OHIO SEA GRANT AND STONE LABORATORY

CITIZEN SCIENCE AT WORK

Charter Boat Captains Help to Monitor Lake Erie Water Quality

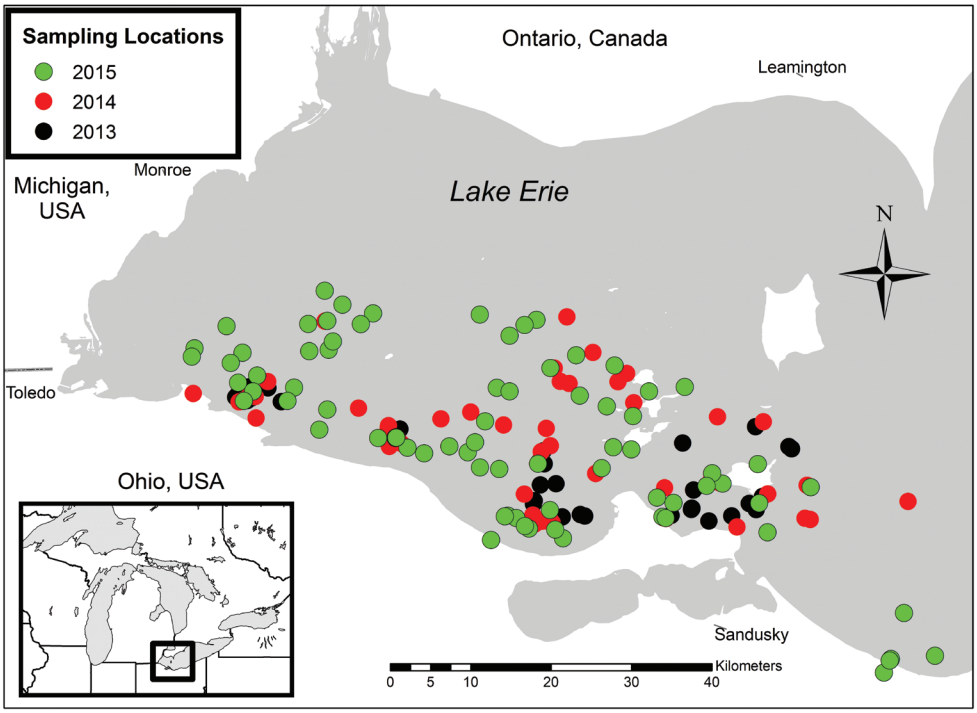
Routine monitoring programs are necessary to determine the health of Lake Erie. Many of these monitoring programs focus on scientists doing the work, but programs that involve citizens can perform a dual function: collecting data on Lake Erie water quality as well as educating people on what they can do to keep the environment healthy.

Charter fishing boats spend several days per week on the lake with citizens who already have an interest in Lake Erie's health. Training charter captains how to collect water samples can increase existing monitoring programs and provide a valuable learning experience to anglers.

In 2012, charter boat captains began to collect water samples in the western basin of Lake Erie under Ohio EPA guidance. Stone Laboratory took over coordination of the sampling program the following year, with funding provided by Ohio EPA. Every week during fishing season, the captains collect a water sample and measure water temperature and water clarity at locations they visit during charter trips. Stone Laboratory staff retrieves the samples from the captains and returns to the laboratory for analysis. In addition, samples are collected during Stone Lab field trip cruises, getting more than 6,000 kids each year involved in this Lake Erie protection effort.

Data from the captains' samples are used by lake managers and scientists tracking algal blooms in Lake Erie, by NOAA and NASA researchers linking satellite observations of the lake to bloom conditions, and by University of Toledo researchers collecting data on Lake Erie water quality.

A harmful algal bloom (HAB) is any large increased density of algae that is capable of producing toxins or has negative impacts on aquatic organisms. In freshwater, such as Lake Erie, those algae tend to be cyanobacteria — more commonly known as blue-green algae — which are always present in the water to some extent, but which grow excessively in warm water with high concentrations of phosphorus and nitrogen. Cyanobacteria produce a toxin called microcystin, which affects the liver, nervous system and skin, and potentially causes cancer in humans. Reducing the amounts of phosphorus and nitrogen that enter Lake Erie will reduce the size of the bloom.

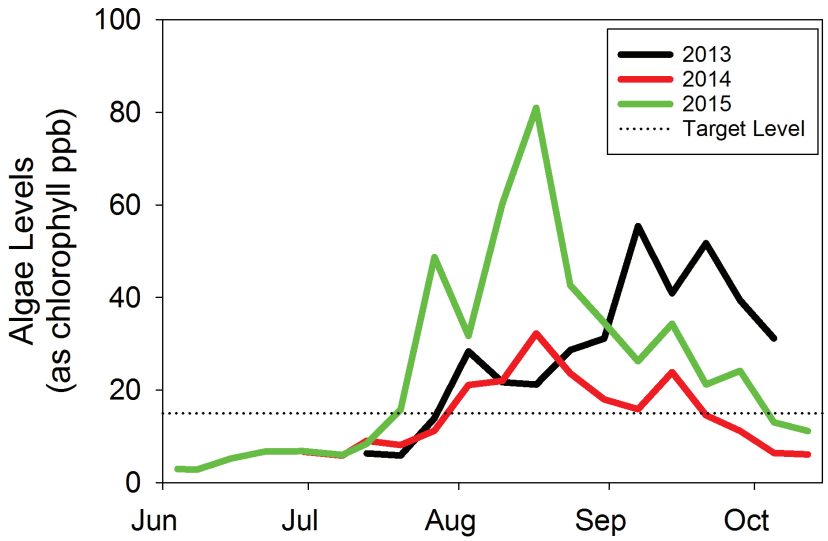


The captains have collected more than 220 samples since June 2013 throughout the western basin from Toledo to Huron.

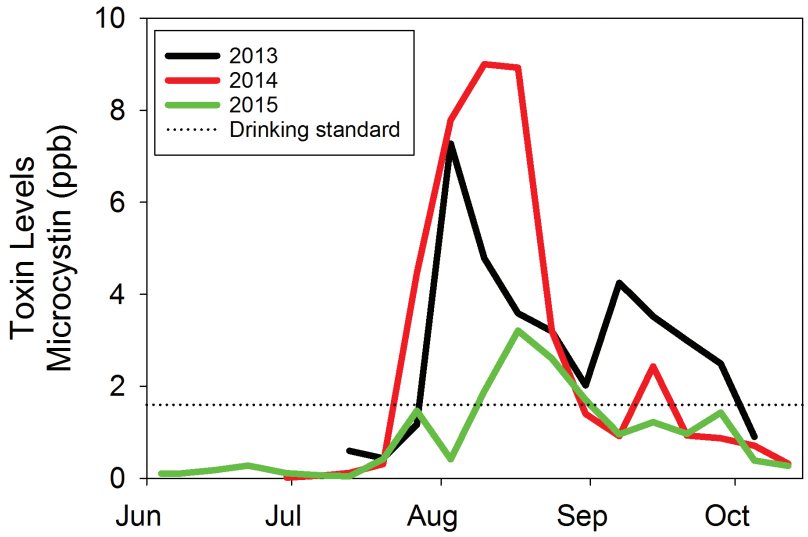
OHSU-TS-1510

The 2015 harmful algal bloom was the largest bloom on record, but produced low levels of toxin.

The massive 2015 harmful algal bloom was fueled by high inputs of phosphorus and nitrogen from the Maumee River following the June storms.



- There are "good" and "bad" forms of algae that are measured in chlorophyll parts per billion (ppb). Cyanobacteria (blue-green algae) produce toxins that are harmful to humans and other wildlife, while other forms of "good" algae (diatoms and green algae) act as an important food source for Lake Erie organisms.
- The 2015 harmful algal bloom (green line) was the largest bloom on record and primarily consisted of cyanobacteria.



- The size of an algal bloom does not necessarily predict how much toxin will be present. For example, the large 2015 bloom (green line) produced lower levels of toxin compared to blooms in 2013 and 2014 (black and red lines).
- The Ohio EPA considers microcystin levels above 6 ppb unsafe for swimming, 1.6 ppb unsafe for adult consumption (black dotted line), and 0.3 ppb unsafe for child consumption.