Irrigation & Adaptive Nitrogen Management Project

A response to Nitrogen Concerns in a Challenging Landscape

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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 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

August 31, 2009 – August 31, 2019
(Amended 2014)
Irrigation Expansion & Concentration
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.
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
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

![Graph showing soil water deficit and irrigation management allowed depletion for dry beans.](image)
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Days Past Planting</th>
<th>Daily ET (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/8/2015</td>
<td>76</td>
<td>0.13 (ET)</td>
</tr>
<tr>
<td>7/7/2015</td>
<td>75</td>
<td>0.26 (ET)</td>
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<td>7/6/2015</td>
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<td>7/5/2015</td>
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<td>7/4/2015</td>
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<td>7/3/2015</td>
<td>71</td>
<td>0.21 (ET)</td>
</tr>
<tr>
<td>7/2/2015</td>
<td>70</td>
<td>0.24 (ET)</td>
</tr>
</tbody>
</table>

### Daily ET (in) for the Last 7 Days

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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.

89% indicating the information provided at the 2016 event WILL help them more efficiently manage irrigation water.
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
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

2011
23 Growers
52 Fields
2 Counties

2012
44 Growers
53 Fields
4 Counties

2013
41 Growers
44 Fields
4 Counties

2014
58 Growers
65 Fields
4 Counties

2015
52 Growers
52 Fields
4 Counties
Program Results
Corn Stalk Nitrate Tests are Lower
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?

- Product: 21%
- Place: 15%
- Time: 49%
- Rate: 60%
2015 Meeting Survey | Highlights

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

Nearly 10,000 acres managed by program participants

![Bar chart showing Acres Managed for 2013, 2014, and 2015]
Program Results

Sidedress Nitrogen Application Increases

% of Participant Fields Sidedressing Nitrogen

- **Irrigated**
  - 2013: 0%
  - 2014: 13%
  - 2015: 50%
  - 2016: 95%

- **Dryland**
  - 2013: 0%
  - 2014: 18%
  - 2015: 65%
  - 2016: 100%
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!!!!**