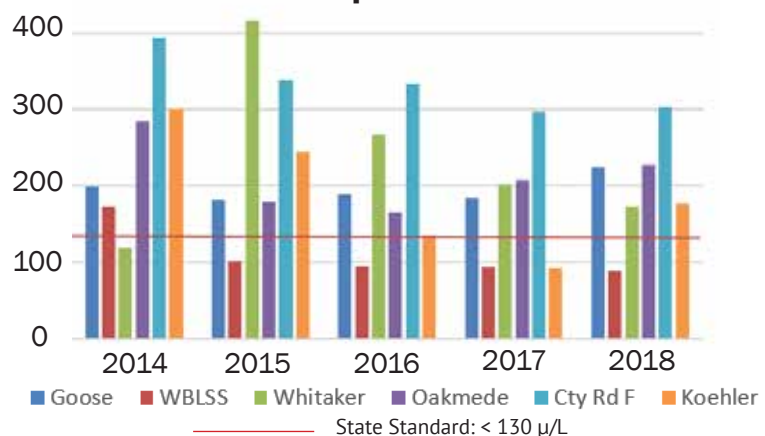


Lambert Creek

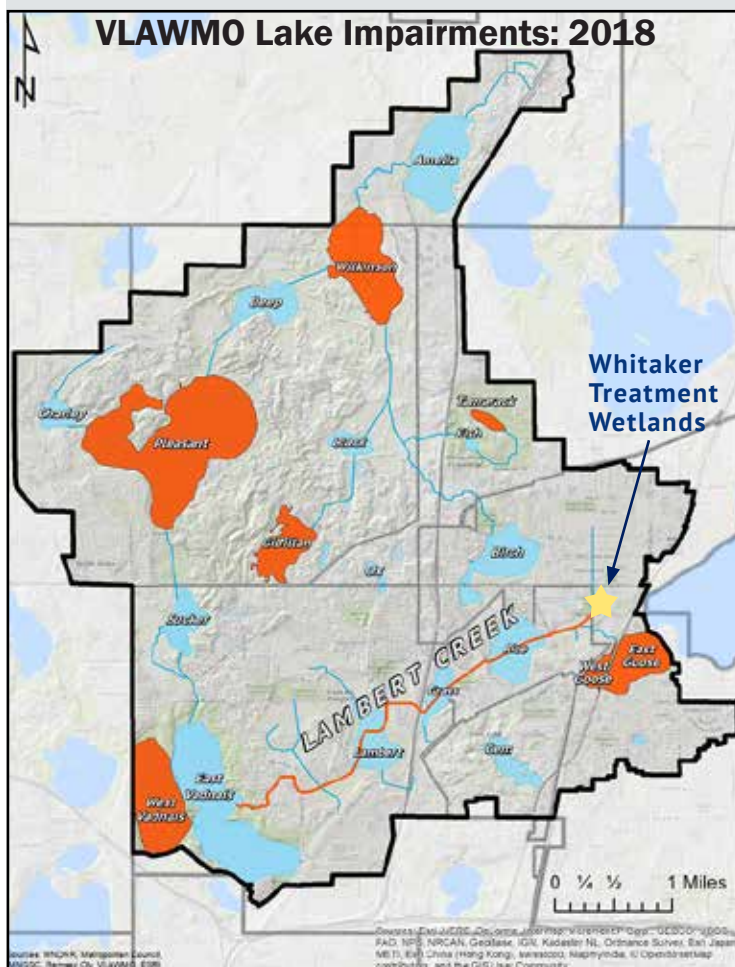
Historical Total Phosphorus of Lambert Creek



Lambert Creek is impaired for being high in nutrients and bacteria. Six sample sites are taken along the creek to assess contaminants in different parts of the watershed. E. coli levels have been detected as primarily avian and canine.

In 2018, VLAWMO partnered with Houston Engineering to create a complete hydraulic model of the Lambert Creek drainage system. This model serves to identify areas for repair or maintenance, and is a reference for future planning and problem solving. VLAWMO is the ditch authority for Lambert Creek under the state of MN, charged with maintaining a reasonably functioning ditch with the help of its partnering Cities.

Visit VLAWMO.org to learn what's being done to resolve these issues and see how you can be a part of the solution!



Whitaker Treatment Wetlands

The Whitaker Treatment Wetlands is a research project investigating new ways to treat stormwater runoff. Completed in 2018, data will be collected until 2020 to analyze how various materials treat contaminants such as phosphorus, nitrogen, and E. coli bacteria.

Samples are gathered before (pre) and after (post) storm events and at various points within the 3 treatment cells. Each cell consists of layers of gravel, sand, and a unique mix of specialized sorptive media (concrete, peat, clay, tire crumb). Sampling is staggered over a period of days as water moves through the system. At right, E. coli levels are lower after water travels through the cells. The lowest level is seen in cell 3. These results may indicate that the composition in cell 3 is the most beneficial for removing E. coli bacteria. Research will continue until 2020 to replicate and investigate these results, making recommendations for future water treatment projects.

Whitaker Treatment Wetlands E. coli Samples Surrounding a Storm Event: 9/4/2018



Image: Burns & McDonnell



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Vadnais Lake Area Water Management Organization

2018 Water Monitoring Report Summary



VLAWMO's monitoring program consists of:

- 12 Lakes
- Lambert Creek
- Water quality sampling every other week from May to September
Phosphorus, nitrates, chlorophyll-A, chloride, turbidity, bacteria, pH, and storm sampling



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

2018 Lake Notes

A summary of significant watershed issues.

See the 2018 water monitoring report at vlawmo.org/reports for more information.



Gem Lake: Gem Lake's chemistry has improved, coinciding with a 2014 Highway 61 swale reconstruction. The improved swale may be capturing nutrients and sediment that drained into the lake from a large parking lot. After 10 years on the State Impaired List and continued monitoring, the Minnesota Pollution Control Agency (MPCA) officially de-listed Gem Lake in 2018. This success story demonstrates that lake improvements are possible!



Gilfillan Lake: One of VLAWMO's lakes on the State Impaired List, Gilfillan data show a nutrient increase over 5 years. An augmentation system was installed in 2012 to raise the water level, and also provided dilution that improved the water quality. Gilfillan and its subwatershed is now maintaining its water level on its own, as no augmentation has occurred since the installation.

Goose Lake (East & West): Goose Lake has had high nutrient levels since VLAWMO began monitoring in 1997 (East) and 2006 (West). A 2015 bullhead removal (pictured right) made minor impacts to lake health, serving to reduce internal loading, which is one of several factors contributing to the lake's impairment. A 2017 fish survey indicated that the bullhead population is under control. Wood Lake/Oak Knoll Pond is a neighborhood pond that feeds into Goose Lake, is the focus of a spent lime treatment study in 2019.



Follow the study and connect to public engagement meetings at vlawmo.org.

Wilkinson Lake: Wilkinson's phosphorus levels are above State standards but its Chlorophyll A level is below. Studies have detected high nutrient levels draining into Wilkinson from both North and South inlets. Because Wilkinson functions more like a wetland than a lake, it continually cycles nutrients through the water column. Its water quality may be especially sensitive to inputs from the surrounding watershed (sediment, agricultural runoff, grass clippings, etc). This question is currently being studied and addressed in the 2017 Wilkinson feasibility study. Visit vlawmo.org/waterbodies/lake-wilkinson for the full report. Reducing upland nutrient and sediment loads in the future are likely to promote the health of Wilkinson and downstream Deep Lake.

Tamarack Lake: A floating island wetland was installed at Tamarack in 2015 to reduce lake nutrient levels. Lake data indicates that the island was undersized, which helps inform future experimental treatments. Tamarack is currently on the State Impaired List.

VLAWMO Lake Grades:

Lake	2017	2018	TSI Status
Amelia	B+	B+	Eutrophic
Birch	B+	A-	Mesotrophic
Black	A-	B+	Mesotrophic
Charlie	C+	C	Eutrophic
Deep	C	C-	Eutrophic
Gem	B	B	Mesotrophic
Gilfillan	C	C	Eutrophic
E. Goose	D	D-	Eutrophic - Hypereutrophic
W. Goose	D	D-	Eutrophic - Hypereutrophic
Tamarack	D-	D-	Eutrophic - Hypereutrophic
West Vadnais	D-	D-	Eutrophic - Hypereutrophic
Wilkinson	C	C	Eutrophic

Definitions:

TSI: Trophic Status Indicator. The trophic status of a lake pertains to its nutrient levels, which helps assess lake health. TSI is calculated from monitoring data and converted into a lake grade for familiarity.

Oligotrophic: Low nutrient levels and abundant oxygen.

Mesotrophic: A moderate amount of dissolved nutrients, less than eutrophic waterbodies.

Eutrophic: Rich in nutrients, supporting a dense plant population and/or large algae blooms.

Hypereutrophic: Exceptionally high nutrient levels that risk low dissolved oxygen and prolific algae blooms, posing threat to fish and other aquatic life.

Eutrophication is the process of nutrient loading into a waterbody from the surrounding watershed (i.e. upland area).

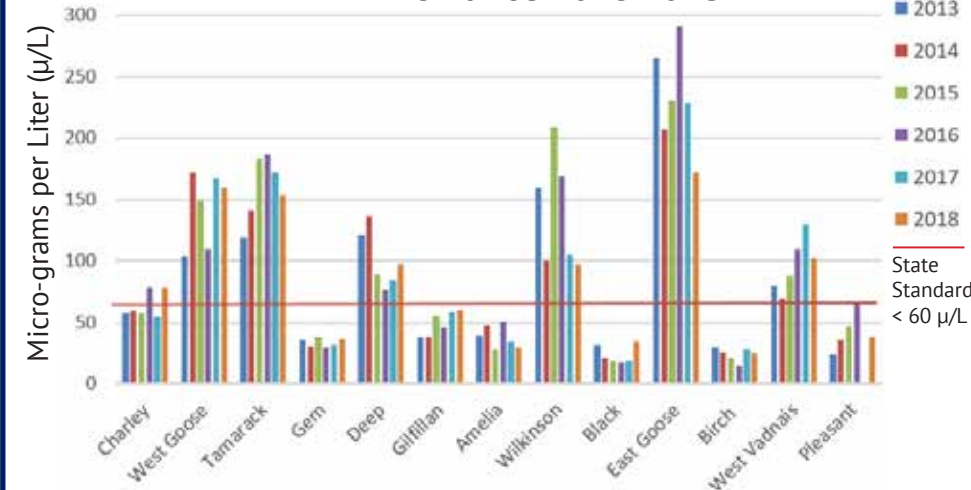
Eutrophication is a natural process that can be accelerated by human activity and is difficult to reverse.

Lake Summaries

Individual lake reports are available in the 2018 water monitoring report at vlawmo.org/reports

for more information. Visit vlawmo.org/waterbodies for more info, studies, reports, and lake fact sheets.

Average Total Phosphorus (TP) in VLAWMO Lakes 2013-2018



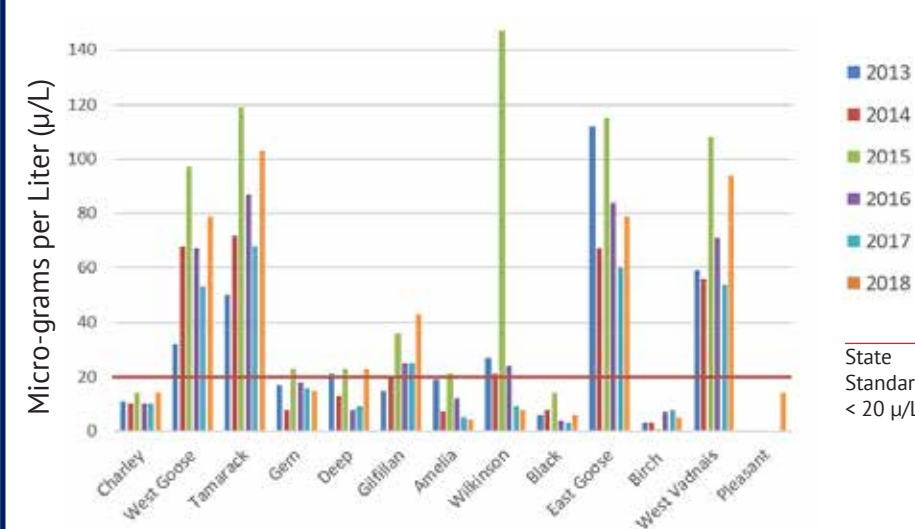
Phosphorus: What is it?

A naturally occurring nutrient. In water, phosphorus is a main driver of algae growth. 1 lb. of phosphorus can produce up to 500 lbs. of algae in a lake. Increased algae levels create a variety of lake issues, including low oxygen, poor light penetration, and reduced fish and wildlife habitat.

What the data says:

6 of our lakes exceed the State phosphorus standard.

Average Chlorophyll-A (Cl-A) in VLAWMO Lakes 2013-2018



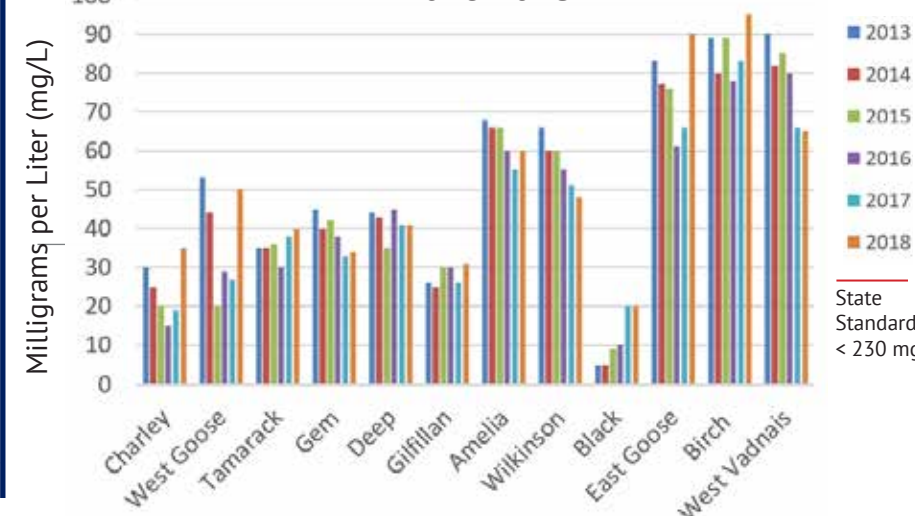
Chlorophyll-A: What is it?

A pigment that helps plants produce food. It is the green color found in algae and other plants. The concentration of chlorophyll present in the water is directly related to the amount of algae living in the water.

What the data says:

6 lakes of our exceed the State Chlorophyll-A standard. They are the same lakes that are high in TP, demonstrating the relationship between Cl-A and TP. For a lake to be listed as "impaired", it must show a trend in being above standards in 2 of the 3 readings: Cl-A, TP, and/or Secchi disk (turbidity).

Average Chloride (Cl) in VLAWMO Lakes 2013-2018



Chloride: What is it?

A common ingredient in de-icers such as sodium chloride (rock salt). Chloride is a permanent pollutant to water quality, requiring only 1 tsp. to pollute 5 gallons of water. Toxic to aquatic life, chloride also interrupts natural temperature and nutrient cycles in lakes.

What the data says:

We have no water bodies impaired for chloride. As water flushes through lakes, overall chloride level can drop over time. However, Birch, Black, and Gilfillan are showing gradual upward trends.