2023

Lake Water *Quality*
Summary

Lakes add to the quality of life and economic stability of the region

INTRODUCTION

The Twin Cities metropolitan region is fortunate to have a large number of lakes. These lakes are important recreational, aesthetic, and ecological resources that add considerably to the quality of life and economic stability of the region. Residents of the region care deeply about protecting the quality of water in our lakes.

Many state and local agencies have a role in managing and monitoring lake water quality. The Metropolitan Council operates the most extensive lake monitoring program in the region, and has been monitoring metro region lakes since 1980. During the 1980s, the Met Council typically monitored about 10 to 30 lakes per year.

In 1993, the Met Council initiated the Citizen-Assisted Monitoring Program (CAMP) to help expand coverage of lake monitoring in the metro region and to provide information to support local water management efforts. This highly successful program collects data on the lakes each year through the efforts of trained, dedicated volunteers and their local sponsors. 2023 was the 31st year of the volunteer program, with 103 volunteers participating. The volunteers were sponsored by local partners, including 12 cities, 14 watershed management organizations and watershed districts, 1 county, and 1 conservation district.

Through the dedicated efforts of the volunteers and local partners, we were able to monitor a total of 166 lake-sites on 155 lakes in 2023 through the CAMP. Met Council staff monitored an additional 5 lake-sites on 4 lakes. In total, Met Council staff and CAMP volunteers and sponsors monitored 171 lake sites on 159 lakes in 2023, including 1 lake and 1 lake site that was newly added to the lake monitoring program. Since 1980, the lake monitoring program has monitored 454 lake-sites on 411 lakes.

WHY WE MONITOR

The Met Council is charged with creating a comprehensive regional development guide that minimizes the adverse impacts of growth, including adverse impacts on the environment. The monitoring data collected by the Met Council, its partners, and volunteers are used to identify pollution problems, support regional planning efforts, and meet federal and state regulations. This Lake Water Quality Summary provides an annual summary assessment of the water quality of many of the metro region's lakes. Also, the Met Council monitors rivers and streams in the metropolitan area and prepares reports on data collected by those programs.

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C O U N C I L

Most of the lake monitoring efforts focus on the assessment of eutrophication, which is the process of nutrient enrichment. Eutrophication increases the biological productivity of a lake by enhancing the growth of algae and other plants. Human activities in the watersheds of lakes (for example, nonpoint sources) increase the delivery of nutrients to lakes beyond what occurs naturally. This acceleration of nutrient enrichment by humans is called cultural eutrophication. During cultural eutrophication, the population of algae increases and water clarity decreases. A variety of other problems may develop, including increases in nuisance algal blooms, odor problems, decreased desirability for recreation, decreased dissolved oxygen, fish kills, changes in the structure of fish and invertebrate communities toward low-oxygen tolerant species, and reductions in biodiversity. Furthermore, eutrophic lakes can develop blooms of toxic blue-green algae (cyanobacteria), which can be a serious health concern for humans and animals (domesticated and wild). Cultural eutrophication is one of the leading water quality concerns facing the region.

METHODS

Lakes monitored by Met Council staff and volunteers are typically sampled at two-week intervals from mid-April through mid-October. Most lakes are sampled at one station located over the deepest spot in the lake. Field measurements taken during each monitoring event typically include temperature and water clarity (measured with a Secchi disk). In addition, surface water samples are collected for lab analyses, which include total phosphorus, total Kjeldahl nitrogen, and chlorophyll-a. The routine chemical analyses are performed at the Met Council Environmental Services laboratory following U.S. EPA-approved methods.

Each lake is assigned a lake grade using an A through F grading system as originally developed by Met Council staff in 1989. The objective of the lake grade system is to provide a tool for assessing lakes on a regional basis. The grading system allows comparisons of lake water quality across the metro area, yet is understandable to the public and nontechnical audiences. The grading system uses percentile ranges of the summertime (May-September) average values for three water quality indicators: total phosphorus, chlorophyll-a, and Secchi depth. Total phosphorus is a key nutrient measure; chlorophyll-a is a measure of algal abundance; and Secchi depth is a measure of water clarity. The lake's water quality grade is calculated as the average grade for the three individual parameter grades. Only lakes with a sufficient quantity of data are assigned a lake grade.

RESULTS

In 2023, 57% of the lake sites received a grade of "A" or "B", meaning that they had relatively good water quality. Another 29% of lake sites received a water quality grade of "C". The remaining 14% of lake sites received a water quality grade of "D" or "F", meaning that they had relatively poor water quality. Similar to that of past years, there was no distinct pattern within the metro region as to where lakes with specific water quality are located.

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

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

The cause or causes of the shift in grades is unknown at this time but the grade shift may be related to the varying drought conditions experienced in the region from 2021 through 2023. A more detailed discussion of the grade shifts and the potential effect of the droughts will be provided in the forthcoming Met Council's full 2023 annual lake report. The Annual Lake Water Quality Summary Report, in addition to other lake, stream, and river reports can be accessed online at:
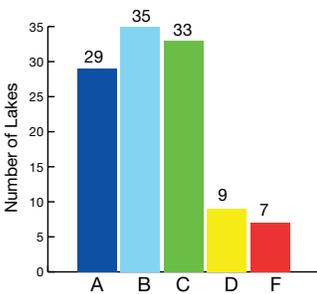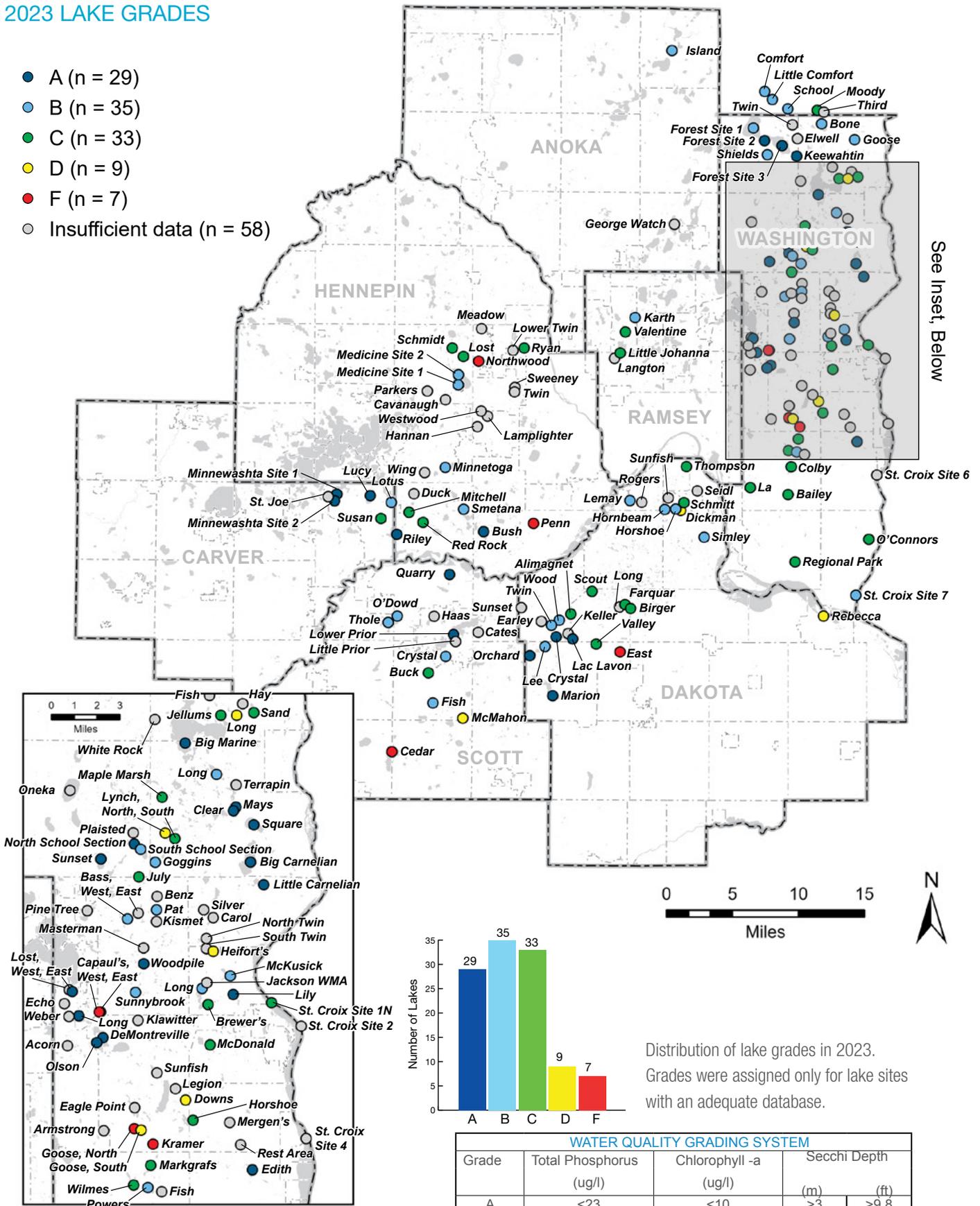
https://eims.metc.state.mn.us/Documents

All of the Met Council's lake, stream, and river monitoring data can be accessed online using the Environmental Information Management System at:

https://eims.metc.state.mn.us

2023 LAKE GRADES

- A (n = 29)
- B (n = 35)
- C (n = 33)
- D (n = 9)
- F (n = 7)
- Insufficient data (n = 58)

ANOKA

HENNEPIN

WASHINGTON

See Inset, Below

Island

Comfort
Little Comfort
School   Moody
Third
Twin
Bone
Forest Site 1
Forest Site 2   Elwell   Goose
Shields   Keewahtin
Forest Site 3

George Watch

RAMSEY

Meadow
Lower Twin
Schmidt   Lost   Ryan
Medicine Site 2   Northwood
Medicine Site 1
Parkers   Sweeney
Cavanaugh   Twin
Westwood
Hannan   Lamplighter

Karth
Valentine
Little Johanna
Langton

Minnewashta Site 1   Lucy   Wing   Minnetoga
St. Joe   Lotus
Minnewashta Site 2   Susan   Duck   Mitchell
Smetana
Riley   Bush
Red Rock   Penn

Sunfish   Thompson   Colby   St. Croix Site 6
Rogers
Lemay   Seidl   La
Schmitt   Bailey
Hornbeam   Dickman
Horshoe
Simley

O'Connors
Regional Park

Quarry

Alimagnet
Wood   Scout   Long
Twin   Farquar
Sunset   Keller   Birger
O'Dowd   Earley   Valley
Thole   Haas   Cates
Lower Prior   Orchard
Little Prior   Lee   Crystal
Crystal   Lac Lavon   East
Buck   Marion

St. Croix Site 7
Rebecca

CARVER

DAKOTA

Fish
McMahon

Cedar

SCOTT

Inset map

0 1 2 3
Miles

Fish   Hay
Jellums   Sand
Long
White Rock   Big Marine
Maple Marsh   Long
Oneka   Terrapin
Lynch,   Clear   Mays
North, South
Plaisted   Square
North School Section
South School Section
Sunset   Goggins   Big Carnelian
Bass,   July
West, East   Little Carnelian
Pine Tree   Benz
Pat   Silver
Masterman   Kismet   Carol   North Twin
South Twin
Lost,   Heifort's
West, East   Woodpile   McKusick
Capaul's,   Jackson WMA
West, East   Long   Lily
Echo   Sunnybrook   St. Croix Site 1N
Weber   Long   Klawitter   Brewer's   St. Croix Site 2
Acorn   DeMontreville
Olson
Sunfish
Legion
Eagle Point   Downs   Horshoe
Armstrong   Mergen's
Kramer   Rest Area   St. Croix Site 4
Goose, North
Goose, South   Markgrafs   Edith
Wilmes   Fish
Powers

N

0   5   10   15
Miles

Distribution of lake grades in 2023.
Grades were assigned only for lake sites
with an adequate database.

WATER QUALITY GRADING SYSTEM				
Grade	Total Phosphorus	Chlorophyll -a	Secchi Depth	
	(ug/l)	(ug/l)	(m)	(ft)
A	<23	<10	>3	>9.8
B	23-32	10-20	2.2-3.0	7.2-9.8
C	32-68	20-48	1.2-2.2	3.9-7.2
D	68-152	48-77	0.7-1.2	2.3-3.9
F	>152	>77	<0.7	<2.3

(ug/L) is an abbreviation for microgram per liter

METROPOLITAN COUNCIL 2023 LAKE WATER QUALITY SUMMARY