Protecting America's Water from Harmful Algal Blooms

Ellen Gilinsky

It's algal bloom season. And as we know, in many of our lakes and other water bodies this "season" has become more frequent and predictable, especially when there are excess nutrients in the water. In fact, close to 2.5 million acres of lakes, reservoirs, and ponds alone have poor water quality because of nitrogen and phosphorus pollution.

Some algal blooms can produce toxic compounds, cyanotoxins, at levels of concern for human health and the environment. When these harmful algal blooms, or HABs, are present near drinking water intakes, cyanotoxins can enter the drinking water utility's supply, putting the local population at risk. Drinking water utilities impacted by HABs must be prepared to remove the cyanotoxins through the drinking water treatment process. Toxins from HABs have also killed pets and livestock and may pose a risk for swimming and other recreation on or in the water.

Today, most of us take safe drinking water for granted. It's such a basic need – Americans drink over 1 billion glasses of tap water every day. The United States Environmental Protection Agency (EPA) estimates that between 30 and 48 million people use drinking water from lakes and reservoirs that may be vulnerable to algal toxin contamination.

Blooms like these are becoming a more frequent occurrence and have diverse and far-reaching economic impacts, not just on drinking water treatment, but also on tourism, real estate values, commercial fishing, and recreational businesses in the United States. The bottom line is nutrient pollution and the algal blooms it helps cause are hurting businesses and jobs that depend on clean water.

Clean and reliable water is the foundation of what makes America a great place to live and work. It's what lets our children grow up healthy, keeps our schools and hospitals running, and fuels our economy. From power plants and manufacturers to local brewers, companies across America depend on clean water. Major companies locate where water will be clean and plentiful well into the future, bringing thousands of jobs with them.

EPA, working in partnership with the states and other federal agencies such as USDA, has made much progress on efforts to address sources of nutrients, with specific actions to reduce nitrogen and phosphorus pollution from wastewater treatment plants, industries, agriculture, and stormwater runoff.

We have taken an important step toward protecting headwaters and small streams from pollution with our proposed Clean Water Rule.

And we have worked with states and other clean water partners to further protect these water sources through the recent release of a toolkit to help identify local opportunities to reduce nutrient pollution in drinking water sources. It's called *Opportunities to Protect Drinking Water Sources and Advance Watershed Goals through The Clean Water Act* (www.gwpc.org/cwa-sdwa-coordination-toolkit). We are also partnering with 25 organizations to further protect drinking water sources through the Source Water Collaborative.

In August 2014, EPA announced $12 million in Great Lakes Restoration Initiative funding to federal and state agencies to strengthen ongoing efforts to target harmful algal blooms in western Lake Erie. Another $17 million was announced in March 2015 to fund projects that will improve water quality by preventing phosphorus runoff and soil erosion in Great Lakes tributaries.

Our researchers are working with three partnering agencies – NASA, NOAA, and USGS – on ways to better monitor coastal and inland waters for potential blooms, including developing an early warning indicator system using satellite data to detect algal blooms through a mobile application for handheld devices. Other researchers are looking at drinking water treatment options and the health effects of cyanotoxins.

And this June we released new drinking water health advisories and analytical methods for cyanotoxins that states and drinking water utilities can use to protect Americans from elevated levels of algal toxins. These recommendations support ongoing monitoring and treatment efforts across the nation.

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envision a database with multiple sources of water quality data, a mechanism for updating the data and access provided in a variety of ways for a variety of users. In short, understanding the dynamics of lake trophic status and cyanobacteria bloom risk is an increasing concern for lake resource managers. The computational approaches we describe here, as well as conducting research via the tenets of open science, will allow us to make significant advances in cyanobacteria ecology and other related fields.

Selected References

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Jeffrey Hollister is a landscape ecologist with expertise in the spatial component of ecology and environmental sciences. Since May of 2006, he has worked as a research ecologist with the U.S. EPA's Atlantic Ecology Division in Narragansett, RI. His current research focus is on how nutrients drive risk of cyanobacterial blooms in lakes and ponds. A unifying theme to his research is using Open Science (Open Access, Open Source, and Open Data) to benefit environmental science.

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Providing clean and safe water for healthy, thriving communities will require new solutions. Shifting rain patterns and seasonal temperatures across the country, in combination with increasing nutrient pollution, can lead to increases in harmful algal blooms. The science on harmful algal blooms is evolving and so are our solutions. Continued monitoring and treatment, and investment in our nation's water infrastructure, are necessary to prevent more blooms in the future**.**

I am encouraged by all of the great efforts going on at EPA and with our federal and state partners. When we all work together, we can adapt to new circumstances and protect our most precious resource for our children and our communities.

Ellen Gilinsky has served, since 2011, as the Senior Policy Advisor for Water at the Environmental Protection Agency. In this position Dr. Gilinsky addresses policy and technical issues related to all EPA water programs, with an emphasis on science, water quality, and state programs. Prior to this appointment she served as director of the Water Division at the Virginia Department of Environmental Quality (DEQ), where she supervised a diverse array of water quality and quantity programs, and before that as manager of the Office of Wetlands and Water Protection, helping to craft Virginia's non-tidal wetlands regulations and permitting program.