

Independent Evaluation Identifies Automated Drainage Water Management (ADWM) as a Promising Innovation for Farmers with Tile-Drained Cropland

“Automated drainage water management (ADWM) applied in a conservation systems approach offers great promise to improve both the environmental performance of agriculture and farm economic viability in tile-drained landscapes” according to a January 2022 report released by the Ohio Environmental Protection Agency (OEPA). ADWM is a conservation practice that allows a farmer to control the outlet height of a tile drainage system to conserve water for when it is needed by a crop and to limit nutrient loss when subsurface drainage is not needed. Under the H2Ohio Technology Assessment Program, Tetra Tech conducted an independent evaluation of ADWM as one of the ten most promising technologies that could be used to address Harmful Algal Blooms in Lake Erie. The goal of the evaluation was to provide an assessment of the potential effectiveness, implementation, readiness, and cost of deploying ADWM.

Key findings from Tetra Tech’s independent evaluation of ADWM included the following:

- There is potential for ADWM to be even more effective than manually operated drainage water management at reducing tile discharge during large precipitation events when most of the nutrient loading occurs because of its ability to manage tile water-control structure gates remotely, based on data, and in real time.
- ADWM is a cost-effective technology when compared with other technologies intended to address nutrient loading to water bodies.
- Conservation program financial assistance for farmers and the potential crop yield increases from use of ADWM make it even more cost-effective.
- ADWM has strong potential for scalability, as there are numerous tile-drained fields where it could be applied.
- Key to widespread adoption of ADWM is farmer willingness, which could be further evaluated through a pilot project funded by the H2Ohio Initiative.

Tetra Tech evaluated ADWM against a set of criteria established by OEPA and determined that ADWM is very likely to be effective at reducing nutrient loading to Lake Erie in direct proportion to the number of agricultural fields to which it is applied. ADWM is a significant technological improvement to manual drainage water management because of its automation features, including electronic data accessibility for real-time precision management of soil water levels in tile-drained agricultural fields. It removes many of the long-standing barriers to farmer adoption of this conservation practice and can improve crop production and environmental benefits, including water quality. Through Ecosystem Services Exchange (ESE), there are almost 20 operational ADWM systems in seven states including Ohio, with more systems slated to become operational in the Spring of 2022.

ADWM is offered by ESE throughout the Upper Mississippi River, Great Lakes, and Chesapeake Bay Basins, plus other locations with a preponderance of tile-drained cropland. Innovative ADWM employs two-way telemetry to automatically manage water levels and flow rates in tile-drained fields. ADWM also provides the opportunity to remotely manage sub-irrigation through tile lines for greater conservation and crop production benefits.

The opportunity for ADWM adoption is in the 10 of millions of acres of tile-drained cropland, with an estimated 914,000 acres being suitable within just the Ohio portion of Western Lake Erie Basin. As a certified Technical Service Provider through the Agricultural Drainage Management Coalition and following USDA Natural Resources Conservation Service criteria, ESE is the nation's leader in working with farmers to evaluate potential sites for ADWM, and in carrying out its planning, design, installation, and automation set-up for reliable operation. ESE has been assisting farmers with their conservation drainage needs since its establishment in 2010 and is a proven expert with ADWM, manually operated drainage water management, sub-irrigation, denitrifying bioreactors, and saturated buffers.

To find out more about ADWM and its planning, design, and implementation, contact ESE at info@ecoexch.com or via phone at (641)740-0890. A copy of the Tetra Tech independent evaluation report of ADWM can viewed on ESE's website at www.ecoexch.com.