

# Minnesota Ecological Science Job Approval Authority Fact Sheet

## Nutrient Management (590)

**DEFINITION:**

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.



**ESJAA INFORMATION:**

Job Classes	Control Factors
	Nutrients
Job Class I	Commercial Fertilizer Only
Job Class II	Commercial Fertilizer, Manure, compost, and other organic nutrient sources
Job Class III	Precision ag. Technology
Job Class IV	All

**CONTROL FACTORS:**

The controlling factor is based on nutrient source.

**KNOWLEDGE, SKILLS, AND ABILITIES (KSA):**

1. Knowledge of State's Crops and Cropping Systems
2. Knowledge of Soil Health and Management
3. Ability to use Current Wind and Water Erosion Prediction Tools
4. Knowledge of Tillage Systems used in the State
5. Knowledge of Synthetic Fertilizers and Analysis
6. Knowledge of Manure Characteristics and Nutrient Values
7. Completion of the Nutrient Management Planning Course
8. Ability to Perform Nitrogen and Phosphorus Risk Assessments

**Minnesota KNOWLEDGE, SKILLS, AND ABILITIES (KSA) needed:**

**Inventory and Evaluation (I&E) Planning**

***Job Class I***

- Read & understand the 590 Standard, Implementation Requirements (IR), and Statement of Work.
- Complete MNC3 Nutrient Management Course Modules 20 and 21.
- Understand and can explain the 4R concepts associated with Nutrient Management.
- Understand University of Minnesota fertilizer guidelines and soil sampling protocols.
- Understand Soil and Source Testing for Nutrient Management (CEMA 217), different soil sampling methods, frequency and number of required samples per acre.
- Understand fertilizer analysis for N, P, & K sources.
- Understand the use of Enhanced Efficiency Fertilizers (EEF).
- Understand C:N ratios of residue and impacts on nutrient availability.
- Understand soil pH and how it impacts crop growth and nutrient availability.
- Knowledge of sensitive features common for geographic region.
- Knowledge of offsite water quality resource concerns caused by loss of nutrients.
- Understand Minnesota’s water quality issues and hypoxia issues.

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# **Minnesota Ecological Science Job Approval Authority Fact Sheet**

## **Inventory and Evaluation (I&E) Planning cont.**

### ***Job Class II***

- Understanding manure used in Minnesota (i.e., sources, storage methods, analysis, volatilization factors, availability factors, application methods) and University of Minnesota recommendations.
- Knowledge of how to sample manure and sample frequency (solids and liquids).

### ***Job Class III***

- Knowledge of creating in-field zones.
- Knowledge of grid soil sampling techniques.
- Knowledge of precision nutrient application equipment and capabilities.
- Understanding of 590 practice specification document entitled 590 MN Precision NM PS in FOTG.

## **Design and Development**

### ***Job Class I***

- Complete MNC3 Nutrient Management Course Modules 1-19.
- Ability to formulate fertilizer recommendations.
- Ability to review soil samples from certified labs.
- Ability to ensure field budgets (planned & applied) follow University of Minnesota Nutrient Recommendations.
- Ability to make nutrient recommendations to mitigate impacts to sensitive features.
- Ability to adjust fertilizer timing & rate based on C:N ratios of residue & interactions with conservation practices.
- Ability to integrate University of Minnesota recommended strategies for Enhanced Efficiency Fertilizers.
- Ability to determine nitrogen rates using the maximum return to nitrogen value (MRTN).
- Ability to inventory N, P, & K applications from commercial sources (e.g., anhydrous, starter, side dress, broadcast, banding, fall app, spring app, etc.) and rotational crop effects utilized in the cropping system.
- Ability to use the Minnesota Phosphorus Index assessment tool and associated tables.
- Ability to write and/or complete a technical review of a Nutrient Management plan (DIA 157) that uses commercial fertilizer sources.

### ***Job Class II***

- Ability to inventory N, P, & K applications from all nutrient sources (e.g., manure, anhydrous, starter, side dress, broadcast, banding, fall app, spring app, etc.) and rotational crop effects utilized in the cropping system.
- Ability to review and understand manure samples from certified labs.
- Ability to calculate first and second-year manure credits.
- Ability to ensure field budgets (planned & applied) follow University of Minnesota Nutrient Recommendations.
- Ability to write and/or complete a technical review of a Comprehensive Nutrient Management Plan (CPA 102/DIA 101) that uses manure and/or commercial sources.

### ***Job Class III***

- Typically, do not have access to technology or software needed to get design JAA for Job Class 3.
- Certified Crop Adviser and/or have the skills and ability to create prescription recommendations with precision technology.

# Minnesota Ecological Science Job Approval Authority Fact Sheet

## Installation Oversight and Certification

### **Job Class I**

- Complete an administrative review of a Nutrient Management Component Plan (DIA 157) that uses commercial fertilizer sources.
- Knowledge of Minnesota Nitrogen Law.
- Knowledge of Minnesota Fertilizer Law.

### **Job Class II**

- Complete an administrative review of a Nutrient Management Component Plan (CPA 102/DIA 101) that uses manure fertilizer sources.
- Knowledge of Minnesota Animal Feedlot (Chapter 7020) rules.

### **Job Class III**

- Complete a **technical** review of a Precision Nutrient Management Component Plan that uses commercial and/or manure fertilizer sources. (590 Precision Nutrient Application, E590B)

## **COMMON ASSOCIATED PRACTICES:**

Nutrient Management (590) is commonly applied with Soil and Source Testing for Nutrient Management (CEMA 217) and other conservation practices needed to mitigate soil erosion and nutrient runoff.

## **ADDITIONAL MATERIALS:**

- [Association of American Plant Food Control Officials \(AAPFCO\)](#). 2011. AAPFCO Official Publication no. 64. AAPFCO Inc., Little Rock, AR.
- Follett, R.F. 2001. [Nitrogen transformation and transport processes. In Nitrogen in the environment; sources, problems, and solutions](#), (eds.) R.F. Follett and J. Hatfield, pp. 17-44. Elsevier Science Publishers. The Netherlands. 520 pp.
- Schepers, J.S., and W.R. Ruan, (eds.) 2008. [Nitrogen in agricultural systems. Agron. Monogr. no. 49](#), American Society of Agronomy (ASA), Crop Science Society of America (CSSA), Soil Science Society of America (SSSA). Madison, WI
- Sims, J.T. (ed.) 2005. [Phosphorus: Agriculture and the environment. Agron. Monogr. no. 46](#). ASA, CSSA, and SSSA, Madison, WI.
- Stevenson, F.J. (ed.) 1982. [Nitrogen in agricultural soils. Agron. Series 22](#). ASA, CSSA, and SSSA, Madison, WI.
- US Department of Agriculture, Natural Resources Conservation Service. 2012. [Title 190, General Manual, \(GM\), Part 402, Nutrient Management](#). Washington, DC
- US Department of Agriculture, Natural Resources Conservation Service. 2017, [Title 190, National Instruction \(NI\), Part 313, 1st Edition, Amendment 20, Nutrient Management Policy Implementation](#). Washington, DC
- Minnesota Pollution Control Agency (MPCA) [Authorization to Construct and Operate a Concentrated Animal Feeding Operation under the National Pollinate Discharge Elimination System Permit \(NPDES\)/State Disposal System \(SDS\) Permit](#) wq-f3-38 February 1, 2011

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