The Revised NRCS Nutrient Management Standard (Code 590)

Potential Impacts

Timeline of 590 Revisions

2009	590 Revisions Commence; NRCS requested assistance from SERA-17 group in the 590 revisions.
2010	Revised Draft of 590 Released for Comments
January 2011	SERA-17 provides recommendations for revisions to 590
January 11, 2011	Revised 590 Posted in Federal Register
February 25, 2011	Final Day to Submit Comments on Revised 590
February/March ?, 2011	Final Revisions will be adopted after Comment Period & after Consideration of Comments
? 2011	Draft Technical Note For Adaptive Nutrient
? 2012	After Final Adoption – States have One Year to Amend & Adopt National 590

Who is SERA-17?

SERA-17

- In the early 1990's, USDA began to develop assessment tools for areas with water quality problems, but there was no model considered suitable for the field-scale assessment of the potential movement of P from soil to water.
- A group of scientists from universities and governmental agencies met in 1990 to discuss the P issue and later formed a work group (PICT: Phosphorus Index Core Team).
  - Discovered lack of integrated research to develop the field-scale assessment tool for P.
  - Developed the Phosphorus Index.
- The group soon grew to over 50 scientists from the U.S. & other countries. In 1993, the groups' efforts were formalized by establishing a USDA Information Exchange Group (IEG).
- A major goal of the group has been to bring together a greater diversity of disciplines to discuss the research and management needs related to agricultural P and water quality.
- SERA is an acronym for Southern Extension-Research Activity, and this is the 17th such group formed
  - Regional branch of the Cooperative States Research, Education, and Extension Service (CSREES).
  - Many of the members are associated with land-grant universities or government agencies
- SERA-IEG 17 has expanded to over 75 members with expertise (from soil science & corn genetics to hydrology & limnology).
- Valuable informational resource for agencies (USEPA, NRCS) in addressing BMPs to prevent nonpoint source pollution of surface waters by agricultural P.

NRCS Gave SERA-17 Five Charges

Charge 1- Define Criteria where a P Index Risk Assessment is Needed

Charge 3 – Define Minimum Requirements of P Indices

Charge 2 – Define Upper P Index threshold that limits P application

Charge 4 – Define Process to Evaluate P Indices

Charge 5 – Define Next Generation P Indices

SERA-17 Executive Summary

In January 2011, SERA-17 provided a their recommendations to NRCS.

1)P Indices estimate the potential for P loss from any agricultural field.

A separate effort to address P balance at a watershed scale is needed.

2) Many States have developed adequate tools for estimating the potential for P loss.

Substantial variation among P Indices in structure, algorithms, & cutoff values.

Even greater deal of inconsistency in results and interpretation regardless of the details of the tools used.

3) Eliminate P Risk Assessments when P applications are based on LGU recommendations; only require P risk assessments when P application is higher than recommendations.

4) All P Indices should "zero out" at some point.

5) Too many legitimate differences in soils, climate, cropping system, etc. for the development & use of a Nation-wide P Index. Development of Regional P Indices is more desirable.

6) States should consider establishing an upper limit of STP above which manure cannot be applied, regardless of P Index assessment.

7) Training Effort on the Use of P Indices during planning/implementation of NMPs.

Overview of Proposed 590 Changes

- Promote Enhanced Nutrient Mgt Planning Activities at the State Level
- Standard Delivers the Minimum Requirements for Nutrient Planning Associated with USDA programs
- Changes Coincides with EPA regulations.

Focus Added

- Erosion Control
- Nutrient Efficiency
- Adaptive Nitrogen Mgt Tactics
- Tile Drainage
- Better Management of Nutrient Application (4Rs)
  - Right Source
  - Right Timing
  - Right Amount
  - Right Placement

Areas of Interest

Revised Nutrient Management (590)

General Criteria Applicable for All Purposes

- Manure and/or organic by-products shall not be applied where existing Phosphorus (P) and Potassium (K) Levels exceed 10 times the Critical Soil Test Concentrations, as established by the *Land Grant University (LGU).

*Where the LGU is the University of Nebraska

Soil, Manure, & Tissue Sampling and Laboratory Analyses (Testing)

- Manure testing conducted by Laboratories successfully meeting the requirements & performance standards of the Manure Testing Laboratory Certification Program (MTLCP) – Minnesota Department of Agriculture
  - Nebraska = 4
  - Kansas = 1
  - S. Dakota = 1
  - Colorado = 1
  - Iowa = 1
  - Wyoming =1

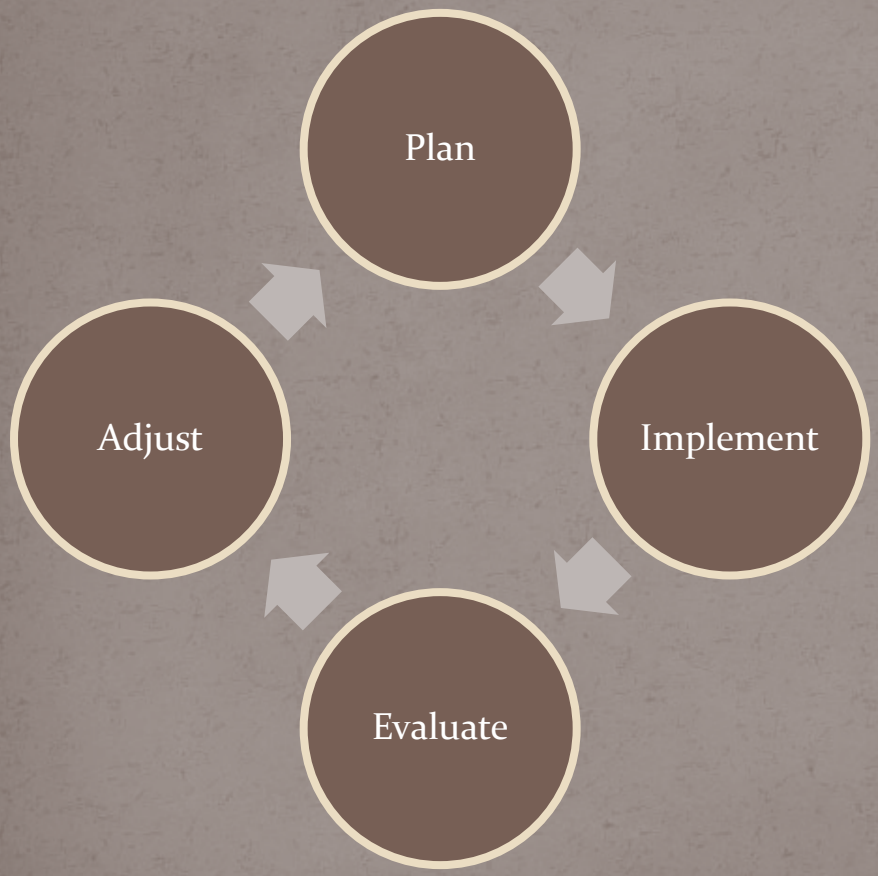
Nutrient Application Rates

- Applications of biosolids, starter fertilizers or pop-up fertilizers will be accounted for in the budget.

Adaptive Nutrient Management

- This section of standard is not applicable until Technical Notes are Final OR if the LGU has developed a protocol for Adaptive Nutrient Management.
- Series of Technical Notes being developed.
- First Tech Note is Still in "DRAFT" form
  - Focuses on N Management.
  - Includes information on N-inhibitors, controlled released products, and manure treatments.
  - Iterative Process (i.e. "Learning by Doing")

Draft Tech Note: Adaptive Management for N



- Traditional N Mgt strategies have been based on "Prediction Only" without evaluation.
- There is no single N Mgt. Strategy that can be considered optimal for all cropping scenarios.

Nutrient Application Timing & Placement

- Nutrients shall not be surface applied (except under emergency provisions in accordance with State Law):
  - To Frozen and/or Snow-Covered Soils;
  - During Seasons of High Runoff Potential;
  - During Periods of Winter Dormancy;
  - When the Top Two Inches of Soil are Saturated from Rainfall or Snow Melt and there is a High Risk of Transport of Nutrients Off-Site.

"Emergency Provisions"

- Except Under & In Accordance with State Law.
- Nebraska has no such provisions.
- Example would be the Manure Application Risk Index (MARI) of Michigan State University, Michigan Extension and Michigan NRCS.
  - Considerations for Soil Hydraulic Group, % Slope, STP, Concentrated Water Flow or Surface Inlet Discharge, N Leaching Index, % Residue/Cover Crops, Surface Water Setbacks, Vegetative Buffer Width, Manure Application Rate, & Manure Application Method.

Nutrient Application Timing & Placement

- Treatment Measures shall be planned to Address the Movement of Manure and Nutrients to Subsurface Drainage (Tile) and/or Surface Drained Fields

Additional Criteria to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater

- Current NRCS-approved Soil Erosion and/or N & P Risk Assessment Tools to Identify Risk and Treat the Resource Concerns to meet the Planning Criteria.

Additional Criteria to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater

- Appropriated Nutrient Management Strategies Shall be Implemented:
  - Slow or Controlled Release Fertilizers
  - Nitrogen Inhibitors
  - Urease Inhibitors
  - Nutrient Enhancement Technologies
  - Incorporation within 24 Hours
  - Injection
  - Soil Nitrate Testing
  - Other

Additional Criteria Applicable to Properly Utilized Manure of Organic By-Products as Plant Nutrient Sources

- Biosolids shall be applied in accordance with USEPA Regulations (40 CFR Parts 403 (Pretreatment) and 503 (Biosolids) and other state laws as applicable) [Transferred from 633]
- Fields receiving Animal Manure shall be monitored for the Accumulation of Heavy Metals (in accordance with LGU)

Phosphorus Application Criteria

- When Manure & other Organic by-Products are applied, the PI Risk Assessment shall be based on the Annual Soil Loss Value Associated With the Crop Interval Including Manure Application.
- Manure P may be Applied in a One-Time Application at Either:
  - The Rate based on Soil Test Recommendations for All Crops in the Rotation
  - The P Removal Rate for All Crops in the Rotation.

Plans & Specifications

- Soils Information – surface texture, pH, drainage class, available water capacity, depth to water table, restrictive features, and flooding and/or ponding frequency.
- Nutrient Budgets for the Planned Crop Sequence or Crop Rotation.
- All Nutrient Use Efficiency Product that will be used.
- In accordance with the N & P Risk Assessment Tools, specify the *recommended* Nutrient Application Source, Timing, Amount and Placement of plant nutrients for each field or management unit.
- Component listing for Precision/Variable Rate Nutrient Management Plan.

Operation & Maintenance

- Nutrient analyses of harvested biomass
- All Nutrient Use Efficiency Products that will be used
- Additional Records for Precision/Variable Rate Sites
  - Maps including variable application source, timing, amount, and placement of all plant nutrients applied.
  - GPS based yield maps

Final Thoughts

NMP Considerations

- Better "Planning" NMPs & CNMPs
- Development & Implementation of Crop Budgets
- Nutrient Efficiency
- Nutrient Management (esp. Manure Application)
  - Rates (one size does not fit all fields)
  - Timing (frozen/snow-covered ground)
  - Placement (apply setbacks from surface water , etc.)
- Soil Sampling – Follow sampling protocols; grid sampling
- Manure Sampling – Know the value of the product; follow sampling protocols
- Equipment Calibration
- Recordkeeping
- Follow-Up
- Alternate Strategies for Manure Utilization/Nutrient Reduction by Livestock Operators
  - Composting/Anaerobic Digesters
  - Feed Management

Future Approaches

- Precision Agriculture Technology
- Land Treatment Conservation Practices (for Erosion) - Buffers, Vegetative Filter Strips, etc.
- Use of Non-Traditional Fields for Manure Application (go the distance)
- Promoting Better Utilization through Manure Transfers – Selling/Giving Away

PRAT – Long Term Goal?

- Better understanding between STP & Runoff P.
- Comparison of P-Index Rating as it relates to actual Runoff P based on existing data (is there a need for more data on a regional basis?).
  - Which modeling to use? (SWAT, APEX, etc.)
- P Research on "edge of field" and "bank" runoff
  - What do we have existing data?
  - Is the existing data obtainable?
  - What additional data, if any, is needed?