## Experimental Lake Erie Harmful Algal Bloom Bulletin

## 26 October 2018, Seasonal Assessment

2018 Bloom Analysis. The *Microcystis* cyanobacteria bloom in 2018 had a severity index (SI) of 3.6, indicating a relatively mild bloom. This is slightly more severe than 2016 (3.2), and much milder than the severe bloom of 2017 (SI=8). The severity index captures the amount of bloom biomass over the peak 30 days of the bloom. The bloom was smaller than the ensemble forecast prediction of 6, and all models overestimated the bloom to some degree (a range from 4.9 to 7.8).

This bloom was unusual in that it started early, the last week of June. The early start was probably a result of the rapid early warming of Lake Erie, starting at the end of May. On the other end of the season, a storm on Sep 9-10 produced strong winds over Lake Erie, which severely disrupted the bloom. The bloom did not recover, and ended by the first week of October, one of the earliest ends of the bloom we have seen.

While some scums did occur, scum was both more localized and less common in this bloom, especially in contrast to the much larger and more severe 2017 bloom.

The reasons for the overestimates of the several models used in the ensemble will be reviewed. NOAA does update its models and strategy for creating an ensemble forecast based on past experience.

The forecast models are based primarily on the load of bioavailable phosphorus from the Maumee River during the spring and early summer (March to July). River discharge and rainfall in 2018 were typical of long-term averages, higher in March and April, lower in May and June, and very low in July. This is much different from 2017, which saw extremely wet months in May and July, leading to extremely high discharge and load in those months. - Stumpf, Wynne, Dupuy.



Figure 1. Bloom severity index for 2002-2018, and the forecast for 2018. The index is based on the amount of biomass over the peak 30-days. The 2018 bloom had a severity of 3.6, comparable to 2016 (3.2). 2011 had a severity of 10; 2015 was 10.5.



Figure 2. Total bioavailable phosphorus from the Maumee River for 2018 compared to some other years. Data collected by Heidelberg University.



Figure 3. The *Microcystis* cyanobacteria bloom in western Lake Erie on 13 August 2018 taken with data derived from Copernicus Sentinel-3 data provided by EUMETSAT. This date captures the largest extent of the bloom. The greenish area along southwest Lake Erie and northeast through the islands is the bloom. Sandusky Bay has a bloom of *Plantothrix*, another cyanobacteria, which produced a darker brownish green at this time.

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