Great Lakes Protection Fund
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Funded Project

Nutrient Reduction through Real-time Optimization and Control

Project No.	1212
Timeline	2019 – Active
Award Amount	$905,000
Team Leader	Xylem, Inc.

This is a foundational proof-of-concept to develop a real-time monitoring and control system for reducing phosphorus, nitrogen, and sediment discharged by agricultural drains. If successful, it has the potential to change the way water and nutrients are managed on drained agricultural land and provide the performance data required to support water quality trading programs.

The project team will deploy an array of sensors on farmland to continuously measure critical parameters such as precipitation, water levels, flows, water quality, and soil moisture. They will build machine learning models using sensor and weather data to predict field drainage behavior on a variety of time scales. These models will be used to evaluate the potential to automatically manage drain system controls to help farmers manage water levels on their land, and balance crop yields against nutrient loads in runoff.

This will be the first of two phases of work. This phase will be conducted around two farm plots in the Paw Paw River watershed in western Michigan with actuated drain tile systems. In this phase, the team will refine the deployment of sensors and automated controls and test the effectiveness of predictive modeling and control algorithms.

Success in this initial project will establish conditions for the second phase of work, conducted on a larger scale — up to 3,000 acres of farming land — to evaluate the scalability and impact of the system.