

# Irrigation & Adaptive Nitrogen Management Project

*A response to Nitrogen Concerns  
in a Challenging Landscape*



**East Otter Tail**  
Soil & Water Conservation District



MINNESOTA DEPARTMENT  
OF AGRICULTURE  
PESTICIDE AND FERTILIZER MANAGEMENT

**Darren Newville District Manager**  
**East Otter Tail & Wadena SWCDs– Perham, MN**

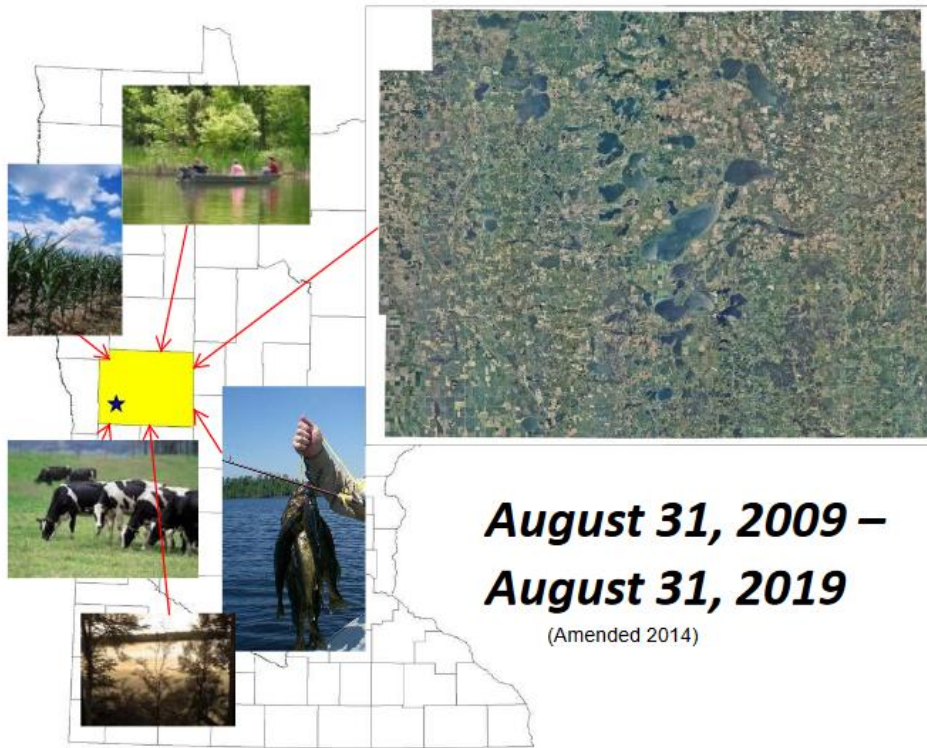
# Highlights

- Otter Tail County Water Plan priority matches Minnesota Dept. of Agriculture (MDA) priority. Program fits resource concerns.
- East Otter Tail (EOT) SWCD has formed a **partnership with MDA.** Joint Powers Agreements using **Clean Water Land and Legacy Funding.**
- Irrigation Forum recommendations – March 2011
- Irrigation Education and Outreach
  - Irrigation Scheduler Program Expansion
  - Ag Weather Network
  - Irrigation Workshops
- Adaptive Nitrogen Management Program
  - Guided Stalk Sampling – Widespread adoption
  - Sidedress Nitrogen Application Increase
  - 94% indicate management change



# Otter Tail County

## Local Water Management Plan

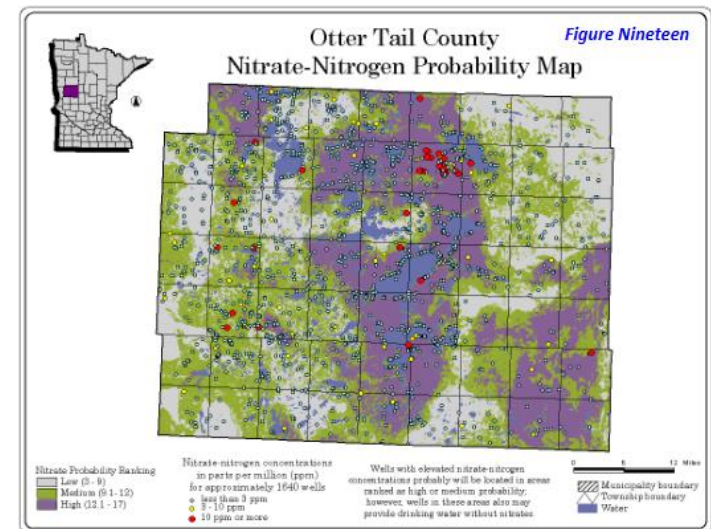


**August 31, 2009 –  
August 31, 2019**  
(Amended 2014)

**Otter Tail County will protect the existing groundwater quality for drinking water purposes.**

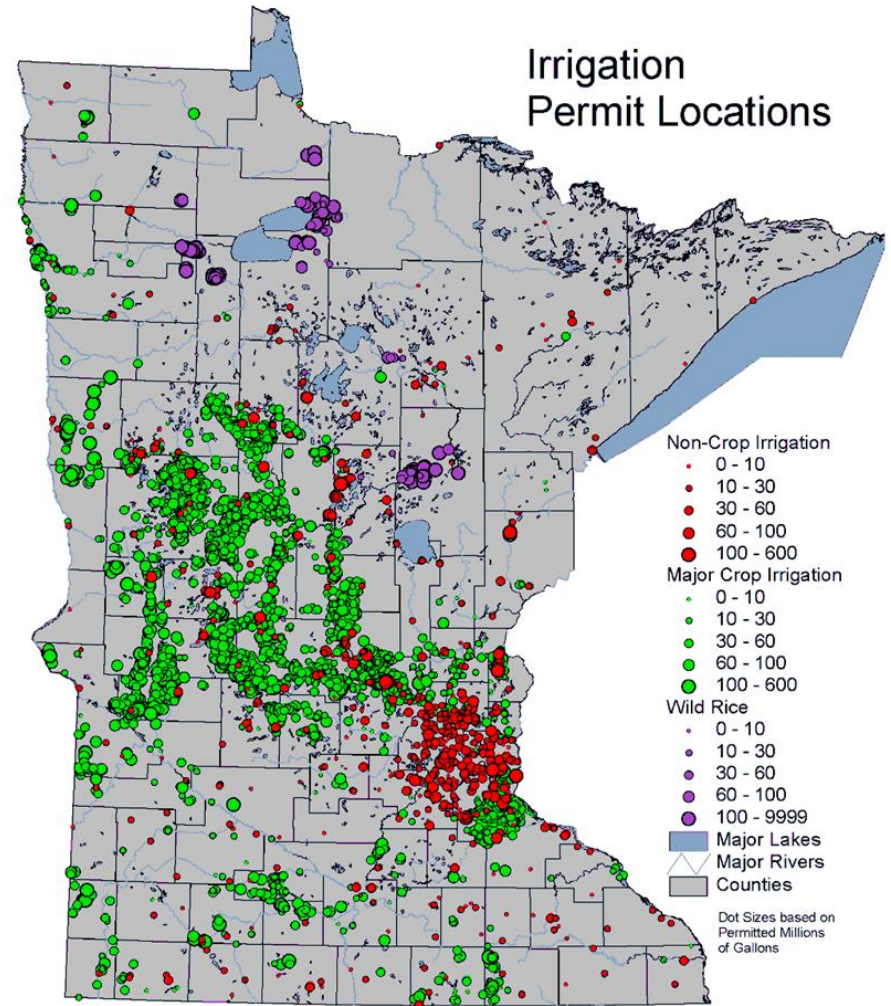
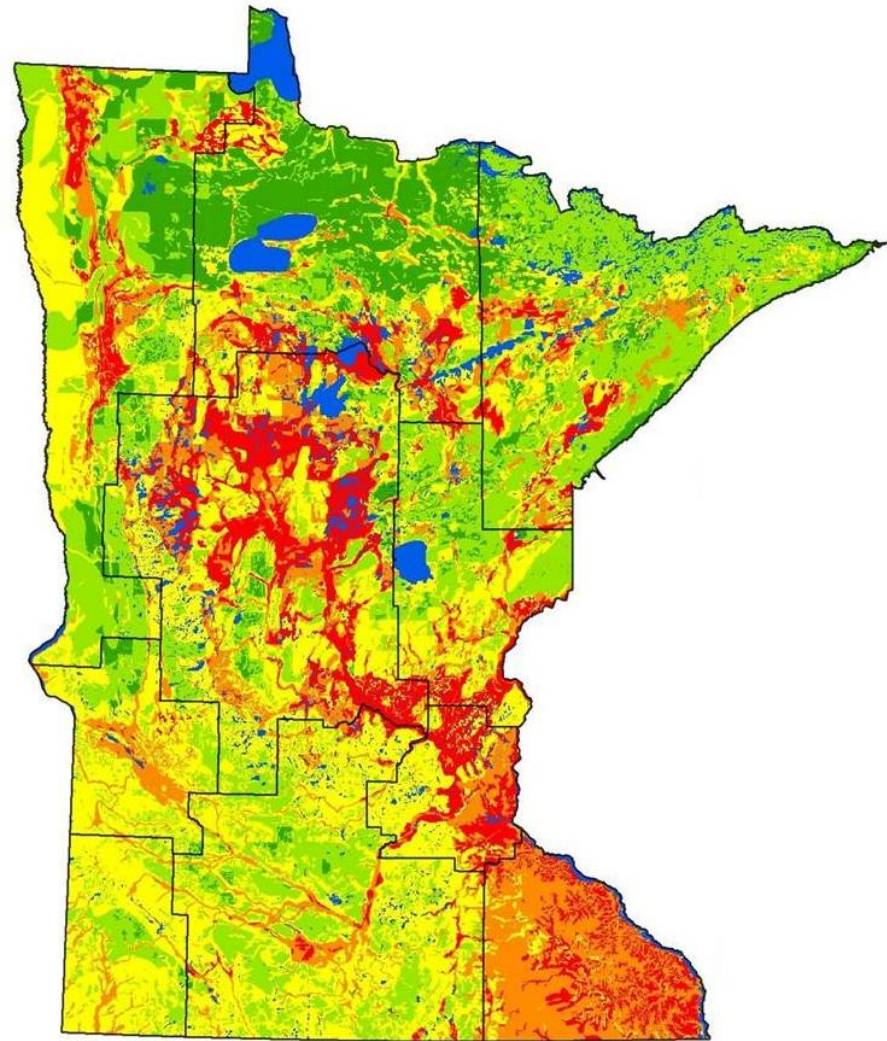
### Local Concerns

- Elevated Nitrate Levels
- Expanding/Concentrated Ag. Irrigation
- Susceptible Soils/Aquifers
- Local Wellhead Protection Efforts





# Irrigation Expansion & Concentration



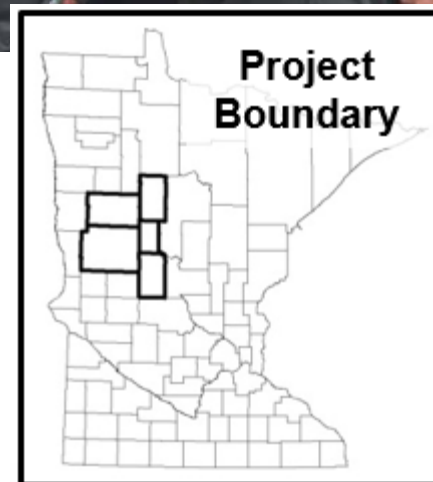
50 0 50 100 Miles

Minnesota DNR Waters  
Water Appropriation Permit Program



# Local priorities matched well with MDA priorities. Partnership Formed

- The EOT SWCD Board has been putting their limited resources into an Irrigation Scheduler Program since the mid 90's.
- Ground Water Quality – High Priority in Otter Tail County Water Plan.
- MDA had concerns in the Central Sands Region.
- Expanding/Concentrated Ag. Irrigation in the region.
- Developed EOT SWCD/MDA partnership to address the problem.
- Irrigation Forum held – Helped define/verify issues.
- Built working relationship with neighboring SWCD's with same concerns/issues.



# Irrigation Forum

March 8<sup>th</sup>, 2011

## Key Recommendations

- U of M Extension Irrigation Position
- **Need For More Education and Outreach**
- **Need For Research On New Technology and Updated Tools For Irrigation**
- **Need for Expanded Weather/Evapotranspiration (ET) Data**
- Possible Voluntary Certification Program For Irrigation Producers



ISSUE	Red	CORO
1. Productivity		40
2. WATER Quality Goals		C
3. WATER QUANTITY		C
4. H <sub>2</sub> O USE CONFLICTS		C
5. City Well Contaminant		C
6. Efficiency of Use		40
7. Cont. Education for Farmers		40
8. Allocation Issues/Rules		40
9. GAP	Jerry's Position Extension	40



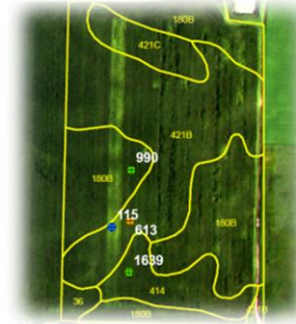
# What is Involved in Our Project

## Central MN Irrigation Outreach and Education



- Irrigation Forum
- Scheduling Program
- Local Weather Stations
  - Evapotranspiration (ET) Rates
  - Ag Weather Network
- Tools & Technology
- Winter Workshops

## On-Farm Adaptive Nitrogen Management

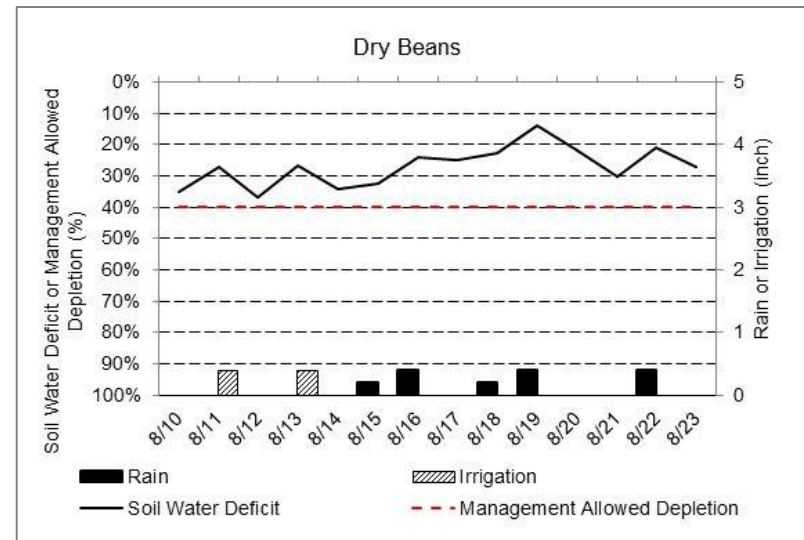


- Tools to Evaluate Nitrogen Use on Corn
- On Farm Evaluations
- In-Season Imagery
- Basal Stalk Testing
- Annual Winter Meeting
  - Producer Interaction

# Irrigation Scheduling



- EOT SWCD Program Since 1995
- Program Growth in mid 2000s (Arnie)
- Value Recognized
  - Adapted in Wadena, Hubbard, Todd, Benton, & Becker Counties, Dakota County is considering
  - Along with Weather Station Expansion
- Participation Continues to Grow

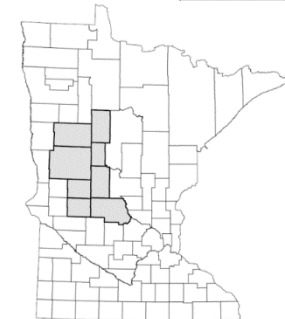
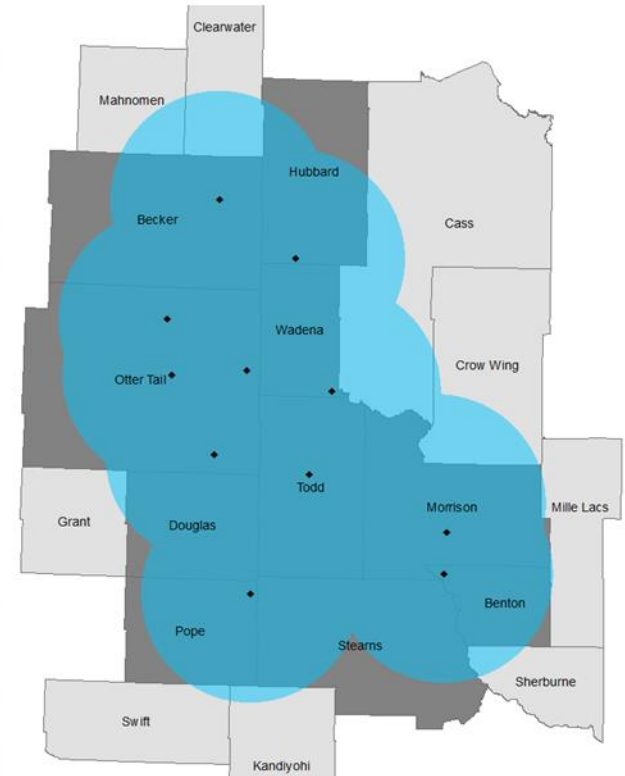




# Central MN Ag Weather Network

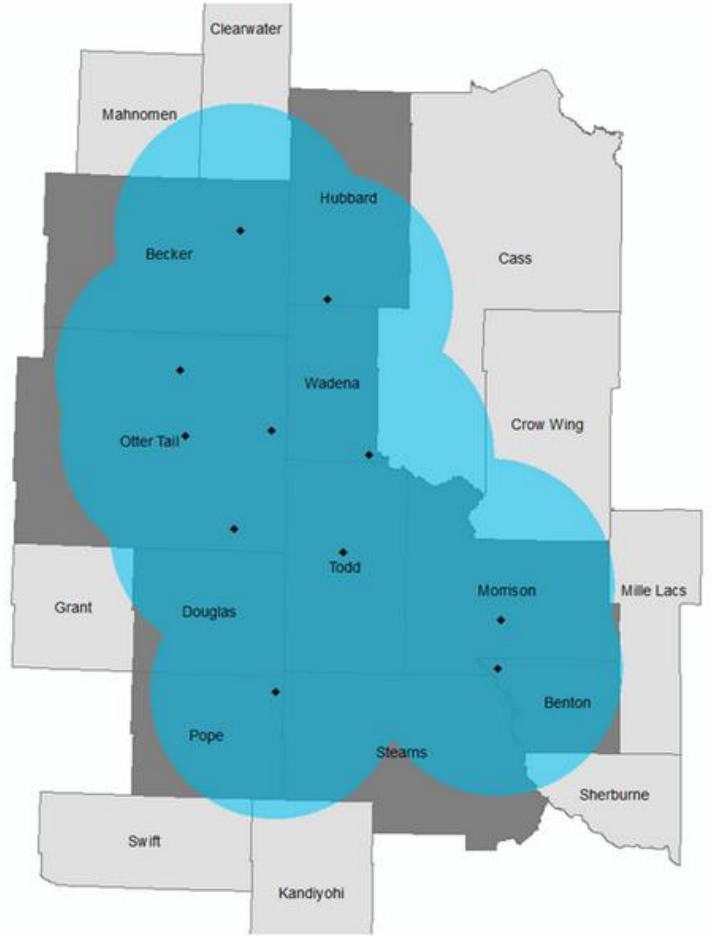
## Existing Stations

Perham		Airport
Ottertail		Sheriff Station
Parkers Prairie		Private Land
Wadena		Airport
Westport		Research Farm
Pine Point		RDO
Hubbard		RDO
Staples		Ag Center
Clarissa		Air Field
Becker		
Little Falls		



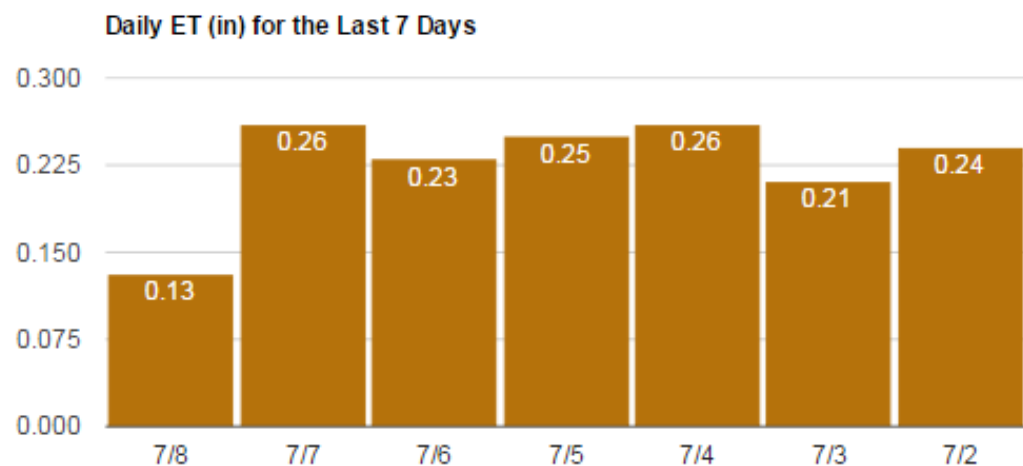
## Welcome to the Central MN Ag Weather Network

Here you can find weather data, crop water use information (evapotranspiration), and growing degree day information for your area of central Minnesota. This data is collected by a network of 11 weather stations, shown in the map below.



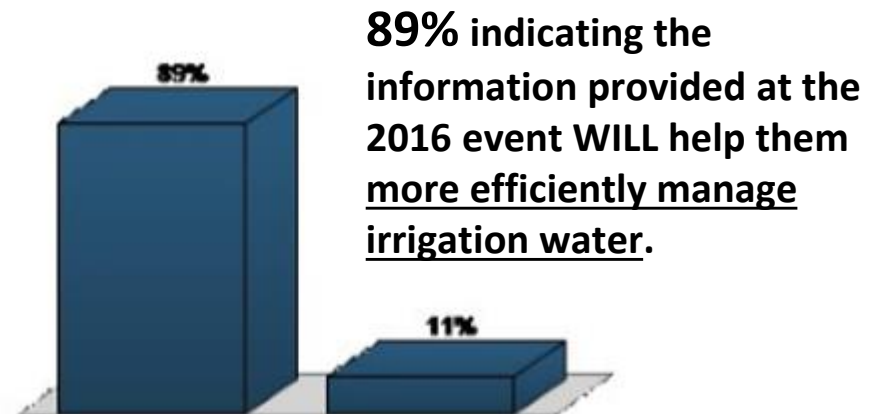
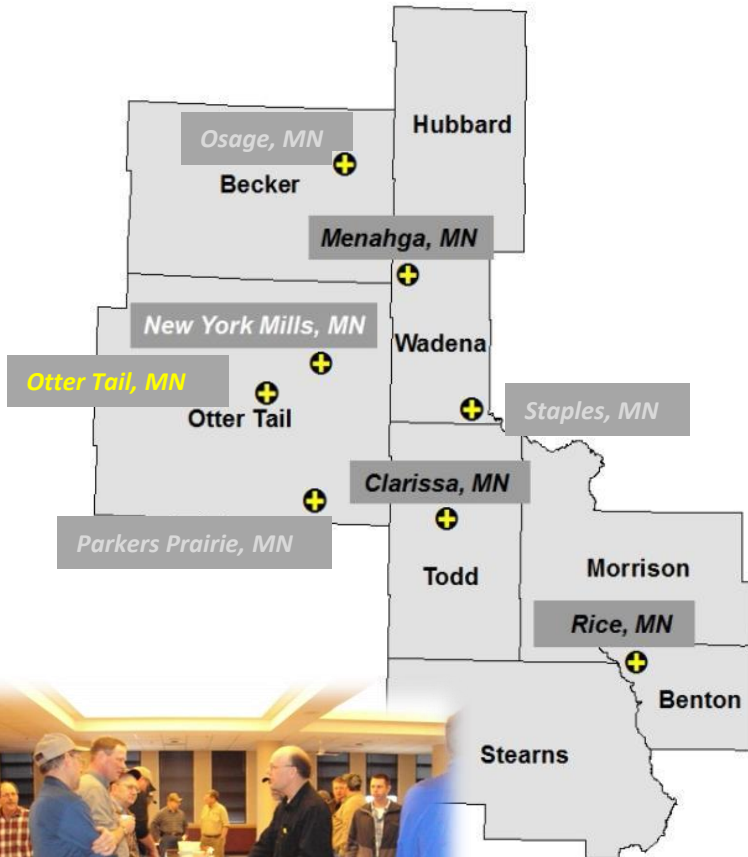
## Previous 7 Days

Date	Days Past Planting	Daily ET (in)
7/8/2015	76	0.13 (ET)
7/7/2015	75	0.26 (ET)
7/6/2015	74	0.23 (ET)
7/5/2015	73	0.25 (ET)
7/4/2015	72	0.26 (ET)
7/3/2015	71	0.21 (ET)
7/2/2015	70	0.24 (ET)



# Irrigation Workshops

- **Ten (10)** workshops held since 2011
- Workshop Guidebook Developed
  - Benton, Pope, Dakota, Stearns...
- Hands-On Activities
- Irrigation & Nitrogen Related Topics
- Industry, University & Gov't Present
- Record attendance in 2016.

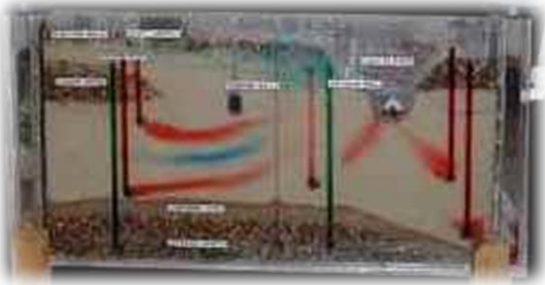




# *Irrigation Workshops*

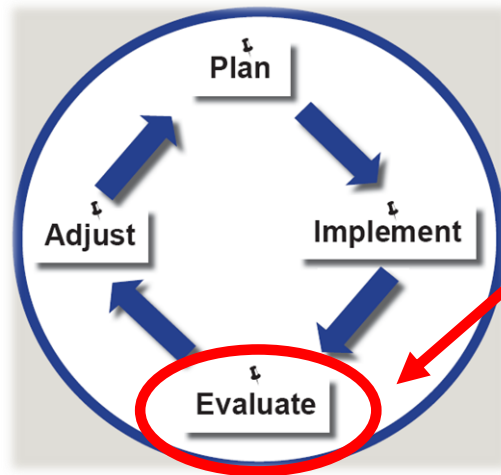
## **Topics Covered**

- Local/Regional/State Groundwater Concerns
- Irrigation Water Scheduling
- Soil Moisture Capacity/Assessment
- ET Information Sources
- New Technology
- Nitrogen Management Practices
- Cover Crops
- Blending field profit and the environment
- Precision Farming/Conservation
- What's happening in other states



# On Farm Nitrogen Management...

## Adaptive Concept



Added diagnostic information to consider in your planning for the following season.

**GOAL:** Improve Nitrogen Use Efficiency



Stalk Sampling and aerial images are components **BUT, It's really the Program Structure**

It just makes Good Business Sense!

# The Approach Is Straight Forward

Provide Good Data and it will empower Good Decisions.

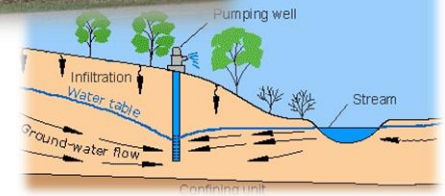
In-Season Imagery  
In-Field Data



**Innovative  
Producers**



↑ Nitrogen Use Efficiency  
↓ Losses of Nitrogen to G.W.



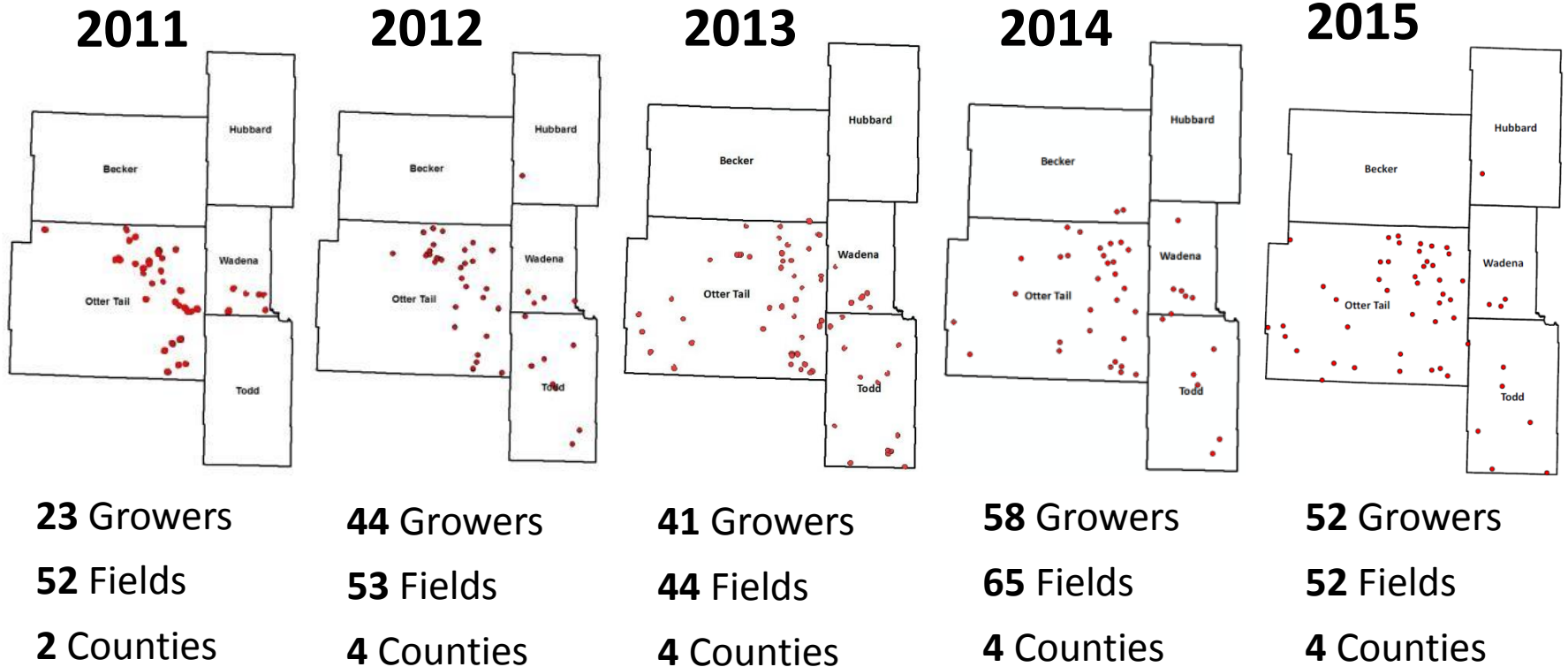
# What Exactly is Involved??

- June | Participants asked to sign up before the end of June (Limited)
- June-July | Field management data & boundaries are collected
- August | Aerial imagery is collected for each field
- Sept-Oct | Basal stalk samples are collected
- Dec-Feb | A winter meeting is held to share results



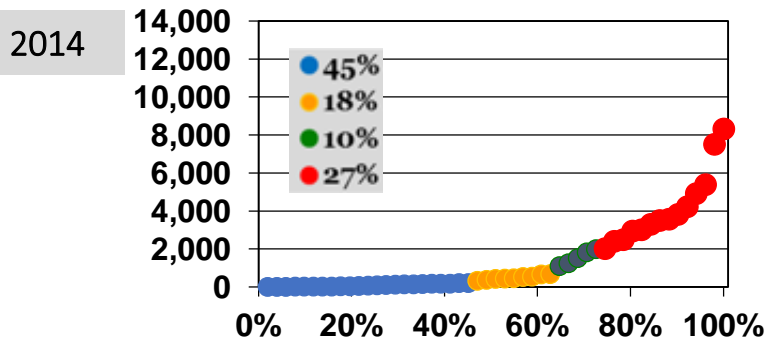
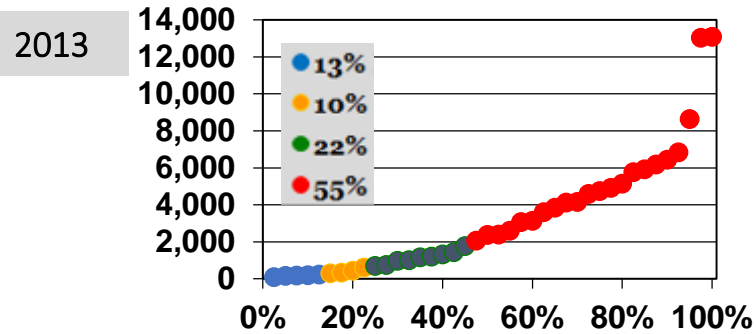
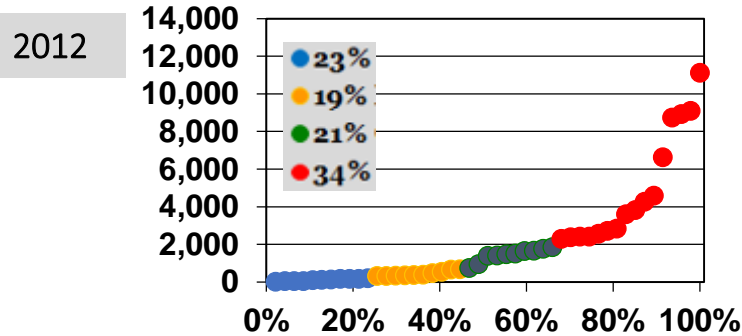
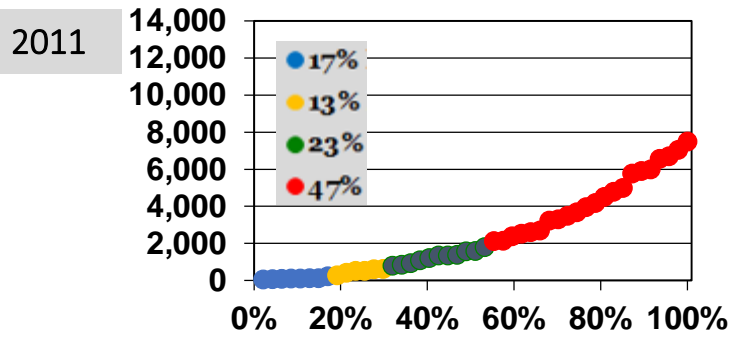


# Spatial Extent & Participation

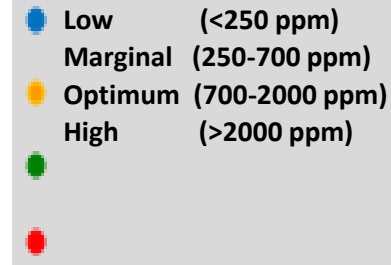
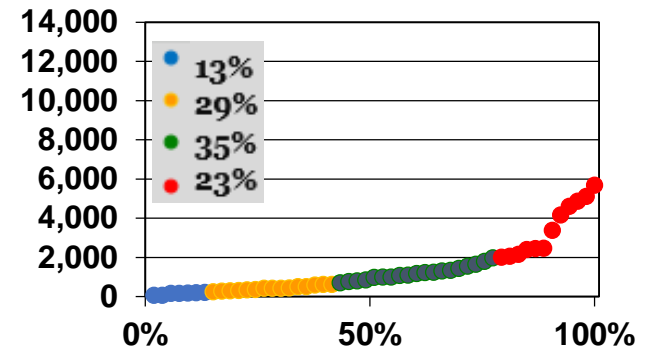


# Program Results

## Corn Stalk Nitrate Tests are Lower

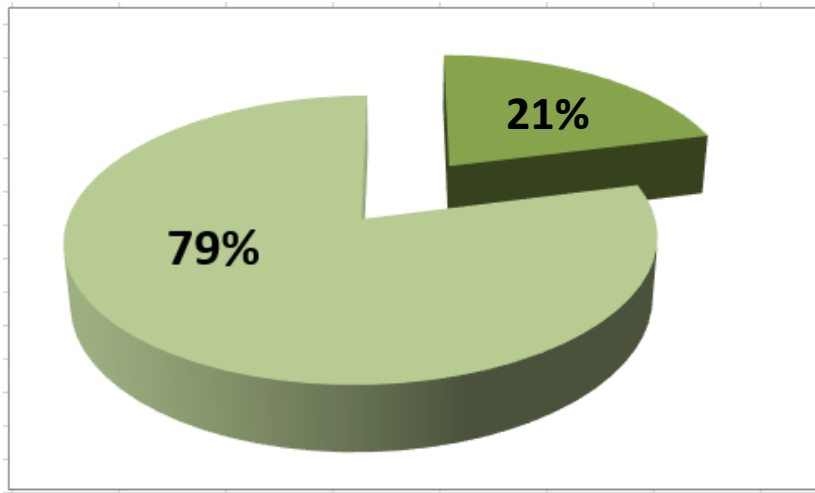


2015

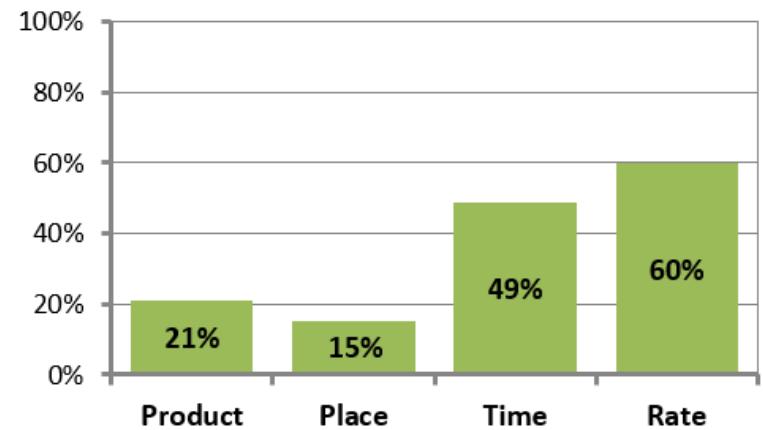


# 2015 Meeting Survey | Highlights

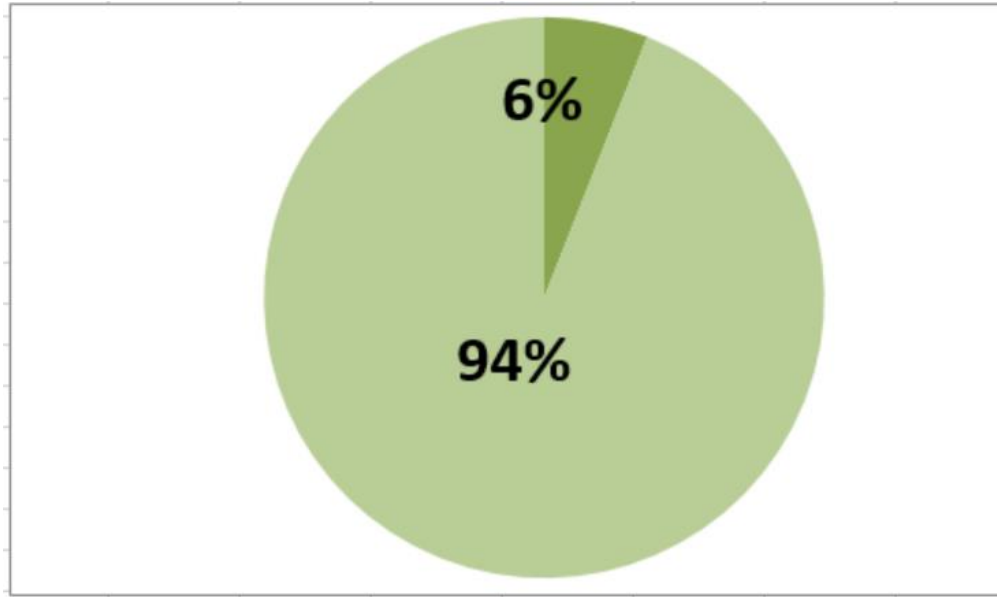
79% of 2015 participants are making nitrogen management changes based on the information they received through the program in 2015.



What Management Changes are being made?

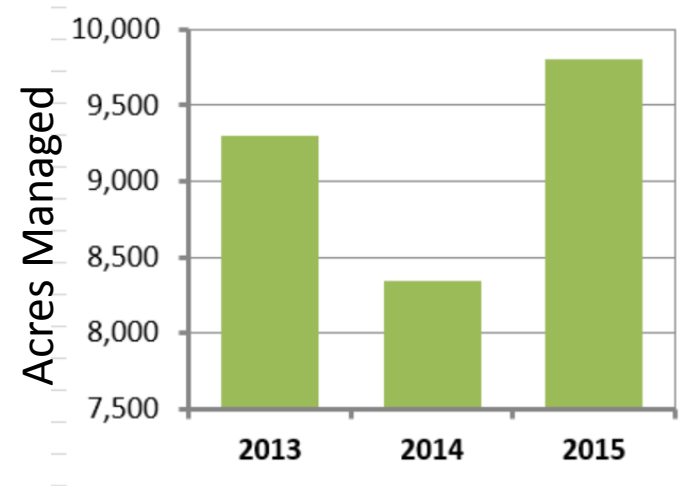


# 2015 Meeting Survey | Highlights



Over the life of the program 94% have made Nitrogen Management Changes

Nearly 10,000 acres  
managed by program  
participants

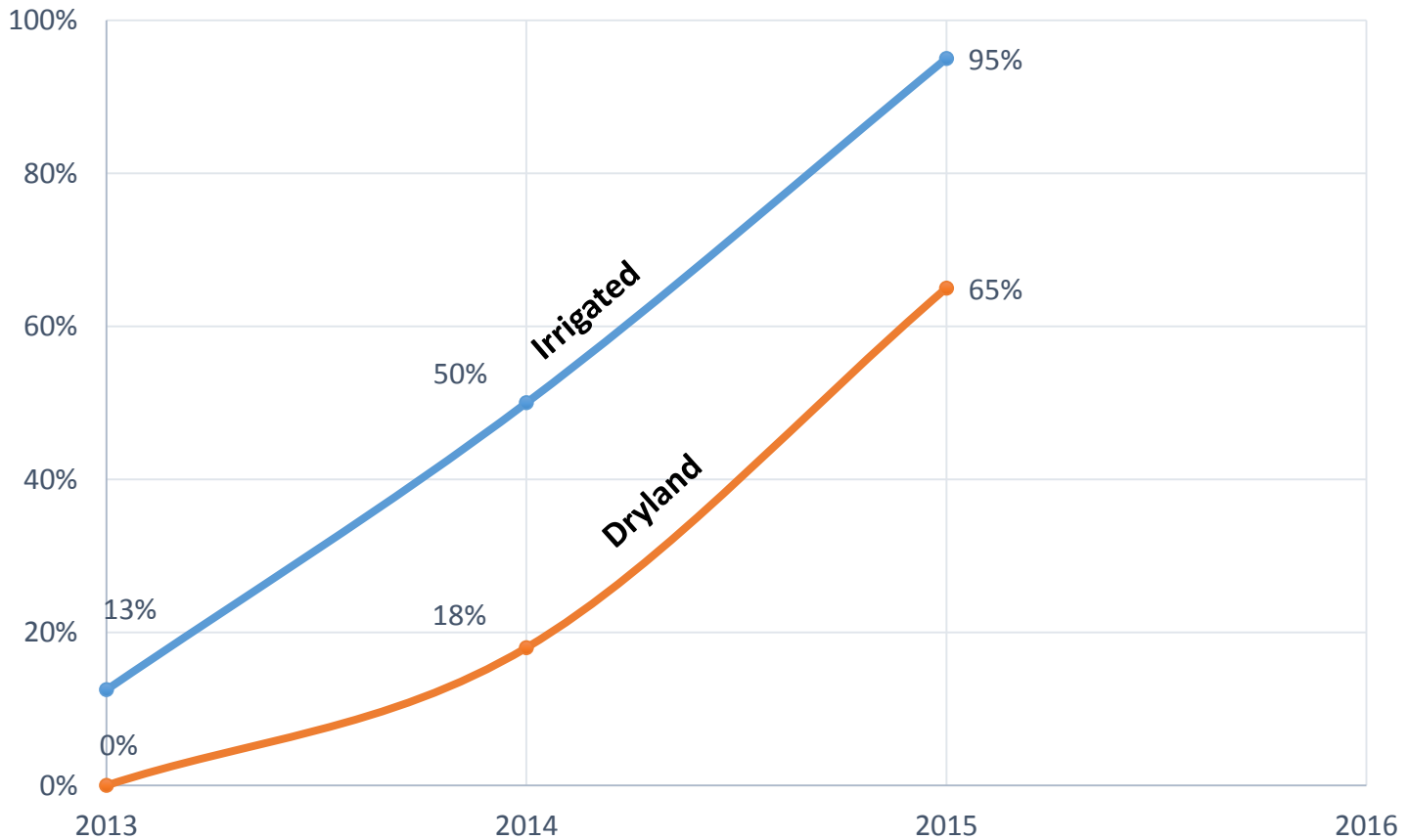




# Program Results

## Sidedress Nitrogen Application Increases

% of Participant Fields Sidedressing Nitrogen



# Summary

- Local and State Resource concerns about ground water quality.
- **Partnerships - Strong CWF/MDA support** has enabled the Local SWCD to provide these programs.
- Local SWCD Board - **Educate** local producers about the resource concerns **and enable** them to adopt best management practices that **protect the resources and allows them to be profitable.**
- Building local partnerships (SWCD's, Crop Consultants, Producers)
- Providing **meaningful tools and information to producers**
- Positive response from producers
- **Clean Water Funding!!!!**





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[www.eotswcd.org](http://www.eotswcd.org)



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[www.mda.state.mn.us/protecting/cleanwaterfund.aspx](http://www.mda.state.mn.us/protecting/cleanwaterfund.aspx)

**Thank You.**

