

WOLFE LAKE ASSOCIATION WESTPORT

Water Quality Report | 2025

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Introduction to Water Quality

Reference: <https://www.ec.gc.ca/eau-water/default.asp?lang=En&n=2C3144F5-1>

We usually think about water in terms of how we want to use it. A common question is: Is this water good enough for what I need it for? Water that is suitable for one use may not be suitable for another. For example, we might feel safe swimming in lake water but would not drink it. In the same way, drinking water can be used to water crops, but water used for irrigation may not be clean enough to drink. The quality of water determines what it can safely be used for.

Scientists look at water quality in a different way. Instead of focusing on specific uses, they study what substances are present in the water and in what amounts. These substances can be dissolved (like salts and minerals) or suspended (tiny particles floating in the water). Scientists are also interested in how these substances affect plants, animals, and the overall health of the ecosystem. The concentration of these substances is what defines water quality and its suitability for different purposes.

Even the cleanest rivers and lakes are not completely pure. All natural water contains some dissolved and suspended substances. These include common minerals and salts such as bicarbonates, sulphates, sodium, chlorides, calcium, magnesium, and potassium. These substances occur naturally and are usually harmless at low levels.

Many factors influence water quality. One of them is the air. Rainwater collects substances as it falls through the atmosphere. Dust, volcanic gases, and natural gases like carbon dioxide, oxygen, and nitrogen dissolve in rain. If the air contains pollutants such as sulphur dioxide, toxic chemicals, or lead, these can also be carried down to the ground in rainfall.

Once rain reaches the earth, it flows over the land and through soil and rocks. As it moves, it dissolves and picks up additional substances. For example, if the soil contains a lot of limestone, the water will collect calcium carbonate. If water flows over rocks rich in metals, it can dissolve and carry those metals. In the Canadian Shield, where there is little soil and few soluble minerals, rivers and lakes usually have very low levels of dissolved substances.

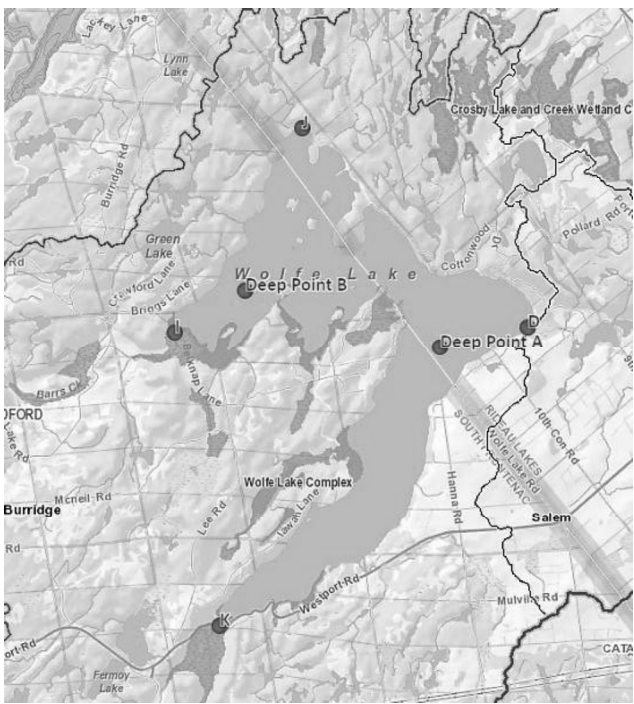
Water quality is also affected by runoff from cities and towns. As rain flows over streets and sidewalks, it picks up litter and other debris and carries it into nearby rivers and lakes. Urban runoff can increase levels of nutrients (such as phosphorus and nitrogen), sediments, animal waste, bacteria, petroleum products, and road salt. All of these can harm water quality.

Human activities like farming, industry, mining, and forestry also have major effects on water quality. Farming can add nutrients, pesticides, and soil particles to water. Industrial activities can increase levels of metals and toxic chemicals, raise water temperatures, and reduce the amount of oxygen in the water. These changes can damage aquatic ecosystems and make water unsuitable for drinking, recreation, or other uses.

Water Quality Sampling in Wolfe Lake

The water quality was tested by the Water Quality Director on 5 occasions in 2025. The water clarity (Secchi Disk depth) was measured and deep-water samples were taken at sites DP1 and DP3 on May 05, July 14, July 10, August 25 and October 02. The samples were analyzed for total nitrogen (TKN) and total phosphorus (TP) concentrations through the Lake Partner Program (Ontario Ministry of the Environment). Deep and shallow-water samples were also taken at several sites by the Rideau Valley Conservation Authority (RVCA). These were analyzed for a number of variables including TP, calcium, total nitrogen, E. coli and dissolved oxygen concentration. The laboratory results are summarized in Table 1. Figure 1 shows the map of the Wolfe Lake with sampling sites indicated.

Figure 1. Map of the Water Quality sampling sites



Results

Total Phosphorus (TP) and Total Nitrogen (TKN) are two of the main indicators of water pollution due to runoff from lake surrounding areas. The concentration of the E. Coli bacteria is another important indicator of water contamination released by the fecal material of human or animal origin.

The measured Secchi depth (SD) refers to the turbidity of the water caused by algae, pollen and sediments. Table 1 below displays the results of the water sampling and analyses.

Table 1: Results of the water sampling

Wolfe Lake 2025 Sampling Information								
Deep Point								
Round	Date Sampled	Site	Calcium (mg/L)	Carbon (mg/L)	E.Coli (CFU/100mL)	TKN (mg/L)	TP (mg/L)	Secchi (m)
1 (May)	2025-05-05	DP 1				0.3	0.007	5.5
		DP 3				0.2	0.002	5
2 (June/July)	07-14-2025	DP 1		5.5		0.3	0.015	6
		DP 2				0.3	0.046	
		DP 3		5.4		0.3	0.012	6.5
		DP 4				0.3	0.016	
3 (August/September)	08-25-2025	DP 1	26.4			0.3	0.01	6
		DP 2				0.3	0.01	
		DP 3	25.6			0.4	0.012	6.5
		DP 4				0.3	0.031	
4 (October)	2025-10-02	DP 1				0.3	0.004	6.25
		DP 2				0.5	0.024	
		DP 3				0.3	0.006	6.5
		DP 4				0.4	0.041	

Shoreline Samples								
Round	Date Sampled	Site	Calcium (mg/L)	Carbon (mg/L)	E.Coli (CFU/100mL)	TKN (mg/L)	TP (mg/L)	Secchi (m)
2 (June/July)	07-14-2025	A			38	0.4	0.022	N/A
		D			6	0.3	0.01	N/A
		I			5	0.4	0.018	N/A
		J			0	0.3	0.015	N/A
		K			22	0.4	0.029	N/A
3 (August/September)	08-25-2025	A			28	0.4	0.014	N/A
		D			0	0.4	0.014	N/A
		I			0	0.5	0.012	N/A
		J			0	0.4	0.016	N/A
		K			21	0.4	0.014	N/A

Water Quality Guidelines and Recommendations		
Type	Guideline Source	Guideline
Total Phosphorus (TP)	Provincial Water Quality Objective (PWQO) - Lakes	<0.020mg/L
TKN - Nitrogen	Secondary Indicator, Ministry of the Environment Recommended Guideline	<0.500mg/L
E.Coli	Provincial Water Quality Objective (PWQO)	<100 CFU/100mL

All measured concentrations are below the maximum standards, except for two deep water samples and a shoreline sample taken in July and October, as indicated in the Table.

Average Secchi Depth, and TKN and TP concentrations are consistent with the sampling results in the previous years. No concerning issues were detected.

Algae and Cyanobacteria Pollution

Many lakes across Canada have seen an increase in the occurrence of algal blooms. Algal blooms occur when phytoplankton (photosynthetic organisms including single-celled plants and cyanobacteria) grow rapidly because of changes to water conditions. Over-enrichment of lakes with nutrients such as Phosphorus and Nitrogen – a condition known as Eutrophication – can lead to excessive phytoplankton growth, and declining water quality. Additional factors such as water temperature, sunlight, and wind mixing play important roles in the onset, duration and severity of algal blooms.

Algal blooms can become a nuisance or potentially harmful. Some cyanobacteria can produce toxins that pose a risk to human and animal health. Decomposing blooms can lead to hypoxic (oxygen-deficient) conditions. Economic impacts of algal blooms can occur in the form of potential depletion of fishery stocks, losses to tourism/recreation, as well as additional requirements for monitoring and water treatment. (<https://www.canada.ca/en/environment-climate-change/services/water-overview/satellite-earth-observations-lake-monitoring/remote-sensing-algal-blooms.html>)

Our Director Water Quality took photos of strange agglomerations of slimy matter floating near the shoreline. (See **Figure 2** below)

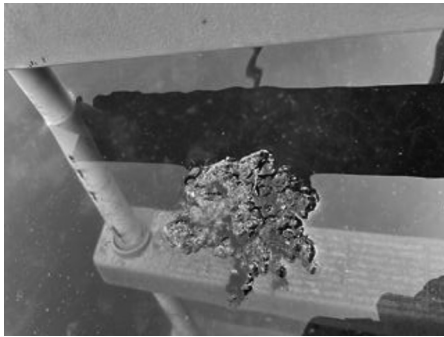


Figure 2. Bacterial or algal agglomerate found at the shoreline of Wolfe Lake

The pictures were then sent to RVCA and University of Ottawa for examination. It was suggested that the agglomerates may be of benthic (bottom) cyanobacterial origin. Cyanobacteria can produce toxins which presents concern for human health. Should these agglomerates reappear in larger quantities, Dr. Francis Pick (University of Ottawa) recommends forwarding the matter to the Ministry of the Environment, Conservation and Parks' Spills Action Centre (1-800-268-6060) for testing. This number is for residents only as there is confidentially attached to it. If needed they will notify their local office to come and take a sample for testing. The results of this testing will be forwarded to the health unit to determine next steps if required. Please keep the Director Water Quality (gordon.moore@kingston.net) in the loop.

Another suggestion concerns decaying vegetation or green algae. These would not present human harm but can be unsightly. There are various forms of algae and vegetation present in several lake ecosystems, but they are a part of the natural cycle of the lake and play a role (H. Matschke, RVCA).

Satellite remote sensing is an effective method for monitoring of the unwanted algae bloom. A-MAPS Environmental Inc. collected many satellite images of algae, sediment and weed distributions across Wolfe Lake in the period 2013-2018. An example is shown below. No excessive phenomena, such as large floating patches, were observed.

Figure 2. Example of algae/chlorophyll distribution patterns

