



**ANNUAL NUTRIENT BUDGET/MANAGEMENT PLAN INSTRUCTIONS*****General Instructions***

- ◆ Soil testing, fertilizer/manure application rate timing and methods, and nutrient budget formulation must meet all NRD, state, local or federal rules and regulations, and Standard 590 “Nutrient Management” criteria
  - ◆ A separate nutrient budget and soil test is usually needed whenever any of the following exist:
    - Soil tests are significantly different (each soil test should never represent an area greater than 40 acres).
    - Different crop will be planted (i.e. corn, wheat, sorghum, etc.)
    - Different realistic yield goals (yield monitor data may be averaged if appropriate)
    - Different previous crop (legume N credit)
    - Different manure and fertilizer history (past year applications)
    - Irrigation water management practices that leached Nitrogen (i.e. upper, middle and lower end of a gravity irrigated field)
    - Any other significant differences in soils or landscape position that affect nutrients recommended (i.e. soil organic matter, soil texture, bottomland versus upland)
1. ***Crop Information***
    - ◆ Planned and previous crop
    - ◆ Realistic yield based on a five-year average plus 5% (For example, if the five-year average is 100 bushels, a realistic yield would be 105 bushels).
    - ◆ Actual Crop Yield (in bushels, pounds, or tons per acre)
    - ◆ Any other appropriate cropping information can be listed
  2. ***Soil Properties***
    - ◆ Record predominant soil map unit, slope and texture
    - ◆ Soil test data from current soil test for pH, buffer pH, organic matter or any other appropriate soil properties, such as EC, etc.
  3. ***Soil Testing Methods:***
    - ◆ It is important to use the appropriate test method based on soil properties (refer to the appropriate NebGuides(s)/Extension Circulars to determine the appropriate test method). List methods for individual nutrients i.e. Bray P1 for Phosphorus, etc.
  4. ***Soil Testing requirements:***
    - ◆ Record values in ppm and depth from a current soil test.
    - ◆ Record the residual nutrients in pounds per acre
    - ◆ Soil test values (surface) for all nutrients (other than nitrates), organic matter and pH must be no older than three years and taken during the same time of the year (in subsequent years) to determine trends.
    - ◆ Guidelines for number of samples, methods of sampling, depth of samples and other guidelines for surface soil sampling and deep nitrate sampling can be found in Neb-Guide G91-1000-A “Guidelines for Soil Sampling”.
    - ◆ General guidelines for deep nitrate soil tests are as follows (All NRD and/or state requirements must be followed):
      - When nitrate nitrogen soil test results are used in a nutrient budget they must be from a current year test. Organic matter from a surface soil test must be known.
      - Nitrate values in ppm shall be listed for each depth sampled in the notes section (item 10). Record a weighted average nitrate value in ppm for the entire profile in this section.
      - Deep nitrate sampling depths will never be less than 2 feet, and taken as close as possible to fertilizer/manure application. Nitrate tests on sandy soils must be taken in the same season that the crop is planted or during the early growing season (i.e. spring for corn, fall for winter wheat). If NRD and/or state requirements on timing and sampling depths are more restrictive they must be adhered to.

- University of Nebraska nitrogen recommendations for corn and sorghum are based on a 48-inch sampling depth and on a 36-inch depth for most other crops. When depth of sampling is less than this, an appropriate estimated value can be used below the sampling depth. In most situations a value of 3 ppm (low value) or greater will be used for an assumed nitrate value.
- ◆ Deep nitrate soil tests are required annually whenever N fertilizer or manure will be applied with the following exceptions and guidelines (*When NRD and/or state regulations require deep nitrate tests the following exceptions do not apply*):
  - *Non-legume crops following annual or biennial legumes ( i.e. corn following soybeans/edible beans/sweetclover)* – Deep nitrate tests are required whenever nitrates may be elevated due to manure being applied in the past, drought, previous crop was hailed out, or any other reason that nitrate levels may vary. If the conditions above do not apply, nitrogen was applied according to Standard 590 criteria last year, and deep nitrate soil test values from two years ago were not elevated (i.e. nitrate tests were in the low category following soybeans/edible beans) a deep nitrate test is not needed.
  - *Non-legume crops following alfalfa or other perennial legume (i.e. corn following alfalfa)*: Deep nitrate tests are not necessary unless there is a reason to believe they are elevated (i.e. manure history, past nitrogen fertilizer application, etc.).
  - *Pastures/CRP* – Deep nitrate tests are not necessary unless there is a reason to believe they are elevated (i.e. manure history, past nitrogen fertilizer application, etc.). Refer to current NebGuide G78-406-A “Fertilizing Grass Pastures and Haylands”.
  - Deep nitrate tests are not required when 20 pounds or less of N via. starter fertilizer will be applied
  - When deep nitrate tests are not taken, an assumed value of at least 3-ppm for residual nitrate values will be used in the nutrient budget in addition to appropriate N-credits when following legumes.
- 5. ***Crop Nutrient Requirements (lbs/ac)*** (refer University of Nebraska Extension EC 01-155-S “Nutrient Management for Agronomic Crops in Nebraska” or current NebGuides for nutrient recommendations for specific crops):
  - ◆ Record nitrogen recommendations based on University of Nebraska recommendations in pounds/acre based on nitrate soil test values prior to subtracting nitrogen credits (soil-testing labs can provide UNL recommendations on request).
  - ◆ Record recommendations for nutrients other than N in pounds/acre based on guidelines in the 590 Nutrient Management Standard.
- 6. ***Soil test residual N Credit (corn only)***
  - ◆ Record the residual nutrients in pounds per acre based on soil test results from item number 4.
- 7. ***Soil Organic Matter N Credit (corn only)***
  - ◆ Record the N credit for organic matter based on the algorithm in Nebraska Conservation Planning Sheet 11 or in NebGuide G174.  
Soil organic matter N credit =  $(0.14 \times \text{Expected Yield} \times \% \text{ Organic Matter})$
- 8. ***Irrigation Water N Credit:***
  - ◆ Analyze irrigation water for nitrate content during the irrigation season.
  - ◆ Credit N in irrigation water based on a prior years nitrate test taken during the irrigation season when nitrate concentration is 10 ppm or greater.
  - ◆ N is credited based on normal seasonal application rates during the growing season (prior to milk stage for grain crops), or as follows: 6" (east), 9" (central), 12" (west), or 15" (panhandle).
  - ◆ Pounds of N/acre credited =  $(\text{inches pumped} \times \text{ppm nitrate} \times 2.7) \div 12$ .
  - ◆ Nebraska Conservation Planning Sheet 11 “Nutrient Management” contains an example chart listing pounds of N/acre credited based upon water application rate and ppm N content of water.
- 9. ***Legume N Credit (previous years crop):***
  - ◆ Pounds of N credited are based on Nebraska Conservation Planning Sheet 11, values in the University of Nebraska “Soil Test Program”, or current Neb Guides/Extension Circulars.
- 10. ***Manure N Credit:***

- ◆ Record type and quantity in tons/gallons/acre-inches/acre applied from one to three years ago.
- ◆ Analyze manure for nitrate and P<sub>2</sub>O<sub>5</sub> content (refer to Neb-Guide G02-1450-A “Sampling Manure for Nutrient Analysis”).
- ◆ Record pounds of organic Nitrogen credited from prior year manure applications (refer to Neb-Guide G97-1335A “Determining Crop Available Nutrients from Manure”).

**11. Nutrient Recommendation(after N credits):**

- ◆ Record nutrients recommended in pounds/acre after subtracting N credits

**12. Nitrate Values for each sample depth/Notes/recommendations:**

- ◆ Record nitrate values in ppm for each sample depth, if an assumed value is used (i.e. 3 ppm below depth sampled) record that as well
- ◆ Record background information such as considerations used for form, timing, and placement of nutrients, calculations for manure credits, manure loads, lime recommendations, additional background information, or the basis for adaptations/adjustments made.

**13. Recommended/Planned Nutrient Application(form, method, timing and rate):**

- ◆ Record formulation/type of fertilizer/manure source (i.e. 82-0-0 for anhydrous, 10-34-0 for starter, type of manure), rate per acre of each nutrient source (lbs/gallons/tons/acre inches per acre), timing/method of application, pounds/acre of each nutrient by nutrient source, leaching potential, total nutrient applied per acre from all sources, and whether an inhibitor was used or not.
- ◆ To determine the pounds of each nutrient credited from current year/planned manure applications (refer to Neb-Guide G97-1335A “Determining Crop Available Nutrients from Manure”).
- ◆ Leaching Potential for inorganic sources of Nitrogen based on soil texture and timing of application

Timing of Application	Soil Texture		
	Coarse	Medium	Fine
Fall Application	High	Medium-Low	Low
Spring Application, Pre-plant	High-Medium	Medium-Low	Low
Sidedress or Split Application	Medium-Low	Low	Low

- This table provides an indication of leaching potential of inorganic sources of nitrogen. It is based on soil texture and application timing. It is used to make appropriate management adjustments (i.e. timing, method, N-inhibitor, and formulation of manure/fertilizer applied) to avoid excessive leaching losses of nitrogen. Fall applications of inorganic nitrogen should be avoided when leaching potential is high (exception when winter annual crops/cover crops such as winter wheat or rye are planted).
- Organic sources of nitrogen that convert to nitrate nitrogen prior to the growing season also apply to this table (i.e. organic N from manure that is applied during the summer fallow preceding a spring planted crop).
- Coarse texture (sand, loamy sand, sandy loam); medium texture (silt, silt loam, loam); fine texture (silty clay loam, silty clay, clay, clay loam, sandy clay loam, sandy clay).
- Fall applications should occur when soil temperatures are 50 degrees or less, or a nitrification (N) inhibitor is advised.

**14. Actual Fertilizer/Manure Application (lbs/ac, tons/acre, etc.):**

- ◆ Record the actual rate per acre of each nutrient source applied, rate per acre of each nutrient source (lbs/gallons/tons/acre inches per acre), total nutrient applied per acre from all sources, and whether an inhibitor was used or not.

**References**

Nutrient Management (590) Standard and Appendices, Nebraska Field Office Technical Guide, Section IV, USDA NRCS

UNL Neb-guides and Extension Circulars are located and can be ordered at <http://www.ianr.unl.edu/pubs/>

UNL Soil Test Computer Program is located on NRCS Field Office computers at

C:/eng/IRRIGATION/SoilTest/soilsmenu.exe

UNL spreadsheets can be accessed through the Nebraska NRCS homepage by clicking on field office tech guide, Section IV, Tools at [http://www.ne.nrcs.usda.gov/techresources/eFOTG\\_Index](http://www.ne.nrcs.usda.gov/techresources/eFOTG_Index) this will provide a direct link to UNL websites.

Nebraska Conservation Planning Sheet 11 “Nutrient Management is available at NRCS field offices