

Riley Creek

Riley Creek begins at lakes Lucy and Ann in Chanhassen and flows through three lakes - Susan, Rice Marsh, and Riley - before descending to the Minnesota River Valley. The creek has mild topography in its upper and middle watershed, but below Lake Riley the banks become steep.

Keeping Riley Creek healthy requires several tools and strategies. Conducting projects to stabilize streambanks and restore stretches of stream is one strategy. Cleaning and slowing rainwater runoff before it reaches the creek is another. Before either of these can be done, we need to understand how the creek is doing and where it needs the most help.

District staff and the Metropolitan Council have monitored the creek's water quality for almost 20 years. The District developed a tool to assess the creek: the Creek Restoration Action Strategy (CRAS). The CRAS uses water quality data, as well as information on erosion and habitat, to rank which creek stretches (sections) are doing the best and which are doing the poorest. CRAS scores for each stretch of stream are located on the next page.



The three major types of data used in creek monitoring



Water quality

District staff take samples at five sites during the summer. They gather information about nutrient levels (phosphorus), sediment, pH, and dissolved oxygen. This data lets us know how clean the water is and if it's healthy for plants, animals, and people.



Erosion

Every three years, staff walk sections of the creek. They note sites with erosion, its severity, and whether any structures like houses or bridges are at risk. Erosion is also a problem because any soil that erodes into the creek is a pollutant.



Habitat

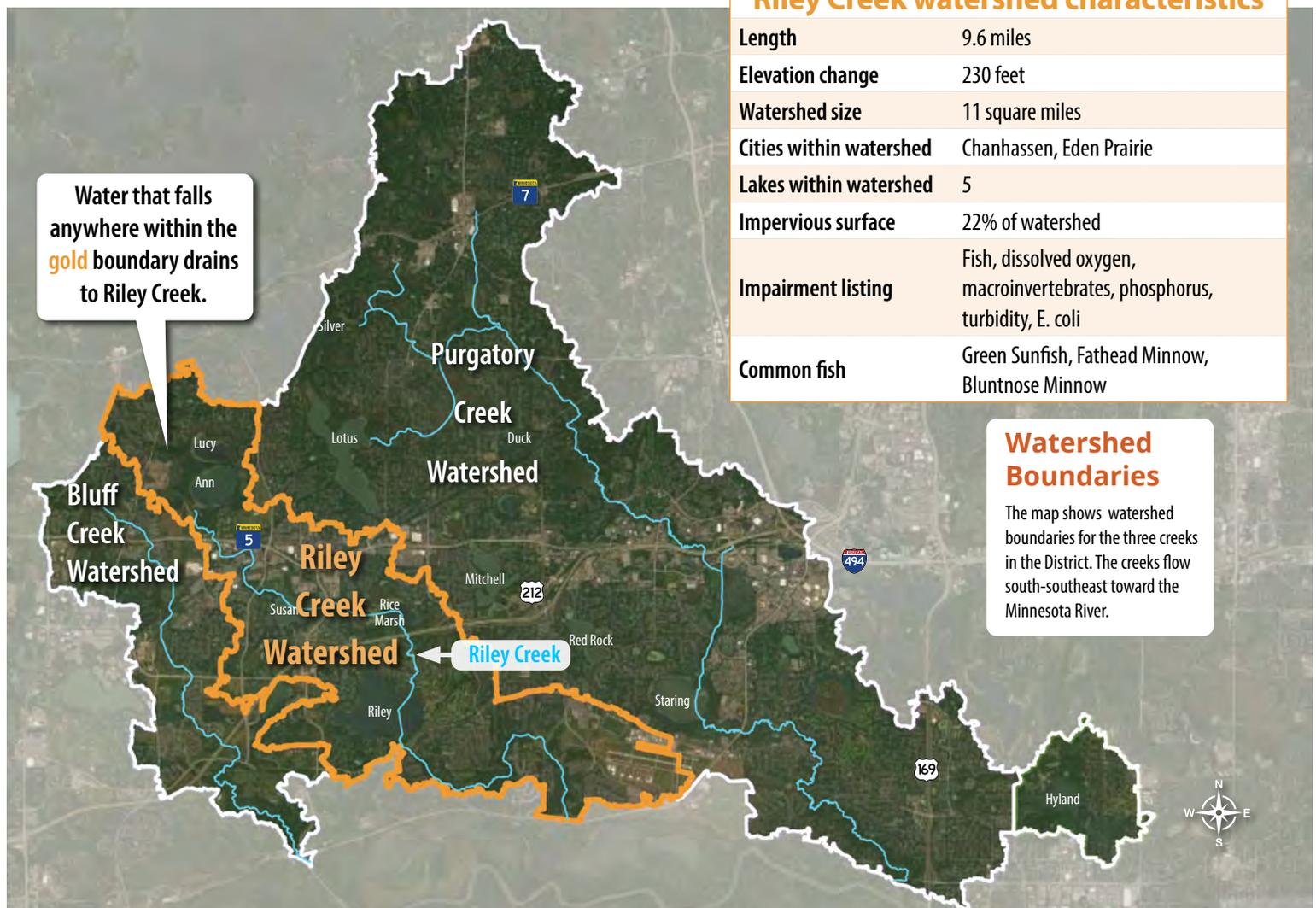
Creeks are important habitat for insects, plants, fish, birds, and other animals. When staff check for erosion, they also assess the habitat. Reaches receive a score based on the quality of habitat they provide and whether it needs to be restored.

Riley Creek watershed characteristics

Length	9.6 miles
Elevation change	230 feet
Watershed size	11 square miles
Cities within watershed	Chanhassen, Eden Prairie
Lakes within watershed	5
Impervious surface	22% of watershed
Impairment listing	Fish, dissolved oxygen, macroinvertebrates, phosphorus, turbidity, E. coli
Common fish	Green Sunfish, Fathead Minnow, Bluntnose Minnow

Watershed Boundaries

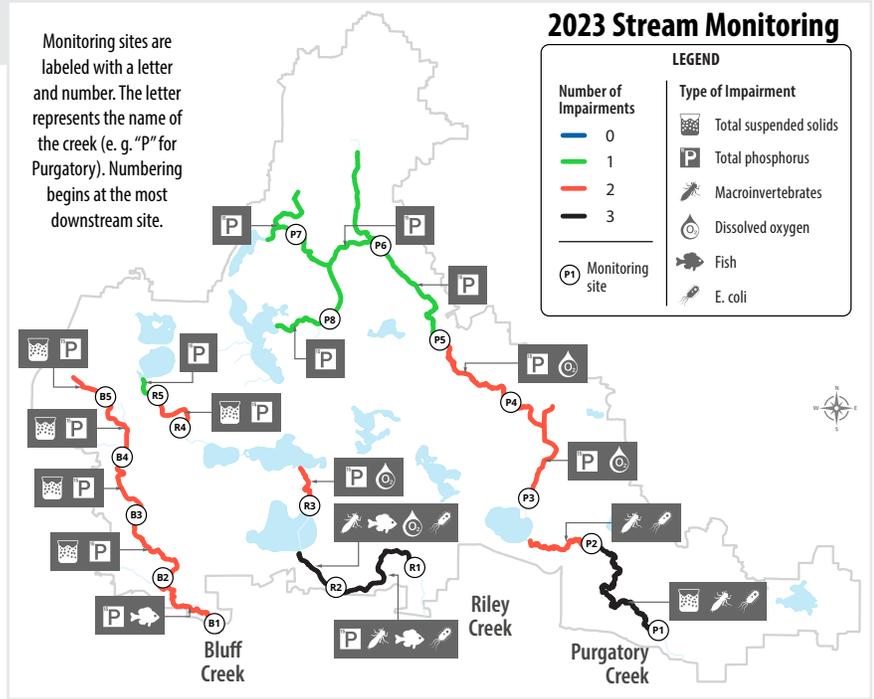
The map shows watershed boundaries for the three creeks in the District. The creeks flow south-southeast toward the Minnesota River.



Stream Water Quality Monitoring

In 2023, District staff collected and analyzed water samples every two weeks, April through September, to determine the average water quality of Bluff, Riley, and Purgatory creeks. The District monitors six impairment categories based upon standards set by the Minnesota Pollution Control Agency (MPCA)

In 2023, the continued drought significantly impacted the streams. Of the 18 regular sampling sites, 14 went dry or became stagnant at some point. From 2022 to 2023, stream water quality was reduced slightly across the district. Excluding the dissolved oxygen impairment, the number of water quality standards exceeded overall increased slightly from 2021 to 2022. Similar to previous years, Total Phosphorus (TP) was the water quality standard causing the most impairments in 2023 with 15 of the 18 sites not meeting the standard.

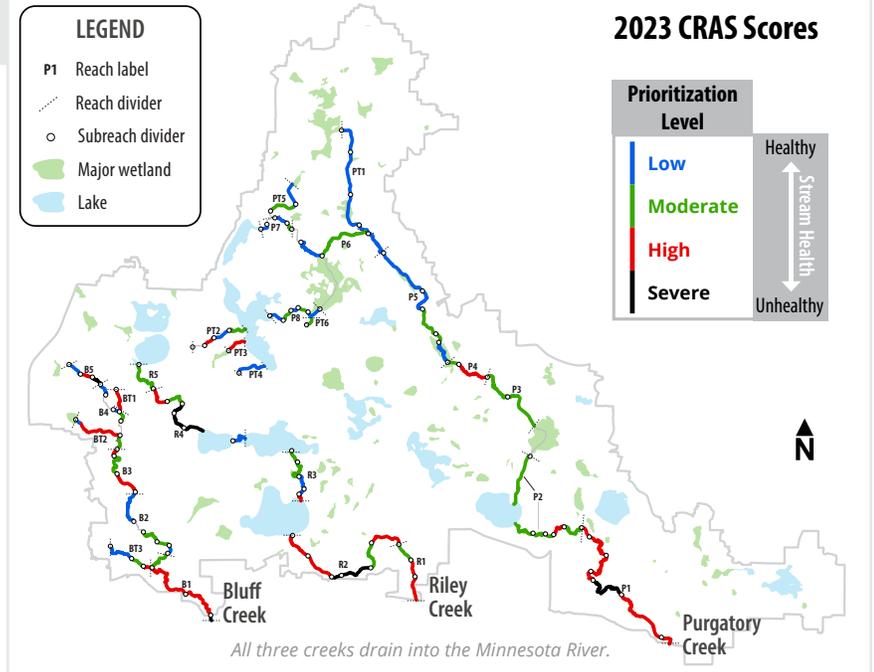


CRAS Scores for Stream Restoration Planning

The District developed the Creek Restoration Action Strategy (CRAS) to prioritize creek reaches, sub-reaches, or sites, in need of stabilization and/or restoration. The District identified eight categories of importance for project prioritization:

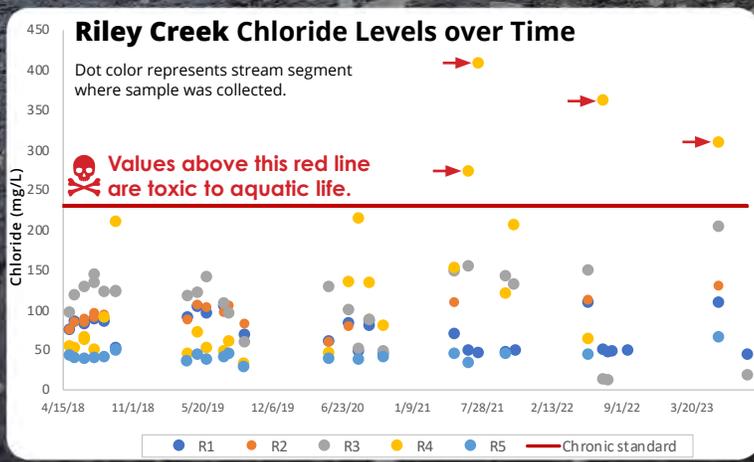
- Infrastructure risk
- Erosion and channel stability
- Public education
- Ecological benefits
- Water quality
- Project cost
- Partnerships
- Watershed benefits

These categories were scored using methods developed for each category based on a combination of published studies and reports, erosion inventories, field visits, and scoring sheets from specific methodologies. Final tallies of scores for each category, using a two-tiered ranking system, were used to prioritize sites for restoration/ remediation.



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Purgatory Creek



Purgatory Creek has three headwaters: Lotus Lake in Chanhassen, Silver Lake in Shorewood, and wetlands in Minnetonka. After these forks join, the creek flows through the Purgatory Recreation Area and Staring Lake before eventually reaching the Minnesota River.

Keeping Purgatory Creek healthy requires several tools and strategies. Conducting projects to stabilize streambanks and restore stretches of stream is one strategy. Cleaning and slowing rainwater runoff before it reaches the creek is another. Before either of these can be done, we need to understand how the creek is doing and where it needs the most help.

District staff have monitored Purgatory Creek since the 1970s. The District developed a tool to assess the creek: the Creek Restoration Action Strategy (CRAS). The CRAS uses water quality data, as well as information on erosion and habitat, to rank which creek stretches (sections) are doing the best and which are doing the poorest. CRAS scores for each stretch of stream are located on the next page.

The three major types of data used in creek monitoring



Water quality

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Erosion

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Habitat

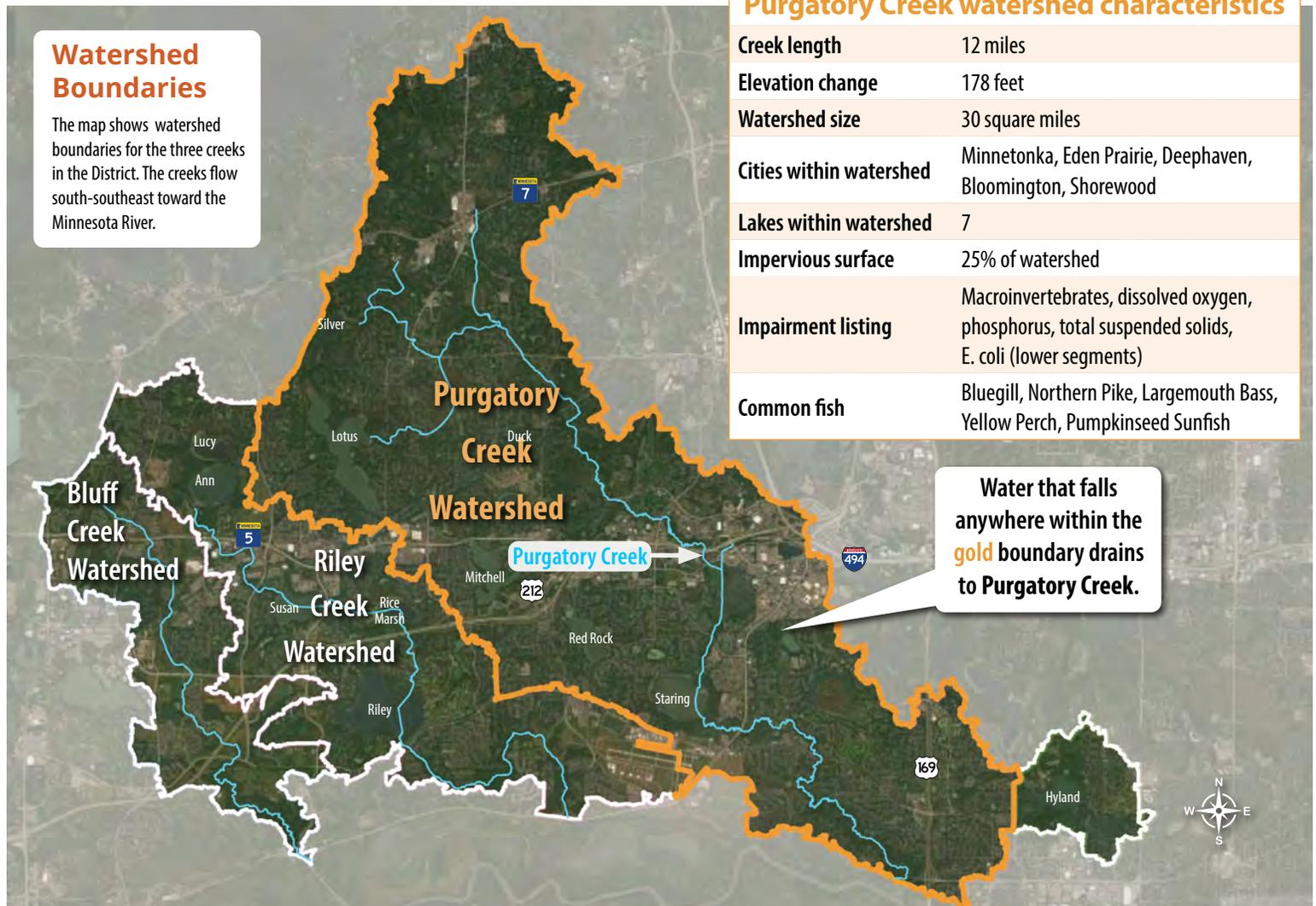
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Purgatory Creek watershed characteristics

Creek length	12 miles
Elevation change	178 feet
Watershed size	30 square miles
Cities within watershed	Minnetonka, Eden Prairie, Deephaven, Bloomington, Shorewood
Lakes within watershed	7
Impervious surface	25% of watershed
Impairment listing	Macroinvertebrates, dissolved oxygen, phosphorus, total suspended solids, E. coli (lower segments)
Common fish	Bluegill, Northern Pike, Largemouth Bass, Yellow Perch, Pumpkinseed Sunfish

Watershed Boundaries

The map shows watershed boundaries for the three creeks in the District. The creeks flow south-southeast toward the Minnesota River.

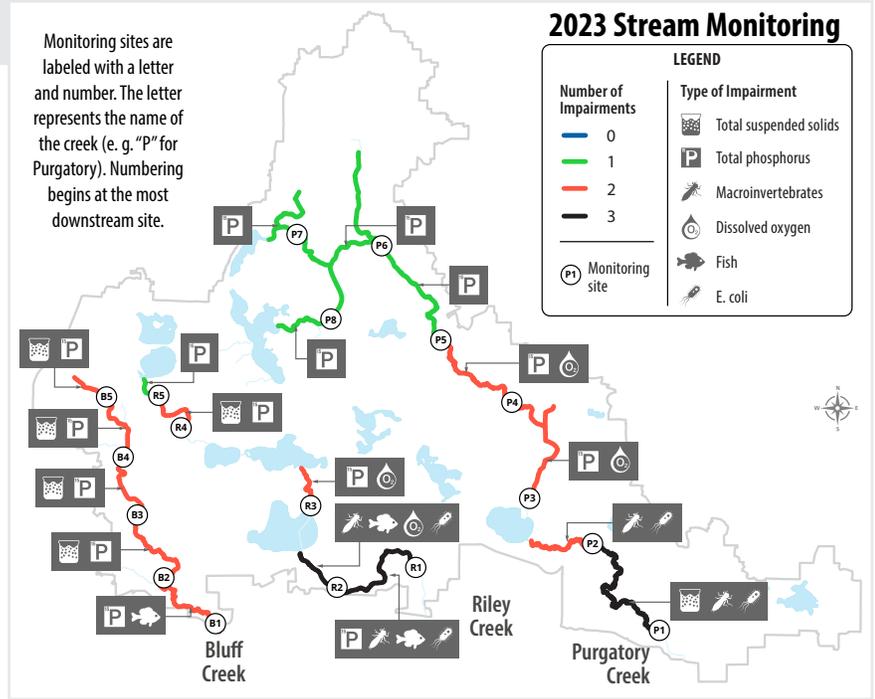


2023 Stream Monitoring Results

Stream Water Quality Monitoring

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In 2023, the continued drought significantly impacted the streams. Of the 18 regular sampling sites, 14 went dry or became stagnant at some point. From 2022 to 2023, stream water quality was reduced slightly across the district. Excluding the dissolved oxygen impairment, the number of water quality standards exceeded overall increased slightly from 2021 to 2022. Similar to previous years, Total Phosphorus (TP) was the water quality standard causing the most impairments in 2023 with 15 of the 18 sites not meeting the standard.

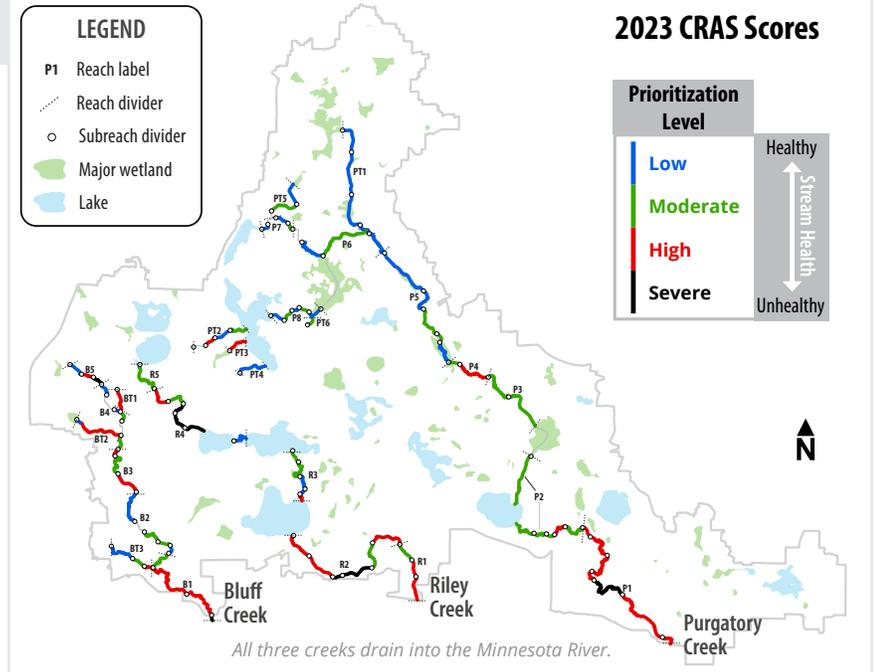


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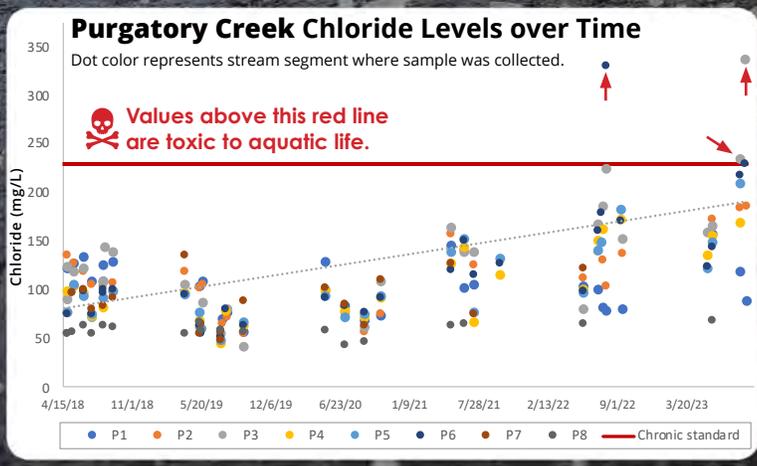
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Bluff Creek

Bluff Creek is about seven miles long. Unlike Purgatory and Riley creeks, it does not connect any lakes on its way to the Minnesota River. However, it does connect many wetlands, and you can explore almost its entire length on trails.

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District staff have monitored Bluff Creek since the 1980s. To assess creek health, staff developed a tool called the Creek Restoration Action Strategy (CRAS). CRAS uses water quality data, as well as information on erosion and habitat, to rank which creek stretches (sections) are doing the best and which are doing the poorest. CRAS scores for each stretch of stream are located on the next page.



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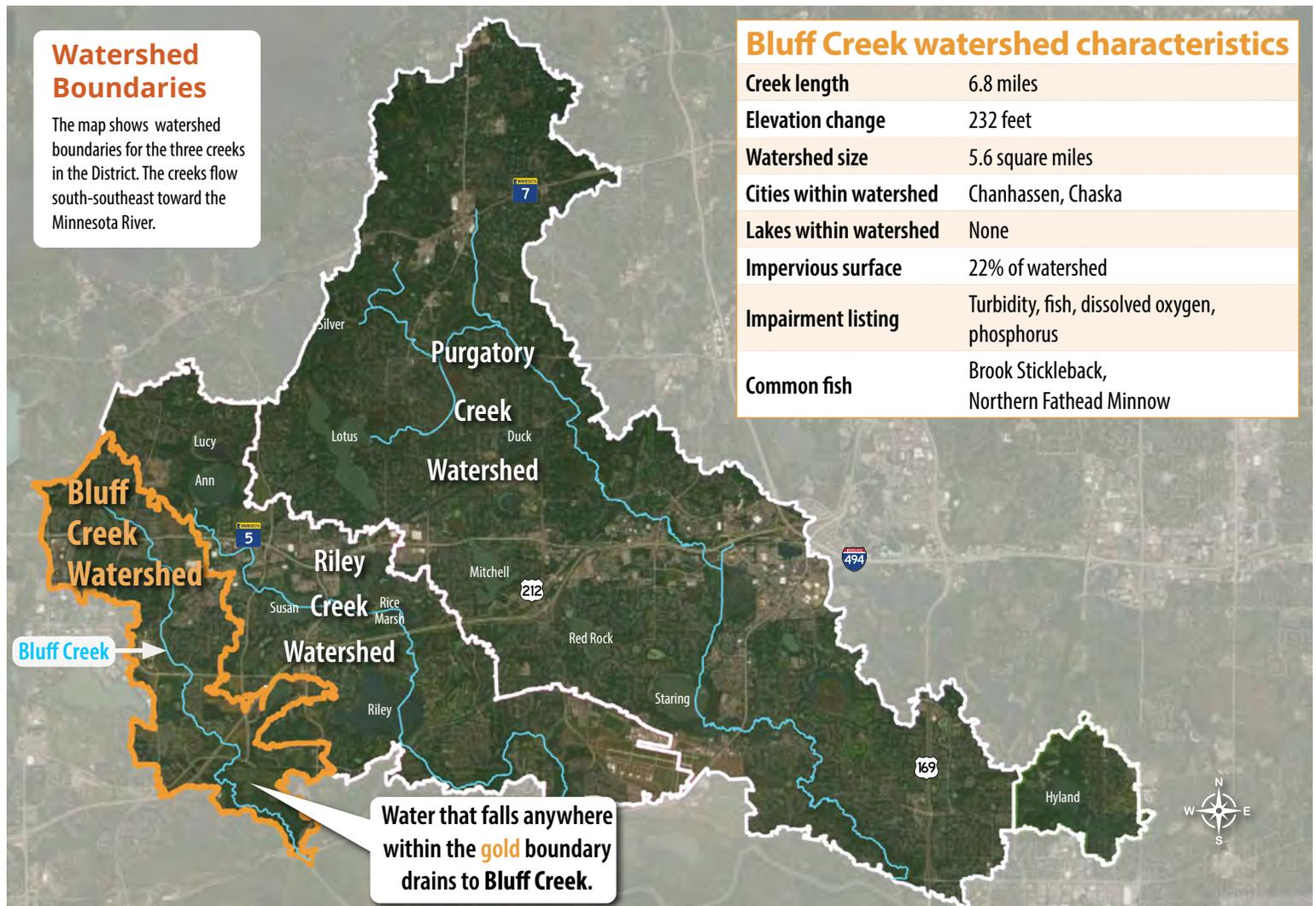


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Bluff Creek watershed characteristics

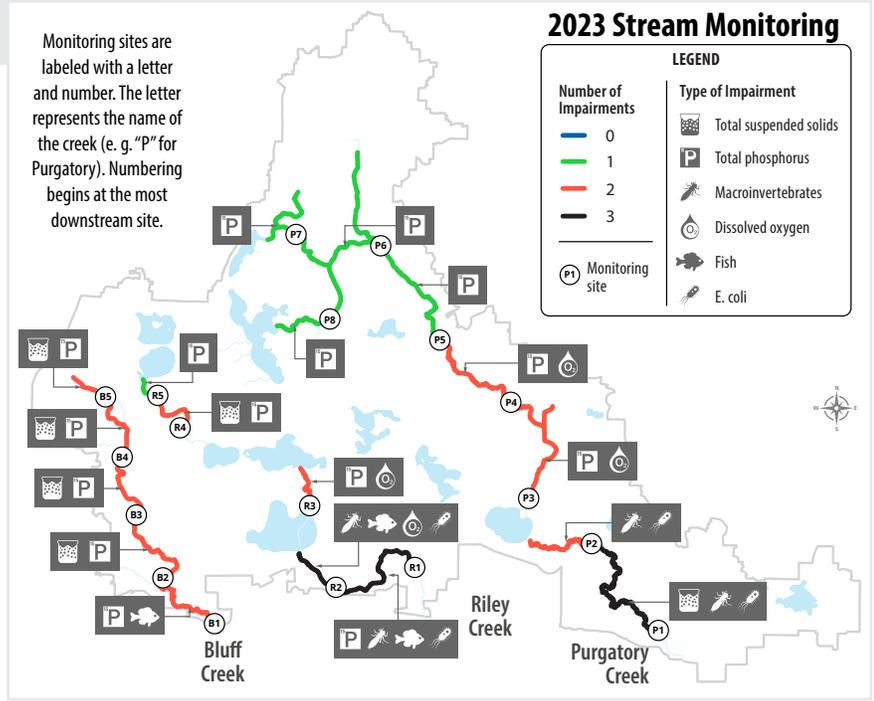
Creek length	6.8 miles
Elevation change	232 feet
Watershed size	5.6 square miles
Cities within watershed	Chanhassen, Chaska
Lakes within watershed	None
Impervious surface	22% of watershed
Impairment listing	Turbidity, fish, dissolved oxygen, phosphorus
Common fish	Brook Stickleback, Northern Fathead Minnow

Water that falls anywhere within the gold boundary drains to Bluff Creek.

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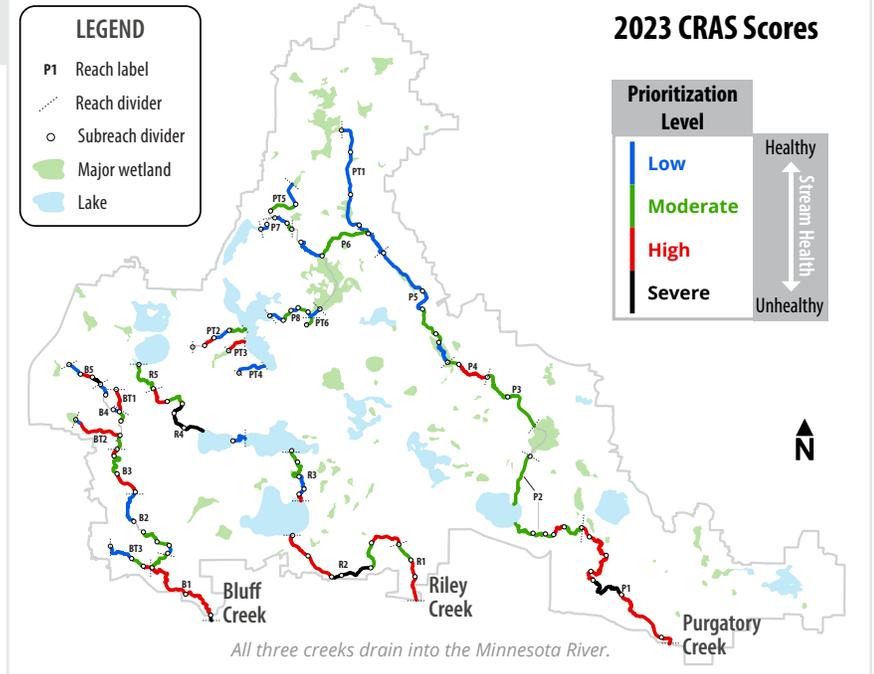


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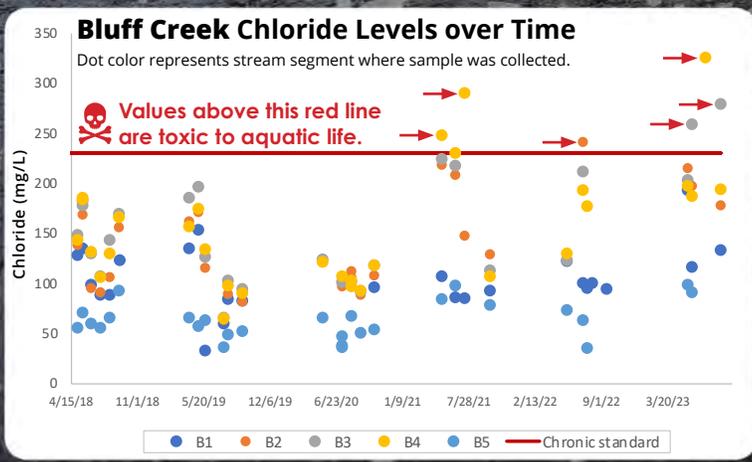
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Lake Ann

Located in Chanhassen, Lake Ann is at the headwaters of Riley Creek. Over the past 40 years, Lake Ann has consistently met the Minnesota Pollution Control Agency clean water standards.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Ann is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and an average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

P Total Phosphorus: The lake consistently meets the MPCA deep lake standard (<0.04 mg/L). In 2023, the average was **0.022 mg/L**, which is slightly up from 2022. Ann continues to have some of the best water quality in the District.

Chlorophyll-a: The lake consistently meets the MPCA deep lake standard (<14 µg/L). In 2023, the average chlorophyll-a reading was **10.98 µg/L**. This is slightly worse than the historical average of 8.2 µg/L.

Water clarity: The lake consistently meets the MPCA deep lake standard (>1.4 meters). The average reading in 2023 was **3.0 meters**, which is better than the historical average of 2.6 meters.

Plants: Lake Ann has the highest plant diversity of all lakes in the district at 22 species. Coontail was the most common plant found at 67% of sites followed by Flatstem Pondweed at 55% of sites. White Water Lily was the most dominant floating plant at 28% frequency of occurrence. In the 2023 survey, no Eurasian Watermilfoil was sampled. However, for the first time, Brittle Naiad was at a detectable level (4% frequency of occurrence) since its discovery in the lake in 2017.

Lake & watershed characteristics

Lake size	119 acres
Average lake depth	16.8 feet
Maximum lake depth	40 feet
MPCA lake classification	Deep lake
Watershed size	257 acres
Impervious surface	2% of watershed
Impaired Waters listing	Mercury
Common fish	Bluegill, Northern Pike, Largemouth Bass, Yellow Perch, Pumpkinseed Sunfish
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Common Carp, Brittle Naiad, Zebra Mussel

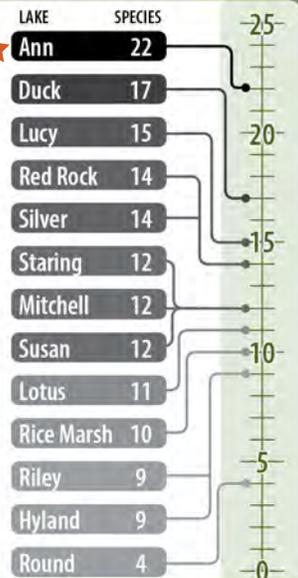


Watershed Boundary



Native Aquatic Plant Diversity

How does **Lake Ann** compare to **other lakes** in the District in **number of native plant species?**



Lake Ann Water Quality by the Numbers

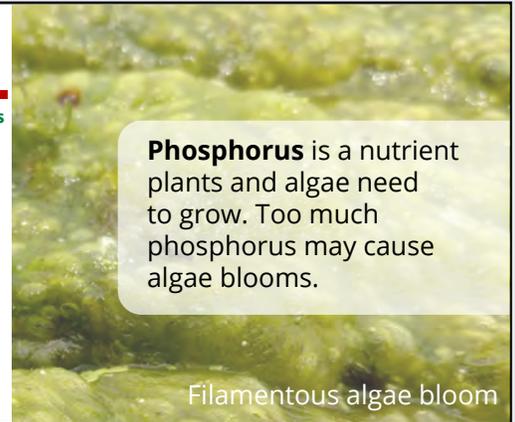
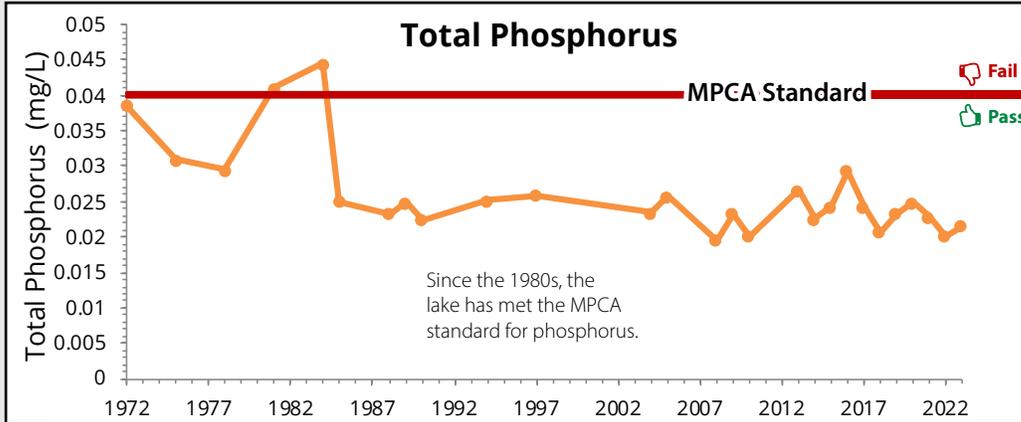
For the past 40 years, Lake Ann has consistently met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line representing the MPCA standard for deep lakes.

Water Quality Report Card

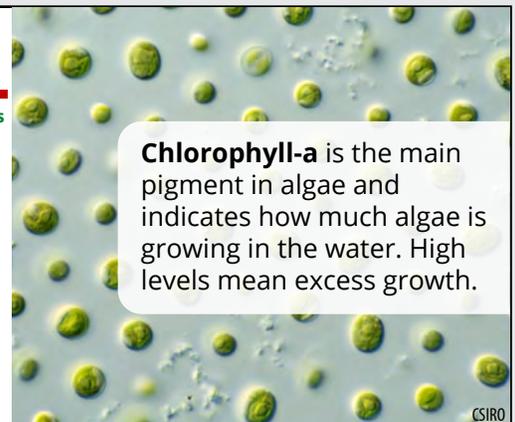
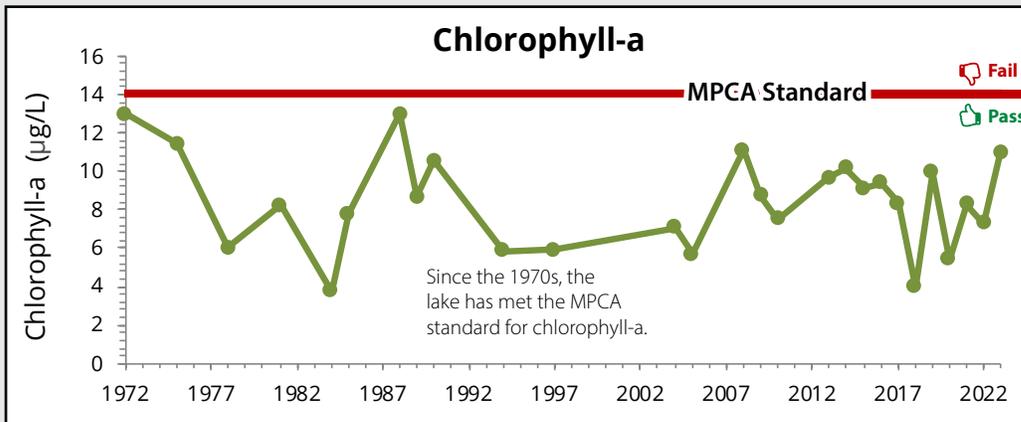
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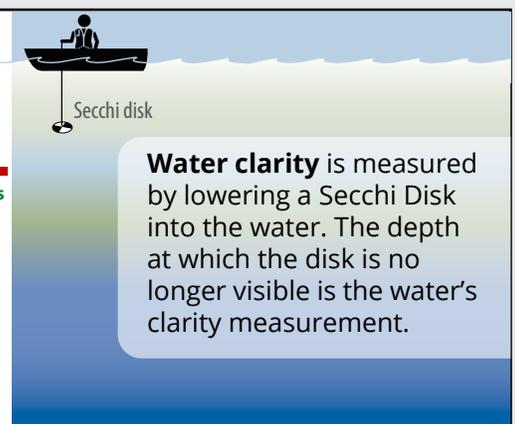
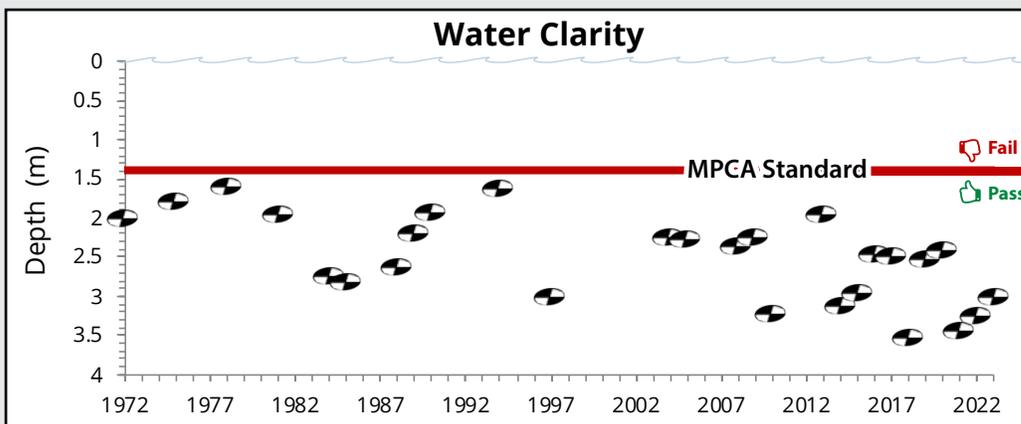
Trends Over Time: 1972-present



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



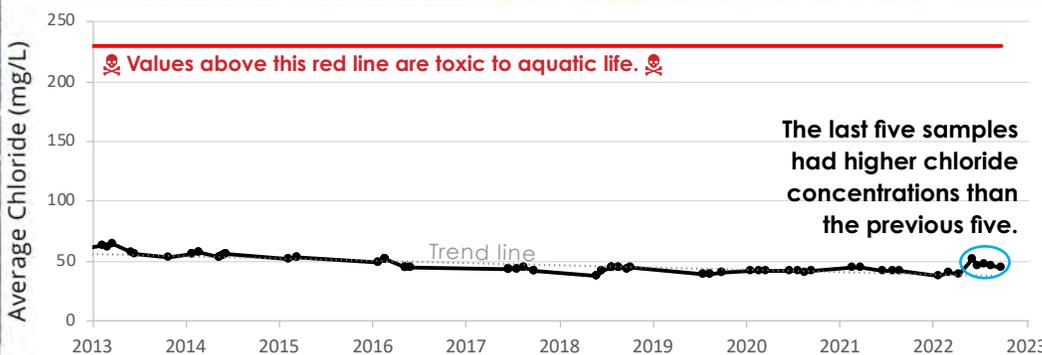
Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.



Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

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Duck Lake

Located in Eden Prairie, Duck Lake is one of the District's shallow lakes. Since 2011, it has seen improvement in water quality and met the Minnesota Pollution Control Agency's clean water standards for several years.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Duck Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P Total Phosphorus: No significant trend. In 2023, the lake met the MPCA shallow lake standard (<0.06 mg/L) with an average total phosphorus level of **0.057 mg/L**.

Chlorophyll-a: No significant trend. In 2023, the lake met the MPCA shallow lake standard (<20 µg/L) with the average for the year at **15.2 µg/L**.

Water clarity: No significant trend. The lake consistently meets the MPCA shallow lake standard for water clarity (>1.0 meters). The average reading in 2023 was **1.6 meters**. Typically, staff are able to lower the Secchi disk to the lake bottom and still see it, so water clarity is likely better than what the data indicates.

Fish: Over the past few years, Duck Lake has had consecutive winter fish kills due to depleted oxygen levels. This has reduced native fish survival and is considered a natural process for a shallow lake.

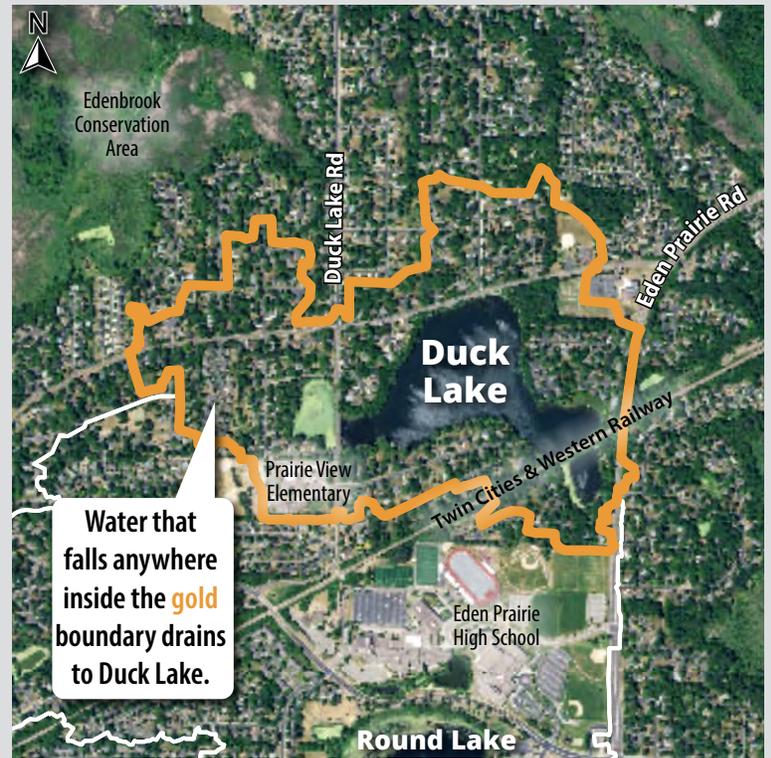
Plants: Coontail was the most dominant plant species (96% of sites) followed by Flatstem Pondweed at 52% of sites. Overall, plant growth in Duck Lake covered 100% of the lake surface. The number of plants increased from 6 in 2020 to 16 in 2023. This is partially due to the inclusion of the west bay and very low densities of additional floating and emergent native species that previously were not found (Longleaf Pondweed, Arrowhead, American Lotus, and Hardstem Bullrush).

Lake & watershed characteristics

Lake size	41 acres
Average lake depth	3.4 feet
Maximum lake depth	8 feet
MPCA lake classification	Shallow lake
Watershed size	233 acres
Impervious surface	20% of watershed
Impaired Waters listing	Not listed
Common fish	Bluegill, Black Crappie, Largemouth Bass, Green Sunfish
Invasive species	Curly-leaf Pondweed, Purple Loosestrife, Eurasian Watermilfoil, Goldfish

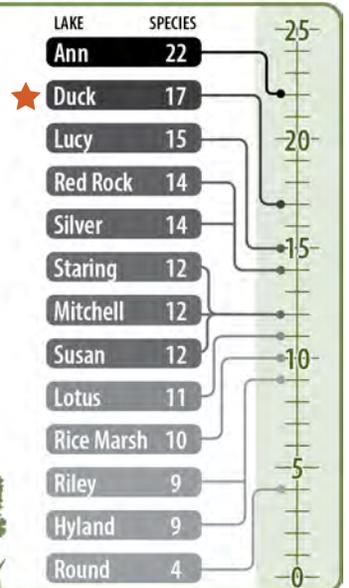


Watershed Boundary



Native Aquatic Plant Diversity

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Duck Lake Water Quality by the Numbers

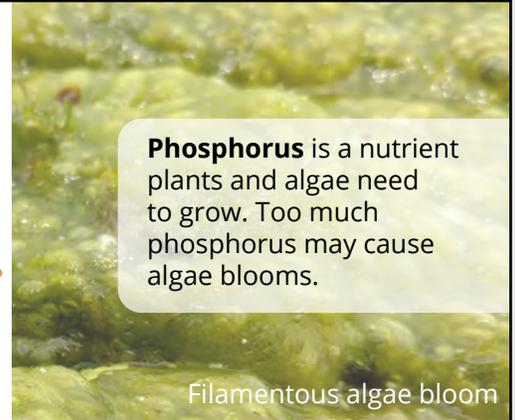
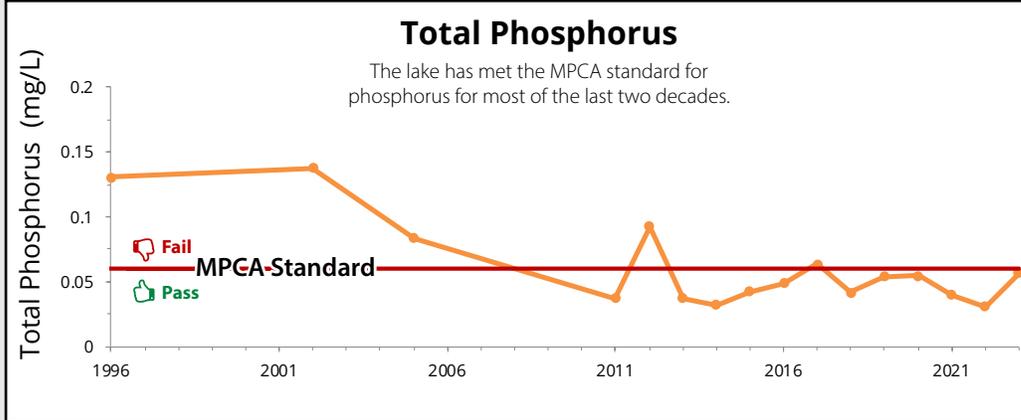
The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. Over the last decade, Duck Lake has typically met the clean water standards set by the MPCA.

Water Quality Report Card

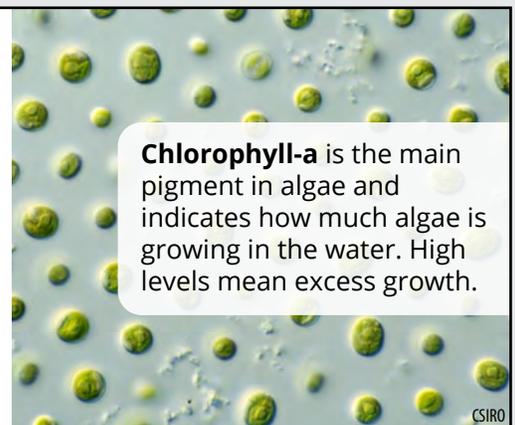
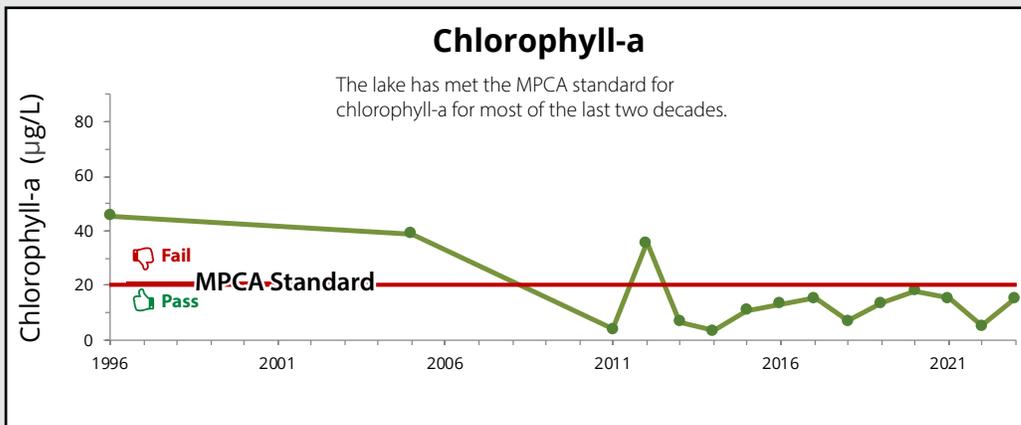
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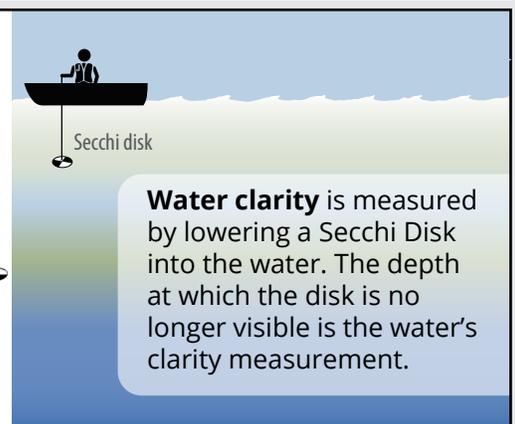
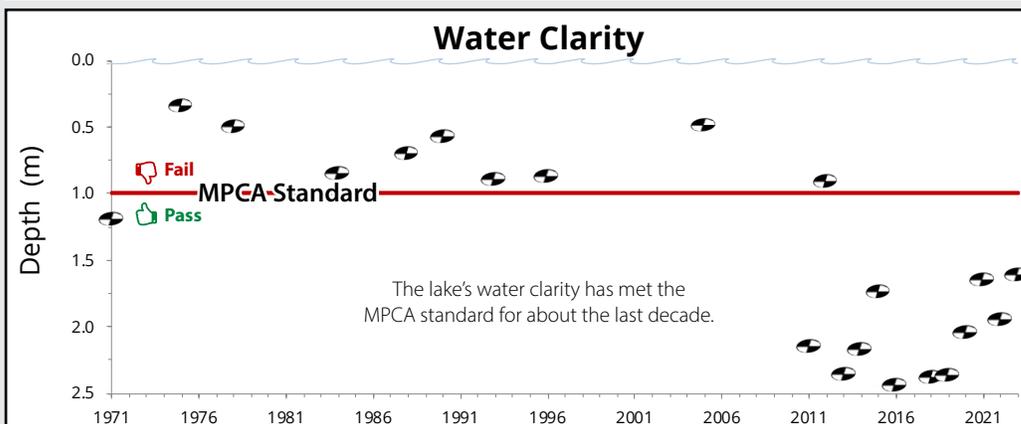
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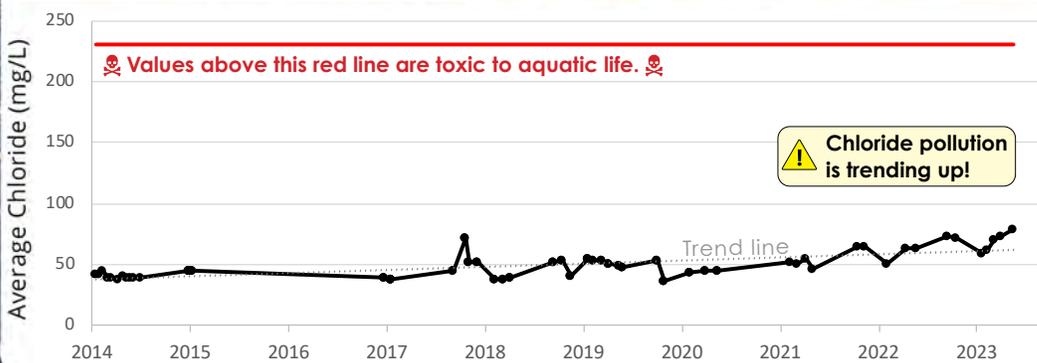
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Hyland Lake

Located in Bloomington, Hyland Lake is surrounded by Hyland Lake Park Reserve, a Three Rivers Park District facility. Visitors can paddle the lake in the summer, hike nearby trails, and ski in the winter.

During June through September of each year, Three Rivers Park District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Hyland Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P Total Phosphorus: A second dose of aluminum sulfate (alum) was applied in 2022 by Three Rivers Park District. Alum reduces algae growth by trapping phosphorus, an algae food source, in lake sediments. In 2023, the lake met the MPCA standard (<0.06 mg/L) with an average total phosphorus level of **0.040 mg/L**. The lake has consistently met the standard since the first alum dose in 2019.

Chlorophyll-a: In 2023, the average reading for chlorophyll-a was **11.6 µg/L**, which met the MPCA shallow lake standard (<20 µg/L). Levels have dropped since the alum treatment.

Water clarity: Since the first alum treatment, the lake has met the MPCA shallow lake standard (>1.0 meters) for the last four years. The average reading in 2023 was **1.3 meters**.

Plants: For the third consecutive year, the herbicide Fluridone was used to treat Curly-leaf Pondweed immediately after ice-off. In 2023, the number of native species increased to 9 species from a previous high of 6 species in 2019 and 2020. The combined herbicide treatments and aluminum sulfate application by Three Rivers Park District has allowed plants to expand to 50% of the littoral area.

Lake & watershed characteristics

Lake size	84 acres
Average lake depth	7.5 feet
Maximum lake depth	12 feet
MPCA lake classification	Shallow lake
Watershed size	922 acres
Impervious surface	17% of watershed
Impaired Waters listing	Nutrients
Common fish	Bluegill, Black Crappie, Walleye, Black Bullhead, Largemouth Bass
Invasive species	Curly-leaf Pondweed



Watershed Boundary



Native Aquatic Plant Diversity

How does **Hyland Lake** compare to **other lakes** in the District in **number of native plant species?**



Hyland Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. Three Rivers Park District provides most of the water quality and plant survey data for Hyland Lake.

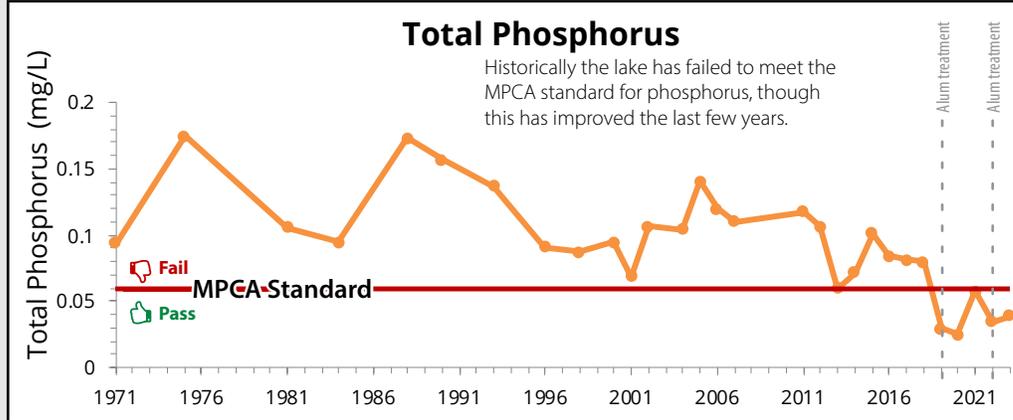


Water Quality Report Card

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C

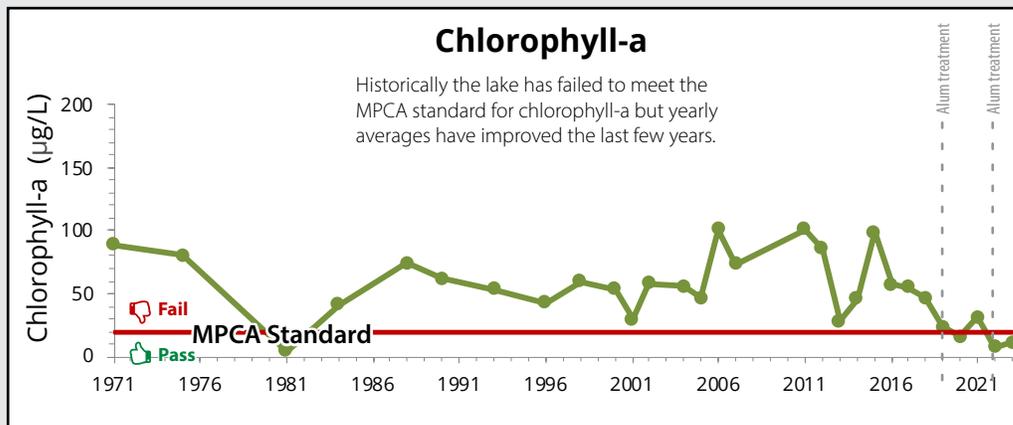
Trends Over Time: 1972-present



Hyland Lake received alum treatments in 2019 & 2022. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

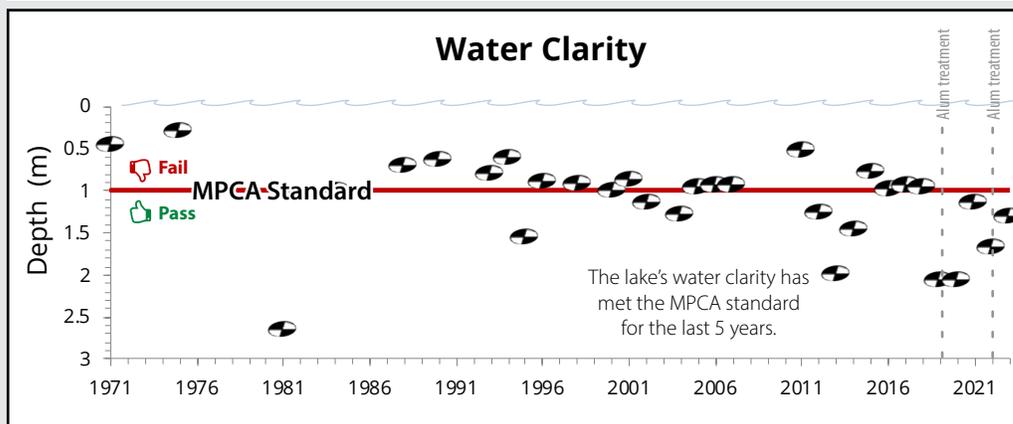
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

Filamentous algae bloom



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.

CSIRO



Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Chloride: A Growing Concern

Chloride permanently pollutes lakes, ponds, & streams!

Using excess winter salt does not equal greater safety. It does mean higher cost for you and more water pollution.



What can I use instead of winter de-icers?

All affordable & effective residential de-icing products contain chloride, even those labeled as "eco-friendly" or "pet safe."

Focus instead on reducing build up of ice on your property:

- ❄️ Shovel early and often
- ❄️ Prevent ice formation, avoid driving or walking on snow
- ❄️ Pile snow where it won't melt and refreeze on walkways

ONE TEASPOON OF SALT POLLUTES 5 GALLONS OF WATER FOREVER

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Lotus Lake

Located in eastern Chanhassen, Lotus Lake is one of three headwaters of Purgatory Creek. Water flows out of Lotus into the south fork of Purgatory Creek, which eventually meets up with the two other forks of the creek.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lotus Lake is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.



Total Phosphorus: Since the alum treatment in 2018, the lake has consistently met the MPCA standard (<0.04 mg/L). In 2023, the average level was **0.031 mg/L**.



Chlorophyll-a: The lake has never met the MPCA standard (<14 µg/L). In 2023, the average chlorophyll-a reading was **24.6 µg/L**.



Water clarity: Since 2013, the lake has consistently met the MPCA standard (>1.4 meters) for water clarity except for one year. The average reading in 2023 was **2.0 meters**.



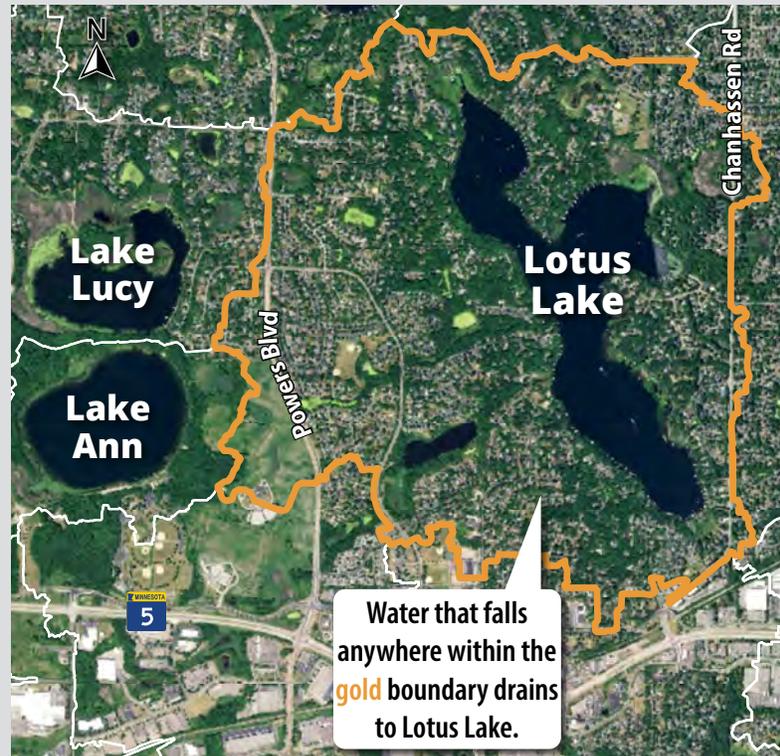
Plants: Eurasian Watermilfoil and Curly-leaf Pondweed were targeted with a single Diquat herbicide treatment (22.92 acres) in the spring of 2023.

Lake & watershed characteristics

Lake size	248 acres
Average lake depth	16 feet
Maximum lake depth	31 feet
MPCA lake classification	Deep lake
Watershed size	1,408 acres
Impervious surface	16% of watershed
Impaired Waters listing	Mercury, nutrients, fish
Common fish	Bluegill, Yellow Bullhead, Walleye, Black Crappie
Invasive species	Eurasian Watermilfoil, Common Carp, Curly-leaf Pondweed, Brittle Naiad



Watershed Boundary



Native Aquatic Plant Diversity

How does **Lotus Lake** compare to **other lakes** in the District in **number of native plant species?**



Lotus Lake Water Quality by the Numbers

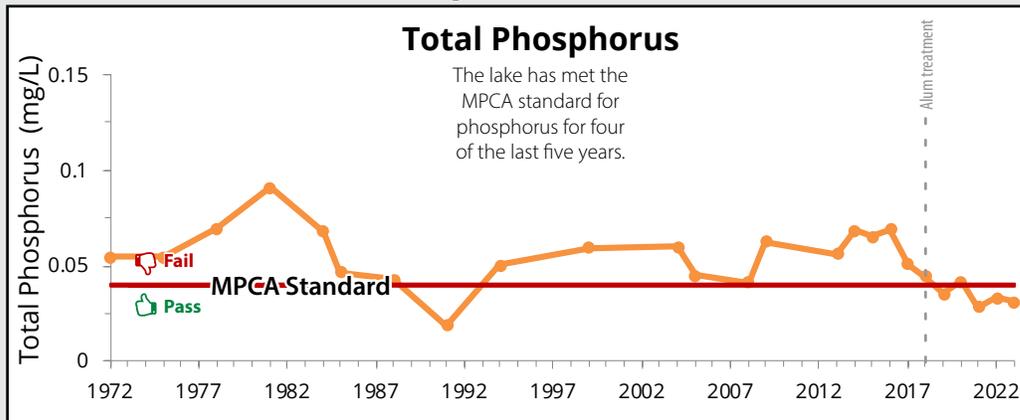
For the last few years, Lotus Lake has consistently met the clean water standards set by the MPCA, except for Chlorophyll-a. The graphs below show water quality trends over time with the red line representing the MPCA standard for deep lakes.

Water Quality Report Card

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C

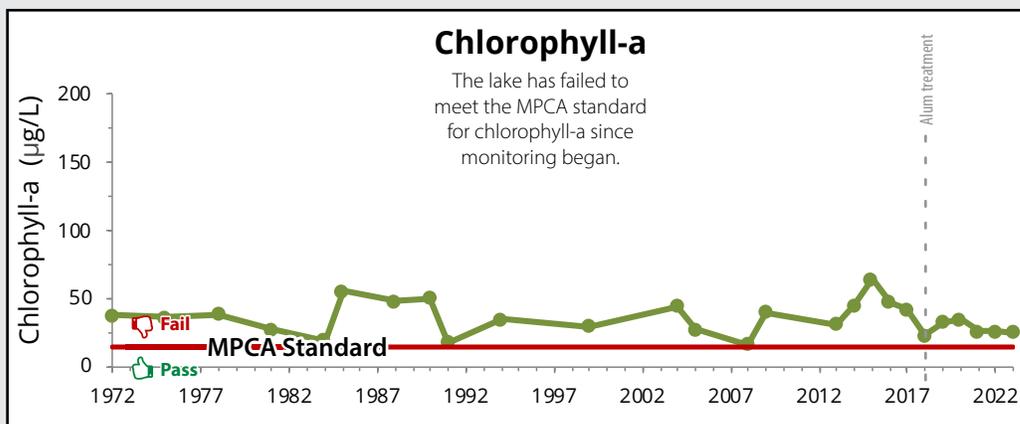
Trends Over Time: 1972-present



Lotus Lake received an alum treatment in 2018. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

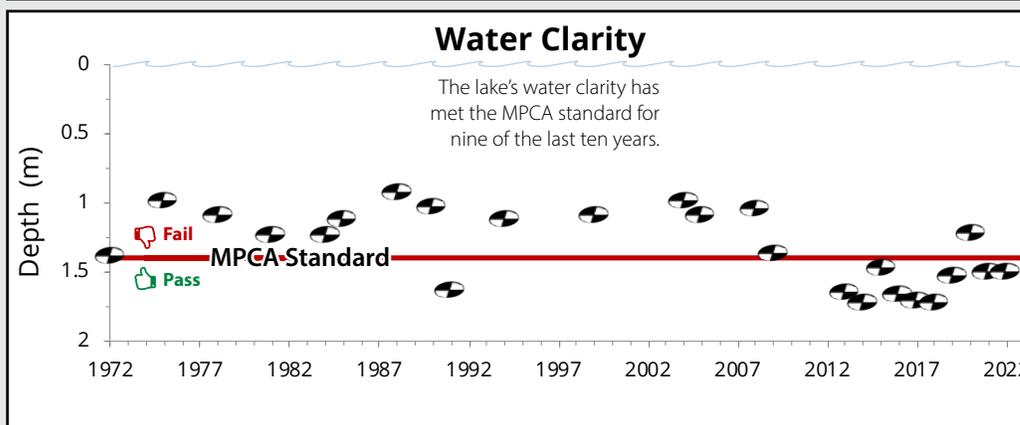
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

Filamentous algae bloom



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.

CSIRO

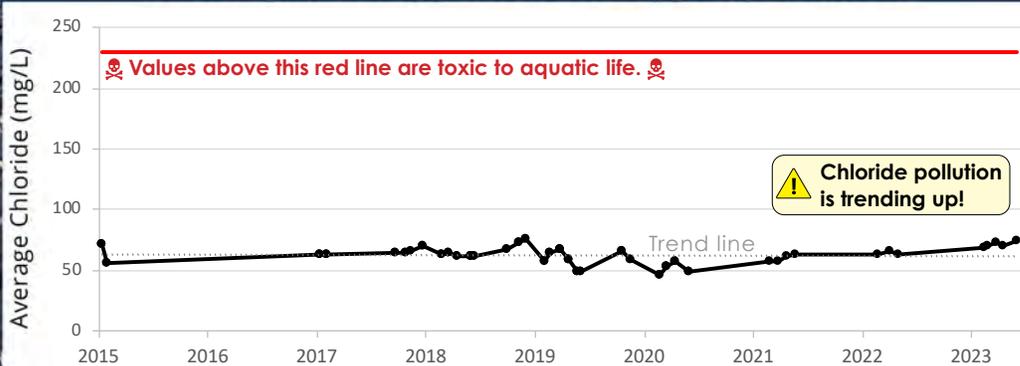


Secchi disk

Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

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Lake Lucy

Lake Lucy is the headwaters to Riley Creek. Water flows out of Lucy to Lake Ann and then to Riley Creek. On its way south to the Minnesota River, Riley Creek passes through Susan, Rice Marsh, and Riley lakes.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Lucy is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P **Total Phosphorus:** No significant trend since monitoring began. In 2023, the lake met the MPCA shallow lake standard (<0.06 mg/L) with average level of **0.028 mg/L**.

Chlorophyll-a: Levels have declined the last few years, which is likely linked to a winterkill events in 2018/2019 and 2022/2023. In 2023, the average reading for chlorophyll-a was **11.3 µg/L**, well within the MPCA standard (<20 µg/L).

Water clarity: Lake clarity has improved since 2019, and the lake consistently meets the MPCA standard (>1.0 meters). The average reading in 2023 was **2.0 meters**.

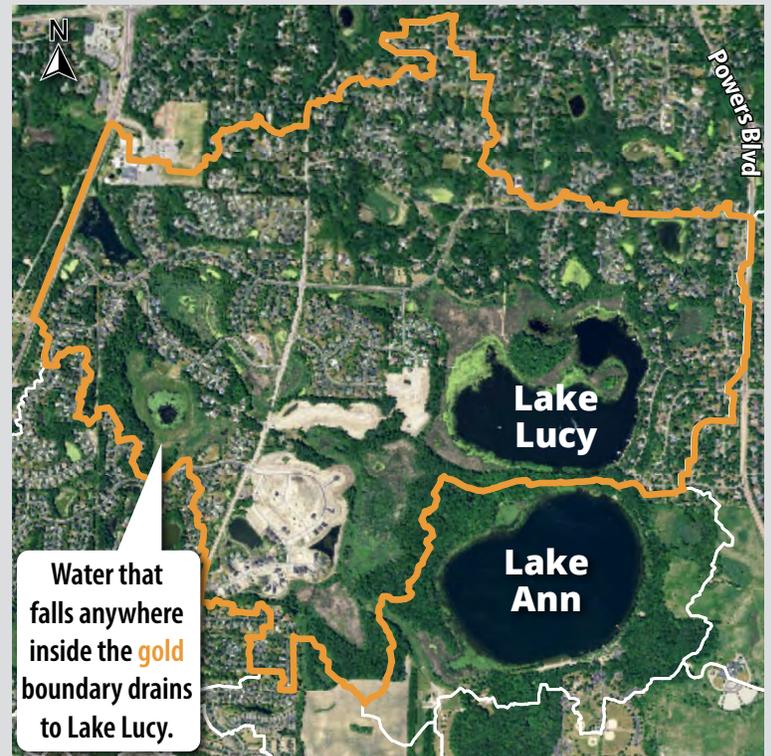
Fish: Small mesh trap netting was conducted in 2023 to see if successful reproduction of Common Carp occurred following the partial winterkill. No young of year carp were captured during the survey indicating carp are not a problem in Lucy. About 300 bluegills were stocked in the spring to ensure a breeding population was established to prevent carp recruitment from occurring.

Lake & watershed characteristics

Lake size	88 acres
Average lake depth	6.5 feet
Maximum lake depth	20 feet
MPCA lake classification	Shallow lake
Watershed size	988 acres
Impervious surface	14% of watershed
Impaired Waters listing	Mercury
Common fish	Bluegill, Northern Pike, Yellow Bullhead, Black Crappie, Pumpkinseed Sunfish
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Common Carp

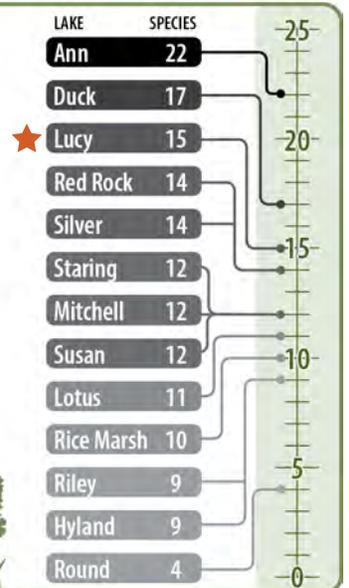


Watershed Boundary



Native Aquatic Plant Diversity

How does **Lake Lucy** compare to **other lakes** in the District in **number of native plant species?**

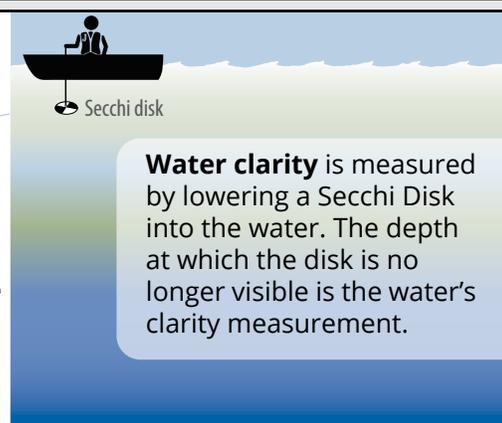
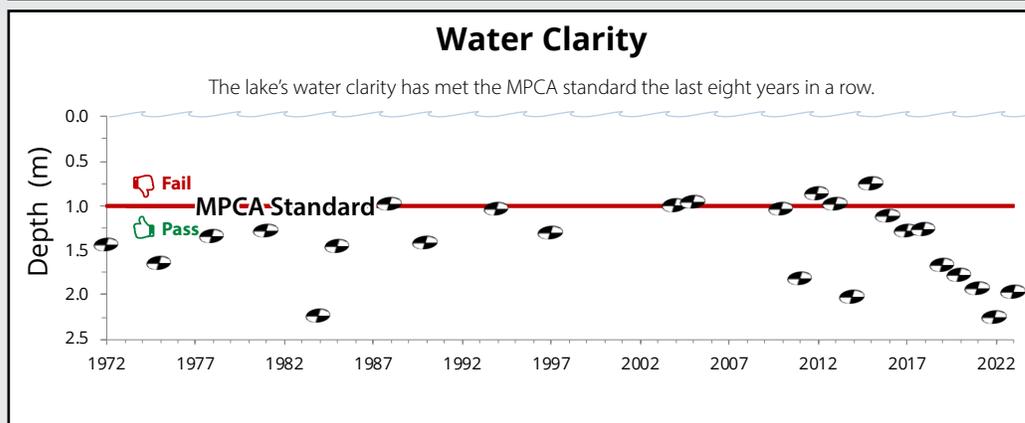
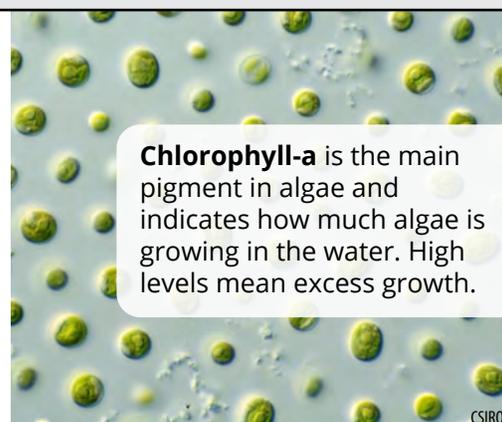
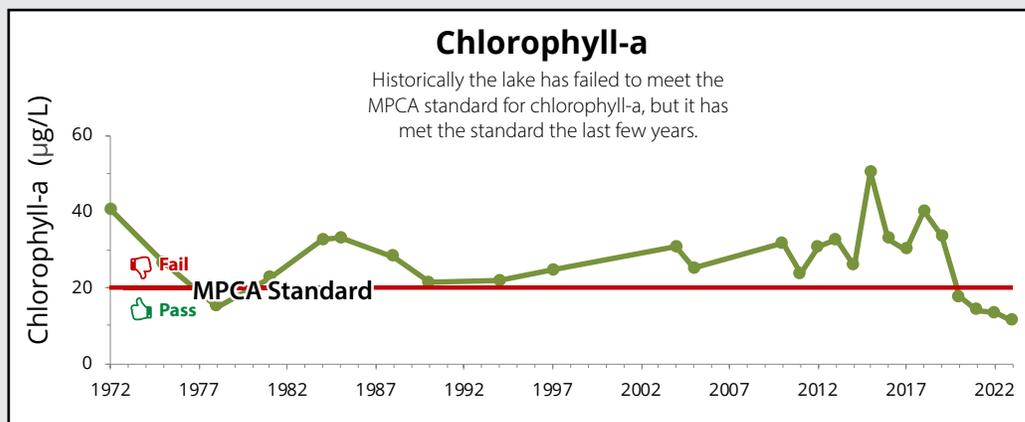
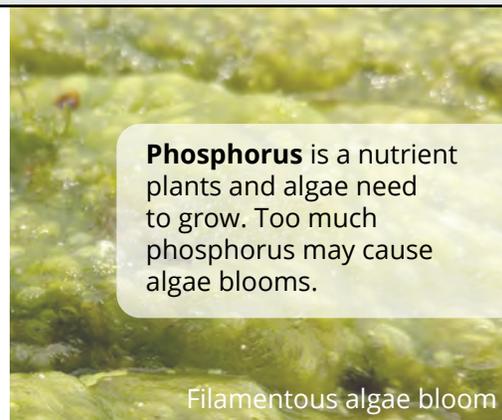
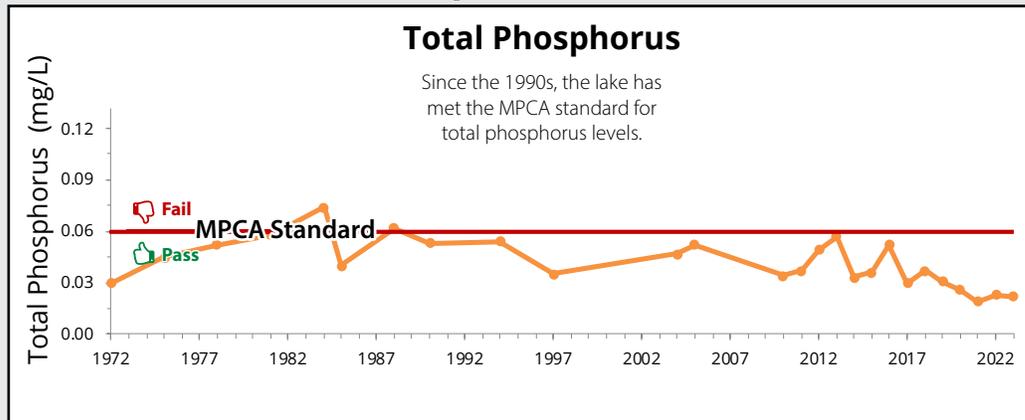


Lake Lucy Water Quality by the Numbers

Over the last few years, **Lake Lucy** has met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes.

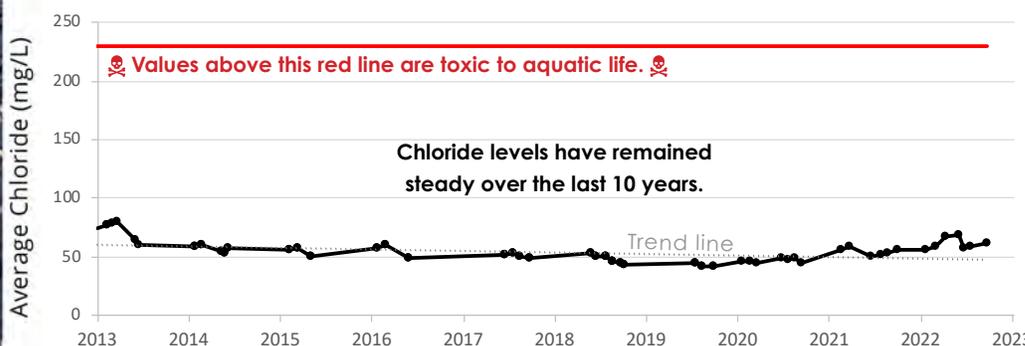
Water Quality Report Card **B**
rpbcwd.org/grades

Trends Over Time: 1972-present



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Mitchell Lake

Located in Eden Prairie, Mitchell Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Red Rock Lake.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Mitchell Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P **Total Phosphorus:** Concentrations have decreased since monitoring began in 1972. In 2023, the lake's average total phosphorus level of **0.052 mg/L** met the MPCA shallow lake standard (<0.06 mg/L).

Chlorophyll-a: No significant trend. In 2023, the average reading was twice the MPCA shallow lake standard (<20 µg/L) at **44.1 µg/L**. 2023 was also higher than 2022 (27.3 µg/L).

Water clarity: No significant trend. The lake consistently meets the MPCA shallow lake standard (>1.0 meters). The average reading in 2023 was **1.3 meters**.

Plants: In 2023, a plant survey was conducted to track aquatic plant populations. Coontail was dominant (52% of sites). At 15 sites, light growth of Eurasian Watermilfoil was found. An established population of Brittle Naiad (invasive) was discovered in the northeast end of the lake. In late summer, submerged aquatic plants covered about 68 acres (61% of the lake). A total of 13 acres of the lake was treated with herbicide, which reduced Curlyleaf Pondweed abundance to a frequency of occurrence of 1%. A fall turion survey (main reproductive structure of Curlyleaf Pondweed) yielded a relatively low abundance of turions.



Watershed Boundary

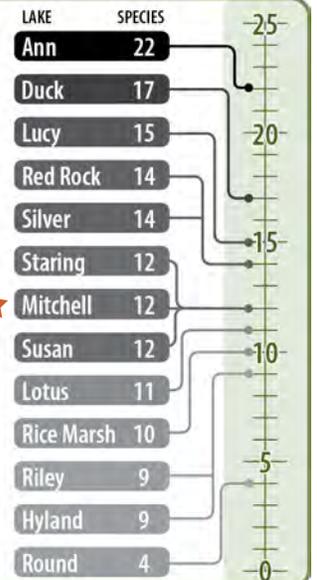


Lake & watershed characteristics

Lake size	124 acres
Average lake depth	5.3 feet
Maximum lake depth	19 feet
MPCA lake classification	Shallow lake
Watershed size	937 acres
Impervious surface	30% of watershed
Impaired Waters listing	Mercury
Common fish	Bluegill, Black Bullhead, Black Crappie, Northern Pike, Pumpkinseed
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Purple Loosestrife, Brittle Naiad

Native Aquatic Plant Diversity

How does **Mitchell Lake** compare to **other lakes** in the District in **number of native plant species?**

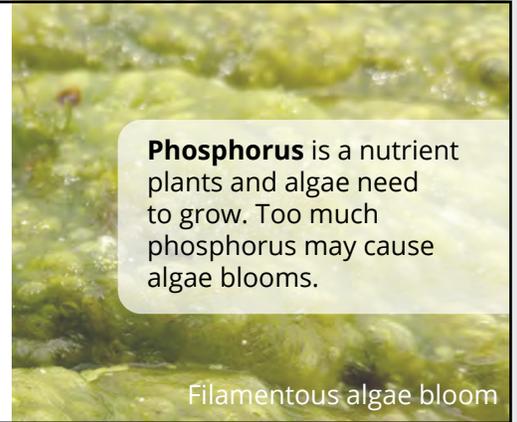
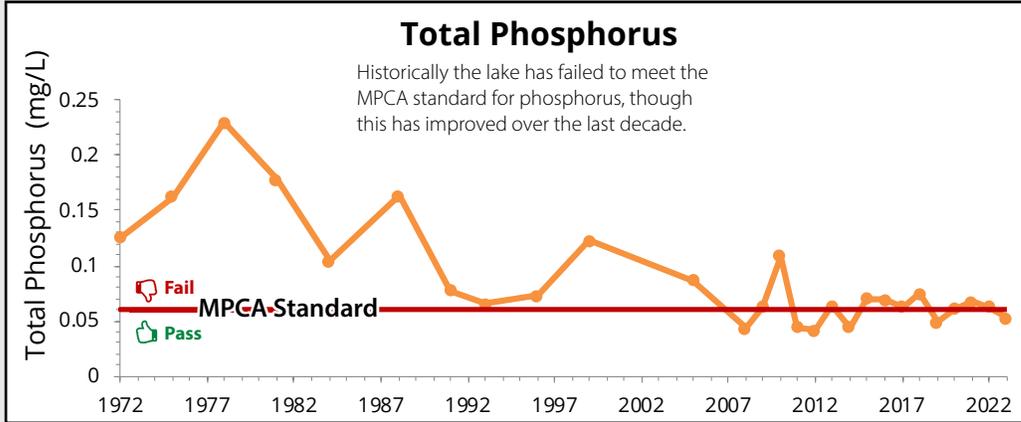


Mitchell Lake Water Quality by the Numbers

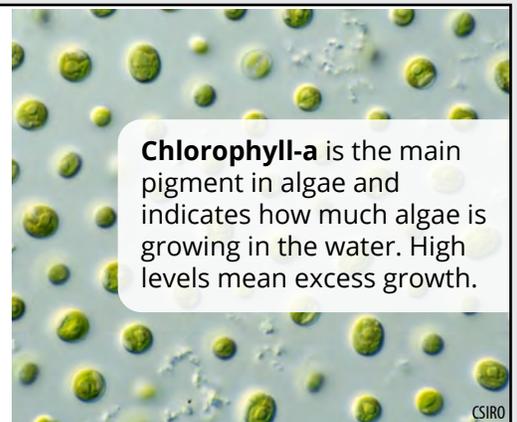
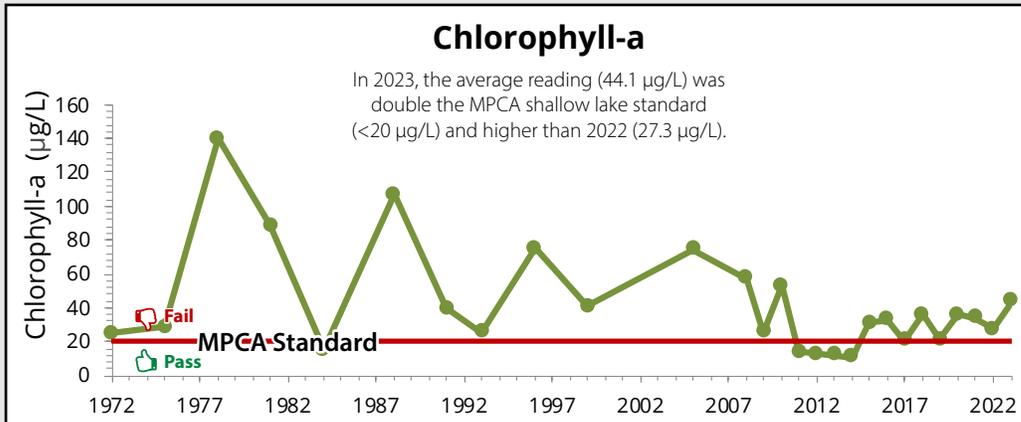
The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. For the last few years, the City of Eden Prairie has collected water quality data for Mitchell Lake.



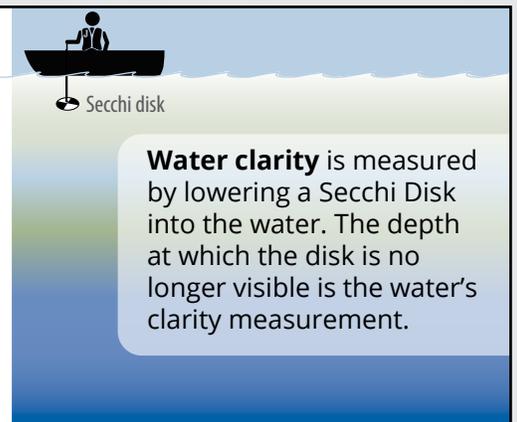
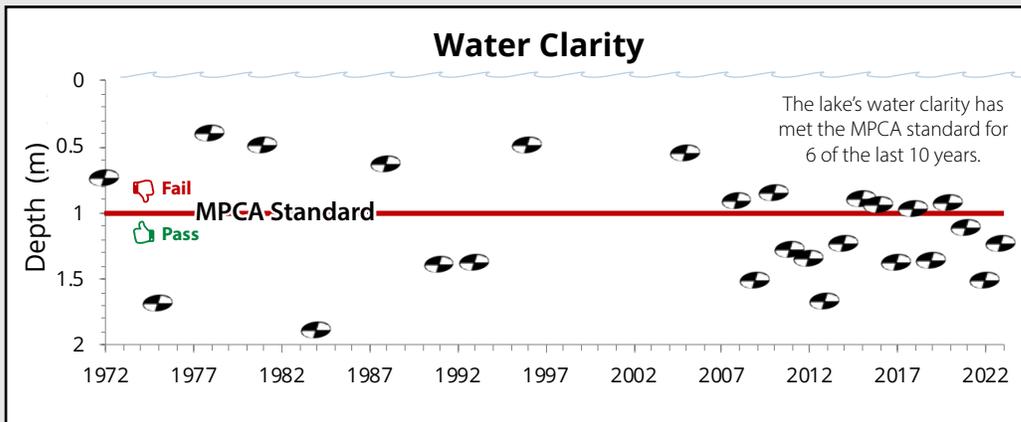
Trends Over Time: 1972-present



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



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Red Rock Lake

Located in Eden Prairie, Red Rock Lake is a part of the Purgatory Creek chain of lakes. During high water events it outflows through an overflow pipe to Staring Lake.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Red Rock Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P Total Phosphorus: No significant trend. In 2023, the lake met the MPCA shallow lake standard (<0.06 mg/L) with an average total phosphorus level of **0.059 mg/L**.

Chlorophyll-a: Over the last decade, the yearly average chlorophyll-a measurements have improved. In 2023, the lake had an average reading of **30.6 µg/L**, which failed to meet the MPCA shallow lake standard (<20 µg/L).

Water clarity: No significant trend. The lake consistently meets the MPCA shallow lake standard (>1.0 meters). The average reading in 2023 was **1.4 meters**.

Plants: A point-intercept plant survey was conducted in 2023 by the City of Eden Prairie to track aquatic vegetation populations. In 2023, 13 acres were treated with the herbicide Endothall to reduce Curlyleaf Pondweed abundance.

Lake & watershed characteristics

Size	121 acres
Average depth	4.7 feet
Max depth	19 feet
MPCA lake classification	Shallow lake
Watershed size	1,286 acres
Impervious surface	25% of watershed
Impaired Waters listing	Mercury
Common fish	Bluegill, Northern Pike, Pumpkinseed, Yellow Perch
Invasive species	Curly-leaf Pondweed

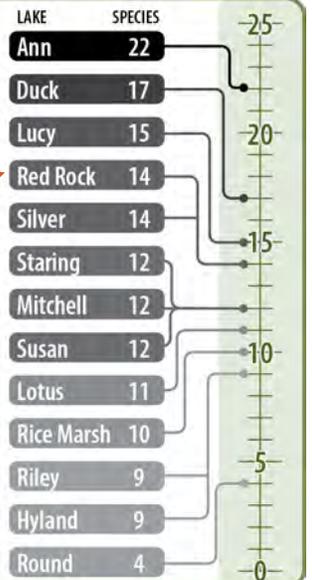


Watershed Boundary



Native Aquatic Plant Diversity

How does **Red Rock Lake** compare to **other lakes** in the District in **number of native plant species?**



Red Rock Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. For the last few years, the City of Eden Prairie has collected water quality data for Red Rock Lake.

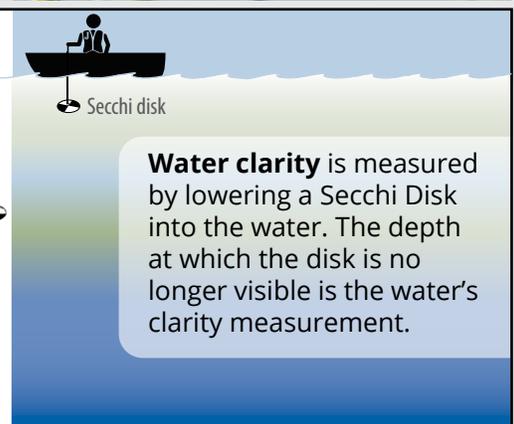
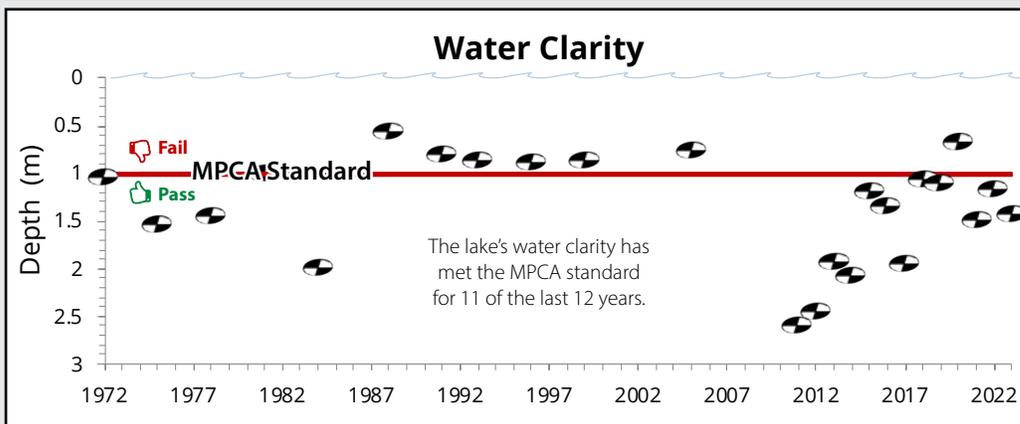
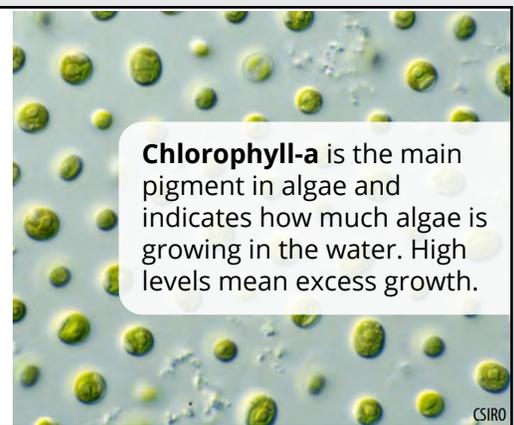
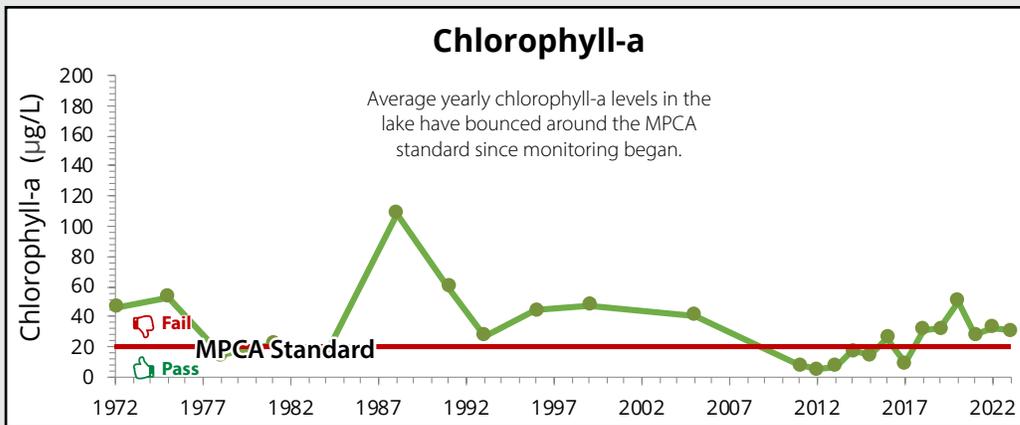
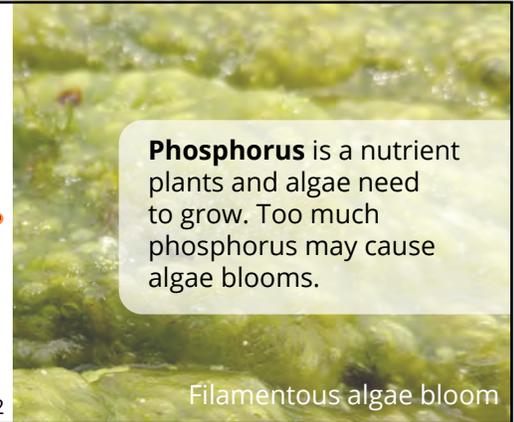
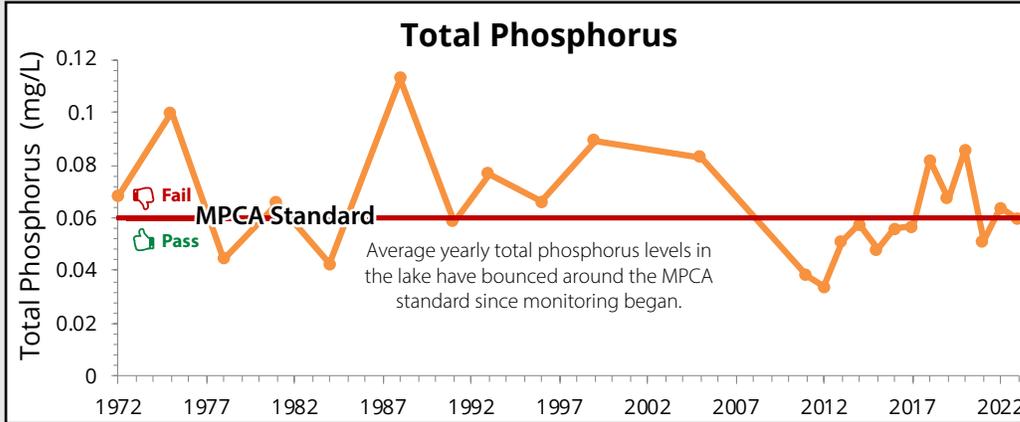


Water Quality Report Card

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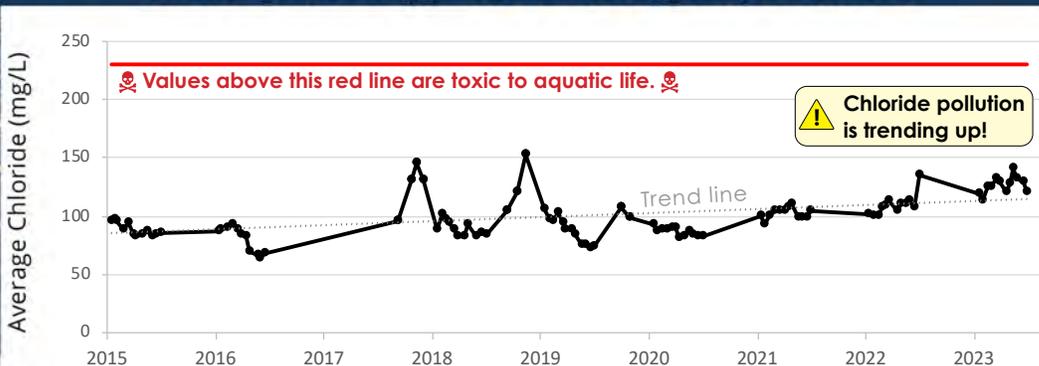


Trends Over Time: 1972-present



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Rice Marsh Lake

Located in both Eden Prairie and Chanhassen, Rice Marsh Lake is aerated in the winter. This management practice helps keep bluegill sunfish alive so that they can feed on invasive carp eggs in the spring.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Rice Marsh Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P **Total Phosphorus:** Levels have decreased since monitoring began in 1972. In 2023, the lake met the MPCA shallow lake standard (<0.06 mg/L) with an average total phosphorus level of **0.044 mg/L**.

Chlorophyll-a: Levels have decreased since monitoring began in 1972. In 2023, the average reading met the MPCA shallow lake standard (<20 µg/L) with an average chlorophyll-a reading of **15.1 µg/L**.

Water clarity: Since 1972, average Secchi disk depths have increased, and the lake consistently meets the MPCA shallow lake standard (>1.0 meters). The average reading in 2023 was **2.1 meters**.

Fish: Small mesh trap netting was conducted in 2023 to see if successful reproduction of Common Carp occurred following the partial winterkill. No young of year carp were captured during the survey indicating carp are not a problem in the lake. About 300 bluegills were stocked in the spring to ensure a breeding population was established to prevent carp recruitment from occurring.

Lake & watershed characteristics

Lake size	83 acres
Average lake depth	5 feet
Maximum lake depth	11 feet
MPCA lake classification	Shallow lake
Watershed size	966 acres
Impervious surface	32% of watershed
Impaired Waters listing	Nutrients

Great news! Because Rice Marsh Lake's 10-year water quality averages meet shallow lake standards, the District is requesting that the MPCA removes it from the Impaired Waters List.

Common fish Bluegill, Northern Pike, Black Crappie, Yellow Bullhead, Pumpkinseed Sunfish

Invasive species Curly-leaf Pondweed, Purple Loosestrife, Common Carp

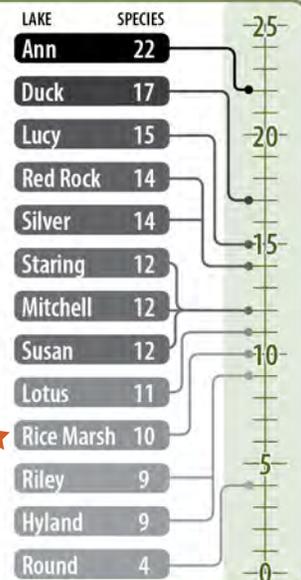


Watershed Boundary



Native Aquatic Plant Diversity

How does Rice Marsh Lake compare to other lakes in the District in number of native plant species?

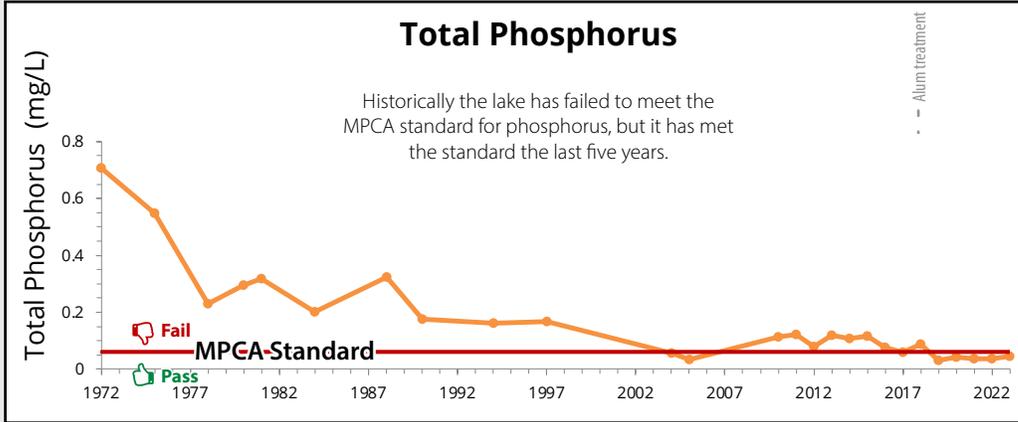


Rice Marsh Lake Water Quality by the Numbers

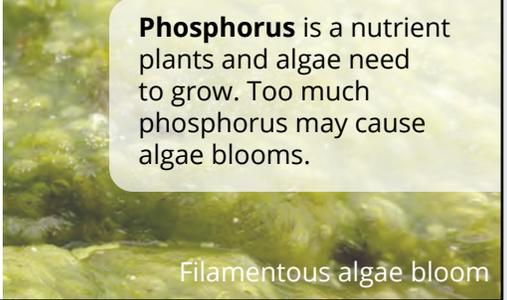
Over the last few years, Rice Marsh Lake has met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes.



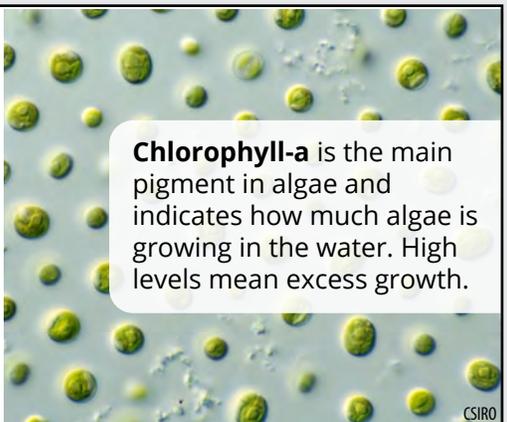
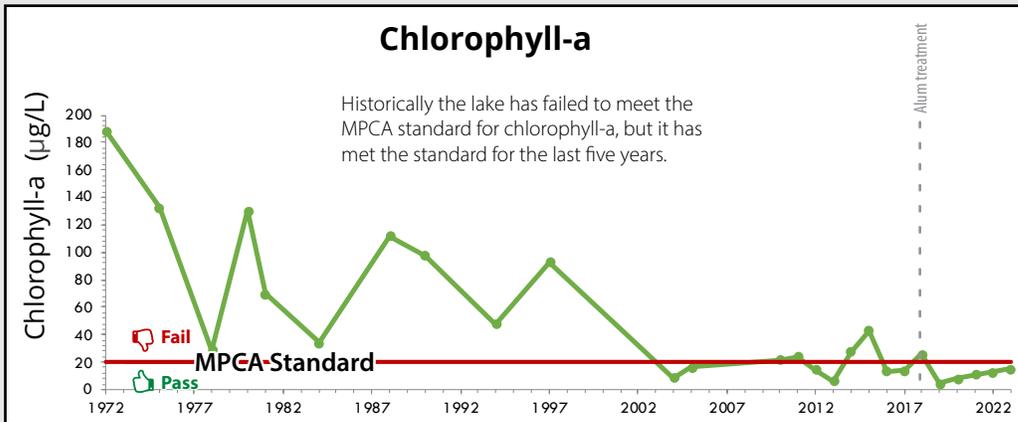
Trends Over Time: 1972-present



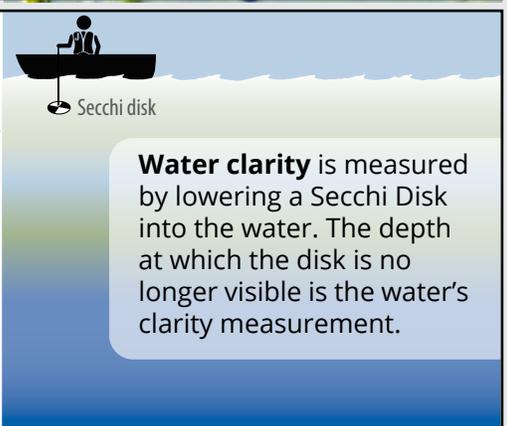
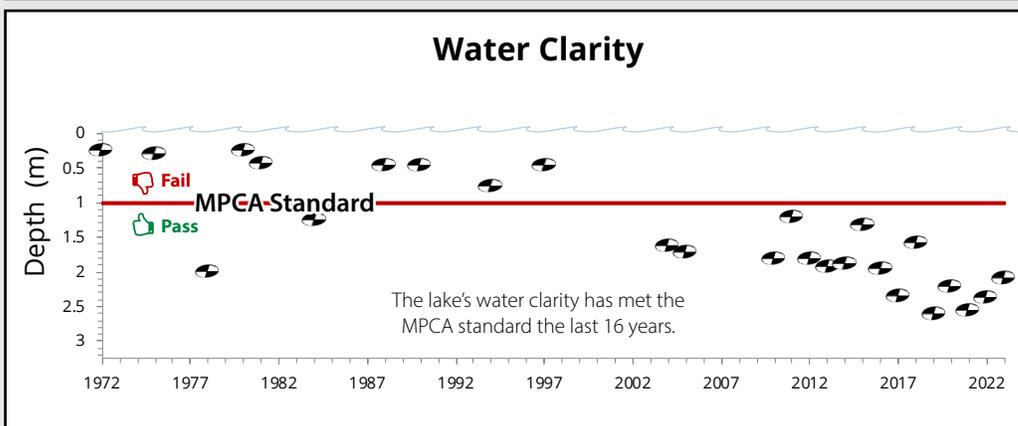
Rice Marsh Lake received an alum treatment in 2018. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.



Water clarity is measured by lowering a Secchi Disk into the water. The depth at which the disk is no longer visible is the water's clarity measurement.

Chloride: A Growing Concern

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- Pile snow where it won't melt & refreeze on walkways



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Lake Riley

At 297 acres and average depth of 23 ft, Lake Riley is the largest lake in the Watershed District. It is located on the boundary of Chanhassen and Eden Prairie and is a popular summer recreation spot.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Riley is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.

Total Phosphorus: The lake consistently meets the MPCA deep lake standard (<0.04 mg/L). In 2023, the average TP level was **0.020 mg/L**.

Chlorophyll-a: The lake consistently meets the MPCA deep lake standard (<14 µg/L). In 2023, the average chlorophyll-a reading was **6.1 µg/L**.

Water clarity: The lake consistently meets the MPCA deep lake standard (>1.4 meters). The average reading in 2023 was **3.7 meters**.

Plants: Lake Riley was treated for Curly-leaf Pondweed (9 acres). UMN conducted three plant surveys in 2023 to track aquatic plant populations. In August, 11 species were observed, 9 of which were native species. In all survey years, most plants were in water < 2 meters deep. However, with improved water clarity in 2016-23, plants were observed in sites up to 5 meters deep. Eurasian Watermilfoil greatly decreased in 2023 with <3% frequency of occurrence. Frequency of Curlyleaf Pondweed increased slightly from 2020 (25%) to 2023 (29%) but has not expanded further.

Fish: Electrofishing was used to monitor Common Carp, an invasive species that harms water quality by destroying aquatic vegetation and stirring up lake bottom sediments. Carp numbers have been very low in Lake Riley, indicating carp are not an issue in the lake.

Lake & watershed characteristics

Lake size	297 acres
Average lake depth	23 feet
Maximum lake depth	49 feet
MPCA lake classification	Deep lake
Watershed size	1,776 acres
Impervious surface	18% of watershed
Impaired Waters listing	Mercury, fish, nutrients
Common fish	Bluegill, Northern Pike, Yellow Perch, Yellow Bullhead, Black Crappie
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Zebra Mussels

Great news!
Because Lake Riley's 10-year water quality averages meet deep lake standards, the District is requesting that the MPCA removes it from the Impaired Waters List for nutrients.

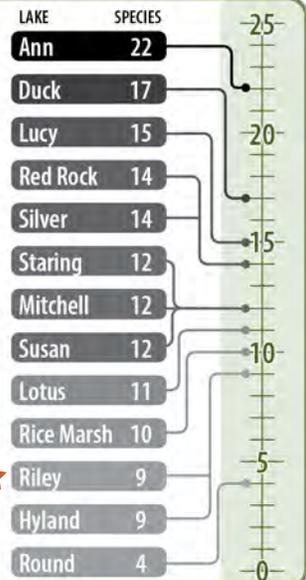


Watershed Boundary



Native Aquatic Plant Diversity

How does Riley Lake compare to other lakes in the District in number of native plant species?



Lake Riley Water Quality by the Numbers

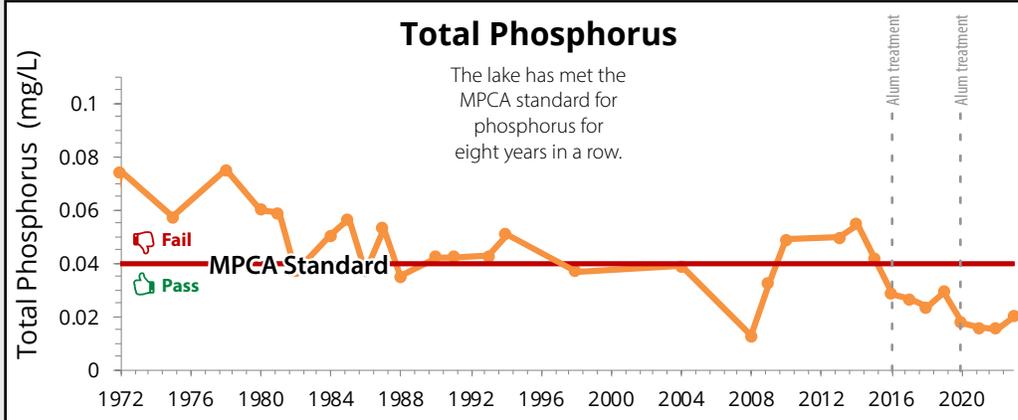
For the last few years, Lake Riley has consistently met the clean water standards set by the MPCA. The graphs below show water quality trends over time with the red line representing the MPCA standard for deep lakes.

Water Quality Report Card



rpbcwd.org/grades

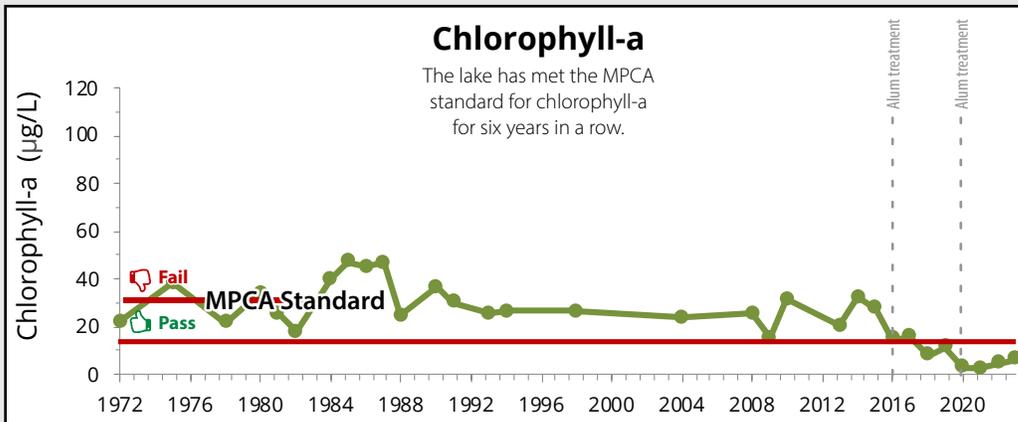
Trends Over Time: 1972-present



Riley Lake received an alum treatment in 2016 and 2020. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

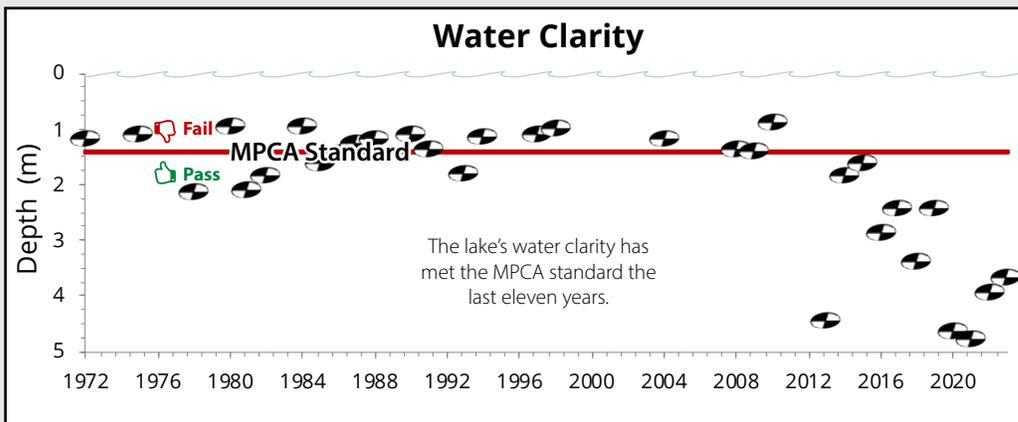
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

Filamentous algae bloom



Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.

CSIRO

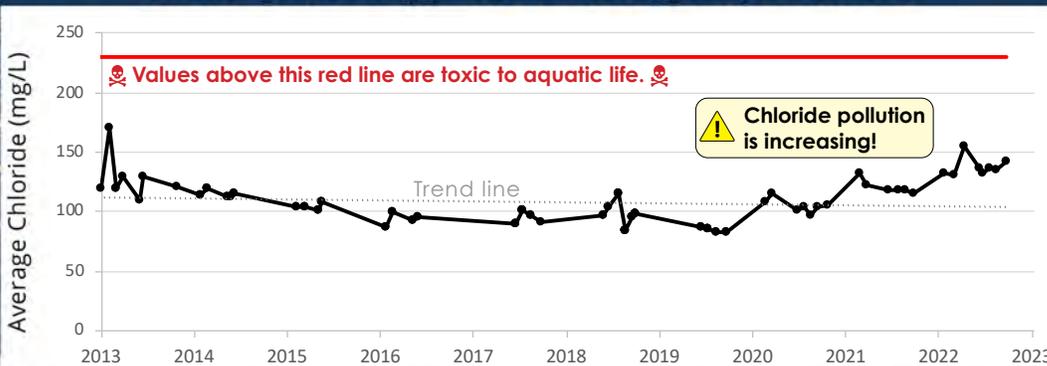


Secchi disk

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Chloride: A Growing Concern

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Round Lake

Located in Eden Prairie, Round Lake is a part of the Purgatory Creek Chain of Lakes. With a park and trail system around the lake, it is a popular recreation spot.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Round Lake is classified as a "Deep Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.4 meters (4.6 feet) or greater. See summary below. Additional details are located on the next page.



Total Phosphorus: Since the alum treatment in 2012, average TP concentrations have been consistently below the MPCA deep lake standard (<0.04 mg/L). In 2023, Round Lake had an average TP concentration of **0.025 mg/L**.



Chlorophyll-a: Lake averages have consistently met the MPCA deep lake standard (<14 µg/L). In 2023, the average chlorophyll-a concentration was **7.7 µg/L**.



Water clarity: Since the alum treatment in 2012, the average water clarity has stabilized below the MPCA deep lake standard (>1.4 meters). In 2023, the average Secchi disk depth was **2.7 meters**.

Lake & watershed characteristics

Lake size	30 acres
Average lake depth	11 feet
Maximum lake depth	37 feet
MPCA lake classification	Deep lake
Watershed size	440 acres
Impervious surface	32% of watershed
Impaired Waters listing	Mercury
Common fish	Bluegill, Yellow Bullhead, Black Bullhead, Black Crappie
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Brittle Naiad



Watershed Boundary



Native Aquatic Plant Diversity

How does **Round Lake** compare to **other lakes** in the District in **number of native plant species?**



Round Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line representing the MPCA standard for deep lakes. For the last few years, the City of Eden Prairie has collected water quality data for Round Lake.

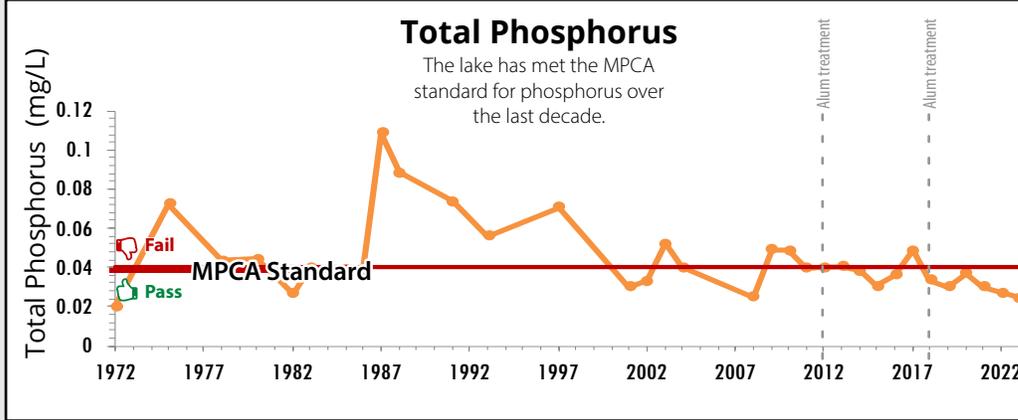


Water Quality Report Card

rpbcwd.org/grades

B

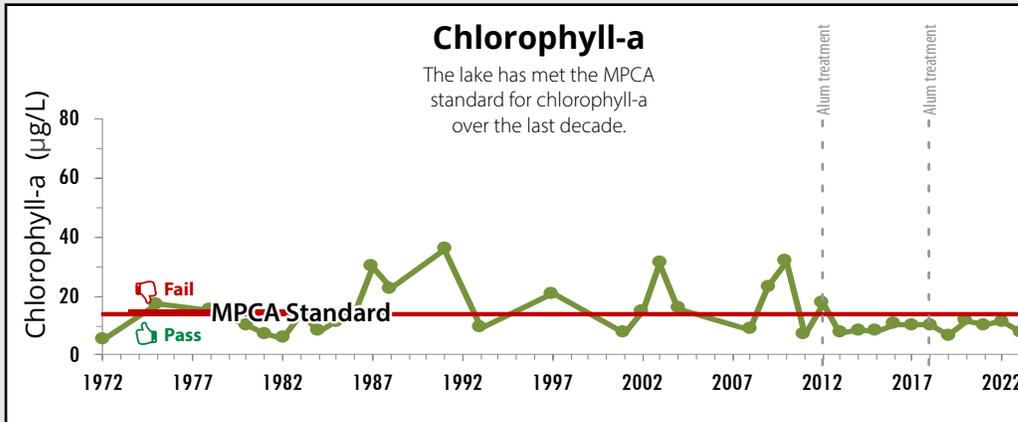
Water Quality Graphs, 1972-present



Round Lake received an alum treatment in 2012 and 2018. Alum limits the availability of phosphorus in lakes to control algae growth & improve water clarity.

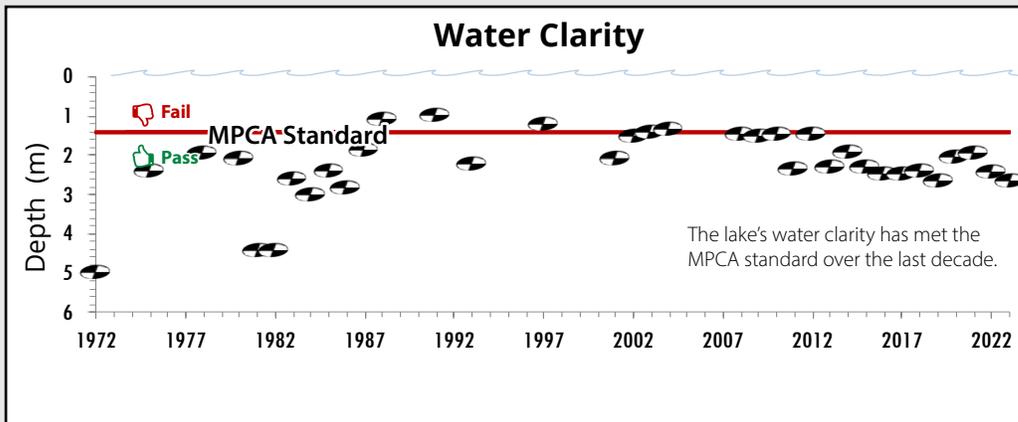
Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.

Filamentous algae bloom



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CSIRO

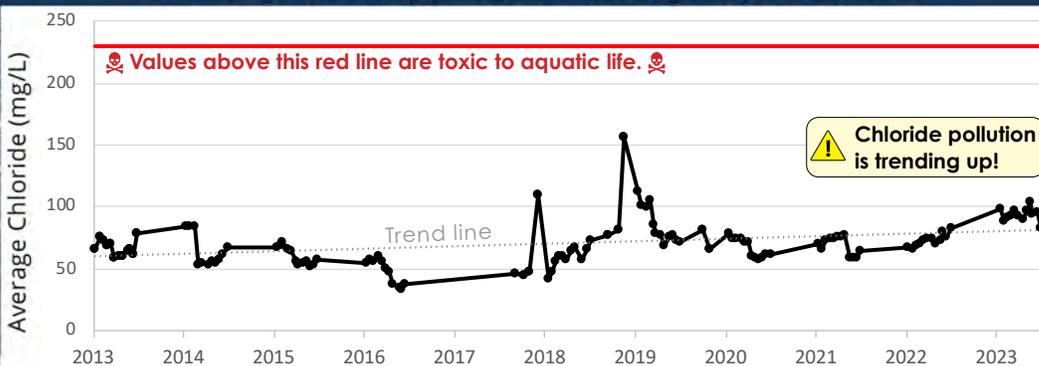


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Silver Lake

Located in Shorewood, Silver Lake sits at the edge of the watershed district. It is the only lake in the District with a native wild rice population, a rarity in metro area lakes!

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Silver Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

- P** **Total Phosphorus:** No significant trend. In 2023, the lake met the MPCA shallow lake standard (<0.06 mg/L) with an average total phosphorus level of **0.063 mg/L**.
- Chlorophyll-a:** No significant trend. In 2023, the average reading for chlorophyll-a was **19.1 µg/L**, which met the MPCA standard for shallow lakes (<20 µg/L).
- Water clarity:** Since 2017, the lake has consistently met the MPCA shallow lake standard for water clarity (>1.0 meters). This is likely linked to reduced water levels that occurred after the outlet was cleared and the increased fish winterkill frequency. The average reading in 2023 was **1.7 meters**.
- Plants:** An aquatic plant survey was conducted in 2023. Submersed Coontail (94% frequency of occurrence) and floating White Waterlily (50% frequency of occurrence) are the dominant vegetation in the lake. Since the 2013 survey, the number of species has increased from 10 species to 16 in 2020 and 14 in 2023. Most plant species have increased in abundance and density due to increased water clarity. This includes Northern Wild Rice which has increased from 5% in 2013 and 1% in 2020 to 13% in 2023.

Lake & watershed characteristics

Lake size	71 acres
Average lake depth	5 feet
Maximum lake depth	14 feet
MPCA lake classification	Shallow lake
Watershed size	391 acres
Impervious surface	14% of watershed
Impairment listing	Nutrients
Common fish	Black Bullhead, Fathead Minnow, Central Mudminnow
Invasive species	Curly-leaf Pondweed, Purple Loosestrife

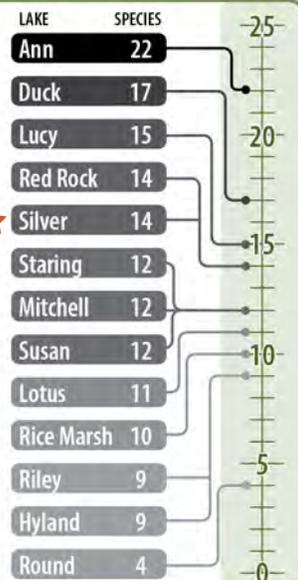


Watershed Boundary



Native Aquatic Plant Diversity

How does **Silver Lake** compare to **other lakes** in the District in **number of native plant species?**



Silver Lake Water Quality by the Numbers

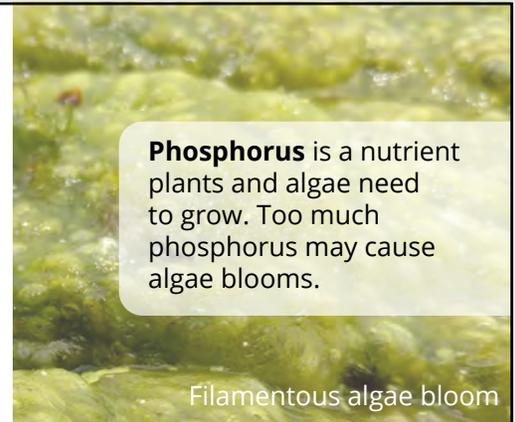
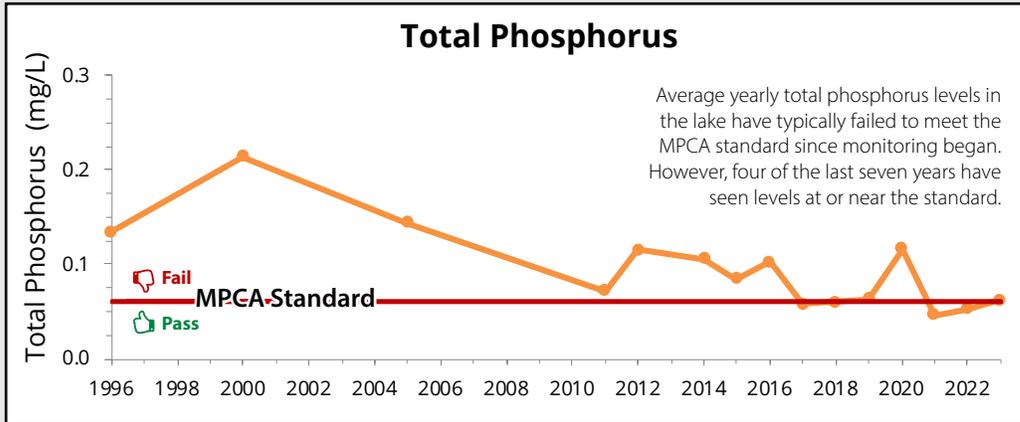
The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes.

Water Quality Report Card

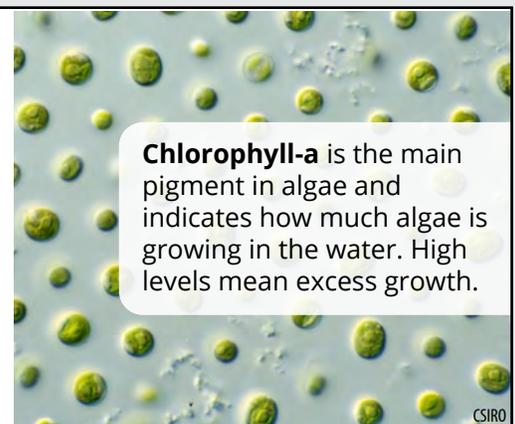
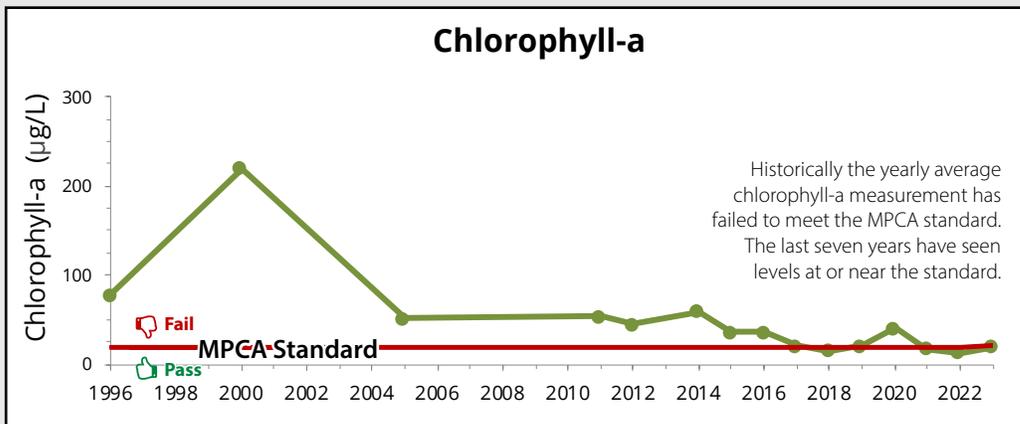
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rpbcwd.org/grades

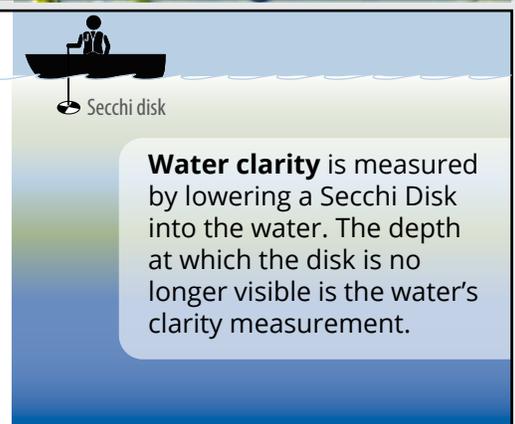
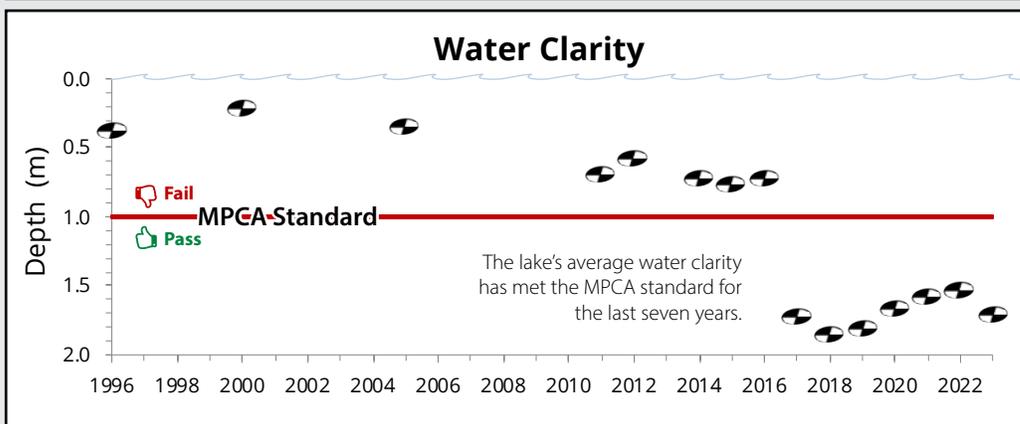
Trends Over Time: 1972-present



Phosphorus is a nutrient plants and algae need to grow. Too much phosphorus may cause algae blooms.



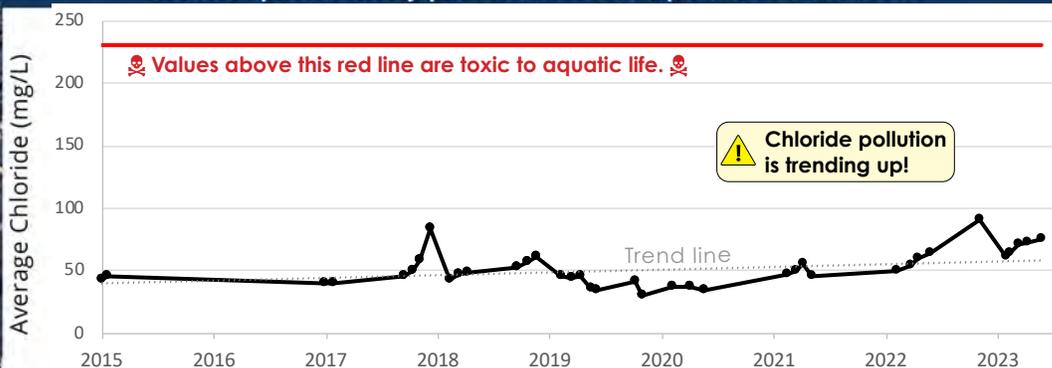
Chlorophyll-a is the main pigment in algae and indicates how much algae is growing in the water. High levels mean excess growth.



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Staring Lake

Staring Lake is located in Eden Prairie, west of Flying Cloud Drive and north of Pioneer Trail. Staring has a public boat ramp and a fishing pier. The Eden Prairie Outdoor Center is also located on its shores, off of Staring Lake Parkway.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Staring Lake is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. See summary below. Additional details are located on the next page.

P Total Phosphorus: Since carp management began in 2011, levels have decreased. In 2023, the lake did not meet the MPCA shallow lake standard for total phosphorus (<0.06 mg/L). The 2023 average was **0.101 mg/L**, which in part was likely due to low water levels and a whole-lake herbicide treatment in 2022.

Chlorophyll-a: No significant trend. In 2023, the average reading for chlorophyll-a was **87.6 µg/L**, which failed to meet the MPCA standard for shallow lakes (<20 µg/L), and was significantly higher than recent years. In an August sample, blue-green algae numbers were high, indicating a probable presence of toxins at that time.

Water clarity: Since carp management began in 2011, clarity has improved. The average reading in 2023 was **0.9 meters**, which failed to meet the MPCA standard (>1.0 m).

Fish: Electrofishing was used to monitor Common Carp, an invasive species that harms water quality by stirring up lake bottom sediments. Carp biomass is decreasing in the lake with little to no reproduction detected the last six seasons. However, near record low water levels led to a winterkill of native fish, which eat carp eggs. Bluegill were stocked in late spring to offset this loss, but not before carp reproduction occurred. This was the first time since 2015 that a significant carp reproduction event has occurred.

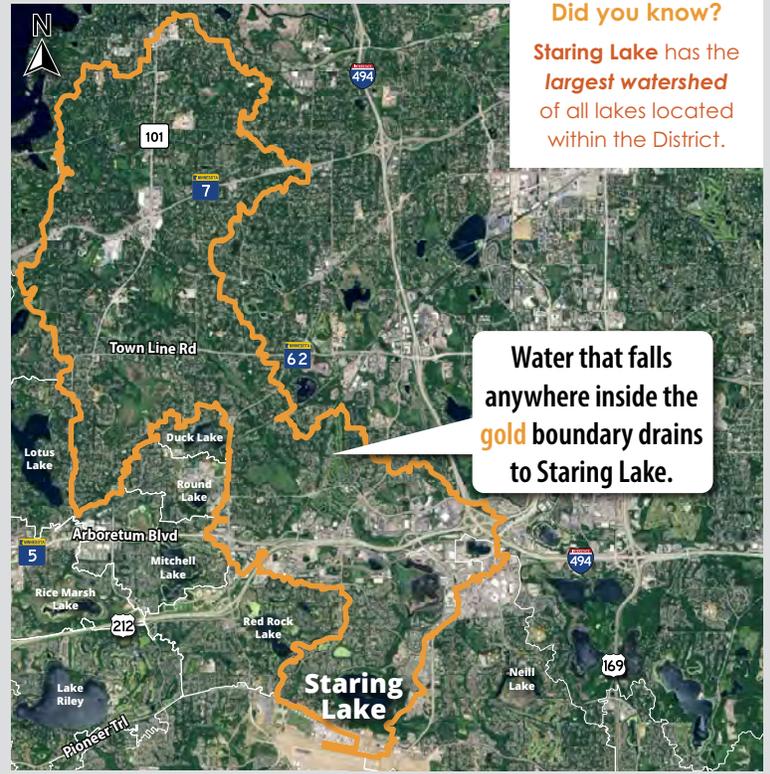
Plants: In 2022, a herbicide treatment successfully treated Eurasian Watermilfoil with none of this invasive species observed in 2023. Unfortunately, the reduced vegetation combined with low water levels led to reduced water quality. Nutrient levels should improve as native vegetation expands across the lake. The District will continue to monitor the plant community to assess native vegetation and keep invasives in check.

Lake & watershed characteristics

Lake size	166 acres
Average lake depth	7 feet
Maximum lake depth	16 feet
MPCA lake classification	Shallow lake
Watershed size	10,158 acres
Impervious surface	21% of watershed
Impairment listing	Mercury & nutrients
Common fish	Bluegill, Black Crappie, Black Bullhead
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Brittle Naiad, Common Carp



Watershed Boundary



Native Aquatic Plant Diversity

How does **Staring Lake** compare to **other lakes** in the District in **number of native plant species?**

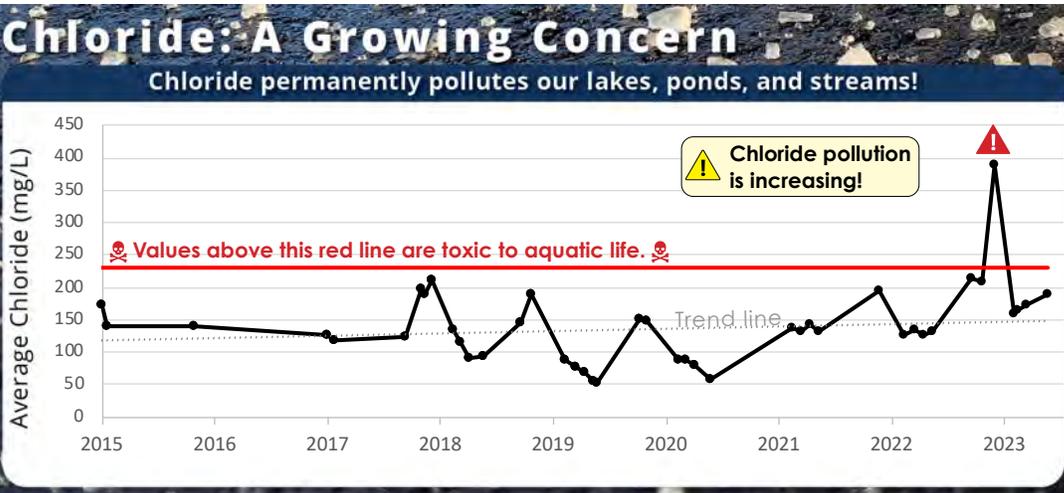
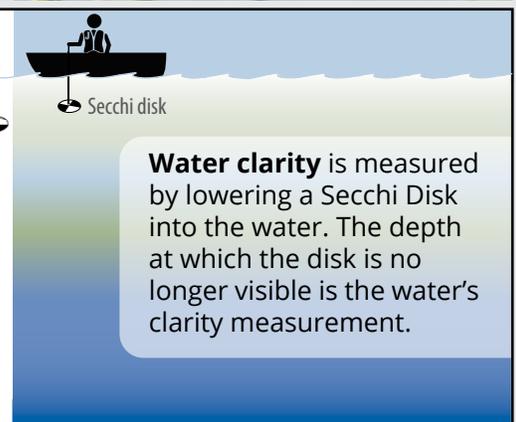
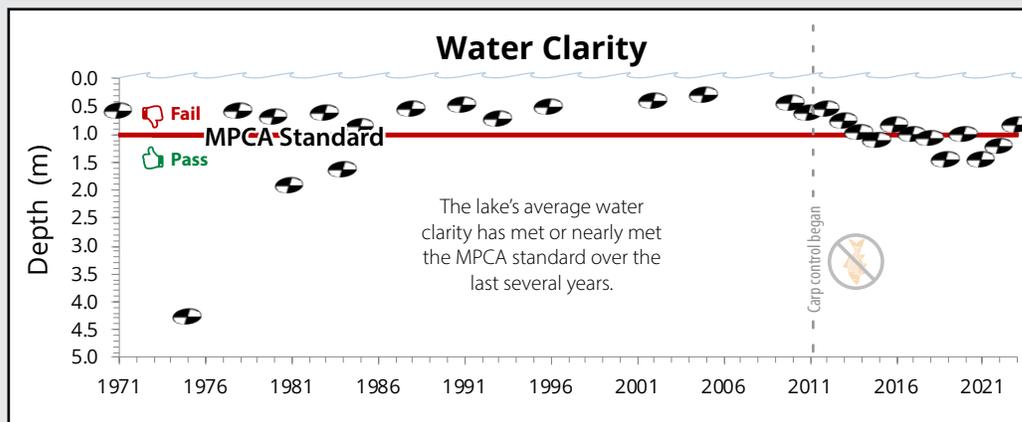
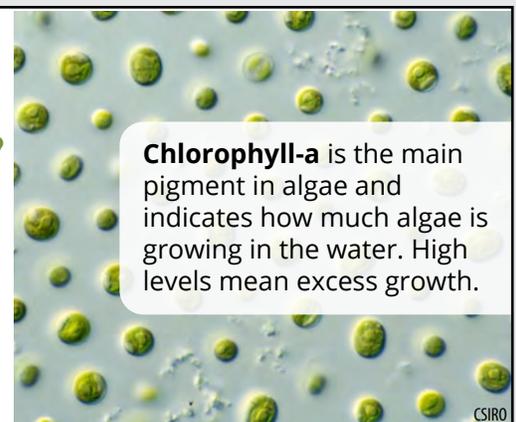
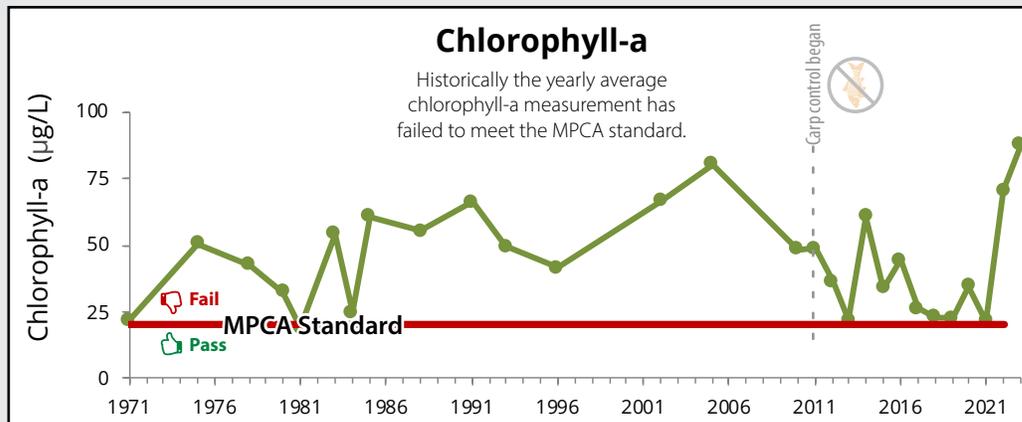
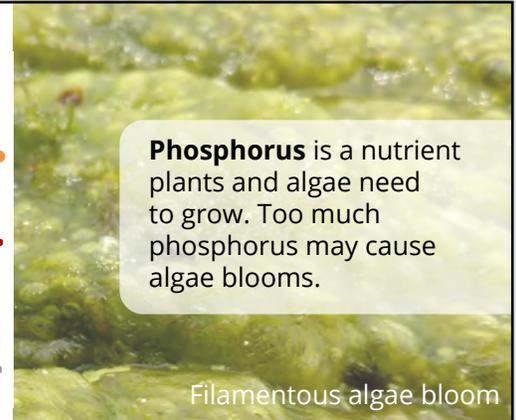
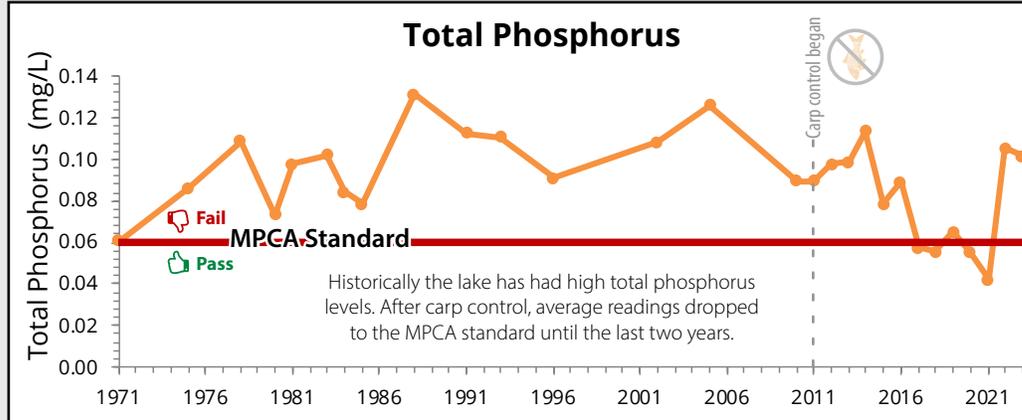


Staring Lake Water Quality by the Numbers

The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. Over the last decade, **Staring Lake** has failed to consistently meet clean water standards set by the MPCA.

Water Quality Report Card **D**
rpbcwd.org/grades

Trends Over Time: 1972-present



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Lake Susan

Located in Chanhassen, Lake Susan is a part of the Riley Creek Chain of Lakes. It is the third lake that Riley Creek flows through as it makes its way to the Minnesota River.

From June to September every year, District staff visit the lake every two weeks to collect water samples and take readings. Samples are sent to a laboratory to be tested for nutrients and other compounds. Staff also measure water clarity by lowering a Secchi disk into the water and measuring how deep it goes before it is no longer visible. The data indicates the lake's health based on standards set by the Minnesota Pollution Control Agency (MPCA).

Lake Susan is classified as a "Shallow Lake" by the MPCA. To be considered healthy, the lake must have very low average phosphorus and chlorophyll-a levels and average water clarity of 1.0 meter (3.3 feet) or greater. For more detail, see the back page.

P **Total Phosphorus:** No significant trend. In 2023, the lake just met the MPCA shallow lake standard (<0.06 mg/L) with an average total phosphorus level of **0.055 mg/L**.

Chlorophyll-a: No significant trend. In 2023, the average reading for chlorophyll-a was **45.3 µg/L**, which failed to meet MPCA shallow lake standard (<20 µg/L). Blue-green algae numbers were high in June-August, indicating a probable presence of toxins during that time.

Water clarity: No significant trend. Over the previous few years, the lake was consistently meeting the MPCA shallow lake standard (>1.0 meters). In 2023, the average reading of **0.7 meters** did not meet standard.

Fish: Electrofishing was used to monitor Common Carp, an invasive species that harms water quality by destroying aquatic vegetation and stirring up lake bottom sediments. The 2023 carp biomass estimate was 11 kg/ha, which was well below the damaging threshold of 100 kg/ha. This combined with limited recruitment mean carp are not an issue for Lake Susan.

Plants: In 2023, herbicide treatments were carried out on 5.3 acres to reduce Curly-leaf Pondweed. UMN conducted three plant surveys in 2023 to track aquatic vegetation populations. In May maximum depth of growth was 3.1 meters, decreasing to 1.5 in August. Invasive Eurasian watermilfoil has declined in frequency since 2011 and was not observed on any rake tosses in 2018-2023. Invasive Brittle Naiad remains at low levels.

Lake & watershed characteristics

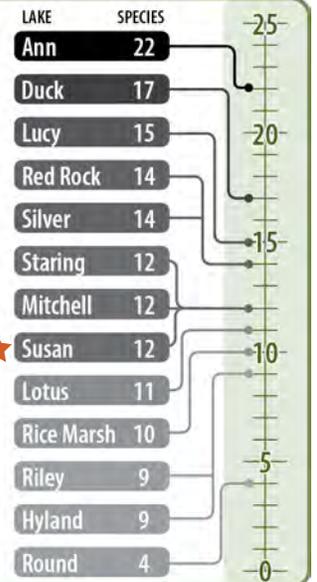
Lake size	88 acres
Average lake depth	10 feet
Maximum lake depth	17 feet
MPCA lake classification	Shallow lake
Watershed size	1,231 acres
Impervious surface	27% of watershed
Impairment listing	Mercury & nutrients
Common fish	Bluegill, Black Crappie, Northern Pike, Black Bullhead, Yellow Bullhead
Invasive species	Curly-leaf Pondweed, Eurasian Watermilfoil, Common Carp, Brittle Naiad



Watershed Boundary



Native Aquatic Plant Diversity
How does **Lake Susan** compare to **other lakes** in the District in **number of native plant species?**



Lake Susan Water Quality by the Numbers

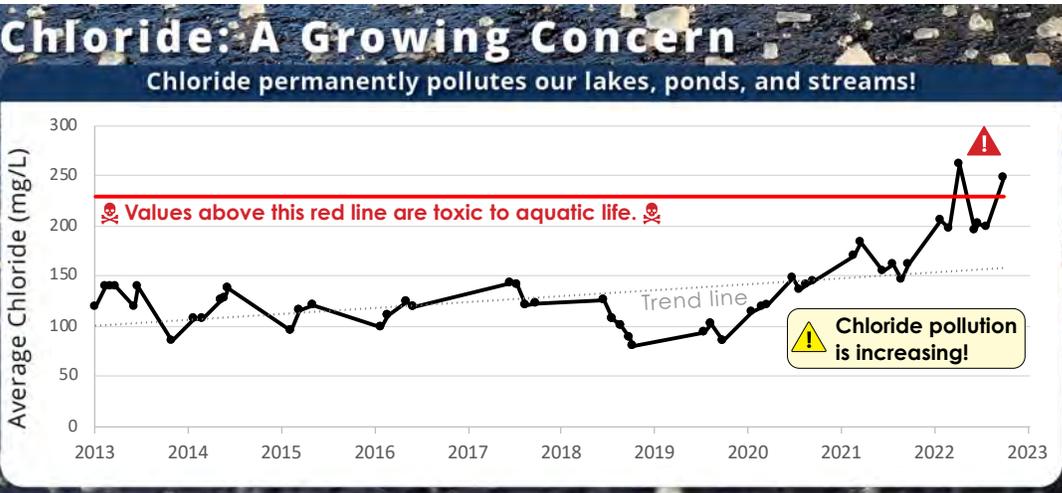
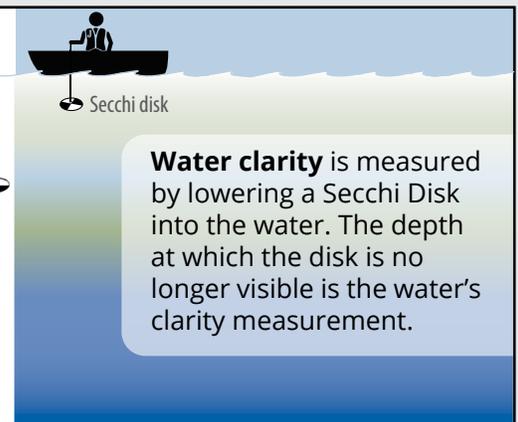
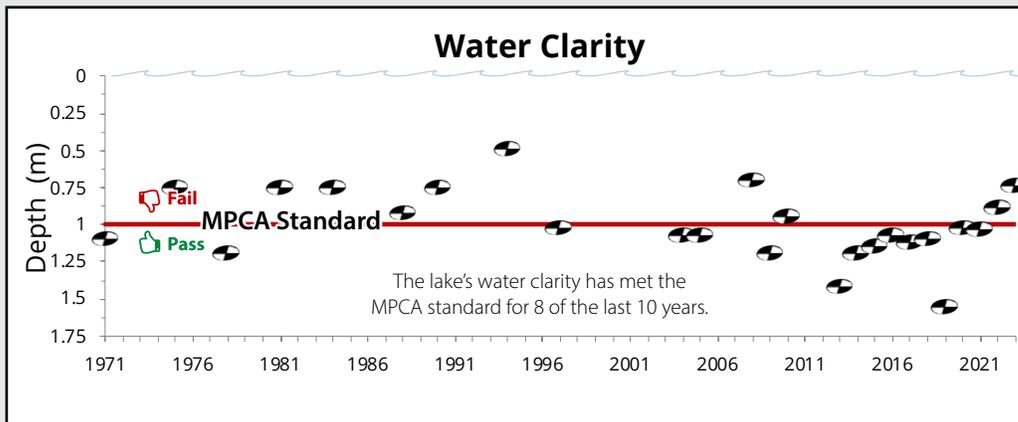
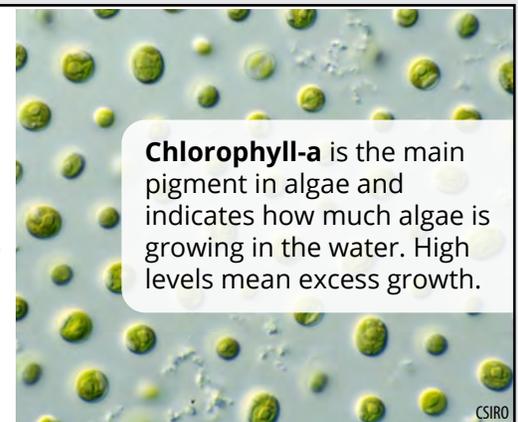
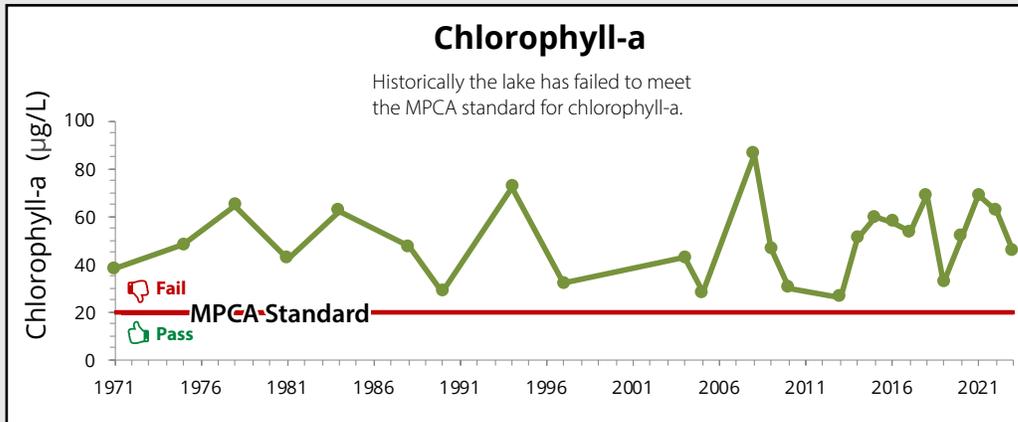
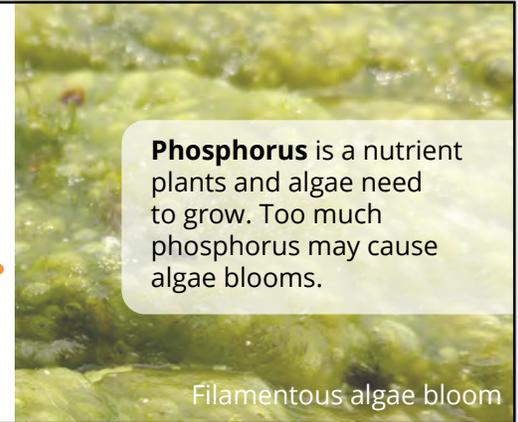
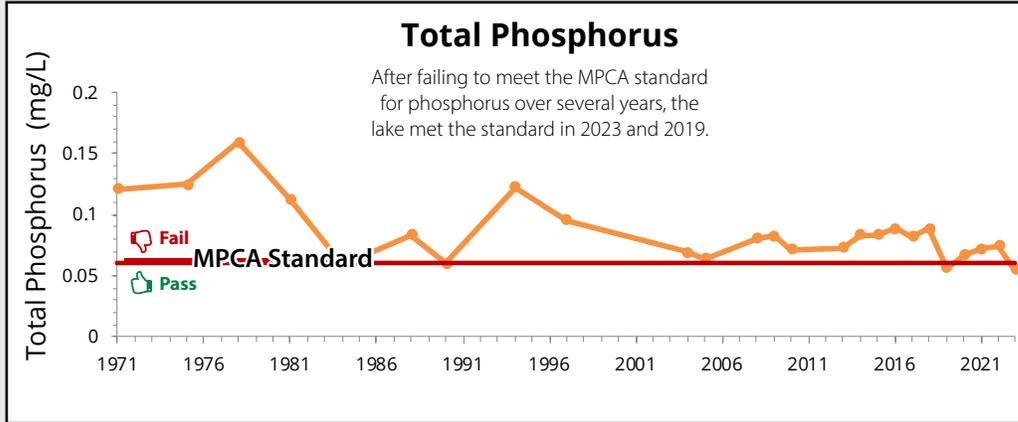
The graphs below show water quality trends over time with the red line representing the MPCA standard for shallow lakes. In 2023, Lake Susan failed to meet two clean water standards set by the MPCA.

Water Quality Report Card

D

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Trends Over Time: 1972-present



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