**Sandusky Bay Activities, Bullerjahn lab, BGSU**

**A.** The objectives of our monitoring efforts are to link *Planktothrix* bloom biomass to nutrient inputs that arise from riverine inputs as well as from sediment resuspension. Additionally, the role of wind in promoting sediment resuspension (measured as turbidity) compared to river discharge is also tracked through the bloom season. This work seeks to determine whether improving water clarity due to sediment accretion can limit the *Planktothrix* bloom by photoinhibition, and our project has obtained good baseline data to guide future restoration efforts.

Field monitoring and real-time sensor data acquisition have continued with EXO-2 water quality sondes deployed at the Edison Bridge, Sandusky East Bay and at the primary Sandusky city water intake out in Lake Erie. All sondes were calibrated prior to deployment and report to the following URLs:

Edison Bridge: glbuoys.glos.us/sbedison

Sandusky Buoy 2: glbuoys.glos.us/bgsusd2

Sandusky primary water intake: glbuoys.glos.us/lebiww

In addition to water quality measurements (dissolved oxygen, turbidity, chlorophyll, phycocyanin, pH, conductivity and temperature), Sandusky Buoy 2 reports wind speed, direction and barometric pressure. The Edison Bridge site also reports water flow and current speed measured by an Acoustic Doppler Current Profiler (ADCP) at 1 m depth. The Edison Bridge site also as a NuLAB automated nutrient analyzer for dissolved phosphate and nitrate. and deployment in May 2019 is yielding an ongoing data set that will reveal whether wind-driven sediment resuspension increases bioavailable nutrients to the bloom.

Nutrient and chlorophyll grab samples were taken during biweekly ODNR surveys of the Bay (9 stations sampled), and during visits to the Bridge site to validate NuLAB nutrient analyzer data.

**B.** To date, we have shown that wind resuspension is a larger contributor to water clarity than river discharge in 2017 and 2018. High turbidity in spring/early summer 2019 has been attributed to heavy rains and resulting river discharge. Given that 2017 and 2018 yielded typical rain patterns, we found that wind resuspension contributed more to Sandusky Bay turbidity than rain events.

The trial deployment of the NuLAB nutrient analyzer in late summer 2018 demonstrated that the instrument was reliable enough to yield a real-time data set for nitrate and phosphate. Successful deployment in May 2019 is yielding an ongoing data set that will reveal whether wind-driven sediment resuspension increases bioavailable nutrients to the bloom. Nutrient data from Heidelberg and (in 2019) OSU Stone Lab from grab samples have validated the NuLAB nutrient sensor performance. Additionally, grab samples and the NuLAB have documented the year occurrence of N limitation in Sandusky Bay due to denitrification. The ADCP data, combined with additional velocity data from Limnotech, have revealed that seiche effects contribute to long residence times in the Bay, allowing for continuing sedimentary denitrification driving N depletion through the summer. Our hypothesis is that *Planktothrix* is well adapted to an environment in which N can become limiting, despite the fact that this genus is not a nitrogen fixer.

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**Outreach activities**

Bullerjahn has given seminars to the general public on research in the Sandusky Bay system. These include the following presentations:

Society of Environmental Journalists, Flint, MI 10/04/18

Lake Forest College, ‘Great Lakes, Great Issues Lecture Series,’ Lake Forest, IL 10/10/18

Ohio Federation of Soil and Water Conservation Districts, Annual Meeting, 02/25/19

Wood County (OH) League of Women Voters, 04/02/19

Chautauqua Institution, Winter Speakers Series, 04/23/19

Lake Erie Shipboard Science Workshop, 07/08/19 – 07/14/19