Outreach to the Ag Community

Understanding the Nutrient-HAB Linkage and Solutions

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Associate Professor and Field Specialist, Agronomic Systems
What are the science based solutions I can implement my farm that improve yield and protect resources?

Source: www.farmflavor.com
A comprehensive outreach framework:

1. Regulations statewide and targeted (some with required educational components)
2. Supporting program
3. Farmer Engagement
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1. Regulations statewide and targeted (some with required educational components)
   • Regulations related to manure
   • Fertilizer Training
   • Application rules

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3. Farmer Engagement
Disclaimer

• I am providing a listing on regulations that exist in the state of Ohio related to agricultural runoff of nutrients, soil erosion and application of nutrient sources.
• This is to provide a context to this audience on to outreach efforts and engagement with farmers as affected by these regulations.
• I also want the scientific community in the to have some general sense of the current regulations they can consult in detail later.
• Those wanting changes in regulations will want to consult with the legislative bodies in the state.
Regulation Related to Manure (Statewide)

- Ohio Agricultural Pollution Abatement Laws (Ohio Department of Agriculture (ODA))
  - All livestock facilities or manure application fall under these standards.
- Ohio Livestock Environmental Permitting (ODA)
  - Based on size of operation need to obtain permits.
- National Pollutant Discharge Elimination System Permits (Ohio EPA)
- Certified Livestock Managers (ODA)
  - Applicators of more than 4500 ton or 25 million gallons must undergo training and recertification

http://go.osu.edu/manureregulations or Ohio Agency listed above
Fertilizer Applicator Certification Training (Statewide)

- Certification required by 9/30/17 for fertilizer applicators who apply nitrogen, phosphorus or potassium to 50 or more acres of agricultural production.
- Ohio Department of Ag is the issuing authority SB 150 (2014)
- Ohio State University Extension delivers 3 hour educational Sessions
- Since September, 2014 total of 12,600 participated in 200+ sessions
- CEU’s required to maintain certification renewed every 3 years
What is covered in Training?

1. Current rules for certification
2. Nutrient Enrichment effects on Water Quality
3. Quality in Soil Testing
4. Phosphorus Management for Yield and Water Quality
5. Nitrogen Management

Materials used posted at: http://go.osu.edu/FACT
Survey results from the training tell us…

- 3677 Surveys summarized
- 16% had not attended OSUE programs in the past

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree or Strongly Agree % answering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm P is a significant problem to water quality</td>
<td>74</td>
</tr>
<tr>
<td>I have improved my knowledge</td>
<td>91</td>
</tr>
<tr>
<td>I will change my Nutrient Management practices</td>
<td>56</td>
</tr>
</tbody>
</table>
Application Regulations (WLEB only)

- Applies to Manure & Granular Fertilizer containing Phosphorus & Nitrogen:
  1. **No** application to frozen, snow covered soil
  2. **No** application when top 2 inches of soil is saturated
  3. **Consult** rainfall forecast before application. **Do not apply if:**

<table>
<thead>
<tr>
<th>Nutrient Source</th>
<th>Forecast period after application</th>
<th>Predicted rainfall exceeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manure</td>
<td>24 hour</td>
<td>0.5 inches</td>
</tr>
<tr>
<td>Fertilizer N&amp;P</td>
<td>12 hour</td>
<td>1.0 inches</td>
</tr>
</tbody>
</table>

http://go.osu.edu/applicationregulations
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   - 4R Nutrient Stewardship Program

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4R NUTRIENT STEWARDSHIP CERTIFICATION PROGRAM

Western Lake Erie Basin - Ohio, Michigan & Indiana

Voluntary program for agricultural retailers & nutrient service providers implementing the 4Rs

**GOALS**
- Maximize crop nutrient uptake and minimize crop loss
- Positively impact local water bodies
- Provide up-to-date information on nutrient stewardship
- Help the agricultural sector adapt to new research and technology

**REQUIREMENTS**
- Initial training and on-going education
- Monitoring of 4R implementation
- Nutrient recommendation and application

**THIRD-PARTY VERIFIED**
- Audits review training and education, recommendations to growers and application records
- Third-party auditor verification occurs each year

**RIGHT SOURCE - RIGHT RATE - RIGHT TIME - RIGHT PLACE**

http://4rcertified.org/
4R Nutrient Stewardship Certification Program

Current status

- 38 Certified Branch Facilities
- 1,875,000 Acres in WLEB
- 905,000 Acres Outside WLEB
- 39 Branch Commitments
- 2,780,000 Total Acres
- 3,500 Clients Serviced in WLEB
- 1,700 Clients Serviced Outside WLEB
- 5,200 Total Clients
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   - Farmer DRP Water Quality Monitoring
   - Nutrient Management Plans
   - Best Management Practice Website
Farmer DRP Water Quality Monitoring

Diffusive Gradient Thin Film device

*Figure 1.* Actual device showing plastic body and filter. Actual size is 2.5 cm or 1 inch (left). Note gel is below the filter. Drawing with components (right).

For DRP measurements the gel is Fe-oxide.
Farmer DRP Water Quality Monitoring
Placed in tile outlets or drainage control structures
Farmer DRP Water Quality Monitoring

Sampling Periods and participation

<table>
<thead>
<tr>
<th>Sample Target Period</th>
<th>Year</th>
<th>Distributed</th>
<th>Collected</th>
<th>Farmers</th>
<th>Fields</th>
<th>Acres</th>
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<tbody>
<tr>
<td>9/1 to 11/30</td>
<td>2015</td>
<td>August</td>
<td>December</td>
<td>35</td>
<td>45</td>
<td>1605</td>
</tr>
<tr>
<td>3/15 to 6/30</td>
<td>2016</td>
<td>March</td>
<td>June</td>
<td>93</td>
<td>135</td>
<td>4725</td>
</tr>
<tr>
<td>10/1 to 12/30</td>
<td>2016</td>
<td>September</td>
<td>December</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/15 to 6/30</td>
<td>2017</td>
<td>March</td>
<td>June</td>
<td></td>
<td></td>
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</table>
Farmer DRP Water Quality Monitoring

Results Fall 2015

<table>
<thead>
<tr>
<th>Sample Period</th>
<th>Days Deployed</th>
<th>Total Mass DRP (ug)</th>
<th>Concentration (ppm)</th>
<th>Average</th>
<th>Concentration Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low (ppm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High (ppm)</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>5</td>
<td>0.011</td>
<td></td>
<td>ND</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>2</td>
<td>0.006</td>
<td></td>
<td>ND</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>2</td>
<td>0.007</td>
<td></td>
<td>0.050</td>
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Compare to:
- Management
- Soil Test Levels of P
Nutrient Management Plans

Plan that identified crop nutrient needs and environmental risk for erosion and nutrients losses.

- Used as basis for resource concerns identification and BMP practice implementation for cost share programs
- Self implementation of practices for yield and BMP’s
- Use for other assurance programs

BMP’s often identified are:

- 4R practices
- Water control practices
- Soil carbon

Sources of Nutrient Management Plans

- OSU Extension
- Technical Service Providers
- Ag Retailers
- Soil and Water Conservation Districts
What you will find

**Critical Concerns**- Pictures and descriptions of critical resource concerns.

**BMP Practices**- A listing of all BMP practices.

**FAQ - Frequently Asked Questions**- Answers to common questions.

**Submit**- Submit pictures of critical concerns or BMP's in action or questions for FAQ.

**People**- People that can assist in answering questions.

http://agbmps.osu.edu
Ag BMP’s Website

Resource for farmers and professionals
- Decision Tree with entry points from NMP plan outcomes (P Index value) or description of concern

For each BMP
- Description
- Effectiveness in addressing water quality concerns
- Potential to affect other factors (unintended consequences)
- Cost
- Key management
- Design tools
- Technical References
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