HARMFUL ALGAL BLOOMS IN THE GREAT LAKES

What they are & how they can affect your health

What are algal blooms?
What makes them harmful?

There are many species of single-celled organisms living in the Great Lakes, including algae. When certain conditions are present, such as high nutrient or light levels, these organisms can reproduce rapidly. This dense population of algae is called a bloom. Some of these blooms are harmless, but when the blooming organisms contain toxins, other noxious chemicals, or pathogens, it is known as a harmful algal bloom, or HAB. HABs can cause the death of nearby fish and foul up nearby coastlines, and produce harmful conditions to marine life as well as humans.

Blue Green Algal Blooms

Blue-green algae are the most common, but not the only group of algae to form HABs. Blue-green algae are actually bacteria (cyanobacteria) which are able to photosynthesize, hence the green color. Cyanobacteria live in terrestrial, fresh, brackish, or marine water. They usually are too small to be seen individually, but sometimes can form visible colonies. Some cyanobacterial blooms can look like foam, scum, or mats on the surface of fresh water lakes and ponds. The blooms can be blue, bright green, brown, or red and may look like paint floating on the water. Some blooms may not affect the appearance of the water. As algae in a cyanobacterial bloom die, the water may smell bad. If you detect an earthy or musty smell, taste or see surface scum's of green, yellow or blue-green, the water may contain blue-green algae. Only examination of a water sample under the microscope will confirm the presence of blue-green algae.

Blue-green algal bloom in Lake Erie as seen from the MODIS satellite on August 13, 2009 (left).

Blue-green algal bloom in Lake Erie on the shore of Catawaba Island, Ohio in summer 2009 (top).

Are all algae poisonous?
What species are poisonous?

There are many species of algae, and most do not produce toxins. It is important to remember that algae are a natural part of our water ways. However, all blue-green algae, or cyanobacteria, can produce skin irritants under certain conditions, and some can produce multiple types of the more harmful toxins. The most common species of toxic cyanobacteria in the Great Lakes are:

- ***Microcystis aeruginosa***
- ***Anabaena circinalis***
- ***Anabaena flos-aquae***
- ***Aphanizomenon flos-aquae***
- ***Cylindrospermopsis raciborskii***

Aerial photo of Lake Erie blue-green algal bloom near Kelley's Island, Sept. 4, 2009 (Photo: T. Archer).

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The Do's and Don'ts of HABs

- **Do** avoid contact with water where algae are visible (e.g. pea soup, floating mats, scum layers, etc), or where water is discolored.
- **Do** rinse yourself and/or your pet off after swimming in any ponds, lakes or streams, regardless of the presence of a visible algal blooms.
- **Do** obey posted signs for beach closings.
- **Do** contact your local health department or department of natural resources to report any large blooms.
- **Don't** drink untreated surface water, whether or not blooms are present. Remember, BOILING THE WATER WILL NOT REMOVE THE TOXINS.
- **Don't** use algaecides to kill the cyanobacteria– when the cells die, the toxins are directly released into the water.
- **Don't** allow children or pets to play in or drink water where scum is present.
- **Don't** water-ski or jet-ski over algal mats.
- **Don't** irrigate lawns or golf courses with water that looks or smells bad.

For more information on Harmful Algal Blooms,

http://www.glerl.noaa.gov/res/Centers/HumanHealth/hab/EventResponse/

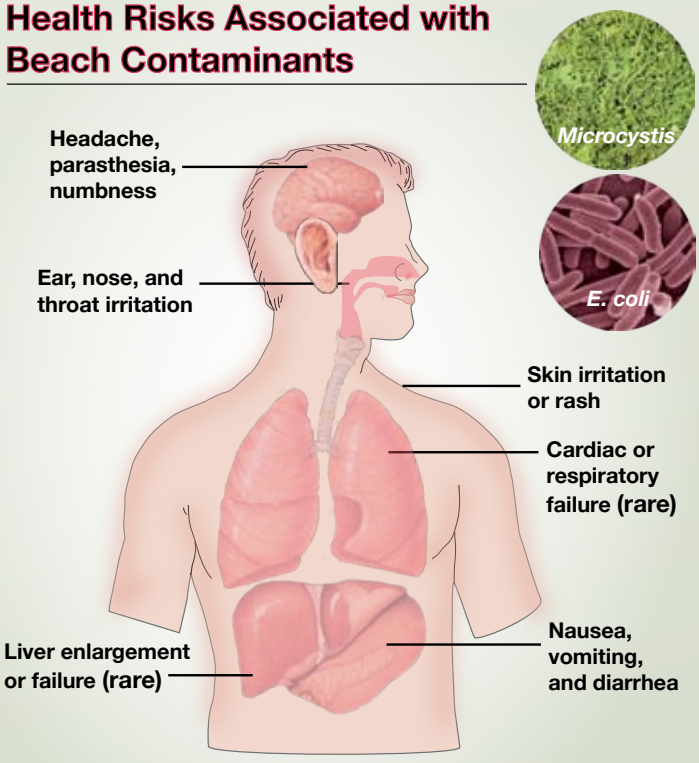
Toxins Producted by blue green algae

Blue-green algae can produce a wide array of neurotoxins, liver toxins (hepatotoxins), cell toxins, and skin irritants. Neurotoxins include anatoxin-a, anatoxin-a(s) and saxitoxin, and are commonly produced by the *Anabaena* and *Oscillatoria* species. Consumption of large amounts of these toxins by animals or humans can result in muscle cramps, twitching, paralysis, and cardiac or respiratory failure.

Hepatotoxins (liver toxins) include microcystin and cylindrospermopsin, and are produced by the *Microcystis* and *Cylindrospermopsis* species. These toxins produce symptoms including nausea, vomiting, and acute liver failure.

Dermatotoxins (skin irritants) include aplysiatoxin, lyngbiatoxin-a, and lipopolysaccharides. Nearly all blue-green algae produce dermatotoxins. These toxins produce symptoms including skin irritation, rashes, and gastrointestinal distress. Sensitivity to these toxins varies widely among individuals.

TOXIN	ACUTE EFFECT	SYMPTOMS
Anatoxin-a	Neurotoxicity	Not documented
Anatoxin-a (s)	Neurotoxicity	Not documented
Cylindrospermopsin	Hepatotoxicity, renal toxicity, chromosome breakage, aneuploidy	Enlarged liver, malaise, anorexia, vomiting, headache.
Microcystin	Hepatotoxicity	Paresthesia and numbness of lips and mouth within ½ to 3 hours after exposure, extending to face, neck, extremities; motor weakness; incoordination; respiratory and muscular paralysis.



If you experience any of these symptoms, call your physician or the National Emergency Poison Control Hotline IMMEDIATELY.

POISON CONTROL HOTLINE 1- 800-222-1222