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Harmful Algal Blooms and Drinking Water

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AGRICULTURAL & FOOD LAW CONSORTIUM

The Agricultural & Food Law Consortium, led by the National Agricultural Law Center, is a national, multi-institutional collaboration designed to enhance and expand the development and delivery of authoritative, timely, and objective agricultural and food law research and information.

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What is a Harmful Algal Bloom?

Algal communities are a part of healthy ecosystems, but when the population of algae "blooms" or rapidly increases, the toxins produced by some algae can significantly impact surrounding ecosystems. For instance, cyanobacteria, commonly called blue-green algae, are commonly found in freshwater, but certain freshwater cyanobacterial can bloom and produce cyanotoxins. These events, known as harmful algal blooms (HABs), can result in major fish kills, cause economic harm to local communities, limit recreational use of waterways, and threaten human and animal health.

What causes HABs?

Warmer temperatures and increased nutrient concentrations (nitrogen and phosphorus) provide environmental conditions that allow algal communities to grow excessively and bloom, producing toxins. Nutrients like nitrogen and phosphorus enter waterbodies through a number of sources including municipal wastewater discharges, stormwater runoff, and agricultural discharges, such as fertilized cropland manure and runoff.

The frequency and distribution of HABs has been increasing in recent years. In addition to an increase in the occurrence of HABs, the number of reported toxic species and toxins has also increased. HABs have been reported in all 50 states and affect ecosystems and waterways that cross state lines.

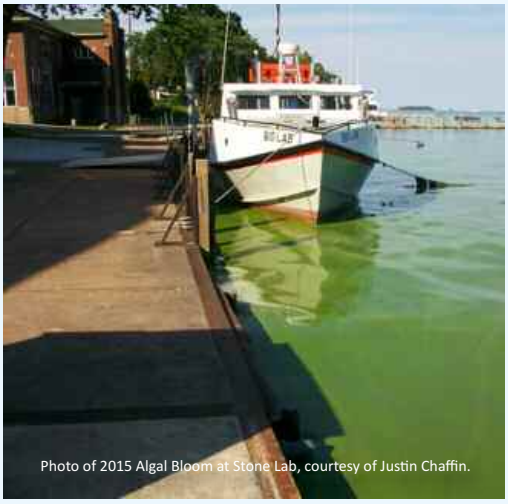

Photo of 2015 Algal Bloom at Stone Lab, courtesy of Justin Chaffin.

What's the concern?

An algal bloom is poisonous if consumed; it can result in abnormal liver function, diarrhea, vomiting, nausea, numbness, and dizziness. Children, the elderly, people with compromised liver function, and pets are especially vulnerable to the toxins present in HABs. In fact, just coming into contact with contaminated water could cause skin rashes or burns. Boiling the water increases the presence of the toxin.

CDC Takes Action

In response to the attention given to recent HABs, the U.S. Centers for Disease Control and Prevention (CDC) launched the One Health Harmful Algal Bloom System (OHHABS) in June 2016. The OHHABS is a voluntary reporting system for both state and territorial public health departments. By collecting this data, the CDC hopes to increase the understanding of why HABs occur and to prevent future HABs and their associated illnesses.

More information on the OHHABS can be found at: https://www.cdc.gov/habs/ohhabs.html.

HAB Case Studies

In recent years, Lake Erie has been subject to multiple algal blooms. The city of Toledo, Ohio relies on Lake Erie to supply drinking water to its residents. In 2014, a cyanobacterial HAB in Lake Erie forced Toledo to issue a "do not drink" order for tap water that resulted in 500,000 people being without drinking water for several days, and over 100 people in the city became ill from the water. Toledo residents were forced to rely on bottled water. Economists estimate that the drinking water restriction resulted in $65 million in lost benefits.

Of late, algal blooms in Lake Erie have become an annual occurrence. The 2017 bloom was the third largest in history, behind blooms in 2011 and 2015. The bloom contained microcystis cyanobacteria, but a water emergency did not need to be declared.

Detroit Lake in Oregon has also seen an increase in HABs. In May 2018, the city of Salem, Oregon, which obtains its drinking water from Detroit Lake, found dangerous levels of cyanotoxins in its water supply. At one point, the city's water supply tested at 6.96 parts per billion of cylindrospermopsin. The result was a "do not drink" water advisory that lasted for weeks, and the Oregon Health Authority issued a temporary rule requiring certain larger drinking water systems that use surface water to regularly test for cyanotoxins.

HABS and the Safe Drinking Water Act

The cynobacterial toxins often found in HABs, microcystins and cylindrospermospin, are not regulated under the SDWA. However, EPA has taken the following actions regarding these toxins:

2015 Amendments to the SDWA

Requires the EPA to develop a strategic plan targeted at managing the risks of algal toxins in drinking water supplies.

2015 EPA Health Advisories (HA) for Microcystins and Cylindrospermospin

* The HA levels released by EPA are informal technical guidance and not regulatory values *

Contaminant	*Pre-school age and younger (<6 years)*	*School-aged children through adults*
Microcystins	<= 0.3 micrograms/liter	<= 1.6 micrograms/liter
Cylindrospermospin	<= 0.7 micrograms/liter	<= 3.0 micrograms/liter

2016 EPA Unregulated Contaminant Monitoring Rule

What is covered?	30 contaminants, including 10 cyanotoxins.
Who must monitor?	Applies to all community water systems and non-transient non-community water systems serving more than 10,000 people (@about 6,000 PWS).
Are all systems treated the same?	No. Only surface water systems and systems that use ground water under the direct influence of surface water will have to monitor cyanotoxins.
When will the monitoring occur?	The monitoring under the rule will occur from 2018-2020.

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