Title of the Practice: Nutrient Management (NRCS Conservation Practice 590)

Definition: managing the amount, source, placement, form and timing of the application of plant nutrients and soil amendments.

Purposes: The purposes of this practice are to budget and supply nutrients for plant production, properly utilize manure or organic by-products (biosolids are not permitted) as plant nutrients, minimize agricultural nonpoint source pollution of surface and ground water resources, protect air quality (by reducing nitrogen (N) emissions and the formation of atmospheric particulates) and maintain or improve soil quality.

General Expectations: A nutrient budget for N, phosphorus (P) and potassium (K) shall be developed that considers all potential sources of nutrients including animal manure and organic by-products, waste water, commercial fertilizer, crop residues, legume credits and irrigation water. Nutrient recommendations are based on realistic yield estimates (RYE), in the absence of which an N fertilization rate will be based on recommendations of nutrient management specialists at Clemson or N.C. State (NCSU). Plans shall specify source, amount, timing and method of application of nutrients on each field to meet RYE.

In addition, nutrient application rates, including lime, will be based on **current** soil test results. Application rates of N, P, K and other nutrients shall match (not to exceed) recommended rates as closely as possible, except when manure or organic by-products are a source of nutrients (for N and P).

Recent NCSU research indicates that N-based starter fertilizers give an equal crop response to starter fertilizers containing both N and P on soils with “very high” or “excessive” soil test P-I. No starter P shall be applied to said soils or sites. N, P and K applications may exceed recommended rates only when custom blended fertilizers are not available (on a short term basis only).

Timing of application shall correspond as closely as possible with plant nutrient uptake (given weather, climate accessibility and other limiting factors) and never when fields are frozen, snow-covered or flooded.

Additional management expectations with respect to manure or organic by-products applied as plant nutrient sources:

* Nutrient management plans will be based on nutrient values of applicable organic materials based on laboratory analysis (preferred), acceptable default values or historical records.
* When animal manures are applied, a field-specific evaluation of the potential for transport from the field, Phosphorus Loss Assessment (PLAT) or Phosphorus Index Tools, shall be conducted. Using PLAT or PI as a guide, management strategies and supporting conservation practices should be planned and applied to reduce the potential for excessive P loss to surface water.
* Practices that reduce potential P loss include buffers and/or filter strips to reduce sediment-bound P delivery, managing crop residues, applying erosion control practices, limiting manure application to selected portions of fields that are flatter, less erosive or further from surface water, reducing application rates and/or and improving pasture stands.
* Manure or organic by-products shall not be applied more than 30 days prior to planting the crop or forages breaking dormancy, nor within 90 (vegetable in contact with soil) 120 days (no contact with soil) of harvest of crops for human consumption.
* For animal manure applications, soil zinc (Zn) and copper (Cu) content shall be monitored. When concentrations of these metals approach excessive levels, alternative crop sites for application of manure are advised. Soil pH should be maintained at 6.0 (or higher) to limit Zn or Cu availability.
* Importantly, recent NCSU research indicates that acutely acidic soil conditions contribute to high levels of water solubility of soil P reactive products when organic waste P is applied. Thus, when soil tests show that pH is below soil target pH and lime is recommended, soils should be limed to increase soil pH to soil target levels (as per soil test report) prior to application of organic waste materials.

Additional management considerations for specific resource concerns:

* Where air quality is a concern, any component(s) of nutrient management identified by risk assessment fools as a potential source of atmospheric pollutants shall be adjusted, as necessary to minimize the loss(es).
* When tillage can be performed, incorporate manure within 24 hours of application
* Apply poultry litter or other dry types of animal manures when potential for wind-driven loss is low.
* Consider induced nutrient imbalances due to excessive levels of fertilizer application.
* Consider complementing or enhancing nutrient management by relieving moisture stress in crops through irrigation, promoting infiltration, reducing surface runoff and recycling residual N by cover cropping.
* Alternative application methods and timing that reduce risk of nutrient loss to ground and surface water include split N applications, banding P near the seed row, delaying application of nutrients (in any form) if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.
* Observe minimum application setback distances from environmentally sensitive areas such as wells, gullies, ditches, etc.
* Avoid application of manures upwind of occupied structure when residents are likely to be home.

Operation and Maintenance: The landowner is responsible for the safe operation and maintenance of the practice including all equipment. The producer is encouraged to review the plan annually and make adjustments and modifications as needed. The producer is responsible for protection of fertilizer and organic materials storage facilities, proper calibration of application equipment to ensure uniform distribution material at planned rates, maintain records to document plan implementation for five years (see plans and specs for items), protection of workers from fertilizer materials of any kind, disposal of material generated by the cleaning of nutrient application equipment and disposal or recycling of nutrient containers (according to state or local regulations).

Practice financing (2014):

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| Practice | Component | Unit | Practice Rate NC/SC |
| Nutrient Management | Basic/Variable Rate Nutrient Management System | Each | $12.22/17.39 |
| Nutrient Management | Basic/Variable Rate Nutrient Management System HU\* | Each | $14.86/20.86 |
| Nutrient Management\*\* | Basic Organic Nutrient Management System | Acre | $22.57 |
| Nutrient Management\*\* | Basic Organic Nutrient Management System HU | Acre | $27.08 |
| Nutrient Management\*\* | Diversified Specialty Crop Farm Nutrient Management Plan  | Each | $326.85 |
| Nutrient Management\*\* | Diversified Specialty Crop Farm Nutrient Management Plan HU | Each | $392.22 |

\*HU = Historically Underserved and Beginning Farmer Rates

\*\*NC only