Effectiveness of Floating Wetlands in Removing Nutrients from Tile Drains

Recently published data indicates that agricultural tile drains may be the greatest single contributor of phosphorus delivery to Lake Erie. This research is being directed toward developing a novel approach to reduce nutrients leaving farm fields and entering tributaries. Two floating wetlands were constructed to determine the effectiveness of using floating vegetation mats and a filtration bed for removing nutrients from an agricultural tile outlet draining a 16-acre alfalfa field. The wetlands work as a treatment train with the first wetland using a surface water treatment of floating vegetation on mats and the second connected wetland using subsurface treatment with a sand and limestone mix as a filter media. Water samples are collected at 48hr intervals using an automatic sampler and drainage control structures to measure water flow, while concentrations of phosphorus (total and dissolved) and nitrogen are measured in the lab. Over a two-and-a-half-year period this system has shown a significant reduction of nutrients as water leaves the wetland, particularly during large rain events. This study has also indicated which plant species thrive best in this environment and uptake the highest amount of nutrients. As more is discovered about floating wetlands, it is hoped that this innovative approach can be used by producers in the future as a cost-effective method for finding a balance between critical food production and our delicate ecosystem.

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Alaina is a research assistant at the Institute of Water Research (IWR), located at Michigan State University (MSU) is East Lansing, MI. She took on this role after completing a Bachelor of Science in Biochemistry at Saginaw Valley State University, as well as a Master's degree in Community Sustainability at MSU. Her studies in graduate school focused on empowering farmers with water quality data to assist in making farm-management decisions that reduce nutrient loading to nearby water sources. This research has since led her to participating in numerous studies at the IWR focused on innovative approaches to mitigating nutrient loss, including the use of floating wetlands on the farm, which will be the focus of her talk today.