

*Testimony of
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Subcommittee on Energy and the Environment
Cyanotoxins in Drinking Water
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Who Are We?

The Ohio Environmental Protection Agency has received primary enforcement authority from the United States Environmental Protection Agency (U.S. EPA) to implement the Safe Drinking Water Act (SDWA) within Ohio. We implement a “source to tap” program to ensure public water systems are in compliance with drinking water requirements. Ohio EPA regulates over 4,500 public water systems, including 114 that use surface water as a source. Twenty-five public water systems in Ohio use Lake Erie as their source water, serving a combined population of over 2.6 million people. Traditionally, Ohio implements and enforces drinking water standards and regulations that are established by U.S. EPA.

How did we get to where we are?

U.S. EPA’s general regulatory approach is very robust and results in scientifically defensible regulations. Ohio has been forced to “short-circuit” this rigorous regulatory process out of necessity in the current circumstances where Harmful Algal Blooms (HABs) threaten the source waters used by public water systems.

To fill this gap, beginning in 2010 Ohio began issuing recreational advisories for bodies of water, including Grand Lake St. Marys, that also were being used as a source of public drinking water. Ohio EPA anticipated that people would logically ask “If I can’t swim in it, is it safe to drink?” In an effort to answer these questions and reassure the public water systems’ consumers, we determined it was important to test the treated drinking water for the most common cyanotoxins. We also knew that it was critical to understand how we would use the test results once we had them. Ohio formed an interagency state workgroup with representatives from Ohio EPA, the Ohio Department of Health and the Ohio Department of Natural Resources to develop a HAB Response Strategy that dealt with both recreational and public drinking water issues. The workgroup benchmarked off other states and countries to develop a strategy that established sampling and analytical protocols as well as public health advisory levels for several of the most commonly identified toxins. Based on the research available at the time, Ohio EPA generally expected that testing of the treated drinking water would show that treatment was effective. The triggered advisory was included as a contingency, in case the data showed otherwise.

The majority of sampling has proven the effectiveness of treatment, as expected. Since sampling for cyanotoxins began in 2010, Ohio EPA has collected over 1,500 raw and treated water cyanotoxin samples at almost 50 public water systems. Public water systems that have recurring

HABs in their source water are encouraged to collect their own samples and have submitted hundreds of additional sample results to Ohio EPA. While cyanotoxins have been detected in the majority of the source waters sampled in Ohio, there were no detections above the drinking water thresholds until microcystin was detected above Ohio thresholds in the treated water for Carroll Township in September 2013 and for the City of Toledo in August 2014. In accordance with the State of Ohio HAB Strategy, these threshold exceedances resulted in the issuance of “Do Not Drink” Advisories.

What is Ohio doing to address cyanotoxins in public drinking water sources?

Ohio is working on many different fronts to respond to these issues. Our first of many steps to help combat HABs in Ohio after the events in Toledo was to immediately make \$1 million in grant funds available for cyanotoxin testing equipment so water systems can conduct their own monitoring, to be disbursed in up to \$10,000 increments per water system. This will enable them to more closely monitor the source water for algal blooms, which are very dynamic, and more rapidly respond with any necessary treatment adjustments. Ohio EPA also made \$50 million available as zero-interest loans for enhanced water treatment infrastructure and back-up water sources at public water systems.

Ohio EPA also has been coordinating with U.S. EPA regarding the health advisory levels expected to be issued by U.S. EPA, and we plan to update the State of Ohio HAB Strategy when they are finalized. We have been working with U.S. EPA on analytical methodologies and the effectiveness of various treatment processes. Ohio EPA also has been coordinating with the Association of State Drinking Water Administrators (ASDWA), and we concur with the comments and recommendations contained in its letter dated November 14, 2014, to this Subcommittee.

Ohio EPA issued and is developing revisions to a standard operating procedure for the most commonly used testing method (ELISA), so that the results are as consistent and comparable as possible. We also are coordinating with the kit manufacturer to investigate matrix interferences that may cause issues with the analytical tests. Additionally, we have been working with the Battelle Memorial Institute to establish a program to verify other available test kits.

We are coordinating with the Ohio Section of the American Water Works Association to update the white paper on treatment technologies. We have coordinated with the Ohio State University to establish a new reservoir management training course and to offer additional algal identification courses for public water system operators. We’ve also been working with public water systems, including participating in emergency planning exercises.

Ohio also has developed a coordinated strategy with the Departments of Agriculture, Natural Resources, EPA and Health to develop prescriptions for the watersheds in the Lake Erie basin to address nutrient pollution.

Request for federal guidance

Ohio EPA has been active in addressing HABs in drinking water sources, but these issues are very complex and we have repeatedly and will continue to request federal assistance and guidance. There are many other states in similar circumstances, although only a limited number of states have identified health advisory levels and many of them are different. It is our belief that the country would benefit from a consistent national approach to these issues. Specific elements to a national approach should include:

- **Health effects:** A robust assessment is needed on the health effects and recommended health advisory levels, not only for microcystin-LR (as expected), but also for other variants of microcystin as well as other common cyanotoxins. This assessment should take into account various exposures (especially acute and short-term) and sensitive subpopulations, as well as the cumulative effects of multiple cyanotoxins/variants. Federal guidance is requested for how and when any health advisory level should be applied. For example, if microcystin-LR is the only variant of microcystin for which a federal health advisory level is issued, how should states respond if other variants are detected above the LR threshold?
- **Detection:** Standard analytical methods are needed that are reliable and selective, but also affordable, available and easy to use. Analytical reference standards that are consistent and reliable are needed, as well as information on common matrix interferences and a method for evaluating and verifying the performance of the various test kits available. Guidance on the appropriate frequency of monitoring, considering the dynamic nature of the blooms, is also requested.

Finally, satellite imagery has been an important tool in the surveillance and monitoring of HABs in Lake Erie. This tool was previously also available for inland lakes but due to satellite losses has been unavailable for several years now. It is our understanding the satellite is expected to be replaced soon, but an expedited schedule to return this important detection tool to use is requested, if possible.

- **Additional ecological research:** Additional information is needed on the ecology of cyanobacteria, including what triggers them to produce cyanotoxins and why the toxins are sometimes more extracellular than intracellular and how treatment strategies may vary. In addition, more information about diurnal bloom dynamics may enable some water systems to employ avoidance strategies.
- **Treatment:** More guidance is needed on effective and reliable treatment approaches, including how to optimize current available treatment, best advanced treatment options, and management of treatment residuals. Guidance on effective reservoir management strategies would be helpful for many public water systems.

Prevention: Early detection of cyanotoxins in the source and treated water are necessary, but it won't necessarily prevent an advisory. Treatment of the source water is necessary but can become quite expensive if the source water quality is poor. The best approach in the long-term is

to work to implement source water protection activities as well as prevent blooms and bring these ecosystems back into balance via data-driven, targeted strategies to address nutrient pollution. Ohio EPA would support changes to Section 1452(k)(1)(C) of the Safe Drinking Water Act to make funds available again to complete assessments of waters being used as a source of drinking water.

Summary

Ohio EPA takes very seriously the quality of drinking water supplied by public water systems. HABs have proven to be a very dynamic and variable source of potential contamination, and for which many scientific uncertainties still remain. Ohio has taken many steps to proactively address the issue of cyanotoxins in drinking water, but this is a complex and challenging issue and much remains to be done. State and federal leaders need to work closely together to quickly advance the science to detect and effectively treat cyanotoxins in drinking water, and to adjust our strategies as new information is obtained.

I appreciate the opportunity to offer this testimony to the committee and would be pleased to respond to any questions the Committee may have during my oral testimony.

Nutrient Management Initiatives in Ohio

Ohio is aggressively tackling issues of water quality, particularly harmful algal blooms (HABs). A multi-faceted, multi-year approach to reduce the discharges and runoff of nutrients is vital to protect public health, the environment and our valuable water resources. Ohio's approach uses both broad and targeted projects and partnerships on the local, state, national and international levels. Some of these are highlighted below.

On-the-Ground Practices

- The Ohio Department of Natural Resources (ODNR), Ohio Department of Agriculture (ODA) and Ohio Environmental Protection Agency (Ohio EPA) have worked collaboratively to improve the health of **Grand Lake St. Marys** and its watershed. With the assistance of numerous local, state and federal partners, Ohio has implemented multiple practices including: increased dredging to improve boater safety and water quality; rough fish removal; constructed wetland and treatment train installation; improved aeration efforts; alum treatments and the installation of more than 700 conservation practices in the watershed.
- Through the **Ohio Clean Lakes Initiative**, the Ohio Legislature -- led by State Sen. Randy Gardner -- appropriated more than \$3.55 million for the installation of best management practices (BMPs) to reduce nutrient runoff in the Western Lake Erie Basin. State and local partners worked with more than 350 farmers to implement BMPs on more than 40,000 acres. Additional stream monitoring stations have also been installed to measure the effectiveness of these practices.
- The Ohio Legislature appropriated \$10 million to the **Healthy Lake Erie Initiative** to be used to reduce the open lake placement of dredge material into Lake Erie. The funds will identify or develop alternate uses for this material and identify additional disposal locations.
- Ohio EPA used funds from the **Great Lakes Restoration Initiative** to award grants to local and state organizations for projects to protect or improve Lake Erie water quality, including storm water projects, home septic system replacement/improvements and stream restoration projects.
- The Ohio Natural Resources Conservation Service is part of the **National Water Quality Initiative**, an effort to improve conservation practice delivery. Ohio EPA is assisting in this effort to help farmers implement conservation systems.

Strategies, Research, Partnerships and Legislative Updates

- In 2011, the directors of Ohio EPA, ODNR and ODA called together the **Directors' Agricultural Nutrients and Water Quality Working Group** of research scientists, agribusiness leaders and environmentalists to discuss how agricultural practices may affect conditions in Lake Erie and develop recommendations on how the state can partner with the agricultural community to promote nutrient stewardship statewide. The agencies also reconvened the **Ohio Lake Erie Phosphorus Task Force**. The group issued a new report that further analyzed the latest research on how nutrients are entering our water systems and made recommendations for both private sector and public policy initiatives to reduce the amount of nutrient loading in Lake Erie.
- Ohio EPA, coordinating with ODA and ODNR, developed **Ohio's Nutrient Reduction Strategy**, a comprehensive plan to manage point and non-point sources of nutrients and reduce their impact on Ohio's surface waters. The strategy recommends regulatory initiatives and voluntary practices that can reduce nutrients throughout the state. The agencies are also working to implement the Great Lakes Water Quality Agreement, a binational effort to develop phosphorus targets and allocations for the near shore and open waters of Lake Erie by 2016 and domestic action plans for achieving those targets by 2018.
- Ohio EPA is developing Nutrient **Water Quality Standards** targeting phosphorus and nitrogen in response to U.S. EPA's national nutrient criteria recommendations and the Clean Water Act. In 2013, Ohio EPA asked for public comments from various stakeholder groups. A nutrient technical advisory group will advise Ohio EPA as it moves forward with the next steps in developing nutrient standards.

Nutrient Management Initiatives in Ohio

- In 2014, Governor John Kasich signed into law **Senate Bill 150**, an update of Ohio's regulatory structure specifically geared to improving water quality. The bill requires fertilizer applicators to undergo education and certification by ODA; encourages producers to adopt nutrient management plans; allows ODA to better track the sales and distribution of fertilizer throughout the state; and provides ODNR the authority to repurpose existing funding for additional BMP installation.
- Ohio EPA works with local communities to develop, implement and fund long-term control plans to reduce overflows of nutrient-rich sewage into streams and lakes following heavy storms and snow melt. Since 2010, Ohio EPA has awarded more than \$292 million in low-interest and interest-free loans from the Water Pollution Control Loan Fund for 138 projects in the Western Lake Erie watershed.

Monitoring

- Ohio EPA's **water quality monitoring programs** are nationally recognized and essential to the state's nutrient management efforts. Ohio EPA staff annually surveys several watersheds across the state for water and sediment chemistry, biological health, diversity and habitat. These monitoring and sampling efforts include the inland lakes and Lake Erie near shore monitoring programs. Ohio EPA has formed partnerships with universities and other organizations to create a Lake Erie-specific monitoring network.
- Ohio EPA, ODNR and the Ohio Department of Health developed protocol for **monitoring public waters** where HABs exist or are suspected. Ohio is one of the first states to establish protocols for issuing advisories when algal toxins are present at or above threshold levels. For more information, go to ohioalgaefinfo.com.
- Ohio EPA developed a **Public Water System Harmful Algal Bloom Response Strategy** to assist the agency and Ohio's public water systems prepare for and react to HABs in public water system source waters.
- Ohio EPA partnered with the National Oceanic and Atmospheric Administration (NOAA) to be the first state to use **NOAA satellite data** to remotely detect HABs on inland lakes and Lake Erie. This helped focus sampling efforts on areas where HABs had not been previously reported.

For More Information

- Ohio's Nutrient Strategy and Nutrient Water Quality Standards — epa.ohio.gov/dsw/wqs/NutrientReduction.aspx
- Ohio Clean Lakes Initiative — cleanlakes.ohiodnr.gov
- Directors' Agricultural Nutrients and Water Quality Working Group — <http://agri.ohio.gov/topnews/waterquality/>
- Point Source and Urban Runoff Nutrient Workgroup — epa.ohio.gov/portals/35/documents/point_source_workgroup_report.pdf
- Water Quality Trading Program — epa.ohio.gov/dsw/WQ_trading/index.aspx
- Great Lakes Restoration Initiative — greatlakesrestoration.us
- Public water systems — epa.ohio.gov/ddagw/HAB.aspx



FACT SHEET

Division of Drinking and Ground Waters
Division of Surface Water
Division of Environmental and Financial Assistance
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Financial Incentives to Address Harmful Algal Blooms

Lake Erie is one of Ohio's crown jewels in terms of economic impact, natural resource value and water supply. Lake Erie is a source of drinking water for 23 Ohio public water systems serving approximately 2.6 million customers. Unfortunately, recreational and drinking water uses have been impaired by harmful algal blooms (HABs) in recent years. Ohio EPA is making funds available to enhance drinking water testing and treatment, as well as reduce nutrient levels in wastewater treatment plant discharges.

Harmful Algal Blooms

A variety of nutrient sources contribute to the formation of blue-green algae, which is naturally found in Ohio lakes, ponds and slow-moving streams. Approximately 80 species of blue-green algae can produce the contaminant known as microcystin. The World Health Organization has determined that microcystin in excess of one part per billion is considered unsafe for drinking water, and Ohio EPA advises local water authorities to follow that standard.

Health effects from exposure could include numbness and dizziness, nausea, vomiting, abnormal liver function, skin irritation or rashes. In early August 2014, the City of Toledo advised residents not to use the water for more than two days due to elevated levels of microcystin in the treated drinking water.

Testing and Analysis at Public Water Systems

Based on recent events in Toledo, it is clear that Ohio public water systems need a quick and cost-effective means to test their source and finished water for the presence of cyanotoxins (microcystin, cylindrospermopsin, saxitoxin). Having the capacity to analyze samples at the public water system rather than sending samples to an outside lab will allow flexibility in monitoring and a quicker response to any potential finished water detections. Given the dynamic and unpredictable nature of cyanobacteria blooms, having this flexibility is critical.

Ohio EPA will make available \$1 million in grants to Ohio public water systems to obtain the laboratory equipment, supplies and training needed to test for Microcystin and other Cyanotoxins. Only public water systems that use a surface water source are eligible for the funding, up to \$10,000 per system. Funds are available immediately.

Consistent Drinking Water Testing Protocol

Ohio EPA also provided guidance to public water systems on a consistent sampling and analysis protocol for microcystins and will be available to provide additional training. Water systems doing their own sampling will follow the procedures outlined in Ohio EPA's [HAB Response Strategy](#) for public water systems. If a public water system chooses not to purchase a test kit and has a bloom of concern in its water source, Ohio EPA will conduct the sampling on a prioritized basis as described in the HAB Response Strategy.

Public Water System Infrastructure Improvements

In addition, Ohio EPA will make available \$50 million at 0% interest for enhanced water treatment infrastructure components as well as back-up water sources. These funds will be administered through Ohio EPA's Water Supply Revolving Loan Account (WSRLA). The targeted entities are also public water systems that use surface water as a direct source. Priority will be given to water systems in the Lake Erie watershed, and those that have already experienced an algal bloom or a detection of toxins.

Financial Incentives to Address Harmful Algal Blooms

Qualifying projects will include components at water treatment facilities that treat for toxins produced from harmful algal blooms, as well as projects that implement avoidance strategies such as interconnections with other water supplies, new elevated storage facilities and the installation of alternative sources for source water. The 0% interest rate will be available for the portion of the project directly attributable to the treatment or avoidance strategy. Standard, below-market interest rate loan funds will be offered for the balance of a proposed project.

A call for project nominations will occur in the near future and water systems could receive assistance as early as this fall.

Nutrient Reduction from Wastewater Treatment Plants

Ohio EPA will make available \$100 million at a 0% interest rate for equipment and facilities that reduce the levels of phosphorus and other pollutants. Priority will be given to public wastewater treatment plants in the Lake Erie watershed or a watershed where Ohio EPA has identified that phosphorus is excessive.

The 0% rate will be available for the portion of the project directly attributable to the nutrient reduction. Standard, below-market interest rate loan funds will be offered for the balance of a proposed project. Priority will be given to public wastewater treatment systems in the Lake Erie watershed or a watershed where Ohio EPA has identified that phosphorus is excessive. Project nominations are currently being accepted through Sept. 5, 2014.

For More Information

More information about these funding options and microcystin sampling at public water systems is available at www.epa.ohio.gov/HAB_funding.aspx