

Together, we can keep our Blue Spaces healthy.

Our recreational spaces are threatened by toxin-producing cyanobacteria. Here is what you can do to help prevent another lake shutdown.

Reduce the nutrients that enter lakes. We know excess nutrients to be a leading cause of HABs. You can reduce nutrient additions to our blue spaces by practicing the following:

- Don't use phosphorous-containing fertilizers on your lawn.
- Use less fertilizer, and make sure none lands on impervious surface, where it can be swept into the lake via runoff.
- Pick up after your pets and dispose of it in the proper receptacle.
- Do not feed geese. It will encourage them to stick around. Their waste is high in nutrients.

Participate in citizen science! Join EPA's *Cyanobacteria Monitoring Collaborative* and help researchers better understand the nature of HABs. Its as simple as snapping a photo on you phone!

Learn more at <http://cyanos.org/>.



Welcome to bloomWatch!

Crowdsourcing to find and report potential cyanobacteria blooms

Learn more at <http://www.worcesterma.gov/dpw>

City of Worcester

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Harmful Algal Blooms (HABs) in Worcester's Blue Spaces



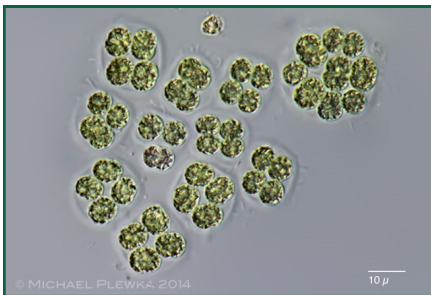
What are Cyanobacteria, and What do they mean for our Lakes and Ponds?

Photo courtesy of Indian Lake Watershed Association

What is a Harmful Algal Bloom (HAB)?

Blue-green algae, better known as cyanobacteria, are bacteria-like prokaryotes that harvest energy from the sun. They prefer warm water environments, and can quickly outcompete other algae due to their ability to regulate their buoyancy in the water column. Under the right conditions, a population can multiply quickly and create a thick mat of green matter, or scum, over and throughout a lake or pond. This is called an algal bloom.

Algal blooms are harmful because high concentrations of cyanobacteria or algae can deplete dissolved oxygen, which is necessary for other aquatic life. Additionally, some cyanobacteria can produce toxins, called *cyanotoxins*. US EPA states that exposure to these toxins can cause “gastrointestinal, dermatologic, respiratory, neurologic, and other symptoms” in humans and illness and death in pets. As such, the Mass Department of Public Health has issued guidelines for the upper limit for algal density and toxin levels before a lake should be closed.



C. microcystis, algae that may produce the cyanotoxin microcystin.

How can HAB's affect Worcester's Blue Spaces?

A high density of algae increases the chances that they will produce toxic levels of cyanotoxins. A recreational advisory is recommended whenever (1) a scum mat is visible, (2) the blue green cell count exceeds 70,000 cells/ml, or (3) the concentration of microcystin reaches 14 ppm. **Contact with this water can be dangerous for humans and pets** and so recreational activity must cease.



In July 2014, Indian Lake turned bright green. By October, cyanotoxin levels had reached dangerous levels.

In the summer of 2014, an HAB advisory closed Indian Lake to recreational activity for the season. No swimming, boating or fishing was allowed from July until end-October 2014.

Since then, the Indian Lake Watershed Association (ILWA) and the City have worked together to reduce the possibility of another HAB at Indian Lake. The City is committed to better understanding algal dynamics, and implementing long-term solutions.

What is Worcester doing about it?

Reducing illicit connections and discharges. DPW&P searches out and disconnects illicit connections of sanitary sewers to the municipal storm water system in order to reduce the amount of nutrients and pollution entering our blue spaces.

Rain gardens. Plants, soils and microbes act as natural water filters. DPW&P has installed rain gardens and over 24 tree boxes to intercept, absorb and filter storm water before it carries HAB-friendly pollutants to our lakes through outfalls.



Aluminum sulfate “Alum”. Alum causes phosphorous (P), a key element to algal growth, to be stripped out of the water column, and creates a thin cap on sediment nutrients. Making P unavailable in water reduces algae’s ability to grow and reproduce. Long term, the City would like to develop a plan to eliminate the causes of HABs so as to discontinue the use of chemicals in our blue spaces.

Learn more about the ways we are protecting our blue spaces from HABs at <http://www.worcesterma.gov/dpw>