

Harmful Algal Blooms

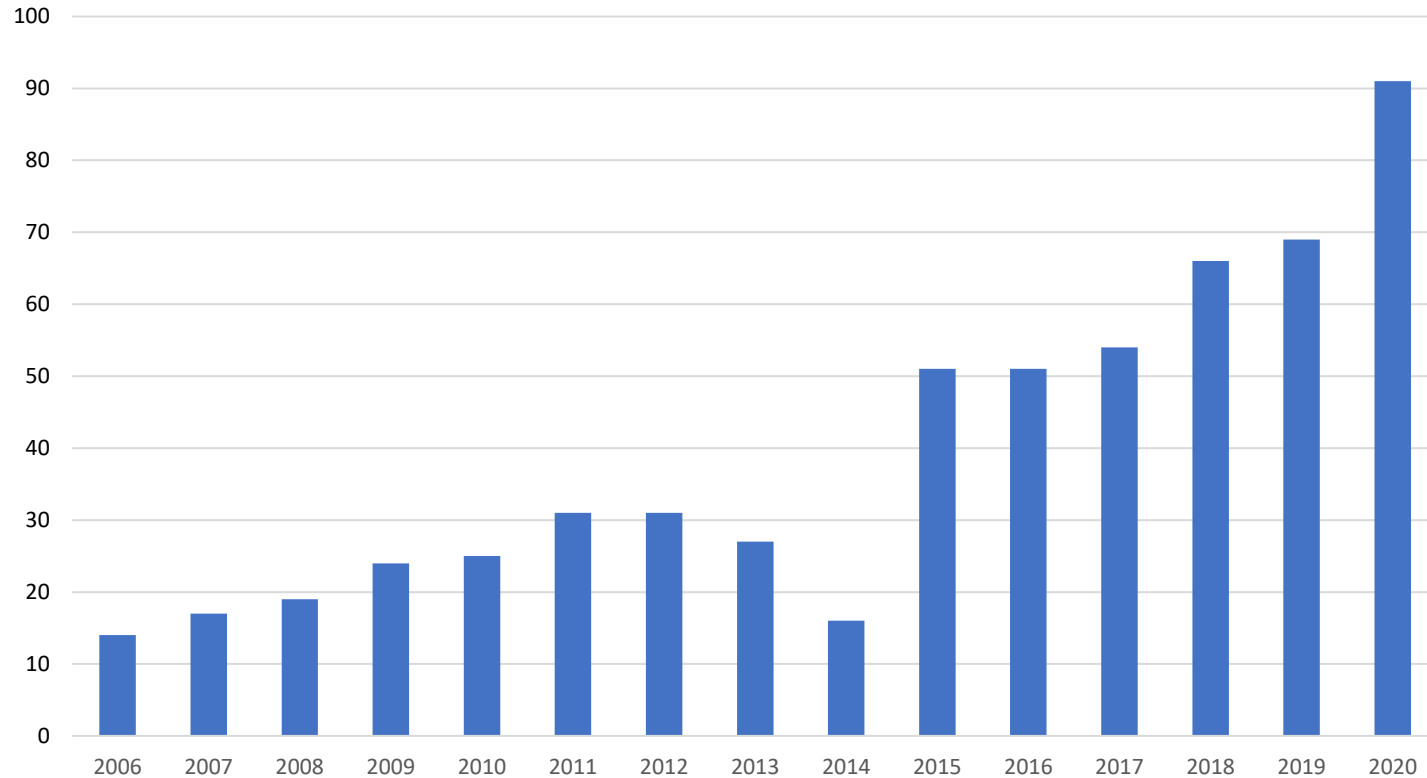
Due to the concern of health risks to humans and animals associated with algal blooms, all reports of potential algal blooms are a priority issue for this Ministry.

Any cyanobacterial bloom is regarded as being potentially toxic.

Eastern Region is the lead for the response procedure for reports of Harmful Algal Blooms (HABs) for the Province of Ontario.



Number of Confirmed Harmful Algal Blooms in the Province



The frequency in the number of confirmed Harmful Algal Blooms is increasing.

The highest number of HABs occurred in 2020 (91).

There were 90 confirmed blooms in the Province in 2021.

The majority are in Northern Region followed by Eastern Region.

What are algal blooms

Algae are an essential component of a healthy aquatic food web. Blue-green algae has been in surface waters pre-humans

Excessive growth of algae under favorable environmental conditions can result in the formation of an algal "bloom"

When are algal blooms a cause for concern

Harmful Algal Blooms (HABs) are blue-green algae containing cyanotoxins, in sufficient concentrations, to cause bloom conditions.

Not all blue-green algae are toxin producing (cyanotoxins)

Cyanotoxins can cause skin and eye irritation and if ingested in large quantities can cause flu-like symptoms and are potentially toxic to humans, wildlife, livestock and pets



A “bloom” is defined as -

“the excessive growth of one or more species of algae”

- **Conditions favourable for the formation of an algal bloom:**
 - sufficient levels of nutrients in the water and sediments
 - calm weather
 - strong sunlight
 - high air & water temperatures
- these conditions usually occur from mid summer to late fall
- Blue-green algal blooms are **usually** relatively easy to identify visually - it has the appearance of florescent lime green paint on the water surface and smells like freshly cut grass





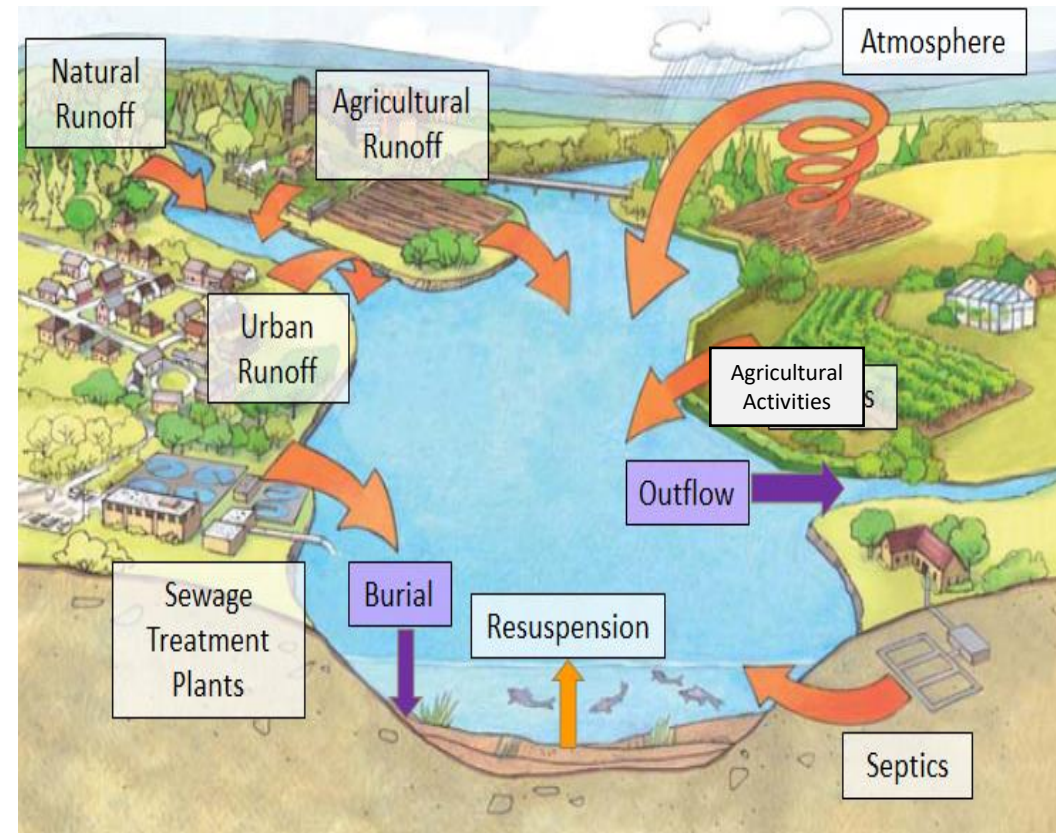
- **Aesthetic issues**
- blooms can produce unpleasant tastes & odours
- decomposing algae can cause shoreline fouling
- blooms may impact recreational activities & property values
- **Human health issues**
- algal toxins can impact humans (drinking water, skin)
- toxins can also impact our pets, livestock, waterfowl & other animals
- **Drinking water & industrial water use issues**
- blooms can impact maintenance or treatment for water taking
- taste & odour can affect public perception of drinking water safety
- small systems with modest treatment facilities may not be able to effectively treat water during blooms

Factors influencing algal blooms

Phosphorus is the primary nutrient that promotes algal blooms in freshwater

Phosphorus

- Occurs naturally on land and in all lakes and rivers and is **essential** for plant and animal life.
- Inputs to lakes and rivers are increased by human activities.
- TP comes from point (e.g., sewage treatment plants) and non-point sources (e.g., agricultural and urban stormwater run-off, faulty sewage systems, fertilizing lawns)
- The link between phosphorus loads and levels in a lake is complex.



Reducing excess phosphorus is a necessary step to improving the health of an over-enriched system, but it is not the only factor that influences algal bloom formation. Weather, geomorphic features such as depth and flushing rates also influence water quality.



Phosphorus and Upper Rideau Lake

The Total phosphorus concentration is used to interpret the nutrient status in Ontario lakes. Phosphorus is the element that controls the growth of algae in most Ontario lakes. Increases in phosphorus stimulates algae growth decreasing water clarity.

Limnologists place lakes into three broad categories with respect to nutrient status.

Lakes with less than $10 \mu\text{g/L}$ TP are considered oligotrophic. These are dilute, unproductive lakes that rarely experience nuisance algal blooms (lake trout lakes such as Big Rideau Lake).

Lakes with TP between 10 and $20 \mu\text{g/L}$ are termed mesotrophic and are in the middle range with respect to trophic status. These lakes show a broad range of characteristics, they tend to be more productive yet can also be clear and unproductive.

Lakes over $20 \mu\text{g/L}$ are classed as eutrophic and may exhibit persistent, nuisance algal blooms.

The average Total Phosphorus Concentration for Upper Rideau Lake in May (2012-2016) sampled at Narrow's Locks was $17.58 \mu\text{g/L}$. This places URL in the category at the higher end of the mesotrophic status.

Compliance is difficult and complicated when dealing with algal blooms (ie. often there is no direct pipe), the response to reports of HABs is about clear communication and following procedure.

Ensuring adherence to the Ministries Standard Operating Procedure ensures that all stakeholders are engaged throughout the process and risks are managed to ensure public health and safety.

The Ministry of Environment, Conservation and Parks' role is to gather, assess and provide basic scientific and technical information.

Information is provided to Health Units in a timely fashion.

The Health Unit is responsible for making decisions as to whether notification of the public is required and what actions should be taken.



Key role for MECP is to confirm if a HAB is present and obtaining a sample is the only way to confirm if toxins are present

Steps :

- Report is received that a bloom is suspected
- If it is determined a site visit is warranted, samples are collected and observations recorded.
- Samples are sent to MECP's LaSB for algal identification to confirm presence/absence of a bloom of algae with toxin potential, quick turn around 1-2 days
- Sample then sent for ELISA screening for total toxins in the sample, turnaround to receive results within 7-10 days
- Samples then sent for concentrations of Microcystin variants e.g. microcystin-LR and Anatoxin-a
- Each sample result is distributed to the HU and Complainant in a very timely manner as received

EMRB tracks HABs throughout the Province, an Algae Tracker App was developed allowing EO's a quick snapshot of a history of blooms on a lake in Ontario



Strategies to Minimize Impacts to the Lake

- Minimize water use.
- Do not use fertilizers or pesticides on lawns and gardens.
- Maintain natural vegetation as ground cover or shrubs instead of a lawn. This will capture nutrient loadings to the lake and minimize runoff and erosion of shorelines.
- Create areas that encourage infiltration (e.g. rain gardens, infiltration trenches (instead of gutters) grassed swales, vegetated filter strips
- re-establish a minimum 3m wide, natural vegetative shoreline to buffer runoff to the lake that helps capture nutrient loadings and protect fish habitat and other species
- Reduce lot grading and limit the creation of impervious surfaces towards the lake
- Use phosphate-free, chlorine-free and biodegradable soap, shampoo, household cleaning products and detergents





In the event of a suspected blue-green algal bloom, the public is advised to avoid using the water and report the incident to the Ministry's Spills Action Centre



Call 1-800-268-6060

