

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, five species of blue-green algae (cyanobacteria) emerged. All are capable of producing toxins.

- *Microcystis* produces the toxin microcystin.
- *Aphanizomenon* can produce multiple toxins including cylindrospermopsin, saxitoxin and anatoxin.
- *Anabaena* can produce both microcystin and cylindrospermopsin, as well as anatoxin and saxitoxin.
- *Cylindrospermopsis* can produce cylindrospermopsin.
- Also, *Planktothrix* is making a return and can produce microcystin, anatoxin and saxitoxin.

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 the other species.

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

Algal toxin levels vary considerably in different locations and on different days.

Microcystin levels in Grand Lake St. Marys were measured above 2,000 ppb in 2010. Cylindrospermopsin levels reached 9 ppb at the end of June 2010.

Anatoxin levels spiked at 15 ppb in early August. Saxitoxin was up to 0.09 in early July.

Ohio EPA continues to monitor the water quality and is posting the sampling results on its website regularly.

How often 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) and from the city's raw water intake and finished water. Samples from the beaches 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?”).

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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.

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, health effects from dermal (skin) contact 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?

There have been several reports of illness that are under investigation to determine whether they can be attributed to exposure to algal toxins.

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, please contact your local health department.

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.

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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?

It depends on the concentrations of algal toxins detected in the most recent sampling. People wanting to boat or swim should check the most recent advisory.

In general, state officials advise against direct contact with lake water. When toxin levels are very high, boating is not recommended either.

The state recommends you use your best judgment when considering boating, and if boating, have little or no contact with the water. Swimming, jet skiing, water skiing, tubing and lawn irrigation are not recommended.

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.

For the current Ohio Fish Consumption Advisory, go to www.epa.ohio.gov/dsw/fishadvisory/index.aspx.

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.

What precautions should I take when removing my boat from Grand Lake St. Marys and cleaning it?

The risk from exposure to toxins when removing your boat from algal toxin contaminated water is minimal. However, to reduce any potential exposure to algal toxin contaminated waters after removing a boat, ODH suggests the following preventive measures:

- Wear waterproof gloves.
- Drain the water in your holding tank.
- Drain the water from your boat motor.
- Gently wash/rinse the boat with clean, non-contaminated water.

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- If a high-pressure wash is going to be used, the state recommends letting the boat sit in the direct sun for a couple of hours so water can run off and/or evaporate. Cyanobacteria toxins quickly break down in the air and sunlight, so this will allow an opportunity to reduce the toxins potentially being aerosolized.
- If people have direct dermal (skin) contact with algal toxin contaminated lake water, thoroughly rinse all impacted areas with clean, non-contaminated water.
- If clothing becomes wet with algal toxin contaminated lake water, replace with dry clothing. Contaminated clothing can be cleaned in a household washer and dryer.

How long do the algae toxins last on the ground after rinsing my boat?

It is not known how long it takes the toxins to break down when they are out of the water. Experts do know that sunlight and bacteria break down the algal toxins. So, how quickly the toxins will break down depends on the conditions they are under.

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

The presence of algae is likely 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?

Algal toxins have been found in a number of inland lakes across Ohio in 2010.

You can find a list of state-owned lakes with advisories at ODNR's algae update website at <http://ohiodnr.com/tabid/22957/default.aspx>.

Ohio EPA accepts reports of potential algae issues in other Ohio lakes and investigates them as appropriate. To report a suspected algae bloom, visit www.epa.ohio.gov/dsw/HAB.aspx.

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, federal and local 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 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. This work will begin in the fall of 2010.

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

Farmers can focus on manure management and reducing the amount of phosphorus applied to fields. They should use best management practices such as planting winter cover crops and not applying manure to fields in the winter.

Farmers are encouraged to work with their local soil and water conservation districts and/or farm service agencies to obtain technical and financial assistance.

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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 material 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 (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.

I have seen a company spreading waste on fields near Grand Lake St. Marys. Is this legal?

A company may do this if it has a wastewater discharge permit from Ohio EPA for the land application of water and solids. Many discharge permits require the permit holder to land apply wastes in a specific manner and with appropriate setbacks to reduce the chance of runoff and contamination.

Ohio EPA staff will inspect permit holders to ensure they are following the terms of their permits.

If you are concerned about an activity you observe, you can contact Ohio EPA's Northwest District office or the Emergency Spill Line (See response to "What should I do if I see a spill or someone dumping material in or near the lake?").

Where can I get more information about algal toxins?

Ohio EPA suggests the following Web links:

- List of state and local contacts for issues at Grand Lake St. Marys
www.epa.ohio.gov/portals/47/citizen/GLSMContacts.pdf
- 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/glsm_algae.aspx
- Direct link to Grand Lake St. Marys sampling data
www.epa.ohio.gov/portals/35/inland_lakes/glsm_microcystin_data.pdf
- Ohio EPA Harmful Algae Blooms web page
www.epa.ohio.gov/dsw/HAB.aspx
- Ohio Department of Health web page — Blue-Green Algae/Cyanobacteria Harmful Algae Bloom (HABs) fact sheet
www.odh.ohio.gov/odhPrograms/eh/hlth_as/chemfs1.aspx