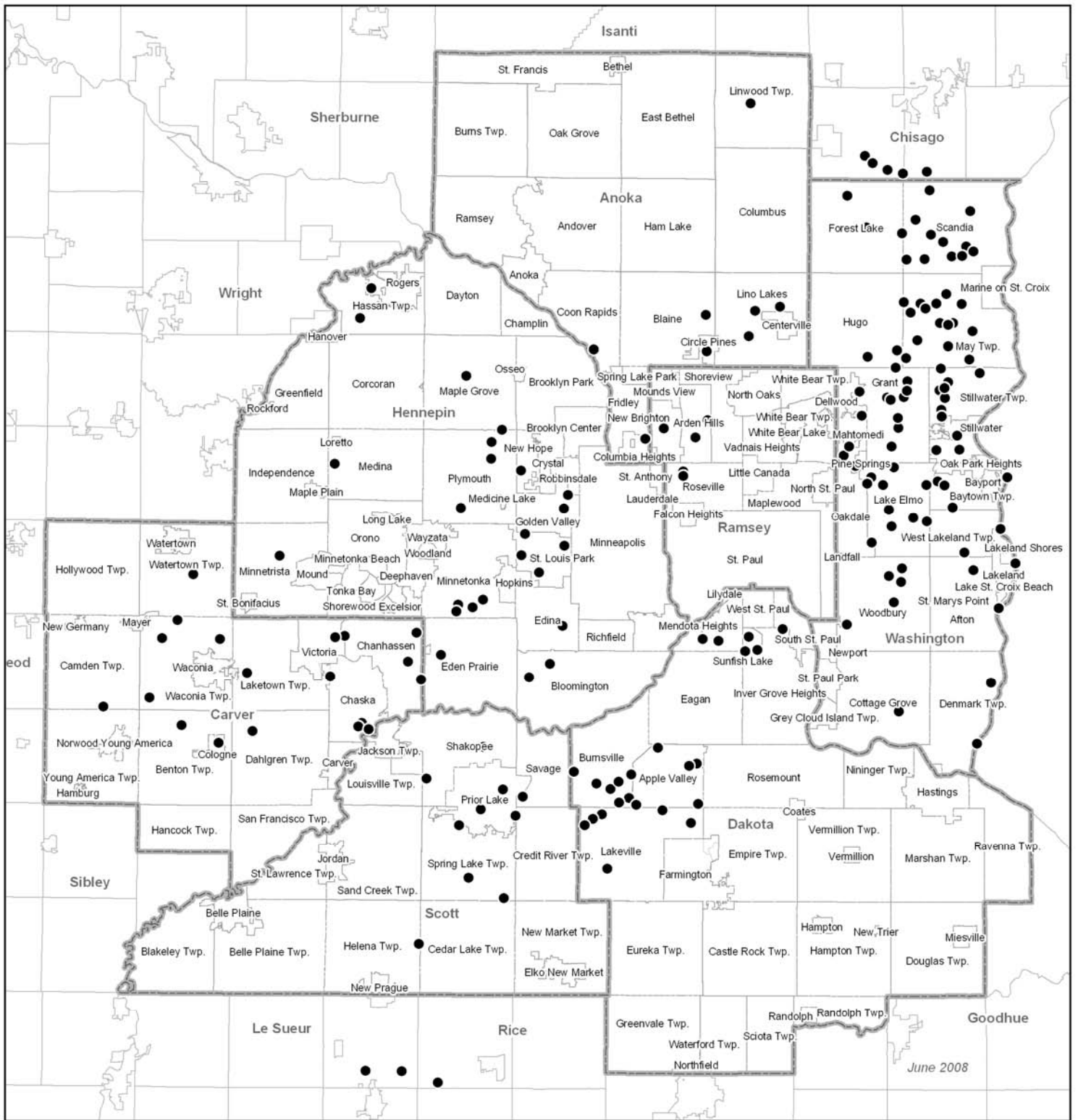


# 2007 Study of the Water Quality of 176 Metropolitan Area Lakes



By  
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Metropolitan Council  
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## 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.

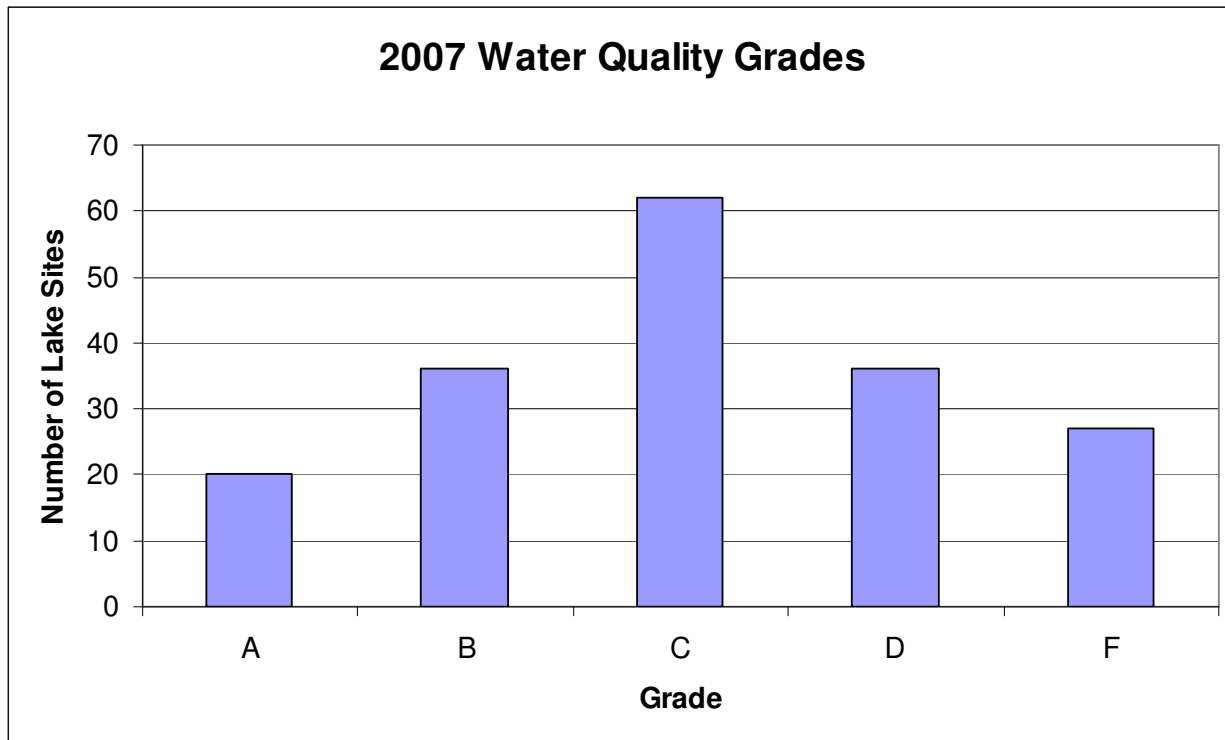
The year 2007 marked the fifteenth year that CAMP was used to increase our knowledge of the water quality of area lakes. Once again, volunteers measured surface water temperature and transparency, and collected surface water samples that were analyzed for total phosphorus, total Kjeldahl nitrogen, and 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](mailto: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.
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  - 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.

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**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](mailto:brian.johnson@metc.state.mn.us).**