

# Rosholt Farm Project

## *A Public-Private Partnership to Improve Nitrogen Fertilizer Efficiency and Protect Groundwater*

*This project will provide a better understanding of nitrogen fertilizer management and the associated water quality impacts on irrigated, coarse-textured (sandy) soils. This will be accomplished through a unique partnership between local soil and water conservation districts (SWCDs), Prairie Lakes Co-op, the University of Minnesota and the Minnesota Department of Agriculture.*



Nitrates are widely present in vulnerable aquifers across Minnesota and, at times, can exceed the drinking water standard. One significant source of high nitrates can be agricultural fertilizer, especially in sandy soils that are vulnerable to groundwater contamination. The University of Minnesota Nitrogen Fertilizer Recommendations specific to irrigated coarse-textured soils need to be revised to keep pace with the higher yield potential of new seed types while protecting water quality. This project will assess nitrogen losses to groundwater resulting from different fertilizer application rates, application timing, and application method and provide critical information on water quality impacts.

### Rosholt Farm



The Herman Rosholt farm, near Westport, Minnesota, is an ideal setting for this type of project. The Pope County SWCD purchased the 30 acre parcel to continue agricultural research and education in this region. The farm's coarse-textured soils and need for supplemental irrigation typifies the challenges that many producers face on the outwash sands of west-central and central Minnesota. The Rosholt Farm will function as an "educational hub" for providing technical information to area producers and dealerships about best management practices (BMPs), new fertilizer recommendations, emerging technology, and water quality impacts.

### On-Farm Research

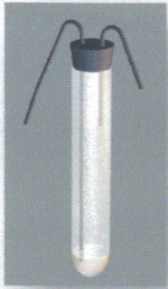
This site is designed to evaluate the water quality impacts of different nitrogen management practices in a highly vulnerable irrigated setting. The site will feature three crop rotations; corn on corn, corn following soybeans, and soybeans following corn and investigate four different nitrogen forms applied at various rates. Plots will receive irrigation water from a linear irrigation system.

A climatic weather station capable of measuring minimum and maximum daily temperatures, wind speed, relative humidity, and rainfall will be installed. These measurements will be used to calculate local evapotranspiration (ET) potential. Having a weather station onsite will provide an accurate method of identifying crop water needs and help eliminate under and/or over-watering. Access to information about local climate conditions enables producers to tailor their management and apply the right amount of water at the right time, minimizing the loss of water and nutrients.



POPE SOIL & WATER

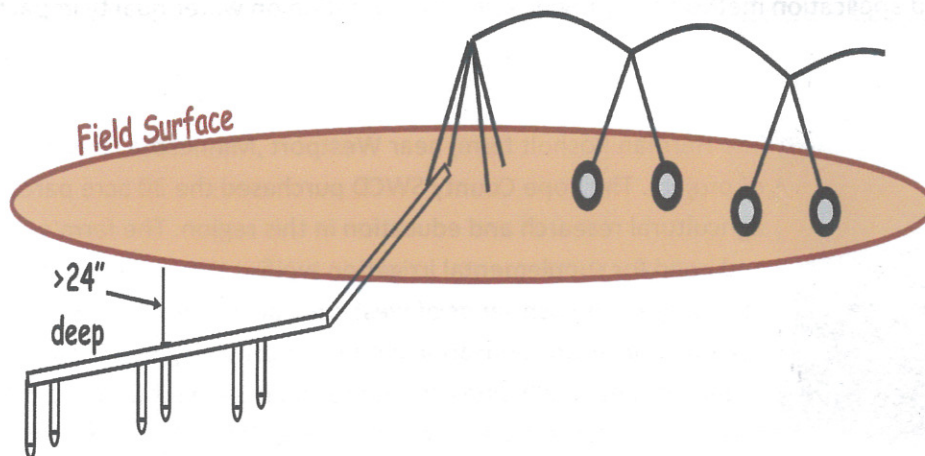




## Water Quality Monitoring

Water that escapes below the root zone of growing crops will be collected and analyzed for nitrate nitrogen. This water is collected in specialized equipment called "suction-tube lysimeters" that are buried and strategically placed within the experimental area. Water is pulled through a ceramic tip that is under a vacuum, much like a plant root. Lysimeter sample lines are enclosed in protective PVC pipe and buried in trenches below the surface so normal tillage and other farming operation can be performed.

Once installed, the suction lysimeters will remain undisturbed during the life of the project. Samples will be collected once per week during the entire cropping season and will be analyzed on-site. Additionally, researchers will use high tech, in-field chlorophyll meters to measure plant nitrogen concentrations and provide information about plant nutrition during the growing season.



Research will be conducted on the Rosholt Farm during the 2011-2015 cropping seasons. This project will complement on-going research on coarse-textured, irrigated soils in Dakota County. Collectively these sites will provide significant information for evaluating environmentally protective and economically feasible nitrogen fertilizer recommendations on coarse-textured soils.

### **Expected outcomes include:**

- Scientifically defensible nitrogen fertilizer recommendations for corn production in Central Minnesota
- Clear understanding of the relationship between inputs, yields, and potential nitrogen losses to groundwater
- Assessment of Greensseeker technology and other optical methods for sensing plant nutrition
- Assessment of slow release nitrogen fertilizer products under irrigated corn
- Reestablishment of the Herman Rosholt Farm as an educational hub for irrigators, industry, educators, and policymakers

# CLEAN WATER FUND



Agriculture comprises a significant portion of the state's land use, and the way farmers manage their land can make a big contribution to achieving state goals for resource conservation. The activities described in this brochure are designed to give farmers and ranchers information to help them do their part in ensuring the quality of Minnesota's water resources. Funding from the Clean Water, Land and Legacy Amendment is being used to further enhance MDA's capabilities, develop new partnerships, and support new initiatives.

## Research, Pilot Projects and Technical Assistance

**\$2.265 million for FY10-11 biennium**  
*Funding for individual activities listed below*

### Clean Water Research Program

*\$1.250 million for FY10-11 biennium*

The Minnesota Department of Agriculture (MDA) is supporting research projects to identify processes that affect water quality and evaluate the costs and benefits of specific agricultural practices. Since 2008, the MDA has announced two requests for research proposals. Any organization, research entity or individual may apply for these funds. The MDA works cooperatively with various research entities and provides administrative support for the program. The MDA's Clean Water Research Program has sponsored over a dozen projects. The goals of the program are to evaluate the effectiveness of agricultural Best Management Practices (BMPs), identify underlying processes that affect water quality and develop technologies to target critical areas of the landscape.

### Discovery Farms Minnesota

*\$250,000 for FY10-11 biennium*

The Discovery Farms program is a farmer-led effort to gather information on soil and nutrient movement on farms in different settings across Minnesota. It is designed to evaluate agriculture's impact on water quality and to provide baseline data on the environmental performance of Minnesota farms. The MDA is supporting the Discovery Farms program by providing technical assistance and expertise in water monitoring.

Discovery Farms Minnesota was launched in 2009 by farm organizations and commodity groups, specifically the Minnesota Agricultural Water Resources Coalition (MAWRC), with the support of the MDA and the University of Minnesota Extension.



*Discovery Farm site in Goodhue County*

### Livestock Environmental Quality Assurance (LEQA) Program

*\$300,000 for FY10-11 biennium*



LEQA is an MDA program to help livestock producers address, using a non-regulatory approach, the unique water quality issues on their farms. MDA has contracted with Ag Resource Strategies, LLC, to recruit farmers to enroll in the LEQA program. The company trains technicians to assess farms in separate resource management areas, such as the farmstead, livestock facilities, fields and wooded areas. The technicians then develop an environmental assessment and identify financial assistance for these projects.

### Clean Water Research Accountability Database

*\$85,000 for FY10-11 biennium*

This project will create a centralized, web-based inventory of water related research in Minnesota. When complete, users will be able to search for information by research topic, research method, water body, funding source, etc. Organizing information about research projects in a single database will make it easier to find results and coordinate research efforts.

## Precision Conservation: Targeting Clean Water Implementation

*\$35,000 for FY10-11 biennium*

Via workshops and case studies, this project is disseminating high-resolution, GIS-based terrain analysis modeling techniques to conservation professionals who work on locally-led water quality projects. In a previous Clean Water Legacy project, the MDA developed terrain analysis techniques that provide a more scientific basis for identifying and prioritizing critical sources of erosion and runoff in agricultural landscapes. Targeting conservation practices to critical source areas can produce greater environmental benefits at a lower cost.

## Drainage Demonstration Sites

*\$86,000 for FY10-11 biennium*

The MDA operates a network of drainage demonstration sites around the state of Minnesota, each designed to study the quality and quantity of water and agricultural chemicals moving through subsurface drainage tiles. These sites evaluate different methods of reducing phosphorus and/or nitrogen loss on agricultural lands and provide critical information about the characteristics of agricultural drainage. Clean Water funded sites include the Highway 90 project near Mankato and the Tile Drainage Demo Site in Clay County.

## Technical Assistance and Program Administration

*\$259,000 for FY10-11 biennium*

Technical assistance is a vital element of the MDA's clean water activities. Clean Water funding has been used to coordinate clean water projects, enhance communication and outreach, support local partnerships, and foster regional cooperation. This assistance helps to ensure that accurate, scientifically-based information on the costs and benefits of specific agricultural practices is incorporated into environmental plans in Minnesota. These costs are for technical staff and program administration.

## Root River Field to Stream Partnership

*One time appropriation of \$395,000*

The Root River Partnership is designed to help southeast Minnesota farmers and policy-makers better understand the relationship between agricultural practices and water quality. The partnership is conducting evaluations of water quality and land management at multiple scales using the latest tools and technology.

This project includes two approaches to addressing water quality/ quantity issues in the Root River watershed. One component emphasizes monitoring and the other focuses on implementation strategies for BMPs.



## Agricultural BMP Loan Program

*\$4.5 million for FY10-11 biennium*



This water quality program provides zero interest loans to local units of government who in turn provide low interest loans to individuals for management practices that restore or protect water quality. Loans must be used towards practices that reduce soil and water erosion and ensure safe manure and wastewater management. Loans can be used on a farm, a rural home site, in an unsewered community or at a lakeside cabin.

## Ground and Surface Water Monitoring

*\$675,000 for FY10-11 biennium*



The MDA has been monitoring the state's water resources continuously for more than 20 years. The purpose of the MDA's monitoring activities is to determine the presence and concentration of pesticides and nutrients in Minnesota's ground and surface water. MDA water quality data is used to evaluate the need for and effectiveness of protective actions for ground and surface water. Clean Water funding has increased the capability and capacity of the water monitoring program through the provision of new analytical instruments in the MDA lab. The new equipment is capable of detecting a broader suite of chemicals at lower concentrations.

## Groundwater and Drinking Water Protection

*\$1.125 million for FY10-11 biennium*

Groundwater funding from Minnesota's CWF is being used for activities that help identify potential sources of nitrate contamination and evaluate and implement practices at the local level to reduce nitrates in groundwater.

The MDA is working with many local partners and passing funding through to local government units. Below are a few examples of Clean Water Fund projects.

- **Characterizing Nitrates in Private Drinking Water Wells- Central Sands Region**

The MDA has signed a Joint Powers Agreement with Wadena County Soil and Water Conservation District (SWCD). Wadena County SWCD is partnering with 13 counties that make up the "Central Sands Outwash". Nitrate analysis of approximately 2,500 private wells will be completed and a subset of these homeowners will be used to establish a long term monitoring network.

- **A Public and Private Partnership to Improve Nitrogen Fertilizer Efficiency and Protect Groundwater**

The MDA has signed a Joint Powers Agreement with Pope County SWCD. Partners, which include Stearns County SWCD, Prairie Lakes Co-op, and the University of Minnesota (U of MN), will support a demonstration project at the Herman Rosholt Farm near Westport, MN. The project is designed to evaluate the water quality impacts of different nitrogen management practices in a highly vulnerable irrigated setting.

- **Crop Irrigation Workshops**

The MDA has entered a Joint Powers Agreement with the East Otter Tail SWCD. The EOT SWCD, along with 5 counties, the U of MN, and IAM, will carry out workshops to explain water and nitrogen management to both the new and experienced irrigators in central MN.

- **Nutrient Management Survey**

The MDA, in partnership with researchers at the University of Minnesota and the National Agricultural Statistics Service (NASS), have pioneered a survey tool for characterizing fertilizer management practices on a regional and statewide scale. Information collected will guide future research and educational activities, provide insight to BMP adoption, and guide policy makers in making informed decisions related to nitrogen use.



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**Visit the MDA's Clean Water Fund Website at: [www.mda.state.mn.us/cleanwaterfund](http://www.mda.state.mn.us/cleanwaterfund)**