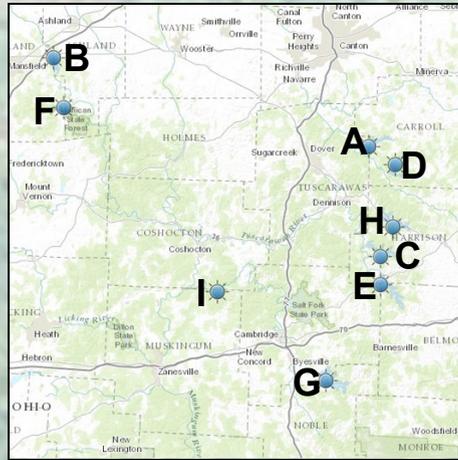


## Thank you to our Lake Keepers!

This report would not be possible without the dedication of citizen scientists. The MWCD Lake Keepers continue to watch over the reservoirs and gather water quality information, including HABs. For additional information on the Muskingum Reservoirs, visit [www.eyesonthewater.org/olms/](http://www.eyesonthewater.org/olms/).



A. Atwood Lake	Richard Bassetti Mark Hausman
B. Charles Mill Lake	Maureen Coleman
C. Clendening Lake	Mark Tondra
D. Leesville Lake	Dick Zimmerman
E. Piedmont Lake	Ed Lee
F. Pleasant Hill Lake	Steve and Sue James Don Driver
G. Seneca Lake	Don Dieffenbaugher
H. Tappan Lake	Mike Bennett
I. Wills Creek Lake	David Brumbaugh Jim Cook Dennis Sutek Loren Griffiths



For more information, contact:  
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8440 E. Washington St. #206  
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## Keeping an Eye on Our Lakes

### 2014 Algae Monitoring Report on the Reservoirs of Muskingum Watershed Conservancy District



## How to Keep Your Family Safe

Watch for posted warning signs.

**Orange Sign**  
Health Advisory  
Caution

**Red Sign**  
No Contact  
Warning  
Beware

When in doubt, stay out.



*\*HAB Photos courtesy of Ohio EPA.*

## What should you do?

- Stay out of water that may have a HAB.
- Do not let your children or pets play in HAB debris on the shore. Avoid scum on lake surface.
- After swimming or wading in lake water, even where no HABs are visible, rinse off with fresh water as soon as possible.
- Never swallow any lake or river water, whether you see HABs or not.
- Do not let pets lick HAB material from their fur or eat HAB debris.
- Do not drink or cook with lake water.
- See a doctor if you or your children might be ill from HAB toxins. If a pet appears ill, contact your veterinarian.
- Report blooms to CLAM, MWCD, or Ohio EPA. See how or for more information visit: <http://epa.ohio.gov/habalgae.aspx>



## GOOD NEWS!

Harmful Algal Blooms (HABs) are not a concern in the nine lakes of the Muskingum Watershed Conservancy District (MWCD). HAB toxin levels were well below Health Advisory thresholds, so the lakes are considered safe for recreational contact.

This report highlights three years (2011 - 2013) of monitoring for cyanobacteria (blue-green algae) that produce HABs and the common toxins associated with human health risk.

HABs are found in certain water conditions, such as high sunlight, low-water or low-flow, warmer temperatures, calm water, and excess nutrients. Nutrients come from pollution from runoff of fertilizers, animal manure, sewage treatment plants, storm water runoff, and failing septic tanks.

People exposed to HABs on the skin or by ingestion can experience a rash, allergic reaction, stomach ache, or dizziness. Toxins can also be harmful to pets, and in extreme cases, can even cause death.

## Study Design



MWCD partnered with the Citizen Lake Awareness and Monitoring (CLAM) program, sponsored by the Ohio Lake Management Society (OLMS), to monitor nine reservoirs located in the District; Atwood, Charles Mill, Clendening, Leesville, Piedmont, Pleasant Hill, Seneca, Tappan, and Wills Creek.

For three seasons, Lake Keepers collected water samples from beach shorelines using modified Ohio Environmental Protection Agency (EPA) methods twice a month, July through September. A metal bucket on a string, thrown 2 meters out from land, captured water 10 cm below surface at three locations along a 5 – 10 meter transect. The composite samples were cooled and sent by mail to BSA Environmental Services, Inc., Beachwood, Ohio to analyze the concentrations of two hepatotoxins (affecting the liver); microcystin and cylindrospermopsin. The number of cyanobacteria cells in a milliliter of water, or abundance, was also measured.

		Presence of Toxin Producing Cyanobacteria by Lake (2011 - 2013)								
		Atwood	Charles Mill	Clendening	Leesville	Piedmont	Pleasant Hill	Seneca	Tappan	Wills Creek
<input type="checkbox"/> Microcystin	Anabaena	x	x		x	x	x	x	x	x
<input type="checkbox"/> Cylindrospermopsin	Anabaenopsis	x	x	x		x		x	x	
	Aphanizomenon	x						x		
	Cylindrospermopsis	x	x	x	x	x	x	x	x	x
	Microcystis	x					x			
	Oscillatoria									x
	Planktothrix		x							

*Figure 1: Presence of toxin producing cyanobacteria genera found in the MWCD lakes (indicated with an 'x') during all three sampling seasons, 2011 through 2013. Aphanizomenon and Cylindrospermopsis produce the toxin cylindrospermopsin. The remaining genera shown above produce microcystin.*

## What We Have Learned

Most of the samples collected (75%) did not even register a measurable amount of toxin. Those that did were all less than 1.5 µg/L. This value is well below the threshold for a Health Advisory (6 µg/L) or No Contact warning (20 µg/L), as determined by the Ohio EPA (<http://epa.ohio.gov/habalgae.aspx>).

The cyanobacteria shown in *Figure 1* were found in the MWCD lakes. These are the common types that produce microcystin or cylindrospermopsin. Both of these toxins can cause liver damage if lake water is swallowed when toxin levels are high.

Cylindrospermopsis was the most common cyanobacteria seen in all nine lakes for the three seasons sampled. Oscillatoria and Planktothrix were the least common. These two types were only found all three years in Wills Creek Reservoir and Charles Mill Lake, respectively.

The average toxin concentration in the nine MWCD lakes over the three year period did not exceed 1 µg/L (*Figure 2*). Microcystin was found to be highest in Tappan Lake. Microcystin was very low in Clendening Reservoir and Seneca Lake (so low they are not shown on the graph) with values always below .15 µg/L throughout the three years of sampling. Cylindrospermopsin was only found in considerable amounts in Piedmont Lake, with an average just above 0.6 µg/L.

## What it Means

We now know that the types of cyanobacteria that produce toxins leading to a potential human health risk are growing in the MWCD Lakes. This is typical of Ohio lakes but is only a problem if they are found in high numbers. Measured toxin at the beaches where people have contact with the water has been well below the threshold for concern.

To remain safe, it is important to know that HABs exist. Use all lakes and rivers with caution. Be on the lookout for signs alerting visitors to potential danger. Remember that pets and children are at greater risk because they don't understand the hazard associated with an algae bloom. Stay informed and follow the Ohio EPA recommendations in this brochure. The MWCD will continue to monitor the water to ensure your safety as you enjoy the MWCD lakes.

Average Toxin Concentration (2011 - 2013) µg/L

Microcystin ■ Cylindrospermopsin ■

