United States Department of Agriculture

Conservation Enhancement Activity

E590118Z

CONSERVATION STEWARDSHIP PROGRAM

Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water

Conservation Practice 590: Nutrient Management

APPLICABLE LAND USE: Crop (annual & mixed); Crop (perennial)

RESOURCE CONCERN ADDRESSED: Water Quality Degradation

ENHANCEMENT LIFE SPAN: 1 year

Enhancement Description

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

Criteria

- Documentation of producer's record of nutrient management meeting all NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.
- For Nitrogen, Phosphorus, and Potassium (N-P-K), rates of application are to be agronomic application rate (based on soil test and yield goal).
- Minimize soil surface disturbance during fertilizer placement.
- **Utilize two or more nutrient use efficiency strategies or technologies** to reduce nutrient loss risk and improve nutrient use efficiency. Select two or more of the strategies and technologies below:

- Use Enhanced Efficiency Fertilizer (EEF) products with 1 or more nutrient applications.
  - Nitrogen or phosphorous EEF products recommended by state Land Grant University (LGU) and concurred with by NRCS on all treatment acres to supply at least 50% of the pre-emergent and early post emergent LGU recommended nitrogen or phosphorous requirements for the crop(s) grown.
- Use in-season soil nitrate sampling.
  - Use pre-sidedress soil nitrate test (PSNT) to determine the need and/or amount of additional nitrogen to be applied during sidedress/topdress N application. Conduct a PSNT on a selected crop (e.g. corn) to test if additional N fertilizer is needed.
- Use in-season plant tissue sampling and analysis as a complement to soil testing.
  - Follow local LGU and/or laboratory guidelines for interpretations of the results and appropriate adjustments in the application of N and other nutrients. *End of season stalk nitrate testing is not applicable if the enhancement is only contracted for one year, as results must be used to evaluate and adjust nutrient management in the following year, as needed.*
- Split nutrient applications.
  - Apply no more than 50% of total crop nitrogen needs within 30 days prior to planting (or in the case of hay or pasture after green up of dormant grasses). Apply the remaining nitrogen after crop emergence (or green up).
  - Post emergent nitrogen may be reduced based on crop scouting, in-season soil sampling/analysis, or plant tissue sampling/analysis.
- Time nutrient application timing to match nutrient uptake timing.
  - Apply nutrients no more than 30 days prior to planting date of annual crops.
- Nutrient application placement below soil surface.
  - Fertilizer is injected or incorporated at time of application.

Documentation and Implementation Requirements

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Participant will:

- ☐ Prior to implementation, provide documentation for review by NRCS showing a record of implementing nutrient management meeting all NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.
- ☐ Prior to implementation, develop and document a planned nutrient budget, yield goal, and applications (pounds/acre active ingredient, nutrients must include at a minimum N-P-K).
- ☐ Prior to implementation, select two or more of the nutrient use efficiency strategies or technologies. **Selections:**_____
- ☐ During implementation, keep records to document actual nutrient applications (pounds/acre active ingredient, nutrients must include at a minimum N-P-K).
- ☐ During implementation, minimize soil surface disturbance during fertilizer placement.
- ☐ During implementation, notify NRCS of any planned changes to verify the planned system meets the enhancement criteria.
- ☐ During implementation, additional record keeping requirements for specific strategy or technology:
    - o In-season soil nitrate sampling. Records and documentation must include results (including reference strips) and adjustments in nutrient management based on results.
    - o In-season plant tissue sampling and analysis. Records and documentation must include type of test used (stalk, leaf, chlorophyll, infrared, or other plant tissue), results (including reference strips), and adjustments in nutrient management based on results.
    - o Nutrient application placement below soil surface. Records and documentation must include method of injection or incorporation and depth.
- ☐ After implementation, make documentation and records available for review by NRCS to verify implementation of the enhancement.

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NRCS will:

- ☐ As needed, provide technical assistance to meet the criteria of the enhancement.
- ☐ Prior to implementation, provide and explain NRCS Conservation Practice Standard Nutrient Management (CPS 590) as it relates to implementing this enhancement.
- ☐ Prior to implementation, review documentation to verify a record of implementing nutrient management meeting all NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.
- ☐ Prior to implementation, verify the development of a planned nutrient budget, yield goal, and planned nutrient applications.
- ☐ Prior to implementation, verify the selection of two or more nutrient use efficiency strategies or technologies.
- ☐ During implementation, evaluate any planned changes to verify the planned system meets the enhancement criteria.
- ☐ After implementation, review documentation and records to verify implementation of the enhancement.

NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

Participant Name _____ Contract Number _____

Total Amount Applied _____ Fiscal Year Completed _____

_____ _____

NRCS Technical Adequacy Signature Date

USDA United States Department of Agriculture

IOWA SUPPLEMENT TO

CONSERVATION ENHANCEMENT ACTIVITY

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Additional Criteria for Iowa

- Enhanced Efficiency Fertilizers that work in Iowa:
    - Only products that have been adequately tested under agronomic conditions and their efficacy has been concurred with by ISU can be used for this enhancement. Use an agronomically appropriate nitrification inhibitor product containing nitrapyrin or Dicyandiamide (DCD), urease inhibitor product containing N-(n-butyl) thiophosphoric triamide (NBPT), or a polymer coated urea. "Nitrification inhibitors are most useful with preplant nitrogen application on sandy (excessively drained) soils prone to leaching or with fall nitrogen application on poorly drained soils subject to denitrification." Urease inhibitors may reduce volatilization of urea fertilizers "surface applied to high residue or high pH soils, and when a substantial rainfall or irrigation event is unlikely for several days after application." (Source: Agricultural Nitrogen Management for Water Quality Management in the Midwest, 2006). Polymer coated urea (ESN was the product tested) has shown some promise with corn. No phosphorus EEF products are approved for this enhancement.
- In-season soil nitrate test
    - Use Iowa State University's late Spring soil nitrate test as the in-season soil nitrate test as described in ISU publication CROP 3140: Use of the Late-Spring Soil Nitrate Test in Iowa Corn Production.
- In-season plant tissue tests

  - Use Iowa State University's publication PM2026: Sensing Nitrogen Stress in Corn for in-season leaf testing and nitrogen analysis.

- Split nitrogen applications: Post emergent nitrogen
  - Use Iowa State University's late Spring soil nitrate test as the in-season soil nitrate test as described in ISU publication CROP 3140: Use of the Late-Spring Soil Nitrate Test in Iowa Corn Production or
  - Use Iowa State University's publication PM 2026: Sensing Nitrogen Stress in Corn for in-season leaf testing and nitrogen analysis.
- Time nutrient application
  - Applies only to nitrogen, not P nor K.

Additional Documentation Requirements for Iowa

- Complete the Iowa Nutrient Management (590) Conservation Practice Standard Job Sheet or provide equivalent documentation from existing records.