



Harmful Algal Blooms and Cyanobacteria

Introduction

Algal blooms (ABs) are dense populations of algae that can occur in fresh or salt water when populations increase rapidly under favorable growth conditions. The blooms can block sunlight from penetrating deeper into the water, impacting underwater vegetation (Figure 1). In addition, when algae die following a bloom, their decomposition consumes dissolved oxygen, resulting in oxygen-deprived water which suffocates aquatic life including fish.

Although not all ABs are harmful (some blooms may actually be beneficial for shellfish), blooms that contain toxins are referred to as a harmful algal blooms (HABs). In freshwater systems, HABs are blooms that consist primarily of cyanobacteria. Cyanobacteria, also known as blue-green algae, are small plant-like organisms. Some, but not all, cyanobacteria produce toxins that can be harmful to people, livestock, and pets. This factsheet, provides information about freshwater HABs, what factors contribute to risk of the HAB occurrence, and what can be done to reduce the risk of occurrence of HABs.

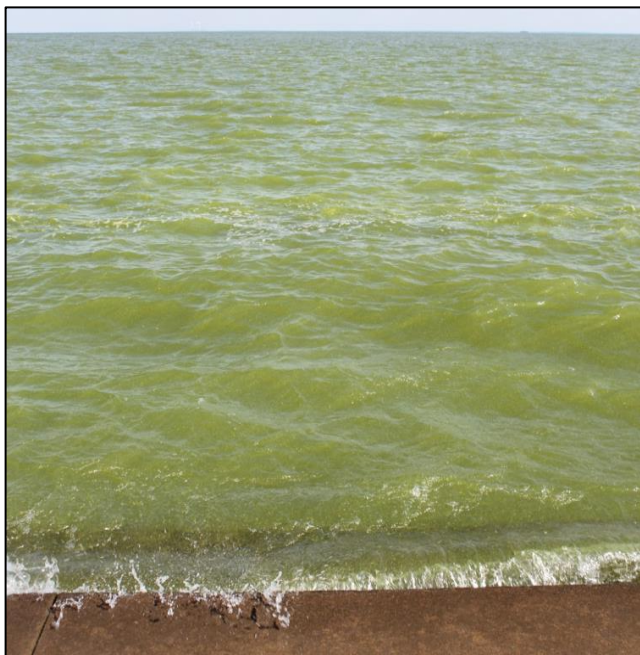


Figure 1: Algal bloom in Lake Erie in summer 2017.

Cyanotoxins

Cyanotoxins can affect the nervous system or damage the liver of people if consumed in sufficient quantity. Some people are also highly sensitive to the cell walls of cyanobacteria and contact can cause skin irritation and allergic reactions.

Similarly, pets that consume or come in contact with the toxins may be harmed. Dogs are especially susceptible (more than humans) because they lick their fur as a cleaning process which can concentrate the toxins. For more information on human and pet exposure, contact your county or state health department.

Causes of HABs

Cyanobacteria favor conditions that allow them to reproduce at a rapid rate. These include weather related conditions:

- Cyanobacteria tend to be favored by hot weather and blooms are more likely to occur in unshaded, stagnant, warm waters. Calm conditions allow cyanobacteria to grow quickly and float up towards the surface of the water body. This causes an increased density of the bloom near the surface of the water body. Shifting summer weather patterns may be a contributing factor to an increase in HABs in NY.
- By washing nutrients from the landscape into waterbodies, heavy rainstorms in spring and summer months can be an important contributor of nutrients that can support HABs.
- Heavy rainfall events can also overwhelm waste water treatment plant outflow and allow untreated waste to be discharged directly to waterbodies.

In addition, cyanobacteria favor environments rich in nutrients such as available phosphorus (P) and nitrogen (N). These nutrients can enter a water body from a variety of sources:

- Waste from livestock, pets, and waterfowl populations.

- Lake shore septic systems; most of the P excreted by humans is through urine and is highly bioavailable. Urine is also a source of available N.
- Lawn clippings/leaves from residential areas piled near or into drainage pathways.
- Sediment from streambanks and roadside ditch erosion.
- Fertilizer that contains N and/or P used on lawns, golf courses and agricultural fields.
- Invasive species like the zebra or quagga mussel (two prominent Dreissenid mussels) can filter particulate P from water and convert it to more soluble P that can be used by cyanobacteria. Dreissenid mussels may also selectively consume non-harmful algae, reducing competition for cyanobacteria.

Reducing Risk of HABs

Many of these factors are beyond our ability to control. To reduce the risk of HABs occurring in lakes in New York, it is important to reduce nutrient runoff from individual households, farms, and municipalities.

- Address point sources to minimize nutrient loss to waterbodies. This includes efforts of waste water treatment plants to prevent waste and nutrients from entering waterbodies.
- Proper designs and installation of lake shore septic systems. This includes proper offsets and material selection. Many near shore areas are made up of porous soils and may not provide adequate protection to waterbodies when using conventional drain fields for septic treatment.
- Implement conservation efforts to reduce streambank and roadside ditch erosion. This can include planting vegetation to slow runoff and reduce sediment loss.
- Timely inspection and maintenance of municipal storm water drain systems to ensure proper operation and prevent loss of P and waste during major storm events.
- Introduce setbacks away from fields or grass buffer strips in heavy use areas where animals are concentrated and grass cover is not maintained, regardless of the number of animals.
- Use best management practices for manure application to reduce N and P loss from agricultural fields and maintain soil test P levels in the optimum range. Best management practices include incorporation

or injection of manure, along with adjusting rates and timing of application.

- Match fertilizer application to crop needs. In many cases, P fertilizer use on farms is based on the needs of the crop determined by soil testing. New York and many other states prohibit P fertilizer use on lawns unless soil tests show P levels to be deficient. In most circumstances, lawns do not need supplemental P fertilizer.
- Pick up pet waste and keep pets and livestock out of streams and water courses.
- Properly dispose of lawn clipping/leaves in accordance to local regulations to ensure the leaves and their leachate do not reach streams, watercourses, or storm drains.
- Keep lakeside fire pits away from water's edge as the ash can contribute P directly to the surface water.

Summary

Harmful algae blooms can pose serious threats to people, livestock, and pets. The risk of HABs cannot be eliminated entirely, but may be reduced. Practices described in this factsheet can reduce the risk of nitrogen and phosphorus reaching large water bodies and fueling a HAB.

Additional Resources

- USEPA Harmful Algal Blooms (April 2017): www.epa.gov/nutrientpollution/harmful-algal-blooms
- NYDEC Harmful Algal Blooms: www.dec.ny.gov/chemical/77118.html.
- Sea Grant, NY: Dogs and Harmful Algal Blooms. www.seagrant.sunysb.edu/btide/pdfs/HABsBrochure-0814.pdf.

Disclaimer

This fact sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this fact sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information



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