

Grand Lake St. Marys Algal Toxins – Common Questions

What causes algal blooms?

Under the right water conditions, usually in the warmer months, the number of these blue-green algae can dramatically increase, or “bloom.” Warm, slow-moving water containing high nutrients is optimum. Nutrients, including phosphorus and nitrogen, can drain from the landscape into the lake. Streams in the Grand Lake St. Marys watershed are impaired primarily by high levels of nutrients from livestock and row crop agriculture. Residential use of lawn and garden fertilizers, failing septic systems and other sources are among other, smaller sources. Stream channel modification can contribute excess soil to streams, leading to damaged aquatic life habitat and downstream transport to the lake.

What is algal toxin?

There are many species of algae and most do not produce toxins. However, some algae do produce toxic chemical compounds. In fresh water, a type of bacteria called cyanobacteria — more commonly called blue-green algae — produce toxins under certain conditions. Scientists do not fully understand what causes the same species of blue-green algae to produce toxin during one bloom and not produce toxin during the next.

What kinds of toxins have been found in the lake?

In 2010, two species of blue-green algae emerged. Both are capable of producing toxins. *Microcystis* produces the toxin microcystin. *Aphanizomenon* can produce multiple toxins including cylindrospermopsin, saxitoxin and anatoxin.

What is the safe level of algal toxins in water?

There are currently no federal or state regulations for algal toxins in drinking water or recreational water. However, the World Health Organization (WHO) set guidelines for microcystin toxin at 1 part per billion (ppb) in drinking water and 20 ppb for recreational waters. No similar guidance has been issued for toxins produced by *Aphanizomenon*.

What are the algal toxin levels in Grand Lake St. Marys?

Microcystin levels in Grand Lake St. Marys reached 82 ppb in 2009 and were measured above 2,000 ppb in 2010. Toxins produced by *Aphanizomenon* have been detected at relatively low levels (less than 1 ppb), with cylindrospermopsin levels up to 9 ppb at the end of June 2010. Algal toxin levels vary considerably in different locations and on different days. This is expected. Ohio EPA continues to monitor the water quality and is posting the sampling results on its website regularly.

How often and how are samples collected?

Ohio EPA and its partner agencies, Ohio Department of Natural Resources, U.S. Geological Survey (USGS) and city of Celina Water Department, are working together on sampling throughout the summer in an effort to maintain updated information about the presence of algal toxins. Samples are currently being collected once a week at the three public beaches (East Beach, West Beach and Camp Beach). Samples are collected from lake water where there is dense biomass of bacteria in the shallow water along each beach. Collecting water with dense biomass captures free toxins and endotoxins inside bacteria that may be ingested during recreational activities. Also, endotoxins are eventually released into the water when the cells die. This sampling method allows the state to be the most protective of human health. Drinking water samples are also collected on a regular basis (see “Is Celina’s drinking water safe?”).

Are algal toxins present throughout the entire lake?

USGS is sampling regularly at the state park beaches and the Celina PWS is collecting samples at the Celina water plant intake area. However, it is reasonable to assume that algal toxins could be present anywhere in the lake. This is because the lake is shallow and the water is easily moved by wind.

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Is my health at risk?

The health effects from recreational contact (swimming, boating, water skiing, fishing) with algal toxins can vary depending on the type of bacteria, level of bacteria, duration of contact and an individual's sensitivity. At levels above the WHO 20 ppb guidance for recreational waters, there is a higher risk of health effects from dermal (skin) contact that can include rash, hives or skin blisters (especially on the lips and under swimsuits). Drinking (ingesting) contaminated water above the WHO's 1 ppb guideline may cause gastrointestinal illness (including diarrhea and vomiting). Ingesting large quantities of contaminated water also can potentially cause liver, kidney or neurological issues. Inhaling aerosolized water – suspended droplets of water – during activities such as power boating, jet skiing, tubing or lawn irrigation can cause runny eyes and nose, a sore throat, asthma-like symptoms or allergic reactions.

Are the odors hazardous to my health?

Information obtained by the Ohio Department of Health suggests that some of the blue-green algae detected in the lake produce an odor-generating byproduct (geosmin) when the algae die. The human nose is extremely sensitive to geosmin; people can detect it at very low concentrations. Although these odors are not chemically toxic, the unpleasant smell can cause sensitive individuals to become nauseous (upset stomach) and have headaches. In addition, the decomposition of dead algae and fish in the lake can generate hydrogen sulfide gas (a rotten egg smell), contributing more unpleasant odors in and around the lake. Unpleasant odors can lead to short-term, non-life threatening health effects such as nausea and headaches.

Can toxins be released to the outside air and pose an inhalation hazard to residents?

The chemical toxins produced by these blue-green algae are not known to volatilize (change from a liquid to a gas) and they are not released as vapors to the outside air. However, recreational activities like power-boating, water-skiing, jet-skiing and tubing can whip up the surface of the water and create aerosols (toxin-containing water droplets) that can be inhaled or ingested and potentially result in health issues (headaches, nausea, runny eyes and nose, sore throat, asthma-like symptoms and skin rashes). Other activities that have the potential to aerosolize the lake water — like using lake water to spray lawns and gardens — should be avoided to minimize exposure to the toxins in the lake.

What if I get sick after visiting the lake?

Ohio EPA is not aware of any confirmed illnesses that can be attributed to algal toxins in Ohio. Citizens should contact their personal physician if they have specific questions about their health. If you develop symptoms consistent with algal toxin exposure following contact with the water, contact your physician or the Poison Control Center.

Is Celina's drinking water safe?

Yes. Public drinking water in the area is supplied by the city of Celina, which gets its water from the lake. Sampling results indicate that the treated water does not contain algal toxins. The Celina public water system conducts routine monitoring of the raw and finished waters. The current treatment processes used at the Celina water treatment plant are advanced and are known to be effective at removing algal toxins. Celina's treatment processes include granular activated carbon treatment and ozonation providing additional removal of toxins.

Is the water in other lake communities and my private well safe?

The city of St. Marys draws its drinking water from deep wells and not from the lake. Like Celina, this water is monitored regularly for contaminants. St. Marys' wells and most private wells in the area are deep and should not be affected by the lake.

Is it safe to swim or boat?

Due to the extremely high levels of microcystin found in the lake in mid-July 2010, the state is recommending people avoid all contact with the water, including boating. Boating previously was considered a minimal risk to people because of the low risk of ingestion. However, toxin-containing water droplets can become airborne and be inhaled or swallowed, creating a potential health risk when toxin levels are high. Swimming, power boating, jet skiing, water skiing, tubing and lawn irrigation also are not recommended.

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Is it safe to eat the fish I catch?

Typically, the toxins do not build up in fish filets in amounts that would make people sick and fish filets would be safe to eat as long as the internal organs, fat and skin of the fish are discarded. However, the extremely high levels measured in July 2010 coupled with the uncertainty of the buildup of toxins in fish tissues at this high level led the state to advise against eating fish from the lake at this time. Pending further evaluation of microcystin levels in fish filets from Grand Lake St. Marys, the advisory will be revisited.

The usual Ohio fish consumption advisory for Grand Lake St. Marys (which is NOT based on algal toxin analysis) states that largemouth bass, sunfish and yellow perch from the lake are safe to eat twice per week; meals of all other species should be limited to one per week due to mercury contamination. Go to www.epa.ohio.gov/dsw/fishadvisory/index.aspx to view the current Ohio Fish Consumption Advisory.

Can I still use lake to water my lawn and garden?

The state advises against this practice because toxin-containing water droplets from hoses and sprinklers can become airborne and be ingested through the nose or mouth.

Can my pet go in the water?

Pets, particularly dogs, are especially susceptible to harmful health effects if they are in the lake water, due to the amount of water they tend to ingest compared to their size. Pets should not be allowed to play in or drink water where algal blooms are present or when algal toxin levels are elevated. Do not allow animals that have been in the water to groom themselves because the algae clings to their fur and can be ingested when they groom. Do not allow animals to eat algae off the beach. For more information on risks to pets and livestock, go to www.epa.ohio.gov/dsw/HAB.aspx and click on the link to the "Harmful Algal Blooms – Protect Your Pets and Livestock" brochure.

Can harmful algae be transported from Grand Lake St. Marys to other lakes by boaters?

Algae is already transported in many different ways, including wind dispersal in dust, and most of the nuisance cyanobacteria are fairly widespread and common in lakes already. Algae is more likely to become a problem based on the level of nutrients present in the water and not the

amount of bacteria that may be transported from one lake to another. Transport of the small amount of algae that would be on a boat after traveling in the lake isn't enough to cause a significant algal bloom if that boat is used elsewhere.

How long could it take for algal toxin levels to drop below levels of concern?

The presence of algae is probably a long-term problem because phosphorus in the lake sediment will continue to be stirred up in the water, even if no additional nutrients were added to the lake from tributary streams. Scientists cannot accurately predict how long it will take for toxin levels to drop.

How long has the algal toxin been in Grand Lake St. Marys?

Algal species that have the potential to produce toxins have likely been present in the lake for a long time. Ohio EPA does not know how long algal toxins have been present. The state became aware of the problem in 2009 after getting results from its participation in a national lake survey for U.S. EPA.

Are algal toxins present in any other Ohio lakes?

In addition to Grand Lake St. Marys, Ohio is conducting routine sampling at Buckeye Lake southeast of Columbus. Microcystin levels have measured between 0.2 and 0.8 ppb this summer. Low levels of microcystin were discovered in Buckeye Lake and Indian Lake in 2009. Ohio EPA is aware of algal blooms on Lake Erie that are capable of producing algal toxins.

Ohio EPA accepts reports of potential algae issues in other Ohio lakes and investigates them as appropriate.

What is the State doing to improve water quality in Grand Lake St. Marys?

Efforts promoting conservation farming practices, improved manure management and upgraded septic systems are ongoing. More than \$3.5 million in state and federal dollars have been leveraged in the watershed for projects including whole farm conservation planning and conservation practice projects, purchasing Airy-Gators and home septic system repairs or replacement. A state-sponsored plan to reduce nutrients from agricultural lands

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has led to almost a quarter of the cropland acreage in the watershed obtaining an approved nutrient management plan. A U.S. EPA-funded report on strategies for restoring and managing the lake was recently released. Proposals in the report include treating the lake with alum to clear algae from the water column and strategic dredging.

What can farmers and livestock producers do to help improve water quality?

Focus on manure management and reducing the amount of phosphorus applied to fields. Use best management practices such as planting winter cover crops and avoiding winter application of manure. Work with their local soil and water conservation districts and/or farm service agencies to obtain technical and financial assistance.

What can lakefront homeowners do to help improve water quality?

Homeowners throughout the watershed are encouraged to limit the amount of phosphorus-containing fertilizer that they apply to their lawns. In addition, all homeowners who have septic systems should keep those systems properly cleaned and maintained to prevent additional nutrients from leaching into the lake.

What should I do if I see a spill or someone dumping in or near the lake?

Ohio EPA's Emergency Response Team is available 24/7 to respond to emergency releases and spills. Ohio EPA's spill hotline is (800) 282-9378. You may report spills anonymously. To report a non-emergency environmental problem, contact Ohio EPA's Northwest District Office at 1-800-686-6930. Be prepared to provide as much of the following information as possible:

- responsible party;
- date and time discovered or occurred;
- location;
- material(s) spilled/dumped;
- quantity released;
- hazards, e.g., hazardous material placard or materials safety data sheet (MSDS);
- affected media/area such as air, land or waterway, including threats to ditches, sewers, streams; and/or
- contacts on the scene such as the responsible party, contractor, facility's point of contact.

Where can I get more information about algal toxins?

Ohio EPA suggests the following Web links:

NOAA Great Lakes Sea Grant Extension Office - Harmful Algal Blooms FAQ:

www.glerl.noaa.gov/seagrant/GLWL/Algae/HAB/HABFAQ.html

Centers for Disease Control (CDC) - Facts About Cyanobacteria and Cyanobacterial Harmful Algal Blooms:

www.cdc.gov/hab/cyanobacteria/facts.htm

CDC page as printable PDF:

www.cdc.gov/hab/cyanobacteria/pdfs/facts.pdf

Grand Lake St. Marys Algal Toxin Web page:

www.epa.ohio.gov/pic/gls_m_algae.aspx

Direct link to Grand Lake St. Marys sampling data:

www.epa.ohio.gov/portals/35/inland_lakes/gls_m_microcystin_data.pdf

Ohio EPA Harmful Algal Blooms Web page:

www.epa.ohio.gov/dsw/HAB.aspx

Ohio Department of Health Web page: Blue-Green Algae/Cyanobacteria Harmful Algal Bloom (HABs) fact sheet

www.odh.ohio.gov/odhPrograms/eh/hlth_as/chemfs1.aspx