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Vadnais Lake Area Water Management Organization

2023 Water Monitoring Summary

VLAWMO's monitoring program consists of:

- 15 Lakes: *Grab samples*
- Lambert Creek: *Grab samples, remote sensors*
- Water quality sampling every other week from May to September:
  Dissolved oxygen, conductivity, chlorophyll-A, chloride, phosphorus, nitrates, total suspended solids, turbidity, temperature, bacteria, pH, and storm sampling

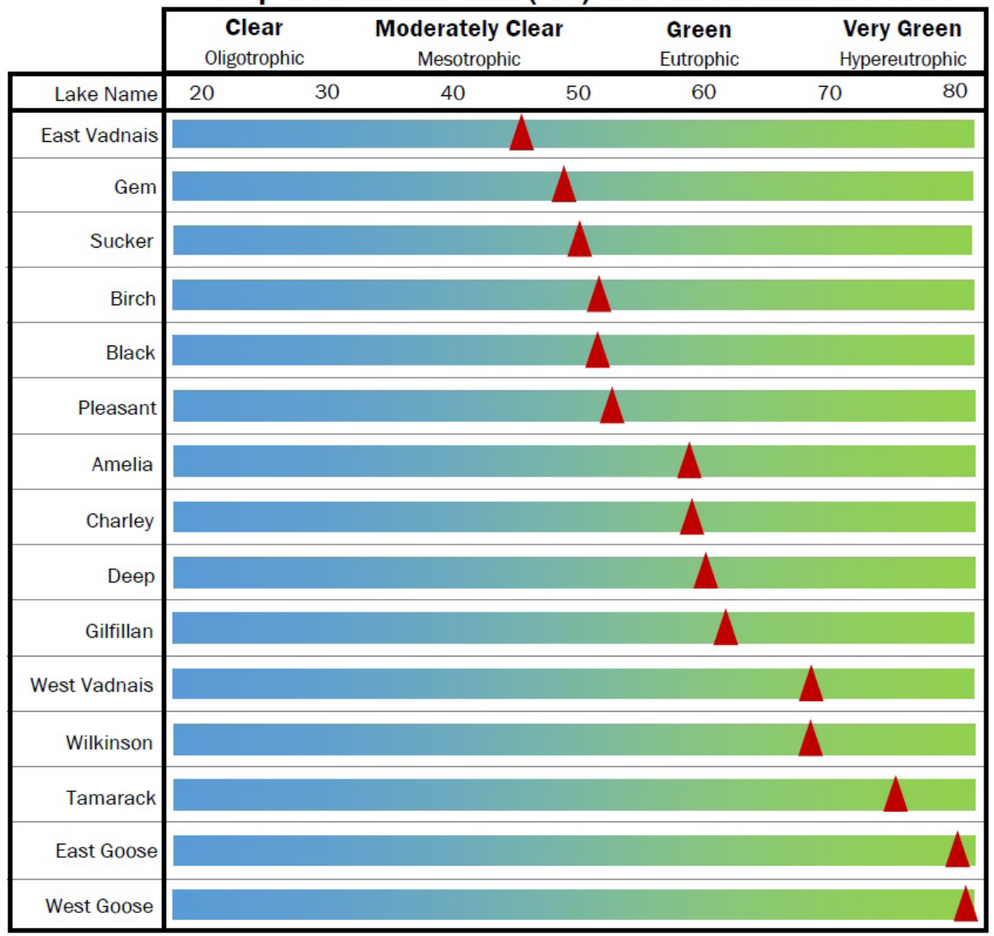
See the complete report at www.VLAWMO.org/resources/reports

The Watershed at a Glance

*See the 2023 water monitoring report at **vlawmo.org/reports** for more information.*

Thinking like a lake scientist:
Lake science is a continual quest for data, trends, and critical thinking. Lakes can vary from year to year depending on what's happening either within or around the lake. Because trends aren't always visible to the naked eye, lake scientists take a long-term approach and piece together multiple variables to draw conclusions. VLAWMO refers to Minnesota state water quality standards in this pursuit. Some of VLAWMO's lakes meet state standards and some don't. See the next page for examples.

Trophic State Indexes (TSI) of VLAWMO Lakes: 2023



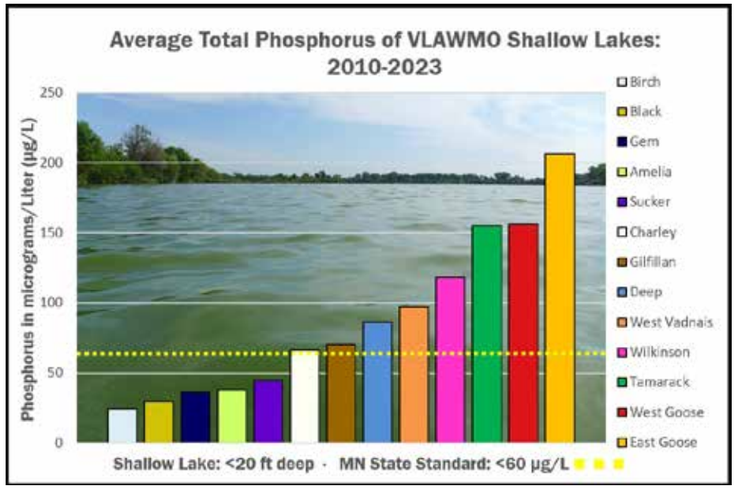
Definitions:

TSI: Trophic Status Index. The trophic status of a lake pertains to its nutrient levels, transparency, and chlorophyll. The data for each reading is combined to create a single value, which is a TSI index, depicted with red arrows.

Oligotrophic: Low nutrient levels and abundant oxygen. May be suitable as an unfiltered water supply.
Mesotrophic: A moderate amount of dissolved nutrients. Iron or manganese taste/odors, turbidity increases.
Eutrophic: Rich in nutrients, supporting either a dense plant population or large algae blooms.
Eutrophication is the process of nutrient loading into a waterbody from the surrounding watershed (i.e. upland area). It is a natural process that can be accelerated by stormwater runoff and erosion.
Hypereutrophic: Exceptionally high nutrients causing dense algae and macrophytes. Rough fish (bullhead, carp) dominate, blue-green algae most likely, fish kills possible during algae blooms. Episodes of severe taste and odor.

Nutrients and Chlorides

*Visit **vlawmo.org/waterbodies** for specific lake studies, reports, and lake fact sheets.*

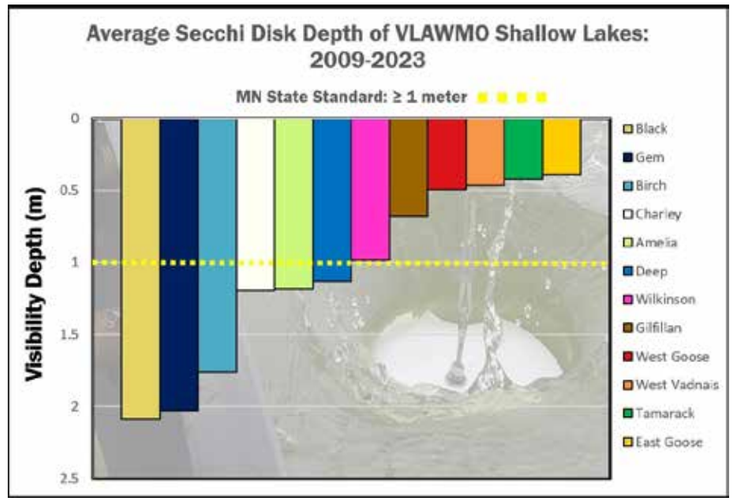


Phosphorus: What is it?

Phosphorus is a naturally occurring nutrient and a main driver of algae growth. 1 lb. of phosphorus can produce up to 500 lbs. of algae. Increased algae levels create low oxygen and poor light penetration in lakes, and reduce quality of fish and wildlife habitat.

What it means to me:

High phosphorus levels determine whether the water looks like pea soup or an aquarium. Excessive algae can produce foul smells and toxins harmful to humans and pets. To prevent this, it's important to keep sediment and nutrients on the landscape and out of waterbodies.

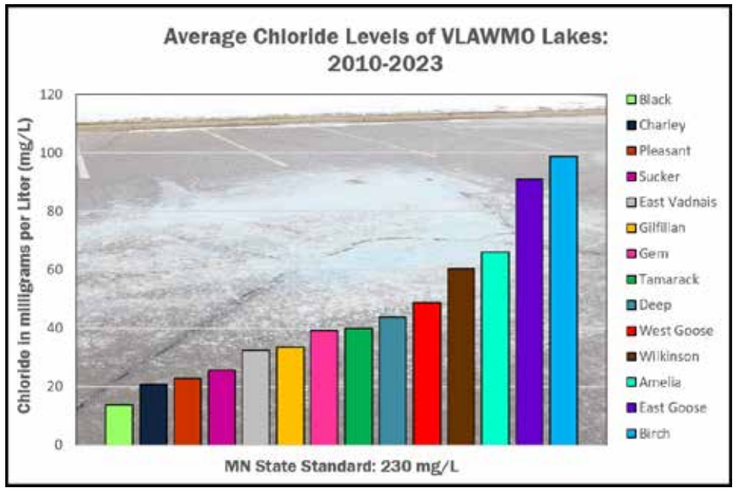


Secchi Disk: What is it?

A Secchi disk is a 20 cm flat disk that is lowered into the water until it can no longer be seen. The depth of where the disk disappears, called the Secchi depth, is a measure of the transparency of the water.

What it means to me:

Transparency is the most basic indicator to assess risks for most lake uses, and informs potential issues downstream. Poor transparency means there's extra debris in the water column that will have more clues. Transparency can be affected by pollutants or sediment draining into the lake or by existing sediments recirculating from the lake bottom.



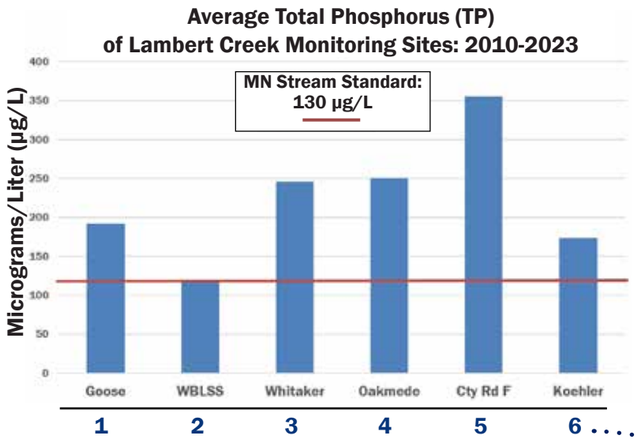
Chloride: What is it?

Chloride is a common ingredient in salt de-icers and home water softening. Chloride is a permanent pollutant to water quality, requiring only 1 tsp to pollute 5 gallons of water. It is toxic to aquatic life and interrupts lake temperature and nutrient cycles.

What it means to me:

Chloride poses threats to freshwater and even drinking water supplies. There is no economical way to remove it. VLAWMO currently has no waterbodies impaired for chloride, but some lakes show upward trends. Lake chloride levels can decline as water flushes through, but the chloride will carry through to rivers, other lakes, or groundwater.

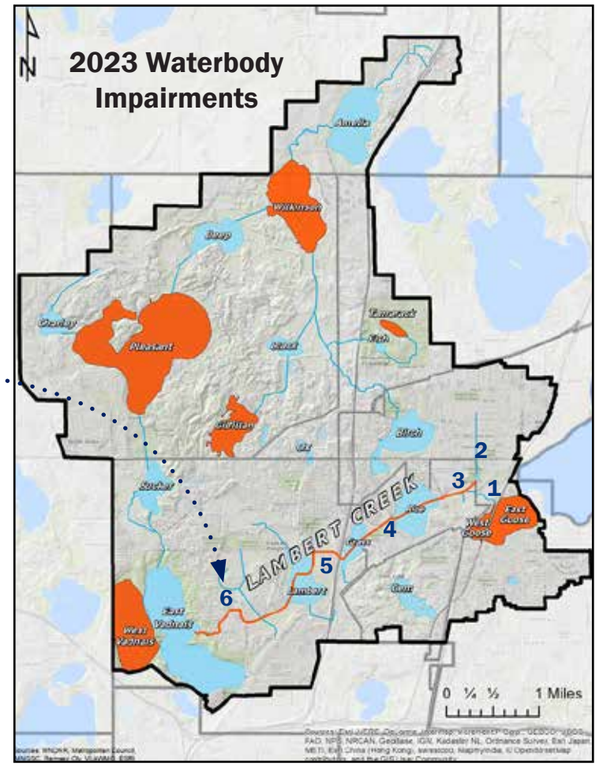
Lambert Creek:



Lambert Creek is impaired for high bacteria during storm events. Although not officially impaired for nutrients, the creek monitoring results show high nutrient levels. Water samples from six sites are taken along the creek every other week from May to September (locations on map, right). E. coli bacteria has been detected as largely avian and canine.

Waterbody impairments: VLAWMO has several lakes listed as impaired waterbodies. For a lake to be listed as impaired it must show a trend in being above standards for several years. Impairments can be assigned for high nutrient, bacteria, or chloride levels, or others. Most of VLAWMO's lakes are classified as shallow with the exception of Pleasant and East Vadnais classified as deep.

Visit **VLAWMO.org/residents** to learn how you can help take care of the watershed from home.



Citizen Science

Aquatic Invasive Species (AIS):

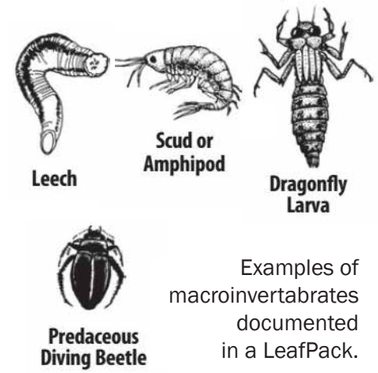
VLAWMO partners with Ramsey County Soil and Water Conservation Division to monitor for new infestations of aquatic invasive species. In this program, trained volunteers gather aquatic vegetation samples throughout the growing season. This provides the opportunity for early detection before infestations become problematic or spread to other lakes.

Above: AIS training in North Oaks

Macroinvertebrates:

To compliment chemistry monitoring, VLAWMO utilizes bio-monitoring at four locations on Lambert Creek and at several lake locations such as Sucker, Deep, and Pleasant Lakes. This data provides a more robust snapshot of the water's health because the various organisms detected have specific water quality needs and habitat preferences. Based on what the samples contain or don't contain, we gain clues about the health of the aquatic habitat and thus the water itself.

This effort utilized the LeafPack assessment method, which is a program of the Stroud Water Research Center. VLAWMO's volunteer group, the Watershed Action Volunteers (WAV) assist in collecting samples and submitting data to the Monitor My Watershed Wiki.



Examples of macroinvertebrates documented in a LeafPack.

Right: Volunteer Erika Turkington collects a macroinvertebrates sample at Deep Lake.