Iowa Programs and Initiatives for Reducing Nutrient Transport to Water Resources from Ag Lands

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Iowa’s Approach to Reducing Nutrient Transport From Ag Lands

1. Continue long-standing programs to encourage adoption of traditional conservation practices.

2. Develop new, innovative technologies and programs targeted to reducing nutrient transport to water resources.
<table>
<thead>
<tr>
<th>Iowa Conservation Programs Which Reduce Nutrients to Water – State Fiscal Year 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation &amp; Watershed Protection</td>
</tr>
<tr>
<td>Research &amp; Technology Development</td>
</tr>
<tr>
<td>Education &amp; Outreach</td>
</tr>
<tr>
<td>*<em>TOTAL</em></td>
</tr>
</tbody>
</table>

*includes landowner match $
New Innovative Technologies and Programs Targeted to Reduce Nutrient Transport

- On-Farm Nitrogen Network – Iowa Soy Association
- Iowa Learning Farms – Iowa State University
- Iowa CREP Nitrogen Removal Wetlands
- Cedar River Watershed Case Study
- Iowa Wetland Landscape Systems Initiative
- Iowa Strategy for Nutrient Reduction – Gulf of Mexico Hypoxia
- Voluntary BMP Adoption/Recognition Program – Iowa Ag Organizations
On-Farm Network

Over 3,000 guided stalk nitrate evaluations
Over 1,000 replicated strip trials
Focused on in-field comparisons of:

- N stabilizers
- Timing of N (fall vs. spring; Preplant vs SD)
- Forms of N (UAN, NH3, Urea, Manure)
- Type of application (injection vs dribbling)
- Crop sensors
- Potential for variable rate

www.isafarmnet.com
Iowa

35 grower groups

www.isafarmnet.com
# Nitrogen Trials

<table>
<thead>
<tr>
<th>Year</th>
<th>Rotation</th>
<th>Fertilizer N</th>
<th>Grain Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Rate</td>
<td>High Rate</td>
</tr>
<tr>
<td>2001</td>
<td>C-SB</td>
<td>80</td>
<td>130</td>
</tr>
<tr>
<td>2002</td>
<td>C-SB</td>
<td>70</td>
<td>120</td>
</tr>
<tr>
<td>2003</td>
<td>C-C</td>
<td>130</td>
<td>180</td>
</tr>
<tr>
<td>2004</td>
<td>C-SB</td>
<td>60</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>110</td>
<td>160</td>
</tr>
<tr>
<td>2005</td>
<td>C-SB</td>
<td>60</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>110</td>
<td>160</td>
</tr>
<tr>
<td>2006</td>
<td>C-C</td>
<td>120</td>
<td>150</td>
</tr>
<tr>
<td>2007</td>
<td>C-C</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>2008</td>
<td>C-C</td>
<td>130</td>
<td>155</td>
</tr>
</tbody>
</table>

[www.isafarmnet.com](http://www.isafarmnet.com)
Adaptive Management

Need to evaluate what actually happened.
Iowa Learning Farms

• Conducted by Iowa State University
• Farm cooperator demonstrations – crop residue and tillage management
• Education and outreach, awareness
• Rainfall simulator educational tools
• “Building A Culture of Conservation”
Iowa Conservation Reserve Enhancement Program

- Drainage District Boundary
- Hydric Soils
- Subsurface Tile Drain
- CREP Wetland
Observed and modeled wetland performance (2007)

W.G. Crumpton, Iowa State University
Iowa CREP Status

72 wetlands restored, under construction or design

- 715 acres total wetland pool
- Remove 40-70% of nitrate from 86,100 acres
- Estimated nitrate removal over practice lifetime is 53,600 tons
- Nitrogen removal cost $0.23/lb, below current cost of fertilizer N
Cedar River Watershed Case Study – scenario to reduce nitrate losses 35% (9,200 tons/non-point source allocation) while retaining row-crop production

<table>
<thead>
<tr>
<th>Practice</th>
<th>% reduction</th>
<th>Acres* treated</th>
<th>Tons reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>140 to 100 N rate - CB</td>
<td>20.1% or 3.9 lb/ac</td>
<td>all or 1.70 M ac</td>
<td>3,315</td>
</tr>
<tr>
<td>190 to 150 N rate - CC</td>
<td>16.2% or 3.8 lb/ac</td>
<td>all or 0.10 M ac</td>
<td>190</td>
</tr>
<tr>
<td>Avoid fall N application</td>
<td>15% or 2.5 lb/ac</td>
<td>all or 300,000 ac</td>
<td>375</td>
</tr>
<tr>
<td>Rye cover crops</td>
<td>50% or 8 lb/ac</td>
<td>10% or 170,000 ac</td>
<td>680</td>
</tr>
<tr>
<td>Drainage water mgt</td>
<td>50% or 8 lb/ac</td>
<td>10% or 167,000 ac</td>
<td>670</td>
</tr>
<tr>
<td>N removal wetlands</td>
<td>50% or 8 lb/ac</td>
<td>59% or 1.00 M ac</td>
<td>4,000</td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td>[*2/3 of 2.55 M or 1.70 M ac]</td>
<td>9,230</td>
</tr>
</tbody>
</table>
Iowa Wetland Landscape Systems Initiative

Pilot Demonstrations
Iowa Wetland Landscape Systems Initiative

Targeted Wetland Restoration

Corn
Soybean
DD Tile

1 km

W.G. Crumpton, Iowa State University
Projected Environmental/Ecological Service Benefits – Wetland Landscape Systems

- Reduce nitrate transport – 40-70%
- Reduce surface runoff overland flow – 50%
- Reduce sediment delivery – 50%
- Reduce phosphorus transport – 50%
- Reduce $\text{N}_2\text{O}$ greenhouse gas emissions
- Increase habitat and ecological service functions of the landscape – potential market force driver?
- Market force economic driver for implementation and food security benefit - optimize crop production
Calhoun County – Potential Nitrate Removal Wetlands
Pilot Demonstration Study Sites

- Solicitation of interest across 3000 watershed districts
- Pilot demonstration study watersheds
  - Pocahontas DD 65 (construction completed)
  - Clay DD 8
  - Pocahontas DD 48 & 81
  - Palo Alto DD15 North
  - Palo Alto DD15 South
  - Pocahontas/Palo Alto Joint DD36
Interagency Working Group

Iowa Department of Agriculture & Land Stewardship (IDALS)
Iowa State University (ISU)
University of Iowa (UI)
Iowa Institute of Hydraulic Research (IIHR)
Center for Agricultural and Rural Development (CARD)
Iowa Flood Center (IFC)
Iowa Department of Natural Resources (DNR)
USDA – Farm Service Agency (FSA)
USDA – Natural Resources Conservation Service (NRCS)
USDA – Agricultural Research Service (ARS)
United States Fish & Wildlife Service (FWS)
United States Environmental Protection Agency (EPA)
United States Geological Survey (USGS)
Technical Work Groups and Study Areas

• Hydrology and Water Quality
• Soil Resources
• Habitat
• Green House Gases
• Crop Yield
• Decision Drivers

49 research and technical members
Wetland and Watershed Infrastructure
Funding of Pilots

Landowners $5.3 million
Iowa cost-share funds 4.0
Iowa CREP 2.0
State revolving fund 0.4 + loan

TOTAL $11.7+ million
Iowa Strategy for Nutrient Reduction – Gulf of Mexico Hypoxia

Voluntary BMP Adoption/Recognition Program – Iowa Ag Organizations