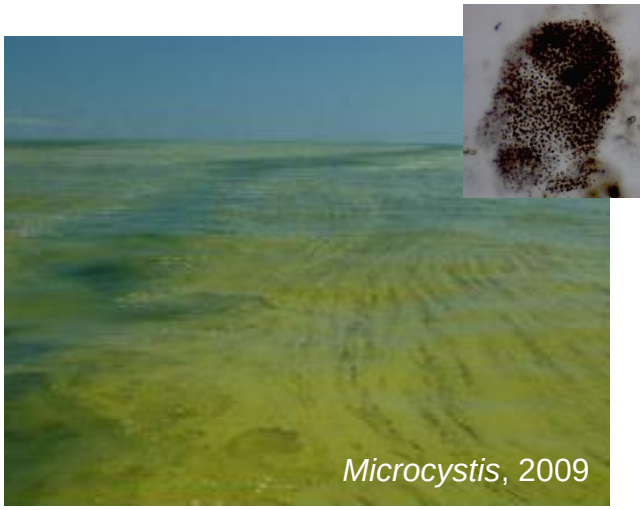
Algal Blooms in Ontario

Coalition of Haliburton Property Owner Associations Lake Steward Workshop

Haliburton County, Ontario, April 25 2015

Algal blooms


Microcystis, 2009


Planktothrix, 2006

Algae

- are diverse, naturally occurring organisms that form the base of the food web

What is a “bloom”

- excessive growth of one or more species of algae

Bloom forming conditions include

- sufficiently high levels of nutrients in the water or sediments
- calm weather
- strong sunlight
- high air & water temperatures
- these conditions usually occur from summer to fall

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Why are algal blooms a concern?

Aesthetic issues

- blooms can produce unpleasant tastes & odours
- decomposing algae can cause shoreline fouling
- blooms may impact recreational activities & property values

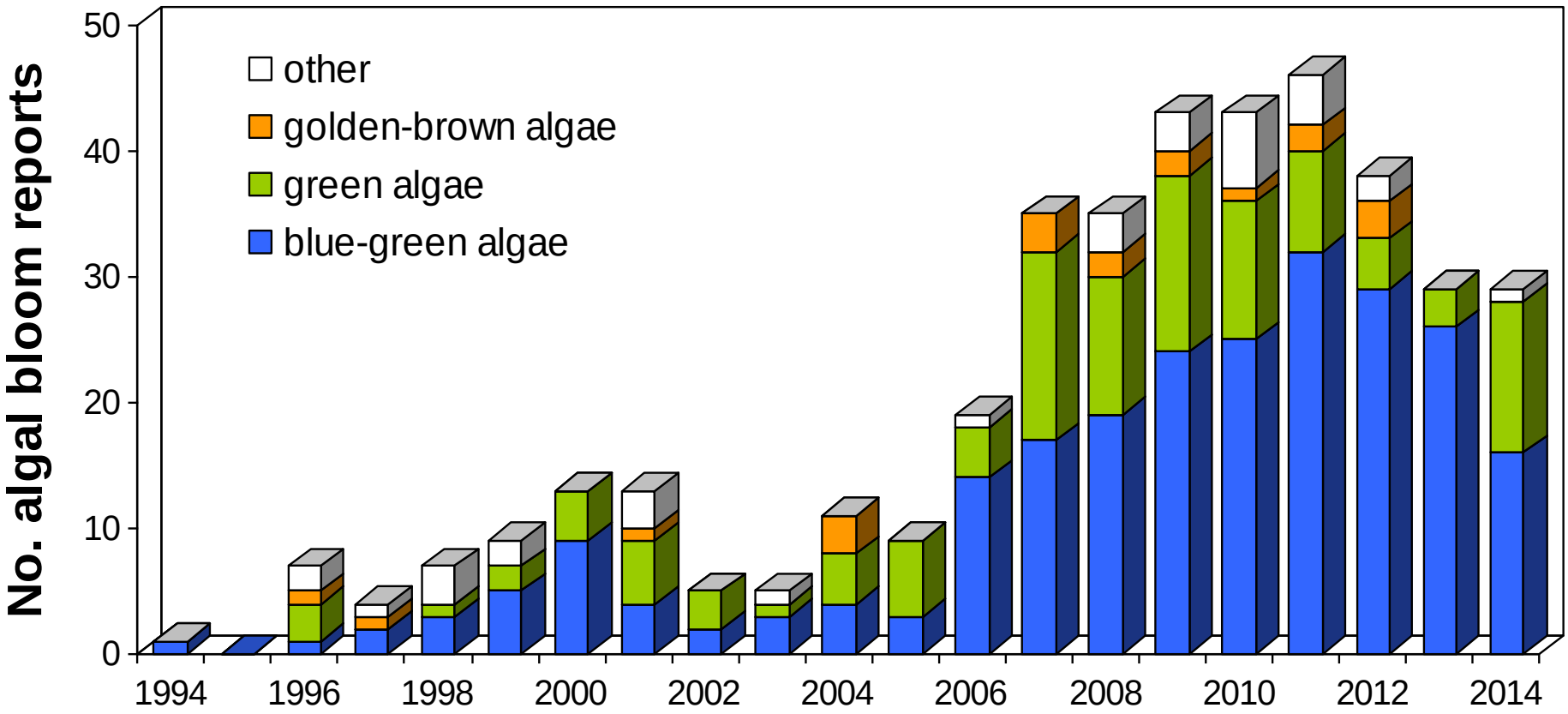
Drinking water & industrial water use issues

- 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

Human health issues

- algal toxins can impact humans
- toxins can also impact our pets, livestock, waterfowl & other animals

Algal blooms are increasing in Ontario



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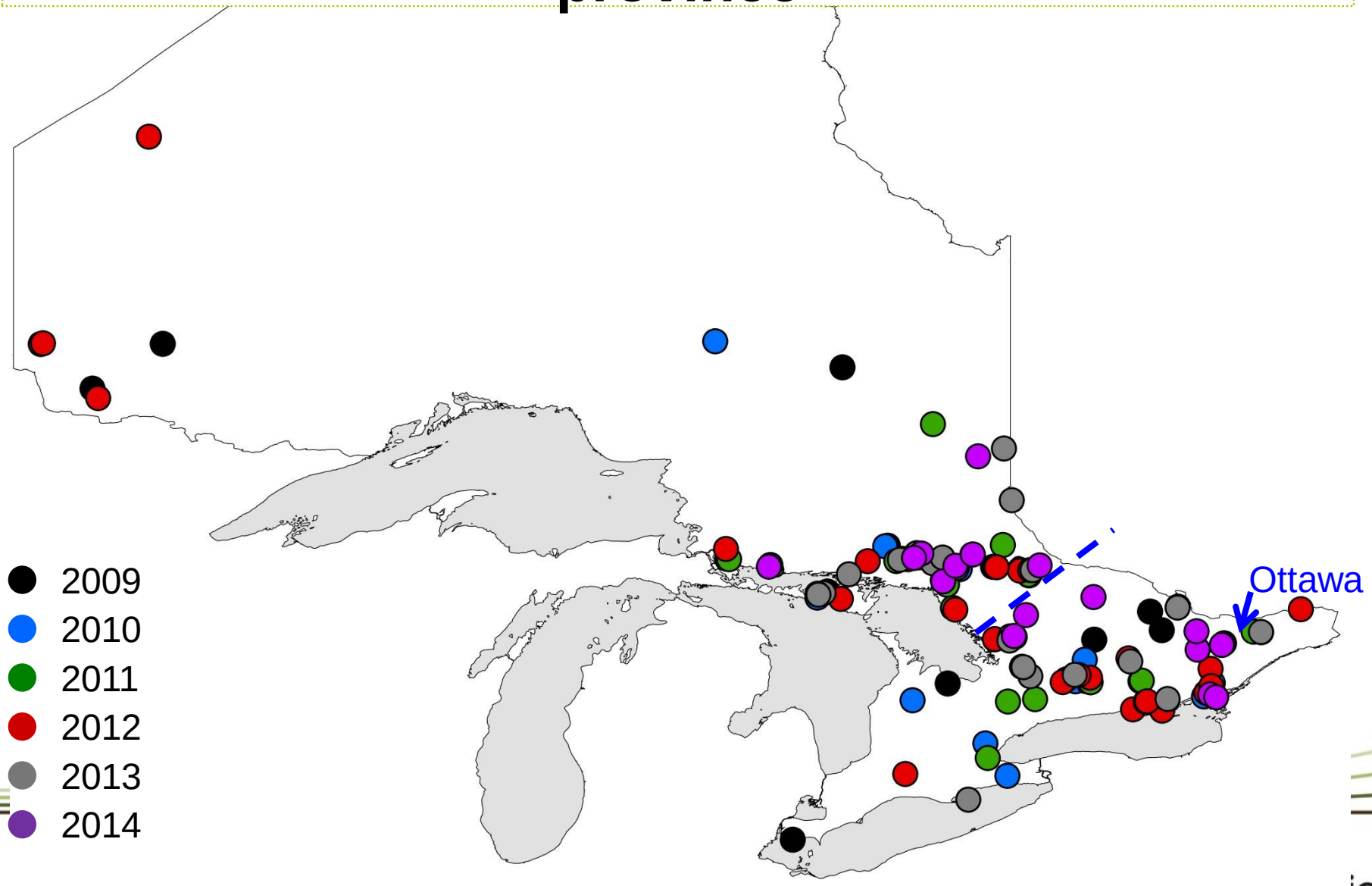
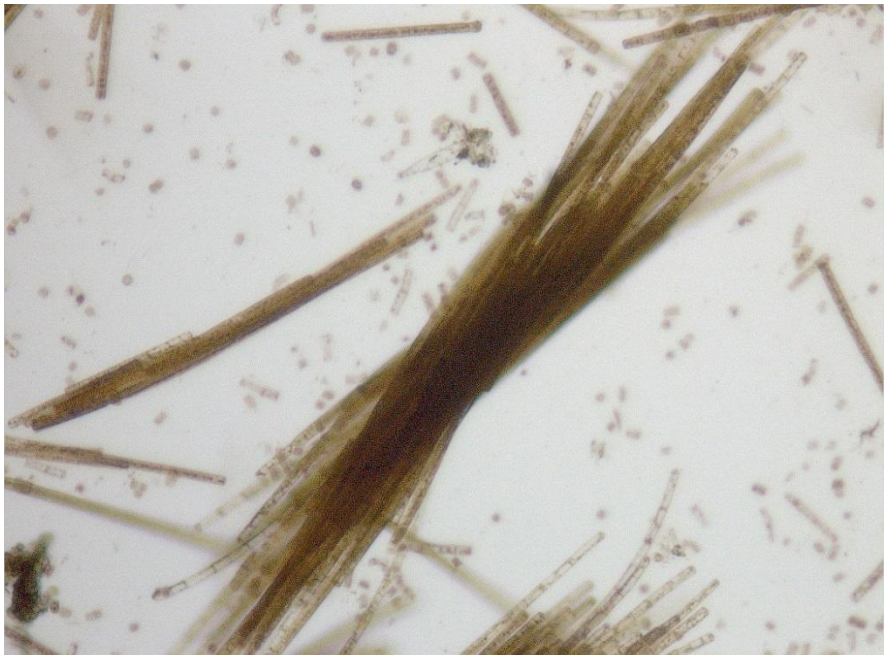
Algal blooms are reported from all over the province



Algal blooms reported from Haliburton County



Blue-green alga *Aphanizomenon* in November 2009

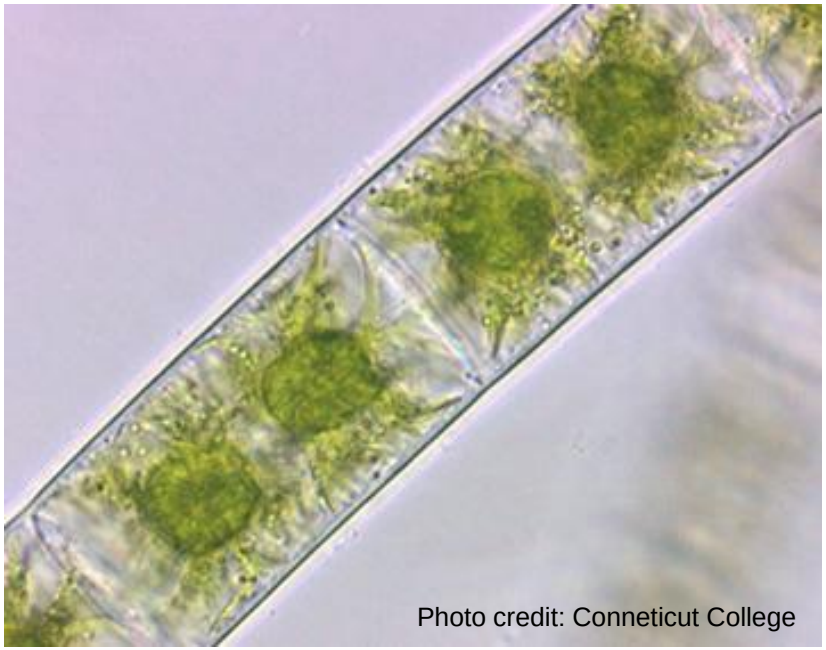


Photo credit: Conneticut College

Green alga *Zygnema* in August 2007

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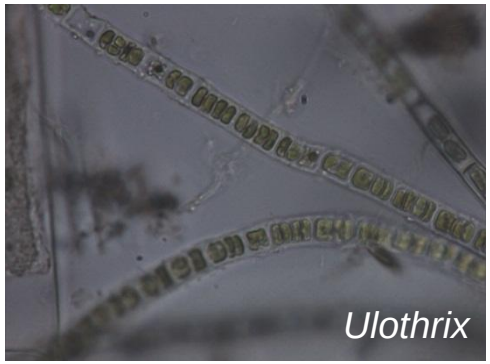
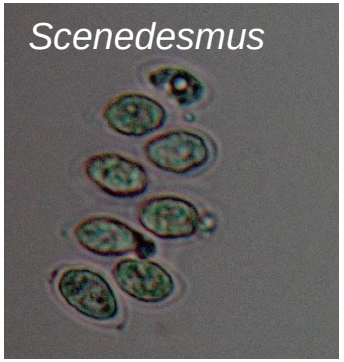
Algal groups that commonly form blooms

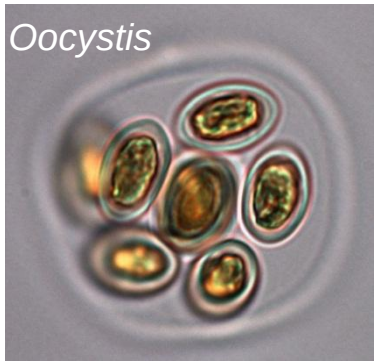
Green algae

- chlorophytes
- includes filamentous algae like *Cladophora*
- do not produce toxins
- can cause beach fouling & odour issues
- may be associated with bacteria

Examples







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Filamentous green algal blooms:

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Filamentous green algal blooms:

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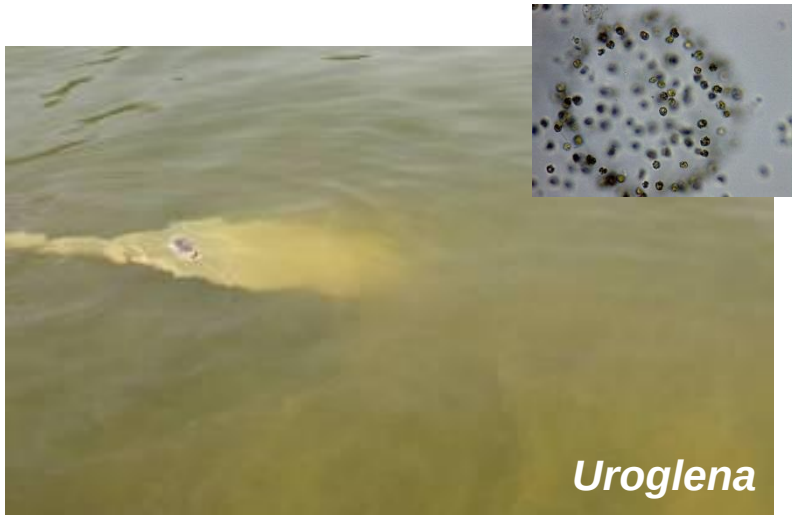
Algal groups that commonly form blooms

Golden-brown algae

- chrysophytes
- generally in low nutrient lakes
- increasing in Ontario
- can cause taste & odour problems



Examples

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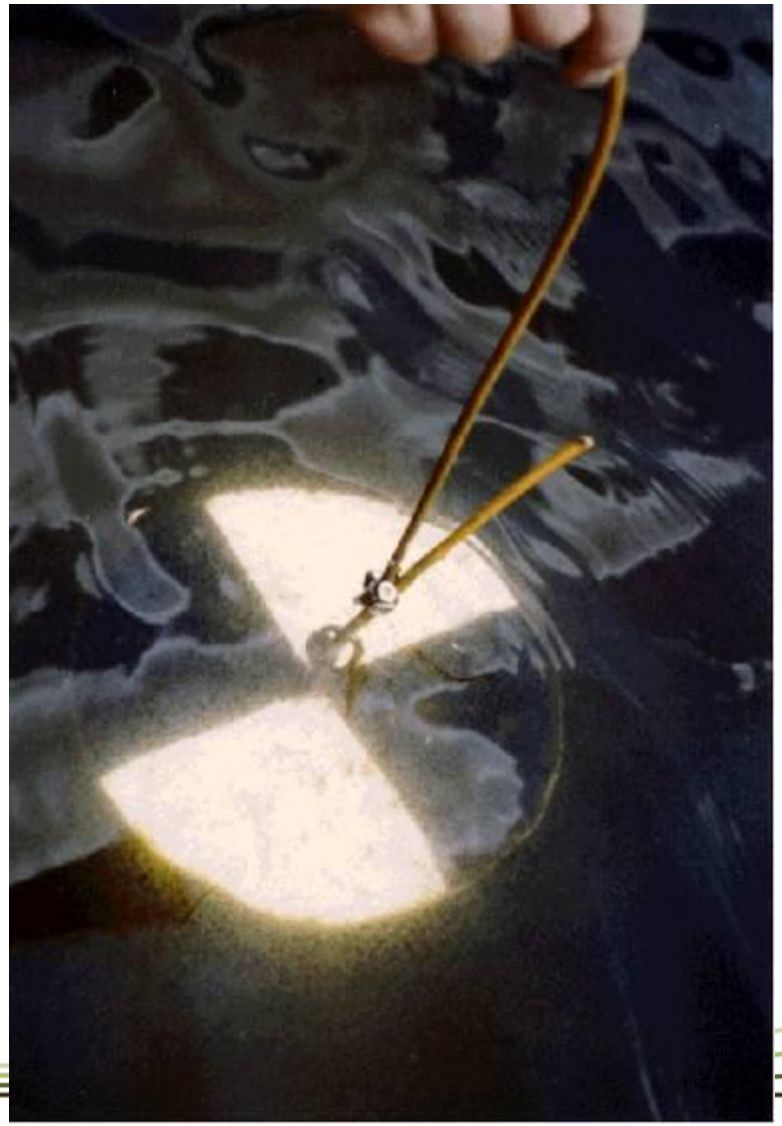
Golden-brown algal blooms:



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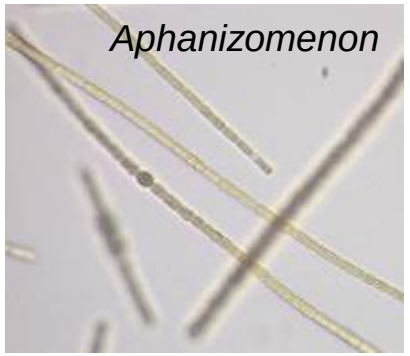
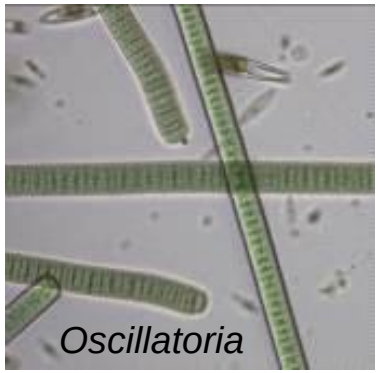
Algal groups that commonly form blooms

Blue-green algae

- cyanobacteria
- a type of photosynthetic bacteria
- called algae due to their ecology
- have inhabited the earth for > 2 billion yrs
- live in a wide range of environments

Examples





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Blue-green algae (cyanobacteria)

Many species can produce toxins that can be released to the surrounding water when the algal cell is damaged or dies.

Toxins produced by blue-green algae can be classified as:

- hepatotoxins – affect the liver
- neurotoxins – affect the nervous system
- irritant toxins

When ingested, toxins can induce symptoms such as fever, diarrhea, abdominal pain, nausea & vomiting.

External contact with toxins during recreational activities, such as swimming, boating or water skiing, may result in itchy, irritated eyes & skin.

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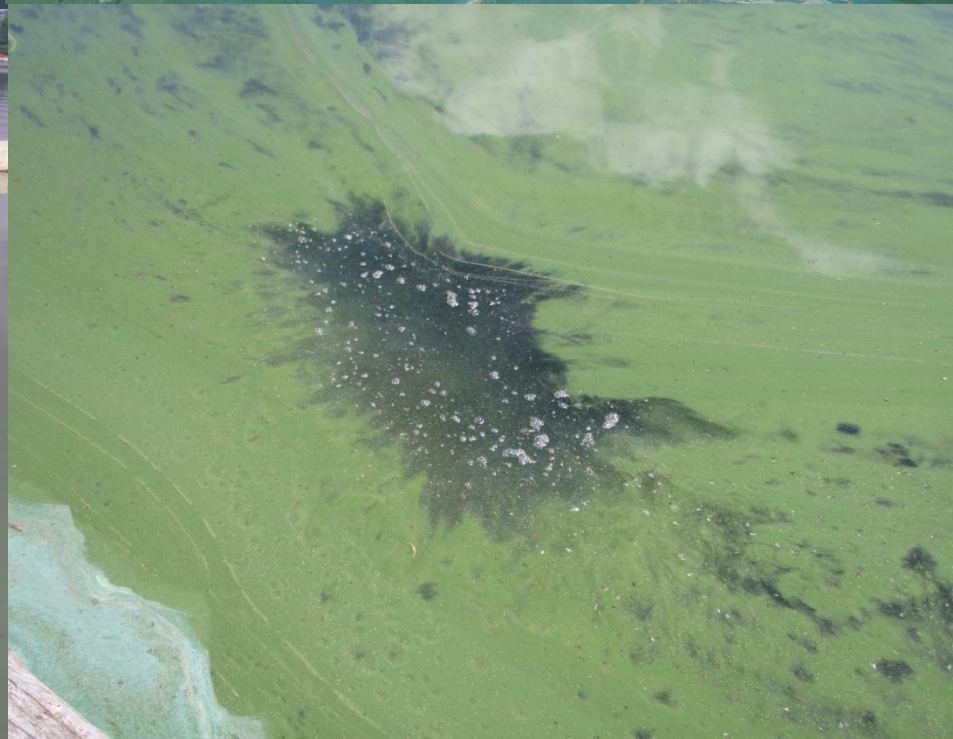



10.01.2009


boat
SEP 19 2008

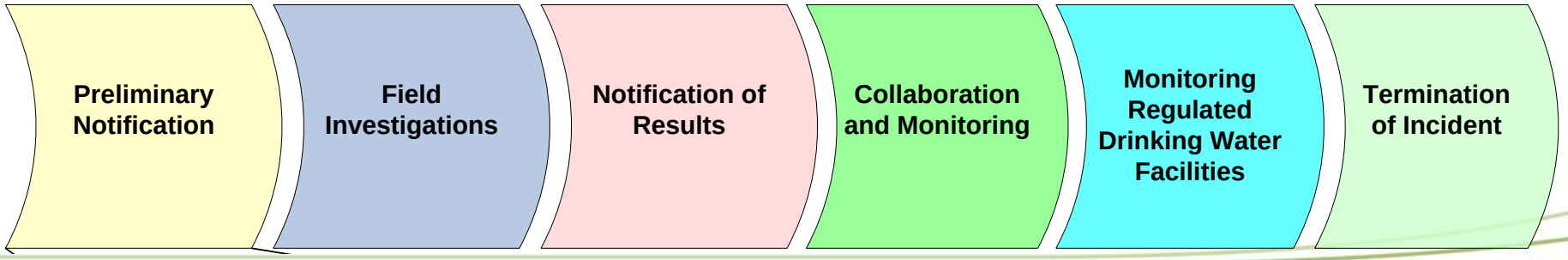
What should you do if you suspect a blue-green algal bloom?

Call the Spills Action Centre

1-800-268-6060

1-855-889-5775 (TTY)

Initiates the Province's algal bloom response



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Algal bloom response protocol

MOECC algal identification service

- rapid identification of blue-green algae
- identification of which algal species are “blooming” & whether these species have the potential to produce toxins

MOECC algal toxin analysis

- testing for microcystin, a common algal toxin
  - ELISA & mass spectrophotometry
- several private labs have also been accredited to screen drinking water for microcystins

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Take a precautionary approach if you suspect a bloom

Health risks are reduced simply by avoiding exposure

In the event of a bloom:

- do not drink, touch or cook with untreated water
- do not swim or bathe in untreated water
- avoid eating fish, particularly the viscera & organs, caught from bloom areas
- do not boil the water or use chlorine, herbicides, copper sulphate or other algaecides
  - these can break open the cell walls & release more toxins
- do not rely on jug filtration systems
  - these do not fully protect against algal toxins
- use alternative water sources
- contact your local Health Unit for bloom warnings, swimming advisories & more information on health risks

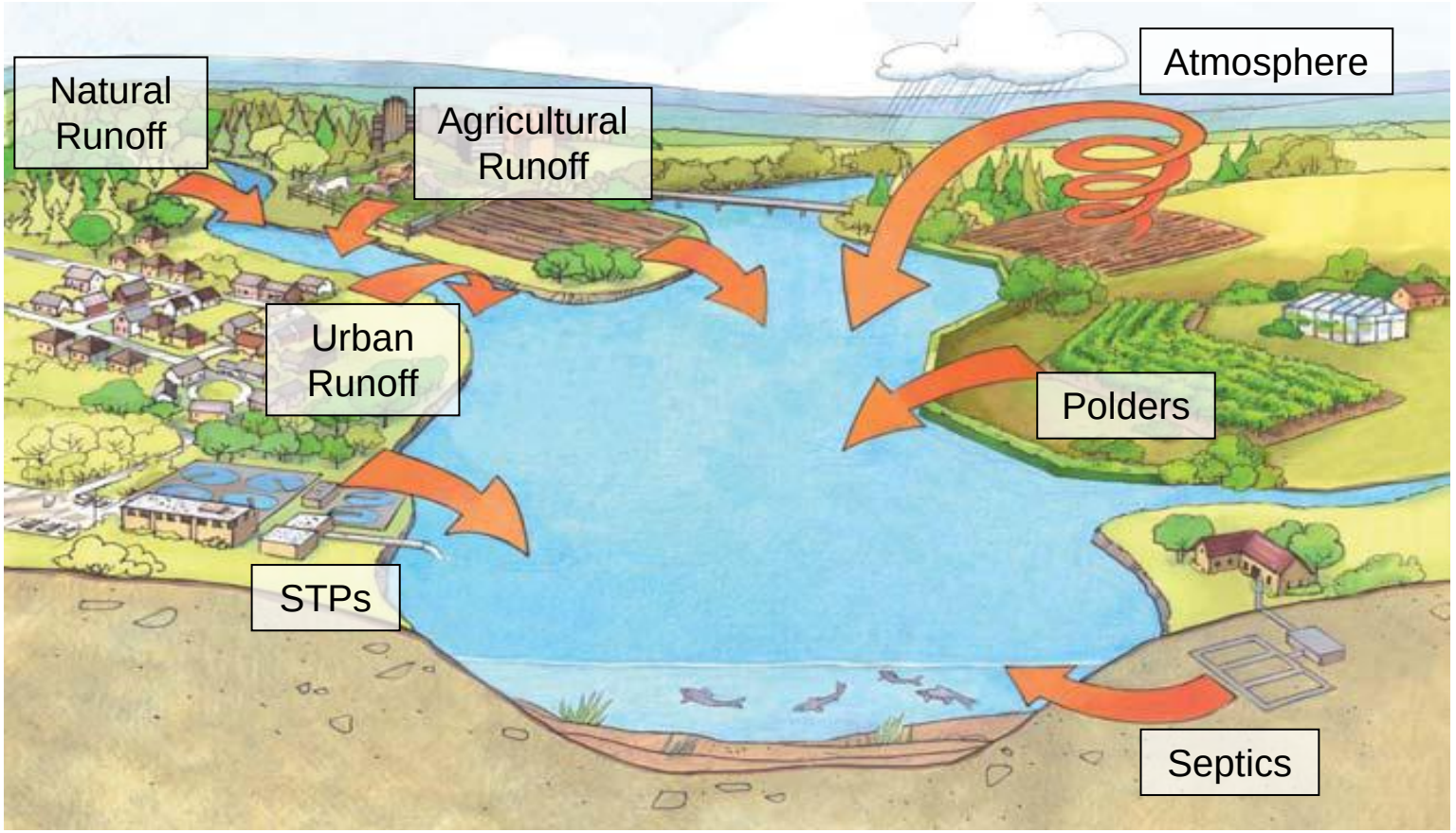
Can my drinking water contain algal toxins?

If drinking water is obtained from a water source during a blue-green algal bloom than it is possible the water may contain algal toxins

- usually people won't drink this water due to its unsightly appearance & smell but sometimes it is hard to tell if the water is contaminated
- appreciable levels of toxins are extremely rare in treated water
  - Ontario Drinking Water Quality Standard for the algal toxin microcystin-LR is a maximum acceptable concentration of 0.0015 mg/L (O. Reg 169/03, schedule 2)
- treatment of drinking water may be effective when algal cells are removed through specialized filtration systems
  - large treatment systems are more likely to have these capabilities

How do we control algal blooms?

Prevention – reduce nutrient loading



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Ways to reduce nutrients

- use phosphate-free household cleaning products, detergents and personal hygiene products
- use phosphorus-free fertilizer on lawns
- retain natural vegetation along shorelines
- reduce agricultural runoff (e.g., setbacks, minimize fertilizer use)
- maintain septic systems
- reduce vehicle emissions & wash your car on pervious surfaces like grass
- pick up pet wastes

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Ontario's 12-Point Plan

http://www.ontario.ca/environment-and-energy/blue-green-algae

1. **Communicate, engage and partner** – on actions to address blooms; info on Ontario.ca, Blue-Green Algae Fact Sheets
2. **Reduce nutrients** – to reduce the occurrence of blooms
3. **Protect** – e.g., source protection plans & stewardship funding
4. **Science and innovation** – expertise & research on blooms
5. **Support** – funds to improve & protect ecological health
6. **Legislation and regulatory tools** – to protect water quality
7. **Water quality standards and guidelines** – for algal toxin microcystin-LR
8. **Monitor** – municipal drinking water systems & source waters
9. **Public health** – comprehensive protocol in place for responding to blooms
10. **Contingency plans** – for municipal drinking water systems
11. **Analytical laboratory services** – licensed laboratories test for algal toxins
12. **Drinking water system courses** – delivered by Walkerton Clean Water Centre

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Thank you, Questions?

For more information please email:
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