sediment-bound iron and becomes available for algal uptake. This internal loading of phosphorus can accelerate lake degradation.

**Are Algae Good for Your Lake?**

Algae are critical to the life of our lakes. They:

- are the base of the food chain
- convert nutrients to organic matter
- oxygenate the water

Fish production in lakes varies directly with the amount of algae the lake produces. If there were no algae there would be no fish. However, problems arise in lakes when the balance between the plants and animals (zooplankton or fish) is upset. The introduction of pollutants and nutrients can result in excessive algal growth.

**How Can I Protect My Lake?**

- Try to maintain a natural shoreline to increase nutrient uptake by plants and reduce erosion and nutrients leaching into the lake
- Use low phosphorus detergents and soaps
- Avoid fertilizing your lawn
- Do not wash cars, shampoo or soap in the lake
- Pump out your septic tank every 3-6 years
- Take a closer look at your lake!
- Be a Lake Partner Volunteer!

If you have any questions, please contact the Lake Partner Program Hotline at 1-800-470-8322 or email lakepartner@ene.gov.on.ca.

**What are Algae?**

In freshwater lakes, algae are tiny aquatic plants containing chlorophyll and are usually green in colour. They make their food in the form of starches or oils by using the energy of sunlight and nutrients from the water. They grow in many forms. Some species are microscopic single cells; others can grow as mass aggregates of cells or in strands. They can even resemble higher plants.

All plants require nutrients and sunlight for growth. The depth of sunlight penetration limits the depth to which plants can grow. A black and white Secchi disc (a round, flat, sinkable disc) is used to measure the water clarity. Algae can affect water clarity. It is usually the amount of available nutrients (in particular nitrogen and phosphorus) that will limit algal growth in a lake.

**Types of Algae**

Several thousand species of algae live in Ontario's waters. Algae are extremely diverse in form, colour, habit and habitat. We have broken them down into four general groups:

(i) **Blue-Green algae (Cyanophyceae)**

(ii) **Green algae (Chlorophyceae)**

(iii) **Diatoms (Bacillariophyceae)**

(iv) **Pigmented flagellates (Dinophyceae, Cryptophyceae, Chrysophyceae, Euglenophyceae)**

**Blue-Green algae at Rice Lake**

In freshwater lakes, algal blooms are marked by the appearance of blue-green algae. These algae are often visible floating on the surface of the water. In some cases, the water may turn a milky blue or green. Blue-green algae can cause unpleasant and sometimes toxic effects on human and animal health. When a "bloom" of blue-greens develops, the algae sometimes drift into bays or along beaches where they decompose. Soluble phycobiliprotein pigments can be released when cells break, giving the water a bluish or pinkish colour. They have a rather revolting foul odour upon disintegration. Poisonings of animals and waterfowl have been attributed to the ingestion of lethal doses of toxic blue-greens accumulating along the shores of lakes. There are three common types of blue-greens that appear to be primarily responsible for most of these incidents: Anabaena, Microcystis and Aphanizomenon.

**Green Facts**

- Try to maintain a natural shoreline to increase nutrient uptake by plants and reduce erosion and nutrients leaching into the lake
- Use low phosphorus detergents and soaps
- Avoid fertilizing your lawn
- Do not wash cars, shampoo or soap in the lake
- Pump out your septic tank every 3-6 years
- Take a closer look at your lake!
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Additional Information You May Want to Read!

- Ontario’s Lake Partner Program (brochure)
- Ontario’s Lake Partner Program (brief)
- Seven Hints on Protecting Your Lake

If you have any questions, please contact the Lake Partner Program Hotline at 1-800-470-8322 or email lakepartner@ene.gov.on.ca.

**better grassy odour while healthy, but this may change to an unpleasant musty smell or to a rather revolting foul odour upon disintegration and decomposition. Poisonings of animals and waterfowl have been attributed to the ingestion of lethal doses of toxic blue-greens accumulating along the shores of lakes. There are three common types of blue-greens that appear to be primarily responsible for most of these incidents: Anabaena, Microcystis and Aphanizomenon.**
The rigid silica walls of diatoms are not subject to decomposition. Some diatoms produce tastes and odours in the water. When taste and odour are a problem in less eutrophic northern lakes, diatoms may be the cause. Some commonly found diatoms are Asterionella, Fragilaria, and Cyclotella.

Factors that Affect Algal Growth

There are a number of environmental factors that influence algal growth. The major factors that determine the type and amount of algae in your lake are:

- The amount of light that penetrates the water (determined by the intensity of sunlight, the amount of suspended material and water colour)
- The concentration of nutrients in the water
- Temperature
- Sulphur dioxide
- Flagellates
- microorganisms
- Seaweed
- Algae
- Water temperatures
- Respiration
- Photosynthesis
- Phosphorus
- Bacteria
- Fish
- Decomposers
- Fertilizer
- Sewage
- Farming
- Detergent
- Nutrients

The Connection to Oxygen Depletion

The amount of oxygen in the water is an important indicator of overall lake health. Oxygen plays an important role in determining the type of organisms that will live in a lake. Some species, such as trout, need consistently high oxygen levels to survive.

Excessive algal growth can lead to oxygen depletion in lakes. Algae produce oxygen as a byproduct of photosynthesis but also take in oxygen for respiration. Respiration occurs all the time, but photosynthesis occurs only when sunlight is available.

Consequently, a lake that has a large population of algae can experience a great fluctuation in dissolved oxygen concentration during a 24-hour period. Extreme oxygen fluctuations place great stress on fish and other creatures in the lake.

When algae die, they provide food for decomposers (bacteria, fungi, and other organisms living in or on the lake sediment). They need oxygen to break down organic matter. In this way oxygen is steadily consumed. Several chemical reactions occur within the lake sediments when dissolved oxygen concentrations reach less than one part per million.