NOAA Western Lake Erie Harmful Algal Bloom Seasonal Assessment

29 October 2020

2020 Bloom Analysis. The *Microcystis* cyanobacteria bloom in 2020 had a severity index (SI) of 3, indicating a relatively mild bloom. The bloom was much less severe than in 2019, which had a severity of 7.3. The forecasted bloom severity was between 4-5, a small overestimate. This forecast uses an ensemble of different models, which consider phosphorus loading into the lake during the spring and early summer. One of the models correctly forecast the severity, other models over-estimated the severity by different amounts. We will be examining these differences in comparison with forecasts for previous years to evaluate the models.

The bloom developed starting in late July, and reached a peak during the last week of August. It weakened rapidly in the first week of September, following several days of strong wind events (20 mph or more), including 40 mph winds on September 7. 2018 and 2019 blooms also declined during a windy September, whereas several previous years saw blooms persisting through September.

The severity index captures the amount of bloom biomass over the peak 30 days of the bloom. The winds may have shorted the duration of the bloom. If the peak of the end of August had lasted into mid-September, the severity could have been as high as 3.4, as observed in 2018.
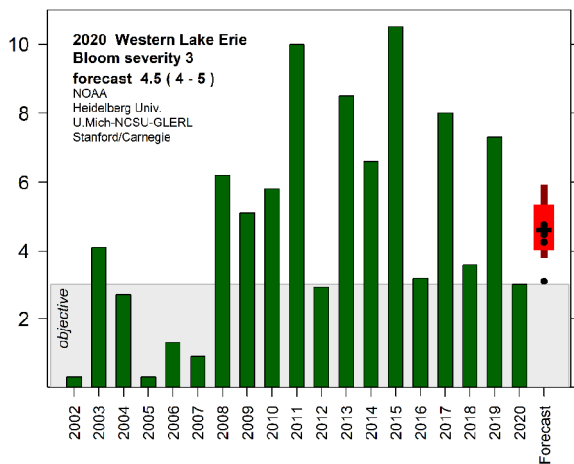
Stumpf, Mishra, Davenport, Briggs, Tomlinson

Figure 1. Bloom severity index for 2002-2020, and the forecast for 2020. The index is based on the amount of biomass over the peak 30-days. The 2020 bloom had a severity of 3, much smaller than 2019. 2011 had a severity of 10; 2015 was 10.5. The 2020 forecast ensemble range appears as red vertical bars, and the forecasts from individual models are shown as black filled circles.
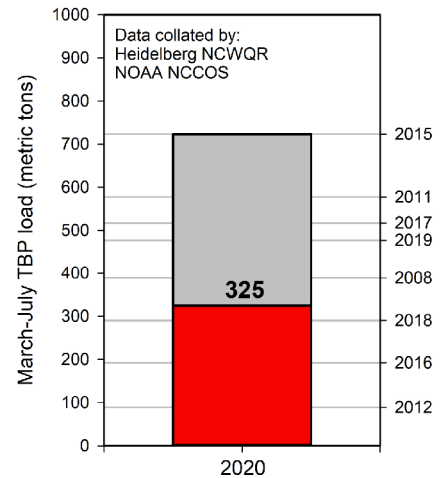
Figure 2. Total bioavailable phosphorus from the Maumee River for 2020 compared to some other years. Data collected by Heidelberg University.
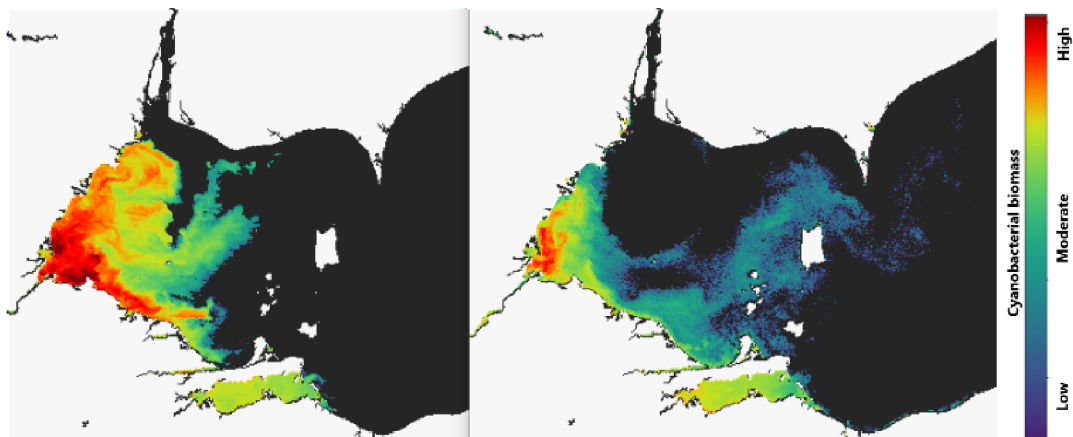

Figure 3. The *Microcystis* cyanobacteria bloom biomass in western Lake Erie at the peaks in Aug 1-10, 2019 (left) and Aug 21-31, 2020 (right), showing the difference in intensity. The images used data derived from the Copernicus Sentinel-3 mission provided by EUMETSAT. Blue color indicates low concentrations that would not be immediately obvious to the eye. Areas that are red had greater likelihood for scum formation. While 2020 had a larger area of cyanobacteria, most of this was low concentration with low risk for toxins. In contrast, the 2019 bloom had a much larger area of high concentration.

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