

Research reveals harmful algal blooms' daily cycles

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A freshwater harmful algal bloom turned Lake Erie a bright blue-green. Credit: NASA

In new NSF-funded research, scientists at the Great Lakes Center for Fresh Waters and Human Health show that, as in the rest of life, timing is everything. Published in the journal *Frontiers in Microbiology*, their recent paper reveals a day in the life of a *Microcystis* bloom, says George Bullerjahn, director of the center at Bowling Green State University.

The team showed that shifts in metabolic functions of freshwater cyanobacteria present in [toxic algal blooms](#) take place according to the time of day. Using DNA samples collected over 48 hours following a 2014 toxic bloom in Lake Erie that left Toledo-area residents drinking bottled water, the scientists looked at what genes were active at different times of the day or night.

Lake Erie experiences [harmful algal blooms](#) every year. The blooms are expected to become worse as the lake continues to be enriched by nitrogen

and other nutrients from farm field runoff. That process causes more algae to grow, which sink to the bottom when they die and contribute to oxygen depletion of the water.

Cyanobacteria rely on nutrients such as nitrogen and phosphorous, which they must get from their environment. "Nitrogen acquisition happens by day, using energy driven by daytime photosynthesis," Bullerjahn said. In contrast, phosphorous uptake uses much less energy and so does not seem to be as affected by the time of day, the analysis found.

More information: Emily J. Davenport et al. Metatranscriptomic Analyses of Diel Metabolic Functions During a *Microcystis* Bloom in Western Lake Erie (United States), *Frontiers in Microbiology* (2019). [DOI: 10.3389/fmicb.2019.02081](https://doi.org/10.3389/fmicb.2019.02081)

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