Nutrient Management Basics
The Georgia Perspective

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Agenda

Why nutrient management
What is a NMP?
Components of a Plan
Tools available
Georgia Program and Extension’s Role
We don’t just win SEC titles!
Environmental Benefits of Manure: Why?

- Manure contains organic carbon.
- Less runoff, erosion, and nutrient losses when done properly.

Commercial fertilizer vs. Manure
Importance of CNMP’s

“EPA, working jointly with USDA NRCS, has determined that the most effective way for all AFO’s to minimize water quality and public health risks is to develop and implement ... Comprehensive Nutrient Management Plans.”

US EPA Guidance Manual for NPDES Permit for Concentrated Animal Feeding Operation
Why Focus on Nutrient Management?
## Water Quality Contaminants in Manure

<table>
<thead>
<tr>
<th>Possible Pollutants</th>
<th>Environmental Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Nitrate-N</td>
<td>Health</td>
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<tr>
<td>2) Ammonia-N</td>
<td>Fish Kills</td>
</tr>
<tr>
<td>3) Phosphorus</td>
<td>Eutrophication</td>
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<tr>
<td>4) Pathogens</td>
<td>Health</td>
</tr>
<tr>
<td>5) Organic Matter</td>
<td>Oxygen Depletion</td>
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Sources of N & P To Watersheds in Southern US (1995 GAO report to US Congress)
Manure P vs. Crop Land P Use
Manure P vs. Crop Land P Use
Manure P vs. Crop Land P Use
What is “Whole Farm” Nutrient Balance
NUTRIENT BALANCE

Inputs
- Feed
- Animals
- Irrigation
- Water
- Fertilizer
- Legume N

Managed Outputs
- Meat & Eggs
- Crops
- Manure

Losses or Storage

Feed → Manure → Farm Boundary

Soil
ARE INPUTS & OUTPUTS IN BALANCE?

Water In 1 gal.

Water Out

Farm Pond
ARE INPUTS & OUTPUTS IN BALANCE?

Water In: 2 gal.

Water Out: 1 gal.

Farm Pond
ARE INPUTS & OUTPUTS IN BALANCE?

Water In 2 gal. Water Out 1 gal.

Farm Pond
ARE INPUTS & OUTPUTS IN BALANCE?

Water In: 2 gal.

Water Out: 1 gal, 1 gal.

Farm Pond
Typical Nutrient Balance on AFO’s are 2:1 to 5:1
What are Appropriate Strategies for Managing Nutrient Imbalances?
“Plug the Leaks” Approach:

Does this correct a nutrient imbalance?

Losses or Soil Storage
“Plug the Leaks” Approach:

Does this correct a nutrient imbalance? NO

Losses or Soil Storage

Farm Boundary
Plugging the Leaks... Temporary Solution to Imbalance

- Water In (2 gal.)
- Sand Bags
- Water Out (1 gal.)

Farm Pond
Sustainable Strategy No.1: Credit Manure Nutrients in Crops

- Fertilizer
- Legumes
- Crops
- Manure
- Farm Boundary
- Soil Storage
- Losses or Storage

Crops → Manure → Crops
Sustainable Strategy No. 2: Reducing Feed Inputs

Feed & Forages

Recycling

Losses or Soil Storage

Meat & Milk
Sustainable Strategy No. 3: Move Manure Nutrients Off Farm
Must Encourage Manure Markets

- Compost Production
- Pelleting
- Value Added Processing
- Energy Production
- Move to non-ag markets
Sustainable Strategy No. 4: Manure Treatment

Manure Treatment

Recycling

Farm Boundary

Losses or
Soil Storage

Low Impact Losses

Manure
New EPA Regulations

- Nutrient Management Plans and permits on all large operations.
- Voluntary on medium size
- Land Application is not a discharge if it follows an NMP
- Include P index
- Buffers to surface water
- Annual reports
What is a NMP? EPA view

- EPA requires 5 components
  - Manure Handling & Storage
  - Land Application
  - Site Management
  - Record Keeping
  - Other Utilization
Minimum Standards to Protect Water Quality in NPDES Permits for CAFOs

1. Maintain Proper Storage Capacity
2. Proper Operation & Maintenance to prevent seepage
3. Divert Clean Water
4. Nutrient Management Plans
5. Record Keeping and Testing
6. Rates & Timing of Land Application of Manure & Waste Water
7. Buffers or Equivalent Practices
8. Animal Mortality
9. Prevent Direct Contact of Animals with the Waters of the US
10. Chemical Disposal

www.epa.gov/ost/guide/cafo/rule.html
What is a CNMP? NRCS view

- Technical Guidance for Developing CNMPs
  - Manure and Wastewater Collection, Handling, Storage, Treatment, and Transfer
  - Evaluation and Treatment of Sites Proposed for Land Application
  - Land Application
  - Records of CNMP Implementation
  - Inputs to Animals
  - Other Utilization Activities
What is a CNMP? NRCS view

- NRCS defines it to be part of a whole farm conservation plan.
  - Must list all practices on the farm
  - Meet requirements in FOTG conservation practice standards
  - Includes all permits
  - Detailed O&M on all equipment, practices, etc.

- NRCS plans require a certified planner to develop the plan. More complex and costly.
What is the purpose of a CNMP?

- EPA approach: Make sure water quality is not impaired.
- NRCS: Document conservation on the farm.
- Is it a regulatory tool?
- Is it something a farmer should be able to understand and use?
- How is it different from the NPDES permit?
Who controls the answer?

- NRCS has National Standard and cost share $.
- EPA controls NPDES program
- But, it is a STATE level decision.
- Each state can and will have different processes and plans, our role is to insure that the plans help the farmer protect the environment.
Other considerations

- Plan review: should be living document but permits are renewed every five years
- Working plans will require continuous updates and revision—this needs to be done by the farmer.
Our EPD wanted plans to be short and to the point since it is part of the permit. Tried to focus on what does the farmer needs to know to manage his operation better and meet all EPA requirements.
Task force first worked to define CNMP

- Published Bulletin to define
  - Maps
  - Storage and Handling
  - Nutrients Produced
  - Land Application and Balance
  - Off-farm Utilization
  - Mortality
  - Record Keeping
  - Emergency Response
  - Closure
Maps

- Maps needed for CNMP
  - Farm map
  - Soils map (optional until P index)
- Includes many features such as flow directions, buffers and filter strips, diversions, set-backs, wetted areas, etc.
- Working with NRCS toolkit
- Southern Region webpage.

Agricultural Pollution Prevention
Manure Storage and Treatment

- Structure Description, Capacity, Designer, Installation date.
- Diversions, Monitoring
- Inspections and Records
- Operating Levels
Nutrients Produced

- Teach a number of methods to calculate based on maximum animal numbers
- Account for Storage and Handling Losses
- N, P, and K available for Land Application
- Program developed to account for feeding programs
Land Application and Balance

- Spreadsheet and application rate for each field
- BMP’s on each field
- Application timing and methods
- Include P index
Balance and off-farm transport

- Plan must be developed for excess N or P.
- Records kept to document use.
Other components

- Mortality: amount, practice, permits
- Records kept
- Emergency Response Plan
- Closure Plan
Tools available

- LPES curriculum
- Many software packages
  - NRCS packages
  - University programs
- Paper based efforts are still useful
Introduction: Georgia Rules

- GA DNR administers federal NPDES permits for large farms as well as state LAS permits for medium farms
- GA Dept. of Agriculture is involved in the NMP process and facility inspections through a MOU with EPD
Georgia Requirements

- <300: below threshold for specialized AFO/CAFO regs, however Clean Water Act applies

- 301 to 1,000: LAS Permit, certified operator on staff, state approved NMP

- 1,001 and greater: NPDES Permit, certified operator on staff, state approved NMP, monitoring wells
Nutrient Management Plan Development

- Begin with recommended NMP template
- Initial collection of data by farmer
- Assistance by NRCS on maps and storage structure design info
- Cooperative production of plan by operator and certified planner
- Submit to GDA for review
- GDA forwards to EPD for final approval
Plan Development and Technical Assistance:

- Plans in Georgia are joint effort and most have cost the farmer little to develop.
- About 100 have been approved
- 90% by Extension
- Implementation phase presents challenges
What Regional Activities are needed?

- Consistency in Plans and Regs.
- Certified Planners working across lines
- Tools
- Voluntary EMS programs

Agricultural Pollution Prevention
Agricultural Pollution Prevention

AWARE

- Newsletter
  - 200 people plus agents
- Web page
  - www.agp2.org/aware
- Listserve
  - listserv@listserv.uga.edu
  - subscribe aware
AGRICULTURAL POLLUTION PREVENTION

Working together to reduce waste and increase Efficiency, Economics, and the Environment