Water WoRDs

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How WRD is addressing algae in Lake Erie

Last summer we posted a piece about Harmful Algal Blooms and talked a little bit about the WRD's concern for Lake Erie. Unfortunately, August 2014 saw the development of a Harmful Algal Bloom (HAB) that impacted the City of Toledo's water supply, including about 34,000 Michiganders in Monroe County that rely on Toledo water.

WRD beach monitoring at Stony Point (LES6), 2013

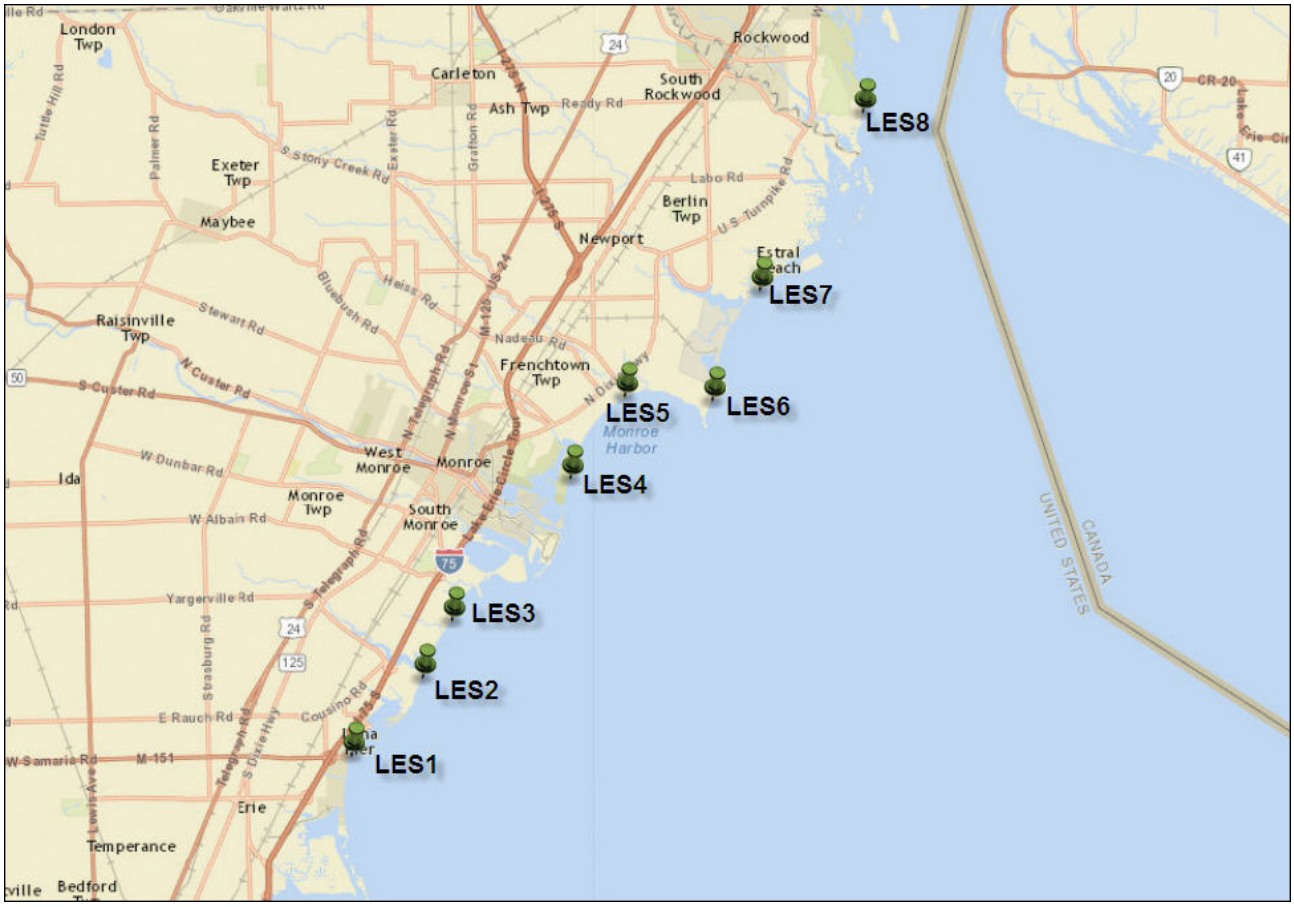
Since then, we've been hard at work with our local, state and federal partners to find a solution and want to share more information with our readers. To truly fix what ails our large lakes, Lake Erie in particular, we need all hands on deck.

HABs refer to blue-green algae, also known as Cyanobacteria, a group of naturally-occurring photosynthetic bacteria that typically grow in lakes, ponds and slow-moving streams. Similar to plants and true algae, they photosynthesize and produce oxygen. Environmental

conditions that can promote the group of blue-green algae include ample sunlight, warm weather, low turbulence and high nutrient levels, particularly phosphorus.

Blue-green algal blooms can arise quickly and are highly visible, often appearing as blue-green paint sheen or scum at the water surface. Blooms are aesthetically displeasing and wind-driven accumulations on shorelines can cause significant odors as they decay. Furthermore, as part of their natural life cycle, some blue-green algae release toxins into the water following a bloom. Ingestion can have both acute and chronic health effects and, in rare instances, may result in death of humans and animals. The presence of one of those toxins, microcystin, led to the Do Not Drink advisory in Toledo and, more recently, a similar advisory for Pelee Island, Ontario was issued along with beach closures.

The WRD is currently working on the development of water quality criteria for microcystin and is awaiting US-EPA finalization of its own criteria to assure consistency. Meanwhile, WRD staff have been monitoring for microcystin along the western shore of Lake Erie since 2012. In the absence of state or federal standards, water suppliers are relying on the World Health Organization's recommendation of a Do Not Drink threshold at 1 part per billion microcystin and a Do Not Use Drinking Water threshold at 20 parts per billion microcystin. The WRD coordinates its efforts with the DEQ's Office of Drinking Water and Municipal Assistance, which works closely with water suppliers to assure safe and clean drinking water for Michiganders. For more information about DEQ's efforts to protect drinking water, check out Current State of HAB Impacts to Michigan Drinking Water Supplies.



WRD beach monitoring locations for microcystin in western Lake Erie

So how do we prevent HABs on Lake Erie? We get asked that question a lot and while many have found it easy to point a finger at phosphorus inputs alone (in particular, contributions from agriculture or Detroit), the WRD is urging our partners to focus on a multi-pronged attack to solve the problem. Because phosphorus alone does not explain the dramatic increase in Lake Erie HABs since the mid-1990s, here's what we think:

1. Yes, phosphorus remains a huge factor. But total phosphorus contributions can be well-controlled by optimizing removal at five key wastewater treatment plants within the watershed: Detroit, Wayne County-Downriver and the Ypsilanti Community Utilities Authority in Michigan; Fort Wayne in Indiana; and Toledo in Ohio. Optimizing treatment can occur with minimal capital expenditures. Relying upon existing facilities and fine-tuning plant operations can minimize total phosphorus concentrations in treated effluent. The WRD calls on its fellow state permitting agencies to follow Michigan's lead in transitioning toward a growing season average concentration for total phosphorus in treated effluent of 0.6 mg/l.
2. Contributions of total phosphorus from agricultural and non-point sources must also be better controlled, in particular within Ohio's Maumee River watershed.
3. We call on the Army Corps of Engineers to cease the open water disposal of dredged sediment from Toledo Harbor. Moving phosphorus-laden sediment around within the waterbody is not a solution or even a temporary fix. This practice has to stop.
4. In Michigan, we will continue to implement phosphorus control activities throughout the state and to the best of our abilities. However, this is one area where individuals can lend a hand. Restricting fertilizer applications, controlling storm water runoff and working to educate neighbors on water stewardship practices are all on the checklist. Every bit of help… helps.
5. Finally, and sadly most overlooked, is the impact on Lake Erie from aquatic invasive species. HABs returned to the Great Lakes at the same time zebra mussel populations were peaking. Zebra mussel and now quagga mussels, commonly referred to as "ecosystem engineers," directly encourage HABs by changing the dynamics of phosphorus cycling in lakes as well as preferentially feeding on green algae and rejecting blue-greens, thereby shifting the composition of the algal community. The ability of zebra mussels to filter large volumes of water are a key factor in the return of blue-green algae blooms, increased presence of microcystin, taste and odor problems, and the development of "muck" on beaches. While these are known consequences of zebra and quagga mussel infestations, managing their population has been starkly absent from the recommended actions for reducing HABs and restoring lake ecosystems. This omission is likely because mussel management options are not well developed yet and management is difficult to implement. Zebra and quagga mussels' effect on elevated cyanobacteria toxin concentrations in low nutrient systems are especially concerning; as the effects of continued efforts to reduce nutrients entering Lake Erie are unclear and may even exacerbate HABs.

It is time to change the paradigm. The mindset that external phosphorus load reductions alone can solve Lake Erie's nutrient problems need to be replaced by a holistic approach that strives to understand and manage external and internal nutrient loading as well as AIS, including zebra and quagga mussels. This is today's problem for the current generation of water quality professionals.