a C was similar to the water quality grade reported in 2005 (C). As mentioned earlier, there are no water quality data available for Lake O'Connor other than the 2005-2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

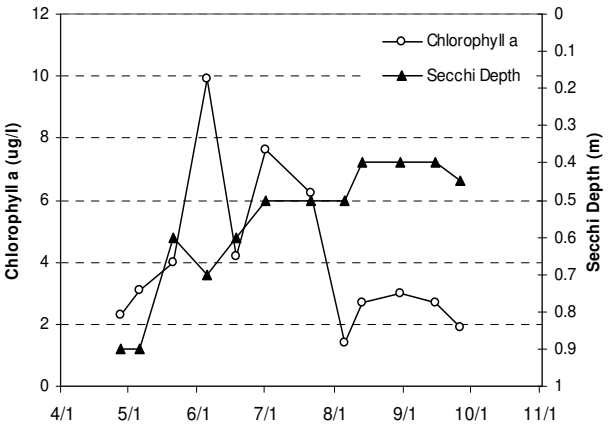
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical conditions on a 1-to-5 scale. The average user perception rankings were 2.5 for physical condition (between 2- "some algae present" and 3- "definite algae present").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

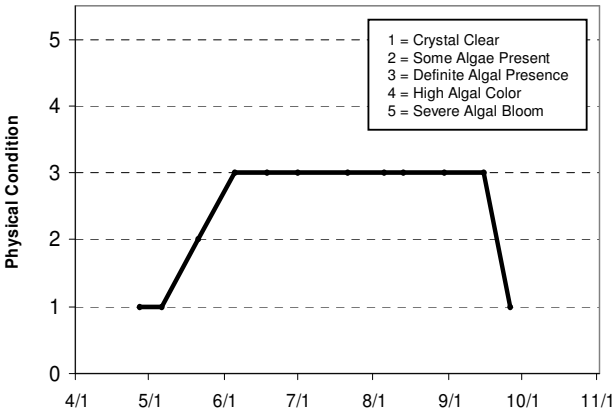






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/27/07	16.4				2.3	57		0.9	1	
05/06/07	16.8				3.1	52		0.9	1	
05/21/07	20.3				4	35		0.6	2	
06/05/07	24.8				9.9	37		0.7	3	
06/18/07	23.4				4.2	58		0.6	3	
07/01/07	25.2				7.6	30		0.5	3	
07/21/07	24.3				6.2	106		0.5	3	
08/05/07	27.1				1.4	45		0.5	3	
08/13/07	27.1				2.7	50		0.4	3	
08/30/07	24				3	44		0.4	3	
09/15/07	22				2.7	26		0.4	3	
09/26/07	19.4				1.9	23		0.45	1	

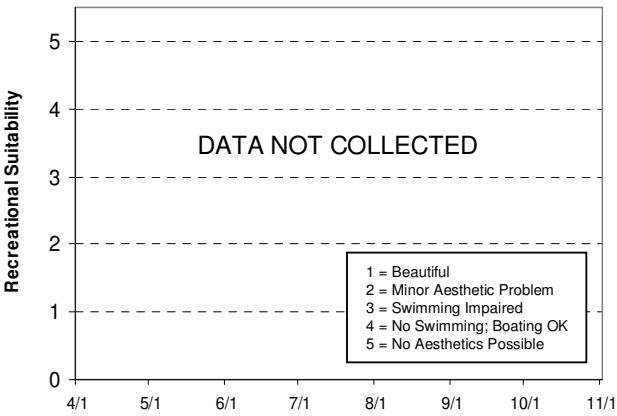


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												C	C	C
Chlorophyll a												B	A	A
Secchi Depth												C	C	F
Overall												**C**	**B**	**C**

Source: Metropolitan Council and STORET data



O'Dowd Lake (70-0095) *City of Shakopee*

O'Dowd Lake is located in both Louisville Township and the City of Shakopee (Scott County). The lake's surface area is 258 acres and has a maximum depth of 6.7 m (roughly 22 feet). Roughly 63 percent of the lake's surface area is considered littoral zone (the 0-15 foot depth area of aquatic plant dominance). Because of its multi-recreational uses, the lake is considered a "Priority Lake" in the Metropolitan Area

Although this is only the second year that O'Dowd Lake has been enrolled in CAMP, the lake had been monitored by Council staff in the past. The lake was monitored 13 times between early-May and mid-October 2007. The collected data and resulting graphs showing TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	51.0	19.0	84.0	C
CLA (µg/l)	55.5	3.4	93.0	D
Secchi (m)	1.2	0.4	3.0	C
TKN (mg/l)	1.76	0.62	2.90	
			Water Quality	C

The lake received on water quality grade of C for 2007. Because of the variability of the lake's grades, no long-term trend is apparent from the lake's water quality database. The lake's water quality seems to be best represented by an grade of D+/C.

Throughout the 2007 season, the volunteer monitor ranked their perceptions of the lake's physical and recreational condition on a 1-to-5 scale. The mean perceived physical condition was 1.9 (roughly 2- "some algae present"), while the mean recreational suitability was 1.8 (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 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.

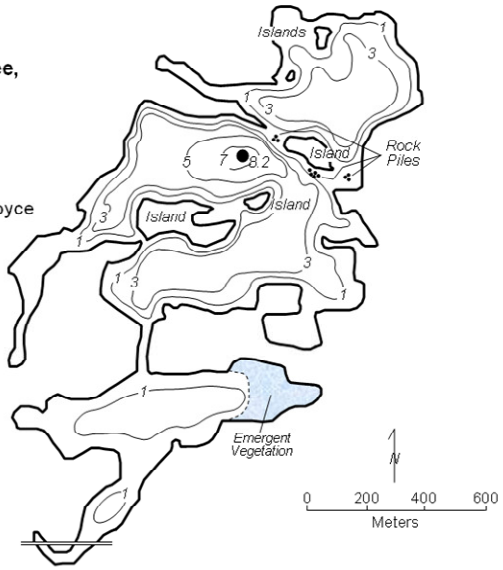
O'Dowd Lake

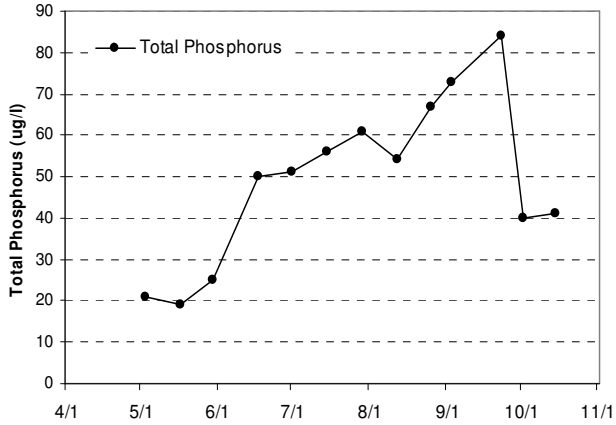
Louisville Twp./Shakopee, Scott Co.

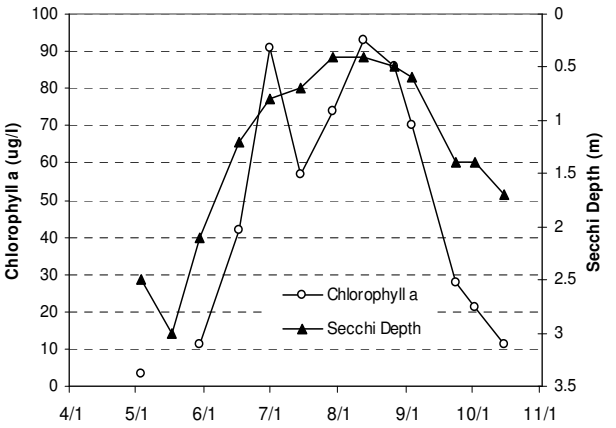
LAKE ID: 700095
WMO: Scott County
Volunteers: Sandy & Andrew Boyce

● Sampling site

Contours in meters

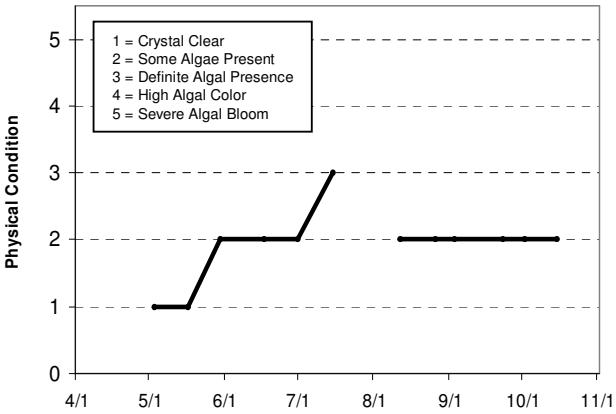






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/03/07	17.2				3.4	21		2.5	1	1
05/17/07	18.5					19		3	1	1
05/30/07	20.8				11	25		2.1	2	1
06/17/07	27				42	50		1.2	2	2
07/01/07	26				91	51		0.8	2	2
07/15/07	25.6				57	56		0.7	3	3
07/29/07	30				74	61		0.4		
08/12/07	25.8				93	54		0.4	2	2
08/26/07	22.3				86	67		0.5	2	2
09/03/07	23.6				70	73		0.6	2	2
09/23/07	19.7				28	84		1.4	2	2
10/02/07	17.5				21	40		1.4	2	2
10/15/07	14.8				11	41		1.7	2	2

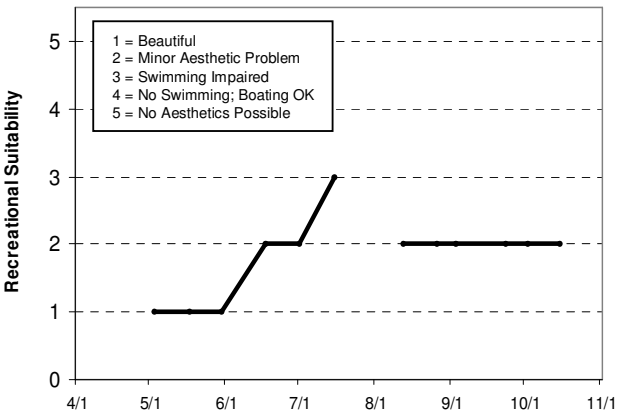


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					C									
Chlorophyll a					C									
Secchi Depth					C									
Overall					**C**									

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C			C			C		D			C	D	C
Chlorophyll a	D			C			C		D			D	C	D
Secchi Depth	C			C			C		C			C	D	C
Overall	**C**			**C**			**C**		**D**			**C**	**D**	**C**

Source: Metropolitan Council and STORET data



Olson Lake (82-0103) *Valley Branch Watershed District*

Olson 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). 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's size and mean depth results in an approximate lake volume of 623 ac-ft.

The lake's surface area and watershed size (200 acres) translates to a 2:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

The lake was monitored 11 times from late-April to late-October 2007. During each monitoring event the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	25.0	16.0	39.0	B
CLA (µg/l)	8.7	1.1	19.0	A
Secchi (m)	2.6	1.4	4.0	B
TKN (mg/l)	1.81	1.60	2.00	
			Water Quality	B

The physical and recreational conditions of the lake, as perceived by the volunteer monitor, were ranked on a 1-to-5 scale. The rankings are shown on the lake's information sheet on the next page. The mean physical condition ranking was 1.8 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 1.4 (between 1- "beautiful" and 2- "minor aesthetic problem").

Available data for Olson Lake reveals that lake water quality grades have improved since the 1980's. The lake water quality report card shown on the information sheet indicates that the lake received an C grade in 1984, as well as receiving Secchi grades of C in 1984-1986, and 1988-1990, before receiving grades of B in 1991, 1993, and 1995. More recently, the lake has recorded grades of an A in 2000 and 2003-2004, before falling back to an grade of B in 2005 - 2007. A recent MPCA conducted trend analysis on the lake's Secchi transparency data, revealed a statistically significant improvement in recent water clarity (MPCA 2008).

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) 297-4916 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.

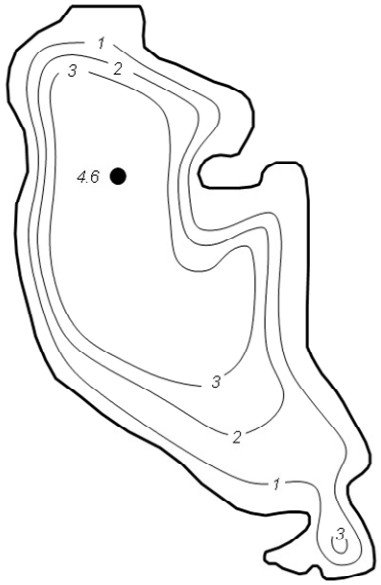
Lake Olson

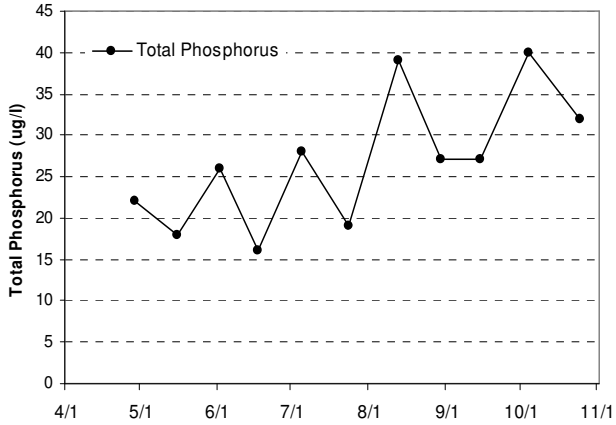
Lake Elmo, Washington Co.

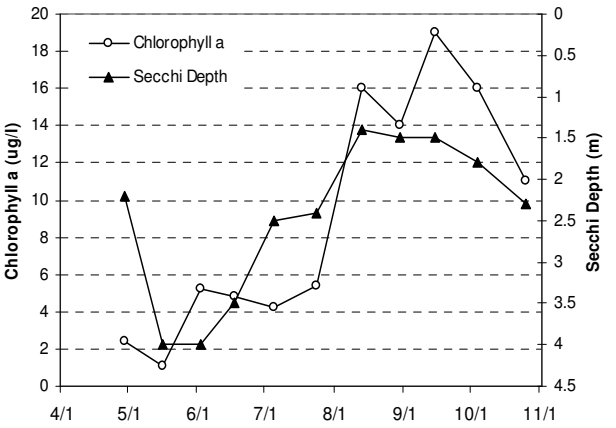
Lake ID: 820103
WD: Valley Branch
Volunteer: Bob Meier

● Sampling site

Contours in meters

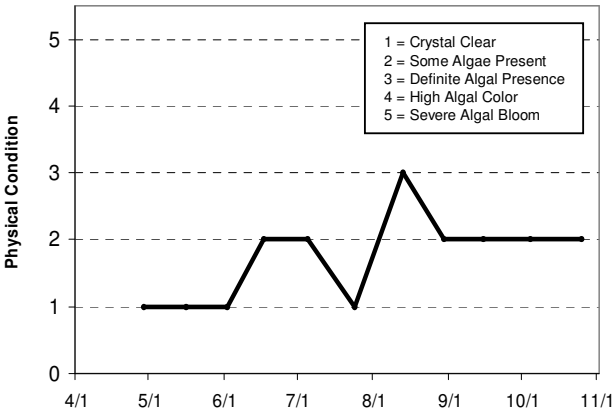






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/29/07	16.3				2.4	22		2.2	1	1
05/16/07	19.2				1.1	18		4	1	1
06/02/07	22.1				5.2	26		4	1	1
06/17/07	27.2				4.8	16		3.5	2	1
07/05/07	26.5				4.2	28		2.5	2	1
07/24/07	28.2				5.4	19		2.4	1	
08/13/07	27.1				16	39		1.4	3	2
08/30/07	24.3				14	27		1.5	2	1
09/15/07	18.2				19	27		1.5	2	1
10/04/07	18.7				16	40		1.8	2	2
10/25/07	11.6				11	32		2.3	2	1

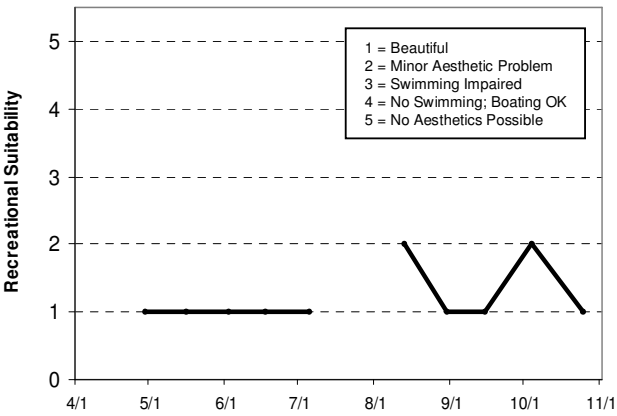


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					C							B		B
Chlorophyll a					C							B		A
Secchi Depth					C	C	C		C	C	C	B		B
Overall					**C**							**B**		**B**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C					A			A	A	B	C	B
Chlorophyll a		B					A			B	A	B	B	A
Secchi Depth		B					A			A	A	B	B	B
Overall		**B**					**A**			**A**	**A**	**B**	**B**	**B**

Source: Metropolitan Council and STORET data



Orchard Lake (19-0031) *Black Dog Lake Watershed Management Organization*

Orchard Lake, managed by the MDNR as a centrachid lake (bass and panfish), is located within the City of Lakeville (Dakota County). The 250-acre lake has a 2,012-acre watershed, which translates to an 8:1 watershed-to-lake size ratio (generally the larger the ratio, the greater the potential stress on the lake from surface runoff). The maximum and mean depths of the lake are 10.0 m (roughly 33 feet) and 3.0 m (10 feet), respectively. The lake's surface area and mean depth translate to an approximate volume of 2,500 acre-feet. Approximately 75 percent of the lake's surface area are considered littoral zone (area of aquatic plant dominance). A public access is located within the City Park on the lake's southeastern end, and because of its multi-recreational uses, it is considered a "Priority Lake" in the Metropolitan Area.

This was the eighth year that Orchard Lake has been involved in CAMP (also involved in 1999-2001 and 2003-2006). A search through the STORET nationwide water quality database for data on the lake resulted in nutrient and Secchi transparency information for 1980-1981, 1983, 1989, 1993, 1998-2001, and 2003-2006, as well as just Secchi data for 1987-1988. The lake had been monitored by Council staff prior to1999, and was again monitored by Council staff in 2006.

As part of the city's involvement in CAMP in 2007, the lake was monitored 14 times between mid-April and mid-October. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	41.2	16.0	87.0	C
CLA (µg/l)	23.1	5.0	38.0	C
Secchi (m)	1.6	0.6	4.1	C
TKN (mg/l)	2.21	1.40	3.50	
			Water Quality	C

The lake's 2007 grade was similar to those recorded in 1980, 1993, 1998-2000, and 2003, and worse than the B's recorded in 1981, 1983, 1989, 2001, 2004-2006. The lake's water quality seems to be well represented by an grade of C+/B.

Throughout the monitoring period, the volunteers' opinion of the lake's physical and recreational conditions was ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 2.7 (between 2- "some algae present" and 3- "definite algal presence"), while the mean recreational suitability ranking was 2.0 (2- "minor aesthetic problem").

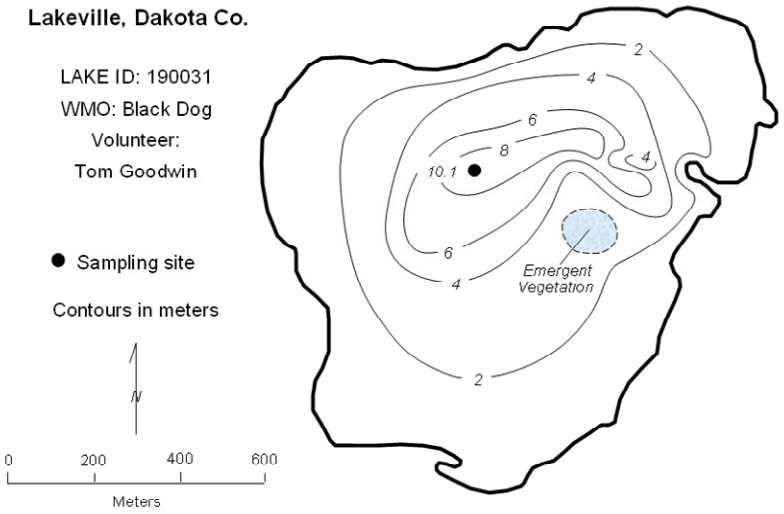
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

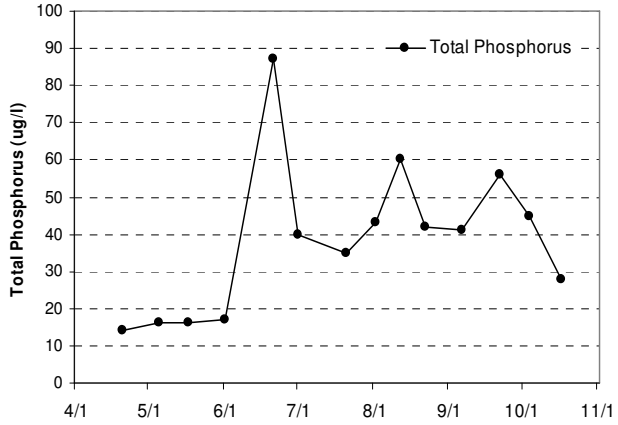
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

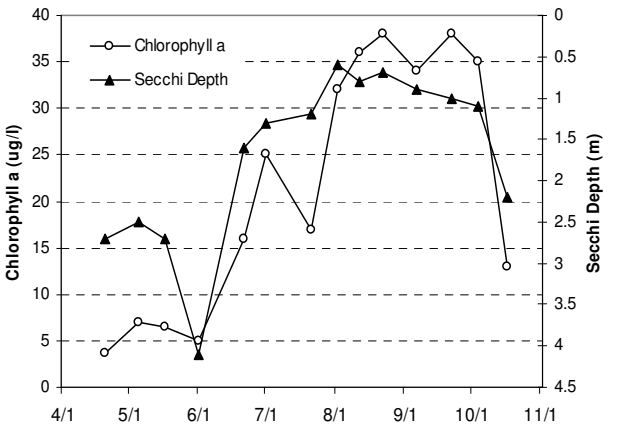
Orchard Lake

Lakeville, Dakota Co.

LAKE ID: 190031
WMO: Black Dog
Volunteer:
Tom Goodwin

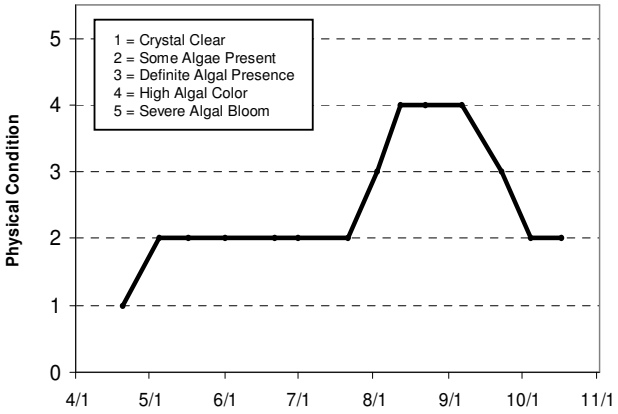






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	12.7				3.6	14		2.7	1	1
05/05/07	16.7				7	16		2.5	2	1
05/17/07	19.1				6.4	16		2.7	2	2
06/01/07	21.5				5	17		4.1	2	1
06/21/07	24.2				16	87		1.6	2	1
07/01/07	26.5				25	40		1.3	2	2
07/21/07	25.4				17	35		1.2	2	1
08/02/07	28.2				32	43		0.6	3	3
08/12/07	27				36	60		0.8	4	3
08/22/07	24.3				38	42		0.7	4	3
09/06/07	25.8				34	41		0.9	4	3
09/22/07	19.6				38	56		1	3	2
10/04/07	17.1				35	45		1.1	2	2
10/17/07	13.4				13	28		2.2	2	1

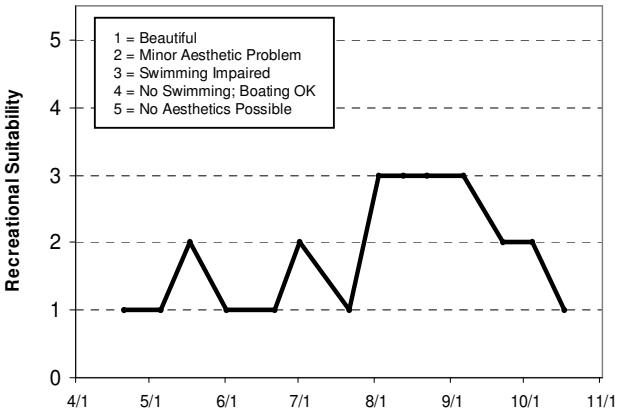


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	B		B						B				C
Chlorophyll a	B	B		B						B				B
Secchi Depth	C	B		B				C	C	C	D	C		C
Overall	**C**	**B**		**B**						**B**				**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					C	C	C	B		C	C	B	C	C
Chlorophyll a					C	C	C	B		C	B	B	B	C
Secchi Depth					C	C	C	B		C	B	B	B	C
Overall					**C**	**C**	**C**	**B**		**C**	**B**	**B**	**B**	**C**

Source: Metropolitan Council and STORET data



Parkers Lake (27-0107) *Bassett Creek Watershed Management Organization*

This was the seventh year that Parkers Lake has been involved in CAMP (it was first enrolled in 2000). The 97-acre lake, located within the City of Plymouth (Hennepin County), has a public access located within a city park on the lake's north end. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake.

The mean and maximum depths of the lake are 3.7 m (roughly 12 feet) and 11.3 m (roughly 37 feet), respectively. The lake's size and mean depth result in an approximate lake volume of 1,164 ac-ft. Approximately 70 percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance). The lake's 950-acre immediate watershed translates to a moderate watershed-to-lake size ratio of 10:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

The lake was monitored 14 times from mid-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.3	13.0	51.0	B
CLA (µg/l)	9.9	1.2	26.0	A
Secchi (m)	2.4	1.0	4.7	B
TKN (mg/l)	1.60	1.40	2.10	
			Water Quality	B

While the lake's 2007 grade, similar to those recorded in 2003-2006, is better than the C's recorded in 1980, 1995, and 1999, it is worse than the recent A's recorded in 2000 and 2002.

A search through the STORET nationwide water quality database for data on the lake resulted in nutrient and Secchi transparency information for 1980, 1990, 1995, and 1999. The 2000 and 2002-2007 water quality years represent the lake's best-monitored water quality. The lake's water quality shows an improvement in water quality from 2000 to 2002, before slipping a little in 2003-2007. To better understand the lake's water quality and where it truly may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.1 for physical condition (roughly 3- "definite algae present"), and 3.2 for recreational suitability (between 3- swimming slightly impaired" and 4- "no swimming; boating ok").

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) 297-4916 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.

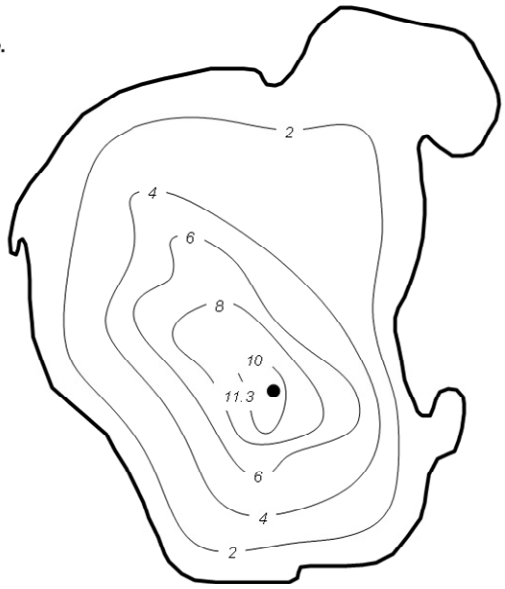
Parkers Lake

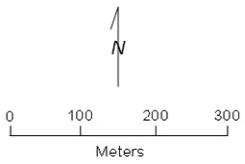
Plymouth, Hennepin Co.

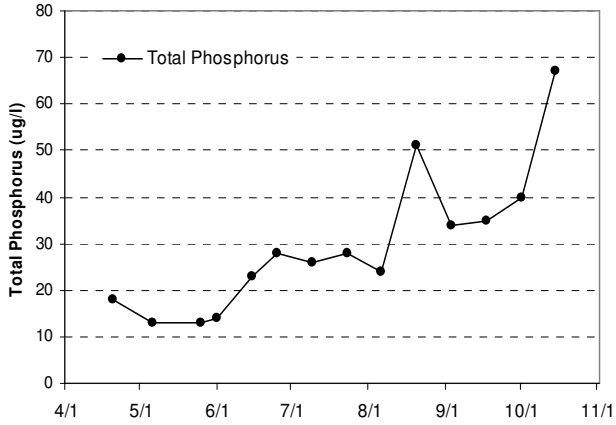
Lake ID: 270107
WMO: Bassett Creek
Volunteer: Bob Videen

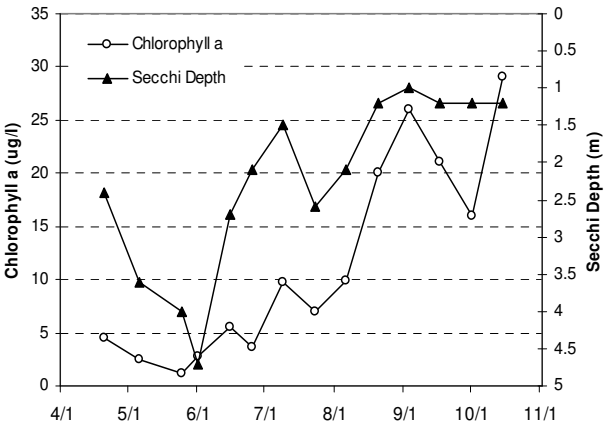
● Sampling site

Contours in meters



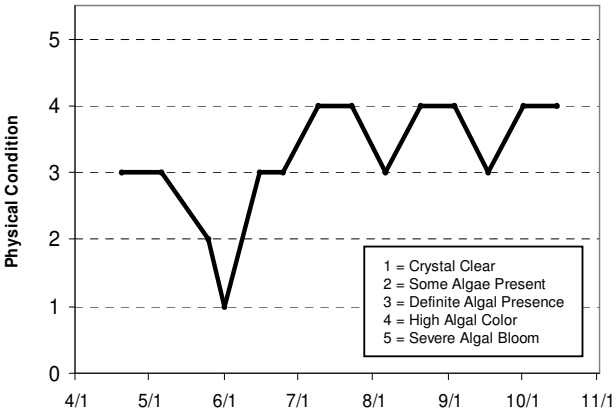






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	12				4.5	18		2.4	3	3
05/06/07	16				2.5	13		3.6	3	4
05/25/07	21				1.2	13		4	2	2
06/01/07	22.5				2.8	14		4.7	1	2
06/15/07	27				5.5	23		2.7	3	3
06/25/07	22				3.6	28		2.1	3	3
07/09/07	27				9.8	26		1.5	4	3
07/23/07	24				7	28		2.6	4	4
08/06/07	28				9.9	24		2.1	3	3
08/20/07	24.5				20	51		1.2	4	4
09/03/07	24.5				26	34		1	4	4
09/17/07	17				21	35		1.2	3	3
10/01/07	17.5				16	40		1.2	4	4
10/15/07	13.5				29	67		1.2	4	5

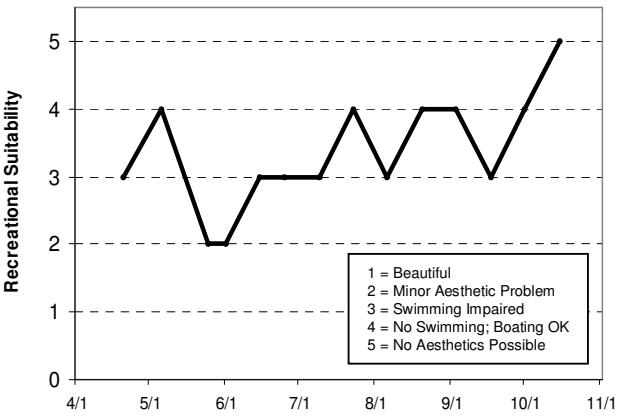


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C													
Chlorophyll a	C										B			
Secchi Depth	C										B			
Overall	**C**													

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C				C	A		A	B	B	C	C	B
Chlorophyll a		B				B	A		A	B	A	B	A	A
Secchi Depth		C				C	B		A	B	C	B	A	B
Overall		**C**				**C**	**A**		**A**	**B**	**B**	**B**	**B**	**B**

Source: Metropolitan Council and STORET data



Pat Lake (82-0125) *Browns Creek Watershed District*

Pat Lake is a small 13-acre lake located in Washington County. There is very little known morphological data available for the lake.

This was the second year that Pat Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data; therefore 2006 and 2007 are the only years of available water quality data for the lake.

As part of the watershed's involvement in CAMP in 2007, the lake was monitored seven times between mid-April and late-September. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	44.7	32.0	70.0	C
CLA (µg/l)	9.3	3.5	13.0	A
Secchi (m)	1.8	1.5	2.1	C
TKN (mg/l)	0.90	0.82	0.94	
			Water Quality	B

As mentioned earlier, there are no nutrient data available for Pat Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

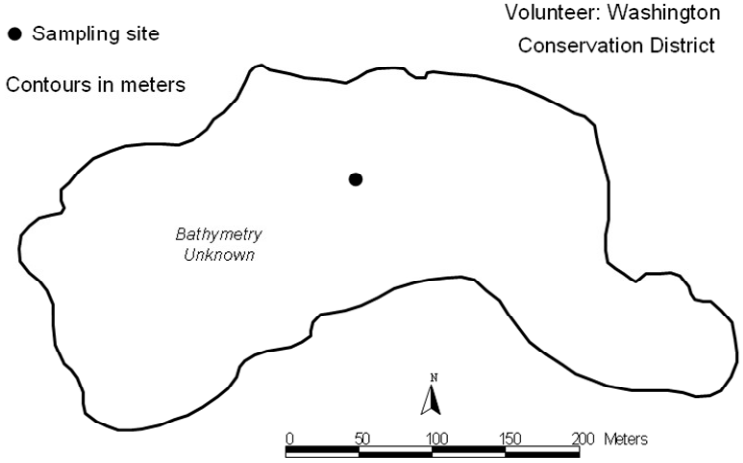
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.5 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 3.2 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming – boating ok").

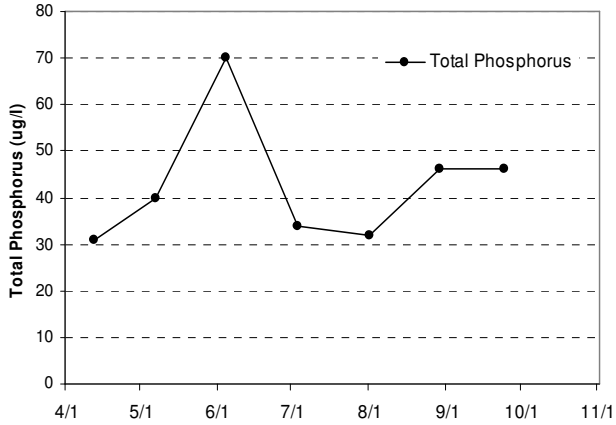
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

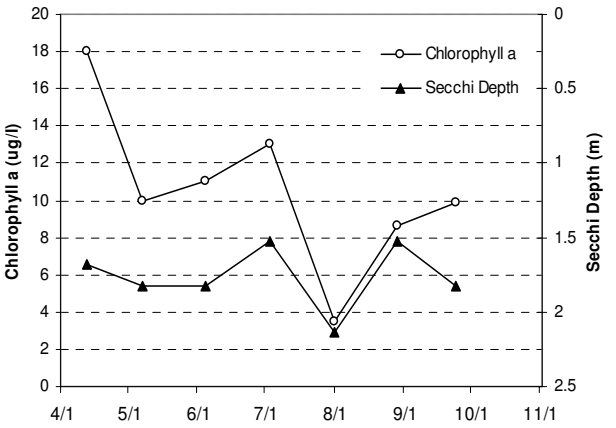
Pat Lake

Grant, Washington Co.

Lake ID: 820125
WD: Browns Creek
Volunteer: Washington Conservation District

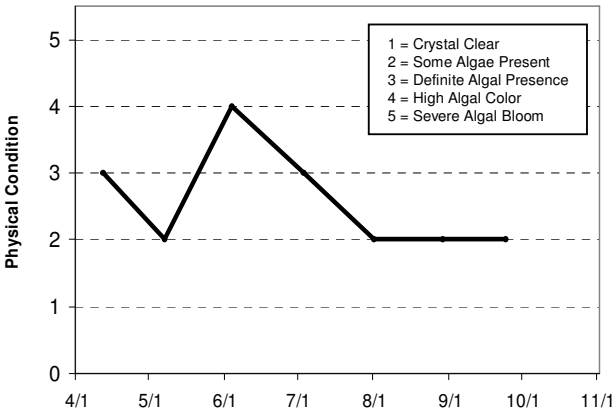






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/12/07	5.9	5.9	13.31	13.36	18	31		1.676	3	4
05/07/07	16.4	16.2	9.21	9.45	10	40		1.829	2	4
06/04/07	24.3	22.1	9.17	7.94	11	70		1.829	4	4
07/03/07	27.4	26.4	6.92	1.2	13	34		1.524	3	4
08/01/07	31.9	29.4	8.89	0.11	3.5	32		2.134	2	3
08/29/07	25.4	24.6	7.18	3.27	8.6	46		1.524	2	2
09/24/07	23.4	21.5	8.69	4.57	9.9	46		1.829	2	2

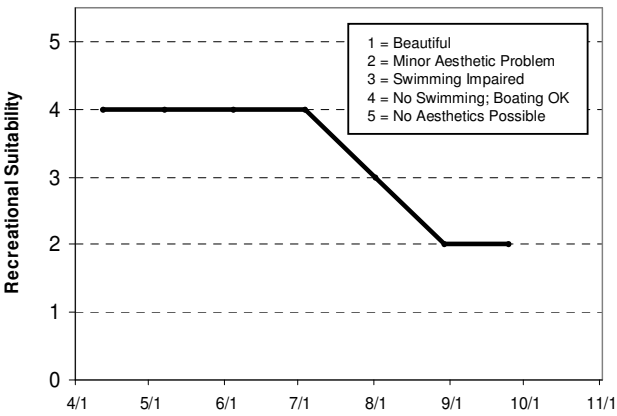


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	C
Chlorophyll a													C	A
Secchi Depth													C	C
Overall													**C**	**B**

Source: Metropolitan Council and STORET data



Peltier Lake (2-0004) *Rice Creek Watershed District*

Lake Peltier, with a surface area of 465 acres, is located one mile north of the City of Centerville (Anoka County). The maximum and mean depths of the lake are 4.9 and 2.1 m (16 and seven feet), respectively. The approximate volume of the lake is 3,255 ac-ft. The lake has a drainage area of roughly 68,082 acres, which translates to an extremely large watershed-to-lake size ratio of 391:1. The greater the ratio, the greater the potential stress on the lake from surface runoff. Public access is possible on the southwestern end of the lake through the Rice Creek Chain of Lakes Regional Park.

Peltier Lake is managed by the St. Paul Water Utility as a back-up water supply, and due to its multi-recreational uses, is considered a "Priority Lake" in the area by the Metropolitan Council. One aspect which may hinder recreational uses on the lake is the recent discovery of Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM]. Additionally, the lake, which is managed by the MDNR as a gamefish lake, experiences frequent winterkills.

Lake Peltier has been involved in CAMP since 1993 and was monitored 16 times from mid-April to mid-October 2007. Results are presented in graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	219.8	24.0	441.0	F
CLA (µg/l)	43.8	1.9	110.0	C
Secchi (m)	0.7	0.5	1.2	D
TKN (mg/l)	2.11	0.91	5.90	
			Water Quality	D

The 2007 grade of D is similar to those recorded in past years, but better than the F grade received in 2006. Other than the 1993-2007 CAMP data, the only other data found through a search of the STORET database was from 1983. The historical database shows the lake fluctuating between grades of low D and F, so trend in water quality is apparent.

The average user perception rankings, on a 1-to-5 scale, was 3.6 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.3 for recreational suitability (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

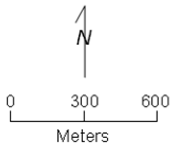
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

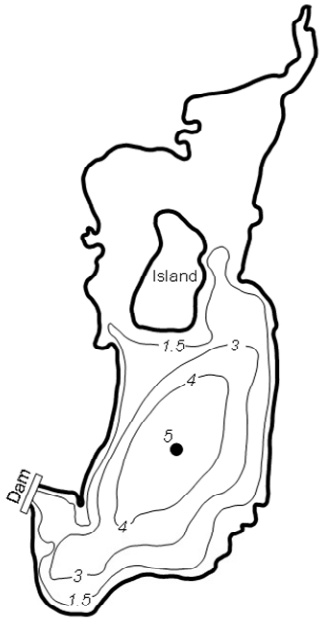
Peltier Lake

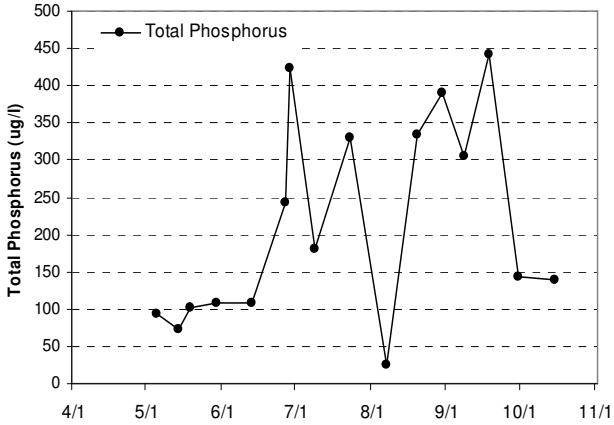
Centerville/Lino Lakes, Anoka Co.

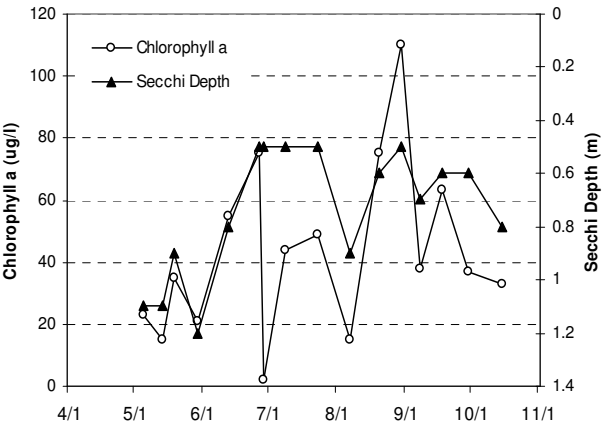
Lake ID: 20004
WD: Rice Creek
Volunteer: Wayne LeBlanc

● Sampling site
Contours in meters



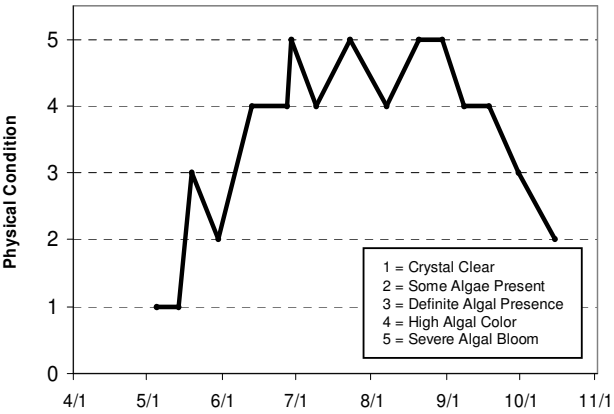






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/05/07	15.5				23	94		1.1	1	1
05/14/07	18.3				15	73		1.1	1	1
05/19/07	18				35	102		0.9	3	2
05/30/07	20				21	107		1.2	2	2
06/13/07	26				55	108		0.8	4	3
06/27/07	26				75	242		0.5	4	4
06/29/07	28				1.9	424		0.5	5	5
07/09/07	26				44	181		0.5	4	4
07/23/07	25.5				49	329		0.5	5	5
08/07/07	28				15	24		0.9	4	3
08/20/07	21				75	334		0.6	5	5
08/30/07	21				110	391		0.5	5	5
09/08/07	23.5				38	304		0.7	4	3
09/18/07	18				63	441		0.6	4	3
09/30/07	17				37	143		0.6	3	3
10/15/07	12				33	139		0.8	2	2

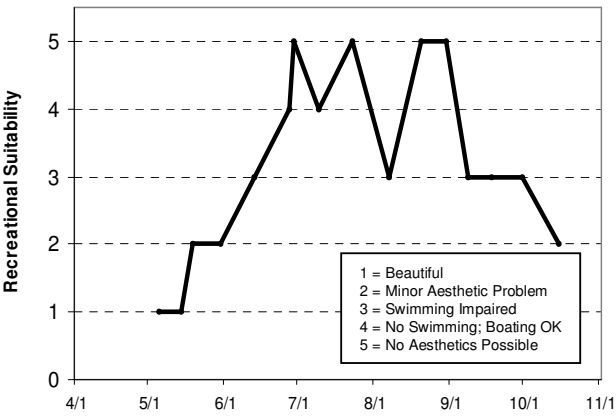


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus				F										F
Chlorophyll a				D										C
Secchi Depth				D										D
Overall				**D**										**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	F	D	F	D	F	F	F	F	F	D	F	F	F	F
Chlorophyll a	D	C	D	C	F	C	D	F	F	D	D	F	F	C
Secchi Depth	F	D	D	F	C	C	D	F	D	D	C	C	D	D
Overall	**F**	**D**	**D**	**D**	**D**	**D**	**D**	**F**	**F**	**D**	**D**	**D**	**F**	**D**

Source: Metropolitan Council and STORET data



Pepin Lake (40-0028) *Sand Creek Watershed District (Scott WMO)*

Lake Pepin is located in Lanesburg Township of LeSueur County. The lake is within the Sand Creek Watershed which drains into Scott County. The lake has a surface area of 326 acres. It has an average depth of 1.1 m (3.5 ft) and a maximum depth of 3.4 m (11.2 ft). The volume of the lake is approximately 1150 acre-feet. The entire lake surface area is considered littoral because the maximum depth is less than 15 feet. There is a public access on the northwest portion of the lake.

A search of historical using the EPA's STORET system revealed no additional data on this lake. Therefore, the 2007 CAMP data are the only known data available for this lake. The lake was monitored 13 times from mid-April to mid-October 2007. Results are presented in graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	296.4	164.0	418.0	F
CLA (µg/l)	119.7	69.0	170.0	F
Secchi (m)	0.2	0.1	0.2	F
TKN (mg/l)	6.45	3.20	9.90	
			Water Quality	F

The lake received an water quality grade of F, and it also received F's in each of the individual parameter grades.

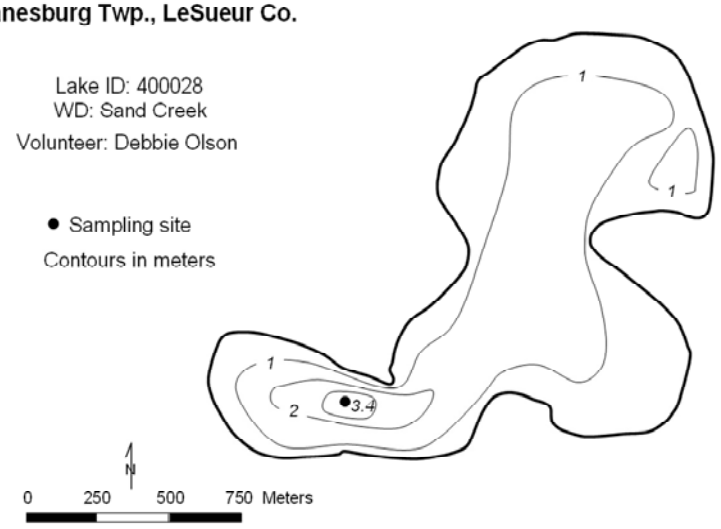
The average user perception rankings, on a 1-to-5 scale, was 4.0 physical condition (4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

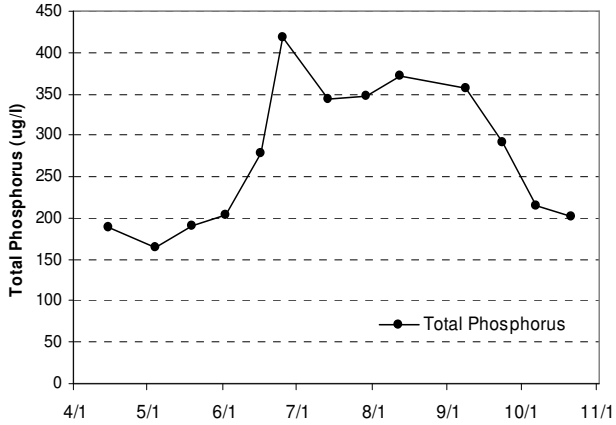
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

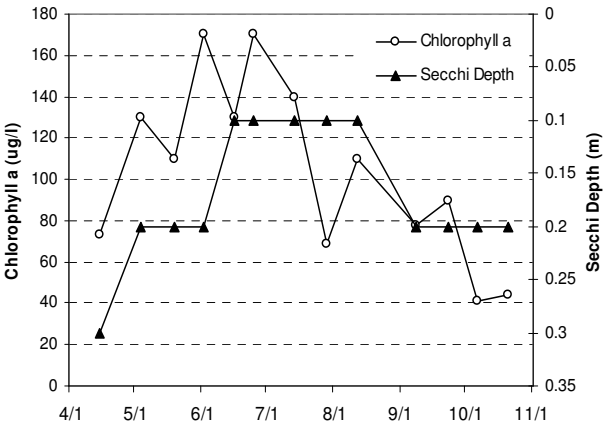
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Pepin Lake
Lanesburg Twp., LeSueur Co.

Lake ID: 400028
WD: Sand Creek
Volunteer: Debbie Olson

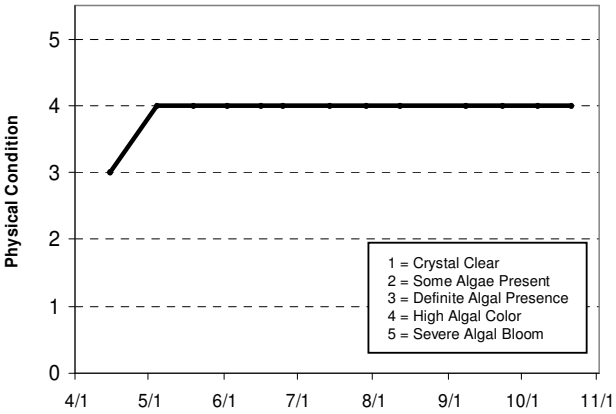






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/15/07	13.5				73	188		0.3	3	4
05/04/07	22.9				130	164		0.2	4	4
05/19/07	23				110	190		0.2	4	4
06/02/07	23.2				170	204		0.2	4	4
06/16/07	27.3				130	278		0.1	4	4
06/25/07	27.8				170	418		0.1	4	4
07/14/07	27.3				140	343		0.1	4	4
07/29/07	23.4				69	348		0.1	4	4
08/12/07	22.8				110	371		0.1	4	4
09/08/07	19.4				78	356		0.2	4	4
09/23/07	18.6				90	292		0.2	4	4
10/07/07	16.1				41	215		0.2	4	4
10/21/07	15.3				44	202		0.2	4	4

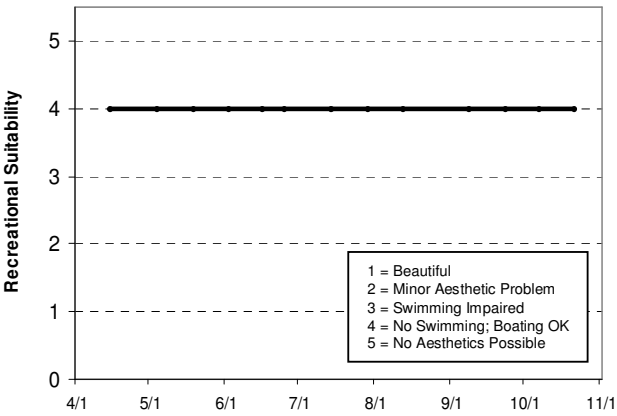


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														F
Chlorophyll a														F
Secchi Depth														F
Overall														**F**

Source: Metropolitan Council and STORET data



Pike Lake [Maple Grove] (27-0111-02) *Shingle Creek Watershed Management Commission*

Pike Lake is located in the City of Maple Grove (Hennepin County). This year marked the fifth year that the 59-acre lake has been enrolled in CAMP (1996 being the first). The lake's 919-acre immediate watershed and its surface size translate to a watershed-to-lake size ratio of 16:1. The lake's mean and maximum depths are 2.0 m (six-and-a-half feet) and 11.9 m (39 feet), respectively. The approximate volume of the lake is 395 ac-ft.

Pike Lake was monitored 4 times between mid-May and late-July 2007. The data and related graphs are presented on the information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	61.5	55.0	69.0	C
CLA (µg/l)	16.9	6.8	35.0	B
Secchi (m)	1.2	0.8	1.4	D
TKN (mg/l)	2.48	1.90	2.80	
			Water Quality	C

The lake received an grade of C in 2007, which is similar to grades received in the mid-1990s and in 2000. It should be kept in mind that the 2007 data only included samples from first half of the summer-time monitoring season. Therefore, the 2007 grade is not fully representative of the full 2007 summer-time period.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 2.8 (between 2- "some algae present and 3- "definite algal presence"), while the mean recreational suitability ranking was 2.5 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

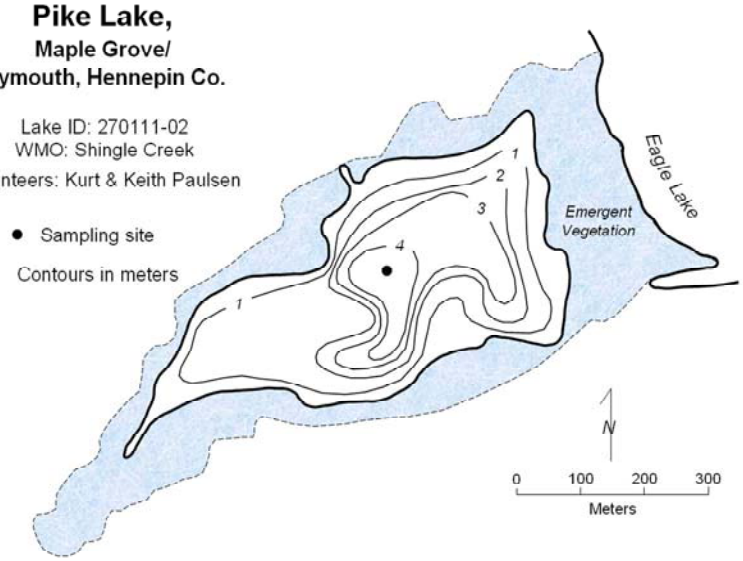
Because of the limited size of the database (1995 [just Secchi data], 1996-1998, 2000, and 2007), there are not sufficient data to determine trends in water quality. To better understand the quality of the lake and what direction it may be heading, more years of data collection are needed.

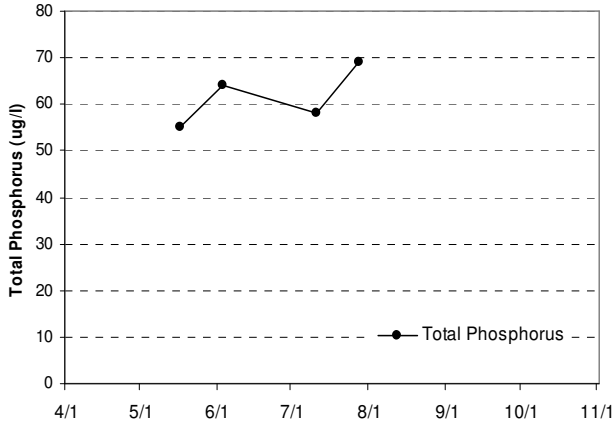
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

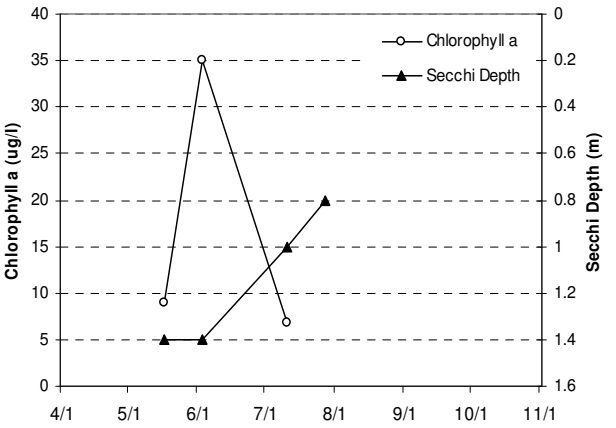
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Pike Lake,
Maple Grove/
Plymouth, Hennepin Co.

Lake ID: 270111-02
WMO: Shingle Creek
Volunteers: Kurt & Keith Paulsen

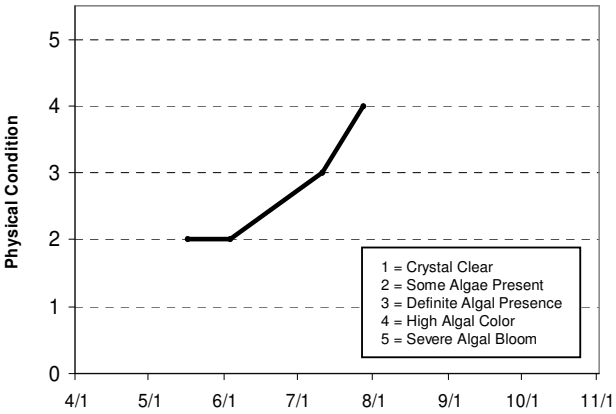






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/17/07	19.5				9	55		1.4	2	4
06/03/07	22				35	64		1.4	2	1
07/11/07	24.9				6.8	58		1	3	2
07/28/07	30					69		0.8	4	3

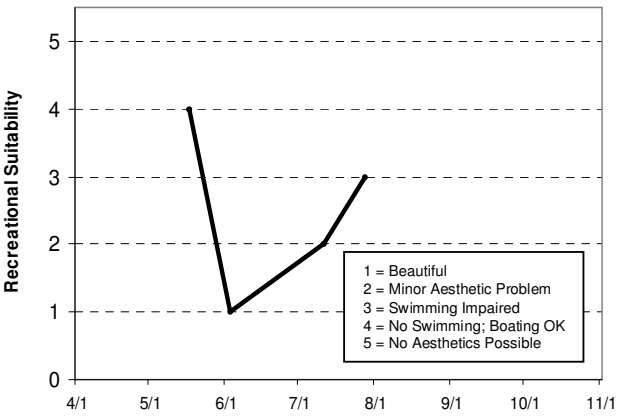


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	D	D		C							C
Chlorophyll a			C	C	C		B							B
Secchi Depth		D	D	C	D		C							D
Overall			**C**	**C**	**D**		**C**							**C**

Source: Metropolitan Council and STORET data



Pike Lake [Ramsey Co.] (62-0069) *Rice Creek Watershed District*

Pike Lake is a 35-acre lake located within the City of New Brighton (Ramsey County). The mean and maximum depths of the lake are 2.1 m (7 feet) and 4.9 m (16 feet). The lake's mean depth and surface area translate to a lake volume of 245 ac-ft. 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).

This was the ninth year that Pike Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake resulted in nutrient and Secchi transparency information for 1981-1983, 1985-1991, and 1999-2005, as well as just Secchi data for 1992-1993.

As part of the watershed district's involvement in CAMP in 2007, the lake was monitored 14 times between late-April and mid-October. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	105.8	42.0	308.0	D
CLA (µg/l)	44.7	5.5	130.0	C
Secchi (m)	1.0	0.4	2.2	D
TKN (mg/l)	2.56	1.00	4.50	
			Water Quality	D

The lake's 2007 grade was similar to that of 1981-1982, 1987-1990, and 1999-2006, better than 1991 (F), and worse than the C grades received in 1983 and 1985-1986. Thus, the lake's quality seems to fluctuate quite a bit, but mostly falls within the grade range of low-C/high-D.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the following page. The mean physical condition ranking was 3.0 (3- "definite algae present"), while the mean recreational suitability ranking was 2.8 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

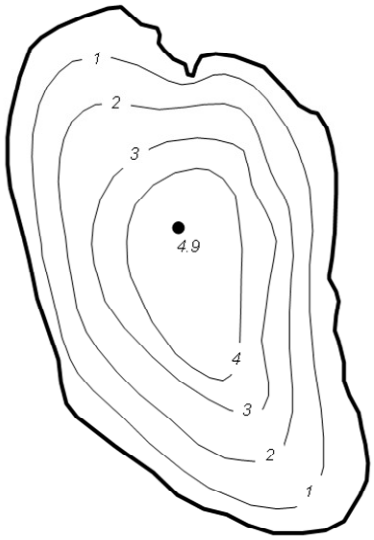
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

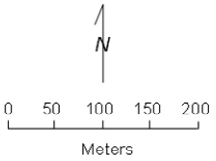
Pike Lake

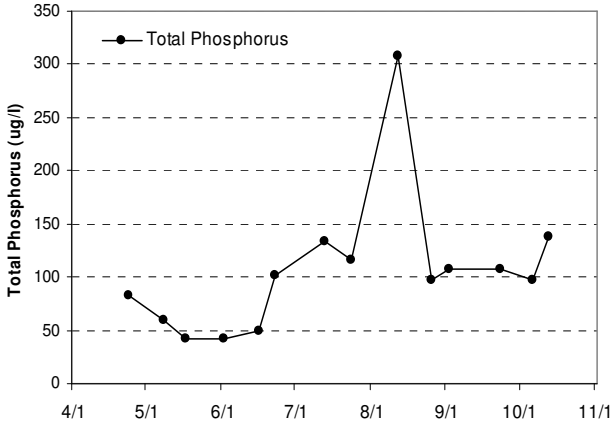
New Brighton, Ramsey Co.

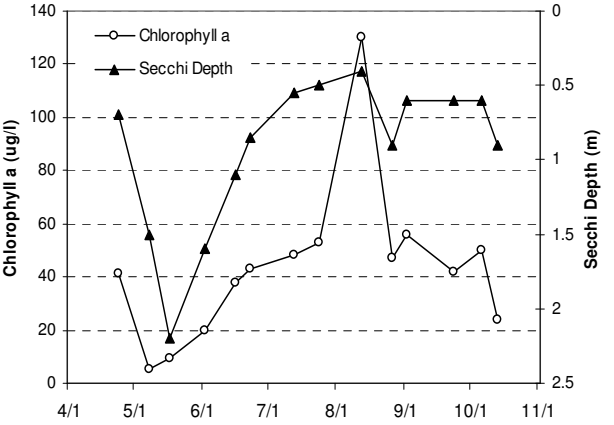
Lake ID: 620069
WD: Rice Creek
Volunteer: Helen & Phil Goodrich



● Sampling site
Contours in meters

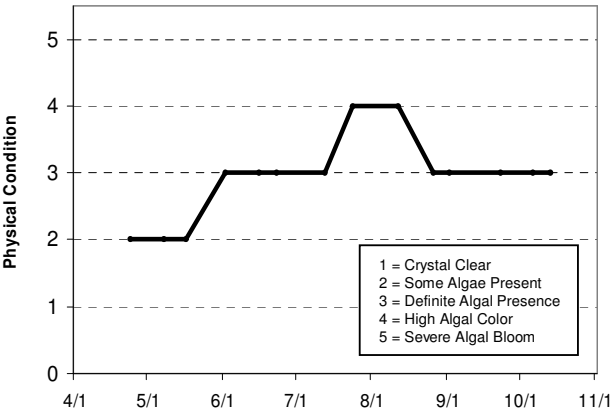






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/24/07	17				41	83		0.7	2	2
05/08/07	19				5.5	60		1.5	2	2
05/17/07	20.4				9.1	42		2.2	2	2
06/02/07	24.4				20	42		1.6	3	3
06/16/07	27.6				38	49		1.1	3	3
06/23/07	26.9				43	102		0.85	3	3
07/13/07	24.5				48	134		0.55	3	3
07/24/07	27.9				53	116		0.5	4	3
08/12/07	26.8				130	308		0.4	4	3
08/26/07	22.7				47	97		0.9	3	3
09/02/07	26.6				56	107		0.6	3	3
09/23/07	16.6				42	107		0.6	3	3
10/06/07	16.4				50	98		0.6	3	2
10/13/07	16.3				24	138		0.9	3	3

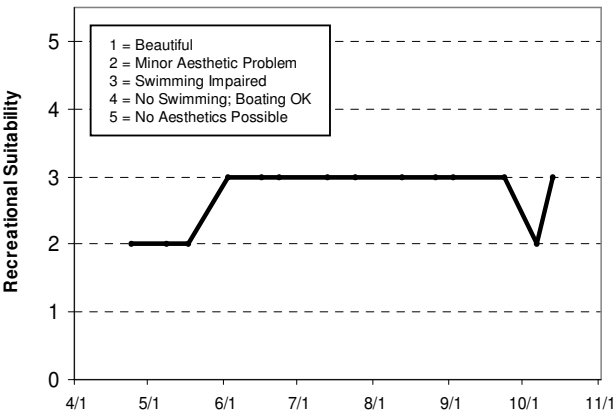


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus		C	C	D		C	C	D	D	D	D	D		
Chlorophyll a		C	D	A		A	C	C	C	D	C	F		
Secchi Depth		F	D	D		F	D	D	D	D	F	F	D	D
Overall		**D**	**D**	**C**		**C**	**C**	**D**	**D**	**D**	**D**	**F**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D	D	D	D	D	D	D	D	D
Chlorophyll a						C	C	D	C	D	C	D	D	C
Secchi Depth						D	D	C	D	D	D	D	D	D
Overall						**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data



Pine Tree Lake (82-0122) *Rice Creek Watershed District*

Pine Tree Lake, located on the eastern edge of the City of Dellwood (Washington County), covers an area of 174 acres and has a maximum depth of 7.9 m (26 feet). The mean depth of the lake, 3.0 m (10 feet), and its surface area translate to an approximate lake volume of 1,740 ac-ft. Because of its multi-recreational uses, it is considered a "Priority Lake" in the Metropolitan Area.

Pine Tree Lake has been a part of CAMP since 1993. In 2007, the lake was monitored 9 times between early-May and mid-October. On each outing, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	23.7	14.0	47.0	B
CLA (µg/l)	7.7	4.2	12.0	A
Secchi (m)	2.6	1.7	3.5	B
TKN (mg/l)	0.74	0.39	1.20	
			Water Quality	B

The lake's 2007 water quality grade of B is similar to the grades received since 2004. The water quality appears to fluctuate between B's and C's. No long-term trend is apparent from the lake's water quality database (including TP, CLA, and Secchi data). The lake's water quality is well represented by a B/C grade

The physical and recreational conditions of the lake, as perceived by the volunteer(s), were ranked on a 1-to-5 scale. These rankings are shown in both table and graphic form on the following page. The mean physical condition ranking was 1.7 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 1.7 (roughly 2- "minor aesthetic problem").

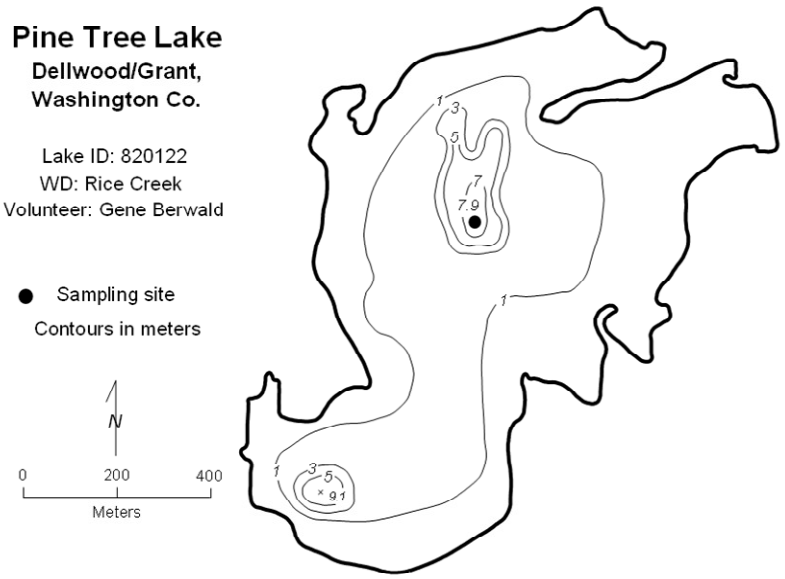
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

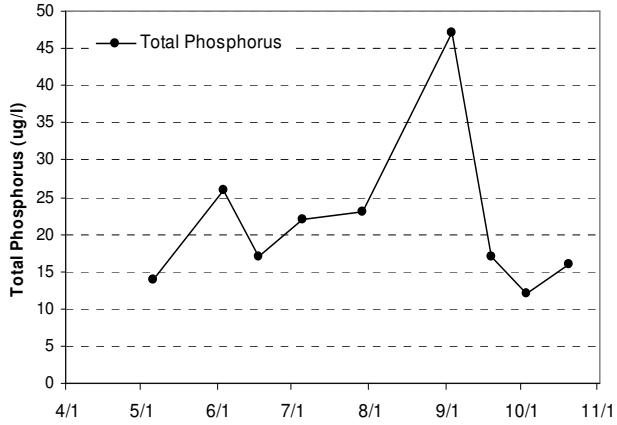
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

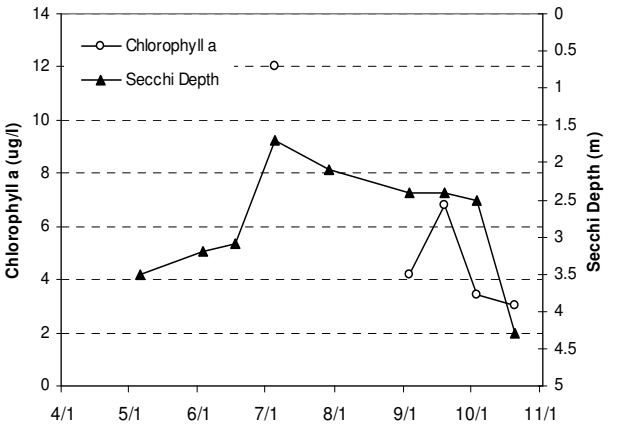
Pine Tree Lake

Dellwood/Grant, Washington Co.

Lake ID: 820122
WD: Rice Creek
Volunteer: Gene Berwald

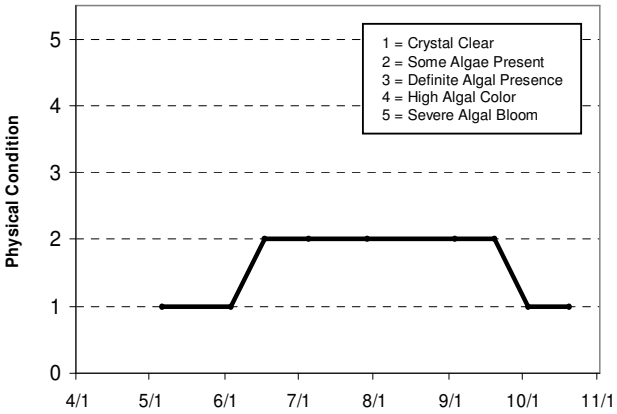






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/06/07	15					14		3.5	1	1
06/03/07	22.5					26		3.2	1	2
06/17/07	28.1					17		3.1	2	2
07/05/07	27				12	22		1.7	2	2
07/29/07	29					23		2.1	2	
09/03/07	24.8				4.2	47		2.4	2	2
09/19/07	19.1				6.8	17		2.4	2	1
10/03/07	17.2				3.4	12		2.5	1	1
10/20/07	12.8				3	16		4.3	1	1

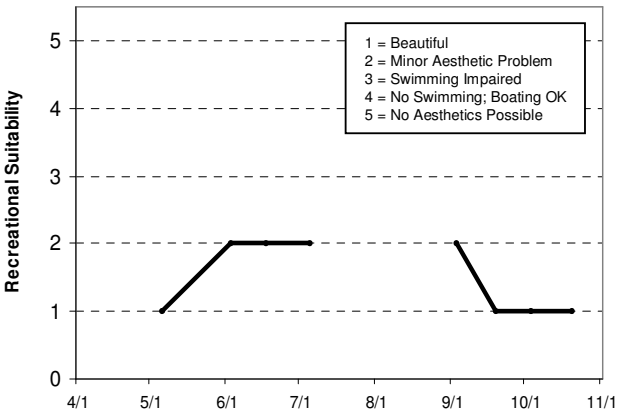


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus						C								B
Chlorophyll a						D								A
Secchi Depth						D								C
Overall						**D**								**B**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	B	C	C	B	B	B	C	C	C	C	B	B	C	B
Chlorophyll a	A	C	B	A	B	B	A	A	B	C	A	B	A	A
Secchi Depth	B	C	C	B	C	C	A	B	C	C	B	B	B	B
Overall	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**

Source: Metropolitan Council and STORET data



Powers Lake (82-0092) *City of Woodbury*

Powers Lake, located within the City of Woodbury (Washington County), has a surface area of approximately 57 acres (a shoreline length of 1.75 miles), and maximum depth of 12.5 m (41.0 feet). Approximately 50 percent of the lake's surface area is considered littoral, the shallow (0-15 feet) area dominated by aquatic vegetation. There is a public (canoe only) access on the northwest end of the lake near one of its two inlets. The lake has no outlet. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

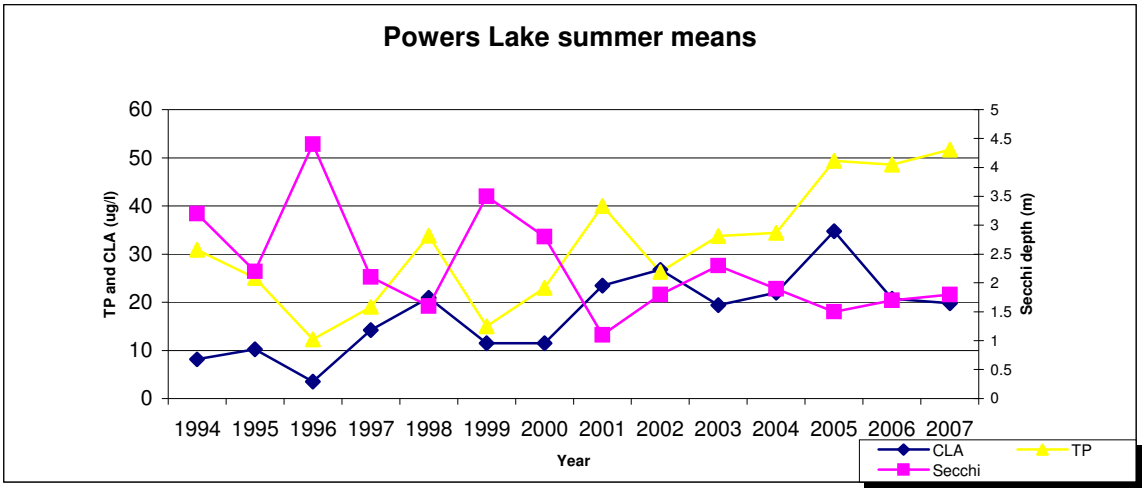
Currently, about 47 percent of the lake's 1,238-acre watershed is open/undeveloped land with the rest either residential or open water/wetlands. Eventually nearly 84 percent of the lake's watershed will be developed as single-family and multi-family residential units. The lake's watershed-to-lake size ratio is 22:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

Powers Lake has been involved in CAMP since 1994. Between mid-April and mid-October 2007, the lake was monitored 14 times. Similar to past years, the lake was monitored on each sampling date for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	51.7	22.0	227.5	C
CLA (µg/l)	19.8	8.0	41.0	B
Secchi (m)	1.8	1.1	2.9	C
TKN (mg/l)	1.44	0.54	2.90	
			Water Quality	C

The lake's water quality in 2007 continues to be inferior to those recorded in 1994-1997 and 1999-2000. The lake has received grades of an A in 1994, 1996, and 1999, B in 1995, 1997, 2000 and 2003, and C in 1998, 2001-2002 and 2004-2006.



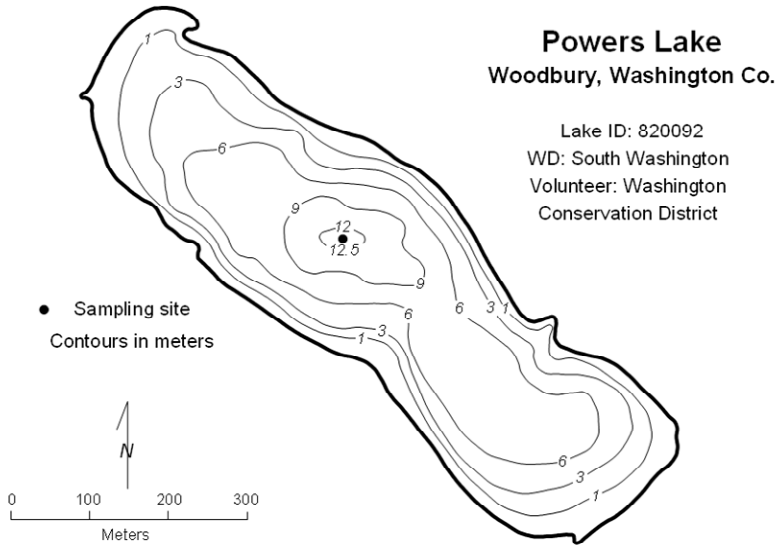
The lake's recent grades of C are worse than the A/B recorded in the 1990's. Additionally the earlier graph reveals that the lake has experienced an increase in TP and CLA means over the past 10 years. More data are needed, however, to determine if this potential decrease in water quality falls within the

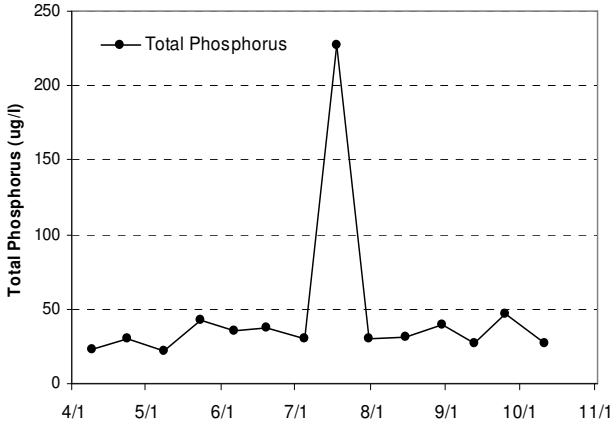
lake's normal range or if the increased development around the lake has added to the lake's nutrient load resulting in an increase in algal abundance and reduced clarity. Continued monitoring is suggested.

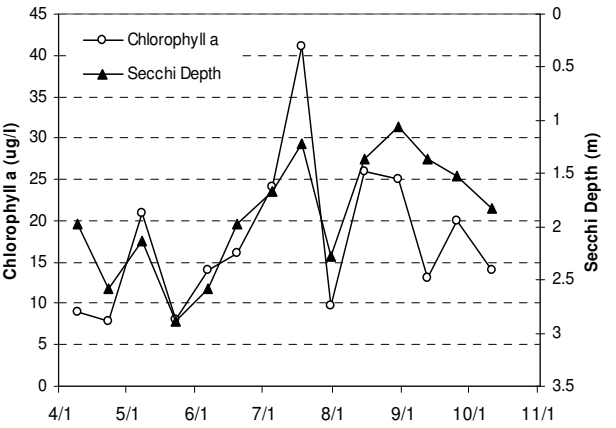
The physical and recreational conditions of the lake, as perceived by the volunteer, were ranked on a 1-to-5 scale and are displayed on the next page. The mean physical condition ranking was 3.2 (between 3- "definite algae present" and 4- "high algal color"), while the mean recreational suitability ranking was 3.1 (between 3- "swimming impaired" and 4- "no swimming – boating ok").

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) 297-4916 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.

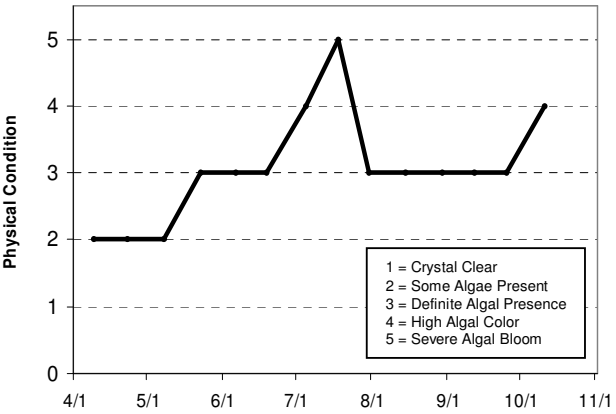






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/09/07	5	4.5	12.42	0.09	9	23		1.981	2	2
04/23/07	13.3	5.2	11.53	9.84	7.8	30	29	2.591	2	2
05/08/07	17.2	7.3	13.31	8.27	21	22		2.134	2	2
05/23/07	20.4	7.5	9.11	0.11	8	43		2.896	3	2
06/06/07	21.9	7.4	9.84	0.09	14	35		2.591	3	2
06/19/07	26.9	10	7.44	0.09	16	37	544	1.981	3	2
07/05/07	27.7	9.4	9.17	0.07	24	30		1.676	4	2
07/18/07	29.8	9.9	9.7	0.09	41	227.5		1.219	5	4
07/31/07	31.6	10	7.9	0.3	9.7	30		2.286	3	4
08/15/07	28.3	10	9.03	0.19	26	31	332	1.372	3	4
08/30/07	24.6	10.2	8.88	0.25	25	39		1.067	3	4
09/12/07	23.2	10.5	7.66	0.15	13	27		1.372	3	4
09/25/07	21.7	11.5	8.21	0.17	20	47		1.524	3	4
10/11/07	17.8	11	6.13	0.64	14	27	439	1.829	4	4

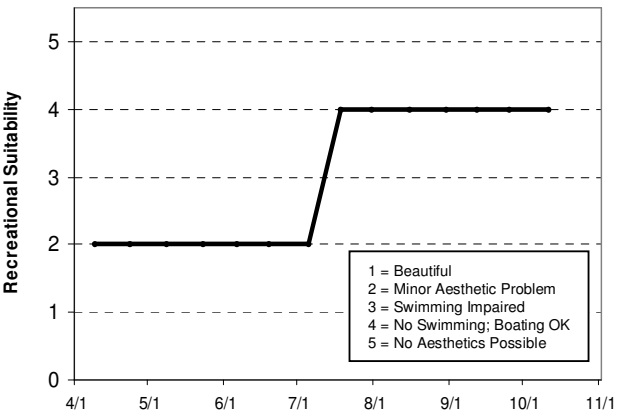


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	B	B	A	A	C	A	B	C	B	C	C	C	C	C
Chlorophyll a	A	B	A	B	C	B	B	C	C	B	C	C	C	B
Secchi Depth	A	B	A	C	C	A	B	C	C	B	C	C	C	C
Overall	**A**	**B**	**A**	**B**	**C**	**A**	**B**	**C**	**C**	**B**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Prior Lake [Lower Basin] [Site-1] (70-0026-01) *Prior Lake - Spring Lake Watershed District*

Prior Lake is divided into two distinct basins (the results of the 2007 monitoring on Prior Lake will be discussed as individual basins, Lower Prior and Upper Prior). Because of the lake's multi-recreational uses it is considered a "Priority Lake" in the Metropolitan Area.

The entire 1,167-acre lake is located within the City of Prior Lake (Scott County). The acreage of each basin is as follows: lower basin= 827 acres and upper basin= 340 acres. The maximum and mean depths of the lower basin are 18.3 and 4.1 m (60 and 13 feet), which along with the surface area, translate to a lower basin volume of approximately 11,120 ac-ft. Roughly 46 percent of the lake's surface area is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants). The lower basin's 2,090-acre watershed translates to a rather small watershed-to-lake area ratio of 2.5:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

The lower basin's public access is located at the southern end of the lake. The lower basin of Prior Lake has one inlet (that from the upper basin of Prior Lake), and one outlet. The outlet structure, located on the southwestern portion of the basin, is a man-made structure that was installed to regulate surface water elevations. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lower basin of the lake.

In an attempt to address issues either contributing to the eutrophication of Prior Lake or the symptoms from the resulting eutrophication, the Prior Lake - Spring Lake Watershed District has recently completed a Sustainable Water Quality Management Plan for its lakes (including Spring and Prior lakes). The Plan sets goals addressing the lakes' biological and chemical make-up and developed implementation strategies enabling the lakes' goals to be met (PLSLWD 2004).

While the Metropolitan Council has monitored the lower and upper basins of Prior Lake in the past, both basins have been a part of CAMP since 1997.

Lower Prior was monitored 12 times from mid-May to mid-October 2007. On each sampling date the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	20.8	9.0	35.0	A
CLA (µg/l)	14.9	3.2	30.0	B
Secchi (m)	2.9	1.3	6.0	B
TKN (mg/l)	1.04	0.42	1.60	
			Water Quality	B

The lake received an grade of B for 2006. The lake's water quality grade appears to fluctuate between A's and C's. With such a wide fluctuation, no long term trend is apparent in the lake's water quality.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean perceived physical condition of Lower Prior Lake was 2.4 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability was 1.6 (between 1- "beautiful" and 2- "minor aesthetics problem").

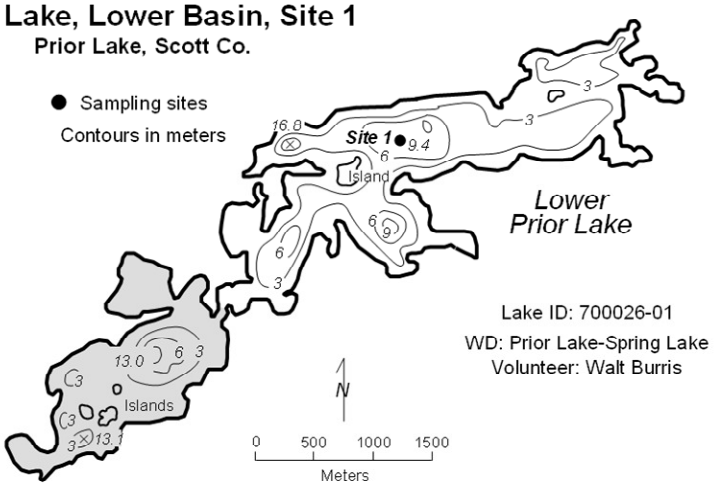
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries

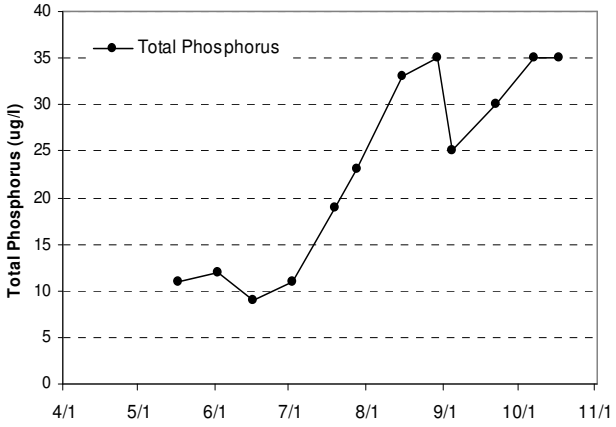
Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

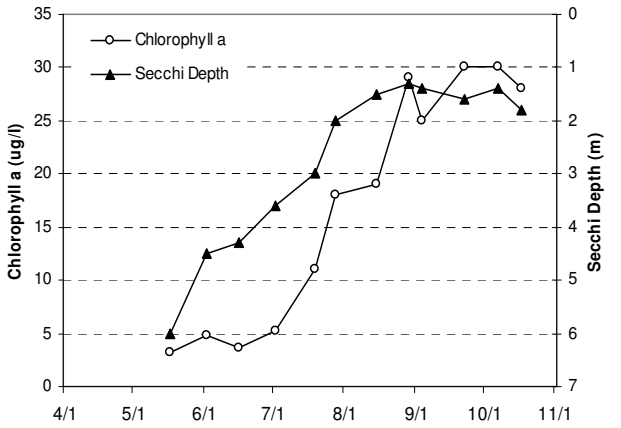
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Prior Lake, Lower Basin, Site 1

Prior Lake, Scott Co.

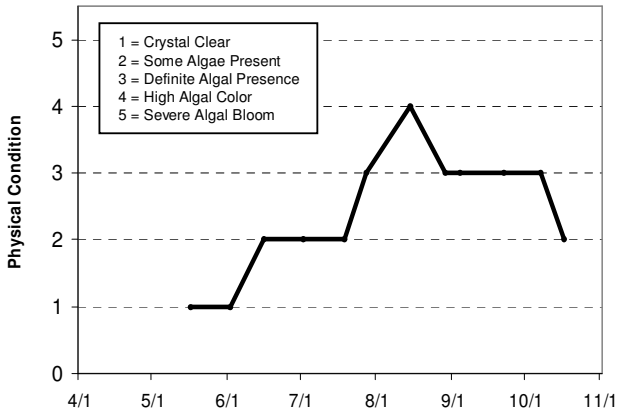






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/17/07	15.5				3.2	11		6	1	1
06/02/07	18.2				4.8	12		4.5	1	1
06/16/07	24.3				3.6	9		4.3	2	1
07/02/07	20.6				5.3	11		3.6	2	1
07/19/07	71.2				11	19		3	2	1
07/28/07	27.1				18	23		2	3	2
08/15/07	28.5				19	33		1.5	4	3
08/29/07	26.2				29	35		1.3	3	2
09/04/07	25.9				25	25		1.4	3	2
09/22/07	17.5				30	30		1.6	3	2
10/07/07	18				30	35		1.4	3	2
10/17/07	13.1				28	35		1.8	2	2



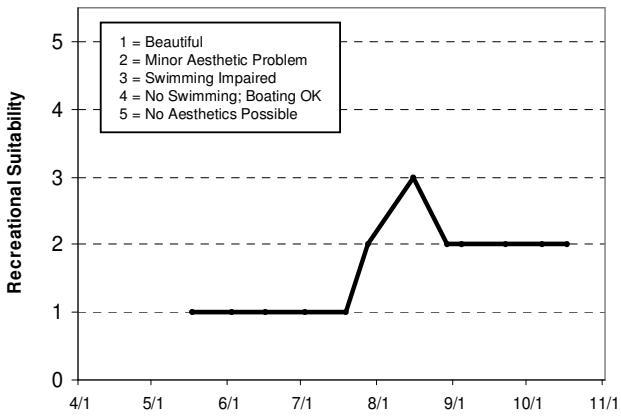
Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total Phosphorus	C	A			B								C
Chlorophyll a	B				B					A	B		B
Secchi Depth	C	C	B	C	B	C	B	C	C	B	B	C	C
Overall	**C**				**B**								**C**

Year	1993	1994	1995	1996	1997	1998 Site 1	1998 Site 2	1999 Site 1	1999 Site 2	2000 Site 1	2000 Site 2	2001 Site 1	2001 Site 2
Total Phosphorus				C	A	A	B	A	C	B	B	A	B
Chlorophyll a				A	A	B	C	A	B	B	B	B	C
Secchi Depth	B	B	B	B	B	C	C	B	C	B	C	B	C
Overall				**B**	**A**	**B**	**C**	**A**	**C**	**B**	**B**	**B**	**C**

Year	2002 Site 1	2002 Site 2	2003 Site 1	2003 Site 2	2004 Site 1	2004 Site 2	2005 Site 1	2005 Site 2	2006 Site 1	2006 Site 2	2007 Site 1	2007 Site 2
Total Phosphorus	B	C	C		B		A		C		A	
Chlorophyll a	B	C	A		B		A		B		B	
Secchi Depth	B	C	A		B		A		B		B	
Overall	**B**	**C**	**B**		**B**		**A**		**B**		**B**	

Source: Metropolitan Council and STORET data



Prior Lake [Upper Basin] [Site-1] (70-0072-01) *Prior Lake - Spring Lake Watershed District*

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 resulting water volume of the 340-acre upper basin is 3,460 ac-ft. About 93 percent of the lake's surface area is considered littoral, (the shallow [0-15 feet] area dominated by aquatic plants). The upper basin's 3,430-acre watershed translates to a watershed-to-lake area ratio of 10:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). The upper basin's public access is located at the northwestern end of the lake.

The upper basin of Prior Lake has two natural inlets, inflow from Spring Lake and the inlet from Rice and Crystal Lake drainage. Agriculturally derived non-point source nutrient loading released through the Spring Lake outlet heavily impacts water quality of the upper basin of Prior Lake.

The upper basin of Prior Lake was monitored 5 times from mid-May to mid-October 2007. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.5	13.0	78.0	C
CLA (µg/l)	68.7	22.0	140.0	D
Secchi (m)	0.9	0.5	1.5	D
TKN (mg/l)	1.72	0.87	2.30	
			Water Quality	D

Historical data for the upper basin of Prior Lake indicate that the water quality of the basin has remained fairly constant over the past decade fluctuating between grades of C and D.

Based on the historic lake water quality grade database, the lower basin of Prior Lake has better water quality than the upper basin. A possible cause for the better water quality in the lower basin is that the upper basin acts as a sort of detention basin for the lower basin. That is, the majority of the water entering the lakes goes through the upper basin first, allowing the settlement of sediments and associated nutrients before it enters the lower basin of the lake. The result is better quality water entering the lower basin of Prior Lake than is entering the upper basin.

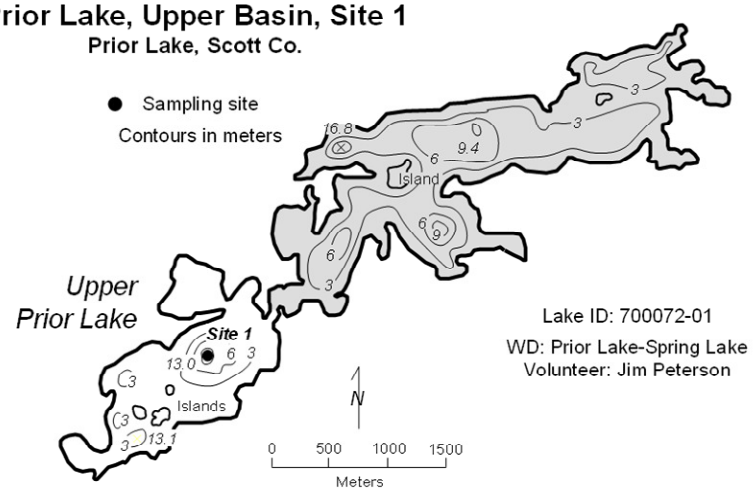
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The mean perceived physical condition of Upper Prior Lake was 1.5 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability was 1.0 (1- "beautiful").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

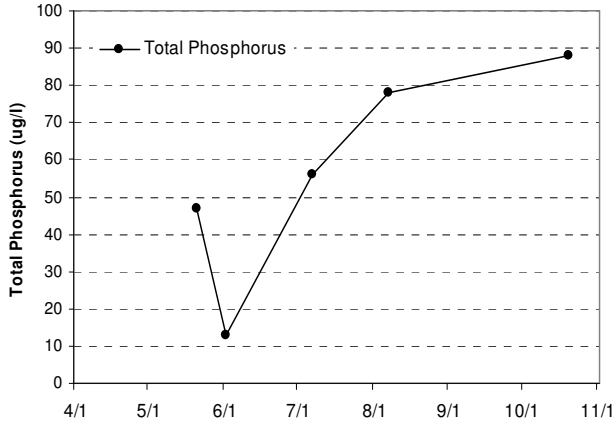
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

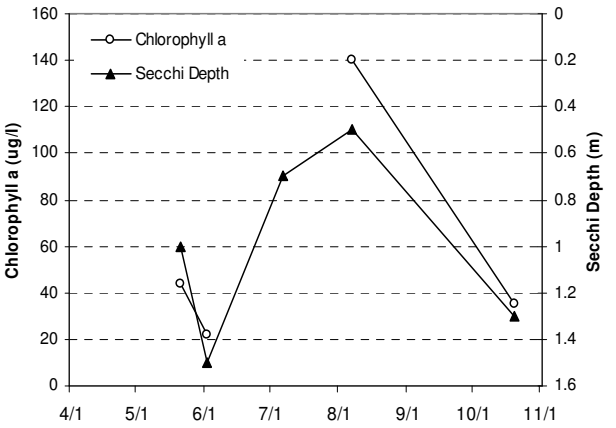
Prior Lake, Upper Basin, Site 1

Prior Lake, Scott Co.



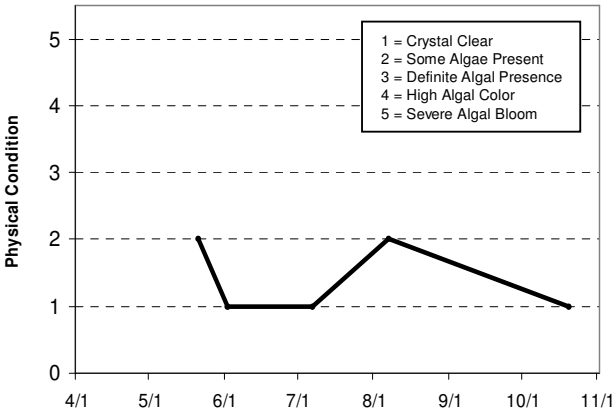
Lake ID: 700072-01
WD: Prior Lake-Spring Lake
Volunteer: Jim Peterson





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/21/07	18				44	47		1	2	1
06/02/07	21.9				22	13		1.5	1	1
07/07/07	28.2					56		0.7	1	1
08/07/07	28				140	78		0.5	2	1
10/20/07	13.6				35	88		1.3	1	1



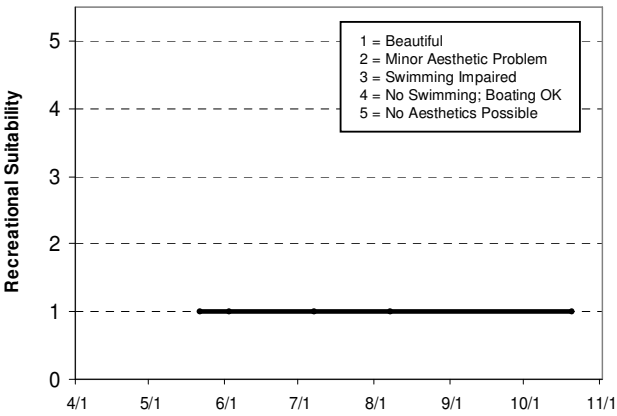
Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total Phosphorus	C	C			D					D			
Chlorophyll a	D	D			D					C	C		
Secchi Depth	D	C	D	F	D	D	D	F	F	D	C	D	D
Overall	**D**	**D**			**D**					**D**			

Year	1993	1994	1995	1996	1997	1998 Site 1	1998 Site 2	1999 Site 1	1999 Site 2	2000 Site 1	2000 Site 2	2001 Site 1	2001 Site 2
Total Phosphorus				C	C	C		D		D		D	
Chlorophyll a				C	C	D		D		D		F	
Secchi Depth	D	D	C	C	D	D		D		C		D	
Overall				**C**	**C**	**D**		**D**		**D**		**D**	

Year	2002 Site 1	2002 Site 2	2003 Site 1	2003 Site 2	2004 Site 1	2004 Site 2	2005 Site 1	2005 Site 2	2006 Site 1	2006 Site 2	2007 Site 1	2007 Site 2
Total Phosphorus	D	D	C		D		C		D		C	
Chlorophyll a	D	D	D		D		C		D		D	
Secchi Depth	D	D	C		D		C		C		D	
Overall	**D**	**D**	**C**		**D**		**C**		**D**		**D**	

Source: Metropolitan Council and STORET data



Regional Park Lake (82-0087) *South Washington Watershed District*

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 (roughly 19 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 majority of the land within the 600-acre watershed is undeveloped. The watershed-to-lake size ratio is 38:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the tenth year that Regional Park Lake has been involved in CAMP. Other than the 1998-2007 CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty. The lake was monitored 7 times between mid-April and early-October 2007. The resulting data and graphs appear on the next page. On each sampling date the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	57.0	49.0	67.0	C
CLA (µg/l)	15.7	7.7	28.0	B
Secchi (m)	1.9	1.5	2.1	C
TKN (mg/l)	0.96	0.76	1.30	
			Water Quality	C

The lake's 2006 grade is similar to that recorded in 1999, and 2004-2006, and better than the D's of 1998 and 2000-2003.

No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems well represented by an grade of D+/C. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 3.8 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming - boating ok").

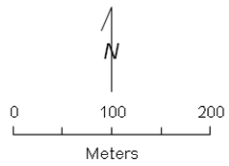
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

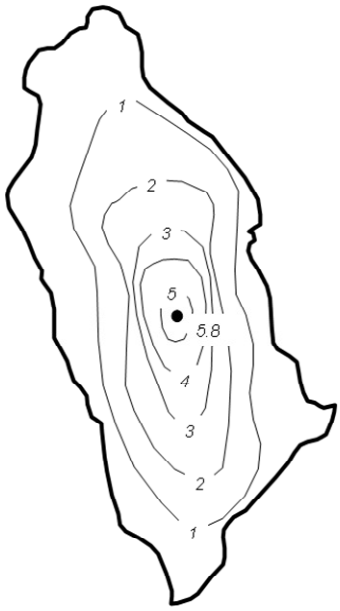
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

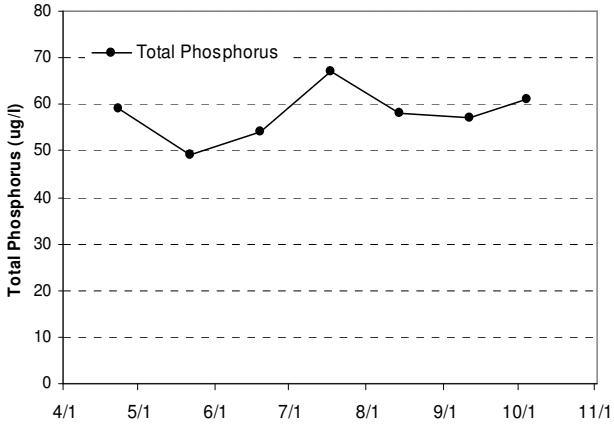
Regional Park Lake
Cottage Grove, Washington Co.

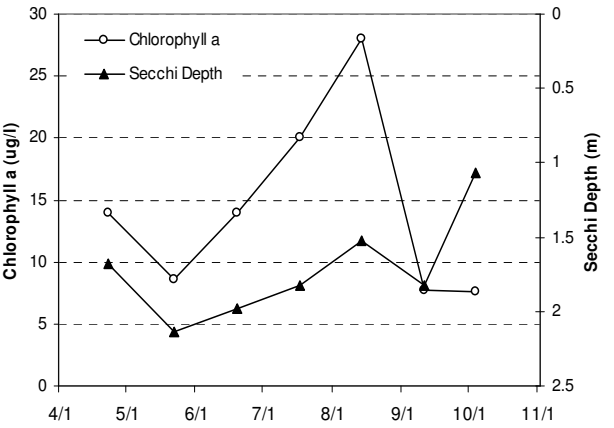
Lake ID: 820087
WD: South Washington
Volunteer: Washington
Conservation District

● Sampling site
Contours in meters



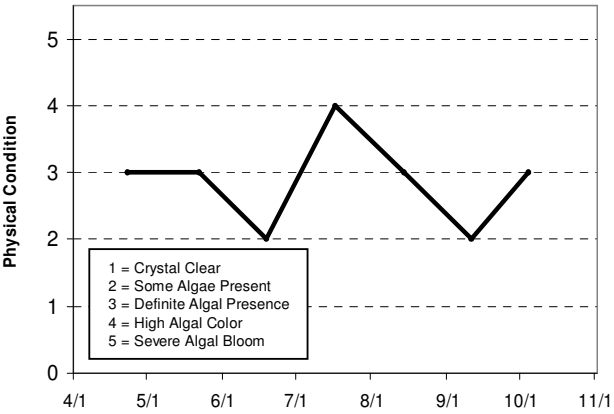






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/23/07	15.4	6.2	10.25	11.75	14	59		1.676	3	5
05/22/07	20.6	10.2	9	0.11	8.6	49		2.134	3	4
06/19/07	27.3	16.5	4.67	0.13	14	54		1.981	2	4
07/17/07	30.3	16.3	10.02	0.06	20	67		1.829	4	4
08/14/07	29	18	9.25	0.15	28	58		1.524	3	4
09/11/07	22.7	18.6	3.63	0.18	7.7	57		1.829	2	3
10/04/07	19.1	18.5	4.92	0.64	7.6	61		1.067	3	4

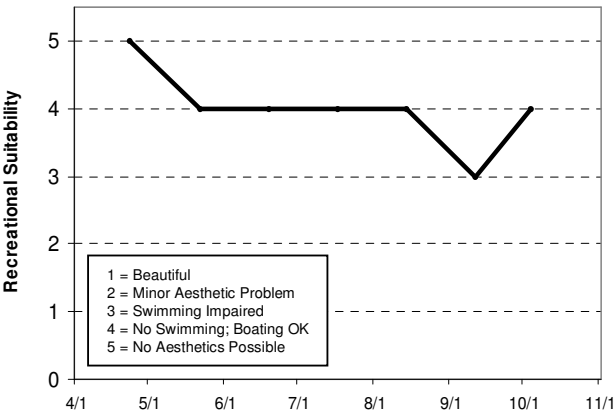


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus					F	C	D	D	D	D	C	C	D	C
Chlorophyll a					B	B	C	C	D	C	C	C	C	B
Secchi Depth					F	D	F	F	F	F	D	C	C	C
Overall					**D**	**C**	**D**	**D**	**D**	**D**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Reitz Lake (10-0052) *Carver County Environmental Services*

Reitz Lake, a 79-acre lake located within Laketown Township (Carver County), is considered a Metropolitan Area "Priority Lake" because of its multi-recreational uses. A public access is located on its northeastern shore. The mean and maximum depths of the lake are 4.0 m (13 feet) and 11.0 m (36 feet). Roughly 58 percent of the lake area is considered littoral zone (area of aquatic plant dominance). The lake's mean depth and surface area translate to an approximate volume of 1,027 ac-ft.

The lake has a 3,711-acre immediate watershed, which translates to a watershed-to-lake area ratio of 47:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: two percent residential, 69 percent agricultural, one percent commercial/industrial, and 28 percent open/undeveloped (Carver County Planning 1999).

This was the ninth year that Reitz Lake has been involved in CAMP. Council staff, however, has monitored the lake, in the past. A search through the STORET nationwide water quality database for historical data on the lake provided only three years of data (1985, 1991 and 1993) prior to the 1999-2006 CAMP data.

The lake was monitored 14 times between mid-April and mid-October 2007. On each outing, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	37.5	24.0	65.0	C
CLA (µg/l)	8.4	2.2	20.0	A
Secchi (m)	1.8	1.0	2.8	C
TKN (mg/l)	1.41	0.94	1.80	
			Water Quality	B

The 2007 grade of B is the best grade the lake yet has received. The lake's water quality grade is substantially better than the D's it received in 1985, 1991, and 1993. Continued monitoring is suggested to determine if the lake water quality is improving or if this year's B grade is aberration in the lake's normal fluctuation of water quality.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 1.9 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.2 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

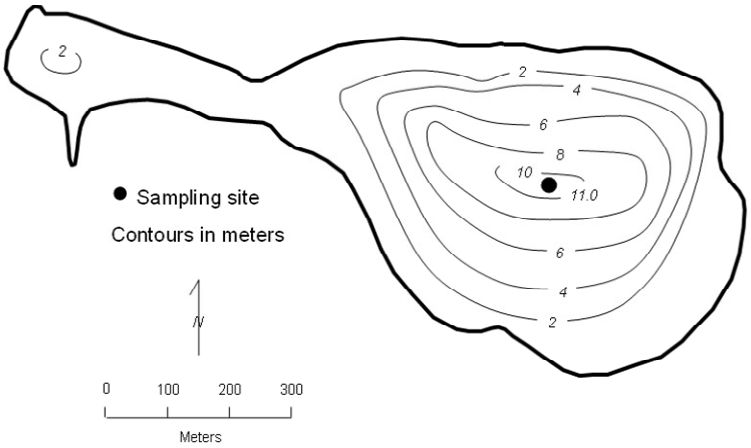
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

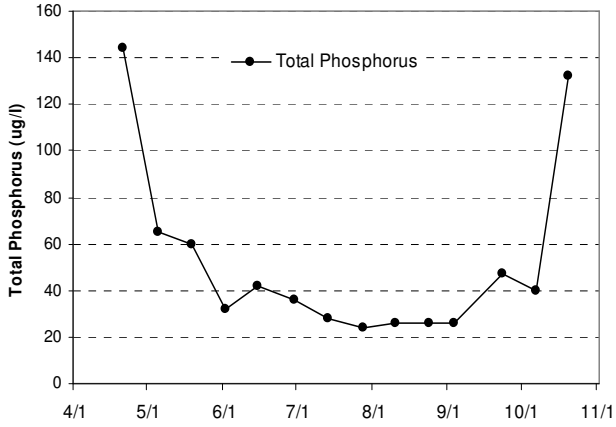
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

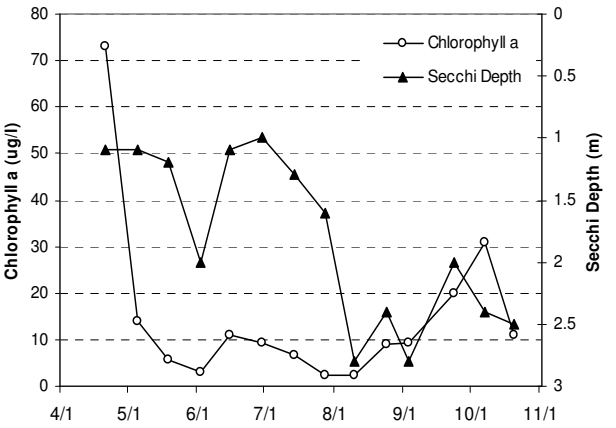
Reitz Lake

Laketown Twp., Carver Co.

Lake ID: 100052
WMO: Carver County
Volunteer: Lynn McMullen

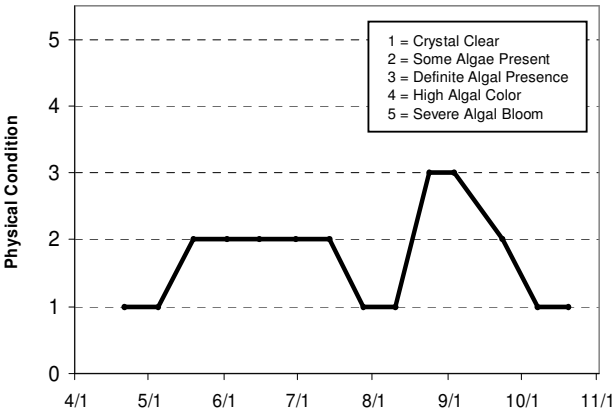






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	12				73	144		1.1	1	1
05/05/07	16				14	65		1.1	1	1
05/19/07	22				5.8	60		1.2	2	1
06/02/07	21				3.1	32		2	2	2
06/15/07	26				11	42		1.1	2	1
06/30/07	27				9.2	36		1	2	1
07/14/07	24				6.7	28		1.3	2	1
07/28/07	27				2.2	24		1.6	1	1
08/10/07	27				2.2	26		2.8	1	1
08/24/07	24				9.1	26		2.4	3	2
09/03/07	24				9.4	26		2.8	3	1
09/23/07	17				20	47		2	2	1
10/07/07	17				31	40		2.4	1	1
10/20/07	14				11	132		2.5	1	1

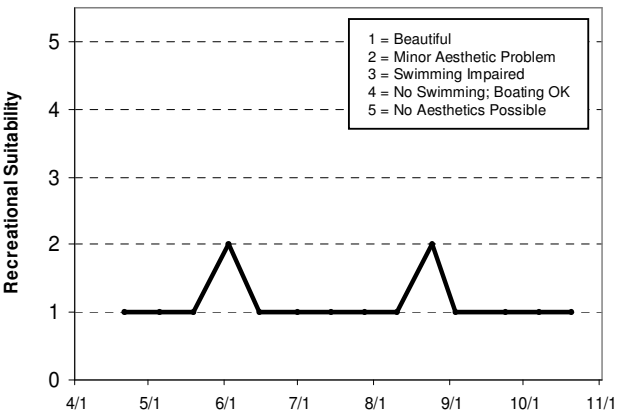


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus						D						D		D
Chlorophyll a						F						D		C
Secchi Depth						D						C		D
Overall						**D**						**D**		**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C	C	D	D	D	D	D	D	C
Chlorophyll a						B	C	D	C	D	C	C	C	A
Secchi Depth						C	C	F	C	B	C	C	C	C
Overall						**C**	**C**	**D**	**C**	**C**	**C**	**C**	**C**	**B**

Source: Metropolitan Council and STORET data



Reshanau Lake (02-0009) *Rice Creek Watershed District*

This was the fifth year that Reshanau Lake, which is located in the City of Lino Lakes (Anoka County), was monitored as part of CAMP. The 336-acre lake has a mean and maximum depth of 3.2 m (10.5 feet) and 4.9 m (16 feet). The lake's surface area and mean depth translates to an approximate lake volume of 3,535 ac-ft. 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).

As part of the volunteer monitoring program the lake was sampled 9 times from late-April to late-October 2007. On each outing, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	111.1	61.0	181.0	D
CLA (µg/l)	45.1	19.0	89.0	C
Secchi (m)	0.5	0.4	0.9	F
TKN (mg/l)	2.41	1.70	3.00	
			Water Quality	D

The water quality grade in 2007 was a D, which is similar to that received in 2006. While there is a fair amount of historical data available for the lake (1980-1983, 1985, 1987-1991, 1999, and 2000), each years' data (other than 1999, 2006, and 2007) consists of only one or two monitoring events. Because of the sporadic and limited nature of the database, there are not sufficient data to determine water quality trends. In the short-term, however, the lake's water quality over the past 20+ years seems well represented by a high-D/low-C grade. In order to detect any possible long-term trends, additional years of data collection are needed.

Throughout the course of the monitoring season the volunteers ranked their perception of the lake's physical and recreational conditions on a 1-to-5 scale as shown on the attached information sheet. The summertime mean recorded physical condition was 2.1 (between 2- "some algae present" and 3- "definite algae present"). The mean suitability for recreation ranking was 1.9 (between 1- "beautiful" and 2- "minor aesthetic problem").

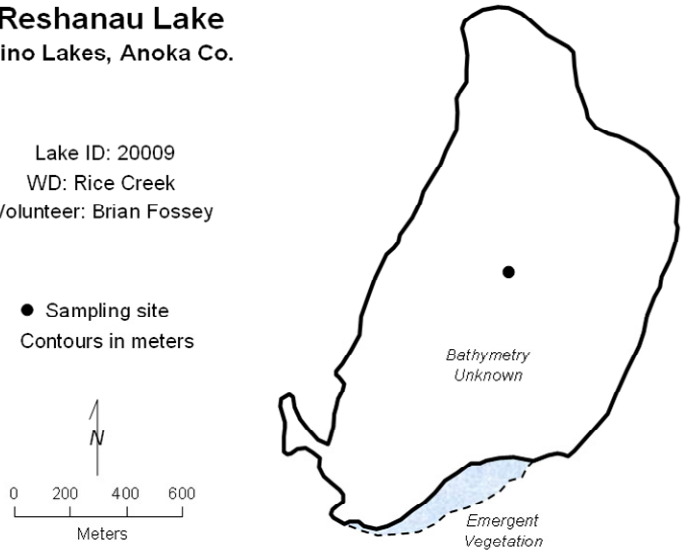
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

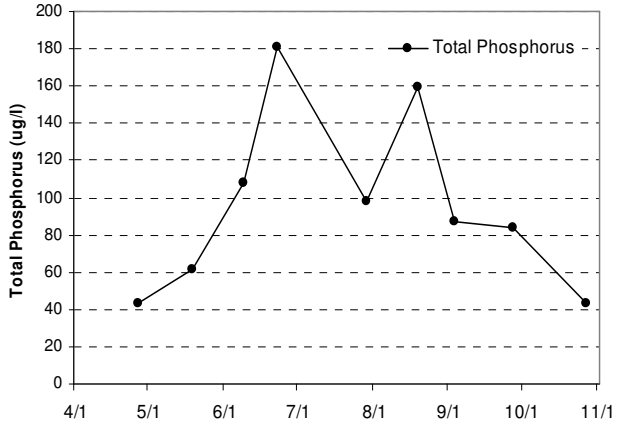
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

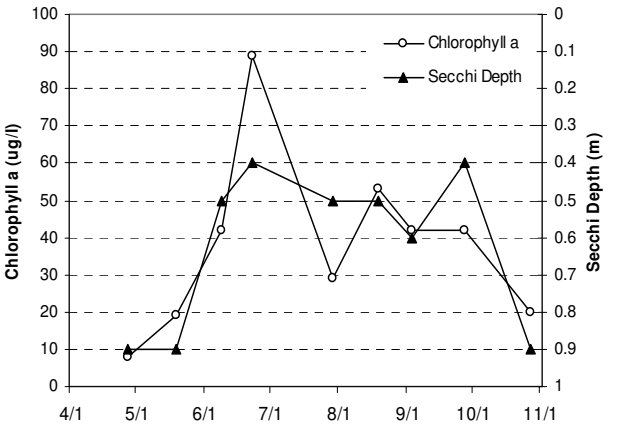
Reshanau Lake

Lino Lakes, Anoka Co.

Lake ID: 20009
WD: Rice Creek
Volunteer: Brian Fossey

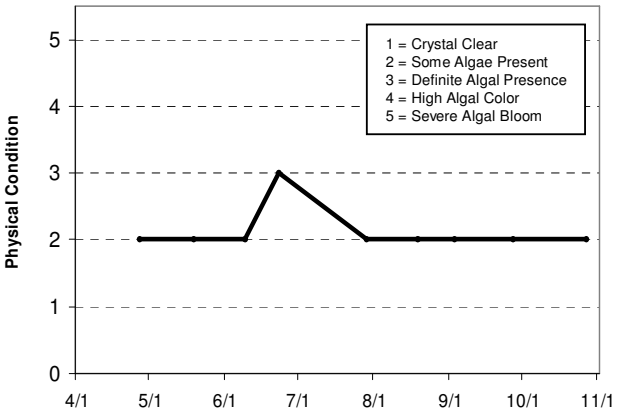






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/27/07	18				8	43		0.9	2	2
05/19/07	21				19	61		0.9	2	2
06/09/07	22				42	108		0.5	2	2
06/23/07	24				89	181		0.4	3	2
07/29/07	30				29	98		0.5	2	2
08/19/07	20				53	159		0.5	2	2
09/03/07	26				42	87		0.6	2	1
09/27/07	19				42	84		0.4	2	2
10/27/07	11				20	43		0.9	2	1

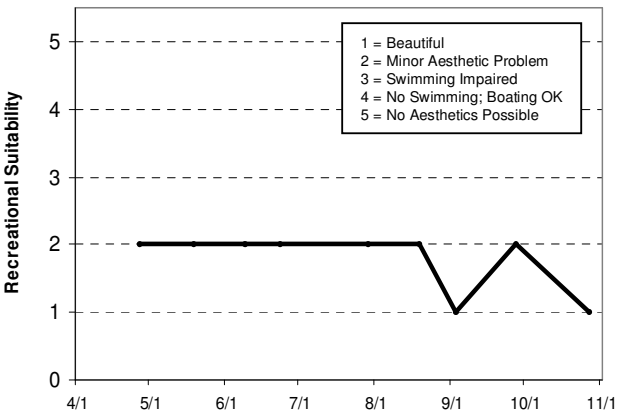


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	D
Chlorophyll a													C	C
Secchi Depth													F	F
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



Rest Area Pond (82-0514) - *Valley Branch Watershed District*

Rest Area Pond is a 12.6-acre lake located within West Lakeland Township (Washington County). There is little morphological information for the lake. The lake's surface area and watershed size (17,781 acres) translates to a 157:1 watershed-to-lake size ratio. Generally the larger the ratio, the greater the potential stress on the lake from surface runoff.

This was the second year that Rest Area Pond has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, the 2006 and 2007 CAMP data are the only nutrient data available. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 10 times between late-April and mid-September 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	178.9	112.0	248.0	F
CLA (µg/l)	41.7	13.0	72.0	C
Secchi (m)	0.6	0.5	0.8	F
TKN (mg/l)	3.12	1.80	4.60	
			Water Quality	D

As mentioned earlier, there are no nutrient data available for Rest Area Pond other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

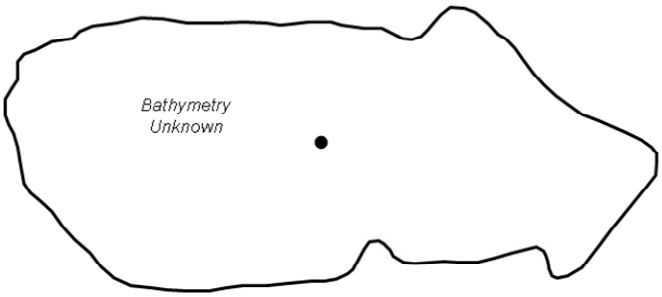
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 1.9 for physical condition (roughly 2- "some algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

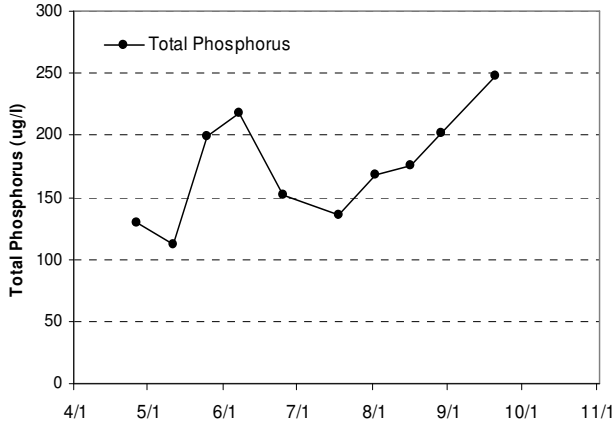
Rest Area Pond

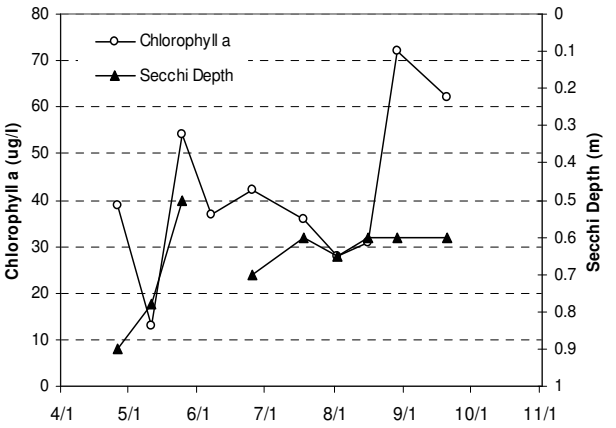
West Lakeland Twp., Washington Co.

Lake ID: 820514
WD: Valley Branch
Volunteer: MnDOT



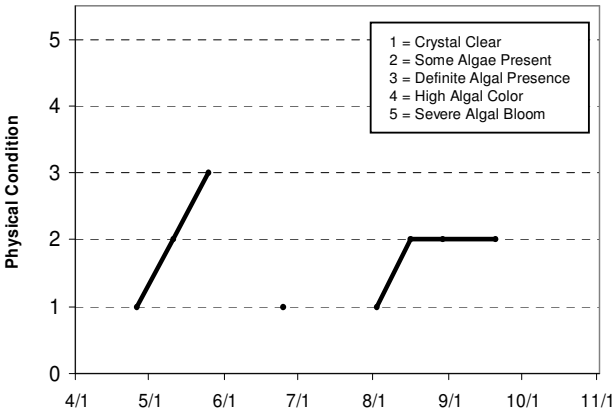
● Sampling site
Contours in meters





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/26/07	15.2				39	129.5		0.9	1	5
05/11/07	21.7				13	112		0.78	2	4
05/25/07	19				54	199		0.5	3	4
06/07/07	21.6				37	218				
06/25/07	27.3				42	152		0.7	1	4
07/18/07	27.4				36	136		0.6		
08/02/07	29.3				28	168		0.65	1	4
08/16/07	25.7				31	175		0.6	2	4
08/29/07	26.7				72	202		0.6	2	4
09/20/07	19.2				62	248		0.6	2	4

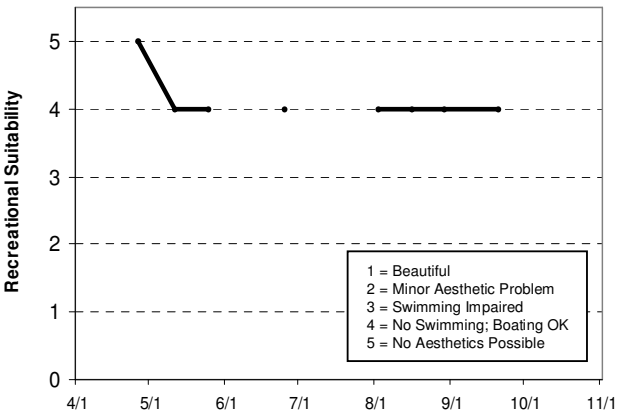


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	F
Chlorophyll a													D	C
Secchi Depth													D	F
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



Rice Lake [Maple Grove] (27-0116) – *Elm Creek Watershed Management Commission*

Rice Lake lies within the City of Maple Grove. The lake has a surface area of 252 acres and an average depth of 1.9 m (6.2 ft) which would give it a volume of 1570 acre-feet. The maximum depth is 3.4 m (11 ft). 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). Eurasion water milfoil was documented to be present in the lake in 1996. There is a carry-in public access to the lake.

This was the first year that Rice Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake showed that Secchi transparency measurements were collected along with user perception rankings for the years 1991, 1993, and 2002-2007. Dissolved oxygen measurements were collected in 1993. However, the CAMP 2007 data is the first year of known data collected for nutrients and chlorophyll-a.

On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 10 times between late-June and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	222.1	144.0	327.0	F
CLA (µg/l)	97.7	9.2	150.0	F
Secchi (m)	0.6	0.4	0.9	F
TKN (mg/l)	3.80	2.80	5.20	
			Water Quality	F

The lake received an grade of F for 2007. As mentioned earlier, there are no nutrient data available for the lake other than the 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 3.9 for physical condition (roughly 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

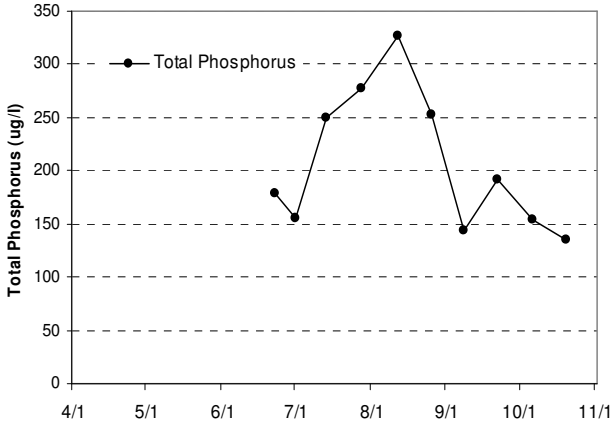
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

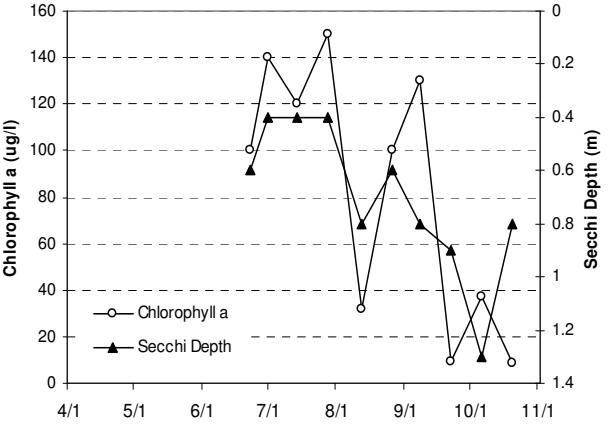
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Rice Lake

Maple Grove, Hennepin Co.

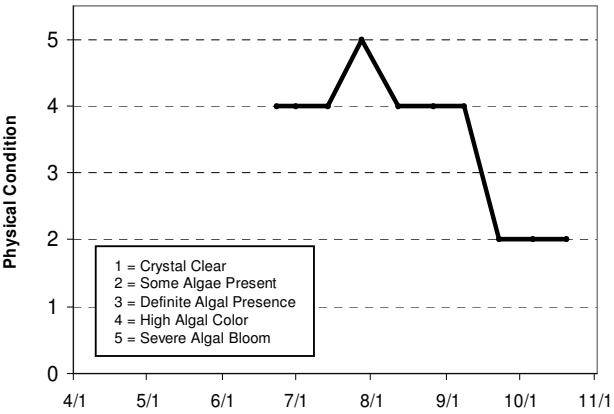
Lake ID: 270116
WMO: Elm Creek
Volunteer: George Schneider





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
06/23/07	26				100	178		0.6	4	4
07/01/07	26				140	156		0.4	4	4
07/14/07					120	250		0.4	4	4
07/28/07	31				150	278		0.4	5	5
08/12/07	28				32	327		0.8	4	4
08/26/07	23				100	252		0.6	4	4
09/08/07	24				130	144		0.8	4	4
09/22/07	19				9.2	192		0.9	2	3
10/06/07	19				37	154		1.3	2	3
10/20/07	13				8.7	135		0.8	2	2

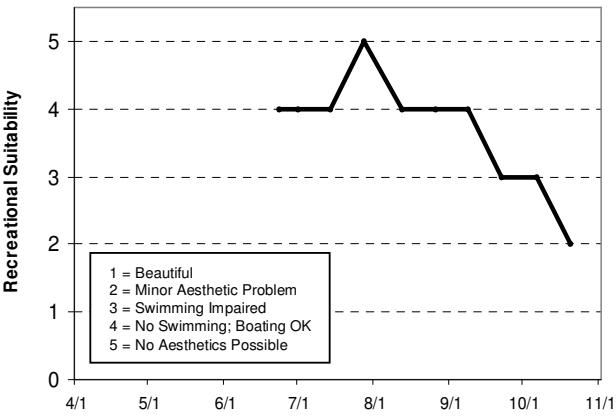


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														F
Chlorophyll a														F
Secchi Depth														F
Overall														**F**

Source: Metropolitan Council and STORET data



Riley Lake (10-0002) *City of Chanhassen*

While Riley Lake has previously been monitored by Council staff, 2007 marks the fifth year the lake has been monitored through CAMP. Riley Lake, with a surface area of 297 acres (2.9 miles in circumference), is located with the cities of Chanhassen and Eden Prairie (Carver and Hennepin counties). The maximum and mean depths of the lake are 15.0 and 6.6 m (49 and 21.6 feet), respectively. Roughly 34 percent of the lake's surface 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 approximate volume of the lake is 6,429 ac-ft.

The lake has a 4,796-acre immediate watershed, which translates to a watershed-to-lake area ratio of 16:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). Public access is possible on the southeastern end of the lake. The lake is considered a "Priority Lake" by the Metropolitan Council" because of its multi-recreational uses. Eurasian Water Milfoil (*Myriophyllum spicatum*) [EWM] has been reported on the lake.

In 2007, Riley Lake was monitored 15 times from early-May to mid-October. On each outing, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

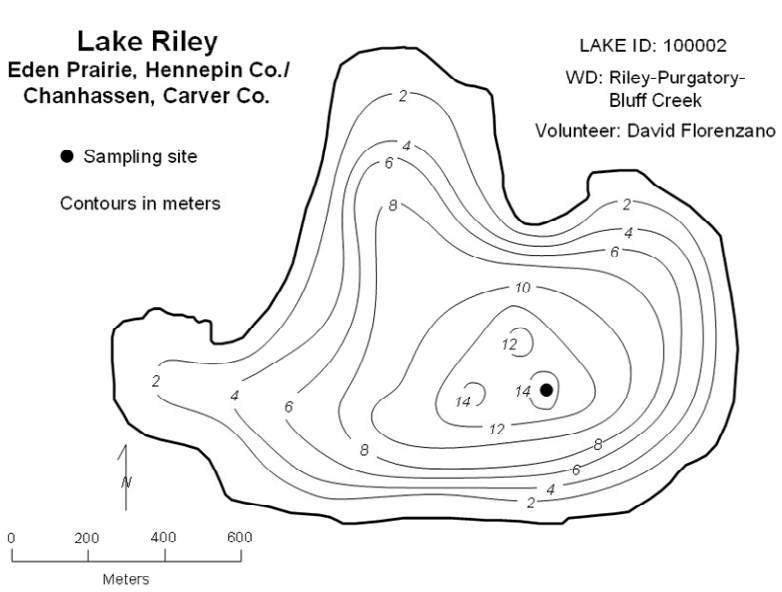
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	28.5	22.0	58.0	B
CLA (µg/l)	19.7	8.6	50.0	B
Secchi (m)	1.8	1.3	3.2	C
TKN (mg/l)	1.62	1.00	2.50	
			Water Quality	B

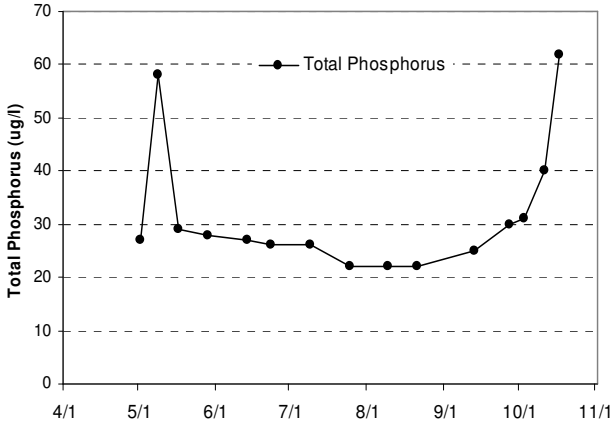
The lake's 2007 grade of B is better that the past years of monitoring, except for 2006 when the lake received a B grade as well. The grades for all of the other years of recorded data were a C.

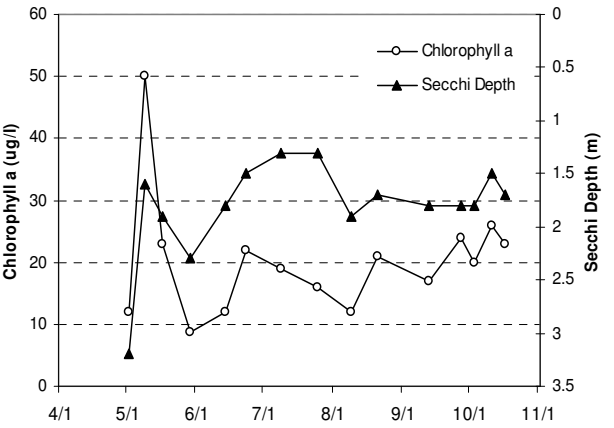
The lake's average user perception rankings for 2006, on a 1-to-5 scale, were 3.5 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 2.6 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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) 297-4916 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.

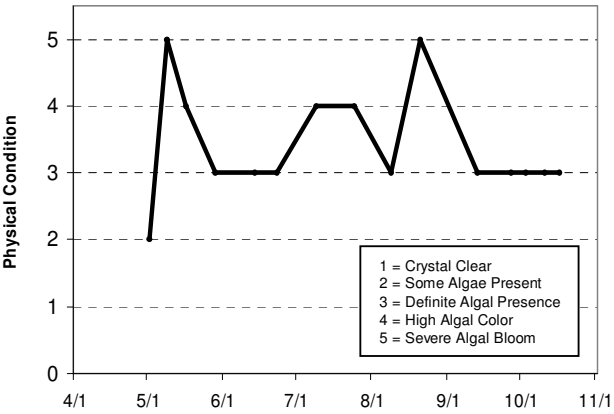






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/02/07	14.7				12	27		3.2	2	1
05/09/07	17.4				50	58		1.6	5	3
05/17/07	17.2				23	29		1.9	4	2
05/29/07	19.5				8.6	28		2.3	3	3
06/14/07	24.6				12	27		1.8	3	3
06/23/07	22.6				22	26		1.5	3	1
07/09/07	27				19	26		1.3	4	3
07/25/07	26.2				16	22		1.3	4	3
08/09/07	24.5				12	22		1.9	3	3
08/21/07	22.9				21	22		1.7	5	3
09/13/07	17.9				17	25		1.8	3	3
09/27/07	18.4				24	30		1.8	3	3
10/03/07	17.4				20	31		1.8	3	3
10/11/07	15.3				26	40		1.5	3	3
10/17/07	13.8				23	62		1.7	3	3

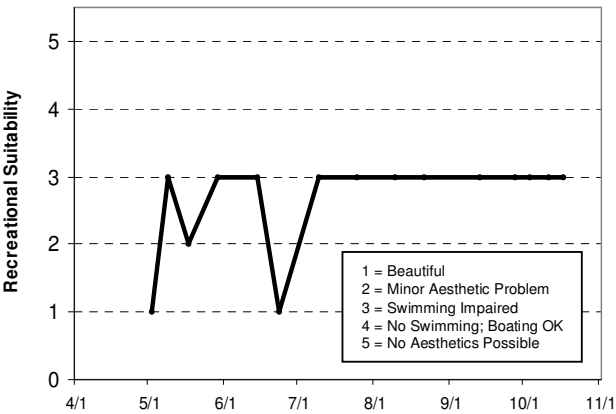


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	B	C	C	C	C	C	C				C		C
Chlorophyll a	C	C	C	C	C	C	C	D			C	C		C
Secchi Depth	C	C	C	C	C	C	C	C	C		C	C		C
Overall	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**				**C**		**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				C			C		C	C	C	C	C	B
Chlorophyll a				C			C		C	D	C	C	B	B
Secchi Depth				C			C		C	C	B	C	B	C
Overall				**C**			**C**		**C**	**C**	**C**	**C**	**B**	**B**

Source: Metropolitan Council and STORET data



Rogers Lake (19-0080) – *Lower Mississippi River Watershed Management Organization*

Rogers Lake lies within the City of Mendota Heights. The lake has a surface area of 94 acres and an average depth of 1.3 m (4.2 ft) which would give it a volume of 393 acre-feet. The maximum depth is 2.4 m (7.9 ft). 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). There is a public access to the lake on the north shore of the south basin.

This was the first year that Rogers Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake showed no available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 12 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.8	30.0	79.0	C
CLA (µg/l)	9.0	1.5	22.0	A
Secchi (m)	1.0	0.5	2.0	D
TKN (mg/l)	2.10	1.90	2.50	
			Water Quality	C

The lake received an grade of C for 2007. As mentioned earlier, there are no nutrient data available for the lake other than the 2007 CAMP data. Therefore there are not sufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The water clarity grade of D does not correlate well with the chlorophyll-a grade of A. There may be a couple of explanations for this discrepancy. It may be the water clarity may be affected by higher levels of total suspended solids from surface runoff from storm sewers and the surrounding urbanized watershed. It is possible for higher suspend solids loadings to decrease water clarity which would decrease light penetration thereby inhibiting algal growth. Another explanation may be related to observations by the volunteer. The volunteer noted on one occasion that the visibility of the Secchi disk was significantly affected by the dense aquatic vegetation on the lake. Therefore, the water clarity may have been better than what the Secchi disk measurements indicated, that is, the disk was obscured by vegetation rather than by the clarity of the water itself.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 1.6 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 3.2 for recreational suitability (between 3- "swimming impaired and 4- "no swimming – boating ok").

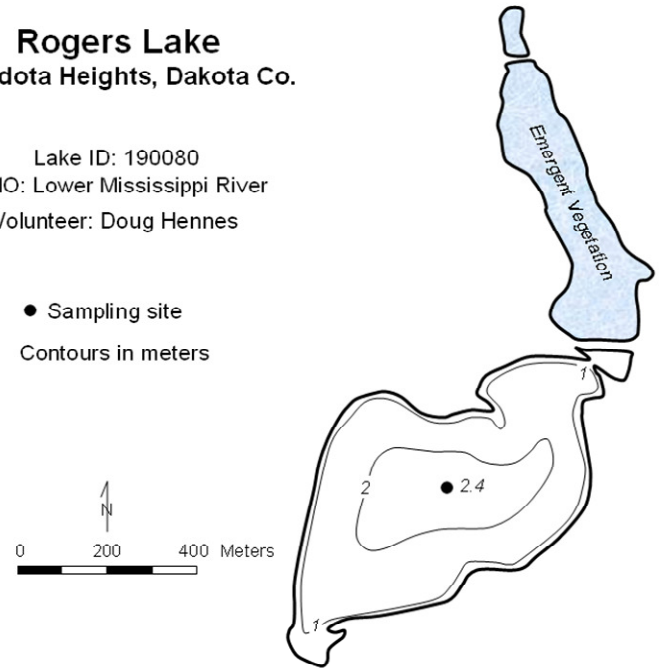
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

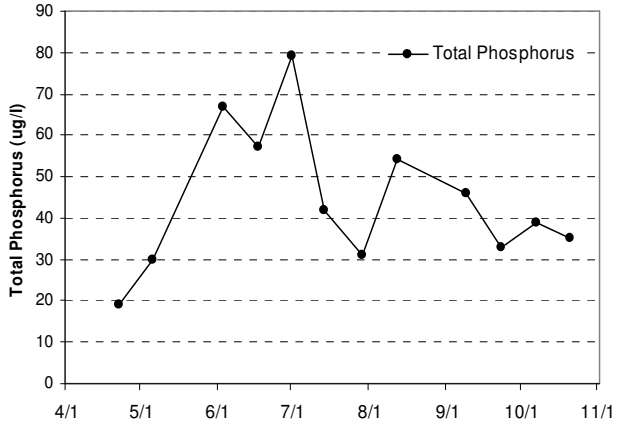
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

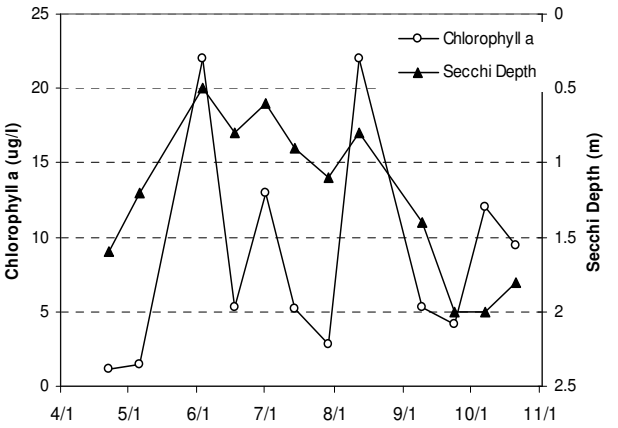
Rogers Lake

Mendota Heights, Dakota Co.

Lake ID: 190080
WMO: Lower Mississippi River
Volunteer: Doug Hennes

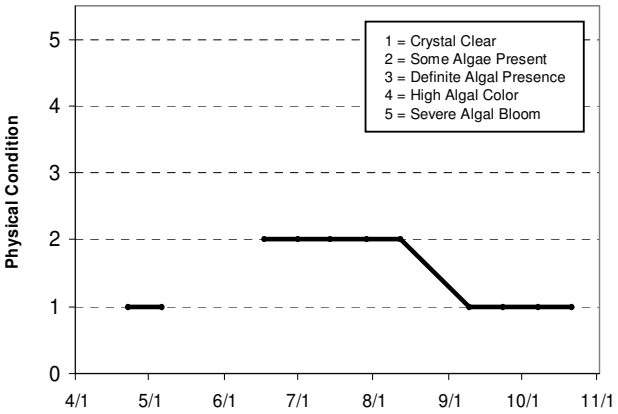






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/22/07	17				1.1	19		1.6	1	1
05/06/07	17.2				1.45	30		1.2	1	1
06/03/07	22.4				22	67		0.5		4
06/17/07	27.9				5.3	57		0.8	2	4
07/01/07	26				13	79		0.6	2	4
07/14/07	23.7				5.2	42		0.9	2	4
07/29/07	29.3				2.8	31		1.1	2	4
08/12/07	27.9				22	54		0.8	2	4
09/09/07	23.7				5.3	46		1.4	1	2
09/23/07	19.1				4.1	33		2	1	2
10/07/07	22.4				12	39		2	1	2
10/21/07	13				9.4	35		1.8	1	2

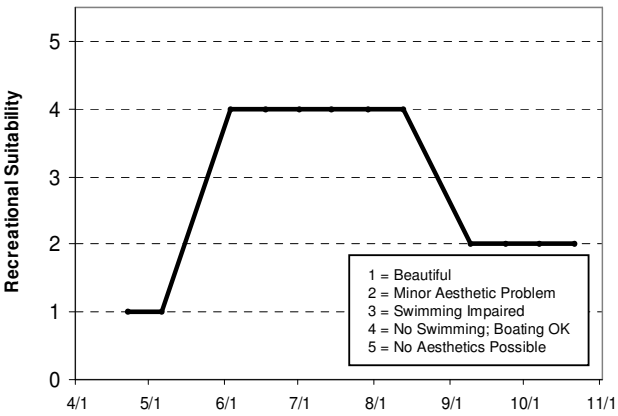


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														C
Chlorophyll a														A
Secchi Depth														D
Overall														**C**

Source: Metropolitan Council and STORET data



Rose Lake (27-0092) *City of Minnetonka*

Rose Lake is a small 17-acre lake located in the City of Minnetonka (Hennepin County). There is very little known morphological data available for the lake.

This was the second year that Rose Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data; therefore 2006 and 2007 are the only years of available water quality data for the lake.

As part of the city's involvement in CAMP in 2007, the lake was monitored 13 times between mid-April and mid-October. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability

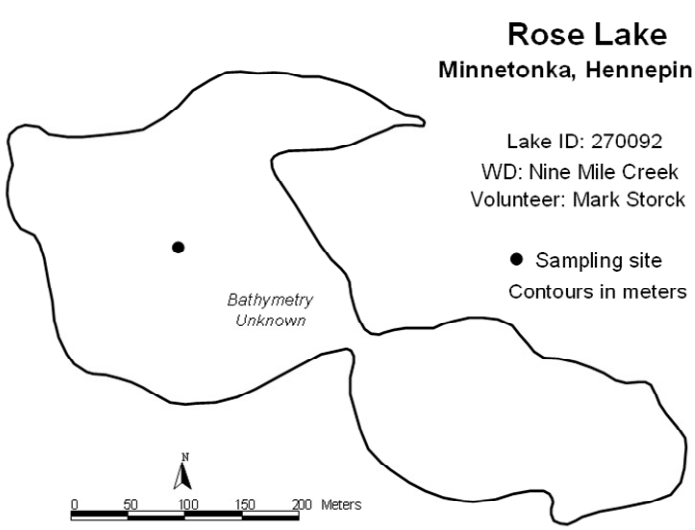
2007 summer (May-September) data summary

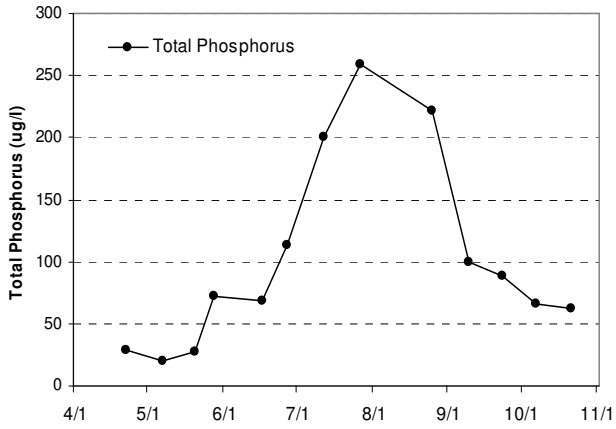
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	117.1	20.0	259.0	D
CLA (µg/l)	70.0	3.5	230.0	D
Secchi (m)	1.0	0.6	1.3	D
TKN (mg/l)	2.12	1.10	3.90	
			Water Quality	D

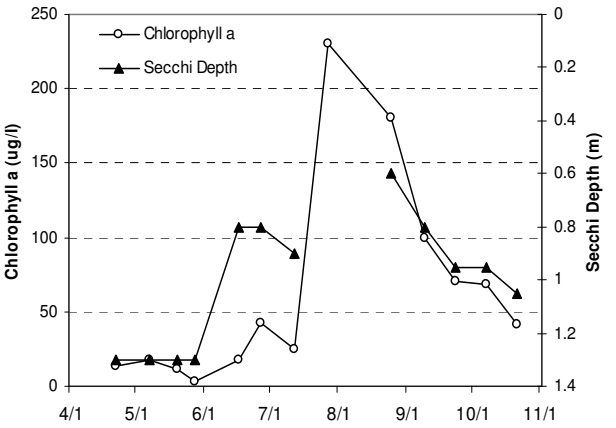
As mentioned earlier, there are no nutrient data available for Rose Lake other than the 2006 and 2007 CAMP data. Therefore there are not sufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 4.2 for physical condition (between 4- "high algal color" and 5- "severe algal bloom"), and 4.9 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

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

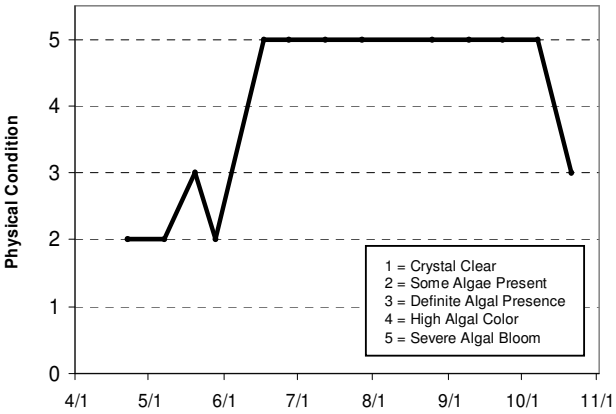






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/22/07	18.1				14	29		1.3	2	4
05/07/07	16.6				18	20		1.3	2	4
05/20/07	18.4				11	28		1.3	3	5
05/28/07	22.6				3.5	72		1.3	2	5
06/17/07	24.8				18	69		0.8	5	5
06/27/07	24.1				43	113		0.8	5	
07/12/07	20.8				25	200		0.9	5	5
07/27/07	25.3				230	259			5	5
08/25/07	21.3				180	222		0.6	5	
09/09/07	21				100	99		0.8	5	5
09/23/07	19.8				71	89		0.95	5	5
10/07/07	22				68	66		0.95	5	
10/21/07	12				42	62		1.05	3	4

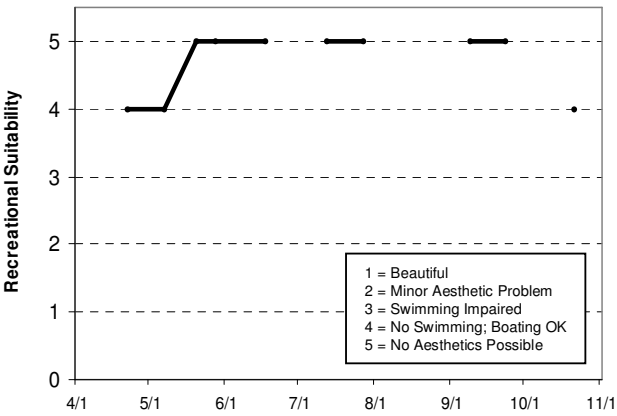


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	D
Chlorophyll a													C	D
Secchi Depth													D	D
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



Rutz Lake (10-0080) *Carver County Environmental Services*

Rutz Lake is a 61-acre lake located within Waconia Township (Carver County). The maximum depth of the lake is 4.0 m (roughly 13 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).

This was the third year that Rutz Lake has been involved in CAMP. The three years of CAMP data are the only known water quality data available for the lake. The lake was monitored 7 times from mid-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	177.6	60.0	257.0	F
CLA (µg/l)	78.1	7.0	220.0	F
Secchi (m)	0.7	0.3	1.1	D
TKN (mg/l)	2.84	1.30	4.30	
			Water Quality	F

These grades result in an water quality grade of F for Rutz Lake in 2007, which is the worse grade it has received since monitoring began in 2000. Because of the limited years of data for this lake, there are insufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, more data are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.2 for physical condition (between 3- "definite algal presence" and 4- "high algal color"), and 3.2 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming; boating ok").

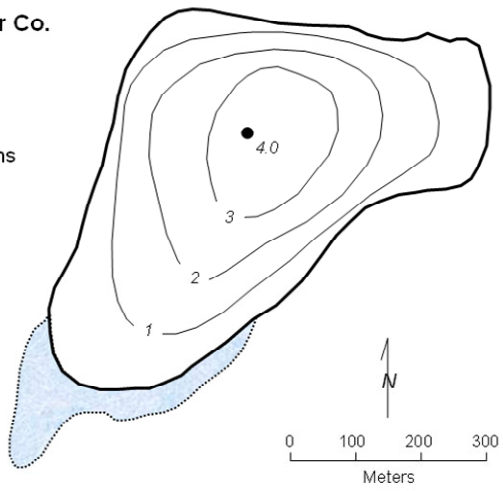
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

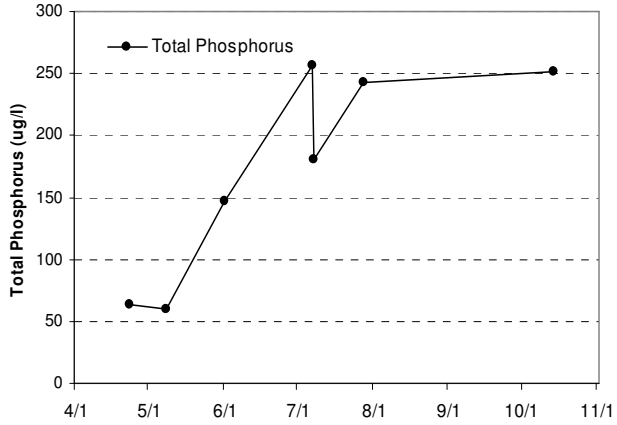
Rutz Lake

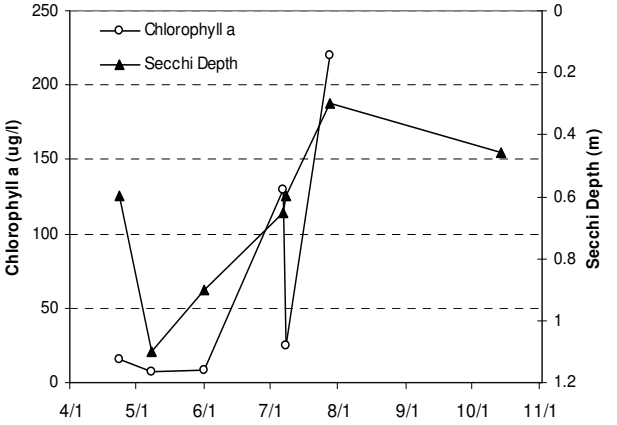
Waconia Twp., Carver Co.

Lake ID: 100080
WMO: Carver County
Volunteer: Marty Ziemans

● Sampling site
Contours in meters

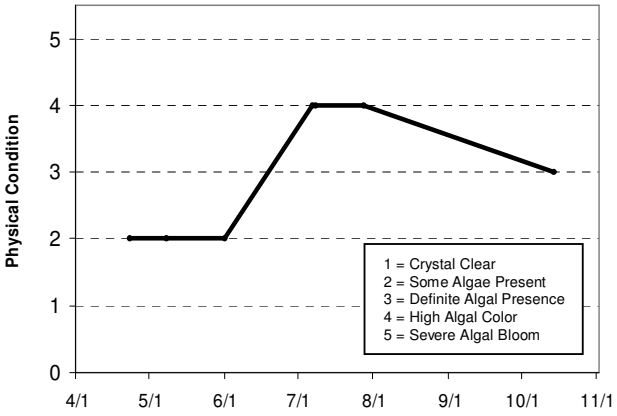






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/23/07	16				16	64		0.6	2	
05/08/07	22				7	60		1.1	2	3
06/01/07	22				8.5	147		0.9	2	3
07/07/07	27				130	257		0.65	4	3
07/08/07	29				25	181		0.6	4	4
07/28/07	29				220	243		0.3	4	3
10/14/07	11					252		0.46	3	3

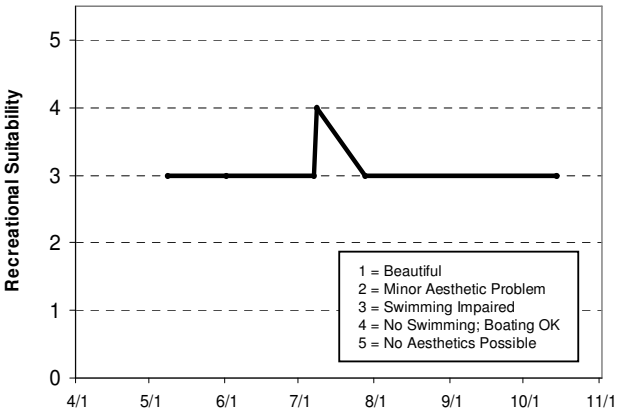


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							F						F	F
Chlorophyll a							C						D	F
Secchi Depth							D						D	D
Overall							**D**						**D**	**F**

Source: Metropolitan Council and STORET data



Sanborn Lake (40-0027) – *Scott Watershed Management Organization (Sand Creek Watershed)*

Sanborn Lake is in Lanesburg Township of LeSueur County. There is little morphological information on the lake. The lake is very shallow and has a fairly flat bottom with an average depth of about 3.0 ft (0.9 m) with a maximum depth of 4.0 ft (1.2 m). 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). There is a public access on the north shore.

This was the first year that the lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake showed no available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored only 2 times in early summer of 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	166.5	121.0	212.0	F
CLA (µg/l)	39.0	36.0	42.0	C
Secchi (m)	0.4	0.2	0.5	F
TKN (mg/l)	2.45	1.70	3.20	
			Water Quality	D

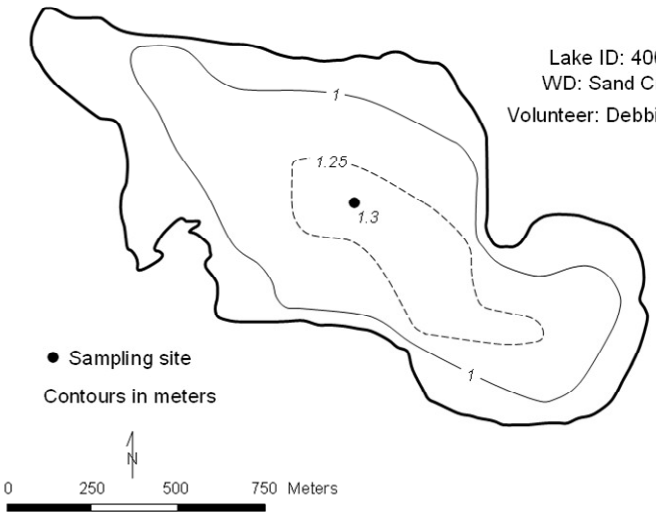
The lake received an grade of D for 2007. However this grade is only representative of early summer conditions because of the limited data available for 2007.

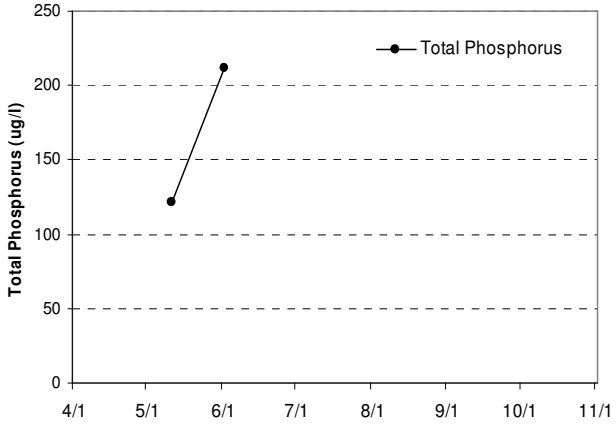
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 3.0 for physical condition (3- "definite algal presence") and 4.0 for recreational suitability (4- "no swimming – boating ok").

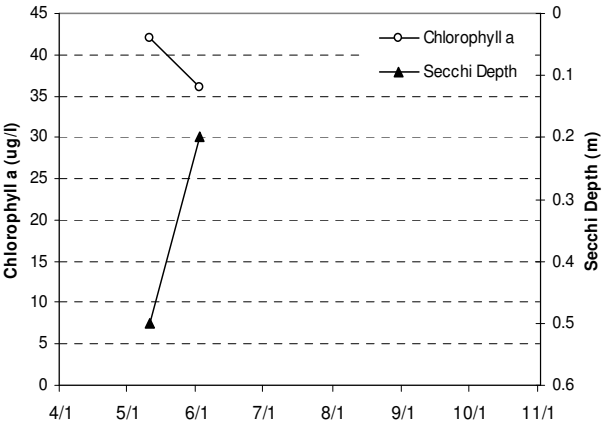
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sanborn Lake

Lanesburg Twp., LeSueur Co.

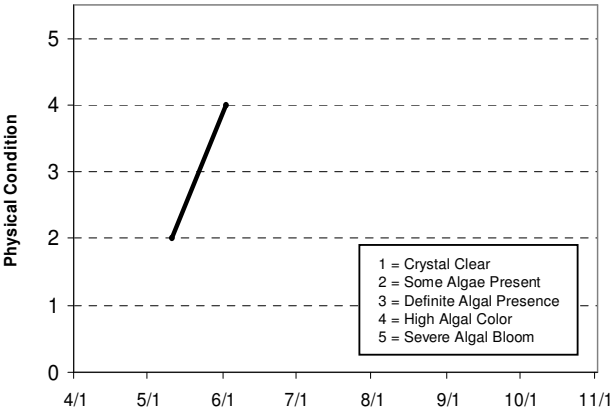






2007 Data

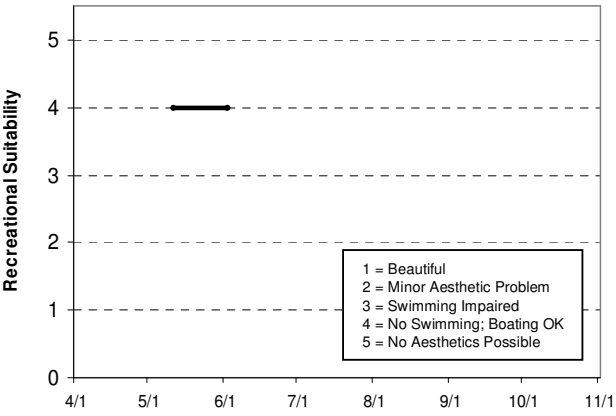
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/11/07	19.4				42	121		0.5	2	4
06/02/07	23.1				36	212		0.2	4	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														F
Chlorophyll a														C
Secchi Depth														F
Overall														**D**



Source: Metropolitan Council and STORET data

Sand Lake (82-0067) *Marine on St. Croix Watershed Management Organization*

Sand Lake is a 46-acre lake located within City of Scandia (Washington County). The lake has a surface area of 46 acres (1.8 miles in circumference) and a mean and maximum depth of 2.4 m (8 feet) and 5.5 m (18 feet), respectively. The lake, which has two inlets has an approximate volume of 368 ac-ft. Approximately 46 percent of the lake's surface area is considered littoral, the shallow (0-15 foot) area dominated by aquatic vegetation.

This was the tenth year that Sand Lake has been involved in CAMP (the lake was previously enrolled in 1993-1996 and 2002-2006). The 1993-1996 and 2002-2006 CAMP data were the only historic water quality data found for the lake. In 2007, the lake was monitored 7 times from mid-April to early-October. During each event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	30.4	26.0	35.0	B
CLA (µg/l)	12.4	3.7	30.0	B
Secchi (m)	2.5	1.4	3.0	B
TKN (mg/l)	0.94	0.78	1.30	
			Water Quality	B

The lake's 2007 grade is similar to that recorded in 2004 and better than those recorded in 1993-1996, 2002-2003, and 2005-2006. Furthermore, 2007 represents the lakes best-recorded water quality year because it received all B's for each of the individual parameters.

The perceived conditions of the lake (both physical and recreational) were ranked on a 1-to-5 scale by the volunteer monitors. These user perception rankings are shown on the lake's information sheet. The mean physical condition ranking was 2.0 (2- "some algae present"), while the mean recreational suitability ranking was 1.6 (between 1- "beautiful" and 2- "minor aesthetic problem").

The lake appears to maintain an water quality grade of C with the occasional B. To better understand the lake's current water quality condition, and which direction it may be heading, continued monitoring is suggested.

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) 297-4916 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.

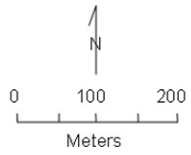
Sand Lake

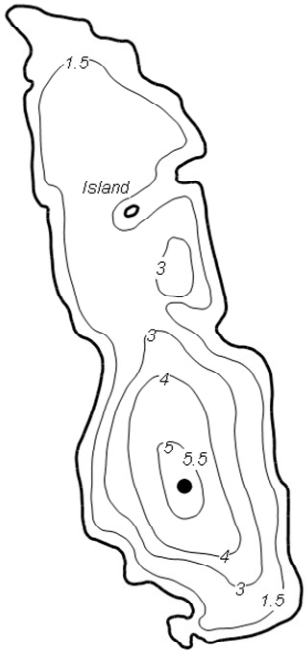
Scandia, Washington Co.

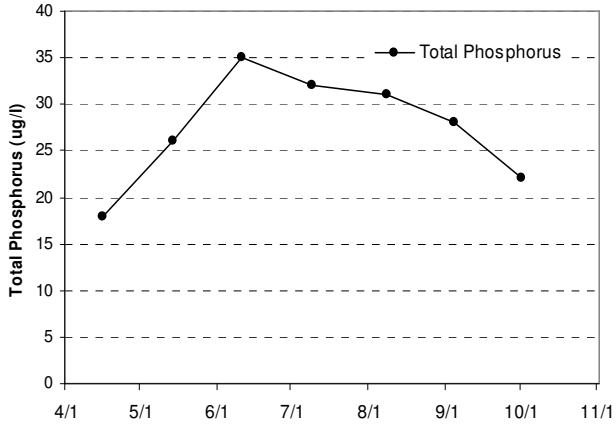
Lake ID: 820067
WD: Carnelian-Marine-St. Croix
Volunteer: Washington
Conservation District

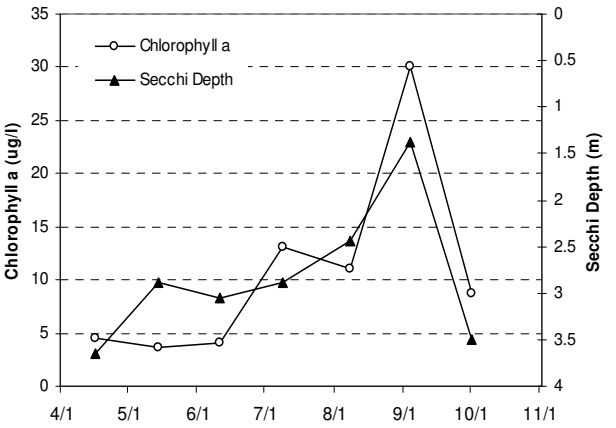
● Sampling site

Contours in meters



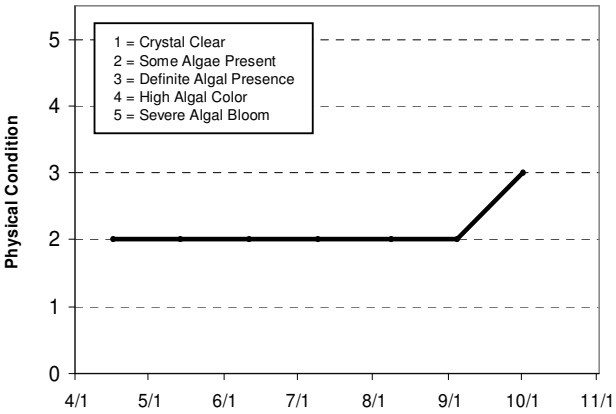






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.9	7.1	12.2	12.6	4.5	18		3.658	2	1
05/14/07	20.9	14.9	9.16	3.95	3.7	26		2.896	2	1
06/11/07	25.4	19.6	7.45	4.23	4.1	35		3.048	2	1
07/09/07	30.5	22.6	7.2	0.09	13	32		2.896	2	1
08/08/07	28	24.8	6.93	0.25	11	31		2.438	2	2
09/04/07	27.6	23	9.6	0.17	30	28		1.372	2	3
10/01/07	19.9	19.8	7.59	0.24	8.7	22		3.505	3	3

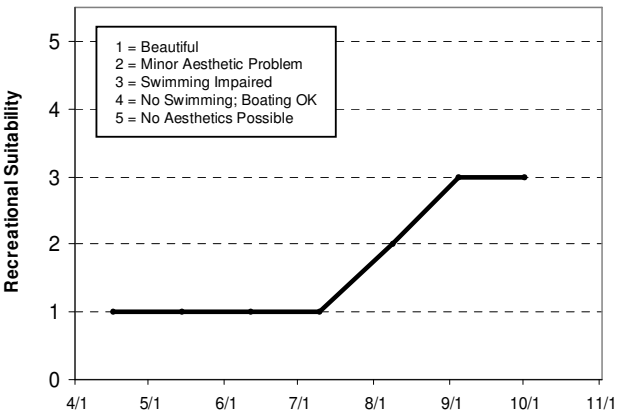


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														C
Chlorophyll a														C
Secchi Depth														D
Overall														**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C						C	C	B	C	C	B
Chlorophyll a	C	B	C						B	C	B	C	B	B
Secchi Depth	D	C	C						C	C	C	C	C	B
Overall	**C**	**C**	**C**						**C**	**C**	**B**	**C**	**C**	**B**

Source: Metropolitan Council and STORET data



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

This was the seventh year that the 47-acre lake has been enrolled in CAMP. In fact, a search through Metropolitan Council and STORET databases indicated that the only other year besides 1995, 1998, 2000-2001 and 2004-2005 (CAMP data) for which data are available was 1994, when Secchi transparencies were taken as part of the MPCA's volunteer lake monitoring program.

The land uses within the lake's 190-acre immediate watershed are 77 percent low density residential and 23 percent wetland/water. The lake's watershed area to surface area ratio is 4:1. An area of concern and need for future management is the recent detection of Eurasian Water Milfoil (*Myriophyllum spicatum*) in the lake. In an attempt to reduce the lake's algal population and improve the lake's water quality, an experimental bacterial treatment took place on Schmidt Lake in 2004 and 2005.

Schmidt Lake was monitored 9 times between mid-May and late-September 2007. During each event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The data and related graphs are presented on the information sheet on the following page.

2005 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	27.8	17.0	44.0	B
CLA (µg/l)	4.1	1.4	7.1	A
Secchi (m)	2.8	1.8	3.7	B
TKN (mg/l)	1.25	0.36	1.80	
			Water Quality	B

The lakes grade for 2005 of B is the best water quality grade yet received by the lake. In fact, the individual parameter grades are the best grades received to date as well. Further analysis of the annual parameter means shows that the water quality in 2004 and 2005 (years with the in-lake bacterial treatments) was slightly better than those recorded in 1998 and 2000-2001, and very similar to that received in 1995. Prior to 2007, the lake's two best water clarity means were recorded in 2004 and 2005. These observations are indicative of improving water quality. To better understand if this years improvement in water quality is an aberration or a continuing trend, more years of data collection are needed.

Throughout the monitoring period, the volunteers ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 1.8 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 1.6 (between 1- "beautiful" and 2- "minor aesthetic problem").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

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

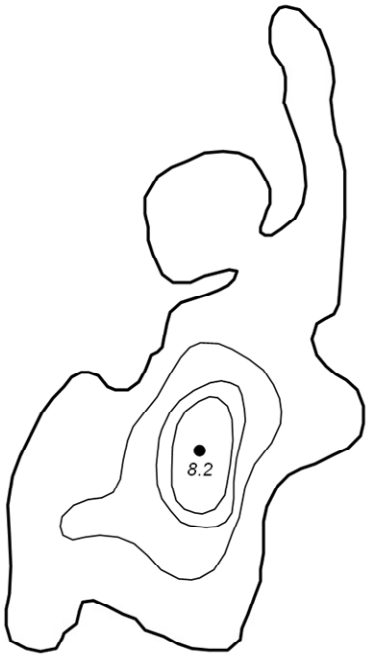
Schmidt Lake

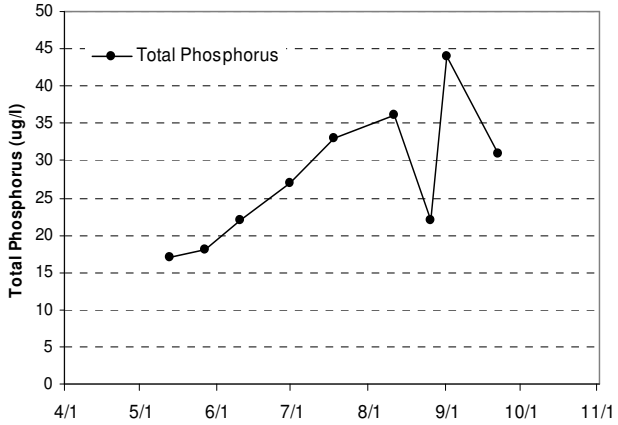
Plymouth, Hennepin Co.

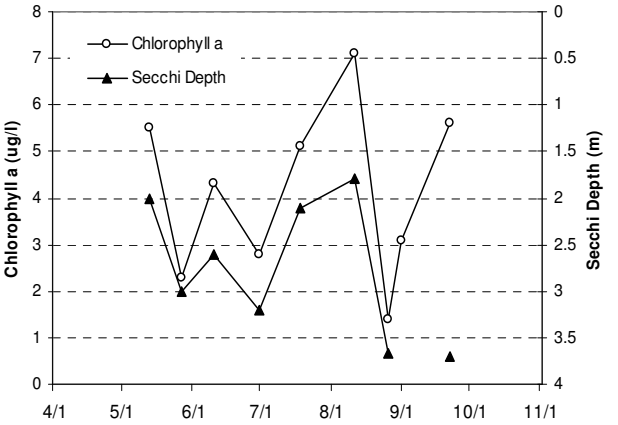
Lake ID: 270102
WMO: Shingle Creek
Volunteer: Dale Wahlstrom

● Sampling site

Contours in meters

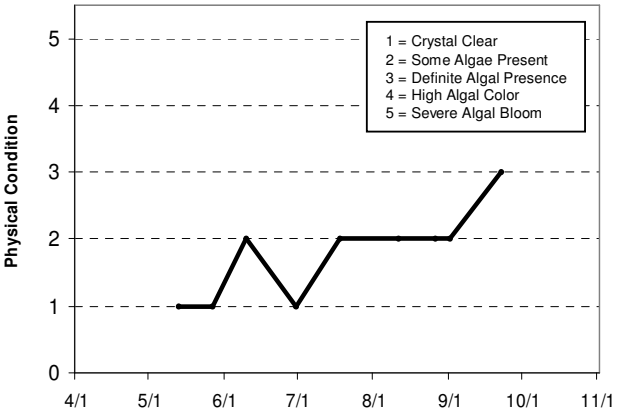






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/13/07	18.6				5.5	17		2	1	2
05/27/07	19.3				2.3	18		3	1	1
06/10/07	24.2				4.3	22		2.6	2	2
06/30/07	26				2.8	27		3.2	1	1
07/18/07	29.1				5.1	33		2.1	2	2
08/11/07	26				7.1	36		1.8	2	1
08/26/07	24				1.4	22		3.67	2	2
09/01/07					3.1	44			2	1
09/22/07	20				5.6	31		3.7	3	2

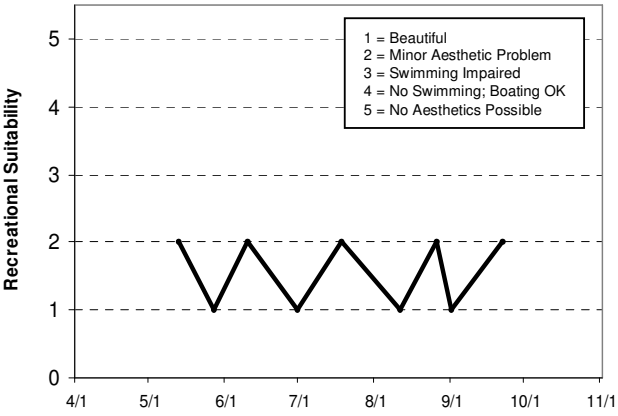


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C			C		C	C			C	C		B
Chlorophyll a		B			C		C	C			B	B		A
Secchi Depth	C	C			C		C	D			C	C		B
Overall		**C**			**C**		**C**	**C**			**C**	**C**		**B**

Source: Metropolitan Council and STORET data



School Lake (13-0057) *Comfort Lake-Forest Lake Watershed District*

School Lake is a 48-acre lake located near Chisago City (Chisago County). There is very little known morphological data available for the lake.

This marks the third year in which School Lake has been involved in CAMP (2005 being the first). A search through the STORET nationwide water quality database for historic data on the lake revealed only the 2005 and 2006 CAMP data. Therefore, 2005-2007 are the only known years of available data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 7 times between mid-April and late-September 2007. The resulting data and graphs appear on the next page.

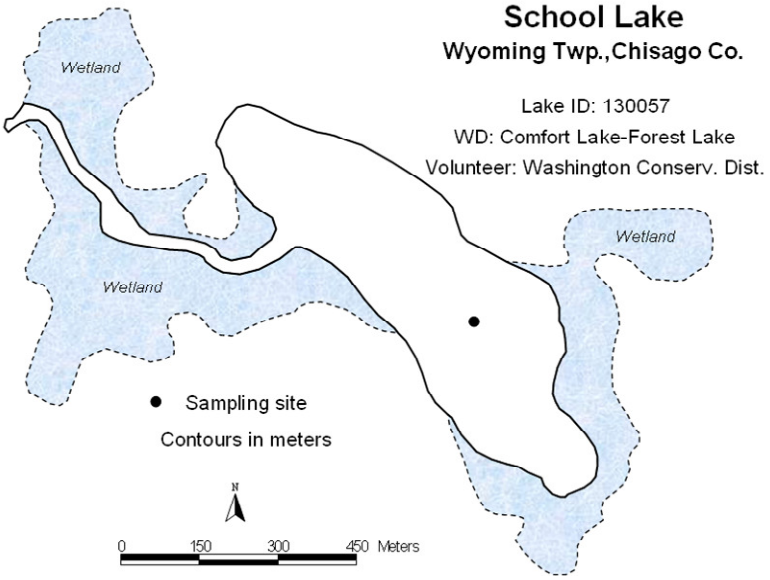
2007 summer (May-September) data summary

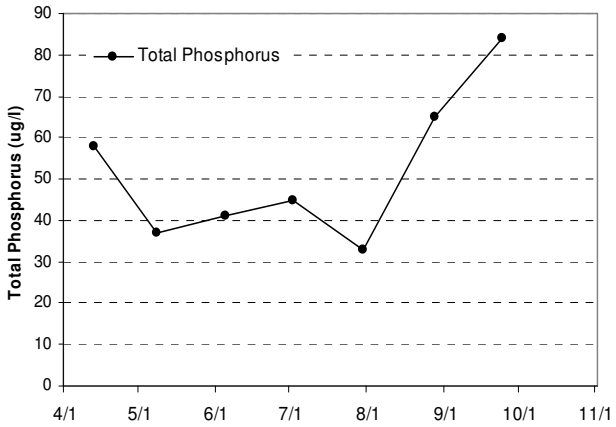
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	50.8	33.0	84.0	C
CLA (µg/l)	38.7	18.0	74.0	C
Secchi (m)	1.4	1.1	2.0	C
TKN (mg/l)	1.22	0.70	1.80	
			Water Quality	C

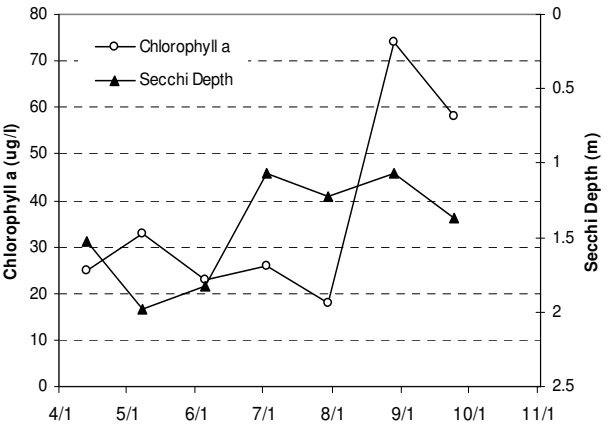
The lake has received a C grade these past 3 years of monitoring. As mentioned earlier, there are no water quality data available for School Lake other than the 2005-2007 CAMP data. Therefore there are insufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.5 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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

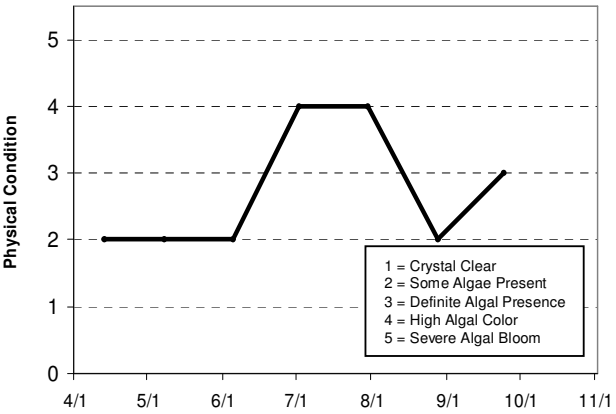






2007 Data

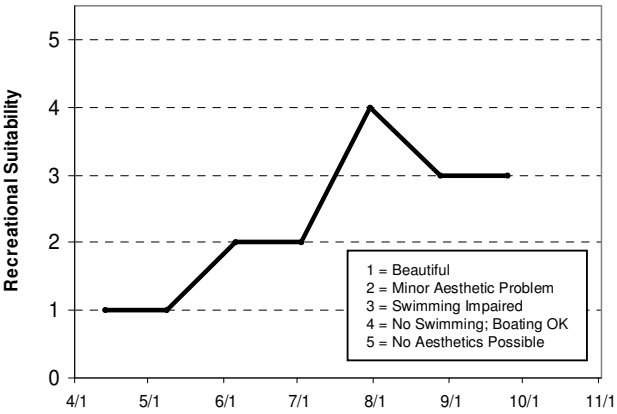
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/13/07	4.5	4.2	13.98	13.62	25	58		1.524	2	1
05/08/07	16.6	7	12.8	0.19	33	37		1.981	2	1
06/05/07	22.9	9.3	7.81	0.06	23	41		1.829	2	2
07/02/07	26.6	12.3	7.15	0.18	26	45		1.067	4	2
07/30/07	30.8	13.3	9.3	0.13	18	33		1.219	4	4
08/28/07	25	14.4	9.1	0.11	74	65		1.067	2	3
09/24/07	21.2	15.7	7.98	0.25	58	84		1.372	3	3



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus												C	D	C
Chlorophyll a												C	C	C
Secchi Depth												C	C	C
Overall												**C**	**C**	**C**



Source: Metropolitan Council and STORET data

Schroeder's Pond (82-0301) *Carnelian - Marine Watershed District*

Schroeder's Pond is a small land-locked lake located within May Township (Washington County). The maximum depth of the lake is 3.0 m (roughly 10 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.

This was the fourth year that Schroeder's Pond has been involved in CAMP. On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored seven times between early-May and mid-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	75.3	29.0	188.0	D
CLA (µg/l)	25.6	9.1	72.0	C
Secchi (m)	1.7	1.1	2.3	C
TKN (mg/l)	0.94	0.65	1.60	
			Water Quality	C

Other than for the 2004-2007 CAMP data, there are no known water quality data available for Schroeder's Pond. Therefore there are insufficient to determine any long-term or short-term trends. The lake's water quality in 2007 was similar to that recorded in 2005 (grade of D) and worse than that recorded in 2004 (grade of B). To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings were 2.2 for physical condition (between 2- "some algae present" and 3- "definite algal presence"), and 3.5 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming; boating ok").

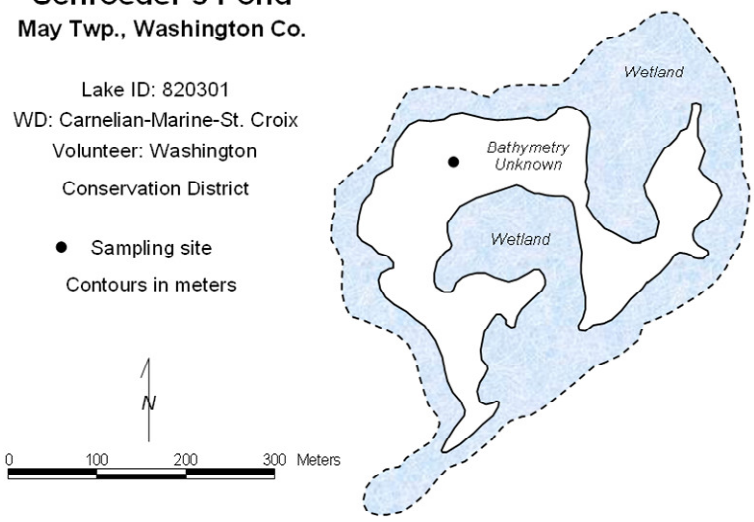
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

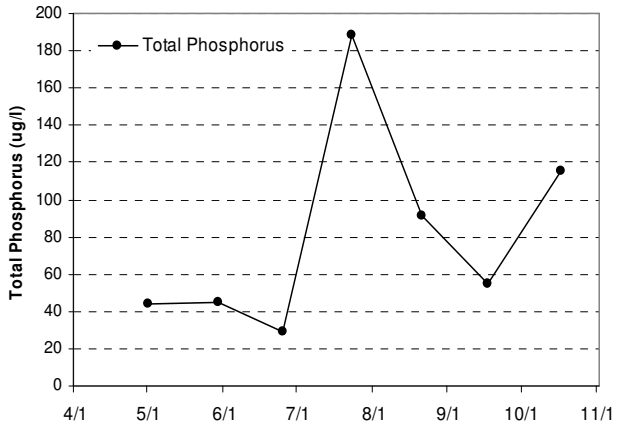
Schroeder's Pond

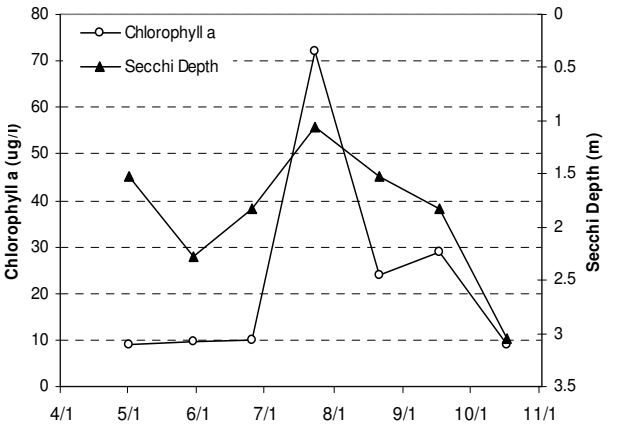
May Twp., Washington Co.

Lake ID: 820301
WD: Carnelian-Marine-St. Croix
Volunteer: Washington
Conservation District

● Sampling site
Contours in meters

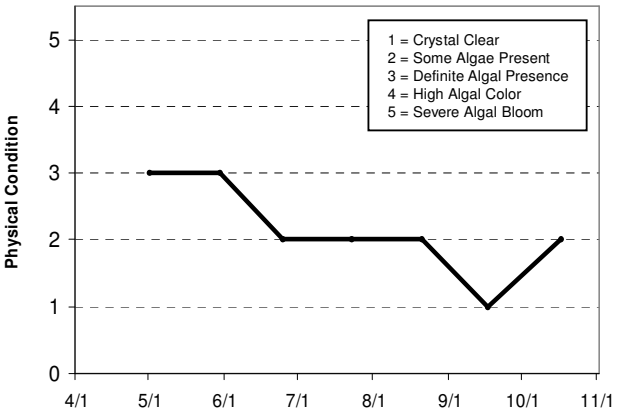






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/01/07	16.6	12.9	6.08	0.35	9.1	44		1.524	3	5
05/30/07	23.2	16.5	10.92	1.55	9.7	45		2.286	3	4
06/25/07	26.7	23.7	7.6	0.16	10	29		1.829	2	4
07/23/07	27.1	24.1	5.97	0.04	72	188		1.067	2	3
08/21/07	21.4	19.6	4.2	0.1	24	91		1.524	2	3
09/17/07	18.1	15.8	7.04	0.28	29	55		1.829	1	2
10/17/07	13.7	12.8	4.78	3.45	9	115		3.048	2	3

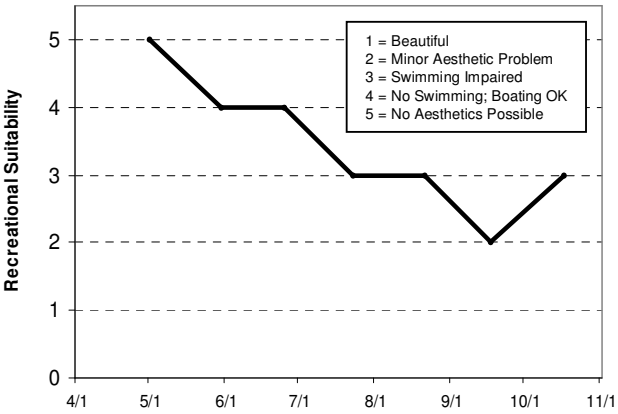


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus											C	D	D	D
Chlorophyll a											A	D	B	C
Secchi Depth											C	C	C	C
Overall											**B**	**D**	**C**	**C**

Source: Metropolitan Council and STORET data



Scout Lake (19-0198) *City of Apple Valley*

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). 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.

This was the first year that Scout Lake has been involved in CAMP. A search through the STORET database revealed no available water quality data. On each of the sampling days the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 14 times between mid-April and mid-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	88.6	54.0	196.0	D
CLA (µg/l)	40.8	13.0	83.0	C
Secchi (m)	0.7	0.6	0.8	F
TKN (mg/l)	3.56	2.40	5.10	
			Water Quality	D

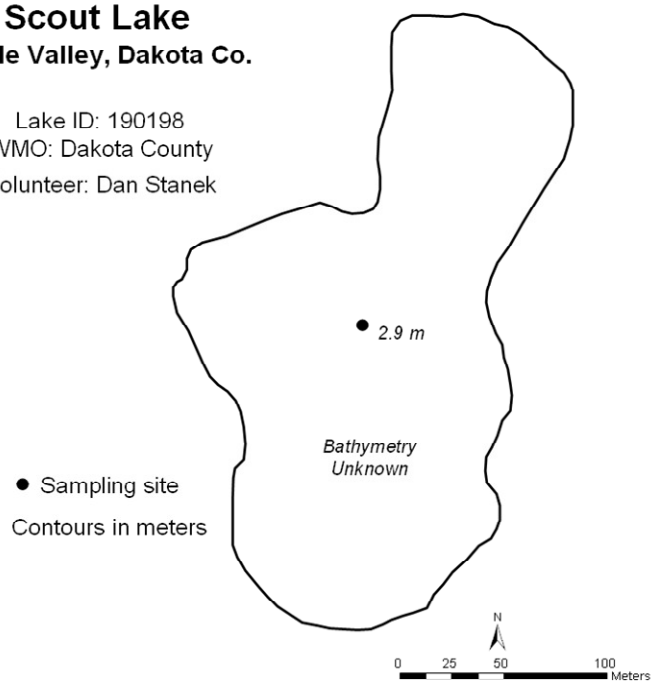
The lake received an water quality grade of D for 2007. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed. The perceived physical and recreational conditions were not documented by the volunteer.

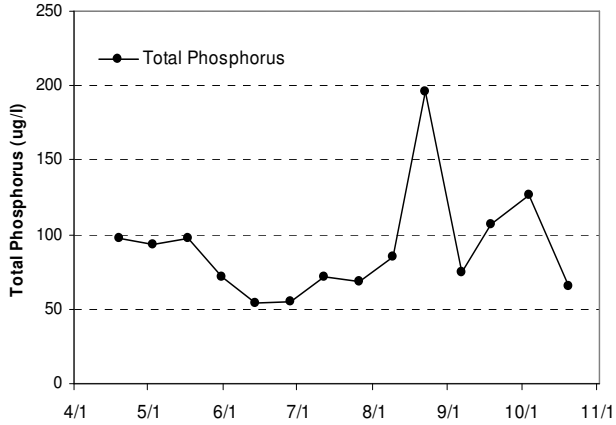
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

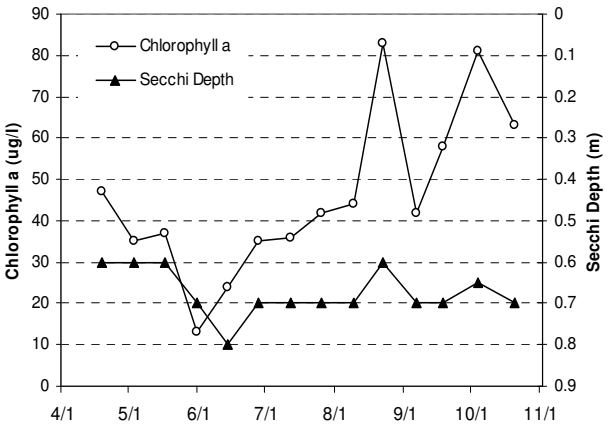
Scout Lake

Apple Valley, Dakota Co.

Lake ID: 190198
WMO: Dakota County
Volunteer: Dan Stanek

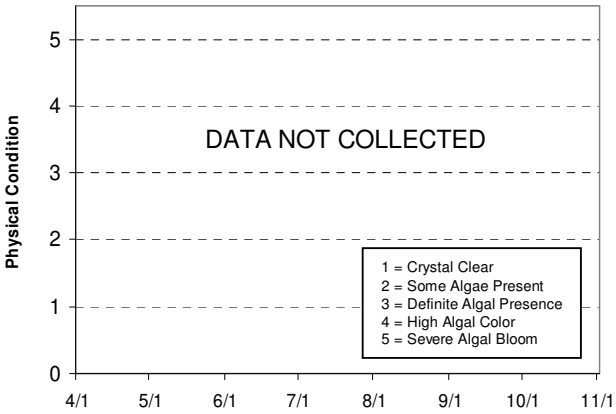






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/19/07	16.4				47	98		0.6		
05/03/07	19.7				35	93		0.6		
05/17/07	21.5				37	98		0.6		
05/31/07	26.1				13	72		0.7		
06/14/07	29.1				24	54		0.8		
06/28/07	26.9				35	55		0.7		
07/12/07	27.7				36	72		0.7		
07/26/07	30.5				42	68		0.7		
08/09/07	28.4				44	85		0.7		
08/22/07	21.9				83	196		0.6		
09/06/07	25.9				42	75		0.7		
09/18/07	21.8				58	107		0.7		
10/04/07	18.9				81	127		0.65		
10/20/07	14.4				63	65		0.7		

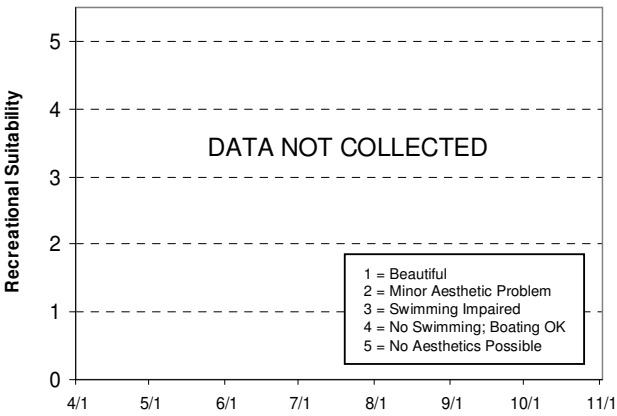


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus														D
Chlorophyll a														C
Secchi Depth														F
Overall														**D**

Source: Metropolitan Council and STORET data



Seidl's Lake (19-0095) Cities of *Inver Grove Heights and South St. Paul*

Seidl's Lake is a 14-acre lake located in the City of Inver Grove Heights (Dakota County) which receives inflow from five inlets. Other than the fact that the maximum depth of the lake is approximately 5.0 m (17 feet), there is very little known morphological data available. The lake has been enrolled in CAMP since 1995. In 2007 it was monitored 8 times from mid-May to late-October. On each sampling date the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

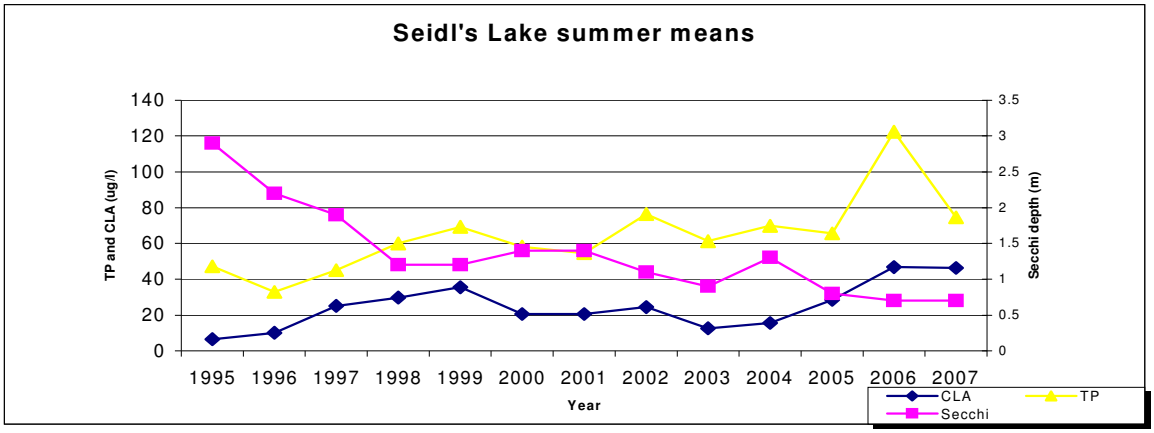
2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	74.5	42.0	105.0	D
CLA (µg/l)	46.3	4.7	83.0	C
Secchi (m)	0.7	0.4	1.0	F
TKN (mg/l)	2.05	1.70	2.50	
			Water Quality	D

Similar to that reported in past lake reports (and noticed again in 2006), the difference between the TP, CLA and Secchi grades in current and past years (see report grade on the lake's information page), may indicate that suspended sediments play a large role in the inner workings of the lake. This scenario can be fairly typical for small shallow lakes where wind action and storm sewer inflow either increase the influx of sediments to the system or cause the re-suspension of existing bottom sediments. That is, the suspended sediments influence the lake's phosphorus make-up (a larger portion of the in-lake phosphorus in particulate form rather than a soluble form more readily available for algal uptake), reduce water clarity, and could actually be limiting the amount of light available for algal growth, thus keeping the CLA concentrations down.

The water quality database for Seidl's Lake consists of nutrients and Secchi data in 1991, Secchi data in 1993-1994, and CAMP data in 1995-2007. Over this time span, the lake's water quality grades fluctuated between a C and low-B grade in 1991-1998, 2000-2001 and 2003-2005, and a low grade of D in 1999, 2002, 2006, and 2007.

In an attempt to address the lake's possible degradation concerns and watershed influences on said degradation, lake area homeowners have been trying to work with the local communities to address areas



of concern to the lake's future management. They are currently working on garnering city involvement and outside funding to further initiate the lake planning/improvement process.

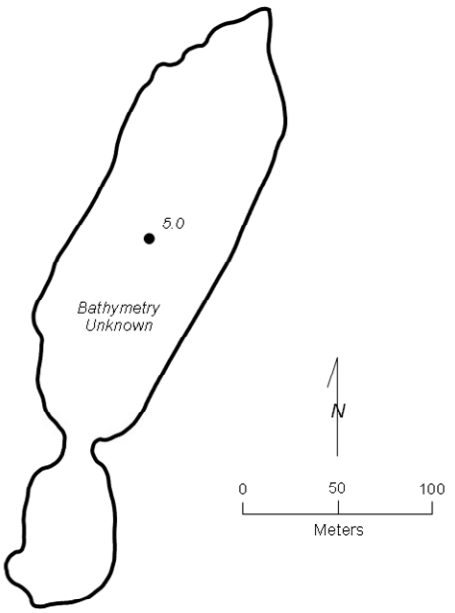
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The summertime mean recorded physical condition was 2.5 (between 2- "some algae present" and 3- "definite algae present"), while the mean suitability for recreation ranking was 4.0 (4- "no swimming - boating ok").

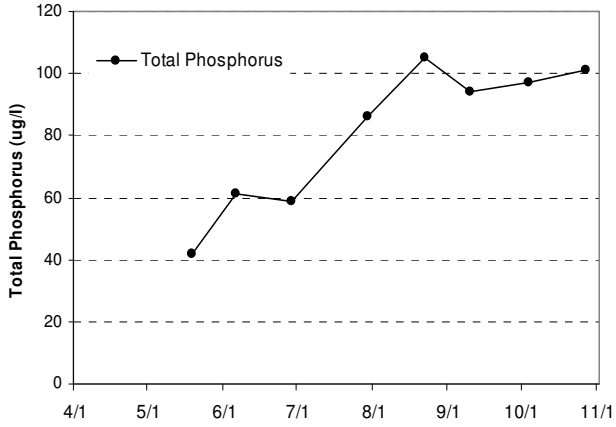
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

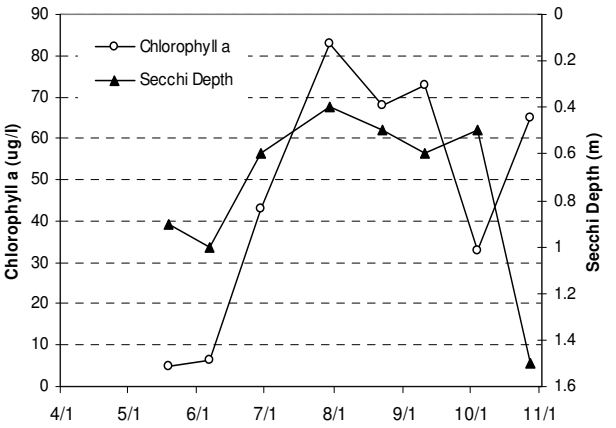
Seidl Lake

Inver Grove Heights, Dakota Co.

Lake ID: 190095
WMO: Lower Mississippi River
Volunteer: Randy Bjorklund

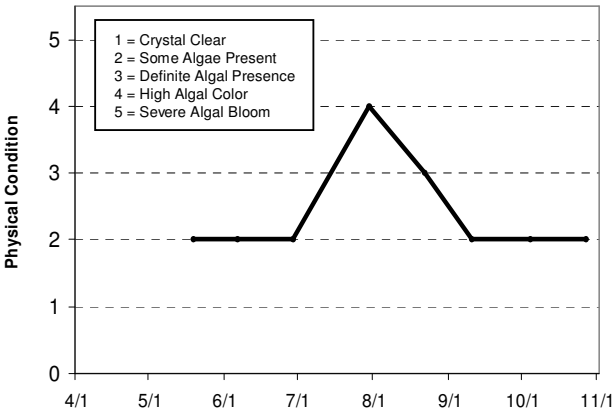






2007 Data

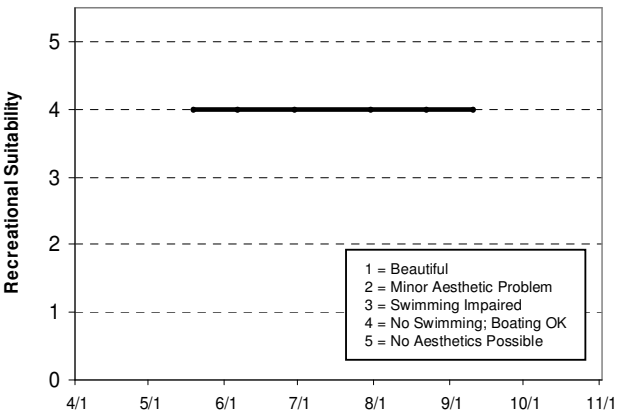
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/19/07	27.3				4.7	42		0.9	2	4
06/06/07	20.7				6.3	61		1	2	4
06/29/07	27.3				43	59		0.6	2	4
07/30/07	27.3				83	86		0.4	4	4
08/22/07	21.8				68	105		0.5	3	4
09/10/07	21.7				73	94		0.6	2	4
10/04/07	20.3				33	97		0.5	2	
10/27/07	11.3				65	101		1.5	2	



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus												C		
Chlorophyll a												C		
Secchi Depth												D		D
Overall												**C**		

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C	C	C	C	D	C	C	D	C	D	C	D	D
Chlorophyll a		A	B	B	C	C	C	C	C	B	B	C	C	C
Secchi Depth	D	B	B	C	D	D	C	C	D	D	C	D	F	F
Overall		**B**	**B**	**C**	**C**	**D**	**C**	**C**	**D**	**C**	**C**	**C**	**D**	**D**



Source: Metropolitan Council and STORET data

Shields Lake (82-0162) *Comfort Lake-Forest Lake Watershed District*

Shields Lake is located in the City of Forest Lake in Washington County. The lake has a surface area of 27 acres (0.8 miles in circumference) and a maximum depth of 8.2 m (27 feet). About 85 percent of the lake's area is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation.

Shields Lake has been involved in CAMP since 1993. The lake was monitored 7 times between mid-April and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

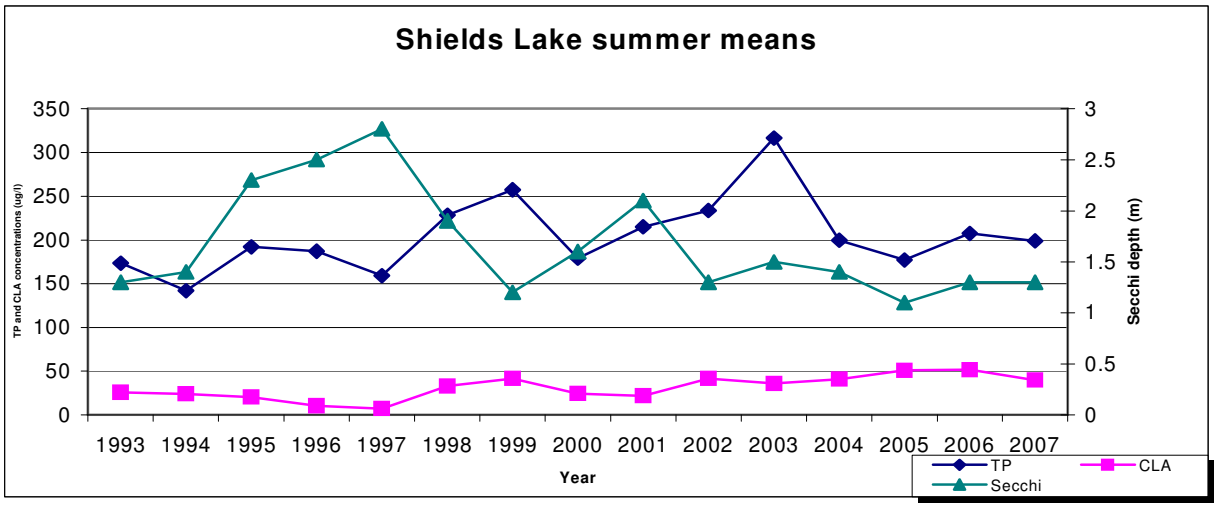
2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	199.0	99.0	347.0	F
CLA (µg/l)	39.8	6.5	67.0	C
Secchi (m)	1.3	0.6	2.9	C
TKN (mg/l)	2.18	1.50	2.60	
			Water Quality	D

The 2007 water quality grade was a D, which has been the typical grade received over the past few years. The Shield Lake water quality database includes 16 years (1991, 1993-2007) where TP, CLA, and Secchi transparency data are available to calculate annual grades. The grades range from C's in 1991, and 1994-1997, to D's in 1993 and 1998-2007. Additional data found for 1988-1989 had only TP and CLA concentrations, and 1990 had only Secchi depth information.

A quick look at the lake's database seems to show that the TP concentrations have remained consistently high (between D and F). The CLA and Secchi numbers, which improved slightly after the biomanipulation of 1994, degraded in 1998 and 1999 and, until 2002-2007, had shown some improvement in 2000-2001. However, because of the great variability of available data, no trends are apparent. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

While the lake's CLA concentrations (corresponding to algal abundance) and Secchi transparencies had shown some improvement in 2000-2001, the recent 2002-2007 data show conditions similar to those of 1998-1999. It was mentioned in the 1998 and 1999 lake reports that TP, CLA, and Secchi transparency conditions in 1998 were similar to that of 1994 and 1995 until early-July, and after the big storms (extreme winds, heavy rains) of late-June, when the lake started to experience below normal water quality conditions. It was further mentioned that, during the July 7, 1998 monitoring event 12 dead turtles were seen at the lake's inlet, no "freshwater shrimp" (zooplankton) were seen in the water samples, and the lake had no oxygen in the water below one meter (approximately three feet). At this point the lake's TP concentrations rose, but more abnormally, the lake's CLA and Secchi readings dramatically worsened. The lake's CLA and Secchi readings did not start to rebound until again until late-September of that year. It is thought that the 1998 storms started the degradation of the lake's water quality by increasing runoff from the surrounding watershed, and riling up the lake's sediments. This potentially resulted in an increased TP and sediment load to the lake, increasing turbidity, TP concentrations, algal populations, and reducing water clarity and in-lake oxygen levels (Anhorn 1999).



The perceived physical and recreational conditions of the lake, recorded by the volunteer(s), were ranked on a 1-to-5 scale. The rankings are shown in both tabular and graphical form on the lake's associated information sheet. The mean physical condition ranking was 3.0 (3- "definite algae present"), while the mean recreational suitability ranking was 3.0 (3- "swimming impaired").

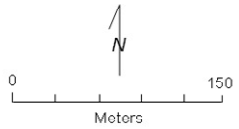
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

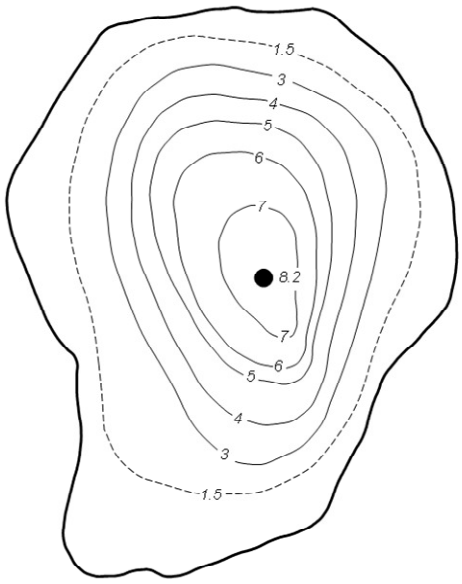
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

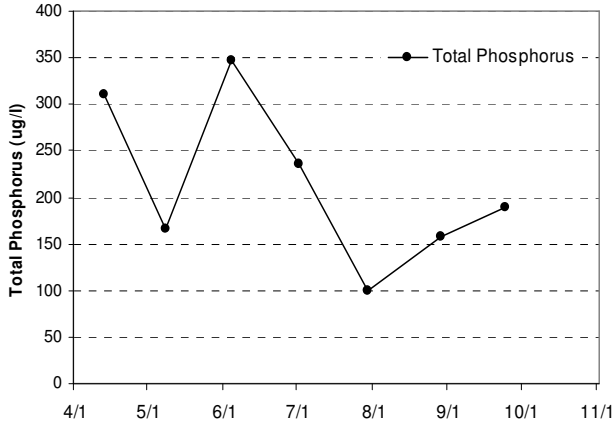
Shields Lake
Forest Lake, Washington Co.

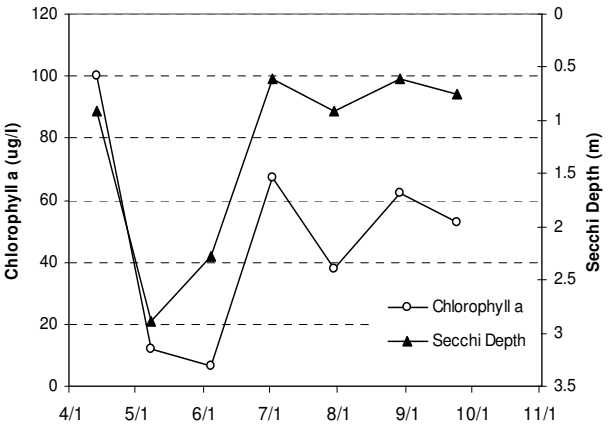
Lake ID: 820162
WD: Comfort Lake - Forest Lake
Volunteer: Washington Conservation District

● Sampling site
Contours in meters



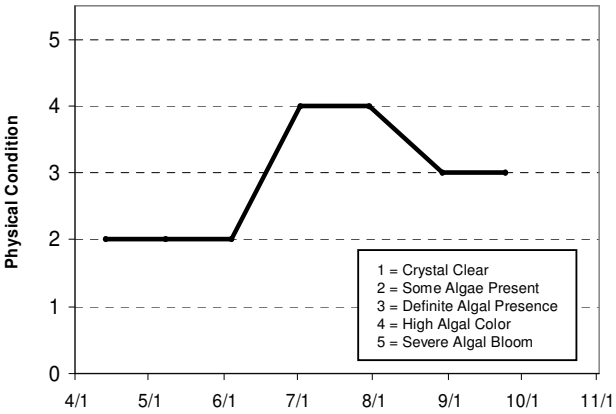






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/13/07	5.5	5.1	19.96	18.82	100	311		0.914	2	2
05/08/07	18.1	6.6	11.16	0.15	12	166		2.896	2	2
06/04/07	22.1	6.8	3.17	0.08	6.5	347		2.286	2	2
07/02/07	27	9.1	5.19	0.13	67	236		0.61	4	2
07/30/07	32.4	10.1	10.25	0.09	38	99		0.914	4	4
08/29/07	24.1	11.5	5.37	0.21	62	157		0.61	3	4
09/24/07	21.9	12	8.63	0.36	53	189		0.762	3	4

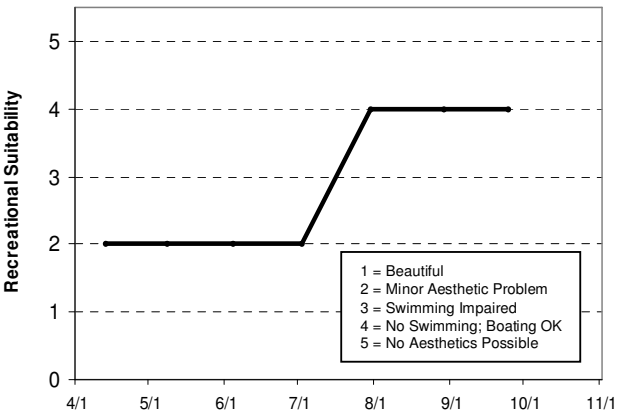


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus									F	D		D		F
Chlorophyll a									D	D		C		C
Secchi Depth											F	C		C
Overall												**C**		**D**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	D	F	F	F	F	F	F	F	F	F	F	F	F	F
Chlorophyll a	C	C	B	A	C	C	C	C	C	C	C	D	D	C
Secchi Depth	C	B	B	B	C	C	C	C	C	C	C	D	C	C
Overall	**C**	**C**	**C**	**C**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data



Silver Lake [Washington County] (82-0016) *Carnelian - Marine Watershed District*

Silver Lake is a 98-acre lake located within Stillwater Township (Washington County). The maximum and mean depths of the lake are 3.4 m (roughly 11 feet) and 1.7 m (five-and-a-half feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 549 ac-ft. 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's 455-acre watershed and surface area translates to a watershed-to-lake size ratio of 4.6:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the eighth year that Silver Lake has been involved in CAMP (although just Secchi transparencies were collected during two of those years). A search through the STORET nationwide water quality database for data on the lake produced a limited amount of data. The only years in which data were found, other than the 2000-2006 CAMP data, was 1996-1999. The only years of which included TP, CLA and Secchi transparency data are available are 1996-2001 and 2004-2006.

The lake was monitored 7 times between late-April and early-October 2007. During each event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	42.8	17.0	90.0	C
CLA (µg/l)	18.9	2.5	57.0	B
Secchi (m)	1.9	1.2	2.3	C
TKN (mg/l)	0.80	0.52	1.40	
			Water Quality	C

The lake's 2007 grade is similar to that recorded in 1996-1998 and 2000-2001 and 2006, better than the grade of D in 1999 and worse than the grades of B in 2004-2005. When looking at the grades and individual parameter means, it is apparent that 2004 was the lakes best-recorded water quality year.

No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems to be well represented by an grade of C+/B-. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

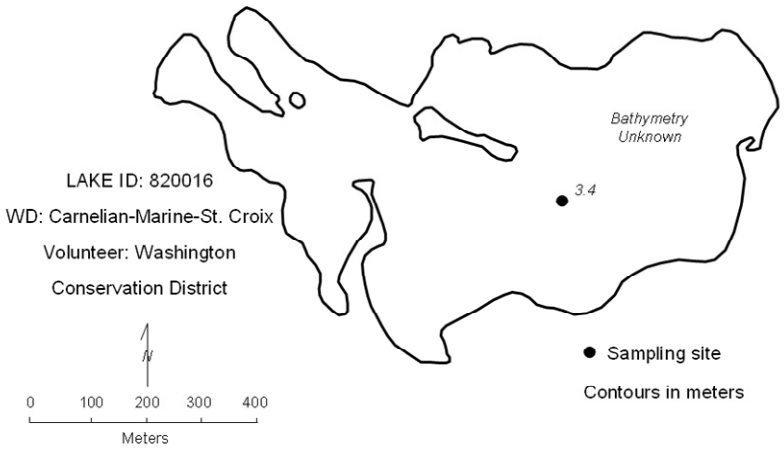
The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.4 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

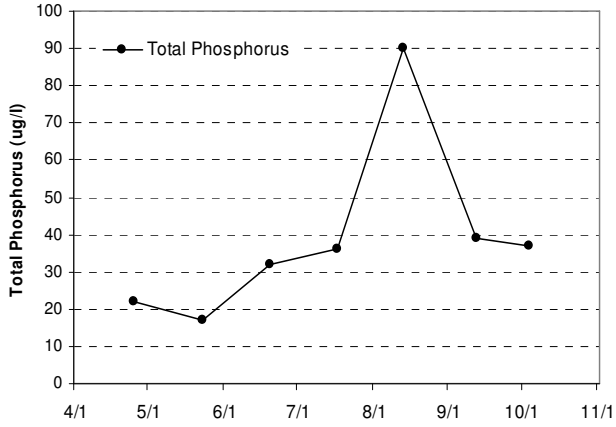
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

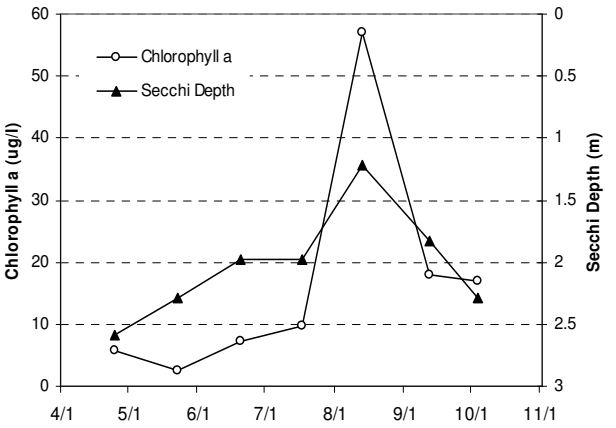
.

Silver Lake

Stillwater Twp., Washington Co.

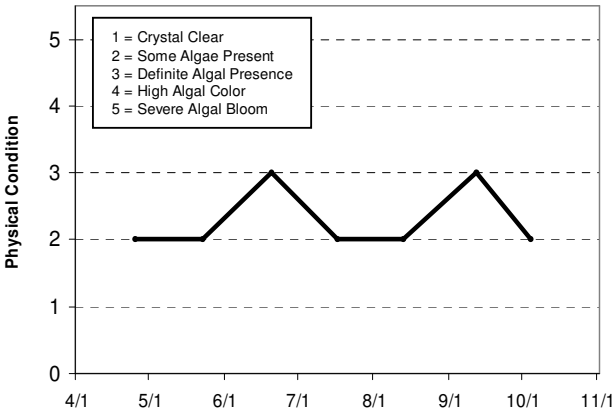






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/25/07	15.1	15.1	9.61	9.71	5.7	22		2.591	2	1
05/23/07	21.6	19.9	8.83	11.08	2.5	17		2.286	2	1
06/20/07	27.1	27	6.93	6.84	7.3	32		1.981	3	2
07/17/07	27.9	25.6	7.47	0.1	9.7	36		1.981	2	2
08/13/07	27.3	23	8.23	0.04	57	90		1.219	2	2
09/12/07	20.6	20.5	5.01	0.6	18	39		1.829	3	3
10/04/07	19.1	18.7	7.94	2.32	17	37		2.286	2	3

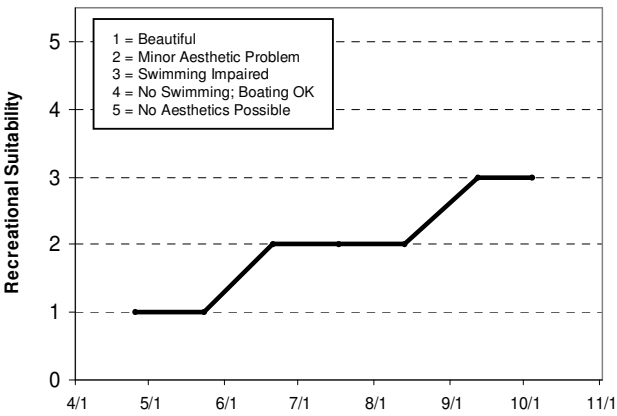


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	C	C	D	C	C			B	C	C	C
Chlorophyll a			C	C	C	D	B	B			A	A	B	B
Secchi Depth			C	D	D	D	C	C	C	B	B	B	C	C
Overall			**C**	**C**	**C**	**D**	**C**	**C**			**B**	**B**	**C**	**C**

Source: Metropolitan Council and STORET data



South Oak Lake (27-0661) *City of St. Louis Park*

South Oak 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. A search through the STORET nationwide water quality database for historic data on the lake was unsuccessful. Thus, 2002-2003, 2006, and 2007 are the only complete, years of available data.

The lake was monitored 8 times between early-May and mid-September 2007. The resulting data and graphs appear on the next page. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	240.6	170.0	295.0	F
CLA (µg/l)	109.5	66.0	200.0	F
Secchi (m)	0.4	0.3	0.5	F
TKN (mg/l)	2.40	1.60	3.40	
			Water Quality	F

The lake's lake quality grade of F in 2007 was determined from the individual parameter grades. The water quality in 2007 was the worst water quality to date for this lake. Continued monitoring of this lake is suggested to determine if this year's poor water quality is an aberration or a sign of a decreasing trend in water quality.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 4.0 for recreational suitability (4- "no swimming - boating ok").

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

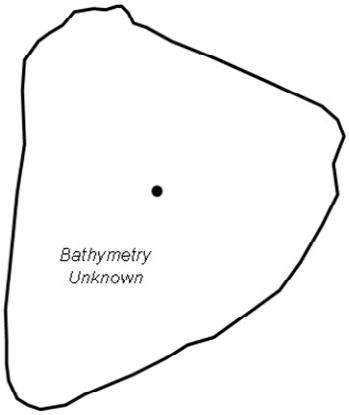
South Oak Lake

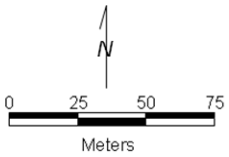
St. Louis Park, Hennepin Co.

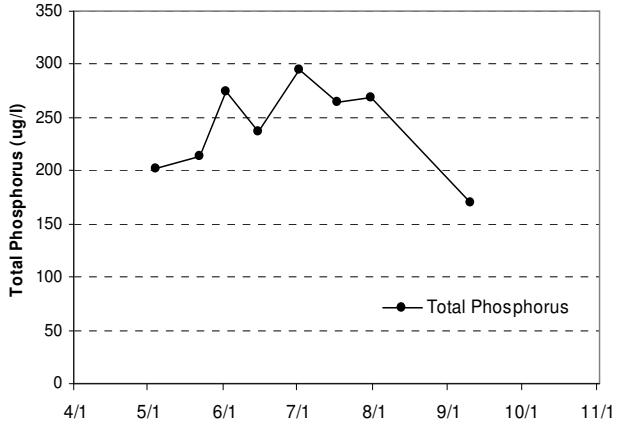
Lake ID: 270661
WD: Minnehaha Creek
Volunteer: Aaron Patterson

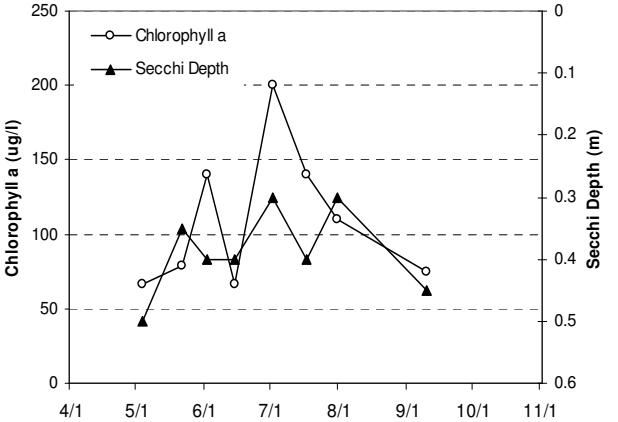
● Sampling site

Contours in meters



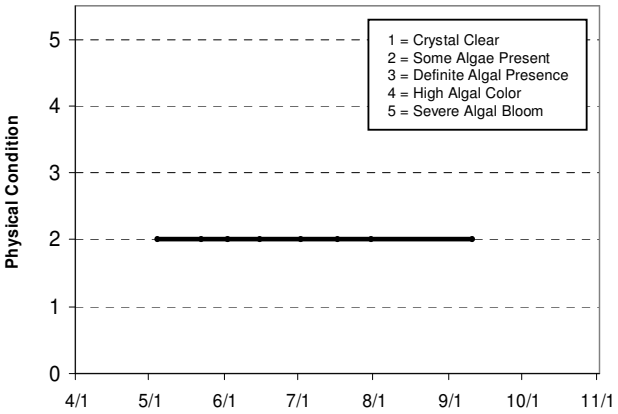






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/04/07	17.4				66	202		0.5	2	4
05/22/07	22.4				79	213		0.35	2	4
06/02/07	23.9				140	275		0.4	2	4
06/15/07	29.1				66	237		0.4	2	4
07/02/07	25.2				200	295		0.3	2	4
07/17/07	29.8				140	265		0.4	2	4
07/31/07	30.8				110	268		0.3	2	4
09/10/07	22.1				75	170		0.45	2	4

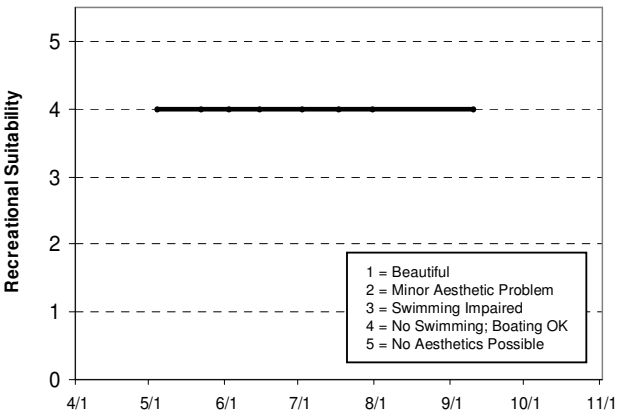


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									D	D			D	F
Chlorophyll a									D	C			C	F
Secchi Depth									D	F			D	F
Overall									**D**	**D**			**D**	**F**

Source: Metropolitan Council and STORET data



South Rice Lake (27-0645) *Bassett Creek Watershed Management Organization*

South Rice Lake is a 3.2-acre lake located within the City of Golden Valley (Hennepin County). The maximum and mean depths of the lake are 2.5 m (roughly 8 feet) and 0.5 m (one-and-a-half feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 5.4 ac-ft. 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's 63-acre immediate watershed and surface area translates to a watershed-to-lake size ratio of 20:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). When including the lake's whole contributing watershed (including flow from Grimes Pond and North Rice Lake), however, the size increases to 514 acres (160:1) (Barr 1997).

This was the eighth year that South Rice Lake has been involved in CAMP (it was also involved in 2000-2005). Other than the 2000-2007 CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty. The lake was monitored 12 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	203.1	50.0	376.0	F
CLA (µg/l)	32.7	16.0	72.0	C
Secchi (m)	0.7	0.4	1.0	D
TKN (mg/l)	1.57	0.82	2.00	
			Water Quality	D

It is apparent that the lake experienced its best water quality in 2004 and its worst water quality was recorded in 2000. The lake received grades of F in 2000, D in 2001-2003 and 2005-2007, and C in 2004.

A recent in-lake alum treatment (applied at ice-off in mid-April, 2002) was meant to lower phosphorus levels, control algal growth and improve water clarity. It was reported in the 2002 Lake Report that the alum treatment was successful in reducing in-lake TP and CLA (indicating a reduction in algal biomass) in 2002. While, the lake's 2002, and 2004-2005 water quality conditions were better than pre-alum treatment, the 2003, 2006, and 2007 water quality was not. Additional years of monitoring are needed to determine the effectiveness and long-term efficiency of the alum treatment.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.8 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 4.7 for recreational suitability (between 4- "no swimming - boating ok" and 5- "no aesthetics possible").

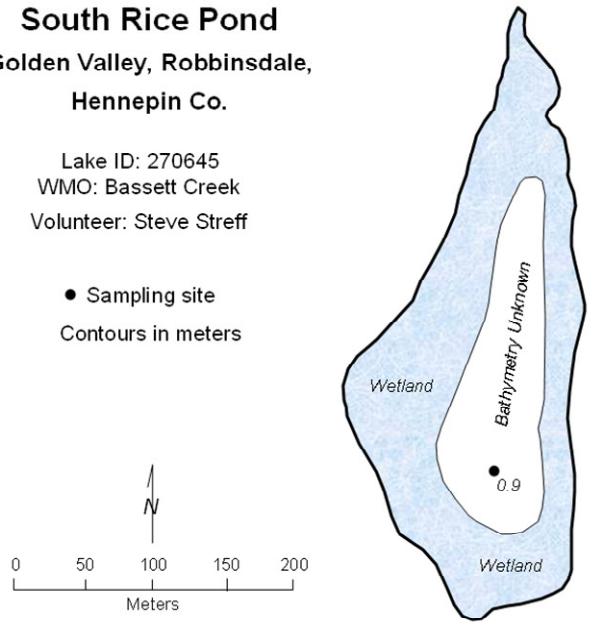
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

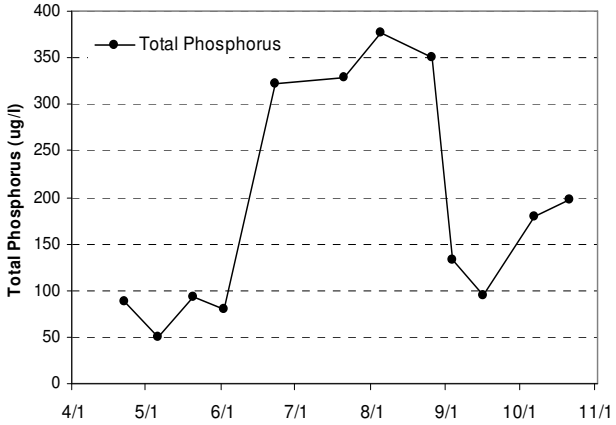
South Rice Pond

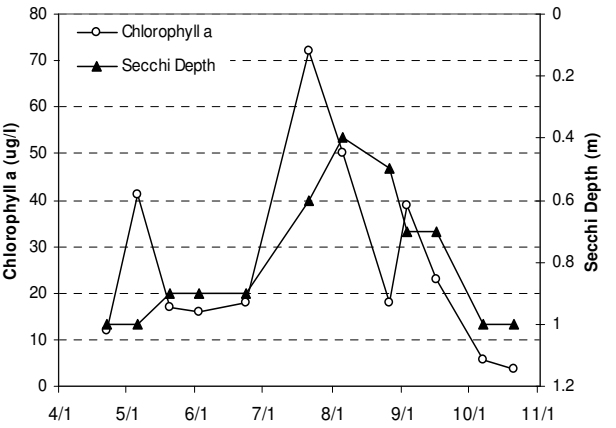
Golden Valley, Robbinsdale, Hennepin Co.

Lake ID: 270645
WMO: Bassett Creek
Volunteer: Steve Streff

● Sampling site
Contours in meters

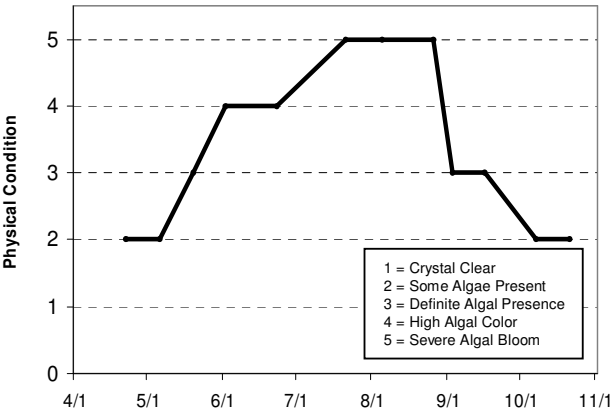






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/22/07	18				12	88		1	2	3
05/06/07					41	50		1	2	4
05/20/07					17	93		0.9	3	4
06/02/07					16	80		0.9	4	5
06/23/07					18	322		0.9	4	5
07/21/07					72	328		0.6	5	5
08/05/07					50	376		0.4	5	5
08/26/07					18	351		0.5	5	5
09/03/07					39	133		0.7	3	5
09/16/07					23	95		0.7	3	4
10/07/07					5.8	179		1	2	4
10/21/07					3.5	198		1	2	3

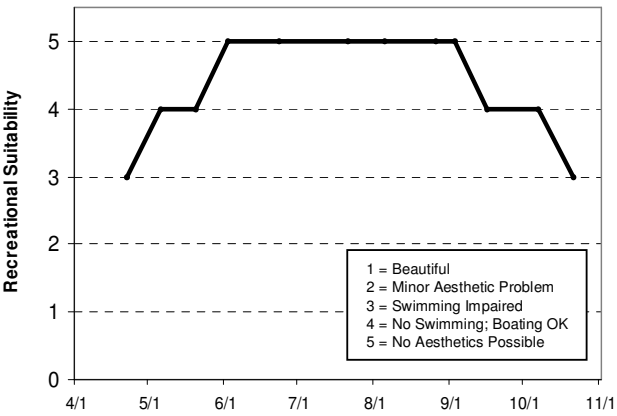


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							F	F	D	F	D	D	F	F
Chlorophyll a							F	B	B	C	A	C	C	C
Secchi Depth							F	F	F	F	D	D	D	D
Overall							**F**	**D**	**D**	**D**	**C**	**D**	**D**	**D**

Source: Metropolitan Council and STORET data



South School Section Lake (82-0151) *Browns Creek Watershed District*

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). About 41 percent of the lake's area is considered littoral, the shallow (0-15 foot depth) area dominated by aquatic vegetation.

On each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. In 2007, the lake was monitored 14 times between mid-April and mid-October.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	58.0	29.0	88.0	C
CLA (µg/l)	41.3	6.1	83.0	C
Secchi (m)	1.5	0.8	3.5	C
TKN (mg/l)	1.48	0.75	2.00	
			Water Quality	C

The lake's 2007 grade of a C was identical to that of 1995, 1996, and 1998, 2005, and 2006. The lake has consistently received C grades so no long term trends in water quality are apparent. Additional year of data are needed to better understand the lake's water quality and what direction it may be heading.

The physical and recreational conditions of South School Section Lake as perceived by the volunteer(s) were ranked on a 1-to-5 scale. These rankings are shown on the lake's information sheet on the next page. The summertime mean physical condition was 3.2 (between 3- "definite algal presence" and 4- "high algal color"). The mean suitability for recreation ranking was 3.3 (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

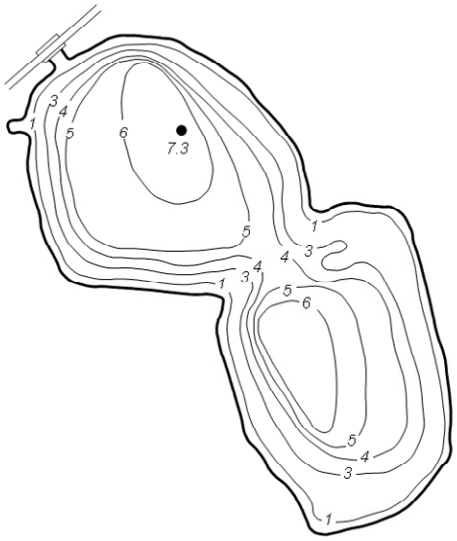
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

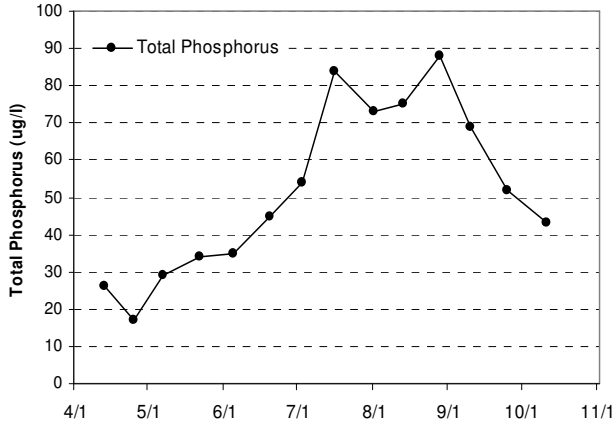
South School Section Lake,
Hugo, Washington Co.

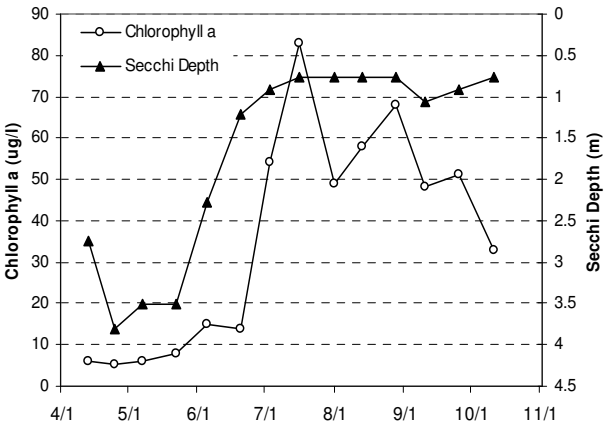
Lake ID: 820151
WD: Browns Creek
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

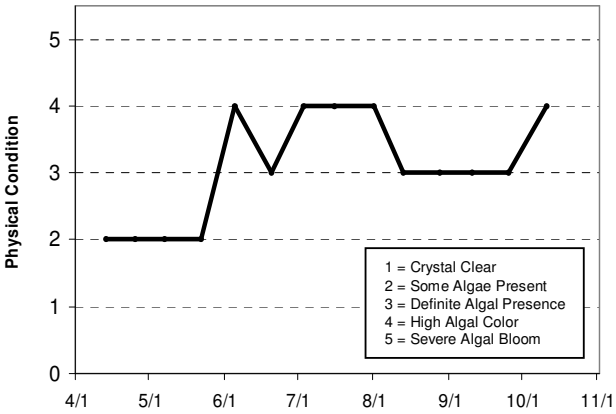






2007 Data

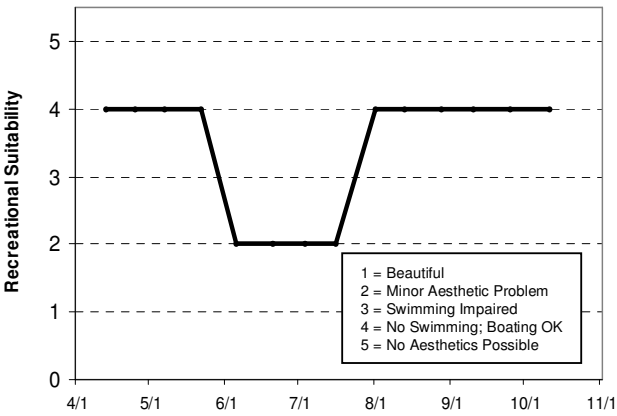
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/13/07	4.1	4.1	13.2	13	5.9	26		2.743	2	4
04/25/07	12.6	12.3	10.91	10.55	5.2	17		3.81	2	4
05/07/07	15.7	15.5	11.32	11.38	6.1	29		3.505	2	4
05/22/07	18.8	18.7	9.1	8.79	7.9	34		3.505	2	4
06/05/07	22.1	19.6	8.53	3.25	15	35		2.286	4	2
06/20/07	26.1	23.6	6.39	0.12	14	45		1.219	3	2
07/03/07	26.5	22.9	6.95	0.1	54	54		0.914	4	2
07/16/07	26.2	24.6	8.61	0.17	83	84		0.762	4	2
08/01/07	30.2	24.2	8.59	0.09	49	73		0.762	4	4
08/13/07	25.5	22	7.26	0.03	58	75		0.762	3	4
08/28/07	24.1	23.5	7.24	1.58	68	88		0.762	3	4
09/10/07	24.5	24	6.25	3.79	48	69		1.067	3	4
09/25/07	21.5	21.5	8.02	7.79	51	52		0.914	3	4
10/11/07	17.2	17	7.58	7.41	33	43		0.762	4	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		C	C		C							C	C	C
Chlorophyll a		C	C		C							C	C	C
Secchi Depth		C	C		C							B	C	C
Overall		**C**	**C**		**C**							**C**	**C**	**C**



Source: Metropolitan Council and STORET data

South Twin Lake (82-0019) Carnelian - Marine Watershed District

South Twin Lake is a 54-acre lake located within Stillwater Township (Washington County). The maximum and mean depths of the lake are 4.0 m (roughly 13 feet) and 2.0 m (six and a half feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 356 ac-ft. 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's 63-acre immediate watershed and surface area translates to a very small watershed-to-lake size ratio of 1.2:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the eighth year that South Twin Lake has been involved in CAMP (although just Secchi transparencies were collected in two of those years). A search through the STORET nationwide water quality database for data on the lake produced a limited amount of data. The only years in which data were found, other than the 2000-2006 CAMP data, was 1996-1999. The years which included TP, CLA and Secchi transparency data were 1996-2001 and 2004-2006.

The lake was monitored seven times between late-April and late-October 2007. During each event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	79.0	66.0	93.0	D
CLA (µg/l)	32.6	10.0	58.0	C
Secchi (m)	1.0	0.6	1.5	D
TKN (mg/l)	2.12	1.70	2.40	
			Water Quality	D

Because of the variability in the lake's water quality database, no long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems to be well represented by an grade of D+/C. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.4 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

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

South Twin Lake

Stillwater Twp., Washington Co.

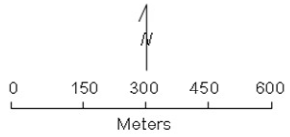
LAKE ID: 820019

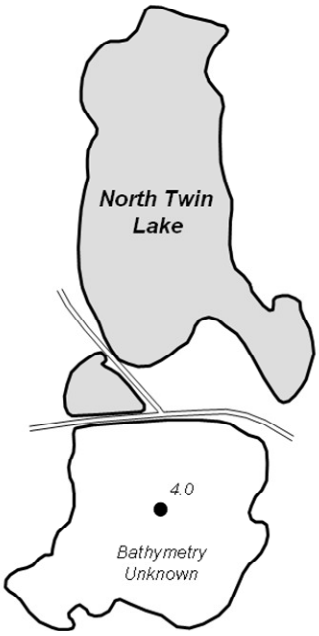
WD: Carnelian-Marine-St. Croix

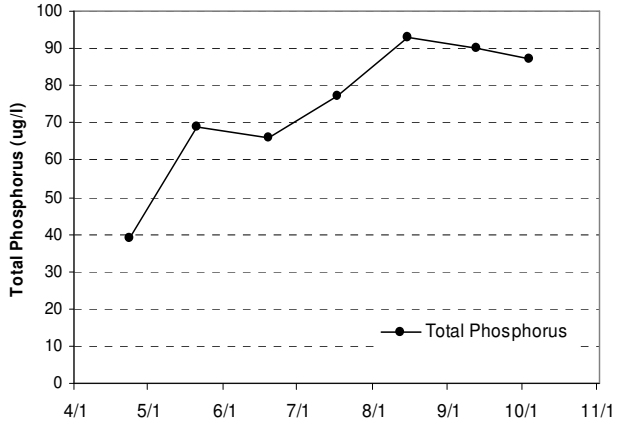
Volunteer: Washington Conservation District

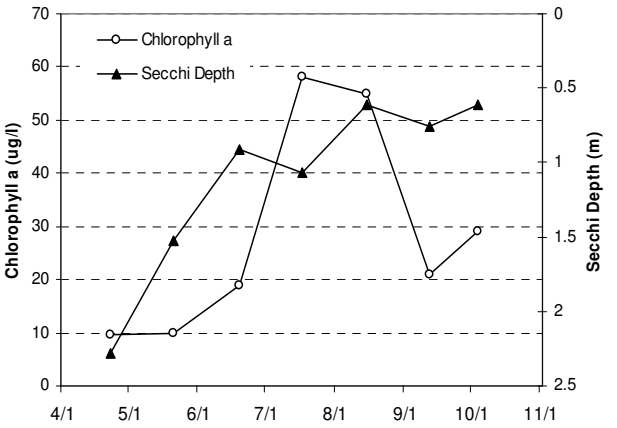
● Sampling site

Contours in meters



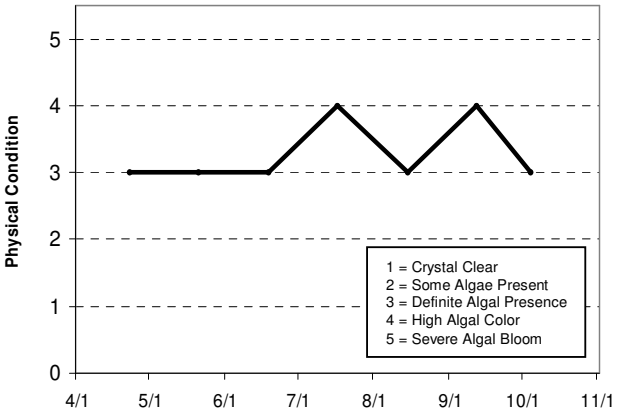






2007 Data

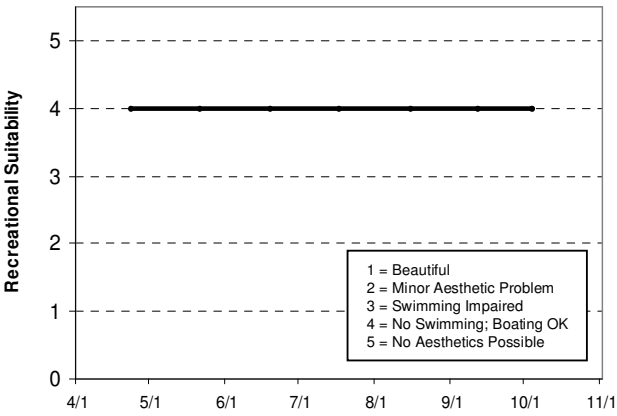
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/23/07	15.9	15.6	10.95	11.07	9.5	39		2.286	3	4
05/21/07	20	19.4	9.04	9.23	10	69		1.524	3	4
06/19/07	26.6	26.5	6.99	7.08	19	66		0.914	3	4
07/17/07	28.2	25.7	11.06	0.07	58	77		1.067	4	4
08/15/07	27.4	26.9	7.12	0.17	55	93		0.61	3	4
09/12/07	21.2	21	7.59	0.2	21	90		0.762	4	4
10/04/07	19.7	18.9	9.05	0.22	29	87		0.61	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	C	D	D	C	D			C	C	D	D
Chlorophyll a			D	D	D	F	C	D			B	C	C	C
Secchi Depth			D	D	F	F	D	F	D	C	C	C	D	D
Overall			**D**	**D**	**D**	**F**	**C**	**D**			**C**	**C**	**D**	**D**



Source: Metropolitan Council and STORET data

Spring Lake [Scott County] (70-0054) *Prior Lake - Spring Lake Watershed District*

Spring Lake is located in southeastern Spring Lake Township in Scott County. The 630-acre lake (5.0 miles in circumference) is considered a "Priority Lake" by the Metropolitan Council because of its multi-recreational uses.

The lake has a large 13,500-acre watershed. The lake and watershed areas translate to a large watershed-to-lake area ratio of 21:1. The larger the ratio, the greater the potential stress on the lake's quality from surface runoff. The majority of the lake's watershed is agricultural.

The maximum and mean depths of the lake are 11.3 and 5.6 m (37 and 18 feet), respectively. About 50 percent of the lake's area is considered littoral (the 0-15 foot depth area dominated by aquatic vegetation). The approximate volume of the lake is approximately 11,500 acre-feet (ac-ft) and a public access to the lake is located on its southwestern shores.

Spring Lake is very fertile, receiving nutrients from runoff and from internal sources. The great fertility causes legendary algal growths. The blue-green algal blooms are a serious nuisance, and purportedly have been the cause of the death of four dogs, which died after drinking the water in 1980.

In an attempt to improve the lake's water quality, a ferric chloride addition system was constructed at the outlet of the Highway 13 wetland in 1998 with continuous operation starting in 1999. The system, which consists of a dosing station at the outlet of the wetland, followed by a de-siltation (settling) basin, meters ferric chloride into storm water to enhance phosphorus removal prior to entering the lake. The ferric chloride removes nutrients from the water column, thereby reducing their availability to algal growth. As the ferric chloride dosed storm water enters the de-siltation basin the ferric chloride rapidly dissociates to form free iron which reacts with soluble phosphorus to form relatively insoluble iron-phosphorus complex (referred to as floc). The de-siltation basin then provides an area where the floc can settle out through the water column and can be eventually removed.

The results from the monitoring of the system in 1999 indicated that there was significant reductions in the ortho-phosphorus load (41 percent) and some reduction in the total phosphorus load (21 percent) from the ditch prior to entering the lake (Prior Lake – Spring Lake Watershed District 2001). The watershed district has continued to monitor the effectiveness of the system.

While Spring Lake has been monitored by Metropolitan Council staff in the past, 2007 was the ninth year it has been involved in CAMP (the others being 1997 and 2000-2006). In 2007 the lake was monitored 8 times between mid-May and mid-October. On each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. However, the chlorophyll-a results were suspiciously low in comparison to historical results. Furthermore, there were indications that the volunteer had difficulties in collecting the chlorophyll-a samples. Therefore the results of the chlorophyll-a are considered suspect and are not reported.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.0	22.0	74.0	C
CLA (µg/l)				
Secchi (m)	0.8	0.4	1.5	D
TKN (mg/l)	1.85	1.40	2.50	
			Water Quality	C

Historical data for Spring Lake indicates that the water quality of the basin has remained fairly constant over the past decade fluctuating between grades of C and D. Because of the fluctuation in the lake's grades, no long-term trends are apparent. To better understand all aspects of the lake's water quality and what direction it may be heading, continued monitoring is suggested.

In an attempt to address issues either contributing to the eutrophication of Spring Lake or the symptoms from the resulting eutrophication, the Prior Lake - Spring Lake Watershed District has recently completed a Sustainable Water Quality Management Plan for its lakes (including Spring Lake). The Plan set goals addressing the lakes' biological and chemical make-up and developed implementation strategies enabling the lakes' goals to be met (PLSLWD 2004).

The physical and recreational conditions of Spring Lake as perceived by the volunteer(s) were ranked on a 1-to-5 scale. These rankings are shown on the lake's information sheet on the next page. The mean summertime physical condition was 3.3 (between 3- "definite algae present" and 4- "high algal color"). The mean suitability for recreation ranking was 2.9 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

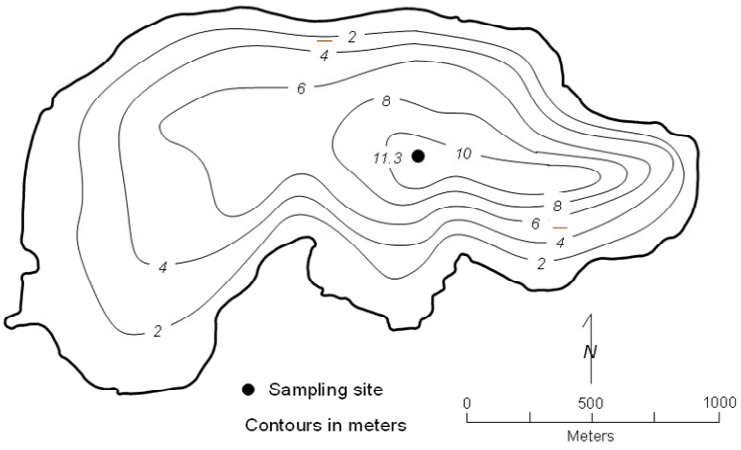
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

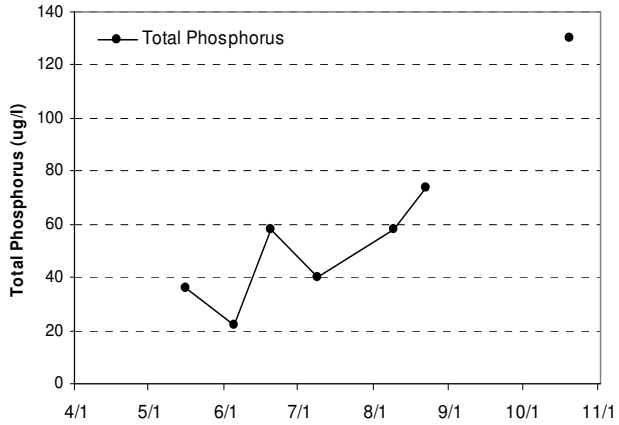
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

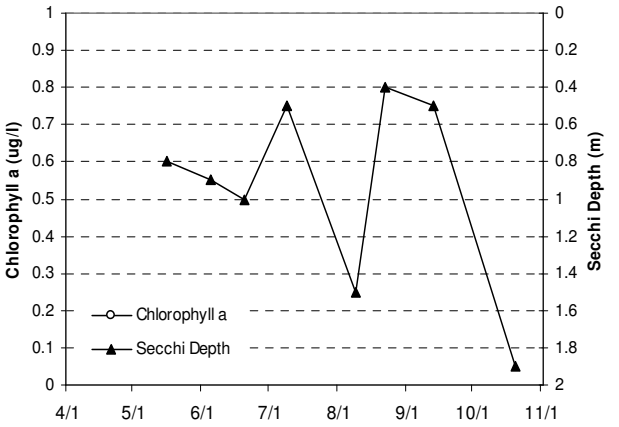
Spring Lake

Prior Lake/Spring Lake Twp., Scott Co.

Lake ID: 700054
WD: Prior Lake-Spring Lake
Volunteer: Lance Needham

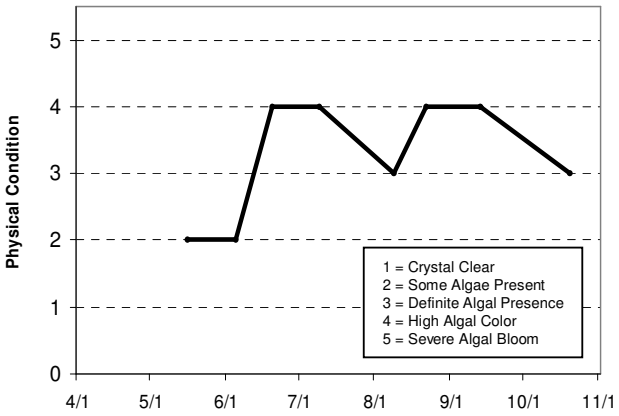






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/16/07	18					36		0.8	2	3
06/05/07	21					22		0.9	2	3
06/20/07	21					58		1	4	3
07/09/07	24					40		0.5	4	2
08/09/07	27					58		1.5	3	3
08/22/07	23.7					74		0.4	4	3
09/13/07	20.3							0.5	4	3
10/20/07	14.3					130		1.9	3	3

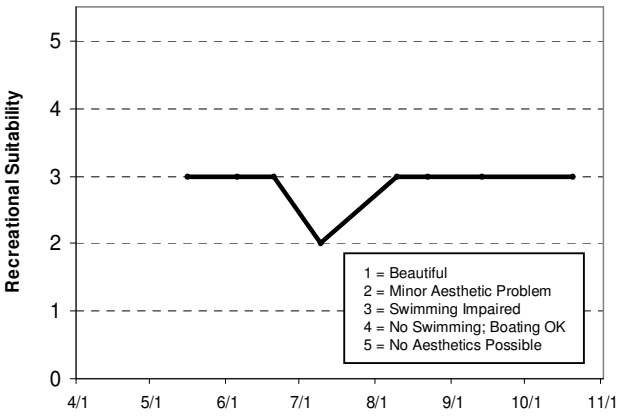


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	F	D	D		D									
Chlorophyll a	C	C	C		D						C			
Secchi Depth	C	B	C	C	C	D	D	D	D	C	B	D	C	C
Overall	**D**	**C**	**C**		**D**									

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			D	D			F	D	D	D	D	D	D	C
Chlorophyll a			C	C			D	D	F	C	D	C	C	
Secchi Depth	C	C	D	D			C	D	F	C	D	C	C	D
Overall			**D**	**D**			**D**	**D**	**F**	**C**	**D**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Square Lake (82-0046) *Marine on St. Croix Watershed Management Organization*

Square Lake, located in eastern May Township (Washington County), is a 193-acre lake (shoreline length of about 2.2 miles) with a maximum and mean depth of 20.7 and 9.0 m (68.0 and 29.5 feet), respectively, for an approximate lake volume of 5,694 ac-ft. About 65 percent of the lake's area is considered littoral (the 0-15 foot depth area dominated by aquatic vegetation). The lake can be accessed through the county park on the southeastern end of the lake. Because of its multi-recreational uses, it is considered a "Priority Lake" in the Metropolitan Area.

The lake is only one of five lakes in the seven-county metropolitan area stocked with trout (rainbows). The lake's level is maintained by a combination of groundwater and runoff from the lake's watershed (MDNR 1996).

The lake's watershed is small (about 782 acres) and rural. The watershed and lake size translate to a very small watershed-to-lake size ratio of 4:1 (the smaller the ratio the less the stress on the lake from surface runoff). The watershed is largely undeveloped; wetlands, parks and open spaces, grasslands and woodlands comprise about 70 percent of the watershed's area.

Square Lake, which was involved in CAMP in 1993-1997, and monitored by Council staff in 1998 (as an in-kind contribution to a Clean Water Partnership project on the lake), was a part of CAMP again from 1999-2007. The lake was monitored 14 times from mid-April to mid-October 2007.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	14.0	7.0	25.0	A
CLA (µg/l)	3.5	1.9	5.4	A
Secchi (m)	5.4	4.4	6.9	A
TKN (mg/l)	0.49	0.21	0.62	
			Water Quality	A

The lake's 2007 water quality grade is similar to those recorded in 1993-2007. However, a recent trend analysis by the MPCA on the lake's historical (1970-present) Secchi transparency database, revealed a statistically significant decline in recent water clarity (MPCA 2008).

The water quality graphs show seasonal trends in mean TP and CLA concentrations and Secchi transparency for 2007, which closely resemble those of past years. In most metro area lakes, TP, CLA and Secchi transparency generally have a tightly linked relationship, such that as TP concentrations increase, algal biomass increases resulting in higher CLA concentrations and lower water clarity. This issue is one that has been addressed as part of the Clean Water Partnership on the lake (Square Lake 2001).

As was mentioned in previous Council lake reports, the data for Square Lake show that the above mentioned relationships are not exclusively dependent on each other. While the graphs show a correlation between CLA and Secchi transparency (clarity increases as CLA decreases and vice versa), TP seemed independent of the other two. An increase or decrease in TP does not automatically result in the same reaction in CLA concentration, which means that phosphorus is not the limiting factor in Square Lake's algal abundance. In fact, earlier Council studies have noted that the lake has lower CLA concentrations than would be expected based on its nutrient levels (Osgood 1981). The reason was discussed in a 1980 Council report and a more recent Clean Water Partnership report on Square Lake which both state that CLA is limited by the presence of large zooplankton (*Daphnia pulicaria*) which are

herbivores that graze on algae and keep the lake's CLA concentrations in check. Therefore, the lake's excellent clarity is due to the presence of ***Daphnia*** rather than limited by nutrients.

More detailed discussions on the lake, its water chemistry, biological make-up, and hydrology and their influence on the lake can be found in the recent diagnostic-feasibility study completed on the lake as part of a Clean Water Partnership (Square Lake 2001). The complete report highlights the concern of a degrading water clarity trend, the importance of the lake's biological make-up on its water quality, and the influence the lake's surface and groundwater watersheds have on the lake's phosphorous load. The Clean Water Partnership report also includes proposed watershed, shoreland, and in-lake projects designed to address issues affecting the lake's quality. An additional resource is an October 2002 report summarizing the lakes recent zooplankton population from monitoring conducted from August 2001-July 2002 (Washington Conservation District 2002)

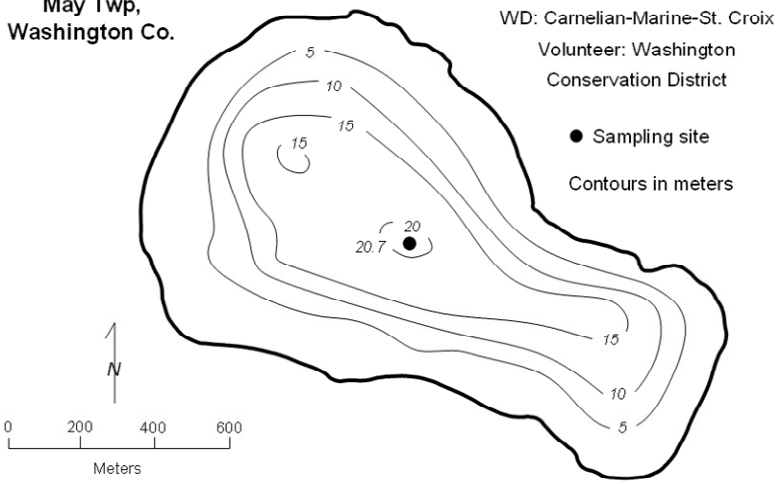
On each monitoring date, volunteers ranked their opinions of physical and recreational conditions of the lake on a 1-to-5 scale, which are graphed on the lake information sheet. The summertime mean recorded physical condition was 1.6 (between 1- "crystal clear" and 2- "some algae present"). The mean suitability for recreation ranking was 1.1 (between 1- "beautiful" and 2- "minor aesthetic problem").

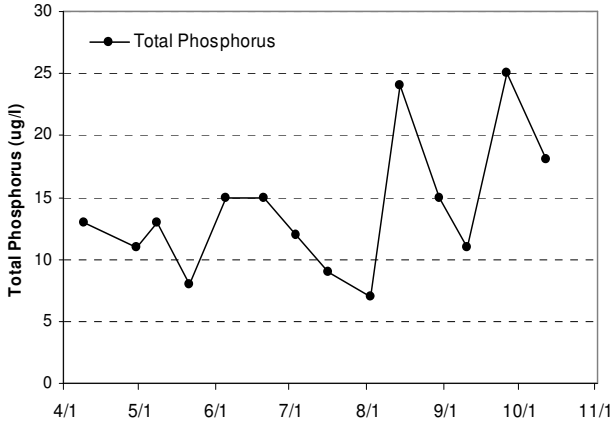
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

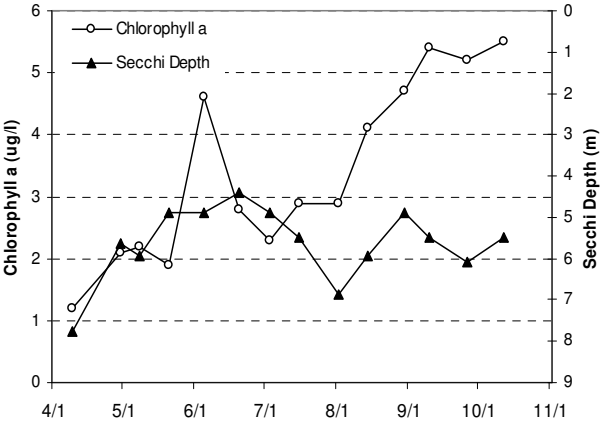
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Square Lake

May Twp,
Washington Co.

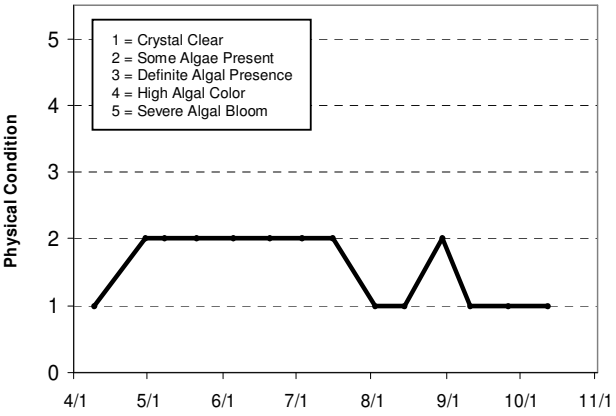






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/09/07	4.9	4.2	12.22	11.7	1.2	13		7.772	1	1
04/30/07	14.6	4.9	10.83	9.57	2.1	11		5.639	2	1
05/08/07	16.2	6.6	11.75	0.24	2.2	13		5.944	2	1
05/21/07	17.8	6.6	9.9	0.3	1.9	8		4.877	2	1
06/05/07	22.5	7	10.11	0.21	4.6	15		4.877	2	1
06/20/07	26.7	9.4	7.2	0.16	2.8	15		4.42	2	1
07/03/07	27.2	8.4	8.37	0.08	2.3	12		4.877	2	1
07/16/07	26.9	8.7	7.5	0.08	2.9	9		5.486	2	1
08/02/07	29.7	8.9	7.6	0.26	2.9	7		6.858	1	1
08/14/07	28.3	9	7.4	0.38	4.1	24		5.944	1	1
08/30/07	24.5	8.8	8.02	0.36	4.7	15		4.877	2	2
09/10/07	25.4	9.1	8.96	0.64	5.4	11		5.486	1	1
09/26/07	21.3	9.6	8.29	0.48	5.2	25		6.096	1	1
10/12/07	18.1	9.5	6.19	0.49	5.5	18		5.486	1	1

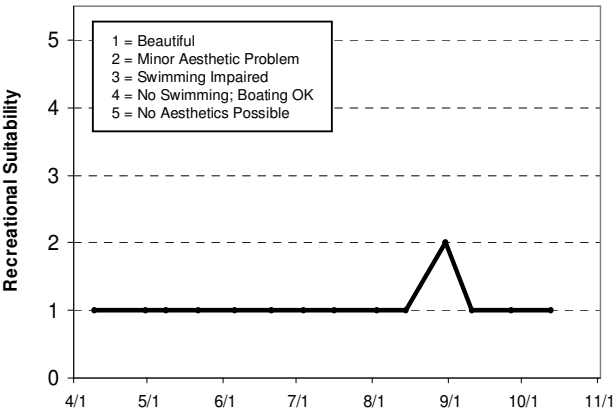


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	B	A	A	A	A	A				A				A
Chlorophyll a	A	A	A	A	A	A				A				A
Secchi Depth	A	A	A	A	A	A	A	A	A	A	A			A
Overall	**A**	**A**	**A**	**A**	**A**	**A**				**A**				**A**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorophyll a	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Secchi Depth	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Overall	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Staples Lake (82-0028) *Carnelian - Marine Watershed District*

Staples Lake is a 24-acre lake located within May Township (Washington County). The maximum and mean depths of the lake are 4.3 m (roughly 14 feet) and 2.1 m (seven feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 165 ac-ft. 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's 127-acre watershed and surface area translates to a watershed-to-lake size ratio of 5.3:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff). There is no formal boat access point on the lake.

This was the eighth year that Staples Lake has been involved in CAMP (although just Secchi transparencies were collected in two of those years). A search through the STORET nationwide water quality database for data on the lake produced a limited amount of data. The only years in which data were found, other than the 2000-2007 CAMP data, was 1997-1999. The years which included TP, CLA and Secchi transparency data were 1997-2001 and 2004-2006.

The lake was monitored 7 times between early-May and mid-October 2007. During each event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.5	18.0	37.0	B
CLA (µg/l)	9.9	1.7	34.0	A
Secchi (m)	3.0	2.6	3.5	B
TKN (mg/l)	0.58	0.45	0.70	
			Water Quality	B

The lake's 2007 water quality grade of B is the same as reported in 1997-2001, 2004, and 2006 and worse than that reported in 2005 (grade of A).

No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's quality seems well represented by an grade of B. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.3 for physical condition (between 2- "some algae present" and 3- "definite algal presence"), and 3.3 for recreational suitability (3- "swimming impaired" and 4- "no swimming; boating ok").

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

Staples Lake

May Twp., Washington Co.

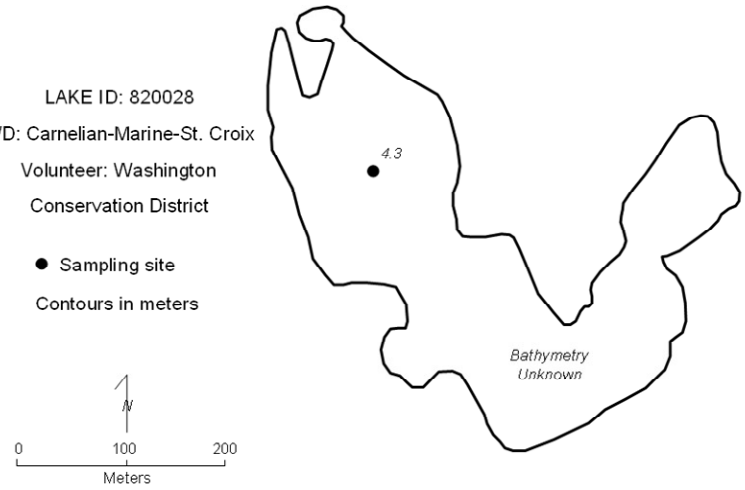
LAKE ID: 820028

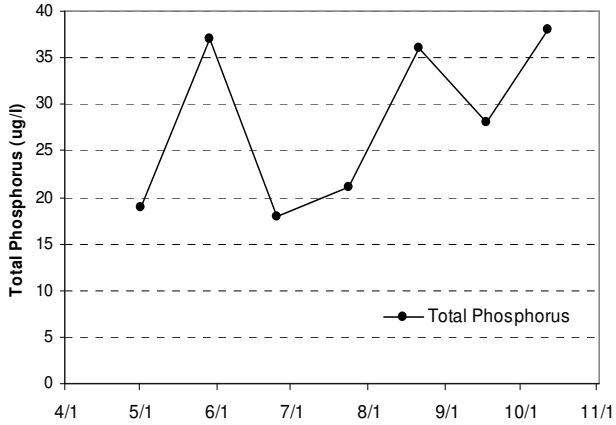
WD: Carnelian-Marine-St. Croix

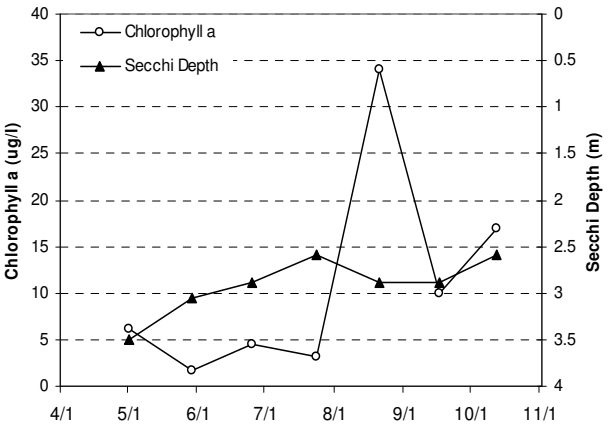
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

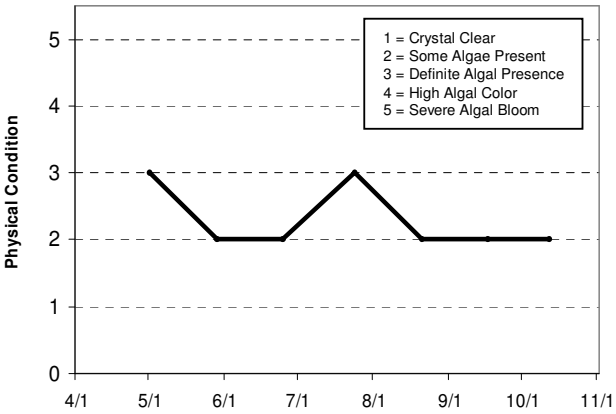






2007 Data

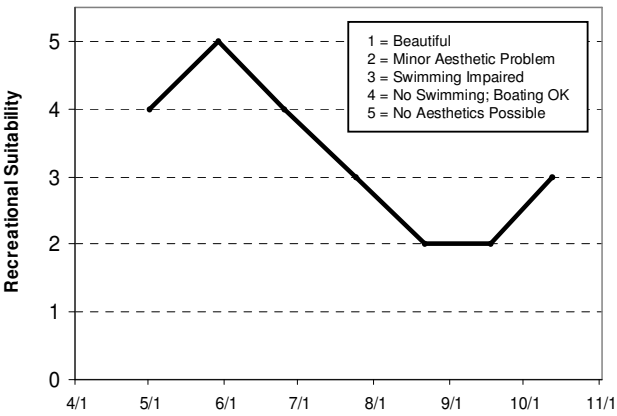
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/01/07	17	14.1	8.72	10.95	6.2	19		3.505	3	4
05/29/07	22.8	20.2	9	11.03	1.7	37		3.048	2	5
06/25/07	28.5	26.2	6.2	1.83	4.4	18		2.896	2	4
07/24/07	27.2	26.1	5.77	0.41	3.2	21		2.591	3	3
08/21/07	23.1	22.1	3.56	1.36	34	36		2.896	2	2
09/17/07	19.6	18.5	7.88	0.22	10	28		2.896	2	2
10/12/07	15.6	15.4	5.97	2.65	17	38		2.591	2	3



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus				B	A	A	C	B			C	A	C	B
Chlorophyll a				C	B	B	B	B			A	A	A	A
Secchi Depth				B	B	B	B	B	B	C	B	B	A	B
Overall				**B**	**B**	**B**	**B**	**B**			**B**	**A**	**B**	**B**



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 five monitoring sites amongst the four pools in 2007. The results will be discussed for the entire lake, as well as individually for each of the five 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. The morphometry of each of the pools is shown in the table below.

Lake St. Croix Morphometry

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

(USGS 2002)

This marks the third year in which any of the Lake St. Croix sites have been formally involved in CAMP. A citizen-monitoring program conducted by the St. Croix Basin Team produced water quality data for four sites (Bayport Pool- Site 2; Troy Beach Pool-Site 3; Troy Beach Pool-Site 5; and Black Bass Pool-Site 6) during the 1999-2002 and 2005-2006 period, and for one site (Kinnickinnic Pool-Site 7) during the 2000-2001 and 2005-2006 period. All data are available in STORET.

As part of this report, the lake will first be discussed as a combined "whole" lake system, and then will be followed by sections on each of the five sites individually.

On each sampling event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	36.0	18	74.0	C
CLA (µg/l)	21.0	1.0	39.0	C
Secchi (m)	1.7	1.0	3.0	C
TKN (mg/l)	0.73	0.33	2.10	
			Water Quality	C

The whole lake's 2007 grade of a "C" is identical to those recorded in 1999-2002 and 2005-2006. That said, the individual parameter means indicate that 2006 was the lake's best water quality year since the inception of the volunteer monitoring program. Because of the limited nature of the lake's database however, it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

Lake water quality grades based on the whole lakes summer means

Year	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Total Phosphorus						D	D	C	C			C	C	C
Chlorophyll a						B	C	C	C			B	B	C
Secchi Depth						C	C	C	C			C	C	C
Overall						**C**	**C**	**C**	**C**			**C**	**C**	**C**

Source: Metropolitan Council and STORET data

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 2.0 for recreational suitability (2- "minor aesthetic problem").

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) 297-4916 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. Croix Lake [Bayport Pool-Site 2] (82-0001) *St. Croix Basin Planning Team*

Lake St. Croix [Bayport Pool-Site 2] was monitored 9 times between mid-May and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

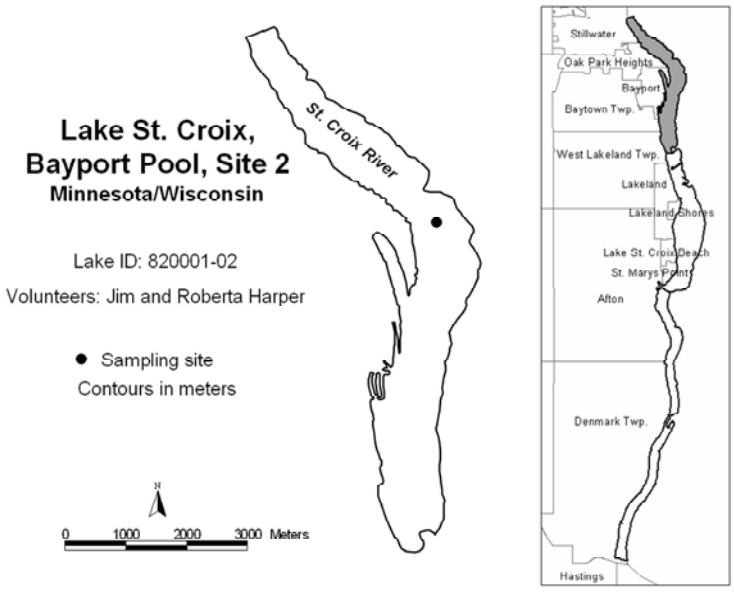
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	43.6	35.0	53.0	C
CLA (µg/l)	20	11	34	C
Secchi (m)	1.7	1.6	2.5	C
TKN (mg/l)	0.76	0.56	1.00	
			Water Quality	C

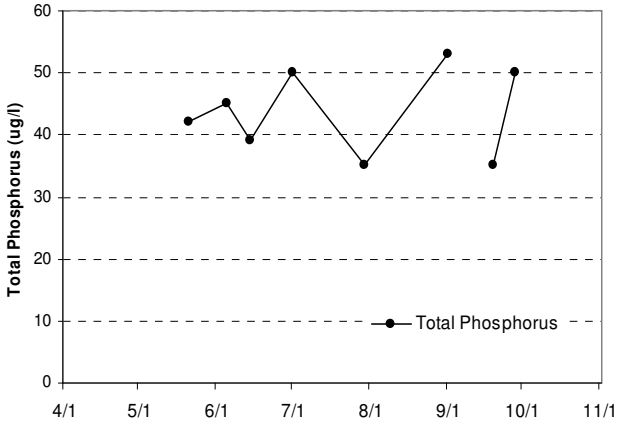
The site's 2007 grade (C) is identical to those recorded in 1999-2001 and 2005-2006, and better than the D recorded in 2002. Because of the limited nature of the site's database however, it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

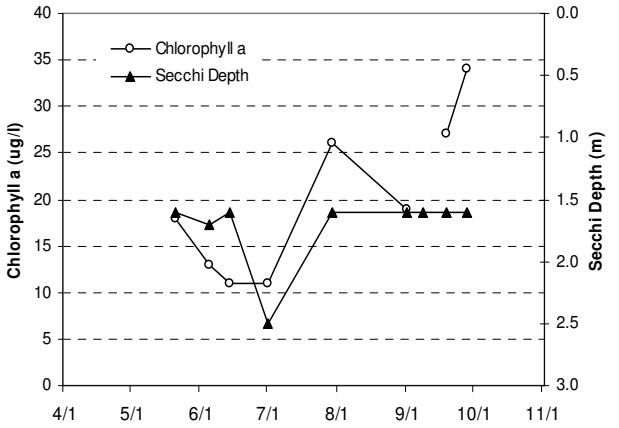
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 1.7 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 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.

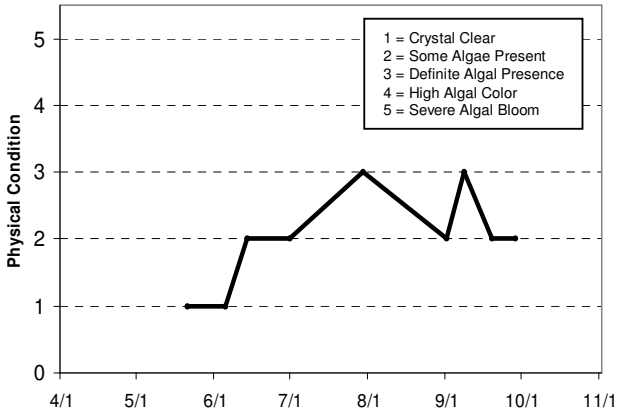






2007 Data

Site	Date	Surface Temp (C)	CLA ug/L	Surf. TP ug/L	Secchi Depth (m)	Physical Condition Rating	Rec. Suitability Rating
SCU-2	21-May-07	18.8	18	42	1.6	1	1
SCU-2	5-Jun-07	21.8	13	45	1.7	1	1
SCU-2	14-Jun-07	26.3	11	39	1.6	2	2
SCU-2	1-Jul-07	26.5	11	50	2.5	2	2
SCU-2	30-Jul-07	28.3	26	35	1.6	3	2
SCU-2	1-Sep-07	24.3	19	53	1.6	2	2
SCU-2	8-Sep-07	19.1			1.6	3	2
SCU-2	19-Sep-07	20.1	27	35	1.6	2	1
SCU-2	28-Sep-07	19.0	34	50	1.6	2	2

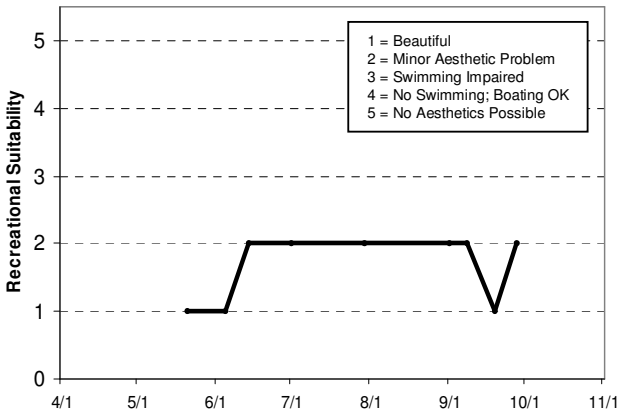


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C	D	D	D			C	C	C
Chlorophyll a						B	C	C	C			C	C	C
Secchi Depth						C	C	C	D			C	C	C
Overall						**C**	**C**	**C**	**D**			**C**	**C**	**C**

Source: Metropolitan Council and STORET data



St. Croix Lake [Troy Beach Pool-Site 3] (82-0001) *St. Croix Basin Planning Team*

Lake St. Croix [Troy Beach Pool-Site 3] was monitored 9 times between late-May and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	39.0	25.0	58.0	C
CLA (µg/l)	25	17	36	C
Secchi (m)	1.5	1.0	2.6	C
TKN (mg/l)	0.51	0.33	0.72	
			Water Quality	C

The site's 2007 grade (C) is identical to those recorded in 1999-2001 and 2005-2006, and better than the D recorded in 2002.

Because of the limited nature of the site's database, it is not possible to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 2.3 for recreational suitability (2- "minor aesthetic problem" and 3- "swimming impaired").

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) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

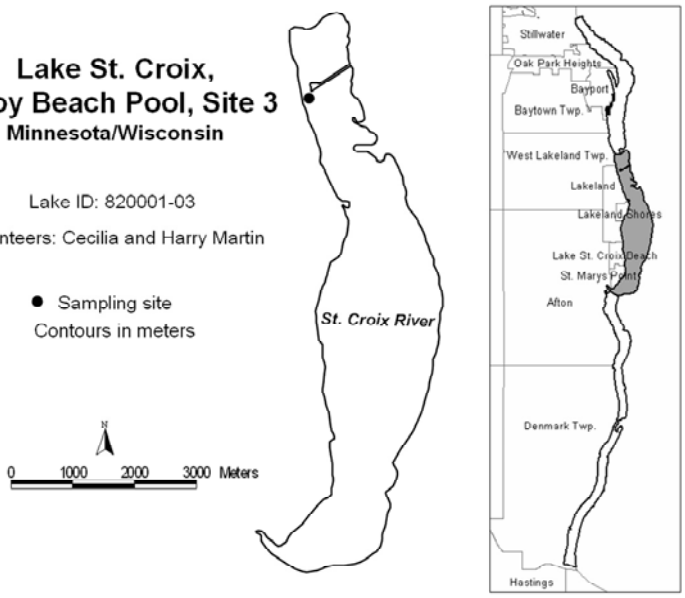
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

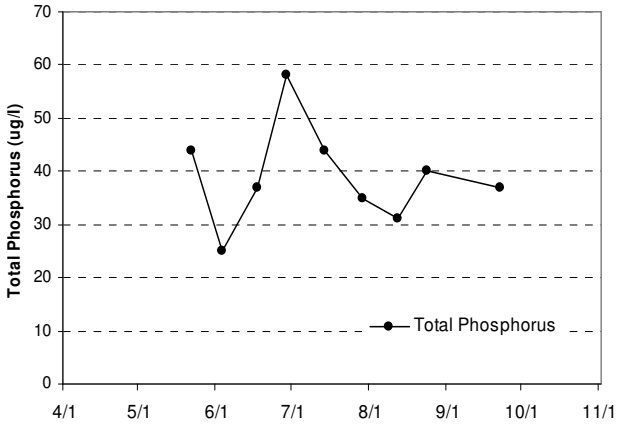
Lake St. Croix, Troy Beach Pool, Site 3

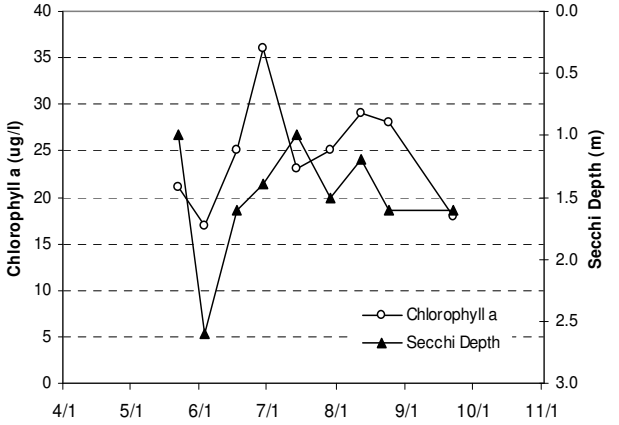
Minnesota/Wisconsin

Lake ID: 820001-03

Volunteers: Cecilia and Harry Martin

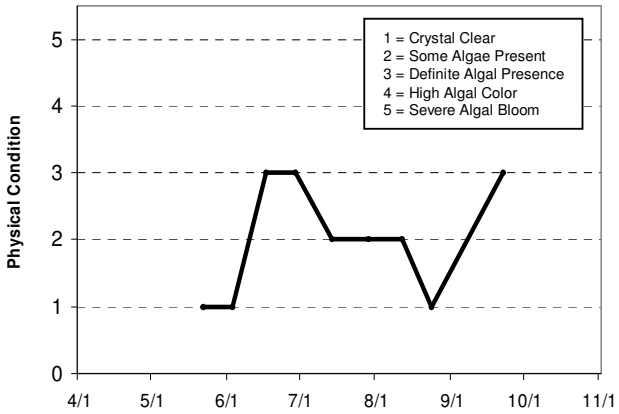






2007 Data

Site	Date	Surface Temp (C)	CLA ug/L	Surf. TP ug/L	Secchi Depth (m)	Physical Condition Rating	Rec. Suitability Rating
SCM-3	22-May-07	19.0	21	44	1.0	1	
SCM-3	3-Jun-07	21.5	17	25	2.6	1	1
SCM-3	17-Jun-07	27.2	25	37	1.6	3	2
SCM-3	29-Jun-07	26.7	36	58	1.4	3	4
SCM-3	14-Jul-07	24.9	23	44	1.0	2	2
SCM-3	29-Jul-07	27.5	25	35	1.5	2	2
SCM-3	12-Aug-07	26.6	29	31	1.2	2	2
SCM-3	24-Aug-07	23.4	28	40	1.6	1	2
SCM-3	22-Sep-07	19.1	18	37	1.6	3	3

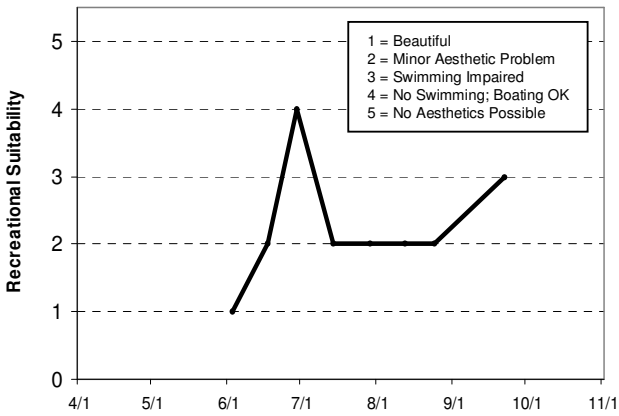


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D	D	D	D			C	C	C
Chlorophyll a						B	C	C	C			B	B	C
Secchi Depth						D	C	C	D			C	C	C
Overall						**C**	**C**	**C**	**D**			**C**	**C**	**C**

Source: Metropolitan Council and STORET data



St. Croix Lake [Troy Beach Pool-Site 5] (82-0001) *St. Croix Basin Planning Team*

Lake St. Croix [Troy Beach Pool-Site 5] was monitored 7 times between mid-May and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	33.1	26.0	49.0	C
CLA (µg/l)	22	9	38	C
Secchi (m)	1.8	1.2	3.0	C
TKN (mg/l)	0.69	0.45	0.85	
			Water Quality	C

The lake's 2007 grade (C) is identical to those recorded in 1999-2002 and 2005-2006.

Because of the limited nature of the site's database, it is not possible to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.0 for physical condition (2- "some algae present"), and 1.3 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

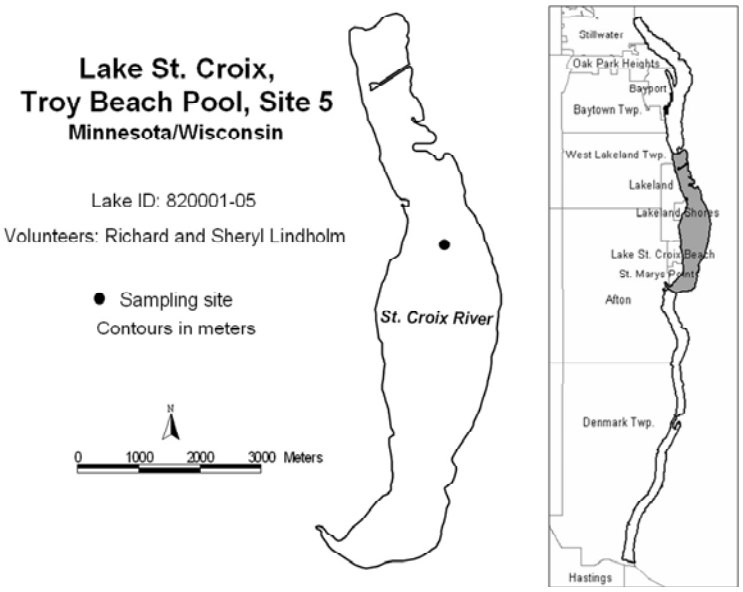
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

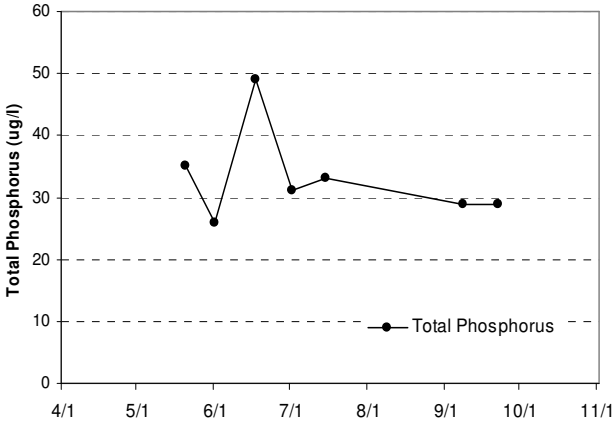
Lake St. Croix, Troy Beach Pool, Site 5

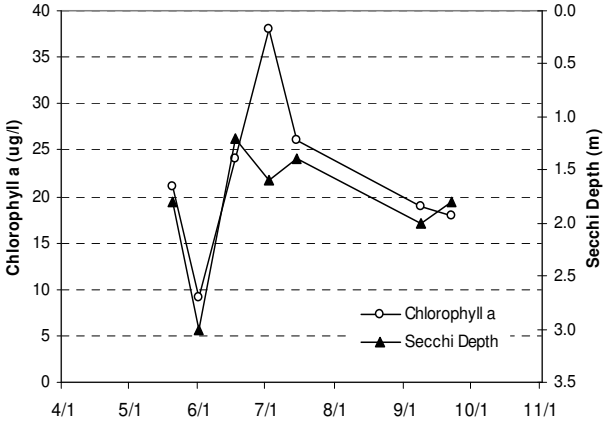
Minnesota/Wisconsin

Lake ID: 820001-05

Volunteers: Richard and Sheryl Lindholm

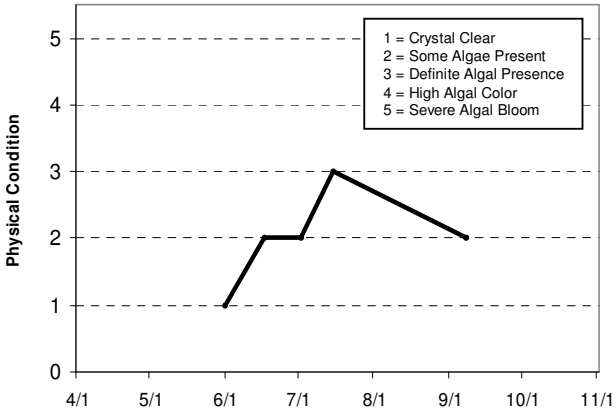






2007 Data

Site	Date	Surface Temp (C)	CLA ug/L	Surf. TP ug/L	Secchi Depth (m)	Physical Condition Rating	Rec. Suitability Rating
SCM-5	20-May-07	16.8	21	35	1.8		
SCM-5	1-Jun-07	21.4	9.2	26	3.0	1	1
SCM-5	17-Jun-07	26.5	24	49	1.2	2	1
SCM-5	2-Jul-07	25.3	38	31	1.6	2	2
SCM-5	15-Jul-07	25.5	26	33	1.4	3	2
SCM-5	8-Sep-07	24.5	19	29	2.0	2	1
SCM-5	22-Sep-07	19.9	18	29	1.8		1

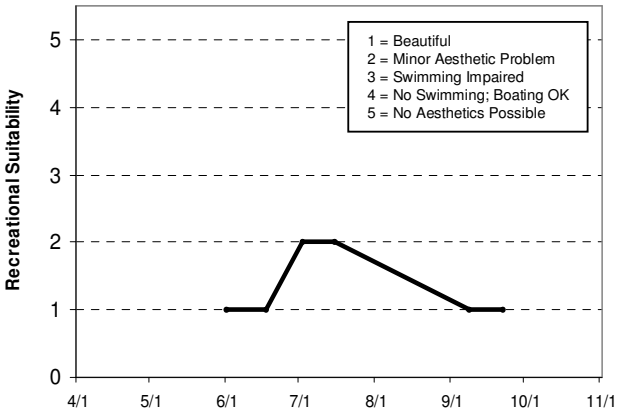


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D	D	C	C			C	C	C
Chlorophyll a						B	C	C	C			C	B	C
Secchi Depth						C	C	C	C			C	C	C
Overall						**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*

Lake St. Croix [Black Bass Pool-Site 6] was monitored 10 times between mid-May and late-September, 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	35.4	23.0	56.0	C
CLA (µg/l)	22	9	34	C
Secchi (m)	1.8	1.4	2.6	C
TKN (mg/l)	0.75	0.52	1.00	
			Water Quality	C

The lake's 2007 grade (C) is identical to those recorded in 1999-2002 and 2005-2006.

Because of the limited nature of the site's database, it is not possible to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.7 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.7 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

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) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

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

Lake St. Croix, Black Bass Pool, Site 6

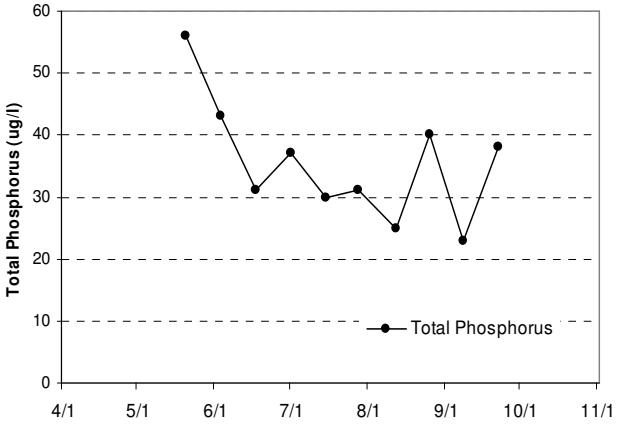
Minnesota/Wisconsin

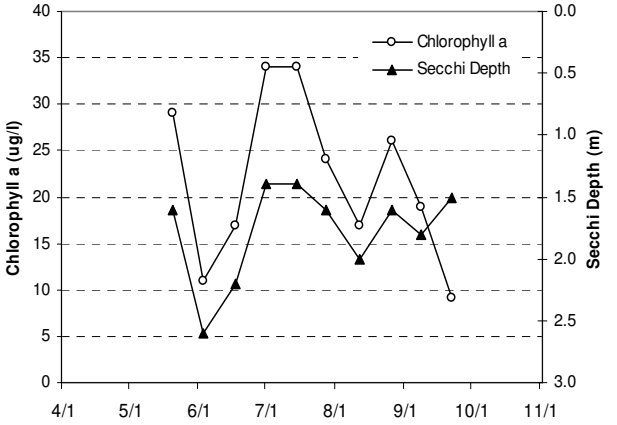
Lake ID: 820001-06

Volunteer: Rick Meierotto

● Sampling site

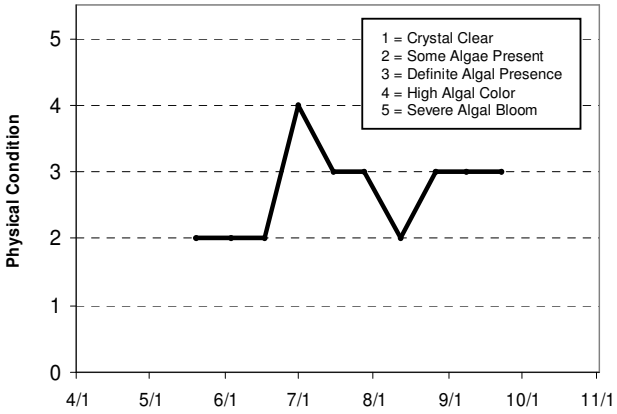
Contours in meters





2007 Data

Site	Date	Surface Temp (C)	CLA ug/L	Surf. TP ug/L	Secchi Depth (m)	Physical Condition Rating	Rec. Suitability Rating
SCL-6	20-May-07	17.2	29	56	1.6	2	2
SCL-6	3-Jun-07	20.7	11	43	2.6	2	2
SCL-6	17-Jun-07	26.1	17	31	2.2	2	2
SCL-6	1-Jul-07	26.4	34	37	1.4	4	3
SCL-6	15-Jul-07	26.0	34	30	1.4	3	3
SCL-6	28-Jul-07	26.7	24	31	1.6	3	3
SCL-6	12-Aug-07	26.5	17	25	2.0	2	3
SCL-6	26-Aug-07	24.4	26	40	1.6	3	3
SCL-6	8-Sep-07	24.4	19	23	1.8	3	3
SCL-6	22-Sep-07	20.1	9.2	38	1.5	3	3

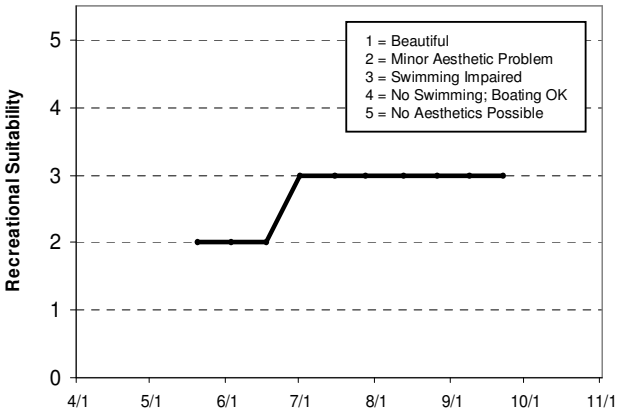


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C	C	C	C			C	C	C
Chlorophyll a						B	C	B	C			B	B	C
Secchi Depth						C	C	C	C			C	C	C
Overall						**C**	**C**	**C**	**C**			**C**	**C**	**C**

Source: Metropolitan Council and STORET data



St. Croix Lake [Kinnickinnic Pool-Site 7] (82-0001) *St. Croix Basin Planning Team*

Lake St. Croix [Kinnickinnic Pool-Site 7] was monitored 10 times between mid-May and late-September 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	29.8	18.0	38.0	B
CLA (µg/l)	19	5	43	B
Secchi (m)	1.8	1.3	2.6	C
TKN (mg/l)	0.91	0.43	2.10	
			Water Quality	B

The lake's 2006 grade of B is better than the C recorded in 2000 and the same as the grades reported in 2005 and 2006.

Because of the limited nature of the site's database, it is not possible to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.3 for physical condition (between 2- "some algae present" and 3- "definite algal presence"), and 2.5 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

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) 297-4916 or by downloading the information off the internet at http://www.dnr.state.mn.us/lakefind/.

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

Lake St. Croix, Kinnickinnic Pool, Site 7

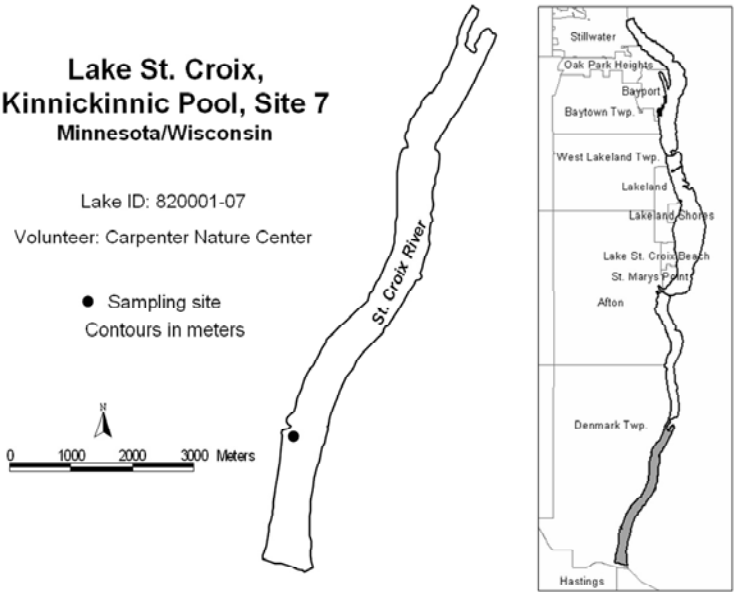
Minnesota/Wisconsin

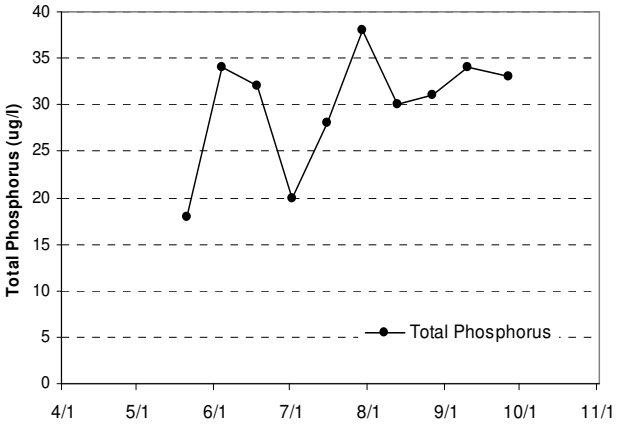
Lake ID: 820001-07

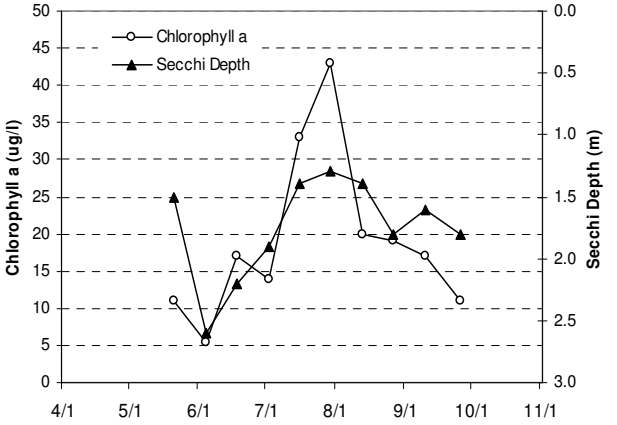
Volunteer: Carpenter Nature Center

● Sampling site

Contours in meters

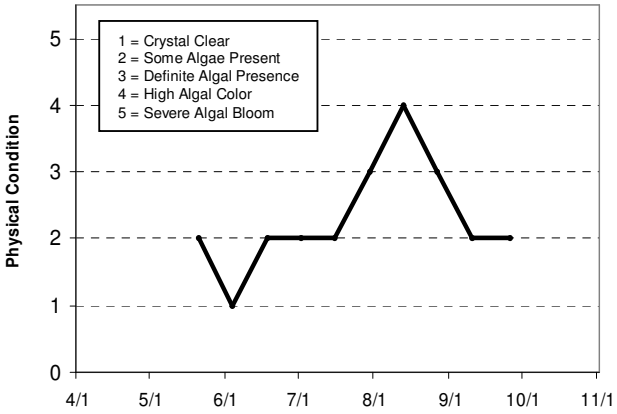






2007 Data

Site	Date	Surface Temp (C)	CLA ug/L	Surf. TP ug/L	Secchi Depth (m)	Physical Condition Rating	Rec. Suitability Rating
SCL-7	21-May-07	19.1	11	18	1.5	2	2
SCL-7	4-Jun-07	22.4	5.3	34	2.6	1	1
SCL-7	18-Jun-07	23.9	17	32	2.2	2	3
SCL-7	2-Jul-07	24.5	14	20	1.9	2	3
SCL-7	16-Jul-07	25.1	33	28	1.4	2	2
SCL-7	30-Jul-07	27.6	43	38	1.3	3	3
SCL-7	13-Aug-07	28.7	20	30	1.4	4	4
SCL-7	27-Aug-07	22.8	19	31	1.8	3	2
SCL-7	10-Sep-07	22.6	17	34	1.6	2	2
SCL-7	26-Sep-07	20.7	11	33	1.8	2	3

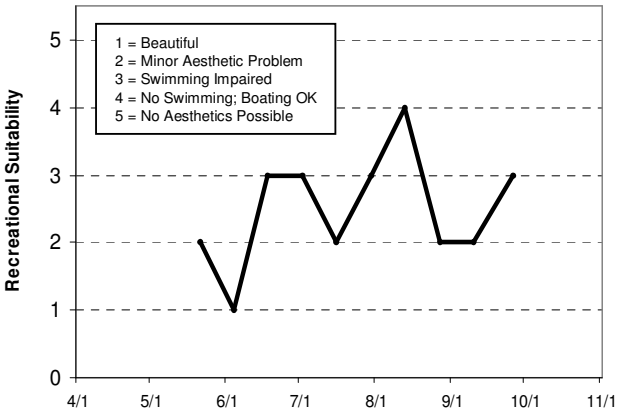


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							C	D				B	B	B
Chlorophyll a							B	B				B	B	B
Secchi Depth							C	NA				C	C	C
Overall							**C**					**B**	**B**	**B**

Source: Metropolitan Council and STORET data



St. Joe Lake (10-0011) C*ity of Chanhassen*

St. Joe Lake is a 14-acre lake located within the City of Chanhassen (Carver County), with a maximum depth of 15.9 m (roughly 52 feet). There is very little other known morphological data available for the lake.

This marks the fourth year in which St. Joe Lake has been involved in CAMP. A search through the STORET nationwide water quality database for historic data on the lake was provided only two years of Secchi transparency data (1994 and 1996). Nutrient data are only available for 2004-2007 are the only years of nutrient data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 9 times between mid-May and late-September 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	22.6	12.0	33.0	A
CLA (µg/l)	6.0	4.1	9.8	A
Secchi (m)	3.3	2.6	3.8	A
TKN (mg/l)	0.67	0.44	0.86	
			Water Quality	A

The lake's 2007 grade of A is similar to the grade reported in 2005. As mentioned earlier, there is very little water quality data available for other than the two years of mid-1990's Secchi data and the 2004-2007 CAMP data. Therefore there are insufficient data to determine any long-term or short-term trends. 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) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 1.4 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

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) 297-4916 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.

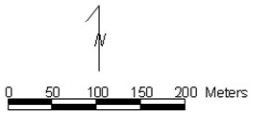
LAKE ID: 100011

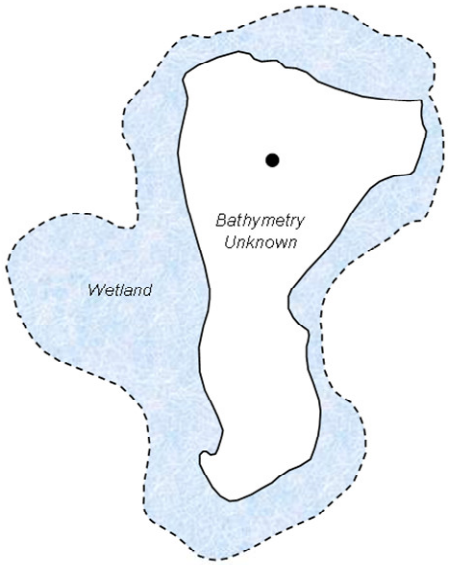
WD: Minnehaha Creek

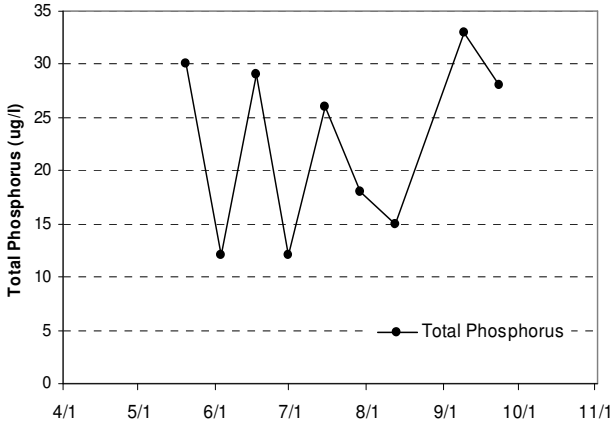
Volunteers: Sue Morgan and Linda Scott

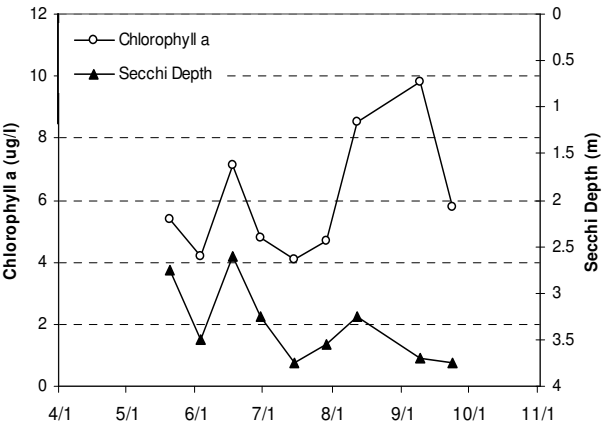
● Sampling site

Contours in meters



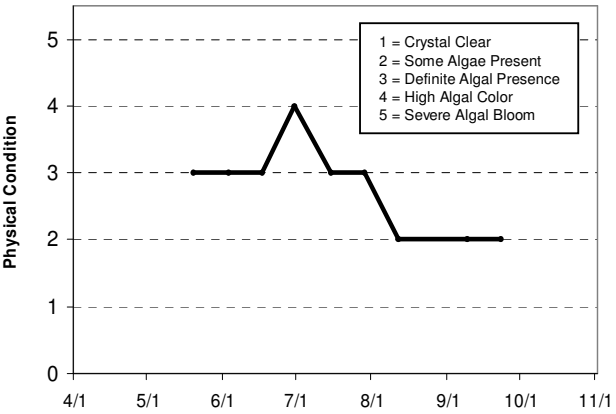






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/20/07	17.5				5.4	30		2.75	3	1
06/03/07	22.1				4.2	12		3.5	3	1
06/17/07	27.4				7.1	29		2.6	3	1
06/30/07	24.9				4.8	12		3.25	4	2
07/15/07	24.9				4.1	26		3.75	3	2
07/29/07	27.9				4.7	18		3.55	3	2
08/12/07	27				8.5	15		3.25	2	2
09/09/07	22.5				9.8	33		3.7	2	1
09/23/07	19.2				5.8	28		3.75	2	1

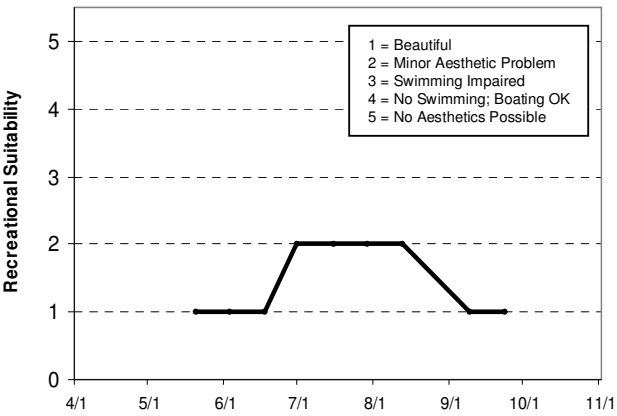


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus											A	A	C	A
Chlorophyll a											A	A	A	A
Secchi Depth	C		B								B	A	B	A
Overall											**A**	**A**	**B**	**A**

Source: Metropolitan Council and STORET data



Sunfish Lake [Sunfish Lake] (19-0050) *City of Sunfish Lake*

Sunfish Lake is a small 49-acre lake located in the City of Sunfish Lake (Dakota County). There is very little known morphological data available for the lake.

This was the second year that Sunfish Lake (Sunfish Lake) has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data, other than Secchi depth information for 1984-1986 and 1991 therefore 2006 and 2007 are the only years of available water quality data.

The lake was monitored 13 times between mid-April and late-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	35.7	14.0	71.0	C
CLA (µg/l)	20.1	1.3	49.0	C
Secchi (m)	2.0	0.7	4.0	C
TKN (mg/l)	0.91	0.62	1.50	
			Water Quality	C

The water quality grade for 2007 was a C, which is similar to the grade received in 2006. However, the total phosphorus, chlorophyll-a, and total kjeldahl nitrogen mean concentrations, along with their minimums and maximums, were lower in 2007 than in 2006. Furthermore, the Secchi transparency summer-time mean, minimum, and maximum depths for 2007 were greater than they were in 2006. In fact, the Secchi transparency grade of C for 2007 was an improvement over the D it received in 2006. Even though both 2006 and 2007 received the same water quality grade, it appears that the water quality for 2007 was slightly better than in 2006.

As mentioned earlier, there are no nutrient data available for Sunfish Lake other than the 2006 and 2007 CAMP data. Therefore there are insufficient data at this time to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

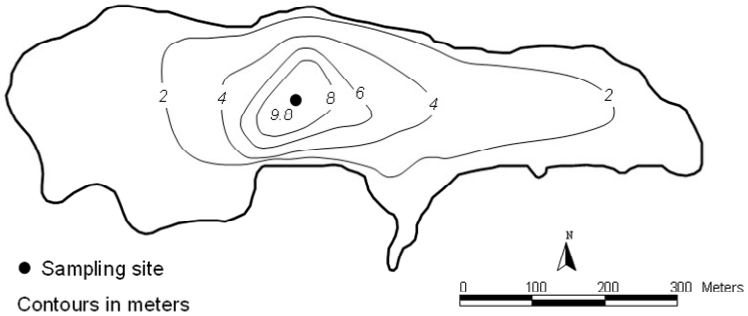
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.6 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 2.2 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

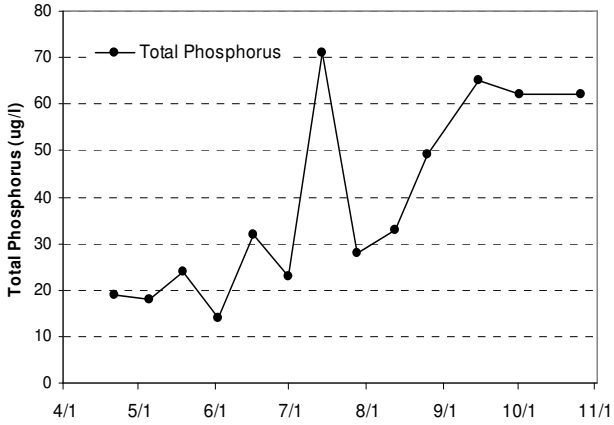
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Sunfish Lake

Sunfish Lake, Dakota Co.

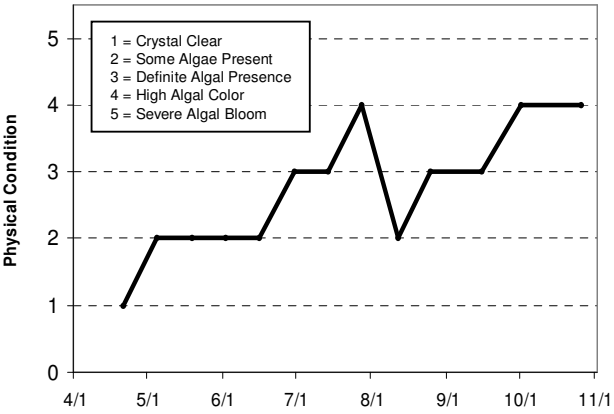
Lake ID: 190050
WMO: Lower Mississippi River
Volunteer: Dick Bancroft





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	15.4				1.5	19		3	1	1
05/05/07	17.1				2.2	18		4	2	1
05/19/07	20.7				3.7	24		3.5	2	1
06/02/07	22.6				1.3	14		3.3	2	1
06/16/07	27.2				8.6	32		2.5	2	2
06/30/07	26.9				12	23		1.5	3	3
07/14/07	24.8				38	71		0.7	3	3
07/28/07	29				33	28		1.2	4	3
08/12/07	27.3				17	33		1.3	2	3
08/25/07	22.6				49	49		0.9	3	3
09/15/07	18.7				36	65		0.8	3	2
10/01/07	18.7				67	62		0.7	4	3
10/26/07	13.3				33	62		1	4	2

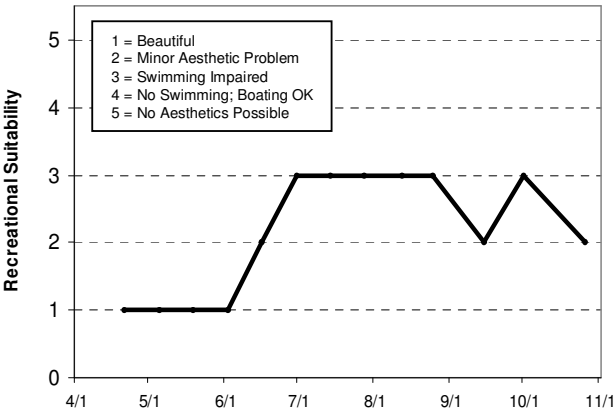


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth					C	C	C					C		
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													C	C
Chlorophyll a													C	C
Secchi Depth													D	C
Overall													**C**	**C**

Source: Metropolitan Council and STORET data



Sunnybrook Lake (82-0133) *Valley Branch Watershed District*

Sunnybrook Lake is a 16-acre lake located within Grant Township (Washington County). The maximum and mean depths of the lake are 6.1 and 2.0 m (20.0 and 6.5 feet), respectively, and the approximate volume of the lake is 104 ac-ft. The majority of the lake's area is considered littoral zone (the area of aquatic vegetation dominance). The lake has a 630-acre immediate watershed, which translates to a watershed-to-lake area ratio of 39:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff).

This was the eighth year in which Sunnybrook Lake has been involved in CAMP (1999 and 2001-2006 being the others). The lake was monitored 14 times between mid-April and mid-October 2007. Other than for the 1999 and 2001-2006 CAMP data, a search through the STORET nationwide water quality database for data on the lake came up empty. Thus, 1999 and 2001-2007 are the only years of available data.

During each monitoring event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	23.3	14.0	43.0	B
CLA (µg/l)	6.3	2.0	13.0	A
Secchi (m)	2.6	1.6	3.7	B
TKN (mg/l)	0.86	0.64	1.10	
			Water Quality	B

The lake's 2007 lake quality grade is identical to those recorded in 2001-2006, and better than the C in 1999. The lake generally maintains an letter grade of B with some variation in the individual parameter letter grades. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

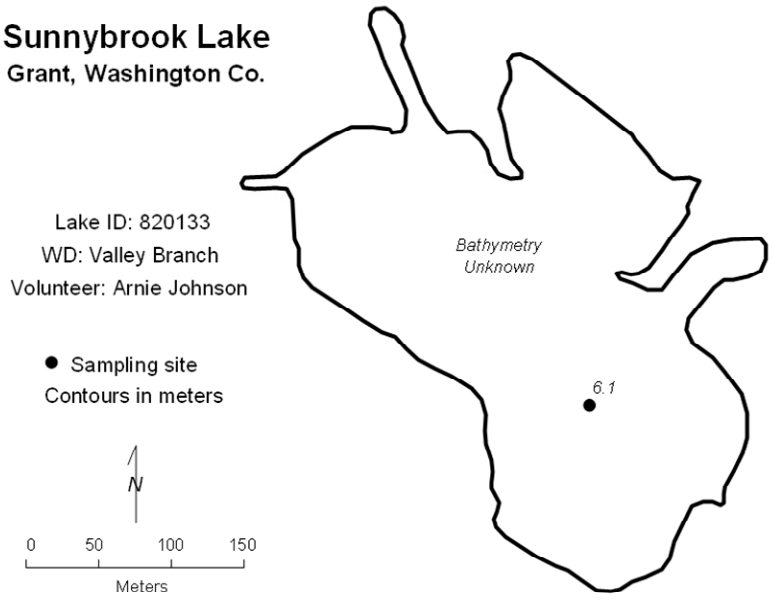
The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, on a 1-to-5 scale, were 1.5 for physical condition (between 1- "crystal clear" and 2- "some algae present"), and 1.2 for recreational suitability (between 1- "beautiful" and 2- "minor aesthetic problem").

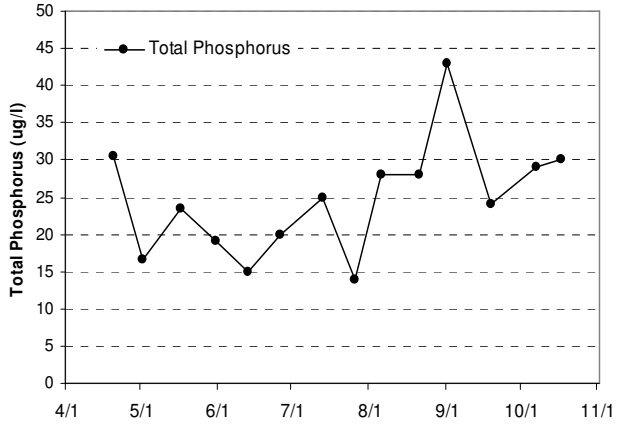
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

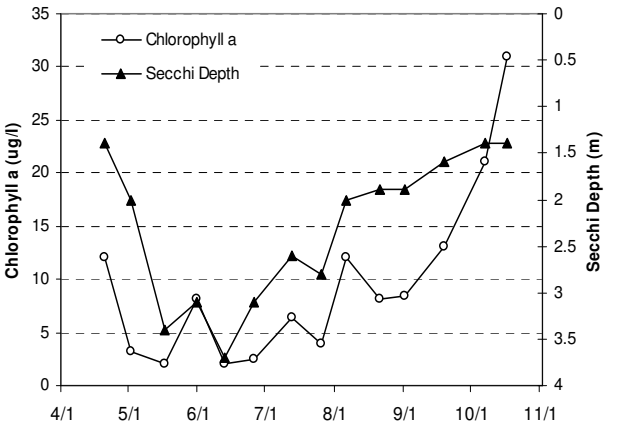
Sunnybrook Lake

Grant, Washington Co.

Lake ID: 820133
WD: Valley Branch
Volunteer: Arnie Johnson

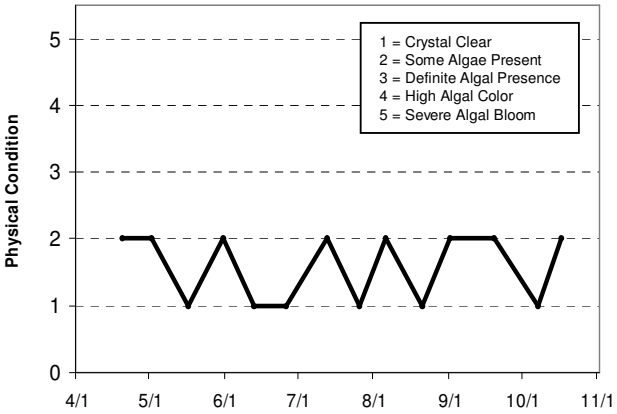






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	13.2				12	30.5		1.4	2	1
05/02/07	17.7				3.2	16.5		2	2	1
05/17/07	17.8				2	23.5		3.4	1	1
05/31/07	21.6				8.2	19		3.1	2	1
06/13/07	25.1				2.1	15		3.7	1	1
06/26/07	26.7				2.5	20		3.1	1	1
07/13/07	23.4				6.4	25		2.6	2	1
07/26/07	28.7				3.9	14		2.8	1	1
08/06/07	24.2				12	28		2	2	2
08/21/07	20.9				8.1	28		1.9	1	1
09/01/07	23				8.4	43		1.9	2	2
09/19/07	18.5				13	24		1.6	2	1
10/07/07	21.4				21	29		1.4	1	1
10/17/07	13.1				31	30		1.4	2	1

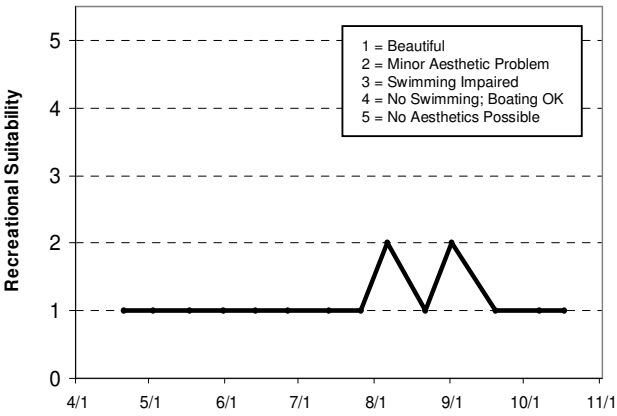


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						C		B	B	C	B	C	B	B
Chlorophyll a						B		A	A	A	A	B	A	A
Secchi Depth						C		B	B	C	B	B	B	B
Overall						**C**		**B**	**B**	**B**	**B**	**B**	**B**	**B**

Source: Metropolitan Council and STORET data



Sunset Lake (82-0153) *Rice Creek Watershed District*

Sunset Lake, with a surface area of about 124 acres (2.3 miles in circumference), is located in the southern portion of the City of Hugo (Washington County). The lake is considered a "Priority Lake" by the Metropolitan Council due to its multi-recreational uses. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*), which has been reported in the lake. Its deepest point is approximately 5.2 m (17 feet).

Sunset Lake has been involved in CAMP since 1993. The lake was monitored 10 times from early-May to early-October 2007. The data and resulting graphs showing seasonal variability in TP and CLA concentrations, Secchi transparency, and user perception (physical condition and recreational suitability) are presented on the lake information sheet.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	22.1	11.0	36.0	A
CLA (µg/l)	3.4	1.5	6.3	A
Secchi (m)	2.9	1.6	3.6	B
TKN (mg/l)	0.60	0.38	0.79	
			Water Quality	A

When comparing the 2007 grade to those of previously monitored years it becomes apparent that the lake's 2001-2007 water quality grade (A) was the best monitored years to date compared to B's in 1994 and 2000, and C's in 1993 and 1995-1999. Year 2007 was the first year that the lake received an A in two of the water quality parameters, which is an improvement over previous years.

Besides the lake's CAMP data, Secchi transparencies had been measured throughout the mid- and late-1980's as part of the MPCA's volunteer program. The lake's historic individual parameter and water quality grades (shown on the following information sheet) indicate that the lake's water quality has fluctuated over the years. Because of the range in the lake's quality, a baseline quality for the lake as well as an overall water quality trend is difficult to determine. With this in mind, however, a primitive interpretation of the data seems to show that recently the lake has maintained an "A" grade average (with normal fluctuations). In fact, a recent trend analysis on the lake's Secchi transparency data by the MPCA, revealed a statistically significant improvement in recent water clarity (MPCA 2008).

The average user perception rankings on a 1-to-5 scale were 1.9 for physical condition (roughly 2- "some algae present"), and 2.5 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

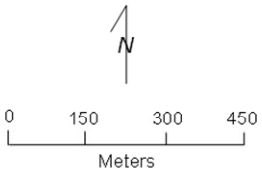
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

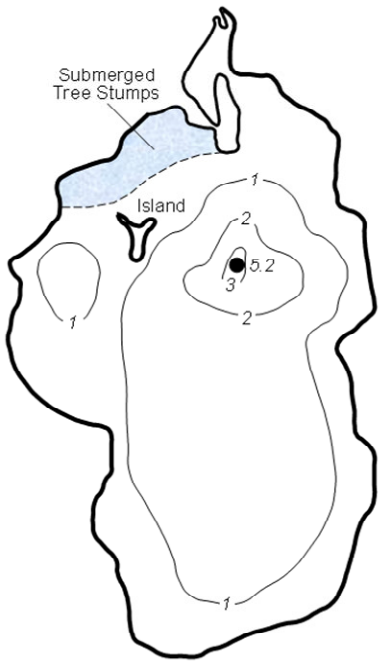
Sunset Lake

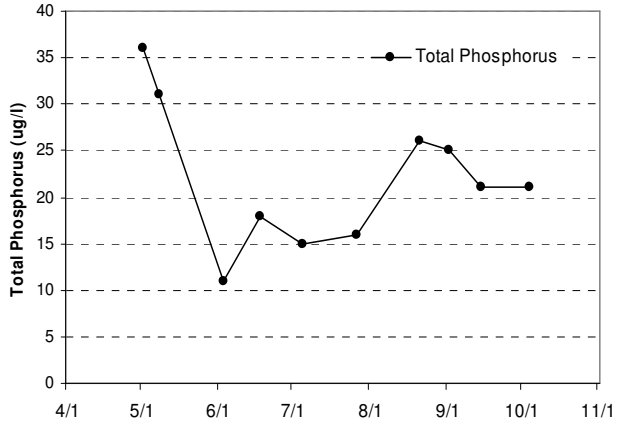
Hugo, Washington Co.

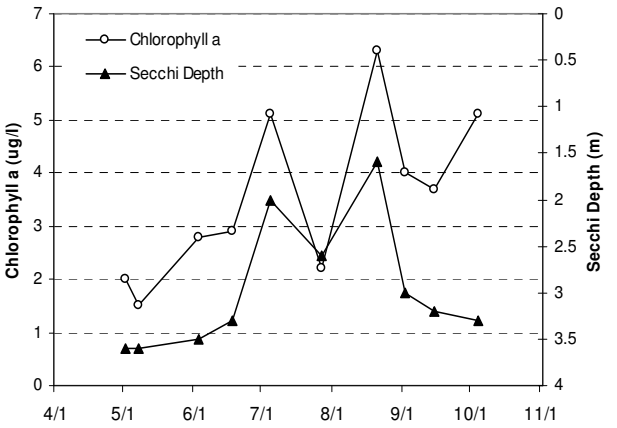
Lake ID: 820153
WD: Rice Creek
Volunteer:
Diane Coderre

● Sampling site
Contours in meters



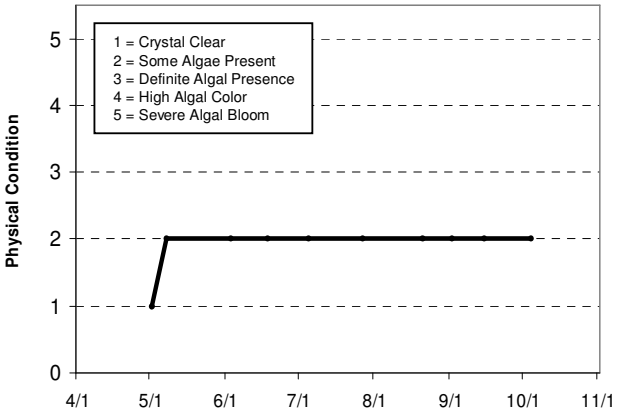






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/02/07	18.5				2	36		3.6	1	2
05/08/07	19.5				1.5	31		3.6	2	2
06/03/07	22.3				2.8	11		3.5	2	3
06/18/07	26				2.9	18		3.3	2	3
07/05/07	27.1				5.1	15		2	2	
07/27/07	28.3				2.2	16		2.6	2	
08/21/07	22.2				6.3	26		1.6	2	
09/02/07	25.8				4	25		3	2	
09/15/07	17.1				3.7	21		3.2	2	
10/04/07	18.3				5.1	21		3.3	2	

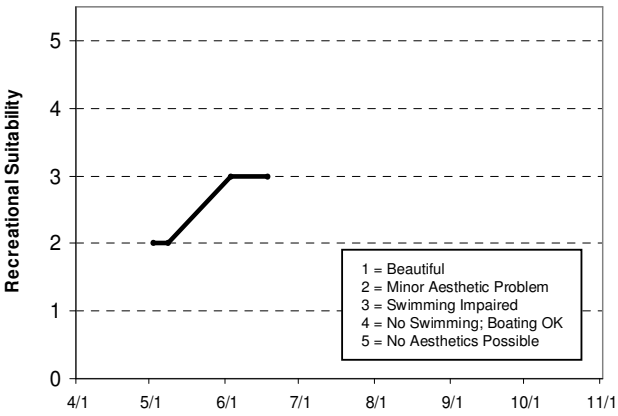


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus					D									C
Chlorophyll a					C									B
Secchi Depth					C	D	C	D	D	C	C			C
Overall					**C**									**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	B	C	C	C	C	C	B	A	A	A	A	A	A	A
Chlorophyll a	B	B	C	C	B	B	A	A	A	A	A	A	A	A
Secchi Depth	B	C	B	C	C	C	B	A	A	A	A	A	A	B
Overall	**B**	**C**	**C**	**C**	**C**	**C**	**B**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



Sunset Pond Lake (19-00451) *Black Dog Watershed Management Commission*

Sunset Pond, a 60-acre man-made lake (1.9 miles in circumference) located in the City of Burnsville (Dakota County), has been involved in CAMP since 1994 (with an omission in 1999). In 2007, the lake was monitored 14 times between mid-April and mid-October.

Because of the shallow depth of the lake ("normal" maximum depth of 3.7 m [about 12 feet]), the entire lake is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). Because the lake was created to detain stormwater, it collects drainage from a portion of the city of Burnsville and Savage's stormwater conveyance systems, including outflow from Crystal and Earley lakes, it can experience extreme bounce in its water level during wet conditions. An area of concern and need for future management is the recent detection of Eurasian Water Milfoil (*Myriophyllum spicatum*) in the lake.

During each sampling event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	56.7	35.0	72.0	C
CLA (µg/l)	5.6	3.5	13.0	A
Secchi (m)	1.9	1.2	2.4	C
TKN (mg/l)	1.90	0.69	2.70	
			Water Quality	B

While the lake's 2007 lake grade is identical to those recorded in 1995-1997, 2003, and 2006, it is worse than B's recorded more recently (1998, and 2000-2002, and 2004). In fact, a review of the lake's past and present individual parameter means reveal that 2002 represents the lake's best-monitored water quality year to date. The lake seems to be well represented by an grade of C+/B. To better understand the long-term quality of the lake and what direction it may be heading, more years of sampling data are needed.

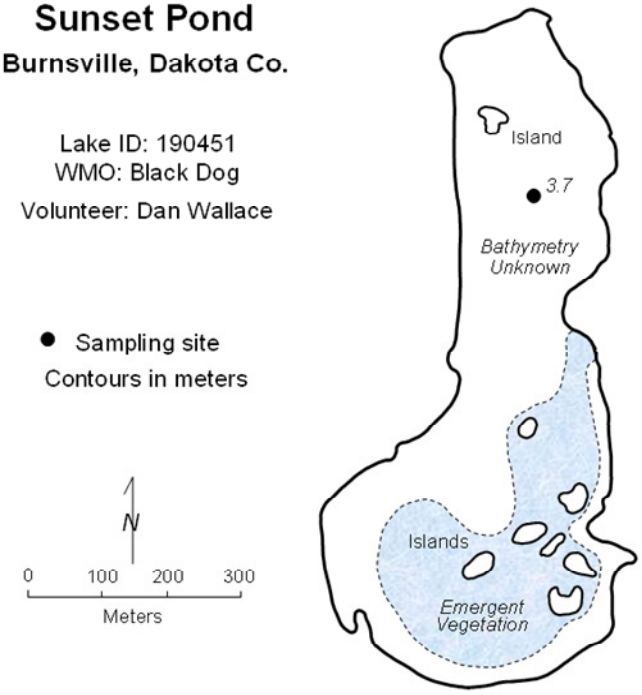
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The mean physical condition ranking was 3.8 (between 3- "definite algae present" and 4- "high algal color"), and the mean recreational suitability ranking 4.3 (between 4- "no swimming - boating ok" and 5- "no aesthetics possible").

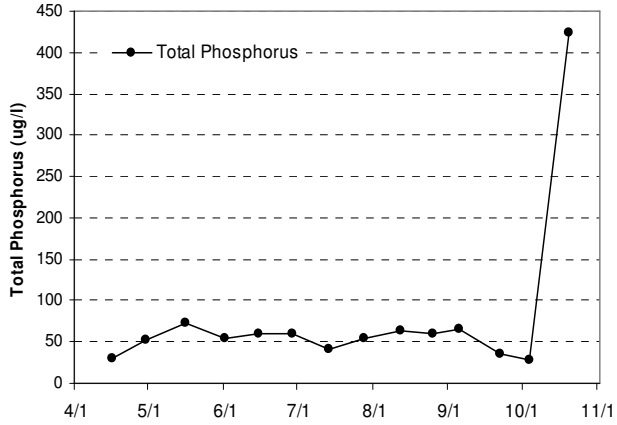
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

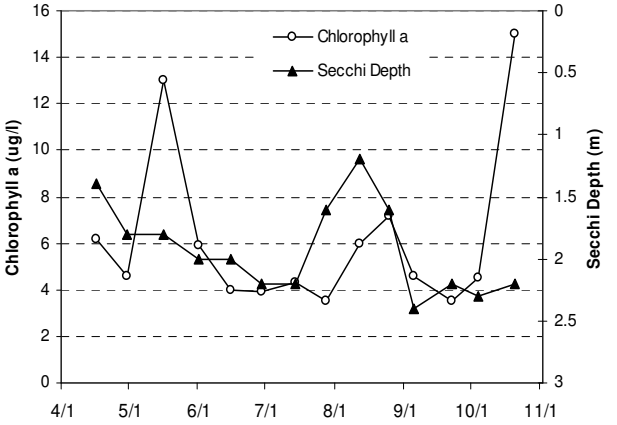
Sunset Pond

Burnsville, Dakota Co.

Lake ID: 190451
WMO: Black Dog
Volunteer: Dan Wallace

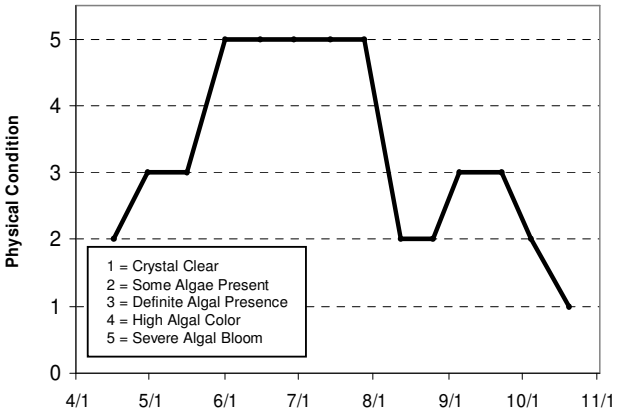






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	14.3				6.2	29		1.4	2	3
04/30/07	20.5				4.6	53		1.8	3	5
05/16/07	17				13	72		1.8	3	4
06/01/07	22.3				5.9	55		2	5	5
06/15/07	25.3				4	60		2	5	4
06/29/07	24				3.9	60		2.2	5	5
07/14/07	23.4				4.3	42		2.2	5	4
07/28/07	26.8				3.5	54		1.6	5	5
08/12/07	25.6				6	64		1.2	2	4
08/25/07	21.5				7.2	59		1.6	2	4
09/05/07	24				4.6	66		2.4	3	4
09/22/07	18.6				3.5	35		2.2	3	4
10/04/07	18				4.5	28		2.3	2	4
10/20/07	13.5				15	424		2.2	1	2

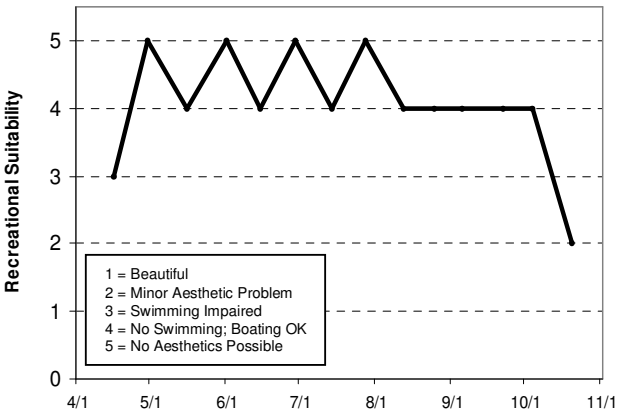


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	C	C	C	C		C	C	C	D	D		D	C
Chlorophyll a	A	B	B	B	A		A	A	A	B	A		B	A
Secchi Depth	C	C	C	C	C		C	B	B	C	B		C	C
Overall	**B**	**C**	**C**	**C**	**B**		**B**	**B**	**B**	**C**	**B**		**C**	**B**

Source: Metropolitan Council and STORET data



Susan Lake (10-0013) *City of Chanhassen*

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). Eighty-one percent of the lake's surface area is considered littoral zone (area of aquatic plant dominance). Because of its multi-recreational uses, the lake is considered a "Priority Lake" in the Metropolitan Area. An area of concern and need for future management is the recent detection of Eurasian Water Milfoil (*Myriophyllum spicatum*) in the lake.

This was the second year that Susan Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data. Therefore 2006 and 2007 are the only years of available water quality data for the lake.

The lake was monitored 11 times between early-May and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	64.1	12.0	112.0	C
CLA (µg/l)	24.9	1.4	44.0	C
Secchi (m)	1.5	0.8	3.0	C
TKN (mg/l)	2.99	1.80	4.80	
			Water Quality	C

As mentioned earlier, there are no nutrient data available for Susan Lake other than the 2006 and 2007 CAMP data. Therefore there are insufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.8 for physical condition (between 2- "some algae present" and 3- "definite algal presence"), and 2.8 for recreational suitability (between 2- "minor aesthetic problem" and 3- "swimming impaired").

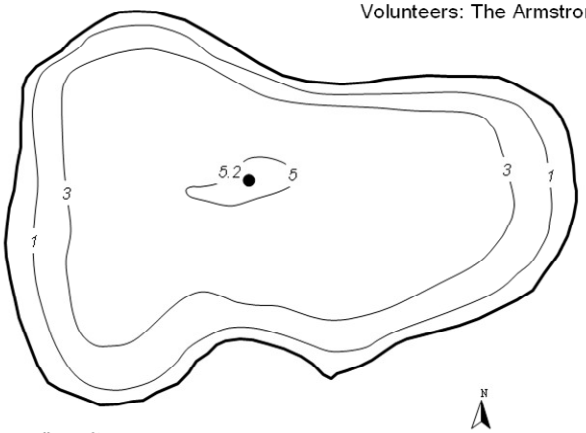
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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.

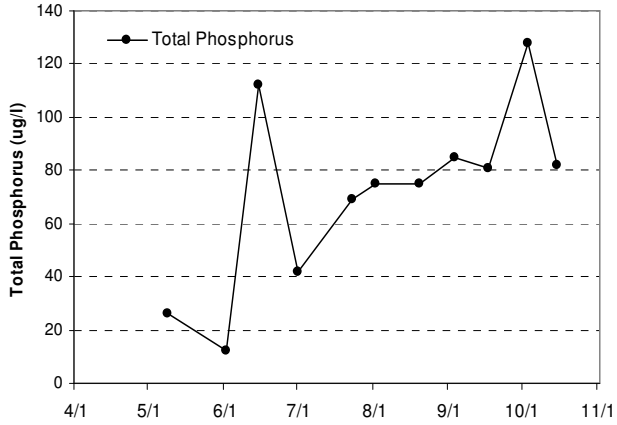
Lake Susan

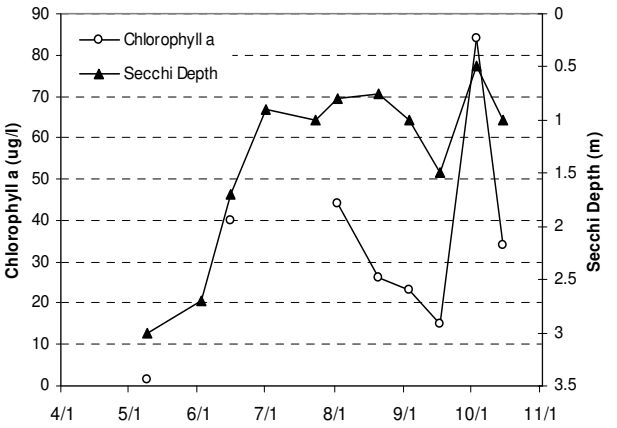
Chanhassen, Carver Co.

Lake ID: 100013
WD: Riley-Purgatory-Bluff Creek
Volunteers: The Armstrong Family



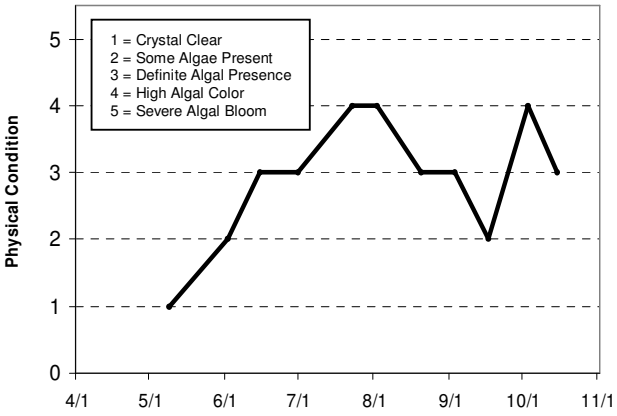
● Sampling site
Contours in meters





2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/09/07	21.1				1.4	26		3	1	1
06/02/07	21.1					12		2.7	2	2
06/15/07	21.4				40	112		1.7	3	2
07/01/07	25.9					42		0.9	3	3
07/23/07	20.2					69		1	4	3
08/02/07	25.8				44	75		0.8	4	3
08/20/07	23				26	75		0.75	3	4
09/03/07	24				23	85		1	3	3
09/17/07	20				15	81		1.5	2	4
10/03/07	24.4				84	128		0.5	4	4
10/15/07	13.1				34	82		1	3	4

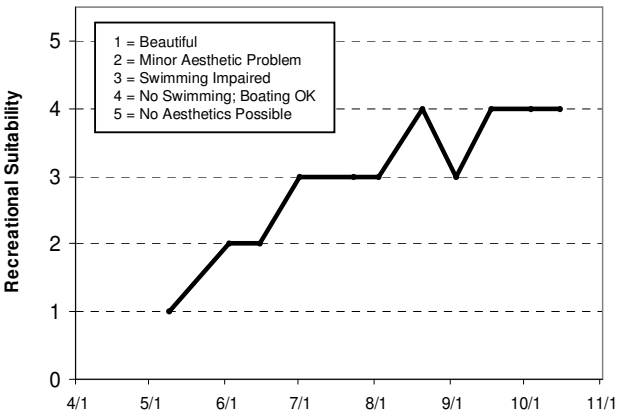


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	C
Chlorophyll a													C	C
Secchi Depth													C	C
Overall													**C**	**C**

Source: Metropolitan Council and STORET data



Swede Lake (10-0095) *Carver County Environmental Services*

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 year 2007 marks the sixth year that Swede Lake has been involved in CAMP (2002 being the first). Additionally, Metropolitan Council staff has monitored the lake in 1996 and 2001. The 1996, and 2001-2007 data are the only water quality data found for the lake.

On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. The lake was monitored 13 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	303.9	171.0	554.0	F
CLA (µg/l)	101.6	58.0	200.0	F
Secchi (m)	0.3	0.2	0.5	F
TKN (mg/l)	4.98	3.00	7.70	
			Water Quality	F

The lake's 2007 grade (F) is similar to that of 1996, 2003-2004, and 2006 and worse than the grade of a D in 2001-2002, and 2005.

As mentioned earlier, there is a limited amount of water quality data available for Swede Lake. Therefore there are insufficient data to determine long-term trends. In the short-term however, the lake's quality seems well represented by an grade of D/F. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.6 for physical condition (between 2- " some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming - boating ok").

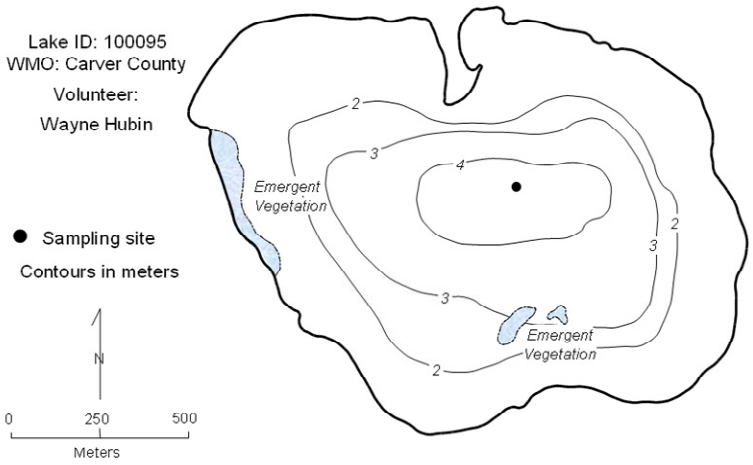
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

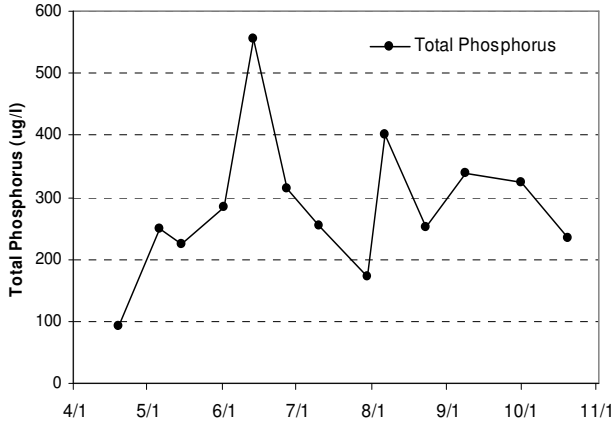
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

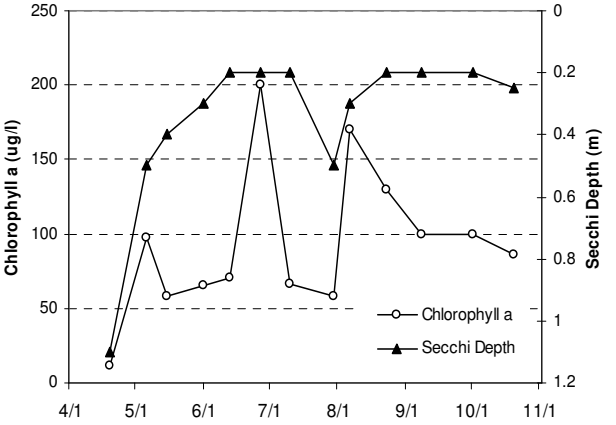
Swede Lake

Watertown Twp., Carver Co.

Lake ID: 100095
WMO: Carver County
Volunteer:
Wayne Hubin

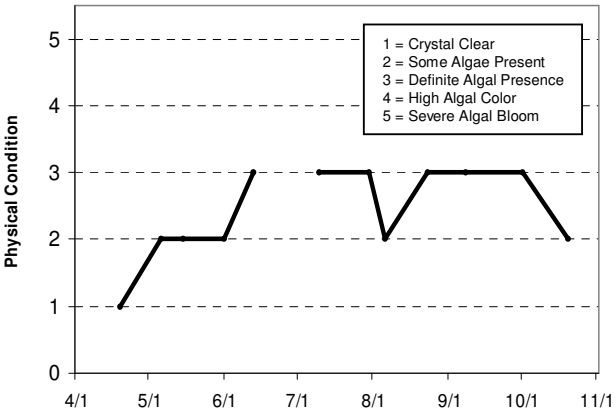






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/19/07	15				11	93		1.1	1	1
05/06/07	18				98	249		0.5	2	4
05/15/07	20				58	225		0.4	2	4
06/01/07	22				65	284		0.3	2	4
06/13/07	27				71	554		0.2	3	4
06/27/07	26				200	313		0.2		4
07/10/07	27				66	254		0.2	3	4
07/30/07	29				58	171		0.5	3	4
08/06/07	26				170	400		0.3	2	4
08/23/07	23				130	251		0.2	3	4
09/08/07	25				100	338		0.2	3	4
10/01/07	20				100	323		0.2	3	4
10/20/07	18				86	234		0.25	2	4

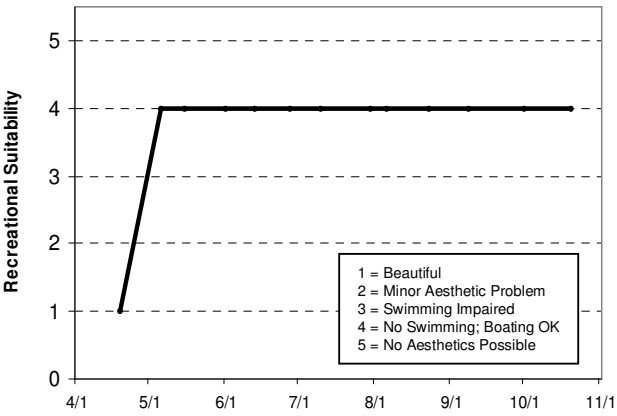


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			D					D	F	F	F	F	F	F
Chlorophyll a			F					D	C	F	D	D	F	F
Secchi Depth			F					D	C	F	F	D	F	F
Overall			**F**					**D**	**D**	**F**	**F**	**D**	**F**	**F**

Source: Metropolitan Council and STORET data



Sweeney Lake (27-0035) *Bassett Creek Watershed Management Organization*

This was the eighth year of CAMP monitoring in Sweeney Lake, which is located in the City of Golden Valley (Hennepin County). The 66-acre lake has a mean and maximum depth of 3.6 m (11.8 feet) and 8.0 m (26.0 feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 790 ac-ft. The lake has two separate depressions each reaching a maximum depth of approximately 8 meters (26 feet). Roughly 52 percent of the lake's area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation). Additionally, the lake's surface area and 2,400-acre watershed translates to a rather large 36:1 watershed-to-lake size ratio. 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 and outlets at the north over a dam. Sweeny Lake is connected to Twin Lake during periods of high lake levels by a meandering channel through a cattail marsh between the northeast shore of Sweeny and the north shore of Twin Lake. The surface elevations of the two lakes are about the same, indicating a minimal flow between the two lakes except during periods of heavy runoff when transfer of water between the two lakes increases. The west and south shoreline of Sweeny Lake consists of privately owned single family homes. The east shore is bordered by the Glenwood Hills Hospital and park consisting of a lawn, a golf course, and a wooded area (Barr, 1994).

While the lake has been monitored at two separate sites (north end and south end) in the past, only one site (the southern site) was monitored in 2007. The lake was monitored 15 times between mid-May and mid-October, 2006. Results are presented on graphs and data tables on the following page. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	48.4	24.0	107.0	C
CLA (µg/l)	15.5	3.6	27.0	B
Secchi (m)	1.1	0.8	1.6	D
TKN (mg/l)	2.30	1.60	3.30	
			Water Quality	C

The lake's 2006 grade (C) is similar to the grades received in 2000-2005, and an improvement over the grade of D received in 2006. No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's quality seems well represented by an grade of C. To better understand the quality of the lake and what direction it may be heading, continued monitoring is suggested.

Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. The 2004 mean perceived physical condition of the lake was 1.4 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability was 1.3 (between 1- "beautiful" and 2- "minor aesthetic problem").

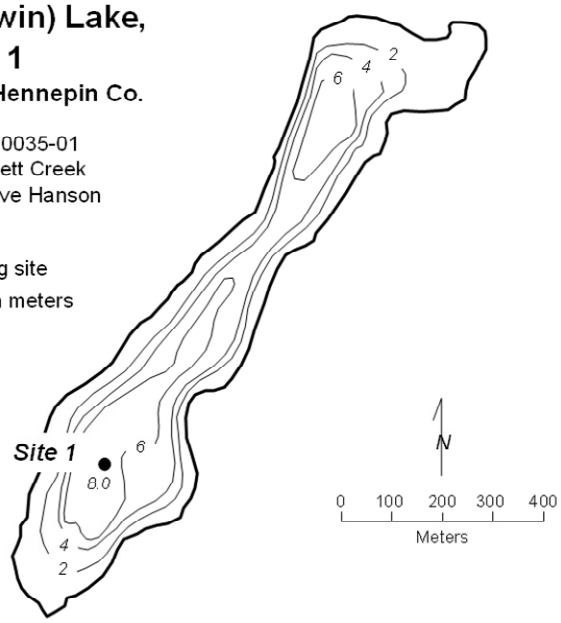
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

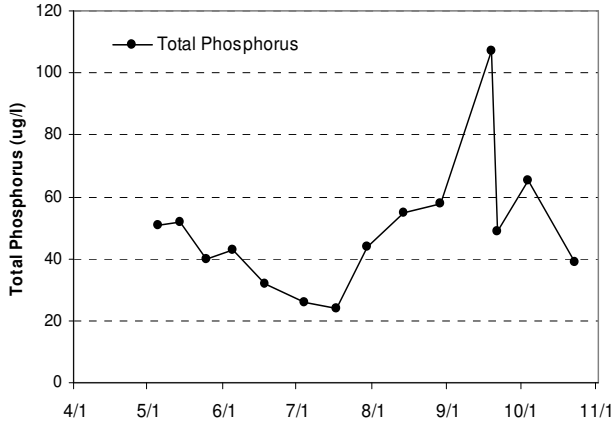
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

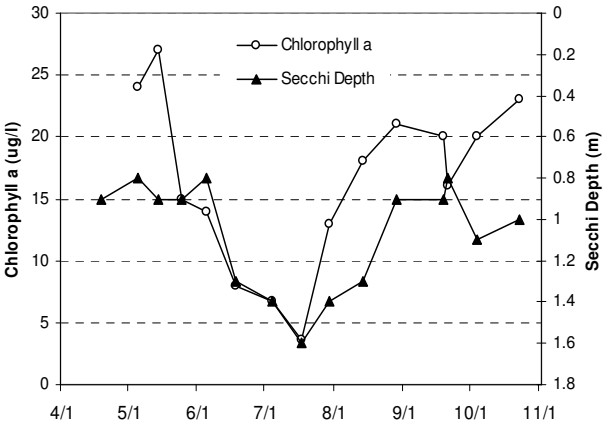
Sweeney (Twin) Lake, Site 1

Golden Valley, Hennepin Co.

Lake ID: 270035-01
WMO: Bassett Creek
Volunteer: Dave Hanson

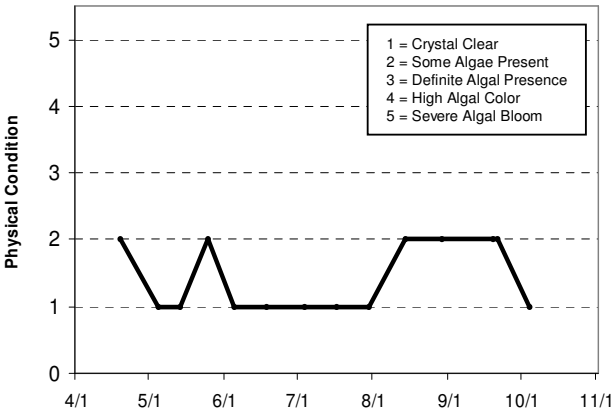






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/19/07	13.9	6.2	14.3	8.7				0.9	2	2
05/05/07	16.4	6.8	10.5	1.9	24	51		0.8	1	1
05/14/07	19	7.7	10.2	0.21	27	52		0.9	1	1
05/25/07	20.6	8	8.9	0.18	15	40		0.9	2	2
06/05/07	21	8	7.3	0.17	14	43		0.8	1	1
06/18/07	25.8	9.5	6.7	0.25	8	32		1.3	1	1
07/04/07	25	13	6.5	0.23	6.7	26		1.4	1	1
07/17/07	27.6	12.4	8.6	0.16	3.6	24		1.6	1	1
07/30/07	28.2	16	8.3	0.15	13	44		1.4	1	1
08/14/07	27.1	18.5	7.9	0.11	18	55		1.3	2	1
08/29/07	24	17.5	10.6	0.16	21	58		0.9	2	2
09/19/07	18.7	18.3	6.27	3	20	107		0.9	2	
09/21/07	18.8	17.4	5.8	1.75	16	49		0.8	2	2
10/04/07	17.1	16.6	6.14	5.9	20	65		1.1	1	1
10/23/07	12.8	12.6	7.9	7.1	23	39		1		



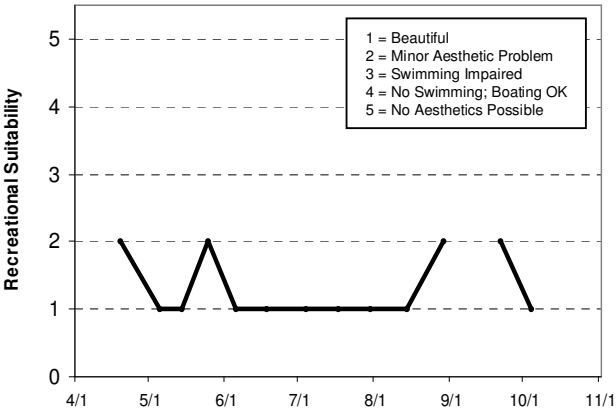
Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total Phosphorus													
Chlorophyll a													
Secchi Depth													
Overall													

Year	1993	1994	1995	1996	1997	1998	1999	2000 Site 1	2000 Site 2	2001 Site 1	2001 Site 2	2002 Site 1	2002 Site 2
Total Phosphorus								C	C	C	C	C	
Chlorophyll a								C	C	B	C	B	
Secchi Depth								D	D	C	C	C	
Overall								**C**	**C**	**C**	**C**	**C**	

Year	2003 Site 1	2003 Site 2	2004 Site 1	2004 Site 2	2005 Site 1	2005 Site 2	2006 Site 1	2006 Site 2	2007 Site 1	2007 Site 2
Total Phosphorus	C		C		C		D		C	
Chlorophyll a	B		B		C		C		B	
Secchi Depth	C		C		C		D		D	
Overall	**C**		**C**		**C**		**D**		**C**	

Source: Metropolitan Council and STORET data



Tamarack Lake (10-0010) *Minnehaha Creek Watershed District*

This was the seventh year that Tamarack Lake has been involved in CAMP (the lake was initially enrolled in 2001). While the 24-acre lake has an unexpected maximum depth of roughly 20.0 m (66 feet), the majority of the lake surface area is considered littoral zone (the shallow 0-15 foot area dominated by aquatic plants). A search through the STORET nationwide water quality database for data on the lake provided limited data (just Secchi data in 1985 and Secchi and nutrient data for 2000-2006).

The lake was monitored 14 times from early-May to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	27.2	15.0	43.0	B
CLA (µg/l)	11.6	3.5	24.0	B
Secchi (m)	2.8	1.8	4.0	B
TKN (mg/l)	1.37	0.80	2.00	
			Water Quality	B

The lake's 2007 grade was a B, which is similar to the grades received in 2001 and 2002. This year's grade is an improvement over the grades of C received in the past 4 years.

As mentioned earlier, there are very limited amounts of water quality data available for Tamarack Lake. The lake has fluctuated between B grades to C grades and then back to a B. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The last two graphs show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 2.0 for physical condition (2- "some algae present"), and 1.0 for recreational suitability (1- "beautiful").

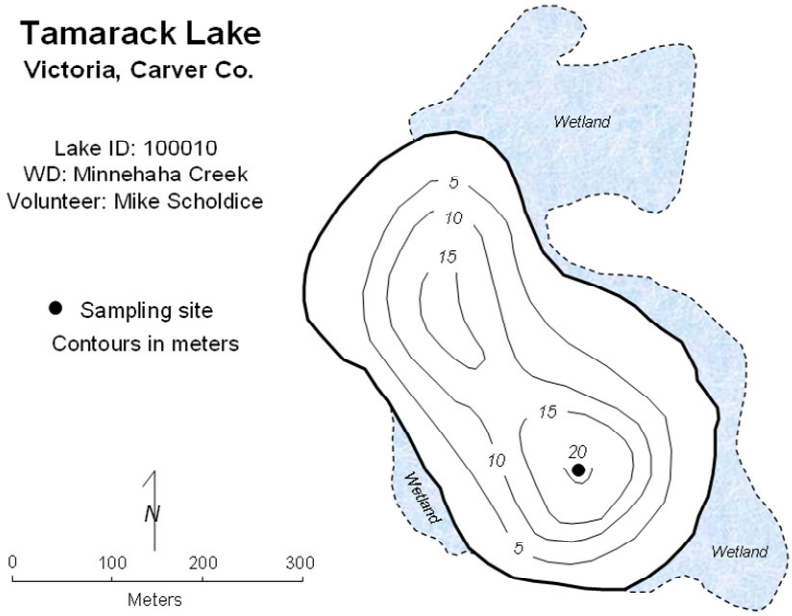
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

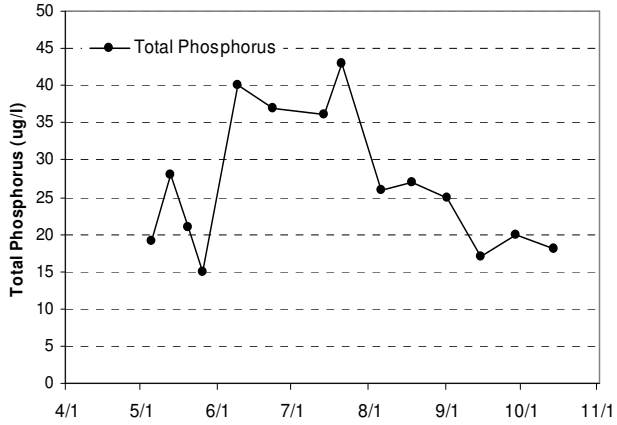
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

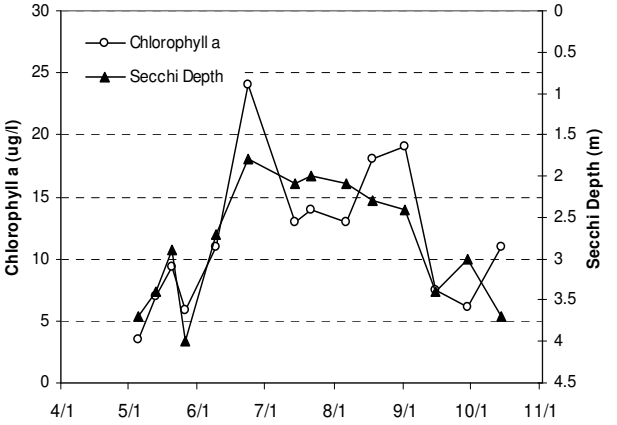
Tamarack Lake

Victoria, Carver Co.

Lake ID: 100010
WD: Minnehaha Creek
Volunteer: Mike Scholdice

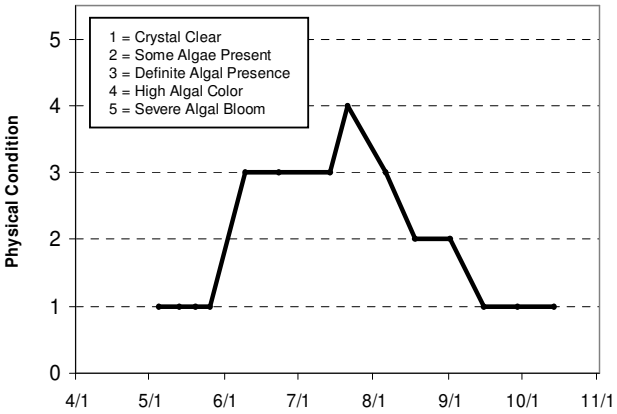






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/05/07	14.1				3.5	19		3.7	1	1
05/13/07	17.2				7	28		3.4	1	1
05/20/07	17.4				9.3	21		2.9	1	1
05/26/07	18.1				5.9	15		4	1	1
06/09/07	20.3				11	40		2.7	3	1
06/23/07	22.5				24	37		1.8	3	1
07/14/07	23.3				13	36		2.1	3	1
07/21/07	24.6				14	43		2	4	1
08/06/07	25.5				13	26		2.1	3	1
08/18/07	23.5				18	27		2.3	2	1
09/01/07	22.7				19	25		2.4	2	1
09/15/07	16.4				7.5	17		3.4	1	
09/29/07	17.1				6.1	20		3	1	1
10/14/07	13.3				11	18		3.7	1	1

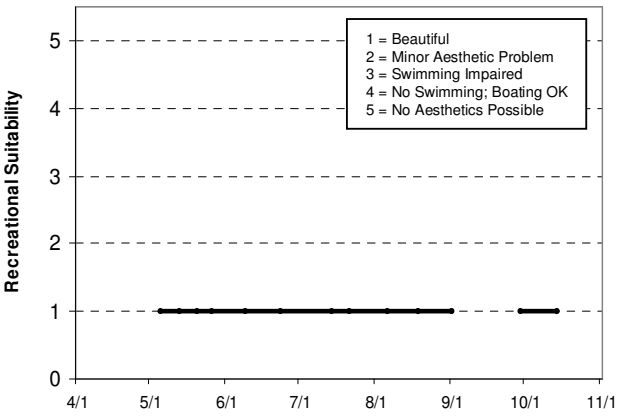


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							C	B	B	C	D	C	D	B
Chlorophyll a							C	A	B	B	C	C	C	B
Secchi Depth			A				C	B	C	C	C	C	C	B
Overall							**C**	**B**	**B**	**C**	**C**	**C**	**C**	**B**

Source: Metropolitan Council and STORET data



Terrapin Lake (82-0031) *Marine on St. Croix Watershed Management Organization*

Terrapin Lake is an 86-acre lake located within the May Township (Washington County), with a maximum depth of 4.6 m (roughly 15 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). There is very little other known morphological data available for the lake.

This marks the fourth year in which Terrapin Lake has been involved in CAMP (2004-2006 being the others). A search through the STORET nationwide water quality database for historic data on the lake produced only the aforementioned CAMP data. Therefore, 2004-2007 are the only complete years of water quality data available for the lake. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored seven times between mid-April and early-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	26.0	21.0	30.0	B
CLA (µg/l)	3.5	1.6	6.2	A
Secchi (m)	3.0	2.3	3.8	B
TKN (mg/l)	0.86	0.80	0.94	
			Water Quality	B

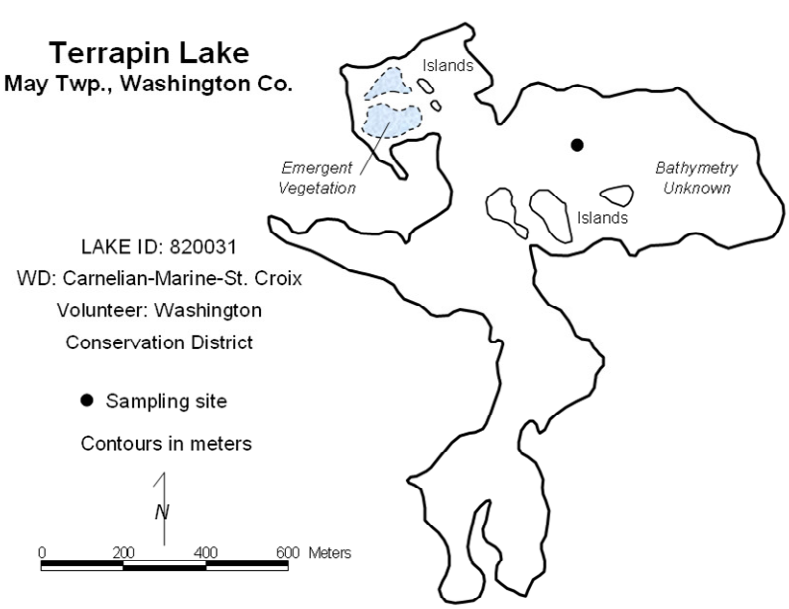
The lake's 2007 grade of B is similar to last year's grade of B but is worse than the A's recorded in 2004 and 2005.

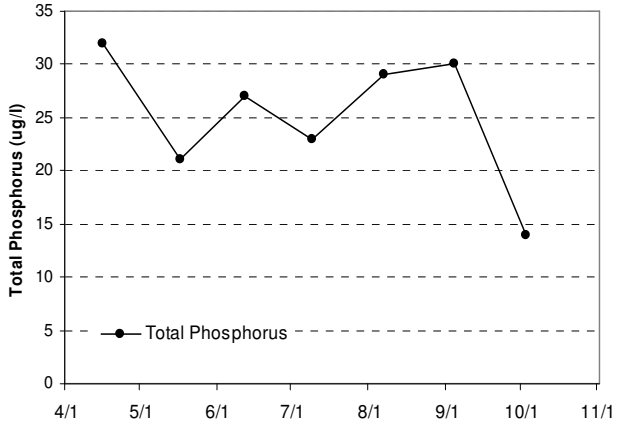
Because of the limited data available in the lake's water quality database, there are insufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

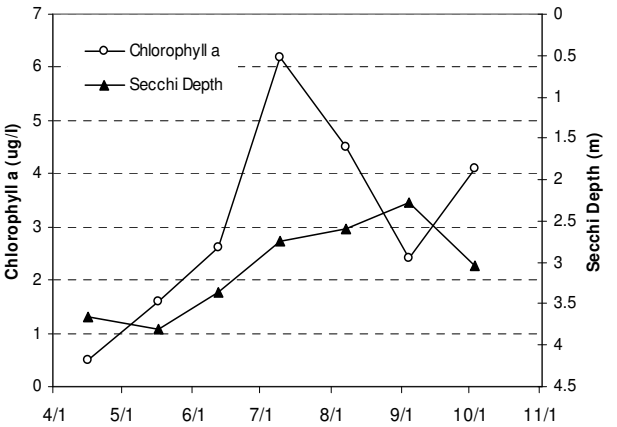
Throughout the monitoring period, the volunteers ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The resulting user perception rankings are shown on the information sheet. The mean physical condition ranking was 2.4 (between 2- "some algae present" and 3- "definite algal presence"), while the mean recreational suitability ranking was 2.4 (between 2- "minor aesthetic problem" and 3- "swimming impaired").

The Fisheries Section of the Minnesota Department of Natural Resources (MNDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MNDNR Fisheries Section by calling (651) 297-4916 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.

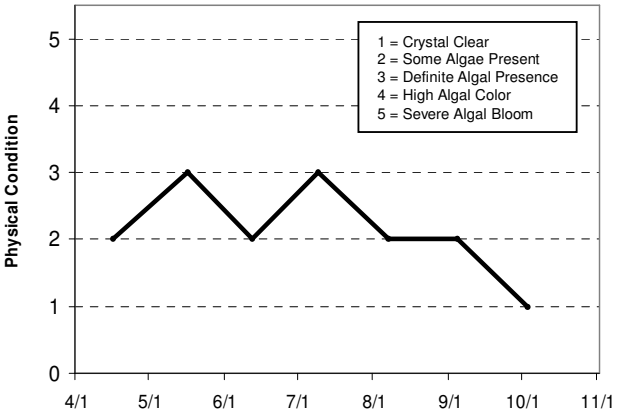






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	8.9	7.5	13.02	13.4	0.5	32		3.658	2	4
05/17/07	19.8	18.4	8.65	8.4	1.6	21		3.81	3	4
06/12/07	27.7	24.7	7.97	8.73	2.6	27		3.353	2	2
07/09/07	29.2	27.5	8.63	3.23	6.2	23		2.743	3	2
08/07/07	27.7	25.1	4.5	0.2	4.5	29		2.591	2	2
09/04/07	26.4	24.6	9.32	0.33	2.4	30		2.286	2	2
10/03/07	19.2	19.2	5.24	3.9	4.1	14		3.048	1	1

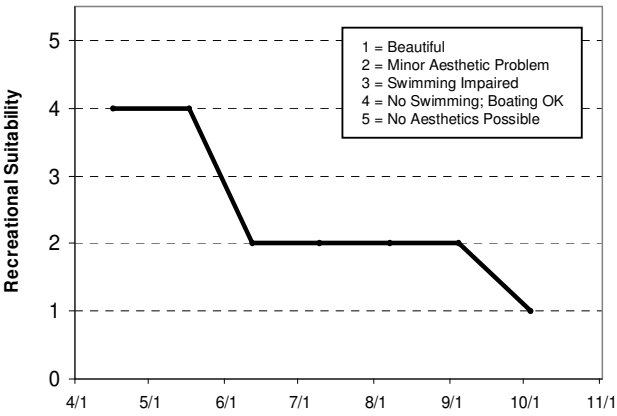


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus											B	A	C	B
Chlorophyll a											A	A	A	A
Secchi Depth											A	A	A	B
Overall											**A**	**A**	**B**	**B**

Source: Metropolitan Council and STORET data



Turtle Lake (82-0036) *Carnelian - Marine Watershed District*

This was the eighth year of CAMP monitoring in Turtle Lake which is located in the May Township (Washington County). A search through the STORET nationwide water quality database revealed a moderate amount of recent data on the lake. Other than for the 2000-2007 CAMP data (only Secchi transparencies collected in 1993-1995, 2002 and 2004-2006), data were found for 1991-1992 and 1996-2001.

The 44-acre lake has a mean and maximum depth of 2.4 m (eight feet) and 1.2 m (four feet), respectively. The mean depth of the lake and its surface area translate to an approximate lake volume of 172 ac-ft. Because of the shallowness of the lake, it is entirely considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The lake does not have a public access and its 699-acre watershed translates to a 16:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

Water samples were not collected in 2007 for analysis of TP, TKN and chlorophyll. The lake's Secchi transparency and dissolved oxygen were monitored seven times from late-April to mid-October 2007. Results are presented in both graphs and data tables on the lake's information sheet on the following page. Because Secchi transparency was the only data collected there are no nutrient or chlorophyll concentration means to compare to previous years. The lake's 2007 summertime (May through September) mean Secchi transparency was 1.6 m (minimum of 0.9 m and a maximum of 2.0 m). This translates to a grade of C for water clarity which is the same grade received as last year.

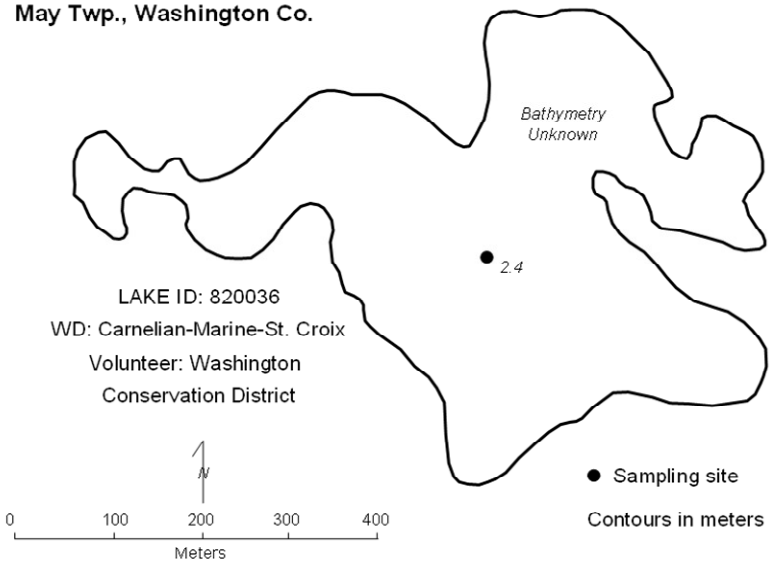
As mentioned earlier, there is a moderate amount of historic data available for Turtle Lake (recent data collected in the 1990's and early-to-mid-2000's). A glance at the lake's grades from 1991-2006 seems to indicate that the lake's water quality has improved. In the short-term, the lake seems well represented by a grade of C. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

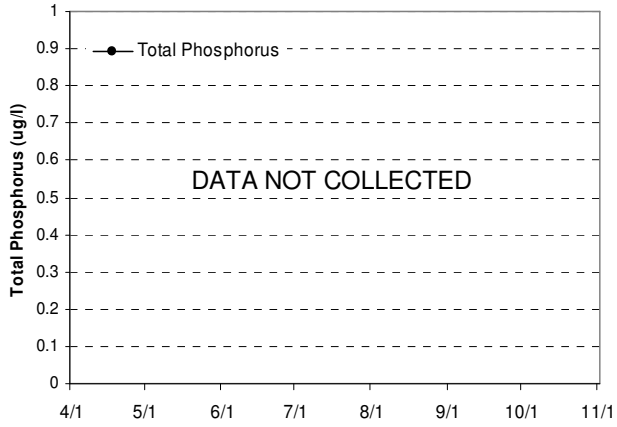
Throughout the summer, the volunteer ranked the lake's perceived physical condition on a 1-to-5 scale (see lake information sheet). The mean physical condition ranking was 2.4 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 3.6 (between 3- "swimming slightly impaired" and 4- "no swimming – boating ok").

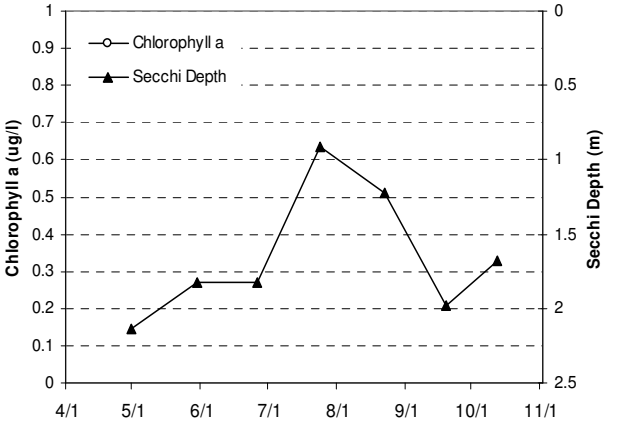
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Turtle Lake

May Twp., Washington Co.

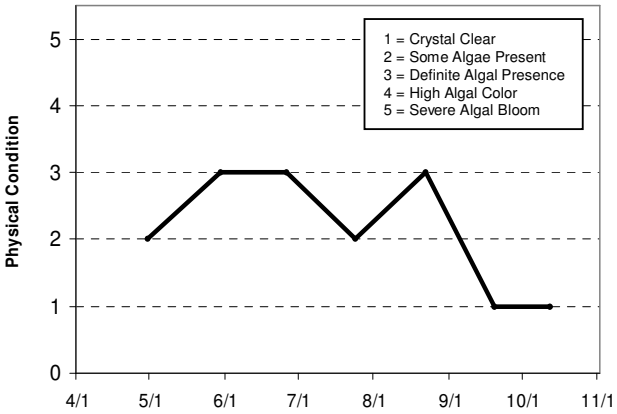






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/30/07	17.5	17.3	8.77	4.83				2.134	2	4
05/30/07	21.9	21.5	9.34	8.71				1.829	3	4
06/26/07	28.8	24.3	9.3	0.21				1.829	3	4
07/24/07	27.3	25.9	6.44	0.28				0.914	2	4
08/22/07	21.6	21	10.29	1.01				1.219	3	4
09/19/07	17.5	15.5	6.81	0.6				1.981	1	2
10/12/07	13.6	13.7	5.6	5.65				1.676	1	2

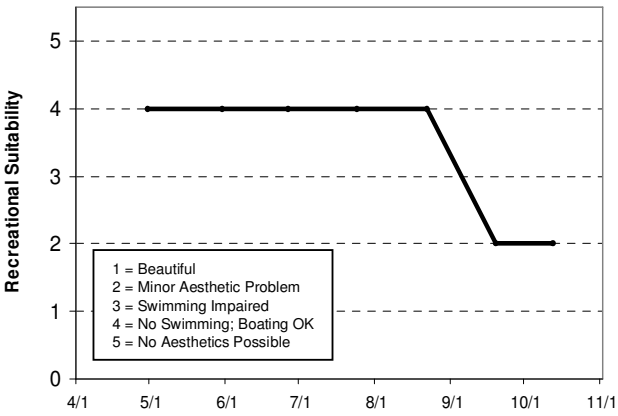


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus												F	F	
Chlorophyll a												F	F	
Secchi Depth												F	F	D
Overall												**F**	**F**	

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	C	C	B	D	C		D				
Chlorophyll a			D	D	D	C	B	B		B				
Secchi Depth	C	D	D	D	D	C	C	C	C	C	C	C	C	C
Overall			**D**	**D**	**D**	**C**	**C**	**C**		**C**				**C**

Source: Metropolitan Council and STORET data



Twin Lake [Burnsville] (19-0028) *Black Dog Watershed Management Commission*

Twin Lake is an 11-acre lake located in the City of Burnsville (Dakota County). Because of the shallowness of the lake, its entire area is considered littoral zone (the area of aquatic vegetation dominance) and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). There is very little known morphological data available for the lake. An area of concern and need for future management is the recent detection of Eurasian Water Milfoil (*Myriophyllum spicatum*) in the lake.

This was the eighth year in which Twin Lake has been involved in CAMP (1999 and 2001-2006 being the others [although the lake was only monitored twice in 2004]). As part of the lake's involvement in CAMP in 2007, the lake was monitored eight times between mid-April and mid-October. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake's 2007 raw data and resulting graphs are presented on the associated lake information page.

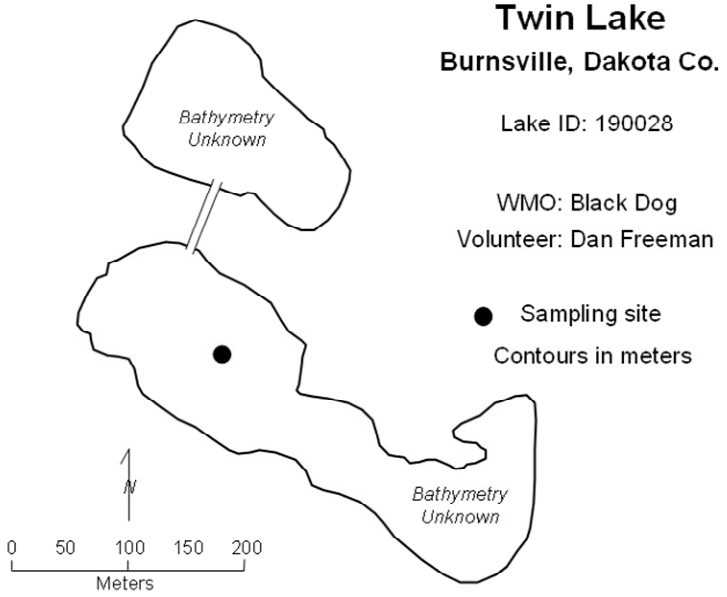
2007 summer (May-September) data summary

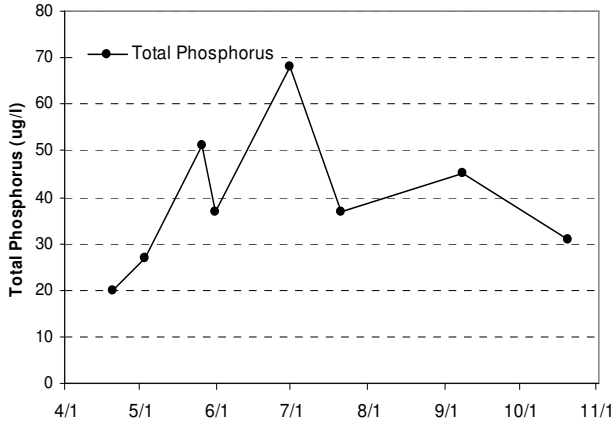
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	44.2	27.0	68.0	C
CLA (µg/l)	7.7	2.4	15.0	A
Secchi (m)	1.9	1.3	2.5	C
TKN (mg/l)	1.43	1.10	1.80	
			Water Quality	B

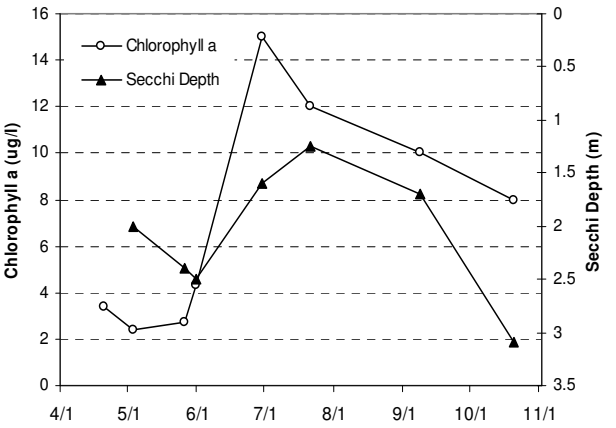
The water quality grade of B in 2007 and the individual grades in 2007 were the same as those received in 2001-2003 and 2005. Therefore, there is no apparent trend in water quality since 2001 based on summer time means. Crushed corn meal was added as a carbon amendment in year 2006 to try to decrease algal concentrations. Water quality in 2006 was worse than that reported in 2005 (grade of a C). There was no carbon amendment made in 2007. The lake's water quality seems to be well represented by a water quality grade of C+/B-.

Throughout the summer, the volunteer ranked the lake's perceived physical condition on a 1-to-5 scale (see lake information sheet). The mean physical condition ranking was 3.0 (3- "definite algal presence"), while the mean recreational suitability ranking was 4.3 (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

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

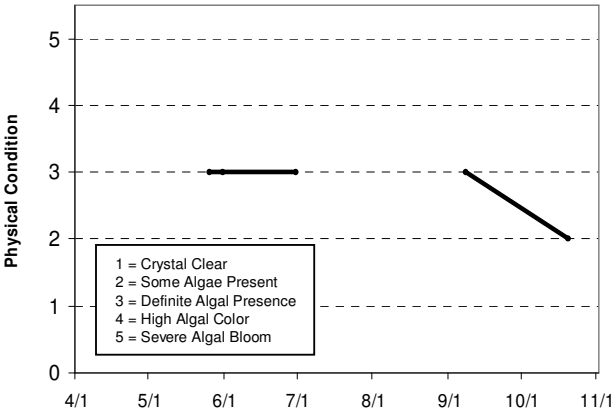






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07					3.4	20				
05/03/07	20.1				2.4	27		2		
05/26/07	19.4				2.7	51		2.4	3	
05/31/07	25.4				4.3	37		2.5	3	4
06/30/07	27				15	68		1.6	3	5
07/21/07	26.2				12	37		1.25		
09/08/07	23.8				10	45		1.7	3	4
10/20/07	13.6				8	31		3.1	2	

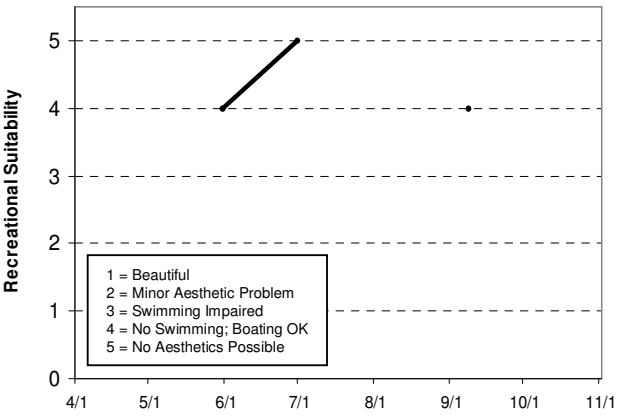


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus						D		C	C	C		C	D	C
Chlorophyll a						B		A	A	A		A	C	A
Secchi Depth						D		C	C	C		C	C	C
Overall						**C**		**B**	**B**	**B**		**B**	**C**	**B**

Source: Metropolitan Council and STORET data



Twin Lake [St. Louis Park] (27-0656) *City of St. Louis Park*

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

This marks the sixth year in which Twin Lake has been involved in CAMP (2002-2006 being the others). A search through the STORET nationwide water quality database for historic data on the lake provided only the aforementioned 2002-2006 CAMP data. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

The lake was monitored 10 times between late-April and late-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	154.1	99.0	221.0	F
CLA (µg/l)	62.1	15.0	240.0	D
Secchi (m)	0.5	0.3	0.7	F
TKN (mg/l)	1.54	1.00	2.40	
			Water Quality	F

The lake's 2007 grade of F was the first year that the lake received an F grade. Furthermore, the chlorophyll-a grade has decreased from a B grade in 2002, to C grades in 2003, 2005, and 2006, and then to a D grade in 2007. These observations seem to indicate that the water quality for Twin Lake has degraded since 2002. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

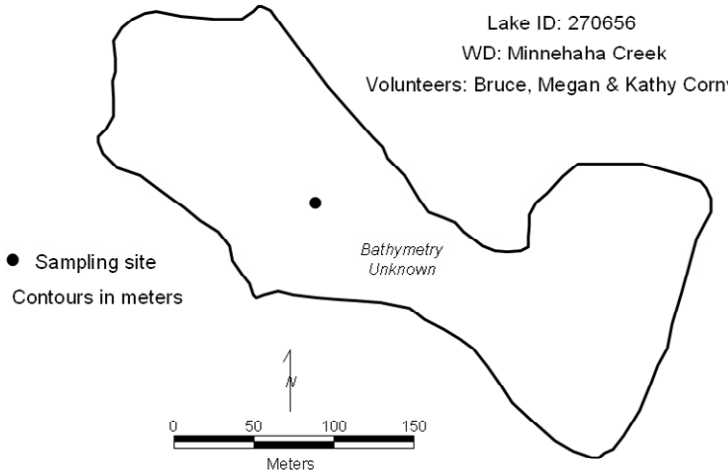
Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake's physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.6 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.0 for recreational suitability (4- "no swimming – boating ok").

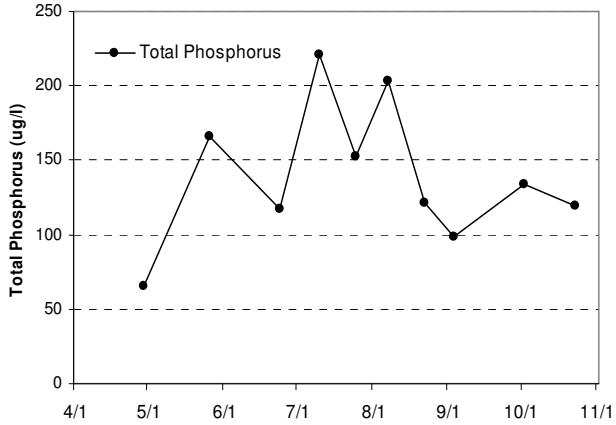
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

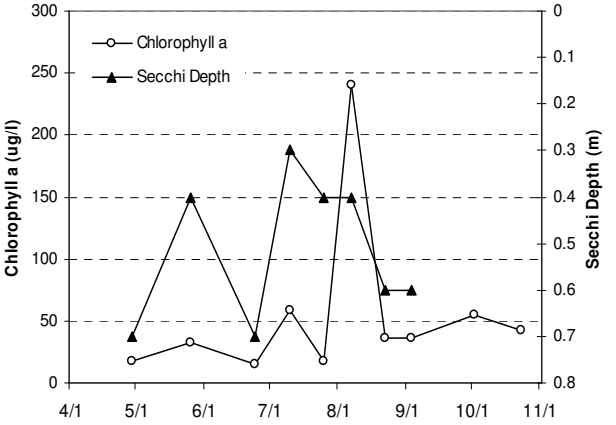
Twin Lake

St. Louis Park, Hennepin Co.

Lake ID: 270656
WD: Minnehaha Creek
Volunteers: Bruce, Megan & Kathy Cornwall

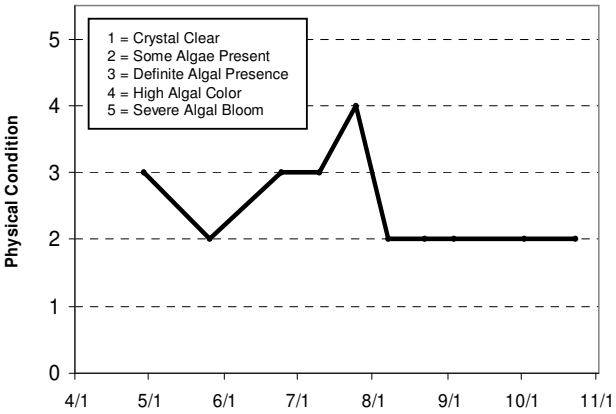






2007 Data

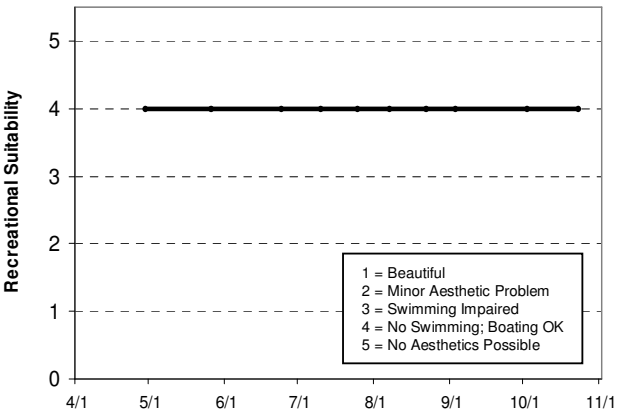
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/29/07	19.2				17	65		0.7	3	4
05/26/07	20.4				32	166		0.4	2	4
06/24/07	28.3				15	117		0.7	3	4
07/10/07	25.6				59	221		0.3	3	4
07/25/07	31.4				17	152		0.4	4	4
08/07/07	27.6				240	203		0.4	2	4
08/22/07	22.5				36	121		0.6	2	4
09/03/07					36	99		0.6	2	4
10/02/07					55	134			2	4
10/23/07					42	119			2	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus									F	F	F	F	D	F
Chlorophyll a									B	C	D	C	C	D
Secchi Depth									D	D	D	F	F	F
Overall									**D**	**D**	**D**	**D**	**D**	**F**



Source: Metropolitan Council and STORET data

Valentine Lake (62-0071) *Rice Creek Watershed District*

Valentine Lake is located within the City of Arden Hills in Ramsey County. The lake has a surface area of 60-acres and a maximum and mean depth of 4.0 m (13.1 feet) and 1.5 m (4.9 feet), respectively. 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, and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column). The mean depth and surface area of the lake translates to an approximate volume of 300 ac-ft. The result of comparing the lake's surface area to its 2,237-acre drainage area (watershed) is a rather large 37:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

This was the seventh year that Valentine Lake has been involved in CAMP (2001-2006 being the others). In fact, the 2001-2006 CAMP data were the only data found through STORET nationwide water quality database search. Therefore 2001-2007 represents the only water quality data readily available for the lake.

The lake was monitored 12 times between early-May and early-October 2007. On each sampling day the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	78.9	53.0	113.0	D
CLA (µg/l)	22.5	3.0	75.0	C
Secchi (m)	1.5	0.8	2.4	C
TKN (mg/l)	2.20	1.85	3.20	
			Water Quality	C

The resulting water quality grade for 2007 (C) is similar to those of 2001-2006. However, 2007 was the first year that the total phosphorus grade dropped to a D; it usually is a C. The lake's 2007 nutrient concentrations and Secchi transparencies are graphed on the following page.

Because of the limitedness of the lake's water quality database, the determination of any long- or short-term trends is not possible. A recently conducted trend analysis by the MPCA on the lake's Secchi transparency data revealed a statistically significant improvement in recent water clarity (MPCA 2008). To better understand the lake's water quality and what direction it may be heading, more years of data collection are needed.

The perceived physical and recreational conditions of the lake, recorded by the volunteers, were ranked on a 1-to-5 scale. The rankings are shown in both tabular and graphical form on the lake's associated information sheet. The mean physical condition ranking was 1.9 (between 1- "crystal clear" and 2- "some algae present"), while the mean recreational suitability ranking was 3.5 (between 3- "swimming slightly impaired" and 4- "no swimming; boating ok").

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

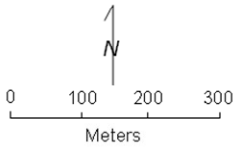
Valentine Lake

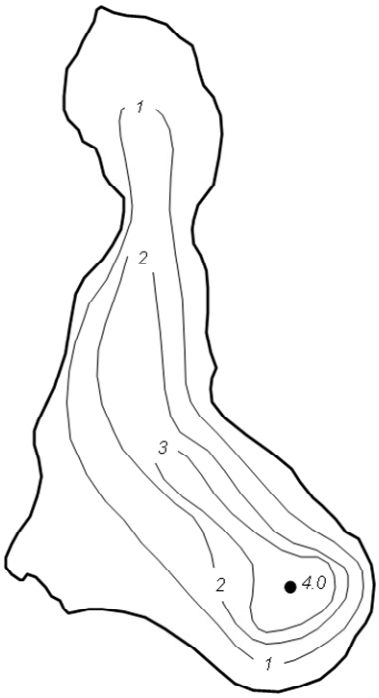
Arden Hills, Ramsey Co.

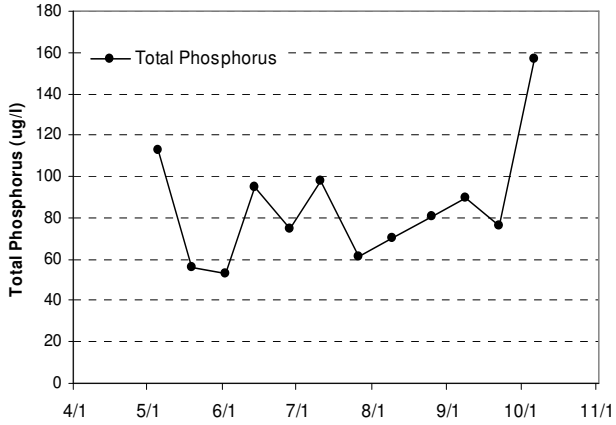
Lake ID: 620071
WD: Rice Creek
Volunteer: Bob Kistler

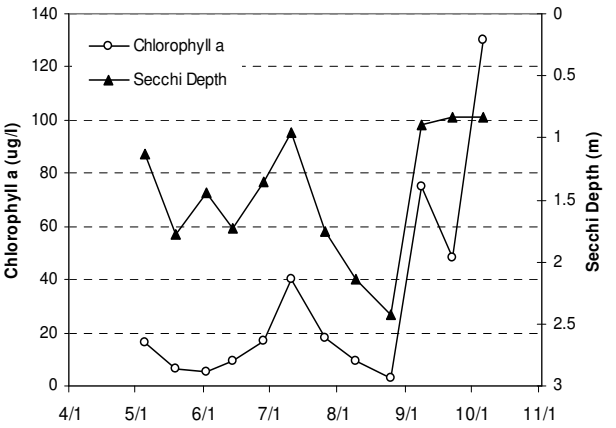
● Sampling site

Contours in meters



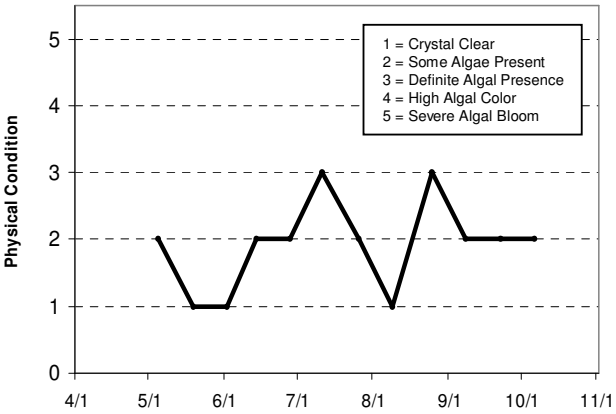






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/05/07	16.2				16	113		1.13	2	1
05/19/07	19.9				6.5	56		1.78	1	1
06/02/07	23.1				5	53		1.44	1	4
06/14/07	25.6				9.1	95		1.73	2	4
06/28/07	25				17	75		1.36	2	4
07/11/07	24.3				40	98		0.96	3	4
07/26/07	28				18	61		1.75	2	4
08/09/07	25.8				9.4	70		2.14	1	4
08/25/07	22.3				3	81		2.43	3	4
09/08/07	23.3				75	90		0.9	2	4
09/22/07	19				48	76		0.84	2	4
10/06/07	18.2				130	157		0.84	2	4

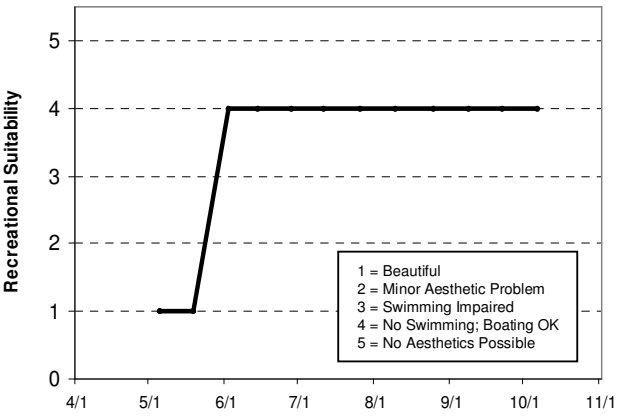


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus								C	C	C	C	C	C	D
Chlorophyll a								B	B	C	C	C	B	C
Secchi Depth								C	C	D	C	C	C	C
Overall								**C**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



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

The 8-acre lake has a maximum depth of 3.2 m (10 feet). Because of the shallowness of the lake, the entire lake is considered littoral (the area dominated by aquatic vegetation). The majority of the land within the lake's 117-acre watershed is parkland or single-family residential homes. The watershed-to-lake size ratio is 8:1 (the greater the ratio, the greater the potential stress on the lake from surface runoff).

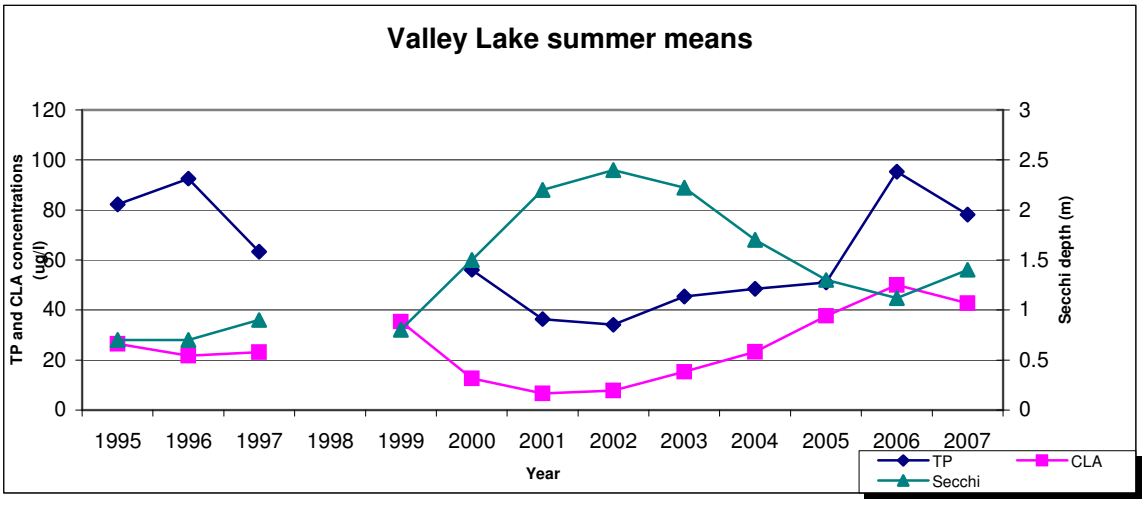
The lake has been involved in an organic carbon amendment project where barley straw or crushed corn was added to the lake in an attempt to inhibit algal populations. Barley straw has been used to attempt to control algae in the United Kingdom for many years. Furthermore, the controlling mechanism has not been known. Therefore, the Valley Lake project was an attempt to answer two questions: 1) Does barley straw treatment control algae in Valley Lake? and 2) What is the controlling mechanism? CAMP data was used to evaluate the effectiveness of the carbon amendments. The 2006 Metropolitan Council lake study report (METC 2007) included a synopsis of the carbon amendment study. More detailed discussion of the study can be found in McComas and Stuckert (2007).

This was the twelfth year that Valley Lake, located in the City of Lakeville (Dakota County), has been involved in CAMP. A search through the nationwide water quality database (STORET) found no water quality data on the lake prior to the 1995 CAMP data. In 2007, TP, TKN, CLA, and Secchi transparency were tested 14 times between mid-April and late-October.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	78.2	28.0	156.0	D
CLA (µg/l)	42.7	8.0	90.0	C
Secchi (m)	1.4	0.7	2.4	C
TKN (mg/l)	1.30	0.53	2.50	
			Water Quality	C

The lake's 2007 water quality grade of C is an improvement over last year's D grade. The figure below shows an improvement in summer time means for the three water quality parameters from 1999 to 2002, and then a continued decline since 2002. It appears that recent summer time means have returned to similar concentrations as seen in the mid-1990's.



The volunteer(s) ranked their perception of the lake's physical and recreational conditions on a 1-to-5 scale as shown on the attached information sheet. The summertime mean recorded physical condition was 3.1 (between 3- "definite algae present" and 4- "high algal color"). The mean suitability for recreation ranking was 2.8 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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) 297-4916 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.

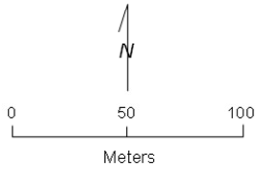
Valley Lake

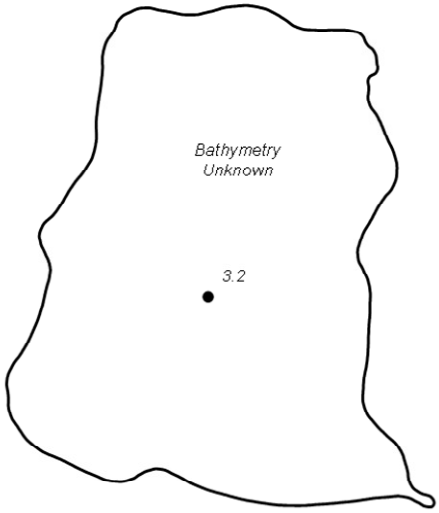
Lakeville, Dakota Co.

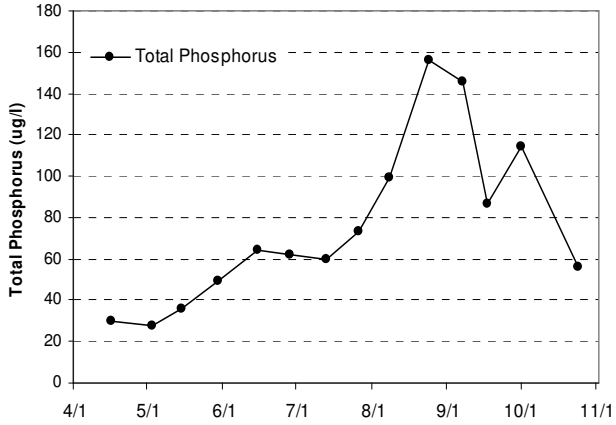
Lake ID: 190348
WMO: Dakota County
Volunteer: City of Lakeville

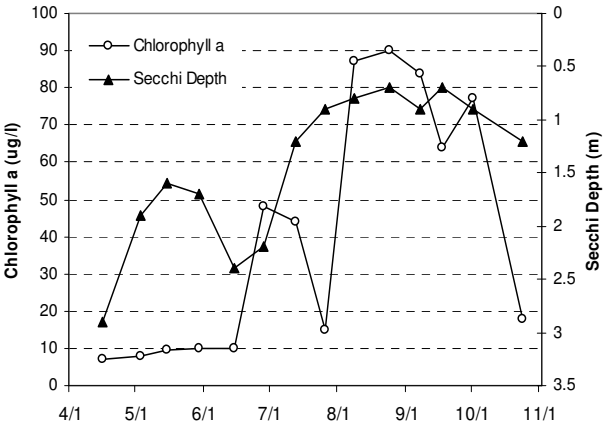
● Sampling site

Contours in meters



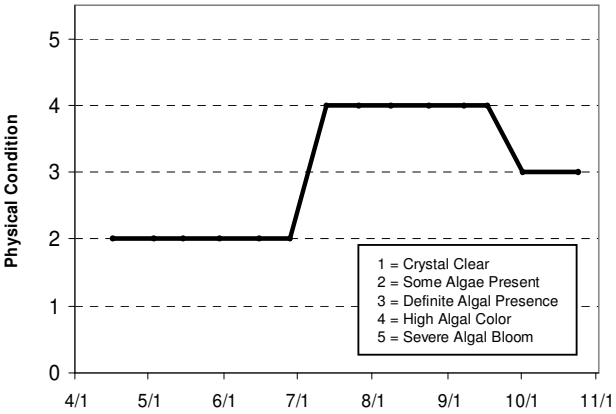






2007 Data

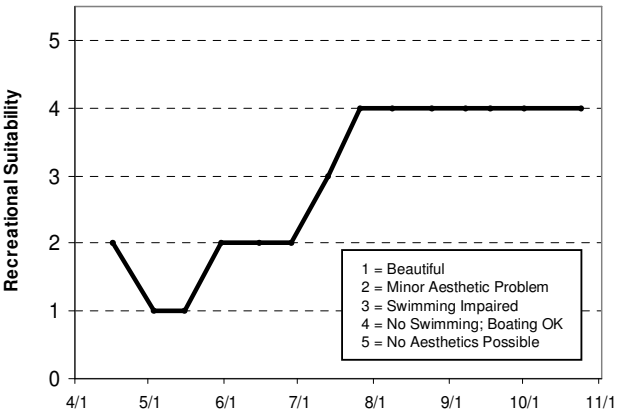
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07	9.4				7.1	30		2.9	2	2
05/03/07	17				8	28		1.9	2	1
05/15/07	19				9.7	36		1.6	2	1
05/30/07	20				10	49		1.7	2	2
06/15/07	26				10	64		2.4	2	2
06/28/07	26				48	62		2.2	2	2
07/13/07	26				44	60		1.2	4	3
07/26/07	27				15	73		0.9	4	4
08/08/07	28				87	99		0.8	4	4
08/24/07	21				90	156		0.7	4	4
09/07/07	26				84	146		0.9	4	4
09/17/07	19				64	87		0.7	4	4
10/01/07	17				77	114		0.9	3	4
10/24/07	12				18	56		1.2	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		D	D	C			C	C	C	C	C	C	D	D
Chlorophyll a		C	C	C		C	B	A	A	B	C	C	D	C
Secchi Depth		D	D	D		D	C	C	B	B	C	C	D	C
Overall		**D**	**D**	**C**			**C**	**B**	**B**	**B**	**C**	**C**	**D**	**C**



Source: Metropolitan Council and STORET data

Waconia Lake (10-0059) *Carver County Environmental Services*

Lake Waconia, located next to the City of Waconia in Carver County, is considered a Metropolitan Area "Priority Lake" because of its multi-recreational uses. Lake Waconia is one of the largest bodies of water in the region. It has a surface area of approximately 3,000 acres (6.8 miles in circumference), and mean and maximum depths of 4.0 and 11.3 m (13.1 and 47.1 feet), respectively. The lake has an approximate volume of 38,632 ac-ft (resulting in a retention time of about 10 years) and an approximate watershed-to-lake size ratio of 4:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

There are a couple of public accesses on the lake to support its high-volume recreational use. One access is a city-owned access on the southern end of the lake while the other is a state-owned access on the northeastern shore. In the future, the recreational use on and around the lake may increase if a proposed regional park on the lake's southeastern shores becomes a reality. One problem that may possibly hinder future recreational activity on the lake, however, is Eurasian Water Milfoil (*Myriophyllum spicatum*) which has been reported in the lake.

A variety of land uses around Lake Waconia may contribute to the lake's nutrient load. There are residential areas along the lake's shoreline (25.9 homes/shoreline mile), wetlands, commercial/ industrial areas, and rural/agricultural uses. The predominant uses associated with rural/agricultural areas are livestock and crop farming (51 percent), while those affiliated with the City of Waconia include: single and multi-family residential, commercial/industrial, and paved areas such as parking lots and city streets. All the land uses around the lake pose a potential runoff and pollution problem to the lake. Shoreline homes provide the possibility of lawn runoff of herbicides and fertilizers. Rural/agricultural uses, if not properly managed, can result in herbicides, fertilizers, and eroded soils ending up in the lake. City uses, where a majority of the area is paved, can result in large amounts of nutrient rich debris entering the lake after a rainstorm. These non-point pollution problems can hasten the lake's natural eutrophication process, resulting in a lake that cannot support all of its recreational uses.

Lake Waconia has been involved in CAMP since 1994 (and monitored by Council staff in 2004). In 2007, the lake was monitored 13 times between mid-April and mid-October. During each monitoring event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	33.1	18.0	58.0	C
CLA (µg/l)	17.1	4.5	37.0	B
Secchi (m)	1.9	1.0	2.8	C
TKN (mg/l)	0.94	0.65	1.50	
			Water Quality	C

The lake's best water quality year recorded through CAMP was 1994 (TP= 21.0 µg/l, CLA= 6.3 µg/l, and Secchi= 3.1 m resulting in an grade of A). The worst was 2006 (TP= 52.2 µg/l, CLA= 29.4 µg/l, and Secchi= 2.4 m resulting in an grade of C).

A search of Council, MPCA, and STORET databases revealed nutrient water quality data for 1980, 1981, 1985, 1990, 1994-2006 (all as a part of the Council's lake monitoring programs). Additionally, Secchi transparencies have been collected through the MPCA's Citizen Lake Monitoring Program since 1974. The lake received C's in 1980, 1998-2000, 2003 and 2006-2007, B's in 1981, 1985, 1995-1997, 2001-2002 and 2004-2005, and an A in 1994. Supplemental Secchi data from 1980-1993 has resulted in annual grades of C or D. The lake's water quality grade seems to be well represented by an grade of C+/B.

Additionally, the MPCA recently conducted a trend analysis on the lake's Secchi transparency data, which revealed a statistically significant improvement in recent water clarity (MPCA 2008).

The volunteer monitor's perceptions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale during each monitoring event. The rankings are shown on the information sheet on the next page. The mean physical condition ranking was 2.1 (roughly 2- "some algae present"), while the mean recreational suitability ranking was 2.0 (2- "minor aesthetic problem").

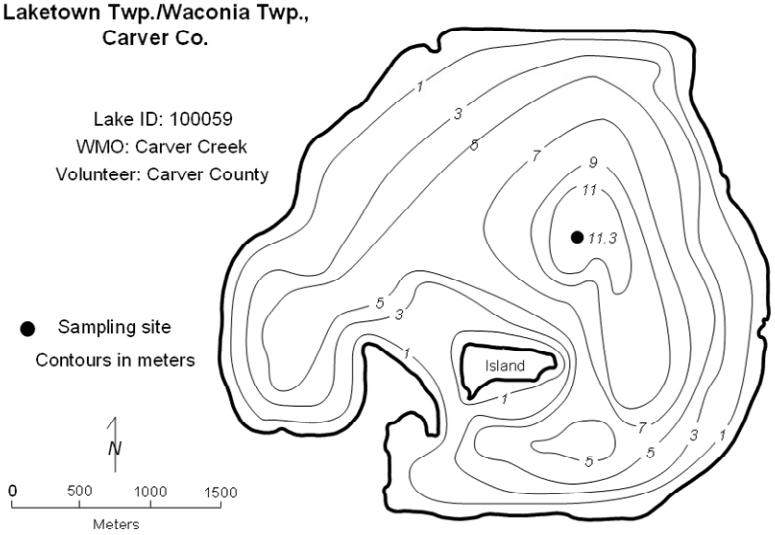
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

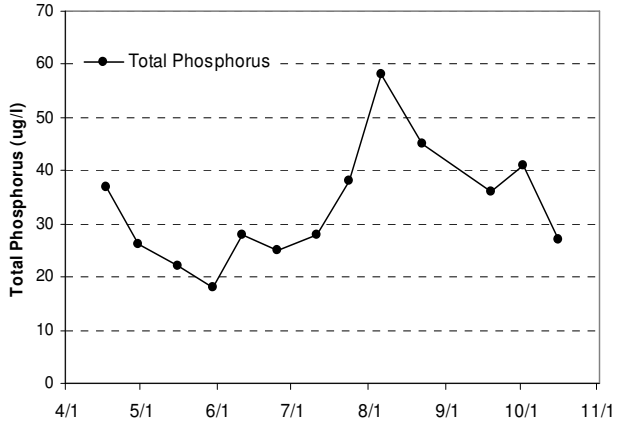
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

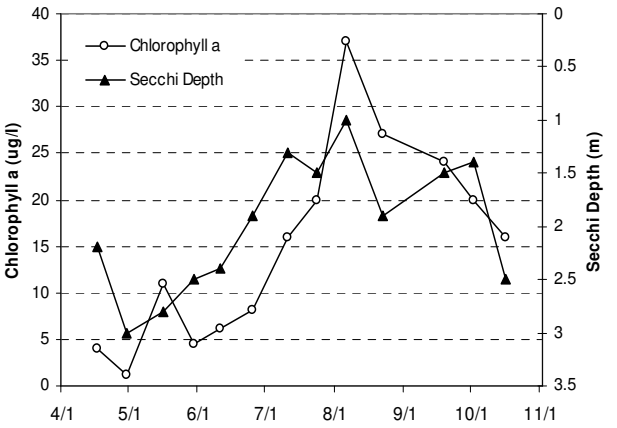
Lake Waconia

Laketown Twp./Waconia Twp., Carver Co.

Lake ID: 100059
WMO: Carver Creek
Volunteer: Carver County

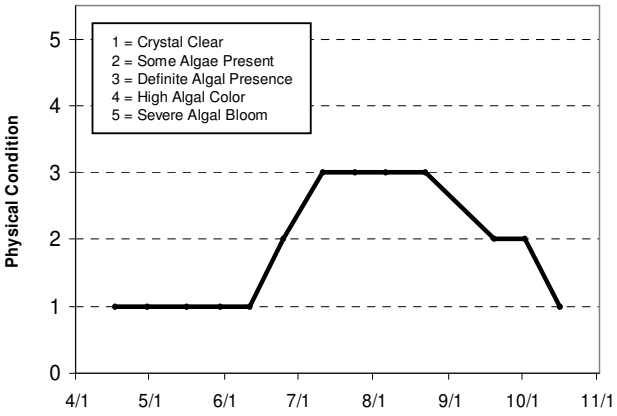






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	5.7		11.09		4	37		2.2	1	1
04/30/07	13.77		9.31		1.2	26		3	1	1
05/16/07	16.64		9.59		11	22		2.8	1	1
05/30/07	18.84		9.42		4.5	18		2.5	1	1
06/11/07					6.2	28		2.4	1	1
06/25/07	23.9		4.3		8.1	25		1.9	2	2
07/11/07					16	28		1.3	3	2
07/24/07	26.27		10.76		20	38		1.5	3	3
08/06/07	25.04		8.03		37	58		1	3	3
08/22/07	21.88		7.35		27	45		1.9	3	3
09/19/07	18.59		8.34		24	36		1.5	2	2
10/02/07			10.1		20	41		1.4	2	2
10/16/07	12.98		10.53		16	27		2.5	1	1

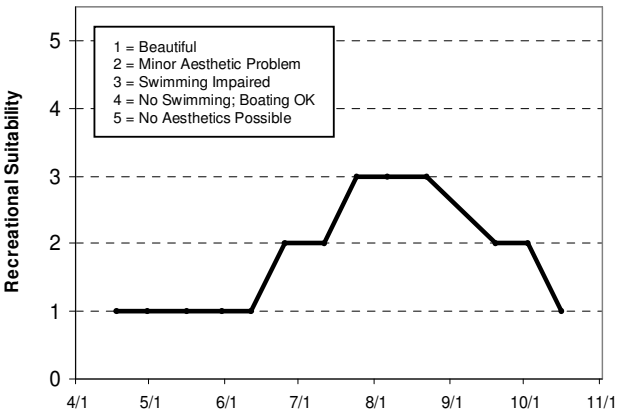


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus	C	B				B								
Chlorophyll a	C	B				B					C			
Secchi Depth	C	C	C	C	D	C	C	C	D	C	C	C	C	C
Overall	**C**	**B**				**B**								

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	A	A	B	B	C	C	C	C	B	C	B	B	C	C
Chlorophyll a	A	B	B	B	B	B	B	B	B	B	B	B	C	B
Secchi Depth	A	B	C	C	C	C	C	B	B	C	C	A	B	C
Overall	**A**	**B**	**B**	**B**	**C**	**C**	**C**	**B**	**B**	**C**	**B**	**B**	**C**	**C**

Source: Metropolitan Council and STORET data



West Boot Lake (82-0044) *Carnelian - Marine Watershed District*

This was the seventh year of CAMP monitoring in West Boot Lake which is located in May Township (Washington County). A search through the STORET nationwide water quality database revealed a moderate amount of data on the lake over the past 10+ years (1991 and 1996-1999 and the 2000-2005 CAMP data). 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. Roughly 56 percent of the lake's area is considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation). The lake's 209-acre immediate watershed translates to a 2:1 watershed-to-lake size ratio (the greater the ratio, the greater the potential stress on the lake from surface runoff).

The lake was monitored 7 times between mid-April and early-October 2007. Results are presented on graphs and data tables on the following page. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	24.4	13.0	41.0	B
CLA (µg/l)	3.6	2.8	5.5	A
Secchi (m)	3.7	3.0	4.3	A
TKN (mg/l)	0.88	0.65	1.10	
			Water Quality	A

The lake's 2007 grade is similar to those recorded in 1999-2006 although the total phosphorus grade of B was less than the A received in the past 3 years. No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake seems to have a wide range of fluctuation (grade of B in 1996 and 1998, C in 1997, and A's in 1999-2007). A recent MPCA conducted trend analysis on the lake's Secchi transparency data, however, revealed a statistically significant improvement in recent water clarity (MPCA 2008). To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

Throughout the summer, the volunteer ranked the lake's perceived physical condition on a 1-to-5 scale (see lake information sheet). The mean physical condition ranking was 2.2 (between 2- "some algae present" and 3- "definite algae present"), while the mean recreational suitability ranking was 2.2 (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

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) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

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

West Boot Lake

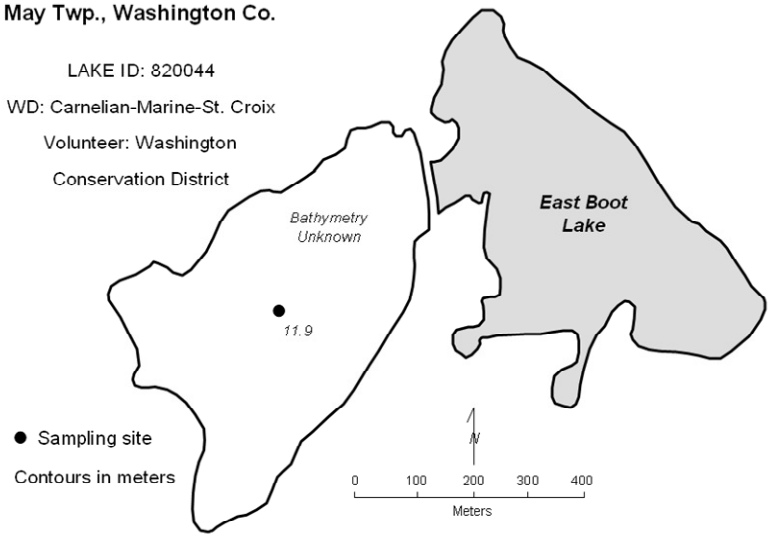
May Twp., Washington Co.

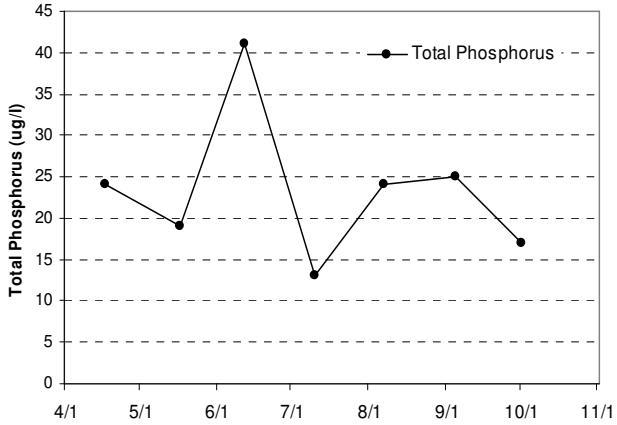
LAKE ID: 820044

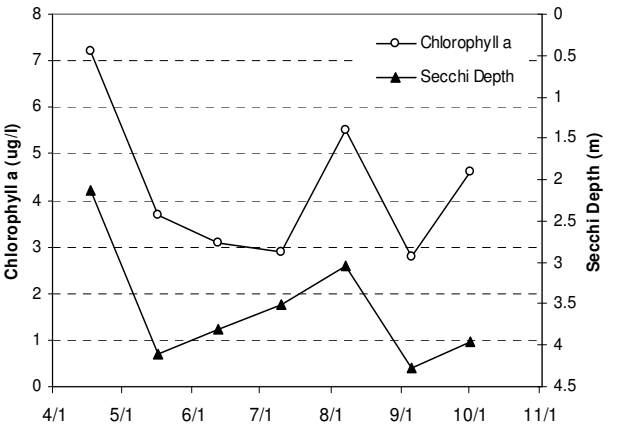
WD: Carnelian-Marine-St. Croix

Volunteer: Washington

Conservation District

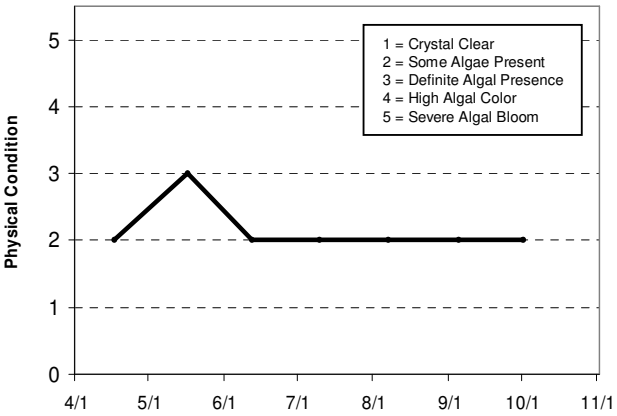






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/17/07	10.9	4.7	11.96	7.07	7.2	24		2.134	2	2
05/17/07	19.7	5.9	8.62	0.1	3.7	19		4.115	3	2
06/12/07	27.8	7.9	8.12	0.09	3.1	41		3.81	2	2
07/10/07	29.1	7.7	6.42	0.09	2.9	13		3.505	2	2
08/07/07	27.8	7.9	5.5	0.25	5.5	24		3.048	2	3
09/05/07	26.8	7.8	8.41	0.33	2.8	25		4.267	2	2
10/01/07	19.8	8.8	7.28	0.32	4.6	17		3.962	2	3

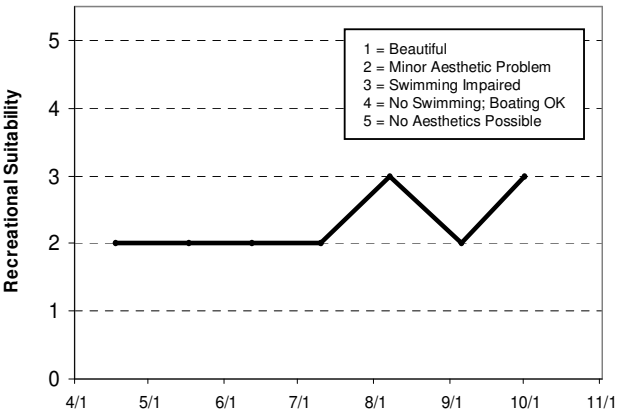


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth												C		
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			B	C	A	A	A	A	A	B	A	A	A	B
Chlorophyll a			A	B	C	A	A	A	A	A	A	A	A	A
Secchi Depth			B	C	B	A	A	A	A	A	A	A	A	A
Overall			**B**	**C**	**B**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Source: Metropolitan Council and STORET data



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

This was the ninth year of CAMP monitoring in Westwood Lake (1993 and 2000-2006 being the others), which is located in the City of St. Louis Park (Washington County). The 41-acre lake has a maximum depth of 2.0 m (six-and-a half feet). Because of the shallowness of the lake, it is entirely considered littoral zone (the 0-15 foot depth area dominated by aquatic vegetation), and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake's water column).

Westwood Lake was monitored eight times between late-April and mid-September 2007. Results from the monitoring are presented on the information sheet on the next page.

2005 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	35.2	28.0	44.0	C
CLA (µg/l)	10.2	1.8	23.0	B
Secchi (m)	1.3	0.9	1.7	C
TKN (mg/l)	2.10	1.50	2.60	
			Water Quality	C

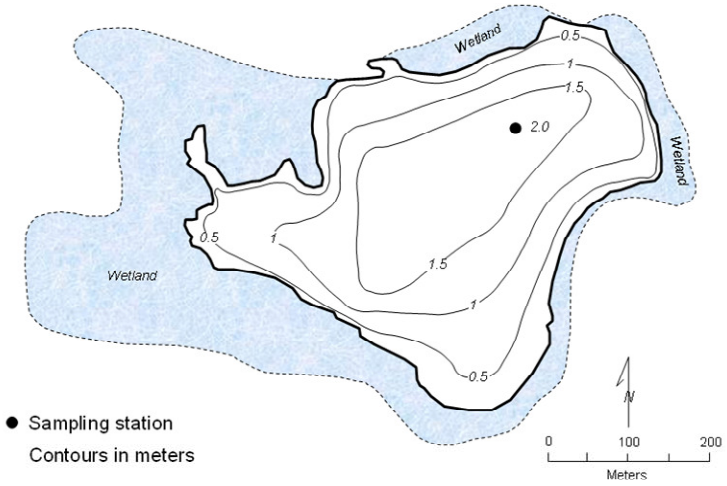
Because there is a limited amount of historic data available for Westwood Lake, it is not possible to determine any long-term trends. In the short-term however, the lake's water quality shows a wide range of fluctuation (grade of D in 1982, C in 1993, 2001-2002, 2005-2007, and B in 2000 and 2003-2004). To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

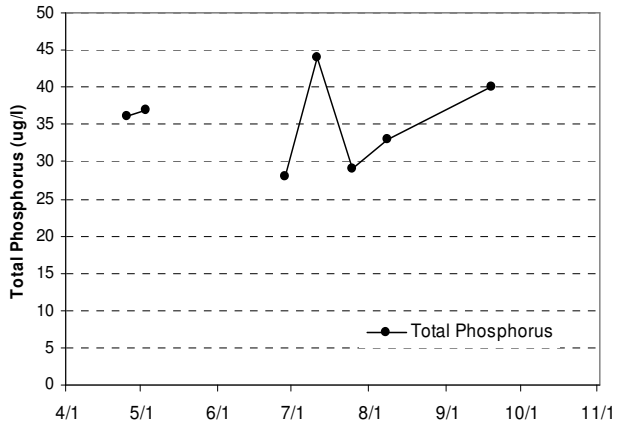
Throughout the monitoring period, the volunteers' opinions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale. These user perception rankings are shown on the lake information sheet. The average user perception rankings, on a 1-to-5 scale, were 3.0 for physical condition (3- "definite algal color"), and 4.2 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

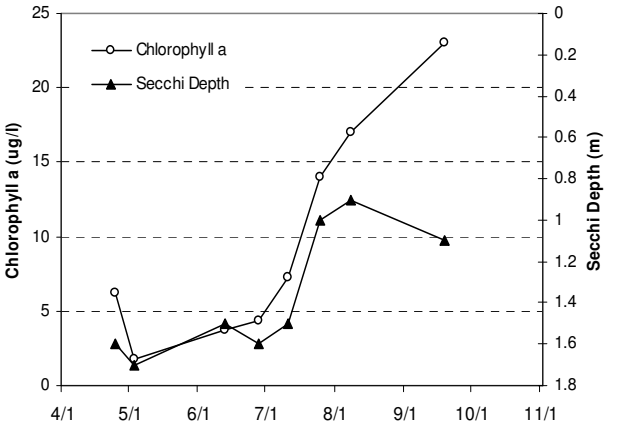
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

Lake ID: 270711
WMO: Bassett Creek
Volunteer: The Westwood Nature Center

Westwood Lake,
St. Louis Park, Hennepin Co.

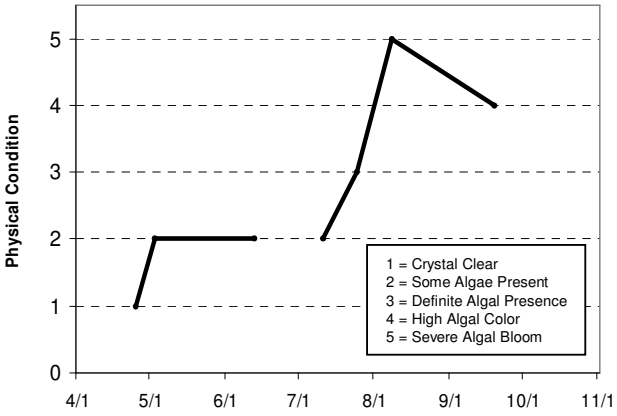






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/25/07	15.5				6.2	36		1.6	1	2
05/03/07	18				1.8	37		1.7	2	4
06/13/07	28.1				3.7			1.5	2	4
06/28/07	28				4.4	28		1.6		
07/11/07	25				7.3	44		1.5	2	5
07/25/07	29.5				14	29		1	3	4
08/08/07	28.6				17	33		0.9	5	4
09/19/07	19.9				23	40		1.1	4	4

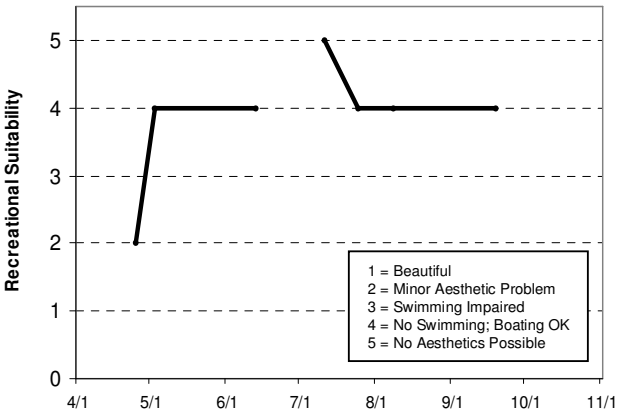


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus			F											C
Chlorophyll a			C											C
Secchi Depth			D											C
Overall			**D**											**C**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus							B	B	C	C	C	D	D	C
Chlorophyll a							B	C	B	A	A	C	B	B
Secchi Depth							C	C	C	C	C	C	C	C
Overall							**B**	**C**	**C**	**B**	**B**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



White Rock Lake (82-0072) *Rice Creek Watershed District*

White Rock Lake is a 65-acre lake located in Washington County. There is very little known morphological data available for the lake. This was the second year that White Rock Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data, other than the 2006 CAMP data.

The lake was monitored 14 times between mid-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	Mean	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	111.1	54.0	186.0	D
CLA (µg/l)	43.5	1.4	110.0	C
Secchi (m)	0.5	0.2	1.5	F
TKN (mg/l)	2.78	1.90	4.80	
			Water Quality	D

The lake received on water quality grade of D, which is the same grade it received in 2006. The lake received the same grades for the individual parameter grades as in 2006 as well. There is limited water quality data available for White Rock Lake. Therefore, there are insufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

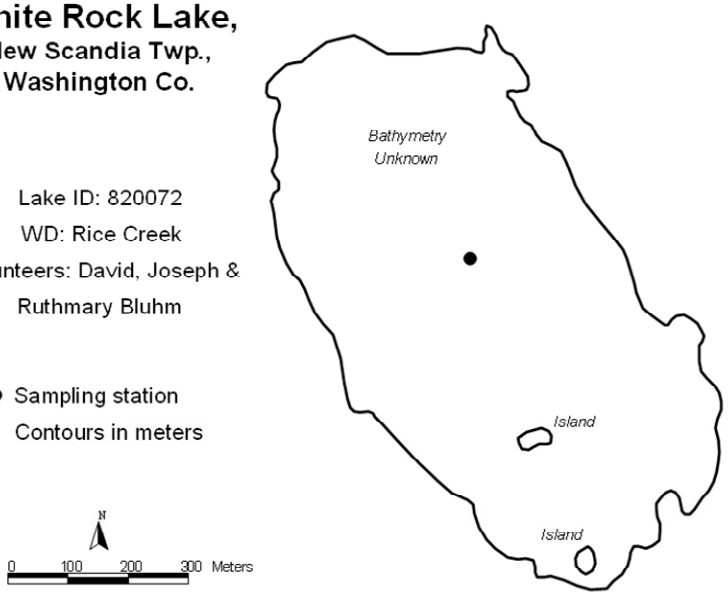
The average user perception rankings, on a 1-to-5 scale, were 2.2 for physical condition (between 2- "some algae present" and 3- "definite algae present") and 2.2 for recreational suitability ranking (between 2- "minor aesthetic problem" and 3- "swimming slightly impaired").

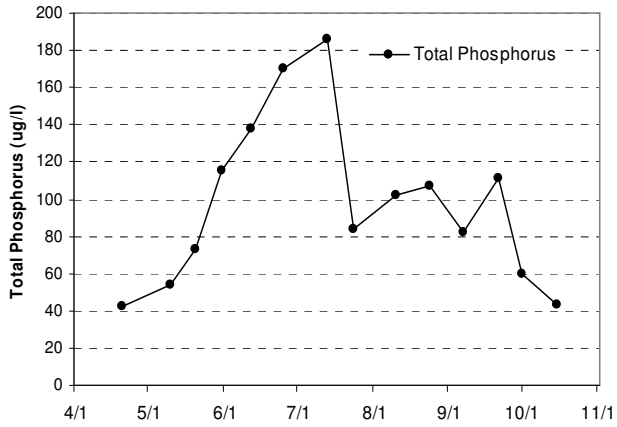
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

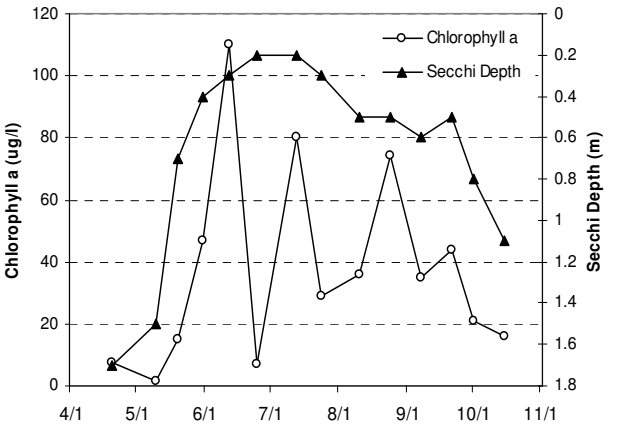
White Rock Lake,
New Scandia Twp.,
Washington Co.

Lake ID: 820072
WD: Rice Creek
Volunteers: David, Joseph & Ruthmary Bluhm

● Sampling station
Contours in meters

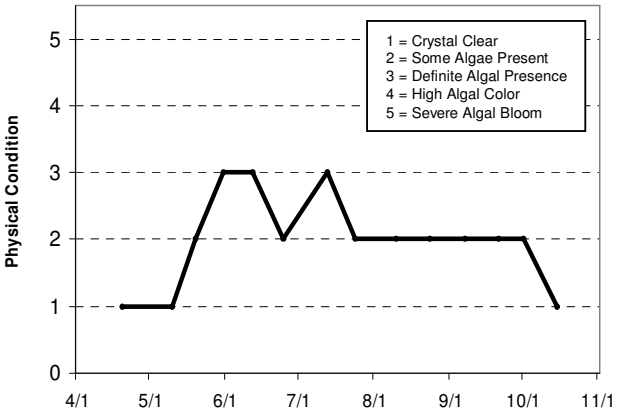






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/20/07	15.1				7.3	42		1.7	1	1
05/10/07	21				1.4	54		1.5	1	1
05/20/07	20.4				15	73		0.7	2	2
05/31/07	26.2				47	115		0.4	3	3
06/12/07	26.9				110	138		0.3	3	3
06/25/07	27.3				6.8	170		0.2	2	1
07/13/07	25.2				80	186		0.2	3	2
07/24/07	27.8				29	84		0.3	2	2
08/10/07	25.9				36	102		0.5	2	2
08/24/07	22.6				74	107		0.5	2	3
09/07/07	25.7				35	82		0.6	2	3
09/21/07	19.3				44	111		0.5	2	2
10/01/07	17.7				21	60		0.8	2	2
10/15/07	13				16	43		1.1	1	1

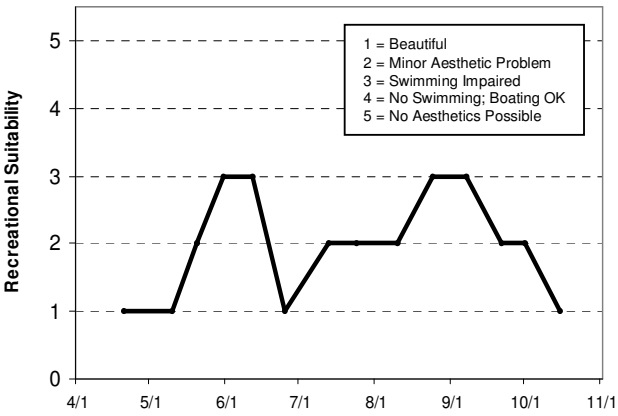


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	D
Chlorophyll a													C	C
Secchi Depth													F	F
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



Wilmes Lake (82-0090) *City of Woodbury*

Wilmes Lake, located in the City of Woodbury (Washington County) is classified as a minnow lake that experiences frequent fish kills. The lake has a surface area of 41 acres (1.3 miles around) and a maximum depth of 5.5 m (18 feet). While there is currently no public access to the lake, one is planned at the northern end of the lake. The lake's 2,247-acre watershed translates to a large watershed-to-lake size ratio of 55:1. The larger the ratio, the greater the potential stress on the lake quality from surface runoff.

The future "ultimate" land uses within the lake's contributing watershed are expected to be: 16.4 percent single-family residential, 4.5 percent multi-family residential, 10.5 percent commercial/retail, 3.7 percent parks/open space, 1.0 percent ponds/wetlands, and 63.9 percent indirect drainage (City of Woodbury 1994).

Wilmes Lake has been involved in CAMP since 1994. In 2007, the lake was monitored 11 times between mid-April and mid-October. During each monitoring event, the lake was monitored for TP, CLA, TKN, Secchi transparency, as well as the perceived physical condition and recreational suitability. Results are presented on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	69.0	36.0	111.0	D
CLA (µg/l)	27.1	7.8	55.0	C
Secchi (m)	1.4	0.9	2.0	C
TKN (mg/l)	2.49	1.50	3.50	
			Water Quality	C

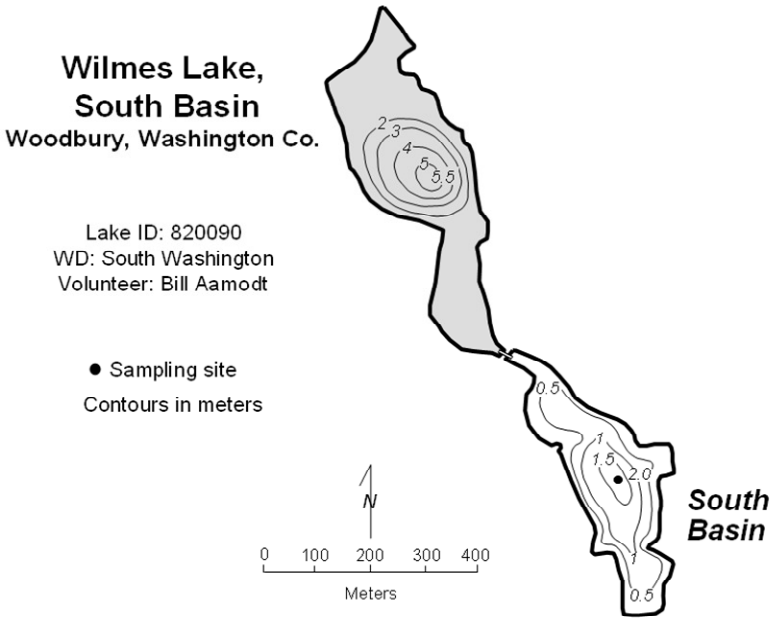
The lake's 2007 water quality grade of C is identical to those of 1995-1996, 1999-2000, 2003-2004, and 2006, better than the D's recorded in 1997-1998 and 2001-2002 and 2005, and worse than the B recorded in 1994. The lake appears to fluctuate between a C and D water quality grade.

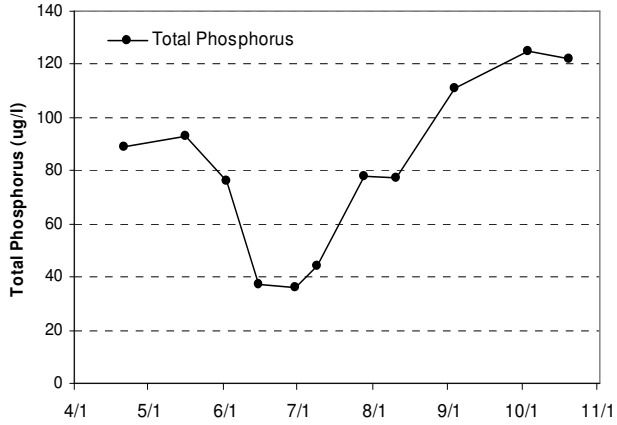
With that said, the 1994 and 1995 CAMP data were actually collected in the northern basin of Wilmes Lake, while the 1996-2004 data were collected in the lake's south basin. For this reason, comparisons between the 1994-1995 database and the 1996-2006 database should not be made.

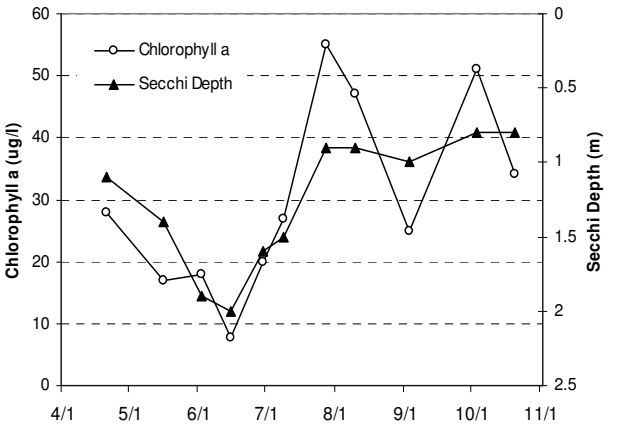
In the short-term, the lake grade in the north basin seems to be C/B, while the grade of the south basin seems to be C/D+. To better understand the lake's water quality and where it may be heading, continued monitoring is suggested.

Throughout the monitoring period, the perceived physical condition and recreational suitability of the lake were ranked on a 1-to-5 scale by the volunteer monitors. These user perception rankings are presented in data tables and graphs on the information sheet. The mean physical condition ranking was 3.1 (roughly 3-"definite algae present"). The mean recreational suitability ranking was 2.9 (between 2- " minor aesthetic problem" and 3- "swimming slightly impaired").

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

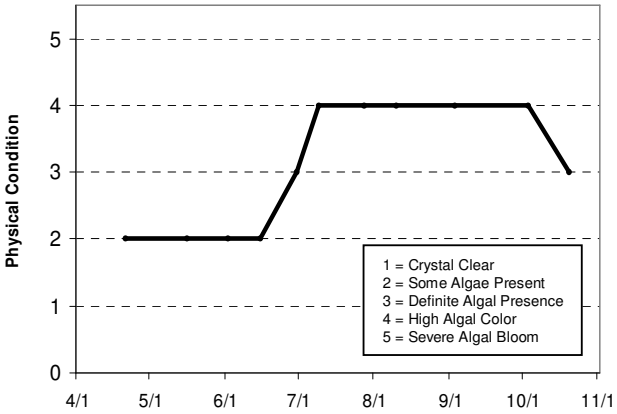






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/21/07	15.1				28	89		1.1	2	2
05/16/07	18.9				17	93		1.4	2	2
06/02/07	22.6				18	76		1.9	2	1
06/15/07	27.8				7.8	37		2	2	2
06/30/07	26.7				20	36		1.6	3	3
07/09/07	28.9				27	44		1.5	4	3
07/28/07	28.3				55	78		0.9	4	4
08/10/07	27.4				47	77		0.9	4	4
09/03/07	24.2				25	111		1	4	4
10/03/07	17.7				51	125		0.8	4	4
10/20/07	14.1				34	122		0.8	3	3

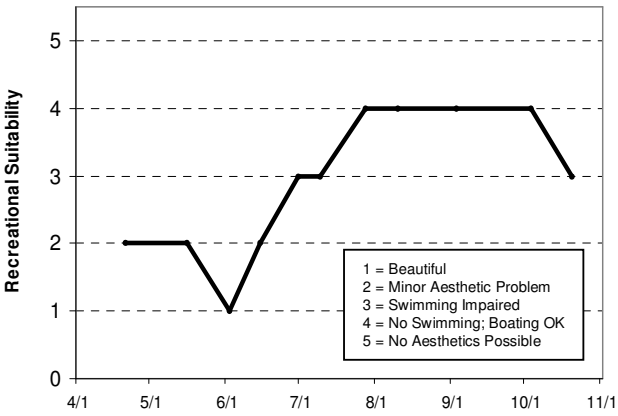


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus	C	D	D	D	D	D	D	D	D	D	C	D	D	D
Chlorophyll a	B	B	C	C	C	C	C	C	D	C	C	C	C	C
Secchi Depth	B	C	C	D	D	C	C	D	D	C	C	D	C	C
Overall	**B**	**C**	**C**	**D**	**D**	**C**	**C**	**D**	**D**	**C**	**C**	**D**	**C**	**C**

Source: Metropolitan Council and STORET data



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

Wing Lake is a small 11-acre lake located within the City of Minnetonka (Hennepin County). There is very little known morphological data available for the lake.

This was the second year that Wing Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data other than the 2006 CAMP data.

The lake was monitored 14 times between mid-April and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

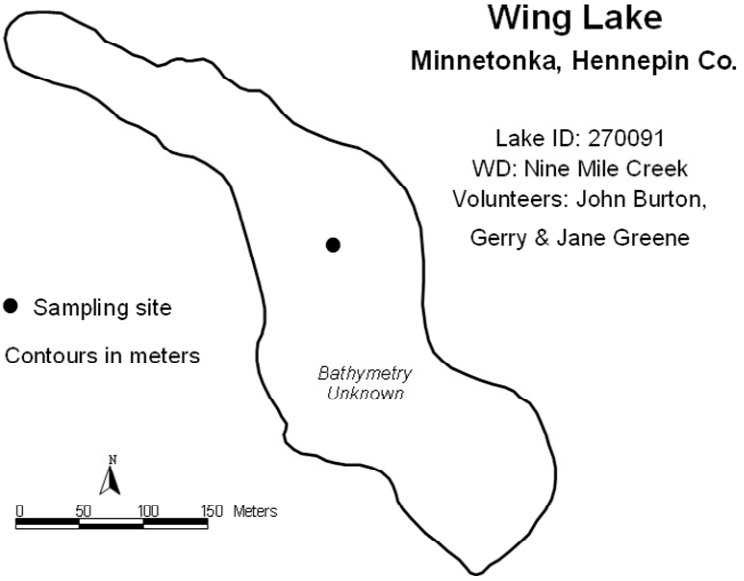
2007 summer (May-September) data summary

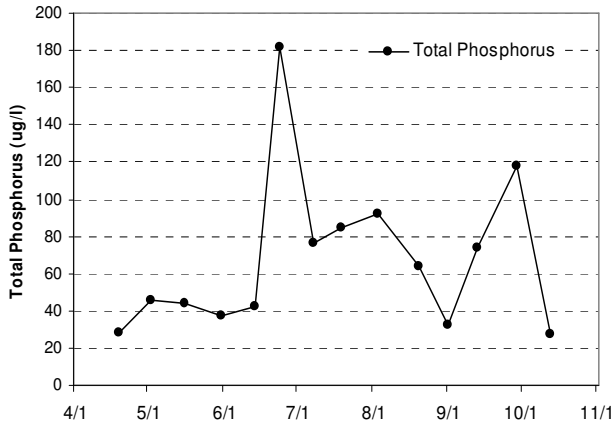
Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	74.3	32.0	182.0	D
CLA (µg/l)	37.7	5.0	98.0	C
Secchi (m)	1.1	0.4	1.5	D
TKN (mg/l)	1.36	0.56	1.90	
			Water Quality	D

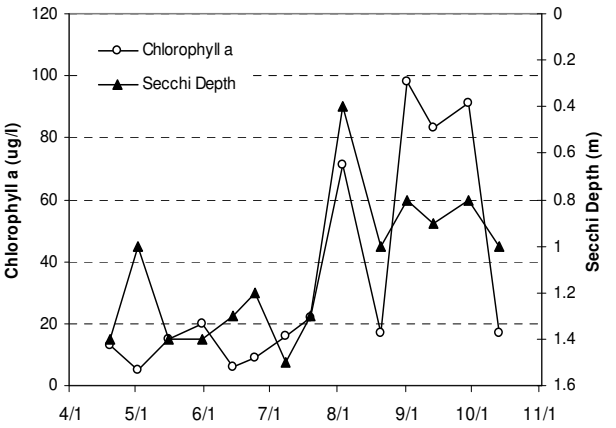
There are no nutrient data available for Wing Lake other than the 2006 and 2007 CAMP data. Therefore there are insufficient data to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 2.9 for physical condition (between 2- "some algae present" and 3- "definite algae present"), and 4.3 for recreational suitability (between 4- "no swimming – boating ok" and 5- "no aesthetics possible").

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

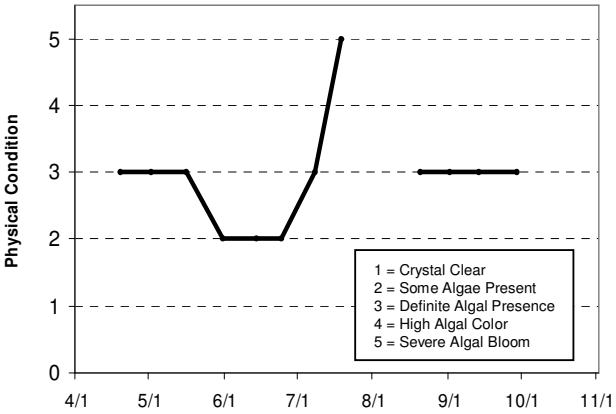






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/19/07	17.2				13	28		1.4	3	4
05/02/07	22.2				5	46		1	3	4
05/16/07	20.1				15	44		1.4	3	4
05/31/07	27.1				20	37		1.4	2	4
06/14/07	28.5				6	42		1.3	2	4
06/24/07	28				8.9	182		1.2	2	4
07/08/07	26.6				16	76		1.5	3	4
07/19/07	30.2				22	85		1.3	5	5
08/03/07	32				71	92		0.4		5
08/20/07	19				17	64		1	3	4
09/01/07	26				98	32		0.8	3	5
09/13/07	17				83	74		0.9	3	4
09/29/07	17				91	118		0.8	3	4
10/13/07	14				17	27		1		4

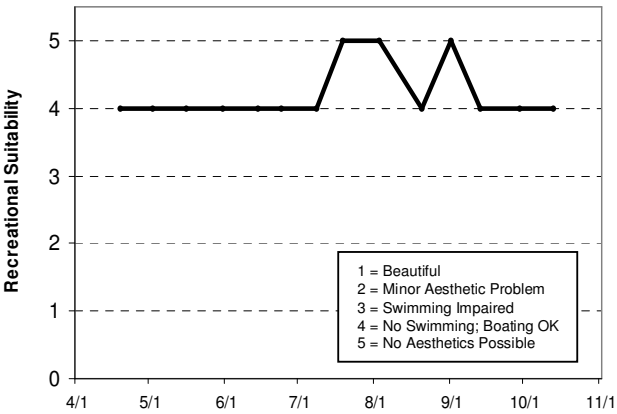


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	D
Chlorophyll a													C	C
Secchi Depth													D	D
Overall													**D**	**D**

Source: Metropolitan Council and STORET data



Winkler Lake (10-0066) *Carver County Environmental Services*

Winkler Lake is a 129-acre lake located within Benton Township (Carver County). The lake has a 2,758-acre immediate watershed, which translates to a watershed-to-lake area ratio of 21:1 (the larger the ratio the greater the potential stress put on the lake from surface runoff). A 1999 water quality report on water resources in Carver County estimates land use for the watershed at: three percent residential, 77 percent agricultural, two percent commercial/industrial, and 18 percent open/undeveloped (Carver County Planning 1999). The lake is the receiving water body for the Bongard's wastewater treatment plant.

This was the sixth year that Winkler Lake has been involved in CAMP (the others being 1999, 2000-2001, 2003, and 2005). The lake was monitored 13 times between mid-April and mid-October 2007. Other than the aforementioned CAMP data, a search through the STORET nationwide water quality database provided only one additional year of data (1995).

During each monitoring event, the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability. Results are presented on graphs and data tables on the following page.

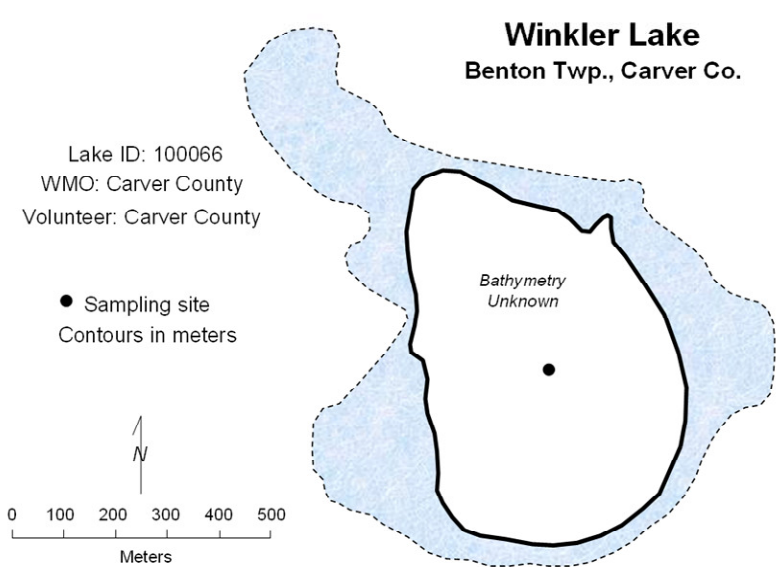
2005 summer (May-September) data summary

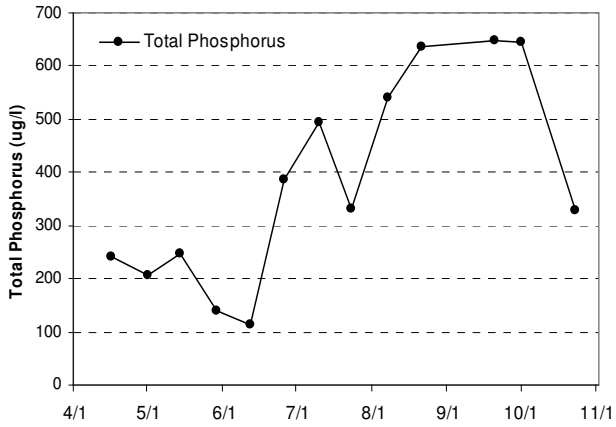
Parameter	Mean	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	374.0	113.0	648.0	F
CLA (µg/l)	26.1	1.8	96.0	C
Secchi (m)	0.4	0.2	0.6	F
TKN (mg/l)	2.37	1.40	3.90	
			Water Quality	D

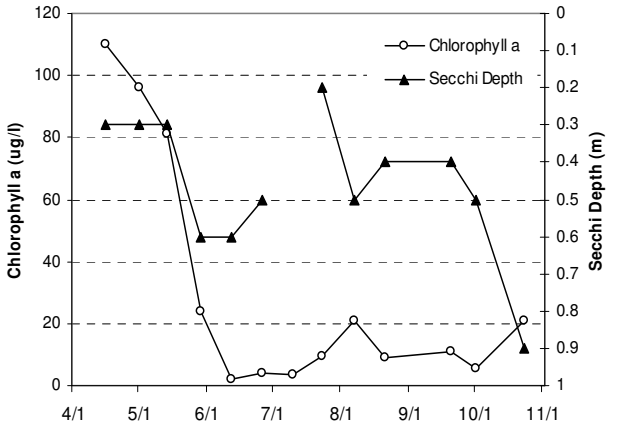
The lake's 2007 water quality grade of D is better than the F received in 2005. The water quality grades received in 2007 are similar to those received in 2001. The lake appears to fluctuate between D and F water quality grades, but there was a C grade received in 1995. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The average user perception rankings, on a 1-to-5 scale, were 3.8 for physical condition (between 3- "definite algae present" and 4- "high algal color") and 4.2 for recreational suitability ranking (between 4- "no swimming - boating ok" and 5- "no aesthetics possible").

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

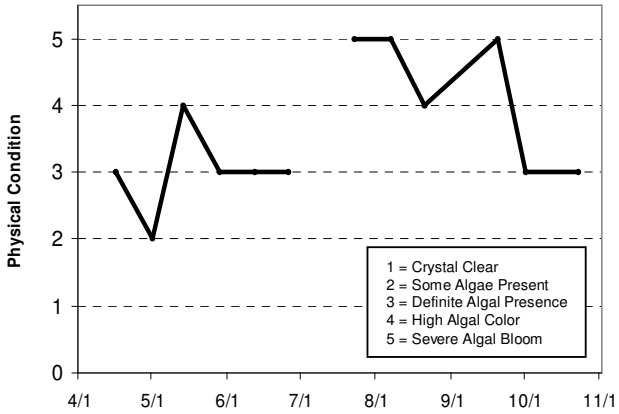






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/16/07					110	240		0.3	3	4
05/01/07	16.68		10.69		96	205		0.3	2	3
05/14/07	21.32		10.66		81	248		0.3	4	4
05/29/07	21.5		8.5		24	140		0.6	3	3
06/12/07					1.8	113		0.6	3	4
06/26/07	26.1		6.73		4	385		0.5	3	4
07/10/07					3.6	493				
07/23/07	24.29		10.27		9.5	331		0.2	5	5
08/07/07	23.63		3.79		21	541		0.5	5	5
08/21/07	21.24		10.34		9.1	636		0.4	4	5
09/20/07			3.43		11	648		0.4	5	5
10/01/07	16.38		11.29		5.7	644		0.5	3	4
10/23/07	99.49		9.25		21	329		0.9	3	4

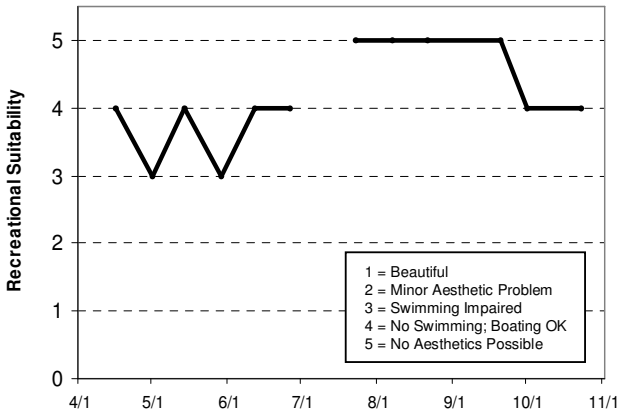


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus		F				F	F	F		F		F		F
Chlorophyll a		A				D	F	C		F		F		C
Secchi Depth		C				F	F	F		F		F		F
Overall		**C**				**F**	**F**	**D**		**F**		**F**		**D**

Source: Metropolitan Council and STORET data



Wood Lake [Burnsville] (19-0024) *Black Dog Watershed Management Commission*

Wood Lake is a 9-acre lake located within the City of Burnsville (Dakota County). The maximum depth of the lake is 4.5 m (14.7 feet). Because the maximum depth is only 4.5 m (almost 15 feet), the entire lake area is considered littoral zone (the area of aquatic vegetation dominance). The majority of the land within the lake's 157-acre immediate watershed is urban/developed. The resulting watershed-to-lake size ratio is 17:1. The greater the ratio, the greater the potential stress on the lake from surface runoff.

This was the twelfth year that Wood Lake has been involved in CAMP. The lake (which has been enrolled in CAMP since 1996) was monitored 13 times between mid-April and mid-October 2007. The resulting data and graphs appear on the next page.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	52.9	23.0	103.0	C
CLA (µg/l)	14.9	1.4	46.0	B
Secchi (m)	2.0	0.7	3.9	C
TKN (mg/l)	2.22	1.60	2.70	
			Water Quality	C

The 2007 lake quality grade was a C which is the same grade it has received since 1996, with the exception of the B grade received in 1998.

As mentioned in previous reports, an alum sulfate (alum) treatment in October of 1997 resulted in the lake's best water quality year in 1998. An alum treatment to a lake involves adding the chemical to bind and precipitate phosphorus, removing it from the water column, and sealing the bound phosphorus in the sediment rendering it inactive for release to the overlying water. By removing the phosphorus from the water column and locking it in the sediments, its availability for plant growth is reduced. The success of this treatment depends on the lake's residence time (the time it would take to entirely refill the lake basin with water if it were empty) and external phosphorus load. The shorter the residence time and the larger the external phosphorus load, the quicker new sources of phosphorus will replenish the water column. Since 1998, however, the lake's water quality has been more comparable to that of the pre-alum treatment years of 1996 and 1997 as opposed to that of 1998.

Other than the data collected through CAMP, there are no historical water quality data available for Wood Lake. A search through STORET (EPA's nationwide water quality database) came up empty. Therefore the only summertime data available are those from 1996-2006. No long-term trend is apparent from the lake's water quality database. In the short-term however, the lake's water quality seems well represented by an grade of C. To better understand the water quality of the lake and determine in what direction the water quality is heading, additional years of data collection are needed.

The volunteer monitor's perceptions of the lake's physical and recreational conditions were ranked on a 1-to-5 scale during each monitoring event. The rankings are shown on the information sheet on the next page. The average user perception rankings were 3.5 for physical condition (which falls between 3- "definite algae present" and 4- "high algal color"), and 4.0 for recreational suitability (4- "no swimming - boating ok").

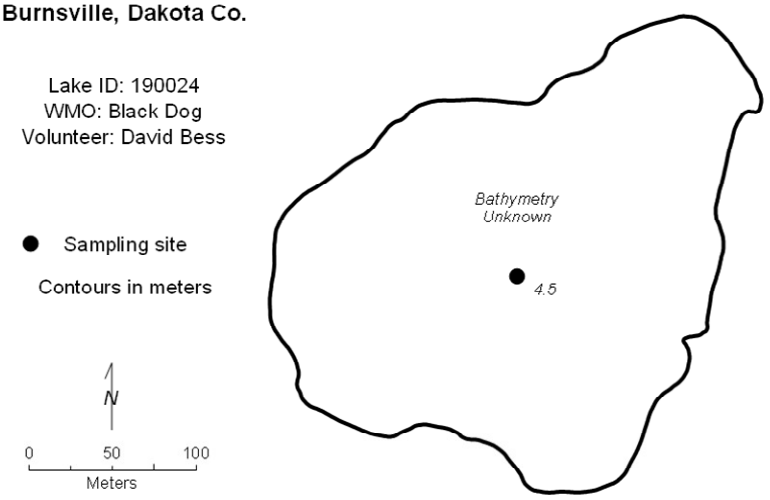
The Fisheries Section of the Minnesota Department of Natural Resources (MDNR) has conducted a fisheries survey on the lake. Information on the survey can be obtained through the MDNR Fisheries Section by calling (651) 297-4916 or by downloading the information off the Internet at http://www.dnr.state.mn.us/lakefind/.

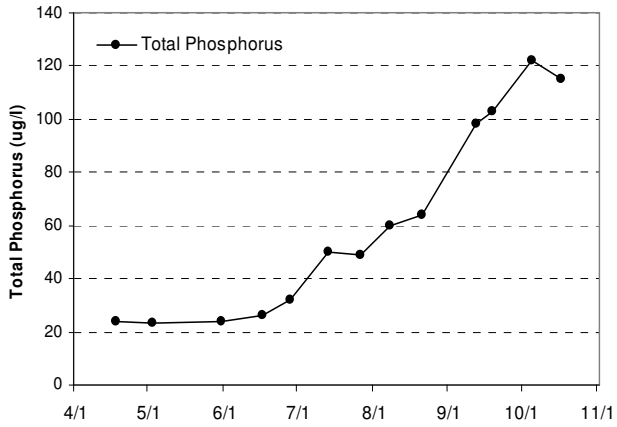
If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651) 602-8743 or brian.johnson@metc.state.mn.us.

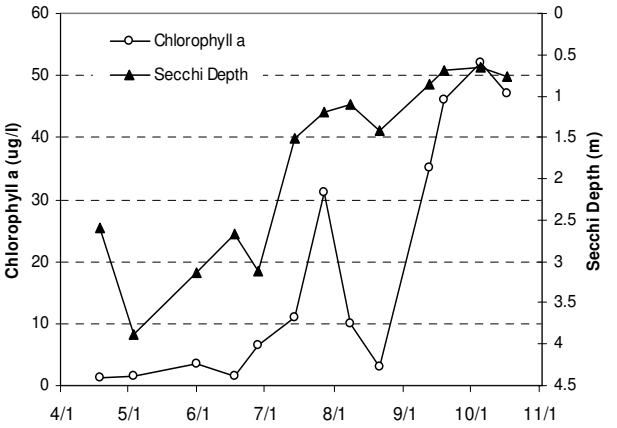
Wood Lake

Burnsville, Dakota Co.

Lake ID: 190024
WMO: Black Dog
Volunteer: David Bess

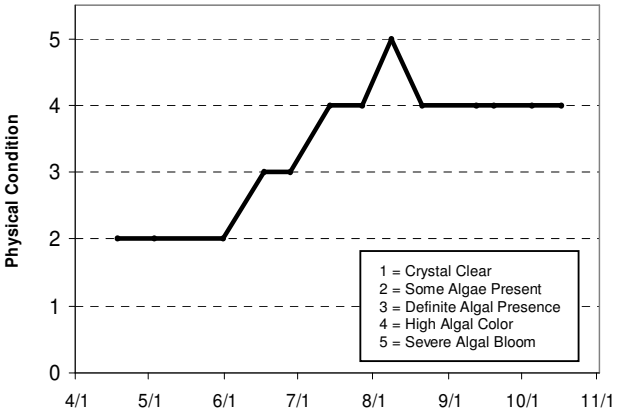






2007 Data

	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
04/18/07	12.6				1.2	24		2.6	2	4
05/03/07	17.6				1.4	23		3.89	2	4
05/31/07	23.3				3.6	24		3.14	2	4
06/17/07	28.6				1.5	26		2.67	3	4
06/28/07	25.6				6.4	32		3.12	3	4
07/14/07	25.6				11	50		1.52	4	4
07/27/07	29.2				31	49		1.19	4	4
08/08/07	27.5				10	60		1.1	5	4
08/21/07	21.9				2.9	64		1.42	4	4
09/12/07	21.4				35	98		0.85	4	4
09/19/07	20.5				46	103		0.7	4	4
10/05/07	20.4				52	122		0.66	4	4
10/17/07	14				47	115		0.76	4	4

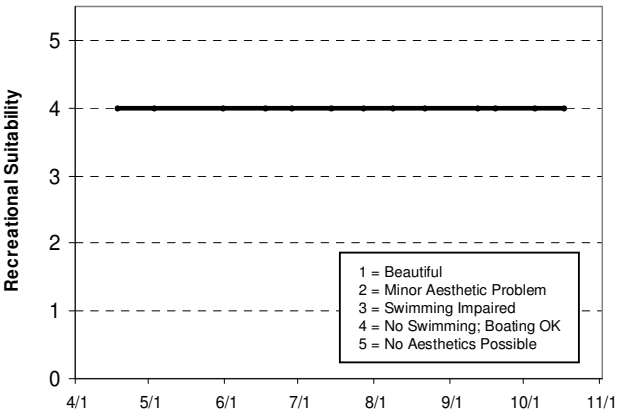


Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus			C	C	B	C	C	C	C	C	C	C	D	C
Chlorophyll a			B	B	B	B	B	C	C	B	B	C	C	B
Secchi Depth			C	C	C	C	C	C	C	C	C	C	C	C
Overall			**C**	**C**	**B**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**

Source: Metropolitan Council and STORET data



Woodpile Lake (82-0132) *Browns Creek Watershed District*

Woodpile Lake is a small 15-acre lake located in Washington County. There is very little known morphological data available for the lake.

This was the second year that Woodpile Lake has been involved in CAMP. A search through the STORET nationwide water quality database for data on the lake provided no data other than the 2006 CAMP data.

The lake was monitored 7 times between early-May and mid-October 2007. During each sampling event the lake was monitored for TP, CLA, TKN, and Secchi transparency, as well as the lake's perceived physical condition and recreational suitability.

2007 summer (May-September) data summary

Parameter	*Mean*	*Minimum*	*Maximum*	*Grade*
TP (µg/l)	50.3	39.0	62.0	C
CLA (µg/l)	10.7	6.2	14.0	B
Secchi (m)	2.2	1.7	2.6	B
TKN (mg/l)	1.13	1.00	1.20	
			Water Quality	B

As mentioned earlier, there are no nutrient data available for Woodpile Lake other than the 2006 and 2007 CAMP data. Therefore there are insufficient data to determine long-term or short-term trends. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The perceived physical and recreational conditions (ranked on a 1-to-5 scale) are shown on the lake's information sheet on the next page. The average user perception rankings, were 3.3 for physical condition (between 3- "definite algae present" and 4- "high algal color"), and 3.3 for recreational suitability (between 3- "swimming impaired" and 4- "no swimming – boating ok").

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

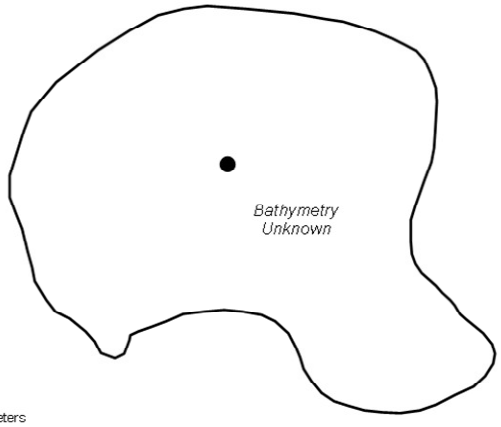
Woodpile Lake

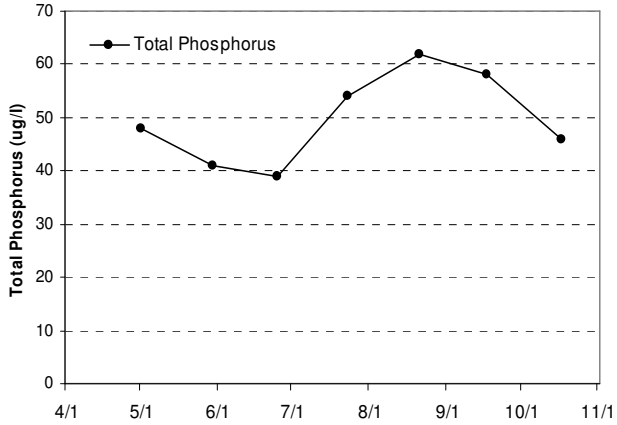
Grant, Washington Co.

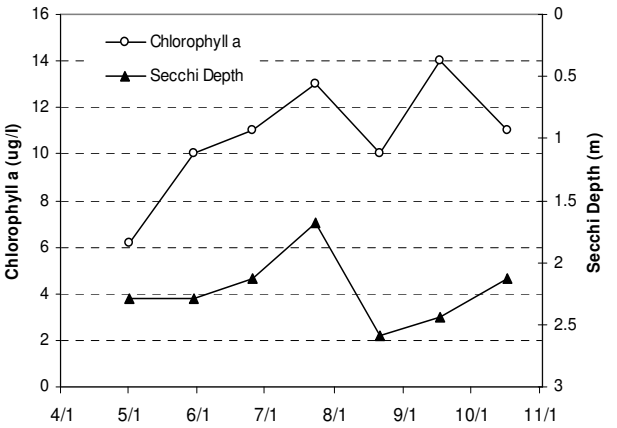
Lake ID: 820132
WD: Browns Creek
Volunteer: Washington Conservation District

● Sampling site

Contours in meters

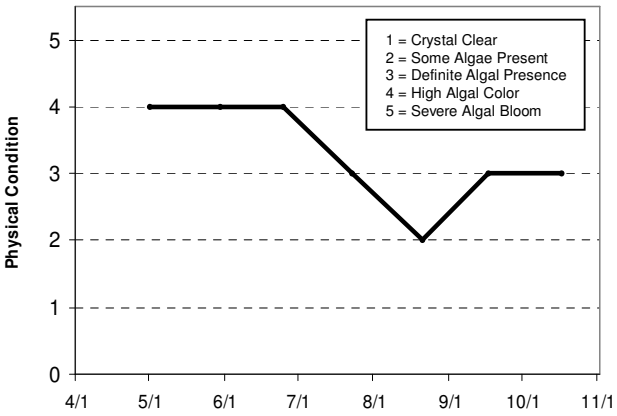






2007 Data

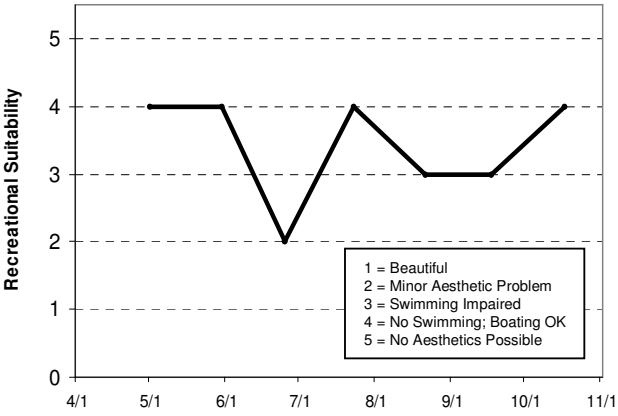
	Surf. Tmp	Bot. Tmp	Surf. DO	Bot. DO	CLA	Surf. TP	Bot. TP	Secchi	PC	RS
Date	C	C	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)	(m)	1 thru 5	1 thru 5
05/01/07	17.1	5.1	10.5	5.15	6.2	48		2.286	4	4
05/30/07	23.2	6.7	10.01	0.15	10	41		2.286	4	4
06/25/07	29.6	8.6	9.4	0.09	11	39		2.134	4	2
07/23/07	27	9.3	5.82	0.1	13	54		1.676	3	4
08/21/07	23	9.5	5.29	0.2	10	62		2.591	2	3
09/17/07	20.7	9.8	8.24	0.29	14	58		2.438	3	3
10/17/07	14.3	10.2	10.73	0.29	11	46		2.134	3	4



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Phosphorus														
Chlorophyll a														
Secchi Depth														
Overall														

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Phosphorus													D	C
Chlorophyll a													B	B
Secchi Depth													C	B
Overall													**C**	**B**



Source: Metropolitan Council and STORET data

CONCLUSIONS

To date, the Metropolitan Council's lake monitoring programs have provided an important tool for making informed lake management decisions. Data from our regional lake monitoring programs are frequently used to determine possible trends in lake water quality, estimate expected ranges in water quality of unmonitored lakes, examine intra-and inter-regional differences, determine potential impairments due to water quality, and investigate the relationships between land use and water quality. In 2007, the Council's lake monitoring program collected data from 181 lake sites on 176 lakes, which were all monitored by CAMP volunteers.

Seventy-one lakes monitored in 2007 are listed by the MPCA as impaired waters due to excessive phosphorus, which affects the lakes' ability to support their designated recreational uses. To learn more about the impaired lakes listings and potential next steps, see http://www.pca.state.mn.us/water/tmdl/index.html.

The year 2007 marked the fifteenth year that CAMP was used to increase our knowledge of the water quality of area lakes. Once again, volunteers measured surface water temperature and transparency, and collected surface water samples that were analyzed for total phosphorus, total Kjeldahl nitrogen, and chlorophyll-a on a biweekly basis from mid-April to mid-October (approximately 14 sampling events).

This year's monitoring program included 11 lakes never before monitored by the Council and volunteers. The 2007 lake monitoring program included lakes from 36 municipalities, watershed management organizations/districts, and counties. Additionally, the 2007 CAMP program enrolled one new group, continuing to expand the list of monitoring partners.

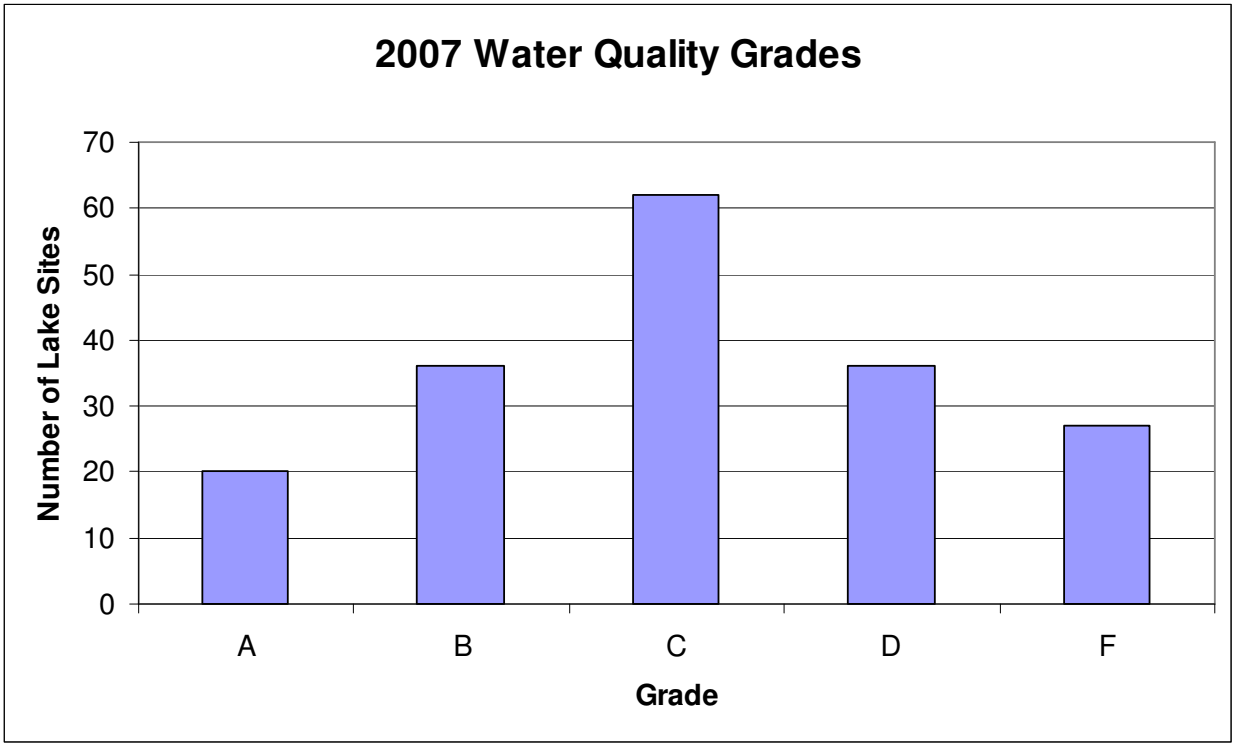
Each lake was given an annual water quality grade. The spread of water quality grades for all of the lakes monitored in 2007 is as follows:

- A – 11% (20 lake sites).
- B – 20% (36 lake sites).
- C – 34% (62 lake sites).
- D – 20% (36 lake sites).
- F – 15% (27 lake sites).

The greatest percentage of the lake sites monitored through CAMP in 2007 received a water quality grade of "C" (34%). The water quality of these lakes is considered average as compared to others in the seven-county Metropolitan Area. When comparing the percentage of above-average lakes, those receiving grades of "A" or "B" (31%), to below-average lakes, those receiving "D" or "F" (35%), more lakes were below average.

The 20 lakes that received "A" grades include: Big Carnelian, Big Marine, Brickyard, Cenaiko, Courthouse, Edith, Elmo, Fireman's, Glen, Halfbreed (Sylvan), Jane, Kingsley, Lac Lavon, Little Carnelian, Little Long, Lochness, Square, St. Joe's, Sunset, and West Boot.

The 27 lakes receiving the lowest water quality grade "F" include: Ardmore, Bay Pond, Benton, Benz, Cobblecrest, Cody, Cornelia, Dean, Downs, Eagle, East, Farquar, Friedrich's Pond, George Watch, Goose (Waconia), Highland, July, Long (Apple Valley), Loon, Lynch, Miller, Pepin, Rice (Maple Grove), Rutz, South Oak, Swede, and Twin (St. Louis Park).



Similar to past years, there is no distinct pattern as to where lakes with specific water quality were located. As observed in the past, the only similarity between the majority of the D and F grade lakes is their size and mean depth. These lakes are generally shallow with small surface areas. In some cases, the lakes are simply deep marshes with an excess of emergent and submergent vegetation. As mentioned in past reports, this distinction is important for three reasons: 1) deeper lakes have a greater ability to incorporate nutrients and trap them in the sediments, where they are not available for plant growth (macrophyte and/or algae), 2) shallow lakes typically do not stratify during the summer months, allowing the potential release of phosphorus from bottom sediments to rise through the water column and become available for plant growth, and 3) the small surface areas of these lakes generally result in higher watershed-to-lake ratios. Lakes with high watershed-to-lake ratios have to handle larger pollutant loads for their size than do larger lakes in a similar-sized watershed.

Similarly, the lakes with above-average water quality (grades of "A" and "B") were not area specific. They were located in all seven of the region's counties. Lakes receiving an "A" grade were found in five of the seven metropolitan counties. Common characteristics of the above-average lakes were: deeper maximum and mean depths, development of a thermocline, small contributing watersheds relative to the lake's surface area, and little construction within the watershed.

Of the 159 lake sites previously monitored in 2006 with a sufficient database needed to generate annual grades:

- 19 lakes had a worse water quality grade in 2007 [Armstrong, Barker, Bass (west), Benz, Bush, Demontreville, Earley, Henry, Herber's, La, Long (May Township), MacDonald's, McDonald's, North Twin, O'Connor, Orchard, Rutz, South Oak, and Twin (St. Louis Park)];
- 34 lakes had a better water quality grade in 2007 [Alimagnet, Bass (May Township), Bass (east), Big Comfort, Big Marine, Carol, Colby, Cowley, Edith, Farquar, Fireman's, Fish (Scandia), Island, Jellum's, Keller, Kingsley, Little Comfort, Long (Pine Springs), Long (Stillwater),

McMahon, Mitchell, Markgraffs, O'Dowd, Pat, Peltier, Reitz, Sand, St. Joes, Sunset Pond, Sweeney (site 1), Tamarack, Twin (Burnsville), Valley, and Woodpile]; and

- 106 lakes had the same water quality grade in both 2006 and 2007.

The locations of the 19 lakes with worse water quality grades in 2007 as compared to 2006 were: Carver County (1), Dakota County (2), Hennepin County (4), and Washington County (12). The 34 lakes with better water quality in 2007 were located in Anoka County (2), Carver County (4), Dakota County (8), Hennepin County (3), Scott County(2), and Washington County (15).

Water quality data from the 159 lake sites monitored in both 2006 and 2007 seem to indicate that the Metro Area lakes experienced slightly better water quality conditions in 2007 as compared to 2006. This observation indicates a reversal of a previous trend in which more lakes saw degradation in their water quality grades from 2004 to 2006.

The MPCA recently conducted a statewide statistical trend analysis on lakes with extensive Secchi transparency databases. The analysis revealed that the majority of assessed lakes showed no statistically significant trends in water clarity (either negative or improving). However, more lakes showed an improving trend than a degrading trend (MPCA 2008). There were 81 CAMP lakes monitored in 2007 which were included in the MPCA's trend analysis. The following is a summary of which lakes saw a statistically significant trend in water clarity:

- 24 lakes showed an improving trend in water clarity [Armstrong (south bay), Bass (Plymouth), Big Carnelian, Big Marine, Colby, Courthouse, DeMontreville, Earley, Elmo, Halfbreed (Sylvan), Hay, Kismet, Langton (site 2), Little Carnelian, Long (May Township), Marion, McKusick, Olson, Pine Tree, Silver (Stillwater), Sunset, Valentine, Waconia, and West Boot].
- 9 lakes showed a negative trend [Goggins, La, Little Long, Markgrafs, Pike (Maple Grove), Powers, Seidl, Shields, and Square].

Since 1980, 333 Metropolitan Area lakes have been monitored through the Council's lake monitoring program. Since some of the lakes have multiple monitoring sites, a total of 354 lake sites have been monitored. The list of lakes in the Council's monitoring database is shown in Appendix A. The resulting data from the Council's lake monitoring program are permanently stored in the U.S. EPA's national water quality data bank, STORET (STOrage and RETrieval). The Council's lake monitoring data are readily available via the Metropolitan Council Environmental Information Management System (EIMS), at: http://es.metc.state.mn.us/eims/lakes/index.asp. The majority of the 354 lake sites have been revisited on a rotating schedule throughout the past 28 years, to develop a working baseline to help determine possible water quality trends, and to aid lake and watershed managers in their decision making. While the Council has done its best to enhance and expand the region's lake water quality database, it is apparent that one of the most economical and efficient methods to expand knowledge of our lakes has been with the assistance of volunteers and the cooperation and financial support of local partners, including watershed management organizations, watershed districts, counties, and cities. So while the first 15 years of CAMP have been very successful, our future goal is to continue to expand the coverage of our lake monitoring program, in order to better understand and manage the region's water resources.

The Council's lake monitoring program, especially the use of volunteer monitors through CAMP, has played a key role in the Council's recent efforts to use satellite images to assess annual lake water clarity for the entire region. The monitoring program provides "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 region's lake water quality from just the lakes involved in our ground-based programs to all of the lakes in the region. 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.

If you have questions pertaining to the lake data or descriptions contained in this report, inquiries about CAMP, or suggestions of lakes the Council 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.

REFERENCES

American Public Health Association. 1992. *Standard Methods for the Examination of Water and Wastewater*. 18th ed.

Anhorn, R.J. 1993. *Handbook for the Citizen-Assisted Lake Monitoring Program*. Metropolitan Council. St. Paul, MN.

Anhorn, R.J. 1994. *A 1993 Study of the Water Quality of 43 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-94-012.

Anhorn, R.J. 1995. *A 1994 Study of the Water Quality of 51 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-95-011.

Anhorn, R.J. 1996. *A 1995 Study of the Water Quality of 59 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-96-014.

Anhorn, R.J. 1997. *A 1996 Study of the Water Quality of 66 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-97-004.

Anhorn, R.J. 1998. *A 1997 Study of the Water Quality of 71 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-98-007.

Anhorn, R.J. 1999. *A 1998 Study of the Water Quality of 70 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-99-008.

Anhorn, R.J. 2000. *A 1999 Study of the Water Quality of 113 Metropolitan Area Lakes*. Metropolitan Council Publ. No. EPE-00-479.

Anhorn, R.J. 2001. *A 2000 Study of the Water Quality of 124 Metropolitan Area Lakes*. Metropolitan Council Publ. No. EPE-01-502.

Anhorn, R.J. 2002. *A 2001 Study of the Water Quality of 132 Metropolitan Area Lakes*. Metropolitan Council Publ. No. EPE-02-516.

Anhorn, R.J. 2003. *A 2002 Study of the Water Quality of 137 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-03-019.

Anhorn, R.J. 2003. *Handbook for the Citizen-Assisted Lake Monitoring Program.* Metropolitan Council. September 2003.

Anhorn, R.J. 2004. *A 2003 Study of the Water Quality of 140 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-04-015.

Anhorn, R.J. 2005. *A 2004 Study of the Water Quality of 145 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-05-037.

Anhorn, R.J. 2006. *A 2005 Study of the Water Quality of 172 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-06-017.

Anhorn, R.J. and Sventek, J. 2007. *A 2006 Study of the Water Quality of 186 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 32-07-02.

Barr Engineering. 1993. *1993 Marcott Lakes Water Quality Study: EP-78 and EP-80*. Barr Engineering. Minneapolis, MN.

Barr Engineering. 1993. *1990 and 1991 Lake water Quality Inventory and Historical Water Quality Trend Analysis: Lakes Ann, Duck, Hyland, Lotus, Lucy, Mitchell, Red Rock, Rice Marsh, Riley, Round, Staring and Susan*. Barr Engineering. Minneapolis, MN.

Barr Engineering. 1994. *Sweeney Lake: Watershed and Lake Management Plan*. Barr Engineering. Minneapolis, MN.

Barr Engineering. 1997. *Project Assessment and Evaluation for the Crystal/Keller Lake Water Quality Improvement Project*. Barr Engineering. Minneapolis, MN.

Barr Engineering. 1997. *North Rice, South Rice, and Grimes Ponds Watershed and Lake Management Plan*. Barr Engineering. Minneapolis, MN.

Barr Engineering. 2001. *2000 Lake Water Quality Study: Northwood Lake, Parkers Lake, Sweeney Lake, and Twin Lake*. Barr Engineering. Minneapolis, MN.

Barr Engineering. *Personal Communication*. Barr Engineering. Minneapolis, MN.

Beduhn, R.J. 1993. *LCMR Lake Monitoring Study: The Effects of Aeration/Circulation on Lake and Reservoirs*. Prepared for the Legislative Commission on Minnesota Resources.

Black Dog Watershed Management Commission. 1987. *Watershed Management Plan*. Orr, Schelen, Mayeron and Associates. St. Paul, MN.

BDWMO 2003. *Crystal and Keller Lakes Use Attainability Analysis*. Black Dog Watershed Management Organization.

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

Bokenmeier, D. 1989. *Staying Ahead of the Game*. North American Lake Management Society: Lake Line. 9(8): 2-16.

Browns Creek Watershed District. 1990. *Watershed Management Plan*. Washington County Soil and Water Conservation District.

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

Capital Region Watershed District. 2003. *Lake McCarrons Management Plan*. The Osgood Group. Shorewood, MN.

Carver County Planning and Zoning Department. 1999. *Carver County 1999 Water Quality Report*. Carver County Planning and Zoning Department.

Carver Creek Watershed Management Organization. 1990. *Water Management Plan*. Carver County Soil and Water Conservation District.

City of Inver Grove Heights. 1993. *Simley Lake Water Quality Study*. Orr, Schelen, Mayeron and Associates.

City of Woodbury. 1994. *Surface Water Management Plan*. Bonestroo Rosene Anderlik & Associates. St Paul, MN.

Cole, G.A. 1983. *Textbook of Limnology: 3rd ed*. C.V. Mosby Company. St. Louis, MI.

Coon Creek Watershed District. 1985. *MSA-509 Plan*. Israelson and Associates, Inc Bloomington, MN.

Environmental Research Group, Inc. 1986. *Management Alternatives Report on the Diagnostic-Feasibility Study for Golden Lake. Anoka County, MN.* Environmental Research Group, Inc.

Forest Lake Watershed Management Organization. 1988. *Surface Water Management Plan*. Washington County Soil and Water Conservation District.

Gersmehl, C., J. Drake and D. Brown. 1986. *Minnesota Water: A Geographical Perspective*. Water Resources Research Center. Public Report Series No. 4.

Gun Club Lake WMO. 1989. *Management Plan*. James M. Montgomery Engineers (Montgomery-Watson). Wayzata, MN.

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

Hanson, K. 1995. *Personal Communication*. City of Inver Grove Heights, MN.

Kernik, S. 1995-1999. *Personal Communication*. City of Woodbury, MN.

Ludvig, M. 1994. *Lake Waconia Surface Water Report*. Carver County Environmental Services. Chaska, MN.

Maloney, T.E. (ed.). 1979. *Lake and Reservoir Classification Systems*. U.S. EPA Environmental Research Lab. Corvallis, OR. EPA-600/3-79-074.

Marine on St. Croix Watershed Management Organization. 1991. *Water Management Plan*. Washington County Soil and Water Conservation District.

McComas, S. 2003. *Using Barley Straw to Improve Water Clarity in Valley Lake, in 2002, Lakeville, Minnesota.* Blue Water Science. St. Paul, MN.

McComas, S. and Anhorn, R. 2004. *The Use of Barley Straw as an Organic Carbon Amendment to Enhance Heterotrophic Processes and Increase Water Clarity on Valley Lake.* Unpublished study.

McComas, S. 2005. *Personal Communication.* Blue Water Science. St. Paul, MN.

McComas, S. Stuckert, J. 2007. *Using Organic Carbon Amendments to Improve Water Clarity in Valley Lake, Lakeville, Minnesota, 2006.* Blue Water Science and City of Lakeville. January 2007.

McComas, S. Stuckert, J. 2008. *Using Barley Straw to Improve Water Clarity in Lee Lake, Lakeville, Minnesota, 2007.* Blue Water Science and City of Lakeville. February 2008.

Metropolitan Council. 1986. *Water Resources Management: Development Guide/Policy Plan*. St. Paul, MN.

Metropolitan Council. 1997. *Lake McCarrons Wetland Treatment System—Phase III Study Report*. St. Paul, MN.

Middle St. Croix Watershed Management Organization. 1991. *Watershed Management Plan*. Washington County Soil and Water Conservation District.

Minnehaha Creek Watershed District. 1987. *Water Resources Management Plan*. James M. Montgomery Engineers (Montgomery Watson). Wayzata, MN.

Minnehaha Creek Watershed District. 1996. *Water Resources Management Plan*. Wenck Associates. Maple Plain, MN.

Minnesota Department of Conservation. 1967. *Metropolitan Lake Inventory*. Minnesota Department of Conservation. St. Paul, MN.

Minnesota Department of Conservation. 1968. *Inventory of Minnesota Lakes*. Minnesota Department of Conservation. St. Paul, MN.

Minnesota Department of Natural Resources. Various years. *Lake Fishery Surveys*. Minnesota Department of Natural Resources. St. Paul, MN.

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

Minnesota Department of Natural Resources. 2004. ***Draft***: *Evaluation of the potential to selectively control Eurasian water milfoil with fluridone herbicide in Minnesota 2001-2003*. Minnesota Department of Natural Resources. St. Paul, MN.

Minnesota Pollution Control Agency. 1985. *A Citizens' Guide to Lake Protection*. Minnesota Pollution Control Agency. St. Paul, MN.

Minnesota Pollution Control Agency. 1994. *Lake Assessment Program: Lake Waconia*. Minnesota Pollution Control Agency. St. Paul, MN.

Minnesota Pollution Control Agency. 2003. *Fact Sheets on Lake Transparency Trends*. Minnesota Pollution Control Agency. St. Paul, MN.

Minnesota Pollution Control Agency. 2008. *Secchi Transparency Trend Lists.* St. Paul, MN. www.pca.state.mn.us/water/clmpfactsheets.html

Montgomery Watson. 1990. *Lake Alimagnet Diagnostic - Feasibility Study*. Montgomery Watson. Wayzata, MN.

Montgomery Watson. 1994-1998. *Personal Communication*. Montgomery Watson. Wayzata, MN.

Newman, R.M., D.W. Ragsdale, and D.D. Biesboer. 1996. *Can Eurasian Water milfoil be Managed in Minnesota by Biological Control with Native or Naturalized Insects?* Third progress report to the Minnesota Department of Natural Resources, Ecological Services, St. Paul, MN.

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

Oberts, G.L. 1982. *Nonpoint Source Pollution in the Metropolitan Area: Technical Completion Report*. Metropolitan Council Publ. No. 10-82-016.

Oberts, G.L and R.A Osgood. 1988. *Lake McCarrons Wetland Treatment System: Final Report the Function of the Wetland Treatment System and the Impacts on Lake McCarrons*. Metropolitan Council Publ. No. 590-88-095.

Osgood, R. 1981. *A Study of the Water Quality of 60 Lakes in the Seven-County Metropolitan Area*. Metropolitan Council Publ. No. 01-81-047.

Osgood, R. 1982a. *A 1981 Study of the Water Quality of 30 Lakes in the Seven-County Metropolitan Area*. Metropolitan Council Publ. No. 10-82-005.

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

Osgood, R.A. 1983. *Diagnostic-Feasibility Study of Seven Metropolitan Area Lakes. Part One: General Overview*. Metropolitan Council Publ. No. 10-83-092. *Part Two: Bryant, Elmo, Fish, George, Riley, Spring, and Square Lakes*. Metropolitan Council Publ. Nos. 10-83-093 a-g.

Osgood, R.A. 1984a. *A 1983 Study of the Water Quality of 28 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 10-84-037.

Osgood, R.A. 1984b. *A 1984 Study of the Water Quality of 43 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 10-84-172.

Osgood, R.A. 1985. *A 1985 Study of the Water Quality of 32 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 10-85-156.

Osgood, R.A. 1988a. *A 1986/1987 Study of the Water Quality of 10 Metropolitan Area Lakes*. Metropolitan Council Publ. No. 590-88-037.

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

Osgood, R.A. 1989a. *An Evaluation of the Effects of Watershed Treatment Systems on the Summertime Phosphorus Concentration in Metropolitan Area Lakes*. Metropolitan Council Publ. No. 590-89-062b.

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

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

Osgood, R.A. 1989d. *Assessment of Lake Use-Impairment in the Twin Cities Metropolitan Area*. Metropolitan Council Publ. No. 590-89-130.

Osgood, R.A. 1990. *A 1990 Study of the Water Quality of 21 Lakes in the Twin Cities Metropolitan Area*. Metropolitan Council Publ. No. 590-90-182.

Osgood, R.A. and J.E. Stiegler. 1990. *The Effects of Artificial Circulation on a Hypereutrophic Lake*. Water Resource Bulletin 26:209-217.

Osgood, R.A. 2000. *City of Victoria Local Water Resources Management Plan: Victoria Lakes – 2000*. Ecosystem Strategies. Shorewood, MN.

Prior Lake - Spring Lake Watershed District. 1991. *Water Resources Management Plan*. James M. Montgomery Engineers (Montgomery Watson). Wayzata, MN.

Prior Lake - Spring Lake Watershed District. 1998. *Draft-Water Resources Management Plan*. James M. Montgomery Engineers (Montgomery Watson). Wayzata, MN.

Prior Lake - Spring Lake Watershed District. 2001. *Final Report on the Prior-Spring Lake Improvement Project*. James M. Montgomery Engineers (Montgomery Watson). Wayzata, MN.

Prior Lake - Spring Lake Watershed District. 2004. *A Sustainable Water Quality Management Plan for Spring and Prior Lakes*. PLSLWD, Prior Lake, MN.

Rice Creek Watershed District. 1987. *Water Resources Management Plan*. James M. Montgomery Engineers (Montgomery Watson). Wayzata, MN.

Riley-Purgatory-Bluff Creek Watershed District. 1982. *Management Plan*. Barr Engineering. Minneapolis, MN.

Short Elliot Hendrickson Inc. 1998. *How's the Water? Plymouth, Minnesota Water Resources Management Plan*. Short Elliot Hendrickson. St. Paul, MN.

Shingle Creek Watershed Management Organization. 2003. *Watershed Management Plan*. Wenck Associates, Inc. Maple Plain, MN.

Simpson, J.T. 1991. *Volunteer Lake Monitoring: A Methods Manual*. EPA 440/4-91-002.

Six Cities Watershed Management Organization. 1988. *Water Management Plan*. Barr Engineering. Minneapolis, MN.

South Washington Watershed District. 1997. *Watershed Management Plan*. Bonestroo, Rosene, Anderlik and Associates. St. Paul, MN.

Square Lake Clean Water Partnership Report. 2001. *Square Lake, Washington County Phase I Resource Investigation.*. Washington County Soil and Water Conservation District. Stillwater, MN.

Square Lake Clean Water Partnership Report. 2001. *Square Lake, Washington County Phase I Resource Investigation*. Washington County Soil and Water Conservation District. Stillwater, MN.

St. Croix Basin Water Resources Planning Team. 2004. *St. Croix Basin Phosphorus-Based Water Quality Goals*.

U.S. Environmental Protection Agency. 1997. *Watershed Protection: Clean Lakes Case Study. Use of Aquatic Weevils to Control a Nuisance Weed in Lake Bomoseen, Vermont*. EPA-841-F-97-002.

U.S. Geological Survey. 1976. *Hydrology of the Lakes in the Minneapolis-St. Paul Metropolitan Area: A Summary of Available Data.* Water-Resources Investigations 76-85.

U.S. Geological Survey. 2001. *Response of the St. Croix River Pools, Wisconsin and Minnesota, to Various Phosphorus-Loading Scenarios.* Water-Resources Investigations Report 02-4181.

Valley Branch Watershed District. 2005. *Watershed Management Plan*. Barr Engineering Company. Minneapolis, MN

Vermillion River Watershed Management Commission. 1989. *Watershed Management Plan*. James M. Montgomery Engineering. Wayzata, MN.

Washington Conservation District. 2002. *August 2001-July 2002 Zooplankton Monitoring Summary Report for Square Lake in Washington County, MN*. Washington Conservation District. Stillwater, MN.

Wenck Associates, Inc. 1987. *Lake Diagnostic/Feasibility Study: Prepared for Forest Lake Watershed Management Organization*. Wenck Associates Inc. Wayzata, MN.

Wenck Associates, Inc. 1987. *Diagnostic/Feasibility Study for Crooked Lake, Anoka County*. Wenck Associates Inc. Wayzata, MN.

Wetzel, R.G. 1983. *Limnology*. Saunders College Publishing. Chicago, IL.

Wilson, B. 1990. *Lake Water Quality Summary of Shields, Bone, Half Breed, and Forest Lakes*. Forest Lake Watershed Management Organization.

APPENDIX A
Lakes Sampled by the Metropolitan Council and CAMP, 1980 - 2007
(Numbers indicate sampling visits per year, while v denotes volunteer monitoring)

LAKE	ID #	'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
Acorn	82-102																											v14	
Alimagnet	19-21																v 12	v10	v10	v10	v10	v10	v8	v9	v12	v10	v10	v8	v10
Ann	10-12						5				13													13					
Ardmore	27-153																												v4
Armstrong	82-116 -02																			v15	v10	v13	v14	v15	v14	v14	v14	v7	v7
Assumption	10-63																				v1								
Auburn-East	10-44				10																								
Auburn-West	10-44				10			17	18				12			13													
Aue	10-28																				v1								
Bald Eagle (Site-1)	62-2	4	5		5																					13	13		
Bald Eagle (Site-2)	62-2																									13	13		
Barnes	10-109																				v1								
Barker	82-96																					v5	v5	v7	v7	v7	v7	v7	v7
Bass	27-98	4														v16			v15		v15		v13		v9		v15		v14
Bass (East Basin)	82-124																											v7	v7
Bass (West Basin)	82-123																											v7	v8
Bass (St. Louis Park)	27-15																							v12			v12	v2	
Bass (Washington Co.)	82-35																					v14	v5	v7	v7	v7	v7	v7	v7
Battle Creek	82-91														v14	v13	v11	v13											
Bavaria	10-19				5			17	18							13		v11	v12	v15	v12	v14	v14	v14	v19	v16	v18	v16	v14
Bay Pond	82-11																											v14	v14
Benton	10-69																				v13	v14	v14		v15		v14		v13
Benz	82-120																			v8							v14	v14	v14

LAKE	ID #	'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
Berliner	10-103																				v1								
Big Carnelian	82-49					5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7
Big Marine	82-52	4	5			5					13					13			13			v14	v7	v14	v14	v14	v14	v7	v7
Birch	13-42																										v10	v7	v7
Birch	62-24	2																									v14		
Bluebill Bay	19-449																		v8										
Bone	82-54					5					13				v7		v14		v14	v14	v14		v14	v14	v14	v14	v14	13	v10
Brand	10-110																				v1								
Braunworth	10-107																				v1								
Brickyard	10-225																							v14	v13	v14	v14	v14	v13
Bryant	27-67	2	5	16		5					13	13	12																
Burandt	10-84																				v7	v13	v9			v18	v22		
Bush	27-47					5									13	13					13		13			13		v13	v15
Byllesby	19-6														v14	v14	v13												
Calhoun	27-31		5			5																							
Campbell	10-127																				v2	v14		v10			v14	v14	
Carol	82-17																					v5	v5	v7	v7	v7	v7	v7	v7
Carver	82-166									20					v15	v15	v16	v9											
Cates	70-18																							v14	v13	v15	v13	v14	v13
Cedar (Minneapolis)	27-39					5																							
Cedar (Scott Co.)	70-91	4	5			5						13			14					13			13				13	v14	v14
Cedar Island	27-119																v13						v13		v11			v9	
Cenaiko	2-654																		v12	v11	v13	v11	v13	v12	v12	v14	v14	v14	v12
Centerville	2-6	4	5		5																	13	13/v4	v1	13	13			
Charley	62-62						5																						

LAKE	ID #	'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
Christmas	27-137	4	5				5												13	13	13			13	13				
Chub	19-20	2													v14	v14	v11												
Clear (Forest Lake)	82-163	4				5						13			v11	v12	v12	v11	v10	v11	v10	v9	v12	v12	v12	v6		13	
Cleary	70-22					5																							
Cloverdale	82-9																						v10	v10	v11	v13	v12	v11	v10
Cobblecrest	27-53																							v4		v14	v16	v13	v13
Cobblestone	19-456																										v14	v14	v12
Cody	66-61																												v3
Colby	82-94															v13	v14	v13	v13	v12	v12	v9	v10	v10	v10	v10	v6	v7	v7
Comfort	13-53																		v3			v14	v14	v14	v14	v14	v13	v14	v14
Coon	2-42	4				5										13			13										
Cornelia	27-28																								v7		v11	v14	v14
Courthouse (Chaska)	10-5																	v2	v14	v13	v13	v14	v14	v14	v14	v14	v14	v13	v13
Cowley	27-169																	v12										v10	v1
Crane	27-734														v9														
Crooked	2-84				5						13				v15	v15	v14	v14	v12	v14	v14								
Crystal (Burnsville)	19-27	2			5						13					13	13	13	13	13	v12	v10	v14	v15	v15	v15	v16	13/ v14	v14
Crystal (Robbinsdale)	27-34							17	19	19						v15			v11				v8				v7		
Crystal (Spring Lake)	70-61																		v12		v11								
Cynthia	70-52	2																											
Dan Patch	70-16																		v15										
Dean	70-74																							v7	v7	v6	v7	v8	v9
Deeg	19-117																						v12						
Deep	62-18						5																						
DeMontreville	82-101	4				5							12		v15		14					13			13	v14	v7	v7	v11

LAKE	ID #	'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
Diamond (Dayton)	27-125	2														v13										13			
Downs	82-110																				v14		v9	v9	v6	v7	v9	v7	v5
Dutch	27-181					5																							
Eagle (Maple Grove)	27-111-01	4			5			17	18				11		v15			v14	v14	v14		v6		v4			v6		
Eagle (Young America)	10-121	4	5				5											12		v15	v14	v14	v12	v14	v14	13	v14	v14	v13
Eagle Point	82-109			2											v14													v5	v2
Earley	19-33															v10	v11	v9	v10	v10	v9	v8	v6	v10	v9	v6	v7	v9	v12
East	19-349																										v13	v6	v14
East Boot	82-34																					v14	v14	v14	v14	v14	v14	v7	v7
East Twin	2-133	2	5		5						13						13			13									
Echo	82-135																											v10	v8
Edina	27-29																									v10	v10		
Edith	82-4																										v6	v12	v12
Egg	82-147																						v3						
Elmo	82-106	4	5	16		5				19			12			v11											v9	v8	v8
Farquar	19-23	4														v15	v16	v14	v15		v15	v13	v11	v13	v14	v14	v15	v13	v13
Fireman's	10-226																						v12	v14	v14	v14	v14	v13	v13
Fish (Eagan)	19-57										13																		
Fish (Grant Twnsp)	82-137																							v5	v5	v4			
Fish (Maple Grove)	27-118	4	5	16			5					13																	
Fish (Scott County)	70-69	4				5						13					13		v2	v13	v8	v12	v9	v14	v13	v11	v13	v11	v13
Fish (Washington Co.)	82-64																					v5	v14	v7	v7	v7	v7	v7	v7
Forest - East (3)	82-159	4				5						13			v7			v12						13			13	13	
Forest - Middle (2)	82-159					5						13			v7			v12						13			13	13	
Forest - West (1)	82-159					5						13			v7			v12	v14	v15	v14	v14	v14	v14	v14	v14	v14	13	v14

LAKE	ID #	'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
French	27-127																						v11	v10	v7	v7			
Friedrich's Pond	82-108																											v13	v14
Gables	82-82																			v8	v5								
Gaystock	10-31																				v2	v14	v14				v14	v14	
George	2-91	4	5	16		5					13					13				13									
George Watch	2-5																	v14	v12	v11	v11	v6	v7	v8	v9	v10	v12	v7	v8
German	82-56																							v7	v7	v7	v7	v7	v7
Gervais	62-7						5																						
Glen	82-93																											v13	v7
Goetschel	82-313																							v11	v9	v4	v15	v9	v5
Goggins	82-77																				v13	v14	v14	v14	v14	v14	v14	v14	v14
Golden	2-45	2											12		14			v13	v11	v15	v13	v13	v12	v11	v11	v10	v11	v11	v10
Goose (Lakeville)	19-360																v13	v13											
Goose (New Scandia)	82-59															v15	v15	v13	v13	v15						v7	v7	v7	v7
Goose (Waconia)	10-89																v9	v7	v15	v15	v14	v11	v14	v14	v14	v14	v14	v14	v13
Grace	10-218																							v11	v14	v14		v14	
Grass	27-681																		v12										
Hafften	27-199																					13	13			13	v15	v13	
Half Breed (Sylvan)	82-80														v7			v14		v15	v14	v14	v14	v14	v14	v14	v14		v11
Ham	2-53					5									v15	v13		v13	v9	v14									
Harriet	27-16					5																							
Hart	2-81																									v6	v4	v8	
Harvey	27-???																									v10			
Haughey	27-187																							v4					
Hay	82-65																			v14	v13	v14	v14	v4	v7	v7	v7	v7	v7

LAKE	ID #	'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
Hazeltine	10-14																				v1	v14	v14				v14	v14	
Henry	27-175																v10										v11	v11	v6
Herber's Pond	82-15-01																									v14	v14	v7	v7
Highland	2-79																				v13	v11	v13	v12	v12	v14	v14	v14	v12
Holland	19-65				10	16	15			20					13						13								
Hornbean	19-47																											v11	v8
Horseshoe (Wash. Co.)	82-74																				v1								
Horseshoe (Dakota Co.)	19-32																v11	v10											
Horseshoe (Sunfish Lake)	19-51																											v11	v11
Hydes	10-88						5						12		13			12			v11	v4	v9	v14	v15	v14	v14	v14	v13
Independence	27-176	4	5		5							13			v14	v15													
Isabelle	19-4															v14													
Island (Linwood)	2-22				7																				v12	v14	v14	v14	v13
Jane	82-104					5		17	18				12			v12						13				v15	v13	v10	v12
Jellum's (Site-1)	82-52-01																					v14	v14	v12	v14	v14	v14	v7	v7
Jellum's (Site-2)	82-52-02																							v11	v11				
Johanna	62-78		5				5				13																		
Jonathan	10-217																							v13				v14	
Josephine	62-57						5				13																		
Jubert	27-165																					v11							
July	82-318																											v7	v7
Karth	62-72																												v11
Keller (Burnsville)	19-25																	13	13	v13	v15	v14	v12	v13	v15	v15	v14	13/ v14	v12
Keller (Maplewood)	62-10						5																						
Kingsley	19-30														5		v11	v10	v9			v14	v14	v15	v14	v15	v16	v14	v14

LAKE	ID #	'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
Kismet	82-333																			v14	v13	v14	v14	v14	v14	v14	v13	v14	v14
Klawitter	82-368																							v13	v13	v14	v13	v12	v12
Kohlman	62-6						5																						
La	82-97															v13	v11	v13	v11	v10	v10	v8	v6	v5	v6	v3	v13	v12	v14
Lac Lavon	19-446																		v11	v10	v10	v9	v2	v7	v12	v12	v12	v12	v13
Laddie	2-72	4													v13	v14	v12					v13	v13	v14	v10				
Langdon	27-182					5																							
Langton (Site-1)	62-49-01																										v14	v7	v13
Langton (Site-2)	62-49-02																										v14	v13	v13
Langton (North Basin)	62-204																										v14		
Lee	19-29															v14	v15	v14	v13			v12	v13	v11	v9	v15	v9	v14	v14
Legion Pond	82-462																										v14	v10	
LeMay	19-82																												v11
Libbs	27-85																									v10			
Lily	82-23																v15	v14	v14	v15	v13	v14	v14	v14	v7	v7	v7	v7	v7
Linwood	2-26	4	5		7						13					13			13										
Lippert	10-104																				v1								
Little Carnelian	82-14																					v14	v7	v14	v14	v14	v14	v7	v7
Little Comfort	13-54																											v14	v13
Little Johanna	62-58																						v12	v16	v15	v8	v6	v3	
Little Long	27-179-01	4				5						13								13			13		13			v11	v2
Lochness	2-584																												v12
Long (Apple Valley)	19-22																		v16					v11	v13	v12	v15	v14	v13
Long (Carver Co.)	10-16																				v2		v13		v5				
Long (Mahtomedi)	82-130																								v11	v9	v12	v10	v10

LAKE	ID #	'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
Long (May Twnsp)	82-30														v14	v14	v14	v13	v14		v14	v14	v14	v14	v14	v7	v7	v7	v7
Long N (New Brighton)	62-67						5																						
Long S (New Brighton)	62-67						5																						
Long (Orono)	27-160				5																								
Long (Pine Springs)	82-118														v14										13	v15	v14	v14	v14
Long (Stillwater)	82-21																v14	v7		v14	v13	v14	v14	v14	v14	v14	v14	v14	v14
Long (Washington Co.)	82-68																					v5	v14	v7	v7	v7	v7	v7	v7
Loon	82-15																					v14	v14	v7	v7	v7	v7	v7	v7
Lost	27-103														v13														
Lost (Mahtomedi)	82-134																											v13	v13
Lotus	10-6						5					13									13	13			v5	v10	v8	v11	v9
Louise	82-25																					v5	v5	v7	v7	v7	v7	v7	v7
Lucy	10-7						5																						
Lynch	82-42																												v7
MacDonald's Pond	82-1501																									v14	v14	v7	v7
Magda	27-65																				v14	v13			v11			v12	
Maple Marsh	82-38																					v5	v5	v7	v7	v7	v7	v7	v7
Marcott (site 1)	19-263																v15												
Marcott (site 2)	19-41																v15	v13	v10	v10	v12	v10	v6	v5					
Maria	10-58																				v2	v14	v14				v13		
Marion (Lakeville)	19-26	2	5		5						13					v15					v15	v14	v13	v14	v14	v15	v16	v15	v14
Markgrafs	82-89															v15	v11	v12	v10	v15	v10	v10	v9	v13	v14	v14	v14	v15	v14
Markley	70-21																		v11	v13	v12	v14	v13	v9	v6	v4		v10	v7
Marsh	10-54																				v1								
Marshan	2-7																	v10	v13	v10	v9	v8	v7						

LAKE	ID #	'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
Martin	2-34				7															13									
Masterman	82-126																											v14	v14
McCarrons	62-54					12	20	17	18	19	13	13	12		14	13	16	13			18	13	13	13		13	13		
McDonald	82-10																				v11		v14	v9	v12	v12	v14	v10	v9
McDonough	19-76						5														13								
McKnight	10-216																											v14	
McKusick	82-20															v14	v14	v14	v14	v14	v13	v14	v14	v14	v14	v14	v14	v14	v14
McMahon	70-50	2				5											13			13			13				13	v14	v10
Meadow	27-57																	v12			v12			v9			v10		
Medicine	27-104	4	5		10							13	12																
Mergen's	82-482																					v10			v3	v2	v6		
Meuwissen	10-70																				v1								
Miller	10-29																	v6	v13		v12	v14	v13	v13	v14	v14	v14	v12	v13
Minnetoga	27-88																												v14
Minnetonka (Lower)	27-133	4	5																										
Minnetonka (Upper)	27-133	2	5																										
Minnewashta	10-9					5						13			13				13	13	13			13	13				
Mitchell	27-70																13				13	13			13	v14	v14	v14	v13
Moody	13-23																										v14	v14	v14
Mooney	27-134														v14	v10													
Moore	2-75																				v14								
Mud	82-26-02																					v5	v5	v7	v7	v7	v7	v7	v7
Myers	10-68																				v1								
Nokomis	27-19	4				5																							
Normandale	27-1045																											v5	v3

LAKE	ID #	'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
North Twin	82-18																					v5	v5	v7	v7	v7	v7	v7	v7
Northwood	27-627																					v12	v10	v13	v12	v12	v10	v10	v10
Oak (Site 1)	10-93																				v2		v14	v13	v12	v14	v14	v14	
Oak (Site 2)	10-93																											v10	
Oak (Site 3)	10-93																											v10	
O'Connor	82-2																										v8	v15	v12
O'Dowd	70-95					5										13			13			13		13			13	v12	v13
Olson	82-103												12		v15		14					13			13	v14	v7	v7	v11
Oneka	82-140																				v13	v11	v11	v9	v6	v5			
Orchard	19-31	4	5		5						13				13					13	v15	v13	v13		v14	v14	v14	13/ v14	v14
Otter	2-3	2			5																								
Owasso	62-56	4			5																								
Pamela	27-675																										v10		
Parkers	27-107	4										13					13				13	v12		v14	v15	v15	v15	v14	v14
Parley	10-42					5		17	18				12					12			13		13		13			13	
Pat	82-125																											v7	v7
Patterson	10-86																				v2								
Peltier	2-4				5										v14	v16	v15	v14	v14	v13	v13	v14	v13	v17	v15	v15	v16	v17	v16
Pepin	40-28																												v13
Phalen	62-13	4	5				5																						
Pickerel	2-103	2															13												
Pierson	10-53	2	5		5						13						13						13	13	13			13	
Pike (Maple Grove)	27-111-02																	v14	v15	v13		v13							v4
Pike (Ramsey Co.)	62-69																				v14	v10	v14	v14	v14	v15	v15	v11	v14
Pike (Scott Co.) [Site-1]	70-76-1																		v9		v10	v9	v9	v11	v15	v15	v13		

LAKE	ID #	'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
Pike {Scott Co.} [Site-2]	70-76-2																							v11					
Pine Tree	82-122						5								v14	v14	v16	v14	v15	v15	v13	v14	v9	v12	v7	v8	v12	v10	v9
Pleasant (New Prague)	70-98														13														
Pleasant (North Oaks)	62-46						5																						
Pomerleau	27-100																	v9			v10		v6		v3				
Powers	82-92															v12	v13	v13	v12	v9	v10	v8	v5	v7	v14	v14	v14	v14	v14
Prior (Lower) [Site-1]	70-26-1					5						13						13	v15	v14	v13	v9	v14	v16	v13	v12	v12	v12	v12
Prior (Lower) [Site-2]	70-26-2																			v14	v13	v9	v14	v15					
Prior (Upper) [Site-1]	70-72-1	4	5			5						13						13	v15	v14	v13	v9	v14	v12	v13	v10	v9	v9	v5
Prior {Upper} [Site-2]	70-72-2																							v12					
Raven	19-369																v13	v6	v8										
Rebecca	27-192				10	12	12																						
Red Rock	27-76																				12	13			13	13		13	
Regional Park	82-87																			v12	v14	v12	v13	v14	v15	v15	v14	v7	v7
Reitz	10-52						5						12		13						v15	v13	v7	v13	v14	v14	15	v14	v14
Reshanau	2-9	2																			v7	v1	v6					v13	v9
Rest Area Pond	82-0514																											v13	v10
Rice	10-78	2																			v1								
Rice (Maple Grove)	27-116																												v10
Riley	10-2	2	5	16			5	17	18			13	12		13				13			13		13	v14	v15	v14	v10	v15
Rogers	19-80																												v12
Rose	27-92																											v14	v13
Rutz	10-89																				v1	v14	v14	v14				v14	v7
Ryan	27-58																	v14		v5		v9		v4	v6				
Sanborn	40-27																												v2

LAKE	ID #	'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
Sand (New Scandia)	82-67														v7	v14	v14	v13						v14	v7	v7	v7	v7	v7
Sarah	27-191	4			5																								
Scheuble	10-85																				v1								
Schmidt (Smith)	27-102																v14			v12		v12	v9			v14	v9		v9
School	13-57																										v14	v7	v7
Schroeder's Pond	82-301																									v14	v14	v7	v7
Schultz	19-75					5	5														13								
Schutz	10-18					5																v6	v10	v6	v8	v9	v11		
Scout	19-198																												v14
Seidl's	19-95																v15	v14	v14	v15	v16	v14	v14	v15	v8	v14	v14	v14	v8
Shaver (Site 1)	27-86																										v14	v13	
Shaver (Site 2)	27-86																											v6	
Shields	82-162														v6	v14	v14	v13	v13	v14	v14	v14	v14	v14	v14	v14	v14	v14	v7
Silver (Washington Co.)	82-16																					v14	v5	v7	v7	v7	v7	v7	v7
Sliver (North St. Paul)	62-1																											v12	
Simley	19-37																v10	v16	v14	v15	v16	v14	v12	v14					
Snail	62-73	4					5																						
South Oak	27-661																							v12	v15			v9	v8
South Rice	27-645																					v9	v14	v15	v14	v14	v15	v14	v12
South School Section	82-151																v14	v7		v14							v14	v14	v14
South Twin	82-19																					v5	v5	v7	v7	v7	v7	v7	v7
Spring (Anoka Co.)	2-71																						v11						
Spring (Prior Lake)	70-54	4	5	16		5						13						13	v12			v6	v11	v13	v14	v14	v13	v9	v8
Square	82-46	4	5	16	6	7	7				13				v11	v14	v14	v13	v14	19	v14	v14	v15	v14	v14	v14	v14	v14	v14
Staring	27-78	4					5										13				13		13			13		13	

LAKE	ID #	'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
Staples	82-28																					v14	v5	v7	v7	v7	v7	v7	v7
Steiger	10-45					12					13						13												
St. Croix (Upper Basin S-1)	82-1																											v2	
St. Croix (Upper Basin S-2)	82-1																										v10	v10	v9
St. Croix (Mid Basin S-3)	82-1																										v11	v9	v9
St. Croix (Mid Basin S-5)	82-1																										v8	v10	v7
St. Croix (Lower Basin S-6)	82-1																										v11	v10	v10
St. Croix (Lower Basin S-7)	82-1																										v8	v8	v10
St. Joe	10-11																									v17	v8	v9	v9
Success	27-634																	v10							v11			v11	
Sucker	62-28						5																						
Sullivan	2-80														v14	v14	v15		v15	v14	v13	v11	v11	v12	v12				
Sunfish (Lake Elmo)	82-107																					v10					v13	v11	
Sunfish (Sunfish Lake)	19-50																											v13	v13
Sunnybrook	82-133																				v14		v13	v10	v12	v10	v16	v14	v14
Sunset	82-153					5									v14	v14	v12	v13	v16	v12	v10	v13	v13	v18	v20	v15	v17	v12	v10
Sunset Pond	19-451															v14	v14	v14	v12	v10		v13	v11	v10	v12	v11		v14	v14
Susan	10-13																											v7	v11
Swan	10-82																				v1								
Swede	10-95	2																13					13	v14	v16	v13	v14	v14	v13
Sweeney (South) [Site-1]	27-35																					v11	v9	v14	v13	v14	v11	v10	v15
Sweeney (North) [Site-2]	27-35																					v11	v9						
Tamarack	10-10																						v10	v11	v12	v11	v11	v13	v14
Tanners	82-115	2								20					v14	v13	v12	v14											
Terrapin	82-31																									v7	v7	v7	v7

LAKE	ID #	'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
Thole	70-120-01					5										13			13			13		13			13	v14	
Thomas	19-67	2																											
Tiger	10-108																				v1								
Turtle	62-61	4	5		5																								
Turtle (Washington Co.)	82-36																					v5	v5	v7	v7	v7	v7	v7	v7
Twin (Burnsville)	19-28																				v6		v13	v11	v6	v2	v11	v8	v8
Twin-Lower (Robbinsd.)	27-42-03												12		v14			13		v5		13			v13		v8		
Twin-Middle (Crystal)	27-42-02						5						12					13	v11		v13	13			v13		v8		
Twin-Upper (Br. Center)	27-42-01												12		v14			11		v15		v11		v13		v14		v13	
Twin-South (May Twnsp)	82-48																		v13	v13									
Twin (St. Louis Park)	27-656																							v12	v14	v14	v11	v14	v10
Vadnais	62-38						5																						
Valentine	62-71																						v14	v13	v12	v12	v9	v10	v12
Valley	19-348																v15	v14	v11		v8	v14	v14	v14	v14	v14	v13	v14	v14
Virginia	10-15																					v11	v12	v14	v12	v15	v13		
Wabasso	62-82	4	5		5						12																		
Waconia	10-59	4	5				5					13				v16	v13	v15	v17	v15	v14	v14	v14	v15	v14	12	v14	v14	v13
Wasserman	10-48				5			17	18							13			13	13	13			13	13			13	
Weaver	27-117				5			17	18																				
Weber	82-119																											v12	
West Boot	82-44																					v14	v14	v14	v14	v14	v14	v7	v7
West Lakeland	82-488																					v2							
Westwood	27-711														v13							v15	v14	v10	v9	v7	v7	v8	v8
Whaletail (Site-1)	27-184-01																									13	13		
Whaletail (Site-2)	27-184-02	4				5														13			13			13	13		

LAKE	ID #	'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
White Bear	82-167	4	5			5																							
White Rock	82-72																											v11	v14
Wilmes	82-90															v14	v15	v14	v15	v15	v14	v13	v13	v10	v12	v12	v10	v12	v11
Windsor	27-82																									v12	v14		
Wing	27-91																											v14	v14
Winkler	10-66																				v8	v6	v6		v13		v14		v13
Wolsfeld	27-157	4																											
Wood (Burnsville)	19-24																	v10	v14	v15	v15	v14	v13	v14	v14	v14	v14	v13	v13
Woodpile	82-132																											v7	v7
Young America	10-105																				v1								
Zumbra	10-41					5						13												13					

APPENDIX B
2007 CAMP Volunteers

Enrolling Group	Lake	DNR #	Volunteer
Anoka Co. Parks	Cenaiko	2-0654	Anoka County Parks
Anoka Co. Parks	Highland	2-0079	Anoka County Parks
Anoka Co. Parks	Island	2-0022	Anoka County Parks
Apple Valley	Cobblestone	19-0456	Wyatt Yohnk
Apple Valley	Farquar	19-0023	Bill Sherry
Apple Valley	Long (Apple Valley)	19-0022	Al Kettelkamp
Apple Valley	Scout Lake	19-0198	Dan Stanek
Bassett Creek WMO	Northwood	27-0627	Robert White
Bassett Creek WMO	Parkers	27-0107	Bob Videen
Bassett Creek WMO	South Rice	27-0645	Steve Streff
Bassett Creek WMO	Sweeney	27-0035	Dave Hanson
Bassett Creek WMO	Westwood	27-0711	Westwood Nature Center
Black Dog WMO	Crystal	19-0027	Carroll Armett
Black Dog WMO	Keller	19-0025	Glenn Gramse
Black Dog WMO	Kingsley	19-0030	City of Lakeville
Black Dog WMO	Lac Lavon	19-0446	Wally Shaver
Black Dog WMO	Orchard	19-0031	Tom Goodwin
Black Dog WMO	Sunset Pond	19-0451	Dan Wallace
Browns Creek WMO	Bass (East)	82-0124	Washington Conservation District
Browns Creek WMO	Bass (West)	82-0123	Washington Conservation District
Browns Creek WMO	Benz	82-0120	Washington Conservation District
Browns Creek WMO	Goggins	82-0077	Washington Conservation District
Browns Creek WMO	July	82-0318	Washington Conservation District
Browns Creek WMO	Kismet	82-0333	Washington Conservation District
Browns Creek WMO	Long (Stillwater)	82-0021	Washington Conservation District
Browns Creek WMO	Lynch	82-0042	Washington Conservation District
Browns Creek WMO	Masterman	82-0126	Washington Conservation District
Browns Creek WMO	Moody	13-0023	Washington Conservation District
Browns Creek WMO	Pat	82-0125	Washington Conservation District
Browns Creek WMO	South School Section	82-0151	Washington Conservation District
Browns Creek WMO	Woodpile	82-0132	Washington Conservation District
Burnsville	Alimagnet	19-0021	John Ritter
Burnsville	Earley	19-0033	John Saffert
Burnsville	Twin (Burnsville)	19-0028	Dan Freeman
Burnsville	Wood	19-0024	Dave Bess
Carnelian-Marine	Barker	82-0076	Washington Conservation District
Carnelian-Marine	Bass	82-0035	Washington Conservation District
Carnelian-Marine	Big Carnelian	82-0049	Washington Conservation District

Enrolling Group	Lake	DNR #	Volunteer
Carnelian-Marine	Big Marine	82-0052	Washington Conservation District
Carnelian-Marine	Carol	82-0017	Washington Conservation District
Carnelian-Marine	East Boot	82-0034	Washington Conservation District
Carnelian-Marine	Fish	82-0064	Washington Conservation District
Carnelian-Marine	German	82-0056	Washington Conservation District
Carnelian-Marine	Herber's Pond	82-0015-01	Washington Conservation District
Carnelian-Marine	Jellum's	82-0052-02	Washington Conservation District
Carnelian-Marine	Little Carnelian	82-0014	Washington Conservation District
Carnelian-Marine	Long	82-0068	Washington Conservation District
Carnelian-Marine	Loon	82-0015-02	Washington Conservation District
Carnelian-Marine	Louise	82-0025	Washington Conservation District
Carnelian-Marine	MacDonald's Pond	82-0062	Washington Conservation District
Carnelian-Marine	Maple Marsh	82-0038	Washington Conservation District
Carnelian-Marine	Mud	82-0026	Washington Conservation District
Carnelian-Marine	North Twin	82-0018	Washington Conservation District
Carnelian-Marine	Schroeder's Pond	82-0301	Washington Conservation District
Carnelian-Marine	Silver	82-0016	Washington Conservation District
Carnelian-Marine	South Twin	82-0019	Washington Conservation District
Carnelian-Marine	Staples	82-0028	Washington Conservation District
Carnelian-Marine	Turtle	82-0036	Washington Conservation District
Carnelian-Marine	West Boot	82-0044	Washington Conservation District
Carver Co.	Bavaria	10-0019	John Ryski
Carver Co.	Benton	10-0069	Carver County
Carver Co.	Brickyard	10-0225	Carver County
Carver Co.	Courthouse	10-0005	Carver County
Carver Co.	Eagle	10-0121	Carver County
Carver Co.	Fireman's	10-0226	Carver County
Carver Co.	Goose (Waconia)	10-0089	Carver County
Carver Co.	Hydes	10-0088	Carver County
Carver Co.	Miller	10-0029	Joe, Diane, & Elysia Williamson
Carver Co.	Reitz	10-0052	Lynne McMullen
Carver Co.	Rutz	10-0080	Marty Ziemans
Carver Co.	Swede	10-0095	Wayne Hubin
Carver Co.	Waconia	10-0059	Carver County
Carver Co.	Winkler	10-0066	Carver County
Chanhassen	Lotus	10-0006	Shelley Strohmaier & Family
Chanhassen	Riley	10-0002	David Florenzano
Chanhassen	St. Joe	10-0011	Sue Morgan & Linda Scott
Chanhassen	Susan	10-0013	Armstrong Family
Comfort Lk-Forest Lk	Big Comfort	13-0053	Charlie Rheault
Comfort Lk-Forest Lk	Birch	13-0042	Washington Conservation District
Comfort Lk-Forest Lk	Bone	82-0054	Jon Hafner & Don Jack
Comfort Lk-Forest Lk	Forest Lake West	82-0159	Dale Hebelsen
Comfort Lk-Forest Lk	Little Comfort	13-0054	Steve Schreiber
Comfort Lk-Forest Lk	School	13-0057	Washington Conservation District
Comfort Lk-Forest Lk	Shields	82-0162	Washington Conservation District

Enrolling Group	Lake	DNR #	Volunteer
Comfort Lk-Forest Lk	Sylvan (Half Breed)	82-0080	Curtis Sparks
Eden Prairie	Mitchell	27-0070	Fran & Gordon Warner
Elm Creek	Cowley	27-0169	Lori and Tierney Ende
Elm Creek	Henry	27-0175	Pam & George Christ
Elm Creek	Rice	27-0116	George Schneider
IGH/SSP	Seidl's	19-0095	Randy Bjorklund
Lakeville	East	19-0349	City of Lakeville
Lakeville	Lee	19-0029	City of Lakeville
Lakeville	Marion	19-0026	Wally Potter
Lakeville	Valley	19-0348	City of Lakeville
Lower St. Croix Valley WMO	O'Connor	82-0002	Ken Nieman & Jeff Keene
Mahtomedi	Lost	82-0134	Matha Popp & Bob Lane
Marine/St.Croix WD	Goose (New Scandia)	82-0059	Washington Conservation District
Marine/St.Croix WD	Hay	82-0065	Washington Conservation District
Marine/St.Croix WD	Long (May)	82-0030	Washington Conservation District
Marine/St.Croix WD	Sand	82-0067	Washington Conservation District
Marine/St.Croix WD	Square	82-0046	Washington Conservation District
Marine/St.Croix WD	Terrapin	82-0031	Washington Conservation District
Mendota Heights	LeMay	19-0082	City of Mendota Heights
Mendota Heights	Rogers	19-0080	Doug Hennes
Middle St. Croix WMO	Lily	82-0023	Washington Conservation District
Middle St. Croix WMO	McKusick	82-0020	Washington Conservation District
Minnehaha Creek Watershed District	Tamarack	10-0010	Mike Scholdice
Minnetonka	Minnetoga	27-0088	Maressia & John Twele
Minnetonka	Rose	27-0092	Mark Storck
Nine Mile Creek WD	Bush	27-0047	Gregg Thompson & Gordy Bratsch
Nine Mile Creek WD	Cornelia	27-0028	Jon Moon & Heidi Dorfmeister
Nine Mile Creek WD	Glen	27-0093	Christine Petersen
Nine Mile Creek WD	Normandale	27-1045	Jane Ladky
Nine Mile Creek WD	Wing	27-0091	John Burton, Jerry & Jane Greene
Pioneer-Sarah WD	Ardmore	27-0153	Pioneer-Sarah WMC
Pioneer-Sarah WD	Little Long	27-0179	Boys and Girls Club

Enrolling Group	Lake	DNR #	Volunteer
Prior Lake	Markley	70-0021	City of Prior Lake
Prior Lake-Spring Lake WD	Cates	70-0018	Tom & Peggy Sletta
Prior Lake-Spring Lake WD	Fish	70-0069	Steve Pierson
Prior Lake-Spring Lake WD	Prior (Lower)	70-0026	Walt Burris
Prior Lake-Spring Lake WD	Prior (Upper)	70-0072	Jim Peterson
Prior Lake-Spring Lake WD	Spring	70-0054	Lance Needham
Rice Creek WD	George Watch	2-0005	Wargo Nature Center
Rice Creek WD	Golden	2-0045	Dave Phipps
Rice Creek WD	Karth Lake	62-0072	Gary Gerding & Mike Enz
Rice Creek WD	Langton	62-0049	Tam & Dick McGehee
Rice Creek WD	Langton	62-0049	Tam & Dick McGehee
Rice Creek WD	Lochness	2-0584	Jim Hafner
Rice Creek WD	Long (Mahtomedi)	82-0130	Kitty Francy-Payton
Rice Creek WD	Peltier	2-0004	Wayne LeBlanc
Rice Creek WD	Pike	62-0069	Helen & Phil Goodrich
Rice Creek WD	Pine Tree	82-0122	Gene Berwald
Rice Creek WD	Reshanau	2-0009	Brian Fossey
Rice Creek WD	Sunset	82-0153	Diane Coderre
Rice Creek WD	Valentine	62-0071	Bob Kistler
Rice Creek WD	White Rock	82-0072	David, Joseph, & Ruthmary Bluhm
Saint Louis Park	Cobblecrest	27-0053	Jim Kellogg
Saint Louis Park	South Oak	27-0661	Aaron Patterson
Saint Louis Park	Twin (St. Louis Pk)	27-0656	Bruce, Meghan, & Kathy Cornwall
Scott Co. WMO	Cedar	70-0091	Jerry Edberg
Scott Co. WMO	Cody	66-0061	Scott County
Scott Co. WMO	McMahon	70-0050	Joe Williamson
Scott Co. WMO	Pepin	40-0028	Debbie Olson
Scott Co. WMO	Sanborn	40-0027	Debbie Olson
Shakopee	Dean	70-0074	Andy, Andrew, & Alyssa Voit
Shakopee	O'Dowd	70-0095	Sandy & Andrew Boyce
Shingle Creek WMC	Bass	27-0098	Marvin Groth
Shingle Creek WMC	Pike	27-0111-02	Kurt & Keith Paulsen
Shingle Creek WMC	Schmidt	27-0102	Dale Wahlstrom
South Washington WD	Armstrong	82-0116	Washington Conservation District
South Washington WD	Colby	82-0094	Washington Conservation District
South Washington WD	Powers	82-0092	Washington Conservation District
South Washington WD	Regional Park	82-0087	Washington Conservation District
St. Croix Basin Planning Team	Lake St. Croix	82-0001	Jim and Roberta Harper
St. Croix Basin Planning Team	Lake St. Croix	82-0001	Cecelia and Harry Martin
St. Croix Basin Planning Team	Lake St. Croix	82-0001	Richard and Sheryl Lindholm
St. Croix Basin Planning Team	Lake St. Croix	82-0001	Rick Meierotto

Enrolling Group	Lake	DNR #	Volunteer
St. Croix Basin Planning Team	Lake St. Croix	82-0001	Carpenter Nature Center
Sunfish	Hornbean	19-0047	Dave Johnson
Sunfish	Horseshoe	19-0051	Jim Nayes
Sunfish	Sunfish	19-0050	Dick Bancroft
Valley Branch WD	Bay Pond	82-0011	Josh Rinke
Valley Branch WD	Cloverdale	82-0009	Kevin Bjork
Valley Branch WD	DeMontreville	82-0101	Bob Meier
Valley Branch WD	Downs	82-0110	The Sly Family & Friends
Valley Branch WD	Eagle Point	82-0109	Bob Schumacher
Valley Branch WD	Echo	82-0135	Jim Serley
Valley Branch WD	Edith	82-0004	Dave Nimmer
Valley Branch WD	Elmo	82-0106	Scott Knudson & Terry Bouthilet
Valley Branch WD	Friedrich's Pond	82-0108	Josh Rinke
Valley Branch WD	Goetschel	82-0313	Nancy & Gary VanCleve
Valley Branch WD	Jane	82-0104	Chuck Taylor
Valley Branch WD	Klawitter	82-0368	Bonnie Juran
Valley Branch WD	Long (Pine Springs)	82-0118	Bill Feely
Valley Branch WD	McDonald	82-0010	Randy Hunt
Valley Branch WD	Olson	82-0103	Bob Meier
Valley Branch WD	Rest Area Pond		MnDOT
Valley Branch WD	Sunnybrook	82-0133	Arnie Johnson
Woodbury	La	82-0097	Simon Fung
Woodbury	Markgrafs	82-0089	Terry Riley
Woodbury	Wilmes	82-0090	Bill Aamodt

APPENDIX C
Lake/Watershed Characteristics

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Acorn 82-102	44	296	7:1	3.0	0.7	440	100	0	N			
Alimagnet 19-21	109	1,094	10:1	3.0	1.5	545	100	12	N	C	3.2	
Ardmore 27-0153	10.1			6.1	2.4	78.0						
Armstrong 82-116-02	39			1.5	1.0	128	100		N	N		
Barker 82-76	45	823	19:1	9.0	4.4	648			Y	N		
Bass (Henn) 27-98	194	3,100	16:1	9.4	3.1	1,979	82		Y	N	2.3	
Bass (StLP) 27-15	95											
Bass (Wash)82-35	81			4.3			100		N	N		
Bass (Wash)82-123							100		N	N		
Bavaria 10-19	200	711	3.5:1	18.3	5.6	3,674	40		Y	Y		Centrarchid
Bay Pond 82-11	10.2	849	9:1	1.1								
Benton 10-69	115	322	3:1	2.0			100		N	N		
Benz 82-120	36						100		N	N		
Big Carnelian 82-49	455	1,900	4:1	20.0	9.8	14,560	28		Y	Y		
Big Comfort 13-53	219			14.3			41		Y	Y		
Big Marine 82-52	1,706	2,659	1.5:1	15.2	7.6	42,527	67		Y	Y		
Birch 13-42	65											

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Bone 82-54	212	5,177	24:1	9.8	3.7	2,820	59	3	Y	Y		
Brickyard 10-225	17			13.1			35		Y	N		
Burandt 10-84	93			7.3			72		Y	N		
Bush 27-47	172			8.5			64		Y	Y		
Campbell 10-127	72			2.0			100		N	N		
Carol 82-17	63	375	6:1	1.8	0.9	186	100		N	N		
Cates 70-18	27			4.0			100		N	N		
Cedar (Scott) 70-91	742	11,104	14:1	4.7	2.1	5,194	100		N	Y		
Cedar Island 27-119	80	800	10:1	2.1	1.4	368	100		N	N		
Cenaiko 2-654	29			9.1			40		Y	N	0.6	Stocked w/Trout - Fishing Pier
Clear 82-163	400			8.5	3.7	4,800	67		Y	Y	3.9	Walleye
Cloverdale 82-9	45	819	18:1	8.5	3.0	450	86		Y	N		
Cobblecrest 27-53	10									N		
Cobblestone 19-456												
Cody 66-61	256			3.7	2.4	78						
Colby 82-94	71	8,088	114:1	3.4			100		N	N		
Cornelia 27-28										N		
Courthouse 10-5	10			17.4			30		Y	N	0.6	Stocked w/Trout
Cowley 27-169												
Crystal(Bnsv) 9-27	292	2,001	7:1	11.3	3.1	2,920	72		Y	Y		Panfish - Fishing Pier
Crystal(rob) 27-34	76	1,272	17:1	10.4	3.7	917	68		Y	Y	1.4	Centrarchid - Fishing Pier

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Dean 70-74	128						100		N	N		
DeMontreville82-101	160	1,108	7:1	7.3	2.4	1,280	90		Y	Y		
Downs 82-110	35	2,400	69:1	2.1	1.5	175	100		N	N		
Eagle(Crv)10-121	233	1,050	4.5:1	4.0	1.2	920	100		N	Y		Natural Environment
Eagle(m.g.) 27-111	291	3,220	11:1	10.4	3.8	3,667	68		Y	Y	3.2	Centrarchid
Eagle Point 82-109	120	11,502	96:1	1.8	1.0	360	100		N	N		
Earley 19-33	29	1,629	56:1							N		
East 19-349	40											
East Boot 82-34	47	93	2:1	8.2	0.9	282	84		Y	Y		
Echo 82-135	41	194	4.7:1	1.8	0.8	107	100		N	N		
Edina 27-29				1.0			100		N	N		
Edith 82-4	81	1,576	19:1	13.0					Y			
Elmo 82-106	284	1,191	4:1	41.7			22		Y			
Farquar 19-23	63	353	6:1	3.0	1.4	290	100		N	N		
Fireman's 10-226	8			7.0			88		Y			
Fish (Grant) 82-137	21			10.4			67		Y			
Fish(Scott) 70-69	171	660	4:1	8.5	4.4	2,468	43		Y	Y		Centrarchid
Fish (Wash) 82-64	72	683	9.5:1	3.0	1.5	360	100		N	N		
Forest 82-159	2,249	4,285	2:1	11.5	3.4	24,986	68	14	Y	Y		
Friedrich's 82-108	14.5	360	25:1									
French 27-127	352	870	4:1	1.0					N	Y		

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Gaystock 10-31	105			5.0			100		N	N		
George Watch 2-5	528			2.0	1.5	2,587	100		N	Y		
German 82-56	109											
Glen 27-93	98			7.6			91			N		
Goetschel 82-313	22	2,812	122:1	4.2	1.2	88	100		N	N		
Goggins 82-77	11						100		N	N		
Golden 2-45	57	7,680	135:1	7.3	2.5	463	90	1	Y	Y	1.5	
Goose (Scndia) 82-59	83			7.6	2.4	664	55			Y		
Goose(Wac)10-89	407	1,100	27:1	3.0	1.5	2,035	100		N	C		Natural Environment
Grace 10-218	22			6.7			79					
Hafften 27-199	43		13.4				60		Y	Y		
Half Breed 82-80	75	303	4:1	10.3	1.7	420	67		Y	N		
Hart 2-81	8						100		N	N		
Harvey 27-??				0.7			100		N	N		
Hay 82-65	33									N		
Hazeltine 10-14	236			2.0			100		N	N		
Henry 10-175	77			1.5			100		N	N		
Herbers Pnd 82-15-01				2.0			100		N	N		
Highland 2-79	22			1.0			100		N	N		
Hornbean 19-47	22											
Horseshoe 19-51	16											

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Hydes 10-88	215	430	2:1	5.5	3.0	2,150	88		Y	Y		
Island 2-22	67			6.7			87		Y	N		
Jane 82-104	155	1,402	9:1	12.0	3.7	1,860	72		Y	Y		
Jellum's 82-5202	72	333	4.6:1	4.9	2.4	569	100		N	N		
Jonathon 10-217												
July 82-318												
Karth 62-0072												
Keller (Brn)19-25	60			2.5	1.5	300	100		N	N		
Kingsley 19-30	44	193	4:1	4.0			100		N	N	1.7	
Kismet 82-333										N		
Klawitter 82-368	4.5	168	37:1				100					
La 82-97	35			3.5			100		N	N	1.3	
Lac Lavon19-446	69	306	4:1	9.8			26		Y	N	2.3	Stocked w/Trout - Fishing Pier
Langton 62-49	30	257	9:1	1.5	1.2	120	100		N			
Lee 19-29	25	324	13:1	5.2			100		N	N	1.0	
Legion Pond 82-462	16	224	14:1									
LeMay 27-85	34			4.0	1.6	173						
Libbs 27-85	23			2.1			100		N	N		
Lily 82-23	52			17.4			73		Y	Y		Centrarchid - Fishing Pier
Little Carnelian 82-14	162	565	3.5:1	21.3	10.7	5,686			Y	N	1.7	
Little Comfort 13-54	36			17.0			44		Y	N		

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Little Johanna 62-58	35			12.0			67		N	N		
Little Long 27-179	108			23.2			49		Y	Y		
Lochness 2-0584	5.3			4.9								
Long(ap val)19-22	36			3.5			100		N	N		
Long(Maht) 82-130	48			7.7			92		Y	N		
Long (May)82-30	88			3.7			100		N	Y		
Long (P.S.) 82-118	62	2,060	33:1	10.4	3.6	744	55		Y	N		
Long(Still) 82-21	71			6.7			96		N	N		
Long (Wash) 82-68	35	381	11:1	2.1	1.1	126	100		N	N		
Loon 82-15	64	407	6.4:1	4.9	2.4	206	100		N	N		
Lost 82-134	9.1			7.9			82					
Lotus 10-6	246	1,033	4:1	8.8	4.3	3,500	74		Y	Y		
Louise 82-25	48	616	13:1	3.7	1.8	283	100		N	N		
Lynch 82-42	43											
MacDonald Pnd 82-62	12			2.7			100		N	N		
Magda 27-65	15											
Maple Marsh 82-38	38	148	4:1	3.4	1.7	212	100		N	N		
Maria 10-58	169			1.0			100		Y	N		
Marion 19-26	560			6.4			81		Y	Y		
Markgrafs 82-89	46	413	10:1	2.4			100		N	N	2.6	Rearing
Markley 70-21	27			3.7			100		N	N		

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Masterman 82-126	45											
McDonald 82-10	54	1,051	19:1	3.7	1.8	324	100		N	N		
McKnight 10-216												
McKusick 82-20	46			4.7			100		N	N	1.6	
McMahon 70-50	110			4.5			100		N	Y		
Meadow 27-57	11	121	11:1	1.2			100		N	N	0.7	
Mergen's 82-482	12	1,383	115:1	1.3			100		N	N		
Miller 10-29	145	16,701	115:1	4.3	3.1	1,479	100		N	N		
Minnetoga 27-88	14.4			8.2	3.9	183						
Mitchell 27-70	112			5.8			97		N	Y		
Moody 13-23	35			14.6			63		Y	N		
Mud 82-26-02	62	899	15:1	2.1	1.1	224	100		N	N		
Normandale 21-1045	103			3.7			100		N			
North Twin 82-18	69	187	3:1	1.8	0.9	207	100		N	N		
Northwood 27-627	15	1,341	89:1	1.5	0.8	41	100		N	N		
Oak 10-93	339			3.4			100		N	N		
O'Connor 82-2	38									N		
O'Dowd 70-95	258			6.7			91		Y	Y		
Olson 82-103	89	200	2:1	4.5	2.1	623	100		N	Y		
Oneka 82-140	381			2.1	1.2	1,524	100		N	N		Wildlife
Orchard 19-31	250	2,012	8:1	10.0	3.0	2,500	75		Y	Y		Centrarchid

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Pamela 27-675	18			1.5			100		N	N		
Parkers 27-107	97	950	10:1	11.3	3.7	1,164	70		Y	Y		
Pat 82-125	13											
Peltier 2-4	174	68,082	391:1	4.9	2.1	3,255	100		N	Y		Gamefish
Pepin 40-28	326			3.4	1.1	1,150				Y		
Pike(m.g.) 27-111	59	919	16:1	11.9	2.0	395	95		Y	Y	1.5	Centrarchid
Pike(ramsy)62-69	35			4.9	2.1	252	100		N	N		Gamefish
Pike (scott) 70-76	57	1,991	35:1	2.7			100		N	N		
Pine Tree 82-122	174			7.9	3.0	1,740	91		Y	N		Centrarchid
Powers 82-92	57	1,238	22:1	12.5			57	2	Y	N	1.8	Centrarchid
Prior(lower)70-26	827	19,560	24:1	18.3	4.1	11,120	46	1	Y	Y		Centrarchid
Prior(upper)70-72	340	16,460	48:1	15.2	3.1	3,460	93	2	Y	Y		Centrarchid
Region Prk 82-87	16	600	38:1	5.8			100		N	N		
Reitz 10-52	79	3,711	47:1	11.0	4.0	1,027	58		Y	Y		
Reshnanau 2-9												
Rest Area 82-0514	12.6	17,781	157:1									
Rice 27-116	252			3.4	1.9	1,570				Y		
Riley 10-2	297	4,796	16:1	15.0	6.6	6,429	34		Y	Y	2.9	
Rogers 19-80	94			2.4	1.3	393				Y		
Rose 27-92	17											
Ryan 27-58	20	5,510	157:1	10.7	64.8	312	56		Y	N	0.6	

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Sanborn 40-27				1.2	0.9					Y		
Sand 82-67	46			5.5	2.4	368	46	2		N	1.8	
Schmidt 27-102	37	190	4:1	9.1	1.5	207	92		Y	N	1.6	
School 13-57	48											
Schutz 10-18	105	943	9:1	15.0	6.0	2,100	27		Y	N		
Schroeder Pnd 82-301				3.0			100		N	N		
Scout 19-198				2.9								
Seidl's 19-95	14	415	30:1	5.0			100	5	N	N		Rearing
Shaver 27-86	11									N		
Shields 82-162	27			8.2			85		Y	N	0.8	
Silver 82-16	98	455	4.6:1	3.4	1.7	549	100		N	N		
Silver (Ramsey) 62-1	72			5.5			99			Y		
South Oak 27-661										N		
South Rice 27-645	3.2	63	20:1	2.5	0.5	5.4	100		N	N		
S. School Section 82-151	125			8.0			41					
South Twin 82-19	54	63	1.2:1	4.0	2.0	356	100		N	N		
Spring (Scott)70-54	630	13,500	21:1	11.3	5.6	11,500	50	2	Y	Y	5.0	
Square 82-46	193	782	4:1	20.7	9.0	5,694	65	5	Y	Y	2.2	Stocked w/Trout
Staples 82-28	24	127	5.3:1	4.3	2.1	165	100		N	N		
St. Croix 82-1	8,600	4,918,790		23.8					Y	Y		
St. Joe 10-11	14			15.9			46		Y	Y		

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Success 27-634												
Sunfish 19-50	49											
Sunfish 82-107	50	526	11:1							N		
Sunnybrook 82-133	16	630	39:1	6.1	2.0	104			Y	N		
Sunset 82-153	124			5.2			100		N	N	2.3	Gamefish
Sunset Pnd19-451	60			3.7			100		N	N	1.9	
Susan 10-13	93			5.2			81			Y		
Swede 10-95	376			4.0			100		N	Y		
Sweeney 27-35	66	2,400	36:1	8.0	3.6	790	52		Y	N		Panfish
Tamarack 10-10	24			20.0			41		Y	N		
Terrapin 82-31	86			4.6			100		N	N		
Thole 70-120	105			3.7			100		N	Y		
Turtle 82-36	44	699	16:1	2.4	1.2	172	100		N	N		
Twin(Bnsv)19-28	11						100					
Twin(U)(b.p.)27-42	137	3,657	31:1	2.4	0.9	397	100		Y	N	2.8	Centrarchid
Twin(M)(cry)27-42	69	4,053	72:1	14.0	4.9	918	57		Y	Y	1.4	Centrarchid
Twin(L)(rob)27-42	46	5,322	176:1	6.7	2.3	340	83		Y	Y	1.2	Centrarchid
Twin(StLP) 27-656										N		
Valentine 62-71	60	2,237	37:1	4.0	1.5	300	100		N			
Valley 19-348	8	117	8:1	3.2			100	1	N	N		
Virginia 10-18	110	772	7:1	10.4	3.3	1,210	88		Y	Y		

Lake DNR #	Surface Area(ac)	Watershed Area(ac)	Ratio	Max Depth(m)	Mean Depth(m)	Volume (ac-ft)	% Littoral	# Inlets	Thermo - cline?	Public Access	Shr Length (miles)	DNR Classification
Waconia 10-59	3,000	7,880	4:1	11.3	4.0	38,632	53		Y	Y	6.8	Centrarchid
Weber 82-119	7.5	1.4	19:1	1.5			100		N	N		
West Boot 82-44	110	209	2:1	11.9	5.9	2,090	56		Y	Y		
West Lakeland 82-488	27	1,139	347:1						N	N		
Westwood 27-711	41			2.0			100		N	N		
White Rock 82-72	65											
Wilmes 82-90	41	2,247	55:1	5.5						Y	1.3	
Windsor 27-82	14									N		
Wing 27-91	11											
Winkler 10-66	129	2,758	21:1									
Wood(Brns)19-24	9	157	17:1	4.5			100	1	N	N		Panfish
Woodpile 82-132	19											