Components of a Nutrient Management Plan

Scott Sturgul
Nutrient & Pest Management Program

Soil & Water Management
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Nutrient Management

- Combine on-farm nutrient sources, with commercial fertilizer, to meet crop need

- On-farm nutrient sources (manure and legumes)

- Commercial fertilizer

- Minimize nutrient losses
Nutrient management strategy

- Measure current levels of soil fertility
- Determine crop nutrient needs
- Account for on-farm nutrient resources
  - Manure applications
  - Legumes in crop rotation
  - Residual soil nitrate
- Adjust commercial fertilizer application rates
What is a Farm Nutrient Management Plan?

- A strategy for obtaining the maximum return from on-farm and commercial fertilizer resources in a manner that protects water quality.

- If required for compliance with an agricultural or environmental program, the plan must meet the USDA-Natural Resources Conservation Service Nutrient Management Standard – 590.
Nutrient Management Plan
- Basic Components -

- Soil Test Reports
- Inventory of On-farm Nutrient Resources
- Nutrient Crediting
- Farm Conservation Plan
- Manure Inventory
- Manure Spreading Plan
  - Map showing restricted areas
- Meets the 590 Nutrient Mgmt. Standard
- Annual Updates
Components of the 590 Nutrient Management Standard

- General concepts of nutrient management
  - Based on University of Wisconsin-Extension research recommendations

- Broken into three criteria:
  - Minimum requirements
  - Minimize nutrient entry to groundwater
  - Minimize nutrient entry to surface water
Nutrient Management Standard: Minimum Requirements

- Soil testing
  - Every four years (minimum)

The soil sample has to represent the field.
Nutrient Management
Standard: Minimum Requirements

- Soil testing
- Field-specific nutrient budgets
- Consistent with UWEX fertilizer recommendations.
Nutrient Management Standard: Minimum Requirements

- Soil testing
  - Every four years (minimum)
- Field-specific nutrient budgets
  - Consistent with UWEX fertilizer recommendations.
- Credit nutrients from non-commercial fertilizers according to UWEX recs.
Efficient fertilization utilizes **all** sources of nutrients!
On-farm Nutrient Sources

1. Manure
If You Are Going To Use Manure as a Fertilizer…

Treat It Like A Fertilizer!
Needed To Properly Credit Manure Nutrients:

- Available nutrient content
  - Book values
  - Laboratory analysis
Needed To Properly Manage Manure Nutrients:

- Available nutrient content
  - Book values
  - Laboratory analysis
- Manure application rate
On-farm Nitrogen Sources

1. Manure
2. Legumes
Legume Nitrogen Credits

Alfalfa provides significant amounts of nitrogen to crops following in the rotation.
On-farm Nitrogen Sources

1. Manure
2. Legumes
3. Residual Soil Nitrate
Worksheet for a Step-by-Step Guide to Nutrient Management on Your Farm
Complete One Form Per Field

1. Field Information
   a) Field ID  3
   b) Year
   c) Acres  15
   d) Crop to be grown  Corn
   e) Soil name  Siesson silt loam
   f) Previous crop  Corn

2. Nutrient Need
   a) Nutrient recommendations (from soil test report)
      N (lbs/acre)
      P₂O₅ (lbs/acre)
      K₂O (lbs/acre)
   b) Special nutrient need
      
   c) Total nutrient need
      
3. Nutrient Credit
   a) Manure
      
   b) Legume
      
   c) Residual nitrate (if test was not conducted enter 0)
      
   d) Other sources (whey, sludge, etc., must have sample analysis)
      
   e) Total nutrient credit
      
4. Adjusted Nutrient Need
   (Total nutrient need - Total nutrient credit)
Nutrient Management Standard: Groundwater Protection Requirements

- UWEX rate recommendations for nitrogen
- On sands and loamy sands:
  - No fall application of commercial nitrogen
  - Fall liquid manure applications when soil temperatures are > 50° must contain a nitrification inhibitor
Nutrient Management Standard: Groundwater Protection Requirements

- UWEX rate recommendations for nitrogen
- On sands and loamy sands:
  - No fall application of commercial nitrogen
  - Fall liquid manure applications when soil temperatures are > 50° must contain a nitrification inhibitor
- No manure can be applied to the following areas unless incorporated:
  - 200 feet up-gradient of wells, sinkholes, cracked bedrock
  - Other locally identified areas
Nutrient Management Standard: Surface Water Protection Requirements

- UWEX rate recommendations for phosphorus (P).
- Manure application rates limited by either:
  1) Soil test P criteria, or
  2) Phosphorus Index (PI) ranking
Soil Test Phosphorus
- Critical Values -

- < 50 ppm P:
  N-based nutrient management plan.

- 50 – 100 ppm P:
  P application not to exceed total crop P removal over the rotation.

- > 100 ppm P:
  Eliminate P applications
    - Unless required for high-demanding crop in rotation.
    - Unless no other option, then apply at less than crop removal of P with soil conservation practices in place.
    - Use P Index.
Phosphorus Index

- Measures the relative potential for a field to deliver P to surface waters.
- Evaluates site loading (quantity of P) and transport potential (erosion and runoff) from individual fields.
- Field characteristics required.
- Agricultural management practice recommendations based on PI value.
The Wisconsin P Index

L. G. Bundy, L. Ward Good, and W.M. Jarrell
Dept. of Soil Science - University of Wisconsin-Madison

http://wpindex.soils.wisc.edu
Nutrient Management Standard: Surface Water Protection Requirements

- UWEX rate recommendations for phosphorus.
- Manure application rates limited by either:
  1) Soil test P criteria, or
  2) Phosphorus Index (PI) ranking
- Soil loss tolerance (T) is not to be exceeded on fields receiving nutrients.
Nutrient Management Standard: Surface Water Protection Requirements

- UWEX rate recommendations for phosphorus.
- If not incorporated within 3 days, manure applications not to exceed 75 lb of available P$_2$O$_5$/acre/year. If incorporated, nitrogen becomes the restricting nutrient.
- Soil loss tolerance (T) is not to be exceeded on fields receiving manure.
- Manure not to be spread in waterways, wetlands, terrace channels, etc.
Nutrient Management Standard: Surface Water Protection Requirements

- Manure not to be applied to the following areas unless injected or incorporated:
  - 300 feet of streams or 1,000 feet of lakes
  - 200 feet up-gradient of wells, sinkholes, cracked bedrock

*Remember: Do not exceed “T”.*
Nutrient Management Standard: Surface Water Protection Requirements

- Manure applications not to be applied on frozen or snow covered fields in the following areas:
  - Within 300 feet of streams or 1,000 feet of lakes
  - Slopes > 9% (up to 12% with soil conservation practices)
  - Other locally identified areas
Nutrient Management Planning
- Information Needed -

- Soil test reports & fertilizer recommendations
- Soil conservation plan
  - Identifies crop rotation, soils, slopes, waterbodies, etc
  - May need updating
- On-farm nutrient resource inventory
  - Manure, legumes, organic wastes
- Manure spreading restrictions
  - Usually identified with a map
- Manure spreading plan
Nutrient Management Planning
- Plan Delivery -

- Farmer friendly & understandable
- “Do-able”
- Updated at least annually
MECHANICS OF PLAN ASSEMBLY

Nutrient Mgmt Plan Components:

Soil Test Reports

- Are they current?
- Are they from an approved lab?
- Have acreage guidelines been met?
MECHANICS OF PLAN ASSEMBLY

Nutrient Mgmt Plan Components:

Conservation Plan Information

- Actual vs tolerable soil loss
- Crop rotation
- Field slope (%)
- Residue / tillage requirements
- Soil maps
- Aerial photos
- Are farmer’s field id consistent with plan?
- Are field boundaries and acreage accurate?
MECHANICS OF PLAN ASSEMBLY

Nutrient Mgmt Plan Components:

Inventory of Manure Production and Equipment Capabilities

- Annual manure production estimate
- Manure spreader calibration
- Manure spreader capabilities
Nutrient Mgmt Plan Components:

ID Areas With Manure Restrictions

- Slopes greater than 9 or 12%
- Waterways
- Frozen or snow-covered ground restrictions
  - Within 1000 ft of lake, pond, or flowage
  - Within 300 ft of river or stream
  - 200 ft uphill of direct groundwater conduits, etc.
MECHANICS OF PLAN ASSEMBLY

Nutrient Mgmt Plan Components:

- Narrative
  - Explain deviations from the 590 standard
  - Explain manure application restrictions
    - no winter spreading
    - critical areas
    - surface water setbacks
  - Verify farms ability to utilize produced manure
  - Manure spreading agreements
  - Fertility or liming alerts
MECHANICS OF PLAN ASSEMBLY

Nutrient Mgmt Plan Components:

Provide Fertilizer Recommendations:

- Balance crop nutrient needs with on-farm nutrients and commercial fertilizers
- Grouping/lumping of similar fields is allowed and encouraged on farms with numerous, small fields
Nutrient management strategy

- Measure current levels of soil fertility
- Determine crop nutrient needs
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Nutrient Management Plan
- Basic Components -

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