WATER QUALITY & HEALTH COUNCIL
PERSPECTIVES

How Algal Blooms Can Impact Water Quality: What You Should Know

By Bob G. Vincent
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In a nutshell…

The summer of coronavirus (COVID-19) has been relatively mild for blue-green algae (cyanobacteria) blooms in the Great Lakes. But problem areas can be found in many states. This article provides an overview of the public health importance of harmful algal blooms on recreational waters and sources of treated drinking water.

As if the coronavirus pandemic was not enough, many parts of the nation still have to contend with seasonal algal blooms. These usually occur in late summer or early fall months and in shallow, slow-moving surface waters. Algal blooms are most common in freshwater lakes, reservoirs, and ponds. Some can also release potentially harmful toxins.

Photo credit: National Oceanic and Atmospheric Association

Florida, in particular and many other states, as well as local governments and utilities that rely on surface water for drinking water, are taking steps to address algal blooms. Drinking water utilities are increasingly using advanced treatment approaches to protect their customers. But there is also a need to improve risk management and communications about algal blooms in fresh recreational waters.

Harmful Algal Bloom Basics

Algae are simple plants that live in fresh, brackish, and marine waters. The latter includes those that cause "red tides" in the Gulf of Mexico that can cause itchy eyes, scratchy throats, and make shellfish dangerous to eat. Blooms can also cause respiratory effects at recreational beaches. Algae, including freshwater blue-green algae—which are actually photosynthetic cyanobacteria—contribute to the food chain and help keep waterbodies healthy. But with warm water temperatures and excess nutrients (primarily nitrogen and phosphorus), rapid or even explosive algae and cyanobacteria growth can crowd-out other aquatic plants. These scum- or foam-like masses are called blooms, and can appear in a wide variety of colors in addition to blue-green. They can also sink below the surface overnight, only to reappear during the day. Algal blooms can be widespread and are pushed to and can accumulate on the shore by waves, winds, and currents.

Some cyanobacteria blooms can release one or more toxins (called cyanotoxins[1]) at potentially high levels. Such harmful algal blooms (HABs) can poison people, pets, wildlife, and ecosystems alike. HABs and cyanotoxins can also create significant taste and odor problems in drinking water and potentially interfere with treatment performance.

Harmful Algal Blooms and Drinking Water Treatment

In August 2014, the Water Quality & Health Council wrote about how almost half a million residents in and around Toledo, Ohio, were told that their tap water was undrinkable. This happened when their treatment plant was overwhelmed with microcystin toxins from an HAB on Lake Erie. That high-profile event ultimately led to nearly $133 million in investments in Toledo water treatment infrastructure upgrades. Two years ago, we focused on cyanobacteria blooms and toxins and their potential impact on the provision of safe drinking water. We explained that while "conventional" treatment—including filtration and chlorination—uses time-proven treatment processes to produce safe drinking water, algae-laden waters often require additional treatment and source water protection. Expanded cyanotoxin monitoring, adjusting water pH to ensure adequate disinfection conditions, and timely public health notifications are effective tools in minimizing the potential health impact of HABs. Boil-water precautions, however, are not. This is because they can increase the levels of toxins that may be present through evaporation.

Harmful Algal Blooms and Recreational Waters

Photo credit: New York State Department of Health

In water bodies with algal blooms, splashing or wakes caused by boating can release cyanotoxins into the air that can be inhaled. But swallowing large amounts of contaminated water is usually what causes illness, because the toxins don't easily pass through the skin. Cyanotoxins can be harmful to people and deadly to animals, livestock, and especially dogs such as by licking cyanobacteria or toxins off their fur. **It is important to stay out of recreational waters containing blooms.** Waterborne disease outbreaks and illnesses from HABs have been on the rise. Also, some HABs can release bad smells that can cause temporary irritation.

The Future of Harmful Algal Bloom Research and Prevention

Many states have expanded their research budgets, online resources, and public health communications about cyanobacteria and other HABs in recreational waters. In 2016, EPA released a strategic plan and health advisories to assess and manage these risks in drinking water. In 2020, EPA's Office of the Inspector General announced a review of the agency's work to date on HABs.

Guidance, research resources, and advisories aside, the biggest challenge to stopping future HABs will be improving the control of nutrient loading across the nation. That is, preventing the conditions that favor

[1] There are four major classes of cyanotoxins, which vary in toxicity. Persons and animals swallowing cyanotoxins are most at risk of upset stomach, vomiting, and diarrhea, but liver and kidney damage are also possible. Microcystins (also known as cyanoginosins) are the most common and frequently studied class of cyanotoxins.

HAB formation in the first place. Nationally, that remains a complex and expensive retrofit of our decades-old practices. Ensuring best management practices for urban and rural fertilizer use, stormwater runoff, and wastewater disposal would significantly reduce future HABs, better protect swimmers, revitalize our natural waters, and reduce the costs of safe drinking water.

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