USDA Blanchard River Watershed



Location

Two sub-watersheds (<19 mi²) in the headwaters of the Blanchard River, which is a tributary to Maumee River whose loads drive the severity of Lake Erie algal blooms.

Temperature and Precipitation



Major land uses Cropland: Corn, Soybean, Wheat.

Data collection

In the small paired watersheds, USGS stream gages were installed in August 2018 and measure discharge every 15 minutes. Weekly grab samples started May 2018, and by October 2019 the stations were built out to include refrigerated automatic samplers. Three samples per day are analyzed for suspended solids and nutrients during high flow; otherwise only one sample a day is analyzed. There are a multitude of other stream gaging stations and water quality monitoring stations throughout the Blanchard and Maumee watersheds. The USDA-ARS SDRU has 38 paired edge-of-field monitoring locations, a majority of which are in the Western Lake Erie Basin, and about 6 are near the CEAP watersheds.

A Conservation Effects Assessment Project (CEAP) Watershed Assessment Study: A collaboration with Heidelberg University, the Agricultural Research Service, and the Natural Resources Conservation Service



The 2011 harmful algal bloom in the Western Basin Satellite of Lake Erie via satellite

Concerns

The western basin of Lake Erie has been plagued by intense harmful algal blooms (HABs) over the past 15 years, and they pose a substantial human health risk in the region. The HABs in Lake Erie are closely associated with bioavailable phosphorus (P) loading from Maumee River during the period of March through July, and this loading is primarily associated with agricultural runoff. Recent research has also shown that precipitation and discharge have increased in the past decade, which accounts for ~35% of the increase in loading since 2002.

Research at the edge of the field found that total and dissolved P concentrations are higher in surface runoff than in subsurface drainage, yet most of the water discharge and P loads are delivered through subsurface tile drainage. These subsurface losses are associated with preferential flow through macropores, a common occurrence in these clayey soils. A study of over 1,500 fields in the region also identified a vast prevalence of soil P stratification associated with rotational no-till and broadcasting P fertilizer, which likely contributes to P losses.

Main conservation practices used

Starting in the 1980s, practices to control soil erosion were increasingly prevalent throughout the Western Lake Erie Basin (WLEB), including conservation tillage and rotation notillage, buffer strips and grassed waterways, and taking highly-erodible land out of production (CRP). These practices continue to be the most common best management practices (BMPs) implemented, though incentives for nutrient management plans have been popular recently. Other BMPs that are promoted heavily include controlled drainage structures and cover crops, though these practices make up <10% of implemented BMPs. There is also interest in gypsum applications and precision fertilizer application.

For this study, the most promising practices include those that reduce the risk of dissolved P runoff (e.g., nutrient management/4R nutrient stewardship and P removal structures) and those that will retain water on fields to reduce watershed flashiness (e.g., drainage water management, cover crops, blind inlets, gypsum application, and two-stage ditches).

Outcomes/Findings

Preliminary Results

• Compared to other watersheds in the Western Lake Erie Basin, the Blanchard has the second highest 5year mean unit area load for dissolved reactive phosphorus (DRP) (0.5 kg/ha, see below).



- Preliminary flow-weighted mean concentrations are very similar between the paired watersheds for all major analytes. Similarly, unit area loads for the control and treatment watersheds are not significantly different from each other when corrected for water yield (see right).
- The treatment phase began in the 2020 water year with prioritized NRCS EQIP and CRP practices in the treatment watershed (see those listed on page 1).



View upstream of the sampling location in the treatment watershed, Shallow Run.

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Watershed map of the Maumee River. Each HUC-8 subwatershed is indicated in varying shades of gray. Located in the Blanchard River watershed, the paired subwatersheds are shown in orange (treatment, Shallow Run) and blue (control, Potato Run). The photo on the right shows the sampling station at Potato Run (control).



More Information

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