Nine Mile Creek Watershed District

2025 Water Monitoring Program Summary

Prepared for
Nine Mile Creek Watershed District

Prepared by Barr Engineering Co.

June 2026

ACRONYMS AND ABBREVIATIONS

AIS	aquatic invasive species
BN	brittle naiad
CAMP	Community-assisted Monitoring Program
CFS	cubic feet per second
Cl	chloride
CLP	curly-leaf pondweed
DO	dissolved oxygen
ECU	Ecological Use (monitoring station)
EWM	Eurasian watermilfoil
FIBI	Fish Index of Biological Integrity
FQI	floristic quality index
GP	glide pool
HABs	harmful algal blooms
HWM	Hybrid watermilfoil
IBI	Index of Biological Integrity
IPM Plan	integrated pest management plan
LVMP	lake vegetation management plan
MCES	Metropolitan Council Environmental Services
MDH	Minnesota Department of Health
mg/L	milligram per liter
MIBI	Macroinvertebrate Index of Biological Integrity
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MSL	mean sea level
NH3	ammonia
NM	not monitored
NMCWD	Nine Mile Creek Watershed District
N/N	nitrate/nitrite
NTU	Nephelometric Turbidity unit (used to measure water turbidity)
OP	orthophosphate
RFU	relative fluorescence unit
RR	riffle run
TDN	total dissolved nitrogen
TDP	total dissolved phosphorus
TKN	total Kjeldahl nitrogen
TP	total phosphorus
TSS	total suspended solids
µg/L	microgram per liter
µmhos/cm	micromhos per centimeter (a water conductivity measurement)
WHO	World Health Organization
WOMP	Watershed Outlet Monitoring Program (of the Metropolitan Council)

CONTENTS

1 INTRODUCTION

Lake Cornelia's North Basin, May 2025

The Nine Mile Creek Watershed District (NMCWD, district) is a special-purpose unit of local government that works with its partners and community stakeholders to manage, protect, and enhance the water resources within the 50-square-mile watershed that drains to the Nine Mile Creek in the southwest portion of the Twin Cities.

Monitoring of waterbodies in the Nine Mile Creek watershed is essential to developing an understanding of past and present conditions within the watershed and determining the need for action by the district or other entities. The district annually implements a lake, groundwater, and stream monitoring program designed to establish baseline conditions, track changes, measure the effectiveness of past and ongoing improvement projects, and inform additional studies (e.g., feasibility studies, water quality studies), as needed. The monitoring program includes:

- Lake water quality and ecological conditions
- Stream water quality and ecological conditions
- Lake levels
- Groundwater levels

The district's 2025 water quality monitoring program included monitoring nine lakes—Arrowhead Lake, Bush Lake, Lake Cornelia (North and South Basins), Indianhead Lake, Lake Holiday, Wing Lake, Minnetoga Lake, Shady Oak Lake, and Normandale Lake—and Nine Mile Creek (Figure 1-1).

The following report summarizes the lake, groundwater, and stream monitoring data collected by the district in 2025 and compares this data to historical data to assess changes in water quality conditions.

NMCWD has been conducting its **water quality and ecological monitoring** program since the late-1960s. Protecting and enhancing the surface water quality of Nine Mile Creek and the lakes within the watershed has been an important goal of the district for many decades. To help accomplish this goal, the district operates an extensive lake and stream management program. Generally, the program includes:

- Data collection (monitoring)
- Assessment (e.g., studies)
- Implementation of projects and programs

The district has been monitoring **lake levels** since 1960 and **groundwater levels** since 1962. This information has been used to monitor fluctuations, helping to understand the connections between groundwater and surface water throughout the watershed and providing important information during times of flooding and drought. In 2025, NMCWD collected monthly levels at 29 lakes and 6 groundwater monitoring wells. Figure 1-2 shows the lake level and groundwater monitoring locations.

This report is organized by subject:

Lake Water Quality and Ecological Monitoring — Chapter 2

Summarizes the most recent and historical water quality and ecological monitoring data collected for district lakes, including a discussion of in-lake and watershed management actions implemented.

Stream Water Quality and Ecological Monitoring — Chapter 3

Summarizes the most recent and historical water quality and ecological monitoring data collected at locations along the Nine Mile Creek.

Lake Level Monitoring — Chapter 4

Includes lake level monitoring observations.

Groundwater Level Monitoring — Chapter 5

Includes groundwater level monitoring observations.

Minnetoga Lake, September 2025

Figure 1-1 2025 lake and stream monitoring overview

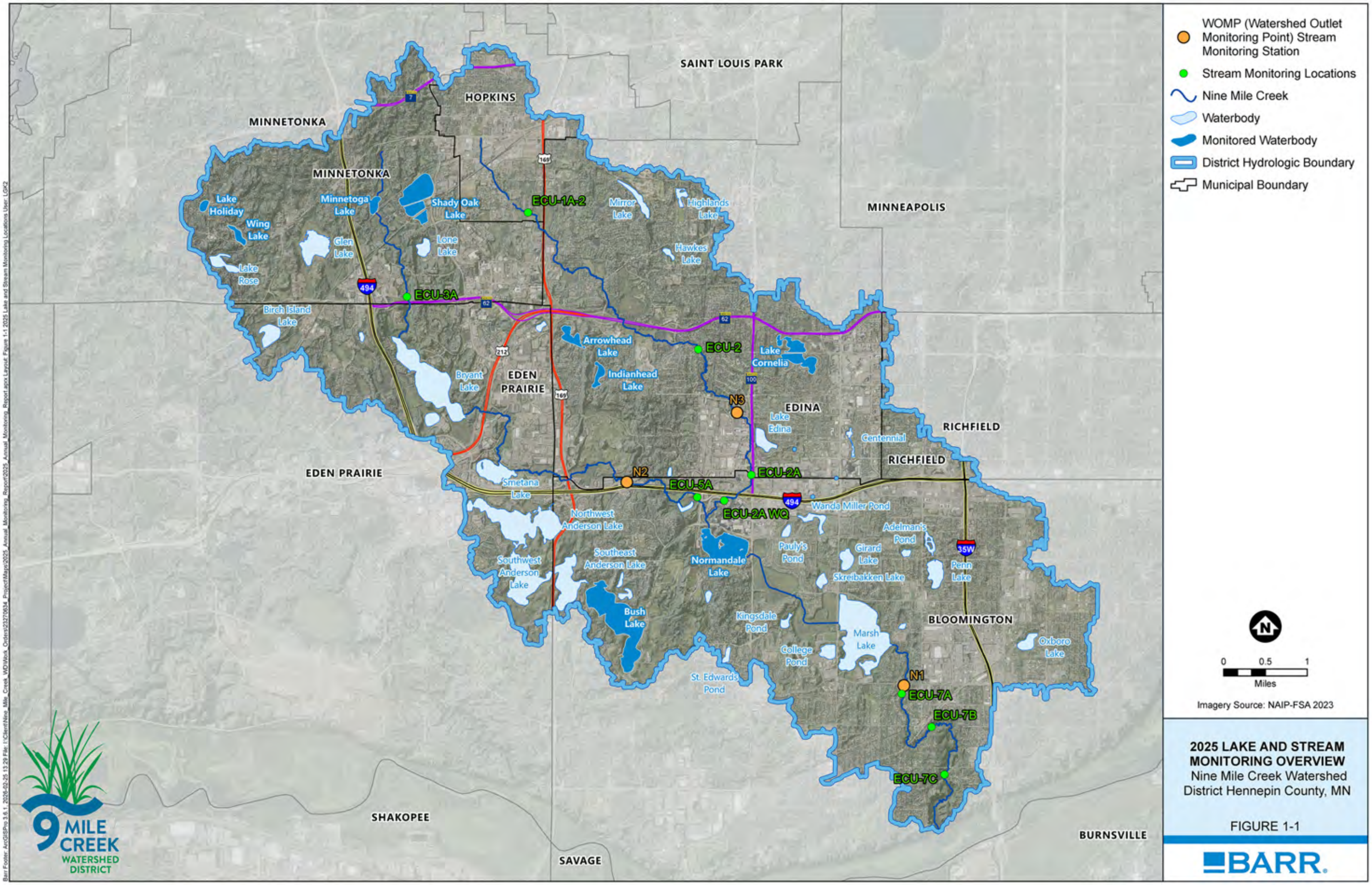
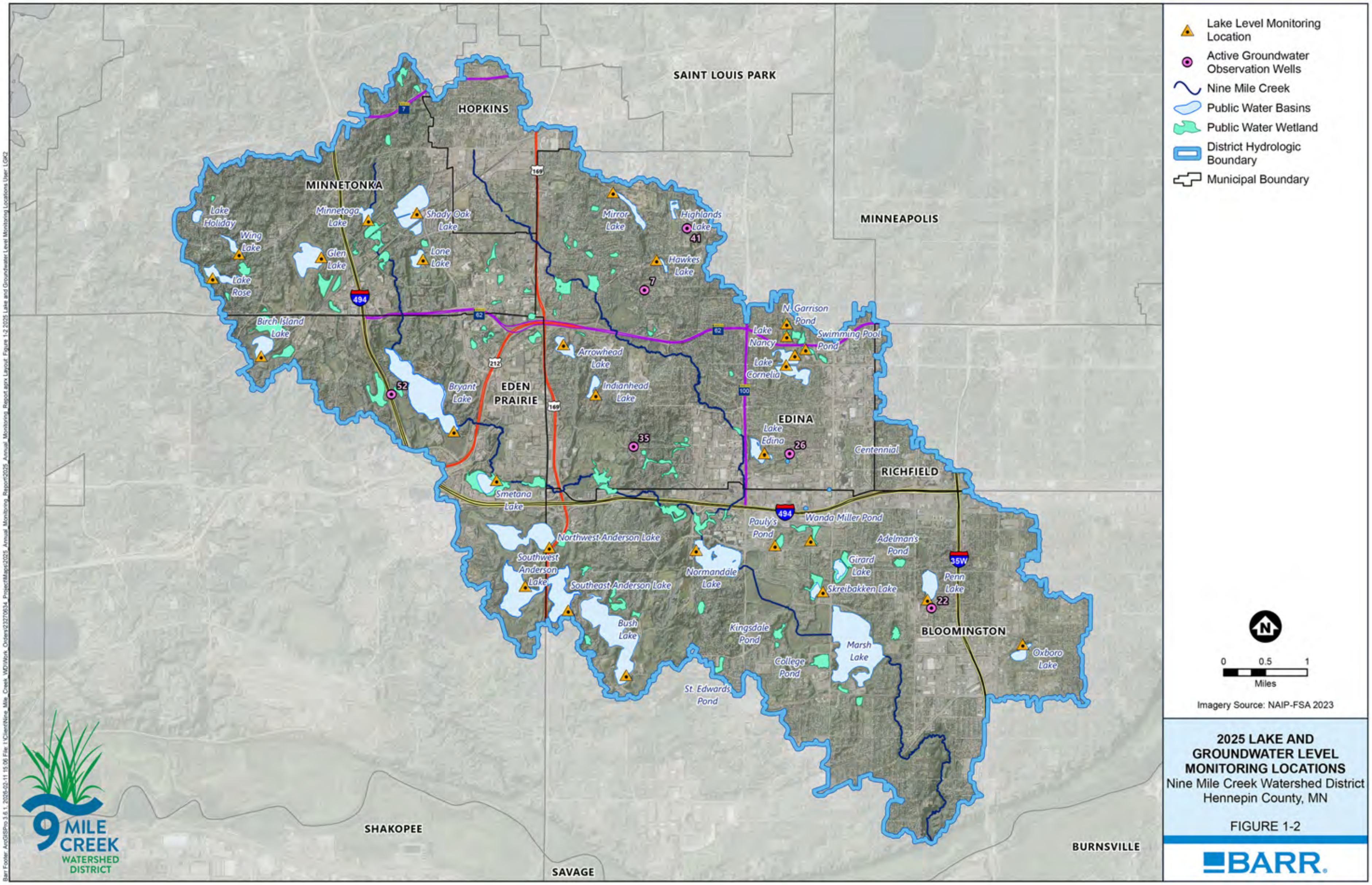
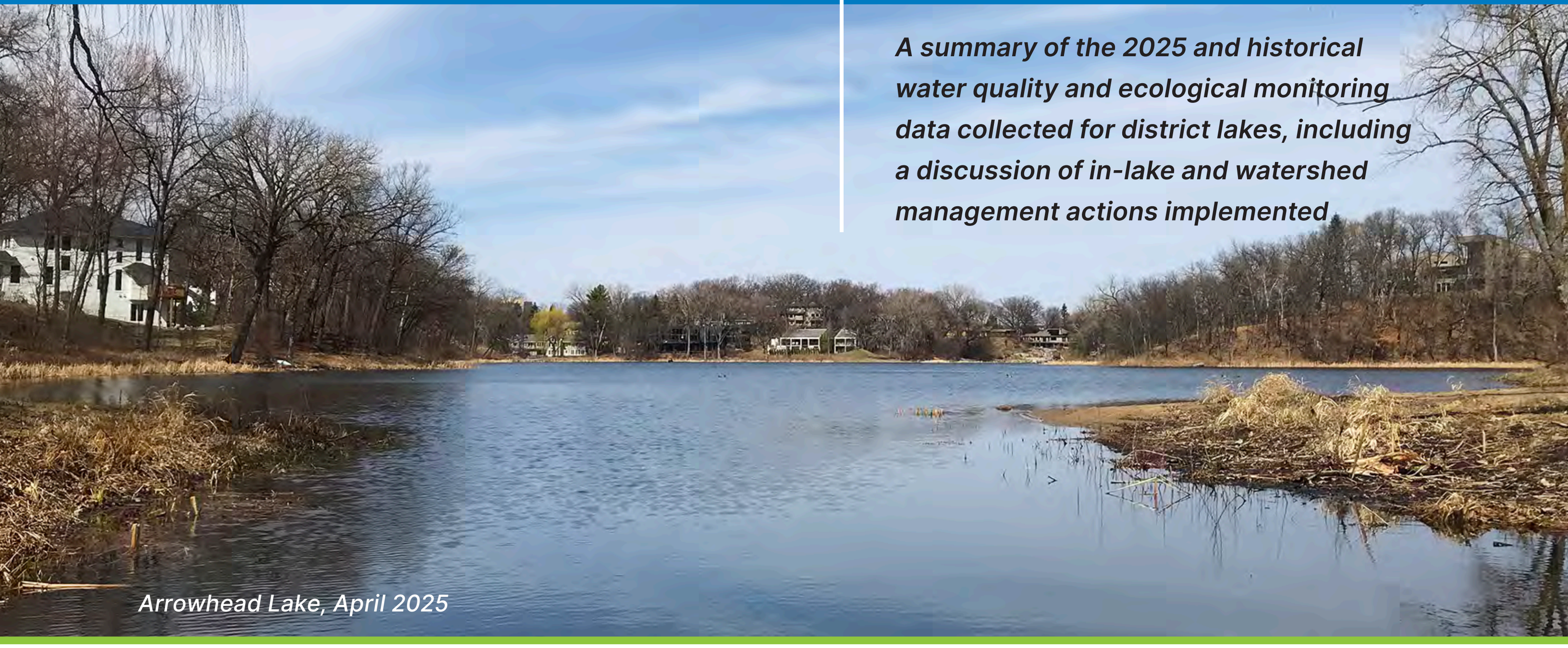


Figure 1-2 2025 lake and groundwater level monitoring locations



2 LAKE WATER QUALITY MONITORING

A summary of the 2025 and historical water quality and ecological monitoring data collected for district lakes, including a discussion of in-lake and watershed management actions implemented



Arrowhead Lake, April 2025

The Nine Mile Creek Watershed District monitors the water quality of its lakes on a rotating basis. Lakes monitored in a given year are selected to track water quality conditions, to gather additional information needed for consideration of potential management activities, to prepare for proposed projects, and/or to measure the effectiveness of past or ongoing improvement projects.

The district's full lake monitoring program typically consists of the following monitoring:

- **Water quality monitoring** on six occasions (ice-out and five events during June through September)
- **Analysis of phytoplankton (algae)** on five occasions (June through September)
- **Analysis of zooplankton** on five occasions (June through September)
- **Aquatic plant (macrophyte) surveys** during June and August
- **Periodic fisheries monitoring** informed by baseline assessments and management needs

In some cases, the district opts to collect a more limited dataset for a given lake, based on specific data needs and budget considerations. Table 2-1 (next page) summarizes the lake monitoring completed by the district in 2025. Results of the district's 2025 lake monitoring are summarized in detail by lake in the subsections of this chapter.

Table 2-1 Summary of 2025 Lake Monitoring by the Nine Mile Creek Watershed District

Lake	Water Quality Monitoring	Zooplankton	Phytoplankton	Aquatic Plant Surveys	Fisheries
Arrowhead Lake	B	NM	NM	NM	NM
Bush Lake	NM	NM	NM	E	G
Lake Cornelia (North and South Basins)	B	NM	D	E	F
Lake Holiday	B	NM	NM	E	NM
Indianhead Lake	B	NM	NM	NM	NM
Lake Minnetoga	A	C	D	NM	NM
Normandale Lake	NM	NM	NM	E	F
Shady Oak Lake	NM	NM	NM	E	G
Wing Lake	B	NM	NM	NM	NM

A Monitored parameters included total phosphorus (TP), total dissolved phosphorus (TDP), orthophosphate (OP), total Kjeldahl nitrogen (TKN), total dissolved nitrogen (TDN), nitrate/nitrite (N/N), ammonia (NH_3), chloride (Cl), total suspended solids (TSS), Chlorophyll-*a*, Secchi Disk depth, temperature, dissolved oxygen (DO), pH, specific conductance, phycocyanin (in RFU)

B Monitored parameters included TP, TDP, OP, TKN, Cl, Chlorophyll-*a*, Secchi Disk depth, temperature, DO, pH, specific conductance, phycocyanin (in RFU)

C Zooplankton species counts

D Algal species counts

E Point intercept aquatic plant surveys

F Trap net, box net, and electrofishing surveys

G Electrofishing survey

NM Not monitored

NOTE: See next page for lake monitoring terms

2.1 Lake Monitoring Terms

The following parameters (terms) on this page are used to inform water quality monitoring.

Phosphorus

Phosphorus is an essential nutrient that plants and algae need to grow. However, when too much phosphorus is in a lake, it can cause excessive algal growth that reduces water clarity and can threaten the health of the aquatic plant community. Phosphorus can enter a lake from stormwater runoff and can be released from lake bottom sediment when certain environmental conditions are met. Reducing the amount of phosphorus entering a lake can help to reduce algal growth.

Chlorophyll-*a*

Chlorophyll-*a* is a photosynthetic pigment found in algae (phytoplankton) and plants (macrophytes). For lake water quality monitoring, measurements of chlorophyll-*a* in water samples are used to estimate how much algae is present in the lake. High chlorophyll-*a* values can indicate degraded lake water quality conditions.

Secchi Disk

A Secchi disk is a black and white circular plate that is lowered into the lake to measure the clarity of the water column (transparency). Low clarity can indicate high algal growth and/or increased sediment suspension in the water column.

Summer Average

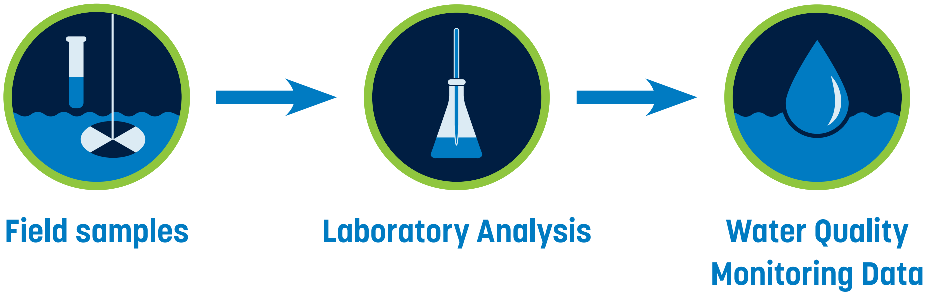
The MPCA lake eutrophication standards for total phosphorus, chlorophyll-*a*, and Secchi Disk transparency utilize summer averages. Summer averages are calculated by taking the mean of the monitoring data collected between June 1 and September 30.

Chloride

Chloride can accumulate in lakes and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians.

Nitrogen

Nitrogen is another essential nutrient required for plants and algae to grow. Nitrogen can enter a lake from stormwater runoff, from the atmosphere, and from the degradation of organic materials. In freshwater systems in Minnesota, phosphorus is most commonly the “limiting nutrient” controlling algal growth, although nitrogen can also be limiting for portions of the growing season. Reducing the amount of nitrogen entering a lake can help to reduce algal growth.



Eutrophication

Eutrophication is the process of gradual nutrient enrichment in lakes, which can lead to increased biological production, such as amplified growth of algae and aquatic plants. This process of increased fertility is natural in an aging aquatic ecosystem and results from the normal environmental forces that influence a lake. ***Cultural eutrophication*** is an acceleration of the natural processes and is caused by human activities. Nutrient inputs from urban, agricultural, and industrial stormwater runoff can far exceed the natural inputs to a lake, often creating excessive algal blooms, low oxygen levels, and loss of aquatic species diversity.

Macrophytes (Aquatic Plants)

Macrophytes, or aquatic plants, are the submerged, emergent, and floating plants that grow in or near the lake water. Macrophytes play vital roles in stabilizing sediment from wind driven suspension, providing spawning habitat for fish, providing refuge for small aquatic insects and fish, offering habitat for nesting birds, and competing with algae for nutrients.

Phytoplankton (Algae)

Phytoplankton, or algae, are photosynthetic, microscopic organisms that are suspended or floating in the water column. Phytoplankton can be single cell, filamentous, or community-based organisms. High levels of nutrients (phosphorus, nitrogen) can lead to an overabundance of phytoplankton growth, creating low lake clarity and degraded water quality conditions.

Cyanobacteria (Blue Green Algae)

Cyanobacteria, or blue green algae, are a type of phytoplankton found in waterbodies. When water is warm and rich in nutrients, cyanobacteria can grow quickly forming blooms. These blooms can be considered harmful (harmful algal blooms (HABs) since some species of cyanobacteria can produce cyanotoxins. Human or wildlife exposure to cyanotoxins may cause skin irritations, including rashes, hives, swelling or skin blisters. Ingestion of cyanotoxins can also cause more severe health effects such as liver or kidney damage, seizures, or death, depending on the cyanotoxin and the magnitude, duration and frequency of the exposure.

Zooplankton

Zooplankton are microscopic aquatic animals that drift and move throughout the lake water column. They play major roles in the aquatic food web by consuming algae and are primary food sources for larger organisms such as fish.

2.2 NMCWD Water Quality Goals for Lakes—Minnesota State Standards

The table on the next page summarizes the lake water quality standards and ecological thresholds used by the NMCWD to assess lake health. These standards and thresholds are referenced throughout the report and shown on summary plots and figures.

- **Minnesota Lake Eutrophication Standards—**The Minnesota Pollution Control Agency (MPCA) has developed deep and shallow lake eutrophication standards based on ecoregion. The NMCWD is located within the North Central Hardwood Forest Ecoregion and as such has adopted the relevant lake eutrophication standards (phosphorus, chlorophyll-*a*, Secchi disk transparency) for that ecoregion.

- **Minnesota Chloride Standards—**Because high concentrations of chloride can harm fish and plant life, the MPCA has established acute and chronic exposure chloride standards. A lake is considered impaired if two or more exceedances of the chronic criterion (230 mg/L) occur within a three-year period or one exceedance of acute criterion (860 mg/L) is measured.

- **Minnesota Aquatic Plant Thresholds—**For aquatic plant monitoring, the NMCWD uses the Lake Plant Eutrophication Index of Biological Integrity (IBI) thresholds developed by the Minnesota Department of Natural Resources (MNDNR). The Lake Plant Eutrophication IBI includes two metrics to measure the response of a lake plant community to eutrophication. The first metric is species richness—the estimated number of species in a lake. The second metric is floristic quality index (FQI), which distinguishes the quality of the plant community and can be a reflection of the quantity of nutrients in the lake. Lakes that score below the thresholds contain degraded plant communities and are likely stressed from cultural eutrophication.

- **World Health Organization Cyanobacteria Thresholds—**Blue-green algae are associated with water quality problems and can be a source of health concerns due to the possible production of hepatotoxins and neurotoxins. The World Health Organization (WHO) has established thresholds for assessing the probability of adverse health effects to lake users from exposure to blue-green algae. The probability of adverse health effects ranges from low to high depending on the abundance of algae (cells/mL) and risk of whole-body contact or ingestion/aspiration.

- **Minnesota Cyanotoxin Levels for Swimming Advisories—**The MPCA has published cyanobacteria (blue-green algae) cyanotoxin advisory recommendations for counties, cities, and other local government entities to consider closing swimming beaches or posting advisories/notices to residents. Recreational guidelines are provided for the following toxins: microcystin, cylindrospermopsin, and anatoxin-a. The district does not routinely monitor cyanotoxins, but did monitor cyanotoxins in Lake Cornelia in 2024 and 2025 as part of a pilot program with the Minnesota Department of Health (MDH).

Table 2-2 Water quality standards and ecological thresholds used by the NMCWD to assess lake health

Type	Parameter	Shallow Lakes[1]	Deep Lakes
Water Quality	Total phosphorus (summer average, µg/L)	≤ 60	≤ 40
	Chlorophyll-*a* (summer average, µg/L)	≤ 20	≤ 14
	Secchi disk transparency (summer average, meters)	> 1.0	> 1.4
	Chloride (mg/L)	≤ 230 (chronic) ≤ 860 (acute)	
Aquatic Plants (macrophytes)	Species richness (number of species)	≥ 11	≥ 12
	Floristic quality index (FQI)	≥ 17.8	≥ 18.6
Blue-Green Algae (Cyanobacteria)	Low probability of adverse health effects (i.e., skin irritation, allergic effects are possible, cells/mL)	20,000–100,000	
	Moderate probability of adverse health effects (i.e., long term illness from algae toxins is possible, cells/mL)	> 100,000	
	High probability of adverse health effects (i.e., acute poisoning from algal toxins is possible)	Areas where whole body contact or ingestion/aspiration with scums could occur (qualitative observations only)	
Blue-Green Algae Cyanotoxins	Microcystin (µg/L)	≤ 6	
	Cylindrospermopsin (µg/L)	≤ 15	
	Anatoxin-a (µg/L)	≤ 7	

[1] Shallow lakes have a maximum depth less than 15 feet or littoral area greater than 80% of the total lake surface area

µg/L = microgram per liter; mg/L = milligram per liter; cells/mL = cells per milliliter

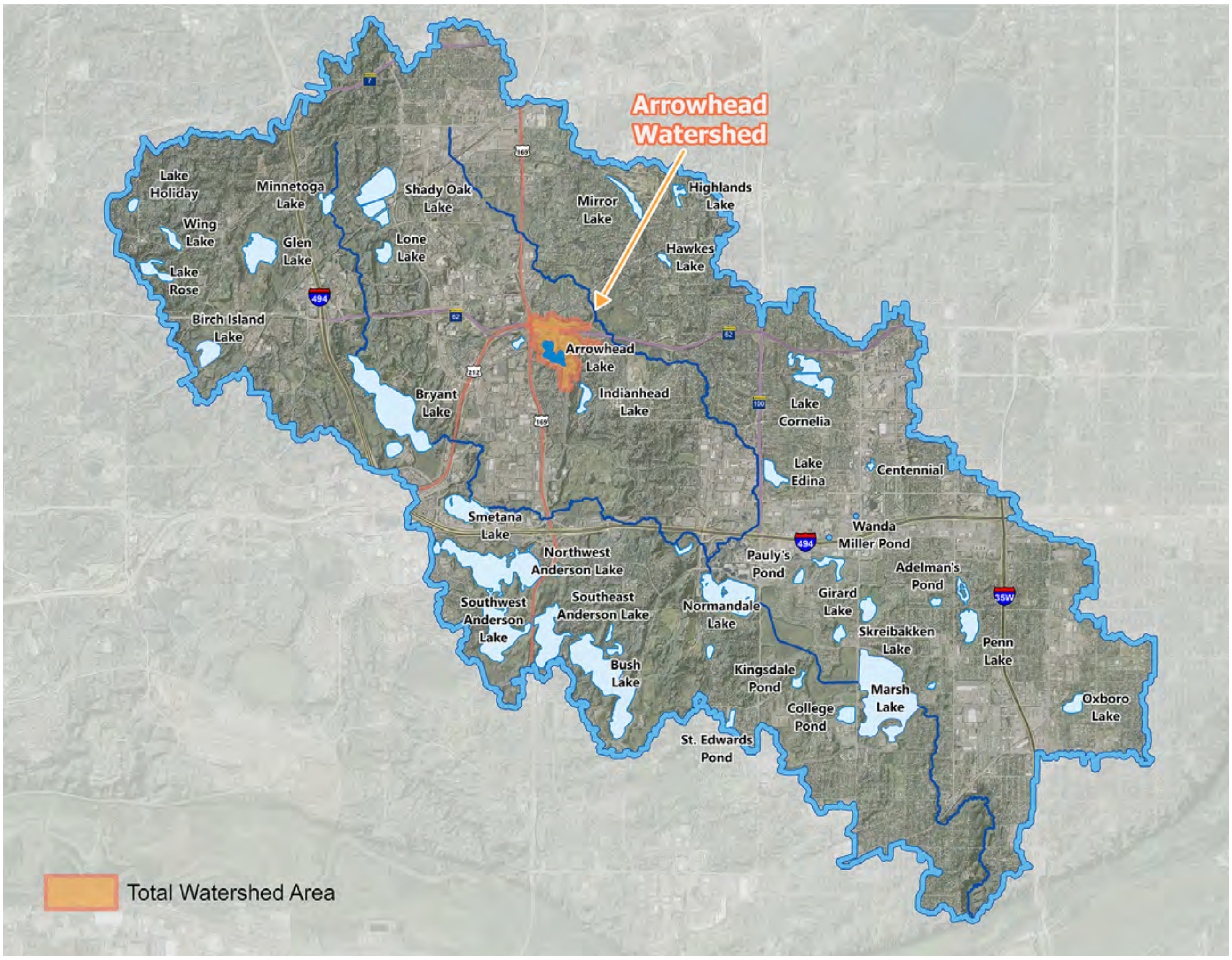
2.3 Arrowhead Lake

2025 MONITORED PARAMETERS

- **Water Quality**

Note: The district can provide water quality monitoring data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Edina
Surface Area	22 acres
Average/Maximum Depth	3.2 feet / 8 feet
Watershed Area	178 acres
Watershed:Surface Area	8:1
Impairment Status	No impairments identified on Minnesota's 2024 impaired waters list
Downstream Waterbody	Landlocked



2.3.1 Water Quality Observations in Arrowhead Lake

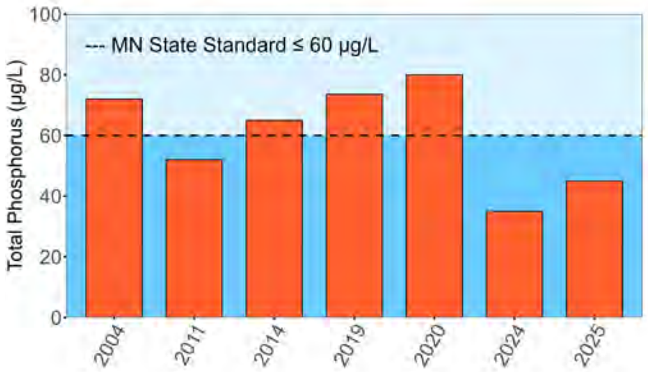
Arrowhead Lake is located in Edina and is used primarily for wildlife viewing. Arrowhead Lake is landlocked with no surface outlet. Thus, the water level in the lake depends on weather conditions (snowmelt, rainfall, evaporation) and groundwater flow.

Arrowhead Lake has a water surface area of approximately 22 acres, a maximum depth of 8 feet, and a mean depth of approximately 3.2 feet. Arrowhead Lake is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

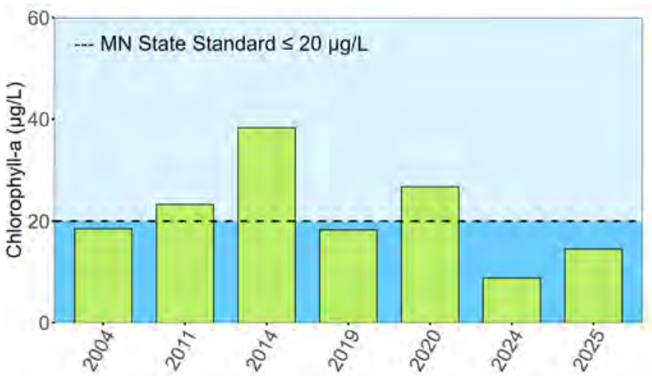
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Arrowhead Lake is not on the Minnesota impaired waters list.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-*a*, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Arrowhead Lake by the NMCWD during 2004, 2011, 2014, 2019, 2020, 2024, and 2025. Monitoring data from 2025 indicate that the management activities completed in 2024 as part of the Arrowhead and Indianhead Lakes Water Quality Improvement Project have resulted in improvements in the lake's water quality. The summer average total phosphorus and chlorophyll-*a* concentrations monitored in 2024 and 2025 were notably lower than concentrations monitored between 2004–2020. While the 2025 Secchi disk transparency measurements were not as high as the year prior, the lake's clarity was noticeably improved over conditions observed in 2019 and 2020. All three eutrophication parameters were better than the respective state standard.

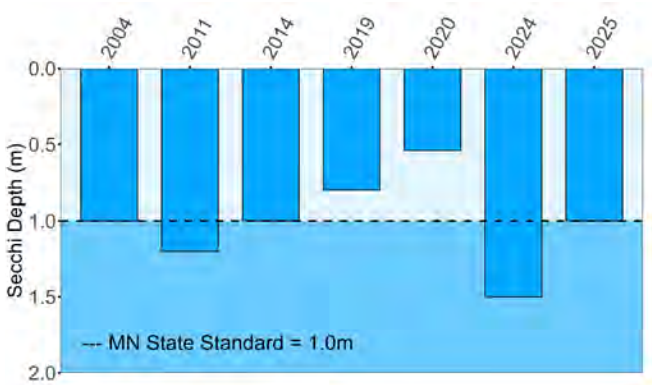
Chloride concentrations were measured by the NMCWD in 2011, 2014, 2019, 2020, 2024, and 2025 (generally between April and September). The chloride concentrations have not exceeded the MPCA chronic standard of 230 mg/L in the historical record. In 2025, chloride concentrations were monitored between April and September. The highest observed concentration was in April 2025 at 122 mg/L. The average chloride concentration between April and September 2025 was 102 mg/L.



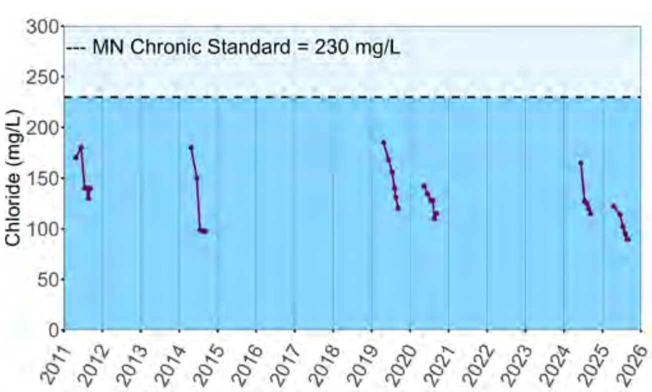
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Arrowhead Lake, the summer average total phosphorus concentrations have been better than the shallow lake state standard in 2011, 2024, and 2025. In 2025 the summer average total phosphorus concentration was 45 µg/L, which is notably lower than the summer average concentrations observed between 2014–2020. Improved phosphorus concentrations in 2025 are likely the result of water quality improvement projects that were implemented in 2024.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Arrowhead Lake, the summer average chlorophyll-*a* concentrations have been better than the shallow lake state standard in 2004, 2019, 2024, and 2025. In 2025 the summer average chlorophyll-*a* concentration was 15 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Arrowhead Lake, the summer average Secchi disk transparency has met or been better than the shallow lake state standard in 2004, 2011, 2014, 2024, and 2025. In 2025 the summer average Secchi disk transparency was 1.0 meter.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Arrowhead Lake, observed chloride concentrations have never exceeded the state chronic criterion standard. In 2025, chloride concentrations were monitored between April and September. The highest observed chloride concentration was 122 mg/L in April 2025. The average chloride concentration between April and September 2025 was 102 mg/L.

2.3.2 Water Quality Management Practices

The district completed a water quality study of Arrowhead Lake in August of 2022 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Arrowhead Lake were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. An overabundance of the aquatic invasive species curly-leaf pondweed was also found to be a water quality concern. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Arrowhead Lake to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study. A few of these practices were already in place before the study, but were identified as being key management efforts for continued improvement of lake health.

Management Practice	Basis	Year Implemented	Lead Agency
Herbicide Treatments	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions	2017–Ongoing	City of Edina
Enhanced Street Sweeping	Reduce pollutant loading from stormwater runoff	2023–Ongoing	City of Edina
Alum + Iron Treatment	Reduce internal sediment phosphorus load	2024	NMCWD
Modifications to Aeration System	Improve oxygen conditions to reduce internal loading and improve fisheries health	2024–Ongoing (system operating in fall 2024)	NMCWD & City of Edina
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	Ongoing	NMCWD

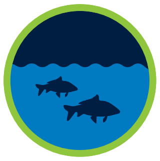
Aeration System Improvements

Alum + Iron Treatment

2.4 Bush Lake

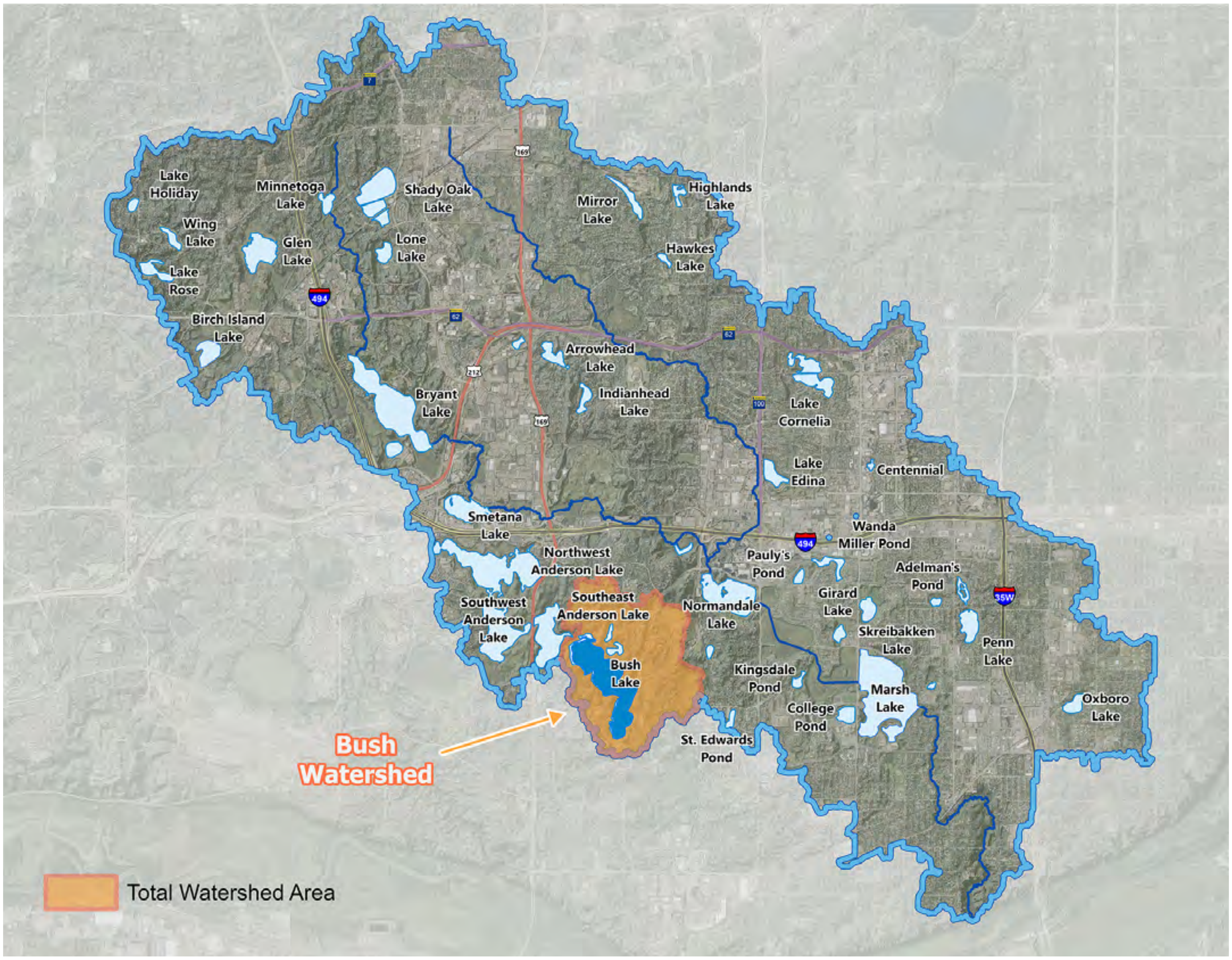
2025 MONITORED PARAMETERS

- **Aquatic Plants (Macrophytes)**
- **Fisheries**



Note: The district can provide aquatic plant survey and fisheries monitoring data upon request.

Parameter	Description
Shallow/Deep	Deep
Location	Bloomington
Surface Area	179 acres (at 832.0 ft, NGVD29)
Average/Maximum Depth	11 feet / 24 feet (at 832.0 ft, NGVD29)
Watershed Area	1,192 acres
Watershed:Surface Area	7:1
Impairment Status	Impaired for mercury in fish tissue since 1998
Downstream Waterbody	Southeast Anderson Lake



2.4.1 Aquatic Plant Observations in Bush Lake

A healthy, urban, deep lake will have an abundance of aquatic plants growing throughout the lake's littoral zone (<15 feet). Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

The district conducted point intercept plant surveys of Bush Lake in June and August of 2025 to assess the health of the plant community. The following page provides a list of the plant species observed in 2025, their percent occurrence in June and August, and the locations native plants were found during the August survey. Graphs also summarize the historical plant IBI scores between 1991 and 2025, tracking how the plant health conditions have changed over time.

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined)		97%	93%
Number of littoral points with plants			
Submerged Plants			
Potamogeton zosteriformis	Flat-stem pondweed	54%	46%
Myriophyllum spicatum	**Eurasian water milfoil**	**50%**	**53%**
Ceratophyllum demersum	Coontail	43%	49%
Potamogeton crispus	**Curly-leaf pondweed**	**33%**	0%
Potamogeton amplifolius	Large-leaf pondweed	23%	23%
Najas guadalupensis	Southern naiad	20%	13%
Potamogeton pusillus	Small pondweed	20%	2%
Potamogeton friesii	Fries' pondweed	13%	0%
Chara sp.	Muskgrass	6%	3%
Ranunculus aquatilis	White water crowfoot	6%	4%
Utricularia vulgaris	Common bladderwort	6%	6%
Elodea canadensis	Common waterweed	5%	5%
Heteranthera dubia	Water star-grass	5%	6%
Potamogeton robbinsii	Fern pondweed	5%	6%
Vallisneria americana	Wild celery	2%	5%
Myriophyllum sibiricum	Northern water-milfoil	2%	0%
Najas flexilis	Slender naiad	2%	5%
Potamogeton richardsonii	Clasping-leaf pondweed	2%	1%
Stuckenia pectinata	Sago pondweed	2%	1%
Potamogeton illinoensis	Illinois pondweed	1%	0%
Potamogeton nodosus	Long-leaf pondweed	1%	4%
Potamogeton foliosus	Leafy pondweed	Visual only	0%
Floating/Emergent Plants			
Nymphaea odorata	White water lily	20%	22%
Brasenia schreberi	Watershield	5%	5%
Eleocharis erythropoda	Bald spikerush	2%	2%
Lemna minor	Small duckweed	2%	2%
Schoenoplectus tabernaemontani	Softstem bulrush	2%	1%
Spirodela polyrhiza	Large duckweed	2%	0%
Typha angustifolia	**Narrow-leaved cattail**	**2%**	**2%**
Filamentous Algae	Filamentous algae	2%	1%
Eleocharis acicularis	Needle spikerush	1%	1%
Juncus effusus	Common rush	1%	0%
Lemna trisulca	Forked duckweed	1%	1%
Phalaris arundinacea	**Reed canary grass**	**1%**	**Visual only**
Sagittaria calycina	Hooded arrowhead	1%	2%

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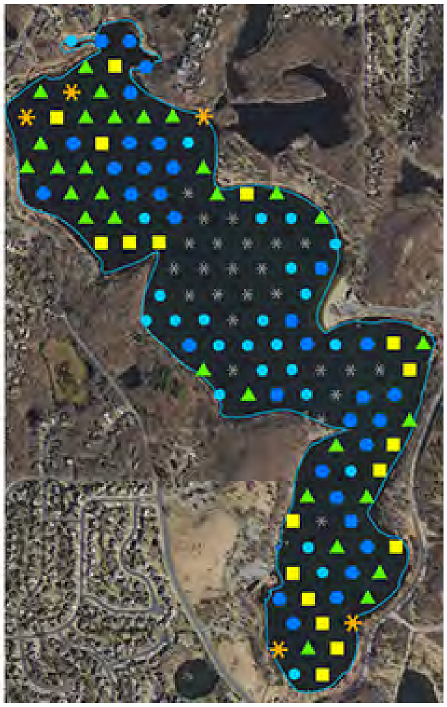
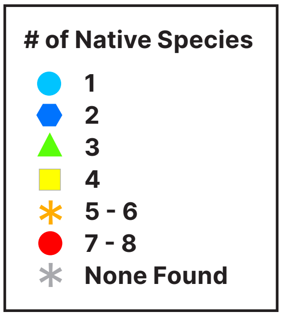


Number of native plant species observed at each observation point in Bush Lake in August 2025.

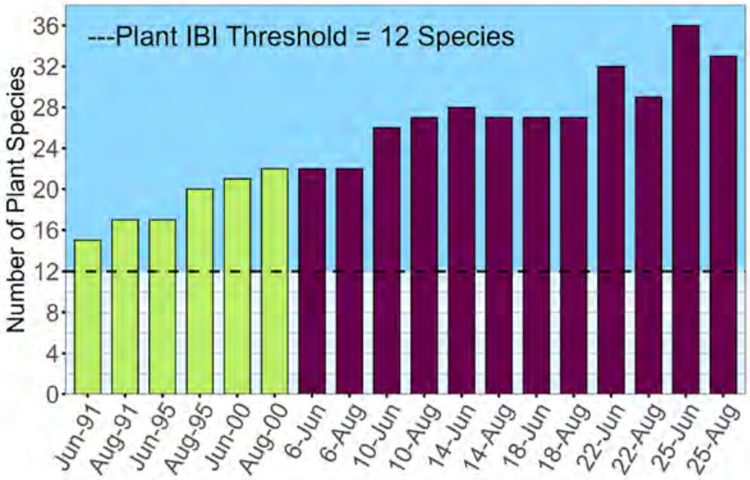


AIS are shown in **bold**, including Eurasian watermilfoil, curly-leaf pondweed, narrow-leaved cattail, reed canary grass, common reed, and purple loosestrife.

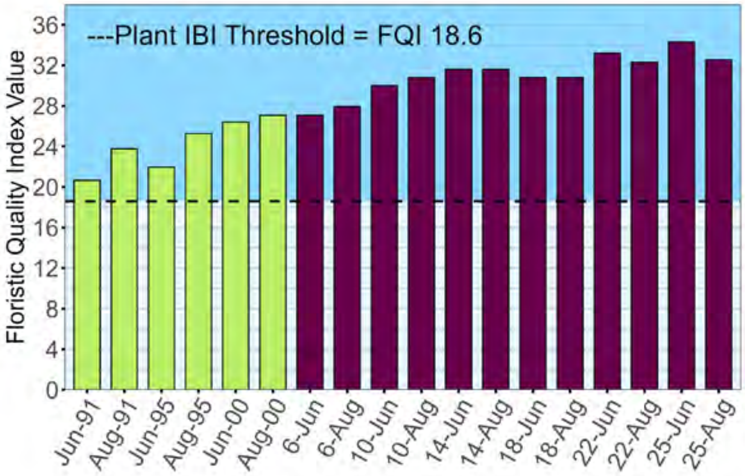
Table continued from previous page

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
Floating/Emergent Plants			
Sagittaria cristata	Crested arrowhead	1%	Visual only
Wolffia columbiana	Common watermeal	1%	4%
Carex comosa	Bottlebrush sedge	Visual Only	1%
Nelumbo lutea	American lotus	Visual Only	Visual only
Phragmites australis	**Common reed**	**Visual Only**	**Visual Only**
Schoenoplectus acutus	Hardstem bulrush	0%	1%
Sagittaria rigida	Sessile-fruited arrowhead	0%	2%
Sagittaria latifolia	Common arrowhead	0%	1%
Lythrum salicaria	**Purple loosestrife**	**0%**	**Visual only**
Scirpus cyperinus	Woolgrass	0%	Visual only
Typha latifolia	Broad-leaved cattail	0%	Visual only
Schoenoplectus pungens	Three-square bulrush	0%	Visual only

Hooded Arrowhead, a state threatened species, observed in Bush Lake in August 2025.



Number of species: A deep lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 12 species. Since monitoring began in 1991, the number of plant species observed in Bush Lake has exceeded the MNDNR Plant IBI threshold. The number of species observed in June 2025 was the highest on record. A total of 36 species, either submerged, floating, or emergent, were observed on the rake in the June survey.



Floristic Quality Index (FQI) values (quality of species): A deep lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 18.6. Since monitoring began in 1991, the FQI observed in Bush Lake has exceeded the MNDNR Plant IBI threshold. The floristic quality observed in June 2025 was the highest on record at 34.3.

Note: purple bars indicate period following spring herbicide treatments completed by the United States Army Corps of Engineers between 2003-2007 to reduce EWM prevalence.

Aquatic Invasive Plant Species

Six aquatic invasive plant species were found in Bush Lake in 2025.

Eurasian watermilfoil (EWM) (*Myriophyllum spicatum*)

Eurasian watermilfoil was widespread throughout the lake in 2025. Eurasian watermilfoil was collected on the rake at 61 locations (50% occurrence) and visually observed at 8 locations in June. On a scale of 1 (low) to 3 (high), the average rake density was 1.6 during the June survey. Eurasian watermilfoil was collected on the rake at 66 locations (53% occurrence) and visually observed at 14 locations in August with an average rake density of 1.7.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

Curly-leaf pondweed was widespread throughout the lake in 2025. Curly-leaf pondweed was collected on the rake at 40 locations (33% occurrence) and visually observed at 3 locations in June. On a scale of 1 (low) to 3 (high), the average rake density was 1.5 during the June survey. During the August survey, curly-leaf pondweed was not observed. Low or no occurrence in August is typical for the plant's growth cycle.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife was observed at one location along the western shoreline in August. Most purple loosestrife plants are managed naturally by Galerucella, a purple loosestrife eating beetle. The beetles control purple loosestrife plants by eating the plants. Because they are expected to control the purple loosestrife in the lake, no additional management is needed.

Common reed (*Phragmites australis*)

Observed at one location along the northern shoreline in June and August.

Reed canary grass (*Phalaris arundinaceae*)

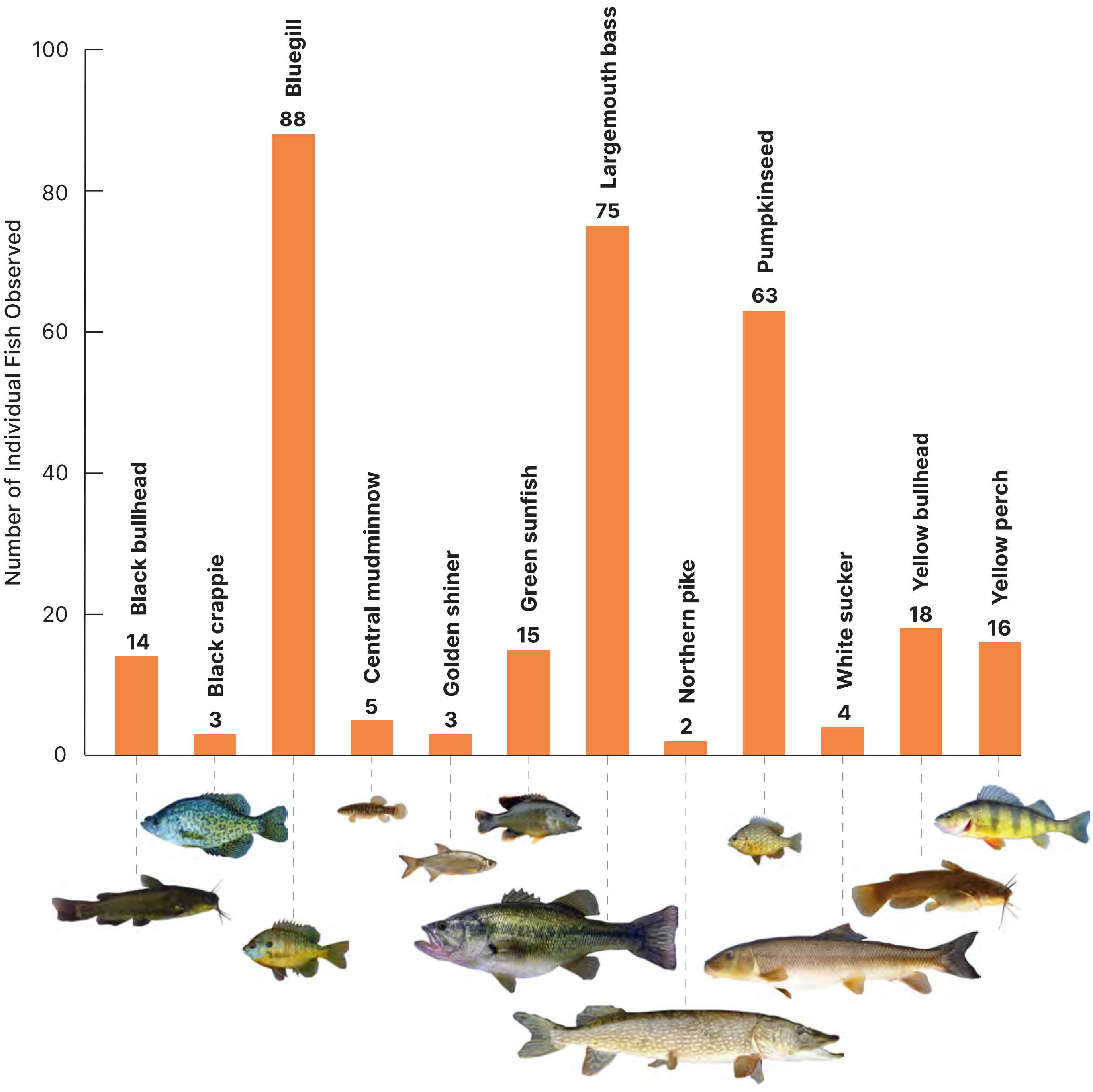
Observed at one location along the western shoreline in June and August. Image source: Endangered Resources Services

Narrow-leaved cattail (*Typha angustifolia*)

Observed at a few locations along the northern and eastern shorelines.

2.4.2 Fisheries Observations in Bush Lake

The NMCWD collects fisheries data periodically to assess the health of the fish community and to evaluate if rough fish populations are impacting lake water quality. NMCWD conducted a fisheries assessment of Bush Lake in summer 2025 using **electrofishing**. Twelve species were observed as shown below. Bluegill, largemouth bass, and pumpkinseed were found at the highest abundances. No carp or goldfish were sampled in the 2025 survey, which are two invasive rough fish species that have caused ecological challenges in other lakes within the NMCWD.



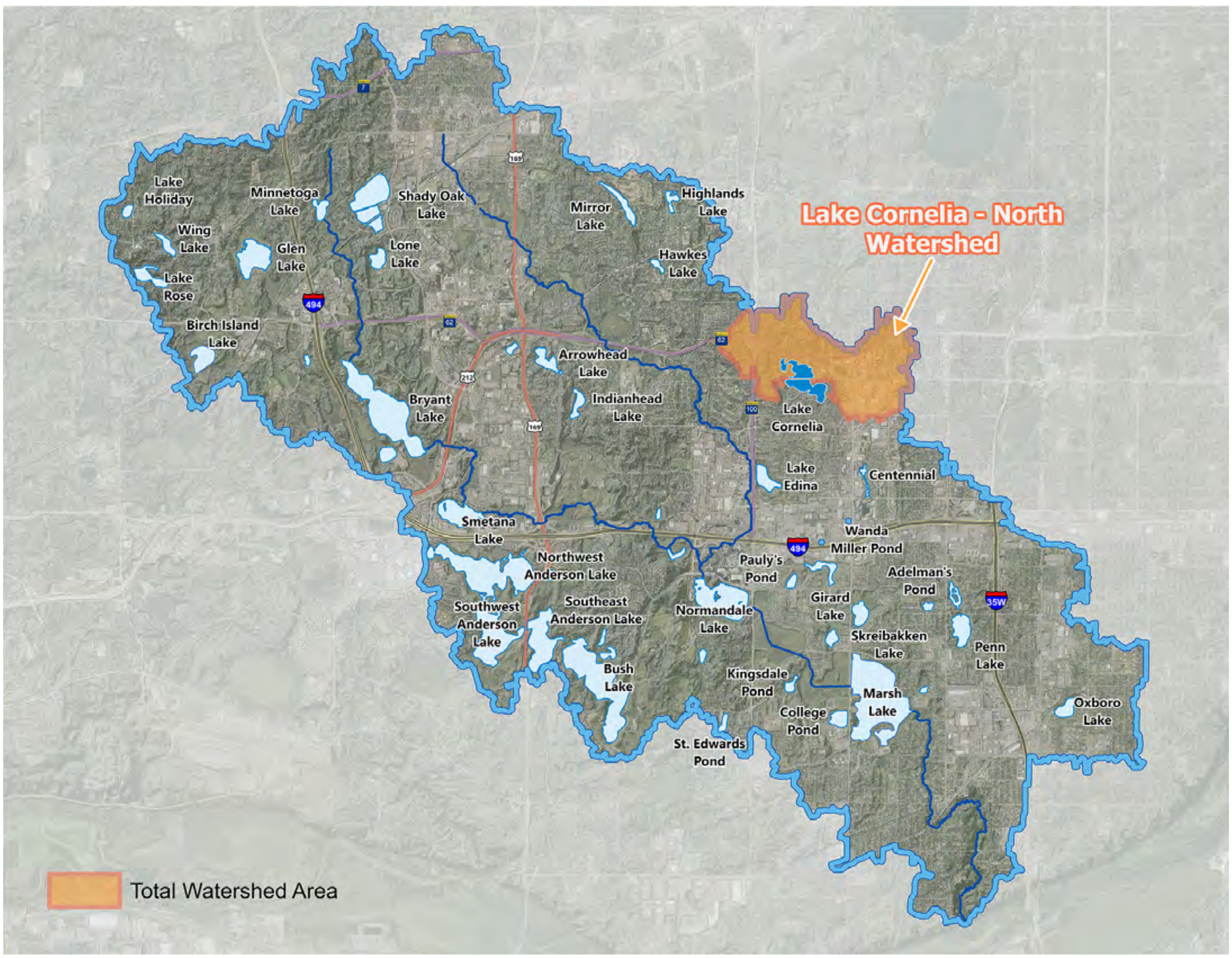
2.5 Lake Cornelia's North Basin

2025 MONITORED PARAMETERS

- **Water Quality**
- **Aquatic Plants (Macrophytes)**
- **Phytoplankton (Algae)**
- **Fisheries**

Note: The district can provide water quality, aquatic plant, phytoplankton, and fisheries monitoring data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Edina
Surface Area	21 acres
Average/Maximum Depth	2.3 feet / 4 feet
Watershed Area	908 acres
Watershed:Surface Area	43:1
Impairment Status	Impaired for nutrients since 2008
Downstream Waterbody	Lake Cornelia's South Basin



2.5.1 Water Quality Observations in Lake Cornelia's North Basin

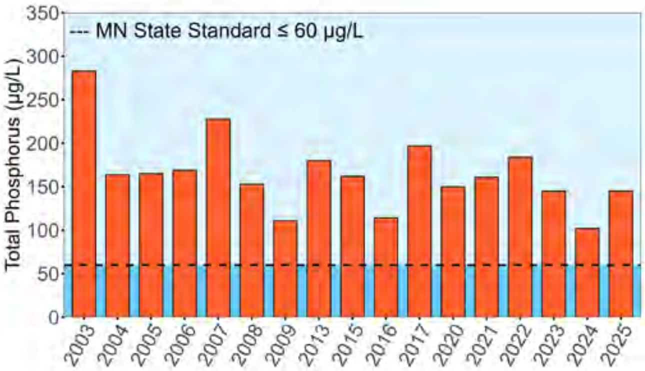
Lake Cornelia is located in the central portion of Edina and is used primarily for fishing and wildlife viewing. Lake Cornelia is comprised of two basins, north and south. The two basins are connected by a small equalizing culvert under 66th Street. The normal water level in both the north and south basins is controlled by the outlet structure in the south basin, which includes a 14 foot long weir structure with a control elevation of 859.1 mean sea level (MSL). Water that discharges from the south basin of Lake Cornelia is conveyed to Lake Edina through an extensive storm sewer network.

Lake Cornelia's North Basin has a water surface area of approximately 21 acres, a maximum depth of 4 feet, and a mean depth of approximately 2.3 feet. The North Basin is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

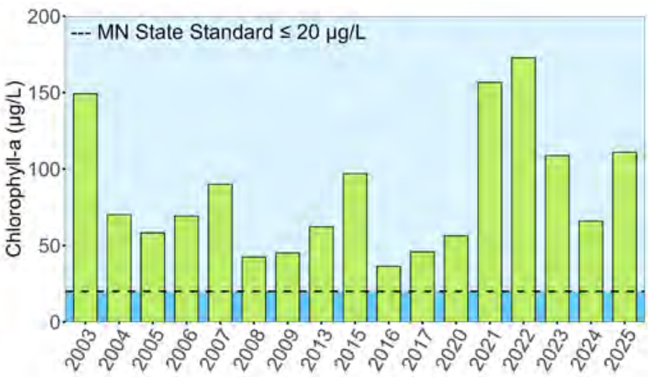
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Lake Cornelia was added to the Minnesota impaired waters list for excess nutrients in 2008.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-a, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Lake Cornelia's North Basin by NMCWD during 2004, 2008, 2013, 2015–2017, and 2020-2025 and by the Metropolitan Council Environmental Services (MCES) Community Assisted Monitoring Program (CAMP) during 2003 and 2005–2009. Poor water quality has been observed in the lake during the entire period of record. All summer average total phosphorus and chlorophyll-*a* concentrations and Secchi disk transparency values, including those monitored in 2025, failed to meet the state standards for shallow lakes in the North Central Hardwood Forest Ecoregion.

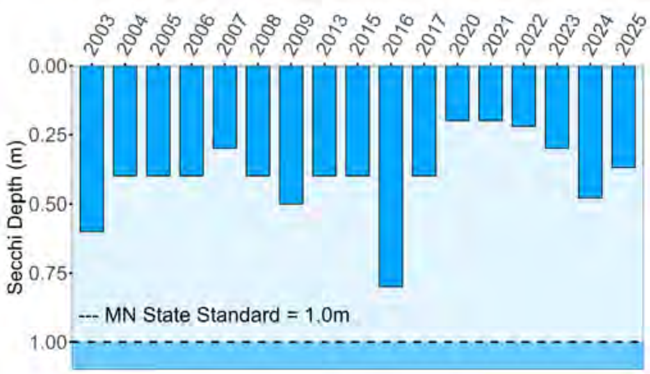
Chloride concentrations were measured by NMCWD in 2013, 2015–2017, and 2020–2025 generally between April and September. For all years with April/May samples, except 2025, the chloride concentrations exceeded the MPCA chronic standard of 230 mg/L. Between 2021 and 2023 chloride concentrations remained above the chronic standard into later months of the summer likely due to the dry climatic conditions and resulting lack of flushing (i.e., low water levels and less water discharging from the lake). In 2025, the chloride concentrations were notably lower than observations in 2021-2023 due to wetter spring and summer climatic conditions. All monitored chloride concentrations between April–September were below the state chronic standard.



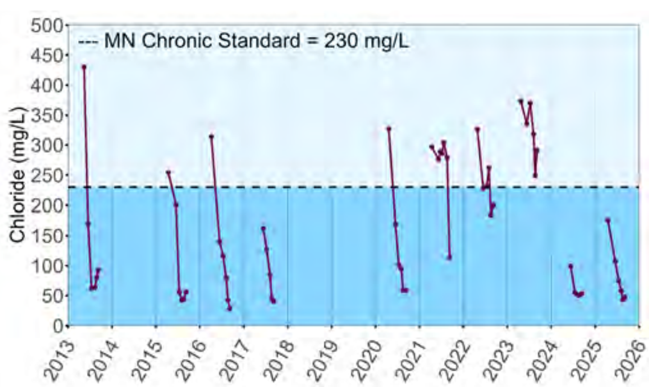
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Lake Cornelia's North Basin, the summer average total phosphorus concentrations have exceeded the shallow lake state standard for all monitored years between 2003–2025. In 2025 the summer average total phosphorus concentration was 145 µg/L.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Lake Cornelia's North Basin, the summer average chlorophyll-*a* concentrations have exceeded the shallow lake state standard for all monitored years between 2003–2025. In 2025 the summer average chlorophyll-*a* concentration was 111 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Lake Cornelia's North Basin, the summer average Secchi disk transparency did not meet the shallow lake state standard for all monitored years between 2003–2025. In 2025 the summer average Secchi disk transparency was 0.4 meters.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Lake Cornelia's North Basin, observed chloride concentrations have exceeded the state chronic criterion standard for portions of the monitored years between 2013–2023. In 2025, chloride concentrations dropped notably from observations in 2022 and 2023, which were particularly dry summers. The highest observed 2025 chloride concentration was in April at 176 mg/L.

2.5.2 Water Quality Management Practices

The district completed a water quality study of Lake Cornelia in July of 2019 to identify water quality and ecological improvement measures. The study concluded that the poor water quality in Lake Cornelia is primarily due to excess phosphorus, which fuels algal production and decreases water clarity. An overabundance of rough fish was also found to be a water quality concern. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Lake Cornelia to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study. A few of these practices were already in place before the study, but were identified as being key management efforts for continued improvement of lake health.

Management Practice	Basis	Year Implemented	Lead Agency
Herbicide Treatments	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions	2017–Ongoing	NMCWD & City of Edina
Enhanced Street Sweeping	Reduce pollutant loading from stormwater runoff	2020–Ongoing	City of Edina
Alum Sediment Treatment	Reduce internal sediment phosphorus load	2020	NMCWD
Rosland Park Stormwater Filtration Vault	Reduce nutrient/pollutant loading from stormwater (following stormwater events) and remove in-lake nutrients/pollutants (during dry weather)	2022–Ongoing (system began operating in July)	NMCWD & City of Edina
Rough Fish Removal	Reduce levels of goldfish to minimize sediment disturbance, reduce sediment phosphorus load, and promote food web balance	2023–Ongoing	NMCWD
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	2011–Ongoing	NMCWD

Alum Treatment

Rosland Park Stormwater Filtration Vault

2.5.3 Aquatic Plant Observations in Lake Cornelia's North Basin

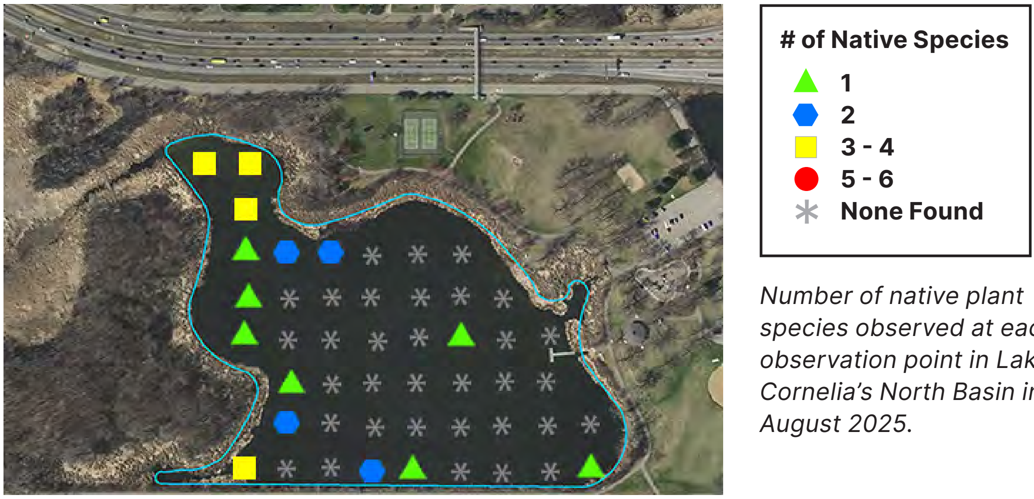
A healthy, shallow, urban lake will have an abundance of aquatic plants growing throughout the entire lake due to the shallowness and higher amounts of nutrients. Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

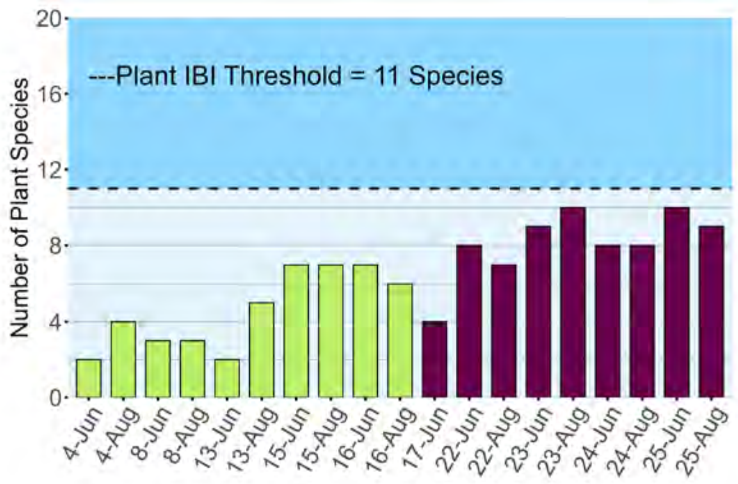
The district conducted point intercept plant surveys of Lake Cornelia's North Basin in June and August of 2025 to assess the health of the plant community. The following page provides a list of the plant species observed in 2025, their percent occurrence in June and August, and the locations native plants were found during the August survey. Graphs also summarize the historical plant IBI scores between 2004 and 2025, tracking how the plant health conditions have changed over time.

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined) Number of littoral points with plants		42%	38%
Submerged Plants			
Ceratophyllum demersum	Coontail	17%	23%
Elodea canadensis	Common waterweed	17%	19%
Potamogeton crispus	**Curly-leaf pondweed**	**15%**	**0%**
Stuckenia pectinata	Sago pondweed	8%	6%
Potamogeton foliosus	Leafy pondweed	4%	0%
Potamogeton nodosus	Long-leaf pondweed	2%	4%
Myriophyllum sibiricum X spicatum	**Hybrid Eurasian water-milfoil**	**Visual only**	**8%**
Floating/Emergent Plants			
Filamentous algae	Filamentous algae	17%	2%
Typha X glauca	**Hybrid cattail**	**2%**	**Visual only**
Carex comosa	Bottlebrush sedge	Visual only	0%
Lemna minor	Small duckweed	Visual only	6%
Lythrum salicaria	**Purple loosestrife**	**Visual only**	**Visual only**
Phalaris arundinacea	**Reed canary grass**	**Visual only**	**Visual only**
Schoenoplectus acutus	Hardstem bulrush	Visual only	Visual only
Spirodela polyrhiza	Large duckweed	Visual only	2%
Sagittaria latifolia	Common arrowhead	0%	Visual only

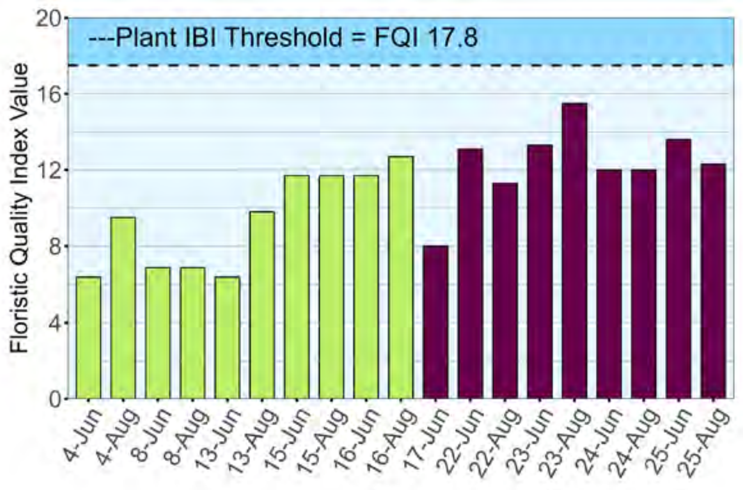
AIS are shown in **bold**, including curly-leaf pondweed, hybrid Eurasian watermilfoil, hybrid cattail, purple loosestrife, and reed canary grass.



Number of native plant species observed at each observation point in Lake Cornelia's North Basin in August 2025.



Number of species: A shallow lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 11 species. Between 2004–2025, the number of species in Lake Cornelia's North Basin ranged from 2 to 10 and failed to meet the MNDNR Plant IBI threshold during the entire period. The number of species observed in 2025 was similar to what was observed in 2023–2024.



Floristic Quality Index (FQI) values (quality of species): A shallow lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 17.8. Between 2004–2025, FQI values in Lake Cornelia's North Basin ranged from 6.4 to 15.5, failing to meet the MNDNR Plant IBI threshold during this entire period. The FQI values observed in 2025 were similar to the values observed in 2024.

Note: purple bars indicate period following significant infestation of curly-leaf pondweed (CLP) and completion of spring herbicide treatments to reduce CLP prevalence.

Aquatic Invasive Plant Species

Five aquatic invasive plant species were found in Lake Cornelia's North Basin in 2025.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

A whole-lake herbicide application was completed on Lake Cornelia in spring 2025 to control the growth of curly-leaf pondweed (CLP). A June 2025 point intercept survey was used to assess the effectiveness of the spring treatment and help determine management needs for 2026. CLP was collected on the rake at 7 locations (15% occurrence) in June. On a scale of 1 (low) to 3 (high), the average rake density was 1.1 during the June survey. During the August survey, CLP was not collected on a rake, which is typical for the plant's growth cycle.

Hybrid watermilfoil (HWM) (Myriophyllum sibiricum X spicatum)

An herbicide application was completed on North Lake Cornelia in fall 2025 to control the growth of hybrid watermilfoil (HWM). Hybrid watermilfoil was only observed at two locations in June. By August the species had spread rapidly and was collected on the rake at four locations (8% occurrence) and visually observed at four additional locations with an average rake density of 2.0.

Purple loosestrife (*Lythrum salicaria*)

Scattered throughout the shoreline in June and August. Purple loosestrife eating beetles, *Galerucella*, typically control expansion naturally.

Reed canary grass (*Phalaris arundinaceae*)

Commonly observed around most developed shoreline areas in both June and August.

Image source: Endangered Resources Services

Hybrid cattail (*Typha X glauca*)

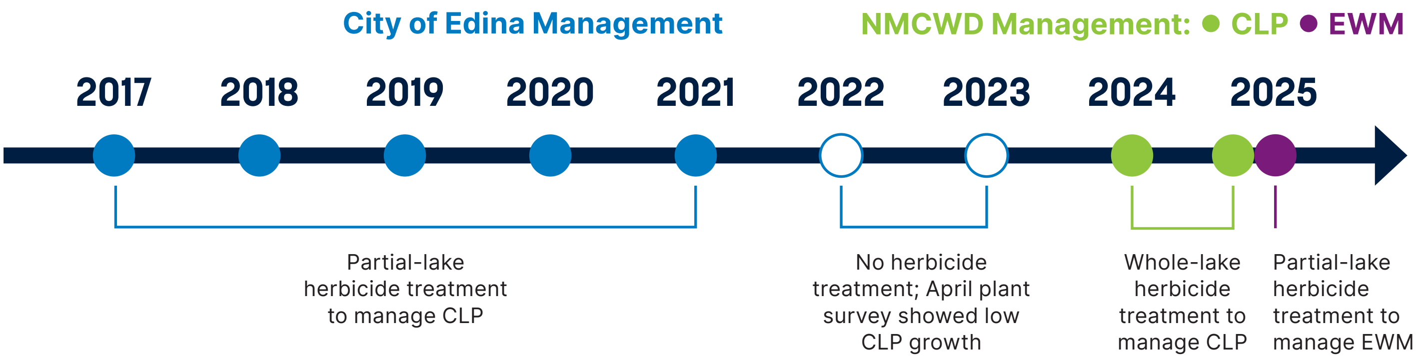
Dominant along the shore of the north basin during June and August.

2.5.4 Aquatic Invasive Species (AIS) Plant Management Practices

Since 2017, the City of Edina or NMCWD have been performing plant surveys in Lake Cornelia's North Basin to document the growth of curly-leaf pondweed (CLP) and have conducted herbicide treatments to manage the invasive species during years with notable growth. The timeline below provides a summary of the management practices completed. The management of CLP in Lake Cornelia has been challenging. Post herbicide treatment surveys have observed small CLP plants regrowing from root masses and from "stick" or "micro" turions, which is atypical as compared to observations in other lakes with similar herbicide management histories.

In April 2024, the NMCWD submitted a lake vegetation management plan (LVMP) to the MNDNR, which was approved and authorized a 5-year variance to perform herbicide treatments on greater than 15% of the littoral area. NMCWD completed whole-lake CLP herbicide treatments in spring 2024 and 2025. CLP management is expected to continue in Lake Cornelia in the coming years.

In fall 2025, established beds of hybrid watermilfoil (HWM) were found in Lake Cornelia's North Basin. As such, the district performed a spot herbicide treatment to limit the spread of this aggressive aquatic invasive species.



Rapid expansion of hybrid watermilfoil occurred between the June and August surveys. Established beds were found near the fishing pier in August.

During an October 2024 turion survey, most turions were of the small "stick" or "micro" varieties, which is an uncommon observation.

During a June 2025 plant survey, CLP plants were found to be maintaining growth despite having severely burned stems post herbicide treatment.

2.5.5 Phytoplankton Observations in Lake Cornelia's North Basin

The phytoplankton community in Lake Cornelia's North Basin was monitored in 2025, including identification and enumeration of the phytoplankton species to help evaluate water quality and the quality of food available to zooplankton. The figure on the next page summarizes the number and major groups of phytoplankton observed in Lake Cornelia's North Basin between April and September 2025. Blue-green algae (cyanobacteria) were the major taxon (or group) observed throughout the monitored period, representing 66%–93% of the phytoplankton community. Green algae, diatoms, golden algae, cryptophytes, and other taxa were also present throughout the monitored period but at notably lower percentages.

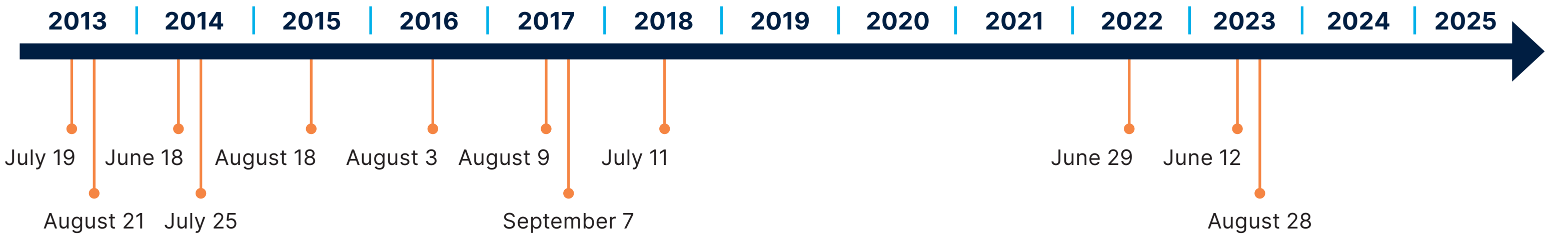
When water is warm and rich in nutrients, cyanobacteria can grow quickly forming blooms. These blooms can be considered harmful since some species can produce cyanotoxins. Human or wildlife exposure to cyanotoxins may cause skin irritations, including rashes, hives, swelling or skin blisters. Ingestion of cyanotoxins can also cause more severe health effects such as liver or kidney damage, seizures, or death, depending on the cyanotoxin and the magnitude, duration and frequency of the exposure. In 2025, blue-green algal blooms were observed in the lake April through September, with more severe blooms observed July through September. Total blue-green algae numbers between April and September ranged from 106,300 cells per milliliter in June to 890,000 cells per milliliter in late August. All observed blue-green algae counts in 2025 were above the WHO threshold of 100,000 cells per milliliter, indicating a moderate probability of adverse health effects to recreational users. Through a partnership with the Minnesota Department of Health (MDH), it was confirmed that microcystin concentrations sampled at the routine monitoring location and/or within scums located in the North Basin exceeded the MPCA's recreational threshold of 6 µg/L during six monitoring events between June and October 2025. Microcystin is a liver toxin, and the level of damage is dependent on the amount ingested and length of exposure. When in doubt, it is best to stay out. Although there can be many causes of blue-green algal blooms, the high total phosphorus concentrations and hot summer conditions likely contributed to the growth and persistence of the blue-green algal population throughout the summer months.

Phytoplankton

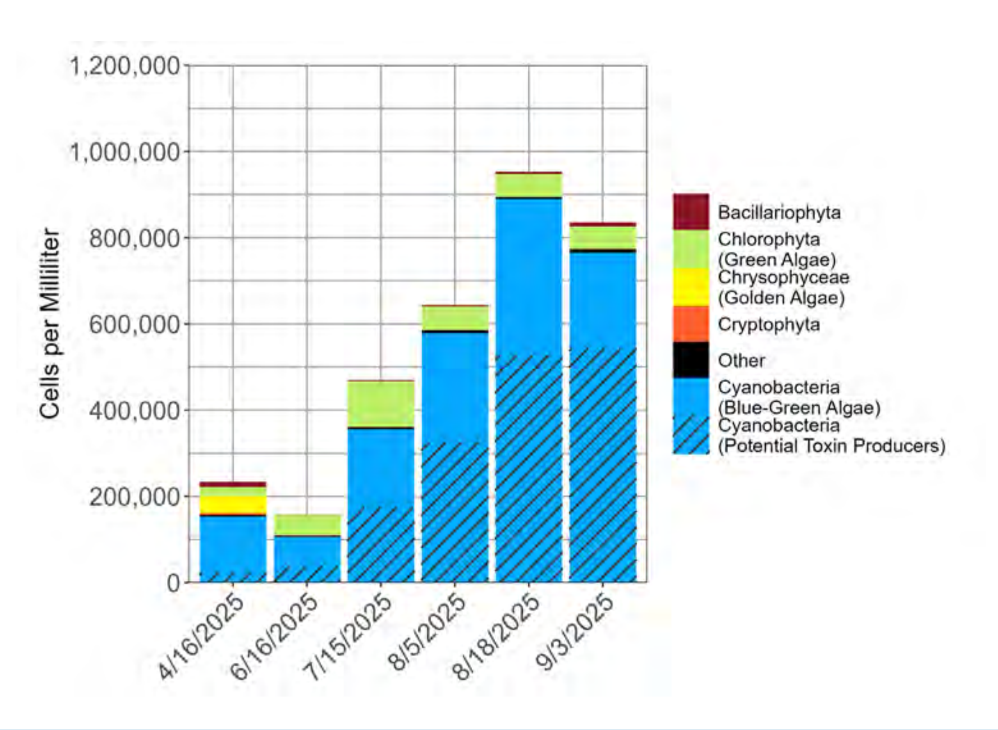
Phytoplankton, or algae, are microscopic organisms that are suspended or floating in the water column. Phytoplankton can be single cell, filamentous, or community-based organisms. They derive energy from the sun through photosynthesis and provide food for several types of aquatic organisms, including zooplankton, which are in turn eaten by fish. Zooplankton prefer to eat phytoplankton species that have higher nutritional quality, are easily edible, and are non- toxic. Freshwater zooplankton typically prefer certain species of cryptophytes, green algae, and haptophytes. Blue-green algae and diatoms are less desirable. An inadequate phytoplankton population limits a lake's zooplankton population and indirectly limits fish production in a lake. However, excess phytoplankton from high amounts of nutrients can reduce water clarity, impact aquatic plant growth, and possibly cause human health concerns.

Cyanobacteria (blue-green algae) scum observed in October 2025 in Lake Cornelia's North Basin

Over the past decade, blue-green algae have historically been a concern in Lake Cornelia's North Basin with observed cell counts well above the WHO thresholds for low or moderate probability of adverse health effects to recreational users on multiple occasions. Due to the high abundance of algae, the City of Edina started treating Lake Cornelia with copper sulfate in 2013 to control algal growth. As such, the reported phytoplankton counts during 2013–2018 and 2022–2023 were impacted by algaecide treatments. The timeline below shows the approximate dates of the algal treatment efforts based on past records.

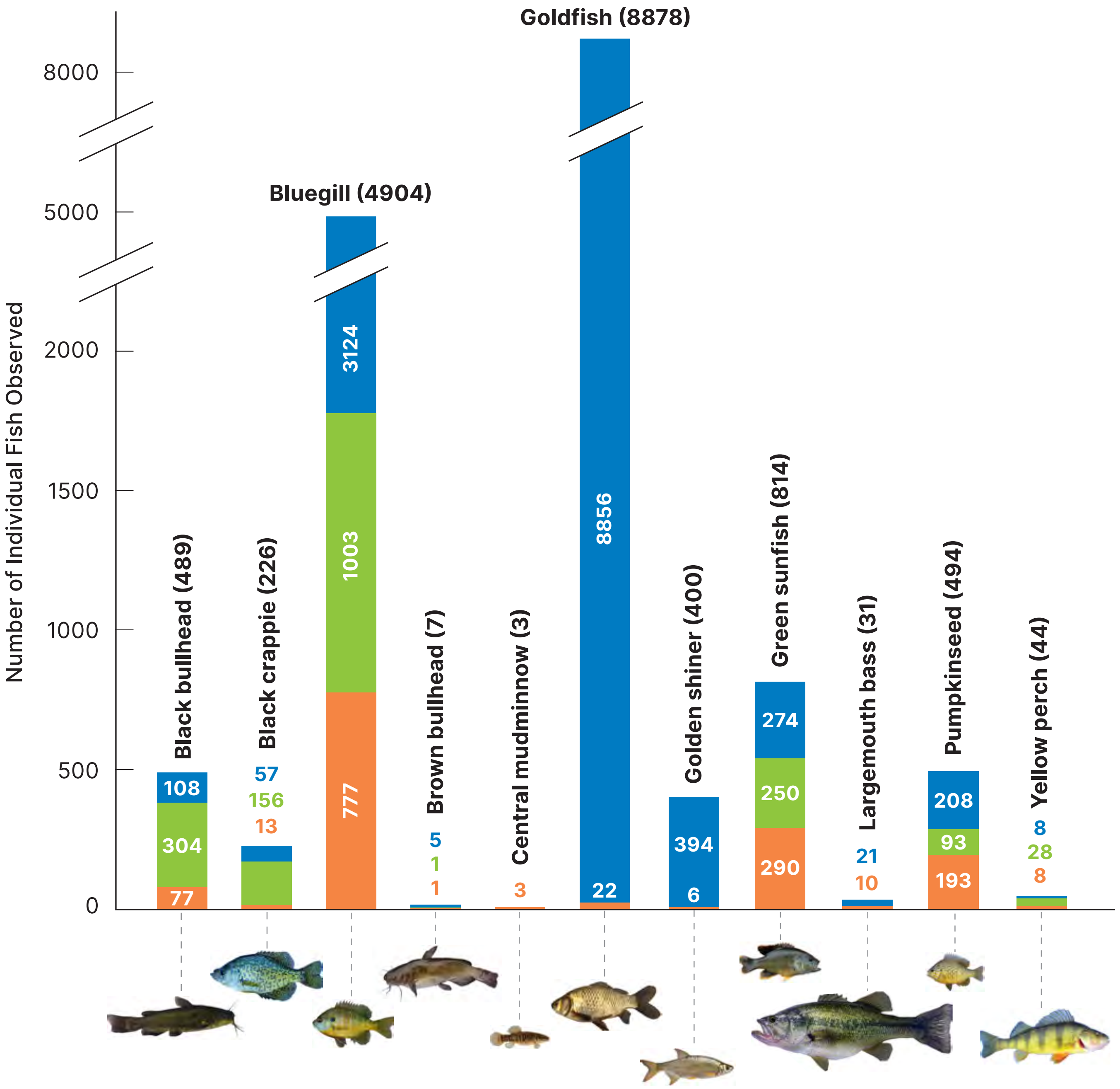


Between April and September 2025 the NMCWD collected phytoplankton (algae) samples for enumeration and identification. The figure to the right summarizes the number and major groups of phytoplankton observed. Blue-green algae (cyanobacteria) were the most abundant taxon (or group) found in the Lake Cornelia's North Basin throughout the monitored period. Blue-green algae numbers in 2025 ranged from approximately 106,000 cells per milliliter in June to approximately 890,000 cells per milliliter in late August. Potential toxin producing species ranged from approximately 22,100 cells per milliliter in April to 542,000 cells per milliliter in early September.



2.5.6 Fisheries Observations in Lake Cornelia's North Basin

The NMCWD collects fisheries data periodically to assess the health of the fish community and to evaluate if rough fish populations are impacting lake water quality. NMCWD conducted a fisheries assessment of Lake Cornelia's North Basin in summer 2025 using **electrofishing, trap nets, and box nets**. Twelve species were observed in the north basin as shown below. The invasive rough fish species, goldfish, was found at the highest abundance of all fish species in the north basin. The most abundant native fish species included bluegill, green sunfish, and black bullheads. The next page discusses the management practices completed by the NMCWD to help manage the goldfish population in Lake Cornelia.



2.5.6.1 Fisheries Management

The water quality study completed by the district in 2019 identified goldfish and carp at biovolumes large enough to warrant further assessment as these rough fish species can have negative effects on lake water quality. The *Goldfish Population and Management Feasibility Study in the Lake Cornelia System* was completed by WSB from 2021–2022 to determine the environmental conditions that drive goldfish movements to upstream waterbodies, to assess the goldfish population, and to test multiple goldfish removal/management methods. The study concluded that goldfish are likely spawning within their resident lakes near cattail and bullrush fringes rather than in upstream waterbodies and determined that small-mesh baited box nets were effective at removing goldfish (WSB, 2022). Following these conclusions, goldfish removal efforts were expanded between 2023–2025. In 2025, two box net traps were deployed and lifted on 20 occasions in the North Basin. From these box net traps, in total, 1,700 pounds or approximately 8,900 individual goldfish were removed from the North Basin. Between 2023–2025 over 61,400 individual goldfish have been removed from the North Basin. Additionally, field staff noticed evidence of natural recruitment of native species, including largemouth bass. The district plans to continue box netting efforts in 2026.

District staff assist with goldfish removal efforts on Lake Cornelia's North Basin in July 2025

During goldfish removal efforts, numerous native fish species were also observed and returned to the lake.

2.5.7 Summary for Lake Cornelia's North Basin

Water quality of Lake Cornelia's North Basin was poor in 2025 and the lake failed to meet state eutrophication water quality standards for shallow lakes due to excess phosphorus and algae in the lake and poor water clarity. All monitored chloride concentrations between April and September in 2025 were below the MPCA chronic criteria.

Both the number of aquatic plant species in the lake and FQI values in 2025 failed to meet the MNDNR Plant IBI thresholds. The values were similar to observations in the last two years.

Five invasive aquatic plant species were observed in the Lake Cornelia's North Basin in 2025 including the submerged species curly-leaf pondweed and hybrid watermilfoil, and the emergent species hybrid cattail, purple loosestrife, and reed canary grass. The City of Edina conducted spring plant surveys and herbicide treatments from 2017 to 2021 within the North Basin to reduce the presence of curly-leaf pondweed. The NMCWD completed a whole-lake herbicide treatments in spring 2024 and 2025 to reduce the presence of curly-leaf pondweed. CLP management is expected to continue in Lake Cornelia in the coming years. In fall 2025, the district also performed a spot herbicide treatment on Lake Cornelia's North Basin to manage the growth of hybrid watermilfoil to limit the spread of this aggressive aquatic invasive species.

In 2025, blue-green algal blooms were observed in the lake between April through October, with blue-green counts well above the World Health Organization (WHO) threshold of 100,000 per milliliter for a moderate probability of adverse health effects to recreational users for the entire monitored period. Although there can be many causes of blue-green algal blooms, the high total phosphorus concentrations and hot summer conditions likely contributed to the growth and persistence of the blue-green algal population throughout the monitored period.

A fisheries assessment was completed in both basins of Lake Cornelia in summer 2025. Twelve species were observed in the north basin. The native fish species bluegill, green sunfish, and black bullheads were found at the highest abundances. Goldfish, an invasive rough fish species, was found at the highest abundance of all fish species in the north basin.

The district completed a water quality study of Lake Cornelia in July of 2019 to identify water quality and ecological improvement measures. The study concluded that the poor water quality in Lake Cornelia is primarily due to excess phosphorus, which fuels algal production and decreases water clarity. An overabundance of rough fish was also found to be a water quality concern. Several management practices have been implemented since the water quality study was completed, including an alum sediment treatment, the installation of the Rosland Park Stormwater Filtration Vault, rough fish removals, and continued implementation of the NMCWD cost-share grant program.

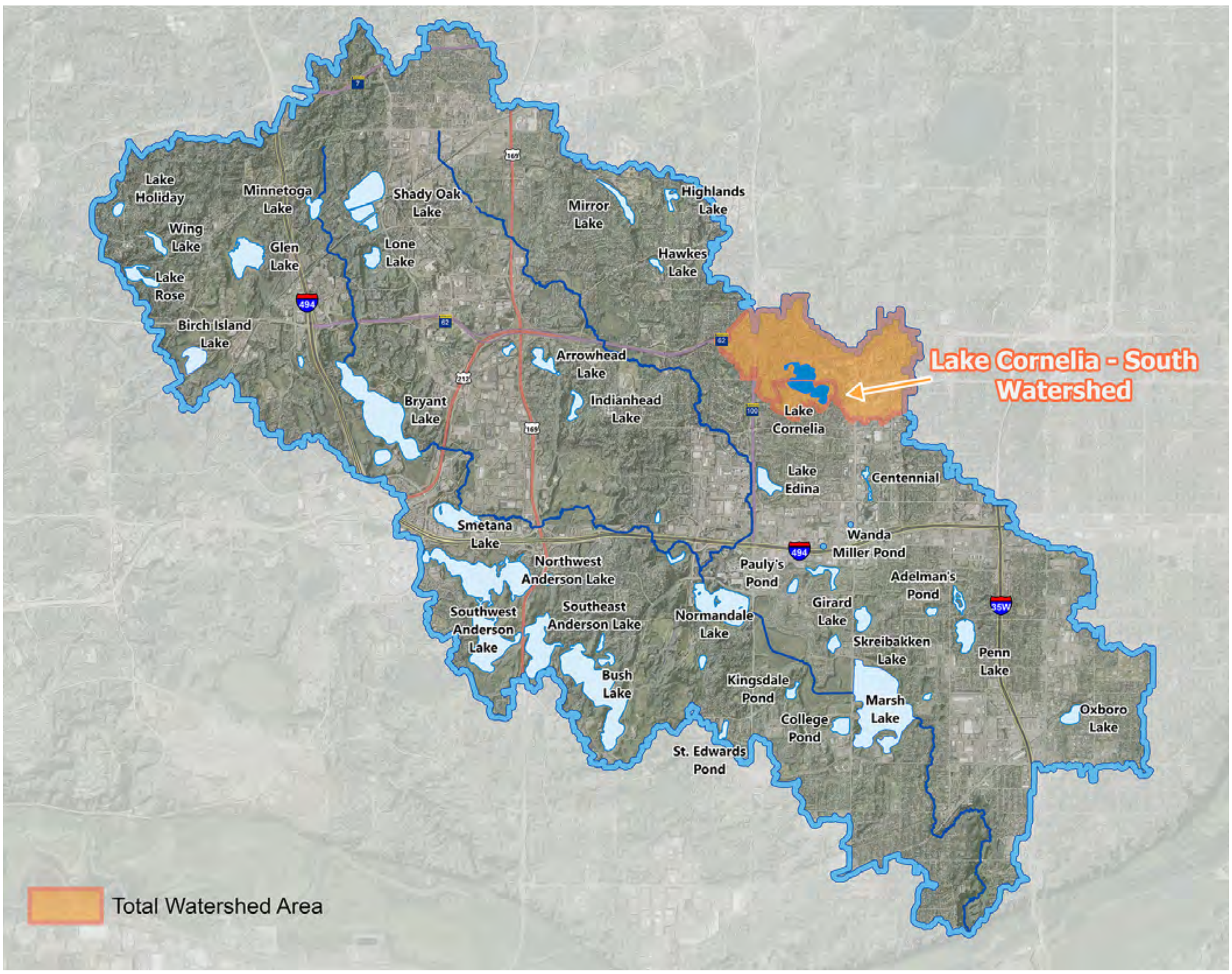
2.6 Lake Cornelia's South Basin

2025 MONITORED PARAMETERS

- **Water Quality**
- **Aquatic Plants (Macrophytes)**
- **Phytoplankton (Algae)**
- **Fisheries**

Note: The district can provide water quality, aquatic plant, phytoplankton, and fisheries monitoring data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Edina
Surface Area	33 acres
Average/Maximum Depth	3.6 feet / 5 feet
Direct Watershed Area	112 acres
Total Watershed Area	1,020 acres
Watershed:Surface Area	31:1
Impairment Status	Impaired for nutrients since 2008
Upstream Waterbody	Lake Cornelia's North Basin
Downstream Waterbody	Lake Edina



2.6.1 Water Quality Observations in Lake Cornelia's South Basin

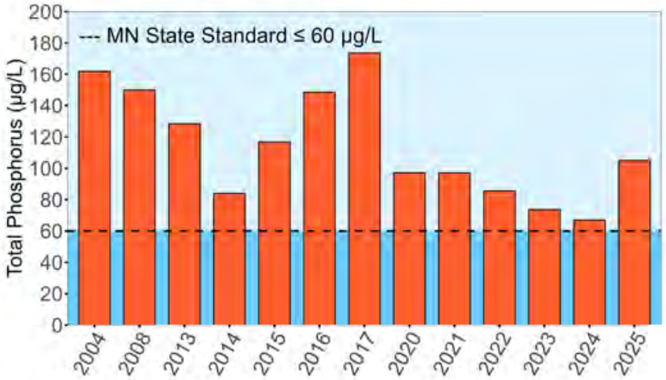
Lake Cornelia is located in the north central portion of Edina and is used primarily for fishing and wildlife viewing. Lake Cornelia is comprised of two basins, north and south. The two basins are connected by a small equalizing culvert under 66th Street. The normal water level in both the north and south basins is controlled by the outlet structure in the south basin, which includes a 14 foot long weir structure with a control elevation of 859.1 mean sea level (MSL). Water that discharges from the south basin of Lake Cornelia is conveyed to Lake Edina through an extensive storm sewer network.

Lake Cornelia's South Basin has a water surface area of approximately 33 acres, a maximum depth of 5 feet, and a mean depth of approximately 3.6 feet. The South Basin is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

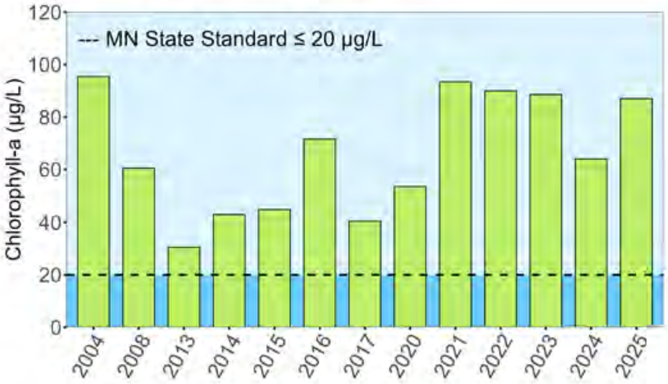
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Lake Cornelia was added to the Minnesota impaired waters list for excess nutrients in 2008.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-*a*, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Lake Cornelia's South Basin by NMCWD during 2004, 2008, 2013, 2015-2017, and 2020-2025. Poor water quality has been observed in the lake during the entire period of record. All summer average total phosphorus and chlorophyll-*a* concentrations and Secchi disk transparency values, including the 2025 values, failed to meet the state standards for shallow lakes in the North Central Hardwood Forest Ecoregion.

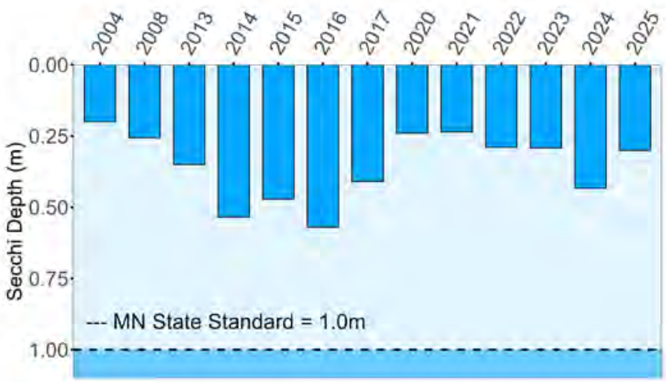
Chloride concentrations were measured by NMCWD in 2013, 2015-2017, and 2020-2025 generally between April and September. Observed chloride concentrations have exceeded the MPCA chronic standard of 230 mg/L for portions of the monitored years in 2013, 2021, 2022, and 2023. Between 2021 and 2023 chloride concentrations remained above the chronic standard into later months of the summer likely due to the dry climatic conditions and resulting lack of flushing (i.e., low water levels and less water discharging from the lake). However, in 2024 and 2025, the chloride concentrations dropped notably due to wetter spring and summer climatic conditions. All 2025 monitored chloride concentrations between April–September were below the state chronic standard.



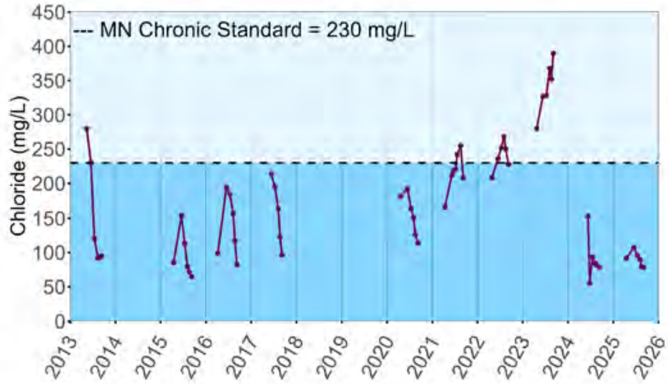
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Lake Cornelia's South Basin, the summer average total phosphorus concentrations have exceeded the shallow lake state standard for all monitored years between 2004–2025. In 2025 the summer average total phosphorus concentration was 105 µg/L.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Lake Cornelia's South Basin, the summer average chlorophyll-*a* concentrations have exceeded the shallow lake state standard for all monitored years between 2004–2025. In 2025 the summer average chlorophyll-*a* concentration was 87 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Lake Cornelia's South Basin, the summer average Secchi disk transparency has not met the shallow lake state standard for all monitored years between 2004–2025. In 2025 the summer average Secchi disk transparency was 0.3 meters.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Lake Cornelia's South Basin, observed chloride concentrations have exceeded the state chronic criterion standard for portions of the monitored years in 2013, 2021, 2022 and 2023. In 2025, chloride concentrations remained similar to observations in 2024. A wet spring and summer in 2025 provided opportunities for increased lake levels and flushing. The highest observed concentration was in June 2025 at 107 mg/L.

2.6.2 Water Quality Management Practices

The district completed a water quality study of Lake Cornelia in July of 2019 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Lake Cornelia were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. An overabundance of rough fish was also found to be a water quality concern. The NMCWD and its partners implemented management practices to reduce nutrients and other pollutants entering Lake Cornelia to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study. A few of these practices were already in place before the study, but were identified as being key management efforts for continued improvement of lake health.

Management Practice	Basis	Year Implemented	Lead Agency
Herbicide Treatments	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions.	2017–Ongoing	NMCWD & City of Edina
Enhanced Street Sweeping	Reduce pollutant loading from stormwater runoff	2020–Ongoing	City of Edina
Alum Sediment Treatment	Reduce internal sediment phosphorus load	2020	NMCWD
Rosland Park Stormwater Filtration Vault	Reduce nutrient/pollutant loading from stormwater (following precipitation events) and remove in-lake nutrients/pollutants (during dry weather)	2022–Ongoing (system began operating in July)	NMCWD & City of Edina
Rough Fish Removal	Reduce levels of goldfish and carp to reduce sediment disturbance, reduce sediment phosphorus load, and promote food web balance	2023–Ongoing	NMCWD
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	2019–Ongoing	NMCWD

Alum Treatment

Rosland Park Stormwater Filtration Vault

2.6.3 Aquatic Plant Observations in Lake Cornelia's South Basin

A healthy, shallow, urban lake will have an abundance of aquatic plants growing throughout the entire lake due to the shallowness and higher amounts of nutrients. Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

The district conducted point intercept plant surveys of Lake Cornelia's South Basin in June and August of 2025 to assess the health of the plant community. The following page provides a list of the plant species observed in 2025, their percent occurrence in June and August, and the locations native plants were found during the August survey. Graphs also summarize the historical plant IBI scores between 2004 and 2025, tracking how the plant health conditions have changed over time.

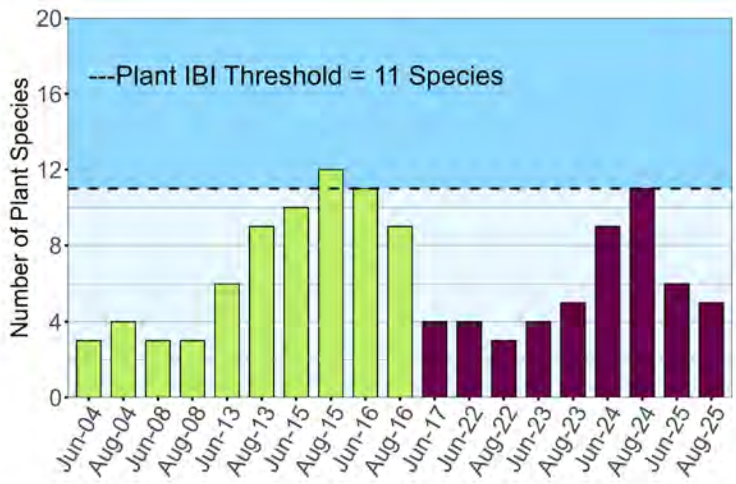
Long-leaf pondweed observed in Lake Cornelia's South Basin

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined) Number of littoral points with plants		13%	6%
Submerged Plants			
Elodea canadensis	Common waterweed	14%	6%
Potamogeton nodosus	Long-leaf pondweed	2%	4%
Floating/Emergent Plants			
Filamentous algae	Filamentous algae	5%	0%
Iris virginica	Southern blue flag	Visual only	Visual only
Lemna minor	Small duckweed	Visual only	0%
Lythrum salicaria	**Purple loosestrife**	**Visual only**	**Visual only**
Phalaris arundinacea	**Reed canary grass**	**Visual only**	**Visual only**
Schoenoplectus acutus	Hardstem bulrush	Visual only	Visual only
Schoenoplectus tabernaemontani	Softstem bulrush	Visual only	Visual only
Spirodela polyrhiza	Large duckweed	Visual only	0%
Typha X glauca	**Hybrid cattail**	**Visual only**	**Visual only**
Sparganium eurycarpum	Common bur-reed	0%	Visual only

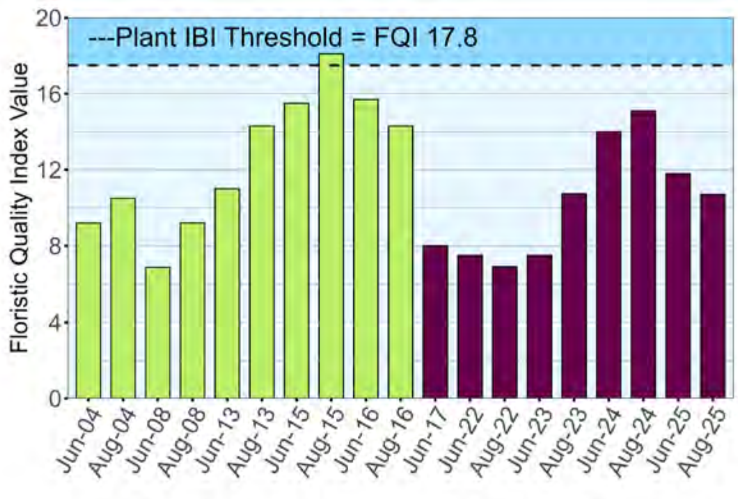
AIS are shown in **bold**, including hybrid cattail, purple loosestrife, and reed canary grass.

# of Native Species
- 1
- 2
- 3 - 4
- 5 - 6
- None Found

Number of native plant species observed at each observation point in Lake Cornelia's North Basin in August 2025.



Number of species: A shallow lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 11 species. Between 2004–2025, the number of species in Lake Cornelia’s South Basin ranged from 3 to 12 and met the MNDNR Plant IBI threshold on three occasions in 2015, 2016, and 2024. The number of species observed on the rake in 2025 was noticeably lower than the previous year.



Floristic Quality Index (FQI) values (quality of species): A shallow lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 17.8. Between 2004–2025, FQI values in Lake Cornelia’s South Basin ranged from 6.9 to 18.1, failing to meet the MNDNR Plant IBI threshold except in August 2015. The FQI values observed in 2025 were lower than what was observed in 2024.

Note: purple bars indicate period following significant infestation of curly-leaf pondweed (CLP) and completion of spring herbicide treatments to reduce CLP prevalence.

Aquatic Invasive Plant Species

Four aquatic invasive plant species were found in Lake Cornelia's South Basin in 2025.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

A whole-lake herbicide application was completed on Lake Cornelia in spring 2025 to control the growth of curly-leaf pondweed. A June 2025 point intercept survey was used to assess the effectiveness of the spring treatment and help determine management needs for 2026. No living curly-leaf pondweed was observed in June or August, only detritus.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife was observed scattered along the shoreline. Most purple loosestrife plants are managed naturally by Galerucella, a purple loosestrife eating beetle. The beetles control purple loosestrife plants by eating the plants. Because they are expected to control the purple loosestrife in the lake, no additional management is needed.

Reed canary grass (*Phalaris arundinaceae*)

Observed around most developed shorelines.

Image source: Endangered Resources Services

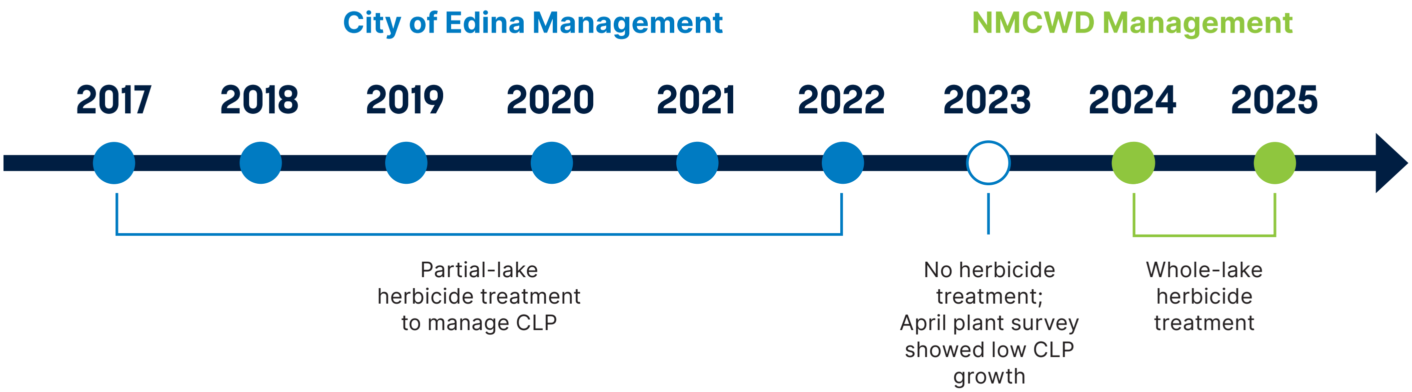
Hybrid cattail (*Typha X glauca*)

Observed scattered around the shoreline.

2.6.4 Aquatic Invasive Species (AIS) Plant Management Practices

Since 2017, the City of Edina or NMCWD have been performing plant surveys in Lake Cornelia's South Basin to document the growth of curly-leaf pondweed (CLP) and have conducted herbicide treatments to manage the invasive species during years with notable growth. The timeline below provides a summary of the management practices completed. The management of CLP in Lake Cornelia has been challenging. Post herbicide treatment surveys have observed small CLP plants regrowing from root masses and from "stick" or "micro" turions, which is atypical as compared to observations in other lakes with similar herbicide management histories.

In April 2024, the NMCWD submitted a lake vegetation management plan (LVMP) to the MNDNR. The MNDNR approved the LVMP and authorized a 5-year variance to perform herbicide treatments on greater than 15% of the littoral area. NMCWD completed whole-lake herbicide treatments in spring 2024 and 2025. CLP management is expected to continue in Lake Cornelia in the coming years.



During an October 2024 turion survey, most turions were of the small "stick" or "micro" varieties, which is an uncommon observation.

In Lake Cornelia, small CLP plants were found growing from microturions in October 2024.

During a June 2025 plant survey, no living curly-leaf pondweed plants were observed, only detritus.

2.6.5 Phytoplankton Observations in Lake Cornelia's South Basin

The phytoplankton community in Lake Cornelia's South Basin was monitored in 2025, including identification and enumeration of the phytoplankton species to help evaluate water quality and the quality of food available to zooplankton. The figure on the next page summarizes the number and major groups of phytoplankton observed in Lake Cornelia's South Basin between April and September 2025. Blue-green algae (cyanobacteria) were the major taxon (or group) observed throughout the monitored period, representing 74%–97% of the phytoplankton community. Green algae, diatoms, golden algae, cryptophytes, and other taxa were also present throughout the monitored period but at notably lower percentages.

When water is warm and rich in nutrients, cyanobacteria can grow quickly forming blooms. These blooms can be considered harmful since some species can produce cyanotoxins. Human or wildlife exposure to cyanotoxins may cause skin irritations, including rashes, hives, swelling or skin blisters. Ingestion of cyanotoxins can also cause more severe health effects such as liver or kidney damage, seizures, or death, depending on the cyanotoxin and the magnitude, duration and frequency of the exposure. In 2025, blue-green algal blooms were observed in April through September, with more severe blooms observed June through September. Total blue-green algae numbers between April and September ranged from approximately 192,100 cells per milliliter in April to approximately 4 million cells per milliliter in July.

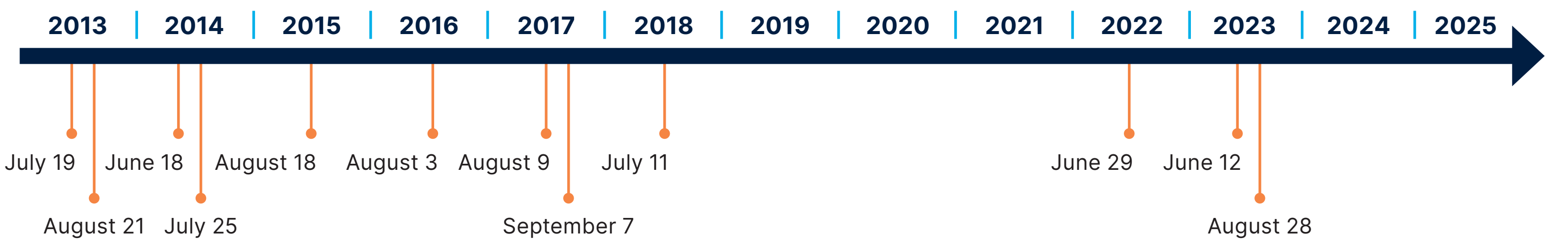
All observed blue-green algae values in 2025 were above the WHO threshold of 100,000 cells per milliliter for a moderate probability of adverse health effects to recreational users. Through a partnership with the Minnesota Department of Health (MDH), it was confirmed that microcystin concentrations sampled at the routine monitoring location and/or within scums located in the South Basin exceeded the MPCA's recreational threshold of 6 µg/L on seven monitored occasions between June and October. Microcystin is a liver toxin, and the level of damage is dependent on the amount ingested and length of exposure. When in doubt, it is best to stay out. Although there can be many causes of blue-green algal blooms, the high phosphorus concentrations and hot summer conditions likely contributed to the growth and persistence of the blue-green algal population throughout the summer months.

Phytoplankton

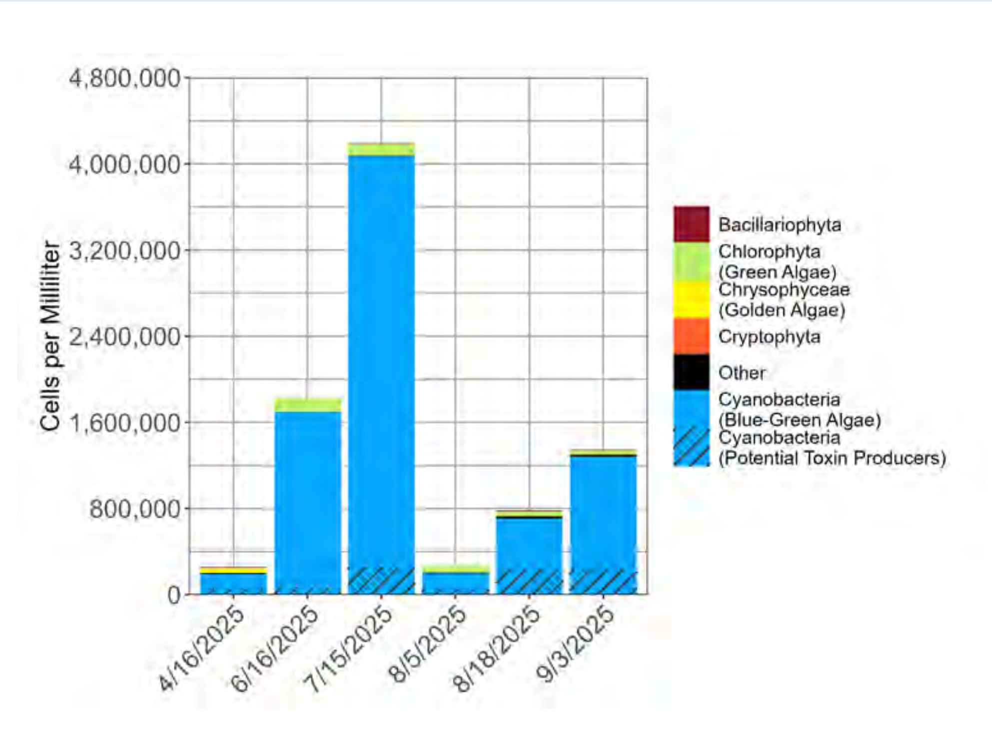
Phytoplankton, or algae, are microscopic organisms that are suspended or floating in the water column. Phytoplankton can be single cell, filamentous, or community-based organisms. They derive energy from the sun through photosynthesis and provide food for several types of aquatic organisms, including zooplankton, which are in turn eaten by fish. Zooplankton prefer to eat phytoplankton species that have higher nutritional quality, are easily edible, and are non- toxic. Freshwater zooplankton typically prefer certain species of cryptophytes, green algae, and haptophytes. Blue-green algae and diatoms are less desirable. An inadequate phytoplankton population limits a lake's zooplankton population and indirectly limits fish production in a lake. However, excess phytoplankton from high amounts of nutrients can reduce water clarity, impact aquatic plant growth, and possibly cause human health concerns.

Cyanobacteria (blue-green algae) scum observed in mid-June 2025 in Lake Cornelia's South Basin.

Over the past decade blue-green algae have historically been a concern in the Lake Cornelia's South Basin with blue-green algae cell counts observed well above the WHO thresholds for low or moderate probability of adverse health effects to recreational users on multiple occasions. Due to the higher abundance of algae, the City of Edina started treating Lake Cornelia with copper sulfate in 2013 to control algal growth. As such, the reported phytoplankton counts during 2013–2018 and 2022–2023 were impacted by algaecide treatments. The timeline below shows the approximate dates of the algal treatment efforts based on past records.



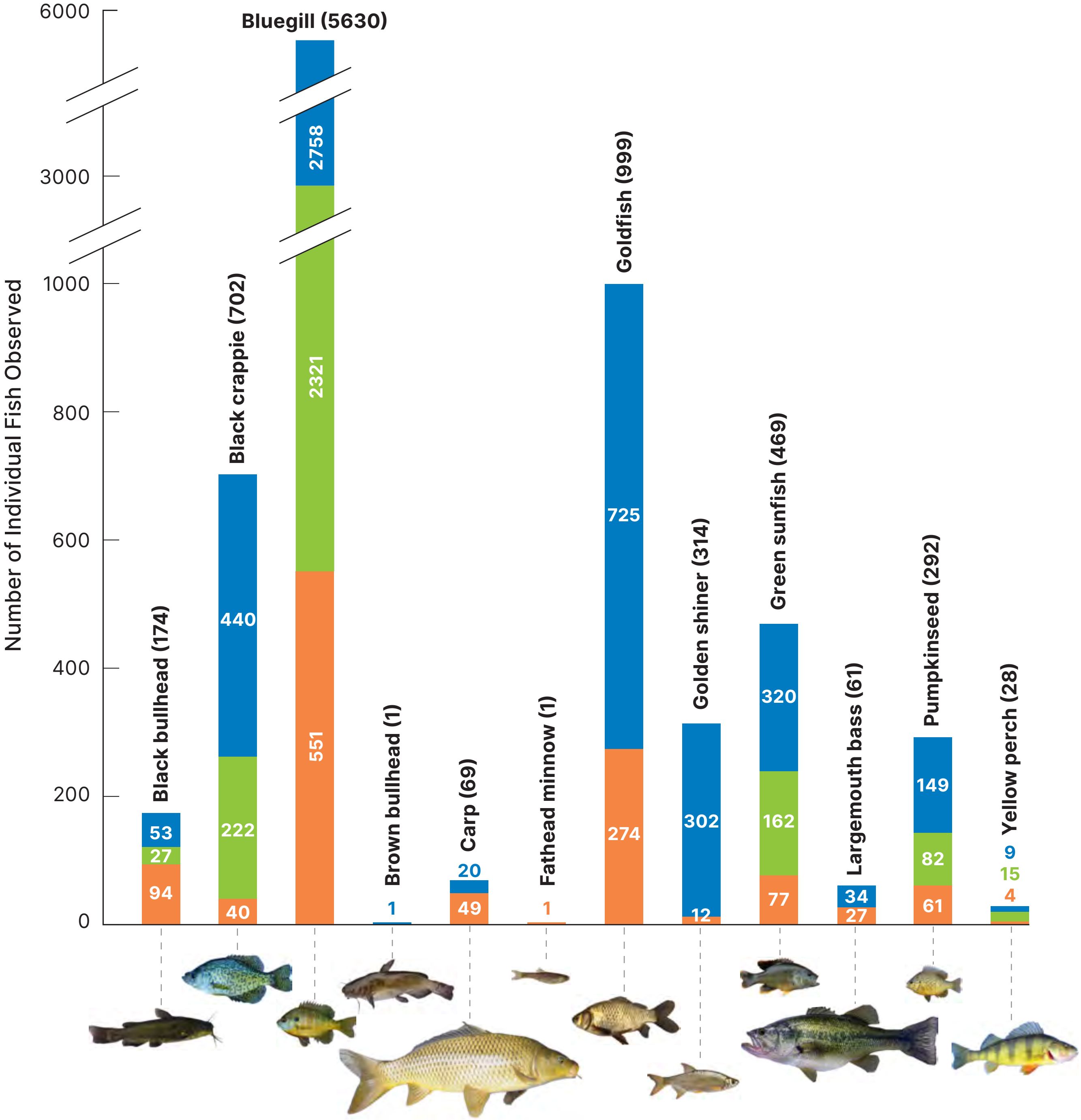
Between April and September 2025 the NMCWD collected phytoplankton (algae) samples for enumeration and identification. The figure to the right summarizes the number and major groups of phytoplankton observed.



Blue-green algae (cyanobacteria) were the most abundant taxon (or group) found in the Lake Cornelia's South Basin throughout the monitored period. Blue-green algae numbers in 2025 ranged from approximately 192,000 cells per milliliter in April to approximately 4 million cells per milliliter in July. Potential toxin producing species ranged from approximately 47,000 cells per milliliter in early August to 253,000 cells per milliliter in July.

2.6.6 Fisheries Observations in Lake Cornelia's South Basin

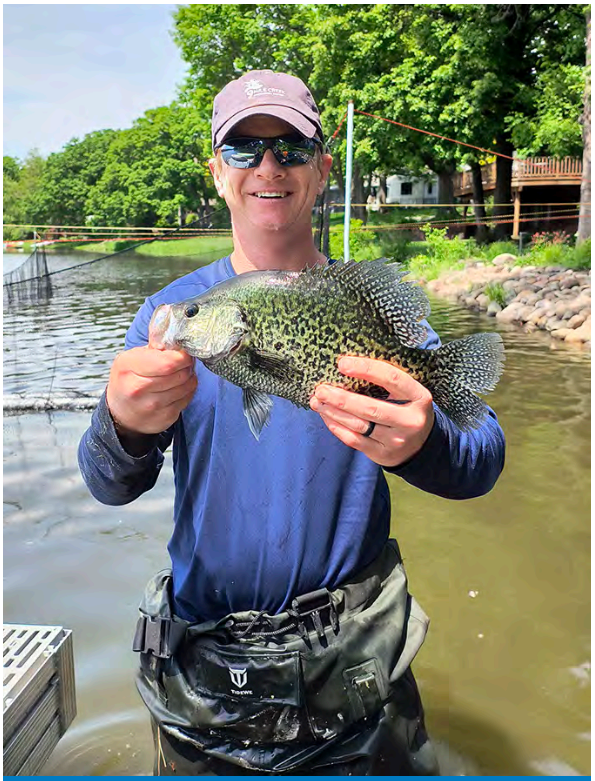
The NMCWD collects fisheries data periodically to assess the health of the fish community and to evaluate if rough fish populations are impacting lake water quality. NMCWD conducted a fisheries assessment of Lake Cornelia's South Basin in summer 2025 using **electrofishing, trap nets, and box nets**. Twelve species were observed in the south basin as shown below. The native fish species bluegill and black crappie were found at the highest abundances. The invasive rough fish species, common carp and goldfish, were also observed. Goldfish was the second most abundant fish species found in the lake. The next page discusses the management practices completed by the NMCWD to help manage the goldfish population in Lake Cornelia.



2.6.6.1 Fisheries Management

The water quality study completed by the district in 2019 identified goldfish and carp at biovolumes large enough to warrant further assessment as these rough fish species can have negative effects on lake water quality. The *Goldfish Population and Management Feasibility Study in the Lake Cornelia System* was completed by WSB from 2021–2022 to determine the environmental conditions that drive goldfish movements to upstream waterbodies, to assess the goldfish population, and to test multiple goldfish removal/management methods. The study concluded that goldfish are likely spawning within their resident lakes near cattail and bullrush fringes rather than in upstream waterbodies and determined that small-mesh baited box nets were effective at removing goldfish (WSB, 2022). Following these conclusions, goldfish removal efforts were expanded between 2023–2025. In 2025, two box net traps were deployed and lifted on 19 occasions in the South Basin. In these box net traps, in total, 275 pounds or approximately 725 individual goldfish were removed from the South Basin in 2025. Between 2023–2025 over 15,400 individual goldfish were removed from the South Basin. Additionally, field staff noticed an increased abundance of black crappie in the South Basin in 2025. The district plans to continue box netting efforts in 2026.

District staff performing backpack electrofishing in Lake Cornelia's South Basin.



District staff observed an 11-inch black crappie in South Cornelia during fish management efforts in May 2025.

2.6.7 Summary for Lake Cornelia's South Basin

Water quality of Lake Cornelia's South Basin was poor in 2025 and the lake failed to meet state eutrophication standards for shallow lakes due to excess phosphorus and algae in the lake and poor water clarity. All monitored chloride concentrations between April and September in 2025 were below the MPCA chronic criteria.

Both the number of aquatic plant species in the lake and FQI values in 2025 failed to meet the MNDNR Plant IBI thresholds. The values were lower than observations in 2024, but higher than observations between 2017-2023.

Four invasive aquatic plant species were observed in the Lake Cornelia's South Basin in 2025 including the submerged species curly-leaf pondweed and the emergent species hybrid cattail, purple loosestrife, and reed canary grass. The City of Edina conducted spring plant surveys and herbicide treatments from 2017 to 2022 within the South Basin to reduce the presence of curly-leaf pondweed. The NMCWD completed a whole-lake herbicide treatments in spring 2024 and 2025 to reduce the presence of curly-leaf pondweed. CLP management is expected to continue in Lake Cornelia in the coming years.

In 2025, blue-green algal blooms were observed in the lake April through October, with blue-green counts well above the World Health Organization (WHO) threshold of 100,000 per milliliter for a moderate probability of adverse health effects to recreational for the entire monitored period. Although there can be many causes of blue-green algal blooms, the high phosphorus concentrations and hot summer conditions likely contributed to the growth and persistence of the blue-green algal population throughout the summer months.

A fisheries assessment was completed in Lake Cornelia in summer 2025. Twelve species were observed in the south basin. The native fish species bluegill and black crappie were found at the highest abundances. The invasive rough fish species, common carp and goldfish, were also observed. Goldfish was the second most abundant fish species found in the lake.

The district completed a water quality study of Lake Cornelia in 2019 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Lake Cornelia were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. An overabundance of rough fish was also found to be a water quality concern. Several management practices have been implemented since the water quality study was completed, including an alum sediment treatment, the installation of the Rosland Park Stormwater Filtration Vault, rough fish removals, aquatic invasive species plant management, and continued funding assistance of private stormwater retrofit installations through the NMCWD cost-share grant program.

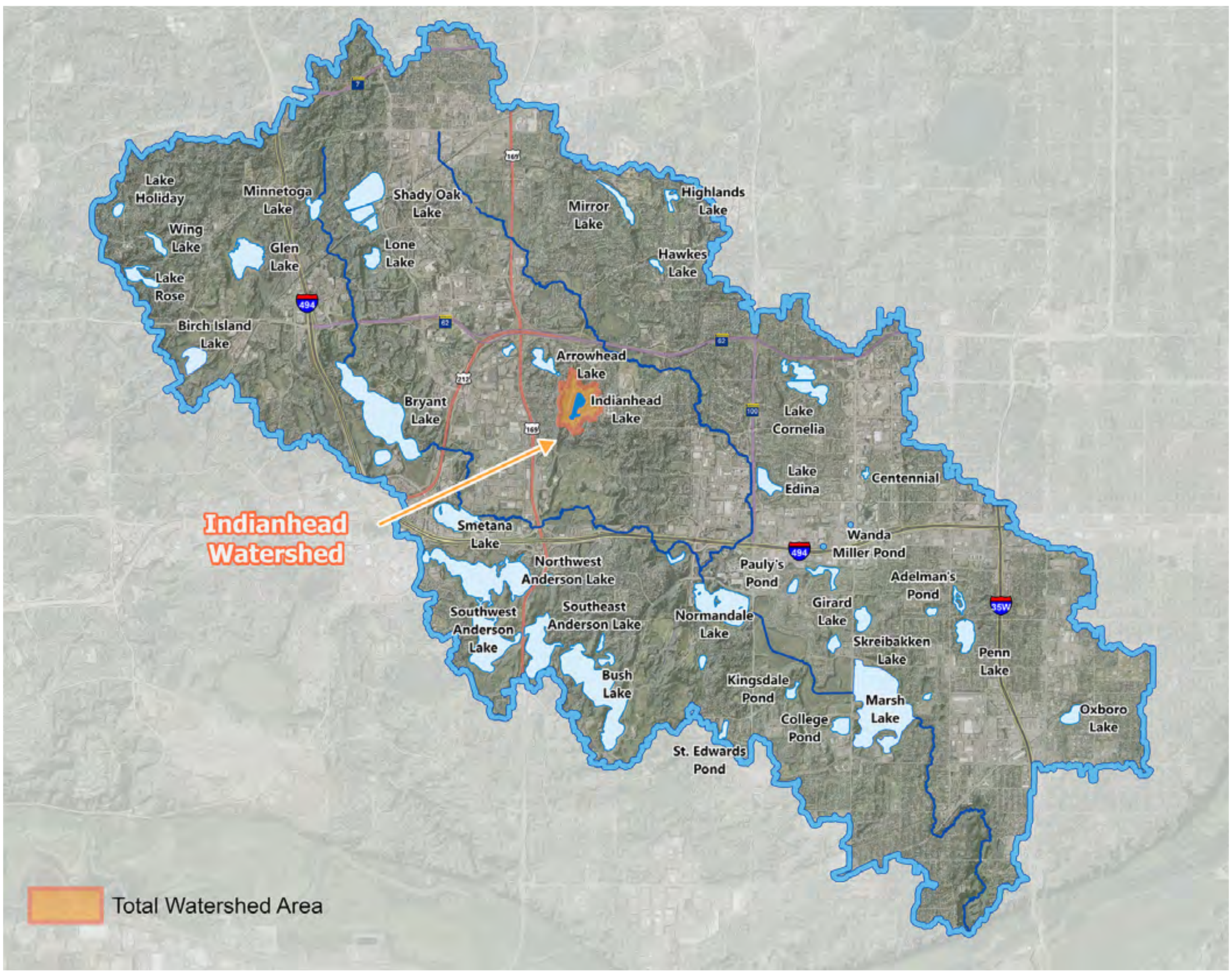
2.7 Indianhead Lake

2025 MONITORED PARAMETERS

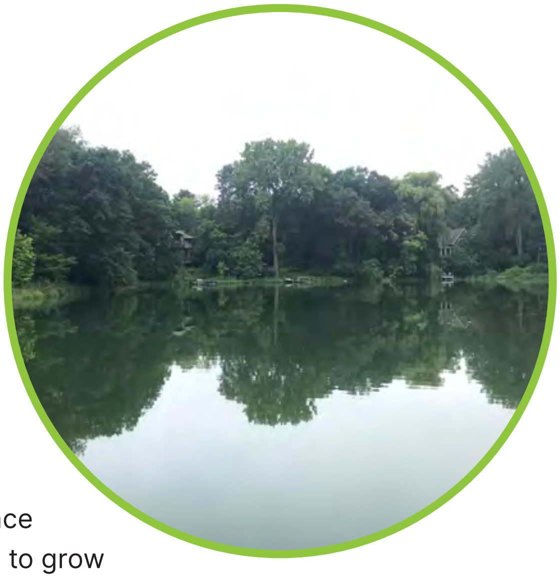
- **Water Quality**

Note: The district can provide water quality monitoring data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Edina
Surface Area	14 acres
Average/Maximum Depth	3.1 feet / 5.3 feet
Watershed Area	107 acres
Watershed:Surface Area	8:1
Impairment Status	No impairments identified on Minnesota's 2024 impaired waters list
Downstream Waterbody	Landlocked



2.7.1 Water Quality Observations in Indianhead Lake



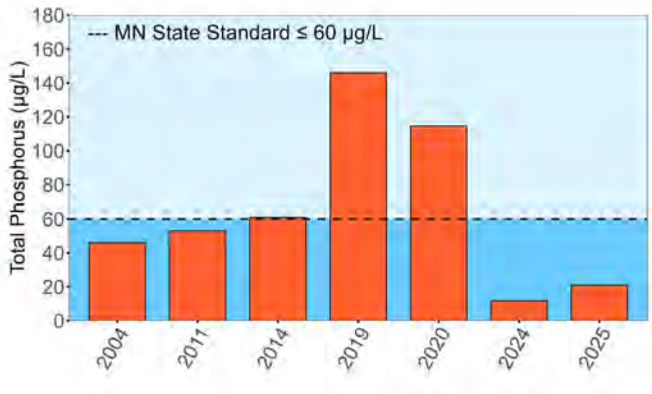
Indianhead Lake is located in Edina and is used primarily for wildlife viewing. Indianhead Lake is land- locked with no surface outlets. Thus, the water level in the lake depends on weather conditions (snowmelt, rainfall, evaporation) and groundwater flow.

Indianhead Lake has a water surface area of approximately 14 acres, a maximum depth of 5.3 feet, and a mean depth of approximately 3.1 feet at the lake's 10-year average water surface elevation. Indianhead Lake is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

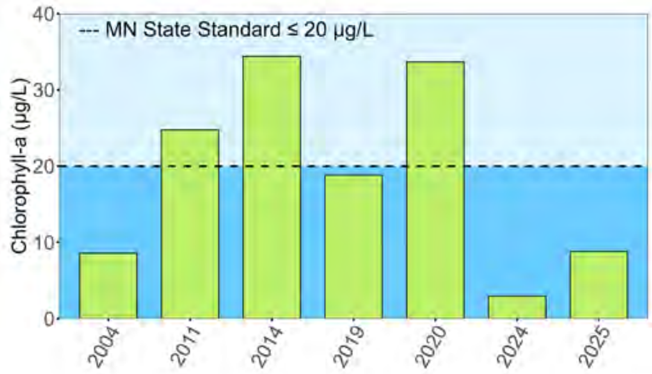
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Indianhead Lake is not on the Minnesota impaired waters list.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-*a*, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Indianhead Lake by the NMCWD during 2004, 2011, 2014, 2019-2020, and 2024-2025. Monitoring data from 2025 indicate that the management activities completed in 2024 as part of the Arrowhead and Indianhead Lakes Water Quality Improvement Project have improved the lake's water quality. The summer average total phosphorus and chlorophyll-*a* concentrations monitored in 2024 and 2025 were notably lower than concentrations monitored between 2004–2020. Similarly, the 2024 and 2025 Secchi disk transparency measurements were noticeably improved from measurements between 2004–2020. All three parameters were better than the respective state eutrophication standards.

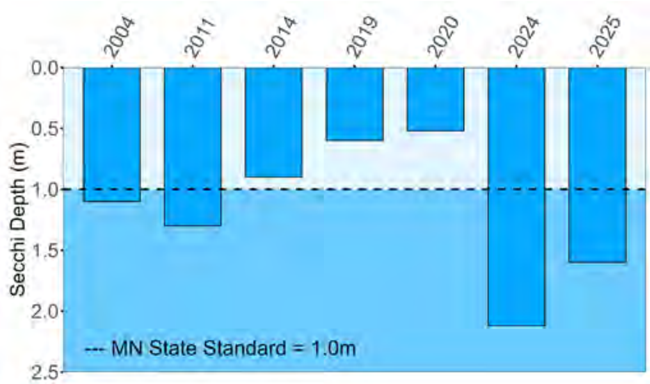
Chloride concentrations were measured by the NMCWD in 2011, 2014, 2019-2020, and 2024-2025 (generally between April and September). The chloride concentrations have not exceeded the MPCA chronic standard of 230 mg/L in the historical record. In 2025, chloride concentrations were monitored between April and September. The highest observed concentration was in April 2025 at 78 mg/L. The average chloride concentration between April and September 2025 was 69 mg/L.



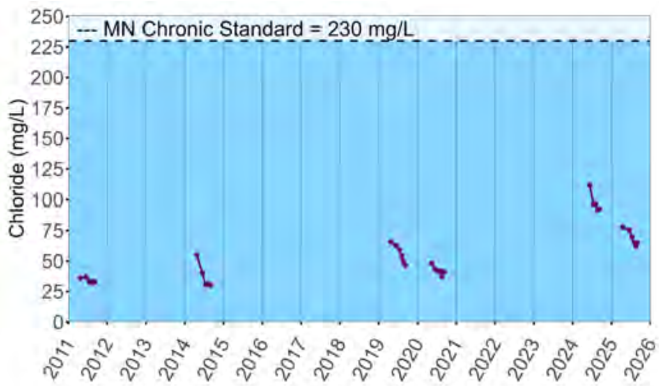
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Indianhead Lake, the summer average total phosphorus concentrations have been better than the shallow lake state standard in 2004, 2011, 2024, and 2025. In 2025 the summer average total phosphorus concentration was 21 µg/L, which is notably lower than the summer average concentrations observed between 2014–2020. Improved phosphorus concentrations in 2024-2025 are likely the result of water quality improvement projects implemented in 2024.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Indianhead Lake, the summer average chlorophyll-*a* concentrations have been better than the shallow lake state standard in 2004, 2019, 2024, and 2025. In 2025 the summer average chlorophyll-*a* concentration was 9 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Indianhead Lake, the summer average Secchi disk transparency has met or been better than the shallow lake state standard in 2004, 2011, 2024, and 2025. In 2025 the summer average Secchi disk transparency was 1.6 meters.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Indianhead Lake, observed chloride concentrations have never exceeded the state chronic criterion standard. In 2025, chloride concentrations were monitored between April and September. The highest observed chloride concentration was 78 mg/L in April 2025, and the average chloride concentration was 69 mg/L.

2.7.2 Water Quality Management Practices

The district completed a water quality study of Indianhead Lake in 2022 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Indianhead Lake were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. An overabundance of the aquatic invasive species curly-leaf pondweed was also found to be a water quality concern. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Indianhead Lake to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study. A few of these practices were already in place before the study, but were identified as being key management efforts for continued improvement of lake health.

Management Practice	Basis	Year Implemented	Lead Agency
Herbicide Treatments	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions	2019–ongoing	City of Edina
Enhanced Street Sweeping	Reduce pollutant loading from stormwater runoff	2023–ongoing	City of Edina
Alum + Iron Treatment	Reduce internal sediment phosphorus load	2024	NMCWD
Upgrades to Aeration System	Reduce internal sediment phosphorus load and improve fisheries health	2024–ongoing (system operating in fall 2024)	NMCWD & City of Edina
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	Ongoing	NMCWD

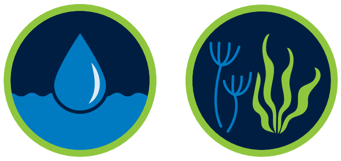
Aeration System Improvements

Alum + Iron Treatment

2.8 Lake Holiday

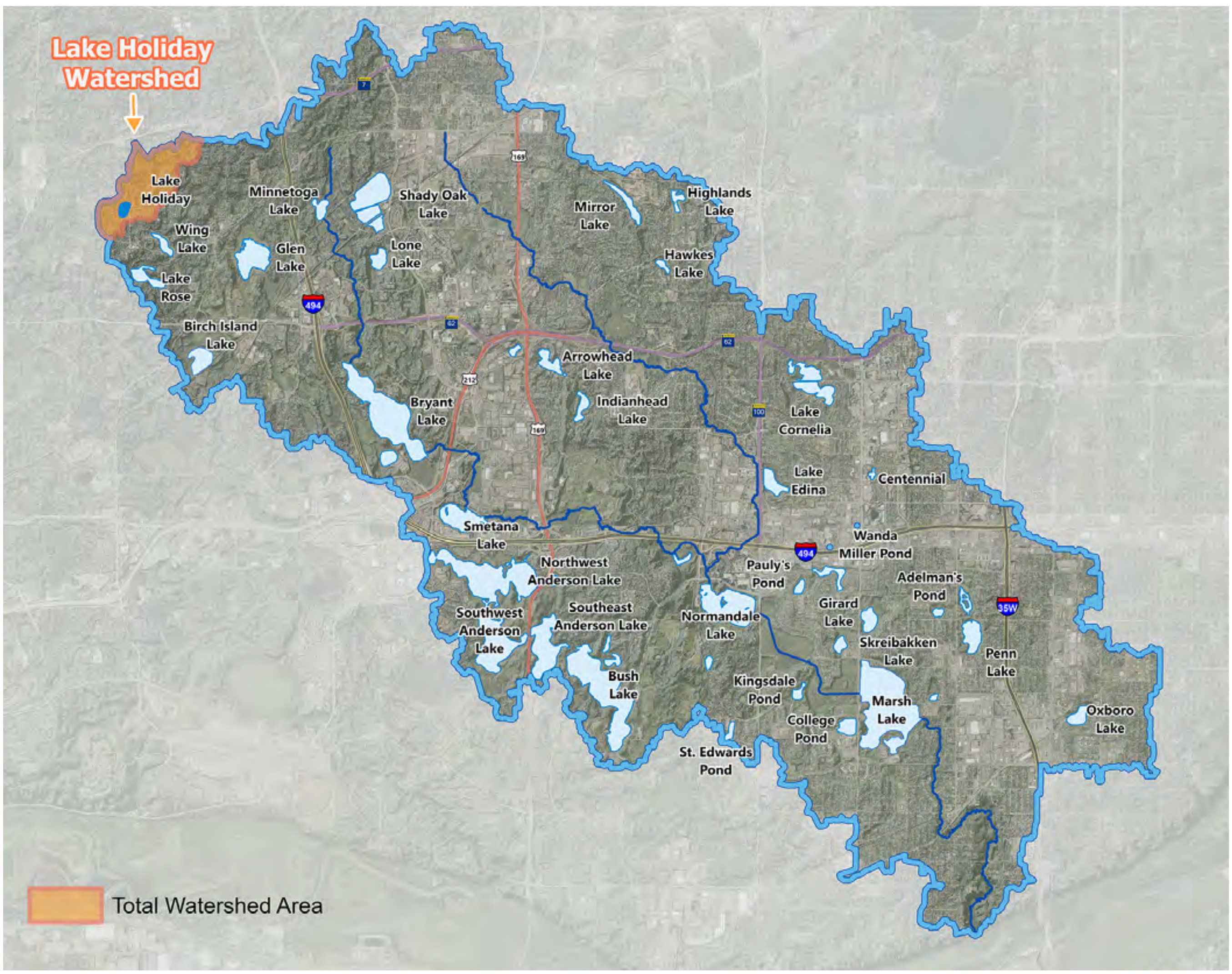
2025 MONITORED PARAMETERS

- **Water Quality**
- **Aquatic Plants (Macrophytes)**



Note: The district can provide water quality monitoring and aquatic plant survey data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Minnetonka
Surface Area	8 acres
Average/Maximum Depth	3.1 feet / 5 feet
Watershed Area	312 acres
Watershed:Surface Area	39:1
Impairment Status	No impairments identified on Minnesota's 2024 impaired waters list
Downstream Waterbody	Wing Lake



2.8.1 Water Quality Observations in Lake Holiday

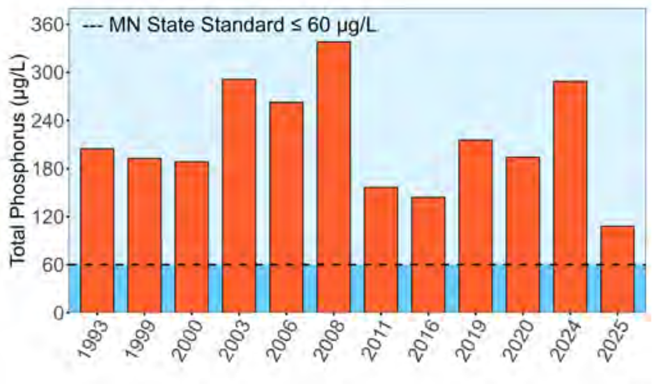
Lake Holiday is located in Minnetonka and is used primarily for wildlife viewing. When water levels are high enough, water is pumped from Lake Holiday to Wing Lake, which discharges to Lake Rose via gravity. Water that discharges from Lake Rose via gravity flows through an extensive storm sewer network that ultimately discharges to Birch Island Lake in Eden Prairie.

Lake Holiday has a water surface area of approximately 8 acres, a maximum depth of 5 feet, and a mean depth of approximately 3.1 feet. Lake Holiday is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

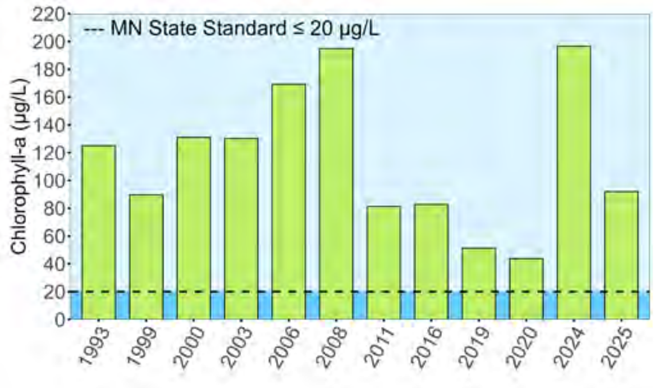
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Lake Holiday is not currently on the Minnesota impaired waters list.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-*a*, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Lake Holiday between 1993 and 2025 through NMCWD and City of Minnetonka routine monitoring programs. Poor water quality has been observed in the lake during the entire period of record. All summer average total phosphorus and chlorophyll-*a* concentrations and Secchi disk transparency depths, including those monitored in 2025, failed to meet the state water quality standards for shallow lakes in the North Central Hardwood Forest Ecoregion.

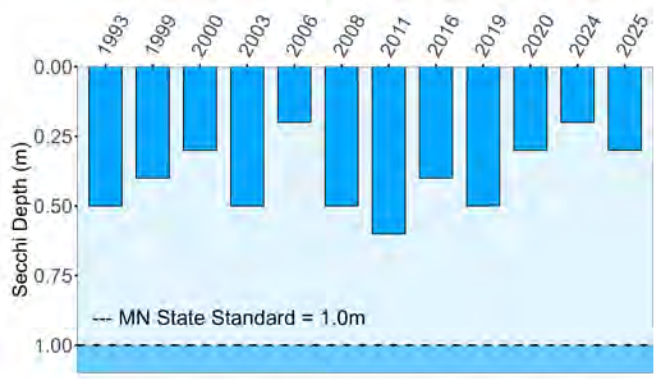
Chloride concentrations were measured by either the NMCWD or City of Minnetonka in 2020, 2024, and 2025 (generally between April and September). The chloride concentrations have not exceeded the MPCA chronic standard of 230 mg/L in the historical record. In 2025, chloride concentrations were monitored between April and September. The highest observed concentration was in April 2025 at 113 mg/L. The average chloride concentration between April and September 2025 was 64 mg/L.



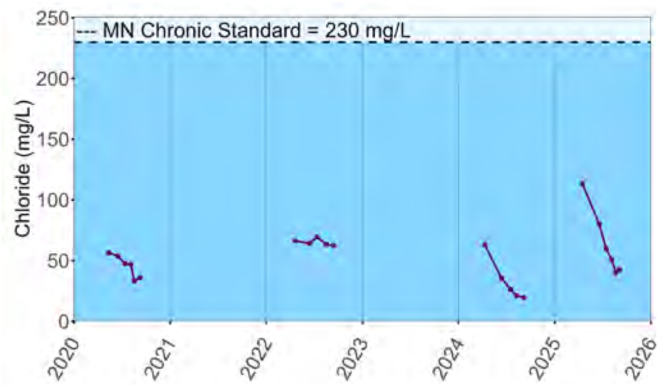
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Lake Holiday, the summer average total phosphorus concentrations have exceeded the shallow lake state standard for all monitored years between 1993–2025. However, in 2025 the summer average total phosphorus concentration was the lowest on record at 108 µg/L. Improved phosphorus concentrations in 2025 are likely the result of water quality improvement projects implemented in 2024.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Lake Holiday, the summer average chlorophyll-*a* concentrations have exceeded the shallow lake state standard for all monitored years between 1993–2025. In 2025 the summer average chlorophyll-*a* concentration was 92 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Lake Holiday, the summer average Secchi disk transparency did not meet the shallow lake state standard for all monitored years between 1993–2025. In 2025 the summer average Secchi disk transparency was 0.3 meters.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Lake Holiday, observed chloride concentrations have never exceeded the state chronic criterion standard. Chloride was monitored between April and September in 2025. The highest observed chloride concentration was 113 mg/L in April 2025. The average chloride concentration was 64 mg/L.

2.8.2 Water Quality Management Practices

The district completed a water quality study for Holiday, Wing, and Rose Lakes in 2022 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Lake Holiday were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. An overabundance of the aquatic invasive species curly-leaf pondweed was also found to be a water quality concern. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Lake Holiday to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study.

Management Practice	Basis	Year Implemented	Lead Agency
Alum + Iron Treatment *Holiday and Wing Lakes*	Reduce internal sediment phosphorus load.	2024	NMCWD
Herbicide Treatments *Lake Holiday*	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions	2024–Ongoing	NMCWD
Enhanced Street Sweeping *Holiday, Wing, Rose Lakes*	Reduce pollutant loading from stormwater runoff.	2024–Ongoing	City of Minnetonka
Modifications to Aeration System *Lake Holiday*	Improve oxygen conditions to reduce internal loading and improve fisheries health	2024–Ongoing (system operating in fall 2024)	NMCWD & City of Minnetonka
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	2008–Ongoing	NMCWD

Alum + Iron treatment on Lake Holiday

Aeration System installed on Lake Holiday

2.8.3 Aquatic Plant Observations in Lake Holiday

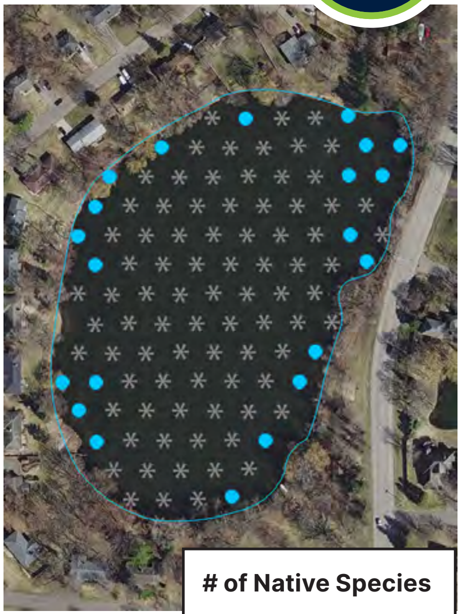
A healthy, shallow, urban lake will have an abundance of aquatic plants growing throughout the entire lake due to the shallowness and higher amounts of nutrients. Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

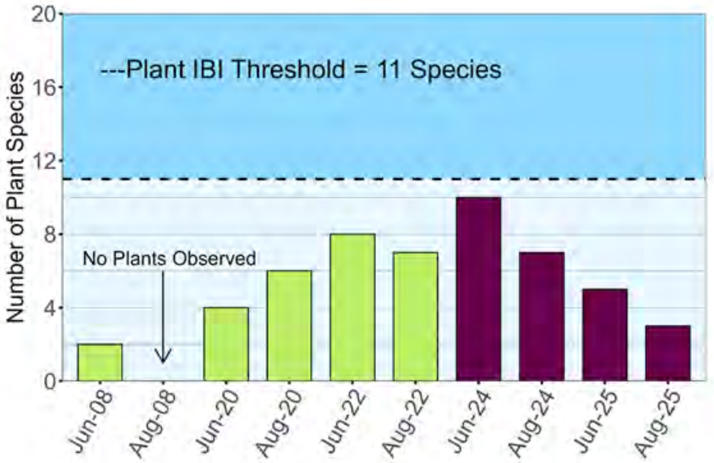
The district conducted point intercept plant surveys of Lake Holiday in June and August of 2025 to assess the health of the plant community. The following page provides a list of the plant species observed in 2025, their percent occurrence in June and August, and the locations native plants were found during the August survey. Graphs also summarize the historical plant IBI scores between 2008 and 2025, tracking how the plant health conditions have changed over time. Submerged plant abundance was noticeably lower in 2025. High algal abundance was documented during both the June and August 2025 plant surveys with less than 1 foot of clarity observed.

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined) Number of littoral points with plants		20%	20%
Submerged Plants			
Elodea canadensis	Common waterweed	33%	33%
Ceratophyllum demersum	Coontail	3%	0%
Stuckenia pectinata	Sago pondweed	3%	Visual only
Potamogeton crispus	**Curly-leaf pondweed**	**2%**	**0%**
Floating/Emergent Plants			
Carex comosa	Bottlebrush sedge	Visual only	Visual only
Eleocharis erythropoda	Bald spikerush	Visual only	Visual only
Phalaris arundinacea	**Reed canary grass**	**Visual only**	**Visual only**
Lythrum salicaria	**Purple loosestrife**	**Visual only**	**Visual only**

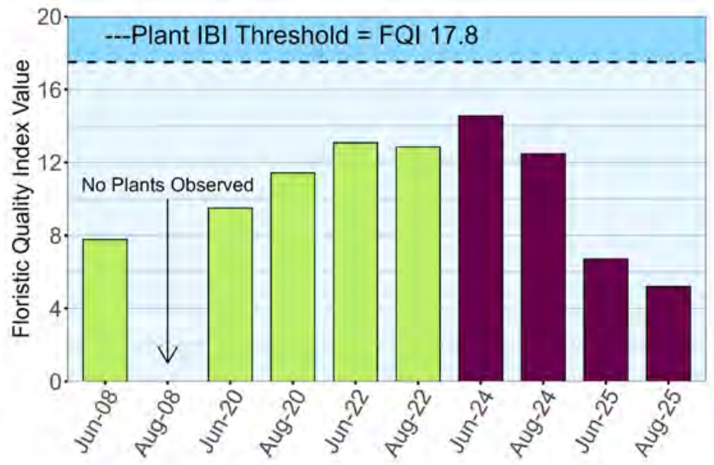
AIS are shown in **bold**, including curly-leaf pondweed, reed canary grass, and purple loosestrife.



Number of native plant species observed at each observation point in Lake Holiday in August 2025



Number of species: A shallow lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 11 species. Between 2008–2025, the number of species in Lake Holiday ranged from 0 to 10 and failed to meet the MNDNR Plant IBI threshold during the entire period. The number of species observed on the rake in 2025 was lower than observations in 2024.



Floristic Quality Index (FQI) values (quality of species): A shallow lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 17.8. Between 2008–2025, FQI values in Lake Holiday ranged from 0 to 14.6, failing to meet the MNDNR Plant IBI threshold during this entire period. The FQI value observed in 2025 were lower than the previous year.

Note: purple bars indicate period following significant infestation of curly-leaf pondweed (CLP) and completion of a spring herbicide treatment (2024, 2025) to reduce CLP prevalence.

Aquatic Invasive Plant Species

Three aquatic invasive plant species were observed in Lake Holiday in 2025.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

An herbicide application was completed on Lake Holiday in spring 2025 to control the growth of curly-leaf pondweed. A June 2025 point intercept survey was used to assess the effectiveness of the spring treatment and help determine management needs for 2026. Only one living curly-leaf pondweed plant was collected on a rake (1.5% occurrence) during the June plant survey.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife was observed at one location along the western shoreline. Most purple loosestrife plants are managed naturally by *Galerucella*, a purple loosestrife eating beetle. The beetles control purple loosestrife plants by eating the plants. Because they are expected to control the purple loosestrife in the lake, no additional management is needed.

Reed canary grass (*Phalaris arundinaceae*)

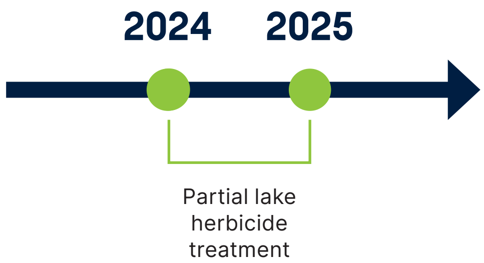
Observed at a handful of locations scattered throughout the eastern, and western shorelines in June and August.

Image source: Endangered Resources Services

2.8.4 Aquatic Invasive Species (AIS) Plant Management Practices

Since 2024, NMCWD has been performing plant surveys in Lake Holiday to document the growth of curly-leaf pondweed (CLP) and have conducted herbicide treatments to manage the invasive species during years with notable growth. The timeline below provides a summary of the management practices completed in 2024 and 2025. Post-herbicide plant surveys in 2025 documented good control of CLP. Only one actively growing CLP plant was found in June while all other monitoring locations found only CLP detritus.

NMCWD Management



During the June 2025 survey, the only living curly-leaf pondweed plant observed post-herbicide treatment was this newly sprouting turion (left photo). Otherwise, just curly-leaf pondweed detritus was noted in other monitored locations.

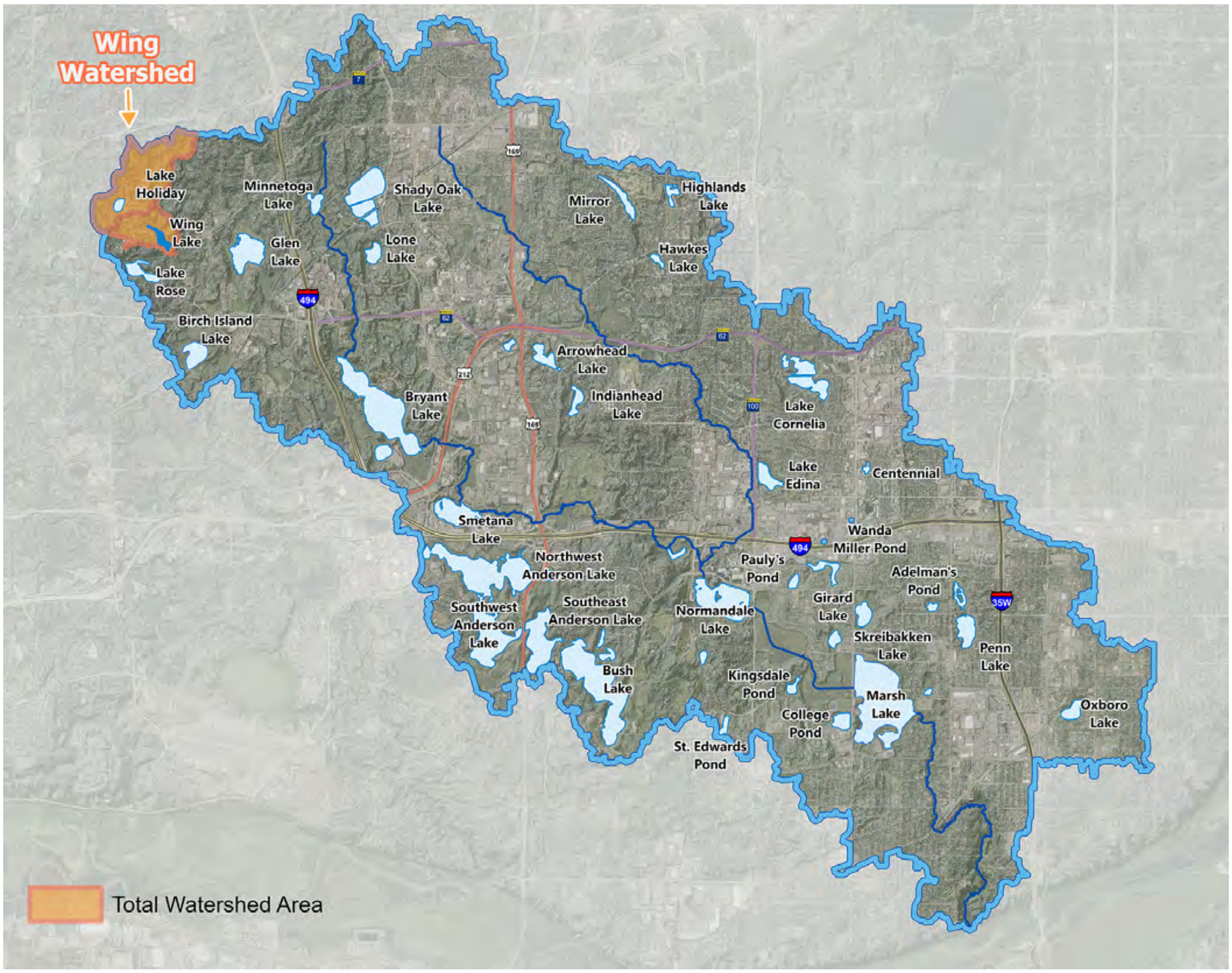
2.9 Wing Lake

2025 MONITORED PARAMETERS

- **Water Quality**

Note: The district can provide water quality monitoring results upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Minnetonka
Surface Area	14 acres
Average/Maximum Depth	3.1 feet / 7 feet
Direct Watershed Area	131 acres
Total Watershed Area	443 acres
Watershed:Surface Area	32:1
Impairment Status	Impaired for nutrients since 2010
Upstream Waterbody	Lake Holiday (when pumped)
Downstream Waterbody	Lake Rose



2.9.1 Water Quality Observations in Wing Lake

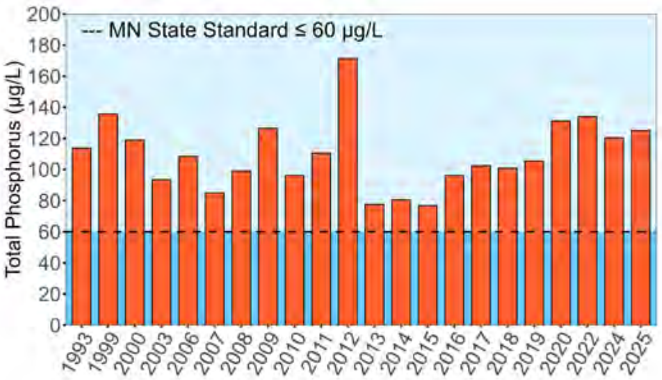
Wing Lake is located in Minnetonka and is used primarily for wildlife viewing. When water levels are high enough, water is pumped from Lake Holiday to Wing Lake, which discharges to Lake Rose via gravity. Water that discharges from Lake Rose via gravity flows through an extensive storm sewer network that ultimately discharges to Birch Island Lake in Eden Prairie.

Wing Lake has a water surface area of approximately 14 acres, a maximum depth of 7 feet, and a mean depth of approximately 3.1 feet. Wing Lake is shallow enough for aquatic plants to grow over the entire waterbody and to mix many times per year (polymictic lake).

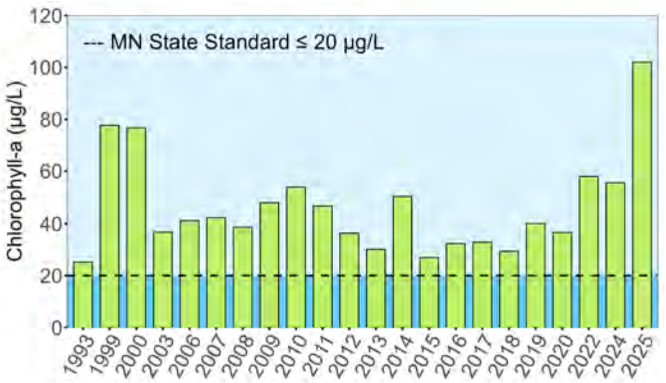
As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Wing Lake was added to Minnesota's impaired waters list in 2010 for excess nutrients.

The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-a, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Wing Lake between 1993 and 2025 through NMCWD and City of Minnetonka routine monitoring programs and through the Metropolitan Council Environmental Services (MCES) Community Assisted Monitoring Program (CAMP). Poor water quality has been observed in the lake during the entire period of record. All summer average total phosphorus and chlorophyll-*a* concentrations, including those monitored in 2025, failed to meet the state water quality standards for shallow lakes in the North Central Hardwood Forest Ecoregion. Most Secchi disk transparency measurements in the historical record also failed to meet the state standard (except 2007–2008 and 2022).

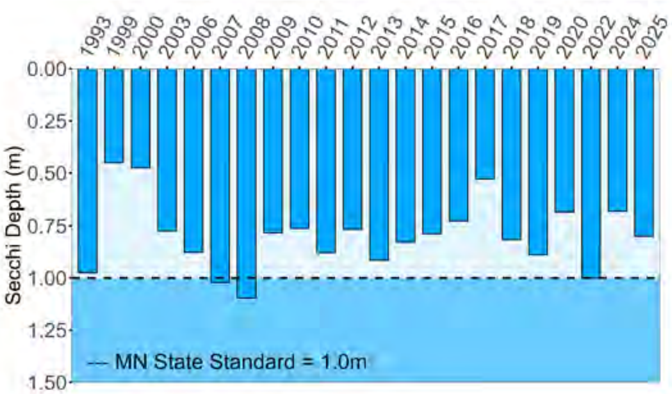
Chloride concentrations were measured by the NMCWD and City of Minnetonka in 2020, 2022, 2024, and 2025 (generally between April and September). The chloride concentrations have not exceeded the MPCA chronic standard of 230 mg/L in the historical record. In 2025, chloride concentrations were monitored between April and September. The highest observed concentration was in June 2025 at 64 mg/L. The average chloride concentration between April and September 2025 was 55 mg/L.



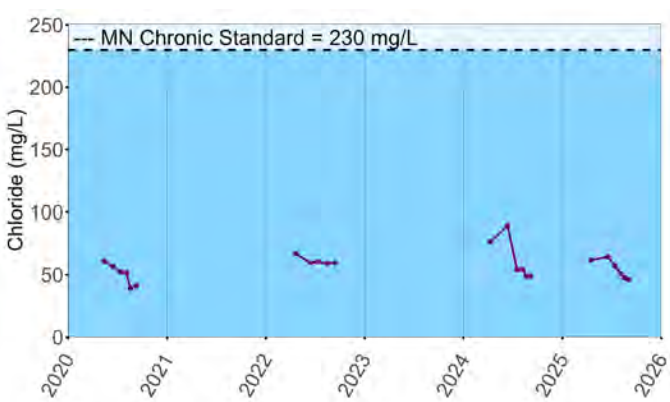
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Wing Lake, the summer average total phosphorus concentrations have exceeded the shallow lake state standard for all monitored years between 1993–2025. In 2025 the summer average total phosphorus concentration was 125 µg/L.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Wing Lake, the summer average chlorophyll-*a* concentrations have exceeded the shallow lake state standard for all monitored years between 1993–2025. In 2025 the summer average chlorophyll-*a* concentration was the highest on record at 102 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Wing Lake, the summer average Secchi disk transparency did not meet the shallow lake state standard for all monitored years between 1993–2025 except 2007– 2008 and 2022. In 2025 the summer average Secchi disk transparency was 0.8 meters.

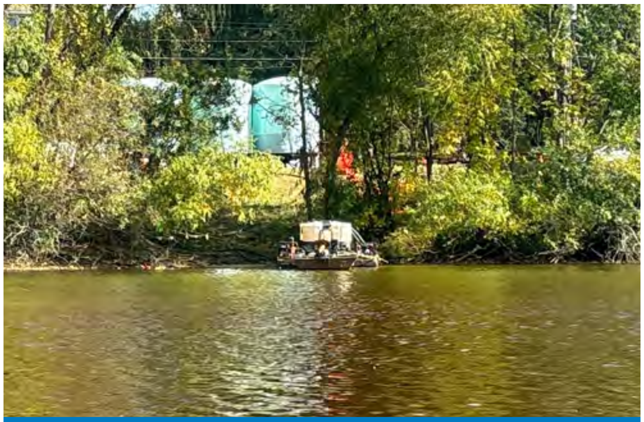


Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Wing Lake, observed chloride concentrations have never exceeded the state chronic criterion standard. In 2025, the highest observed chloride concentration was 64 mg/L in June. The average chloride concentration between April and September 2024 was 55 mg/L.

2.9.2 Water Quality Management Practices

The district completed a water quality study for Holiday, Wing, and Rose Lakes in 2022 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Wing Lake were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Wing Lake to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study.

Management Practice	Basis	Year Implemented	Lead Agency
Alum + Iron Treatment *Holiday and Wing Lakes*	Reduce internal sediment phosphorus load.	2024	NMCWD
Herbicide Treatments *Lake Holiday*	Reduce the impacts of curly-leaf pondweed on producing degraded water quality and ecological conditions	2024–Ongoing	NMCWD
Enhanced Street Sweeping *Holiday, Wing, Rose Lakes*	Reduce pollutant loading from stormwater runoff.	2024–Ongoing	City of Minnetonka
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	2008–Ongoing	NMCWD



Alum + Iron treatment on Lake Holiday. Reductions in nutrients from upstream lakes helps to reduce nutrient loading to downstream Wing Lake & Lake Rose.

Alum + Iron treatment on Wing Lake

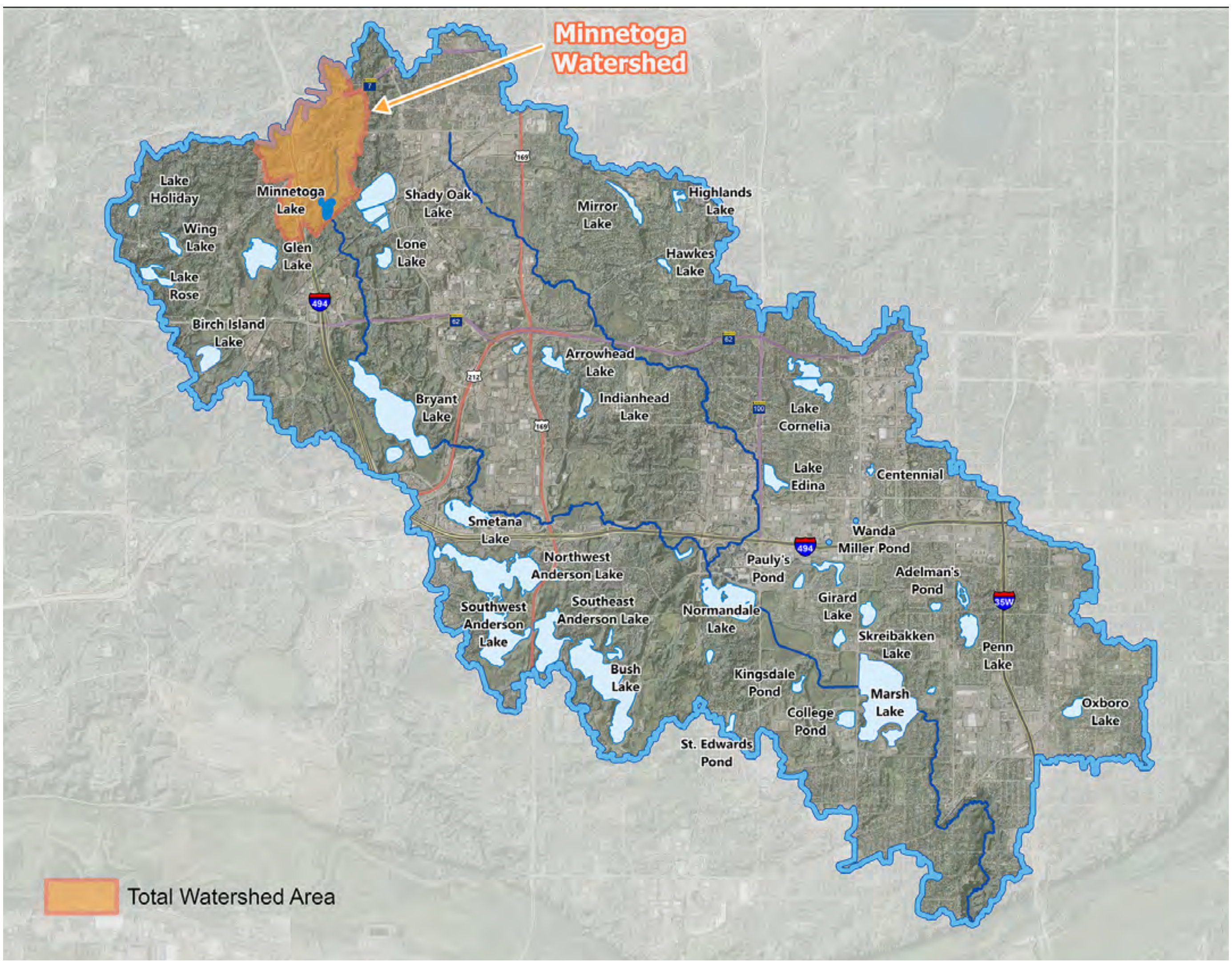
2.10 Minnetoga Lake

2025 MONITORED PARAMETERS

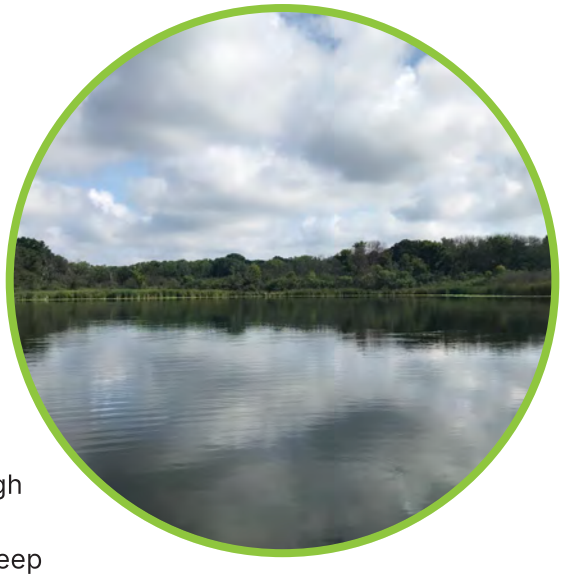
- Water Quality
- Phytoplankton (Algae)
- Zooplankton

Note: The district can provide water quality, phytoplankton, and zooplankton monitoring results upon request.

Parameter	Description
Shallow/Deep	Deep
Location	Minnetonka
Surface Area	14 acres
Average/Maximum Depth	16 feet / 30 feet
Watershed Area	762 acres
Watershed:Surface Area	54:1
Impairment Status	No impairments identified on Minnesota's 2024 impaired waters list
Downstream Waterbody	South Fork Nine Mile Creek



2.10.1 Water Quality Observations in Minnetoga Lake



Minnetoga Lake is located in Minnetonka and is used primarily for wildlife viewing and passive recreation. Water discharges from Minnetoga Lake via gravity and discharges to the South Fork of Nine Mile Creek.

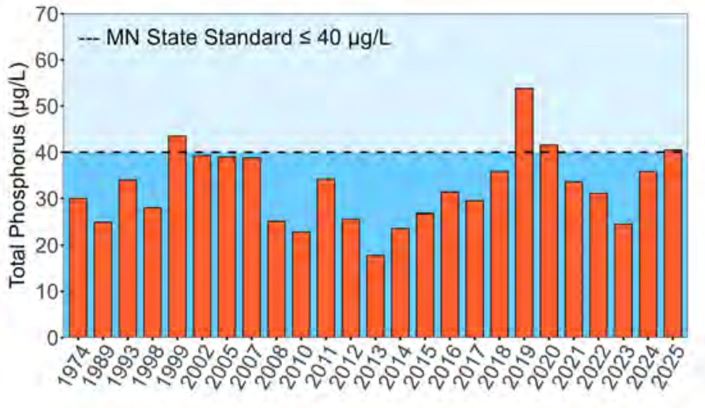
Minnetoga Lake has a water surface area of approximately 14 acres, a maximum depth of 30 feet, and a mean depth of approximately 16 feet. Minnetoga Lake is deep enough that aquatic plants will be found only in the littoral area where enough light can reach the bottom to support growth. This is typically in areas with depths less than 15 feet. Minnetoga Lake is also deep enough that the lake will typically mix only two times per year (dimictic lake).

As required by the federal Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses water quality data collected for various waters of the state and creates a list of impaired waters every two years. Waterbodies included on the list are those that failed to meet water quality standards based on designated use and ecoregion. Minnetoga Lake is not on the Minnesota impaired waters list.

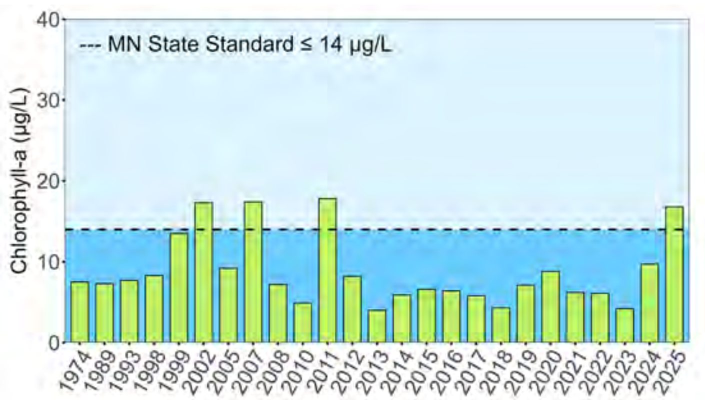
The state of Minnesota commonly uses three eutrophication standards—total phosphorus, chlorophyll-*a*, and Secchi disk transparency—to assess lake health and track water quality changes. These three water quality parameters were measured in Minnetoga Lake between 1974 and 2025 through NMCWD and City of Minnetonka routine monitoring programs and through the Metropolitan Council Environmental Services (MCES) Community Assisted Monitoring Program (CAMP). The observed water quality in the lake has generally been good, with observed parameters being better than state standards for most monitored years. In 25 years of monitoring data, the summer average total phosphorus and chlorophyll-*a* concentrations have been better than state standards for 21 years for each parameter. However, in 2025 both the total phosphorus and chlorophyll-*a* concentrations failed to meet state standards. Most Secchi disk transparency measurements in the historical record were better than the state eutrophication standard, including the summer average Secchi disk depth in 2025. The exceptions were the summer average Secchi disk transparency measurements in 1999 and 2002.

Water quality samples collected from the bottom waters of Lake Minnetoga in 2025 indicate that internal phosphorus loading from lake bottom sediment may be contributing to degraded conditions in the surface waters. Total phosphorus concentrations monitored at the bottom of the lake between July and September were 16–27 times higher than concentrations measured at the surface.

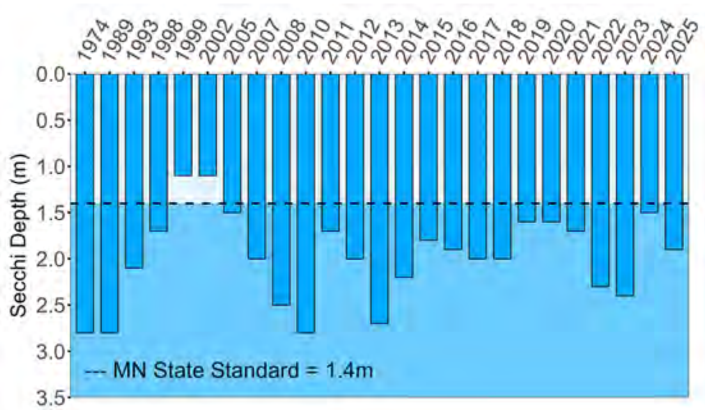
Chloride concentrations were measured by the NMCWD and City of Minnetonka in 2017, 2023, and 2025 (generally between April and September). The chloride concentrations have not exceeded the MPCA chronic standard of 230 mg/L in the historical record. In 2025, chloride concentrations were monitored between April and September in both surface and bottom waters. The highest observed surface concentration was in April 2025 at 128 mg/L. The average chloride concentration between April and September 2025 was 113 mg/L. The observed chloride concentrations in the bottom waters were slightly higher than concentrations observed near the surface. The highest observed bottom chloride concentration was in August 2025 at 132 mg/L, while the surface concentration measured at 101 mg/L that same day.



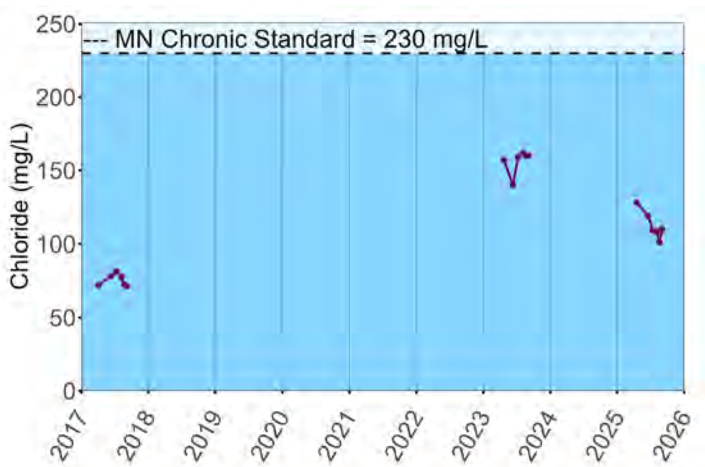
Phosphorus is an an essential nutrient required for biological production. An overabundance of phosphorus in a lake can result in nuisance algal blooms and threaten the health of the aquatic plant community. In Minnetoga Lake, the observed summer average total phosphorus concentrations have been variable in the surface waters. In 2025 the summer average total phosphorus concentration was just above the state standard at 41 µg/L.



Chlorophyll-*a* is used as a measure of algal abundance since it is a photosynthetic pigment of algae. High amounts of chlorophyll-*a* can indicate degraded lake water quality conditions. In Minnetoga Lake, the summer average chlorophyll-*a* concentrations have been better than the deep lake state standard for most monitored years between 1974–2025. However, in 2025 the summer average chlorophyll-*a* concentration in the surface waters exceeded the state standard at 17 µg/L.



Secchi depth (water clarity) is measured by lowering a white circular plate into the lake to see how clear the water is. Low clarity can indicate high algal growth and/or increased sediment suspension in the water column. In Minnetoga Lake, the summer average Secchi disk transparency depths have been better than the deep lake state standard for most monitored years, except 1999 and 2002. In 2025 the summer average Secchi disk transparency was 1.9 meters and was better than state standards.



Chloride can accumulate in lakes from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and become toxic to fish, aquatic insects, and amphibians. In Minnetoga Lake, observed chloride concentrations have never exceeded the state chronic criterion standard. In 2025, the highest observed chloride concentration in the surface waters was 128 mg/L in April 2025. The average chloride concentration in the surface waters between April and September 2025 was 113 mg/L.

2.10.2 Water Quality Management Practices

The district completed a water quality study for Minnetoga Lake in June of 2000 to identify water quality and ecological improvement measures. The study concluded that water quality concerns in Minnetoga Lake were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. The NMCWD and its partners implemented management practices to reduce pollutants and nutrients entering Minnetoga Lake to improve water quality and enhance ecological health. The table below provides a description of the management practices implemented since the water quality study.

Management Practice	Basis	Year Implemented	Lead Agency
Construct Stormwater Ponds	Three stormwater detention ponds were constructed to reduce pollutant loading from stormwater runoff.	2005/2006	NMCWD
Upgrade Existing Stormwater Ponds	Two stormwater detention ponds were upgraded to reduce pollutant loading from stormwater runoff.	2005/2006	NMCWD
Cost-Share Grants	In a fully developed watershed, opportunities for largescale BMPs can be limited. Grant funds are available to residents, associations, nonprofits, schools, businesses, and cities for stormwater retrofit and native plant restoration projects within the district boundaries.	2010–Ongoing	NMCWD

Three new stormwater ponds were installed and two stormwater ponds were upgraded upstream of Minnetoga Lake to capture pollutants from stormwater runoff.

2.10.3 Phytoplankton Observations in Minnetoga Lake

The phytoplankton community in Minnetoga Lake was monitored in 2025, including identification and enumeration of the phytoplankton species to help evaluate water quality and the quality of food available to zooplankton. The figure on the next page summarizes the number and major groups of phytoplankton observed in Minnetoga Lake between April and September 2025. Blue-green algae (cyanobacteria) were the major taxon (or group) observed between July through September, representing 46%–96%. In spring and early summer, the phytoplankton community was more diverse with higher abundances of green algae, golden algae, cryptophytes, and other taxa.

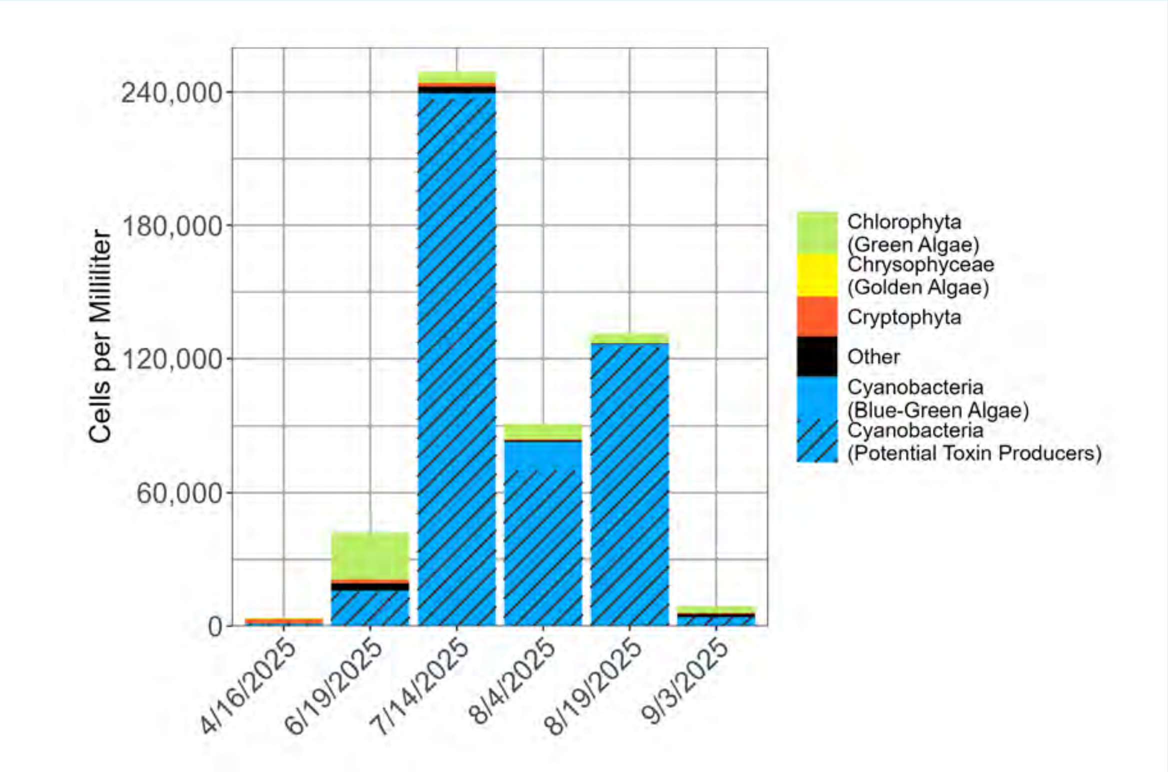
When water is warm and rich in nutrients, cyanobacteria can grow quickly forming blooms. These blooms can be considered harmful since some species can produce cyanotoxins. Human or wildlife exposure to cyanotoxins may cause skin irritations, including rashes, hives, swelling or skin blisters. Ingestion of cyanotoxins can also cause more severe health effects such as liver or kidney damage, seizures, or death, depending on the cyanotoxin and the magnitude, duration and frequency of the exposure. In 2025, a high abundance of blue-green algae was observed between mid-July and late August, ranging from 82,800 cells per milliliter in early August to 239,400 cells per milliliter in July. Of the blue-green algae species present between July and late August, 84%–99% were potential toxin producing species. Cyanotoxins were not monitored in Minnetoga Lake in 2025. The observed blue-green algae counts in July and late August 2025 were above the WHO threshold of 100,000 cells per milliliter for a moderate probability of adverse health effects to recreational users.

The abundance of blue-green algae observed in 2025 was notably higher than what has been observed in other monitored years within the last decade. Although there can be many causes of blue-green algal blooms, the high observed total phosphorus concentrations at lower depths within the water column due to loading from lake bottom sediment likely contributed to the growth and persistence of the blue-green algal population throughout the summer months. Some blue-green algae species can regulate their buoyancy to access preferrable nutrient conditions at lower depths. This was evident in Minnetoga Lake in 2025 where higher chlorophyll-*a* concentrations were observed as deep as 20 feet below the surface as compared to concentrations monitored near the surface.

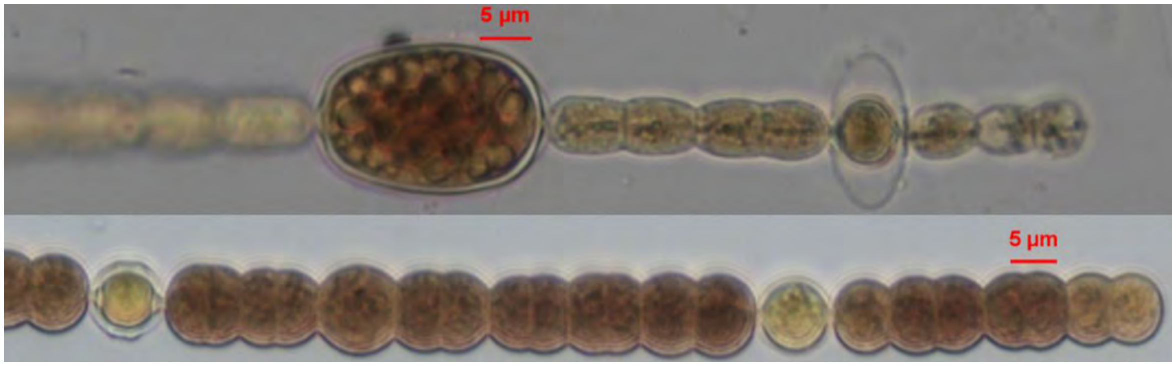
Phytoplankton

Phytoplankton, or algae, are microscopic organisms that are suspended or floating in the water column. Phytoplankton can be single cell, filamentous, or community-based organisms. They derive energy from the sun through photosynthesis and provide food for several types of aquatic organisms, including zooplankton, which are in turn eaten by fish. Zooplankton prefer to eat phytoplankton species that have higher nutritional quality, are easily edible, and are non-toxic. Freshwater zooplankton typically prefer certain species of cryptophytes, green algae, and haptophytes. Blue-green algae and diatoms are less desirable. An inadequate phytoplankton population limits a lake's zooplankton population and indirectly limits fish production in a lake. However, excess phytoplankton from high amounts of nutrients can reduce water clarity, impact aquatic plant growth, and possibly cause human health concerns.

Example of cyanobacteria (blue-green algae) scum



Between April and September 2025 the NMCWD collected phytoplankton (algae) samples for enumeration and identification. The figure above summarizes the number and major groups of phytoplankton observed. Blue-green algae (cyanobacteria) were the most abundant taxon (or group) found in Minnetoga Lake between July and September with notably higher abundances observed July through late August. A large percentage of the observed blue-green algae species were potential toxin producers (between 84%–100% of the observed blue-green abundance).



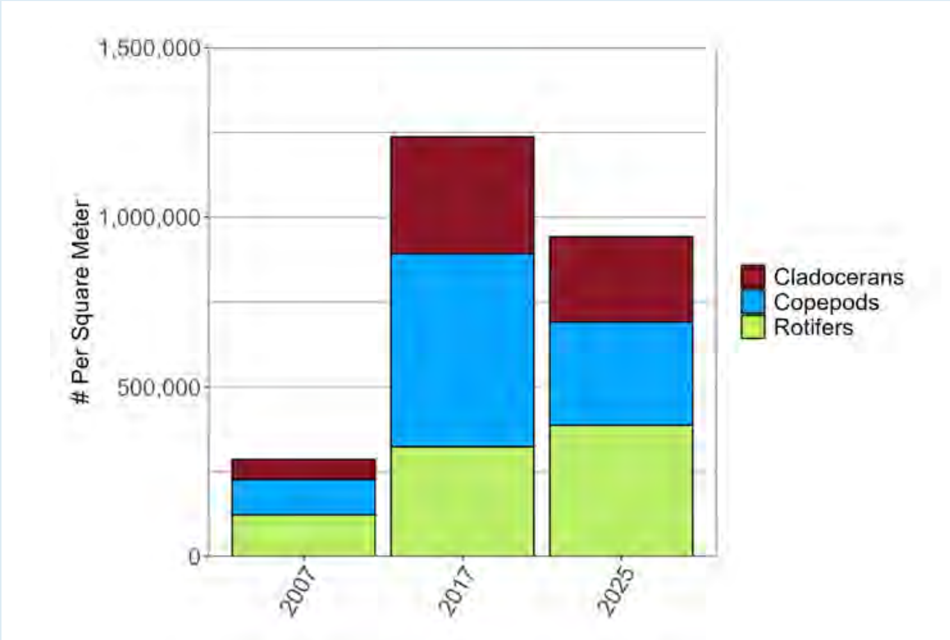
Microscopic images of two types of Dolichospermum that were found in Minnetoga Lake in early August 2025. Both are blue-green algae species which have the potential to produce cyanotoxins under certain environmental conditions.

(Source GreenWater Laboratories)

2.10.4 Zooplankton observations in Minnetoga Lake

Zooplankton are microscopic aquatic animals that drift and move throughout the lake water column. They play major roles in the aquatic food web by consuming algae and are primary food sources for larger organisms such as fish. The zooplankton community in Minnetoga Lake was monitored periodically between 2007 and 2025 to help evaluate water quality and the quality of food available to fish. Fish preference for certain groups of zooplankton can vary depending on the fish species, fish age, and the lake habitat. Copepods can have high protein content making them a nutritious option for certain fish species. Cladocerans tend to be larger in size (i.e., a more substantial food source) and can be relatively easy to capture due to their slower movements. Rotifers are generally smaller in size and provide less nutritional value compared to cladocerans and copepods. While adult fish often prefer larger prey that offer more energy and nutrients per capture, rotifers are still consumed by many fish species, particularly when other food sources are scarce. Additionally, the smaller size of rotifers may be attractive to young, larval fish species.

The figure below summarizes the historical summer averages of the major groups of zooplankton observed in Minnetoga Lake. Since 2007, the observed quantity of zooplankton and the percentages of observed rotifers, copepods, and cladocerans have been variable. Copepods and rotifers have typically been the most abundant; however, moderate to high abundances of cladocerans have also been observed. In 2025, the summer average zooplankton abundances were rather uniform. The summer averages ranged from approximately 251,600 cladocerans per square meter to 387,100 rotifers per square meter. Of the cladocerans present, the species *Daphnia mendotae* and *Bosmina longirostris*, types of water fleas, were found in higher abundances throughout the monitored summer period.



Water fleas (Daphnia, Cladocera) are a popular prey option for fish in lakes.

2.10.5 Summary for Minnetoga Lake

Monitoring data between 1974–2025 shows that the observed lake water quality has been variable, although observed parameters have been better than state standards for most monitored years. In 25 years of monitoring data, the summer average total phosphorus and chlorophyll-*a* concentrations have been better than state standards for 21 years for each parameter. However, in 2025 both the total phosphorus and chlorophyll-*a* concentrations failed to meet state standards. Most Secchi disk transparency measurements in the historical record were better than the state eutrophication standard, including the summer average Secchi disk depth in 2025. Water quality samples collected from the bottom waters of Lake Minnetoga in 2025 indicate that internal phosphorus loading from lake bottom sediment may be contributing to degraded conditions in the surface waters. Total phosphorus concentrations monitored at the bottom of the lake between July and September were 16–27 times higher than concentrations measured at the surface. Historical chloride concentrations have never exceeded the MPCA chronic standard.

In 2025, a moderate to high abundance of blue-green algae was observed between mid-July and late August. The observed blue-green algae values in July and late August 2025 were above the WHO threshold of 100,000 cells per milliliter for a moderate probability of adverse health effects to recreational users. The abundance of blue-green algae observed in 2025 was notably higher than what has been observed in other monitored years within the last decade. Although there can be many causes of blue-green algal blooms, the high observed total phosphorus concentrations at lower depths due to loading from lake bottom sediment likely contributed to the growth and persistence of the blue-green algal population throughout the summer months. Some blue-green algae species can regulate their buoyancy to access preferrable nutrient conditions at lower depths. This was evident in Minnetoga Lake in 2025 where higher chlorophyll-*a* concentrations were observed as deep as 20 feet below the surface as compared to concentrations monitored near the surface.

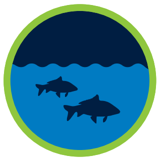
Since 2007, the observed quantity of zooplankton and the percentages of observed rotifers, copepods, and cladocerans have been variable. Copepods and rotifers have typically been the most abundant; however, moderate to high abundances of cladocerans have also been observed. In 2025, the summer average zooplankton abundances were rather uniform. The summer averages ranged from approximately 251,600 cladocerans per square meter to 387,100 rotifers per square meter.

The district completed a water quality study for Minnetoga Lake in 2000 to identify water quality and ecological improvement measures. The study concluded that water quality concerns were primarily due to excess phosphorus, which can fuel algal production and decrease water clarity. Several management practices have been implemented since the water quality study was completed, including the installation of three new stormwater detention ponds and upgrading two existing stormwater ponds to reduce pollutant loading from stormwater runoff. Additionally, the NMCWD continues to offer funding assistance of private stormwater retrofit installations through the NMCWD cost-share grant program. The district plans to complete an internal loading study in 2026 to assess if phosphorus loading from lake bottom sediment is impacting lake health.

2.11 Shady Oak Lake

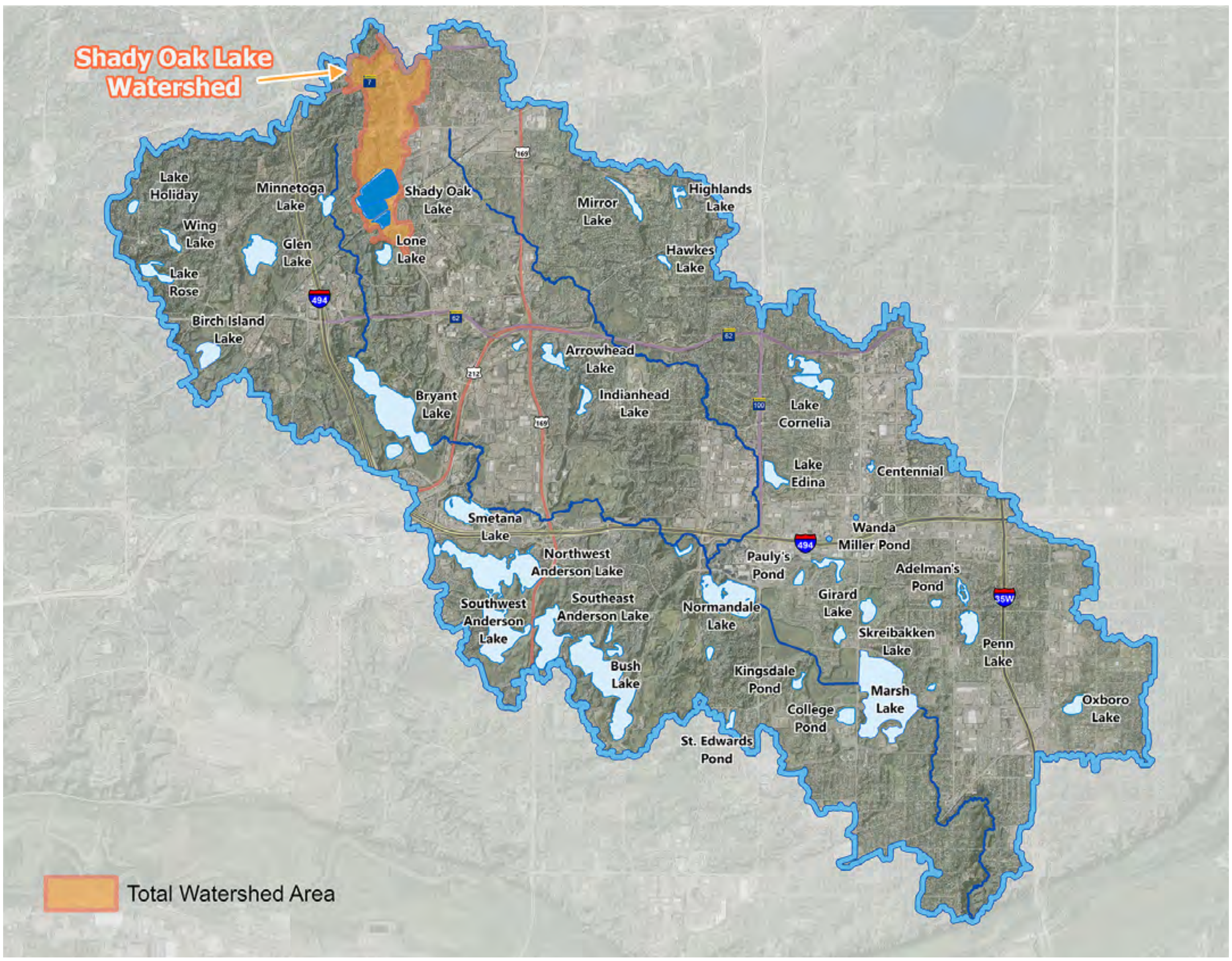
2025 MONITORED PARAMETERS

- **Aquatic Plants (Macrophytes)**
- **Fisheries**

Note: The district can provide aquatic plant survey and fisheries monitoring data upon request.

Parameter	Description
Shallow/Deep	Deep
Location	Minnetonka
Surface Area	90 acres (at 902 ft, NGVD29)
Average/Maximum Depth	11 feet / 35 feet (at 902 ft, NGVD29)
Watershed Area	648 acres
Watershed:Surface Area	7:1
Impairment Status	No impairments identified on Minnesota's 2024 impaired waters list
Downstream Waterbody	South Fork Nine Mile Creek



2.11.1 Aquatic Plant Observations in Shady Oak Lake

A healthy, urban, deep lake will have an abundance of aquatic plants growing throughout the lake's littoral zone (<15 feet). Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

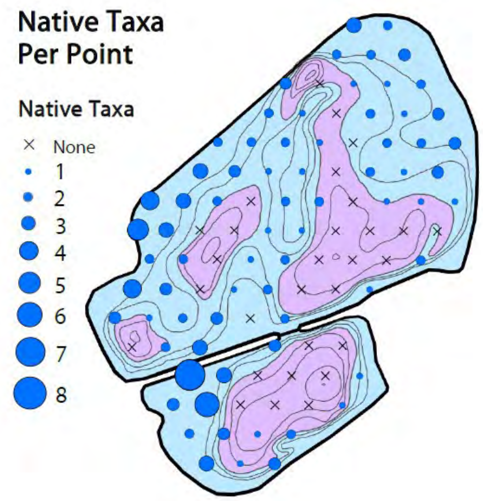
The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

The district conducted point intercept plant surveys in the middle and north basins of Shady Oak Lake in June and September of 2025 to assess the health of the plant community and inform aquatic invasive species management efforts. The following page provides a list of the plant species observed in 2025, their percent occurrence in June and September, and the locations native plants were found during the June survey. Graphs also summarize the historical plant IBI scores between 1995 and 2025, tracking how the plant health conditions have changed over time.

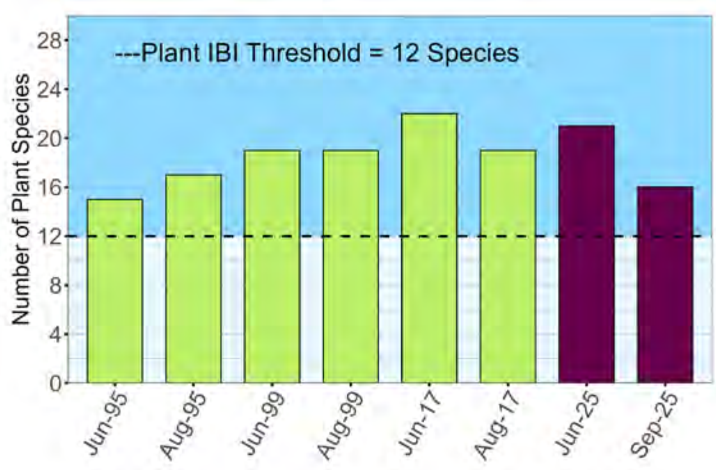
Illinois pondweed observed in Shady Oak Lake in September 2025

Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined)		100%	99%
Number of littoral points with plants			
Submerged Plants			
Myriophyllum spicatum	**Eurasian watermilfoil**	**75%**	**65%**
Ceratophyllum demersum	Coontail	68%	82%
Potamogeton zosteriformis	Flat-stem pondweed	51%	28%
Chara sp.	Muskgrass	22%	12%
Potamogeton illinoensis	Illinois pondweed	22%	40%
Najas flexilis	Slender naiad	18%	0%
Potamogeton crispus	**Curly-leaf pondweed**	**18%**	**0%**
Elodea canadensis	Canadian waterweed	14%	3%
Potamogeton foliosus	Leafy pondweed	12%	2%
Najas guadalupensis	Southern naiad	9%	8%
Stuckenia pectinata	Sago pondweed	6%	2%
Heteranthera dubia	Water stargrass	5%	8%
Ranunculus aquatilis	Stiff water crowfoot	5%	0%
Potamogeton richardsonii	Clasping-leaf pondweed	3%	6%
Najas minor	**Brittle naiad**	**2%**	**0%**
Potamogeton nodosus	Long-leaf pondweed	2%	Visual Only
Vallisneria americana	Wild celery	2%	Visual Only
Floating/Emergent Plants			
Nymphaea odorata	White waterlily	8%	11%
Potamogeton natans	Floating-leaf pondweed	Visual Only	3%
Sagittaria sp.	Arrowhead	Visual Only	0%
Schoenoplectus acutus	Hardstem bulrush	Visual Only	Visual Only

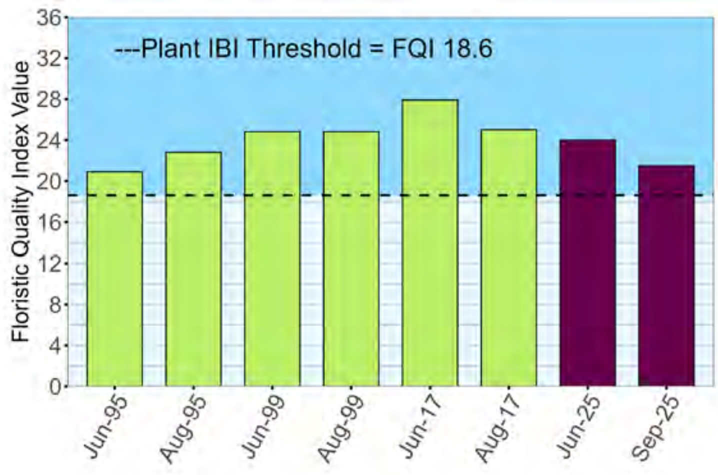
AIS are shown in **bold**, including Eurasian watermilfoil, curly-leaf pondweed, and brittle naiad.



Number of native plant species observed at each observation point in the middle and north basin of Shady Oak Lake in September 2025



Number of species: A deep lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 12 species. Since monitoring began in 1995, the number of plant species observed in Shady Oak Lake has exceeded the MNDNR Plant IBI threshold. The number of species observed in 2025 was consistent with observations in the historical record.



Floristic Quality Index (FQI) values (quality of species): A deep lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 18.6. Since monitoring began in 1995, the FQI observed in Shady Oak Lake has exceeded the MNDNR Plant IBI threshold. The floristic quality observed in 2025 was consistent with observations in the historical record.

Note: purple bars indicate period following significant infestation of Eurasian/hybrid watermilfoil and completion of herbicide treatments to reduce prevalence.

Shady Oak Lake, July 2023

Aquatic Invasive Plant Species

Three aquatic invasive plant species were found in the north and middle basin of Shady Oak Lake in 2025.

Eurasian watermilfoil (EWM) (*Myriophyllum spicatum*)

Eurasian watermilfoil was widespread throughout the north and middle basins in June 2025. EWM was collected on the rake at 49 locations (75% occurrence) and visually observed at 6 locations. On a scale of 1 (low) to 3 (high), the average rake density was 1.6 during the June survey. A whole-lake herbicide application was completed in late summer through fall 2025 to control the growth of EWM. A September survey was completed to assess the effectiveness of the treatment. While EWM was collected on the rake at 42 locations (65% occurrence) and visually observed at 6 locations in September most of the EWM plants showed clear indication of herbicide impacts.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

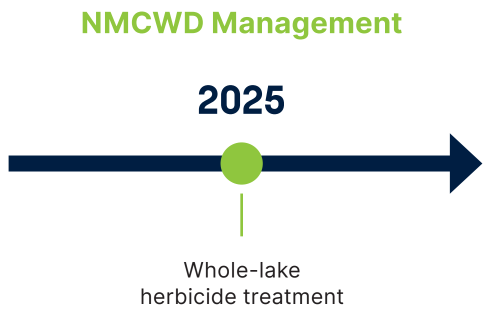
Curly-leaf pondweed was found scattered throughout the north basin and only visually observed at two locations in the middle basin in June 2025. Curly-leaf pondweed was collected on the rake at 12 locations in the north basin littoral area (18% occurrence) and visually observed at one location in the north basin and two locations in the middle basin in June. On a scale of 1 (low) to 3 (high), the average rake density was 1.1 during the June survey. During the September survey, curly-leaf pondweed was not observed. Low or no occurrence in September is typical for the plant's growth cycle.

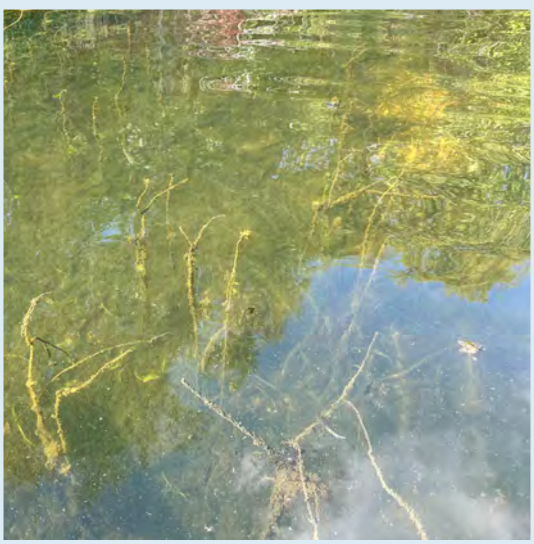
Brittle Naiad (BN) (*Najas minor*)

Brittle naiad was found scattered around the nearshore areas of the north and middle basins in June 2025, but was collected on the rake at only 1 location (2% occurrence). A whole-lake herbicide application was completed in late summer through fall 2025 to control the growth of BN. A September survey was completed to assess the effectiveness of the treatment. No BN was found during the September survey.

2.11.2 Aquatic Invasive Species (AIS) Plant Management Practices

The NMCWD began managing submerged AIS in the north and middle basins of Shady Oak Lake in 2025. Whole-lake herbicide applications were completed between July and September 2025 to manage the growth of Eurasian watermilfoil and brittle naiad. Post-herbicide plant surveys in September 2025 documented good control of both species. No brittle naiad plants were found in September and most of the Eurasian watermilfoil plants had noticeable growth impacts. Herbicide treatments are expected to continue in 2026.

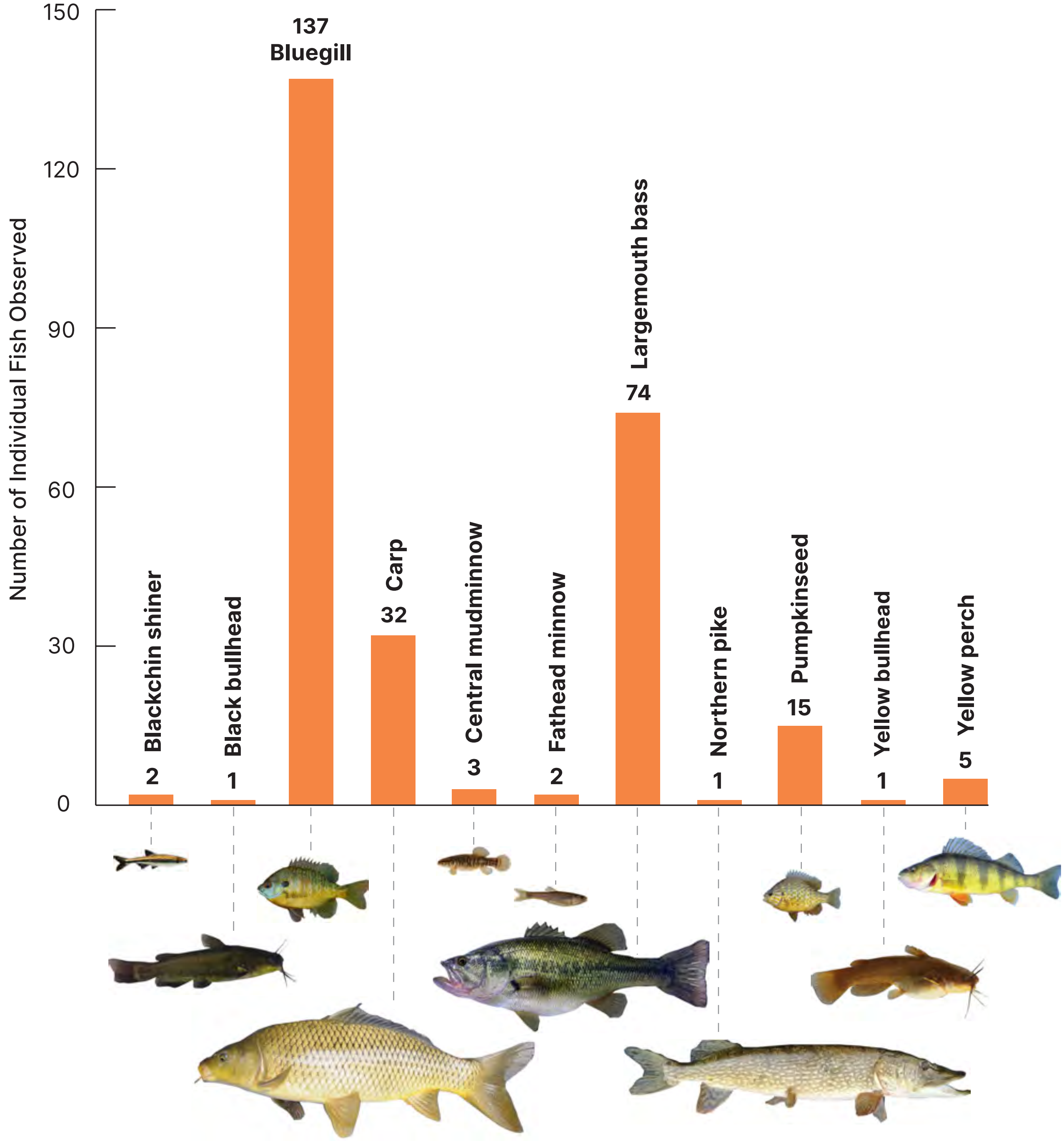




During the September 2025 survey, most Eurasian watermilfoil plants showed herbicide impacts: completely bare stems (left) or mostly bare with a few leaves (right).

2.11.3 Fisheries Observations in Shady Oak Lake

The NMCWD collects fisheries data periodically to assess the health of the fish community and to evaluate if rough fish populations are impacting lake water quality. NMCWD conducted a fisheries assessment within the north and middle basins of Shady Oak Lake in summer 2025 using **electrofishing**. Eleven species were observed as shown below. Bluegill and largemouth bass were found at the highest abundances. The invasive rough fish species, common carp, was also found in 2025. The NMCWD plans to perform additional surveys in 2026 to better understand the possible water quality impacts of common carp in Shady Oak Lake and evaluate potential management practices.



2.12 Normandale Lake

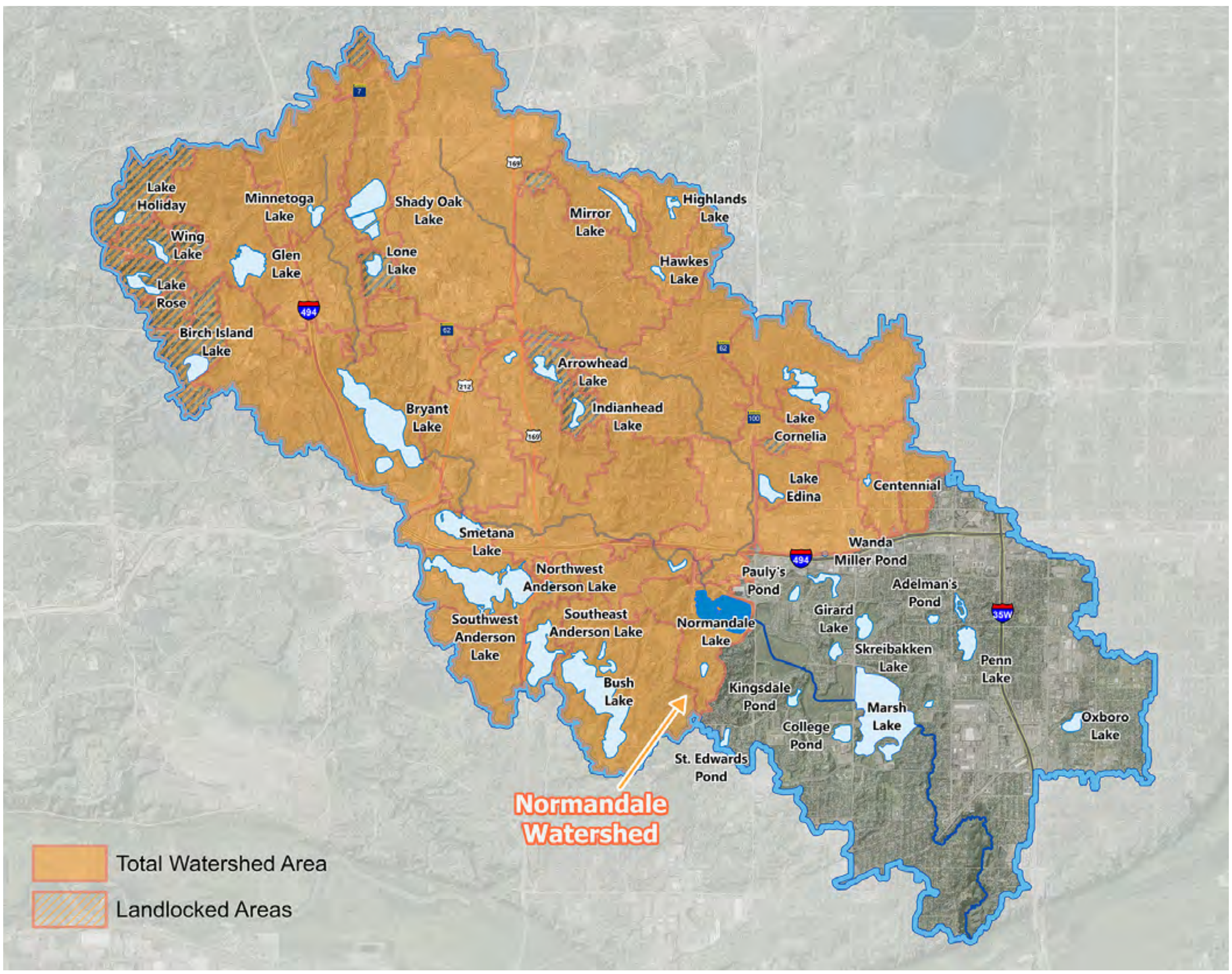
2025 MONITORED PARAMETERS

- **Aquatic Plants (Macrophytes)**
- **Fisheries**

Note: The district can provide aquatic plant survey and fisheries monitoring data upon request.

Parameter	Description
Shallow/Deep	Shallow
Location	Bloomington
Surface Area	112 acres
Average/Maximum Depth	3 feet/ 9 feet
Direct Watershed Area	582 acres
Total Watershed Area*	21,603 acres (1,637 landlocked)
Watershed:Surface Area	178:1
Impairment Status	No impairments identified on Minnesota’s 2024 impaired waters list
Upstream Waterbody	North & South Forks Nine Mile Creek
Downstream Waterbody	Main Stem Nine Mile Creek

* Includes 1,637 acres that are typically landlocked



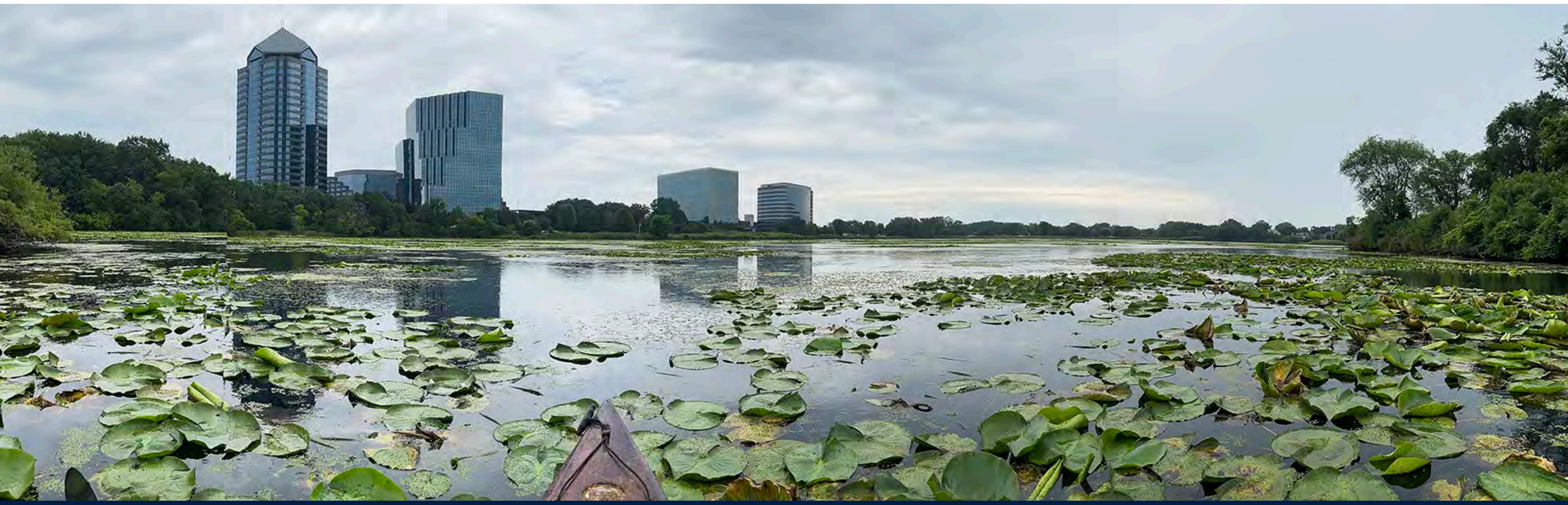
2.12.1 Aquatic Plant Observations in Normandale Lake

A healthy, shallow, urban lake will have an abundance of aquatic plants growing throughout the entire lake due to the shallowness and higher amounts of nutrients. Aquatic plants can provide excellent habitat for insects, zooplankton, fish, waterfowl, and other wildlife. The plants can also help to take phosphorus and nitrogen from the lake water, reducing the amount of nutrients available for algal growth. However, excess nutrients can lead to an overabundance of algal growth that creates turbid (murky-looking, low clarity) water. Lake water with low clarity can limit or prevent aquatic plant growth, which can lead to an unhealthy plant community, including reductions in the quantity and diversity of aquatic plants.

The ability to assess the health of a lake's plant community is a valuable tool in the conservation of Minnesota's lakes. With this objective in mind, the Minnesota Department of Natural Resources (MNDNR) developed a Lake Plant Eutrophication Index of Biological Integrity (IBI) to measure the response of a lake plant community to eutrophication. The MNDNR Lake Plant Eutrophication IBI includes two metrics: (1) the number of species in a lake; and (2) the "quality" of the species, as measured by the floristic quality index (FQI). The MNDNR has determined a threshold for each metric and lakes that score below the thresholds have degraded plant communities and are likely stressed from cultural eutrophication.

The district conducted point intercept plant surveys of Normandale Lake in June and August of 2025 to assess the health of the plant community. The following page provides a list of native plant species observed, summarizes their percent occurrence, and shows the locations native plants were found during the August survey. Graphs also summarize the historical plant IBI scores between 2002 and 2025, tracking how the plant health conditions have changed over time.

The 2025 plant survey in Normandale Lake showed that the submerged plant species with the highest occurrence included coontail, flat-stem pondweed, and common waterweed. In the last 5 years the occurrence of flat-stem pondweed in Normandale Lake has notably increased from 8% in June 2020 to 49% in August 2025. The species of floating and emergent plants with the highest observed occurrence in 2025 included filamentous algae, common watermeal, duckweed (small/large), and white water lily. In the last five years the occurrence of common watermeal has been variable, ranging between 10%–85% occurrence. In 2025, the frequency of occurrence of common watermeal in June and August was 36% and 85%, respectively. In the last five years, the occurrence of white water lily in Normandale Lake has notably increased from 5% in June 2020 to 43% in August 2025.

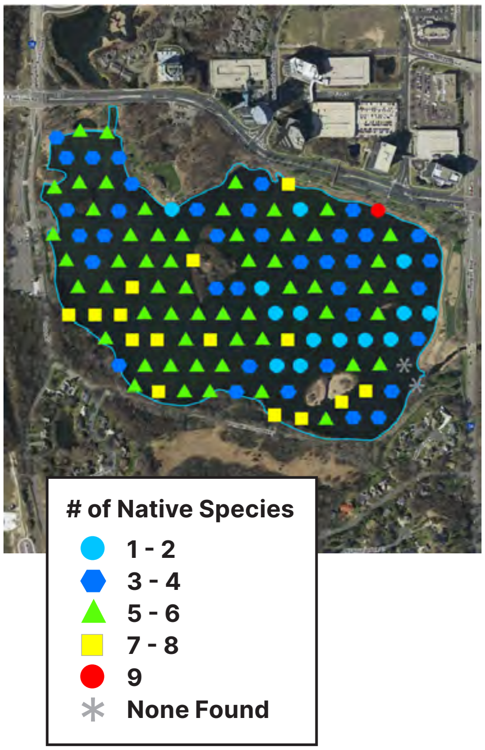


Aquatic Plant Observations in Normandale Lake

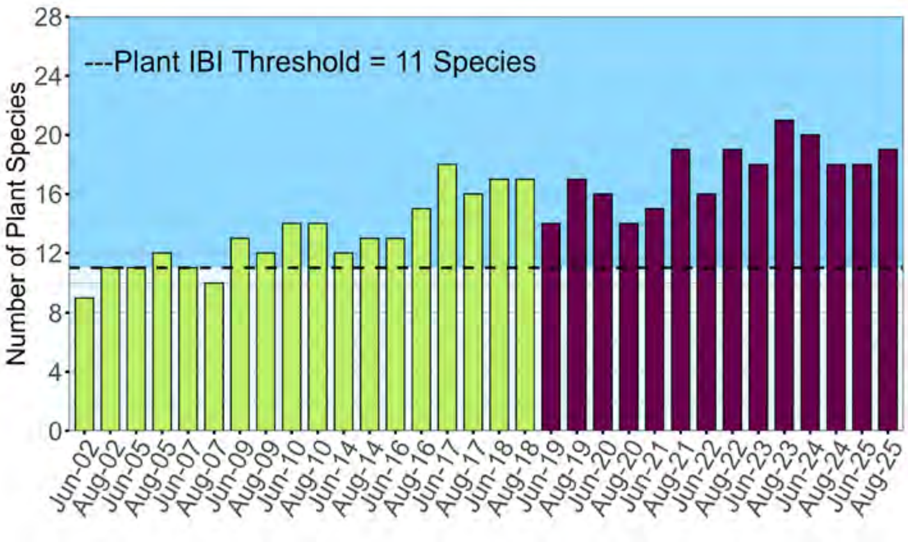
Plants	Common Name	% Occurrence in June 2025	% Occurrence in August 2025
All Plants (Combined) Number of littoral points with plants		98%	98%
Submerged Plants			
Ceratophyllum demersum	Coontail	71%	81%
Potamogeton zosteriformis	Flat-stem pondweed	48%	49%
Elodea canadensis	Common waterweed	33%	38%
Potamogeton crispus	**Curly-leaf pondweed**	**14%**	**1%**
Stuckenia pectinata	Sago pondweed	14%	6%
Potamogeton pusillus	Small pondweed	13%	7%
Potamogeton nodosus	Long-leaf pondweed	5%	6%
Zannichellia palustris	Horned pondweed	2%	0%
Chara sp.	Muskgrasses	1%	1%
Heteranthera dubia	Water star-grass	1%	2%
Najas flexilis	Slender naiad	0%	1%
Floating/Emergent Plants			
Filamentous algae	Filamentous algae	46%	58%
Lemna minor	Small duckweed	36%	78%
Lemna trisulca	Forked duckweed	0%	2%
Wolffia columbiana	Common watermeal	36%	85%
Spirodela polyrhiza	Large duckweed	35%	69%
Nymphaea odorata	White water lily	33%	43%
Typha angustifolia	**Narrow-leaved cattail**	**1%**	**1%**
Eleocharis erythropoda	Bald spikerush	Visual Only	1%
Phalaris arundinacea	**Reed canary grass**	**Visual Only**	**Visual Only**
Polygonum amphibium	Water smartweed	Visual Only	1%
Sparganium eurycarpum	Common bur-reed	Visual Only	Visual Only
Hydrocotyle ranunculoides	Floating pennywort*	Visual Only	Visual Only
Lythrum salicaria	**Purple loosestrife**	**Visual Only**	**1%**
Phragmites australis	**Common reed**	**Visual Only**	**Visual Only**
Sagittaria latifolia	Common arrowhead	Visual Only	Visual Only

AIS are shown in **bold**, including curly-leaf pondweed, narrow-leaved cattail, reed canary grass, purple loosestrife, and common reed.

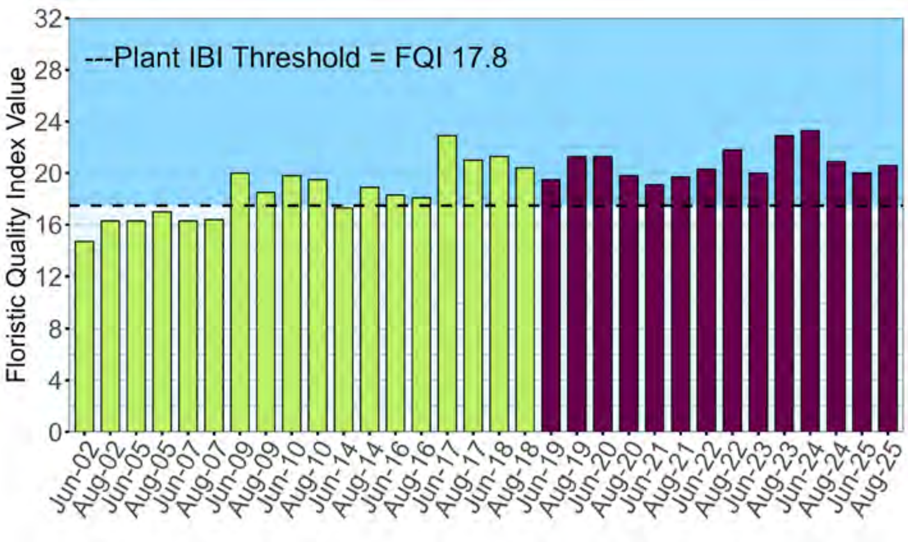
* Floating pennywort is native to the United States, but not to the state of Minnesota. Its growth patterns are being monitored by the MNDNR.



Number of native plant species observed at each observation point in Normandale Lake in August 2025.



Number of species: A shallow lake fails to meet the MNDNR Plant IBI threshold when it has fewer than 11 species. Since 2009 the number of plant species observed in Normandale Lake has been better than the plant IBI threshold.



Floristic Quality Index (FQI) values (quality of species): A shallow lake fails to meet the MNDNR Plant IBI threshold when the lake has an FQI value less than 17.8. In 2025, Normandale Lake had FQI values that were better than the IBI threshold.

Note: purple bars indicate period following completion of a whole-lake drawdown (2018/2019) and subsequent spring herbicide treatments (2020–2025) to reduce CLP prevalence.

Aquatic Invasive Plant Species

Five aquatic invasive plant species were found in Normandale Lake in 2025.

Curly-leaf pondweed (CLP) (*Potamogeton crispus*)

A spot herbicide application was completed on Normandale Lake in spring 2025 to manage the growth of curly-leaf pondweed (CLP). A June 2025 point intercept survey was used to assess the effectiveness of the spring treatment and help determine management needs for 2026. CLP was collected on the rake at 17 locations (14% occurrence) and visually observed at 6 locations in June. On a scale of 1 (low) to 3 (high), the average rake density was 1.5 during the June survey. During the August survey, CLP was collected on the rake at one location. Minimal CLP growth in August is typical for the plant's growth cycle.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife was observed scattered throughout the shoreline and on the largest island in June and August. Most purple loosestrife plants are managed naturally by Galerucella, a purple loosestrife eating beetle. The beetles control purple loosestrife plants by eating the plants. Because they are expected to control the purple loosestrife in the lake, no additional management is typically implemented. In 2025, while some beetle damage was apparent, most plants were still thriving.

Common reed (*Phragmites australis*)

Observed at one location along the southern island in August.

Reed canary grass (*Phalaris arundinaceae*)

Observed scattered along the northern and southern shorelines.

Image source: Endangered Resources Services

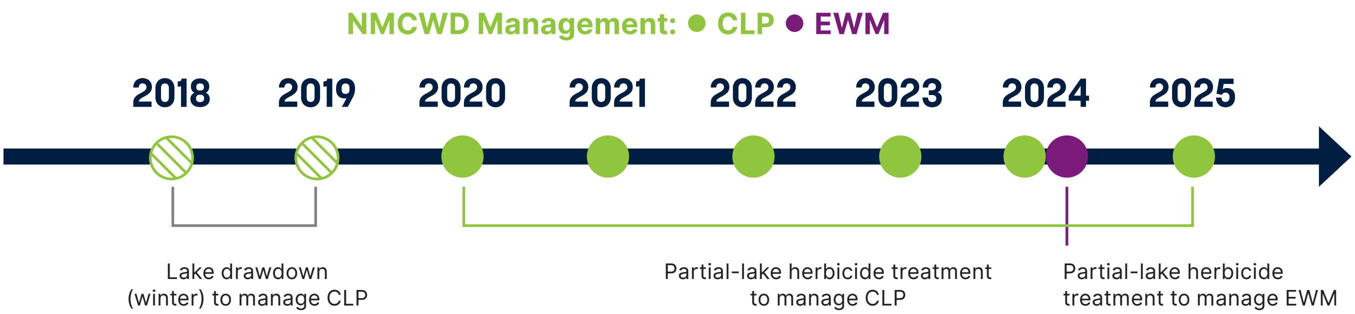
Narrow-leaved cattail (*Typha angustifolia*)

Observed scattered along the northern and southern shorelines.

2.12.2 Aquatic Invasive Species (AIS) Plant Management Practices

In 2018, the district began implementation of the Normandale Lake Water Quality Improvement Project, in partnership with the City of Bloomington. A whole-lake drawdown was performed on Normandale Lake between fall 2018 and spring 2019 to manage the aquatic invasive plant species curly-leaf pondweed (CLP). The lake was drawn down to allow the lakebed to freeze over the winter. Curly-leaf pondweed primarily propagates through the production of dormant vegetative propagules called turions. Turions are produced in late spring, remain dormant in sediment through the summer, and germinate under cooler water conditions in the fall. A winter freeze can kill the turions, thus disrupting curly-leaf pondweed's reproductive cycle. Following the lake drawdown, the NMCWD performed plant surveys and applied spot herbicide treatments as necessary to areas with continued curly-leaf pondweed growth within Normandale Lake and portions of Nine Mile Creek immediately upstream of the lake. Spot herbicide treatments were completed between 2020–2025.

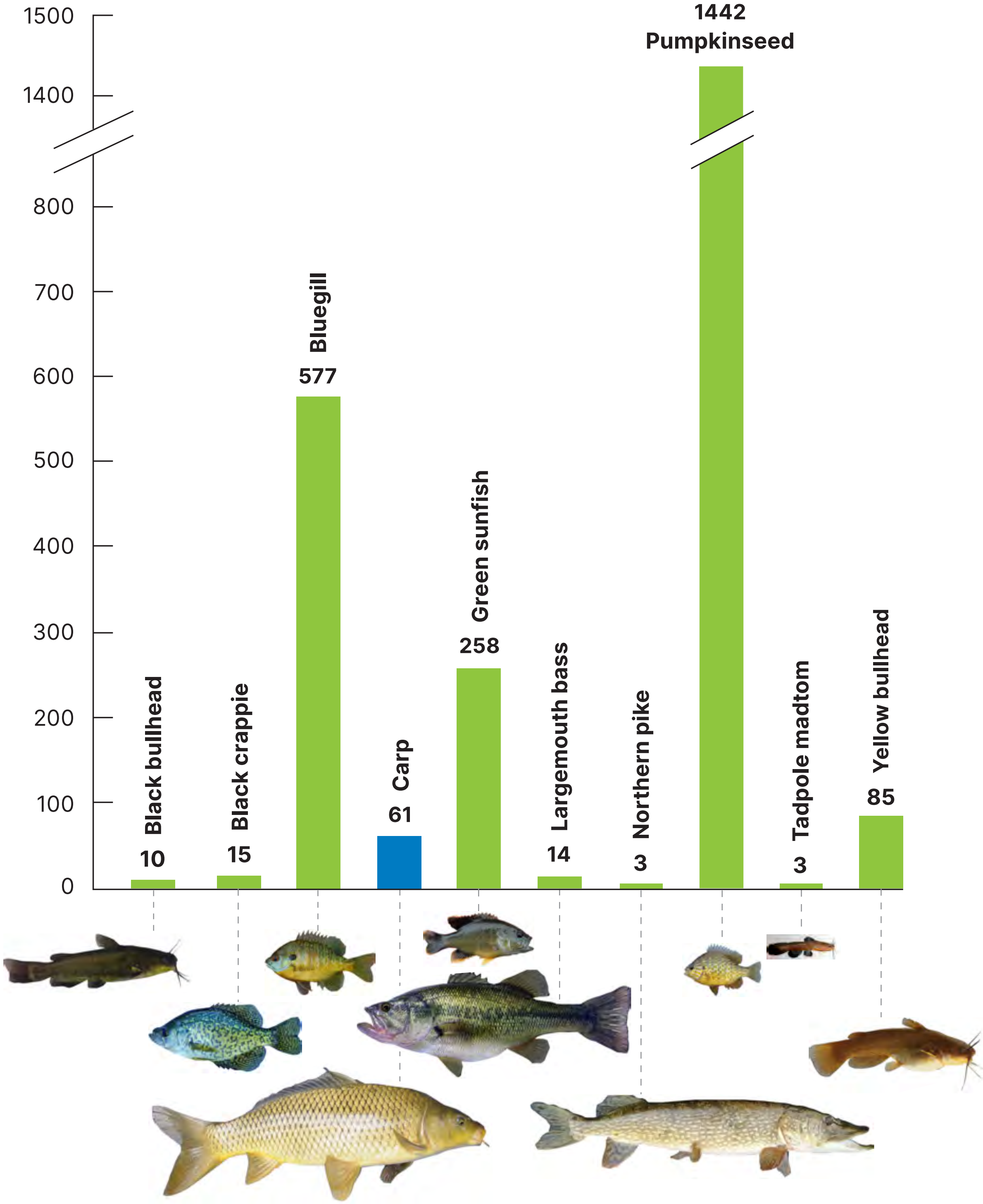
In fall 2024, the district performed a spot herbicide treatment on Normandale Lake to manage the growth of Eurasian watermilfoil (EWM). Established EWM beds were found at three locations during the June plant survey. As such, the district performed a spot herbicide treatment to limit the spread of this aggressive aquatic invasive species.



An April plant survey was completed to assess CLP growth conditions. A spot herbicide treatment was applied in spring 2025 to manage the spread of this invasive species.

2.12.3 Fisheries Observations in Normandale Lake

The NMCWD collects fisheries data periodically to assess the health of the fish community and to evaluate if rough fish populations are impacting lake water quality. NMCWD conducted a fisheries assessment of Normandale Lake in summer 2025 using **trap nets** and **box nets**. Ten species were observed as shown below. Pumpkinseed, bluegill, and green sunfish were found at the highest abundances. The invasive rough fish species, common carp, was also observed. The next page discusses the management practices that the NMCWD has completed to help manage the rough fish population in Normandale Lake.



2.12.3.1 Fisheries Management

Fisheries surveys completed by the district between 2019 and 2021 identified carp at biovolumes large enough to warrant further assessment and management planning as carp can have negative effects on lake water quality. The *Integrated Pest Management Plan (IPM Plan) for Common Carp in Normandale Lake* (updated December 2023) was completed by WSB to review the ecological and hydrological conditions of Normandale Lake and its connected water bodies to develop cost-effective ways to reduce carp populations and limit recruitment. Carp removal efforts have occurred annually between 2021–2025. In 2025, one box net trap was deployed and lifted on eight occasions in Normandale Lake. In total, 280 pounds or approximately 60 individual carp were removed from Normandale Lake in 2025. The district also prepared to remove carp from upstream locations in the Nine Mile Creek, similar to years prior. However, although fish movement surveillance increased in 2025, no carp were seen moving in the creek.

District staff participating in a nighttime carp removal at Normandale Lake in 2025.

District staff assisting with carp removal from a box net trap in Normandale Lake.

3 NINE MILE CREEK STREAM MONITORING

A summary of the 2025 and historical water quality and ecological monitoring data collected at locations along the Nine Mile Creek

North Fork Nine Mile Creek, summer 2025

The Nine Mile Creek Watershed District monitors the water quality and ecological health of the Nine Mile Creek on an annual basis. Because the primary use of Nine Mile Creek is ecological—a place for fish and aquatic life to live—the focus of the Nine Mile Creek monitoring program is the evaluation of the stream's aquatic life community as well as the ecosystem components essential for the survival of aquatic life. The district's stream monitoring program typically consists of the following monitoring:

- **Water quality monitoring** on eight occasions (once a month March through October)
- **Automated stream pollutant monitoring** following the Metropolitan Council's Watershed Outlet Monitoring Program (**WOMP**)—water quality grab samples are collected monthly, composite water quality samples are collected during most storm events larger than 0.5 inches, and stream flow is continuously monitored
- **Habitat monitoring** on one occasion during the summer
- **Fish community monitoring** on one occasion during the summer
- **Macroinvertebrate community monitoring** on one occasion during the fall

Ten locations were monitored for water quality in 2025, including four locations on the North Fork, three locations on the South Fork, and three locations on the Main Stem. Eight locations were monitored for habitat, fish, and macroinvertebrates. Monitoring locations are shown on Figure 1-2. Table 3-1 summarizes the stream monitoring completed by the district in 2025. Stream monitoring locations are listed upstream to downstream for each stream reach. Results of the district's 2025 stream monitoring are summarized in detail in the subsections of this chapter.

Electrofishing on Nine Mile Creek in 2025

Table 3-1 Summary of 2025 Stream Monitoring by the Nine Mile Creek Watershed District

Monitoring Location	Location Description	Water Quality	Ecological (Habitat, Fish, Macroinvertebrates)
ECU 1A-2*	**North Fork** of Nine Mile Creek, immediately west of Highway 169 in Hopkins	A	C
ECU 2	**North Fork** of Nine Mile Creek, east of Cahill Road and north of Brook Drive (Heights Park) in Edina	A	C
N3	**North Fork** of Nine Mile Creek at Metro Boulevard in Edina. Station N3 is one of the automated stream monitoring stations (WOMP stations)	A, B	NM
ECU-2A	**North Fork** of Nine Mile Creek, immediately downstream of West 77th Street / West of Highway 100 in Bloomington	NM	C
ECU 2AWQ	**North Fork** of Nine Mile Creek, downstream of Interstate 494 and immediately upstream of 81st Street in Bloomington.	A	NM
ECU 3A	**South Fork** of Nine Mile Creek, immediately upstream of the Highway 62 crossing and the Bryant Lake Park Reserve and downstream of Bren Road in Minnetonka.	A	C
N2	**South Fork** of Nine Mile Creek at West 78th Street in Bloomington. Station N2 is an automated WOMP stream monitoring station	A, B	NM
ECU 5A	**South Fork** of Nine Mile Creek, in Corridor Park immediately downstream of Interstate 494 and west of East Bush Lake Road in Bloomington	A	C
ECU 7A/N1	**Main Stem** of Nine Mile Creek, downstream of Marsh Lake and immediately downstream of 98th Street in Bloomington. Station 7A is also an automated WOMP Station (N1).	A, B	C
ECU 7B	**Main Stem** of Nine Mile Creek, downstream of Old Shakopee Road at 103rd Street in Bloomington.	A	C
ECU-7C	**Main Stem** of Nine Mile Creek, downstream of 106th Street in Bloomington.	A	C

A Monitored water quality parameters included specific conductance, dissolved oxygen, pH, temperature, turbidity, and flow on eight occasions (once a month March through October).

B Monitored water quality parameters during monthly grab samples and storm event composite samples include alkalinity, chloride, COD, hardness, ammonia nitrogen, nitrate, nitrite, total Kjeldahl nitrogen, total phosphorus, orthophosphate, sulfate, total organic carbon, total suspended solids, and volatile suspended solids. Chlorophyll-*a* and E. coli is only collected during monthly grab samples. Continuous flow monitoring data is also collected at these locations.

NM Not monitored

C Monitored ecological parameters included water depth, flow, depth of fine sediment, percent embeddedness, length of eroded streambank, fish community, and macroinvertebrate community on one occasion.

* In 2025 ECU-1A-1 was moved slightly upstream from the location monitored between 2013–2024 due to access safety concerns

NOTE: See next page for stream monitoring terms

3.1 Stream Monitoring Terms

Chloride

Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians.

Specific Conductance

Specific conductance is a measure of water's ability to pass an electrical current via ions dissolved in the water such as alkalis, chloride, sulfides, and carbonate compounds. The higher the specific conductance, the more dissolved salts and minerals that are present in the water. For example, high chloride concentrations can lead to high specific conductance impacting species diversity and community structures.

Turbidity (and Total Suspended Solids)

Turbidity is a measurement of the relative clarity of the water by computing the amount of light that is scattered by material floating in the water. As the water gets less clear due to an increase in particles (i.e., total suspended solids including sediment, soils, detritus), the turbidity value increases. High turbidity can affect light penetration and reduce plant growth, and can result in harm to habitat areas for fish and other aquatic life due to increased sedimentation and siltation. Increased turbidity and suspended solids can also increase water temperature, as darker, less clear water will adsorb more radiation from the sun.

pH

pH is the measurement of the acidity or basicity of the water. The scale ranges between 1 (very acidic) to 14 (very basic), with 7 being neutral. Natural freshwaters typically have a pH ranging between 6.5–9.0 depending on water quality and environmental conditions. Aquatic organisms have pH thresholds to maintain healthy growth. Changes in pH, especially sudden changes, can result in stress or fatality to aquatic organisms.

Dissolved Oxygen

Dissolved oxygen is the concentration (or the amount) of oxygen gas incorporated in water. Oxygen can enter the water from the atmosphere, or it can accumulate from the oxygen released by plants or algae during photosynthesis. Sufficient dissolved oxygen is necessary to support the health and reproduction of organisms such as aquatic insects and fish. Major physical properties that can influence the concentration of dissolved oxygen include temperature, flow, turbulence, nutrient levels, and level of decomposition.

Temperature

Temperature is the measurement of the water temperature. Factors that control stream water temperature include air temperature, geology, amount of shading, and water inputs from the tributary watershed and springs. Aquatic organisms are adapted to prefer certain temperature ranges. Increases in temperature due to altered landscapes can cause stress to aquatic organisms.

Phosphorus

Phosphorus is an essential nutrient required for biological production. Phosphorus can enter a stream from stormwater runoff or be produced during the degradation of organic matter. Elevated phosphorus can influence plant species, alter food resources for aquatic organisms, and lead to higher risk of low oxygen conditions (due to increased bacterial decomposition).

Macroinvertebrates

Macroinvertebrates (or aquatic insects) are organisms that lack a spine and are large enough to be seen with the naked eye. They play major roles in recycling nutrients and are primary food sources for fish. Because macroinvertebrates can respond quickly to aquatic environmental changes measurements of their diversity and abundance can be good indicators of stream health.

3.2 Water Quality Goals for the Nine Mile Creek—Minnesota State Standards

The information below and the table on the next page summarize the stream water quality standards and ecological thresholds used by the NMCWD to assess stream health. These standards and thresholds will be referenced throughout the report and shown on summary plots and figures.

- **Minnesota Stream Water Quality Standards by Class—**The Minnesota Pollution Control Agency (MPCA) specifies standards applicable to Minnesota streams to protect aquatic life. Nine Mile Creek is required to meet the most restrictive water quality standards for Classes 2B, 2C, or 2D; 3A, 3B, 3C, or 3D; 4A, 4B or 4C; and 5. The levels of dissolved oxygen, pH, and temperature in Nine Mile Creek were compared to Minnesota State standards for Class 2B streams and specific conductance was compared with the Minnesota State standard for a Class 4A stream because they are the most restrictive water quality standards for these parameters.

- **Minnesota Chloride Standards—**Because high concentrations of chloride can harm fish and plant life, the MPCA has established acute and chronic exposure chloride standards. The chronic standard for chloride to protect Class 2B streams is 230 mg/L. The acute (maximum) standard to protect Class 2B streams is 860 mg/L. Two or more exceedances of the chronic criterion within a three-year period are considered an impairment. One exceedance of the acute criterion is considered an impairment.

- **Minnesota Eutrophication Standards—**The MPCA has developed standards for river eutrophication designed to protect aquatic life. The eutrophication standards were developed for three geographic regions. The total phosphorus concentrations monitored at the Nine Mile Creek WOMP stations N1, N2, and N3 were compared to the Minnesota State standards for the Central Region.

- **Minnesota Total Suspended Solids (TSS) Standard—**In 2015, the MPCA introduced a total suspended solids (TSS) standard based on geographic region and stream class due to difference in natural background conditions resulting from varied geology and biological sensitivity. The TSS concentrations collected at the Nine Mile Creek WOMP stations N1, N2, and N3 were compared to the Minnesota State standards for the Central Region. Turbidity was a state standard from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids and is measured at the ECU monitoring locations.

- **Minnesota Fish Community Standards—**For fish community monitoring, the NMCWD uses the Fish Index of Biological Integrity (FIBI) standards developed by the MPCA. The MPCA FIBI is on a 0 to 100 scale with increasing scores indicating improving stream health. The MPCA has classified Minnesota streams into nine types corresponding to regional patterns in the composition of stream fishes. Stream type is differentiated by geographic region, contributing drainage area, reach-scale gradient, and thermal classification. A unique FIBI and biocriterion were developed for each stream type. The FIBI standard and confidence limit applicable to the North Fork of Nine Mile Creek from Metro Boulevard to the downstream end of Marsh Lake are those designated for Class 2Bm Southern Headwaters streams. The FIBI standard and confidence limit applicable to the other reaches of Nine Mile Creek are those designated for Class 2Bg Southern Headwaters streams. The MPCA has determined confidence limits around the standards to account for variability within the aquatic community because of natural spatial and temporal differences and sampling or method errors.

- **Minnesota Macroinvertebrate Community Standards—**For macroinvertebrate community monitoring, the NMCWD uses the Macroinvertebrate Index of Biological Integrity (MIBI) standards developed by the MPCA. The MPCA MIBI is on a 0 to 100 scale with increasing scores indicating improving stream health. The MPCA has classified Minnesota streams into nine types corresponding to regional patterns in the composition of stream macroinvertebrates. Stream type is differentiated by geographic region, contributing drainage area, reach-scale gradient, and thermal classification. Unique MIBI and biocriterion were developed for each stream type. The eight biological monitoring locations of Nine Mile Creek fall under the stream types of either Class 2Bm Southern Stream Riffle Run (RR), Class 2Bg Southern Stream RR, or Class 2Bg Southern Forest Stream Glide Pool (GP).

Table 3-2 Water Quality Standards and Ecological Thresholds used by the NMCWD to assess stream health

<table>
<tr><th>Type</th><th colspan="2">Parameter</th><th>Stream Standard/Threshold</th></tr>
<tr><td rowspan="8">Water Quality</td><td colspan="2">Dissolved Oxygen (mg/L)</td><td>≥ 5</td></tr>
<tr><td colspan="2">pH</td><td>6.5–9.0</td></tr>
<tr><td colspan="2">Temperature (°F)</td><td>Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F</td></tr>
<tr><td colspan="2">Specific Conductance (µmhos/cm @ 25°C)</td><td>< 1,000</td></tr>
<tr><td colspan="2">Chloride (mg/L)</td><td>≤ 230 (chronic)
≤ 860 (acute)</td></tr>
<tr><td colspan="2">Total Phosphorus (µg/L)</td><td>≤ 100</td></tr>
<tr><td colspan="2">Total Suspended Solids (mg/L)</td><td>< 30</td></tr>
<tr><td colspan="2">Turbidity (NTU)</td><td>< 25[6]</td></tr>
<tr><td rowspan="4">Fish Community (Fish Index of Biological Integrity (FIBI))</td><td rowspan="2">Class 2Bg Southern Headwaters[1]</td><td>FIBI Standard</td><td>≥ 55</td></tr>
<tr><td>FIBI Lower Confidence Limit</td><td>≥ 48</td></tr>
<tr><td rowspan="2">Class 2Bm Southern Headwaters[2]</td><td>FIBI Standard</td><td>≥ 33</td></tr>
<tr><td>FIBI Lower Confidence Limit</td><td>≥ 26</td></tr>
<tr><td rowspan="6">Macroinvertebrate Community (Macroinvertebrate Index of Biological Integrity (MIBI))</td><td rowspan="2">Class 2Bg Southern Forest Stream GP[3]</td><td>MIBI Standard</td><td>≥ 43</td></tr>
<tr><td>MIBI Lower Confidence Limit</td><td>≥ 29.4</td></tr>
<tr><td rowspan="2">Class 2Bg Southern Stream RR[4]</td><td>MIBI Standard</td><td>≥ 37</td></tr>
<tr><td>MIBI Lower Confidence Limit</td><td>≥ 24.4</td></tr>
<tr><td rowspan="2">Class 2Bm Southern Stream RR[5]</td><td>MIBI Standard</td><td>≥ 24</td></tr>
<tr><td>MIBI Lower Confidence Limit</td><td>≥ 11.4</td></tr>
</table>

[1] Monitoring stations ECU-1A-2, ECU-2, ECU-3A, ECU-5A, ECU-7A, ECU-7B, ECU-7C

[2] Monitoring station ECU-2A

[3] Monitoring stations ECU-5A

[4] Monitoring stations ECU-1A-2, ECU-2, ECU-3A, ECU-7A, ECU-7B, ECU-7C

[5] Monitoring station ECU-2A

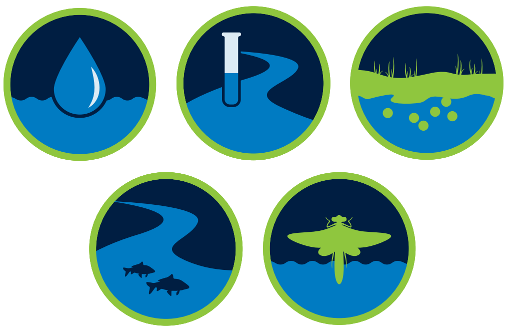
[6] Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

mg/L = milligrams per liter; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; µg/L = micrograms per liter; NTU = Nephelometric Turbidity Units

3.3 North Fork Nine Mile Creek

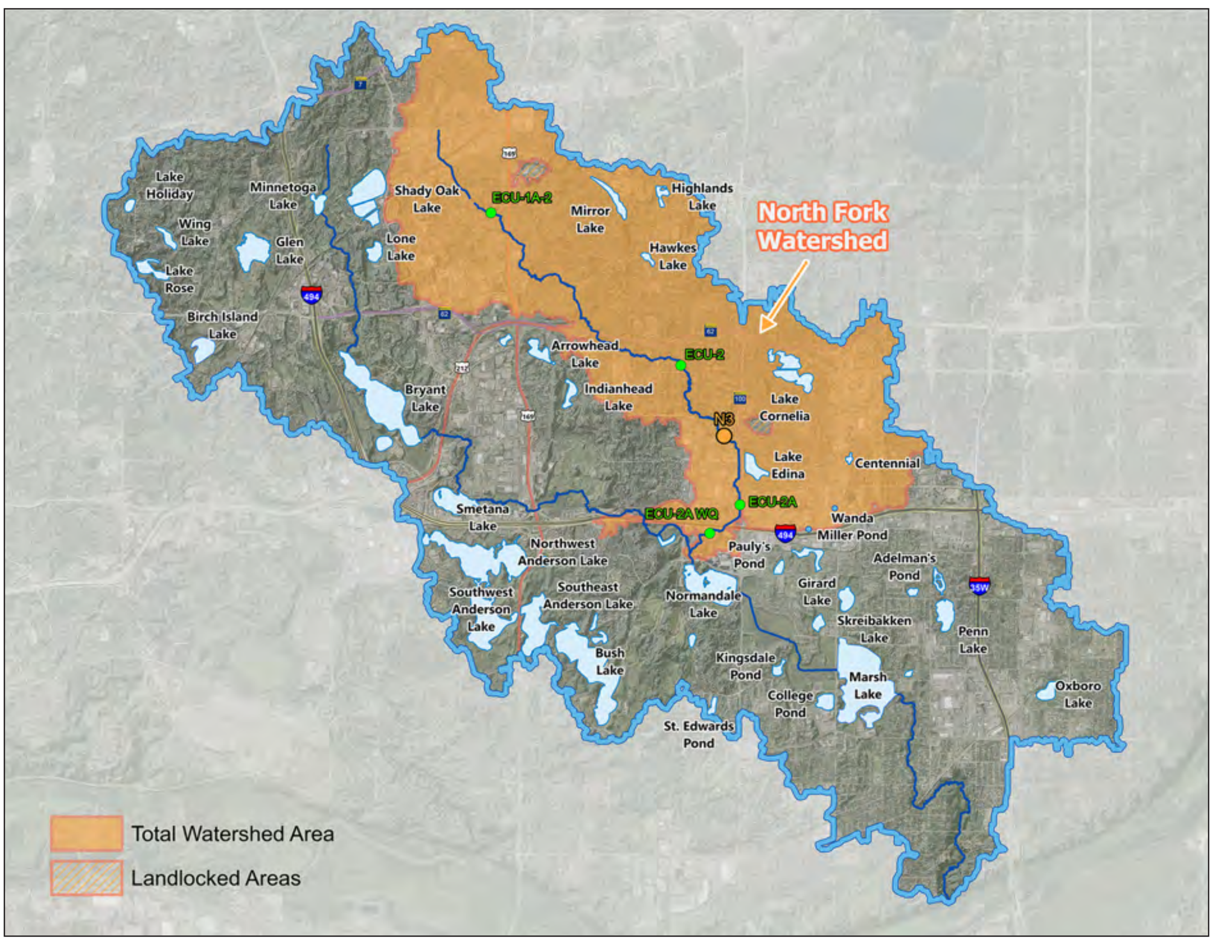
2025 MONITORED PARAMETERS

- **Water Quality**
- **WOMP Stream Flow and Pollutants**
- **Habitat**
- **Fish Index of Biotic Integrity (FIBI)**
- **Macroinvertebrate Index of Biotic Integrity (MIBI)**



Nine Mile Creek Section	North Fork
Tributary Municipalities	Hopkins, Minnetonka, Edina, Richfield, Bloomington
Watershed Area*	8,697 acres (70 landlocked)
Impairment Status—Headwaters to Metro Blvd	Impaired for aquatic life (fish bioassessment) since 2004
Impairment Status—Metro Blvd to Confluence with South Fork	Impaired for aquatic life (fish bioassessment) since 2018 Impaired for aquatic life (macroinvertebrate bioassessment) since 2018

** Includes 70 acres that are typically landlocked*



3.3.1 Water Quality Monitoring in North Fork Nine Mile Creek

In 2025, four monitoring stations were used to measure the water quality conditions of the North Fork of the Nine Mile Creek, including monitoring locations ECU-1A-2, ECU-2, N3, and ECU-2AWQ (listed upstream to downstream). These monitoring locations are shown in Figure 1-1 and in the figure on the previous page. In 2025, ECU-1A-2 was identified as a safer monitoring location slightly upstream of the previous monitoring location, ECU-1A-1 (monitored between 2013–2024). Monitored water quality parameters at all locations included dissolved oxygen, pH, temperature, specific conductance, turbidity, and flow on eight occasions (once a month March through October). Table 3-3 through Table 3-6 summarize the average, maximum, and minimum observed values for each water quality parameter at each monitoring location on the North Fork. The tables also outline the number of events when the monitored parameter exceeded the state standard or threshold.

Dissolved oxygen measurements observed in the North Fork of the Nine Mile Creek in 2025 met the Minnesota State standard (>5 mg/L) at a similar frequency as 2024—97% of measurements met the State standard in 2025 as compared with 100% in 2024. In 2025, the North Fork met the State standard for dissolved oxygen more frequently than other sampling locations on the Main Steam and South Fork. Time series plots showing the observed dissolved oxygen concentrations can be viewed at the end of this section.

Stream flow and temperature can notably influence the observed dissolved oxygen concentrations in the stream. 2025 was generally wet in the spring and summer and dry in the fall. As such, increased flowrates were observed in the North Fork between May and July and notably lower flowrates were observed between August and October. The highest water temperatures were observed in July ranging from 68.4°F to 77.9°F. The lowest dissolved oxygen concentrations were generally observed in August during a period of both lower stream flows and higher water temperatures.

High **stream flow** can also notably influence the observed **turbidity (clarity)** of the stream due to increased particulates discharging to the stream from watershed runoff as well as amplified sediment resuspension and bank erosion in the stream itself. Generally higher turbidity measurements were noted during increased flowrates observed in the North Fork. This was particularly evident during monitoring in May where both the highest flowrates and turbidity measurements were observed at ECU-2, N3, and ECU-2A. At N3, the observed turbidity of 40.7 NTU exceeded the existing state standard of 25 NTU.

The **pH** values observed during monthly monitoring in the North Fork met the state standards throughout the monitored period.

Consistent with previous years, the **specific conductance** criterion (<1,000 µmhos/cm at 25°C) was met less frequently in 2025 than other Minnesota State standards. As in previous years, the North Fork monitoring locations met the State standard for specific conductance less frequently than other sampling locations on the Main Stem and South Fork—only 56% of the North Fork measurements met the specific conductance standard in 2025. Time series plots showing the observed specific conductance values can be viewed at the end of this section. The exceedance of the Minnesota State specific conductance standard in the North Fork of the Nine Mile Creek in 2025 (and similarly throughout the period of record) has been unfavorable for the aquatic life in the stream. High specific conductance measurements in Nine Mile Creek that fail to meet state standards typically result from the discharge of excess chloride from deicing chemicals (salt) to the creek. Other potential sources include synthetic fertilizers.

Table 3-3 North Fork Nine Mile Creek monitoring location ECU-1A-2 monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	8.8	11.3	7.5	0/8 (0%)
pH	6.5–9.0	7.3	7.8	6.8	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	57.7	68.4	48.4	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	1,095	1,251	816	7/8 (88%)
Turbidity (NTU)	< 25[1]	5.7	7.6	3.1	0/8 (0%)
Flow (cfs)	N/A	1.4	1.9	1.0	N/A

Table 3-4 North Fork Nine Mile Creek monitoring location ECU-2 monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	7.5	13.5	4.6	1/8 (13%)
pH	6.5–9.0	7.5	8.0	7.1	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	58.9	77.7	40.3	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	767	1,032	415	1/8 (13%)
Turbidity (NTU)	< 25[1]	7.7	10.5	4.2	0/8 (0%)
Flow (cfs)	N/A	5.1	22.5	1.6	N/A

[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

mg/L = milligrams per liter; °F = degrees Fahrenheit; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable

Table 3-5 North Fork Nine Mile Creek monitoring location N3 monthly water quality data summary (WOMP Station)

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	8.8	13.5	6.9	0/8 (0%)
pH	6.5–9.0	7.8	8.2	7.4	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	59.2	77.9	41.2	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	843	1,091	469	1/8 (13%)
Turbidity (NTU)	< 25[1]	9.6	40.7	2.4	1/8 (13%)
Flow (cfs)	N/A	5.9	29.9	1.3	N/A

Table 3-6 North Fork Nine Mile Creek monitoring location ECU-2AWQ monthly water quality data summary

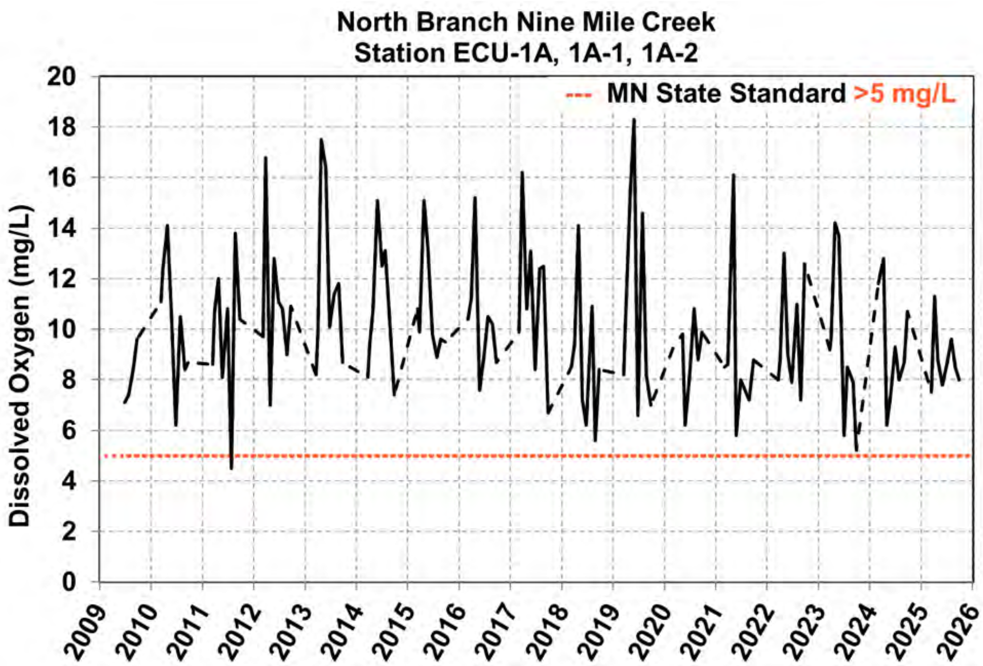
Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	8.2	11.6	5.5	0/8 (0%)
pH	6.5–9.0	7.3	7.8	6.9	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	57.5	73.0	41.0	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	969	1,280	456	5/8 (63%)
Turbidity (NTU)	< 25[1]	11.6	21.3	7.3	0/8 (0%)
Flow (cfs)	N/A	12.5	62.4	3.2	N/A

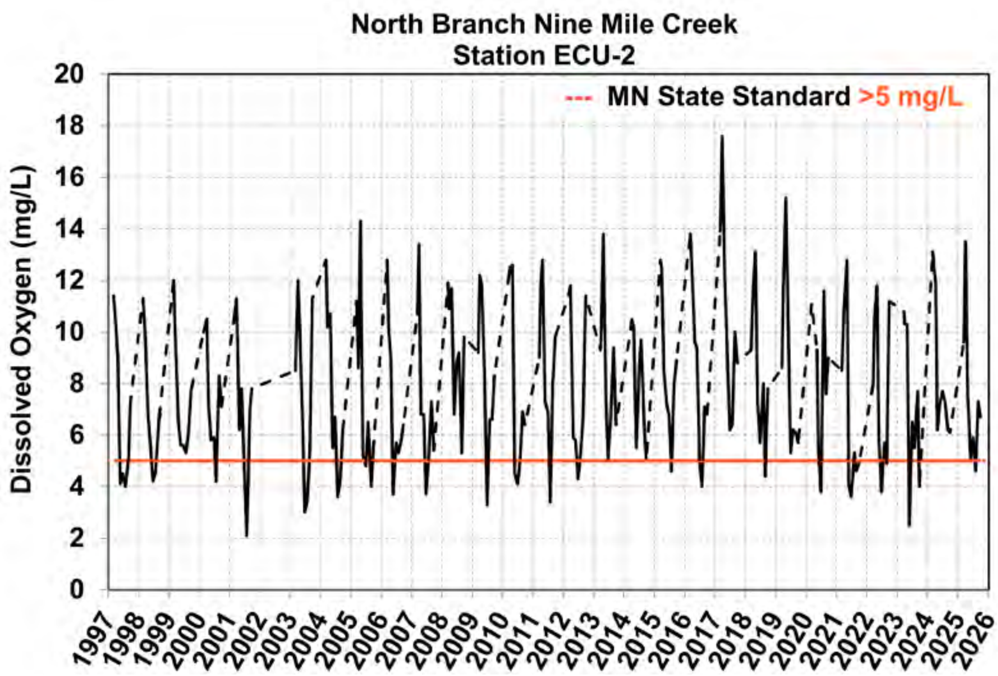
[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

mg/L = milligrams per liter; °F = degrees Fahrenheit; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable

Dissolved Oxygen

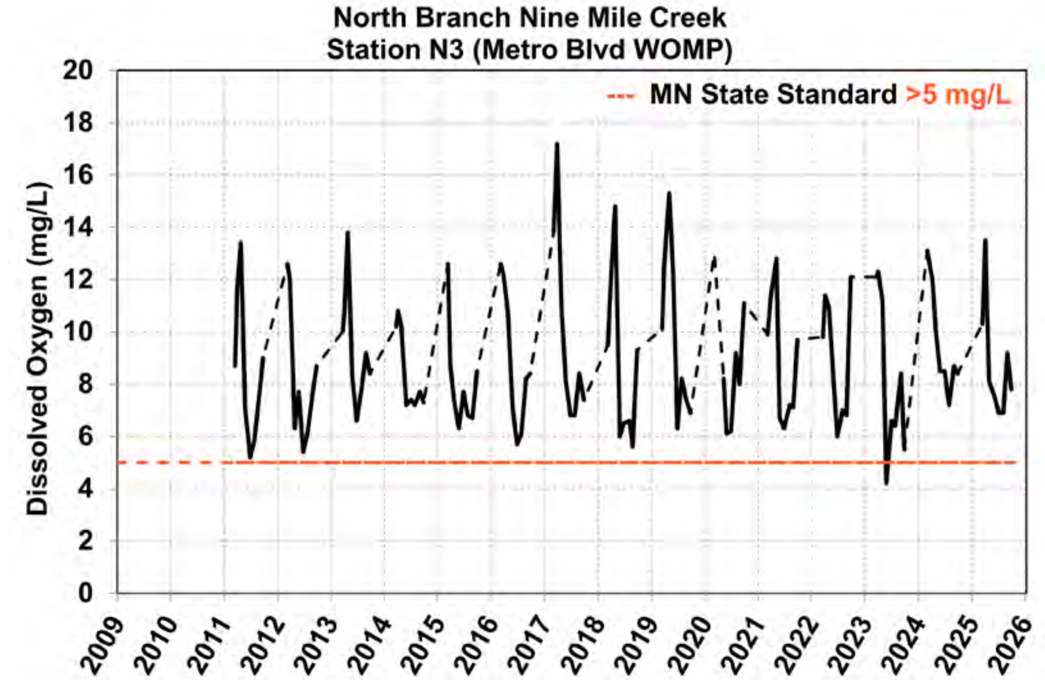
Dissolved oxygen is the concentration (or the amount) of oxygen gas incorporated in water. Oxygen can enter the water from the atmosphere, or it can accumulate from the oxygen released by plants or algae during photosynthesis. Sufficient dissolved oxygen is necessary to support the health and reproduction of organisms such as aquatic insects and fish. Major physical properties that can influence the concentration of dissolved oxygen include temperature, flow, turbulence, nutrient levels, and level of decomposition.

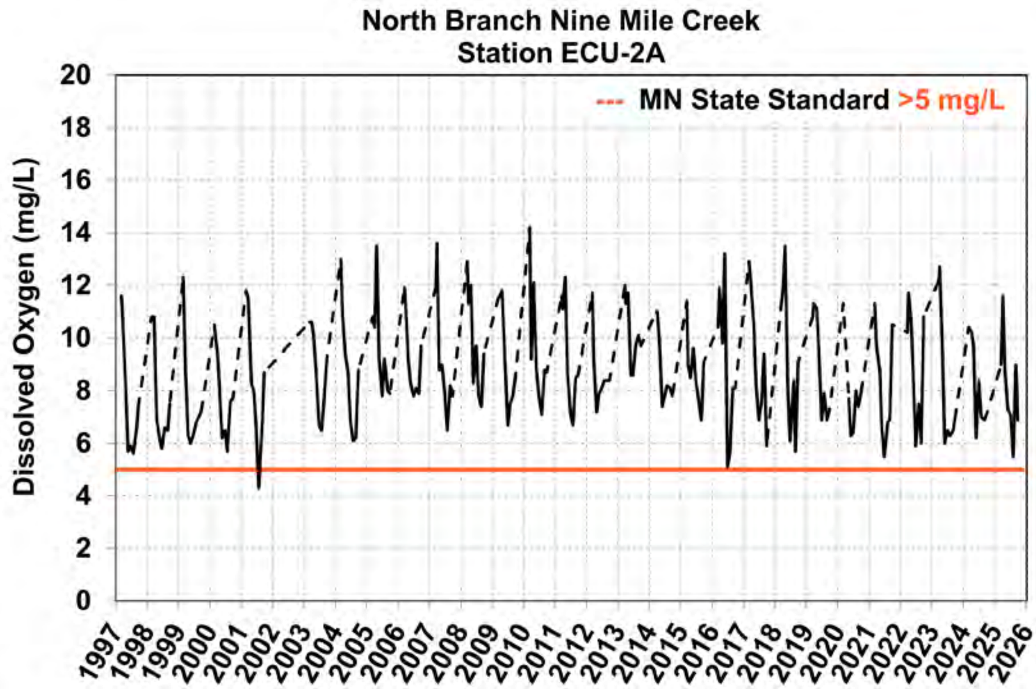




NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

Dissolved Oxygen

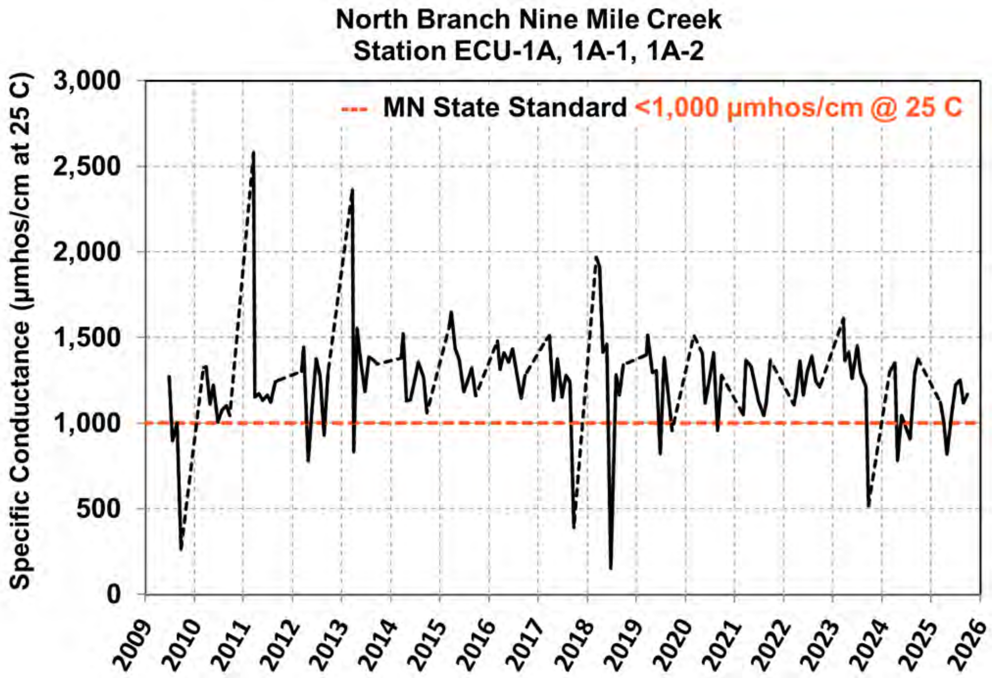


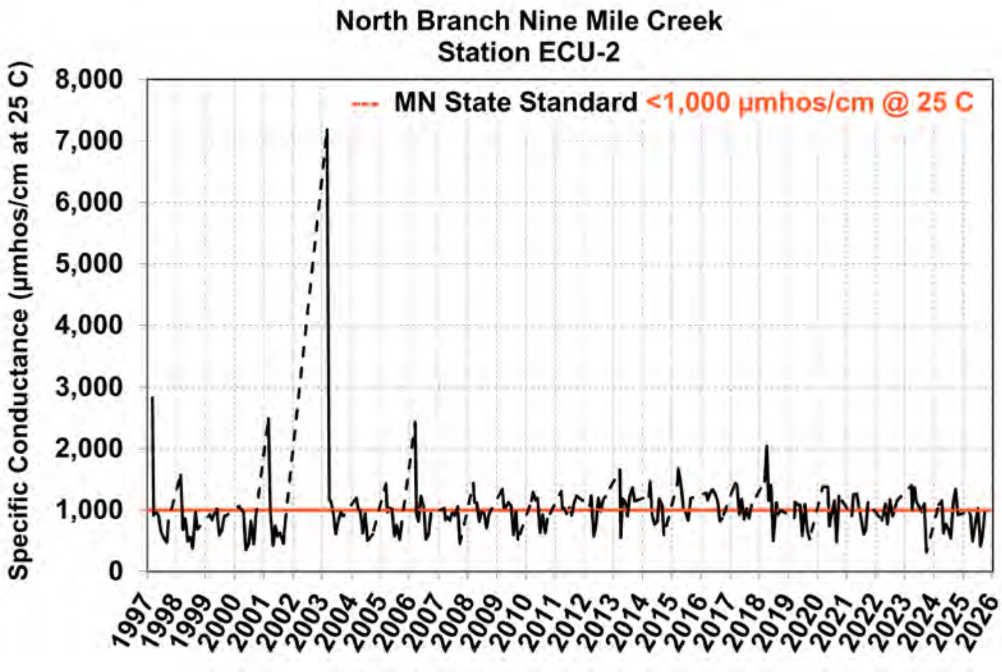


NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

Specific Conductance

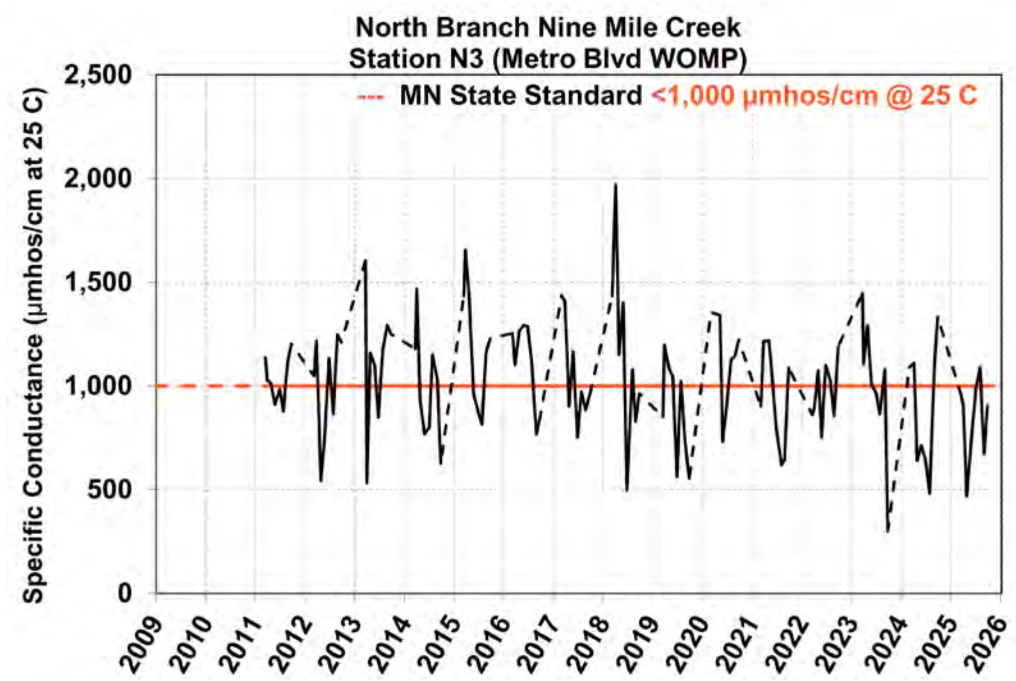
Specific conductance is a measure of water's ability to pass an electrical current via ions dissolved in the water such as alkalis, chloride, sulfides, and carbonate compounds. The higher the specific conductance, the more dissolved salts and minerals that are present in the water. For example, high chloride concentrations can lead to high specific conductance. Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians.

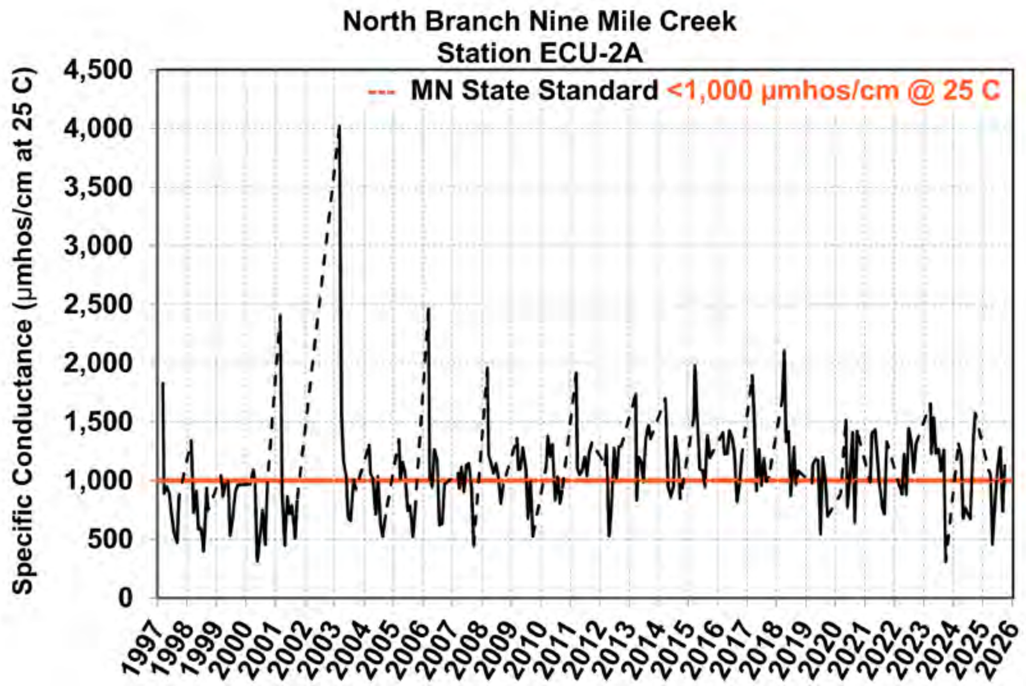




NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

Specific Conductance

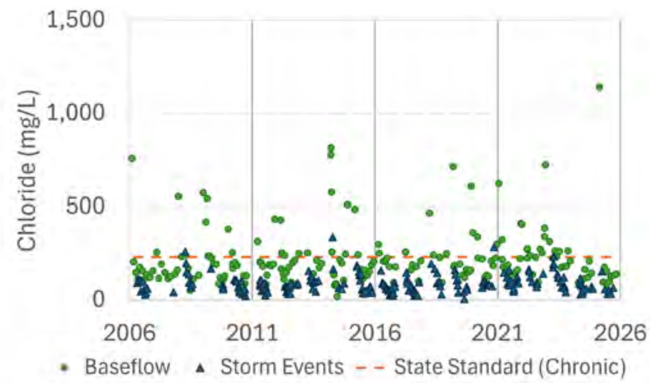




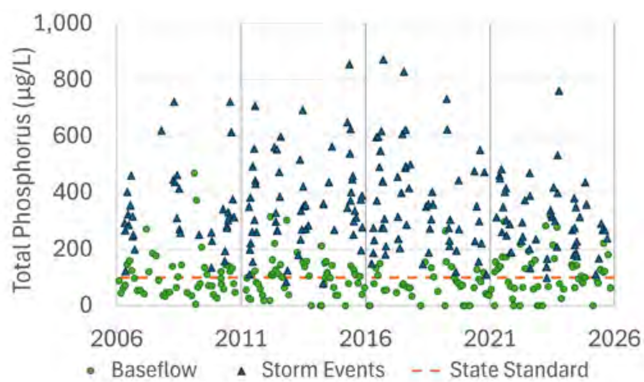
NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

3.3.2 WOMP Stream Pollutant Monitoring in North Fork Nine Mile Creek

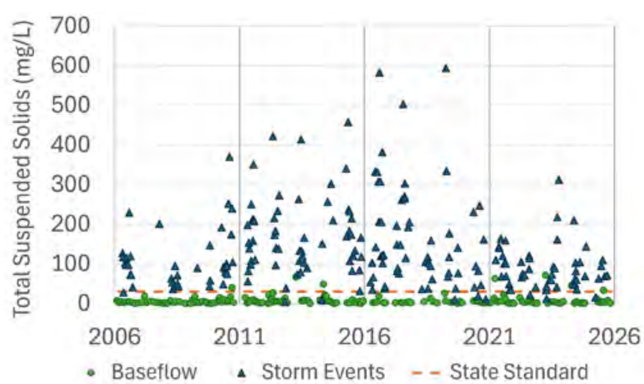
In 2025, one monitoring station was used to measure more robust stream pollutant conditions of the North Fork of the Nine Mile Creek. Monitoring station N3 uses an automated stream pollutant monitoring system similar to the Metropolitan Council's Watershed Outlet Monitoring Program (WOMP). Water quality grab samples were collected bi-weekly to monthly to monitor baseflow conditions and composite samples were collected during most storm events larger than 0.5 inches to monitor stormwater pollutant loads to the North Fork. The plots below summarize the monitored chloride, total phosphorus, and total suspended solids concentrations at station N3 between January 2006 and December 2025 under baseflow (green) and storm event (blue) conditions and compare the monitored data to the state standards.



Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians. In 2025, chloride concentrations at N3 were typically higher during baseflow conditions rather than storm events. A maximum concentration of 1,140 mg/L was observed at the end of February.



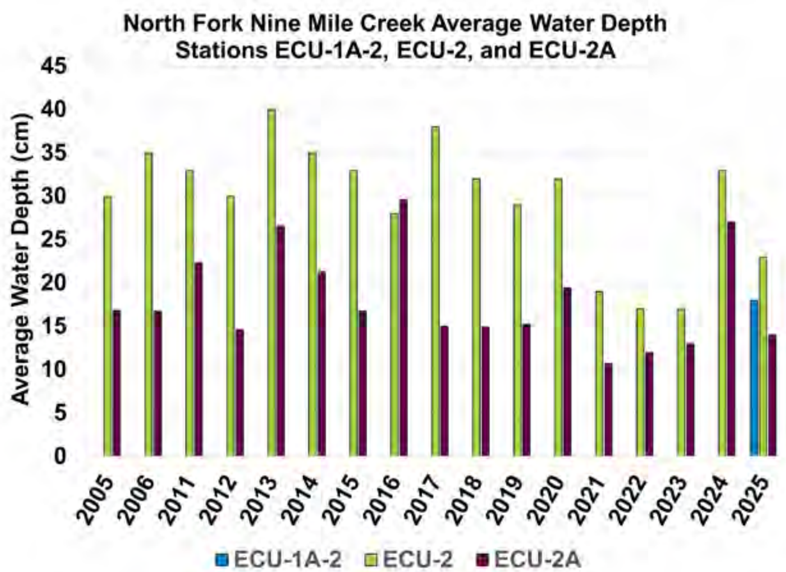
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in streams can influence plant species, alter food resources for aquatic organisms, and lead to higher risk of low oxygen conditions (due to increased bacterial decomposition). In 2025, total phosphorus concentrations at N3 between April and September were higher during storm event conditions. A maximum storm composite concentration of 291 µg/L was observed during a storm event at the end of June.



Suspended solids, including soils, detritus, and algae, in stream water can increase turbidity and decrease clarity. High amounts of suspended solids can affect light penetration and reduce plant growth and cause harm to habitat for fish and other aquatic life due to increased sedimentation and siltation. In 2025, total suspended solids concentrations at N3 between April and September were higher during storm event conditions, in comparison with baseflow samples. A maximum storm composite concentration of 110 mg/L was observed during a storm event in mid-July.

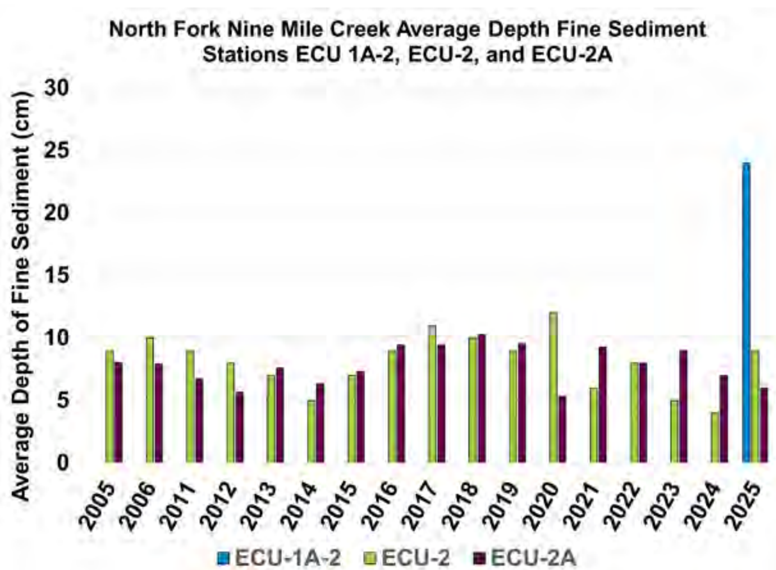
3.3.3 Habitat Monitoring in North Fork Nine Mile Creek

In 2025, three monitoring stations were used to measure the habitat conditions of the North Fork of the Nine Mile Creek, including monitoring locations ECU-1A-2, ECU-2, and ECU-2A (listed upstream to downstream). These monitoring locations are shown in Figure 1-1. In 2025, monitoring location ECU-1A-1 was moved slightly upstream from the location monitored between 2013–2024. As such, data collected between 2013–2024 for this location was not included in the plots below as the new location's habitat data is no longer directly comparable to the previous monitoring location data.* Monitored habitat parameters at all locations included water depth, flow, depth of fine sediment, percent embeddedness, and length of eroded streambank on one occasion (typically completed during fisheries monitoring). A summary of the most recent 20 years of water depth and depth of fine sediment observations, as well as the 2025 stream bank erosion observations are provided below.



Water depth is a factor in determining the presence and distribution of fish in streams. Water depths have annually been measured when fish surveys were completed. The average water depths, measured at monitored cross sections in the North Fork, decreased in 2025, but were consistent with average conditions observed in the historical record.

Fine sediments like silt, clay, and sand can fill the voids between gravel, rocks, and boulders in the streambed. These voids are critical for fish spawning and providing macroinvertebrates with sheltering and breeding locations. The upstream North Fork monitoring location ECU-1A-2 was observed to have a notably higher average depth of fine sediments than the downstream North Fork monitoring locations.



*ECU-1A-1 habitat data collected between 2013-2024 is available upon request.

ECU-1A-2 Stream Bank Erosion Observations

Grasses on the upper portions of the banks are preventing some erosion; however notable erosion was observed along bends where exposed soils are present. There are multiple locations along this new monitoring reach where bank soils are sloughing into the stream. Based on the current erosion observations, it's likely that elevated levels of erosion are occurring during high flow events when water overtops the banks.

ECU-2 Stream Bank Erosion Observations

Erosion is prevalent throughout the entire reach. The most severe erosion is present south of the foot bridge where bank soils at the bends are sloughing off into the stream. It's likely that elevated levels of erosion are occurring during high flow events when water overtops the banks. Grasses on the upper portions of the banks are minimizing erosion in some areas.

ECU-2A Stream Bank Erosion Observations

Because this reach does not have any appreciable bends, bank erosion has not increased to the same extent as what has been observed in the upstream monitoring location. However exposed soils covered by overhanging grasses are still susceptible to erosion, especially during high flow conditions.

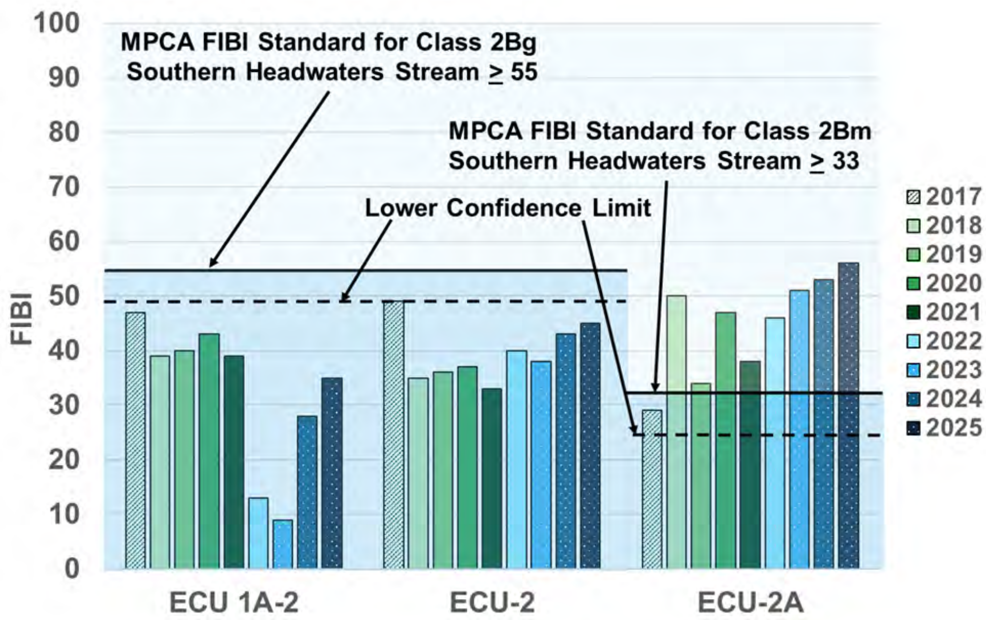
3.3.4 Fish Index of Biotic Integrity (FIBI) in North Fork Nine Mile Creek

Fish were monitored at the three North Fork sample locations during June 12–24, 2025. FIBI scores were computed and compared with the applicable FIBI standards for Nine Mile Creek. FIBI values exceeding their respective standard indicate higher fish diversity and abundance. FIBI scores from the two upstream North Fork locations, ECU-1A-2 and ECU-2 were below the FIBI standard and the lower confidence limit. The FIBI score from the downstream North Fork location, ECU-2A, was the highest on record and met the respective FIBI standard.

FIBI scores from the two most upstream North Fork locations, ECU 1A-2 and ECU 2, have not met the FIBI standard during the entire period of record (2017 through 2025). The *Nine Mile Creek Biological Stressor Identification* (Barr Engineering Co., 2010) concluded that inadequate oxygen was a primary stressor to the North Fork fish community followed by excess sediment and excess ionic strength due to a high concentration of chloride in the stream. Water quality observations in 2025 documented excess specific conductivity (chloride) at both ECU-1A-2 and ECU-2, indicating a possible biological stressor. Specific conductivity exceeded the state standard at ECU-1A-2 in all monitored months between March and October except May. Specific conductivity exceeded the state standard in July at ECU-2. Low dissolved oxygen concentrations were also observed in August at monitoring location ECU-2 indicating another possible biological stressor.

FIBI scores from the downstream North Fork location, ECU-2A, met the FIBI standard between 2018 through 2025, but not in 2017. However, the 2017 value was within the standard's confidence limits indicating it was close to the standard. The *Nine Mile Creek Biological Stressor Identification* (2010) concluded excess ionic strength due to excess chloride in the stream was a stressor to the North Fork fish community. In 2025, specific conductivity was observed to exceed the state standard in March, April, July, August, and October, indicating a possible biological stressor.

The North Fork of the Nine Mile Creek from the stream's headwaters (Hopkins) to Metro Blvd (Edina) has been included on the state's impaired waters list for aquatic life (fish bioassessment) since 2004. The portion of the North Fork downstream of Metro Blvd has been included on the state's impaired waters list for aquatic life (fish bioassessment) since 2018.



2017–2025 North Fork Nine Mile Creek Fish Index of Biotic Integrity (FIBI) values compared with the MPCA FIBI standards and lower confidence limits

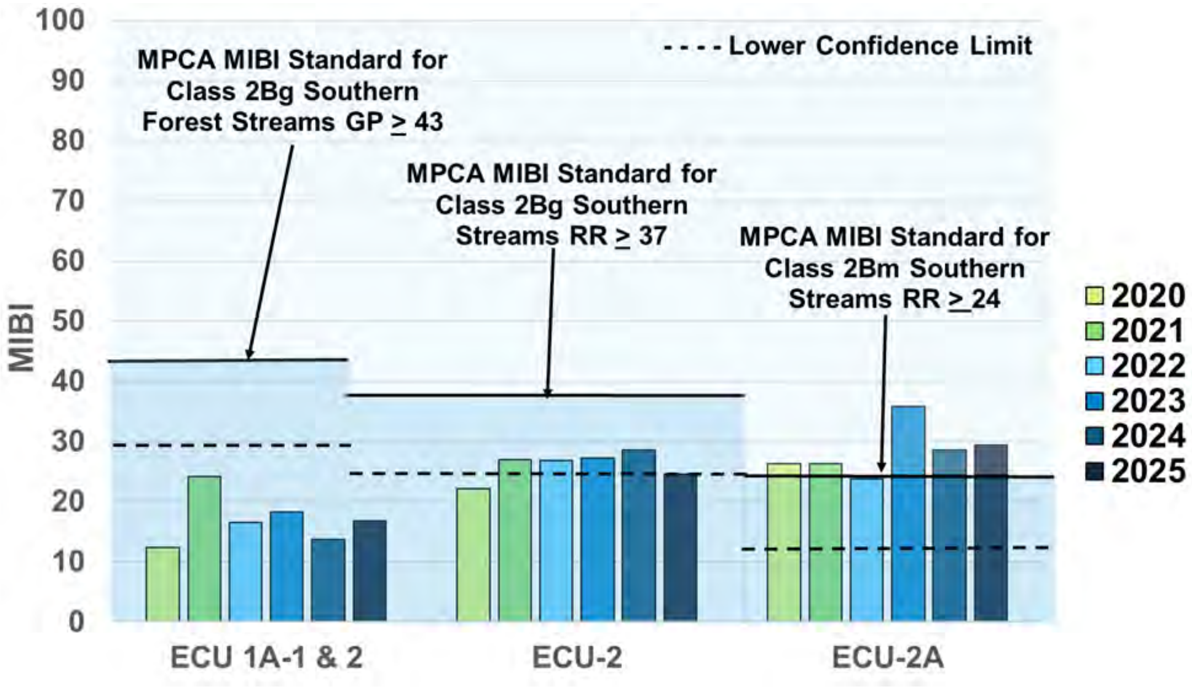
3.3.5 Macroinvertebrate Index of Biotic Integrity (MIBI) in North Fork Nine Mile Creek

Macroinvertebrates were monitored at three North Fork sample locations on October 2, 2025, including ECU-1A-2, ECU-2, and ECU-2A. MIBI scores were computed and compared with the applicable MIBI standards for each of the North Fork Nine Mile Creek monitoring locations. In 2025, the upstream monitoring location, ECU-1A-2, was relocated slightly upstream of the previously monitored location, ECU-1A-1 (monitored between 2020–2024), which resulted in a change to the MIBI stream classification. The stream classification for ECU-1A-1 was Class 2Bg Southern Forest Stream Glide Pool (GP). The stream classification for ECU-1A-2 is Class 2Bg Southern Stream Riffle Run (RR). As such, the MIBI standards for the upstream monitoring location changed in 2025 with its relocation.

Example photo of a mayfly nymph
Photo credit: Dr. Dean Hansen

In 2025, the downstream North Fork Location, ECU-2A, was the only sample location that met the applicable MPCA standard. The downstream ECU-2A monitoring location has also met the applicable MPCA standard in 2020–2021 and 2023–2024. The middle North Fork location, ECU-2, had a 2025 MIBI value greater than its respective lower confidence limit indicating the monitoring location was close to its applicable MIBI standard. This observation is consistent with MIBI observations between 2021–2024. The 2025 MIBI value of the most upstream North Fork location, ECU-1A-2, was below its respective MIBI standard and lower confidence limit. This is consistent with the MIBI observations at ECU-1A-1 since 2020.

The portion of the North Fork Nine Mile Creek downstream of Metro Blvd (Edina) has been included on the state's impaired waters list for aquatic life (macroinvertebrate bioassessment) since 2018.



2020–2025 North Fork Nine Mile Creek Macroinvertebrate Index of Biotic Integrity (MIBI) values compared with the MPCA MIBI standards and lower confidence limits

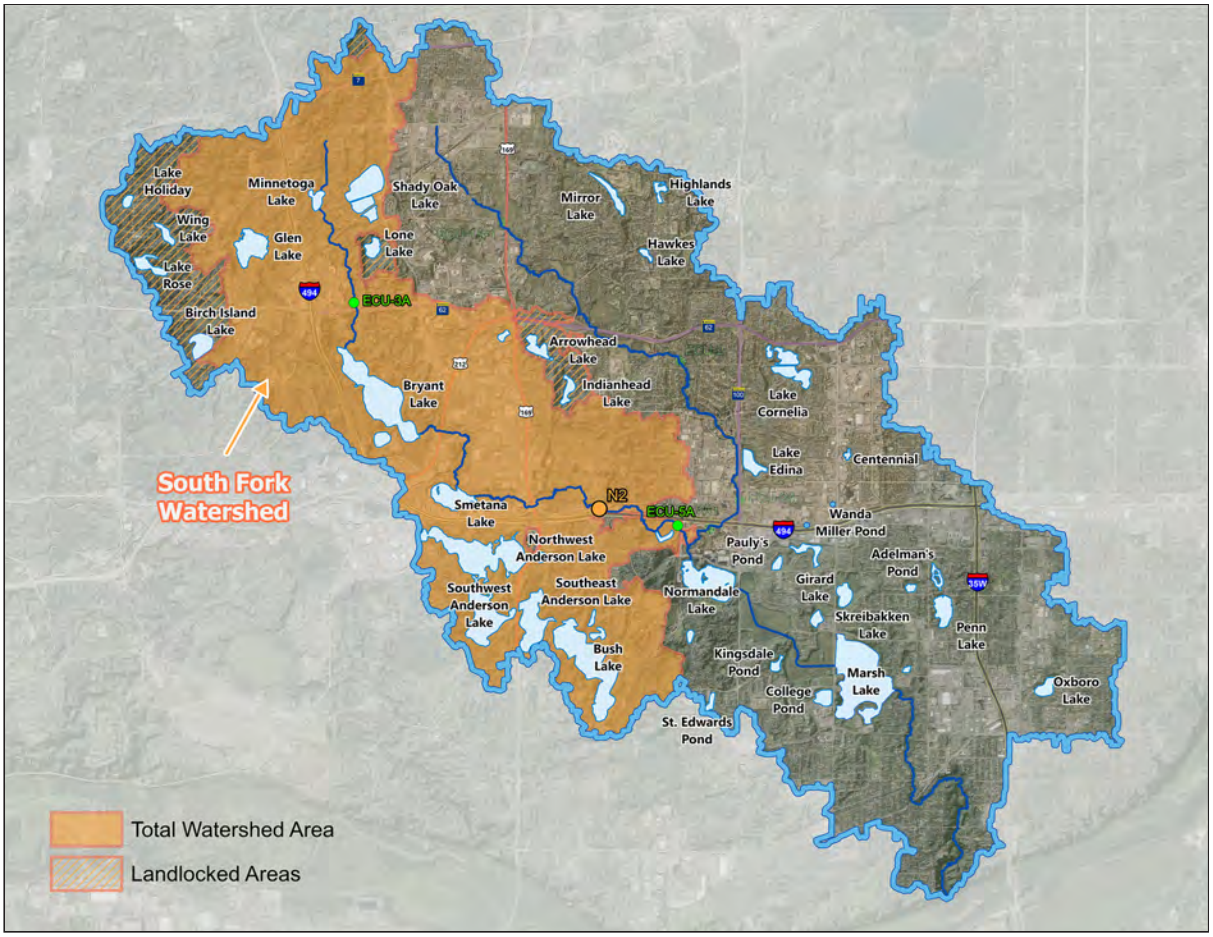
3.4 South Fork Nine Mile Creek

2025 MONITORED PARAMETERS

- **Water Quality**
- **WOMP Stream Flow and Pollutants**
- **Habitat**
- **Fish Index of Biotic Integrity (FIBI)**
- **Macroinvertebrate Index of Biotic Integrity (MIBI)**

Nine Mile Creek Section	South Fork
Tributary Municipalities	Hopkins, Minnetonka, Eden Prairie, Edina, Bloomington
Watershed Area*	12,357 acres (1,640 landlocked)
Impairment Status—Lake Smetana to Confluence with North Fork	Impaired for aquatic life (fish bioassessment) since 2018 Impaired for aquatic life (macroinvertebrate bioassessment) since 2018

** Includes 1,640 acres that are typically landlocked*



3.4.1 Water Quality Monitoring in South Fork Nine Mile Creek

In 2025, three monitoring stations were used to measure the water quality conditions of the South Fork of the Nine Mile Creek, including monitoring locations ECU-3A, N2, and ECU-5A (listed upstream to downstream). These monitoring locations are shown in Figure 1-1 and in the figure on the previous page. Monitored water quality parameters included dissolved oxygen, pH, temperature, specific conductance, turbidity, and flow on eight occasions (once a month March through October). Table 3-7 through Table 3-9 summarize the average, maximum, and minimum observed values for each water quality parameter at each monitoring location on the South Fork. The tables also outline the number of events when the monitored parameter exceeded the state standard or threshold.

Dissolved oxygen measurements observed in the South Fork of the Nine Mile Creek in 2025 met the Minnesota State standard (>5 mg/L) at a similar frequency as 2023 and 2024—79% met the State standard in 2025 as compared to 75% in 2023 and 2024. In 2025, the South Fork met the State standard for dissolved oxygen less frequently than other sampling locations on the Main Steam and North Fork, which met the standard at a frequency of 96% and 97% respectively. Time series plots showing the observed dissolved oxygen concentrations can be viewed at the end of this section.

Stream flow and temperature can notably influence the observed dissolved oxygen concentrations in the stream. 2025 was wet in the spring and summer and dry in the fall. As such, increased flowrates were observed in the downstream South Fork monitoring locations (N2, ECU-5a) between April and September and notably lower flowrates were observed in October. Upstream monitoring location, ECU-3A, had extensively lower flowrates than the downstream South Fork monitoring locations throughout the 2025 monitored period. Observed flowrates ranged from 0.1–1.2 cfs at ECU-3A. The highest water temperatures at all three South Fork locations were observed in July ranging from 70.3°F to 78.3°F. The lowest dissolved oxygen concentrations were generally observed during periods of both reduced stream flow and higher water temperatures. At N2 measured dissolved oxygen concentrations in August and October were below the Minnesota state standard of 5 mg/L. The lowest observed dissolved oxygen concentration was 3.0 mg/L in August at a temperature of 78.3°F. Measured dissolved oxygen concentrations between August and October at ECU-5A were below the state standard ranging between 4.0–4.2 mg/L.

The South Fork generally observed higher **turbidity (clarity)** values during lower stream flowrates during monthly monitoring. Higher turbidity during low flows can occur due to increased algal growth or organic matter accumulation and decomposition, particularly during warmer stream temperatures. Low flow rates may also change the conditions under which fine sediment is resuspended, which can result in higher turbidity measurements. Furthermore, with less water flowing, any pollutants or sediments entering the stream are less diluted, leading to higher concentrations of suspended particles. The South Fork also experiences high turbidity and total suspended solids measurements during storm events (see Section 3.4.2).

The **pH** values observed during monthly monitoring in the South Fork met the state standards throughout the monitored period.

Atypical to previous years, the observed **specific conductance** at the South Fork monitoring locations met Minnesota State standards (<1,000 µmhos/cm at 25°C) for all monitored events—100% of the South Fork measurements met the specific conductance standard in 2025 as compared to 88% in 2024 and 29% in 2023. Additionally, the South Fork monitoring locations met the State standard for specific conductance more frequently than sampling locations on the North Fork where only 56% of measurements met standards. Time series plots showing the observed specific conductance values can be viewed at the end of this section. In the historical record, the exceedance of the Minnesota State specific conductance standard in the South Fork of the Nine Mile Creek has been unfavorable for the aquatic life in the stream. High specific conductance measurements in Nine Mile Creek that fail to meet state standards typically result from the discharge of excess chloride from deicing chemicals (salt) to the creek. Other potential sources include synthetic fertilizers. Lower specific conductance measurements in 2025 are a positive observation.

Table 3-7 South Fork Nine Mile Creek monitoring location ECU-3A monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	7.9	9.9	6.0	0/8 (0%)
pH	6.5–9.0	7.2	7.8	6.7	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	55.8	70.3	38.5	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	646	773	519	0/8 (0%)
Turbidity (NTU)	< 25[1]	4.7	6.2	2.2	0/8 (0%)
Flow (cfs)	N/A	0.4	1.2	0.1	N/A

Table 3-8 South Fork Nine Mile Creek monitoring location N2 monthly water quality data summary (WOMP Station)

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	6.4	10.7	3.0	2/8 (25%)
pH	6.5–9.0	7.3	7.8	6.8	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	60.4	78.3	42.8	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	735	859	663	0/8 (0%)
Turbidity (NTU)	< 25[1]	3.0	6.7	1.3	0/8 (0%)
Flow (cfs)	N/A	4.6	10.6	0.5	N/A

[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

mg/L = milligrams per liter; °F = degrees Fahrenheit; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable

Table 3-9 South Fork Nine Mile Creek monitoring location ECU-5A monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	6.9	11.8	4.0	3/8 (38%)
pH	6.5–9.0	7.5	8.0	7.2	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	61.1	77.9	42.6	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	700	795	598	0/8 (0%)
Turbidity (NTU)	< 25[1]	3.3	6.0	2.4	0/8 (0%)
Flow (cfs)	N/A	5.9	11.0	1.5	N/A

[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

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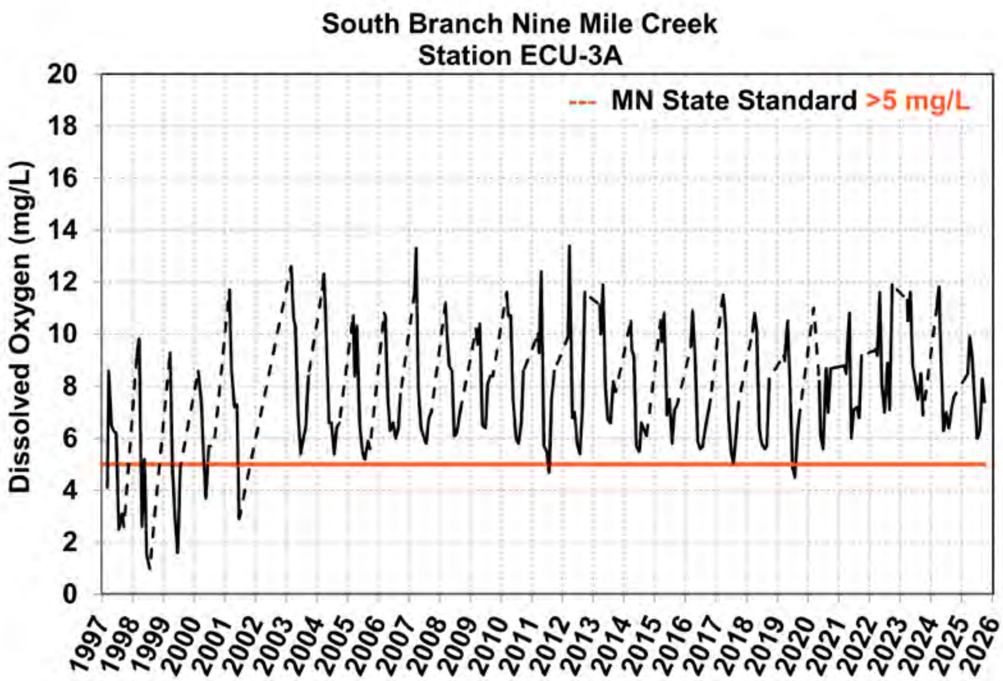
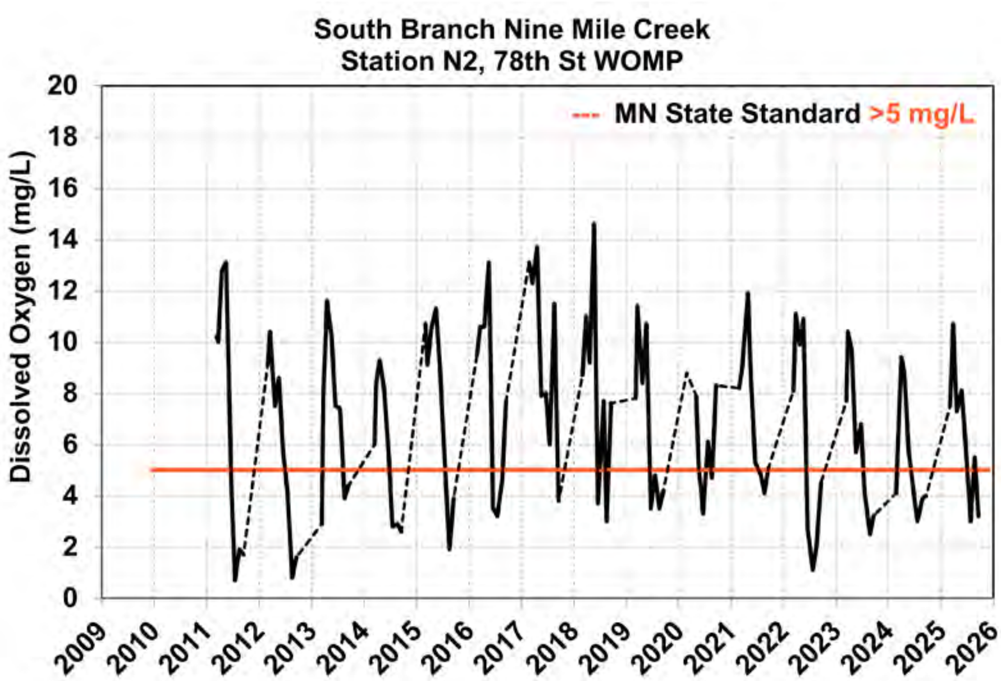
mg/L = milligrams per liter; °F = degrees Fahrenheit; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable

Dissolved Oxygen

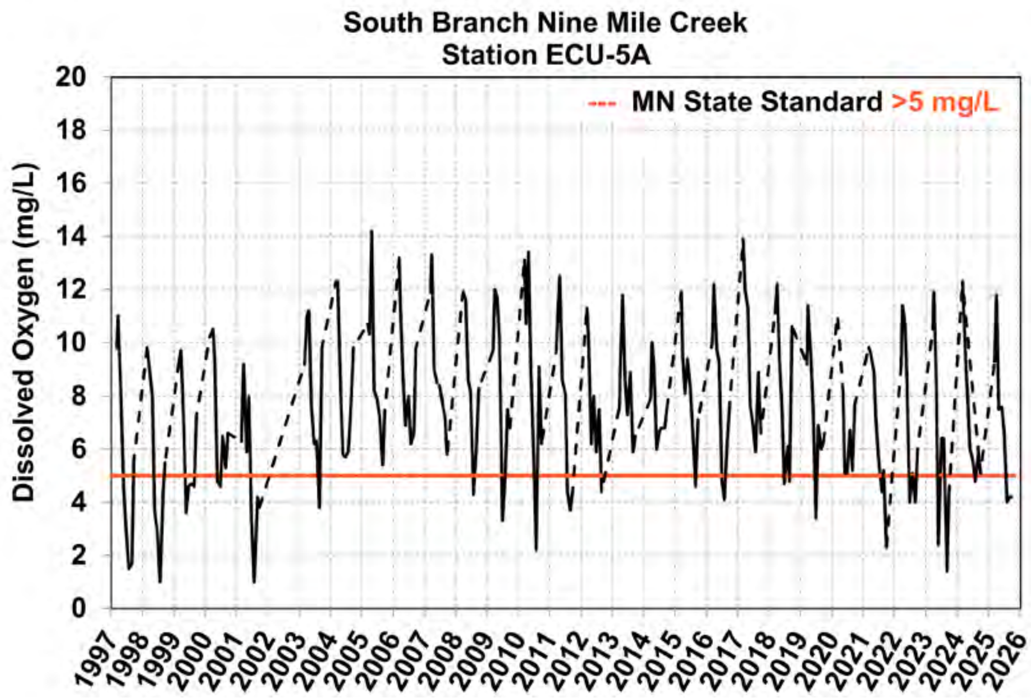
Dissolved oxygen is the concentration (or the amount) of oxygen gas incorporated in water. Oxygen can enter the water from the atmosphere, or it can accumulate from the oxygen released by plants or algae during photosynthesis. Sufficient dissolved oxygen is necessary to support the health and reproduction of organisms such as aquatic insects and fish. Major physical properties that can influence the concentration of dissolved oxygen include temperature, flow, turbulence, nutrient levels, and level of decomposition.





NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

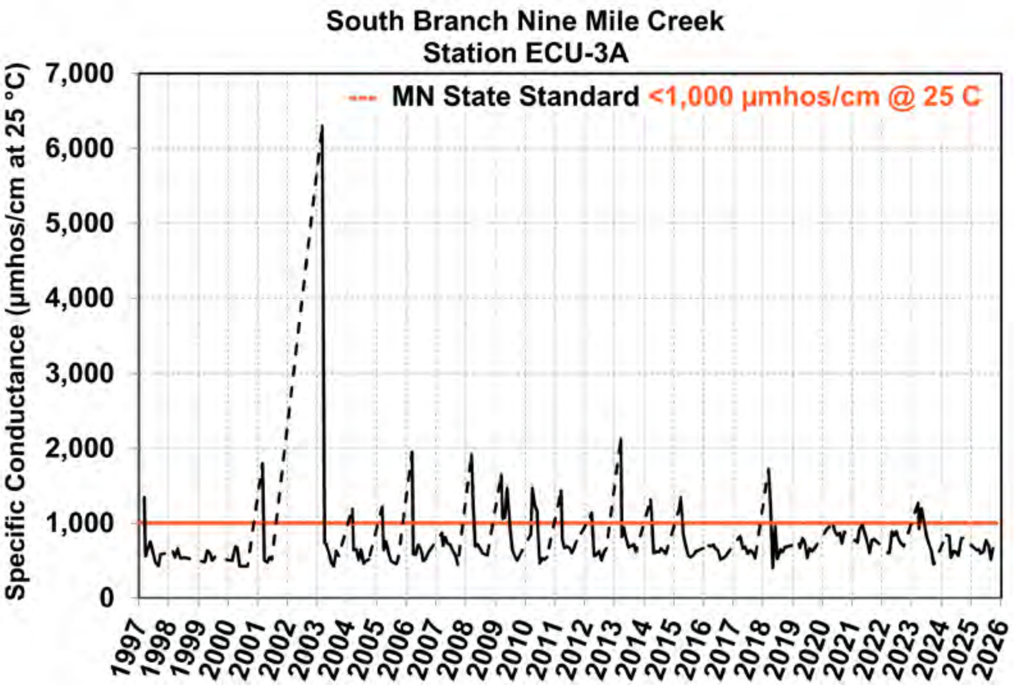
Dissolved Oxygen

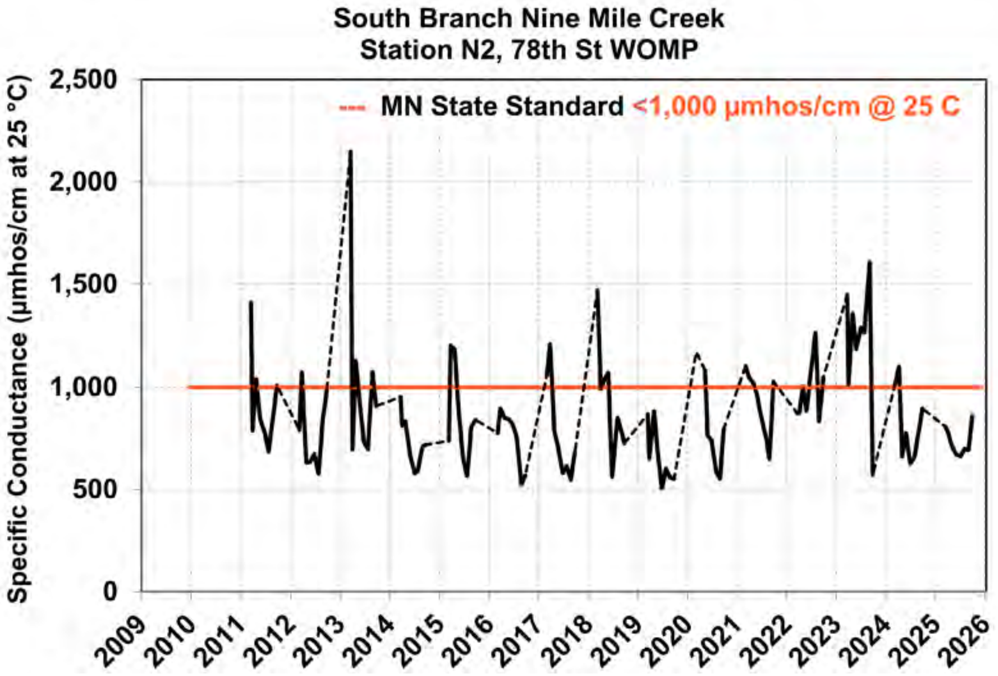


NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

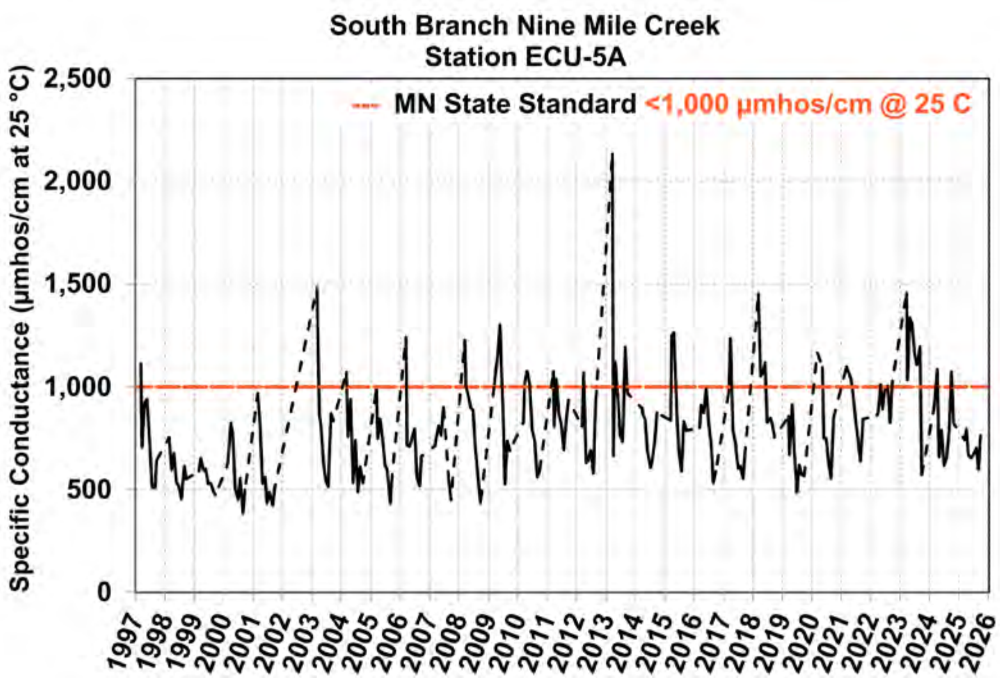
Specific Conductance

Specific conductance is a measure of water's ability to pass an electrical current via ions dissolved in the water such as alkalis, chloride, sulfides, and carbonate compounds. The higher the specific conductance, the more dissolved salts and minerals that are present in the water. For example, high chloride concentrations can lead to high specific conductance. Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians.





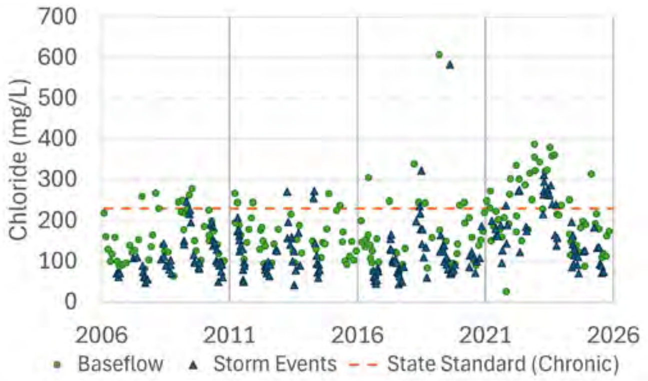
NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)



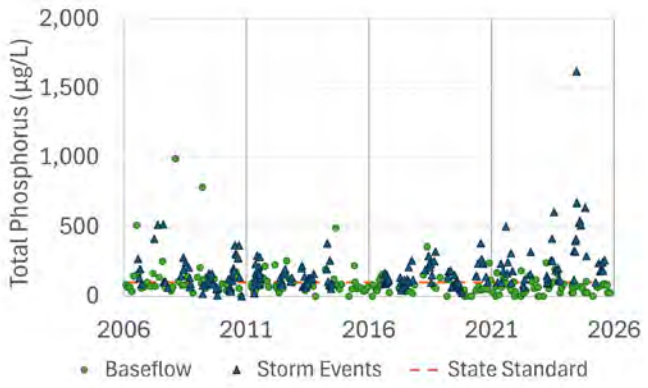
NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

3.4.2 WOMP Stream Pollutant Monitoring in South Fork Nine Mile Creek

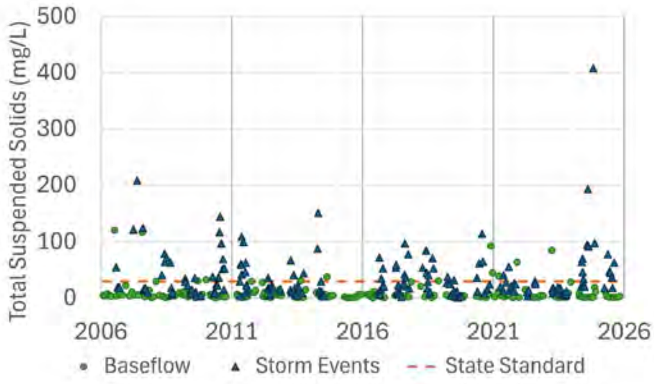
In 2025, one monitoring station was used to measure more robust stream pollutant conditions of the South Fork of the Nine Mile Creek. Monitoring station N2 uses an automated stream pollutant monitoring system similar to the Metropolitan Council's Watershed Outlet Monitoring Program (WOMP). Water quality grab samples were collected bi-weekly to monthly to monitor baseflow conditions and composite samples were collected during most storm events larger than 0.5 inches to monitor stormwater pollutant loads to the South Fork. The plots below summarize the monitored chloride, total phosphorus, and total suspended solids concentrations at station N2 between January 2006 and December 2025 under baseflow (green) and storm event (blue) conditions and compare the monitored data to the state standards.



Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians. In 2025, chloride concentrations at N2 were typically higher during baseflow conditions rather than storm events. A maximum concentration of 314 mg/L was observed at the end of February.



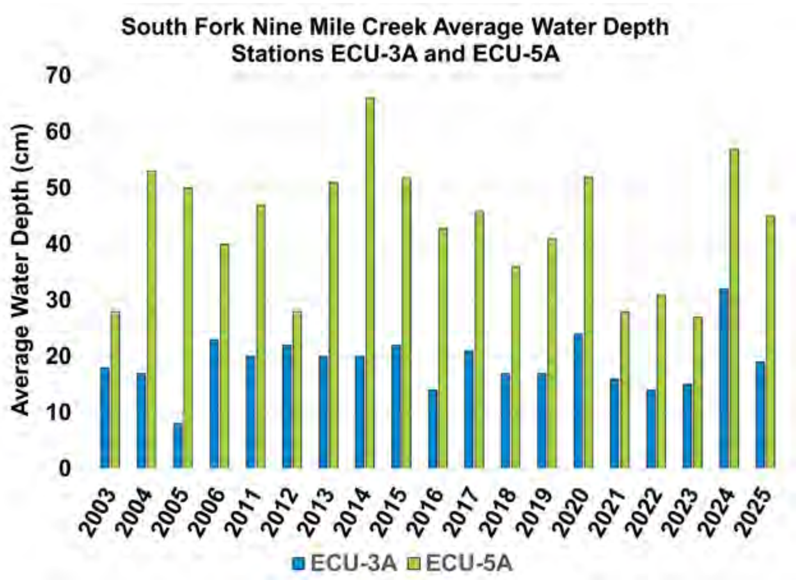
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in streams can influence plant species, alter food resources for aquatic organisms, and lead to higher risk of low oxygen conditions (due to increased bacterial decomposition). In 2025, total phosphorus concentrations at N2 between April and September were higher during storm event conditions. A maximum storm composite concentration of 259 µg/L was observed during a storm event in mid-August.



Stream water will get less clear and more turbid from an increase in **total suspended solids** including sediment, soils, detritus, and algae. High amounts of suspended solids can affect light penetration and reduce plant growth and cause harm to habitat for fish and other aquatic life due to increased sedimentation and siltation. In 2025, total suspended solids concentrations at N2 between April and September were higher during storm event conditions, in comparison with baseflow samples. A maximum storm composite concentration of 78 mg/L was observed during a storm event at the end of May.

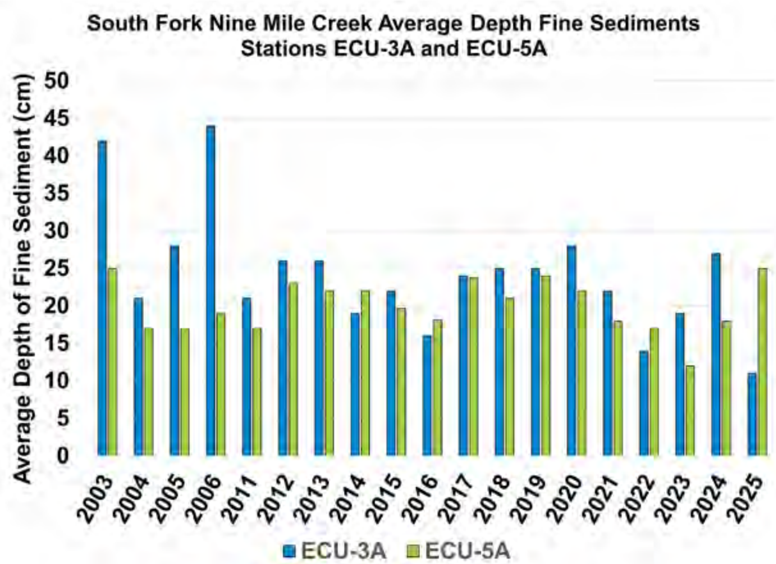
3.4.3 Habitat Monitoring in South Fork Nine Mile Creek

In 2025, two monitoring stations were used to measure the habitat conditions of the South Fork of the Nine Mile Creek. These included monitoring locations ECU-3A and ECU-5A (listed upstream to downstream). These monitoring locations are shown in Figure 1-1. Monitored habitat parameters included water depth, flow, depth of fine sediment, percent embeddedness, and length of eroded streambank on one occasion (typically completed during fisheries monitoring). A summary of the most recent 20 years of water depth and depth of fine sediment observations, as well as the 2025 stream bank erosion observations are provided below.



Water depth is a factor in determining the presence and distribution of fish in streams. Water depths have annually been measured when fish surveys were completed. The 2025 average water depths, measured at monitored cross sections in the South Fork, decreased from observations in 2024, but were consistent with average conditions observed in the historical record.

Fine sediments like silt, clay, and sand can fill the voids between gravel, rocks, and boulders in the streambed. These voids are critical for fish spawning and providing macroinvertebrates with sheltering and breeding locations. Within the past decade, both monitoring locations on the South Fork had similar average depths of fine sediment. A slight increase in the depth of fine sediment was observed at both locations in wet years. In 2025, the lowest average depth of fine sediment on record was observed at upstream monitoring location ECU-3A.



ECU-3A Stream Bank Erosion Observations

Considerable erosion was observed at the downstream end of this reach. Exposed soils on the bends are sloughing into the stream. Some areas of bank erosion have caused trees to fall.

While the downstream end of this reach has more notable erosion concerns, the upper and middle portions of the reach have been experiencing a slight increasing trend in erosion in the last 6 years.

ECU-5A Stream Bank Erosion Observations

Grasses on the upper portions of the banks are helping to stabilize the channel along this reach. Annual erosion measurements of this reach tend to fluctuate with water depth, indicating that erosion is more prevalent in the stream channel rather than the upper portions of the banks.

3.4.4 Fish Index of Biotic Integrity (FIBI) in South Fork Nine Mile Creek

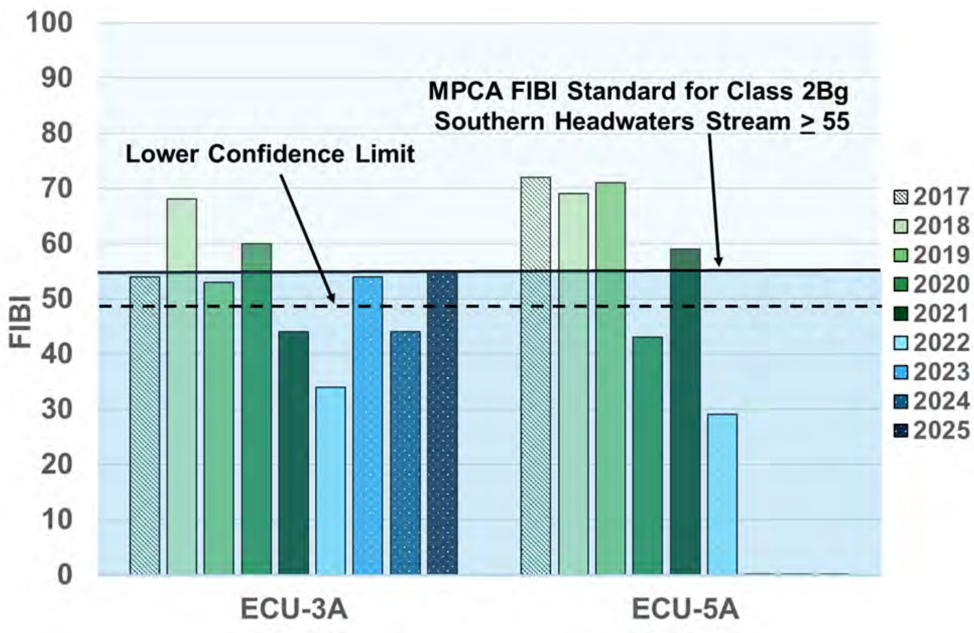
Fish were monitored at the two South Fork sample locations during June 20–23, 2025. FIBI scores were computed and compared with the applicable FIBI standards for the South Fork of the Nine Mile Creek. FIBI values exceeding their respective standard indicate higher fish diversity and abundance. The FIBI score from downstream South Fork monitoring location ECU-5A did not meet its respective FIBI standard or lower confidence limit. The FIBI score from the upstream monitoring location ECU-3A did meet its FIBI standard.

FIBI values from the upstream South Fork location, ECU-3A, met the FIBI standard in 2018, 2020, and 2025, but not during 2017, 2019, and 2021–2024. However, 2017, 2019 and 2023 values were within the standard's confidence limits indicating the values were fairly close to the standard. Low baseflow in 2021 through 2024 was identified as a possible stressor of the fish community. Additionally, dissolved oxygen concentrations monitored at ECU-3A in 2024 failed to meet the state standard in March and between July and October (i.e., dissolved oxygen concentrations below 5 mg/L). While the observed monthly flowrates in 2025 were still low, ≤1.2 cfs, monitored dissolved oxygen concentrations were noticeably improved from the previous year. All monitored dissolved oxygen concentrations in 2025 at ECU-3A met the state standard.

FIBI values from the South Fork downstream location, ECU 5A, met the FIBI standard during 2017 through 2019 and in 2021, but not during 2020 and 2022–2025. The 2023, 2024, and 2025 scores of 0 are the lowest to date as compared with FIBI scores of 29 through 72 during 2017 through 2022. Low baseflow in 2023 likely stressed the fish community. In September 2023 no flow was observed at ECU-5A. While the observed flows at ECU-5A were markedly higher in 2024 and 2025, it's possible that the fish community has not re-established. Low species diversity and abundance were observed in 2025. Additionally, dissolved oxygen concentrations at ECU-5A failed to meet the state standard between August–October indicating possible biological stressor.

The biological stressors identified by the *Nine Mile Creek Biological Stressor Identification* (Barr Engineering Co., 2010) for the South Fork of Nine Mile Creek included inadequate dissolved oxygen, excess sediment, and inadequate baseflow. The low flows and low dissolved oxygen levels measured in the South Fork in 2023 and low dissolved oxygen in 2024 and 2025 at the downstream monitoring location indicate inadequate baseflow and low dissolved oxygen as possible biological stressors in recent years.

The South Fork of the Nine Mile Creek from Lake Smetana (Eden Prairie) to the confluence with the North Fork (Bloomington) has been included on the state's impaired waters list for aquatic life (fish bioassessment) since 2018.



2017-2025 South Fork Nine Mile Creek Fish Index of Biotic Integrity (FIBI) values compared with the MPCA FIBI standards and lower confidence limits.

3.4.5 Macroinvertebrate Index of Biotic Integrity (MIBI) in South Fork Nine Mile Creek

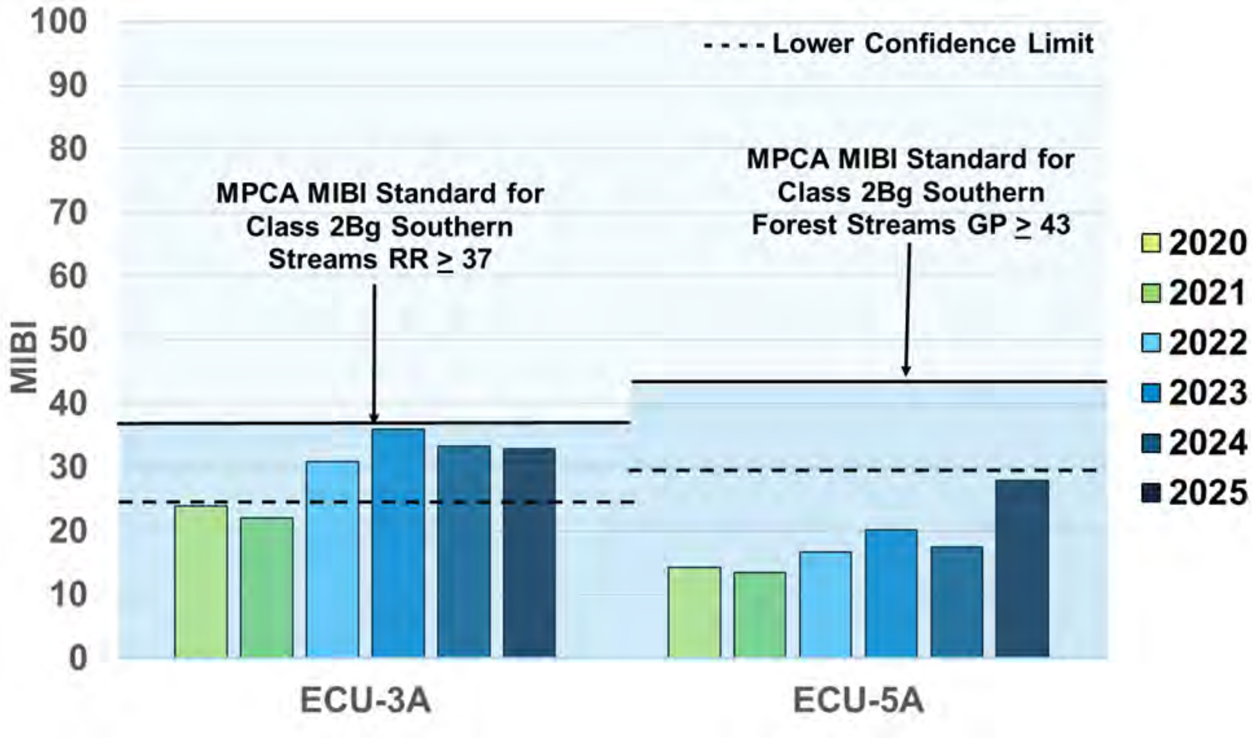
Macroinvertebrates were monitored at the two South Fork sample locations on October 1, 2025. MIBI scores were computed and compared with the applicable MIBI standards for the South Fork of the Nine Mile Creek.

In 2025, upstream South Fork location, ECU-3A, had a MIBI value greater than its respective lower confidence limit indicating the monitoring location was close to its applicable MIBI standard. This observation is consistent with MIBI observations between 2022–2024. The 2025 MIBI value of the downstream South Fork location, ECU-5A, was below the MIBI standard and the lower confidence limit, which is consistent with the MIBI observations since monitoring began in 2020. However, the 2025 MIBI value was the highest on record and just below the lower confidence limit.

The South Fork of the Nine Mile Creek from Lake Smetana (Eden Prairie) to the confluence with the North Fork (Bloomington) has been included on the state's impaired waters list for aquatic life (macroinvertebrate bioassessment) since 2018.

Example photo of a black fly larva

Photo credit: Dr. Dean Hansen



2020-2025 South Fork Nine Mile Creek Macroinvertebrate Index of Biotic Integrity (MIBI) values compared with the MPCA MIBI standards and lower confidence limits.

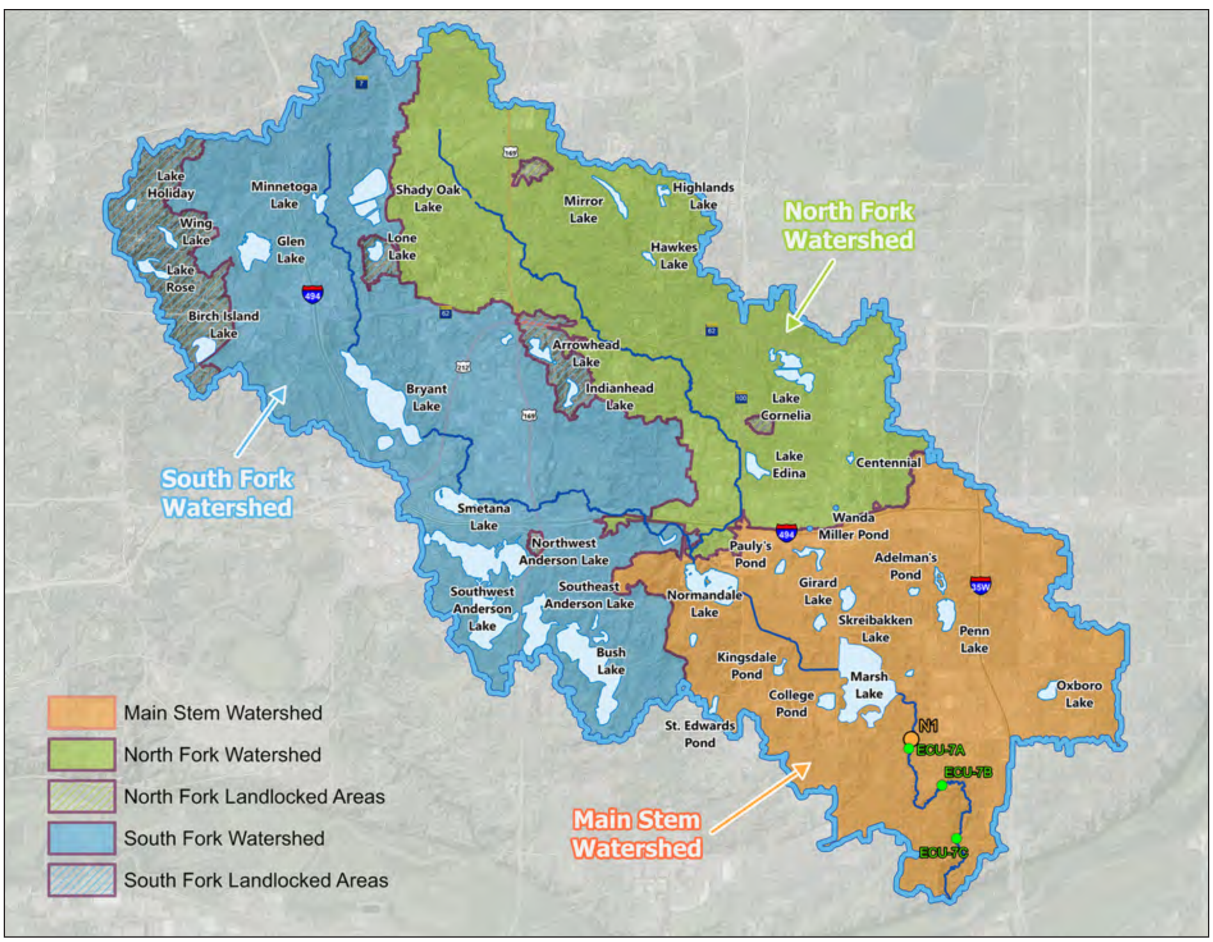
3.5 Main Stem Nine Mile Creek

2025 MONITORED PARAMETERS

- **Water Quality**
- **WOMP Stream Flow and Pollutants**
- **Habitat**
- **Fish Index of Biotic Integrity (FIBI)**
- **Macroinvertebrate Index of Biotic Integrity (MIBI)**

Nine Mile Creek Section	Main Stem
Tributary Municipalities	Richfield, Bloomington, Minnetonka, Eden Prairie, Edina, Hopkins
Direct Watershed Area	8,673 acres
Total Watershed Area*	29,727 acres (1,709 landlocked)
Impairment Status—Confluence of North and South Forks to downstream of Marsh Lake	• Impaired for aquatic life (fish bioassessment) since 2018 • Impaired for aquatic life (macroinvertebrate bioassessment) since 2018
Impairment Status—Downstream of Marsh Lake to the Minnesota River	• Impaired for chloride since 2004 • Impaired for Escherichia coli (*E. coli*) since 2018 • Impaired for aquatic life (fish bioassessment) since 2018 • Impaired for aquatic life (macroinvertebrate bioassessment) since 2018

** Includes 1,709 acres that are typically landlocked*



3.5.1 Water Quality Monitoring in Main Stem Nine Mile Creek

In 2025, three monitoring stations were used to measure the water quality conditions of the Main Stem of the Nine Mile Creek, including monitoring locations ECU-7A (N1), ECU-7B, and ECU-7C (listed upstream to downstream). These monitoring locations are shown in Figure 1-1 and in the figure on the previous page. Monitored water quality parameters included dissolved oxygen, pH, temperature, specific conductance, turbidity, and flow on eight occasions (once a month March through October). Table 3-10 through Table 3-12 summarize the average, maximum, and minimum observed values for each water quality parameter at each monitoring location on the Main Stem. The tables also outline the number of events when the monitored parameter exceeded the state standard or threshold.

Dissolved oxygen measurements observed in the Main Stem of the Nine Mile Creek in 2025 met the Minnesota State standard (>5 mg/L) with a similar frequency as 2024—97% met the State standard in 2025 compared with 96% in 2024. Time series plots showing the observed dissolved oxygen concentrations can be viewed at the end of this section. In 2025, the upstream monitoring location ECU-7A (N1) consistently had lower dissolved oxygen concentrations than the downstream monitoring locations, ECU-7B and 7C. Historical records indicate that water discharging from Marsh Lake can notably influence the observed dissolved oxygen concentrations at ECU-7A (N1). Oxygen levels within Marsh Lake fluctuate due to biological activity within the marsh—biological photosynthesis raises oxygen levels and biological decay lowers oxygen levels. Hence, water flowing from the marsh can influence the dissolved oxygen concentration of the Nine Mile Creek for the portions that are immediately downstream. The periods of low dissolved oxygen observed at ECU-7A (N1) occurred during periods of high flow and high stream temperatures. As such, biological degradation resulting in low dissolved oxygen within Marsh Lake was likely one cause of low dissolved oxygen at ECU-7A (N1), but high stream temperatures also played a role in lower dissolved oxygen levels.

For the downstream Main Stem monitoring locations not as highly influenced by Marsh Lake, **stream flow and temperature** can notably influence the observed dissolved oxygen concentrations. 2025 was wet in the spring and summer and dry in the fall. As such, increased flowrates were observed in the Main Stem between April and July and notably lower flowrates were observed between August and October. The highest water temperatures were observed in August ranging from 73.0°F to 74.8°F in the downstream Main Stem locations. The lowest dissolved oxygen concentrations were generally observed during periods of both reduced stream flow and higher water temperatures at monitoring stations ECU-7B and 7C.

High stream flow can also notably influence the observed **turbidity (clarity)** of the stream due to increased particulates discharging to the stream from watershed runoff as well as amplified sediment resuspension and bank erosion in the stream itself. Generally higher turbidity measurements were noted during increased flowrates observed in the Main Stem, especially in July. Lower turbidity measurements were observed during low flow conditions in October.

The **pH** values observed during monthly monitoring in the Main Stem met the state standards throughout the monitored period.

Atypical to previous years, the 2025 observed **specific conductance** met the Minnesota State standards (<1,000 µmhos/cm at 25°C) for all monitored events—100% of the Main Stem measurements met the specific conductance standard in 2025 as compared to 75% in 2024 and 39% in 2023. Time series plots showing the observed specific conductance values can be viewed at the end of this section. In the historical record, the exceedance of the Minnesota State specific conductance standard in the Main Stem of the Nine Mile Creek has been unfavorable for the aquatic life in the stream. High specific conductance measurements in Nine Mile Creek that fail to meet state standards typically result from the discharge of excess chloride from deicing chemicals (salt) to the creek. Other potential sources include synthetic fertilizers. The MPCA has listed the portion of the Main Stem Nine Mile Creek that downstream of Marsh Lake to the Minnesota River as impaired for chloride since 2004. Lower specific conductance measurements in 2025 are a positive observation.

Table 3-10 Main Stem Nine Mile Creek monitoring location ECU-7A/N1 monthly water quality data summary (WOMP Station)

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	6.8	11.0	3.8	2/8 (25%)
pH	6.5–9.0	7.1	7.7	6.8	0/8 (0%)
Temperature (^oF)	Not to exceed 5^{o}F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86^{o}F	58.6	76.5	38.5	0/8 (0%)
Specific Conductance (µmhos/cm @ 25^{o}C)	< 1,000	663	864	542	0/8 (0%)
Turbidity (NTU)	< 25[1]	3.3	6.2	1.5	0/8 (0%)
Flow (cfs)	N/A	14.3	26.2	6.2	N/A

Table 3-11 Main Stem Nine Mile Creek monitoring location ECU-7B monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	8.5	11.9	6.2	0/8 (0%)
pH	6.5–9.0	7.2	7.8	6.7	0/8 (0%)
Temperature (^oF)	Not to exceed 5^{o}F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86^{o}F	58.9	74.8	39.0	0/8 (0%)
Specific Conductance (µmhos/cm @ 25^{o}C)	< 1,000	669	873	545	0/8 (0%)
Turbidity (NTU)	< 25[1]	3.3	6.6	1.4	0/8 (0%)
Flow (cfs)	N/A	14.5	27.1	6.4	N/A

[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

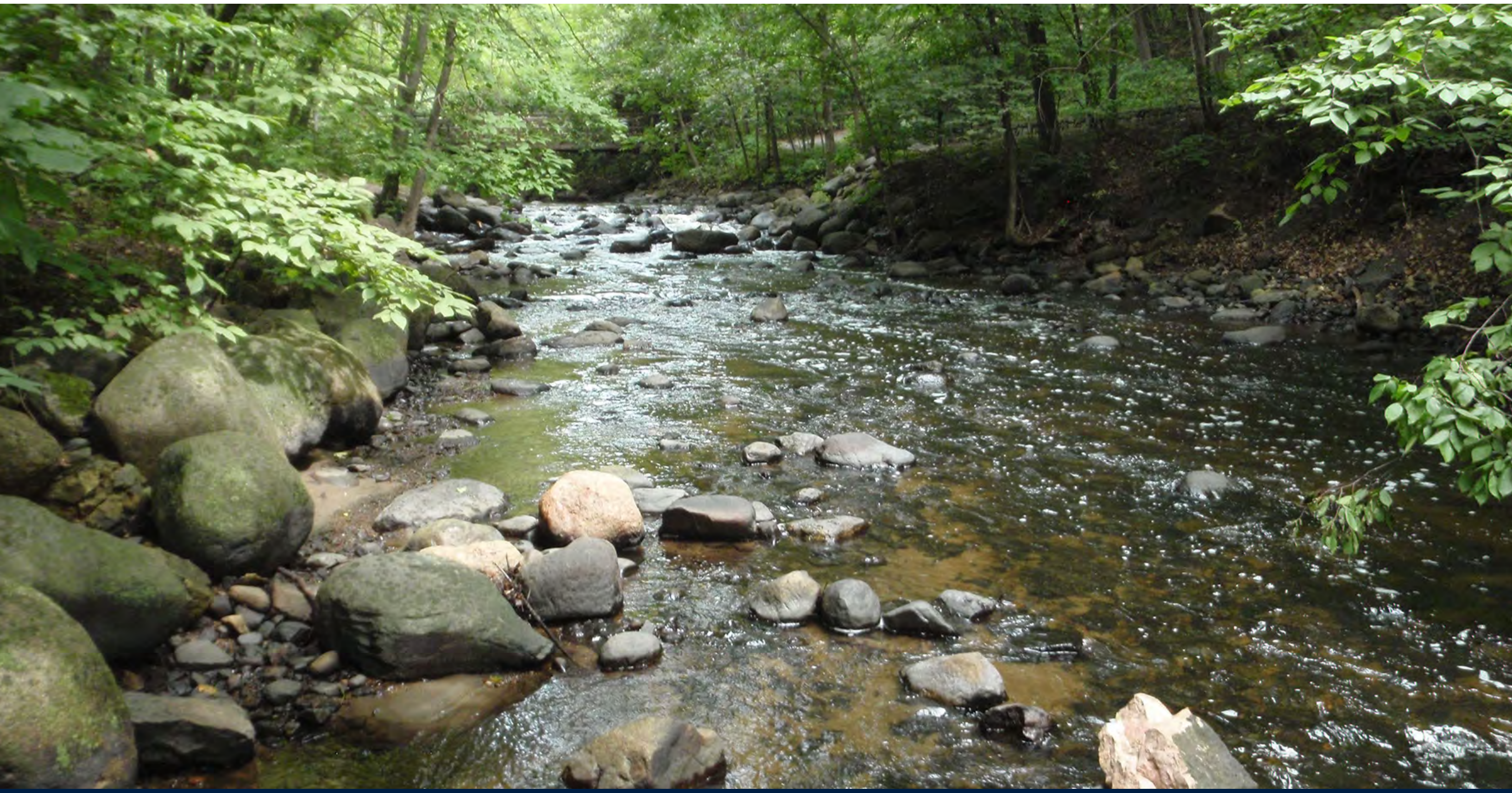
mg/L = milligrams per liter; ^{o}F = degrees Fahrenheit; µmhos/cm @ 25^{o}C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable

Table 3-12 Main Stem Nine Mile Creek monitoring location ECU-7C monthly water quality data summary

Parameter	Stream Standard/ Threshold	Average	Maximum	Minimum	Number of times standard was exceeded (% of samples)
Dissolved Oxygen (mg/L)	> 5	9.7	12.6	7.6	0/8 (0%)
pH	6.5–9.0	7.3	7.9	6.8	0/8 (0%)
Temperature (°F)	Not to exceed 5°F above natural, based on a monthly average of maximum daily water temperature; Not to exceed daily average of 86°F	58.8	73.0	39.7	0/8 (0%)
Specific Conductance (µmhos/cm @ 25°C)	< 1,000	690	872	570	0/8 (0%)
Turbidity (NTU)	< 25[1]	3.8	7.1	2.1	0/8 (0%)
Flow (cfs)	N/A	14.9	29.3	6.5	N/A

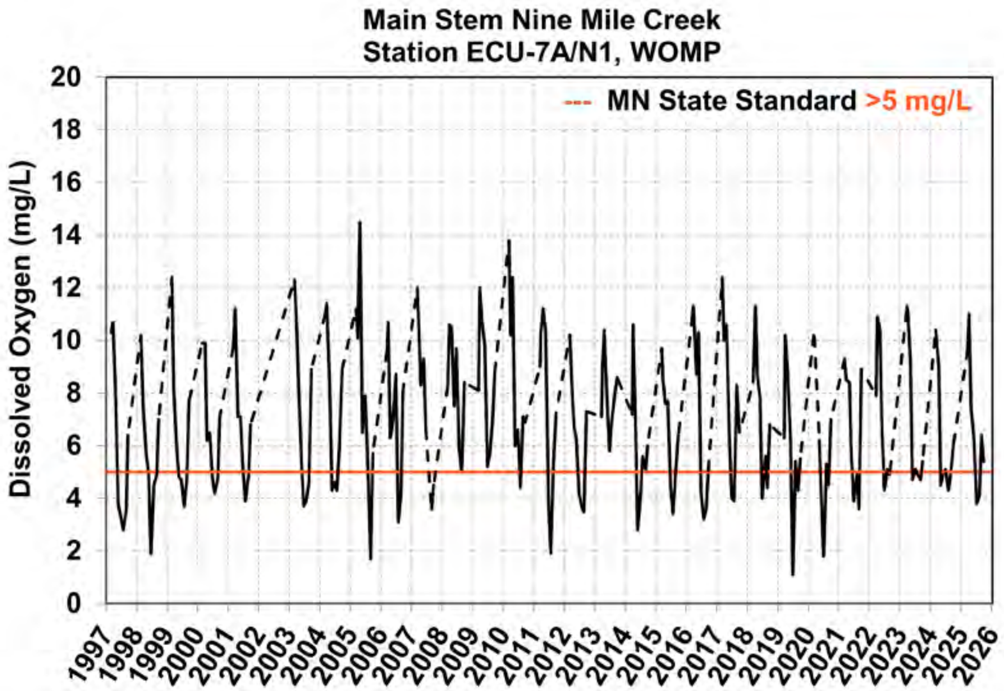
[1]Turbidity was a state standard (< 25 NTU) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

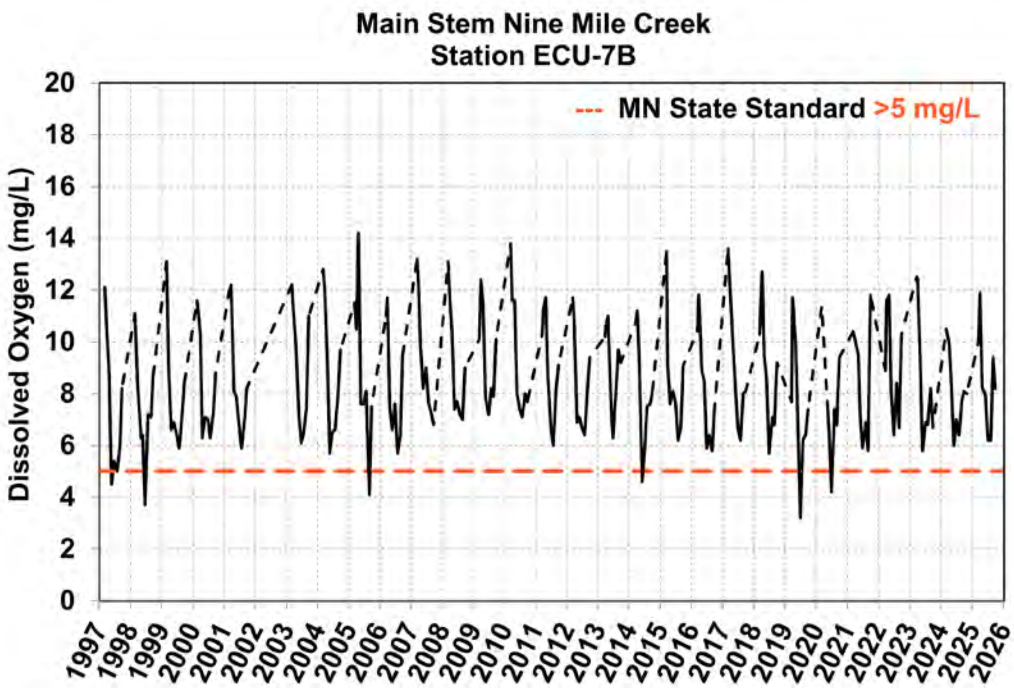
mg/L = milligrams per liter; °F = degrees Fahrenheit; µmhos/cm @ 25°C = micromhos per centimeter at 25 degrees Celsius; NTU = Nephelometric Turbidity Units; cfs = cubic feet per second; N/A = not applicable



Dissolved Oxygen

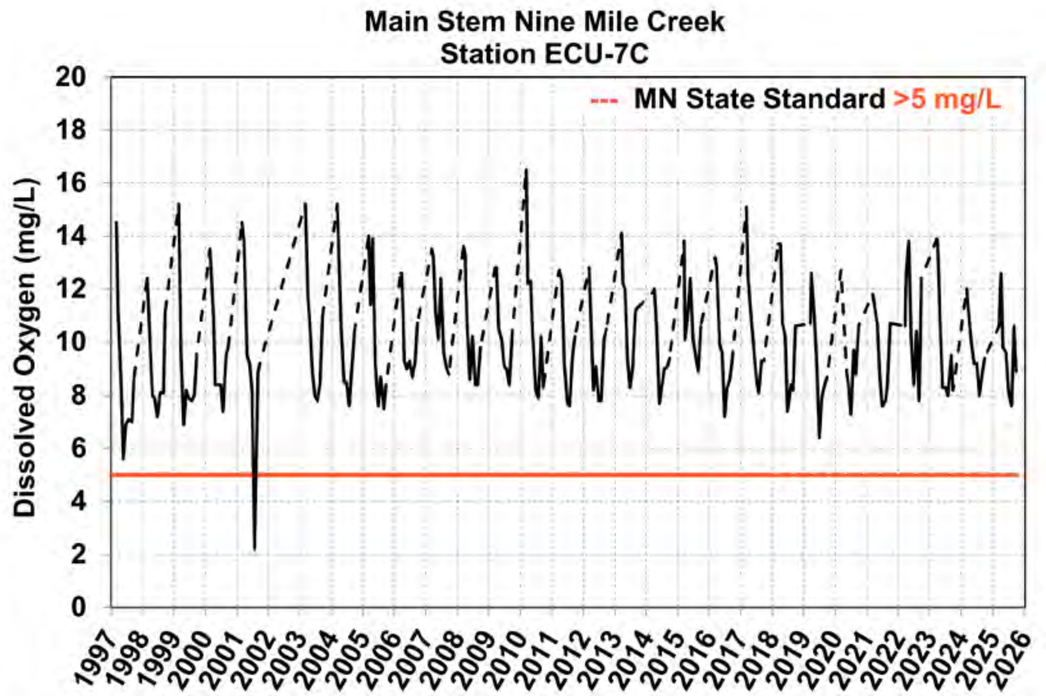
Dissolved oxygen is the concentration (or the amount) of oxygen gas incorporated in water. Oxygen can enter the water from the atmosphere, or it can accumulate from the oxygen released by plants or algae during photosynthesis. Sufficient dissolved oxygen is necessary to support the health and reproduction of organisms such as aquatic insects and fish. Major physical properties that can influence the concentration of dissolved oxygen include temperature, flow, turbulence, nutrient levels, and level of decomposition.





NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

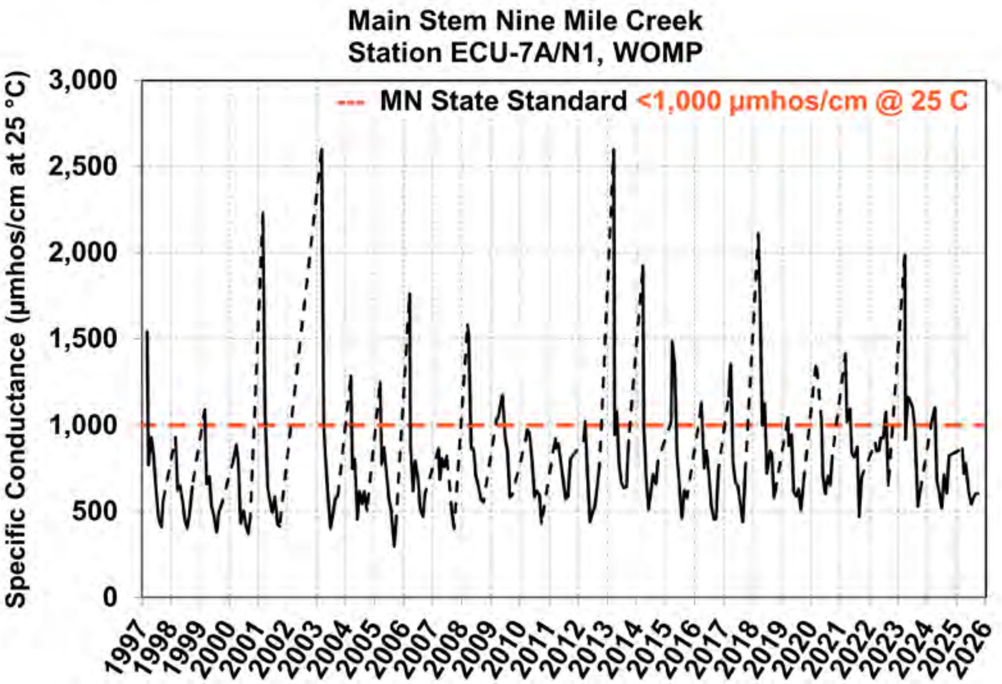
Dissolved Oxygen

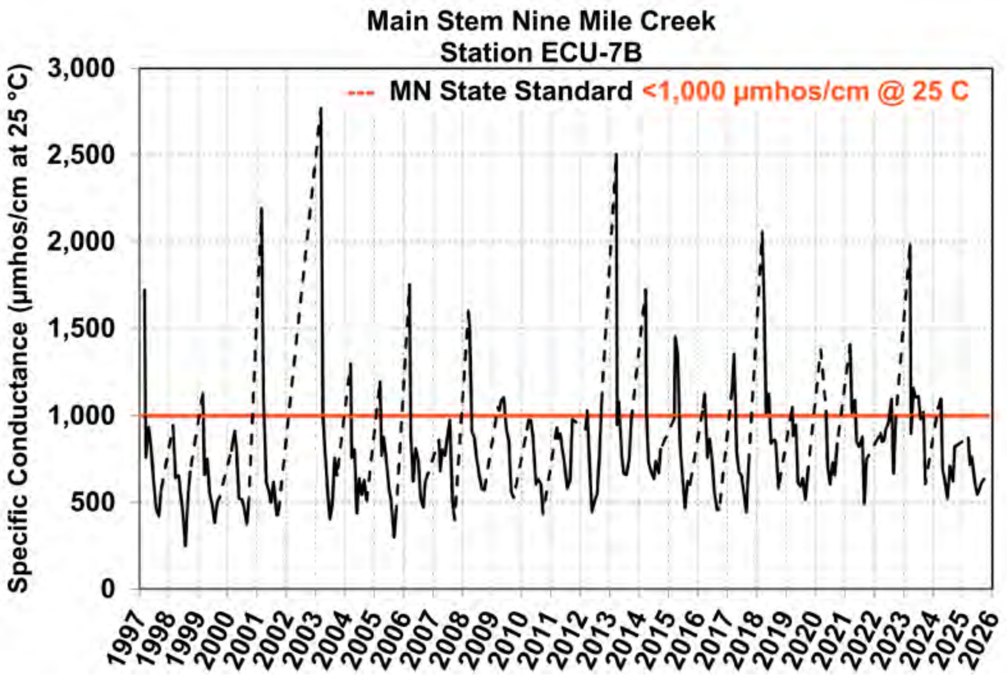


NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

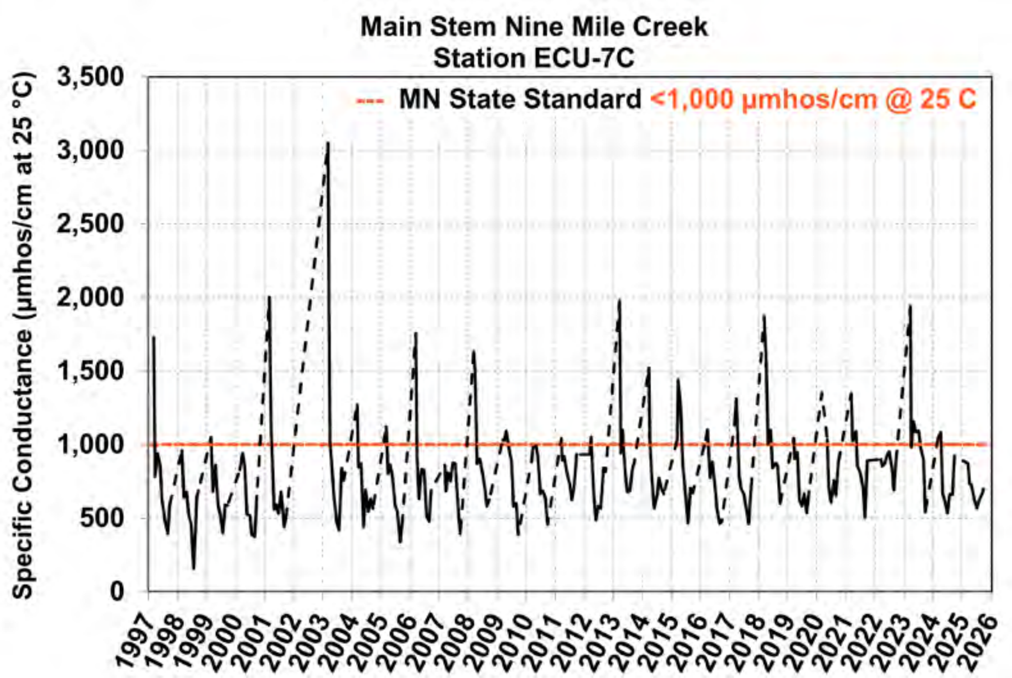
Specific Conductance

Specific conductance is a measure of water's ability to pass an electrical current via ions dissolved in the water such as alkalis, chloride, sulfides, and carbonate compounds. The higher the specific conductance, the more dissolved salts and minerals that are present in the water. For example, high chloride concentrations can lead to high specific conductance. Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians.





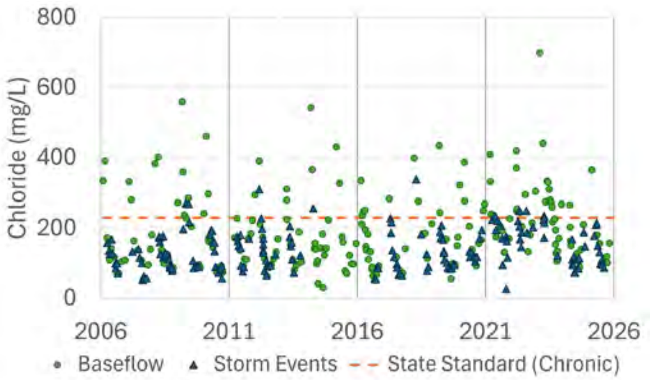
NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)



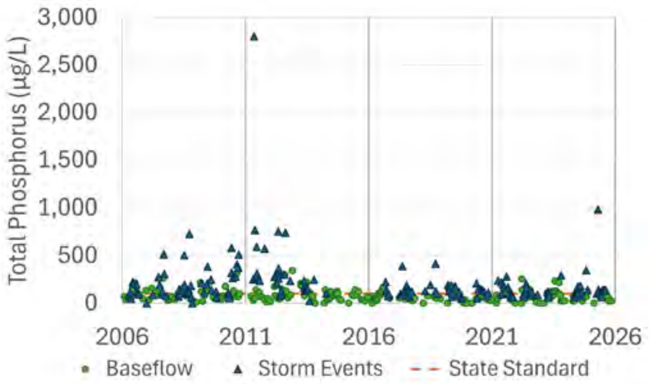
NOTE: Dashed lines indicate periods of no monitoring data (typically in winter)

3.5.2 WOMP Stream Pollutant Monitoring in Main Stem Nine Mile Creek

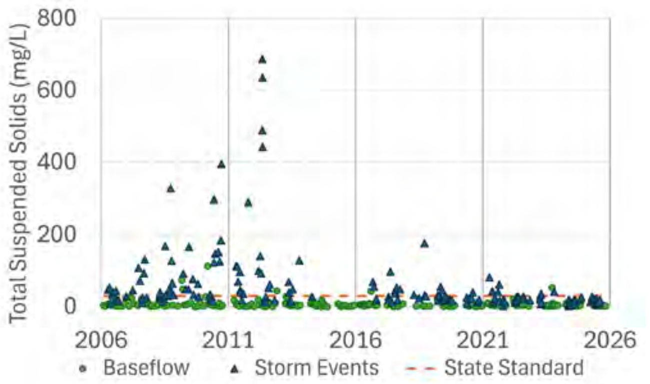
In 2025, one monitoring station was used to measure more robust stream pollutant conditions of the Main Stem of the Nine Mile Creek. Monitoring station N1 uses an automated stream pollutant monitoring system similar to the Metropolitan Council's Watershed Outlet Monitoring Program (WOMP). Water quality grab samples were collected bi-weekly to monthly to monitor baseflow conditions and composite samples were collected during most storm events larger than 0.5 inches to monitor stormwater pollutant loads to the Main Stem. The plots below summarize the monitored chloride, total phosphorus, and total suspended solids concentrations at station N1 between January 2026 and December 2025 under baseflow (green) and storm event (blue) conditions and compare the monitored data to the state standards.



Chloride can enter streams and shallow groundwater from road de-icing salts and synthetic fertilizers. High amounts of chloride can influence species diversity and community structure and become toxic to fish, aquatic insects, and amphibians. In 2025, chloride concentrations at N1 between April and November were similar during baseflow and storm event conditions. Higher chloride concentrations were observed during baseflow conditions in February with a maximum concentration of 365 mg/L.



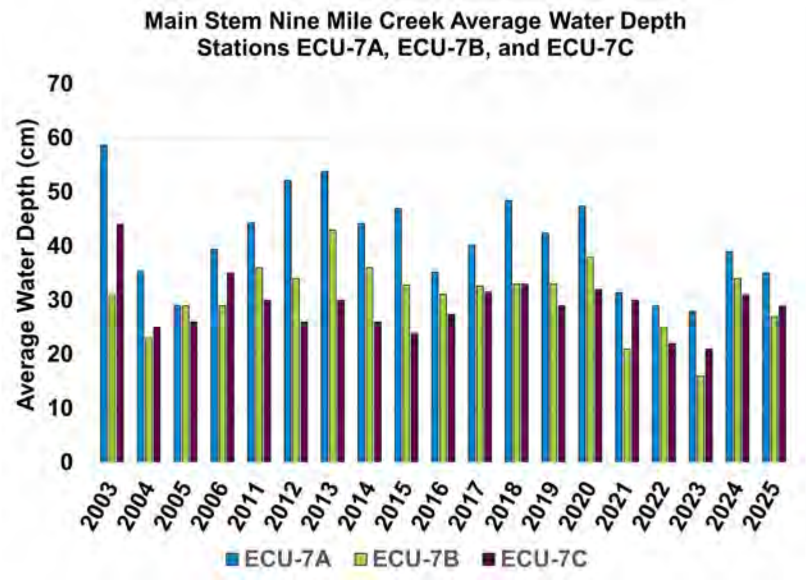
Phosphorus is an essential nutrient required for biological production. An overabundance of phosphorus in streams can influence plant species, alter food resources for aquatic organisms, and lead to higher risk of low oxygen conditions (due to increased bacterial decomposition). In 2025, total phosphorus concentrations at N1 between April and September were higher during storm event conditions. A maximum storm composite concentration of 986 µg/L was observed during a storm/snow melt event at the end of April.



Stream water will get less clear and more turbid from an increase in **total suspended solids** including sediment, soils, detritus, and algae. High amounts of suspended solids can affect light penetration and reduce plant growth and cause harm to habitat for fish and other aquatic life due to increased sedimentation and siltation. In 2025, total suspended solids concentrations at N1 between April and September were higher during storm event conditions, in comparison with baseflow samples. A maximum storm composite concentration of 28 mg/L was observed during a storm/ snowmelt event in at the end of April.

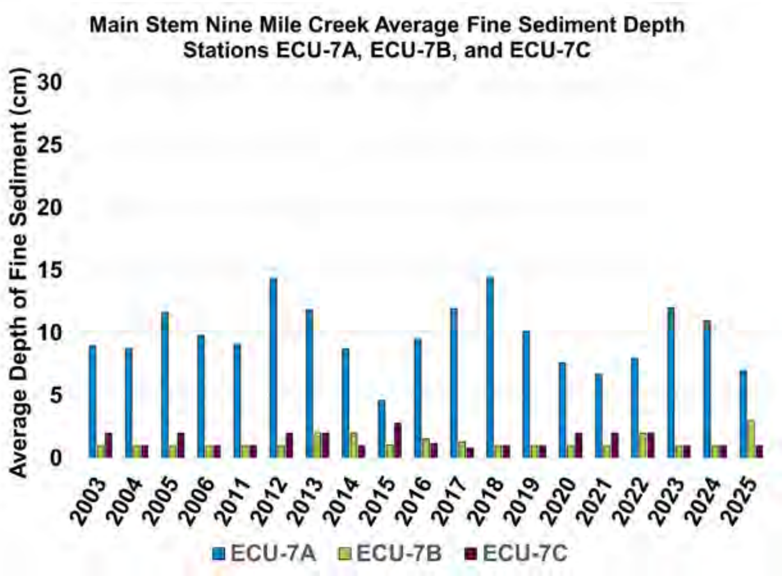
3.5.3 Habitat Monitoring in Main Stem Nine Mile Creek

In 2025, three monitoring stations were used to measure the habitat conditions of the Main Stem of the Nine Mile Creek. These included monitoring locations ECU-7A, ECU-7B, and ECU-7C (listed upstream to downstream). These monitoring locations are shown in Figure 1-1. Monitored habitat parameters included water depth, flow, depth of fine sediment, percent embeddedness, and length of eroded streambank on one occasion (typically completed during fisheries monitoring). A summary of the most recent 20 years of water depth and depth of fine sediment observations, as well as the 2025 stream bank erosion observations are provided below.



Water depth is a factor in determining the presence and distribution of fish in streams. Water depths have annually been measured when fish surveys were completed. The average water depths, measured at monitored cross sections in the Main Stem, were similar to observations in 2024, which increased after multiple years of drought.

Fine sediments like silt, clay, and sand can fill the voids between gravel, rocks, and boulders in the streambed. These voids are critical for fish spawning and providing macroinvertebrates with sheltering and breeding locations. The upstream Main Stem monitoring location ECU-7A has been observed to have notably higher average depths of fine sediments than the downstream monitoring locations.



ECU-7A Stream Bank Erosion Observations

Considerable erosion was observed at the upstream end of this reach. Exposed soils on the bends are sloughing into the stream. Some areas of bank erosion have caused trees to fall. In one location along the reach, an existing storm sewer pipe is exposed due to severe erosion and is discharging runoff multiple inches above the stream bed, which creates conditions where the stream bed is susceptible to erosion during storm events.

ECU-7B Stream Bank Erosion Observations

Bank erosion is fairly uniform throughout the reach, but more noticeable at stream bends. Portions of the reach are more susceptible to erosion due to limited vegetation on the banks, especially during high flow conditions.

ECU-7C Stream Bank Erosion Observations

Bank erosion is fairly uniform throughout the reach, but more noticeable at stream bends. Portions of the reach are more susceptible to erosion due to limited vegetation on the banks, especially during high flow conditions.

3.5.4 Fish Index of Biotic Integrity (FIBI) in Main Stem Nine Mile Creek

Fish were monitored at the three Main Stem sample locations on June 24 and August 6-7, 2025. The downstream locations were monitored later due to high stream flows creating access and safety concerns. FIBI scores were computed and compared with the applicable FIBI standards for the Main Stem of the Nine Mile Creek (as seen in the graph on the next page). FIBI values exceeding their respective standard indicate higher fish diversity and abundance. The 2025 FIBI scores from the upstream, ECU-7A, and downstream, ECU-7C, Main Stem locations met the respective FIBI standard. The FIBI score from the middle Main Stem location, ECU-7B, was just below its respective FIBI standard and above the lower confidence limit. Both of the FIBI scores from the upstream North Fork location, ECU-7A, and middle location, ECU-7B, were the highest scores observed in the historical record.

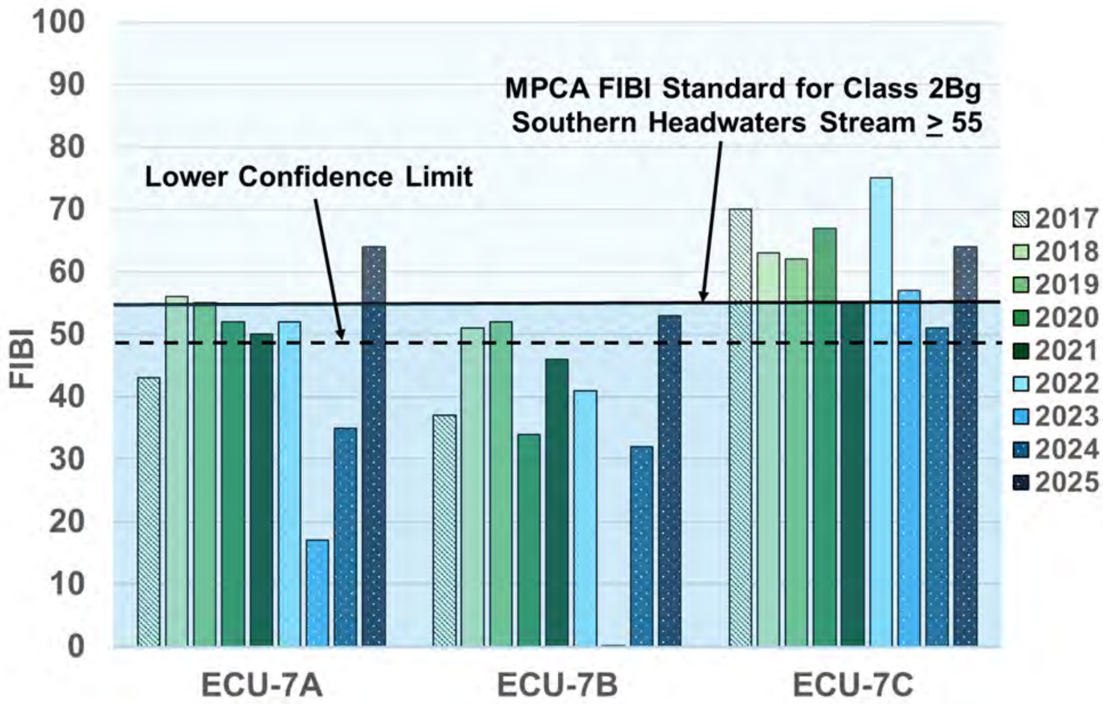
FIBI scores from the upstream Main Stem location, ECU-7A, met the FIBI standard during 2018, 2019, and 2025, but not during 2017 and 2020–2024. However, the 2020 through 2022 values were within the standard's confidence limits. The 2023 FIBI score of 17 was the lowest score to date and was likely due to low flow and oxygen levels. In 2024, the FIBI score of 35 increased from the previous year and in 2025 the FIBI score of 64 was the highest on record. Observed spring (March–June) specific conductance at ECU-7A was noticeably lower than levels observed over the previous decade, likely reducing stress on the fish community. However, low dissolved oxygen levels were observed at ECU-7A in July and August indicating that oxygen may still be a biological stressor.

FIBI scores from the middle Main Stem location, ECU-7B, failed to meet the FIBI standard during all 9 monitored years. The FIBI score of 0 in 2023 was the lowest to date and was likely due to low flow conditions. In 2024, the FIBI score of 32 increased from the previous year and in 2025 the FIBI score of 53 was the highest on record. Observed spring (March–June) specific conductance at ECU-7B was noticeably lower than levels observed over the previous decade, likely reducing stress on the fish community. Observed dissolved oxygen concentrations at ECU-7B were also above state standards for all monitored events ranging between 6.2–11.9 mg/L.

FIBI scores from the downstream Main Stem location, ECU-7C, have met the FIBI standard for all monitored years between 2017–2025 except in 2024. Nevertheless, the 2024 value was within the standard's confidence limits indicating the score is relatively close to the standard. The 2025 FIBI score at ECU-7C was 64, which is well above the FIBI standard. Similar to the upstream locations, observed spring (March–June) specific conductance at ECU-7C was noticeably lower than levels observed over the previous decade, likely reducing stress on the fish community. Observed dissolved oxygen concentrations at ECU-7C were also above state standards for all monitored events ranging between 7.6–12.6 mg/L.

The biological stressors identified by the *Nine Mile Creek Biological Stressor Identification* (Barr Engineering Co., 2010) for the Main Stem of Nine Mile Creek included low dissolved oxygen, high sediment accumulation, and high ionic strength due to excess chloride. Low dissolved oxygen levels measured in the Main Stem in 2023 and low dissolved oxygen at ECU-7A (N1) in 2024 and 2025 are examples when low dissolved oxygen was a potential biological stressor in recent years. Lower specific conductance levels observed in 2025 may have reduced stress on the fisheries communities as compared to high specific conductance seen in previous years.

The entirety of the Main Stem of the Nine Mile Creek has been included on the state's impaired water list for aquatic life (fish bioassessment) since 2018.



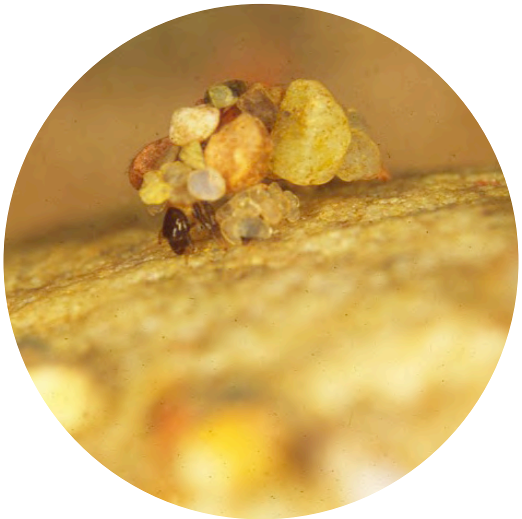
2017-2025 Main Stem Nine Mile Creek Fish Index of Biotic Integrity (FIBI) values compared with the MPCA FIBI standards and lower confidence limits.

3.5.5 Macroinvertebrate Index of Biotic Integrity (MIBI) in Main Stem Nine Mile Creek

Macroinvertebrates were monitored at the three Main Stem sample locations during October 1-2, 2025. MIBI scores were computed and compared with the applicable MIBI standards for the Main Stem of the Nine Mile Creek.

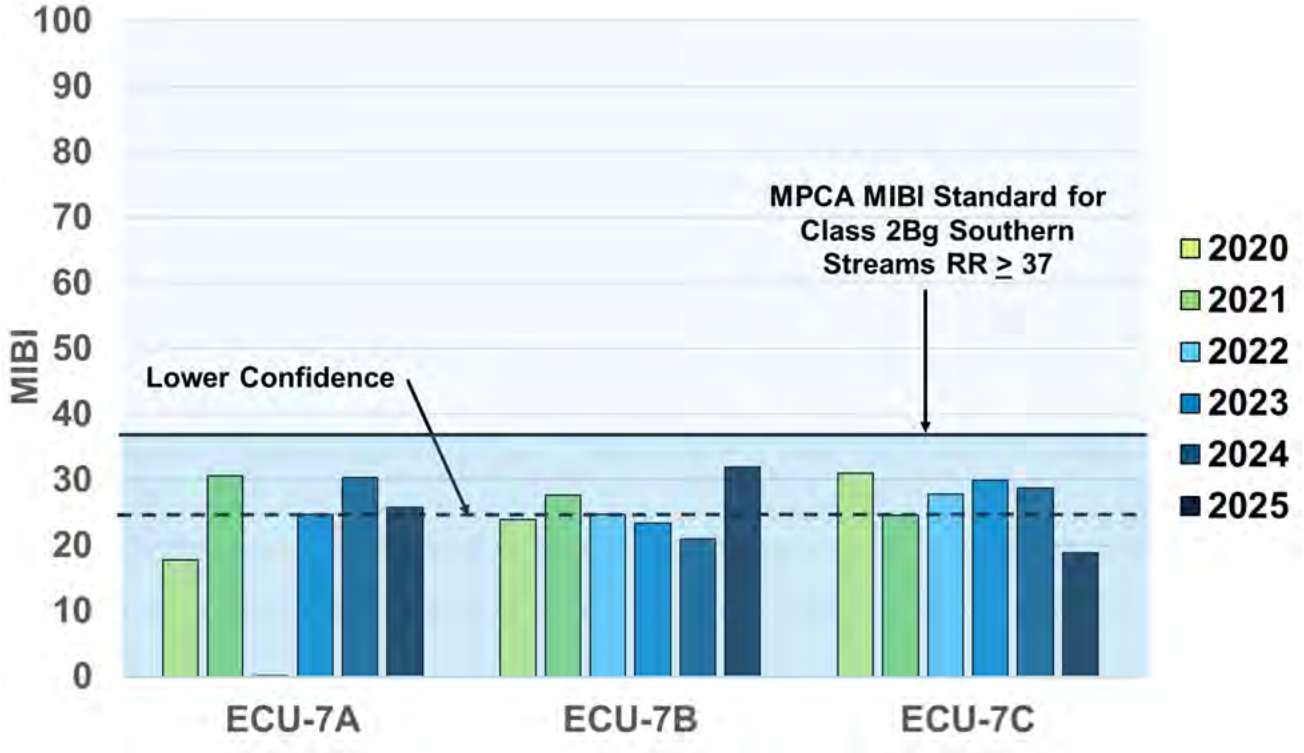
In 2025, the upstream Main Stem location, ECU-7A, had a MIBI value greater than its respective lower confidence limit indicating the monitoring location was close to its applicable MIBI standard. This observation is consistent with the MIBI observations in 2021 and 2023-2024. Upstream Main Stem location, ECU-7A was not sampled in 2022 due to a dry stream bed. In 2025, the MIBI value from middle Main Stem location, ECU-7B, was greater than the lower confidence limit and the highest observed on record. Conversely, the 2025 MIBI value from the downstream Main Stem location, ECU-7C, was the lowest observed on record and was below the lower confidence limit.

The entire length of the Main Stem Nine Mile Creek has been included on the state's impaired waters list for aquatic life (macroinvertebrate bioassessment) since 2018.



Example photo of a caddisfly larva

Photo credit: Dr. Dean Hansen



2020-2025 Main Stem Nine Mile Creek Macroinvertebrate Index of Biotic Integrity (MIBI) values compared with the MPCA MIBI standards and lower confidence limits

3.6 Stream Monitoring Summary for the Nine Mile Creek

Table 3-13 summarizes stream monitoring data from 2025. All Nine Mile Creek pH and temperature measurements met the state standards in 2025. 90% of the dissolved oxygen measurements and 83% of the specific conductance measurements met the state standards in 2025.

In 2025, all South Fork and Main Stem monitoring locations and events met the Minnesota State specific conductance standard, an outcome that was atypical and noteworthy compared to previous years. In contrast, the North Fork locations continued to meet the standard less frequently, with 56% of measurements meeting the state criterion.

In 2025, the North Fork met the state standard for dissolved oxygen more frequently than other sampling locations—97% of the dissolved oxygen measurements from the North Fork were within the state criterion in 2025 compared with 96% of Main Stem and 79% of South Fork measurements.

While the 2025 monitored water depths and monthly average/maximum flowrates were lower than what was observed in 2024, they were similar to averages observed across the historical record and notably higher than observations during the dry years of 2022 and 2023. Increased water depths and flowrates can allow for improved aquatic habitat conditions.

The downstream North Fork (ECU-2A), upstream South Fork (ECU-3A), upstream Main Stem (ECU-7A), and downstream Main Stem (ECU-7C) monitoring locations met their respective state Fish IBI standards in 2025. The middle Main Stem location (ECU-7B) did not meet the state Fish IBI standard in 2025, but the value was greater than the lower confidence limit. All other monitoring locations did not meet the state Fish IBI standard or lower confidence limit.

The downstream North Fork (ECU-2A) monitoring location was the only sample location that met the state Macroinvertebrate IBI standard in 2025. However, four locations (middle North Fork location ECU-2, upstream South Fork location ECU-3A, and upstream and middle Main Stem locations ECU-7A and ECU-7B) had MIBI values greater than their respective lower confidence limits, indicating they were close to the applicable MIBI standard.

Several biological stressors identified by the *Nine Mile Creek Biological Stressor Identification* (2010) were documented as present in Nine Mile Creek during 2025, including:

- North Fork — excess ionic strength (present)
- South Fork — inadequate dissolved oxygen (present) and excess ionic strength (absent in 2025)
- Main Stem — inadequate dissolved oxygen (present) and excess ionic strength (absent in 2025)

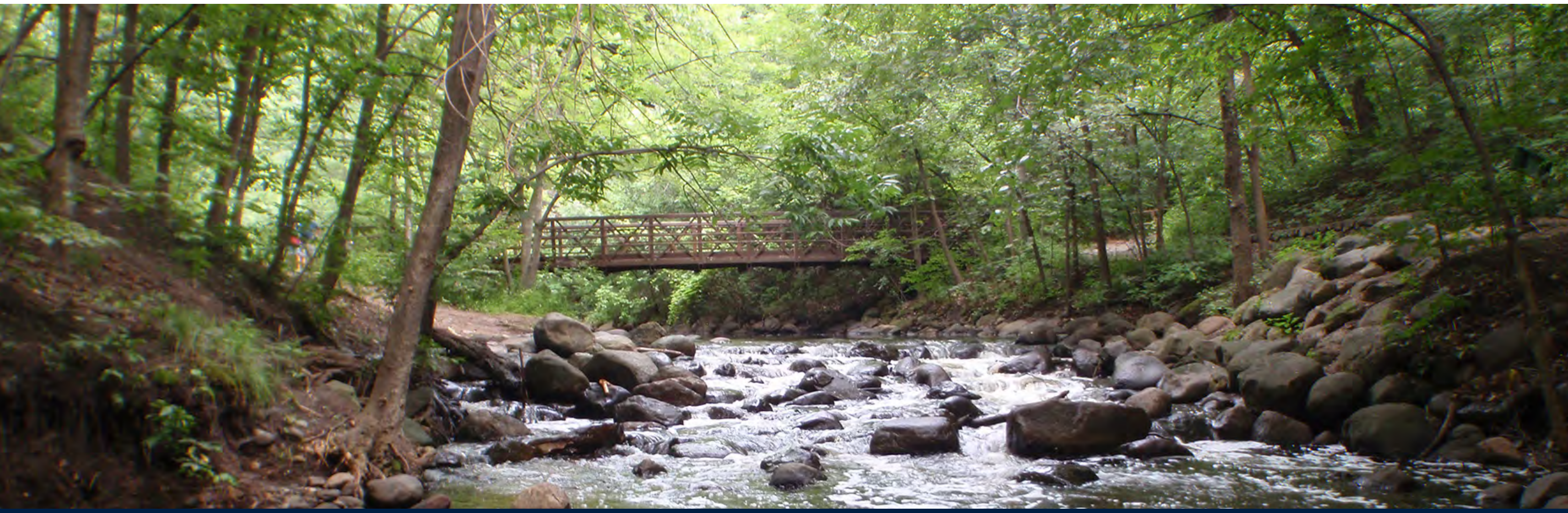


Table 3-13 2024 Nine Mile Creek Stream Data Summary

Stream Section	Station	Specific Conductance Failed to Meet Standard (# of monthly events)		Dissolved Oxygen Failed to Meet Standard (# of monthly events)		pH Failed to Meet Standard (# of monthly events)	Temperature Failed to Meet Standard (# of monthly events)	Turbidity Exceeded 25 NTU[1] (# of monthly events)		Minimum Baseflow (March-October) Cubic feet per second	Average Baseflow (March – October) Cubic feet per second	Average Water Depth (June 18-26 or July 18-19)[2] Centimeters	Average Depth of Fine Sediment [2] Centimeters	Fish IBI[2]	Macro-invertebrate IBI[3]
North Fork	ECU-1A-2	7/8	March–April, June–Oct							1.0	1.4	18	24	did not meet standard or lower confidence limit	did not meet standard or lower confidence limit
North Fork	ECU-2	1/8	July	1/8	August					1.6	5.1	23	9	did not meet standard or lower confidence limit	met lower confidence limit
North Fork	N3	1/8	August					1/8	May	1.3	5.9				
North Fork	ECU-2A	5/8	March–April, July–Aug, Oct							3.2	12.5	14	6	met standard	met standard
South Fork	ECU-3A									0.1	0.4	19	11	met standard	met lower confidence limit
South Fork	N2			2/8	August, Oct					0.5	4.6				
South Fork	ECU-5A			3/8	Aug–Oct					1.5	5.9	45	25	did not meet standard or lower confidence limit	did not meet standard or lower confidence limit
Main Stem	ECU-7A (N1)			2/8	July, August					6.2	14.3	35	7	met standard	met lower confidence limit
Main Stem	ECU-7B									6.4	14.5	27	3	met lower confidence limit	met lower confidence limit
Main Stem	ECU-7C									6.5	14.9	29	1	met standard	did not meet standard or lower confidence limit

[1] Turbidity was a state standard (25 NTU, Nephelometric Turbidity Units) from the 1960s through 2014 when it was replaced with total suspended solids. Although turbidity is not currently a state standard, it is a useful surrogate indicator of total suspended solids.

[2] Fish surveys, water depth, and depth of fine sediment measurements were completed for the North and South Fork monitoring locations on a single day between June 12–24, 2025 and the Main Stem monitoring locations on June 24 and between August 6–7, 2025.

[3] Macroinvertebrate survey was completed October 1–2, 2025.

4 LAKE LEVEL MONITORING

A summary of the 2025 and historical water levels collected for district lakes

Wing Lake, summer 2025

The lake level monitoring program was initiated by the Nine Mile Creek Watershed District in 1960. Since inception of the program, the number of lakes being monitored has fluctuated over time in response to specific data needs. In 2025, the Nine Mile Creek Watershed District recorded monthly lake levels at 29 lakes and waterbodies throughout the Nine Mile Creek watershed. The locations of the monitored waterbodies are shown on Figure 1-2. Lake level readings are taken monthly, usually at the same time the groundwater levels are measured. The levels of the lakes are generally measured using an engineering level from permanent structures along the shore.

Lake levels are influenced by groundwater conditions, local precipitation, size of the drainage area, land surface area, outlet elevation and configuration, local land use, and a variety of other factors. The effects of these influences on the lakes differ; there is no general uniformity in the fluctuation of lake levels in the watershed. Table 4-1 summarizes the net change in lake levels between December 2024 and December 2025, as well as the historic high and low water elevations. Graphs showing measured lake levels from January 2000 through present are available on the district's Web Tool:

https://maps.barr.com/NMCWD/NMCWD_InformationSharingApp/index.html

In 2025, lake levels shifted modestly toward increases, with 18 of the monitored lakes rising and 11 of the monitored lakes declining, indicating generally wetter conditions. This follows the notably dry conditions in 2023, when 27 monitored lakes declined, and the more typical climatic conditions observed in 2024, which showed a relatively even mix of increasing and decreasing lake levels. Recovering lake levels in 2025 were consistent with broader groundwater recovery across the region. The most notable net increase in lake levels from December 2024 to December 2025 was Skriebakken (+0.8 feet), while the most notable net decrease was seen in Lower Penn (-2.6 feet). There were no new historical high or low lake water elevation records set in 2025.

Table 4-1 Summary of 2025 Monthly Observed Lake Levels

Lake	Measured Lake Level—December 2024 (12/26/2024) (feet mean sea level)	Measured Lake Level—December 2025 (12/27/2025) (feet mean sea level)	Net Change in Measured Lake Levels (12/26/2024 - 12/27/2025) (feet)	Historical High Water Elevation (feet mean sea level)	Historical High Water Elevation Date	Historical Low Water Elevation (feet mean sea level)	Historical Low Water Elevation Date
NW Anderson	839.1	839.3	0.2	841.8	7/24/1987	833.0	1/5/2009
SE Anderson	834.9	835.4	0.5	841.8	7/24/1987	833.1	2/28/2013
SW Anderson	839.1	839.4	0.3	841.8	7/24/1987	835.1	12/8/1964
Arrowhead[(1)]	873.8	873.9	0.1	878.6	7/24/1987	871.3[(2)]	1/30/2023[(2)]
Birch Island[(3)]	878.1	878.4	0.4	891.2	3/24/1969	875.1	2/28/2013
Bryant	851.2	851.3	0.1	854.8	7/24/1987	849.3	1/14/1977
Bush[(4)]	829.7	829.5	-0.2	836.9	6/11/1999	826.0	8/8/1964
N Cornelia	859.1	859.1	0.0	864.1	7/24/1987	858.1	12/8/1967
S Cornelia	859.1	859.1	0.0	864.1	7/24/1987	858.0	11/28/2022
Edina	820.9	821.1	0.2	825.4	7/24/1987	817.8	2/9/1982
N Garrison	863.9	864.0	0.1	864.8	4/10/1965	860.7	2/28/2012
Glen	901.0	901.3	0.3	905.0	8/6/1965	898.2	7/30/2010
Hawkes[(4)]	884.9	884.0	-0.9	892.2	7/24/1987	881.6	1/14/1977
Indianhead[(1)]	863.5	863.0	-0.5	865.2	5/31/2019	861.0	2/28/2013
Lone[(1)]	897.6	897.8	0.2	901.6	10/25/2019	895.4	2/6/1990
Minnetoga	896.1	896.4	0.3	899.1	7/24/1987	894.1	2/6/1990
Mirror[(4)]	907.6	908.2	0.7	912.1	7/24/1987	901.8	1/14/1977
Nancy (formerly S. Garrison)	862.8	862.6	-0.2	863.3	4/10/1965	860.7	12/30/2011
Normandale	808.4	808.4	0.0	815.8	7/24/1987	802.0[(5)]	12/3/2018[(5)]
Oxboro	804.0	803.4	-0.6	813.3	7/24/1987	797.9	1/15/1991
Pauly's Pond	815.7	815.4	-0.3	821.2	7/24/1987	811.8	7/29/1988
Penn (Lower)	807.5	804.9	-2.6	816.6	7/24/1987	802.3	2/28/2013
Rose	923.7	923.6	-0.1	928.4	4/4/1966	919.6	1/8/1990
Shady Oak[(6)]	901.7	902.2	0.6	905.6	5/31/2019	897.8	1/29/1990
Skriebakken	803.4	804.1	0.8	811.3	7/24/1987	801.2	1/22/1977
Smetana	835.1	835.2	0.1	840.6	7/24/1987	830.2	11/8/1976
Swimming Pool Pond (formerly Valley View)	862.1	862.1	0.0	865.4	7/24/1987	860.1	2/28/2012
Wanda Miller	819.9	819.7	-0.3	826.7	7/24/1987	814.8	2/28/2013
Wing	938.6	938.6	0.0	941.5	7/24/1987	933.5	1/31/1989

(1) Land-locked lake

(2) Previous record was 871.4 ft on 2/18/1981, 11/28/2022, and 12/27/2022.

(3) High surface outlet. Hasn't discharged since 1987.

(4) Pumped outlet

(5) In 2018, the district began implementation of a water quality improvement project for Normandale Lake. A drawdown of the lake was completed in fall of 2018 to expose the lake bed to a winter freeze and freeze out curly-leaf pondweed.

(6) Gated high surface outlet

5 GROUNDWATER WELL MONITORING

A summary of the 2025 and historical groundwater levels collected from district wells.

The groundwater level monitoring program was initiated by the Nine Mile Creek Watershed District in 1962. Since inception of the program, the number of groundwater wells being monitored has fluctuated over time, with wells being added in response to specific information needs and other monitoring wells being lost as land development occurred. In 2025, only 6 of the groundwater observation wells remain active. The active groundwater observation wells are shown in Figure 1-2.

Table 5-1 summarizes the groundwater level observations from 2025. The table includes measured groundwater observations between December 2024 and December 2025, as well as the corresponding net change in groundwater levels during that time period. During this year, the net change in groundwater elevation ranged from a 0.3-foot decrease in Well 22 (south of Penn Lake in Bloomington) to a 3.1-foot increase in Well 35 (east of Braemar Golf Course in Edina). Table 5-1 also lists the maximum fluctuation of each well between December 2024 through December 2025 (i.e., the difference between the highest and lowest observed water levels in 2025). The maximum fluctuation observed in 2025 ranged from a 2.4-foot decrease in Well 35 (east of Braemar Golf Course in Edina) to a 1.8-foot increase in Well 41 (northeast of Hawkes Lake in Edina), with an average maximum fluctuation of a 0.1-foot increase. There were no new historical high or low groundwater elevations in 2025.

Graphs of the observed groundwater levels for each active monitoring site from January 2000 through present are available on the district's Web Tool:

https://maps.barr.com/NMCWD/NMCWD_InformationSharingApp/index.html

Table 5-1 Summary of 2025 Monthly Observed Groundwater Levels

Well ID	Measured Groundwater Level-December 2024 (12/26/2024) (feet mean sea level)	Measured Groundwater Level-December 2025 (12/27/2025) (feet mean sea level)	Net Change in Measured Groundwater Levels (12/26/2024 - 12/27/2025) (feet)	Maximum 2025 Fluctuation (feet)	Historical High Water Elevation (feet mean sea level)	Historical High Water Elevation Date	Historical Low Water Elevation (feet mean sea level)	Historical Low Water Elevation Date
7	875.1	875.2	0.1	-1.2	894.9	3/25/2004	857.2	10/17/1989
22	798.0	797.7	-0.3	0.7	802.3	5/3/1966	791.0	5/31/1990
26	820.8	821.0	0.2	0.2	827.9	4/29/2003	813.4	12/1/1964
35	842.1	845.2	3.1	-2.4	848.7	3/15/2005	834.1	1/1/1964
41	881.5	881.9	0.4	1.8	885.8	8/26/2019	871.0	8/10/1977
52	851.7	851.9	0.2	1.6	855.0	3/17/2003	849.1	9/15/1994