Institute of Water Research
Michigan State University

Annual Technical Report
2018

General Information

Products

Asher, J. 2019, ‘Constructed Wetlands treatment of Surface and Subsurface Drainage’, paper presented to Michigan Agribusiness Winter Conference, Lansing, MI, 14-16 January.
Asher, J. 2019, ‘Tile Drain Monitoring: Trends and Findings for to help Identify Novel Conservation Practices’, Hosted workshop at Michigan State University, Lansing, MI, 25 March.
Elgin, Erick and Lois Wolfson. 2019. List of household filters approved for certain PFAS removal. MSU Extension News. January. Accessible at: https://www.canr.msu.edu/news/list-of-household-filters-approved-for-certain-pfas-removal.
O’Neil, G. 2019, ‘Algal Blooms, Agricultural Water Management, and Climate Change in Western Lake Erie’, paper presented to Soil and Water Conservation Society's International Annual Conference, Pittsburgh, PA, 28-31 July.
Koundinya, Vikram, Anne Baird, Jenna Klink, Lois Wolfson, Jane Frankenberger, Joseph Bonnell, and Rebecca Power. 2018. Core Competencies for Successful Watershed Management Work. Research In Brief, Journal of Extension. Volume 56(1). (Fully published; Journal does not assign page numbers). Accessible at: https://joe.org/joe/2018february/rb1.php.
Wolfson, Lois G., Ruth Kline-Robach and Darren Bagley. 2018. Perfluorinated Chemicals: What they are and what you should know about them. MSU Extension and CANR News, Michigan State University, East Lansing, MI. Accessible at: https://www.canr.msu.edu/news/perfluorinated-chemicals-what-they-are-and-what-you-should-know-about-them.
Wolfson, Lois and Erick Elgin. 2018. MSU Extension to help address your PFAS questions and concerns. MSU Extension News, Michigan State University, East Lansing, MI. Accessible at: https://www.canr.msu.edu/news/msu-extension-to-help-address-your-pfas-questions-and-concerns.
Wolfson, L. G., and E. Ghane. 2018. Edge-of-Field Research Focuses on Controlled Drainage and Saturated Buffer for Reducing Nutrient Runoff. North Central Region Water Network News, March. Accessible at: https://myemail.constantcontact.com/North-Central-Region-Water-Network-March-Newsletter.html?soid=1108940524026&aid=yhdAUeL-HYM.

Information Transfer Program

Information transfer activities were developed and presented in multiple formats for diversified audiences to provide science-based information, interactive hands-on activities, and field experiences. Specific programs offered included: statewide and regional conferences (Great Lakes Conference, Michigan Inland Lakes Convention, and the co-sponsored One Water Action Forum) that addressed current and emerging water related issues. Interactive training sessions and workshops (Water School, Conservation Stewards, and Aquifer Vulnerability) aided decision makers, lakefront property owners, and students, respectively, in better understanding policy around water and general water quality issues. Using a web-based format, courses (Introduction to Lakes Online and Watershed Management) were offered online to teach audiences key concepts about lakes and provide in-depth information on watersheds, soils, legal issues and social and economic frameworks. In addition to publishing articles on watershed core competencies, PFAS issues, tile drainage and water filters, another set of activities involved developing and/or updating interactive online decision support systems that inform users and help with decision making (Enviroimpact, part of the Regional Runoff Risk Decision Support Tools Network, Great Lakes Watershed Management System). The emerging issue of PFAS incorporated multiple activities including a Speed meeting for outreach and research professionals, three conference/workshop presentations, and the development of an ‘Ask an Expert’ website. Finally, responding to the public through email, in person, or through phone calls on questions relating to algal blooms, lake management, invasive species, storm water, groundwater and other issues is still a viable and popular means for interacting with individuals and providing science-based information.

Student Support

1 doctoral candidate
2 masters degree candidates
6 undergraduate students

Notable Achievements and Awards

PI Lois Wolfson, PhD, received the Michigan State University Distinguish Academic Specialist Award in 2018 in recognition of extraordinary academic achievement, excellence and exceptional contributions as a specialist.

Projects

Improving nutrient management through a drainage tile monitoring program

Project Type: Annual Base Grant **Project ID:** 2018MI247B

Project Impact: This research empowered producers to monitor, visualize, and better understand the nutrients leaving their tile drains. Four farmers participated in the program and tracked six subsurface drains. A website was developed to allow farmers to see their nitrate and dissolved phosphorus levels in near real-time leaving their drains. This helps farmers to make informed decisions regarding their management actions. The research team held two meetings with farmers to discuss the results and learn how this data can influence decision-making and conservation practices on the farm. Several farmers felt additional years of data collection under different weather conditions would be needed before they felt comfortable making decisions. Six students were trained in lab procedures and water sample collection and help with analyzing water samples and reporting results. This project enabled our Institute to leverage additional funding from a private foundation to continue monitoring tile drains and working with farmers for another two years.

Michigan Water Resources Continuing Education Learning Modules

Project Type: Annual Base Grant **Project ID:** 2018MI249B

Project Impact: Seven educational modules were developed on educational topics from basic water sciences to water regulations and policy. A graduate student took the information from four water sciences courses and developed the seven online modules to address the areas of interest from the Michigan Water Environment Association. The modules used the latest technologies to deliver content. These modules were reviewed by IWR and MWEA staff. The modules were released in July 2018. Since they were released, 17 participants have registered for one or more of the modules for a total of 57 registrations. Four people have completed all seven modules.

Nutrient Loading Forecasting for Western Lake Erie

Project Type: Annual Base Grant **Project ID:** 2018MI251B

Project Impact: For this research project we simulated future changes in phosphorus loading from the River Raisin watershed to western Lake Erie. We specifically explored how loadings may change under multiple future climate projections, and how three agricultural water management practices may affect phosphorus losses from farmlands. The primary goal of the project was to provide an indication of the phosphorus-fed algal blooms that plague western Lake Erie may change in the future. We utilized a previously developed Soil and Water Assessment Tool (SWAT) modeled, developed and calibrated for phosphorus loads by co-researchers Kalcic and Muenich, to generate the load estimates. We fed the SWAT model will climate data from an ensemble of five models, each with historical simulations from 1980-1999 and future simulations from 2044-2065, developed and calibrated for the Lake Erie region by researchers at the University of Michigan. We noted the change in phosphorus loading from each model's historical simulation to its future one. In nearly all simulations phosphorus loading decreased from the historical period to the future period. Even though the future climate data forecasts an increase in overall precipitation volume and intensity, higher rates of evapotranspiration from overall warmer temperatures and increased plant use of soil water reduced surface runoff, which in turn reduced much of phosphorus load to Lake Erie from River Raisin. Furthermore, drainage water management and irrigation both increased runoff and therefore increased phosphorus loads in future simulations, while expanded tile drainage decreased it.

Technology Transfer Training, Dissemination and Program Development in Water Resources

Project Type: Annual Base Grant **Project ID:** 2018MI250B

Project Impact: Several annual programs presented in FY18 drew in more people than previous years reaching over 800 people. Evaluations were very positive and self-assessments overwhelmingly indicated increased understanding.

For the Great Lakes conference with 201 attending, 94% ranked the conference as excellent or very good; 84% of respondents said that they have plans to use the information in the future. In Water School, 70% of those filling out the survey indicated that as a result of the program they were well equipped to improve public policy and decision-making regarding water resources in Michigan; and 88% felt confident in making informed decisions with regard to water resources. For the online Introduction to lakes course, 181 from 14 states enrolled in the course; 93% of participants passed the course; and 110 participants plan to use the information learned in local lake management efforts. The combination of networking, learning, and future actions on the part of participants are evidence that these types of programs have lasting impact. Several programs and publications were developed that focused on the emerging contaminant PFAS. Outputs included a “speed meeting” for Extension and research professionals, two online publications, and an “Ask the Expert” PFAS website. Outcomes included an invitation to present at a policy luncheon for legislators and their staff and being the outreach “go-to” person for PFAS information. IWR online tools, contributing to University educational events and workshops, assist a variety of audiences with decision making, accessing data, sharing resources, and learning more about Michigan waters.