



DISCOVERY FARMS MINNESOTA



DISCOVERY FARMS MINNESOTA UPDATE

UPDATED, JANUARY 12, 2012

DISCOVERY FARMS_MINNESOTA: A New Approach To Monitoring Nutrient Movement In Agricultural Landscapes

- George Rehm and Tim Radatz
- 507-263-9127 715-694-3418

Northern-most states adding to kill zone in Gulf of Mexico

● Minnesota, Wisconsin farmers big part of problem.

By JOSEPHINE MARCOTTY
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Minnesota and Wisconsin are contributing an increasing share of the Mississippi River pollution that is killing a wide swath of the Gulf of Mexico.

According to a new federal study, nitrogen flowing into the river from the two states has increased 75 percent over the past two decades and is a major reason why nitrogen levels at the mouth of the river in Louisiana have increased 10 percent over the same period.

The gulf's dead zone is one of the largest such polluted areas in the world, according to researchers from the U.S. Geological Survey

(USGS) who published the study this week.

More importantly, they said, it proves that despite decades of efforts to slow agricultural runoff and clean up wastewater, pollution in the river has not gotten better.

"It's disappointing," said Deborah Swackhamer, head of the Water Resources Center at the University of Minnesota, who was not involved with the research. "But this is hard-core science that backs up what a lot of people have thought."

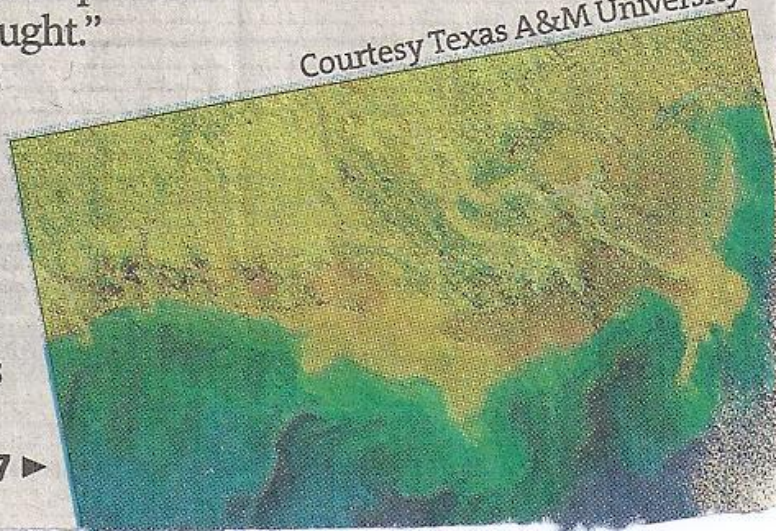
Overall, the USGS found that between 1980 and 2008, the levels of nitrates – nitrogen dissolved in water – held steady at six of the eight spots

River continues on A7 ►

« WE DON'T HAVE ANY REGULATORY HAMMER FOR DEALING WITH NITRATE DISCHARGES FROM AGRICULTURE. »

Deborah Swackhamer, head of the Water Resources Center at the University of Minnesota

Courtesy Texas A&M University



The Scrutiny of Midwest Agriculture



- --nitrates and the relationship to hypoxia in the Gulf of Mexico
- --phosphorus and algal blooms in surface waters
- --many would like to regulate
- --basic question: Should regulations be based on predicted (modeled) movement or actual measurements?
- --farmers want to know also

Discovery Farms-Minnesota



- --A producer led effort to gather field-scale information on water quality moving over and through the landscape in the diversity of farm enterprises in Minnesota

What Is A Discovery Farm



- --an operating farm used for systematic collection of accurate information on water leaving the farm via surface/tile flow

Why Discovery Farms Minnesota?



- Achieve economic and environmental goals
- Increase knowledge of regulations to farm community & help create a science base for rules
- Proactive approach to environmental protection
- Understand impacts of management practices on natural resources
- Opportunity for producers to find solutions that work in their farming system --

One size doesn't fit all!





DISCOVERY FARMS MINNESOTA

- On-farm systems research/evaluation/demonstration program
- Information collected from operating, commercial Minnesota farms
- Partnership between agricultural organizations, individual growers, and state government



Discovery Farms Minnesota Partners



- **Minnesota Agricultural Water Resources Center**

- Organizing and leading the Discovery Farms effort



- **Minnesota Department of Agriculture**

- Technical assistance and expertise in water monitoring
- Assistance with outreach activities
- Staff
- Dollars for monitoring equipment
- Clean Water Fund Dollars



DISCOVERY FARMS
MINNESOTA

Organization of Discovery Farms Minnesota



Steering Committee Members

- **Farm organizations**
 - Broiler and Egg Association of Minnesota
 - Irrigators Association of Minnesota
 - Minnesota Corn Growers Association
 - Minnesota Farm Bureau Federation
 - Minnesota Farmers Union
 - Minnesota Milk Producers Association
 - Minnesota Pork Producers
 - Minnesota Soybean Growers Association
 - Minnesota State Cattleman's Association
 - Minnesota Turkey Growers Association
- **Conservation groups and agency**
 - Minnesota Department of Agriculture
 - Stearns County SWCD
 - The Nature Conservancy
 - NRCS



Instrumentation



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Monitoring 365 Days a Year



Information Collected



- **Environmental Data**

- Weather Data – precipitation, temperature, and moisture
- Water Quantity – runoff volume
- Water Quality – nutrients and sediment

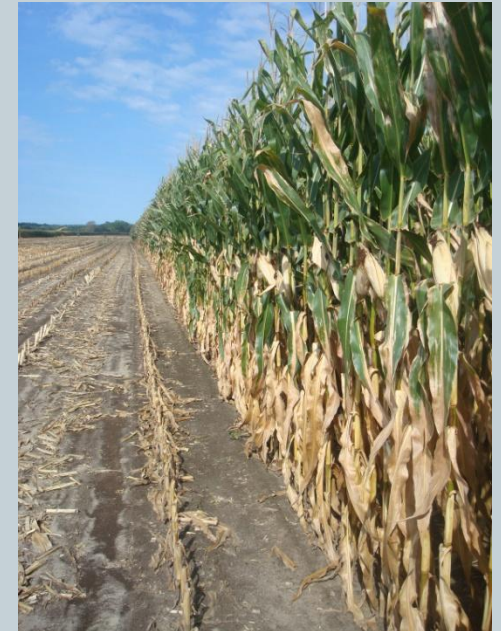


Information Collected



- **Farm Management Data**

- Crop – type, variety, planting and harvest date, and yield
- Fertilization – type, application rate, and date
- Tillage – type, residue remaining, and date
- Pest management – methods and date
- Soil and manure testing – value and date



Surface Water Monitoring



Water Samples Are Analyzed For



- --sediment
- --total nitrogen
- --nitrate-nitrogen
- --ammonium-nitrogen
- --total phosphorus
- --soluble phosphorus

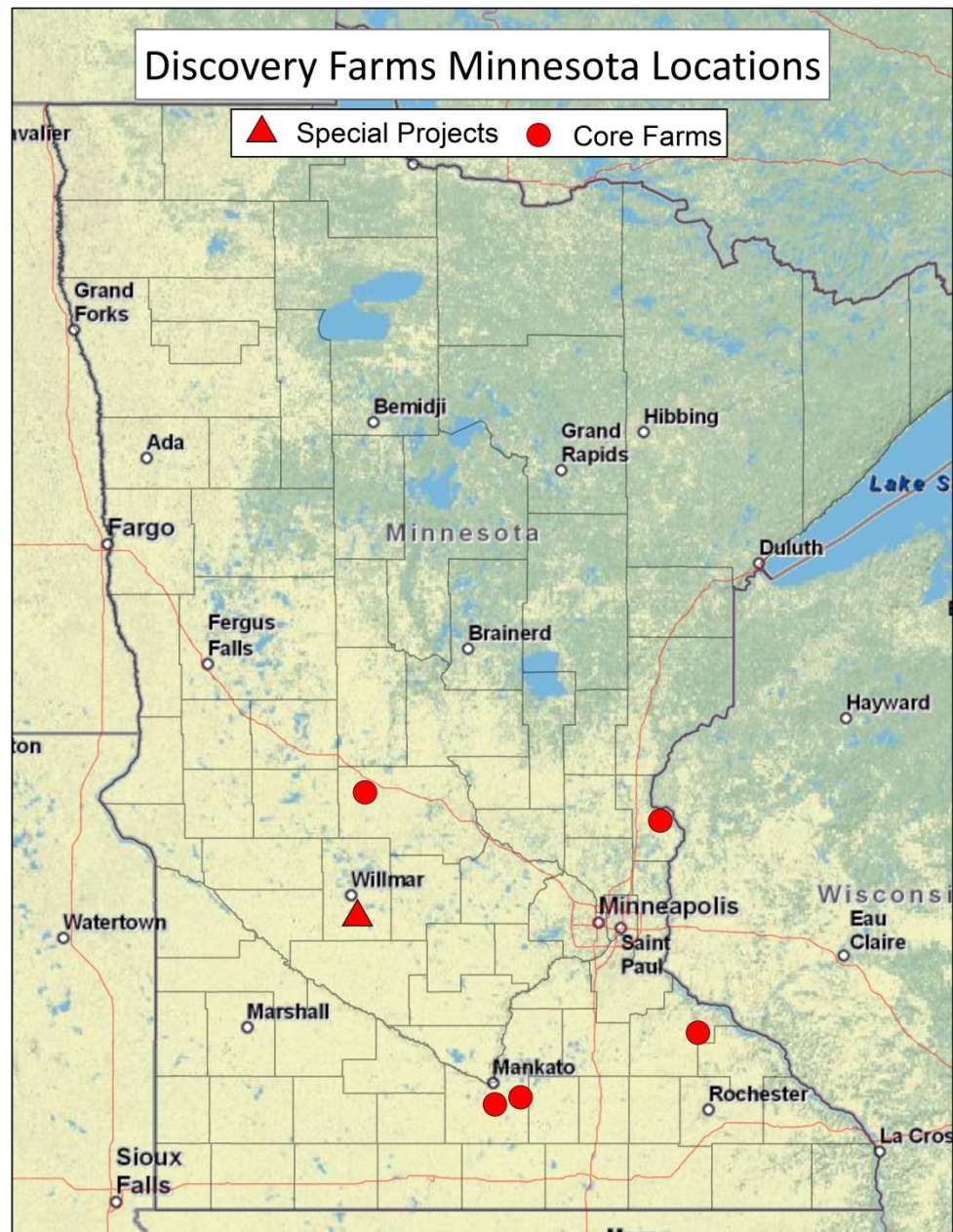
Kandiyohi County

- Special Project
- Farming operation
 - Turkey farm
 - Corn/soybean rotation
 - Manure application
 - Chisel plow and moldboard plow tillage
- Monitoring Setup
 - Surface water runoff and subsurface drainage from three agricultural fields
 - Collecting data since 2008



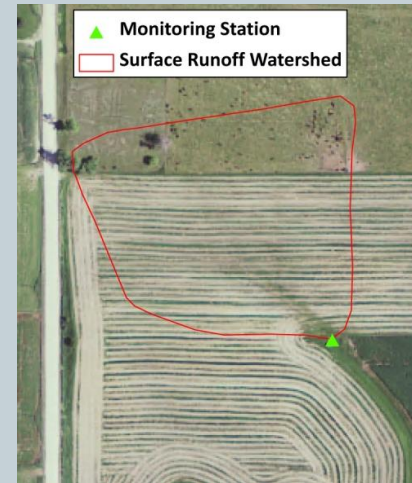
Locations

- Special Projects
 - Kandiyohi County
- Core Farms
 - Goodhue County
 - Stearns County
 - Chisago County
 - Blue Earth County (2)
- Additional locations
Fall/Winter 2011 and
Summer 2012



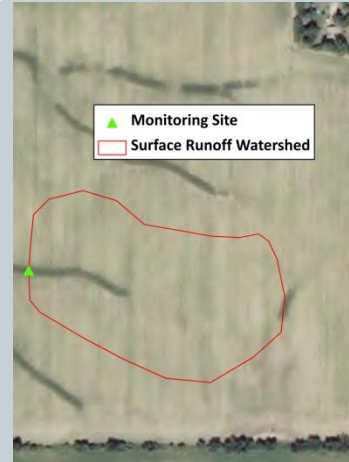
Goodhue County

- Core Farm
- Farming Operation
 - Swine and cow-calf operation
 - Corn-silage/alfalfa rotation
 - Injected manure application
 - Well drained silt loam soils
- Monitoring Setup
 - Surface water runoff
 - ~6 acre watershed
 - Operational September 2010



Chisago County

- Core Farm
- Farming Operation
 - Corn/soybean rotation
 - No-till
 - Commercial fertilizer application
 - Well drained loam soils
- Monitoring Setup
 - Surface water runoff
 - ~ 5 ac watershed
 - Operational March 2011



Sediment Movement-Peterson Farm-2011



Total, lb./acre	Frozen Soil lb./acre	Not Frozen Soil, lb./acre
60.7	14.6	36.4



Nutrient Movement-Peterson Farm 2011



	Nitrogen, lb./acre	Phosphorus, lb./acre
Frozen Soil	.58	.31
Non-Frozen Soil	.73	.11
Total	1.31	.42

Nutrient Movement-Peterson Farm 2011



	Nitrogen, lb./acre	Phosphorus, lb./acre
Frozen Soil	.58	.31
Non-Frozen Soil	.73	.11
Total	1.31	.42

Sediment and Nutrient Movement – Goodhue County

Measurement	Frozen Soil	Non-Frozen Soil
total suspended sediment, lb./acre	40.3	8.7
total phosphorus, lb./acre	1.62	.20
total inorganic phosphorus, lb./acre	.17	.03
total nitrogen, lb./acre	8.49	.47
nitrate-nitrogen, lb./acre	.49	.04
ammonia nitrogen, lb./acre	3.64	.18

Measurements—Goodhue County

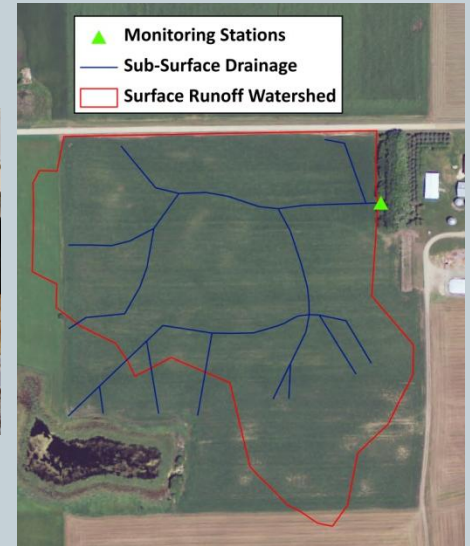


- watershed size.....6 acres
- rainfall.....27.2 inches
- runoff.....16%

Stearns County



- Core Farm
- Farming Operation
 - Small/midsize dairy
 - Corn-silage/alfalfa rotation
 - Chisel-plow tillage
 - Manure application
 - Poorly drained loam soils
- Monitoring Setup
 - Surface water runoff and subsurface drainage
 - 28 acre watershed
 - Operational March 2011



Blue Earth County



- Core Farm
- Farming Operation
 - Corn/soybean rotation
 - Swine manure
 - Poorly drained silty clay loam
- Monitoring Setup
 - Surface water runoff and subsurface drainage
 - 3.7 acre overland watershed
 - 26 acre tile-shed
 - Installed spring 2011



Blue Earth County



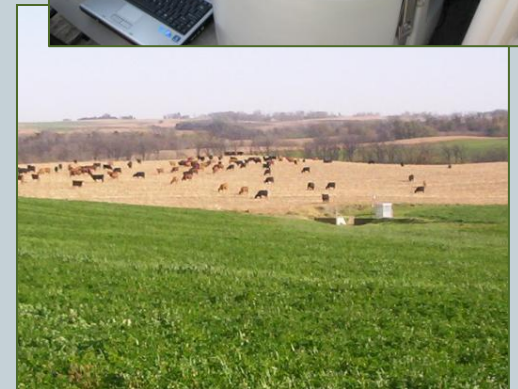
- Core Farm
- Farming Operation
 - Corn/soybean rotation
 - No manure
 - Very poorly drain muck/poorly drained clay loam
- Monitoring Setup
 - Surface water runoff and subsurface drainage
 - 13.2 acre overland watershed
 - Installation in progress



Local Partners for Monitoring Assistance



- **Chisago County**
 - Chisago County Soil and Water Conservation District
- **Goodhue County**
 - Goodhue County Soil and Water Conservation District
- **Stearns County**
 - Stearns County Soil and Water Conservation District
 - Sauk River Watershed District



Funding for Discovery Farms Minnesota



- **Primary Support From:**
 - MN Corn Research and Promotion Council
 - MN Soybean Research and Promotion Council
 - MN Turkey Research and Promotion Council
 - MDA – Clean Water Fund
- **Additional Support From:**
 - NRCS through MRBI program



Expectations for Farmers



- --allow access for 5 to 7 years
- --participate in evaluation of data
- --participate in tours and associated activities
- --make changes in farm enterprise if change is justified

Regional



- Wisconsin
- Minnesota
- North Dakota
- Arkansas
- No limitations

The Future In Minnesota



- --Expand total number of farms; not yet determined
- --Educate both urban and rural clientele; a tremendous challenge



DISCOVERY FARMS MINNESOTA

- Modeled after Wisconsin Discovery Farms Program
- Producer led research
 - Identifying issues
 - Designing solutions
 - Developing implementation plans
 - Testing solutions



Comments From A Cooperator



- “As a 6th generation farmer, environmental stewardship is something that has been taught to us by the generations that came before. If we are going to have the opportunity to watch our kids manage this land, we have an obligation to continue that legacy.”

Discovery Farms-Minnesota



- --if there is interest, don't hesitate to complete an application form



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THANK
YOU!

Questions?

