Dead Zones & Drinking Water: 
Farming’s Nutrient Loss Challenge

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WATER QUALITY CHALLENGES FOR FARMING

- Gulf of Mexico Hypoxia
- Des Moines Water Works lawsuit
- Reducing nutrient losses from fields

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GULF HYPOXIA & THE MISSISSIPPI RIVER BASIN

- Third largest drainage basin in the world; Drains 41% and 31 of the 48 contiguous states

- USDA: 242 million acres of major commodity cropland; $54 billion in agricultural products

- Hypoxia or dead zone: over 5,000 square miles in 2014

- Agriculture may contribute 70% of the delivered nitrogen and phosphorous

- Gulf Restoration Network v. EPA; nutrient criteria

Source: http://www.noaanews.noaa.gov/stories2011/20110728_sullivan.html

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DES MOINES WATERWORKS LAWSUIT

- DMWW: water with nitrates from district drainage is a point source and subject to Clean Water Act

- DMWW claims costs: $4.1m on nitrate removal equip; $7,000 per day to operate; new equip at $76m to $183.5m; spent $1.5m since Dec. 2014

- Drainage Districts: local government; public utility; tax/assessment & eminent domain

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**CWA regulates ‘point source’: “any discernible, confined, discrete conveyance”; pipes, etc.**

- “agricultural stormwater discharges” are defined as ‘nonpoint sources’ and generally exempt

- The DMWW lawsuit questions legal impact of drainage system on exemption


Ohio and Toxic Algae

- 2014: Toledo residents instructed to not use or drink water because of toxic algae blooms in western Lake Erie.

- Ohio Senate Bill 1 (July 3, 2015) restricts fertilizer application in Western Lake Erie Basin.

- Restricted for snow-covered, frozen or saturated soil; also in granular form if 50% chance of 1” precip. in a 12-hour period.


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2010: EPA established a Total Maximum Daily Load (TMDL) to improve water quality in the Bay; a “pollution budget” to each state to combat hypoxic zone

Largest of its kind (64,000 sq. mi.); focused on nitrogen, phosphorous and sediment reductions (25%, 24% and 20% respectively); farming

Has thus far survived legal challenge
Gulf Hypoxia Task Force: 45% reduction in nutrient loading.

Illinois contributes 20% of nitrate and 11% of phosphorous to the Gulf.

Goal is a 15% Nitrate reduction by 2025 with ultimate goal of 45% reduction; could cost as much as $800 million annually.

Est. 9.7m acres of tile-drained farmland; over 22m acres total.

Farms losing est. 440m pounds N lost each year = 82% of total contributed by IL; farmers could be losing as much as 26-43 lbs./acre lost.
### Science Assessment: Examples of practices for N Reduction

<table>
<thead>
<tr>
<th>Practice</th>
<th>Per Acre reduction</th>
<th>Total (million lb)</th>
<th>From baseline</th>
<th>Cost per lb N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrification inhibitor-fall applied, tiled corn</td>
<td>10%</td>
<td>4.3</td>
<td>1.0%</td>
<td>$2.33</td>
</tr>
<tr>
<td>Cover crops-all corn/soy tiled</td>
<td>30%</td>
<td>84</td>
<td>20.5%</td>
<td>$3.21</td>
</tr>
<tr>
<td>Wetlands-25% of tiled</td>
<td>40%</td>
<td>28</td>
<td>6.8%</td>
<td>$5.06</td>
</tr>
<tr>
<td>Buffers on all applicable land</td>
<td>90%</td>
<td>36</td>
<td>8.7%</td>
<td>$1.63</td>
</tr>
<tr>
<td>Bioreactors-50% of tiled</td>
<td>40%</td>
<td>56</td>
<td>13.6%</td>
<td>$1.38</td>
</tr>
</tbody>
</table>
Farm Bill Conservation Programs

- **Environmental Quality Incentives Program (EQIP)**

- Cost-share contracts for conservation practices to comply or avoid regulations ($1.65 billion nationally; 60% reserved for livestock)
  
  - Practices addressing erosion and sedimentation, plant and soil management and water quality
  
  - Includes practices such as nutrient and pest management, cover crop, crop rotation, filter strips and buffers, irrigation water, and residue management.

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Farm Bill Conservation Programs

- Conservation Stewardship Program (CSP)

- 5-year contracts to maintain and improve conservation on the farm; address resource concern (e.g., water quality)

  - Annual payments for installing new conservation activities and maintaining existing practices; and

  - Supplemental payments for adopting a resource-conserving crop rotation.
FARM BILL CONSERVATION PROGRAMS

IL Conservation Investments (Millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>CSP</th>
<th>EQIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>$15.840</td>
<td>$31.479</td>
</tr>
<tr>
<td>2013</td>
<td>$17.387</td>
<td>$22.490</td>
</tr>
<tr>
<td>2012</td>
<td>$18.184</td>
<td>$18.785</td>
</tr>
<tr>
<td>2011</td>
<td>$13.524</td>
<td>$16.389</td>
</tr>
</tbody>
</table>

Source: NRCS

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FARM BILL CONSERVATION PROGRAMS

EQIP in Illinois

✓ 2013 funded 42 contracts for comprehensive nutrient management plans (avg. $7,400 per); 42 contracts for general EQIP (avg. $26,942 per)

✓ 2014 funded 41 comprehensive nutrient management plans (avg. $7,000 per); 58 general EQIP (avg. $32,605 per)

✓ Limit: $450,000 over five years 2014-2018

CSP in Illinois

✓ 2013 funded 240 contracts covering 187,342 acres (avg. $15,505 per contract)

✓ 2014 funded 534 contracts covering 395,469 acres (avg. $15,917 per contract)

✓ Limit: $200,000 over five years 2014-2018
MANAGING CONSERVATION

$0.45/lb. N

26-43 lbs./acre

$11.70 to $19.35 per acre

Practice costs (e.g. cover crop may be $29/acre)

Value of water quality

Assistance with costs (NRCS, etc.)

Adding complexity

Adding risk or helping to manage it?

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REGIONAL CONSERVATION PARTNERSHIP PROGRAM

Address Conservation Challenges

Farm Business Management

Precision Agriculture Technology

Yield Map

Soil Map

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THANK YOU!

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