

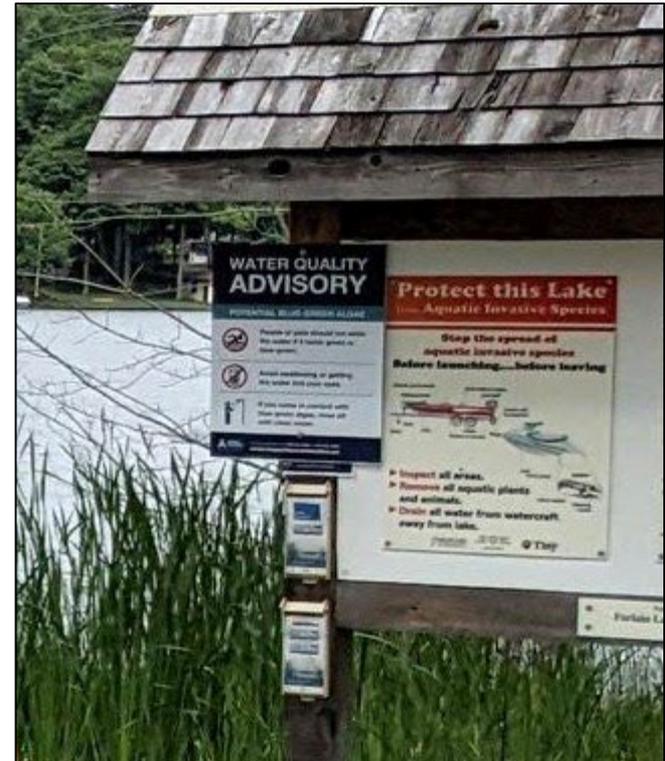


# Update on Conditions on Farlain Lake

Aisha Chiandet, Water Scientist  
Severn Sound Environmental Association  
Township of Tiny Council Meeting  
August 31, 2022

# Outline

- Blue green algae – what is it?
- Update on bloom conditions on Farlain Lake
- Agency roles & responsibilities
- Conditions contributing to blooms
- Reducing nuisance algae growth



# What is Blue Green Algae?

Algae → Microscopic, single-celled plants

- Ancient and highly diverse life form
- Forms the base of aquatic food webs, produces oxygen
- Five major groups in freshwaters:
  - Green algae, diatoms, red algae, dinoflagellates, golden algae & **blue green algae**

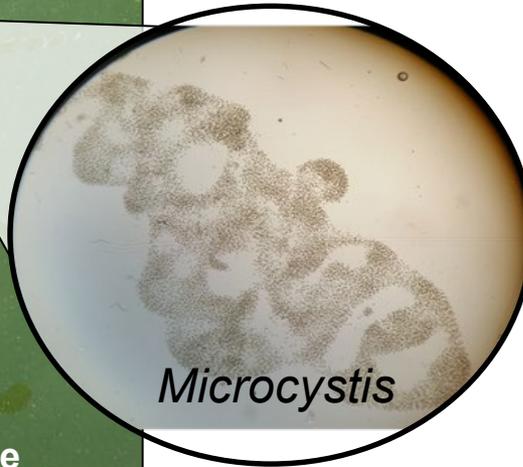
**Blue Green Algae → aka Cyanobacteria**

- Actually a kind of bacteria that can photosynthesize
- Can live suspended in water (phytoplankton) or on the lakebed (benthic), then move up to the surface
- Some blue-green species can produce toxins
- Toxin production is difficult to predict – not all blooms contain toxins, but best to assume toxins present until testing shows otherwise
- Report suspected blue-green blooms to the Spills Action Centre:  
**1-866-MOE-TIPS (663-8477)**



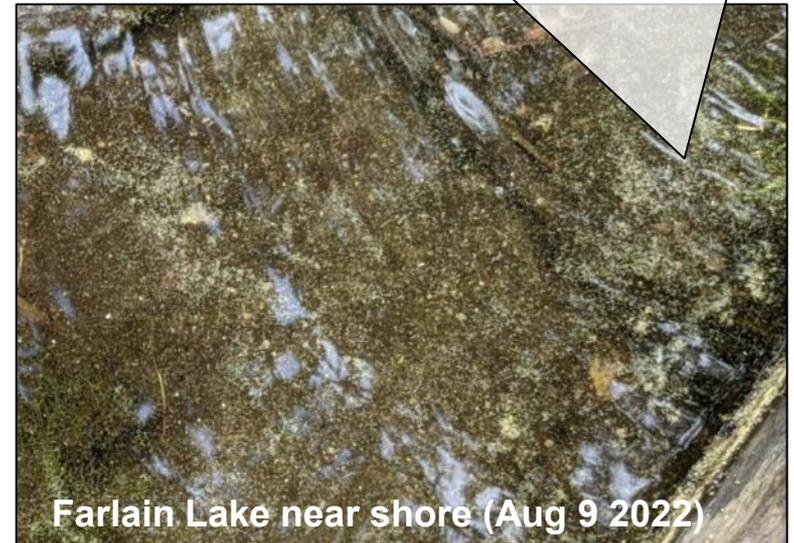
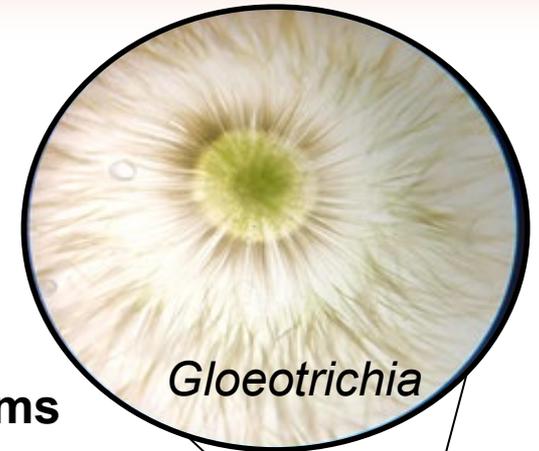
# Appearance of Blue Green Algae Blooms

## Blooms mixed in water column



- Blooms mixed throughout the water column more difficult to visually identify
- Water can look cloudy and greenish, or greenish with larger specks that may look white, yellow or blueish-green

## Surface blooms

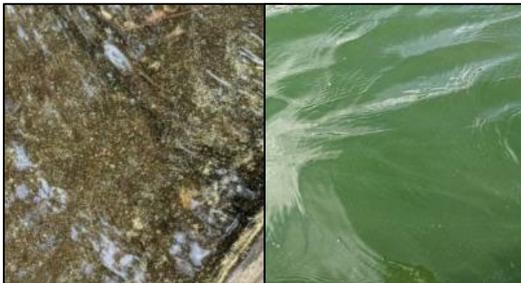


- Surface blooms can take different forms, e.g. spilled paint, fingernail clippings, green peas

# Blue Green Algae Bloom on Farlain Lake

- Bloom observed during SSEA sampling Jul 26, 2022 – reported to Ministry of Environment, Conservation & Parks (MECP)
- MECP sampled Jul 27 at 2 locations (southeast & southwest)
  - Taxonomic analysis - confirmed presence of 3 main types at SE and SW sites, all with the ability to produce toxins: *Gloeotrichia* sp., *Microcystis aeruginosa*, *Dolichospermum* sp.
  - Toxin analysis - 2 major toxin groups → anatoxin was < detection limit and total microcystin was < recreational contact limit (20 µg/L) but > drinking water limit (1.5 µg/L)
- Resampled Aug 3 at 3 locations, (southeast, southwest & north)
  - Taxonomic analysis - N was clear of a bloom, SE & SW samples not ID'd
  - Toxin analysis – total microcystin levels were detected for all 3 samples but at very low levels (<0.2 µg/L)

Large floating specks observed near and off shore



*Gloeotrichia*



*Microcystis*

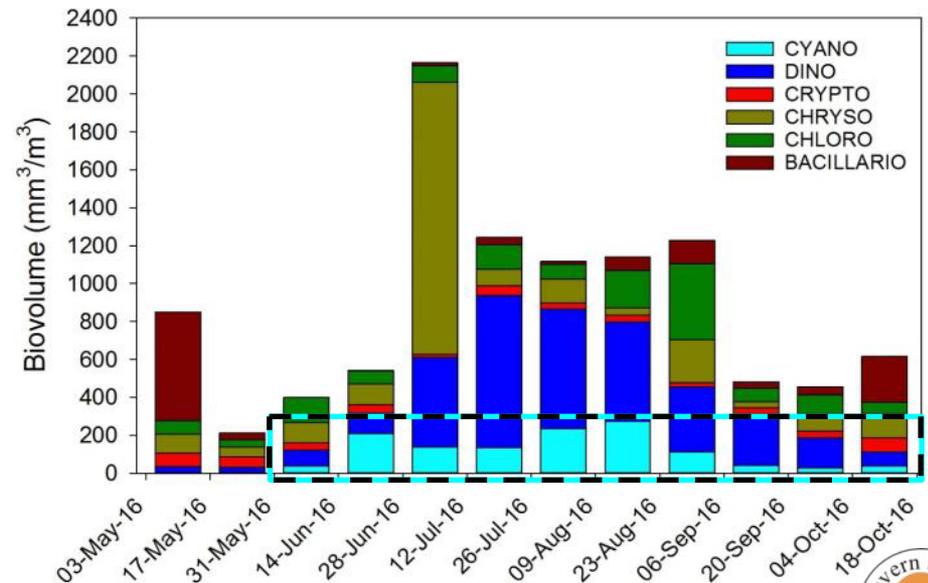
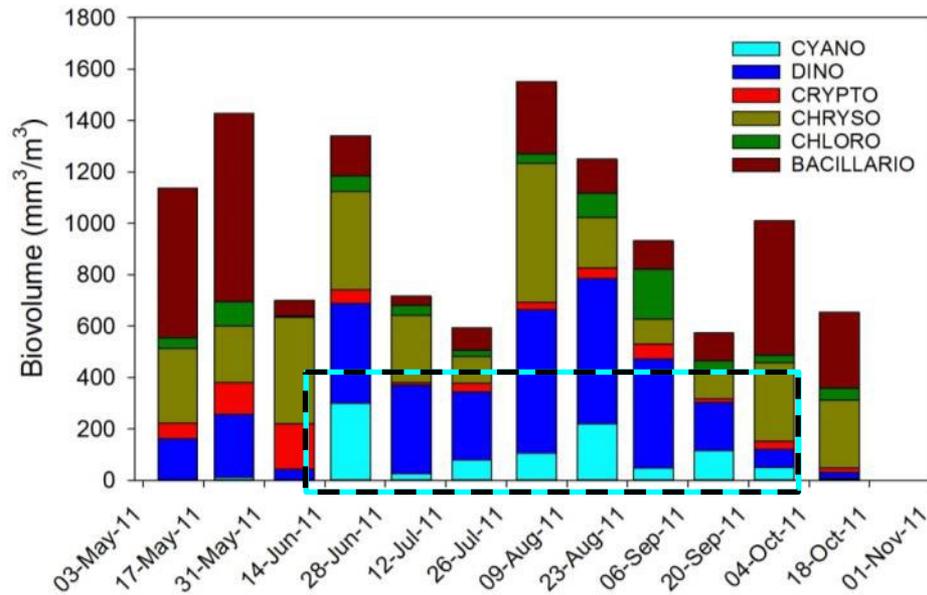


*Dolichospermum*



# Algae Communities from Past Surveys

- Total biovolume of blue green algae highest in early to late summer
- Proportion of algae biovolume made up of blue green algae reached nearly 40%
- 2 of the species (*Microcystis* and *Dolichospermum*) identified in 2022 bloom were present in 1996, 2011 and 2016
- *Gloeotrichia* present in tiny amounts in 2016; population may be increasing



# What Now? Agency Roles & Responsibilities

- Ministry of Environment, Conservation and Parks
  - Protocol after toxins are detected is to resample in the fall
  - Communicate results to Township, SMDHU and SSEA
- Simcoe Muskoka District Health Unit
  - Based on MECP toxin testing, decide when to lift the water quality advisory
  - Communicate information regarding advisory to Township and public
- Township of Tiny
  - Continue to communicate updates regarding water quality advisory and SSEA sampling results to residents
- SSEA
  - Continue biweekly sampling and observing algae conditions (sampling scheduled Sept 7, Sept 20 and Oct 4)
  - Update MECP on algae conditions
  - Communicate SSEA sampling results to residents and Township
  - Assist in communicating updates regarding water quality advisory to residents
  - Report on results of water quality survey
- Farlain Lake Community Association
  - Considering additional toxin testing using private lab, under SSEA/MECP/SMDHU guidance
  - Assist in communicating updates regarding water quality advisory and SSEA sampling results to residents



# SSEA 2022 Water Quality Survey

- Sampling done every 2 weeks from May-Oct (12 runs)
- Water chemistry: nutrients, ions, general characteristics

water  
sampling  
– inflowing  
stream



water/algae  
sampling –  
lake



zooplankton  
sampling



- Algae and zooplankton: identification & biomass
- Water clarity measured using a Secchi disk
- Profile data: temperature, conductivity, dissolved oxygen and pH recorded at 1m depth intervals



profile data  
collection



recording  
profile data



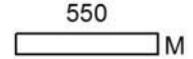
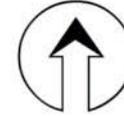
Secchi  
disk

# Legend

- Water Quality Sampling Station
- Drainage
- ★ Blue green algae sample sites

# Farlain Lake Study

## 2022

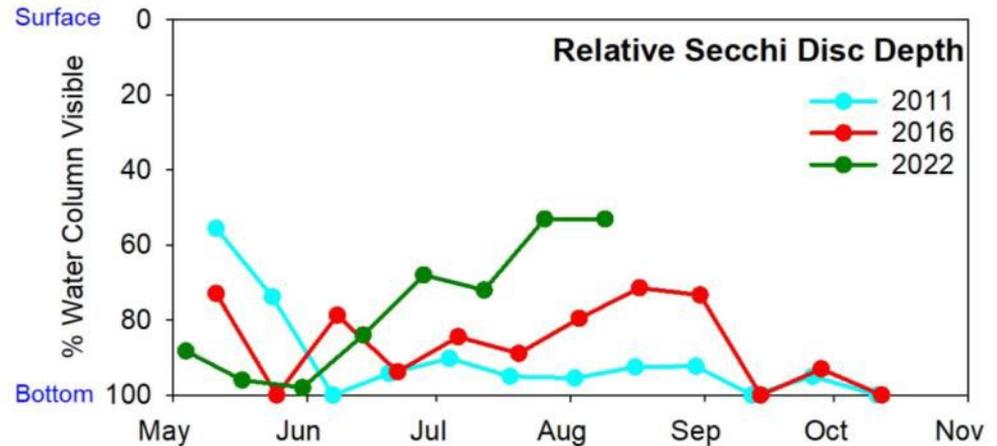
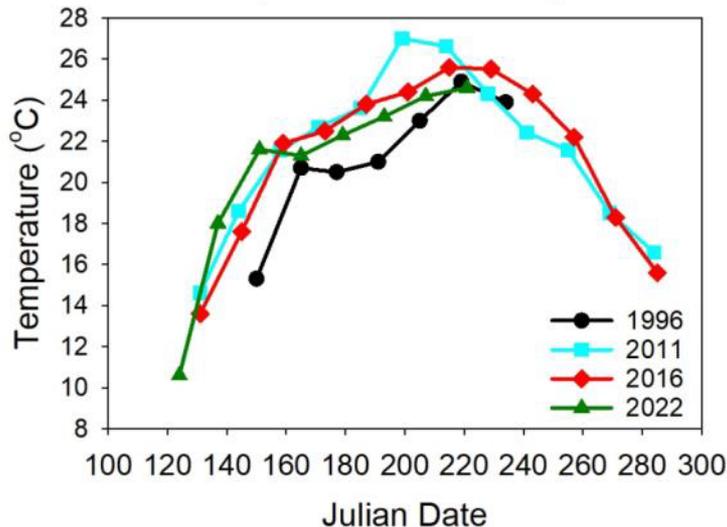


Produced by the Severn Sound Environmental Association with Data supplied in part from the County of Simcoe, the Ontario Ministry of Natural Resources ((c) Queen's Printer 2017) and under License with Members of the Ontario Geospatial Data Exchange, 2017

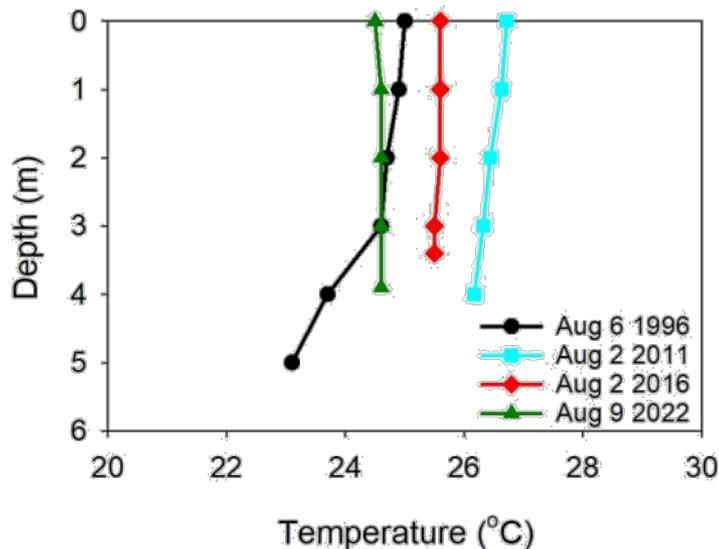


# How Does 2022 Compare to Past Years?

Temperature at 1m Depth



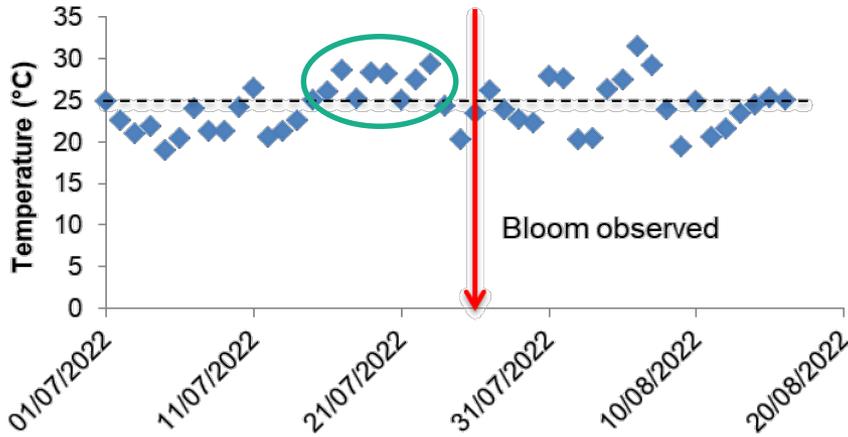
August Temperature Profiles, FL1



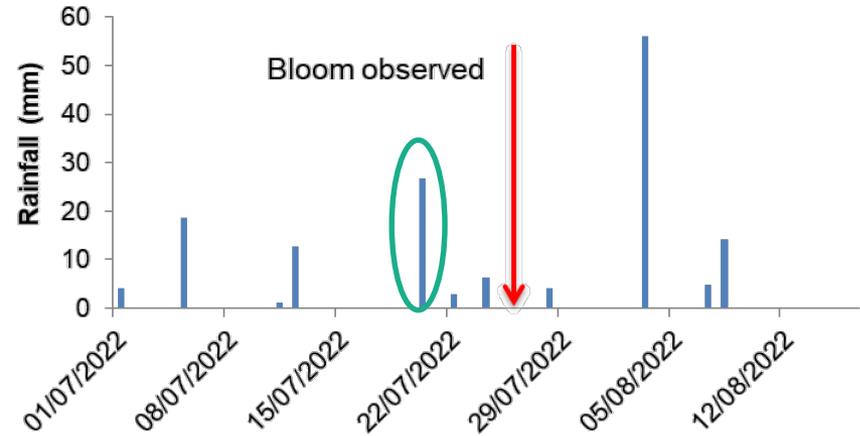
- Start of season was warmer compared to past surveys
- Depth profiles show no sign of temperature layering or oxygen depletion
- Water clarity lower than in previous surveys

# Climate Factors in Bloom Formation

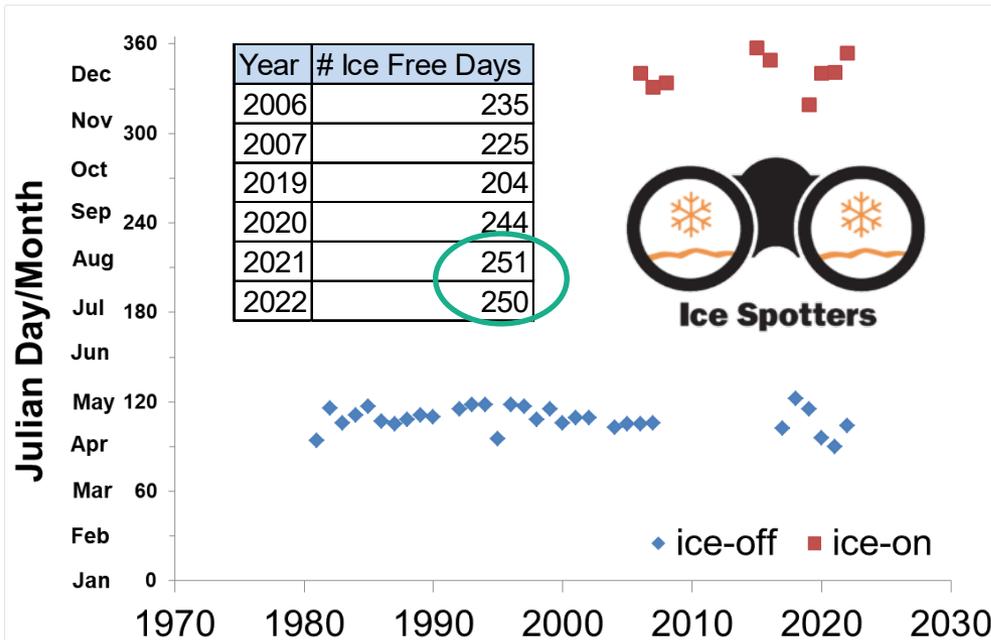
## Maximum Daily Air Temperature



## Total Daily Rainfall



Climate data from SSEA weather station in Lafontaine



- Conditions leading up to the bloom event (rainfall, heat wave, sunny and calm winds) may have been contributing factors
- More ice free days in recent years – longer growing season

# Trends in Productivity of Farlain Lake

Indicator	Trend Dir. <sup>‡</sup>	1996 Avg.	2011 Avg.	2016 Avg.
Total phosphorus	↔	11.6 µg/L	8.8 µg/L	8.7 µg/L
Total Kjeldahl nitrogen	↔	593 µg/L	388 µg/L	413 µg/L
Water clarity	↓	2.7 m	3.7 m	3.9 m
Chlorophyll <i>a</i> *	↓	3.7 µg/L	-	-
Total algae biovolume	↔	1362 mm <sup>3</sup> /m <sup>3</sup>	1064 mm <sup>3</sup> /m <sup>3</sup>	1005 mm <sup>3</sup> /m <sup>3</sup>

↔ No change    ↑ Increase    ↓ Decrease

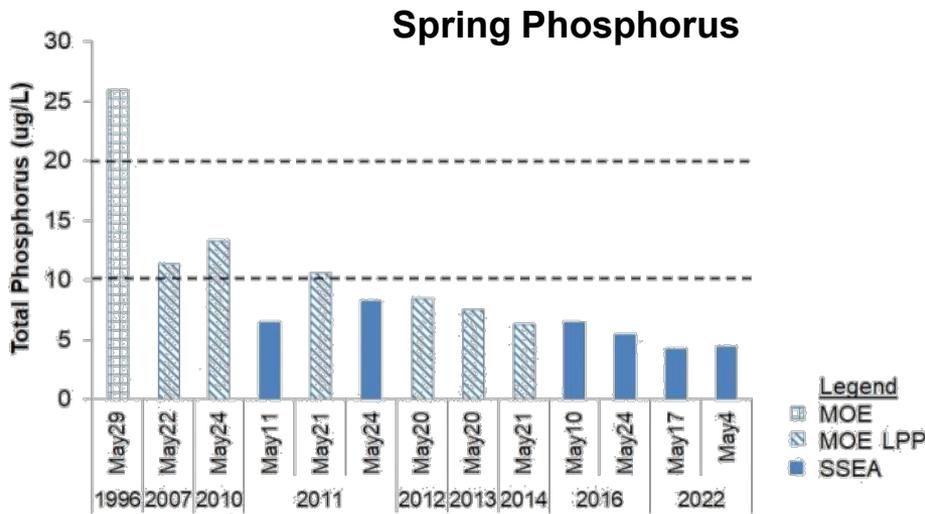
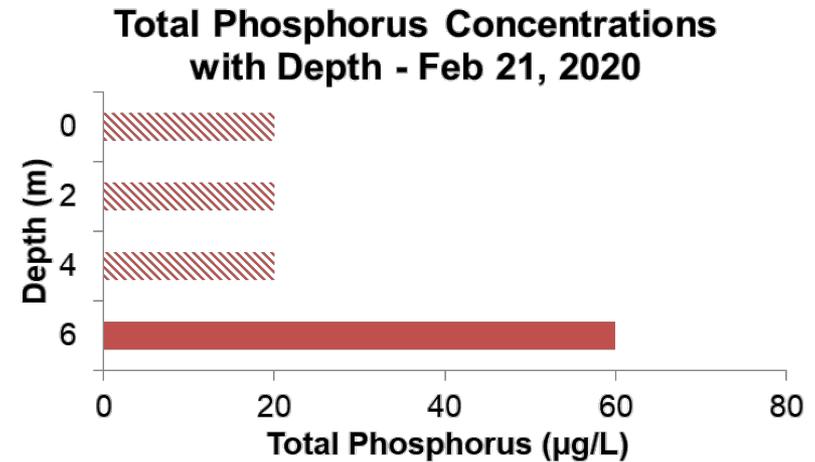
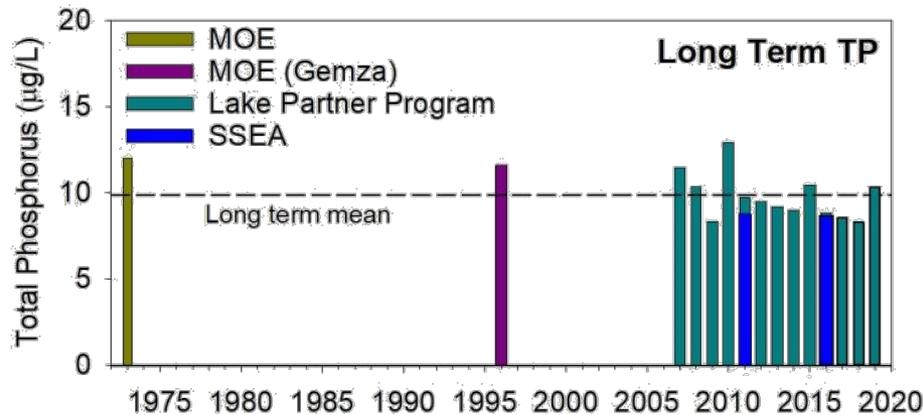
- Values for these indicators place Farlain Lake in the **mesotrophic, or moderately** enriched category

<sup>‡</sup>Includes all available data, some back to 1973

\*Last year of data was 1996

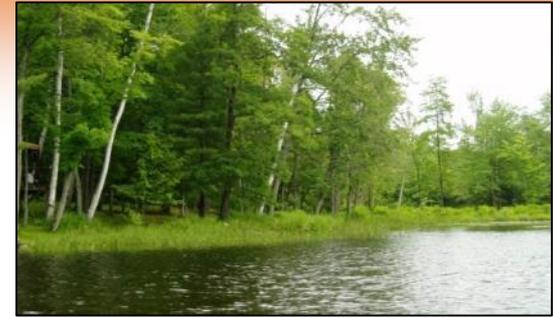


# Nutrients - Total Phosphorus



- Long term annual averages show no significant trend, overall avg in nutrient poor range (<10 µg/L)
- Low spring phosphorus in recent years, incl. 2022
- BUT under ice sampling in 2020 showed layer of high TP near lake bed
  - *Gloeotrichia* begins lifecycle in sediment
  - This could be fueling growth of blue-green algae that can take advantage of this P

# Reducing Nuisance Algae Growth



Example of a natural shoreline

- Phosphorus is the key nutrient controlling growth - limiting nutrient inputs will help to control blooms
- **Maintain septic systems** with regular pump-outs (approx. 3-5 years) and inspections and reduce septic output using water conserving techniques
- **Eliminate fertilizer use**, especially within 100m of the shoreline
- **Maintain a natural shoreline** (minimal/no lawn, wide buffer of native shoreline plants)
- **Reduce runoff and soil erosion** by planting or maintaining vegetation in vulnerable areas such as adjacent to cleared pathways and on steep hills, and minimize hardened surfaces, and **reduce boat wakes**
- **Encourage native rooted aquatic plant growth** along the shoreline to help with sediment settling and phosphorus uptake
- **Do not restrict natural water circulation** around docks etc.
- **Avoid transporting invasive species** in/out of the lake

# Summary

- Blue green algae are important part of lake ecosystem but can occur in excess amounts and produce toxins
- Farlain L is currently experiencing a bloom of 3 main species
  - Toxin levels have decreased since initial bloom detection
  - MECP will resample in fall
  - Lake has experienced blooms of other species in the past
- Conditions that lead to bloom likely related to legacy nutrients in sediment, climate conditions, reduced ice cover and increasing population of *Gloeotrichia*
- Likelihood of blooms expected to increase with climate change effects and continued nutrient inputs
- Property owners can take steps to reduce further nutrient inputs

# Thank-You to Our Partners!

Special thanks to Tiny Township:



TOWNSHIP OF / CANTON DE  
**Tiny**



Township of  
**Springwater**



Our external partners:

Ministry of Environment, Conservation  
and Parks

Ontario



**FARLAIN LAKE**  
COMMUNITY ASSOCIATION

Resources:

[Algae Quick ID sheet](#)

[Algae in Severn Sound Area YouTube video](#)

[Simcoe Muskoka District Health Unit – Algae Page](#)

[Minimize Your Impact and Protect Your Shoreline](#)

[Citizen Science in Severn Sound: 2020 Data Report](#)

[Citizen Science in Severn Sound: 2021 Data Report](#)

**Algae in Severn Sound Area Lakes:  
Quick Identification & Reporting Tips**

**What is Algae?**

- Microscopic, single-celled plants
- Exist as single cells, or as groups of cells in colonies and filaments
- Can live suspended in water (phytoplankton) or attached to rocks (periphyton) or plants (epiphyton), or grow as macro algae (barn-like, anchored in lake sediment)
- Vital component of aquatic food web
- Respond to light, nutrients and water temperature, and can grow in abundance under harmful algal blooms

**Algae Types**

- In the Severn Sound area, six major groups are commonly found in local lakes: Blue-Green algae, Green algae, Diatoms, Charophytes, Dinoflagellates, and Cryptomonads
- Algae can take many different forms:
  - Free floating or Surface films (single cells & colonies)
  - Attached or floating filaments & colonies
  - Macro algae (leaf-like)
- The same type of algae can occur in multiple forms (e.g. free floating and not floating)
- Most algae are non-toxic, however some species of Blue-Green algae can produce toxins that are harmful to humans and animals
- This ID card will help you distinguish between common forms of Blue-Green and Green algae, and common look-alikes

**Blue Green Algae**

 Fingernail clippings	 Floating bluish specks	 Stick
 Floating peels	 Stick	 Frog skin

**Visual clues for different types of Blue Green algae:**

- Bright bluish green colour
- Fluffy slick or floating scum
- Fingernail clippings
- Peels
- Frog skin
- Can have strong odour

**Can produce toxins**

**Visual clues for different types of Blue Green algae (continued):**

- If you suspect a Blue Green algae bloom:
  - Call the Ministry of Environment Conservation and Parks Spills Action Centre: 1-800-MALTS-TRIPS
  - Assume toxins are present and avoid using, drinking, bathing or swimming in the water, and restrict pet and livestock access to the water (note: bathing does not get rid of toxins)
  - Contact the Simcoe Muskoka District Health Unit for information on health risks

**Resources**

- Provincial Blue Green Algae Fact Page - [www.ontario.ca/page/blue-green-algae](http://www.ontario.ca/page/blue-green-algae)
- Blooms in Simcoe-Muskoka Area - [www.simcoemuskokahealth.com/ToxicSubstances/SevernSoundArea](http://www.simcoemuskokahealth.com/ToxicSubstances/SevernSoundArea)
- Algae in the Severn Sound Area - [www.severn-sound.com/severn-sound](http://www.severn-sound.com/severn-sound)

