



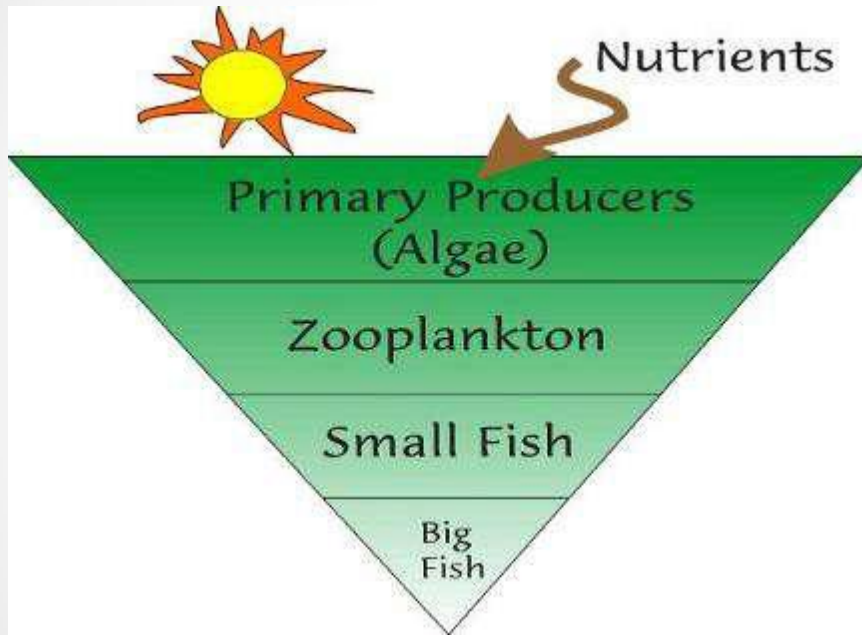
Heavily Adapted from:  
MOE Fact Sheets  
and  
Algae Blooms in  
Ontario's Lakes:  
Analyzing the trends  
Jenny Winter,  
Ministry of the  
Environment

# What are Algae?

- Small, mostly microscopic plants
- Live in virtually all water bodies
- Free floating, some attached to rocks, lake bottom, etc.
- Thousands of species
- Many different habitats and habits
- Similar to other terrestrial plants in that they require nutrients and light and they grow better when it is warm



# What are Algae?



- Algae are an important part of lake food webs
- Necessary part of ecosystem integrity
- Influence our atmosphere by producing oxygen and converting carbon into organic compounds

# Algal Blooms



- A “bloom” is the excessive growth of one or more species of algae (including cyanobacteria)
- Blooms can...  
Impact the appearance of water, result in unpleasant tastes or odours, reduce water clarity, colour the lake a vivid green, brown, yellow, or red, deplete oxygen levels, may produce toxins (cyanobacteria)
- Less likely to occur in deep lakes with lower total phosphorus (TP)
- Most occur in shallow lakes or bays with moderate to high amounts of total phosphorus

# Algal Blooms

## Filamentous Green Algae

- do not produce toxins
- e.g., *Cladophora*, *Spirogyra*, *Zygnema*, *Mougeotia*



## Golden algae (chrysophytes)

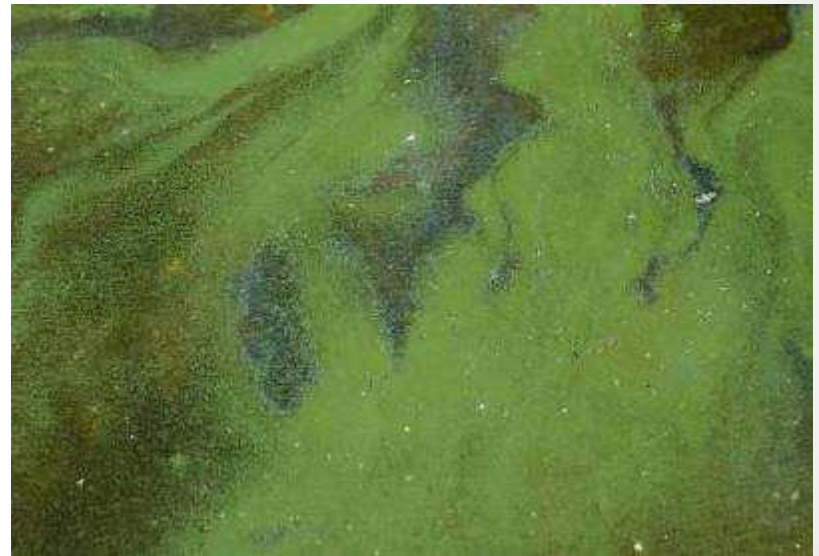
- found in low nutrient lakes
- becoming a dominant member of the algal community in lakes throughout Ontario
- cause taste and odour in water





# Blue-green algae (cyanobacteria)

- Have inhabited the earth for over 2 billion years
- Are a type of photosynthetic bacteria (the term algae is applied because of their ecology)
- Inhabit a wide variety of environments
- Under favourable conditions can rapidly reproduce to form a bloom





# Blue-green algae (cyanobacteria)

- Toxins which are formed at all stages of the organisms' growth are released to the surrounding water upon the cell death.
- Toxins can affect the health of humans, livestock and household pets.
- Although there are relatively few reports of human illness, these toxins can induce symptoms such as fever, diarrhea, abdominal pain, nausea and vomiting.
- External contact during recreational activities, such as swimming, boating or water skiing is more common and may result in itchy, irritated eyes and skin.

# Blue-green algae (cyanobacteria)

Bloom forming conditions include:

- sufficiently high levels of nutrients (water or sediments)
- calm weather
- strong sunlight
- high air and water temperatures
- relatively shallow water.

These conditions usually occur from mid summer into fall.





# Climate change and algal blooms

**“Nutrient overenrichment... has promoted the growth of cyanobacteria... Climate Change is a potent catalyst for further expansion of these blooms”**



**Paerl & Huisman (2008) Blooms like it hot. *Science*. 320 (5872): 57-58.**

# Algal bloom response

## **MOE Response Reference Guide**

- Ensures communication and collaboration among the various stakeholders
- MOE role is to gather, assess and provide basic scientific & technical information with which the Health Unit can assess risks to humans
- Health Unit makes decisions as to what actions should be taken

# Who Do You Call?

If I see a bloom and suspect it's blue-green algae, what immediate actions should I take?

It is best to be cautious. **If you suspect a blue-green algae bloom**, assume toxins are present, avoid using the water and call the **Ministry of the Environment Spills Action Centre at 1-800-268-6060**.

For more information on blue-green algae contact the Ministry of the Environment's

- **Public Information Centre at: 1-800-565-4923**

# Should I be concerned about blue-green algae?

Yes, you should be cautious, particularly during an algae bloom. Although many forms of blue-green algae are relatively harmless, some forms produce toxins which can be harmful to your health and the health of your animals. **The most common toxins are called microcystins.**

Symptoms of human health effects from contact with these toxins can include:

- itchy, irritated eyes and skin if you swim in contaminated water; and
- if the toxins are swallowed, symptoms such as headaches, fever, diarrhea, abdominal pain, nausea and vomiting.

However, if swallowed in large quantities more serious health effects may occur.

## How much Microcystin is allowable in drinking water under the Ontario Drinking Water Quality Standards?

The current Ontario Drinking Water Quality Standard for microcystin-LR, is a concentration of 0.0015 mg/L (which is the same as 1.5  $\mu\text{g/L}$  or 1.5 parts per billion).

Under Health Canada's *Interim* Guideline for recreational exposure to microcystins (20 micrograms/litre) or 20 parts per billion.



# Reducing the health risks is easy

Follow the advice of the local Health Unit.

Avoid activities that increase the chance of exposure to these algae toxins in the event of an algae bloom:

- **Do not drink, bathe or shower in untreated water.** Do not allow children, pets and livestock to drink or swim in the water;
- **Do not use herbicides, copper sulphate or other algaecides** that may break open algae cells and release toxins into the water;
- **Do not boil the water.** Boiling water may release more toxins into the water;
- **Do not cook with the water.** Your food may absorb toxins from the water;



# Reducing the health risks is easy

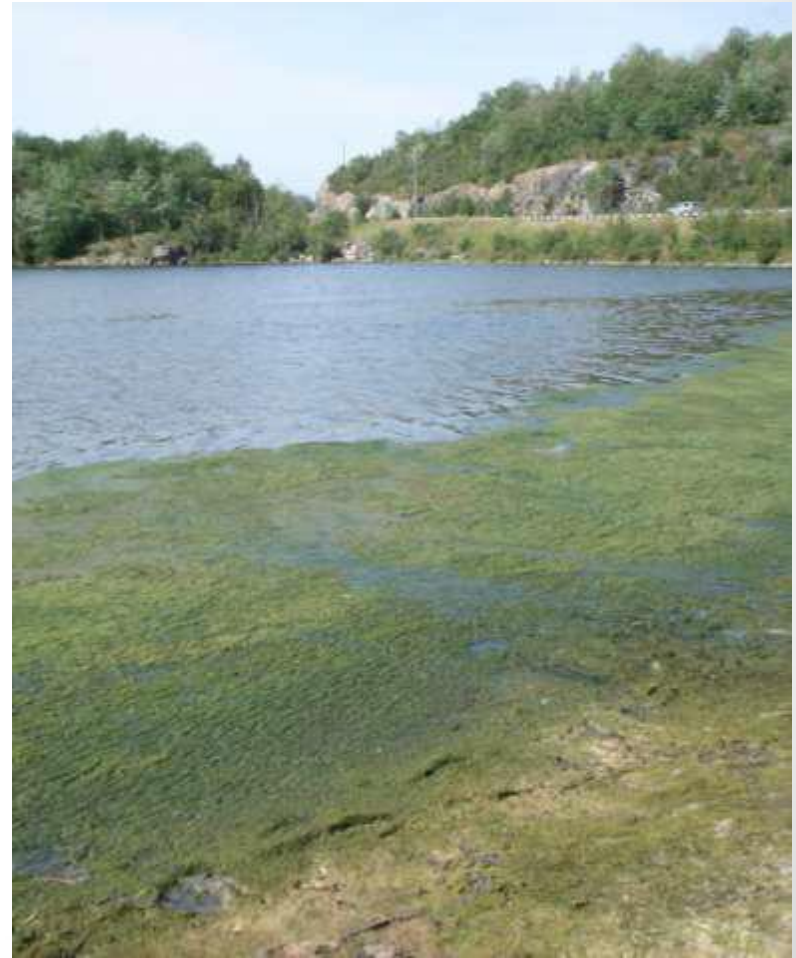
- **Do not eat the liver, kidneys and other organs of fish caught** in the waterbody. Be cautious about eating fish caught in water where blue-green algae blooms occur;
- **Do not treat the water with a disinfectant like chlorine (bleach).** This may break open algae cells and release toxins into the water;
- **Do not rely on jug filtration systems** as they do not fully protect against toxin poisoning; and
- **Use alternative water sources** including bottled, carted or tanked water, or call a water treatment service provider for help.

# How can I recognize a blue-green algae bloom?

Dense blue-green algae blooms may make the water **look like bluish-green pea soup**. When the bloom is very large, algae may form solid looking clumps.

**Fresh blooms often smell like newly mown grass; older blooms smell like rotting garbage.**

# Filamentous green algae:





# Blue-green algae (cyanobacteria)













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