Institute of Ag Professionals

Proceedings of the

2015 Crop Pest Management Shortcourse &

Minnesota Crop Production Retailers Association Trade Show

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Nitrate in Groundwater: Well Testing Results and the Nitrogen Fertilizer Rule

For the MCPR Short Course
December 10, 2015

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Nitrogen Fertilizer Management Plan (NFMP)

- Many wells exceed the health standard for nitrate in areas where groundwater is vulnerable to contamination.

- The NFMP is the state’s blueprint for minimizing groundwater impacts from the use of nitrogen fertilizer.

- Has voluntary and regulatory components.

- Revised in March 2015.
Nitrate Leaching from Fertilizer

- A very challenging problem
- Under row crop production in vulnerable soils, nitrate leaching will occur
- Losses may vary significantly between years due to weather
- May be long lag times (years) between changes in practices and changes in groundwater quality
- Enormous variability *between* and *within* aquifers

There is no simple solution
The Revised NFMP

1. An emphasis on prevention;
2. Extensive testing of private wells by township;
3. A new phased approach to assessing and prioritizing areas with nitrate contamination;
4. An emphasis on involving local producers and communities in problem solving through local advisory groups; and,
5. Promoting alternative management tools (AMTs) – changing land management in targeted areas.
Phased Approach

- A four phase (level) approach based on percent of wells exceeding the nitrate drinking water standard
- Two levels are voluntary, two are regulatory
- Starts with one of the voluntary levels
- Becomes regulatory only if BMPs are not voluntarily adopted
Nitrate Reduction Strategies

- Adoption of the nitrogen fertilizer Best Management Practices (BMPs)

- Increased low nitrogen vegetative cover (perennial crops, forages and cover crops) or taking land out of production in targeted high risk areas
Township Well Testing Program

- In townships with vulnerable groundwater and significant row crops
- Partnership effort with local government
- Includes all private wells (up to 70,000 wells)
- Voluntary
- No cost to owner – funded by the Clean Water Fund
- If nitrate is detected follow-up sampling is conducted for pesticides
Township Testing

Approximately 280 to 300 townships with row crop agriculture and vulnerable groundwater, or history of high nitrate will be tested.
Two Step Process

Step 1 – Initial test
• Work with local partner (SWCDs or County)
• All well owners are offered a free nitrate test kit
• Homeowner collects sample and mails it in

Step 2 – If nitrate is detected:
• Collect follow-up nitrate and pesticide samples
• Samples collected by trained staff
Preliminary Results
For 2013-2014

<table>
<thead>
<tr>
<th>Percent of Wells above the Standard (10 mg/L Nitrate-N)</th>
<th>Number of Townships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5%</td>
<td>14</td>
</tr>
<tr>
<td>5%-9.9%</td>
<td>17</td>
</tr>
<tr>
<td>10% or more</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

- Approximately 7342 wells were sampled
- 13% (982) of those wells were >= HRL

Does not include hand dug wells or wells with unclear locations
Results are preliminary and subject to change
Results for Central Minnesota
Results for SE Minnesota
• Sampling will occur over several years

• The first round of sampling should be completed by 2019
Nitrogen Fertilizer Rule

- **Part One**— Restrict application of nitrogen fertilizer in the fall and to frozen soils in areas vulnerable to groundwater contamination

- **Part Two**— Place the process for moving to regulations, as outlined in the NFMP into rule
Nitrogen Fertilizer Rule – Part One

Applies to areas with vulnerable groundwater

These may include:
- Coarse textured soils
- Shallow fractured bedrock (karst)
- Elevated nitrate in local wells
- Defined as vulnerable by the DNR based on groundwater infiltration rates
Nitrogen Fertilizer Rule – Part Two

The NFMP process for moving to regulations will be placed into rule

- Generally based on township(s) or source water protection area
- Selected from a list of options based on local and regional conditions
- Input from local advisory committee
- Only regulate if BMPs are not adopted
- Applied on a site specific basis via Commissioner’s Order
Part Two Rule Process

Regulatory Options:
- Appropriate Regional BMPs
- Record keeping
- Attend training
- Collect well water samples
- Credit N from previous crop and manure
- Soil Testing
- Nitrification inhibitor
- Irrigation Management

Local Advisory Team

Commissioner’s Order

Example Commissioner’s Order:
- Record keeping
- Credit nitrogen from all sources
- Soil testing
- Select BMPs
Request for Comments

- MDA is currently requesting comments on content for the rule
- Comment period ends January 29, 2016
- More information on the MDA website
Thank you!

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For more information:
http://www.mda.state.mn.us/nfmp