



The Tree

The Discovery Farms® Program Newsletter

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Capturing drainage below the root zone

Ryan Heiderman, heiderman@wisc.edu

During a chilly first week of November, eight large holes were dug into a field in Pepin County in Western Wisconsin. Now, buried in these holes are water quality monitoring equipment called lysimeters. There is a significant need to understand and quantify the influence agricultural systems have on nitrate leaching, in particular how conservation practices may improve and limit this impact.

Discovery Farms is ready to take on this new style of project to learn about subsurface waters and agriculture’s impact. Water draining below the root zone can potentially contain high concentrations of soluble nutrients such as nitrate and chloride; however, they can be difficult to monitor and measure. The purpose of the lysimeters is to capture and sample water draining below the root zone which is on its way to groundwater. Analysis of the collected water can then be related back to the management practices happening above ground in the agricultural field.

There is minimal data in Wisconsin on subsurface drainage outside of the Central Sands and this project is a great opportunity to expand into a new region where information is limited. This project partners with and expands on the efforts of the Pepin County Land Conservation and Planning Department (LCD) and the local farmer-led groundwater group, FARMERS4HEALTH, which prioritize efforts to effectively improve drinking water quality in the area. Well-testing efforts by the LCD have identified particularly vulnerable landscapes within the county and this Discovery

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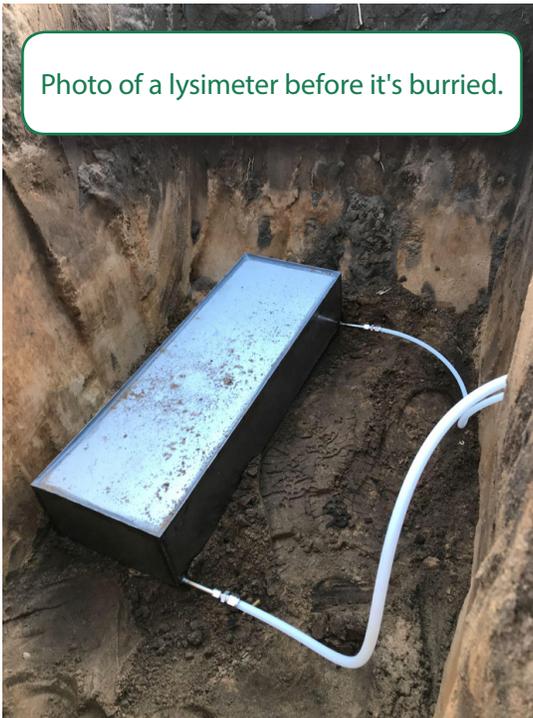
Farms monitoring site was chosen to fall within this area of concern. These loamy sand soils were formed from the accumulation of sandy outwash materials deposited by rivers downstream of a glacier melt. They have rapid permeability, allowing drainage to move quickly through the soil profile. These types of soils are of particular concern due to this rapid drainage carrying soluble nitrate into groundwater reservoirs and ultimately ending up in wells and drinking water.

Installed at this study site are four control boxes, each running to two lysimeters buried about 4.5 feet below the soil surface. Four of the lysimeters are buried in the east side of the field, with the other four buried on the west side of the same field. This field is irrigated, typically receives manure application, and is cropped in a corn-soybean rotation. Tillage is limited, with debris left to overwinter to protect the soil from wind erosion. This study will first collect baseline measurements during this first winter and the upcoming growing season. Then after harvest in Fall 2022, the field will be split into a treatment and control, where a conservation practice will be established on one side to assess any shifts in drainage or nitrate concentration. Discovery Farms will work with local Extension Educators, Land Conservation Department, and the farmer-led watershed group to finalize plans for next season. Currently under consideration are cover crops and manure management as potential conservation practices to be evaluated. Discovery Farms looks forward to the outcomes of this new and exciting partnership. §

Tubing is run for the vacuum and sampling lines through deep trenches to the lysimeters



Photo of a lysimeter before it's buried.



The lysimeter system is fully automated through control boxes placed at edge of field



Partner piece: Kewaunee County

Andrew Wick, wick.andrew@kewauneeco.org

In 2018, Discovery Farms® established a partnership with the Door Kewaunee Demo Farms Network, Peninsula Pride Farms and the Kewaunee County Land Conservation Department. The partnership was established to seek cropping systems that reduce surface runoff of soil and nutrients, reduce the risk of nutrients reaching groundwater and improve soil health. Two edge-of-field monitoring stations were installed to measure and collect runoff samples from monitored basins.

Andrew Wick from the Kewaunee County Land Conservation Department is responsible for sample collection and site maintenance in Kewaunee County. We asked Andrew a few questions about his monitoring experience.

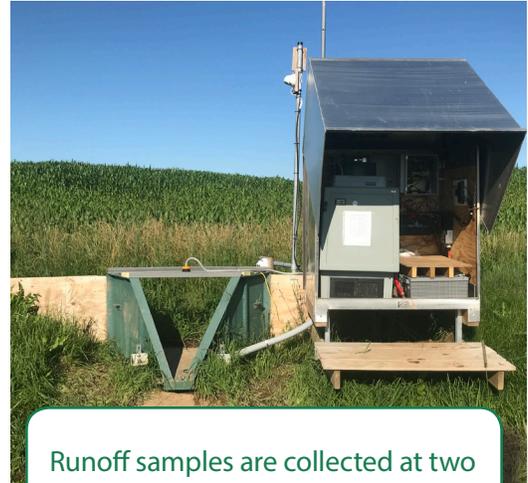
What has your experience been like with sampling?

My experience has been very enjoyable so far. It is a mix of sample retrieval, landscaping maintenance, and trouble shooting. I enjoy getting to be a part of a project that is making a difference. I always look forward to retrieving samples after a large rain event.

What are you most excited about given what you've seen/heard so far?

I am most excited to view the sample results after a grass waterway was installed upstream at one of our sites. Only a gully existed during my first year of sampling there. After a rainfall event the sample flume would be buried in inches of soil and debris. The gully was seeded last year and it is amazing the difference it made. The flume no longer has any soil in it and the water samples are visibly more clear. It is rewarding to see first-hand how much good a grassed waterway can do.

To see Real-Time data from these monitoring sites, visit our website: <https://uwdiscoveryfarms.org/on-farm-projects/usgs-real-time-data/> §



Runoff samples are collected at two sites in Kewaunee County



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Introducing the Agriculture Water Quality Program!

A message from Ag Water Quality Program Manager

Amber Radatz, amber.radatz@wisc.edu



I am a firm believer in our need to embrace change and improve. Discovery Farms' work has evolved to respond to the needs of agriculture and water quality in Wisconsin. Within the current Extension structure, Discovery Farms is considered a branded program which somewhat limits our scope of work and capacity for growth. Most of these limits are felt internally. Eric and I have worked with Extension leadership to develop a structure that can build off of Discovery Farms' successes and allow Extension to expand and build its capacity on agricultural water quality issues. An opportunity to create a dedicated program area, called the Agricultural Water Quality Program emerged which will nest Discovery Farms within it.

Discovery Farms will maintain its status as a branded program, and will continue to conduct the on-farm research related to water quality that provides a basis for outreach and programming conducted in partnership with the Agriculture Water Quality program. The Ag Water Quality program will coordinate the outreach component for the water quality research coming out of DF and from many other faculty and units across Extension and the broader University. This fall, we began implementing this program change by hiring the first Agricultural Water Quality Outreach Specialist, Chelsea Zegler, for the new program area.

Creation of this program area allows Extension to expand support for Discovery Farms. This is the first time Extension has expanded support for Discovery Farms' efforts since the program was started 20 years ago.

Additionally, this program builds an obvious place to streamline the communication channels and create collaboration opportunities for other researchers and partners interacting with farmers on agriculture water quality, and unify the experience that farmers and others receive by working with Extension. It also increases the capacity to raise funds, manage projects and strengthen relationships on campus and off to result in more capacity and increased impact for farmers and other stakeholders in Wisconsin.

We realize that with any change, there are tradeoffs, and we do feel strongly that the opportunities outweigh the challenges. The new program will build from the three pillars of Discovery Farms: farmer leadership, credible research and communicating results. Discovery Farms identity, branding and distinctive role partnering with farmers for on-farm research and outreach will remain unaltered. We sincerely view this change as the next step in the long and successful history of Discovery Farms.

From a logistical standpoint, the Agricultural Water Quality program will be led John Exo and I. Discovery Farms will continue to conduct on-farm water quality research and monitoring efforts, within the new Ag Water Quality program area and will continue to be led by current Co-Director Eric Cooley. John is a Water Quality Programs Coordinator for the UW-Madison College of Agricultural & Life Sciences, and he will be returning to Extension where he spent 22 years as a co-director and educator in the Natural Resources Education Program.

Finally, know that the Steering Committee, in its oversight role, has thoroughly reviewed, discussed and debated the implications of these changes on Discovery Farms' historical role as well as its ability to not just continue, but to expand Discovery Farms's influence in this critical agricultural water quality research arena. We are glad to have the opportunity to embrace change and shape the next decade of Discovery Farms' work with agricultural water quality in Wisconsin! §

Get to know the Ag Water Quality Program and Discovery Farms staff!



Eric Cooley
Discovery Farms
Director

Eric jumps into Lake Michigan every January 1st.



Amber Radatz
Ag Water Quality Program
Manager

Amber has no first cousins!



John Exo
Ag Water Quality Program
Manager

John was born in Juneau, Alaska.



Matt Ruark
UW-Madison
Discovery Farms Faculty
Advisor

Matt enjoys coaching youth baseball and soccer.



Aaron Wunderlin
Discovery Farms
Senior Research Specialist

Aaron looks forward to family game nights.



Erica Gentry
Discovery Farms
Farmer Network and
Communications Coordinator

Erica enjoys spending time with her twin boys.



Ryan Heiderman
Discovery Farms
Nitrogen Projects Coordinator

Ryan enjoys making candles and playing disc golf.



Chelsea Zegler
Ag Water Quality Program
Outreach Specialist

Chelsea is hoping to work her way to every national park, so far she is only at 9.



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Discovery Farms

Questions about this mailing?

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Journal of Nutrient Management

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The Discovery Farms® Program, part of UW-Madison Division of Extension, is a farmer-led research and outreach program that conducts research on working farms located throughout Wisconsin, seeking to identify agriculture's impact on water quality.

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