HABs State of the Science Webinar series: HABs Blooms Sources and Modeling
Thursday June 23, 2016, 1:00-2:00 p.m. (EDT)

Q/A follow-up
(This document will be updated as answers will be available)

Question for Mike McKay, Bowling Green State University: Do the N compounds affect more Planktothrix than other genre?"

The link between nitrogen and Planktothrix appears to be related more so to Planktothrix being a superior competitor for N than other taxa. In our article published last year (Davis et al., 2015. Environ. Sci. Technol. 49: 7197-7207), we showed that Planktothrix responds equally well to additions of various forms of N including nitrate, ammonium and urea with both ammonium and urea addition leading to higher toxin production. Our data also suggested that Planktothrix may interact with other nitrogen fixing organisms in the Bay once reactive nitrogen becomes depleted later in the summer. This could be a form of mutualism whereby Planktothrix excretes organic carbon used by nitrogen fixing bacteria who in turn provide fixed nitrogen. We also believe that when nitrogen is plentiful, Planktothrix may invoke luxury consumption – i.e. it acquires more nitrogen than needed and stores the excess in any number of nitrogen storage compounds (cyanophycin, phycobiliproteins, excess Rubisco enzyme, etc). When nitrogen becomes depleted, Planktothrix can draw from those internal reserves.

Question for Mark Rowe, University of Michigan: How do the nutrient inputs from the Detroit River continue to be ignored?
1. Statistical models based on Maumee River phosphorus load or discharge can explain > 90% of the interannual variance in bloom intensity (Obenour et al., 2014), indicating strong influence of Maumee River nutrient loading, and weak influence of Detroit River nutrient loading.

2. Review of satellite-derived bloom extent over 2002-2014 indicated that blooms occur most frequently in Maumee Bay and rarely occur in the Detroit River plume (Wynne and Stumpf 2015), again indicating strong influence of the Maumee River and minimal influence of the Detroit River.
Detroit River nutrients may contribute to other issues such as hypoxia.

Obenour, D. R., A. D. Gronewold, C. A. Stow, and D. Scavia (2014), Using a Bayesian hierarchical model to improve Lake Erie cyanobacteria bloom forecasts, Water Resour. Res., 50, 7847-7860, doi:10.1002/2014WR015616.

Wynne, T. T., and R. P. Stumpf (2015), Spatial and Temporal Patterns in the Seasonal Distribution of Toxic Cyanobacteria in Western Lake Erie from 2002–2014, Toxins, 7(5), 1649-1663.