Outreach to the Ag Community

Understanding the Nutrient-HAB Linkage and Solutions

Greg LaBarge
Associate Professor and Field Specialist, Agronomic Systems
What are the science based solutions I can implement on 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
A comprehensive outreach framework:

1. Regulations statewide and targeted (some with required educational components)
   - Regulations related to manure
   - Fertilizer Training
   - Application rules

2. Supporting program

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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2. Supporting program
   • 4R Nutrient Stewardship Program

3. Farmer Engagement
4R Nutrient Stewardship Certification Program
Targeted to WLEB

Assurance program targeted at Nutrient Service providers:
• agricultural retailers
• independent crop consultants

Voluntary third party audit program with 41 standards built around a science-based framework for plant nutrition management and sustained crop production.

Focused on proven 4Rs practices
• Right Source
• Right Rate
• Right Time
• Right Place.

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

Current status

4R NUTRIENT STEWARDSHIP CERTIFICATION PROGRAM

Western Lake Erie Basin - Ohio, Michigan, and Indiana

34 Certified Branch Locations

37 Commitments From Other Branches

Acres serviced or applied in WLEB: 1,900,000
Acres outside WLEB: 800,000
Total: 2,700,000

Number of Clients Serviced in WLEB: 4,000
Clients Serviced Outside WLEB: 1,500
Total: 5,500
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3. Farmer Engagement
   - Farmer DRP Water Quality Monitoring
   - Nutrient Management Plans
   - Best Management Practice Website
Farmer DRP Water Quality Monitoring

Diffusive Gradient Thin Film device

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>
</tr>
</thead>
<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>
<td></td>
</tr>
</tbody>
</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>Low (ppm)</th>
<th>High (ppm)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>5</td>
<td>0.011</td>
<td>ND</td>
<td>0.047</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>2</td>
<td>0.006</td>
<td>ND</td>
<td>0.026</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>2</td>
<td>0.007</td>
<td>ND</td>
<td>0.050</td>
</tr>
</tbody>
</table>

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
Best Management Practice 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 water quality concerns
- Potential to affect other factors (unintended consequences)
- Cost
- Key management
- Design tools
- Technical References

Planned release for December 2016.
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